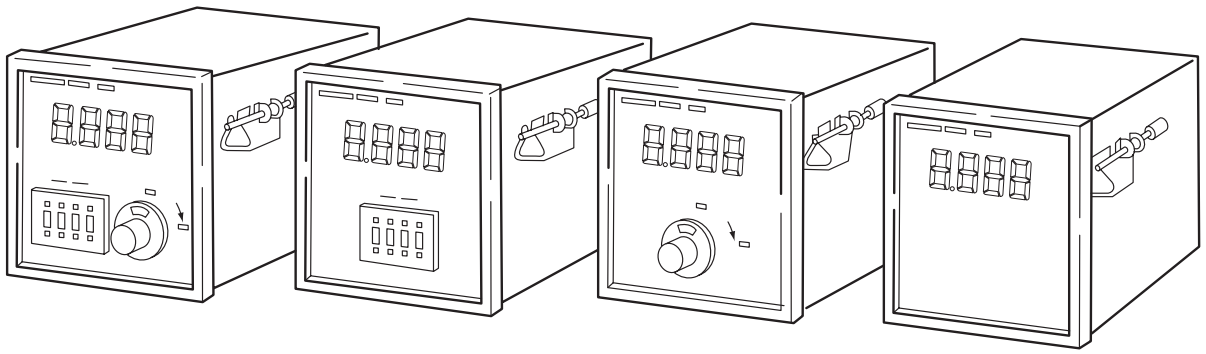
OVAL INSTRUCTIONS

Ins. No. L-504-6-E

READOUT UNITS

MODEL : ROU Series



Every OVAL product is fabricated, tested, and inspected under stringent quality control before it leaves our factory.

To derive maximum benefit from the product, we recommend you to be well familiar with the information and instructions given in this manual before you place it in service and retain this manual at the field location for ready reference.

It is suggested that you also familiarize yourself with the instruction manuals of the companion pulse generator (flowmeter) and receiving instrument.

CONTENTS

The indications **NOTE**, **CAUTION**, and **WARNING** shown throughout this manual are to draw your attention to specific items:

➡ NOTE

Notes are separated from the general text to bring user's attention to important information.

⚠ **CAUTION**

Caution statements call attention to user about hazards or unsafe practices that could result in minor personal injury or property damage.

⚠ **WARNING**

Warning statements call attention to user about hazards or unsafe practices that could result in serious personal injury or death.

1. GENERAL

The ROU00 Series are the dedicated readout units for the MASFLO-OVAL II (thermal mass flowmeter/ controller).

Various functions necessary for flow measurement/control are integrated into specialized units. The ROU00 series make possible the simple and economical configuration of flow measurement/control systems.

1.1 Features

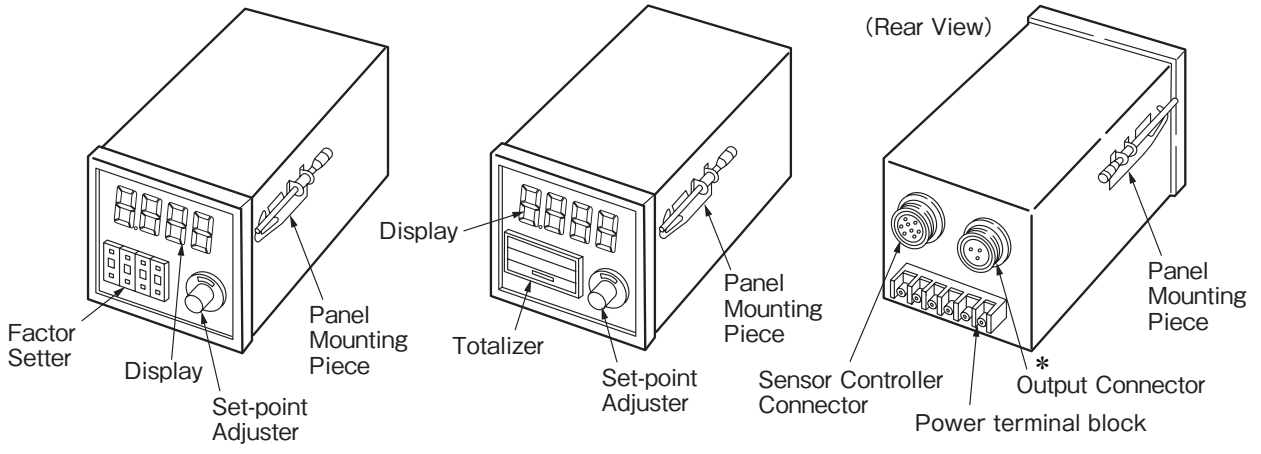
(1) DIN-sized compact and lightweight receiving instruments. Provided with all the basic capabilities required for measurement and control.

(2) A remote output (0 to 5V DC) is furnished as a standard feature. ROU01A, in particular, is designed to accept a remote control input for increased freedom in system design.

(3) Combined with MASFLO-OVAL II series, a fluid measuring system can simply and readily be built in laboratories, experimental equipment, etc.

(4) Prompt delivery and low cost.

1.2 Part Names



* Also serves as remote setting input on ROU01A.

Fig.1.1

1.3 Available Models and Configurations

Function / Model	±15VDC Power Output	Display	Totalizer	Set-point adjuster	Conversion Factor Setter (※1)	External Control Input Compatibility	Signal converter (※2)	Companion Instruments	
								MASFLO-OVAL II	
								Sensor	Controller
								FHA FHC	FHB FHC＋FHD
ROU01A	○	—	—	—	—	○	—	○	○
ROU02A	○	○	—	—	—	—	—	○	—
ROU03A	○	○	—	○	—	—	—	—	○
ROU04A	○	○	—	—	○	—	—	○	—
ROU05A	○	○	—	○	○	—	—	—	○
ROU06A	○	—	—	—	—	○	—	○	○
ROU07A	○	○	○	—	—	—	—	○	—
ROU08A	○	○	○	○	—	—	—	—	○
ROU01C	○	—	—	—	—	○	○	○	○
ROU02C	○	○	—	—	—	—	○	○	—
ROU03C	○	○	—	○	—	○	○	—	○
ROU07C	○	○	○	—	—	—	○	○	—
ROU08C	○	○	○	○	—	○	○	—	○
ROU03S	○	○	—	○	—	○	—	—	○
ROU05S	○	○	—	○	○	○	—	—	○

Each MASFLO-OVAL II requires an ROU series with the exception of ROU06A. Up to 4 instruments can be connected to ROU06A.

Analog input/output circuit and pulse output circuit of the ROU series are not isolated. For use of external input/output, connection should be made through an analog isolator as necessary.

➡NOTE: ※1. If conversion factor needs to be set arbitrarily, models with conversion factor setter should be selected. (Refer to the general specification sheet of MASFLO-OVAL II for the details of conversion factor.)

※2. Signal converter is capable of converting between 4 types of analog signal: 0 to 5VDC, 1 to 5VDC, 0 to 20mADC, and 4 to 20mADC.

2. HANDLING CONSIDERATIONS

Every Oval product is thoroughly tested and inspected before shipment from our factory. When received, its appearance should be inspected for possible damage by rough handling during transit. First of all, thoroughly read the handling precautions described in this section. For topics other than those stated in this section, refer to respective sections.

If at any time in the future you seek our assistance, consult OVAL sales office or nearest representative.

2.1 Confirming the Nameplate

This instrument is adjusted to individual specifications before it leaves our factory. Indicated on the back of terminal block cover is the nameplate showing the converter specifications and on top of the terminal block is the model number nameplate.
Make sure to see that the instrument you have received conforms to the GENERAL SPECIFICATIONS and PRODUCT CODE EXPLANATION.

2.2 Transportation Considerations

(1) In order to safeguard against damage during transit, transport the instrument to the installation location in the original package used for shipment from the factory if possible.
(2) Use care not to give impact shocks to the instrument during transportation.

2.3 Storage Considerations

If the instrument is to be stored over an extended period of time before installation, it could be involved in unexpected happenings. So if an extended period of storage is expected, good practice is to take the following precautions:

(1) The instrument should be stored in the original package used for shipment from the factory if circumstances permit.
(2) Select a storage location that meets the following requirements:
- where it is free from rain and water.
- where vibration and impact shock are least encountered.
- where temperature and humidity in the storage location are near the room temperature and humidity (25℃ , 65% R.H.).

3. INSTALLATION

3.1 Outline Dimensions

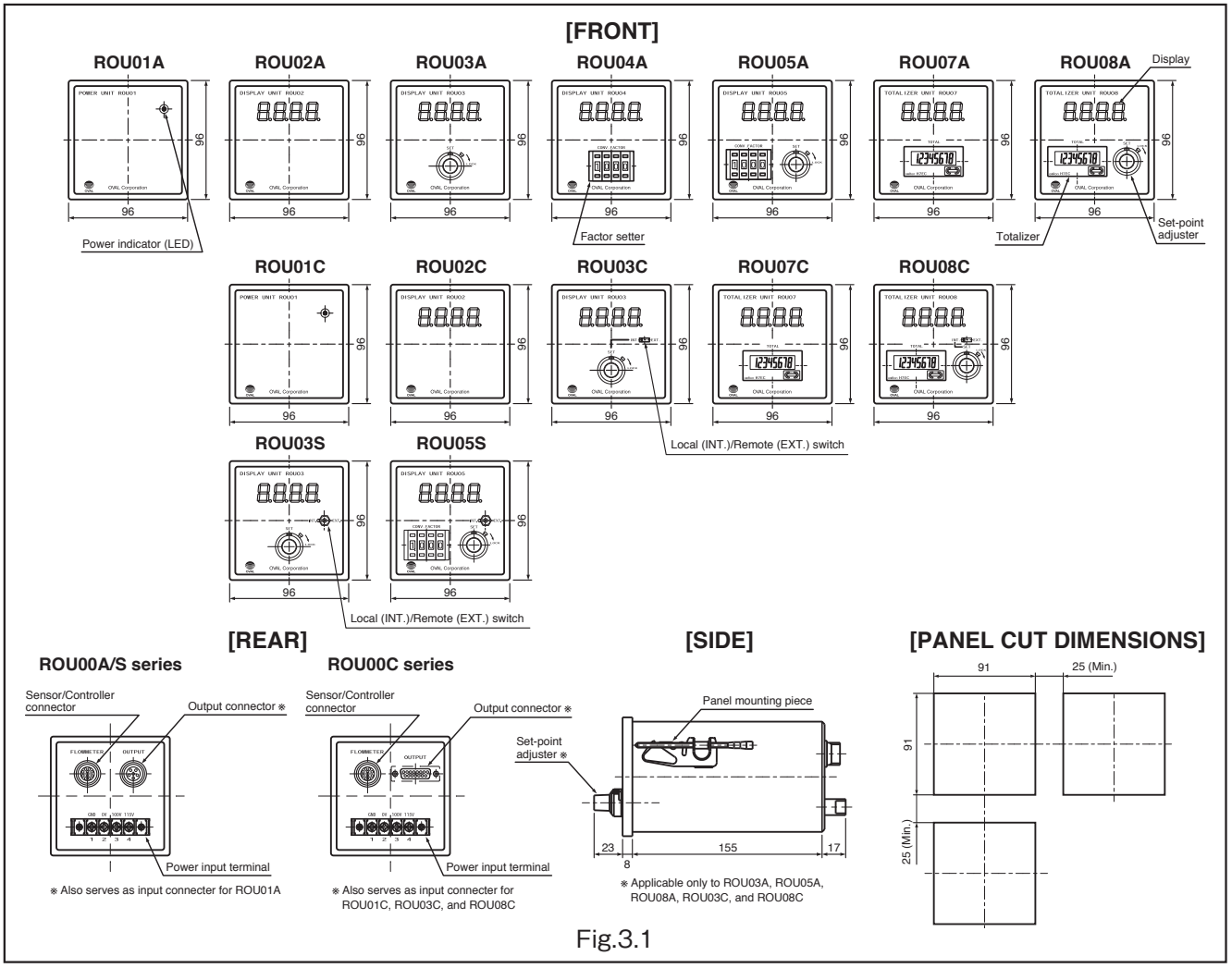


Fig.3.1

ROU06A

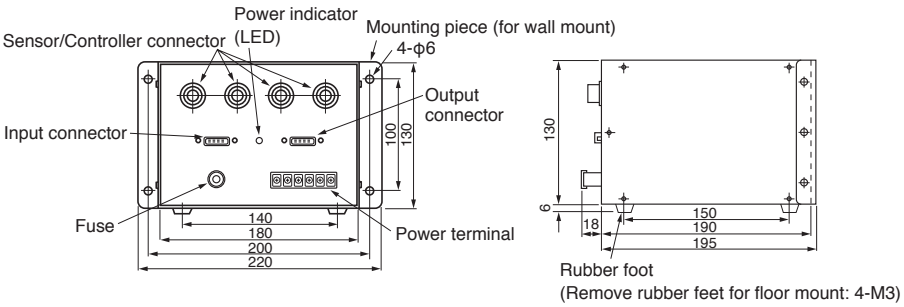


Fig.3.2

3.2 Installation

3.2.1 Installation Location

① Mechanical vibration, shock and corrosive gases least exist.

② Air is dry and temperature at room temperature and stable.

③ Allow a proper slack to the wiring harness and provide a sufficient working space behind the instrument to facilitate maintenance and servicing.

➡ NOTE: Although the manufacturer guarantees stated performance at ambient temperatures from -10 to +50℃ , it is recommended that the instrument be placed in service at room temperature.

3.2.2 Installation

(1) This instrument is of panel mount type (see Fig.3.3).

➡NOTE: Provide a clearance 100 millimeters minimum behind the instrument to the rear panel (see Fig.3.4).

(2) To install, remove the panel mounting pieces located on both sides of the instrument and front mount the instrument in the panel opening. Then install the mounting pieces and secure the instrument to the front panel with clamp screws.

(3) For ROU06A, wall mount or floor mount can be selected.

In case of wall mount, fix it with M5 screw using a mounting bracket of main unit.

In case of floor mount, remove the rubber legs on the bottom of main unit and attach it to the floor surface using the screw holes M3 from which rubber legs are removed.

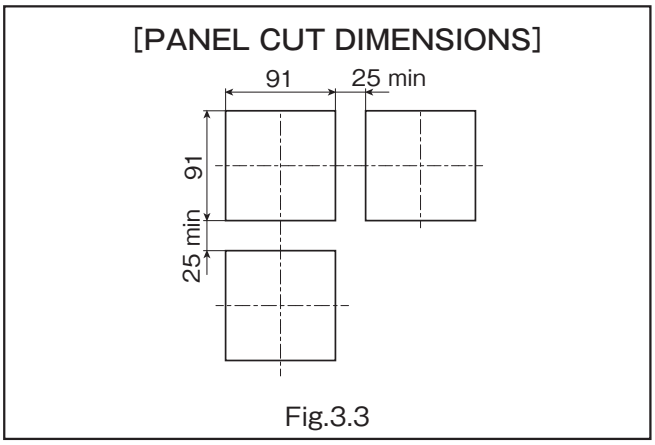


Fig.3.3

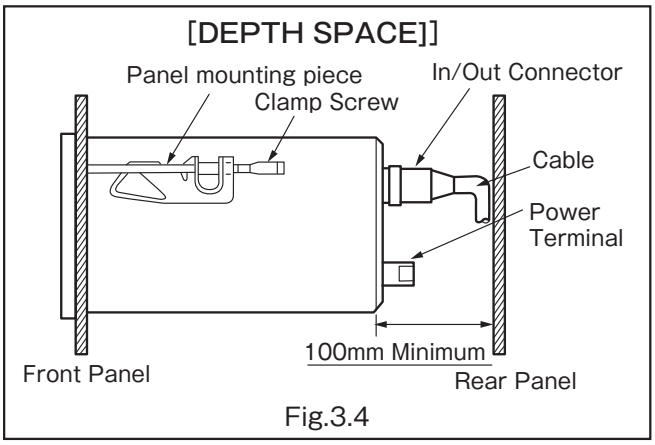


Fig.3.4

4. WIRING CONNECTIONS

4.1 Cables for Field Wiring

(1) For the cable to connect to the flowmeter body (sensor/controller), a dedicated C1 cable (with connectors on both ends) should be used.

(2) For the cable to connect the instrument's output receptacle with a remote receiving instrument, a dedicated C2 cable for this instrument or a furnished plug connector with a shielded cable (cable outer diameter 7mm maximum, conductors 0.3-0.5mm^2) soldered to it should be used.

4.2 Wiring Connections by Model

(1) Wiring Connections with MODEL ROU01A

Since using current signal for output (marked *in Figs.4.4 and 4.5), makes the output "floating", the external receiving instrument to be connected requires an isolated input circuit, or an isolator must be installed between the readout unit and the external receiving instrument.

① If the flowmeter uses voltage signal (Fig.4.1).

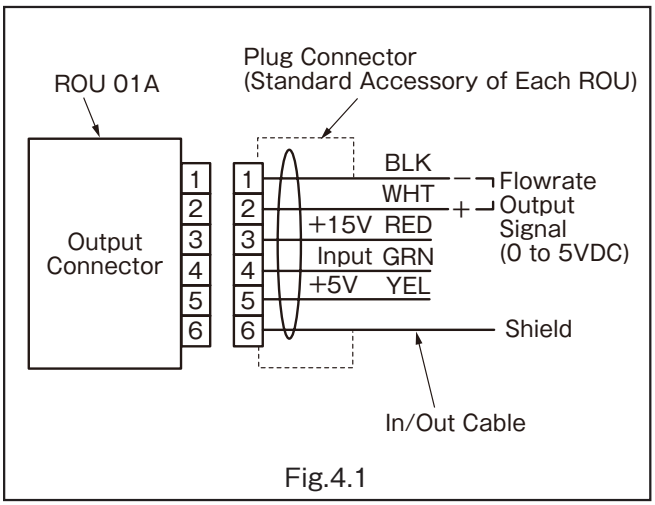


Fig.4.1

② If the flow controller uses voltage signal

a. Regular arrangement (Fig.4.2)

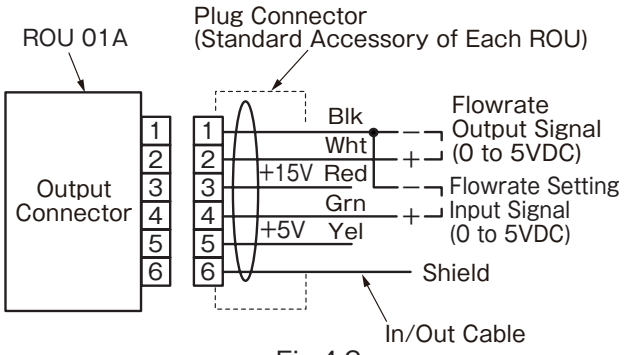


Fig.4.2

b. A potentiometer used for setting input (Fig.4.3)

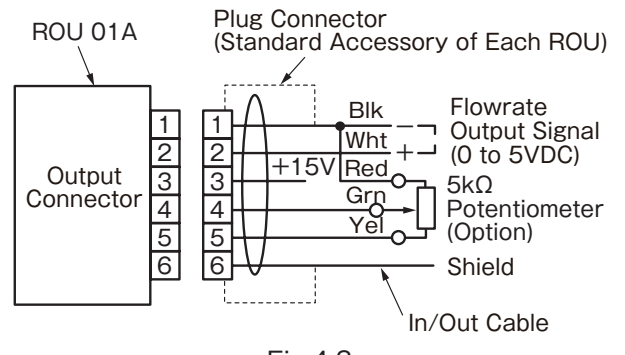


Fig.4.3

③ If the flowmeter uses current signal (Fig.4.4)

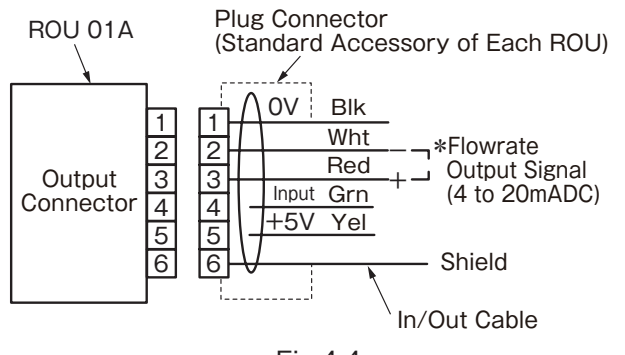


Fig.4.4

④ If the flow controller uses current signal (Fig.4.5).

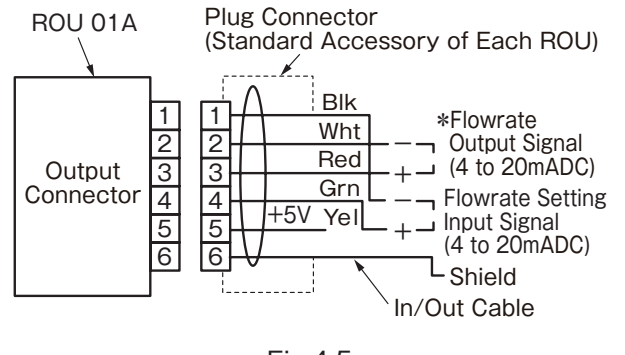


Fig.4.5

➡ NOTE: Colors indicated in the above diagrams represent the colors of the dedicated C2 cable conductors.

⚠ **CAUTION: Since using current signal for output (marked * in Figs.4.4 and 4.5), makes the output "floating", the external receiving instrument to be connected requires an isolated input circuit, or an isolator must be installed between the readout unit and the external receiving instrument.**

(2) Wiring Connections with MODELS ROU02/03/04/05

Models ROU02/03/04/05 use 0-5VDC (analog) output for both the sensor and controller. If the signal needs to be of different levels, provide a signal converter (e.g. TB-2100) between the readout unit and external receiving instrument (wiring connection example: Fig.4.6).

➡ NOTE: Colors indicated in the above diagrams represent the colors of the dedicated C2 cable conductors.

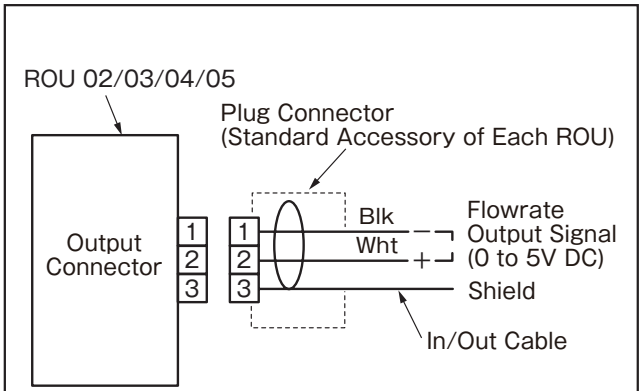


Fig.4.6

(3) Wiring Connections with MODELS ROU07/08

Models ROU07/08 use 0-5VDC (analog) output for both the sensor and controller. If the signal needs to be of different levels, provide a signal converter between the readout unit and external receiving instrument.

As for pulse output, voltage pulse output and open collector pulse output can be obtained simultaneously (wiring connection example: Fig.4.7).

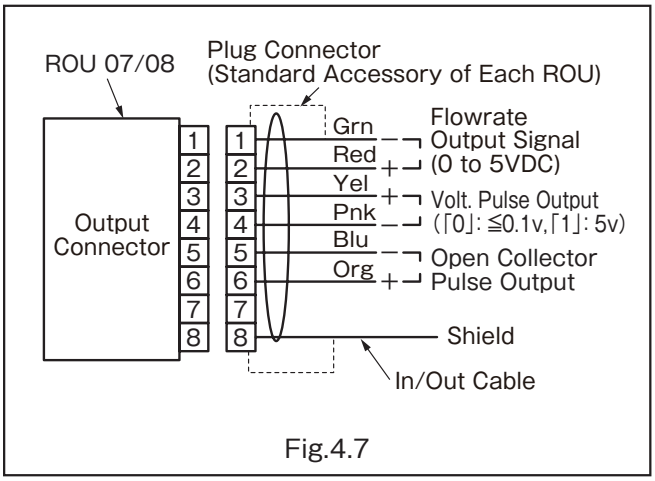


Fig.4.7

➡NOTE: Colors indicated in the above diagrams represent the colors of the dedicated C2 cable conductors.

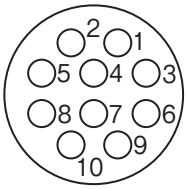
(4) Wiring connections with MODEL ROU06A

Pin No.	Wire color (※1)	Description	0/1 to 5VDC, 0 to 10VDC 0/4 to 20mADC sourcing output		0/4 to 20mADC floating output	
			Polarity	Wiring connection	Polarity	Wiring connection
1	Green	0V Common	(−)			
2	Red	Flow output CH1	(+)	CH1 Analog output	(−)	CH1 Analog output
3	Yellow	Flow output CH2	(+)	CH2 Analog output	(−)	CH2 Analog output
4	Pink	Flow output CH3	(+)	CH3 Analog output	(−)	CH3 Analog output
5	Blue	Flow output CH4	(+)	CH4 Analog output	(−)	CH4 Analog output
6	—	Unused				
7	—					
8	Shield	Shield				
9	—					
10	—	Unused				
11	—					
12	—					
13	White	0V Common	(−)			
14	Brown	+5VDC (※2)	(+)			
15	Gray	+15VDC	(+)		(+)	

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ＊＊ O ".
※2. +5VDC is used as power source for external display (designated by OVAL/optional)

4.3 Connector Pin Arrangements and Signal Names

(1) Flowmeter Connector

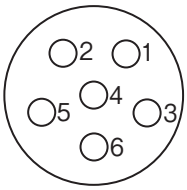


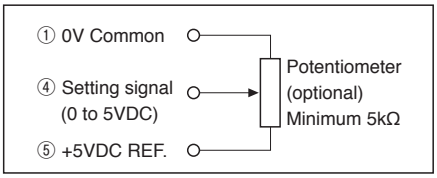
Pin No.	Wire color (※1)	Description
1	Brown	+5VDC REF. (※2) /Unused
2	Red	Flow input
3	Yellow	Flow setting output
4	Green	0V Valve
5	Blue	Valve actuating signal (※3)
6	Pink	−15VDC (※2) /Unused
7	Gray	＋15VDC
8	White	0V Common
9	Shield	Ground
10	—	Unused

➡ NOTE: ※1. Wire color according to dedicated cable "C1- ＊＊＊ ".
※2. This pin is unused when previous digital model with analog I/O specification is connected.
※3. This signal is not processed inside ROU00 series.

(2) Output Connectors

① ROU01A

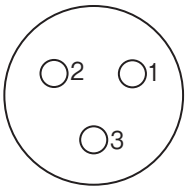




Pin No.	Wire color (※1)	Description
1	Black	0V Common
2	White	Flow output
3	Red	＋15VDC
4	Green	External setting input
5	Yellow	＋15VDC REF (※3) ／ Unused
6	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ＊＊ B ".
※2. Every signal specification is determined by the specifications of connected MASFLO-OVAL II.
※3. Only with 0 to 5VDC specification, setting input through external potentiometer (optional) is possible as shown in the left diagram.

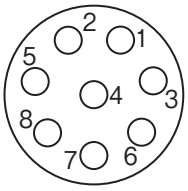
② ROU02A ／ 03A ／ 04A ／ 05A



Pin No.	Wire color (※1)	Description
1	Black	0V Common (−)
2	White	Flow output 0 to 5VDC (+)
3	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ＊＊ A ".

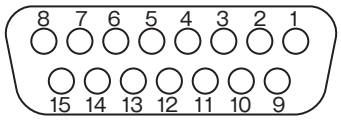
(3) ROU07A ／ 08A

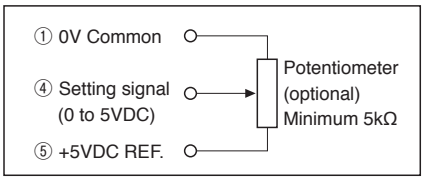


Pin No.	Wire color (※1)	Description
1	Green	0V Common (−)
2	Red	Flow output 0 to 5VDC (+)
3	Yellow	5V voltage pulse output (+)
4	Pink	0V Common (−)
5	Blue	Open collector pulse output (−)
6	Orange	Open collector pulse output (+)
7	—	Unused
8	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ＊＊ C ".

(4) ROU06A





Output Connector

Pin No.	Wire color (※1)	Description
1	Green	0V Common
2	Red	Flow output CH1
3	Yellow	Flow output CH2
4	Pink	Flow output CH3
5	Blue	Flow output CH4
6	—	Unused
7	—	
8	Shield	Shield
9 to 12	—	Unused
13	White	0V Common
14	Brown	+5VDC (※2)
15	Gray	+15VDC

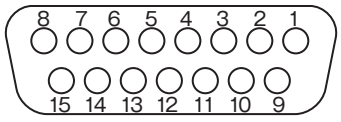
➡ NOTE: ※1. Wire color according to dedicated cable "C2- ∗ ∗ O ".
※2. +5VDC is used as power source for external display (designated by OVAL/optional)

Input Connector

Pin No.	Wire color (※1)	Description
1	Green	0V Common (–)
2	Red	+5VDC REF. CH1 (+) (※2) /Unused
3	Yellow	External setting input CH1 (+)
4	Pink	+5VDC REF. CH2 (+) (※2) /Unused
5	Blue	External setting input CH2 (+)
6	Orange	+5VDC REF. CH3 (+) (※2) /Unused
7	Black	External setting input CH3 (+)
8	White	+5VDC REF. CH4 (+) (※2) /Unused
9	Brown	External setting input CH4 (+)
10	Gray	Unused
11 to 14	—	Unused
15	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ∗ ∗ I ".
※2. Only with 0 to 5VDC specification, setting input through external potentiometer (optional) is possible as shown in the left diagram.

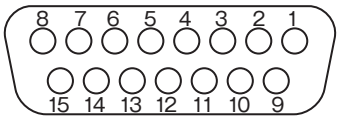
(5) ROU01C/02C/03C



Pin No.	Wire color (※1)	Description
1	Red	Flow output (+)
2	Black	0V Common (−)
3	Green	External setting input (+) (※2)
4	White	0V Common (−)
5 to 14	—	Unused
15	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ∗ ∗ E ".
※2. Not available for ROU02C.

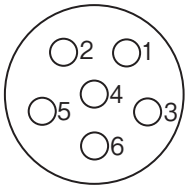
(6) **ROU07C/08C**



Pin No.	Wire color (※1)	Description
1	Green	Flow output (+)
2	Red	0V Common (−)
3	Yellow	External setting input (+) (※2)
4	Pink	0V Common (−)
5	—	Unused
6	—	
7	Black	Totalizer remote reset (+)
8	Gray	Totalizer remote reset (−)
9	Pale blue	5V voltage pulse output (+)
10	Purple	0V Common (−)
11	White green	Open collector pulse output (+)
12	White red	Open collector pulse output (−)
13	—	Unused
14	—	
15	Shield	Shield

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ∗ ∗ F ".
※2. Not available for ROU07C.

(7) **ROU03S/05S**



Pin No.	Wire color (※1)	Description
1	Black	0V Common (−)
2	White	Flow output 0 to 5VDC (+)
3	Shield	Shield
4	Red	External setting input (+)
5	—	Unused
6	—	Unused

➡ NOTE: ※1. Wire color according to dedicated cable "C2- ∗ ∗ G ".

4.4 Output Circuit Diagrams

(1) Voltage Output (all models)

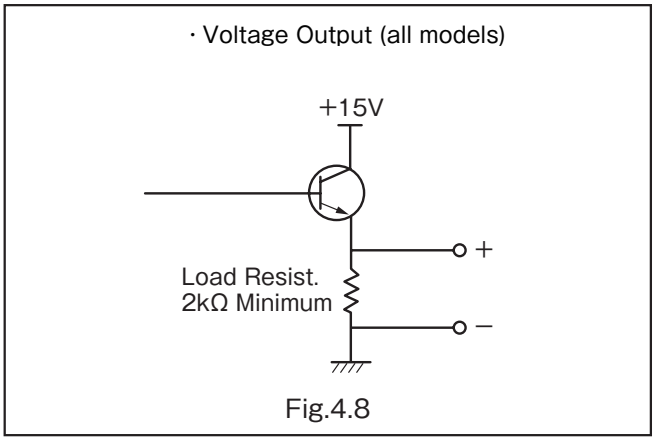


Fig.4.8

(2) **Current Output (ROU01A/06A)**

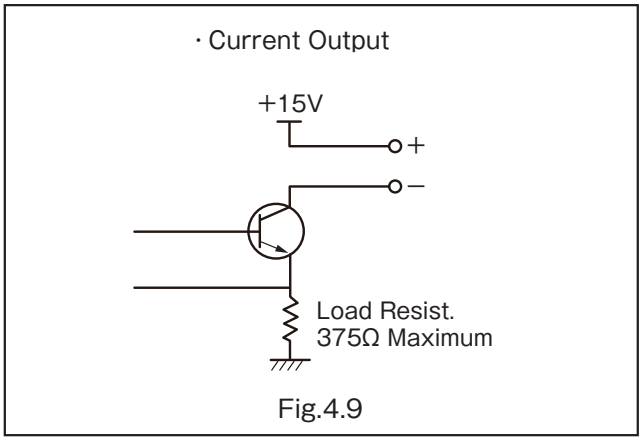


Fig.4.9

4.5 Power Terminal Block

Power is supplied through the furnished power cable or a 2-conductor cable.

100V AC input across terminals 2 and 3

110/115V AC input across terminals 2 and 4

Pin No.	Signal Name
1	Ground
2	0V
3	100V
4	115V

5. OPERATION AND INDIVIDUAL FUNCTIONS

5.1 Operation

(1) Make sure of correct wiring connections before you turn on power. In response to power on, the LED indicator (except for ROU01) will come on.
(2) Provide at least 15 minutes' warm-up period before commencing operation.

5.2 Individual Functions

5.2.1 Display (all models except for ROU01A/06A)

The display shows instantaneous flowrate or instantaneous pressure, depending on the instrument coupled. The unit of registration is shown on the label at right.

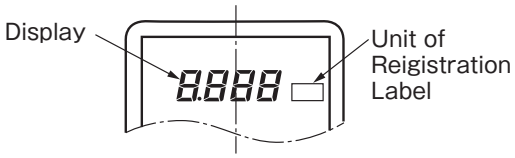


Fig.5.1

(1) "% " readout
00.0 to 100.0% . Because of % readings, there is no limitation to the flow range or other factors of the instrument coupled.
(2) "Scaling" readout
The scaling readout consists of three digits except when the most significant digit is "1" where the readout consists of four digits (see examples ① and ②).
Examples: ① If the full scale is 20NL/minimum, the display shows 00.0 to 20.0NL/minimum
② If the full scale is 150NmL/minimum, the display shows 00.0 to 150.0NmL/minimum

➡ NOTE: A zero reading usually will not fall below a point corresponding to 0.2 to 0.3% of full scale, but it is by no means any sign of a fault.

5.2.2 Flowrate/Pressure Set-point Adjuster (ROU03A/C, ROU05A, ROU08A/C)

Flowrate/pressure setpoint is established with the front panel potentiometer of the readout unit.
Shown below is the set-point adjuster set to 65.0% .

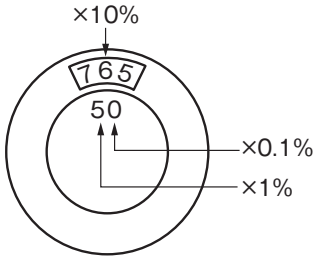


Fig.5.2

⚠ **CAUTION:**

1. For accurate setting, keep on monitoring the flowrate reading. You are reminded to the fact that the potentiometer reading could be slightly offset.

2. At zero flow, set the potentiometer to "0" and then shut off the stop valves upstream and downstream of the mass flow controller. Closing the stop valves with the potentiometer setting intact will, at the next startup, cause the control valves to open fully, resulting in excessive flow.

5.2.3 Conversion Factor Setter (ROU04A, ROU05A/S)

The conversion factor setter offers the following applications:

(1) Conversion factor setting

In gas applications, if the mass flowmeter is calibrated with N2 gas, the actual quantity indicated of the measured gas can directly be read by setting the conversion factor of that gas.

(2) Correction factor setting

In applications where gas temperature, pressure or other parameters vary and that magnitude of variation causes a significantly greater error than at the time of calibration, flowrate readings under the same conditions as those at calibration can be read by setting that correction factor.

How to Set:

You can set the desired setpoint by pressing buttons ⊞ ⊟ above and below the numerical windows for each digit.

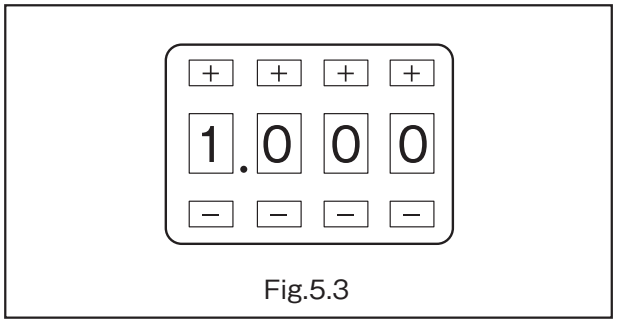


Fig.5.3

5.2.4 Total Counter Reset Lock (ROU07A/C, ROU08A/C)

Slide the reset button located next to the totalizer display window in the direction of arrow to lock the button.

To lock or unlock the button, move the lock to snap in or out of position with a click.

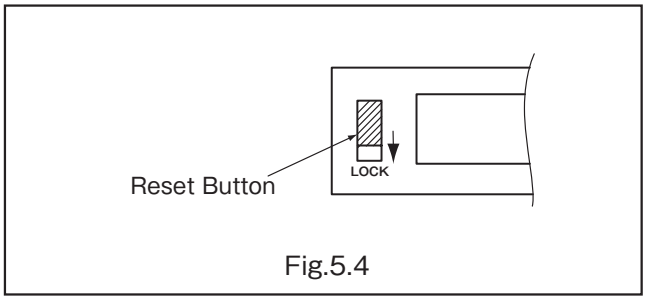
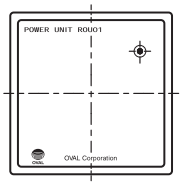


Fig.5.4

6. GENERAL SPECIFICATIONS

(1) ROU01A

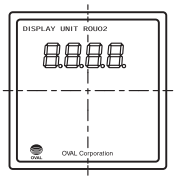
Supplies power to MASFLO-OVAL Ⅱ . Equipped with flow input/output.

Front panel	Item	Description
	Power output	±15VDC
	Flow input / Setting output (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC 0 to 20mADC, 4 to 20mADC (※2)
	External flow output (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC (Minimum load resistance: 2kΩ) 0 to 20mADC, 4 to 20mADC (※ 2) (Maximum load resistance: 375Ω)
	External setting input (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC (Input resistance: 1MΩ) 0 to 20mADC, 4 to 20mADC (※ 2) (Input resistance: 250Ω)
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 11VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.85kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 6-pin plug for output and input (Model: SNS-1606-PCM-7) (※ 3)

➡ NOTE: ※ 1. Every signal specification is determined by the specifications of connected MASFLO-OVAL II.
※ 2. If analog output of ROU01A is floating current signal and the receiving instrument is not differential input type, an analog isolator must be installed between ROU01A and the receiving instrument.
Same principle also applies when the setting device is capable of floating current output.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ B) is included in the order.

(2) ROU02A

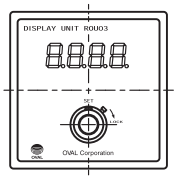
Equipped with flow display.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Flow input	0 to 5VDC
	External flow output (※ 1)	0 to 5VDC Minimum load resistance: 10kΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.9kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 3-pin plug for output (Model: SNS-1603-PCM-7) (※ 2)

➡ NOTE: ※ 1. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 2. Not furnished if dedicated cable (Model: C2- ∗ ∗ A) is included in the order.

(3) ROU03A

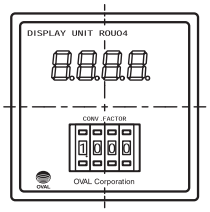
Equipped with flow display and set-point adjuster.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: 3600° $^{+10°}_{0°}$
	Flow input / Setting output	0 to 5VDC
	External flow output (※ 1)	0 to 5VDC Minimum load resistance: 10kΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.95kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 3-pin plug for output (Model: SNS-1603-PCM-7) (※ 2)

➡ NOTE: ※ 1. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 2. Not furnished if dedicated cable (Model: C2- ∗ ∗ A) is included in the order.

(4) **ROU04A**

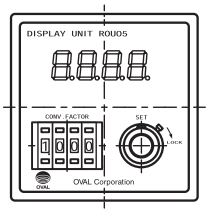
Conversion factor setter added to ROU02A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Conversion factor setter	Factor setting method: 4-digit digital setter Set-point: 0.500 to 2.000 (※ 1)
	Flow input	0 to 5VDC
	External flow output (※ 2)	0 to 5VDC Minimum load resistance: 10kΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.95kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 3-pin plug for output (Model: SNS-1603-PCM-7) (※ 2)

➡ NOTE: ※ 1. Set-point range may be narrower depending on full scale setting or display scaling.
※ 2. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ A) is included in the order.

(5) **ROU05A**

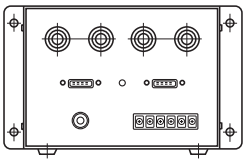
Conversion factor setter added to ROU03A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: 3600°$^{+10}_{0}$°
	Conversion factor setter	Factor setting method: 4-digit digital setter Set-point: 0.500 to 2.000 (※ 1)
	Flow input / Setting output	0 to 5VDC
	External flow output (※ 2)	0 to 5VDC Minimum load resistance: 10kΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.0kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 3-pin plug for output (Model: SNS-1603-PCM-7) (※ 3)

➡ NOTE: ※ 1. Set-point range may be narrower depending on full scale setting or display scaling.
※ 2. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ A) is included in the order.

(6) **ROU06A**

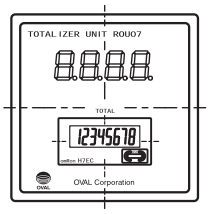
Provides power to up to 4 MASFLO-OVAL II. Capable of flow input/output.

Front panel	Item	Description
	Power output	±15VDC
	Number of connectable unit	4 units
	Flow input / Setting output (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC 0 to 20mADC, 4 to 20mADC (※2)
	External flow output (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC (Minimum load resistance: 2kΩ) 0 to 20mADC, 4 to 20mADC (※ 2) (Maximum load resistance: 375Ω)
	External setting input (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 10VDC (Input resistance: 1MΩ) 0 to 20mADC, 4 to 20mADC (※ 2) (Input resistance: 250Ω)
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 58VA maximum
	Installation	Floor or wall mount
	Housing material	Steel sheet
	Weight	3.5kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output and input (Model: DA-15P-N/DA-C3-J10) (※ 3)

➡ NOTE: ※ 1. Every signal specification is determined by the specifications of connected MASFLO-OVAL II. However, signal type of multiple instruments connected to one ROU06A is recommended to be unified.
※ 2. If analog output of ROU06A is floating current signal and the receiving instrument is not differential input type, an analog isolator must be installed between ROU06A and the receiving instrument.
Same principle also applies when the setting device is capable of floating current output.
※ 3. Depending on the specification of connected instrument, one or two plugs will be furnished. However, plugs will not be furnished if dedicated cable (Model: C2- ∗ ∗ I/C2- ∗ ∗ O) is included in the order.

(7) ROU07A

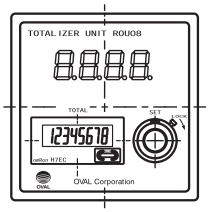
Totalizer and pulse output added to ROU02A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Totalizer	Totalizing method: LCD counter (with manual reset) Number of digit: 8 Response frequency: 15Hz maximum
	Flow input	0 to 5VDC
	External flow output (※ 1)	0 to 5VDC Minimum load resistance: 10kΩ
	Pulse output (※ 2)	Voltage pulse : Low: 0.1V maximum, High: 5V Response frequency: 3kHz maximum Open collector pulse : Pulse width: 25ms (standard) Response frequency: 15kHz maximum ON-voltage: 0.8V maximum Capacity: 35V/50mA maximum
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 16VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.15kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 8-pin plug for output (Model: SNS-1608-PCM-7) (※ 3)

➡ NOTE: ※ 1. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 2. Two pulse output can be used simultaneously.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ C) is included in the order.

(8) ROU08A

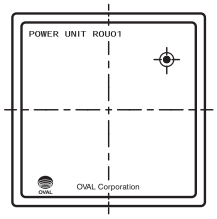
Totalizer and pulse output added to ROU03A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Totalizer	Totalizing method: LCD counter (with manual reset) Number of digit: 8 Response frequency: 15Hz maximum
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: $3600°^{+10°}_{0°}$
	Flow input / Setting output	0 to 5VDC
	External flow output (※ 2)	0 to 5VDC Minimum load resistance: 10kΩ
	Pulse output (※ 2)	Voltage pulse : Low: 0.1V maximum, High: 5V Response frequency: 3kHz maximum Open collector pulse : Pulse width: 25ms (standard) Response frequency: 15Hz maximum ON-voltage: 0.8V maximum Capacity: 35V/50mA maximum
	Power supply, power consumption	100VAC, 110/115VAC 50/60Hz, 16VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.2kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 8-pin plug for output (Model: SNS-1608-PCM-7) (※ 3)

➡ NOTE: ※ 1. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 2. Two pulse output can be used simultaneously.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ C) is included in the order.

(9) **ROU01C**

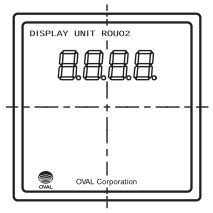
Analog signal converter added to ROU01A.

Front panel	Item	Description
	Power output	±15VDC
	Flow input / Setting output (※1)	0 to 5VDC, 1 to 5VDC, 0 to 20mADC, 4 to 20mADC
	External flow output (※ 2)	0 to 5VDC, 1 to 5VDC Minimum load resistance: 10kΩ 0 to 20mADC, 4 to 20mADC Maximum load resistance: 500Ω
	External setting input (※ 2)	0 to 5VDC, 1 to 5VDC, Input resistance: 100kΩ 0 to 20mADC, 4 to 20mADC Input resistance: 250Ω
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 15VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.9kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output and input (Model: DA-15P-N/DA-C3-J10) (※ 3)

➡ NOTE: ※ 1. Specifications of flow input and setting output are determined by the signal specification of connected MASFLO-OVAL II.
※ 2. Select one of the signal specifications. Signal specifications of external flow output and external setting input do not need to match.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ E) is included in the order.

(10) **ROU02C**

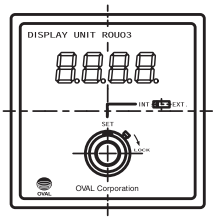
Analog signal converter added to ROU02A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Flow input (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 20mADC, 4 to 20mADC
	External flow output (※ 2)	0 to 5VDC, 1 to 5VDC Minimum load resistance: 10kΩ 0 to 20mADC, 4 to 20mADC Maximum load resistance: 500Ω
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 17VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.9kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output (Model: DA-15P-N/DA-C3-J10) (※ 3)

➡ NOTE: ※ 1. Specifications of flow input is determined by the signal specification of connected MASFLO-OVAL II.
※ 2. Select one of the signal specifications.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ E) is included in the order.

(11) **ROU03C**

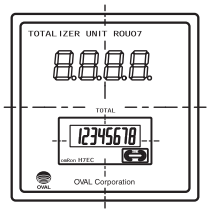
Analog signal converter and remote control (external setting input) added to ROU03A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: $3600^{\circ}{}^{+10}_{0}{}^{\circ}$
	Local/Remote switch	Manual operation, slide switch
	Flow input / Setting output (※1)	0 to 5VDC, 1 to 5VDC, 0 to 20mADC, 4 to 20mADC
	External flow output (※ 2)	0 to 5VDC, 1 to 5VDC Minimum load resistance: 10kΩ 0 to 20mADC, 4 to 20mADC Maximum load resistance: 500Ω
	External setting input (※ 2)	0 to 5VDC, 1 to 5VDC, Input resistance: 100kΩ 0 to 20mADC, 4 to 20mADC Input resistance: 250Ω
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 17VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.95kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output and input (Model: DA-15P-N/DA-C3-J10) (※ 3)

➡ NOTE: ※ 1. Specifications of flow input and setting output are determined by the signal specification of connected MASFLO-OVAL II.
※ 2. Select one of the signal specifications. Signal specifications of external flow output and external setting input do not need to match.
※ 3. Not furnished if dedicated cable (Model: C2- ∗ ∗ E) is included in the order.

⑿ ROU07C

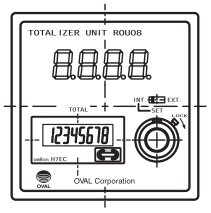
Analog signal converter added to ROU07A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Totalizer	Totalizing method: LCD counter (with manual and remote reset) Number of digit: 8 Response frequency: 15Hz maximum Remote reset: "a" contact or open collector, Reset duration: minimum 20ms
	Flow input (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 20mADC, 4 to 20mADC
	External flow output (※ 2)	0 to 5VDC, 1 to 5VDC Minimum load resistance: 10kΩ 0 to 20mADC, 4 to 20mADC Maximum load resistance: 500Ω
	Pulse output (※ 3)	Voltage pulse : Low: 0.1V maximum, High: 5V Response frequency: 3kHz maximum Open collector pulse : Pulse width: 25ms (standard) Response frequency: 15kHz maximum ON-voltage: 0.8V maximum Capacity: 35V/50mA maximum
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 18VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.1kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output (Model: DA-15P-N/DA-C3-J10) (※ 4)

➡ NOTE: ※ 1. Specifications of flow input is determined by the signal specification of connected MASFLO-OVAL II.
※ 2. Select one of the signal specifications.
※ 3. Two pulse output can be used simultaneously.
※ 4. Not furnished if dedicated cable (Model: C2- ∗ ∗ F) is included in the order.

⒀ ROU08C

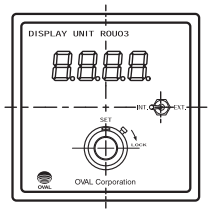
Analog signal converter and remote control (external setting input) added to ROU08A.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Totalizer	Totalizing method: LCD counter (with manual and remote reset) Number of digit: 8 Response frequency: 15Hz maximum Remote reset: "a" contact or open collector, Reset duration: minimum 20ms
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: $3600°^{+10°}_{0°}$
	Local/Remote switch	Manual operation, slide switch
	Flow input / Setting output (※ 1)	0 to 5VDC, 1 to 5VDC, 0 to 20mADC, 4 to 20mADC
	External flow output (※ 2)	0 to 5VDC, 1 to 5VDC Minimum load resistance: 10kΩ 0 to 20mADC, 4 to 20mADC Maximum load resistance: 500Ω
	Pulse output (※ 3)	Voltage pulse : Low: 0.1V maximum, High: 5V Response frequency: 3kHz maximum Open collector pulse : Pulse width: 25ms (standard) Response frequency: 15kHz maximum ON-voltage: 0.8V maximum Capacity: 35V/50mA maximum
	External setting input (※ 2)	0 to 5VDC, 1 to 5VDC, Input resistance: 100kΩ 0 to 20mADC, 4 to 20mADC Input resistance: 250Ω
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 18VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.15kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 15-pin D-SUB plug for output and input (Model: DA-15P-N/DA-C3-J10) (※ 4)

➡ NOTE: ※ 1. Specifications of flow input and setting output are determined by the signal specification of connected MASFLO-OVAL II.
※ 2. Select one of the signal specifications. Signal specifications of external flow output and external setting input do not need to match.
※ 3. Two pulse output can be used simultaneously.
※ 4. Not furnished if dedicated cable (Model: C2- ∗ ∗ F) is included in the order.

⑭ **ROU03S**

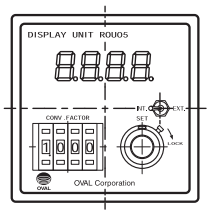
Equipped with flow display, set-point adjuster, and external setting input.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: $3600^{\circ}{}^{+10^{\circ}}_{0^{\circ}}$
	Flow input / Setting output	0 to 5VDC
	External flow output (※ 1)	0 to 5VDC Minimum load resistance: 10kΩ
	External setting input	0 to 5VDC Input resistance: 1MΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	0.95kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 6-pin plug for input and output (Model: SNS-1606-PCM-7) (※ 2)

➡ NOTE: ※ 1. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 2. Not furnished if dedicated cable (Model: C2- ∗∗ G) is included in the order.

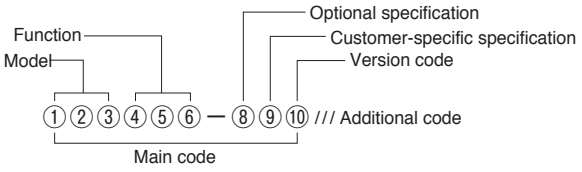
⑮ **ROU05S**

Conversion factor setter added to ROU03S.

Front panel	Item	Description
	Power output	±15VDC
	Display	Maximum indicator reading: 1999 (3 1/2-digit, Red LED) Display unit: Direct reading [example: L/min (normal)] or 0 to 100.0%
	Set-point adjuster	Setting method: 10 rotary type potentiometer Resistance: 5kΩ ±5% Independent linearity: ±0.2% Mechanical rotation angle: $3600^{\circ}{}^{+10^{\circ}}_{0^{\circ}}$
	Conversion factor setter	Factor setting method: 4-digit digital setter Set-point: 0.500 to 2.000 (※ 1)
	Flow input / Setting output	0 to 5VDC
	External flow output (※ 2)	0 to 5VDC Minimum load resistance: 10kΩ
	External setting input	0 to 5VDC Input resistance: 1MΩ
	Power supply, power consumption	100VAC , 110/115VAC 50/60Hz, 13VA maximum
	Installation	Panel mount
	Housing material	Special resin
	Weight	1.0kg
	Accessories	① AC power cable, 3m long (with type A plug) ② 6-pin plug for input and output (Model: SNS-1606-PCM-7) (※ 3)

➡ NOTE: ※ 1. Set-point range may be narrower depending on full scale setting or display scaling.
※ 2. Direct output of the signal from the connected MASFLO-OVAL II (0 to 5VDC type only).
※ 3. Not furnished if dedicated cable (Model: C2- ∗∗ G) is included in the order.

7. PRODUCT CODE EXPLANATION



● Main code

①	②	③	**Model**
R	O	U	Readout Unit
④	**⑤**	**⑥**	**Function**
0	1	A	1CH power source, external control input
0	2	A	1CH power source, display, 0 to 5VDC only
0	3	A	1CH power source, display, set-point adjuster, 0 to 5VDC only
0	4	A	1CH power source, display, conversion factor setter, 0 to 5VDC only
0	5	A	1CH power source, display, set-point adjuster, conversion factor setter, 0 to 5VDC only
0	6	A	4CH power source, external control input
0	7	A	1CH power source, display, totalizer, 0 to 5VDC only
0	8	A	1CH power source, display, totalizer, set-point adjuster, 0 to 5VDC only
0	1	C	1CH power source, external control input, signal converter
0	2	C	1CH power source, display, signal converter
0	3	C	1CH power source, display, set-point adjuster, external control input, signal converter
0	7	C	1CH power source, display, totalizer, signal converter
0	8	C	1CH power source, display, totalizer, set-point adjuster, external control input, signal converter
0	3	S	1CH power source, display, set-point adjuster, external control input(0 to 5VDC) 0 to 5VDC only
0	5	S	1CH power source, display, set-point adjuster, conversion factor setter external control input (0 to 5VDC) 0 to 5VDC only
⑦	—		
⑧	**Optional specification**		
N	Non (Standard)		
Z	Special		
⑨	**Customer-specific specification**		
N	Non (Standard)		
⑩	**Version code**		
A	Version code: A		

● Additional code

Dedicated cable (ROU to external equipment) ※ Must choose			
C	B	0	No C2 cable　　Choose "No" when special length is required.
C	B	1	3m
C	B	2	5m
C	B	3	10m
Document			
D	S	J	SPEC. & DWG (Approval Drawing) (Japanese)
D	S	E	SPEC. & DWG (Approval Drawing) (English)
D	R	0	Re-submission of SPEC. & DWG
D	C	J	Final DWG (Japanese)
D	C	E	Final DWG (English)
D	W	J	Wiring diagram (Japanese)
D	W	E	Wiring diagram (English)
S	E	J	Inspection Certificate (Calibration report) (Japanese)
S	E	E	Inspection Certificate (Calibration report) (English)
D	9	J	Photo (Japanese)
D	9	E	Photo (English)
C	B	J	Inspection certificate: B set　　Only Japanese
Witness Test			
V	1	0	Required

《PRODUCT CODE EXPLANATION OF THE OLD PRODUCT CODE》

The new product code has been implemented since April 2017.
Therefore, the product code explanation of the old product code will not be updated after April 2017.
Consult OVAL sales office or nearest representative if you wish to order with the old product code for reasons such as type approval.

Item	Product Code									Description
	①	②	③	④	⑤	⑥	—	⑦	⑧	
	R	O	U							Readout Unit
Code				0	1	A	–			1CH special power source, external control input
				0	2	A	–			1CH power source, display, 0 to 5VDC only
				0	3	A	–			1CH power source, display, set-point adjuster, 0 to 5VDC only
				0	4	A	–			1CH power source, display, conversion factor setter, 0 to 5VDC only
				0	5	A	–			1CH power source, display, set-point adjuster, conversion factor setter, 0 to 5VDC only
				0	6	A	–			4CH power source, external control input
				0	7	A	–			1CH power source, display, totalizer, 0 to 5VDC only
				0	8	A	–			1CH power source, display, totalizer, set-point adjuster, 0 to 5VDC only
				0	1	C	–			1CH power source, external control input, signal converter
				0	2	C	–			1CH power source, display, signal converter
				0	3	C	–			1CH power source, display, set-point adjuster, external control input, signal converter
				0	7	C	–			1CH power source, display, totalizer, signal converter
				0	8	C	–			1CH power source, display, totalizer, set-point adjuster, external control input, signal converter
				0	3	S	–			1CH power source, display, set-point adjuster, external control input (0 to 5VDC), 0 to 5VDC only
				0	5	S	–			1CH power source, display, set-point adjuster, conversion factor setter, external control input (0 to 5VDC), 0 to 5VDC only
Optional specification								N		None (standard)
								Z		Special
Customer-specific specification									N	None (standard)

2021.10 Revised
2021.05 Revised △
2000.04 Released
L-504-6-E（2）