MagneW 3000 PLUS Smart Electromagnetic Flowmeter
Model MGM14C(Converter)/MGM18(Detector)
Multivariable Flowmeter

OVERVIEW

The MagneW 3000 PLUS Multivariable flowmeter is a high performance, highly reliable flowmeter. MagneW3000 PLUS carries Pt100 Ohm sensor to an electrode for the first time and made temperature compensation of liquid density possible.

FEATURES

Mass flow output function

- Temperature compensation of liquid density is applicable in order to carry Pt100 Ohm sensor in the electrode.
- Get two outputs from temperature, density, volume, flow and mass flow value simultaneously.

Programming function

- Carry the temperature compensation program for water by standard.
- Applicable for an arbitrary fluid to establish 3 points calibration program for it.

Liquid crystal display with optional backlighting

- Backlight eases reading in direct sunlight or in a dark room.
- Simultaneously displays flow volume in %, actual flow volume and integrated flow volume.
- Rotating display improves visibility of integral models mounted on pipes up to 90° degrees from standard.

Setting parameters by optional infrared touch sensor

- Allows sure setting, in severe environments, without opening the cover of the converter.
- Prevent malfunctioning of the infrared touch sensor via special security feature.

APPLICATIONS

Pulp and Paper
Chemicals, corrosive liquids, industrial water, slurries , etc.

Petroleum/petrochemical/chemicals
industrial water, etc.

Food
Potable water, soy sauce, high density fluids, industrial water, slurries, etc.

Steel/nonferrous metals/ceramics
Cooling water, industrial water, corrosive liquids, etc.

Machinery/equipment/electric machinery
Corrosive liquids, cooling water, circulating water, industrial water, etc.

Electric power
Corrosive liquids, cooling water, industrial water, etc.

Gas
Circulating water for air conditioning, cooling water, etc.

For Converter(MGM14)

FUNCTIONAL SPECIFICATIONS

Type of protection

JIS C 0920 Waterproof model
NEMA ICS6-110 TYPE4X
IEC PUBL 529 IP66

Input signal

Flow signal

Flow proportional voltage signal from the detector

Contact input (optional)

Solid-state contact or no-voltage contact

Output signal

Excitation current

Output of the excitation current to the detector coil

Analog output

4 to 20mADC (select digital output)

Digital output

DE (Select analog output)

Contact input and output (optional)

Open collector
Contact capacity 30VDC max., 200mA max.

Pulse output (optional)

Open collector

Contact capacity

30VDC max., 200mA max.

Pulse frequency

2000Hz max.

Pulse width

0.3 to 999.9ms
Random setting or fixed at 50% of the duty

Temperature compensation programming function

For service water (standard installation)
For an arbitrary fluid (applicable for an arbitrary fluid to establish 3 points calibration program)

Analog output range/load resistance

Without SFC communication

I OUT1

0.8mA to 22.4mA (-20% to +115%)
Load resistance 0 to 600 ohm
With internal power source for 4 to 20mA DC
Out put DC16 to 45V

I OUT2

0.8mA to 22.4mA (-20% to +115%)
Load resistance 0 to 600 ohm
External power source for 4 to 20mA DC

Unit of flow indication

Can be selected from percentage, volume flow, mass flow, time, temperature

Unit of volume flow	m3, L, cm3
Unit of mass flow	t, kg, g
Unit of time	d, h, min, s
Unit of temperature	°C, °F, R, K

Damping time

(for volume flow output and mass flow output)

Continuous variable from 0.5s to 199.9s (time duration until 63.2% of the set range is reached.)

Low flow cutoff

Output corresponding to 0 to 10% of the set range of the analog output and digital output is fixed at 0%
(the integer is a continuous variable.)

Dropout

Pulse output corresponding to 0 to 10% of the set range of the analog output and digital output is cut (the integer is a continuous variable.)

Lightning protection

12kV, 1000A
Incorporated into the power source and external input and output terminals.

Power failure

An EEPROM retains data record of integrated flow volume when pulse output is used (retention period approximately 10 years)

Power supply

AC100V, 110V, 115/120V±10%, 200V, 220V, 230/240V±10%

Frequency

50Hz or 60Hz, DC24V±10%

Power consumption

Within 13W (17VA)
Out put DC16 to 45V

Optional specifications

Display (optional) Indication by LCD with backlighting

Main display

7-segment, 6 digits

Sub display

16 digits, 2 lines

Display contents

Instantaneous indication of flow in percentage, instantaneous indication of actual flow temperature, indication of integrated flow (when pulse output selected)

Selection of main display and secondary display

Random election depending on data , three columns maximum.

Data setter

Setting by means of infrared touch sensor

Infrared touch sensor four key switches

Contact input function

External 0% lock input

Enables 0% stop of the flow indication, analog output, digital output and pulse output via contact input.

External automatic zero adjustment input

Adjusts the zero-point by contact input.

External range changeover input

Switches double range or forward/reverse range is achieved by contact input.

Built-in counter reset input (for pulse output model)

Resets the integrated value of the built-in counter by contact input.

Contact output function

Alarm actuating contact output

Outputs alarm-actuating contacts for self-diagnosis, no-load detection, and upper/lower flow limit value alarm.

Range identification output

Outputs ID signal contacts for large and small ranges, forward and reverse direction ranges.

Preset status output (for the pulse output model)

Outputs a contact is output when the built-in counter reaches the preset value.

Self-diagnosis alarm output

Outputs an alarm-actuating contact when the self-diagnosis function detects an errors.

Empty-status detection

Outputs an alarm-actuating contact when the fluid level in the detector goes below the electrode level.

Upper/lower flow limit value alarm output

Outputs an alarm actuating contact is output when the flow volume exceeds the set upper/lower limit values.

Two-stage flow value alarm output
(with two contact outputs)

Outputs an alarm-actuating contact when the simultaneous flow value exceeds the set two upper limits (H and HH) or the two lower limits (L and LL).

No-load detection function

When the fluid level in the detector goes below the electrode level, the analog output, digital output and pulse output are fixed at 0%.

Pulse output

Refer to “Output” in the standard specifications. Must be selected for totalizer.

Totalizer

Depending on the pulse distortion setting, it totals one count at a time, for forward and reverse flows.

Totalizer with presetting function

A preset value target total can be set between 0000000000 and 9999999999. The counting method is the same as the standard totalizer's.

Forward/reverse flow difference totalizer

The difference in flow volumes in the forward and reverse directions is calculated and counted.

Certification of traceability

From 3 sources Measuring management system the configuration for your electromagnetic flowmeter, a repair certification, and test reports.

Tropicalization treatment (for transportation/storage)

Protects the electromagnetic flow meter in harsh environments during transportation and/or storage.

The following treatments can be applied corrosion protection, moisture prevention and mildew proofing.

Indication other than SI units

Units to be exported other than SI units. Those units are as follows

Volume unit

B (barrel), kG (kilo-gallon), G (gallon), mG (milli-gallon)

Mass unit

lb (pound)

Tag number on terminal box

The designated tag numbers (maximum 16 characters) should be stamped on a plate, which is attached to the terminal box. One line can contain 8 characters, so if more characters must be written on two lines.

Characters can be upper-case English letters, numbers and hyphens (-).

Pt1/4 air purge hole

One of the cable connection ports is a dedicated air purge hole with threads for a PT1/4 screw.

For additional specifications, please contact your Yamatake Corporation representative.

PHYSICAL SPECIFICATIONS

Finish

Standard	Acrylic resin
Corrosion-resistant	Acrylic resin
Corrosion-proof	Epoxy resin

Color

Light beige (Munsell 4Y7.2/1.3)

Main body material

Aluminum alloy

Display cover material

Tempered glass, 5mm thick Aluminum alloy

For Detector (MGM18)

FUNCTION SPECIFICATIONS

Type of protection

JIS C 0920 water-tight model
NEMA ICS6-110 TYPE4X
IEC PUBL 529 IP67

Temperature range of Liquid to be measured

PFA lining

Diameter (mm)	Temperature of the liquid to be measured (°C)
	Integral model
40 to 200	-40~+120

Polyurethane rubber lining

Diameter (mm)	Temperature of the liquid to be measured (°C)
	Integral model
40 to 200	-40~+50

Measurable electrical conductivity

10mS/cm or more

Measurement flow range

Refer to the minimum/maximum set ranges shown in the Table below.

Diameter (mm)	Minimum set range (m3/h) (Maximum constant flow speed of 0 to 0.1m/s)	Minimum set range (m3/h) (Maximum constant flow speed of 0 to 10m/s)	Flow conversion factor K
40	0 to 0.452	0 to 45.2	0.2210
50	0 to 0.707	0 to 70.7	0.1415
65	0 to 1.19	0 to 119	0.08375
80	0 to 1.81	0 to 181	0.05526
100	0 to 2.83	0 to 283	0.3537
125	0 to 4.42	0 to 442	0.02264
150	0 to 6.36	0 to 636	0.01572
200	0 to 11.31	0 to 1,131	0.008842

Flow conversion Velocity V(m/s)=K´Q

$$K=\text{Flow conversion factor}=\frac{1}{3600}\times\frac{4}{\pi D^2}$$

$Q=\text{Flow rate}(m^3/h)$

Measurement flow velocity range

0m/s to 10m/s

Flange rating

JIS10K, JIS16K, JIS20K, JIS30K, JPI150, JPI300,ANSI150, ANSI300, DIN PN10, DIN PN16, DIN PN25,DIN PN40 (diameter 40 to 200mm)

Ambient temperature limits

-25 to +60°C

Ambient humidity limits

5 to 100% RH

Optional specifications

Test report

Test result based on repair of electromagnetic flowmeter for actual flow.

Certification of traceability

From 3 sources configuration of measuring management system for electromagnetic flowmeter, repair certification, and test report.

Mill sheet

Data sheet describing materials and charge numbers of electrodes and grounding rings.

Moisture treatment

When shipped, condensation is removed from wetted surfaces.

Oil removal treatment

When shipped, oil is removed from wetted surfaces.

Gasket for resin pipe (for general use)

When installing the detector on a resin pipe, attach this gasket between the PFA lining and the grounding ring, and between the grounding ring and the pipe flange.

Attaching the tag number to the terminal box

Mark the tag with the specified number and attach to the terminal box of the cover. The maximum number of characters in the tag number is 8.

Attaching the tag number on the neck section

Mark the tag number specified and attach it to the neck section of the detector. The maximum number of characters in the tag number is 16.

For additional specifications, please contact your Yamatake Corporation representative.

PHYSICAL SPECIFICATIONS

Finish

No paint (SUS304 case)

Main body material

Measuring pipe materials

SUS304 stainless steel

Flange

SUS304 stainless steel (diameter 40 to 65mm)

Carbon steel + corrosion-preventive coating (diameter 80 to 200mm)

Case

SUS304 stainless steel

(diameter 40 to 200mm)

Material of parts in contact with liquid

Lining

PFA (diameter 40 to 200mm)

Polyurethane rubber (diameter 40 to 200mm)

Electrode

SUS316L, Hastelloy C, titanium, zirconium, tantalum, tungsten-carbide, platinum/iridium

Ground ring

SUS316, Hastelloy C, titanium, zirconium, tantalum, platinum

Gasket

PTFE (if the grounding ring is not made of SUS316)

Structure of electrode

External insertion electrode with Pt 100W and external insertion electrode (electrode can be removed)

PERFORMANCE SPECIFICATIONS

Accuracy

Measuring volume flow

Vs(m/s)	Velocity during measurement ³Vs×20%	Velocity during measurement ≤Vs´20%
1.0≤Vs≤10	±0.5% of indicated value	±0.1% of Vs
0.1≤Vs≤1.0	±(0.1/Vs+0.4)% of the indicated value	±0.2(0.1/Vs+0.4)% of Vs

Measuring mass flow

Vs(m/s)	Velocity during measurement ³Vs×20%	Velocity during measurement ≤Vs´20%
1.0≤Vs≤10	±0.7% of indicated value	±0.14% of Vs
0.1≤Vs≤1.0	±(0.1/Vs+0.6)% of the indicated value	±0.2(0.1/Vs+0.6)% of Vs

Measuring temperature ±2°C

Calculating density by temperature

±0.2% of indicated value.

Measuring volume or mass flow

±0.2% FS / 25 °C change of ambient temperature.

Measuring temperature

$\Delta T \times \pm 0.03C$

(ΔT = Ambient temperature - Fluid temperature)

INSTALLATION

Electrical connection

General model

G1/2 (PF1/2) internal thread, 1/2 NPT internal thread, CM20 internal thread, Pg 13.5 internal thread.

FM/CSA Nonincendive model

1/2 NPT internal thread

Pipe connection

Wafer (models 40 to 200mm in diameter)

Flange (models 40 to 200mm in diameter)

Nuts and bolts (for models of wafer construction)

S20C carbon steel, SUS304 stainless steel

Grounding

Resistance lower than 100 Ω

Length of straight pipe

Upstream side

Five (5) times or longer than the diameter. However, 10 times or longer than the diameter if a diffuser, valve, pump, etc., are installed.

Downstream side

Not required. However, 2 times or longer than the diameter if influence exists from drift current of such equipment as a valve.

MODEL SELECTION

Structure/Basic Model No.	Lining	Pipe connection	Diameter(mm)	Ref. page
Waterproof model MGM14				6
Watertight model MGM18D	PFA	Wafer	40 to 200	7
Watertight model MGM18F	PFA	Flange	40 to 200	8
Watertight model MGM18D	Polyurethane rubber	Wafer	40 to 200	9
Watertight model MGM18F	Polyurethane rubber	Flange	40 to 200	10

PFA lining
Rubber lining

MagneW 3000 PLUS (Multivariable Flowmeter Converter/Integral models)

Basic Model No. MGM14C – Selections – Optional selections – options

Power supply	AC100V 50/60Hz	A					
	AC110V 50/60Hz	B					
	AC115/120V50/60Hz	C					
	AC200V 50/60Hz	D					
	AC220V 50/60Hz	E					
	AC230/240V 50/60Hz	F					
	DC24V AC Noise filter 50Hz	G					
	DC24V AC Noise filter 60Hz	H					
Output signal/ Communication	4-20mA DC 2 outputs/Without communication		A				
	4-20mA DC 2 outputs/With communication		B				
	DE output/With communication		C				
Electrical connection/ Watertight gland	G1/2 internal thread/Without watertight gland			1			
	G1/2 internal thread/With brass (Ni-plated) watertight gland			2			
	G1/2 internal thread/With plastic watertight gland			3			
	1/2NPT internal thread/Without watertight gland			4			
	CM20 internal thread/Without watertight gland			5			
	Pg13.5 internal thread/Without watertight gland			6			
	Others			□			
Installation/Wiring direction	Integral model	Horizontal piping mounting/Upstream side			A		
		Horizontal piping mounting/Downstream side			B		
		Horizontal piping mounting/Left side viewed from upstream			C		
		Horizontal piping mounting/Right side viewed from upstream			D		
		Vertical piping mounting/Downstream side (Flow direction : Downstream to upstream)			E		
		Others			□		

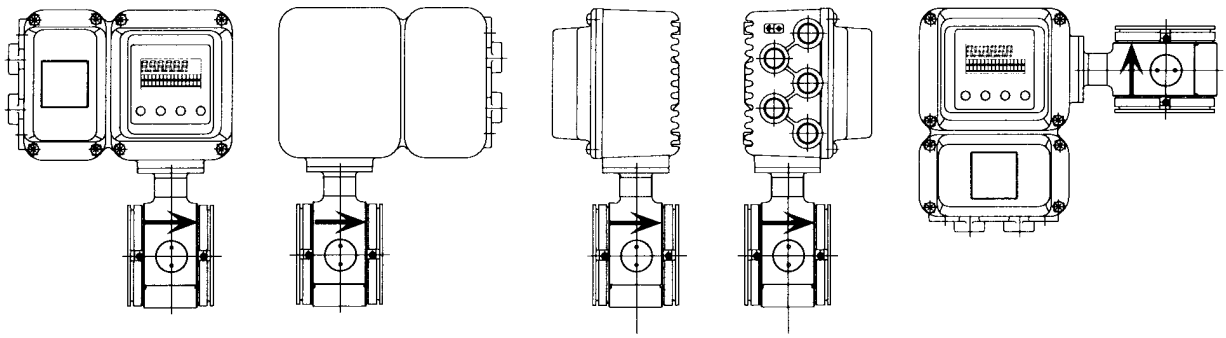
x	Finish	Standard finish
1		Corrosion-resistant finish
2		Corrosion-proof finish

x	Display/ with data setting device	None
A		Main display : Instantaneous indication of flow in %
B		Main display : Instantaneous indication of actual flow
C		Main display : indication of integrated flow Note. 1

x	Contact in-puts/outputs	None
1		1 input and 1 output
2		2 inputs
3		2 outputs

x	Approval	None

Note 1: In case of this code, option “B” must be selected.



A B C D E

MagneW3000 PLUS (General Model) (Wafer detector 40~20mm) PFA lining

Basic Model No.: MGM18D – Selections: □□□□□□□□□ – Optional selections: □□ – Options: □

Item	Description	Code
Diameter	40mm	040
	50mm	050
	65mm	065
	80mm	080
	100mm	100
	125mm	125
	150mm	150
	200mm	200
Lining	PFA	P
Pipe connection	Wafer JIS10K	11
	Wafer JIS20K	12
	Wafer JIS30K	13
	Wafer ANS150	21
	Wafer ANS300	22
	Wafer DIN PN10	41
	Wafer DIN PN16	42
	Wafer DIN PN25	43
	Wafer DIN PN40	44
	Wafer JPI150	61
	Wafer JPI300	62
Electrodes	SUS316L	L
	Hastelloy C	C
	Titanium	K
	Zirconium	H
	Tantalum	T
	Platinum iridium	P
	Others	□
Grounding ring	SUS316	S
	Hastelloy C	C
	Titanium	K
	Zirconium	H
	Tantalum	T
	Platinum	P
	Others	□
Wiring connection/ Watertight gland	Integral model	1
Face to face	Standard	A
	Others	□
Installation/Wiring direction	Integral model	H
Calibration/ Approval	Standard calibration	A
	Others	□

Optional selections:

Code	Item	Description
X	Finish	Standard
1		Corrosion-resistant finish
2		Corrosion-proof finish
X	Bolt/nuts	None
1		Carbon steel
2		SUS304

Options:

Code	Description
X	No option
A	Test report
B	Certification of traceability
C	Mill sheet
E	Moisture treatment
F	Oil removal treatment
J	Gasket for resin pipe (for general purposes)
K	Attaching the TAG number plate to the terminal box (remote detector)
L	Attaching the TAG number plate to the neck section
□	Others

MagneW3000 PLUS (General Model) (Flange detector 40~20mm) PFA Lining

Basic Model No.		Selections										Optional selections		Options	
MGM18F	–											–		–	

Diameter	40mm	040													X	No option
	50mm	050													A	Test report
	65mm	065													B	Certification of traceability
	80mm	080													C	Mill sheet
	100mm	100													E	Moisture treatment
	125mm	125													F	Oil removal treatment
	150mm	150													J	Gasket for resin pipe (for general purposes)
	200mm	200													K	Attaching the TAG number plate to the terminal box (remote detector)
Lining	PFA		P												L	Attaching the TAG number plate to the neck section
Pipe connection	Flange JIS10K			J1											□	Others
	Flange JIS20K			J2												
	Flange JIS30K			J3												
	Flange ANS150			A1												
	Flange ANS300			A2												
	Flange DIN PN10			D1												
	Flange DIN PN16			D2												
	Flange DIN PN25			D3												
	Flange DIN PN40			D4												
	Flange JPI150			P1												
	Flange JPI300			P2												
Flange material	Standard				1											
	Others				□											
Electrodes	SUS316L					L										
	Hastelloy C					C										
	Titanium					K										
	Zirconium					H										
	Tantalum					T										
	Platinum iridium					P										
	Others					□										
Grounding ring	SUS316						S									
	Hastelloy C						C									
	Titanium						K									
	Zirconium						H									
	Tantalum						T									
	Platinum						P									
	Others						□									
Wiring connection/ Watertight gland	Integral model							1								
Face to face	Standard								A							
	Others								□							
Installation/ Wiring direction	Integral model									H						
Calibration/ Approval	Standard calibration										A					
	Others										□					

X	Finish	Standard
1		Corrosion-resistant finish
2		Corrosion-proof finish

MagneW3000 PLUS (General Model) (Wafer detector 40~200mm) Polyurethane rubber lining

Basic Model No.		Selections									Optional selections		Options	
MGM18D	–									–		–		
Diameter	40mm	040											X	No option
	50mm	050											A	Test report
	65mm	065											B	Certification of traceability
	80mm	080											C	Mill sheet
	100mm	100											E	Moisture treatment
	125mm	125											F	Oil removal treatment
	150mm	150											J	Gasket for resin pipe (for general purposes)
	200mm	200											K	Attaching the TAG number plate to the terminal box (remote detector)
Lining	PFA		P										L	Attaching the TAG number plate to the neck section
Pipe connection	Wafer JIS10K			11									□	Others
	Wafer JIS20K			12										
	Wafer JIS30K			13										
	Wafer ANS150			21										
	Wafer ANS300			22										
	Wafer DIN PN10			41										
	Wafer DIN PN16			42										
	Wafer DIN PN25			43										
	Wafer DIN PN40			44										
	Wafer JPI150			61										
	Wafer JPI300			62										
Electrodes	SUS316L				L									
	Titanium				K									
	Others				□									
Grounding ring	SUS316					S								
	Titanium					K								
	Others					□								
Wiring connection/ Watertight gland	Integral model						1							
Face to face	Standard							A						
	Others							□						
Installation/Wiring direction	Integral model								H					
Calibration/ Approval	Standard calibration									A				
	Others									□				

X	Finish	Standard
1		Corrosion-resistant finish
2		Corrosion-proof finish

X	Bolt/nuts	None
1		Carbon steel
2		SUS304

MagneW3000 PLUS (General Model) (Flange detector 40~200mm) Polyurethane rubber lining

Basic Model No.		Selections									Optional selections		Options	
MGM18F	–									–		–		

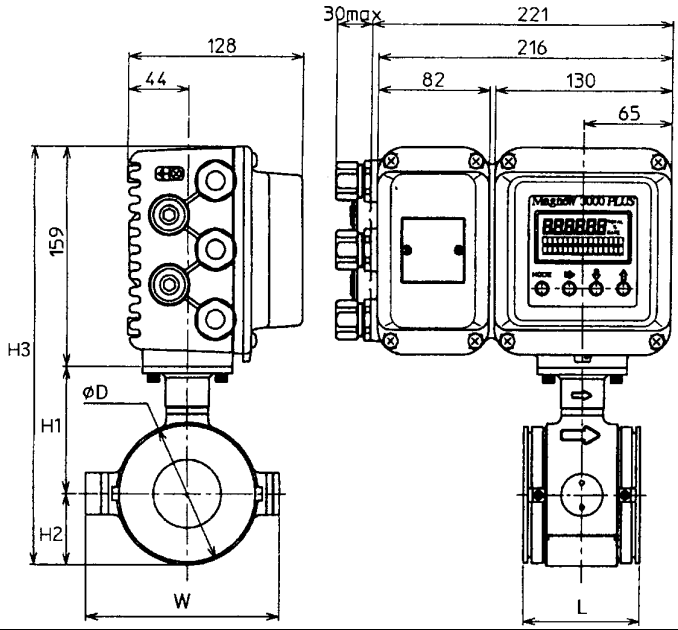
Diameter	40mm	040											X	No option
	50mm	050											A	Test report
	65mm	065											B	Certification of traceability
	80mm	080											C	Mill sheet
	100mm	100											E	Moisture treatment
	125mm	125											F	Oil removal treatment
	150mm	150											J	Gasket for resin pipe (for general purposes)
	200mm	200											K	Attaching the TAG number plate to the terminal box (remote detector)
Lining	PFA		P										L	Attaching the TAG number plate to the neck section
Pipe connection	Flange JIS10K			J1									□	Others
	Flange JIS20K			J2										
	Flange JIS30K			J3										
	Flange ANS150			A1										
	Flange ANS300			A2										
	Flange DIN PN10			D1										
	Flange DIN PN16			D2										
	Flange DIN PN25			D3										
	Flange DIN PN40			D4										
	Flange JPI150			P1										
	Flange JPI300			P2										
Flange material	Standard				1									
	Others				□									
Electrodes	SUS316L					L								
	Titanium					K								
	Others					□								
Grounding ring	SUS316						S							
	Titanium						K							
	Others						□							
Wiring connection/ Watertight gland	Integral model							1						
Face to face	Standard								A					
	Others								□					
Installation/ Wiring direction	Integral model									H				
Calibration/ Approval	Standard calibration										A			
	Others										□			

X	Finish	Standard
1		Corrosion-resistant finish
2		Corrosion-proof finish

DIMENSIONS

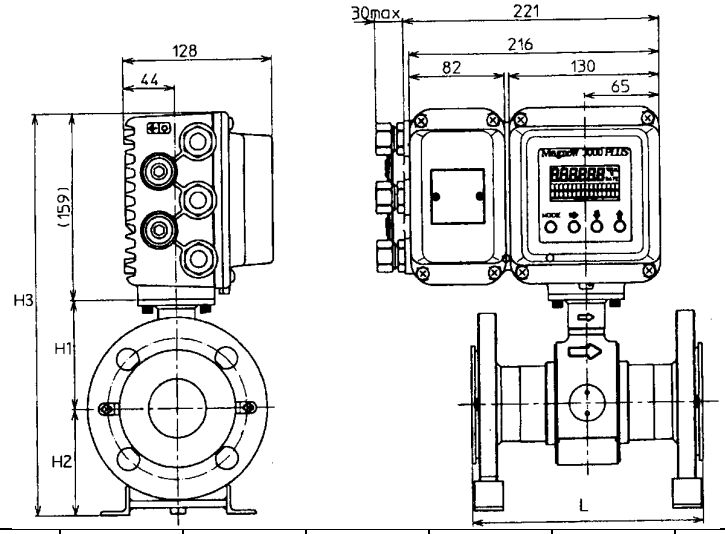
(Unit : mm)

Wafer



Detector diameter		40	50	65	80	100	125	150	200
Face to face dimension	L	80	86	96	106	120	140	160	200
Height	H1	84	93	100	108	121	133	160	185
	H2	43.5	52	62	67	79.5	95	110	135
	H3	287	304	321	334	359	387	429	479
	H4	168	177	184	192	205	217	244	269
Width	W	132	142	155	171	196	221	247	297
Outer diameter	ϕD	87	104	124	134	159	190	220	270
Mass(kg)		6.1	6.7	7.8	8.5	10.0	13.3	16.9	25.3

Flange



Detector diameter		40	50	65	80	100	125	150	200
Face to face dimension	L	200	200	200	200	250	250	300	350
Height	H1	84	93	100	108	121	133	160	185
	H2	85	90	102	105	120	143	175	197
	H3	328	342	361	372	395	435	477	523
	H4	168	177	184	192	205	217	244	269
Mass(kg)		9.8	11.8	13.3	15.9	21.7	29.3	35.9	51.3

azbil

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