



Turbine Flowmeter for Saturated Steam
OVAL TURBO STEAM METER
Mini: GSM Standard: GSH, GSV

GENERAL SPECIFICATION
GS.No.GBT301E-1

■ GENERAL

This Turbo Steam Meter is specifically designed and built for the measurements of saturated steam consumption at the end of steam line and is capable of directly indicating the total consumption in kilograms over a wide range.

When coupled to a pulse generator, it also makes remote total count obtainable. In view of today's increasing steam cost, this instrument will contribute to attaining significant energy saving through reasonable measurement management.

■ FEATURES

1. Wide flow range and high measuring accuracy.
2. By exchanging the flow diverter nozzle, flow range can be changed without removing the meter from pipe line.
3. Meter count can be seen locally, and output signal for remote totalization is available too.
4. Manual pressure adjusting device or Automatic Pressure Compensator (APC) is optionally available for actual readout.
5. Robust and simple configuration makes the maintenance easier.



GSM type
(Horizontal mount)



GSH type
(Horizontal mount)



GSV type
(Vertical mount)

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■ FLOW RANGE

● Mini Type (GSM)

Unit: kg/h

Steam pressure MPa [gauge]	No. of diverter nozzle		
	1	2	3
0.03	30 to 100	15 to 50	7.5 to 25
0.05	32 to 105	16 to 53	8 to 27
0.1	36 to 120	18 to 60	9 to 30
0.2	43 to 145	22 to 72	11 to 36
0.3	50 to 165	25 to 83	12 to 41
0.4	55 to 183	27 to 92	14 to 46
0.49	60 to 200	30 to 100	15 to 50
0.59	64 to 215	32 to 107	16 to 54
0.69	69 to 229	34 to 115	17 to 57
0.78	73 to 242	36 to 121	18 to 61
0.88	76 to 255	38 to 127	19 to 64
0.98	80 to 266	40 to 133	20 to 67

※: With the built-in flow diverter nozzle, flow range of Mini type can be changed.
Table left shows the flow range per each diverter nozzle to each pressure of saturated steam.

※: All No. 1, 2, and 3 diverter nozzles are provided with the meter. A No. 1 diverter nozzle will be installed at the time of delivery. Replace the nozzle according to the desired flow rate if necessary.

● Standard Type (GSH, GSV)

Flow range of standard type (GSH, GSV) can be changed depending on the orifice plate inserted in the main pipe of meter body even with same nominal size. Table below shows the flow range per each orifice plate to each pressure of saturated steam.

Unit: kg/h

Steam Pres. MPa	Norm. size Orifice No. Service Condition	50mm (2")						80mm (3")						100mm (4")					
		No.1		No.2		No.3		No.1		No.2		No.3		No.1		No.2		No.3	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
0.05		166	605	83	449	41	222	339	1580	170	917	84	458	678	2461	339	1831	169	916
0.10		190	788	95	637	47	315	381	2021	190	1273	95	637	762	3147	381	2553	190	1277
0.20		229	1143	114	826	57	340	460	2940	230	1725	115	863	919	4588	459	3448	229	1724
0.29		262	1498	131	985	65	444	525	3841	262	1970	131	985	1050	5989	525	3940	262	1970
0.39		290	1840	145	1090	72	545	583	4375	291	2188	145	1094	1166	7381	583	4373	291	2187
0.49		317	2187	158	1190	79	595	635	4765	317	2383	158	1192	1270	8751	635	4763	317	2382
0.59		340	2521	170	1278	85	639	682	5115	341	2558	170	1279	1362	10084	681	5110	340	2555
0.69		363	2725	181	1363	90	682	727	5454	363	2728	181	1364	1454	10910	727	5455	363	2728
0.78		384	2880	192	1440	96	720	769	5770	384	2885	192	1443	1538	11535	769	5768	384	2884
0.88		404	3030	202	1515	101	758	808	6065	404	3033	202	1517	1616	12125	808	6063	404	3032
0.98		422	3170	211	1585	105	793	846	6345	423	3173	211	1587	1691	12685	845	6343	422	3172

※: Guaranteed accuracy is should be within $\pm 2\%$ of RD in from 1.5 times of min. flow rate to max. flow rate; within -4% to $+2\%$ in from min. flow rate to 1.5 times of min. flow rate.

※: Instantaneous flow rate up to 1.2 times the max. flow rate would not cause abrasion damages.

※: Select the proper orifice plate No. so that the nominal flow rate is 70% of the max. flow rate.

※: Upon your advice of required flow rate, orifice with proper No. is furnished on the meter when delivered. Other No. orifice plates are not provided.

■ PRODUCT CODE EXPLANATION

● Mini Type (GSM)

Item	Code No.										Description	
	①	②	③	④	⑤	⑥	⑦	—	⑧	⑨		⑩
Model	G	S										OVAL TURBO STEAM METER
Installation	M											Horizontal mount (Mini type)
Nominal size		0	3									25mm (1")
					0							Always 0
Material						B	—					FC250
Readout								1				Direct coupled counter
								A				Direct coupled counter with pulse generator
Pressure Compensation								M				Manual adjusting device
								P				Automatic Press. Compensator
Range of APC									0			None
									1	0		to 0.22MPa
									2	0.1		to 0.51MPa
									3	0.2		to 0.83MPa
									4	0.44		to 0.98MPa

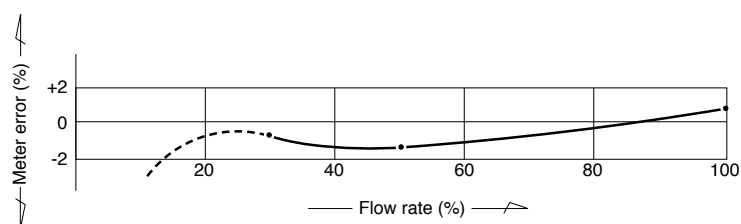
● Standard Type (GSH, GSV)

Item	Code No.										Description	
	①	②	③	④	⑤	⑥	⑦	—	⑧	⑨		⑩
Model	G	S										OVAL TURBO STEAM METER
Installation		H										Horizontal mount
		V										Vertical mount
Nominal size			0	5								50mm (2")
			0	8								80mm (3")
			1	0								100mm (4")
Orifice Plate					1							No.1
					2							No.2
					3							No.3
Material of Meter Body			B		—							FC250
Read out								1				Direct coupled counter
								A				Direct coupled counter with pulse generator
Pressure Compensation									M			Manual adjusting device
									P			Automatic Press. Compensator
Range of APC									0			None
									1			0 to 0.22MPa
									2			0.1 to 0.51MPa
									3			0.2 to 0.83MPa
									4			0.44 to 0.98MPa

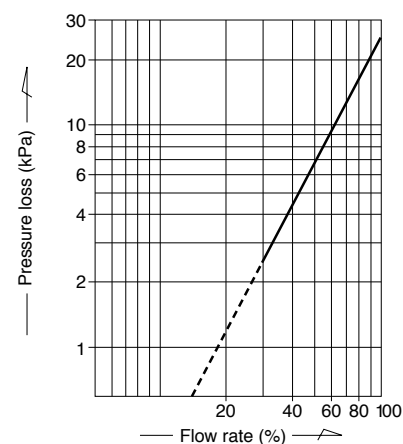
■ PERFORMANCE CHARACTERISTICS

● Mini Type (GSM)

● Meter Error



● Pressure Loss

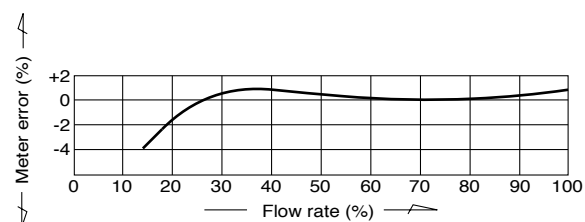


※: Data in the condition of 0.49MPa saturated steam is shown.

※: 100% flow rate indicates the maximum flow rate with respective diverter nozzles.

● Standard Type (GSH, GSV)

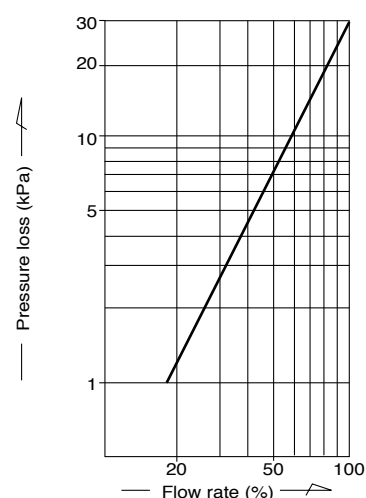
● Meter Error



※: Data in the condition of 0.49MPa saturated steam is shown.

※: 100% flow rate indicates the maximum flow rate with respective diverter nozzles.

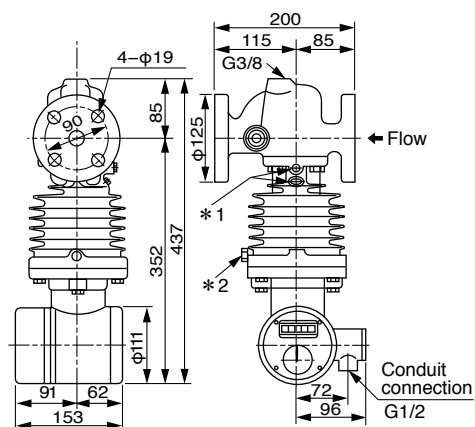
● Pressure Loss



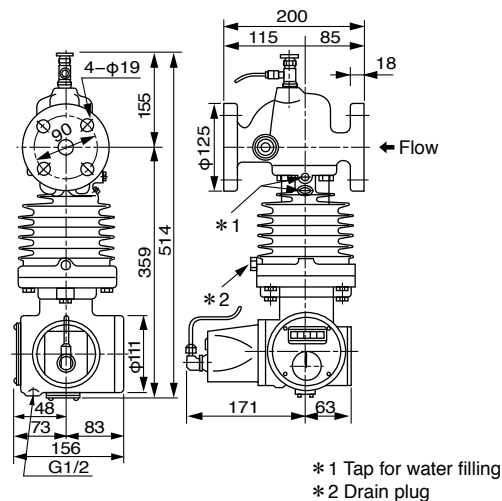
■ OUTLINE DIMENSIONS (Unit: mm)

● Mini Type (GSM)

● Manual Pressure Adjustment Version



● Automatic Pressure Compensation Version

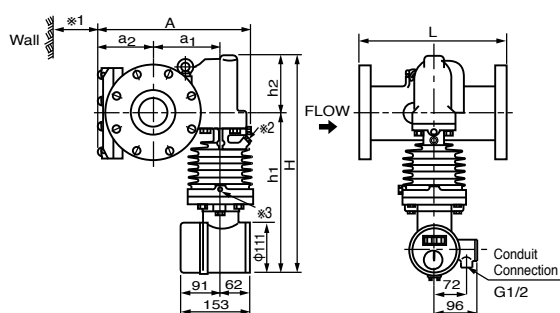


* 1 Tap for water filling
* 2 Drain plug

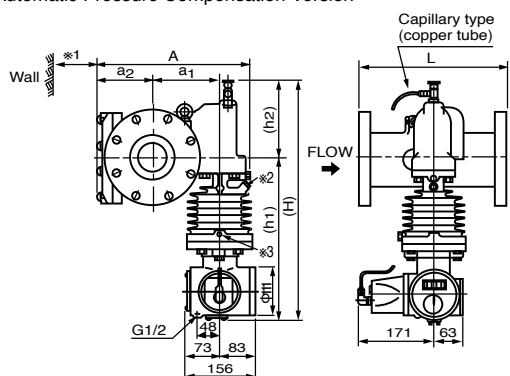
■ OUTLINE DIMENSIONS (Unit: mm)

● HORIZONTAL MOUNT TYPE (H TYPE)

Manual Pressure Adjustment Version



Automatic Pressure Compensation Version



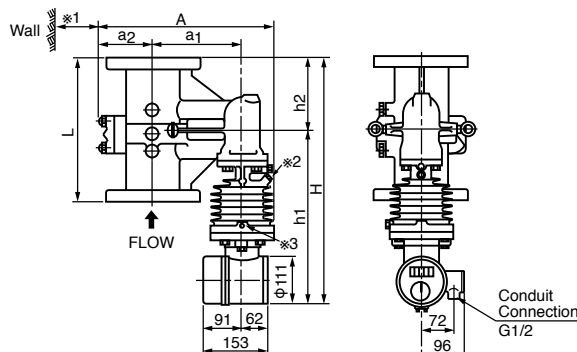
※1: It is necessary to keep distance of more than 200mm from wall surface for replacement of orifice plate

※2: Tap for water filling

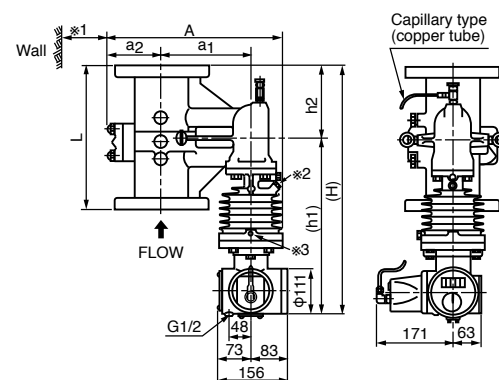
※3: Drain plug

● VERTICAL MOUNT TYPE (V TYPE)

Manual Pressure Adjustment Version



Automatic Pressure Compensation Version



Unit: mm

	Model	Size mm	Flange rating	L	h1 (h1)	h2 (h2)	H (H)	a1	a2	A	Max. Operating Pressure MPa	Hydraulic Test Pressure MPa	Weight kg
Horizontal Mount Type	GSH05 ¹ / ₂ B ₃	50 (2")	JIS 10K FF	320	355 (362)	127 (197)	482 (559)	120	113	303	0.98	1.96	34 (35)
	GSH08 ¹ / ₂ B ₃	80 (3")	JIS 10K FF	320	355 (362)	127 (197)	482 (559)	135	113	318	0.98	1.96	39 (40)
	GSH10 ¹ / ₂ B ₃	100 (4")	JIS 10K FF	320	355 (362)	127 (197)	482 (559)	145	123	338	0.98	1.96	43 (44)
Vertical Mount Type	GSV05 ¹ / ₂ B ₃	50 (2")	JIS 10K FF	320	400 (407)	160	560 (567)	190	113	373	0.98	1.96	35 (36)
	GSV08 ¹ / ₂ B ₃	80 (3")	JIS 10K FF	320	400 (407)	160	560 (567)	210	113	393	0.98	1.96	40 (41)
	GSV10 ¹ / ₂ B ₃	100 (4")	JIS 10K FF	320	400 (407)	160	560 (567)	225	123	418	0.98	1.96	45 (46)

Figures in brackets () indicate APC furnished version.

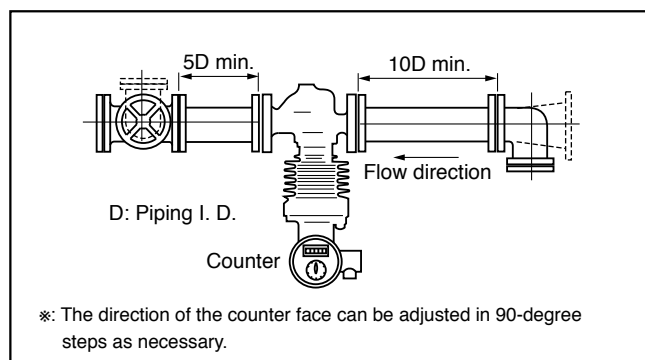
■ INSTALLATION

- **Mini Type (GSM): Horizontal only**
- **Standard (GSH, GSV): Horizontal or vertical**

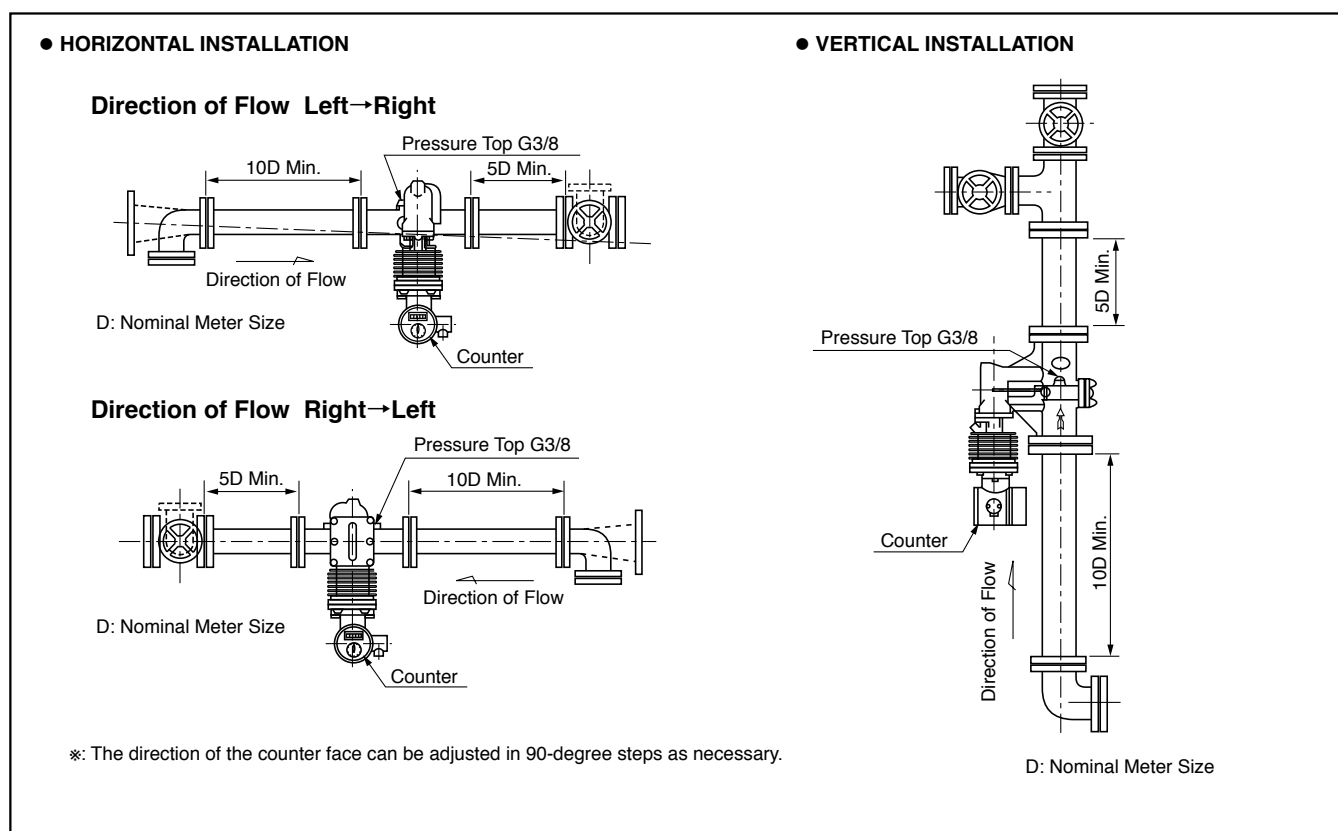
Straight pipe sections of 10D upstream of the meter and 5D downstream of the meter are required as minimum. This applies in piping with bypass lines also. Before starting operation, make sure to fill up the reduction gear chamber with clean antifreeze solution, particularly in winter time to avoid freezing. Suitable concentration of the antifreeze is described in the meter instruction manual.

Typical piping layout

- **Mini Type (GSM)**



- **Standard Type (GSH, GSV)**

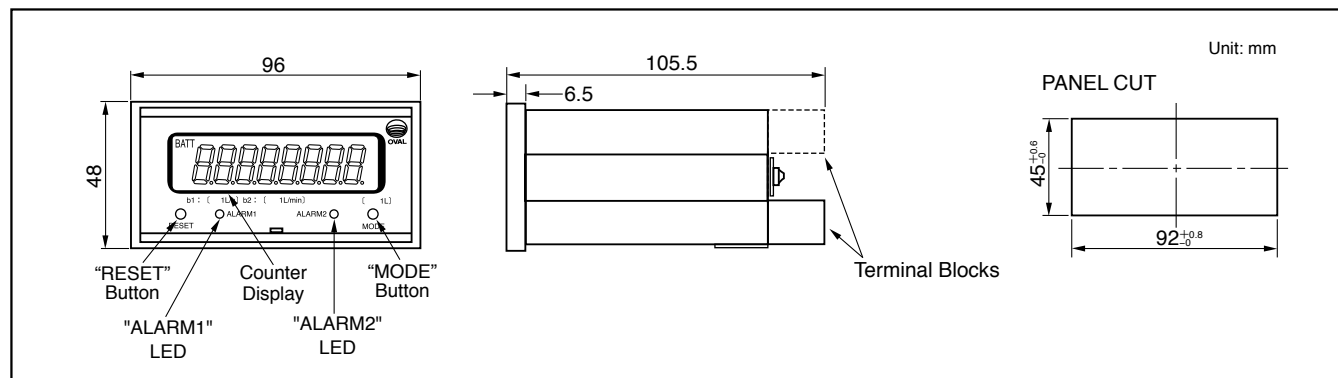


■ TOTALIZER

In case of the direct reading/remote reading type (A type), a pulse generator can be installed to the meter register and can be connected with a remote totalizing counter.

The remote totalizer counts 10 units per revolution of the pointer on the meter register.

Model	EL0122, EL0123	
Total flow	7 Digits	
Power supply	EL0122	85 to 264 VAC 50/60Hz
	EL0123	A built-in lithium battery Capacity: 3.6V 5.4 amp-hr. A connector coupled, dedicated battery (UM-3 size×2) "BATT" is displayed in case of voltage reduction Life: 4 years
Weight	Approx. 0.4kg (EL0122), Approx. 0.2kg (EL0123)	



※1: EL0123 (battery-powered) does not have alarm functions.

※ Instantaneous flow rate display of EL0123 will not function with the Turbo Steam Meter due to its very low pulse frequency. (Display remains at "0".)

※ See GS No. GED713 and 714 for the details.

■ PLEASE SUPPLY THE FOLLOWING INFORMATION WHEN YOU INQUIRE.

(Tick the boxes of your request and/or describe your requirements.)

1 Application			
2 Fluid	☐ Saturated steam ☐ Other ()		
3 Operating conditions	Min.	Nor.	Max.
(1) Flow range	kg/h	kg/h	kg/h
(2) Fluid temperature (Not required for saturated steam)	°C	°C	°C
(3) Fluid pressure	MPa [G]	MPa [G]	MPa [G]
4 Flow direction	Mini Type: ☐ R → L ☐ L → R Standard type: Horizontal (☐ R → L, ☐ L → R) ☐ Vertical (Bottom → Top)		
5 Remote totalization	☐ Required ☐ Not required		
6 Special note			

■ GENERAL SPECIFICATIONS

Item		Description			
Applicable fluid		Saturated steam			
Type		Mini (GSM)	Standard (GSH, GSV)		
Nominal size		25mm (1″)	50mm (2″)	80mm (3″)	100mm (4″)
Flow range		See flow range table on page 2			
Connection flange		JIS 10K FF			
Max. operating temperature		220°C (Counter: 60°C)			
Operating pressure range		0.03 to 0.98MPa	0.05 to 0.98MPa		
Accuracy		Within ±2% of RD	Within ±2% of RD or within -4% to +2% of RD (※1)		
Material		Body: FC250			
Counter reading	Display digit	5-digit			
	Min. digit unit	10kg	100kg	100kg	1000kg
	One pointer revolution	10kg	100kg	100kg	1000kg
	Min. reading	0.5kg	2kg	2kg	20kg
Output	Type	Contact pulse			
	Contact capacity	5VA			
	Duration	200 million times			
	Pulse unit	1kg/P	10kg/P	10kg/P	100kg/P
Electric conduit		G1/2 (female)			
Cable		2-conductor CVV or CVS; conductive area: 1.25 to 2.0mm ² (※2)			
Transmission distance		Max.1km (with conductive area 2.0mm ²) (※3)			
Pressure compensation		Manual adjusting device or Automatic Pressure Compensator (APC)			
Compensation range	APC	0 to 0.98MPa (4 sections)			(※4)
	Manual	0.03 to 0.98MPa			
Flow direction		R → L (std.), L → R	GSH: R → L, L → R GSV: Bottom → Top		
Mounting orientation		Horizontal	GSH: Horizontal GSV: Vertical		
Pressure loss		See page 3			
Configuration		Non-explosionproof; non-waterproof			
Finish color		Body: Munsell 10Y8.5/1 Silicone resin paint			
Weight		21kg approx.	See page 4		

(※1): See flow range table for the details.
(※2): Should inductive interferences be expected, use a vinyl sheathed isolation cable (CVVS) which can shut off electrostatic energy.
(※3): In case longer than 1km, consult OVAL.
(※4): See page 2 for the detail of the sections.

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