OVAL

High Pressure Coriolis Flowmeters

ULTRA *mass MK Ⅱ* CN004H

Transmitter : MT9431

GENERAL SPECIFICATION

GS.No.GBN066E–4

■ GENERAL

Our concentrated effort in developing true state-of-art measuring tools and specialized manufacturing experience in Coriolis technology has resulted in this extra-high pressure service Coriolis flowmeter characterized by outstanding performance, ease of use, and increased safety.

Transmitter
Rack mount Type
MT9431

■ FEATURES

1. High accuracy (± 1.0% of reading ± zero stability error) and high sensitivity (measuring range 1 to 100).
2. Accepts both liquid and gas. Measures a wide flow range accurately with low pressure loss.
3. Measures temperature accurately besides mass flowrate.
4. Branchless flow path design offers ease of cleaning.
5. Only two welded points - at the inlet and output in the wetted parts - a truly dependable design suitable for high pressure gas measurement.
6. All wetted parts of CN004H-HY-900 are made of Alloy C and are compatible with a wide variety of fluids.
7. All wetted parts of CN004H-SS-900R are made of SUS310S and are particularly suited for high pressure hydrogen flow measurement.
8. The meter casing has a high mechanical rigidity for ease of use, reducing space requirements, and increasing process safety.
9. The transmitter is of remotely located type.
10. Explosionproof design allows its use in hazardous locations.
11. High pressure gas safety regulations-compliant models also available.

■ GENERAL SPECIFICATIONS

● **Sensor unit**

For the transmitter（MT9431）, see OVAL products General Specification Sheet No. GEJ514E.

Item		Description	
Mode		CN004H-HY-900R	CN004H-SS-900R
Nominal size		3/8″	
Materials	**Wetted**	Alloy C	SUS310S
	Housing	SUS304	
Connector connection		High-press. cone & thread connection, size 3/8 375C (male thd. 3/4-16UNF)	
Applicable fluids		Liquids and gases	
Density range		0 to 2.0 g/mL	
Temperature range	**Non-explosionproof type**	Transmitter separate type：－ 40 to ＋ 130℃	
	Ex. temp. class T1	－ 20 to ＋ 120℃	
Max. operating pressure		95MPa（Max. 93℃）	82MPa（Max. 40℃）
Flow direction		Forward and reverse, both available	
Explosionproof symbol		TIIS explosionproof：Intrinsically safety explosionproof（Exia Ⅱ CT1）（※ 1）	
Weight (Terminal box and mtg. base incl.)		Approx. 20kg	

※ 1：This explosionproof configuration is system approved for explosionproof rating with the sensor unit and transmitter combined.
※ ：Density and volume flow measurements are unacceptable.
※ ：Since the casing of sensor unit is not pressure resistant, the withstanding pressure rating of the casing is not indicated. To afford adequate protection, an Rc1/4 boss is provided; use customer's discretion in providing a rupture disc (Supported with options we offer.), pressure switch, etc. Rupture disc pressure rating and pressure switch setting is 7 MPa (G).
※ ：Miscellaneous: as for high pressure gas safety regulations compliant models, consult OVAL.
※ ：If you plan to use CN004H-HY-900R for hydrogen flow measurement, consult OVAL.

OVAL Corporation

http://www.oval.co.jp/english

Head Office (Tokyo): Tel. +81 3-3360-5121 Fax. +81 3-3365-8605
International Sales Division Email: SK10@oval.co.jp
Overseas Branch Offices: Beijing, Seoul, Singapore, Taipei

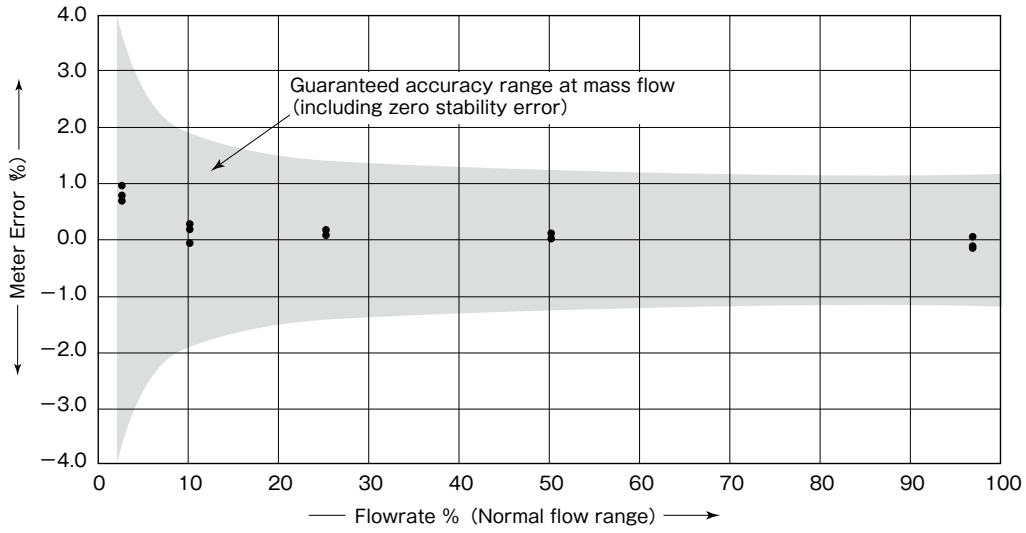
■ GENERAL PERFORMANCE

Item		Description	
Model		CN004H-HY-900R	CN004H-SS-900R
Flow rate	**Normal flowrate**	2.0 kg/min	
	Allowable max. flowrate	4.0 kg/min	
	Min. flowrate	0.04 kg/min	
	Accuracy in factory calibration	[±1% ± zero stability error] of RD	
	Repeatability	[±0.5% ± 1/2 zero stability error] of RD	
	Zero stability	0.002 kg/min	0.003 kg/min
	Analog accuracy	±0.1% of FS added to each accuracy	

$$\text{Zero stability error} = \frac{\text{Zero stability (kg/min)}}{\text{Flow rate at the moment (kg/min)}} \times 100\%$$

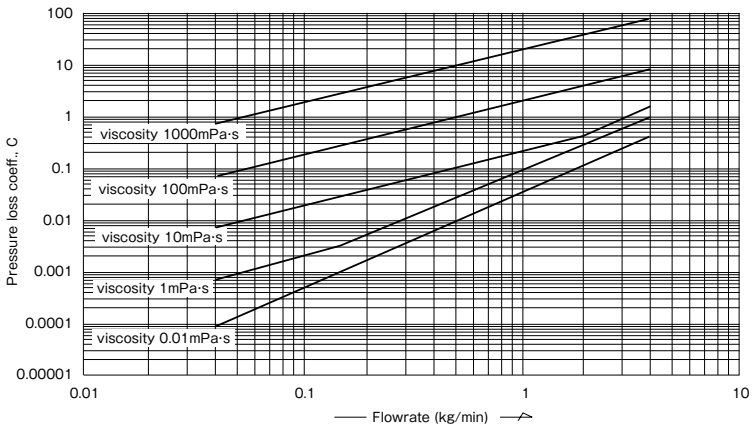
※ : In gas measurement, the max. permissible flow velocity varies with the type of gas and some may be beyond the bounds of measurement. If such is the case, seek our technical assistance.

■ METER ERROR



● Mark : Actual error in factory calibration of Model CN004-HY.

■ PRESSURE LOSS



How to determine pressure loss

1. Find the pressure loss factor C from flowrate (kg/min) and viscosity (mPa·s) of parameter.
   Dividing the obtained value C by specific gravity d (1 for water) gives the pressure loss. That is,

$$\Delta P = \frac{C}{d} \text{ (MPa)}$$

2. For high viscosity liquids not shown in these graphs, calculate the pressure loss by the following formula:

$$\Delta P_2 = C \times \frac{\mu_2}{\mu_1} \times \frac{1}{d}$$

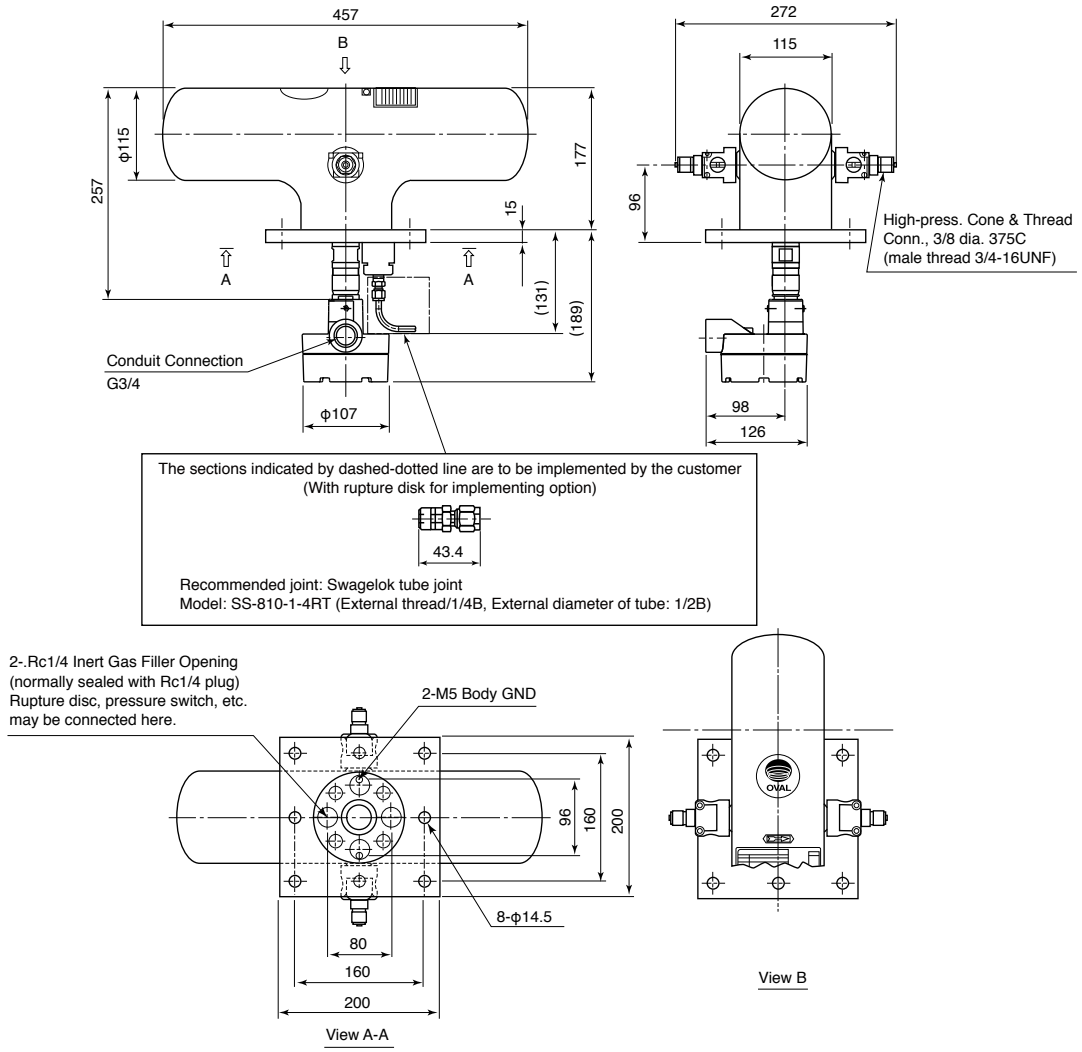
where

ΔP_2 : Pressure loss of high viscosity liquid (MPa)
μ_2 : Viscosity of high-viscosity liquid (mPa·s)
d : Specific gravity of high-viscosity liquid (1 for water)
μ_1 : Max. viscosity shown in the graph (mPa·s)
C : Pressure loss factor found from the max. viscosity curve at a given flowrate (kg/min).

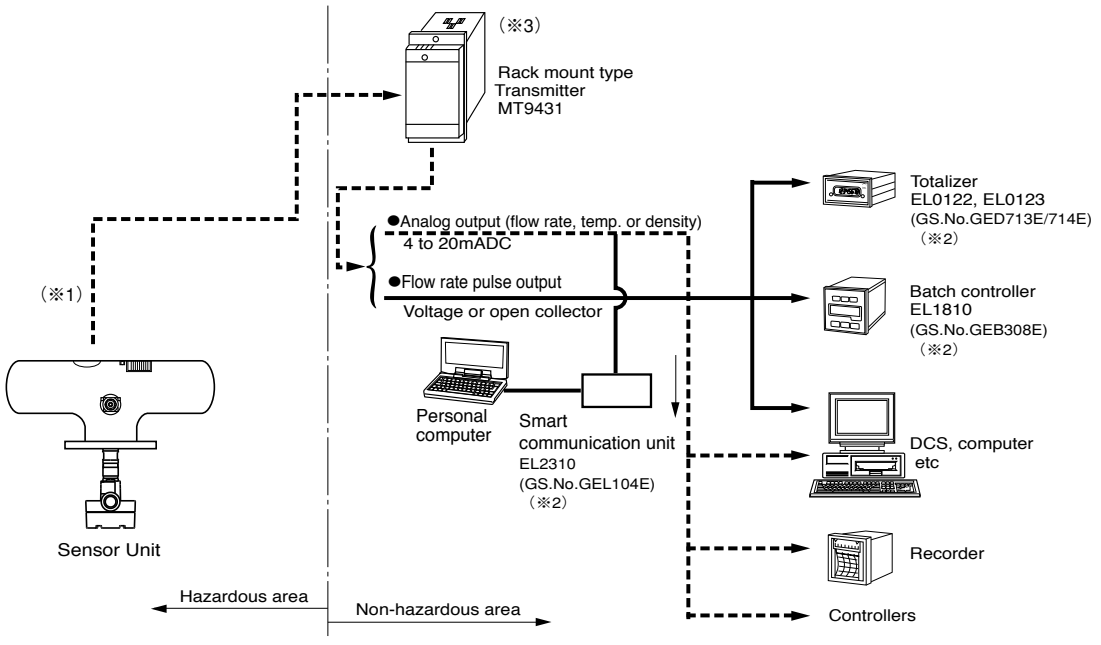
3. For pressure losses with gases, consult OVAL.

■ DIMENSIONS [Unit in mm]

●Transmitter separate type sensor unit only



■ REMOTE MEASURING SYSTEM

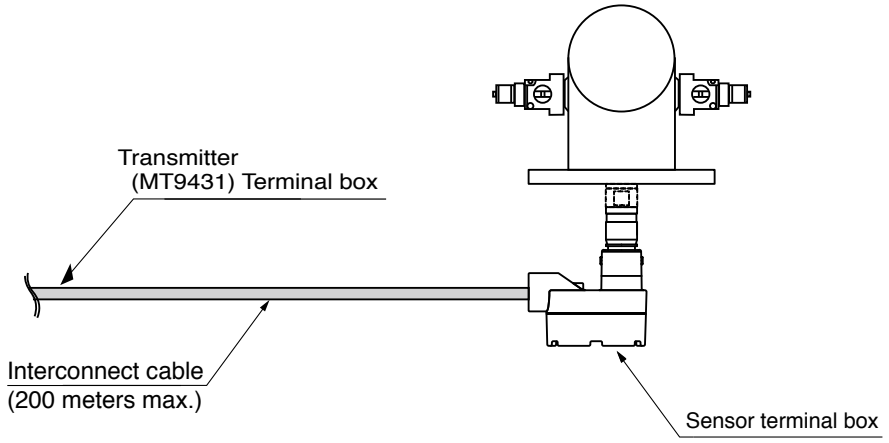


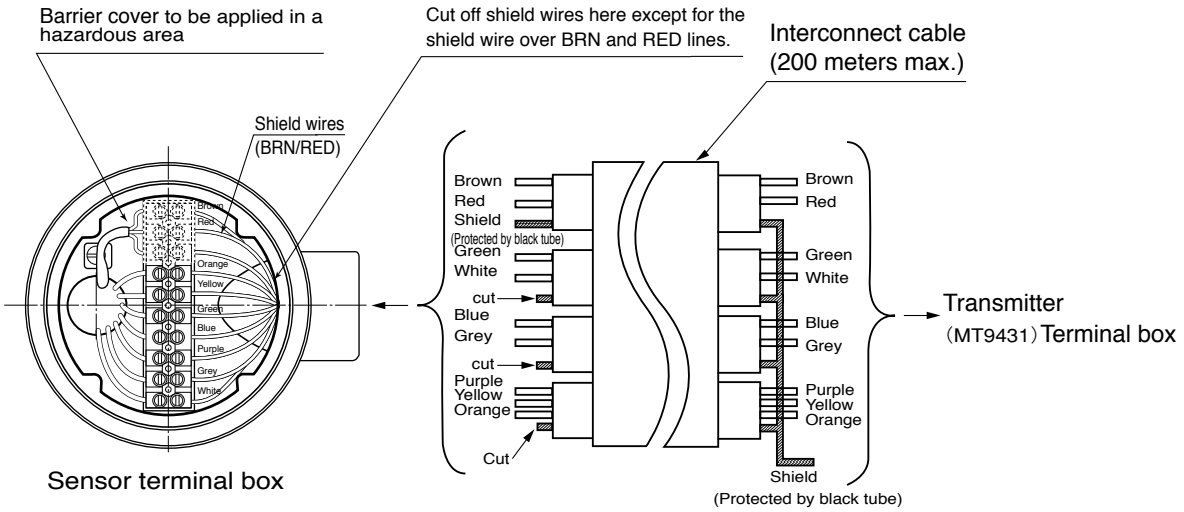
※1：In case of the separate type, the sensor unit and transmitter are connected with exclusive cable.
※2：For detailed information about companion instruments, see respective products GS sheets separately prepared.
※3：CE-marking compliant products are not available.

■ WIRING CONNECTIONS

For wiring connections with transmitter (MT9431), see OVAL products General Specification Sheet (GS. No. GEJ514E).

● Transmitter separate type





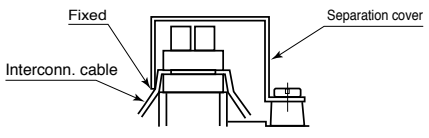
※：1.Do not fail to use Interconnect cable

2.Shield wire preparation

Slip a black sleeve over the shield wires corresponding with brown/red pair cable as shown in the figure, exercising care to avoid potential contact with the housing and other conductive parts. Clip all other shield wires.

How to install the cover.

After wiring with the terminals, install the cover as shown below.



■ STANDARD INSTALLATION

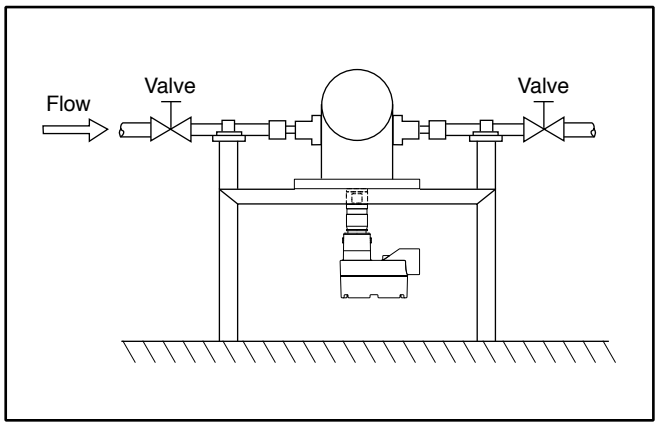
1. Typical Installation (See figure at right.)

① Exercise care not to place excessive piping stresses on this unit.

② While this unit is designed for installation on the mounting base, be sure to provide piping support upstream and downstream of the unit.

③ Arrange the piping such that this unit is completely filled with fluid at all times. Avoid installing it in a "pocket" where slurries or other substances may collect.

④ Provide a valve that can stop the flow completely downstream of the meter. It is necessary for zeroing with no flow.
We also suggest to provide another valve upstream of the meter for maintenance and servicing.



2. Precautions at Installation

① Locate the ULTRA*mass MKII* at least one meter from large transformers, motors, or other sources of electromagnetic induction. Also avoid installation near the sources of excessive vibration, such as motors and pumps.

② For making measurement of fluids that require heat insulation, direct tracing is applicable to the sensor unit.
Acceptable thermal insulation ranges from -40 to +130 ℃.
For explosionproof type, a range from -20 to +120 ℃ is acceptable.

③ The sensor unit is a gastight, argon-filled unit to prevent dew condensation inside. Use extra care therefore to avoid inadvertent or accidental dropping or bumping against objects.

④ In a horizontal run, install the sensor unit with the transmitter up as shown in the figure.

⑤ Locate the control valve downstream of this unit.
If cavitation is a possibility, locate it at least five meters apart.

⑥ To ensure consistent and accurate measurement, the Coriolis flowmeter should be placed in an environment where pipeline oscillation is held below 0.3G.

3. Physical orientation

Physical orientation does not affect the performance of this unit. It can be installed either in a horizontal or vertical run. However, with metered fluids that tend to produce bubbles and/or sediments, or where process fluid removal or purging is conducted after measurement, install the unit in a vertical run.

■ PRODUCT CODE EXPLANATION

● Sensor unit

Item	Code No. ① ②	③ ④ ⑤	⑥	—	⑦ ⑧	—	⑨	⑩	⑪	⑫	⑬	Description
Model	**C N**											ULTRA *mass MK II*
Nominal size		**0 0 4**										3/8″
Construction			**H**	—								High pressure type
Material					**H Y**	—						Alloy C
					S S	—						SUS310S
Connector connection							**9**					High-press. cone & thread connection, size 3/8 375C (male thd. 3/4-16UNF)
Connection standard								**0**				Always "0"
Pressure rating									**0**			Always "0"
Transmitter Mounting Construction										**R**		Rack mount type transmitter MT9431
											A	Version code A

● Transmitter

Item	Code No. ① ② ③ ④ ⑤ ⑥	—	Supplementary Code ⑦	⑧	⑨	⑩	⑪	⑫	Description
Model	**M T 9 4 3 1**	—							Rack-mount Transmitter MT9431
Power supply			**6**						20 to 30VDC
			7						85 to 250VAC 50/60Hz
Analog Output				**M**	**M**				2 mass flow outputs (same for single output)
				M	**T**				Mass flow + temperature
Pulse Output						**1**			Mass flow voltage pulse
						3			Mass flow open collector pulse
Status Output							**1**		Error output
							2		Flow direction
							3		Auto zero in progress
							4		Hi/Low alarm
Explosionproof								**0**	Non-explosionproof
								9	TIIS (domestic explosionproof) Temperature Class T1

※: If a high pressure service Coriolis flowmeter is connected, volume and density outputs are not provided.
※: For details of the transmitter, see OVAL products General Specification Sheet No. GEJ514E.

■ PLEASE SUPPLY THE FOLLOWING INFORMATION WHEN YOU INQUIRE

（Fill in the form below to the extent possible. Further details will be finalized in later consultation.）

・Fill in the blanks. Tick the boxes ☐ that apply.

1. Process fluid（※ 1）	Name：_____ SP. gr：_____ Viscosity：_____ Slurry content in a slug flow：_____ %	
2. Flow range	Max. _____ Normal _____ Full scale _____ ☐ kg/min ☐ kg/h ☐ Others _____	
3. Fluid temperature	Max. _____ °C Normal _____ °C Min. _____ °C	
4. Operating pressure	Max. _____ MPa Normal _____ MPa Min. _____ MPa	
5. Ambient temperature	Max. _____ °C Min. _____ °C	
6. Fluid flow direction	☐ Left → Right ☐ Right → Left ☐ Bottom → Top（☐ Top → Bottom） Orientation：See sketch on page 12.	
7. Nominal size	_____ mm or _____ inch	
8. Required accuracy	± % of reading ± % of full scale	
9. Explosionproof	☐ Not required ☐ TIIS	
10. Power supply	Power supply _____ V ☐ AC ☐ DC	
11. Output specifications	Pulse output	☐ Volt. pulse: [0]: 1.5V [1]: 15VDC min. Out. impedance: 2.2kΩ
		☐ Open collector: Min. 10V to Max. 30VDC, 50mA
		☐ Output frequency: Any point from 0.1 to 10000Hz at full scale
	Analog output	4 to 20mA DC Max. load: 600Ω
		2 outputs from instant. flow rate (mass), temp.
	Additional damping	0 to 200s. (variable)
	Alarm output	Slug flow High _____ g/mL Low _____ g/mL
12. Companion receiver	☐ Totalizer ☐ Indicator ☐ Recorder ☐ Flow controller ☐ Batch controller	
	☐ Computer ☐ Others	
13. Transmission length	Sensor unit（ ⟶ ）m Transmitter（ ⟶ ）m Receiving instrument	
14. Exclusive cable length	In case of separately- mounted type m (Max. 200m)	
15. No. of units required		
16. Application		
17. Other considerations		

※ 1：Special fluids, such as slurries, should be stated precisely and in detail.

The specification as of September, 2018 is stated in this GS Sheet. Specifications and design are subject to change without notice.

Sales Representative:

GS.No.GBN066E

初版	改訂	印刷
09.01	18.09	