



# ECO OVAL

## (OVERSEAS EDITION)

GENERAL SPECIFICATION  
GS.No.GBB351E-12

### ■ GENERAL

This flowmeter is unique in selecting measuring chamber material and in design. The state-of-the-art electronic expertise is used throughout with multiple-function, all-electronic register.

A magnetic sensor detects magnetic fields created by magnets embedded in the oval rotor in the wetted parts to obtain unfactored and factored pulses of extremely high sensitivity and reliability.

### ■ FEATURES

1. Accurate flowmetering is attributable to the inherent accuracy of oval flowmeter.
2. The register contains an LCD counter with multiple functions. View angle is freely adjustable. [Grand total flow, instantaneous flowrate (per-hour or per-minute), and resettable total flow selectable]
3. The LCD changes display modes with MODE switch at left of the register.
4. Small wetted parts count contributes to long life.
5. Flow output signal is compatible with a wide choice of remote receiving instruments for control, adjustment, record, and more applications.



### ■ ELECTRONIC REGISTER SPECIFICATIONS

Item	Description	
Functions	1 Accumulated total (8-digit)	
	2 Instantaneous flowrate (Mode b1: Hourly/Mode b2: Per-minute, selectable)	
	3 Resettable total (Zerostart /zeroresettable, Mode C)7-digit	
	4 Low battery alarm (a low battery indicator comes on below battery voltage 3.0V.) "■"	
	5 Factored pulse and unfactored pulse output (in externally powered model)	
Display	LCD7-segment 8-digit. Characters 10mm high. LCD reads in L (standard), kL, m <sup>3</sup> , g, kg, or none (normal).	
Reading accuracy	Total: ±1 count or better Instantaneous: ±1% of full scale or better	
Display orientation	Rotatable in 90° steps.	
Output signal	Type	Open collector pulse
	Capacity	Allowable current: 20mA DC Max, voltage impression: 30VDC
	Kind	Factored Unfactored
	Pulse width	1ms (std.), 50ms, 100ms, 250ms 2ms (fixed)
Transmission distance	1km max. (model operating on external power source) Vinyl insulated, vinyl sheathed control cable (CVV-S): 1.25mm <sup>2</sup> Finished cable O.D.: Applicable up to 12.0mm	
Power source	Battery powered	Externally powered
	Power sources 3.6VDC dedicated battery pack built in Life: 8 years (Low battery alarm comes on below 3V approx.)	12 to 50VDC ±10% Current capacity: 10mA Min. Backup battery built in
Ambient temp. range	-20 to +60°C (explosionproof model: -20 to +50°C) ※ Display temp. range: -10 to +60°C (Without dew condensation)	
Material	Housing: AC2A-T6	
Finish	Body: 2.5G8/2 Body cover: 2.5BG5/6 (baked melamine)	
Explosionproof configuration	TIIS	Battery powered: Intrinsically safe explosionproof Exia IIB T4, External power: Exd IIB T4
	NEPSI	External power: Flameproof and intrinsically safe ex. Exd IIB T4/Exia IIB T4 (※1)
	ATEX	Battery powered: Intrinsically safe explosionproof II2G Ex ib IIB T4 Gb External power: Flameproof safe explosionproof II2G Exd IIB T4
Housing Protection Grade	IP66	

※1 : Externally powered model operates with or without external power. Rated flameproof when externally powered; rated intrinsic safety when powered from an internal battery

※ : This flowmeter is not provided with subtracting counter; both reverse flows and pulsations cause counts on the total flow and pulse output.

### ■ APPLICABLE EN DIRECTIVES

Applicable EU Directive	Electro-Magnetic Compatibility Directive : 2004/108/EC ATEX Directive : 94/9/EC
Applicable EN standards, etc.	For Electro-Magnetic Compatibility Directive EN55011 : 1998/A1 : 1999, Group1, ClassB EN61000-6-2 : 2001 ATEX Directive : EN 60079-0:2006 EN 60079-1:2007 (d) EN 60079-0:2009 EN 60079-11:2007 (i)

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## ■ METER BODY SPECIFICATIONS

Item	Description							
Meter size	41	45	49	50	52	53	55	56
Applicable fluid	Kerosene, light oil, heavy oil (L) (※2), water (W), General chemical liquids service (V, D)							
Connection	Rc 1/4	Rc 3/8	JIS 10 K RF, ASME 150 RF					
Operating temp. range	0 to +120°C (explosionproof type : 0 to +100°C)							
Pressure range	1.96MPa				1.19MPa			
Linearity	±0.35% RD (L, V, D) (※2), ±1% RD (W)							
Material	Body	SCS14 (V)		FC250 (L), SCS13 equivalent (W, D)				
	Rotors	SUS316L (Sintered metal) (V)		Special resin (L, W), SUS316L (Sintered metal) (D)				
	O-rings	Viton (L, V, W), Teflon (Front Cover), Perfluor (Rotor Shaft) (D)						
Flow directions	Right to left (standard), left to right, bottom to top, top to bottom							
Finish	Non (V)			Munsell 2.5YR6/13 (L), Non (W,D)				

※1 : LGL Model are not applicable to gasoline.

※2 : Model LGD operating on water 80 to 120°C has an accuracy of ±1% of reading.

※ : L=LGL, W=LGW, V=LGV, D-LGD (See Product Code Explanation.)

## ■ METER SIZES, PROCESS CONNECTIONS, AND MATERIALS

Meter size	Nominal size	Flange rating	Meter body: L Material : FC250/resin	Meter body: W Material : SCS13/resin	Meter body: V Material : SCS14/ SUS316L (Sintered metal)	Meter body: D Material : SCS13/ SUS316L (Sintered metal)
41	10mm (3/4")	Rc1/4	—	—	○	—
45	10mm (3/8")	Rc3/8	—	—	○	—
49	20mm (3/4")	JIS 10K, ASME 150	○	—	—	—
50	20mm (3/4")	JIS 10K, ASME 150	○	—	—	—
52	20mm (3/4")	JIS 10K	—	○ (JIS only)	—	○ (JIS only)
	25mm (1")	JIS 10K, ASME 150	○	—	—	—
53	25mm (1")	JIS 10K	—	○ (JIS only)	—	○ (JIS only)
	40mm (1 1/2")	JIS 10K, ASME 150	○	—	—	—
55	40mm (1 1/2")	JIS 10K, ASME 150	○	○ (JIS only)	—	○ (JIS only)
56	50mm (2")	JIS 10K, ASME 150	○	○ (JIS only)	—	○ (JIS only)

## ■ FLOW RANGES

● For Oil Service Only (Kerosene, gas oil, heavyoil) (L) Material : Body: FC250/Rotors: Special resin. Unit:L/h

Meter size	Nom. size	Viscosity	Kerosene	Gas Oil (heavy oil A)	Heavy oil
			(Above 0.8mPa·s to 2mPa·s)	(Above 2mPa·s to 5mPa·s)	(Above 5mPa·s to 200mPa·s)
49	20mm (3/4")		10 to 800	7 to 800	5 to 800
50	20mm (3/4")		150 to 1600	80 to 2000	50 to 2000
52	25mm (1")		300 to 3000	150 to 3800	80 to 3800
53	40mm (1 1/2")		600 to 5000	300 to 6400	150 to 6400
55	40mm (1 1/2")		1200 to 11000	600 to 14000	400 to 14000
56	50mm (2")		2000 to 20000	1400 to 24000	900 to 24000

● For Water Service Only (W)

Material : Body: SCS13 equivalent/Rotors: Special resin.

Unit:L/h

Meter size	Nom.size	Water
52	20mm (3/4")	200 to 1200 L/h
53	25mm (1")	600 to 3600 L/h
55	40mm (1 1/2")	1200 to 7200 L/h
56	50mm (2")	2000 to 12000 L/h

● General chemical liquids service, oil & water (V, D)

Material : Body:SCS14 (V), SCS13 equivalent (D)

Rotors:SUS316L (Sintered metal)

Unit:m<sup>3</sup>/h

Meter size	Viscosity Nom. size	80°C to 120°C	Less than	0.3mPa·s to	0.8mPa·s to	2mPa·s to	5mPa·s to
		Water	0.3mPa·s	0.8mPa·s	2mPa·s	5mPa·s	1000mPa·s
41	8mm (Rc1/4)	0.018 to 0.1		0.012 to 0.1	0.004 to 0.1	0.0025 to 0.1	0.001to 0.1 (※1)
45	10mm (Rc3/8)	0.035 to 0.5		0.035 to 0.5	0.015 to 0.5	0.010 to 0.5	0.005 to 0.5 (※1)
52	20mm (3/4")	0.7 to 3		0.4 to 3	0.3 to 3	0.15 to 3.8	0.08 to 3.8
53	25mm (1")	1.1 to 5		0.7 to 5	0.55 to 5	0.28 to 6.4	0.15 to 6.4
55	40mm (1 1/2")	1.8 to 11		1.2 to 11	1 to 11	0.4 to 14	0.26 to 14
56	50mm (2")	3.5 to 20		2.5 to 20	2 to 20	0.9 to 24	0.6 to 24

※1 : 5mPa·s to 200mPa·s for flow.

**FACTORED PULSE WIDTH SELECTOR TABLES**

Meter ID code:L

: Option

Meter Size	Capacity	Factored pulse		Factored pulse selectable range				Unfactored pulse		Instant flowrate indicated (std)	
		Unit pulse	Output freq., Hz	1ms	50ms	100ms	250ms	Nom.meter factor	Output freq.	Hourly Mode b1	Per minute Mode b2
49	999999.99×L	10mL/P	22.2Hz	○	—	—	—	5.928mL/P	37.5Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	2.22Hz	○	○	○	○				
	99999999×L	1L/P	0.22Hz	○	○	○	○				
50	999999.99×L	10mL/P	55.6Hz	○	—	—	—	9.912mL/P	56.0Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	5.56Hz	○	○	○	—				
	99999999×L	1L/P	0.56Hz	○	○	○	○				
52	999999.99×L	10mL/P	106Hz	○	—	—	—	9.639mL/P	109.5Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	10.6Hz	○	○	—	—				
	99999999×L	1L/P	1.06Hz	○	○	○	○				
53	999999.9×L	100mL/P	17.7Hz	○	—	—	—	17.470mL/P	101.8Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	1.77Hz	○	○	○	○				
	999999.99×m³	10L/P	0.17Hz	○	○	○	○				
55	999999.99×L	100mL/P	38.9Hz	○	—	—	—	34.526mL/P	112.6Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	3.89Hz	○	○	○	—				
	999999.99×m³	10L/P	0.39Hz	○	○	○	○				
56	999999.9×L	100mL/P	66.7Hz	○	—	—	—	74.483mL/P	89.5Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	6.67Hz	○	○	○	—				
	999999.99×m³	10L/P	0.67Hz	○	○	○	○				

Meter ID code: W

: Option

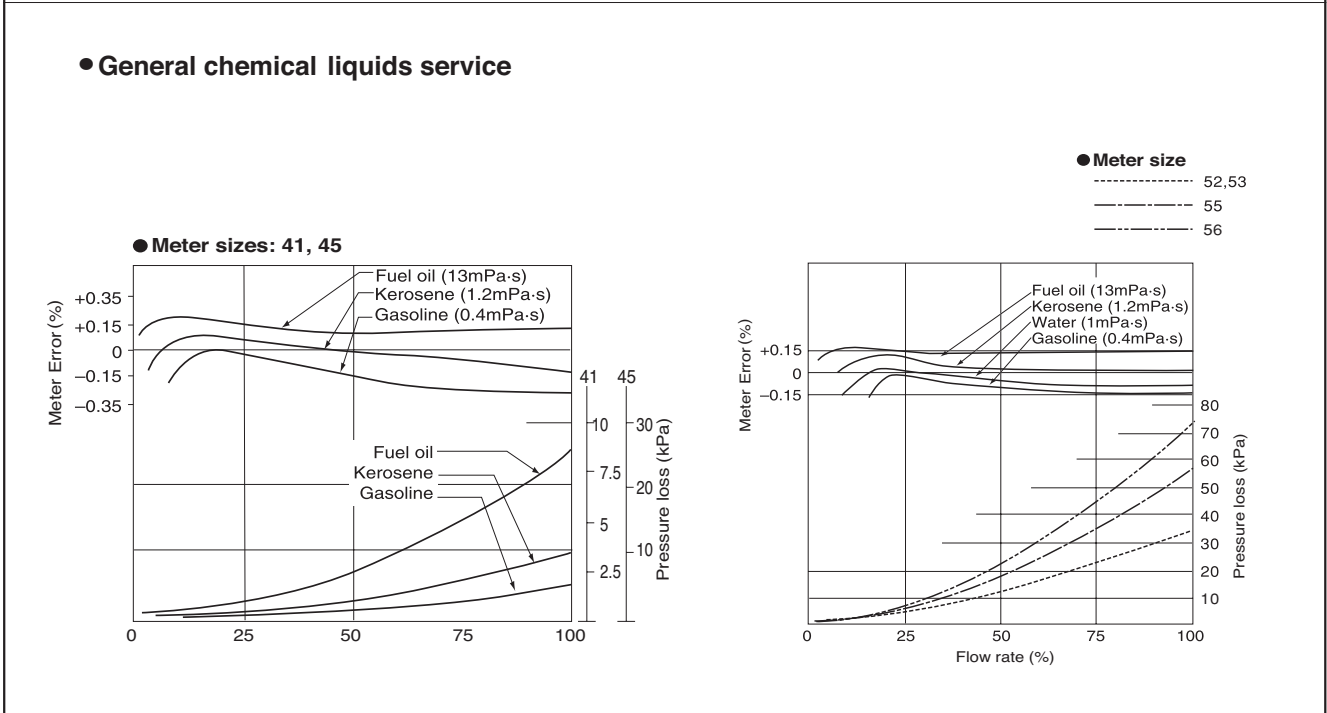
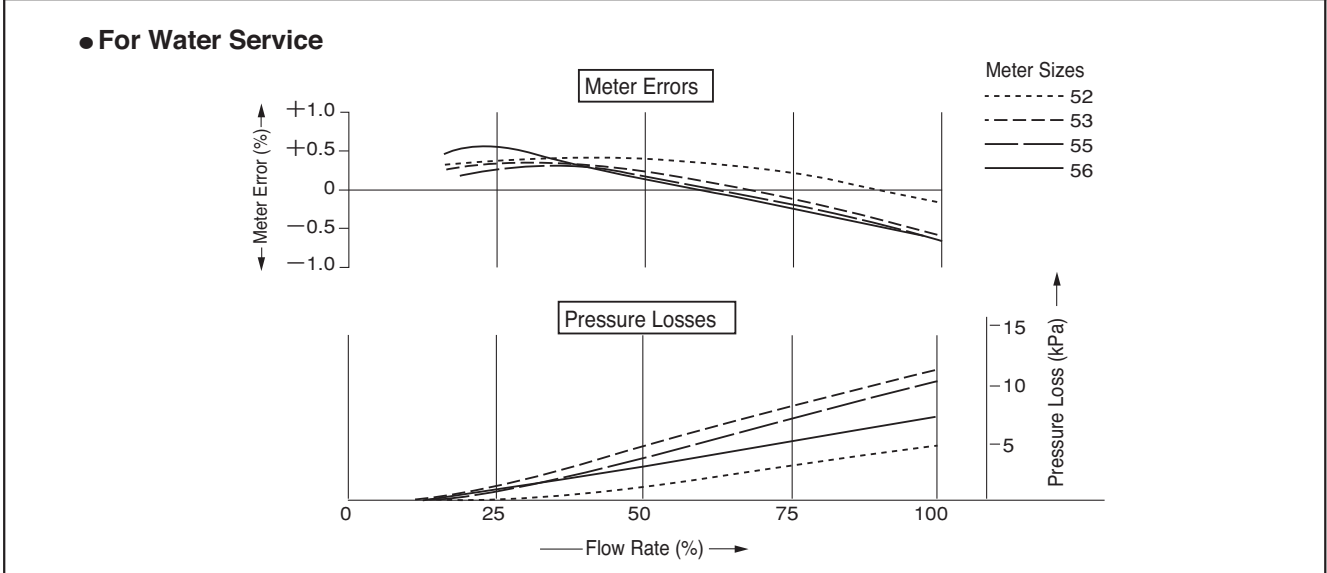
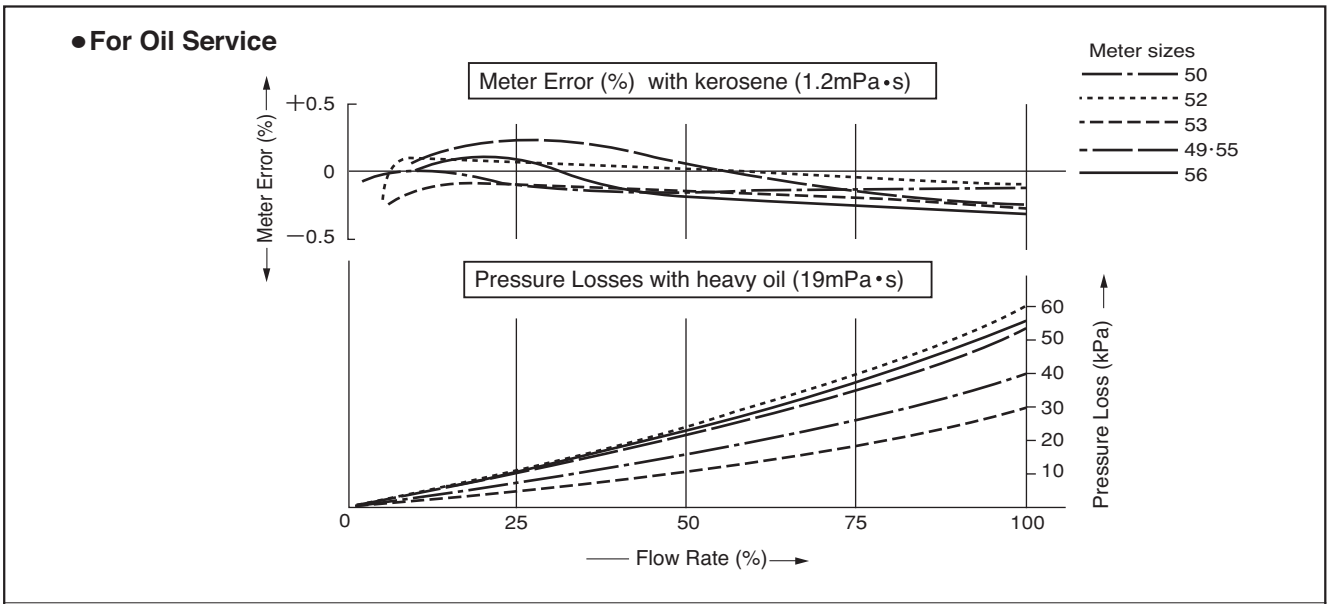
Meter Size	Capacity	Factored pulse		Factored pulse selectable range				Unfactored pulse		Instant flowrate indicated (std)	
		Unit pulse	Output freq., Hz	1ms	50ms	100ms	250ms	Nom.meter factor	Output freq.	Hourly Mode b1	Per minute Mode b2
52	999999.99×L	10mL/P	33.3Hz	○	—	—	—	9.918mL/P	33.6Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	3.33Hz	○	○	○	—				
	99999999×L	1L/P	0.33Hz	○	○	○	○				
53	999999.9×L	100mL/P	10.0Hz	○	○	—	—	17.955mL/P	55.7Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	1.0Hz	○	○	○	○				
	999999.99×m³	10L/P	0.1Hz	○	○	○	○				
55	999999.9×L	100mL/P	20.0Hz	○	—	—	—	35.496mL/P	56.3Hz	0.01m³/h	0.0001m³/min
	999999.99×L	1L/P	2.0Hz	○	○	○	○				
	999999.99×m³	10L/P	0.2Hz	○	○	○	○				
56	999999.9×L	100mL/P	33.3Hz	○	—	—	—	76.455mL/P	43.6Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	3.33Hz	○	○	○	—				
	999999.99×m³	10L/P	0.33Hz	○	○	○	○				

Meter ID code:V, D

: Option

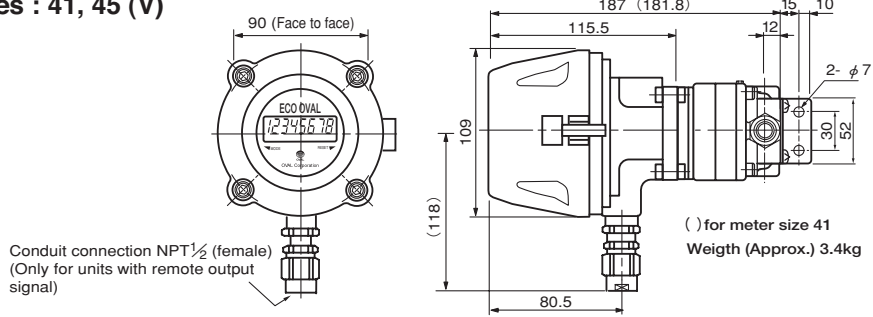
Meter Size	Capacity	Factored pulse		Factored pulse selectable range				Unfactored pulse		Instant flowrate indicated (std)	
		Unit pulse	Output freq., Hz	1ms	50ms	100ms	250ms	Nom.meter factor	Output freq.	Hourly Mode b1	Per minute Mode b2
41	99999.999×L	1mL/P	27.8Hz	○	—	—	—	0.4896mL/P	56.7Hz	0.1L/h	0.001L/min
	99999.99×L	10mL/P	2.78Hz	○	○	○	—				
	999999.9×L	100mL/P	0.28Hz	○	○	○	○				
45	99999.99×L	10mL/P	13.9Hz	○	—	—	—	2.468mL/P	56.3Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	1.392Hz	○	○	○	○				
	99999999×L	1L/P	0.14Hz	○	○	○	○				
52	99999.99×L	10mL/P	106Hz	○	—	—	—	9.644mL/P	109.2Hz	1L/h	0.01L/min
	999999.9×L	100mL/P	10.6Hz	○	○	—	—				
	99999999×L	1L/P	1.06Hz	○	○	○	○				
53	999999.9×L	100mL/P	17.7Hz	○	—	—	—	17.513mL/P	101.5Hz	1L/h	0.01L/min
	99999999×L	1L/P	1.77Hz	○	○	○	○				
	999999.99×m³	10L/P	0.17Hz	○	○	○	○				
55	999999.9×L	100mL/P	38.89Hz	○	—	—	—	34.605mL/P	112.4Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	3.89Hz	○	○	○	—				
	999999.9×m³	10L/P	0.39Hz	○	○	○	○				
56	999999.9×L	100mL/P	66.7Hz	○	—	—	—	74.66mL/P	89.3Hz	0.01m³/h	0.0001m³/min
	99999999×L	1L/P	6.67Hz	○	○	○	—				
	999999.99×m³	10L/P	0.67Hz	○	○	○	○				

**METER ERRORS AND PRESSURE LOSSES**

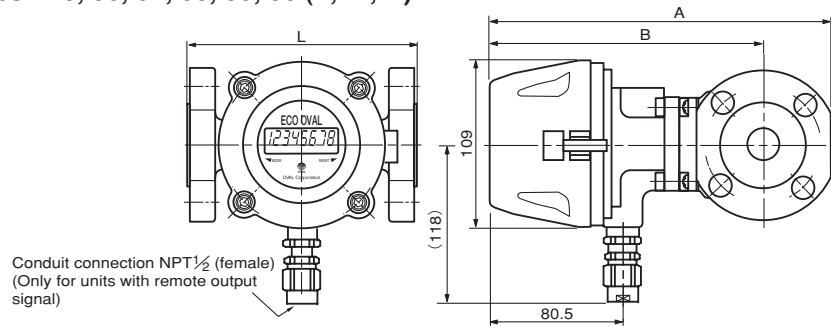


■ **OUTLINE DIMENSIONS (Unit in mm)**

● **Meter sizes : 41, 45 (V)**



● **Meter sizes : 49, 50, 52, 53, 55, 56 (L, W, D)**



Meter size	Material	Nom. size	L	A	B	Weight (Approx.)
49	L	20	150	200.5	155.5	4.2
50	L	20	150	205.5	160.5	4.2
52	L	25	225	218.5	163.5	7.2
	W,D	20	225	204.5	158.5	7.5
53	L	40	225	232.5	174.5	8.7
	W,D	25	225	229.5	172.5	9.1
55	L	40	230	236.5	178.5	10.7
	W,D	40	245	237.5	179.5	11.2
56	L	50	250	255.5	183.5	15.5
	W,D	50	280	255.5	183.5	16.9

※ : JIS 10K RF dimensions are shown. For ASME 150 RF, consult the factory.

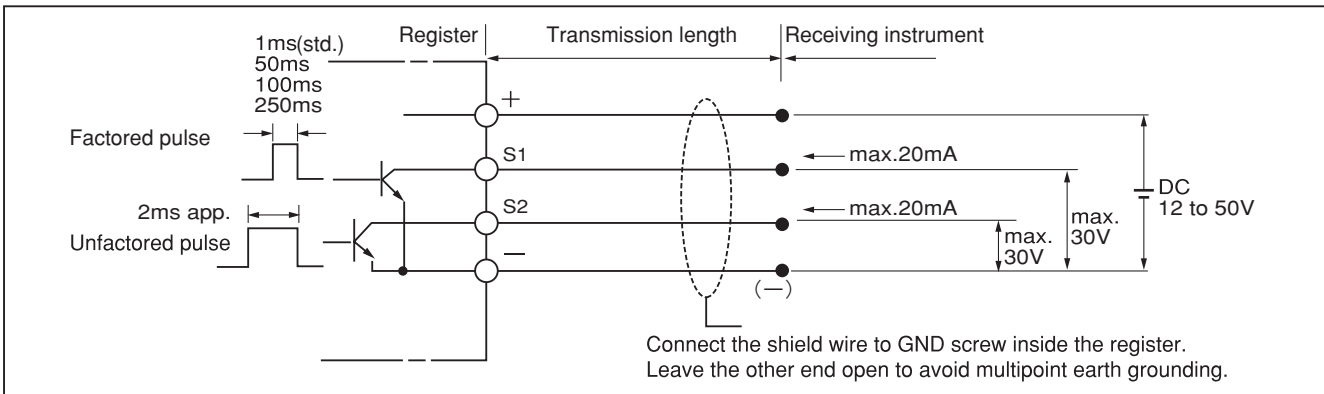
※ : Materials W are not applicable to ASME 150 flange.

● **Liquids applicable to LGV and LGD**

LGV(O-ring material : Viton), LGD(O-ring material : Teflon)		LGD(O-ring material : Teflon)
Water and oils	Other general liquids	Solvent use
Water (See Note.)	Isobutyl alcohol	Cyclohexane
Gasoline	Ethanol and ethyl alcohol	Methanol, Methyl alcohol
Kerosene, lightoil, heavyoil (ABC)	Etylbenzene and ethylbenzol	Methyl ethyl ketone (MEK)
Engine oil	Ethylene glycol	Benzene
Gear oil	Octanol (n-octyl alcohol)	Toluene
Coolantoil	Xylene (o-, meta-and para-) and xyloil	Thinner for peint
Grease	Dimethylbenzene	Acryli cacid
Glycerin	Diethylene glycol	LLC (50%)
Coaltar, tar and pitch	Isopropyl alcohol	Ammonium solution (Less than 25wt%)
Mineral oil and transformer oil		
Lubricating oil, spindle oil		
Residue oil		
JP-1 and JP-4		
Turpentine		
Noramalparaffin, paraffin		
Castor oil and wood oil		
Glycerol		
Liquid paraffin		
Wax		
Varnish		

※ : Warm water, distilled water, soap water, industrial water, boiler feed water, etc.

**WIRING DIAGRAM**



For reference purpose, an arrangement to convert open collector pulse into voltage pulse is shown.

NOTE: Select load resistance value R such that the current flowing into the transistor is held below 20mA in relation with E.  
The wave pattern of (A) and (B) becomes the reversed wave pattern each other.

**Precautions**

1. Both factored pulse and unfactored pulse output is of open collector output. Use by connecting a load on the part of receiving instrument that the rate is held within 30VDC, 20mAmax.
2. Exercise care to avoid exceeding the rating or incorrect wiring connections with regard to polarities that could result in damage to the register.
3. Depending on the type of cable, select either unfactored or factored pulses.

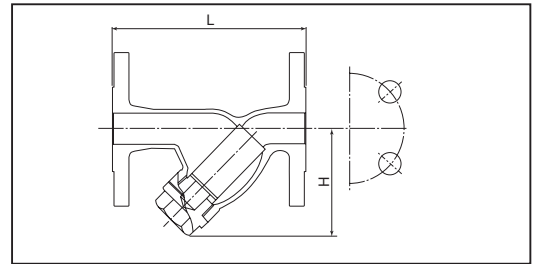
**PRODUCT CODE EXPLANATION**

Item	Code No.												Description				
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫					
Type	L	G											ECO OVAL				
Meter ID code (also material code)	L												Meter body: Cast Iron (FC250) Rotors: Special resin				
	W												Meter body: Stainless steel (SCS13 equivalent) Rotors: Special resin				
	V												Meter body: Stainless steel (SCS14) Rotors: SUS 316L Sintered metal				
	D												Meter body: Stainless steel (SCS13 equivalent) Rotors: SUS 316L Sintered metal				
Meter size													L	W	V	D	
	4	1											—	—	Screw Rc1/4	—	
	4	5											—	—	Screw Rc3/8	—	
	4	9											20mm (3/4")	—	—	—	
	5	0											20mm (3/4")	—	—	—	
	5	2											25mm (1")	20mm (3/4")	—	20mm (3/4")	
	5	3											40mm (1 1/2")	25mm (1")	—	25mm (1")	
	5	5											40mm (1 1/2")	40mm (1 1/2")	—	40mm (1 1/2")	
													50mm (2")	50mm (2")	—	50mm (2")	
Flange rating			A										General (O-ring : Viton) (In case of Meter ID code L, W, V)				
			B										General or Solvent use (O-ring : Teflon or Perfluoro) (In case of Meter ID code D)				
			1										JIS 10K RF				
		2										ASME 150 RF (In case of Meter ID code W , not available.)					
		3										Screw Rc1/4, Rc3/8 (In case of Meter ID code V)					
		0	—									Always "0"					
Power source													D	Battery powered (without pulse generator)			
													G	Externally powered			
Explosionproof ratings													0	Non-explosionproof			
													1	TIIS / Battery powered:Exia IIBT4, External power:Exd IIBT4/Exia IIBT4			
													2	ATEX / Battery powered:II2G EExia IIBT4, External power:II2G ExdIIBT4			
													7	NEPSI / Battery powered:Exia IIBT4, External power:Exd IIBT4/Exia IIBT4			
Pulse Generator													0	Less pulse generator			
													3	Open collector factored pulse (pulse width 1ms), unfactored pulse (pulse width 2ms)			
													5	Open collector factored pulse (pulse width 50ms), unfactored pulse (pulse width 2ms)			
													6	Open collector factored pulse (pulse width 100ms), unfactored pulse (pulse width 2ms)			
													7	Open collector factored pulse (pulse width 250ms), unfactored pulse (pulse width 2ms)			
Version code													A	(Always "A")			

■ **STRAINERS** (41, 45 models are of 200 mesh strainer built-in.)

● **General chemical liquids service (LGD) Visocsity : Max.5mPa·s**

Item		Description
Operating temp. range		0 to 120°C
Max. operating pressure		0.98MPa
Materials	Body	SCS13A
	Net	SUS316/SUS304
Finish		Unpointed
Allowable diff. press.on net		0.1MPa

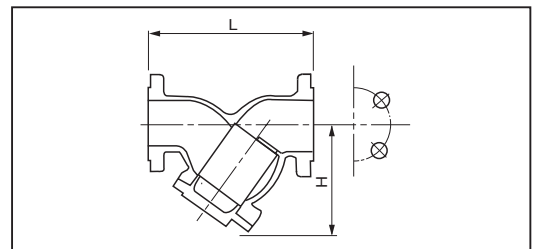


Model	Nom.size (mm)	Net Mesh	L (mm)	H (mm)	Flange rating	Weight (kg)	Applicable meters
YKL13F-20J	20	100	140	75	JIS10KRF	2.5	52
YKL13F-25J	25	100	160	85		4	53
YKL13F-40J	40	60	190	110		6	55
YKL13F-50J	50	60	220	130		8	56

※ : For liquids in excess of 5mPa·s, select one from the medium size strainers in General Specifications No. GCB002-E.

● **Oil and water service (LGL, LGW)**

Item		Description
Operating temp. range		0 to 120°C
Max. operating pressure		1.18MPa
Materials	Body	FC250
	Net	SUS304
Finish		Orange (Munsell2.5YR6/13)



Model	Nom.size (mm)	Net Mesh	L (mm)	H (mm)	Flange rating	Weight kg	Applicable meters	
							LGL	LGW
SS5278A	20	80	125	82	JIS10KRF	3.4	49,50	52
SS5378A	25	60	140	104		5.3	52	53
SS5578A	40	60	170	129		7.7	53,55	55
SS5678A	50	60	190	153		9.6	56	56

## ■ ORDERING INFORMATION

Please complete the following form when making inquiries.

1. Model	L_____
2. Fluid to be measured	Name_____ Viscosity_____ mPa·s Specific gravity_____
3. Flowrate (L/h, m <sup>3</sup> /h)	Maximum_____ Normal_____ Minimum_____
4. Fluid temperature (°C)	Maximum_____ Normal_____ Minimum_____
5. Ambient temperature (°C)	Maximum_____ Normal_____ Minimum_____
6. Pressure (MPa)	Maximum_____ Normal_____ Minimum_____
7. Flow direction	Right ⇌ Left, Bottom ⇌ Top
8. Flange connection	Nominal size_____ mm, Flange rating_____
9. Required Linearity	±_____ %
10. Explosionproof configuration	<input type="checkbox"/> Required class_____ <input type="checkbox"/> Not required
11. Accessories	<input type="checkbox"/> Strainer, <input type="checkbox"/> Air eliminator, <input type="checkbox"/> Companion flange
12. Quantity	Including accessories_____
13. Application	_____(dosing, sampling, blending process, etc.) <input type="checkbox"/> Flow integration, <input type="checkbox"/> Flow indication, <input type="checkbox"/> Record, <input type="checkbox"/> Flow control, <input type="checkbox"/> Batch control, <input type="checkbox"/> CPU interface, <input type="checkbox"/> Others
14. Receiving instrument	Type, manufacturer, model, specifications (input, output, power supply, etc.)
15. Distance between flow meter and receiving instrument	_____ m

The specification as of August, 2015 is stated in this GS Sheet. Specifications and design are subject to change without notice.

**Sales Representative:**