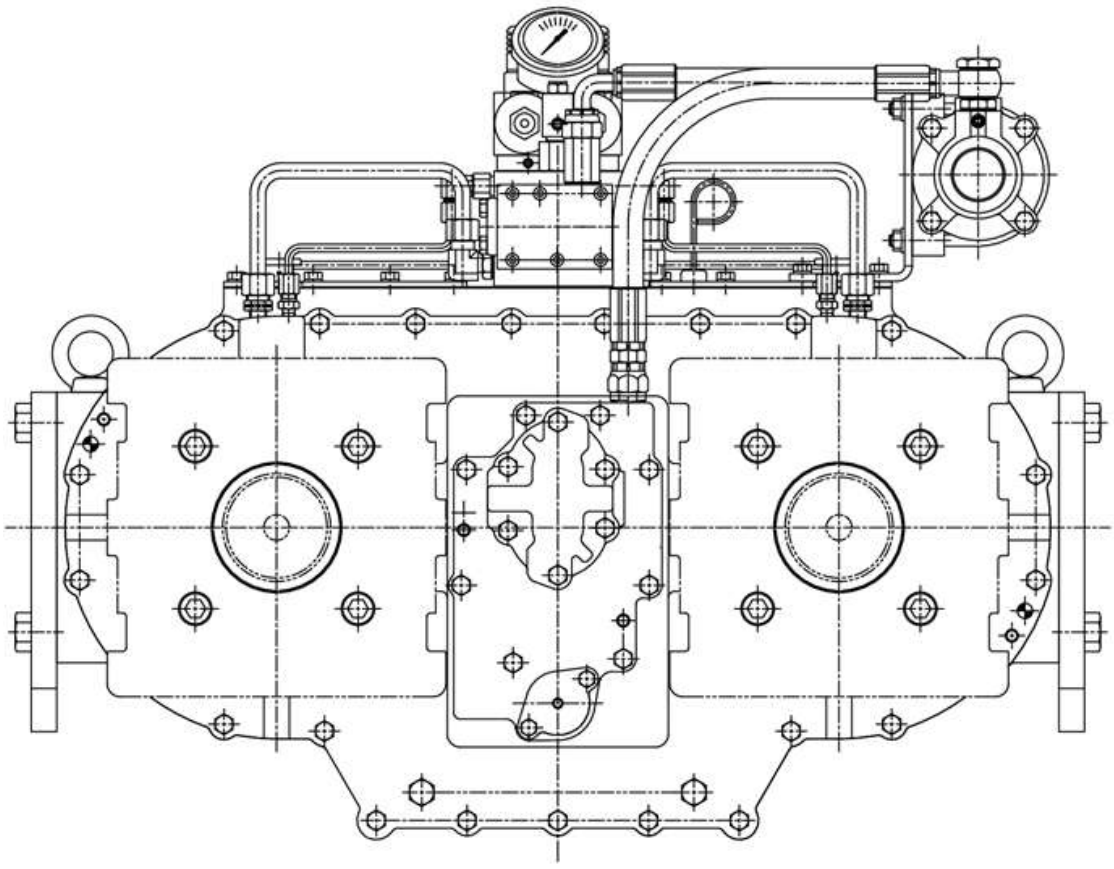
The user should read this manual thoroughly before operation and observe the method and precautions for more effective operation.

POWER TAKE OFF

INSTRUCTION MANUAL

MODEL : DPO 167



D-I INDUSTRIAL CO., LTD.

APPRECIATION

Appreciate you prefer to purchase our PTO. D-I PTO was made under the scientific research and design, hi-technology and thorough quality control to get the customer's reliability. In case of inconvenient things and further requirements while you use the PTO, you are kindly required to contact to our agent or head office.

TIP TO RECEIVE THE WARRANTY SERVICE

1. You shall sign on the receipt of PTO delivery when you receive the new PTO.
2. In case of the abnormal condition under the warranty period, contact our agent or CS department in head office and present the warranty letter of this manual.
   If the third party D-I doesn't admit maintains the PTO, you cannot get any warranty benefit.

INTRODUCTION

This manual contains description of construction, operating principles, correct operation and handling methods, precautions for installation, information on repair and check, etc. for D-I P.T.O (Hereinafter called “DPO167”)

TYPE	POWER TAKE OFF (P.T.O)
MODEL	DPO-167
The users should read this manual thoroughly before operation and observe the operating methods and precautions. Keep this manual at a safe place for future reference.	

Before operation, users should read the contents ⚠ marked in this manual. Since the contents ⚠ marked are very important for safety, users should follow the instructions.
In this manual, danger degrees which can be occurred by faulty use are shown in the following table.

DANGER	Failure to observe this mark could result in severe danger such as death or injure.
CAUTION	Failure to observe this mark could result in severe injure or death. And material damage can also occur.
IMPORTANT	Failure to observe this mark could result in material damage.

CONTENTS

SECTION 1 - INTRODUCTION

1-1. MAJOR FUNCTIONS

The D-I Power Take Off (Hereinafter called "DPO-167") described in this manual is a product to take power off an engine for the purpose of operating hydraulic pumps, winches or generators etc.

The main function of this PTO is to provide one(1) input clutch running all the time and two(2) output clutches running when needed, and it is possible to use for various application with six(6) gear ratios by four(4) models as below specifications. The on/off switch of the clutch is operated by the solenoid valve composed.

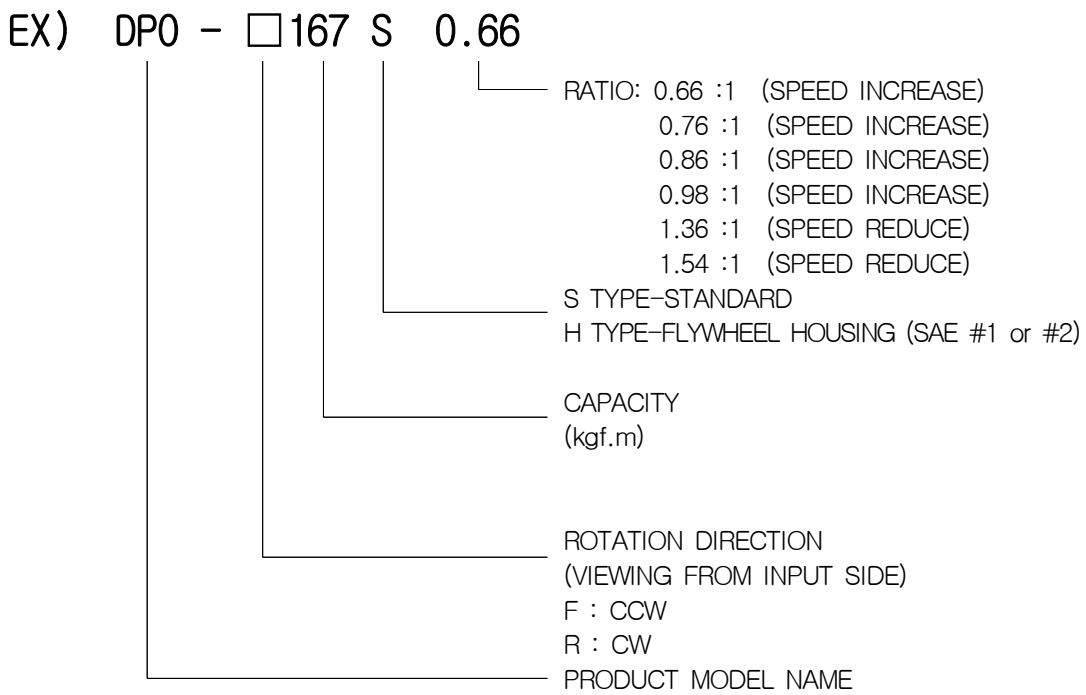
1-2. SPECIFICATION

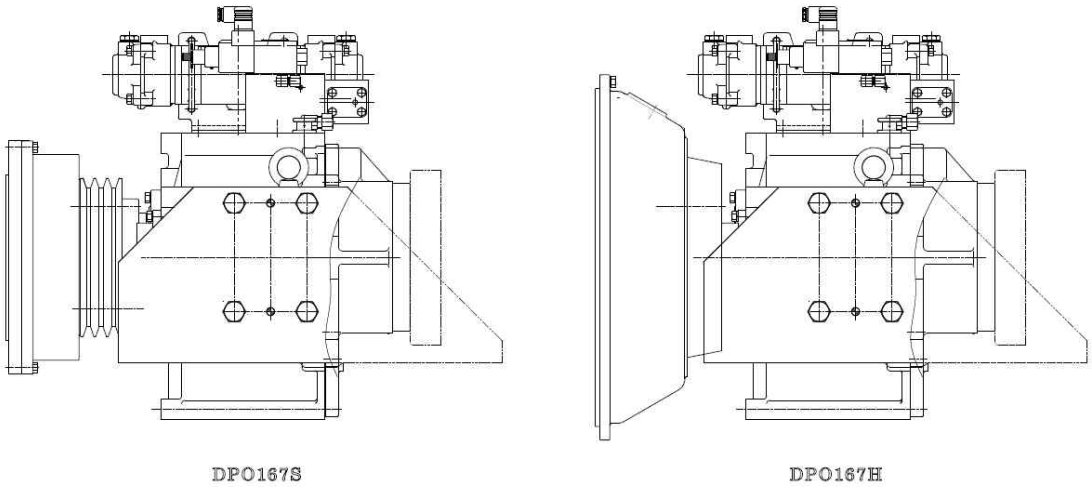
[Table. 1-1]

MODEL	MIN.SPEED (rpm)	MAX. SPEED (rpm)	INPUT TORQUE (kgf.m)	OPERATION PRESSURE (kgf/㎠)	LUB. PRESSURE (kgf/㎠)	DRY WEIGHT (kg)	FLOW OF COOLING WATER (ℓ/min)
DPO-F 167S	400	2300	400	MIN 16	0.1~10	420	40~60
DPO-F 167H							
DPO-R 167S							
DPO-R 167H							

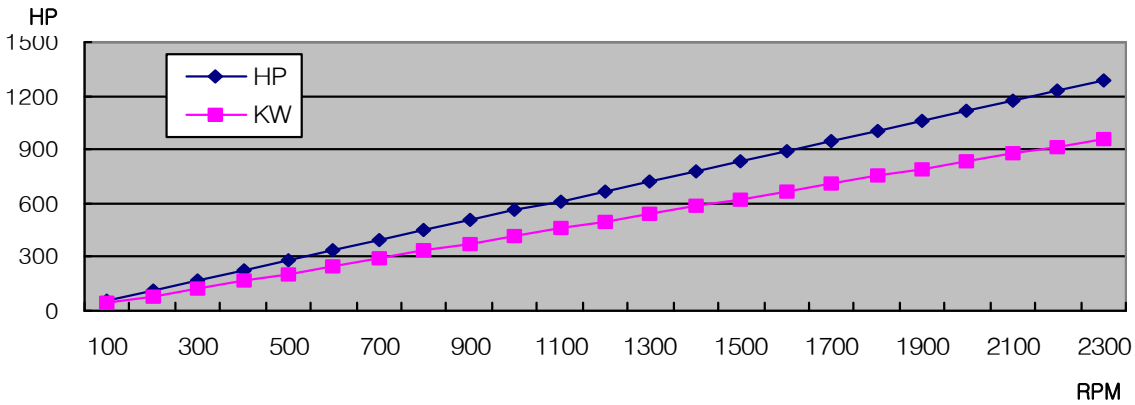
[FIG. 1-1] PTO SPECIFICATION

1-3. MODEL NAME DESCRIPTION





[FIG. 1-1] DPO - 167 SPECIFICATION



[FIG. 1-2] DPO - 167 PERFORMANCE CURVE

⚠ CAUTION

D-I PTO must be operated within the limit of capacity of winch, roller, alternator or other equipment which PTO drives.
If not, the fatal damage such as malfunction and bearing stickness can occur.
Rotation direction is marked on the name plate with the model name.
In case of the wrong rotation, out of operation and overheating can be occurred. {when viewing from input side, F: Counter Clock Wise, R: Clock Wise. (As to the model name, refer to the MODEL NAME DESCRIPTION at 1-3)}. Please keep the using capacity and any query is required to contact D-I head office.

SECTION 2 - STRUCTURE

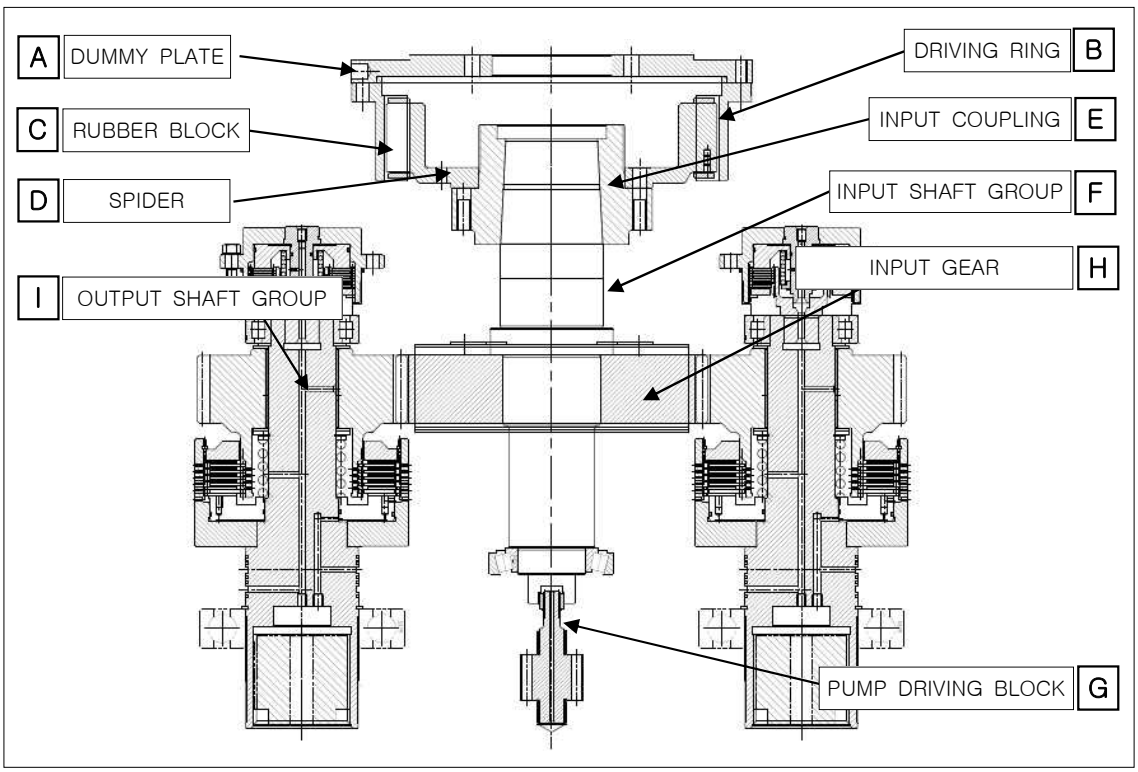
2-1 OVERVIEW

D-I PTO can take power off an engine and it is a device to provide the convenience of work in the vessel and its main components are largely one(1) input shaft group and two(2) output shaft groups.

Operation of PTO is performed by hydraulic clutch including oil pressure-producing pump assembly, oil cooler assembly, manifold assembly and solenoid valve in the PTO for the hydraulic system. A brake system at each clutch is equipped with this PTO to prevent the turning of output shaft from failure of stop.

Dummy plate is mounted with pulley of engine and then driving ring is coupled and through the spider and input coupling the power is transmitted into input shaft group. Or, the engine and PTO's power is performed by flexible coupling.

Each output shaft group has integral clutches, and two(2) output shaft groups can be rotated independently when each clutch is engaged.



[FIG. 2-1] PTO INTERNAL STRUCTURE DIAGRAM

2-2 INPUT SHAFT GROUP

1. Dummy plate - [Fig. 2-1 A]

   The dummy plate supplied is to be fitted to the pulley of engine. In order to fit the dummy plate to the engine pulley, the driving plate should be suitably machined for the pulley.

   The dummy plate is to be bolted directly to the pulley of engine.

2. Driving Ring - [Fig. 2-1 B]

   The driving ring is furnished with the involute grooves on which the rubber blocks are fixed to transmit power, and is bolted directly to the dummy plate.

3. Rubber Block - [Fig. 2-1 C]

   The rubber blocks are in the shape of involute gear teeth, and reduce rotative vibration of the engine and transmit the power smoothly.

4. Spider - [Fig. 2-1 D]

   The spider is fixed on the pulley of PTO with fitted reamer bolts, and constructed in a manner that the rubber block can be fixed on it.

5. Input Coupling - [Fig. 2-1 E]

   The Input Coupling transmits the power connecting the spider and the input shaft.

6. Input shaft ass'y - [Fig. 2-1 F]

   The input shaft ass'y is heat shrink-fitted with the input shaft and input gear and supported by tapered roller bearing on the both sides. When engine is on, the power is transmitted to the output gear through the input gear. When the engine is running, the input shaft is always driving and the power is transmitted to the pump ass'y through the driving block.

2-3 BLOCK, PUMP DRIVING- [Fig. 2-1 G]

The pump driving block is connected at the groove of the input shaft end is assembled with the pump ass'y and the spline and transmits the power. and the rotation direction is the same as engine's.

2-4 INPUT GEAR GROUP- [Fig. 2-1 H]

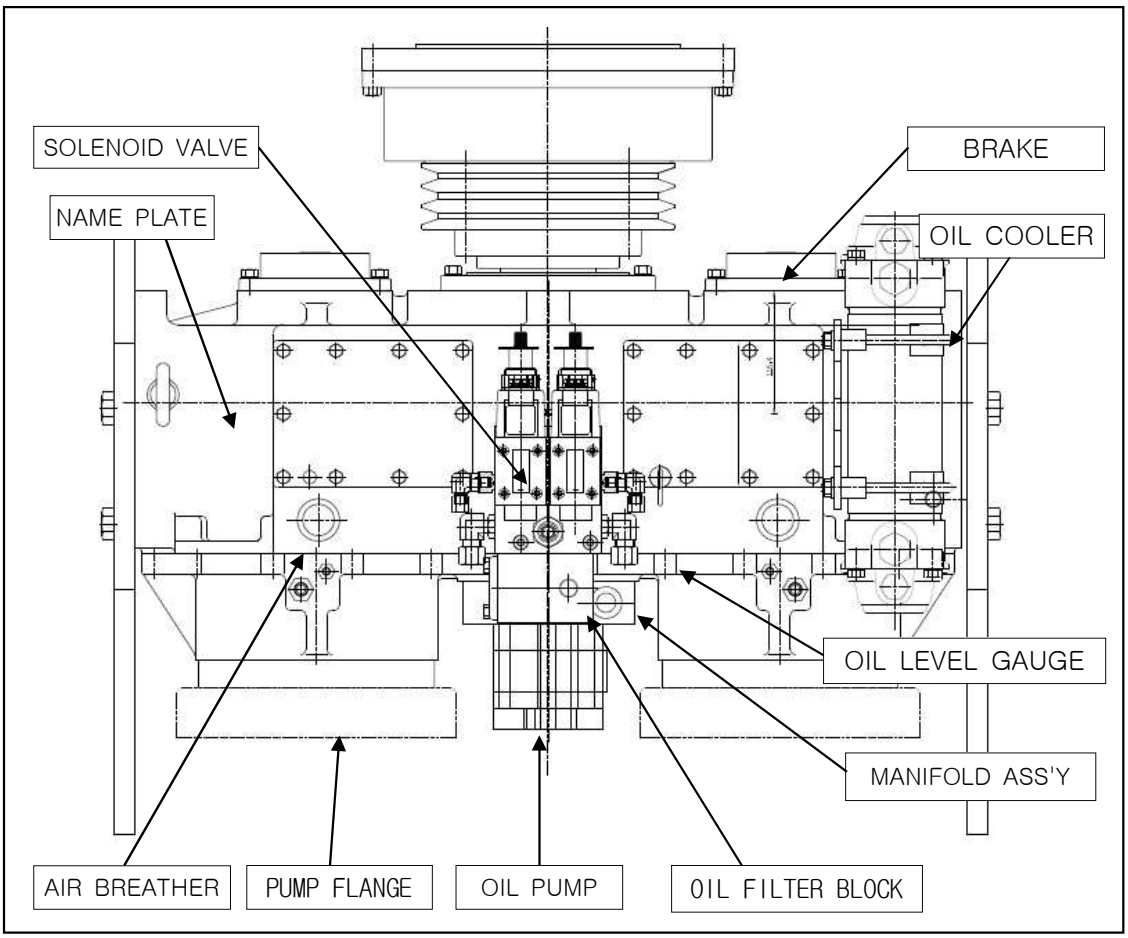
The input gear ass'y is heat shrink-fitted with the input gear and the input gear and tooth-combined with the output gear assembled with the ouput shaft and transmits the power from the clutch housing to the output gear group.

2-5 OUTPUT SHAFT GROUP

The output shaft ass'y is heat shrink-fitted into the output shaft and the clutch housing and supported by the tapered roller bearings on the both side. If the clutch is engaged, the power is transmitted from the input shaft group to the output shaft group.

2-6 CASE GROUP

The case group is made of cast iron and consists of the case and case cover.



[FIG. 2-2] PTO OUTSIDE VIEW

2-7 MANIFOLD ASS'Y

Manifold is made of cast iron and consists of the pump and solenoid valve. Oil path, which flows into and out the pump, is formed inside and the screen filter are built in the suction side of oil path of the pump.

2-8 SOL VALVE ASS'Y

The solenoid valve assembled to the valve block actuates and stops PTO by electrical signal. Oil controlled by the solenoid valve is sent to each oil path through the valve block. Two(2) solenoid valves are applied to control the left and right output shaft groups separately.

2-9 HYD' PUMP ASS'Y

The hydraulic pump is the circumscribed gear type, and assembled with one direction and reverse direction plates and bolted on the manifold. The pump driving gear connected by the spline of pump driving block is driving and rotated at the same speed and rotation direction as the engine's ones.

PERIODIC INSPECTION : REFER TO ANNEX I

IMPORTANT

In case of a special engine (clock wise seeing from rear of the engine), please contact with D-I head office for consultation.

2-10 BRAKE ASS'Y

Two(2) brakes are installed the back side of the case cover. The brake housing group consists of the brake housing, the brake shaft, the clutch piston, sintered and steel plates, and the back plate. Steel plates' inner teeth are inter locked with brake driving shaft which is heat shrink-fitted at the output shaft and sintered plates' outer teeth are inter locked with the brake housing. The plates are assembled alternately by each sintered and steel plate and the brake works on the port B of solenoid valve when the engine is running and if like to clear the brake, put the solenoid valve on the port A and also it is possible to clear the brake by the return spring.

PERIODIC INSPECTION : REFER TO ANNEX I

2-11 SCREEN FILTER ASS'Y

The screen Filter Assembly is connected with a suction pipe to the inlet side pump and filterates oil and is fixed by the screen filter cover on the bottom side of the manifold.

PERIODIC INSPECTION : REFER TO ANNEX I

2-12 OIL COOLER

The Oil Cooler is the device which cools the operating oil inside of PTO and uses the sea water as the cooling water. It is fixed on the right side of the case cover with cooler bracket and bolts, and cools the oil supplied from the hydraulic oil pump and then sends the oil to the solenoid valve. To increase durability of oil cooler, the oil cooler contains brass(mixed aluminum and brass) pipe which is resistant to corrosion. Zinc anodes are put into the both sides of the oil cooler.

PERIODIC INSPECTION : REFER TO ANNEX I

2-13 Oil filter Blok Ass'y

The oil filter block Ass'y is connected to the outlet side of cooler and fixed to the valve block. It filters the oil and separates the operating and lubricating oil.

2-14 Valve Block Ass'y

The valve block Ass'y controls the set value of operating and lubricating pressure of oil cooled down across the oil cooler. The solenoid valve provides oil to the clutch and the parts oil is needed and operates or stops the PTO assembled with the valve blcok Ass'y.

SECTION 3 - PRINCIPLES OF OPERATION

3-1 OVERVIEW

PTO(DPO-167) is operated by hydraulic pressure and must be operated within the limits of load capacity described on our catalogues or technical data.

By one(1) input gear, two(2) clutches are running independently and the left and right shaft capacities are the same.

Since the clutch consists of hydraulic multiple plates, the operation of PTO is accomplished by hydraulic pressure.

Each component of PTO is force-lubricated and splash-lubricated.

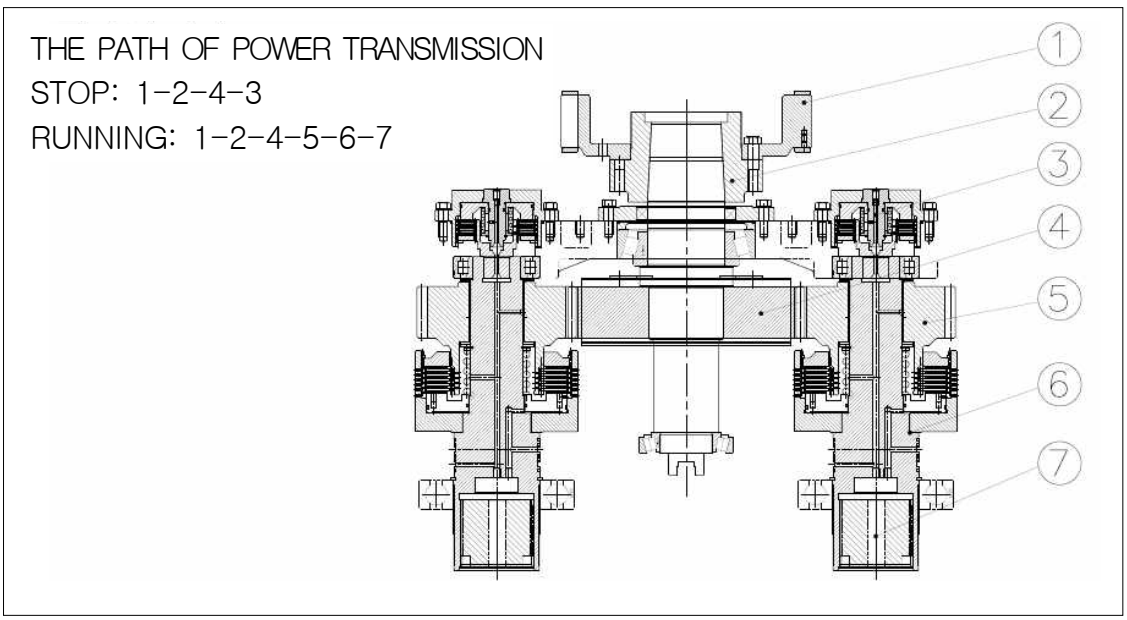
Force-lubricated : Oil seal, Bearing, Brake, Plates, and etc.

Splash-lubricated : Input gear and Output gear

3-2 ROTATION DIRECTION

The input shaft rotates in the same direction as engine's and output shaft rotates in the opposite direction to engine's one.

3-3 POWER TRANSMISSION FLOW



[FIG. 3-1] PTO POWER TRANSMISSION FLOW

1. STOP

ⓐ Power is transmitted from a dummy plate, which is fitted to a pulley of a engine with bolts, to the spider(①) fitted with rubber blocks.

ⓑ The spider transmits the power to the input shaft ass'y(③) through the input coupling(②).

ⓒ The oil of B port of solenoid valve goes through the valve block and pushes the brake piston of brake housing and makes stop of output shaft transmitting the power into brake drive shaft.

2. OPERATION

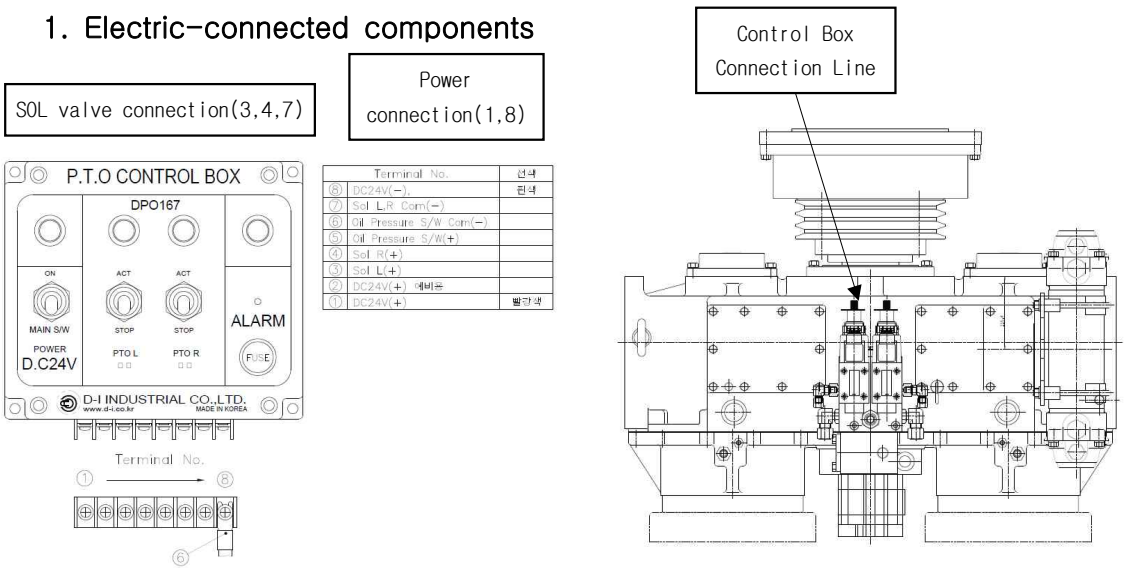
ⓐ The oil with high pressure from each solenoid valve pushes the piston in the clutch housing through the valve block.

ⓑ The steel and sintered plates in the clutch stick each other and rotate in the same direction.

ⓒ The steel plates and external teeth of output gear ass'y(5) are interlocked at transmit the power to the output group(6) heat shrink-fitted with the clutch housing interlocked with sintered plates.

3-4 OPERATING METHOD BY SOLENOID VALVE

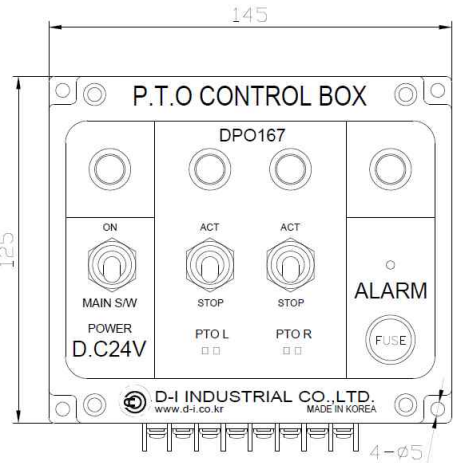
1. Electric-connected components



CONTROL BOX　　CONNECTION LINE

2. How to install

1) Install PTO in the engine room or other place.
2) Place the control box where PTO control is needed.
3) Fix the control box firmly.
(Refer to FIG. 3-5)
4) Connect the connector of PTO body to the back side of control box.
5) The switch of the control box should be located as the diagram.
(Refer to FIG. 3-6)

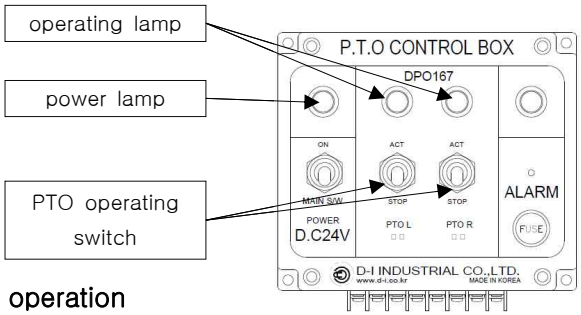


[FIG. 3-5] INSTALLATION OF CONTROL BOX

6) Connect the electric cables to power supply(DC24V) so that the power flows when engine starts.

PTO L	Up	Down
	ACT	OFF

PTO R	Up	Down
	ACT	OFF



[FIG 3-6] Switch position during operation

DANGER

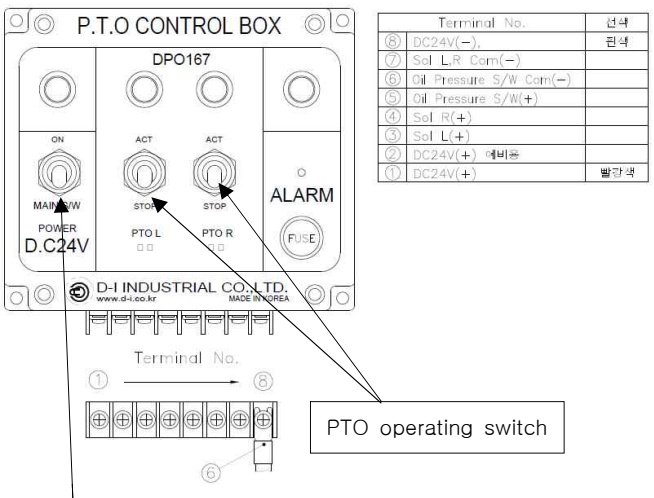
Do not install the control box in spots where sea water or rainwater comes in. Only DC 24V of power supply is allowed to be used.

3. How to operate

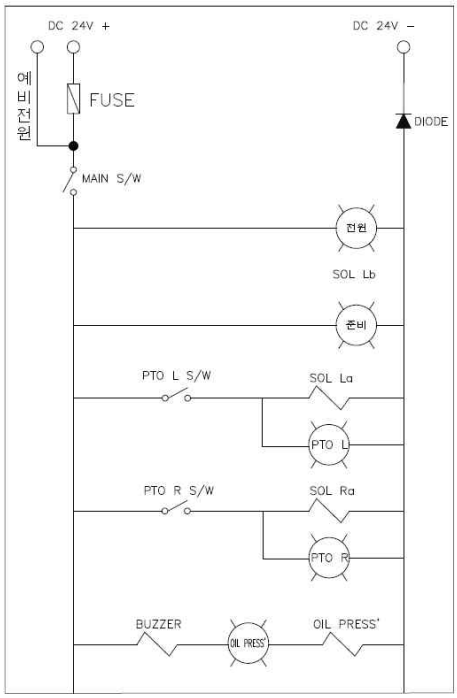
1) If MAIN S/W is turned on after connecting the electrical power to the control box, the power lamp is on.
2) Solenoid valve of PTO body and control box should be connected each other.
3) When the engine starts, the operating switch of the control box must be in the STOP position and MAIN S/W must be in the OFF position.
4) If the switch of the control box is on, operation lamp is lighted and operation lamp of solenoid valve is lighted and operation starts.
5) How to treat when the fuse is damaged
   If the internal fuse is disconnected, connect DC24V plus(+) line of NO.1 and spare DC24V plus(+) line of NO.2 of terminal block in the control box for emergency. After use once, it is necessary to replace the fuse newly and connect the spare DC24V plus(+) line of NO.2 and NO.1 of the terminal block to use normally.

SOL Valve Connection
NO.2, NO.5

Power Connection
NO.1, NO.6



Terminal No.	선색
⑧ DC24V(−)	흰색
⑦ Sol. L,R Com(−)	
⑥ Oil Pressure S/W Com(−)	
⑤ Oil Pressure S/W(+)	
④ Sol. R(+)	
③ Sol. L(+)	
② DC24V(+) 예비용	
① DC24V(+)	빨간색



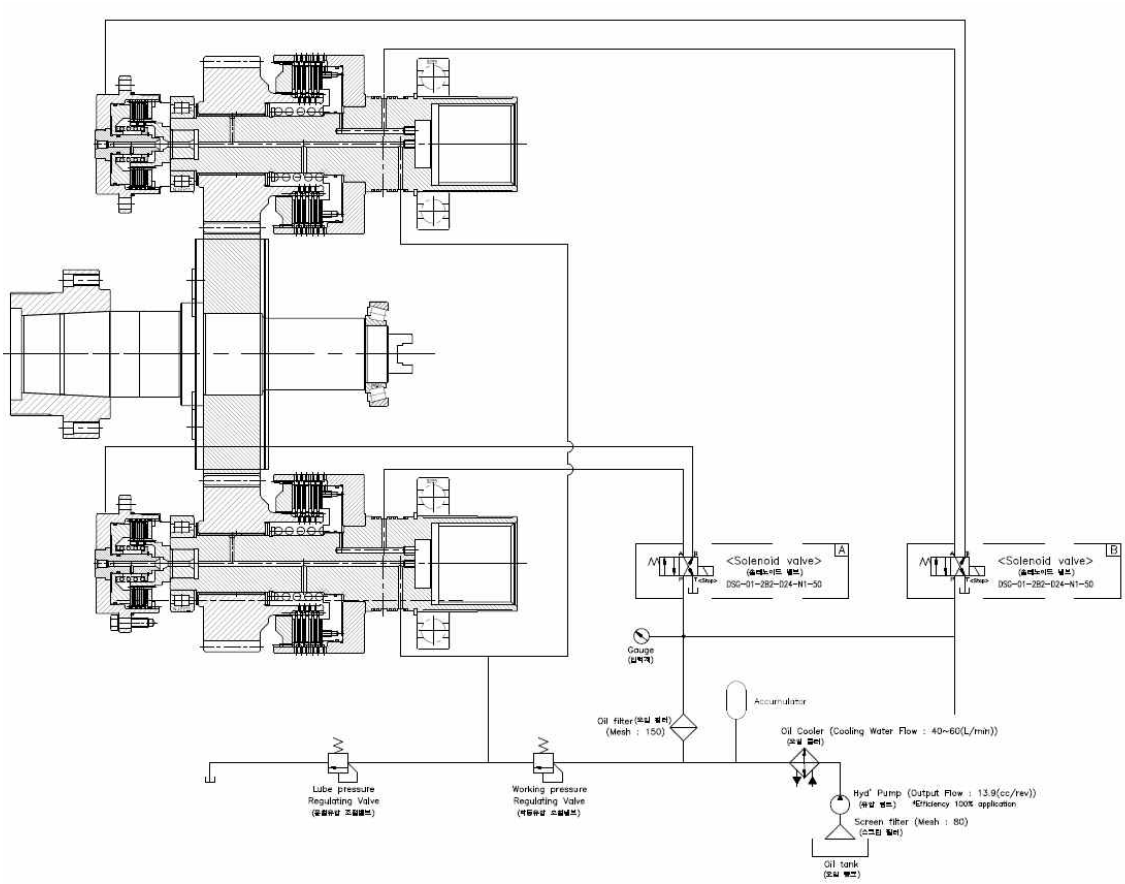
Circuit Diagram

SECTION 4 - HYDRAULIC SYSTEM

4-1 OVERVIEW

The hydraulic system is shown in [FIG. 4-1]. The oil contained in the PTO flows into the pump through the oil screen filter. Oil discharged from the pump is led to the oil cooler and solenoid valve and regulated by the lubricating pressure valve and operating pressure valve and the oil is supplied to operate the clutch and to lubricate the each component.

According to the operating of solenoid valve, the oil is supplied through the path of stop and operation position.



[FIG. 4-1] HYDRAULIC CIRCUIT

SECTION 5 - INSTALLATION

Installation of PTO has an important effect on the function and performance of the PTO. Therefore, please study this manual before installing the PTO.

GAUGE/TOOL	SPEC	REMARK
DIAL GAUGE	0.01mm	
MAGNETIC BASE	-	
THICKNESS GAUGE	0.01 ~ 1mm	
SPANNER/WRENCHES	M16 ~ M32	

⚠ DANGER

MAKE SURE NOT TO RUN ENGINE WHILE INSTALLING PTO

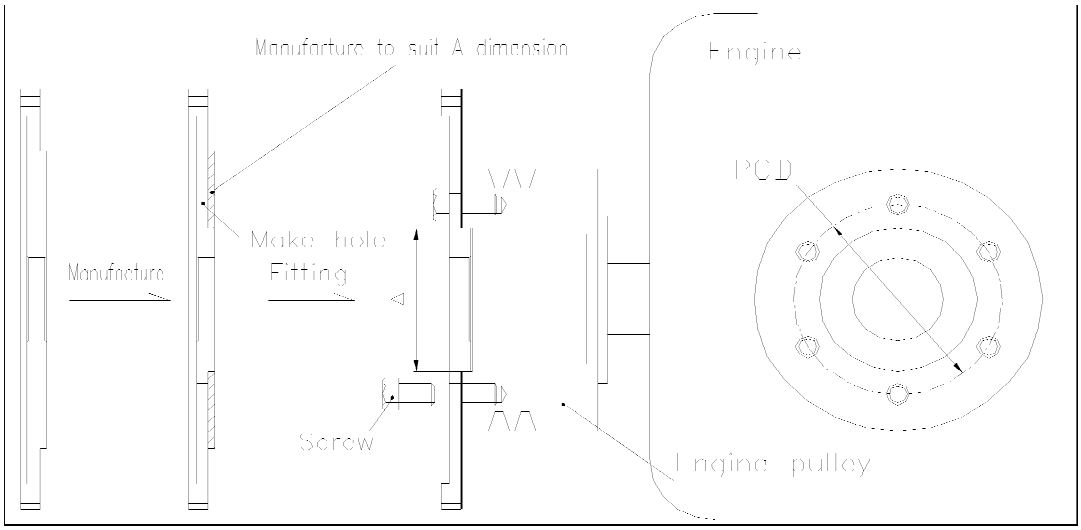
5-1 IN CASE THE PTO IS COUPLED TO THE FRONT OF MARINE ENGINE

1. Installation **(MUST REFER TO THE DRAWING ATTACHED FOR THE CONCENTRIC DEGREE AND VERTICAL ANGLE DEGREE OF PTO AND ENGINE)**

1) Dummy plate process and coupling

① After check the diameter (A) of engine pulley and tapping, process the dummy plate as of the below figure.

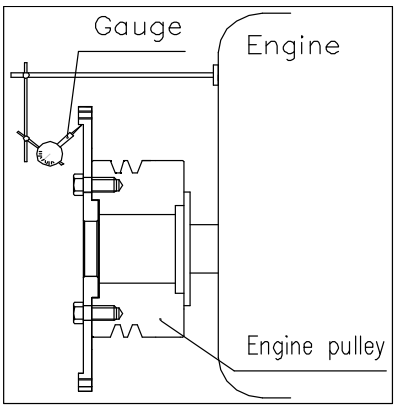
② Fit the dummy plate by using the screws.



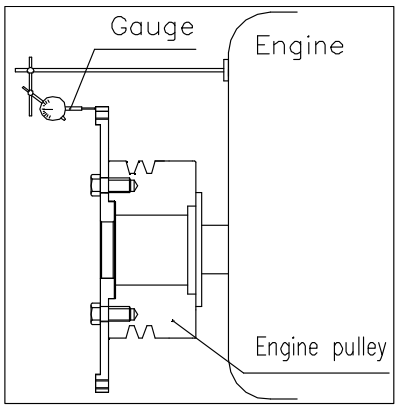
[FIG. 5-1] FITTING DUMMY PLATE

2) Inspection of the diameter of the dummy plate guide (Concentricity) [FIG. 5-2]. Install a dial test indicator gauge as shown [FIG. 5-2], and read off the deviation of indicator gauge's scale, by rotating the pulley in the same direction. At this point, the value of deviation should not exceed 0.2 mm.

3) Check the dummy plate face (Flatness) [FIG. 5-3].
Install a dial test indicator gauge as shown [FIG. 5-3], and read off the deviation of indicator gauge's scale, by rotating the pulley in the same direction. At this point, the value of deviation should not exceed 0.2 mm.



[FIG. 5-2] CONCENTRICITY



[FIG. 5-3] FLATNESS

4) Coupling PTO to Engine.
The alignment of the engine and PTO is the most important factor for normal performance and extended life.

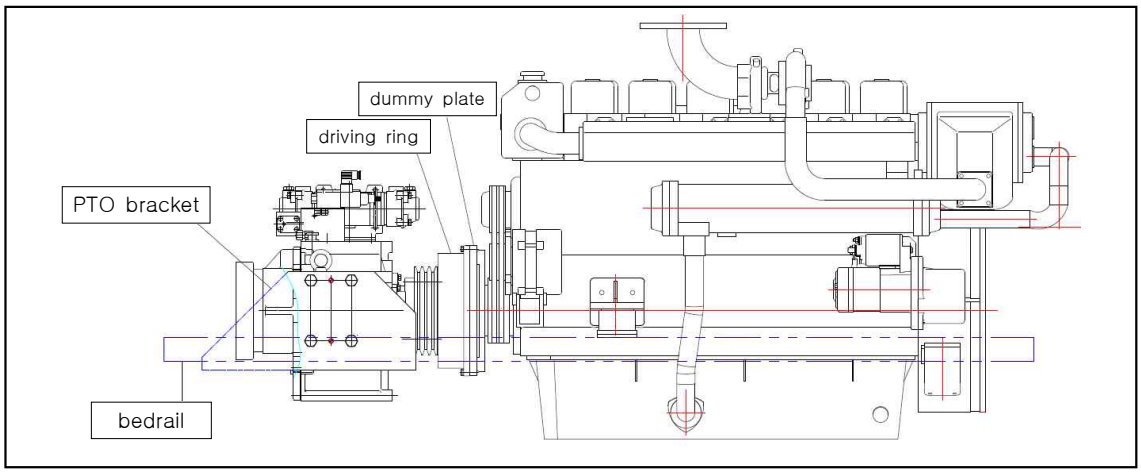
(1) Bedrail : Use the engine bedrail made of well-dried rigid wood or steel. If the engine bedrail is not rigid, the alignment will deviate due to the vibration of the engine or other influence.

(2) Fitting PTO and Fixing

① Fit driving ring to the dummy plate with bolts.

② Fit the PTO rubber blocks assembled into the driving ring.

③ After fitting, try to accord the driving ring and rubber blocks faces together.(Refer to the detailed drawing of the back in this manual)



[FIG. 5-4] PTO INSTALLATION

⚠ CAUTION	If the dummy plate and the brackets are not bolted firmly, they could be broken due to the vibration of engine while cruising.

5-2 IN CASE PTO IS COUPLED TO AUXILIARY ENGINE (OPTION)

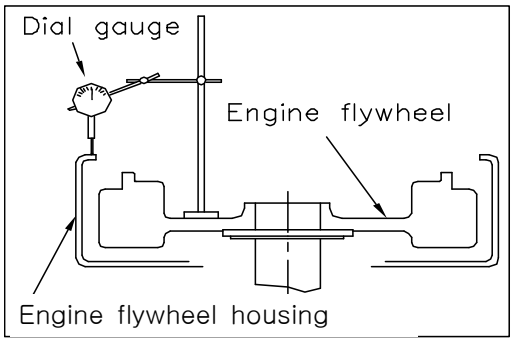
1. Checking point before installation

   Clean Engine flywheel and flywheel housing.

SAE HOUSING NO.	00	0	1/2	1	2	3	4	5	6
Flatness deviation	0.012	0.010	0.010	0.008	0.008	0.008	0.006	0.006	0.006
Concentricity deviation	0.012	0.010	0.010	0.008	0.008	0.008	0.006	0.006	0.006

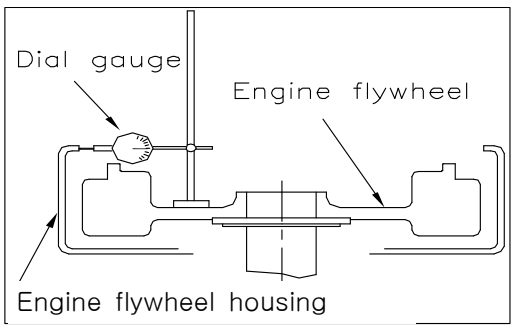
[Table. 5-1]

1) Check the surface of the flywheel housing (flatness).
   Install a dial test indicator gauge as shown in below figure, and read off the deviation of the indicator gauge's scale, by rotating the flywheel in the same direction.(Allowable deviation is refer to [table. 5-1])



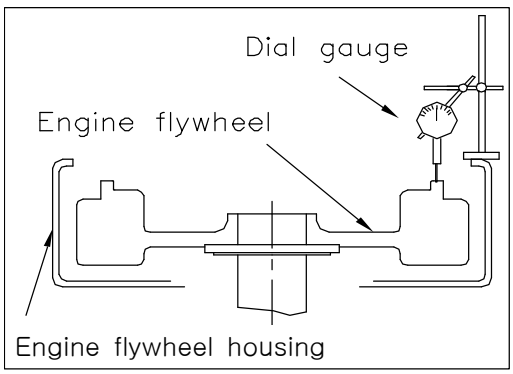
[FIG. 5-5] FLYWHELL HOUSING FLATNESS CHECKING

2) Check the engine flywheel housing guide (concentricity).
   Install a dial test indicator gauge as shown in below figure, and read off the deviation of the indicator gauge's scale, by rotating the flywheel in the same direction.
   (Allowable deviation is referred to [table. 5-1])



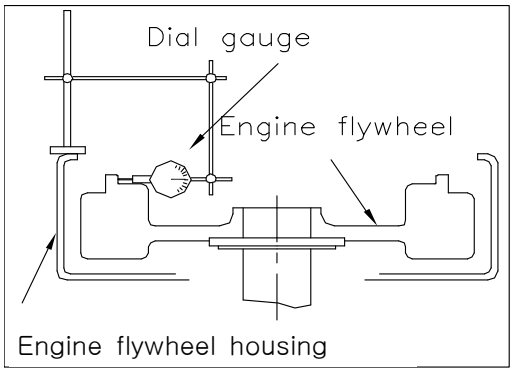
[FIG. 5-6] FLYWHEEL HOUSING CONCENTRICITY CHECKING

3) Check the surface of engine flywheel driving ring face (flatness).
   Install a Dial test indicator gauge as shown in below figure, and read off the deviation of the indicator gauge's scale, by rotating the flywheel in the same direction. (Allowable deviation is referred to [table. 5-1])



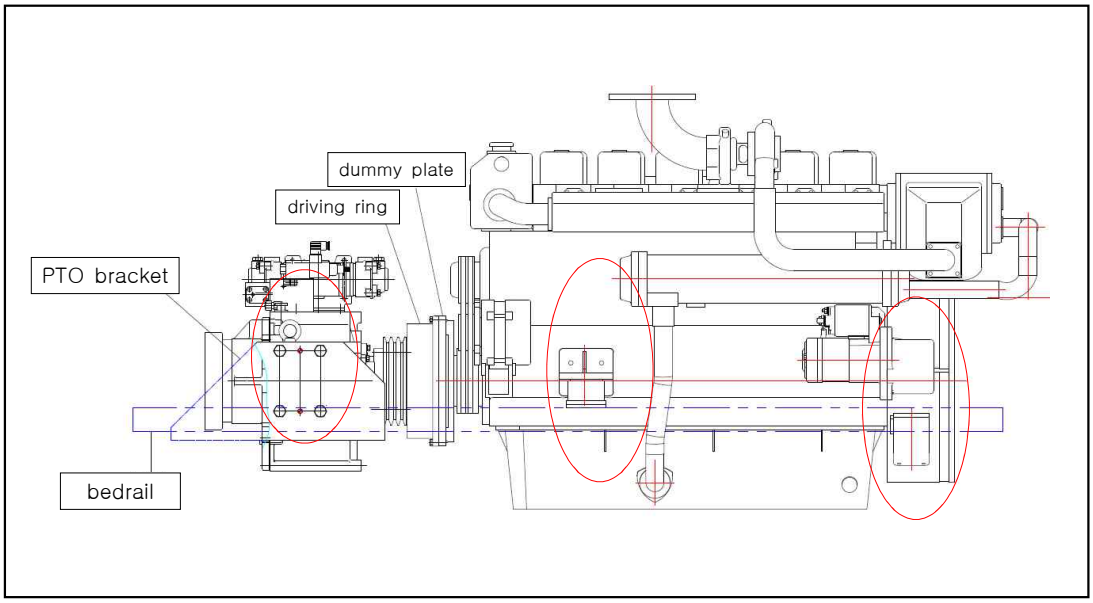
[FIG. 5-7] FLYWHEEL FLATNESS CHECKING

4) Check the diameter of the flywheel driving ring seating guide (concentricity)
Install a dial test indicator gauge as shown in below figure, and read off the deviation of the indicator gauge's scale, by rotating the flywheel in the same direction.(Allowable deviation is referred to [table. 5-1])



[FIG. 5-8] FLYWHEEL CONCENTRICITY CHECKING

2. Installation (Refer To FIG. 5-9)
The alignment of the engine and the PTO is the most important factor for normal performance and extended life.
1) Fixing
The support brackets for the PTO have to be fixed to the engine bed firmly like the engine mounting.



[FIG. 5-9] PTO INSTALLATION TO AUXILARY ENGINE

CAUTION	Bolts for housing and brackets of PTO should be tightened firmly. If not, a noise, vibration or breakage of housing can occur while cruising.

SECTION 6 - OPERATION

6-1 PREPARATIONS FOR OPERATION

1. Check all the parts of PTO, and check if bolts, nuts, etc in major parts are tight.
2. Check the oil level with oil level gauge.
   (Run the engine at idle speed for a few minutes, and check immediately after stopping it)
3. Place the operating switch of control box on the Stop position before starting the engine.

CAUTION	Check the oil of PTO before operation. If the oil is insufficient, fill to correct level.

6-2 OPERATION

1. Run the engine at idling speed for about 10 minutes for warming-up.
2. At this point, check oil leakage, abnormal noise, overheating, cooling water etc.

6-3 OPERATION AND STOP

1. The normal temperature of oil in the PTO during continuous actuation is between 50-90℃, but may be raised a little due to frequent operating, Stand-by and Stop operation.
2. Check at all the time if there is abnormal noise or over-heat during operation. If an abnormal condition is found, stop the engine, find out the cause and correct it.
3. Shift the operating switch of control box to the Stop position before stopping the engine. Main switch should be off.

CAUTION	Before operation of PTO, ensure engine RPM is suitable to run the other equipments fitted to the PTO

SECTION 7 - PREVENTIVE MAINTENANCE

7-1 OVERVIEW

All the rotating parts in the PTO is lubricated by oil in the case of the PTO. Followings are the check points for maintenance of the proper performance.

7-2 OIL

1. Use only SAE-API service class SAE#30 engine oil.

CAUTION	Use only SAE-API service class SAE#30 engine oil. Multi-grade oils (SAE#10W, 15W40,etc)should not be used in D-I PTO because they have influence on the coefficient of friction and cause the clutch to slip.

2. Check the oil level every day.
3. Replace the oil after first 100hours operation and then every 1000hours.

CAUTION	If a foreign substance such as clean water, seawater, etc has come into the PTO, overhaul and clean all parts before assembly. Refill with new oil.

7-3 Oil Filter

At the time of oil replacing, clean screen filter and magnetic plug.

7-4 Visual Inspection

Inspect the external parts of PTO frequently and repair if any defect is found. Particularly, inspect the rubber blocks and replace them with new ones if they are damaged or worn out.

7-5 Overhaul

1. Look for our distributor in your country for overhaul of the PTO or D-I head office.
2. Replace all gaskets, o-rings, and other rubber products in every overhaul.
3. Replace rubber blocks and bearings after 10,000hours operation or in earlier if. excessive wear or damage is found.

SECTION 8 - TROUBLE SHOOTING

If something is wrong with the PTO, refer to [Table. 8-1]

[Table. 8-1]

Symptom	Cause	Remedy
Low main oil pressure	Oil strainer clogged	Remove the residue and clean
	Oil pressure regulating valve stuck in the control valve	Remove the residue and clean
	Seal damaged or worn	Replacement
	Hydraulic pump damaged or worn	Replacement
	Clutch oil pressure regulator valve's spring damaged or worn	Inspect length of spring and replace it if necessary
No oil pressure	Oil level low	In case of oil leakage, replace of the components such as gaskets, oil seals, etc. which cause oil leakage and fill the oil
High main oil pressure	regulator pressure valve operated poorly	Remove the residue and clean
Low Lubricating oil pressure	Lubricating oil pressure regulating valve operated poorly	Remove the residue and clean
Over-heat	Clutches slipping	Disassemble PTO and check the clutch plates
	Excessive oil level	Regulation of oil level
	Bearing damaged	Overhaul PTO and check the bearing.
Rotating parts defective	Clutch plates stuck	Disassemble of clutch ass'y and replace clutch plates
	Pinion bush stuck	Disassemble and replace
	Clutch piston's returning spring is damaged or broken	Disassemble and replace of spring
Improper Shifting	Clutch plates stuck	Disassemble of clutch ass'y and replace clutch plates
	Defective Remote controller	Adjust and replace the remote controller
	Clutch piston's return spring is damaged or broken	Disassemble and replace the spring
Abnormal noise	Gear teeth or spline damaged worn	Disassemble and repair or replace
	Bearing damaged	Disassemble and replace
	Rubber blocks damaged or worn	Disassemble and replace
	Bolts or nuts loosened or removed	Secure tightening

ANNEX I (PERIODIC INSPECTION TABLE)

○ Check, ◎ Exchange

	NAME	Check / Exchange (year)				Parts to Using	Remark
		1	3	5	10		
PTO BODY	*Gasket, paper				◎	Case, Plate, Manifold, etc.	
	*Gasket, copper				◎	Drain & Magnet Plug etc.	
	*O-Ring				◎	Screen Filter, Oil filter(2nd)	
	*Seal, oil				◎	Input / Output Shaft	
	Ring, oil Seal		○		◎	Input Shaft	Wear, Breakage
	Spring		○		◎	Pressure reg. valve & oil pre. valve	
	Brake Shoe		○	○	◎	Brake	Wear, Breakage
	Plate (sintered/steel)		○	○	◎	Brake, Clutch	Wear, Taken off, Transformed
	*Snap Ring				◎	Brake, Clutch	
	Trust Metal			○	◎	Input Shaft	Wear, Damage, Taken off
	Trust Bearing			○	◎	Input Shaft	〃
	Bearing, tapered roller			○	◎	Input shaft	〃
	Bearing, roller			○	◎	Output shaft	〃
	※Oil Filter						Breakage, Transformed
	※Magnet Plug						Breakage, Transformed
	※Oil(SAE#30)						Refer to Section 7-2
	※Screen Filter						Breakage, Transformed
PUMP	*Gaskets					BODY, pump	
	Bush Bearing			○		Pump Gears	Wear, Damage, Taken off
	Pump Ass'y			◎	◎		
COOLER	*Gasket, paper					Oil cooler cover	
	*Gasket, copper					Bolt, union	
	Zinc Anode						Every 6 month to exchange

* MARK : The parts, which are marked *, should be replaced with new ones once marine transmission is disassembled and assembled.

※ MARK : The parts, which are marked ※, are recommended to be cleaned when replacing oil (Replace oil after first 100hours and then every 1000hours)

★ When you need to repair after 3, 5 and 10 years, please contact A/S department in Head office.

ANNEX II

PARTS ORDER SHEET

Fill out the blanks below and get in touch with distributor		DATE	
COMPANY			
NAME			
ADRESS			
TEL.		FAX.	

PARTS ORDER LIST			
MODEL		Gear Ratio	
		Serial No.	
ENGINE	HP/ rpm	Installation date	
PTO Left use		PTO Right use	

No.	NAME	PARTS NO.	Q.TY	No.	NAME	PARTS NO.	Q.TY

REMARK	

ANNNEX III
WARRANTY LETTER

The PTO, which D-I Industrial Co., ltd manufactures, is guaranteed to have a good operation in case that D-I PTO is operated according to the instructions mentioned in the D-I PTO manuals. D-I industrial Co.,ltd warrants D-I PTO as follows.

1. SCOPE OF WARRANTY
   Warranty is limited to repair or supply with new one against D-I PTO or its parts which is occurred by defective materials or workmanship within warranty period.

2. WARRANTY PERIOD
   D-I Industrial Co., Ltd warrants against defective materials or workmanship for a period of twenty-four(24) months from the date of original shipment by D-I Industrial Co., Ltd. to original customer or twelve(12) months from the first sea trial, whichever occurs first.

3. WARRANTY NON EFFECTIVE (D-I Industrial Co.,ltd dose not warrant.)
   1) The parts that are not produced by D-I Industrial Co., ltd. or genuine parts which are lost.
   2) The cost or the breakdown that occurs for repairing before contacting with D-I Industrial Co.,ltd.
   3) The breakdown which is occurred due to any modification to D-I PTO or its parts without the prior consent of D-I Industrial Co.,ltd.
   4) The breakdown that is occurred due to the customer's negligence, faulty maintenance. Misuse or non observance of recommended or operation instructions.
   5) Consumable parts such as Gaskets, packings, tubes, and etc.,

4. OBLIGATION OF USERS.
   1) D-I PTO should be inspected and repaired according to the instructions mentioned in the manuals.
   2) Use of unsuitable parts, inspection or repair can cause a fatal damage. In case that D-I PTO should be repaired in a workshop, use a workshop that is appointed by D-I Industrial Co.,ltd.

5. WARRANTY REPAIR
   1) This warranty letter is accompanied D-I PTO and is effective with signature of D-I Industrial Co.,Ltd.
   2) Users should summit this warranty letter to warranty repairman when warranty repair or periodic inspection.

6. D-I Industrial Co.,Ltd. does have no obligation to apply new specifications to the D-I PTO that was supplied before changing specifications.

7. WARRANTY SUCCESSION
   In case that owner is changed because D-I PTO is resold or contributed to the other customer within warranty period, D-I Industrial Co.,ltd warrants the rest of warranty period. In order to do that, this warranty letter should be accompanied with D-I PTO.

D-I INDUSTRIAL CO.,LTD.

The contents of this manual can be modified without prior notice for the improvement of quality.

D-I
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