

Operation and Maintenance Manual

Metering Paint Feeder Flushable Gear Pump

FGP30



This manual contains important information on warnings and cautions. Read the manual thoroughly before starting to operate this equipment, and follow the instructions.

Always keep the manual handy until such time as the equipment is no longer being used.

If your manual is lost or worn badly, do not hesitate to contact our agency which is closest to you, or the Asahi Sunac Corporation, directly, and ask us to send you a new one.

Thank you for buying our product.

Dear Valued Customer,

Thank you for buying our product, Flushable Gear Pump (FGP30).

Please read this manual carefully before starting to operate the equipment. Please pay particular attention to major specifications, warnings and precautions, including prohibited items. Use the equipment appropriately and with care, following the instructions. We hope that by doing so you win benefit from use of the product over a long period of time.

The equipment is geared to industrial painting. It is for use only by those who are familiar with its workings and have undergone proper training; persons without such knowledge should not be allowed to operate the equipment.

Should you have any questions with regard to the manual, please give us the "Model Name" and "Serial Number" of your equipment, so that we may be able help you with your questions. You can reach us at any of the addresses, phone numbers and fax numbers shown on the back cover.

Thank you,
Asahi Sunac Corporation

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Please carefully read this manual and get yourself acquainted with the equipment.

Please observe the operating procedures in the manual. Failure to do so may result in **personal injury and/or damage to property**.

This manual covers only minimum safety precautions and it does not suggest or imply that no other precautions are required. Of course, each enterprise must observe its own rules as well as the laws and regulations of the country or region in which it operates, in addition to the safety precautions in the manual.

Again, shown on the pages that follow are basic and minimum safety precautions for use of our products.

- **As shown below, safety precautions are classified into three categories based on the severity of hazards involved.**

 WARNING	Alerts a hazardous situation which may result in personal injury, with instructions on how to avoid it.
 CAUTION	Alerts a hazardous situation which may result in damage or breakage to equipment, with instructions on how to avoid it.
NOTE	Indicates important methods and practical information.

- ※ A hazardous situation classified into the CAUTION category could cause a serious accident depending on how things develop. All the precautions in the manual convey significant information that you must observe such precautions in order to ensure your own safety and prevent equipment from failure.

WARNING

<<Intended use of the product>>

This operation manual applies to:

the **Flushable Gear Pump <FGP30>**, a metering paint feeder.

This product can be installed in a coating line equipped with an exhaust system in order to feed paint at a constant rate.

If there is any question about the intended use and materials of the product, please consult us.

Unless especially approved by us, the use of the product under conditions other than mentioned above is always considered misuse and may lead to an accident. Take enough care.

<<General instructions on the use of the equipment>>

- ① Replacing or altering any part of the equipment may lead to a malfunction and is strictly prohibited.
- ② Periodically check the whole equipment and repair or replace faulty parts if any.
- ③ The operator shall operate the equipment by bare hand or using electrically conductive gloves.
- ④ Those who have not learned to operate the equipment shall keep off of it.
- ⑤ Check that the paint or solvent to be used is compatible with the equipment. If anything is unclear about the paint or solvent to be used, please consult the material manufacturer.
- ⑥ When a paint or solvent is fed at a constant rate, static electricity is generated in the feeding circuit. Each part of the equipment shall be properly grounded for protection from sparks caused by static electricity.
- ⑦ If any electric shock due to static electricity is felt while handling the equipment, immediately stop operation and check the grounded condition of each part of the equipment. Do not restart operation until the cause is located and action taken.
- ⑧ Besides the equipment itself, the air compressor, paint hose, coating equipment, products to be coated, paint container, etc. shall be properly grounded.
- ⑨ Do not use any halogenated hydrocarbon based solvent for the equipment. It chemically reacts with aluminum, plating section, etc. in a hazardous manner.
- ⑩ Do not use the product in a poorly ventilated place.
- ⑪ Extinguishers with a sufficient capacity that have passed periodical inspection shall be kept at hand in case of emergency.
- ⑫ The coating equipment shall only be operated by those who have completed the training for safe operation of the equipment.
- ⑬ Those who have not completed the training for safe operation of the coating equipment shall not work with the coating equipment.

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Overview of the equipment

①Features

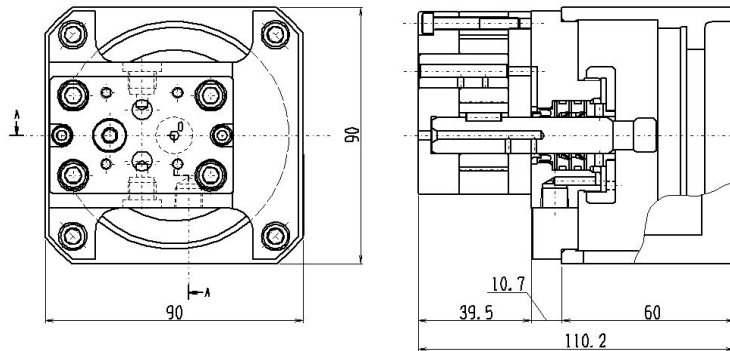


- The equipment consists of an automatic feed gear pump capable of controlling the delivery rate of a viscous fluid in proportion to the rotational speed.
- It is a leakless gear pump featured by its fluid circuit and seat section. The fluid circuit runs around the drive shaft and, therefore, requires a very limited part of the piping to be blocked. A self-expandable packing is used for sealing, resulting in a more stable operation than with a conventional packing.
- The equipment cannot be used for some types of paint. Thoroughly check its compatibility with the paint before use.

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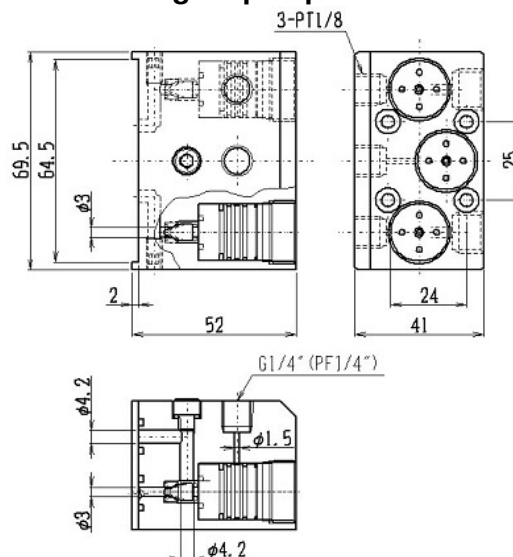
Specifications

<Flushable Gear Pump: T2049-5, T2049-6>



Model	FGP30
Part No.	T2049-5, T2049-6
Discharge rate	3cc/rev
Withstanding pressure	1MPa
Recommended paint pressure	> 0.3MPa
Max. rotational speed	150rpm (when flushing for color change) 200rpm (when paint transferring)
Allowable fluid viscosity range	20mPa·s ~ 150mPa·s
Rotational torque	0.15N·m at 150rpm (for reference) * Slightly varies depending on the paint properties.
Maximum fluid temperature	40°C (continuous)
Weight	1kg

<Flushing valve manifold for flushable gear pump: T3344A>



Model	Manifold
Part No.	T3344A
Withstanding pressure	1MPa
Valve operating air pressure	0.4MPa

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Installation and Connection of the Pump Body

① Installation

(1) The pump is filled with a solvent. It can be directly used after peeling the tape off.

⚠ CAUTION

If the pump becomes dry inside, pour paint thinner into the pump before installation.

(2) After securing a joint or gear to the shaft, install the pump to the drive unit.

⚠ CAUTION

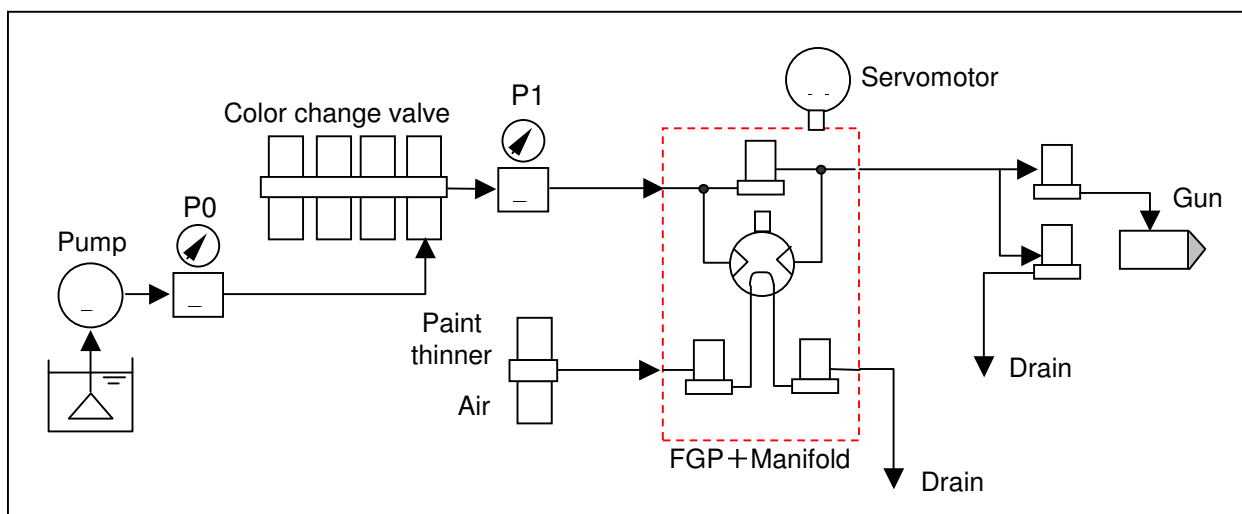
When securing a joint or gear to the shaft, do not apply an excessive force or hit them. Doing so may cause the internal gears to collide with the casing, resulting in a dent or poor assembling accuracy and faulty rotation.

(3) Rotate the shaft by hand to adjust the drive gear backlash or correctly center the joint.

⚠ CAUTION

If a force is applied to incline the shaft as it is rotated, the gear pump may be internally seized to prevent rotation or unevenly worn to shorten its service life.

② Example of connection



NOTE

- ① The paint circuit shall be so laid out to supply a sufficient pressure and flow to the flushable gear pump. If the pressure or flow is insufficient, the delivery rate cannot be increased by raising the flushable gear pump rotational speed.
- ② The inlet pressure, P1, of the flushable gear pump shall be set to the level at which the paint is delivered at the specified rate from the coating equipment with the bypass valve open (not through the flushable gear pump).
- ③ When flushing, open the bypass valve to drain the paint circuit through the gun tip. The flushable gear pump can be thoroughly flushed at the same rotational speed as in the coating process.
- ④ The thinner and air pressures used for flushing the shaft shall be set to a sufficient level (>0.5MPa). Insufficient pressures may affect the flushing performance.
- ⑤ If a paint valve downstream the flushable gear pump fails, the paint tube internal pressure is raised to damage the tube. It is recommended to provide a current load detector to stop the servomotor in case of an unusual condition.
- ⑥ The flushable gear pump can be used in both rotational directions. The IN and OUT sides of the paint circuit are exchanged according to the pump rotational direction.

CAUTION

- ① If the fluid is less viscous and contains less resin or lubricating component, the internal sliding parts may be seized. Run the pump at a speed not exceeding 50rpm, reduce the internal pressure as far as possible or make an in-depth study before use.
- ② When using a two-component or highly-reactive paint, it may stock to the internal sliding parts. An in-depth study is required as in case of ①.
- ③ The pump cannot be used for water or water-soluble paint.

③Commissioning

(1) Set the rotational speed with reference to the following table.

Condition	Rotational speed
When coating	50 ~ 200rpm
When flushing (air/thinner)	100 ~ 150rpm
When filling with another color	~ 200rpm
Max. rotational speed	≤300rpm (≤5 seconds)

CAUTION

When filling the pump with paint with another color, the gear pump contains paint thinner and air. Before running the pump, open the paint valve for the selected color and slowly rotate the pump for 0.5 to 1 second until the pump is sufficiently filled with paint. Some types of paint may rub against and stick to the internal parts to stop the pump.

CAUTION

When using a two-component paint, a paint that is highly reactive to the shearing force or a less viscous paint containing less resin, the shaft may stick while rotating at a higher speed. In this case, set the rotational speed to a lower level.

- (2) Run the gear pump at a lower speed to check for unusual sound due to poor installation.
- (3) The IN side paint pressure shall be set to the same level as for the OUT side load pressure. This helps sustain the metering ability of the gear pump.

 **CAUTION**

Adjust the load so that the internal paint pressure will not exceed 0.3MPa.

- (4) Try to discharge the paint through the gun tip and measure the actual paint discharge rate for 30 seconds using a measuring cylinder or similar container. Use the measured rate as a guide to correct the mechanical gap from the commanded pump rotational speed.
- (5) Periodically check and correct the discharge rate. The actual discharge rate may increase (or decrease) as the paint pressure leakage rate at the primary side increases (or decreases) as a result of internal wear.

**CAUTION**

- ① When flushing the paint circuit, continuously run the pump at a speed not exceeding the permissible limit (150rpm) within 20 seconds. Never run the pump with nothing (only air) or non-lubricating liquid in it.
- ② The gear pump used for the curing agent side of a two-component system shall be overhauled periodically (monthly or bimonthly) as the curing agent will stick to the bearing part.
- ③ The gear pump should be regarded consumable. No parts can be repaired except for replacement of the packing and are not separately offered.
- ④ When using a metallic paint, lay out the circuit in such a manner as to avoid circulation as far as possible. (Five or more circulations lead to deformation of aluminum flakes, resulting in a darker tone.)
- ⑤ The paint with a very low resin content may not be used in some cases. Please consult us.
- ⑥ The pump is delivered as filled with a fluid. When assembling the pump, flush it using a solvent.
- ⑦ The pump shall rotate counterclockwise as viewed from the shaft.
- ⑧ The paint suction (intake) side comes to the left of the pump (marked IN) as viewed from the shaft.

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Maintenance and Periodical Inspection

① Maintenance

To use the pump to its maximum performance, periodically inspect the pump according to the following table.

Item	Remedy	Frequency
Measurement of discharge rate	Correct according to the measured value.	Every 100 operating hours
Leak from shaft seal	Replace seal and packing.	Every 1000 operating hours

② Replacement schedule for consumables

Replacement schedule at normal discharge rate of 200ml/min

Part name	Part No.	Ordinary base paint	Abrasive (mica or primer based) paint
U-packing	3704-005	up to 7000 hrs.	up to 2000 hrs.
Lip seal	373-0006		

NOTE

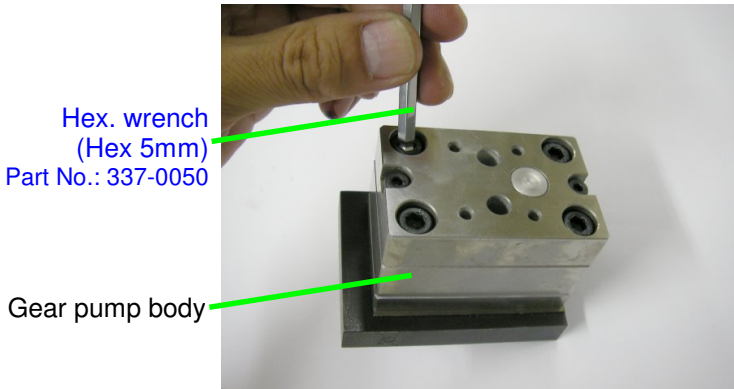
- ① It is recommended to replace the U -packing and lip seal at the same time.
- ② Leak may persist depending on the degree of the shaft wear even after the packing and lip seals are replaced. In this case, replace the gear pump as a whole with a new one.

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Parts Replacement Procedure

① Overhauling the gear pump (the procedure is the same as used for the MGP (multi-gear pump) and photographs for the MGP are shown herein).

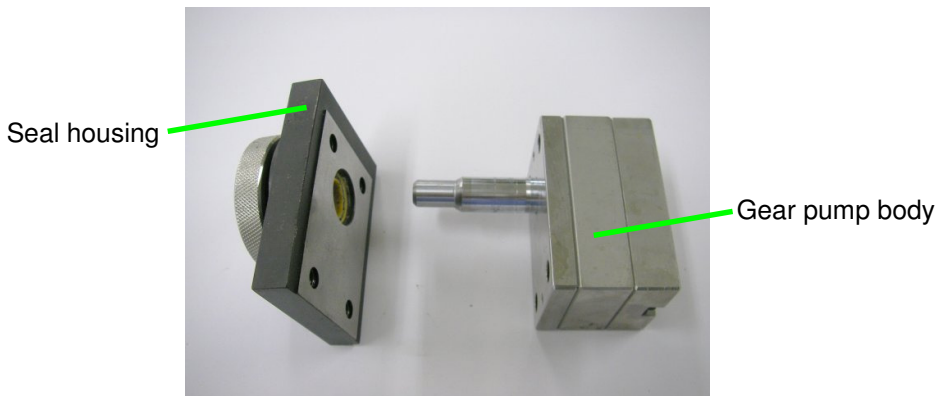
(1) Remove the hexagon socket bolts (M6 x 40) securing the gear pump, using a hexagonal wrench, Hex 5mm.



⚠ CAUTION

Never loosen the two hexagon socket head cap screws (M4 x 30) securing the gear pump body. Doing so may affect the performance including the metering ability.

(2) Slowly pull the gear pump body out of the seal housing.

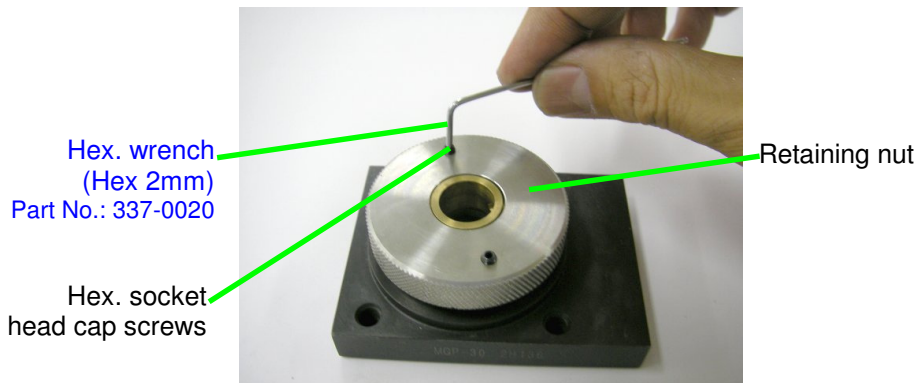


⚠ CAUTION

Handle the gear pump body in the shown position with care not to apply a force to the shaft or body. Failure to do so may cause misalignment among parts during re-assembly to impair the normal pump function.

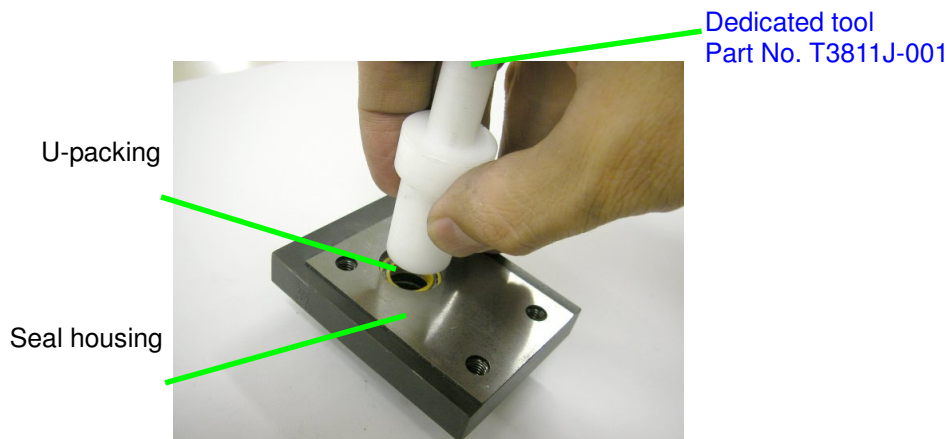


- (3) Before removing the seal housing retaining nut, loosen the two hexagon socket bolts (M3) serving as anti-rotation devices, using a hexagonal wrench, Hex 2mm.



- (4) After loosening the hexagon socket bolts, remove the retaining nut using a pipe wrench or similar tool.

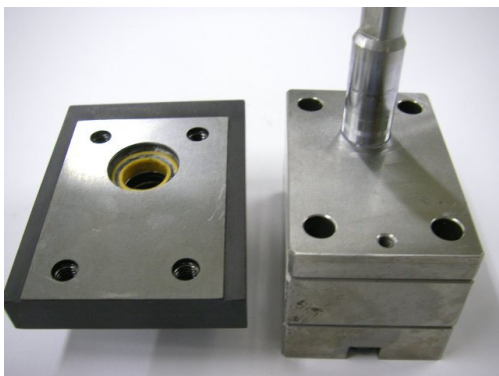
- (5) Remove the U-packing from the rear of the seal housing using a dedicated tool.



CAUTION

The U-packing, which is made of a material that is very likely to deform, must be replaced with a new one if once removed.

- (6) Thoroughly clean the mating faces of the gear pump shaft and body.

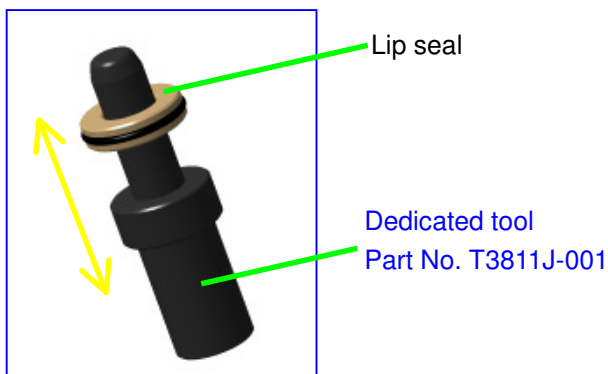


CAUTION

Never overhaul the gear pump body as the inside structure thereof is very precise. For the purpose of assuring the quality of the product, we will not sell or repair the gear pump body as a single unit. If the pump body fails, replace the whole product with a new one.

②Assembling the gear pump

- (1) Insert the lip seal into the dedicated tool and move it vertically several times to enlarge the lip seal bore.

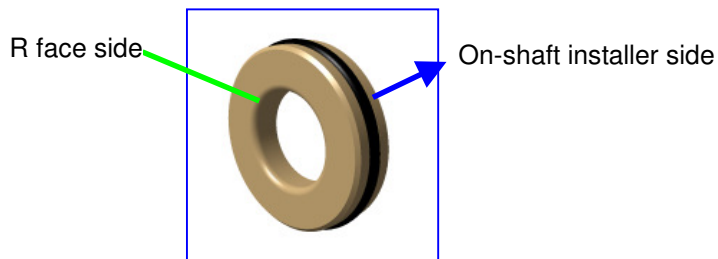


NOTE

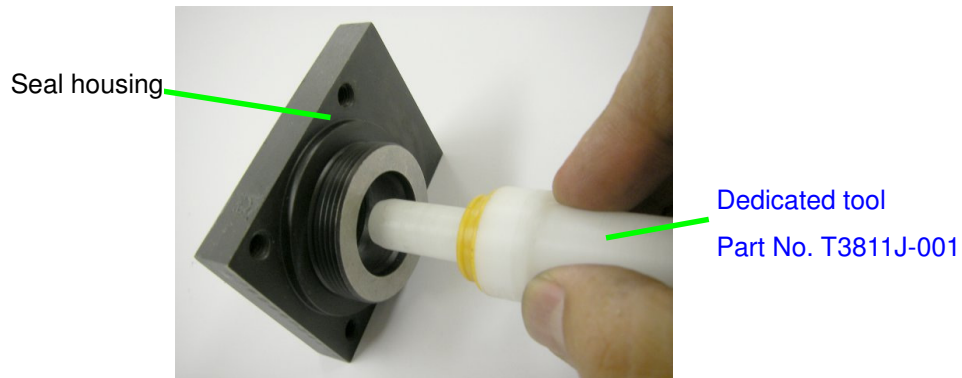
The dedicated tool and on-shaft installer used for replacement of the lip seal and U-packing are not included in the product and shall be prepared by the customer.

CAUTION

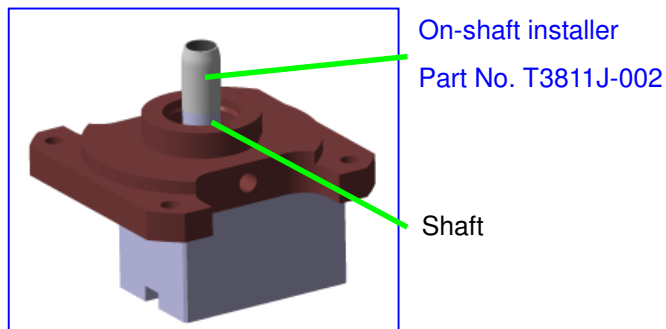
Take care to insert the lip seal in the correct direction.



(2) After coating the seal housing bore with Vaseline, install the U-packing to the dedicated tool and insert it into the seal housing. Slightly tap with a plastic hammer at this time.



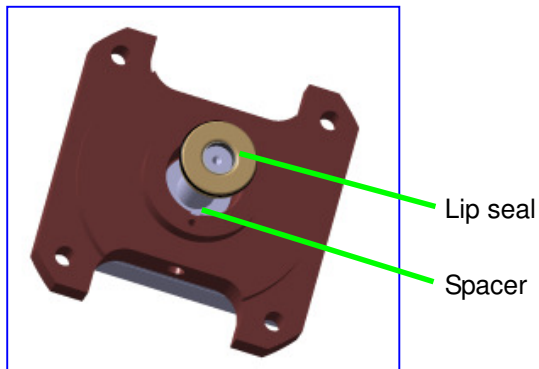
(3) Install the seal housing with the U-packing over the gear pump shaft and install the on-shaft installer onto the shaft serration part.



 **CAUTION**

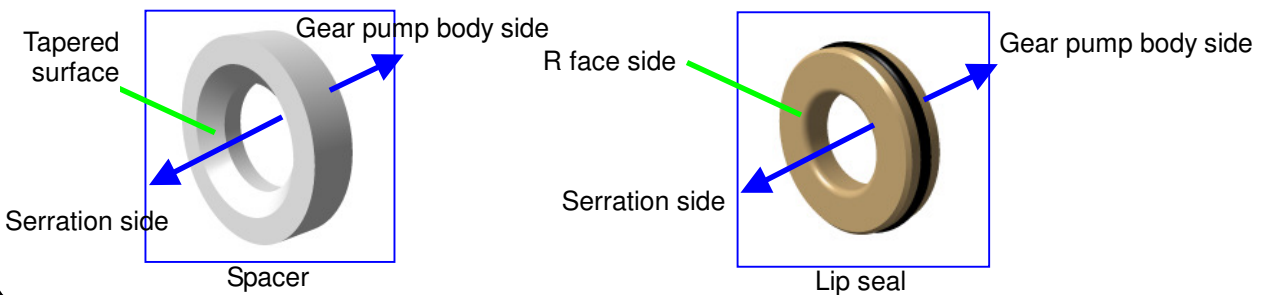
Check that there is no level difference between the on-shaft installer and the shaft. If there is any difference, the inside surface of the lip seal may be damaged when it is inserted.

(4) Coat the spacer bore and the enlarged bore of the lip seal with Vaseline in this order and insert them into the shaft from the top of the on-shaft installer.



CAUTION

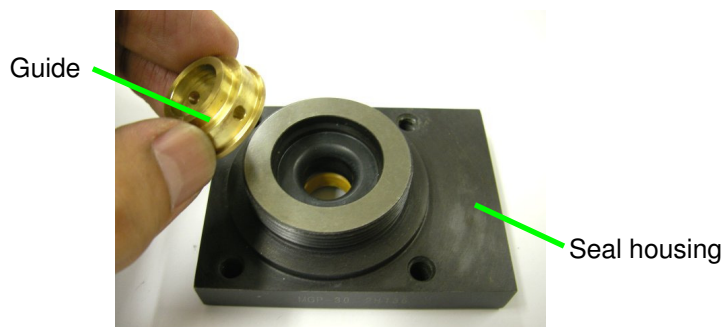
Take care to insert the spacer and lip seal in the correct direction.



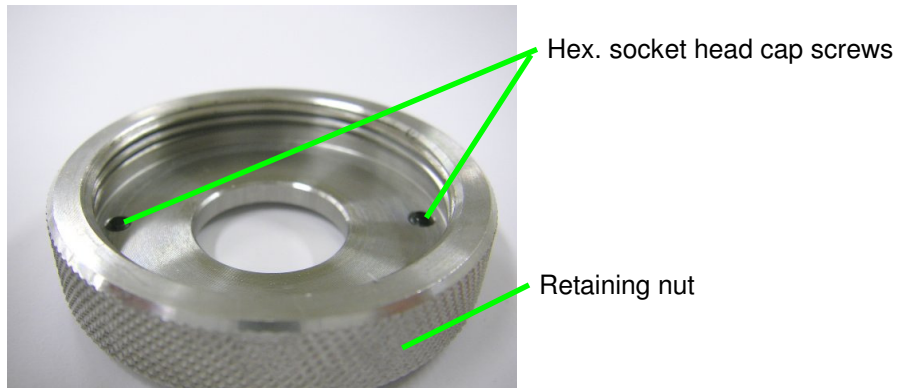
CAUTION

If the lip seal bore has not been sufficiently enlarged, the lip seal may be caught by the on-shaft installer and damaged. Sufficiently enlarge the lip seal bore using a dedicated tool.

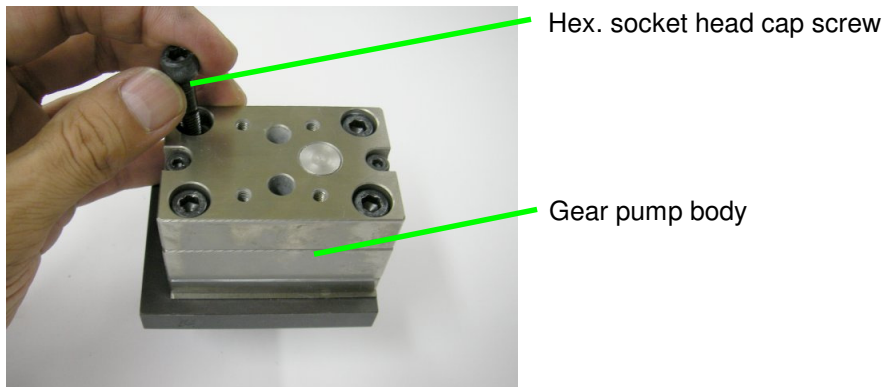
(5) After inserting the U-packing, spacer and lip seal, coat the guide bore with Vaseline and insert the guide over the shaft.



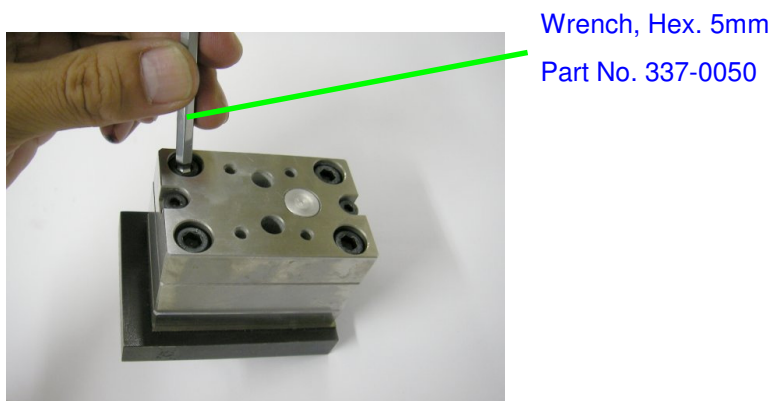
(6) After checking that the hex. socket bolts for the retaining nut do not protrude from the nut, tighten the retaining nut using a pipe wrench or similar tool.



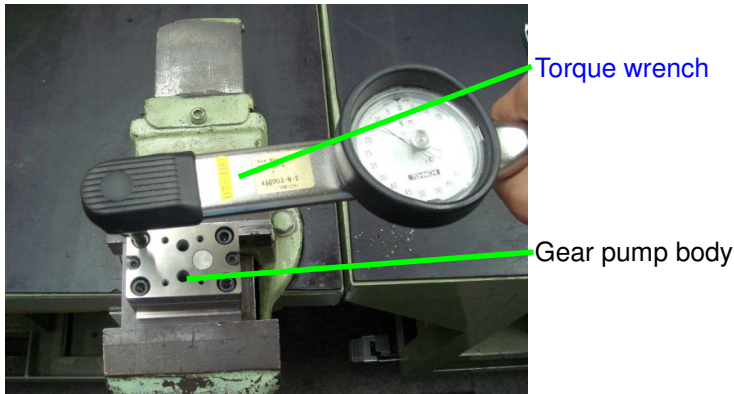
(7) Insert the four hex. socket bolts (M6 x 40) for securing the seal housing and gear pump body.



(8) With the hex. socket bolts inserted, temporarily tighten them in the order shown below using a hexagonal wrench, Hex 5mm. After temporarily tightening each screw, rotate the shaft for two or three turns to check that it smoothly rotates. If not, loosen the hexagon socket bolts and retighten to ensure that the shaft will smoothly rotate.



(9) After temporarily tightening all hexagon socket bolts, check again that the shaft smoothly rotates and finally tighten them using a torque wrench to the torque of 15N-m in three steps; 5N-m in each step. When tightening, apply a uniform force little by little. Tightening quickly puts the plate of the gear pump body out of position, resulting in faulty rotation.



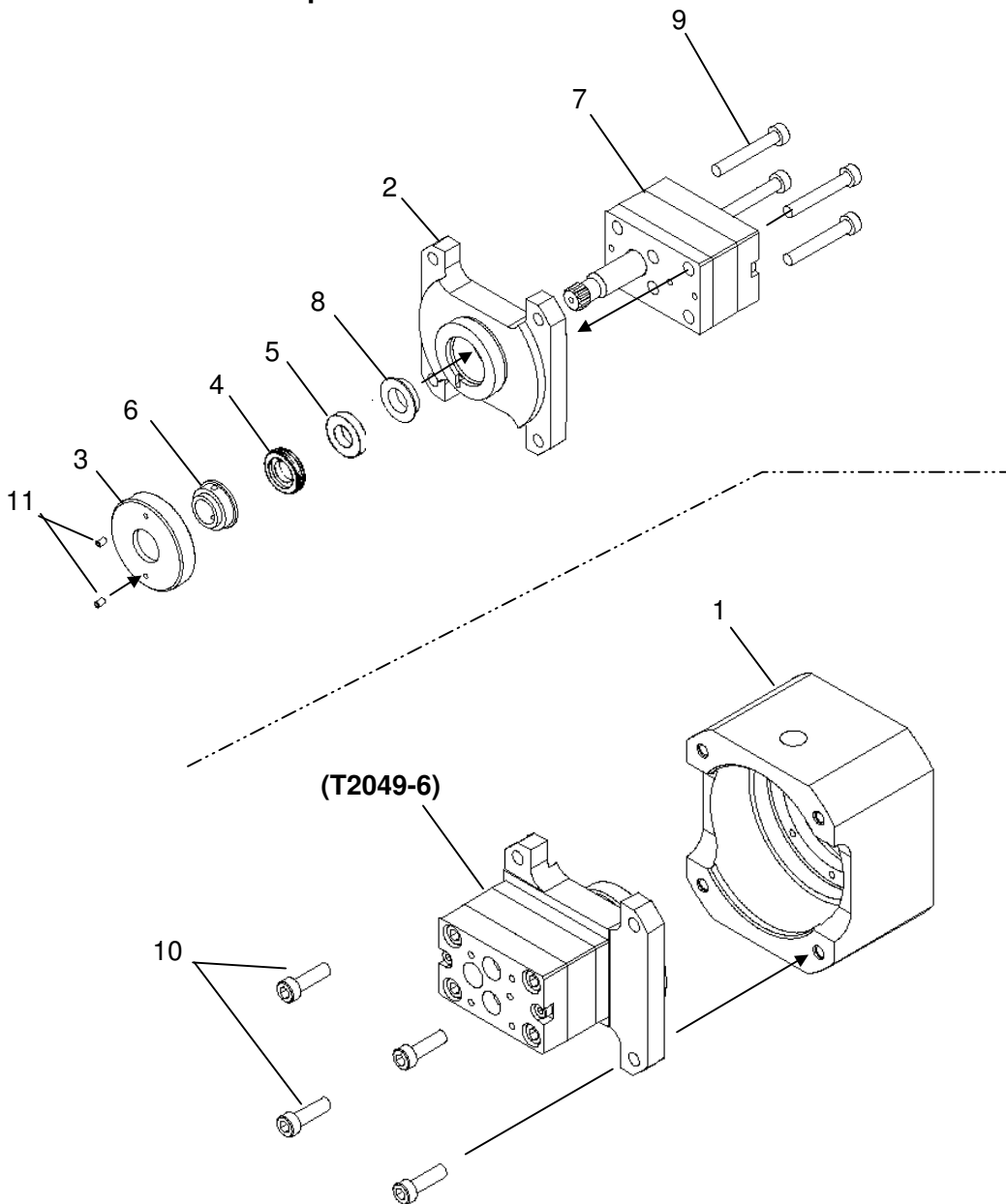
(10) Check once again that the shaft smoothly rotates. If the shaft rotation is not uniform at this time, return to step (7).



NOTE

The shaft may be felt some heavy when rotating after replacement of the packing. There is no problem if the shaft rotates evenly (without feeling heavy at some points).

<Flushable Gear Pump FGP30:T2049-5>



<T2049-5, -6>

No.	Part No.	Part name	Qty	Remarks
1	T2049-401	Housing	1	
2	T2049-402	Seal housing	1	
3	T2049-103	Special nut	1	
4	373-0006	Lip seal	1	
5	T2049-008	Spacer	1	
6	T2049-106	Guide	1	
7	T2049-506	Gear pump body	1	

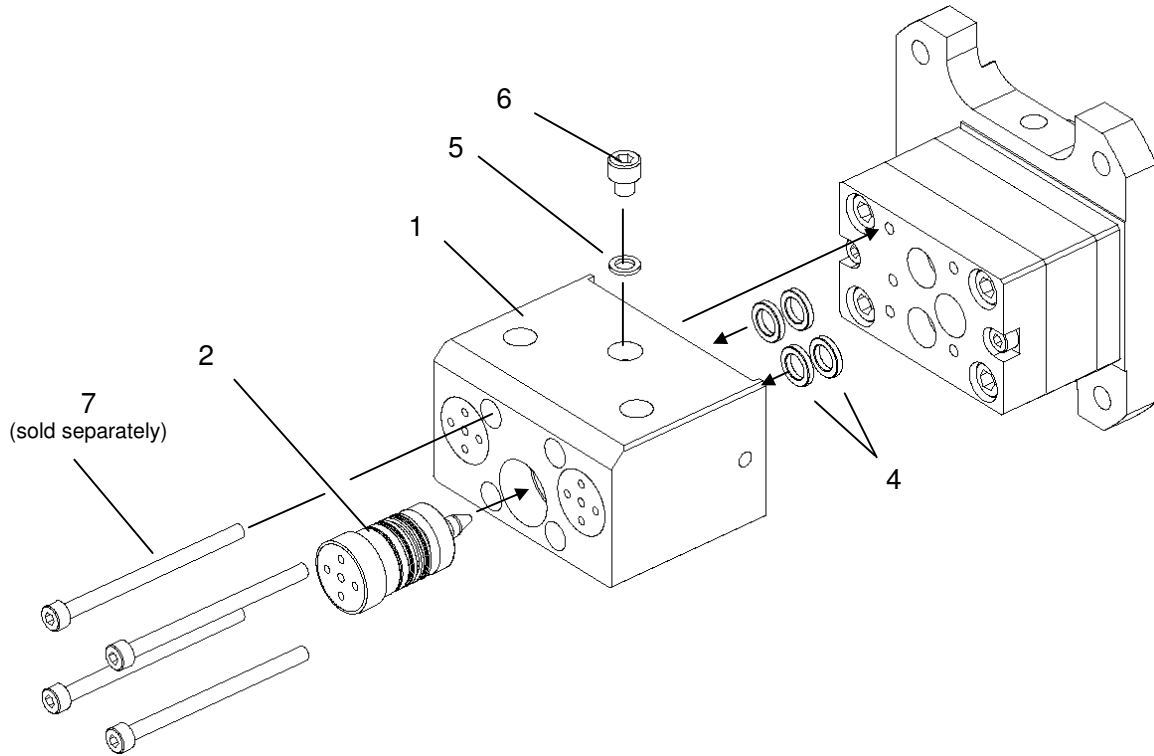
No.	Part No.	Part name	Qty	Remarks
8	3704-005	U-packing	1	
9	03-50640	Hex. socket bolt	4	
10	03-50620	Hex. socket bolt	4	
11	83-50305	Hex. socket head cap screw	2	
	T3811J-001	Tool	1	
	T3811J-002	On-shaft installer	1	

※1) Take care to install the lip seal in the correct direction. (See section 7 "Parts Replacement Procedure.")

※2) We do not separately sell or repair parts of the gear pump body.

※3) The dedicated tool and on-shaft installer are not included in the product and shall be prepared by the customer.

<Valve unit: T3344A>



<T3344A>

No.	Part No.	Part name	Qty	Remarks
1	T3344A-001	Manifold	1	
2	0836	2P valve	3	
4	T3344A-004	Seat	4	

No.	Part No.	Part name	Qty	Remarks
5	155-2005	Back-up ring	1	
6	03-70505	Hex. socket bolt	1	
7	03-50435	Hex. socket bolt	4	(sold separately)

※1) The valve unit is not included in the product and shall be prepared by the customer.

※2) The hexagon socket bolts, 03-50435, are not included in the valve unit and shall be prepared by the customer.

9

Troubleshooting

Symptom	Cause	Remedy
The paint discharge rate is different from the preset level.	① Pressure is leaking due to internal wear of the gear pump.	Replace the gear pump with a new one.
	② The preset IN side pressure is too high.	Adjust the regulator setting to the same level as for the OUT side pressure.
	③ The required rotational speed cannot be obtained due to the slipping drive unit.	Check the drive unit.
	④ The bypass valve or shaft flushing valve seat is faulty.	Replace the valve with a new one.
The gear pump does not rotate.	① The paint sticks to the friction part.	Adjust the gear pump body alignment to eliminate the stress by rotation.
		Reduce the maximum rotational speed.
		Extend the time to be elapsed before starting the pump after it is filled with paint.
	② Pigment in the paint is precipitated.	Periodically flush the circuit.
	③ The shaft is seized during dry run.	Replace with a new one and preset the rotational speed below the permissible limit.
Replace with a new one and modify the color change timing chart.		
Paint leaks.	① Wear of the shaft packing	Replace with a new one.
	② Excessive vibration of the drive unit	Check the drive unit.

ASAHI SUNAC CORPORATION (the “Company”) shall provide the original purchaser (the “Purchaser”) with warranty service against defects in design, manufacturing, or indications for a period of one (1) year from the date of purchase of the product, as follows:

- Should you find defects in design or manufacturing with regard to parts, ship them back to the Company, freight prepaid. The Company shall repair or replace the parts free of charge and reimburse the freight charges, provided that, as a result of an inspection and investigation of the parts conducted by the Company, the defects are deemed to be attributable to the factors within the Company’s responsibility.
- When, on the other hand, defects are found, as a result of inspection and investigation conducted by the Company, to be attributable to natural wear, corrosion, negligence, accidents, an act of God, installation contrary to the Company’s instructions, abusive use or misuse, operation contrary to the instructions appearing in the manual, or unauthorized modification, this warranty shall not apply. Neither shall it apply to any services that are conducted outside Japan. In these circumstances, any costs that may be incurred on repair or freight shall be the responsibility of the Purchaser.
- In the event also of failure caused by use in conjunction with a hose or a gun, etc. of a maker not approved by the Company, the warranty does not apply. In these circumstances, the Company will submit a quotation for the costs of whatever corrective measures are necessary, repair or replacement, including relevant terms and conditions.
- As for items such as parts purchased by the Company from another manufacturer, the warranty of that manufacturer shall apply.
- As for any parts deemed to be defective, the Company shall not be held liable for any expenses beyond the provision of replacement parts free of charge.
- The Company shall not be held liable for any damage to the Purchaser caused by factors not attributable to the Company, such as misuse of product, etc.

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- When a transfer of title of this equipment takes place, please see to it that this Operation and Maintenance Manual is handed over to the new owner.
 - This equipment is manufactured in compliance with the Laws and Regulations of Japan. In the rare eventuality of this equipment being used outside Japan, compliance with the safety standards of the relevant countries is of course mandatory.
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