

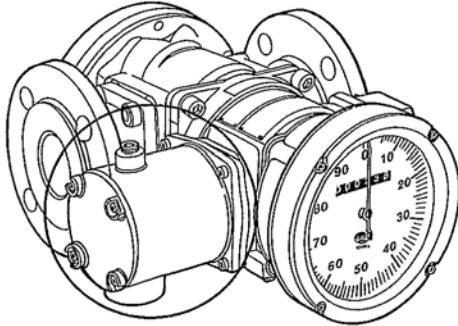


# INSTRUCTIONS

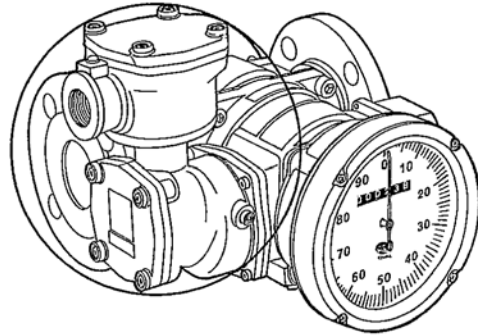
Ins. No. T-519-5-E

## PULSE GENERATORS

MODEL PG20 · PG20EP



<MODEL PG20>



<MODEL PG20EP>

### ■ GENERAL

OVAL Models PG20 and PG20EP pulse generators, when used in conjunction with an OVAL flowmeter, provide pulse signals proportional to the flowrate of liquid. Each pulse generator is comprised of a reed switch and a permanent magnet. The revolution of oval rotors is transmitted through a gear train to the permanent magnet in the pulse generator. As the magnet is rotated, it actuates the reed switch. The OVAL pulse generators shown below are completely compatible with all OVAL flowmeters.

#### 1. Pulse Generator Types

- (a) Standard ...PG20
- (b) Explosionproof ...PG20EP

This type of pulse generator is designed and built in accordance with the Recommendations on Explosion-Protected Electrical Installations by the Technology Institution of Industrial Safety.

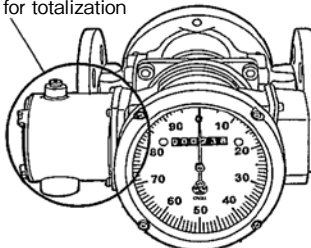
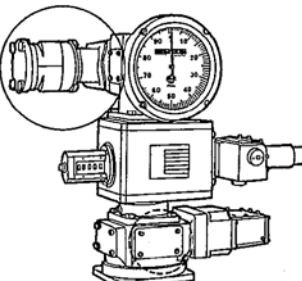
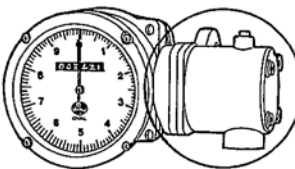
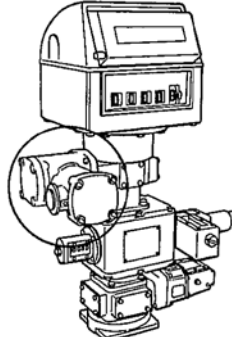
#### 2. Reed Switch

A dry contact reed switch is used.

**3. As a pulse generator, its applications include** remote totalization (pulses calibrated to units of measurement selected).

**Example:** A pulse generator for electromagnetic counters, batch controllers, etc.

### ■ INSTALLATION Examples of typical pulse generator installation:

<p style="text-align: center;">&lt; GB Type &gt;</p>  <p>Pulse generator for totalization</p> <p style="text-align: center;">Unit pulse generators.</p>	<p style="text-align: center;">&lt; CB Type &gt;</p>  <p style="text-align: center;">Unit pulse generator with Model LW11 register after temperature compensation.</p>	<p style="text-align: center;">&lt; LW13 Type &gt;</p>  <p style="text-align: center;">Unit pulse generator with sizes 02,51,52,53 OVAL flowmeters.</p>	<p style="text-align: center;">&lt; PB Type &gt;</p>  <p style="text-align: center;">Unit pulse generator with LW42 or LW43 registers after temperature compensation.</p>
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## WIRING

### a) Cables

Signal cables should be of the type covered by JIS C3401 unless otherwise specified. Polyvinyl-insulated, Polyvinyl-sheathed control cables (CVV, CVS, etc.) are recommended. The cross-sectional area of conductor should be in a range from 1.25mm<sup>2</sup> to 2.0mm<sup>2</sup>.

### b) Maximum Transmission Distance

Max. allowable transmission distance is one kilometer when the specified cables (CVV, CVS, etc. having a cross-sectional area of 2mm<sup>2</sup>) are used for the transmission line.

➡ **Note:** If the max. transmission distance is in excess of one kilometer, contact your OVAL-designated distributor for additional instructions.

### c) Conduit Construction (Standard)

Conduit construction is recommended to prevent cable damage.

#### ◆ Cable connections ◆

R3/4 internal thread for Model PG20.

G3/4 internal thread for Model PG20EP.

### d) Conduit Construction (Flameproof)

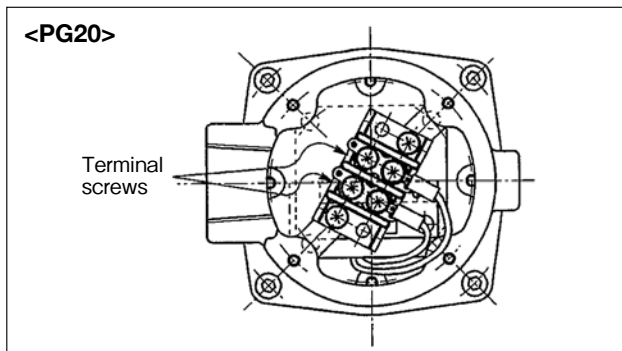
- ① Conduit specified in JIS B8305 is suggested.
- ② Conduit accessories, such as boxes and universal couplings, covered by JIS C0903 are recommended.
- ③ Sealing construction should be made where necessary.
- ④ After threads are engaged, a coat of non-drying sealing compound is applied to the outer surface of threads where rust is expected.

### e) Prevention of Inductive Interference

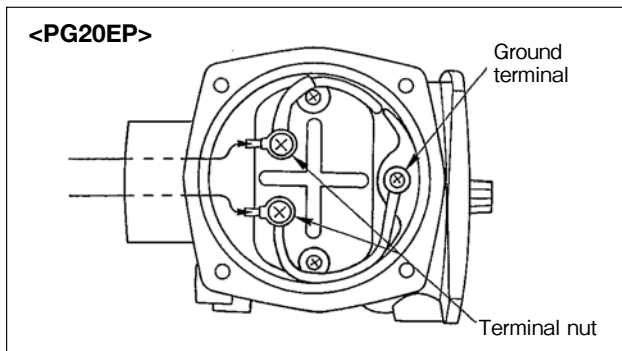
Keep the wiring away from power cables or power circuits to prevent the possibility of inductive interference. If both an unfactored and a factored pulse generator are used together, use two 2-conductor cables (CVVS), rather than single 4-conductor cable.

## WIRING INSTRUCTIONS

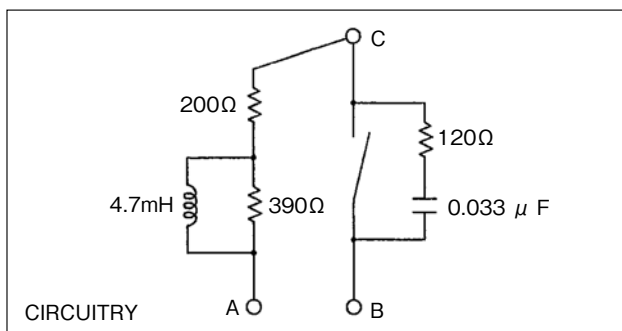
Use crimp-style terminals to ensure good electrical connections.



- ① To make wiring connections with PG20, take off four screws (106) holding the blind cover of housing and remove the blind cover (102) to gain access to the 2-post terminal block. Make wiring connections using terminal screws. Be careful not to drop terminal screws into the interior of pulse generator. No polarity observation is required.



- ② To make wiring connections with PG20EP, take off four screws (110-A) holding the housing cover and remove the housing cover (103-A) to gain access to the 2-post terminal block. Make wiring connections using terminal nuts. No polarity observation is required.  
In case earth grounding is desired on the pulse generator side, use the ground terminal.



- ③ About the reed switch  
In standard connections, the reed switch connections are across terminals A and B. However, to energize an electromagnetic total counter operating on 12VDC or 24VDC, connections should be across terminals B and C.

➡ **Note:** 1. A surge suppressor is provided for connections between terminals B and C.  
2. A surge suppressor and a spark killer are provided for connections between terminals A and B.

## ■ TROUBLESHOOTING

When a pulse signal does not appear at the input of a remote totalizer while the flowmeter register's pointer or counter is functioning properly, trouble may be due to an "open" in the circuit wiring or a defective pulse generator. If such is the case, use the following chart as a guide to check and correct the cause of trouble.

### a) No pulse signal or fewer pulses than necessary

Symptom	Probable cause	Remedy
No pulses appear at the terminals of receiving instrument.	Poor electrical contact at generator terminals or open cable.	Ensure good electrical connections or replace defective cable.
Pulse generator's driving arrangement fails to rotate.	Loose gears or coupling. Defective bearings.	Recondition or replace with new ones.
Erratic reed switch operation.	Poor electrical contacts. Contacts worn and no longer serviceable.	Replace as an assembly.

### b) More pulses than necessary

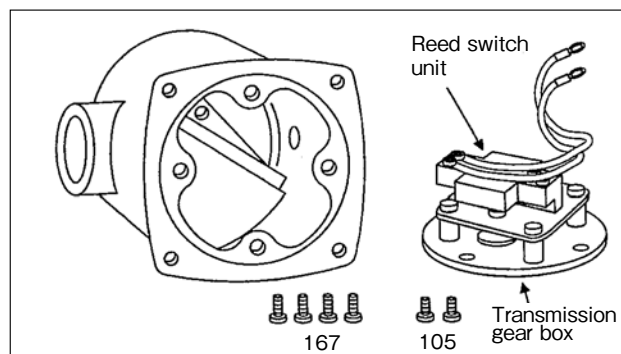
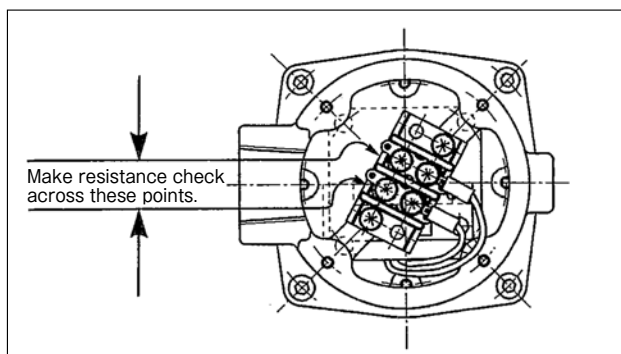
Symptom	Probable cause	Remedy
Irregular pulse generation.	Poor electrical contact at generator terminals or open cable.	Ensure good electrical connections or replace defective cable.
Erratic reed switch operation.	Poor electrical contacts or contact bounce.	Replace as an assembly.
Signal generated while meter is at rest.	Inductive interference.	Change field wiring routes. Keep away from noise sources.

## ■ DISASSEMBLY AND INSPECTION

⊙ The pulse generator should be disassembled for inspection once a year.

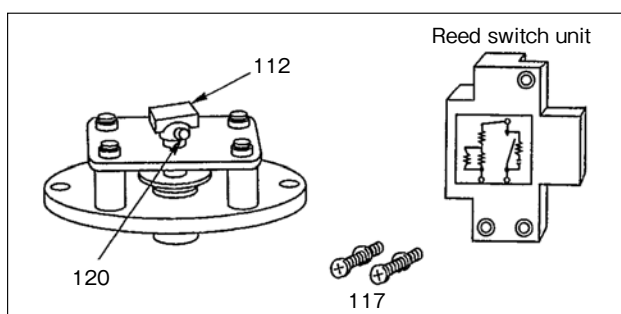
(Make sure that the transmitter cables are not lodged between the casing parts while reassembling.)

### 〈DISASSEMBLY AND INSPECTION-1, MODEL PG20〉



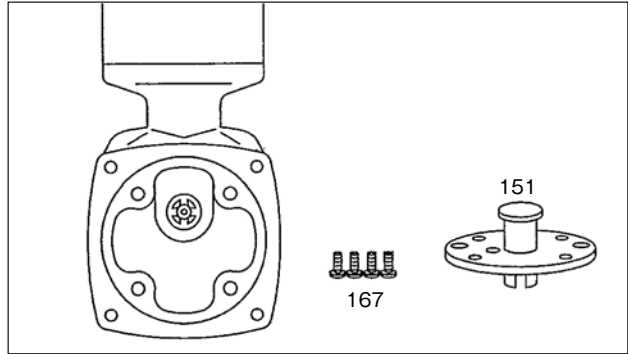
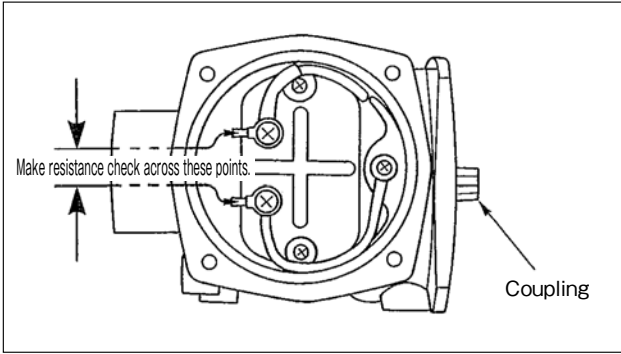
① Take off four fitting screws holding the mounting plate (204), separate the pulse generator from the flowmeter and remove the blind cover (102) of housing to gain access to the coupling (153) and pulse generator terminals. Hand rotating the coupling, make a resistance check across terminals to make sure of incoming pulse signal.

② Take off two fitting screws (105) holding the mounting plate and four fitting screws (167) for the plate. The conversion gear train and reed switch assembly are ready for inspection.



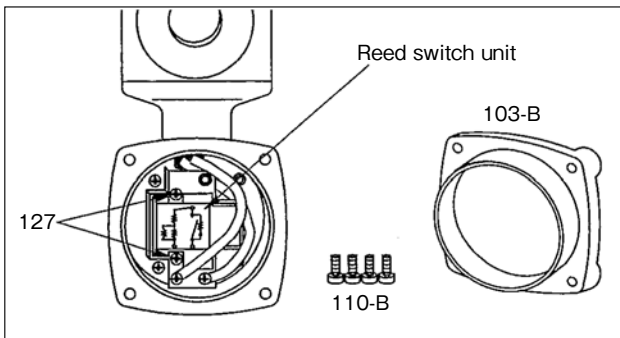
③ The reed switch unit may be removed after removing the two screws (117). To check the ON/OFF ratio of the pulse signal for adjustment, loosen the two screws (120) and move the driving magnet (112) in the vertical direction. The "ON/OFF" ratio is preset to somewhere between 1/1 and 1.8/1.

〈DISASSEMBLY AND INSPECTION-2, MODEL PG20EP〉



① Take off four fitting screws (207) holding the mounting plate, separate the pulse generator from the flowmeter, remove the blind cover (102) of housing, take off four housing fitting screws (110-A) and remove the housing cover (103-A) to gain access to the coupling (153) and pulse generator terminals. Hand rotating the coupling, make a resistance check across terminals to make sure of incoming pulse signal.

② Take off two plate "A" fitting screws (167) and separate plate "A" (151). The conversion gear train is ready for inspection.



③ Take off four housing fitting screws (110-B) and separate the housing cover (103-B). Then take off two screws (127). The reed switch assembly is now ready to be replaced. Located under the reed switch assembly is a signal generating magnet (123). With its setscrews (136) loosened, you can make an ON/OFF time adjustment for the waveform. (See ③ in the case of MODEL PG20.)

**■ LUBRICATION** Lubricate gears and bearings with suitable oil.

Do not fail to use proper lubricants shown below, or equivalent, at disassembly and inspection.

L: Lubricating oil  
G: Grease

Gear Train		Bearings		Brake Shoe
Spur	Bevel	Plain	Ball	
L3	G2	L3	L3	G2

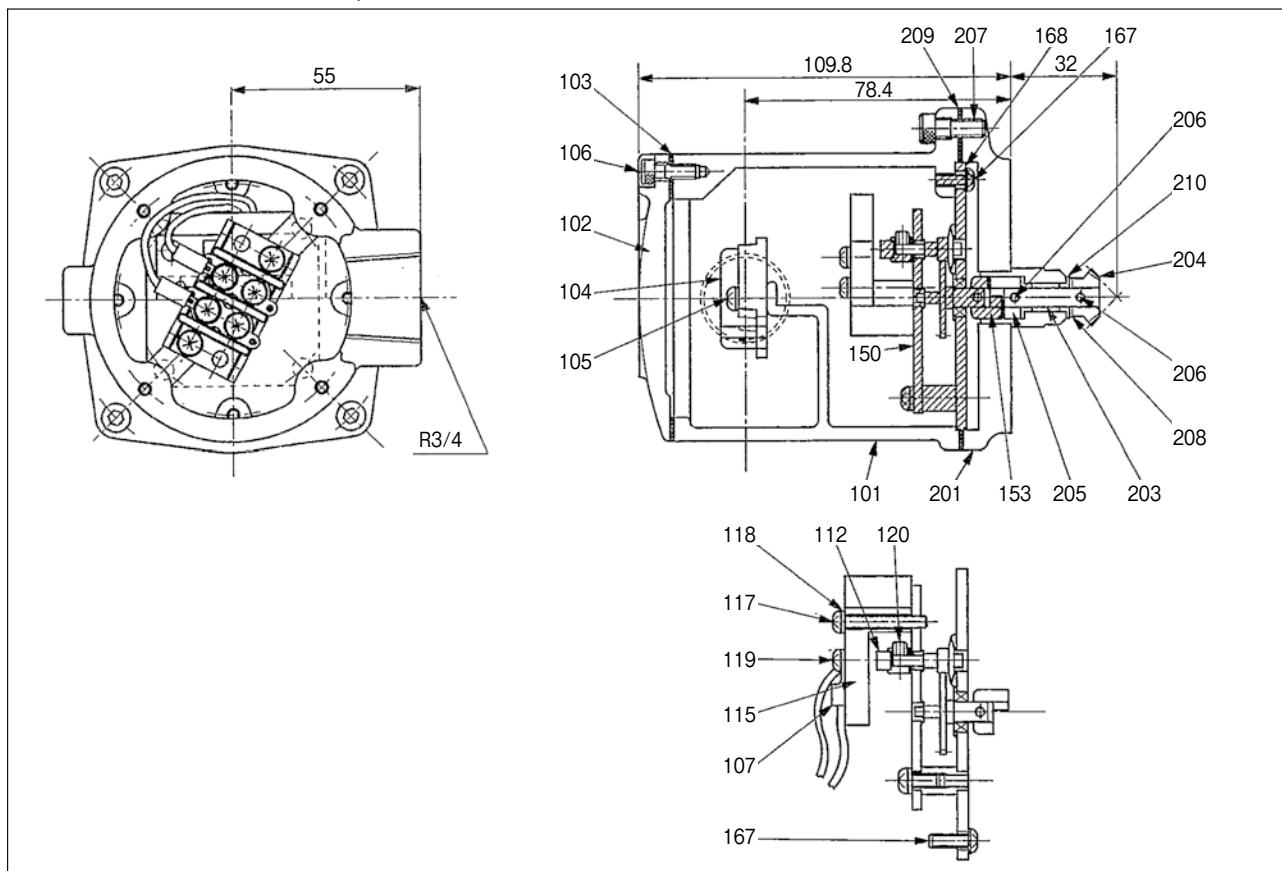
**● Lubricating Oil Specifications and Examples of Products**

Symbol	Viscosity or Consistency	Pour Point or Drop Point	Example of Products by Trade Name
L3	36.4 <sup>cst</sup> /30°C	- 37.5°C	Nisseki Launa 40 (Nippon Oil Co., Ltd.)
G2	300/25°C	300°C and above	Jun BG Grease (Nihon Tokushu-koyu Co., Ltd.)

■ ASSEMBLY DRAWINGS AND PARTS LISTS

WHEN ORDERING REPLACEMENT PARTS, PLEASE SPECIFY THE FLOWMETER MODEL, FLOWMETER SERIAL NO., INSTRUCTION MANUAL NO., SYMBOL NO., AND QUANTITY OF THE PARTS DESIRED.

● ASSEMBLY DRAWINGS, MODEL PG20



● PARTS LISTS, MODEL PG20

〈Pulse Generator〉

Sym. No.	Part Name	Q 'ty
101	Outer housing	1
102	Rear lid	1
103	Gasket	1
104	Terminal	1
105	Mounting screw	2
106	Rear lid mounting screw	4
107	Terminal lug	6
112	Driving magnet	1set
120	Driving magnet setscrew	
115	Reed switch unit	▲ 1set
117	Reed switch mounting screw	
118	Washer	
119	Terminal mounting screw	

➡ Note: ▲ : Recommended spare parts

〈Transmission Gear Box〉

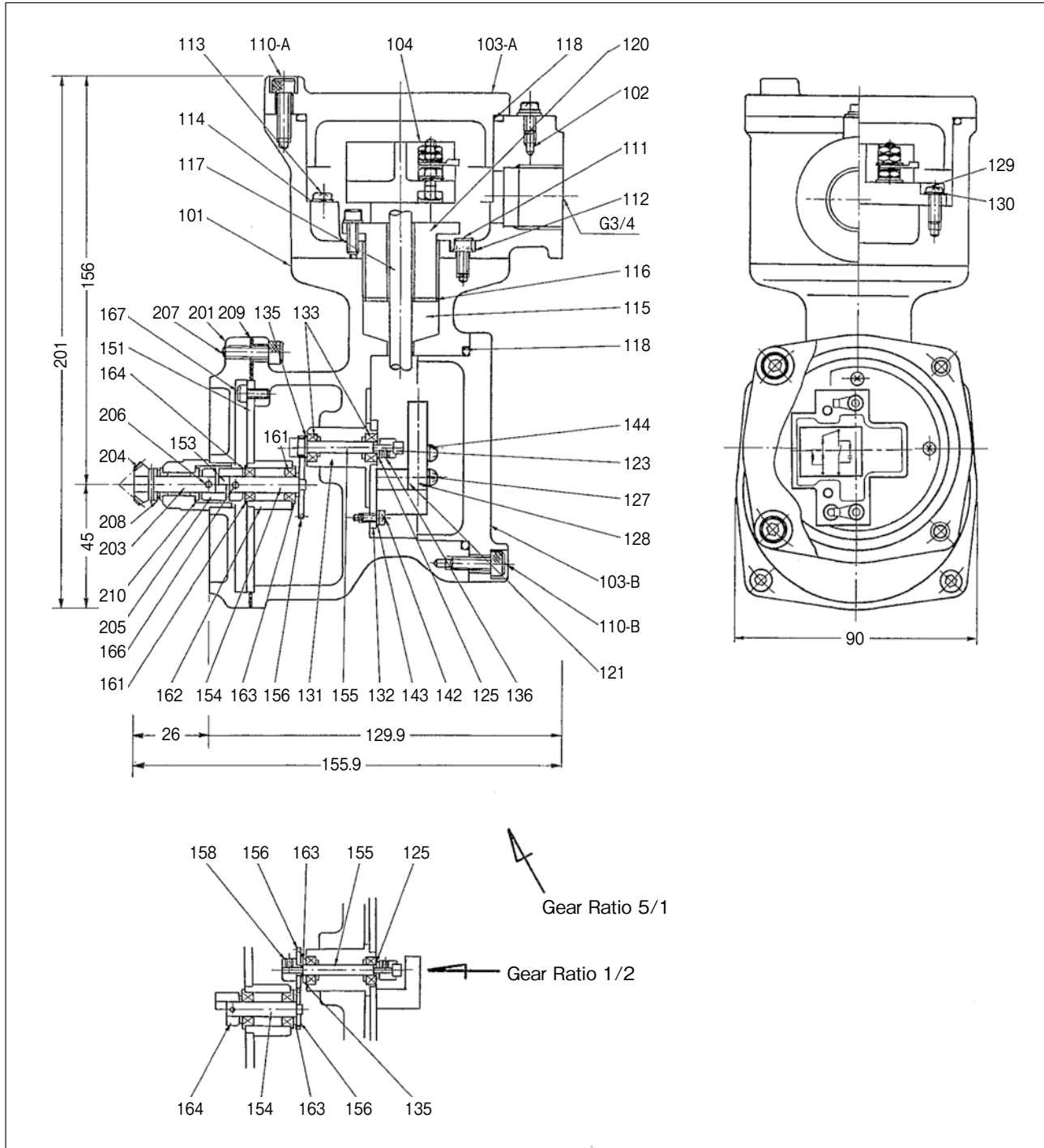
Sym. No.	Part Name	Q 'ty
150	Transmission gear box	1set
153	Coupling	1
167	Plate mounting screw	3
168	Washer	3

➡ Note: The transmission gear box is furnished as an assembly. When ordering this unit, please specify the "Gear Ratio" (1/2, 5/1, for instance) stamped on the rear surface of the plate (A).

〈Mounting Plate〉

Sym. No.	Part Name	Q 'ty
201	Mounting Plate	1
203	Transmission shaft	1
204	Bevel gear (input)	1
205	Coupling	1
206	Coupling retaining pin	2
207	Mounting plate screw	4
208	Thrust sheet	1
209	Gasket	1
210	Oilless bearing	2

● ASSEMBLY DRAWINGS, MODEL PG20EP



## ● PARTS LISTS, MODEL PG20EP

### <Pulse Generator>

Sym. No.	Part Name	Q 'ty
101	Outer housing	1
102	Terminal box housing	1
103	Cover	2
104	Terminal	1set
110	Mounting screw	8
111	Mounting screw	8
112	Washer	4
113	Screw (grounding)	1
114	Washer	1
115	Packing (pressuretight)	1
116	Washer (pressuretight)	1
117	Cabtyre cable	1
118	O-ring	2
119	Blind plug	1
120	Packing gland	1
125	Driving magnet, spacer	2
129	Terminal mounting screw	2
130	Washer	2
131	Driving magnet shaft holder	1
132	Driving magnet shaft plate	1
133	Ball bearing (A) (L1040ZZ)	2
135	Plate spring	1
142	Base plate mounting screw	3
143	Washer	3
121	Reed switch unit	
127	Mounting screw	▲
128	Washer	1set
144	Terminal mounting screw	
123	Driving magnet (w/holder)	1set
136	Setscrew	

⇒ Note : ▲ : Recommended spare parts

### <Transmission Gear Box>

Sym. No.	Part Name	Q 'ty
○151	Plate (A)	1
153	Coupling	1
○154	Input shaft	1
155	Magnet shaft (w/2nd gear)	1
○156	1st and 2nd gear	1
○158	Dowel	1
161	Ball bearing (B) (LF1260ZZ)	2
○162	Input holder	1
163	Thrust spacer (B)	2
166	Coupling retaining pin	1
167	Plate(A) mounting screw	4

⇒ Note : The transmission gear box is furnished as an assembly.

○ : When ordering this unit, please specify the "Gear Ratio" stamped on the plate(A).

### <Mounting Plate>

Sym. No.	Part Name	Q 'ty
201	Mounting Plate	1
203	Transmission shaft	1
204	Bevel gear (input)	1
205	Coupling	1
206	Coupling retaining pin	2
207	Mounting-plate screw	4
208	Thrust sheet	1
209	Gasket	1
210	Oilless bearing	2

## ■ GENERAL SPECIFICATIONS

ITEM \ MODEL		PG20		PG20EP	
		PG21	PG22	PG21EP	PG22EP
Number of pulses per rev.		1P/rev	10P/rev	1P/rev	10P/rev
Gear ratio		1/2	5/1	1/2	5/1
Pulse-generating method		Contact pulse generation from permanent-magnet-driven switch			
Driving magnet	Symbol and characteristics	BF, anisotropic			
	Dimensions	8 × 5 × 4 (mm)			
	Magnetic flux density	1100 to 1300G			
ON/OFF ratio		ON/OFF = 1/1 to 1.8/1			
Working temperature range		- 20°C to + 90°C			
Reed switch unit	Model	ORD-229 (dry contact type)			
	Part No.	RS-0-13			
	Max. working current	0.5A			
	Contact life	1 × 10 <sup>7</sup> operations (at 5VA, 60mA, resistive load) 2 × 10 <sup>8</sup> operations (at 12V DC, 5mA, resistive load)			
	Orientation	Any position			
	Color	Black			
Construction	Explosionproof construction	Standard		Flameproof	
	Explosionproof grade	—		d2G4	
	Cable entry	R3/4 internal thread		G3/4 internal thread	
	Starting torque	25g-cm max. (at 5/1 gear ratio)			

All specifications are subject to change without notice for improvement.