Yamatake-Honeywell **Specification**

Smart MagneW 3000
Electromagnetic Flowmeter (Integral Type)
Model KID10A/KIX20A (General Use)

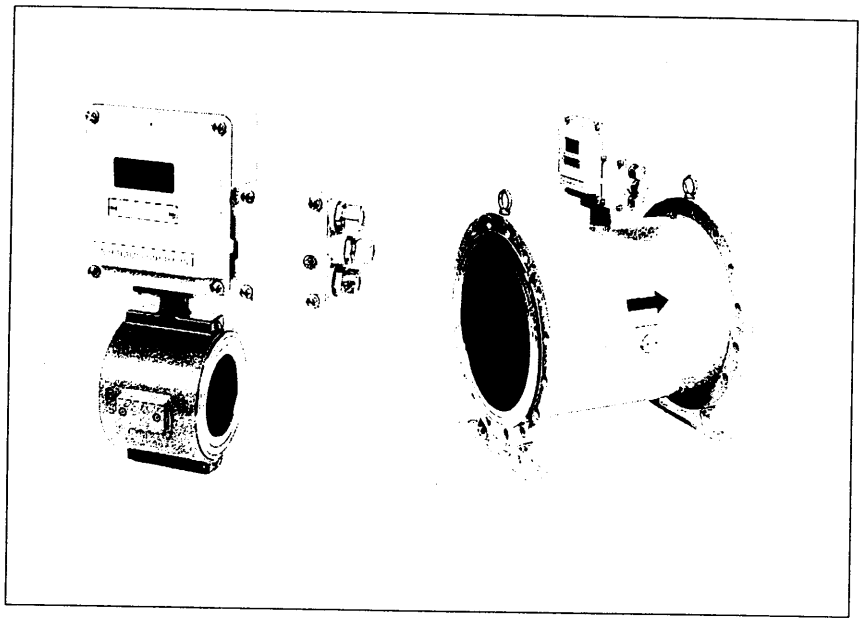
Introduction

Smart MagneW3000, incorporating a microprocessor, is an integral-type electromagnetic flowmeter allowing remote setting of parameters through the Smart Communicator (SFC).

Features

The outstanding features of the MagneW3000 are as follows:

1) By using Smart Communicator (SFC), communications are possible including calibration, setting, or self-diagnoses remotely.
2) Stabilized measurement can be realized for various fluid noise through application of digital signal processing technique on auto spike cut or others.
3) The MagneW3000 employs a square-wave excitation system, thereby providing excellent zero-point stability and eliminating zero-point shift that could be caused by stain of electrodes.
4) The accuracy is ±0.5% of rate.
5) The detectors are extremely compact and light, and provide a very high magnetizing efficiency—all products of their design which employs a Finite Element Method magnetic field analysis (concentrated magnetic field system).
6) Compact and light detectors/converters are very convenient for installation and maintenance.
7) The MagneW3000 is available either in an integral type or remote type. Conversion between the two is possible.
8) The lining is made of Teflon PFA and embedded with an integral punched plate structure (patent No. 129514), making the MagneW3000 highly resistant to sharp changes in heat, steam, and vacuum pressures.



Measurable Liquids

Any liquids, provided that their electrical conductivity is 3μS/cm or higher, can be measured irrespective of their properties or states (viscosity, temperature, pressure, or slurry).

Water: Potable, sewage, industrial, irrigation, sea, or drain water
Chemical: Acidic, alkaline, or corrosive fluids
Slurries: Cement, lime, alumina, latex, and other slurries
Suspensions: Pulp, drain, mud, or filthy liquids
Foods: Beer, milk, juice, and sauce
Viscous liquids: Jam, paste, etc.

Functions

Ranging functions

- Single range
- Automatic-switching dual range
- External-switching dual range
- Direct/reverse automatic-switching range
- Direct/reverse external-switching range

Built-in totalizer functions

- Totalizer
- Totalizer with presetting
- Direct/reverse differential flow rate integration

Contact input functions

- External 0% lock
- External automatic zero adjusting
- Built-in totalizer resetting
- External range switching

Contact output functions

- Alarm (flow rate alarm, self-diagnosis, empty-status, detection)
- Range switching
- Preset totalizer

Flow rate display functions

- %
- Engineering unit (m^3/h, l/min, cc/min, GPM, BPD, or others)
- Totalizer

Lightning arresting functions

Built-in lightning arrestors (12kV, 1,000A) at each terminal for power supply, excitation, analog output pulse output, and contact input/output.

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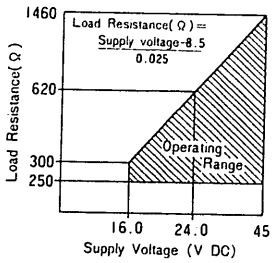
Instrument Specifications

Item	Specifications
Size (Diameter)	2.5, 5, 10, 15, 25, 40, 50, 80, 100, 150, 200, 250, 300, 350, 400, 500, 600 (mm)
Power requirement	100, 110, 120V AC ±10%, 50/60Hz ±2Hz 200, 220, 240V AC ±10%, 50/60Hz ±2Hz 24V DC ±10%
External power supply for SFC communications	Refer to the figure. (Load resistance of 250 ohms minimum is required to enable communications with SFC. When SFC communication function is not used, external power supply is not required. In this case, load resistance of current output is 0 to 600 ohms.) 
Power consumption	14W (22 VA) including detector and converter
Input signal	Flow signal: Flow rate proportionate signal from detector Contact input: Any one point of the following signals among semiconductor contact points or no-voltage contacts points • 0% signal lock signal • Automatic zero adjust signal • Internal totalizer, External reset.
Output signal	Excitation current: Output to detector excitation coil Current output: 4 to 20mA DC Contact output: Any one point among the following under open-collector external load of 30V DC. max. 200mA max. (in case of resistance load) • Upper/lower limit alarm, self-diagnosis alarm, empty-status detection • Range discrimination • Pre-set totalizer Pulse output: • Open-collector output 0 to 2,000Hz, pulse widths 0.3, 0.5, 1, 7, 10, 15, 30, 50, 100ms External load 20V DC max., 200mA max. • Electromagnetic totalizer drive output 0 to 20Hz, pulse widths 30, 50, 100ms External load 24V DC, 210Ω • Mercury relay contact output 0 to 20Hz, pulse widths 30, 50, 100ms External load 30V DC max., 300mA max.
Display	Display card: 7-segment LED, 6 digits Local setting card: LED, 7-segment/6 digits, LCD, 15 digit/2 lines Instantaneous flow rate percentage display: % Instantaneous flow rate display in engineering units: Volumetric units; m^3, *l*, cc, B (barrel), KG (kilogallon), G (gallon), mG (milligallon) Time units; day, hour, min., sec. Built-in totalizer; m^3/p, *l*/p, cc/p, B/p, KG/p, G/p, mG/p.
Setting method	Local setting card: 5 key-switches Remote setting by SFC
Flow velocity range	0 – 0.1m/s to 0 – 10m/s
Damping time constant	0, 0.5, 1, 2, 3, 4, 5, 10, 50, 100 sec.
Dropout	2 to 10% FS of pulse output (variable integers)
Low flow cutoff	0 to 10% FS of current output (variable integers)

Structure (Sizes 2.5 to 200mm)

Materials		1) Detector Case: Aluminium alloy (size 40mm and over), cast steel (size 25mm or less) Lining: Teflon PFA, polyurethane rubber (size 100mm and over) Electrodes: SUS316L, hastelloy B, hastelloy C, titanium, tantalum, platinum/iridium Ground ring: SUS316, hastelloy B, hastelloy C, titanium, tantalum, platinum 2) Converter Case: Aluminium alloy
Electrodes		External insertion type (Detachable electrodes)
Case	**Structure**	NEMA4, IEC IP67, JIS C0920 Water-proof type equivalent
	Finish	Detector: Acryl paint Converter: Acryl paint
	Finish color	Detector: Dark beige (Munsell 10YR4.7/0.5) Converter: Light beige (Munsell 4Y7.2/1.3)

Structure (Sizes 250 to 600mm)

Materials		1) Materials Case: Carbon steel (SS 41) Flange: Carbon steel (SS 41) [A 105 (ASTM) for flanges of ANSI 150 rating] Lining: Teflon PFA, chloroprene rubber Electrodes: SUS316L, hastelloy C, titanium, platinum/iridium Ground ring: SUS316, hastelloy C, titanium 2) Converter Case: Aluminium alloy
Electrodes		External insertion type (Detachable electrodes)
Case	**Structure**	NEMA4, IEC IP67, JIS C0920 Water-proof type equivalent
	Finish	Detector: Polyurethane corrosion-proof paint Converter: Acryl paint
	Finish color	Detector: Dark beige (Munsell 10YR4.7/0.5) Converter: Light beige (Munsell 4Y7.2/1.3)

Installation Specifications (Sizes 2.5 to 200mm)

Ambient temperature	–10 to +50°C
Relative humidity	10 to 90% RH
Installation	Wafer type
Flange ratings	JIS 10K, JIS 20K, JIS 30K, JIS Water Service Class 2, ANSI 150, ANSI 300, DIN ND10, DIN ND40
Electrical conduit connection	G1/2, CM20, 1/2NPT internal thread
Mounting angle	The two electrodes to be in mutually horizontal position.
Ground	JIS Class 3 ground (Ground resistance not greater than 100 ohms)

Installation Specifications (Sizes 250 to 600mm)

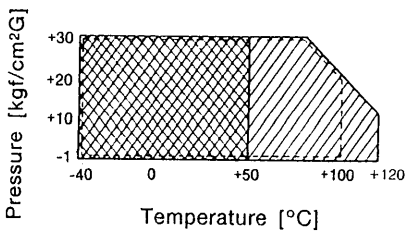
Ambient temperature	–10 to +50°C
Relative humidity	10 to 90% RH
Flange ratings	JIS 10K, JIS 20K, JIS Water Service Class 2, ANSI 150, DIN ND10
Electrical conduit connection	G1/2, CM20, 1/2NPT internal thread
Mounting angle	The two electrodes to be in mutually horizontal position.
Ground	JIS Class 3 ground (Ground resistance not greater than 100 ohms)

Fluid Specifications (Sizes 2.5 to 600mm)

Flow velocity ranges	0 – 0.1m/s to 0 – 10m/s
Electrical conductivity of liquid	3 μS/cm or over

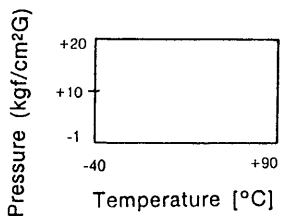
Liquid Pressure and Temperature Ranges (Sizes 2.5 to 200mm)

Teflon PFA, sizes 15 to 200mm
Teflon PFA, sizes 2.5 to 10mm
Polyurethane rubber, sizes 100 to 200mm

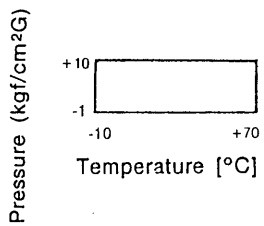


Liquid Pressure and Temperature Ranges (Sizes 250 to 600mm)

Teflon PFA



Chloroprene rubber



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Performance Specifications (Sizes 2.5 to 600mm)

Item	Specifications		
	Span (Vs)	Flow rate ≧ 25%	Flow rate ≦ 25%
Accuracy (Reference operating conditions)	Vs = 1.0 to 10m/s	±0.5% of rate	±0.125% FS
	Vs = 0.1 to less than 1.0m/s	$\pm\left(\frac{0.1}{Vs}+0.4\right)$ % of rate	$\pm\frac{1}{4}\left(\frac{0.1}{Vs}+0.4\right)$ % FS

Semi-standard Specification (Sizes 2.5 to 200mm)

Corrosion-resistant finish (Y138A, B)	Corrosion-resistant finish (Y138A): Baked acryl finish Corrosion-proof finish (Y138B): Baked epoxy finish

Semi-standard Specification (Sizes 250 to 600mm)

Corrosion-resistant finish (Y138E, F)	Corrosion-resistant finish (Y138E): Resistant to corrosive ambiance Corrosion-proof finish (Y138F): Resistant to corrosive liquids

Flow Conversion Table

$V = K \times Q$

[V: Flow velocity (m/s), Q: Flow rate (m^3/h), K: Flow conversion factor $\frac{1}{3600} \times \frac{4}{\pi D^2}$]

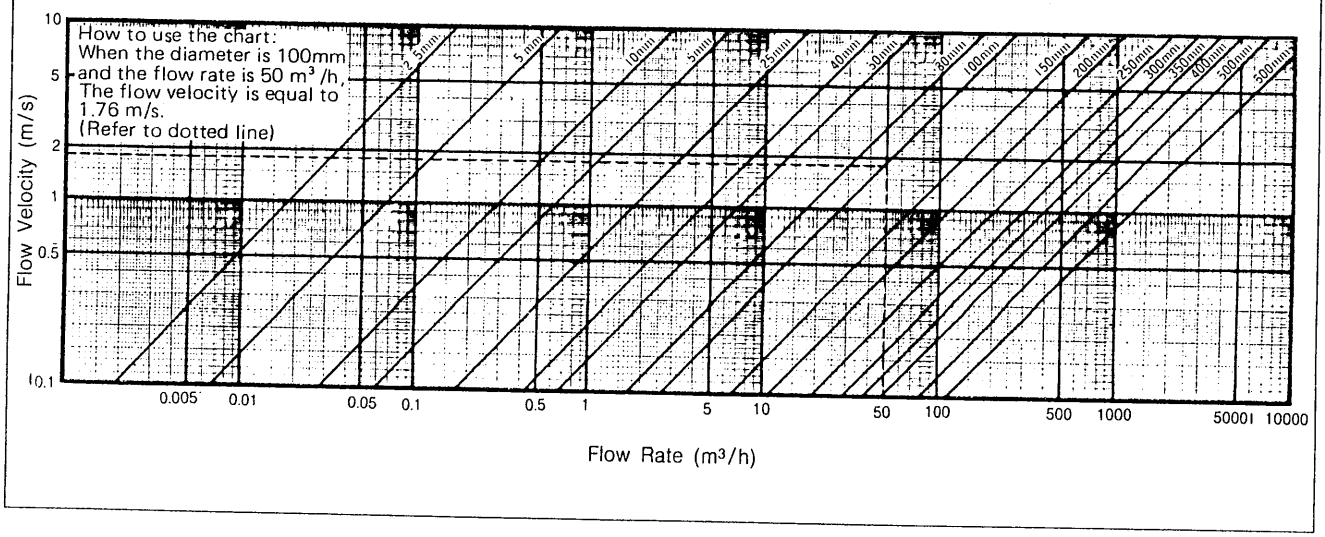
Example: When size is 50mm and flow rate is $20m^3/h$

$V = 0.1415 \times 20 = 2.830$ m/s.

Size (mm)	Flow convertion factor K	Flow span Q (m^3/h)	Flow velocity V (m/s)
2.5	56.59	0.00177 to 0.177	0.1 to 10m/s
5	14.15	0.00707 to 0.707	
10	3.537	0.0283 to 2.83	
15	1.572	0.0636 to 6.36	
25	0.5659	0.177 to 17.7	
40	0.2210	0.452 to 45.2	
50	0.1415	0.707 to 70.7	
80	0.05526	1.81 to 181	

Size (mm)	Flow convertion factor K	Flow span Q (m^3/h)	Flow velocity V (m/s)
100	0.03537	2.83 to 283	0.1 to 10m/s
150	0.01572	6.36 to 636	
200	0.008842	11.31 to 1,131	
250	0.005659	17.67 to 1,767	
300	0.003930	25.45 to 2,545	
350	0.002887	34.64 to 3,464	
400	0.002210	45.24 to 4,524	
500	0.001415	70.70 to 7,070	
600	0.0009824	101.79 to 10,179	

Maximum Flow Velocity Conversion Chart



Model Number Table

Detector
(Sizes 2.5 to 200mm)

Ex: KID10A-0050PL11SX-XX

Basic Model No.	Selection: Flowmeter Size (I)	Lining (II)	Electrodes (III)	Flange Standards & Pressure Rating (IV)	Ground Ring (V)	Conduit Connection (VI)	Option I (VII)	Options II (VIII)	Applicable Size: 2.5mm	5 mm	10 mm	15 mm	25 mm	40 mm	50 mm	80 mm	100 mm	150 mm	200 mm	Description
KID 10A									○	○	○	○	○	○	○	○	○	○	○	Integral type detector
	— 0002								○											2.5mm
	— 0005									○										5mm
	— 0010										○									10mm
	— 0015											○								15mm
	— 0025												○							25mm
	— 0040													○						40mm
	— 0050														○					50mm
	— 0080															○				80mm
	— 0100																○			100mm
	— 0150																	○		150mm
	— 0200																		○	200mm
		P							○	○	○	○	○	○	○	○	○	○	○	Teflon PFA
		Q															○	○	○	Polyurethane rubber
			L						○	○	○	○	○	○	○	○	○	○	○	SUS 316L
			B						○	○	○	○	○	○	○	○	●	●	●	Hastelloy B
			C						○	○	○	○	○	○	○	○	●	●	●	Hastelloy C
			K						○	○	○	○	○	○	○	○	●	●	●	Tilanium
			T						○	○	○	○	○	○	○	○	●	●	●	Tantalum
			P						○	○	○	○	○	○	○	○	●	●	●	Platinum / iridium
				11					◑	◑	◑	○	○	○	○	○	○	○	○	JIS 10K
				12					◑	◑	◑	○	○	○	○	○	○	○	○	JIS 20K
				13					◑	◑	◑	○	○	○	○	○	○	○	○	JIS 30K
				14					○	○	○									For JIS 10K / 20K, 10mm flanges
				15					○	○	○									For JIS 30K, 10mm flanges
				21					◑	◑	◑	○	○	○	○	○	○	○	○	ANSI 150
				22					◑	◑	◑	○	○	○	○	○	○	○	○	ANSI 300
				31												○	○	○	○	JIS Water Service Class 2
				41					◑	◑	◑	○	○	○	○	○	○	○	○	DIN ND10
				43					◑	◑	◑	○	○	○	○	○	○	○	○	DIN ND40
				44					○	○	○									For DIN ND10 / 40, 10mm flanges
					S				○	○	○	○	○	○	○	○	○	○	○	SUS 316
					B				○	○	○	○	○	○	○	○	●	●	●	Hastelloy B
					C				○	○	○	○	○	○	○	○	●	●	●	Hastelloy C
					K				○	○	○	○	○	○	○	○	●	●	●	Titanium
					T				○	○	○	○	○	○	○	○	●	●	●	Tantalum
					P				○	○	○	○	○	○	○	○	●			Platinum
						X			○	○	○	○	○	○	○	○	○	○	○	None
							–X		○	○	○	○	○	○	○	○	○	○	○	None
								X	○	○	○	○	○	○	○	○	○	○	○	None
								A	○	○	○	○	○	○	○	○	○	○	○	SUS304 bolts and nuts
								B	○	○	○	○	○	○	○	○	○	○	○	Carbon steel bolts and nuts

Legends:
- ○ ..... Applicable
- ● ..... Applicable to Teflon lining. Not applicable to polyurethane rubber lining.
- ◑ .... Applicable when mating flanges are 15mm.

Detector
(Sizes 250 to 600mm)

Basic Model No.	Selection: Flowmeter Size (I)	Lining (II)	Electrodes (III)	Ground Ring (IV)	Flange Standards & Pressure Rating (V)	Conduit Connection (VI)	Option I (VII)	Option II (VIII)	Applicable Size: 250 mm	300 mm	350 mm	400 mm	500 mm	600 mm	Description
KID 10A									○	○	○	○	○	○	Integral type detector
	— 0250								○	○	○	○	○	○	250mm
	— 0300									○					300mm
	— 0350										○				350mm
	— 0400											○			400mm
	— 0500												○		500mm
	— 0600													○	600mm
		P							○	○	○	○			Teflon PFA
		R							○	○	○	○	○	○	Chloroprene rubber
			L						○	○	○	○	○	○	SUS 316 L
			C						●	●	●	●			Hastelloy C
			K						●	●	●	●			Titanium
			P						●	●	●	●			Platinum / iridium
				11					○	○	○	○	○	○	JIS 10K
				12					●	●					JIS 20K
				21					○	○	○	○	○	○	ANSI 150
				31					○	○	○	○	○	○	JIS Water Service Class 2
				41					○	○	○	○	○	○	DIN ND10
					S				○	○	○	○	○	○	SUS 316
					C				●	●	●	●			Hastelloy C
					K				●	●	●	●			Titanium
						X			○	○	○	○	○	○	None
							–X		○	○	○	○	○	○	Without watertight gland
								X	○	○	○	○	○	○	None

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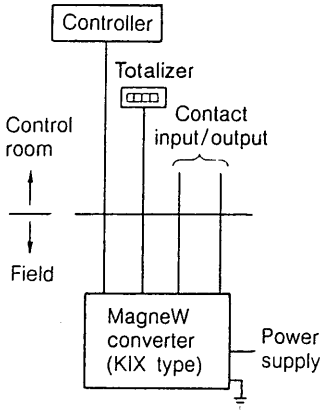
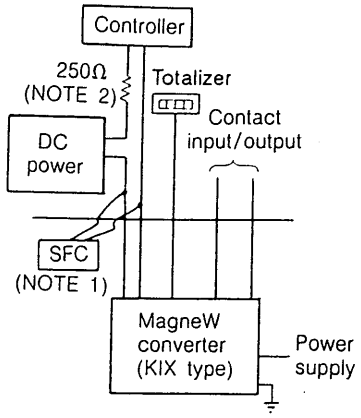
Configuration of Smart MagneW3000

KIX-type MagneW converter, mounted with microprocessor, can conduct remote setting of various parameters by external communications with SFC.

1) No communication function provided



2) Communication by SFC



Notes 1) Under configuration of "communication by SFC," DC power supply for loop and resistance of over 250 ohms are requried on the current output line.
2) Wire connection of SFC is effected only when communications are made.

Converter

Ex: KIX20A-A12X2XV-XXX
KIX20A-A1102XV-XSF2A31

Basic Model No.	Selections: Power Supply (I)	Selections: Output Signal: Analog (II)	Selections: Output Signal: Indicator (III)	Selections: Output Signal: Pulse (IV)	Selections: Terminal Box Lightning Arrester (V)	Selections: Installation (VI)	Selections: Electrical Connection (VII)	Options: Water-tight Gland (VIII)	Options: Communication (IX)	Options: Function Designation (X)	Description	
KIX 20A											Integral type converter	
	-A										100V AC, 50/60Hz	
	-C										110V AC, 50/60Hz	
	-E										120V AC, 50/60Hz	
	-G										200V AC, 50/60Hz	
	-I										220V AC, 50/60Hz	
	-K										240V AC, 50/60Hz	
	-M										24V DC	
		1									4 to 20mA DC	
			X								Without display card	(Note 1)
			1								With display card	(Note 1)
			2								With local setting card	
				X							None	
				O							Open collector pulse output	
				P							Electromagnetic totalizer drive pulse output	
				Q							Mercury relay contact pulse output (Note 2)	
					2						Terminal box and lightning arrester provided	
						X					Integral type	
							V				G 1/2	
							W				CM20 internal thread	Water-tight gland is not available.
							Y				1/2NPT internal thread	Water-tight gland is not available.
								-X			Without water-tight gland	
								-1			With brass (plating Ni) water-tight gland	
								-2			With plastic water-tight gland	
									X		Communication function not provided	
									S		Communication by SFC	
										X	None	
										F□□□□	Provided (used according to functon designation table)	

Notes: 1) Date must be set, changed through communication with SFC.
2) Cannot be selected for vertical mounting.
3) Functions (default value)
w/o pulse output:
- Ranging function → Default value
- Built-in totalizer function → Not available
- Contact input function → Not used
- Contact output function → Not used

w/pulse output:
- Ranging function → Single range
- Built-in totalizer function → Built-in totalizer
- Contact input function → Not used
- Contact output function → Not used

Function Designation Table (F)

Designate the device type number according to the following tables. The converter will be shipped by incorporating the designated functions. Also, changes of designated functions can be achieved by the "Local Setting Card" or by communications.

1) Single range

Function designation F	Ranging I	Built-in totalizer II	Contact input III	Contact output IV	Description
	0				Single range
		X			None
		A			Totalizer (Note 1)
		B			Totalizer with preset (Note 1)
			X		None
			1		External 0% lock
			2		External auto zero adjustment
			4		Built-in totalizer reset
				X	None
				1	Alarm output (w/empty-status detection)
				3	Preset totalizer output

2) Direct/reverse automatic-switching range

Function designation F	Ranging I	Built-in totalizer II	Contact input III	Contact output IV	Description
	3				Direct/reverse automatic-switching range
		X			None
		A			Totalizer (Note 1)
		C			Direct/reverse differential flow rate integration (Note 1)
			X		None
			1		External 0% lock
			2		External auto zero adjustment
			4		Built-in totalizer reset
				2	Range discrimination signal output

3) Direct/reverse external-switching range

Function designation F	Ranging I	Built-in totalizer II	Contact input III	Contact output IV	Description
	4				Direct/reverse external-switching range
		X			None
		A			Totalizer (Note 1)
		B			Totalizer with preset (Note 1)
		C			Direct/reverse flow rate integration (Note 1)
			3		External range switching
				X	None
				1	Alarm (w/empty-status detection)
				2	Range discrimination signal output
				3	Preset totalizer output (Note 2)

4) Automatic-switching dual range

Function designation F	Ranging I	Built-in totalizer II	Contact input III	Contact output IV	Description
	1				Automatic-switching dual range
		X			None
		A			Totalizer (Note 1)
			X		None
			1		External 0% lock
			2		External auto zero adjustment
			4		Built-in totalizer reset
				2	Range discrimination signal output

5) External-switching dual range

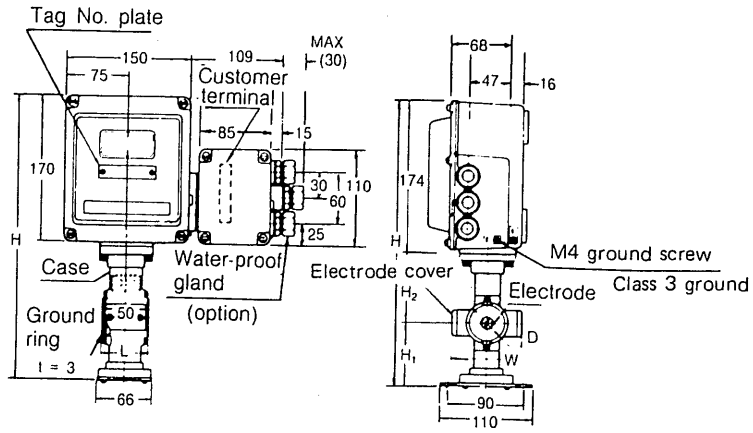
Function designation F	Ranging I	Built-in totalizer II	Contact input III	Contact output IV	Description
	2				External-switching dual range
		X			None
		A			Totalizer (Note 1)
		B			Totalizer with preset (Note 1)
			3		External range switching
				X	None
				1	Alarm output (w/empty-status detection)
				2	Range discrimination signal output
				3	Preset totalizer output (Note 2)

Notes: 1) Conditions to allow selection:
- Requires to select "w/display card" or "w/local setting card" in the model No. as well as to select "pulse output".

2) Conditions to allow selection:
- Automatically selected only when selecting "Totalizer with preset" in the built-in totalizer.

Dimension Drawings (Sizes 2.5 to 200mm)

(Unit: mm)

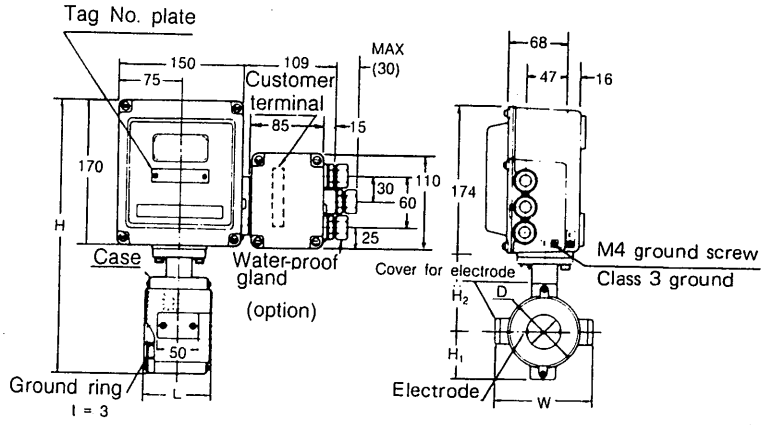


Terminal Correspondence of Converter (KIX20A)

Mark	Description
I+	Current output
I−	
P+	Pulse output
P−	
STATUS OUT+	Contact output
STATUS OUT−	
STATUS IN+	Contact input
STATUS IN−	

H (+)	Power supply
N (−)	
E	Case earth

1) Sizes 2.5 to 25mm



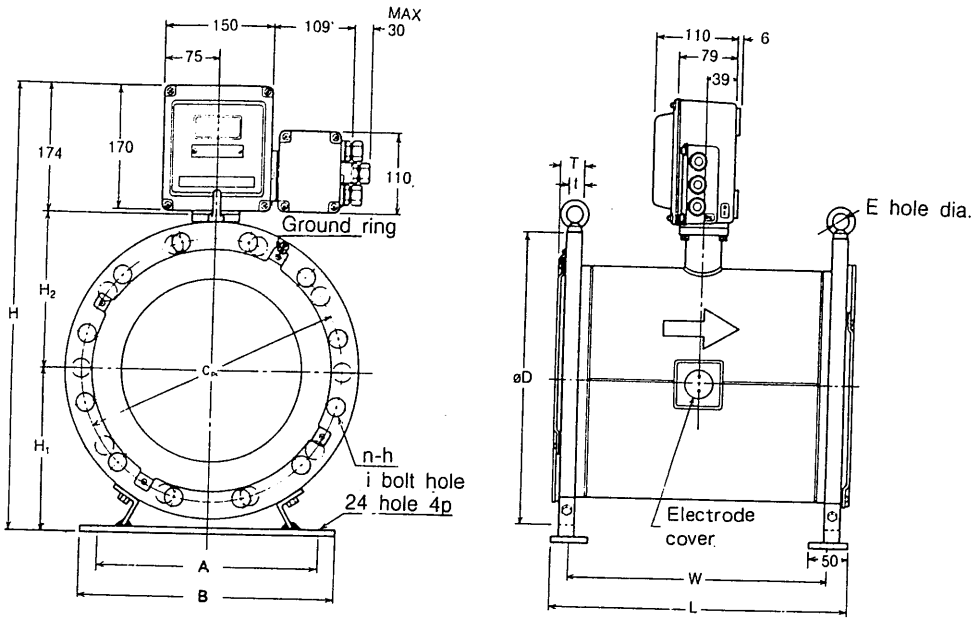
2) Sizes 40 to 200mm

Size (Diameter)		2.5	5	10	15	25	40
Face-to-face	L	56	56	56	56	56	80
Height	H	329	329	329	329	343	317
	H_1	73	73	73	73	80	55
	H_2	82	82	82	82	89	88
Case width	W	84	84	84	84	94	116
Case OD	D	48.5	48.5	48.5	48.5	65	86
Weight (kg)		5.7	5.7	5.7	5.7	5.7	5.4

Size (Diameter)		50	80	100	150	200
Face-to-face	L	86	106	120	160	200
Height	H	333	361	385	440	496
	H_1	64	78	90	120	150
	H_2	95	109	121	146	172
Case width	W	132	161	185	230	292
Case OD	D	102	132	156	216	267
Weight (kg)		6.0	7.8	9.2	16.2	24.6

Dimension Drawings (Sizes 250 to 600mm)

(Unit: mm)



Dimension Table

Size (Dia.)	Flange Rating	D	t	T	C	n	h	i Bolt	E	L	W	H	H1	H2	Weight (kg)	A	B
250mm (10")	JIS 10 K RF	400	24	32	355	12	25	M22	25	400	350	607	221	212	62	300	350
	JIS 20 K RF	430	34	42	380	12	27	M24				624	238		84		
	ANSI 150 RF	406	30.5	38.5	361.9	12	26	7/8				610	224		71		
	JIS Water Service Class 2	410	24	32	360	8	23	M20				612	226		64		
	DIN ND 10	395	26	34	350	12	23	M20				604	218		62		
300mm (12")	JIS 10 K RF	445	24	32	400	16	25	M22	25	450	400	659	250	235	75	300	350
	JIS 20 K RF	480	36	44	430	16	27	M24				679	270		104		
	ANSI 150 RF	483	32	40	431.8	12	26	7/8				680	271		99		
	JIS Water Service Class 2	464	26	34	414	10	23	M20				670	261		83		
	DIN ND 10	445	26	34	400	12	23	M20				659	250		77		
350mm (14")	JIS 10 K RF	490	26	34	445	16	25	M22	30	500	450	706	273	259	98	300	350
	ANSI 150 RF	535	35	43	476.2	12	29	1				730	297		130		
	JIS Water Service Class 2	530	26	34	472	10	25	M22				714	281		111		
	DIN ND 10	505	26	34	460	16	23	M20				728	295		102		
400mm (16")	JIS 10 K RF	560	28	36	510	16	27	M24	30	550	500	782	321	287	130	350	400
	ANSI 150 RF	595	37	45	539.7	16	29	1				802	341		165		
	JIS Water Service Class 2	582	26	34	524	12	25	M22				794	333		134		
	DIN ND 10	565	26	34	515	16	27	M24				785	324		128		
500mm (20")	JIS 10 K RF	675	30	38	620	20	27	M24	35	600	550	900	383	343	204	350	400
	ANSI 150 RF	700	43	51	635	20	32	1 1/8				913	396		251		
	JIS Water Service Class 2	706	30	38	639	12	27	M24				916	399		220		
	DIN ND 10	670	28	36	620	20	27	M24				897	380		197		
600mm (24")	JIS 10 K RF	795	32	40	730	24	33	M30	35	650	600	1012	446	392	274	350	400
	ANSI 150 RF	895	48	56	749.3	20	35	1 1/4				1021	455		341		
	JIS Water Service Class 2	810	33	41	743	16	27	M24				1020	454		287		
	DIN ND 10	780	28	36	725	20	30	M27				1007	441		257		