## **PTD Series**

206/206S/306/306S/406/406S 206T/206TS/306T/306TS/405T/405TS



# **PTD Diesel Engine Pump**

## **FHG DY Pump**



## FOREWORD

Thank you very much for purchasing FHG DIESEL PUMP.

This manual covers the operation and maintenance of this **FHG DIESEL PUMP**. Please take a moment to familiarize yourself with the proper operation and maintenance procedures in order to maximize the safe and efficient use of this product. Keep this owner's manual at hand, so that you can refer to it at any time.

All information in this publication is based on the latest product information available at the time of approval for printing. Please read this manual carefully before operating. Due to constant efforts to improve our products, certain procedures and specifications are subject to change without notice.

Always provide us the **Model Name and Serial No.** of your pump, when ordering spare parts. Please fill in the following blanks after checking the **Model Name and Serial No.** on your pump. (Location of the serial label differs depending on the product specification.)

PUMP MODEL:	PTD
ENGINE MODEL:	DY
SERIAL NO.:	

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NOTE Please refer to the illustrations on the back page of the front cover or back cover for Fig.1 to 7 indicated in the sentence.

## **1. SAFETY PRECAUTIONS**

Please make sure you review each precaution carefully. Pay special attention to the following statements.

#### 

"WARNING" indicates a strong possibility of severe personal injury or loss of life, if instructions are not followed.

WARNING

"CAUTION" indicates a possibility of personal injury or equipment damage, if instructions are not followed.

## : EXHAUST PRECAUTIONS

- Never inhale exhaust gases.
- They contain carbon monoxide, a colorless, odorless and extremely dangerous gas, which can cause unconsciousness or death.
- Never operate the pump indoors or in poorly ventilated areas, such as tunnels, caves, etc.
- Exercise extreme care, when operating the pump near people or animals.
- Keep the exhaust pipe free of foreign objects.

#### A WARNING

## : REFUELING PRECAUTIONS

- Be sure to stop the pump prior to refueling.
- Do not overfill the fuel tank.
- If fuel is spilt, wipe it away carefully and wait until the fuel has dried before starting the engine.
- After refueling, make sure that the fuel cap is secured to prevent spillage.

#### \Lambda WARNING

### : FIRE PREVENTION

- Do not operate the pump while smoking or near an open flame.
- Do not use around dry bushes, twigs, cloth rags, or other flammable materials.
- Keep cooling air intake (recoil starter area) and muffler side of the engine at least 1 meter (3feet) away from buildings, obstructions and other burnable objects.









Keep the pump away from flammables and other hazardous materials (trash, rags, lubricants, explosives).

#### A WARNING : OTHER SAFETY PRECAUSIONS

#### Be careful of hot parts.

- The muffler and other engine parts become very hot when the pump is running or just after it has stopped. Operate the pump in a safe area and keep children away from the running pump.
- Operate the pump on a stable, level surface. If the engine is tilted, fuel spillage may result.

#### NOTE

Operating the pump at a steep incline may cause seizure due to improper lubrication even with a maximum oil level.

- Do not transport the pump with fuel in the tank or with fuel strainer valve open.
- Keep the unit dry (do not operate it in rainy conditions).

#### 

#### : PRE-OPERATION CHECKS

- Carefully check fuel hoses and joints for looseness and fuel leakage. Leaked fuel creates a potentially dangerous situation.
- Check bolts and nuts for looseness. A loose bolt or nut may cause serious engine trouble.
- Check the engine oil and refill, if necessary.
- Check the fuel level and refill, if necessary. Take care not to over fill the tank.
- Keep cylinder fins and recoil starter free of dirt, grass and other debris.

Wear snug fitting working clothes, when operating the engine. Loose aprons, towels, belts, etc. may be caught in the engine or drivetrain, causing a dangerous situation.







## 2. LABEL



## **3. COMPONENTS**

**NOTE** Please refer to the illustrations on the back page of the front cover or back cover for Fig. 1 to 6. indicated in the sentence.

### (See Fig. 1-A)

- ① Plug (Drain)
- 2 Suction (inlet)
- ③ Delivery (outlet)
- 4 Air cleaner
- (5) Fuel injection pump
- 6 Speed control Stop lever
- ⑦ Casing

- 8 Fuel tank
- (Fuel filter inside)
- 9 Plug (Priming)
- 10 Muffler
- 1 Oil gauge
- 12 Recoil starter

#### Accessories

- Pump strainer
- ➢ Hose coupling
- Hose band
- > Tools
- Instruction manual (this publication)

## 4. PRE-OPERATION FOR STARTING

#### **Recommended engine oil**

Use diesel engine oil of class "CC" or "CD" (API ranking) according to the table below:

Temperature	Viscosity grade of oil
+10℃ to +40℃ (+50℉ to +104℉)	SAE 30
-10℃ to +20℃ (+14℉ to +68℉)	SAE 10W-30

#### CAUTION

■ Do not use gasoline engine oil. Use diesel engine oil only.

■ Low grade oil or deteriorated oil causes engine trouble and shorten engine life.

■ Do not screw in the oil gauge, when checking oil level.

#### 1. CHECK FUEL

Check fuel level (See Fig.<u>[3</u>-E)

#### A WARNING

Do not refuel while smoking or near open flames or other such potential fire hazards.

Otherwise fire accident may occur.

- Check the fuel level is sufficient.

#### CAUTION

Use automobile diesel fuel only.

Fuel tank capacity:	(L)
PTD206	2.5
PTD306	3.5
PTD406	5.5
PTD206T	3.5
PTD306T	5.5
PTD405T	5.5

#### Air discharge from fuel line

Air discharge from the fuel line is required only when starting the engine under following conditions:

- a) Starting the brand-new engine for the first time.
- b) Restarting the engine after the engine has stopped due to fuel shortage.

#### Air discharging procedure (See Fig. 4-A, 5-A)

Open the fuel valve.

Set the speed control lever to the "START" position and pull the recoil starter handle slowly 2 or 3 times. Air will be discharged from the fuel line automatically.



■ If the fuel tank is refilled before it gets empty, air discharge is unnecessary.

If the high-pressure pipe is disassembled for the purpose of serving/ maintaining injection nozzle, discharge air from the highpressure pipe by the following procedure:

Set the speed control level to the "START" position and detach the cap nut of the highpressure pipe on the side of the nozzle. Pull the recoil starter handle slowly until fuel is sufficiently injected.

#### CAUTION

■ When discharging air from the fuel line, be sure to fill fuel tank with enough fuel (at least 2 liters).

#### WARNING

■ Wipe off any split fuel before starting the engine, otherwise fire accident may occur.

#### 2. CHECK PRIMING WATER (See Fig. [2]-C)

It is required that the water chamber of the pump casing is sufficiently primed with water before operating the pump.

## - PLUG (PRIMING)

#### WARNING

Never attempt to operate the pump without priming water or the pump will overheat.

• Extended dry operation will destroy the mechanical seal.

If the unit has been operated dry, stop the engine immediately and allow the pump to cool before adding priming water.

## 5. ORERATING YOUR PUMP

#### 1. STARTING

a) Open the fuel valve. (See Fig. 4-A)

#### - OPEN

- b) Set the speed control lever to the START position. (See Fig. 5 -B)
- c) Pull the starter handle slowly until passing the compression point (resistance will be felt), then return the handle to its original position.
- d) Lift down decompression lever. (See Fig. 7 -A)

#### - Down

A

e) Pull briskly. Do not pull out the rope completely.

#### CAUTION

Be sure to pull the recoil starter handle forcibly.
Do not pull out the rope completely.

 After the engine starts, allow the starter handle to return to its original position while still holding the handle.

#### 3. CHECK AIR CLEANER (See Fig. 6)

Check the air cleaner condition.

If oil is lacking or contaminated, add engine oil up to the required oil level, or exchange it with fresh engine oil.

e) Warm up the engine without a load for a 2 or 3 minute.

#### 2. RUNNING

After the engine starts, set the speed control lever close to "STOP" position (IDLE position) and warm it up without a load for a few minutes. (See Fig.5-B)

### - IDLE

Gradually move the speed control lever toward "START" position and set it to the required engine speed.

### - START

#### NOTE

Whenever high-speed operation is not required, slow the engine down (idle), by moving the speed control lever, to save fuel and extend engine life.

#### 3. STOPPING

 a) Set the speed control lever close to "STOP" position (IDLE position) and allow the engine to run at low speed for 2 or 3 minutes before stopping. (See Fig.5-B)

#### - IDLE

b) Close the fuel valve. (See Fig. 4-A)

#### - CLOSE

#### 4. ELECTRIC STARTER

a) Open the fuel valve. (See Fig. 4-A)

#### - OPEN

- b) set the speed control lever to the START position. (See Fig. 5 -B)
- c) Turn the starting key clockwise to "START" position.
- d) Remove your hand from the key as soon as the engine starts.
- e) If the starting motor does not start after 10 seconds, wait 15 seconds before starting it again.

#### CAUTION

Λ

- Do not stop the engine suddenly because this may cause the engine temperature to rise abnormally.
- Run the starting motor for long time will cost the battery power greatly even burn out the motor.
- Always leave the starting key at "ON" position while the engine is running.

#### 5. BATTERY

Check the battery electrolyte level every month. Refill the distilled water until the upper limits if the electrolyte dropped to the lower limits.

#### CAUTION

If the electrolyte level is too low, the engine may fail to start because there is not sufficient power. On the other side, if the electrolyte level is too high, the fluid will corrode the surrounding parts. Do keep the electrolyte level between the upper and lower limits.

## 6. "HOW-TO" MAINTENANCE

#### **1. DAILY INSPECTION**

Before running the engine, check the following service items.

- 1. Check priming water
- 2. Excessive vibration, noise
- 3. Sufficient fuel
- 4. Safe surroundings
- 5. Clean air cleaner element
- 6. Leakage of fuel and engine oil
- 7. Sufficient and clean engine oil
- 8. Loose or broken bolts and nuts

#### 2. PERIODIC INSPECTION

Periodic maintenance is vital to the safe and efficient operation of your product. Check the table below for periodic maintenance intervals. The below chart is based on a normal product operation schedule.

#### A CAUTION

 Replace rubber pipes of the fuel passage every two years. If fuel leakage is found, replace the pipes immediately

Maintenance Items	8 hours (daily)	50 hours (weekly)	100 hours	200 hours (monthly)	500 hours	1000 hours	1500 hours
CLEAN ENGINE PUMP AND CHECK BOLT AND NUTS	X (daily)						
CHECK AND REFILL ENGINE OIL	X (refil	I daily up to	upper limit)				
CHANGE ENGINE OIL (*Note 1)			X (initial	: 20 hours)			
REPLACE OR CLEAN OIL FILTER			х				
REMOVE AND CLEAN THE PUMP CASING				х			
CLEAN OR REPLACE FUEL FILTER					х		
CHECK AND CLEAN FUEL INJECTION NOZZLE (*Note 2)					х		
CHECK AND ADJUST VALVE CLEARANCE (*Note 2)					x		
DISCHARGE WATER FROM FUEL TANK.				х			
CLEAN CYLINDER HEAD (*Note 2)						Х	
REPLACE FUEL LINES (*Note 2)							Х
OVERHAUL ENGINE (*Note 2)							x

#### Periodic Maintenance schedule table

Thereafter change oil every hundred (100)

\* Note 1

Initial oil change should be performed after the first twenty (20) hours of operation. hours. Before changing the oil, check for a suitable way to dispose of the old oil. Do not pour oil down into sewage drains, onto garden soil or into open streams. Your local zoning or environmental regulations will give you more detailed instruction on proper disposal.

#### \* Note 2

After the procedures of these items, please refer to the SERVICE MANUAL or consult your nearest FHG service dealer.

## 3. ENGINE OIL CHANGE AND OIL FILTER CLEANING

Intervals for oil change

Initial	After first 20 hours				
Oil change	of operation				
Thereafter	Every 100 hours of operation				

#### Recommended engine oil

Use diesel engine oil of class "CC" or "CD" (API ranking) according to the table below:

Oil capacity:	(L)
PTD206	0.75
PTD306	1.1
PTD406	1.65
PTD206T	1.1
PTD306T	1.65
PTD405T	1.65

- a) Remove drain plug from the engine pump base and drain oil thoroughly. It is advised to drain the oil while the engine is warm and to remove the oil gauge for quick discharging. (See Fig. 3-A)
- b) Remove oil filter from the crankcase and clean it in clean fuel. (See Fig.3-B)
- c) Reinstall the oil filter and drain plug firmly.
- d) Pour fresh oil into the oil filter neck, up to the upper level mark of the oil gauge. (See Fig.3-C)
- e) Reinstall the oil gauge firmly.

#### 

Do not use gasoline engine oil. Use diesel engine oil only.

## 4. SERVICING THE AIR CLEANER

Dirty or clogged air cleaner elements result in a poor engine performance and can sometimes shorten the engine life. Always keep the air cleaner elements clean. (See Fig.[6]-A)

- Do not clean the element with detergent and water. This is wet type.
- Dry the elements thoroughly and then reinstall them into the air cleaner.
- When operating the engine pump under extremely dusty condition, check and clean the air cleaner elements every day.

#### CAUTION

Do not clean elements in kerosene, gasoline, diesel fuel or any other kinds of oil.

### 5. FUEL PIPE REPLACEMENT

Replace rubber pipes every 2 years. If a fuel leak is found from a crack in the fuel pipe, replace all the rubber pipes at once.

#### 6. CHECKING BOLTS, NUTS AND SCREWS

- Retighten loose bolts and nuts.
- Check for fuel and oil leaks.
- Replace damaged parts with new ones.

## 7. CLEANING PUMP INSIDE

Trash pump (PTD206T, PTD306T, PTD405T) only.

- Turn the knob counterclockwise and open the casing cover holder.
- Pull the casing toward you, and then remove the casing and the inner casing.

## 7. PREPARATIONS FOR STORAGE

#### 1. WATER

Drain all water from the drain plug. (See Fig.2-D)

## - PLUG (DRAIN)

#### 

When retightening the drain plug, be sure to clean the drain plug and the thread of the casing. Otherwise, the thread may be damaged.

## 2. DISCONNECT THE DELIVERY HOSE

Tilt the pump and drain all water from the delivery hole. Severe damage to the pump may occur, if water freezes in the pumping chamber.

#### 3. DISCHARGE FUEL

Remove the drain screw of the fuel tank. (See Fig.3-D)

WARNING

Flames prohibited.

#### WARNING

Do not smoke while discharging fuel. Otherwise a fire accident may occur. Clean the inside of the pump casing and casing cover with clean water.

- 4. LUBRICATING ENGINE OIL (See Fig. 3-A)
- Change the used engine oil with fresh oil.
- Be sure to put the plug back into the inlet.

#### 5. CLEAN AND STORE

- Slowly pull the recoil starter handle until resistance is felt and leave it in that position.
- Clean the pump thoroughly with an oiled cloth. Put the cover on and store the pump indoors in a well ventilated with low humidity area.

## 8. EASY TROUBLESHOOTING

#### **1. PUMP DOES NOT RUN**

Stucking of impeller (Disassemble and clean.)

#### 2. PUMPING VOLUME IS LOW

- Air suction at suction side. (Check piping at suction side.)
- Engine output drop-off.
  - (Consult your nearest dealer.)
- Breakage of mechanical seal (Consult your nearest dealer.)
- Too high suction lift (Lower the height.)
- Suction hose is too long or too thin. (Use a thick hose with a minimum length.)
- Leakage of water from the water
  - passage. (Stop the leaking.)
- Clogging of foreign substances on the impeller.

(Disassemble and clean.)

- Wear out of the impeller.
- Strainer is clogged. (Clean it.)
- Engine speed is too low. (Consult your nearest dealer.)

#### 3. PUMP DOES NOT SELFPRIME.

Air suction at suction side.

(Check piping at suction side.)

- Insufficient amount of priming water inside the pump casing (Prime sufficiently.)
- Loose tightening of the drain plugs. (Tighten the plugs firmly.)
- Engine speed is too low. (Consult your nearest dealer.)
- Air suction from mechanical seal. (Consult your nearest dealer.)

## 4. WHEN ENGINE DOES NOT START:

- Perform the following checkup before you take the pump to your FHG dealer.
- If you still have trouble after completing the checkup, take the pump to your nearest FHG dealer.

## Are foreign substances contained in the fuel?

- Drain all the fuel from the fuel tank and check that no foreign substances and/or water are contained in the fuel.
- Clean the fuel filter.

#### Is there enough compression?

- If the compression is not sufficient, check the mounting of the injection nozzle.
- If the mounting nuts are loose, tighten them.

		Recoil Starter	PT D206	PTD306	PTD406	РТD206Т	PTD306T	
		Electric Starter			PTD406S		PTD306TS	PTD405TS
	Type		Self-	priming, Centrifugal pu	dur	S	elf-priming, Trash pum	d
	Suction × Delivery D	iameters(mm) [in.]	50.8×50.8 [2×2]	76.2×76.2 [3×3]	101.6×101.6[4×4]	50.8×50.8 [2×2)	76.2×76.2[3×3]	101.6×101.6[4×4]
	Total Head		32	28	27	28	28	28
dɯn	Maximum Delivery V	'olume(∉/min)	520	006	1,300	750	1,300	1,800
H	Suction Head(m)				. ∞			
	Axle Seal Material(N	fechanical Seal)		Carbonic-ceramic			Silicon-carbide	
	Inner Case			Cast-iron		Cast-iror	n with stainless steel lin	er inside
	Model		FHG DY25P	FHG DY30P	FHG DY41P	FHG DY30P	FHG DY41P	FHG DY46P
ອເ	Type				Forced Air-cooled, 4	stroke, Diesel engine		
rign∃	Fuel				Diese	l Fuel		
	Fuel Tank Capacity	()	2.5	3.5	5.5	3.5	5.5	5.5
	Starting System			6	Recoil Starter / Reco	il & Electric Starter	Υ.	
Net We	ight(kg)	Recoil Starter	40.0	48.0	68.0	61.0	80.0	I
		Electric Starter	ļ	I	78.0	I	90.0	96.0
Dimens	sion L×W ×H (mm)	Recoil Starter	590×430×510	610×450×550	740×505×620	610×450×550	740×505×620	I
		Electric Starter	I	I	970×505×620	I	970×505×620	970×505×620
Standa	rd Accessories			Engine tool kit(1	set), Strainer(1pc.), Ho	se coupling(2pcs.), Hc	se band(3pcs.)	
						*Spe	cifications are subject to	change without notice.

## 9. PUMP SPECIFICTION

## **10. ENGINE SPECIFICATIONS**

MODEL		DY25P	DY30P	DY41P	DY46P	
TYPE		Single cylinder, 4 stroke, vertical, air cooled, diesel engine				
Cumbustion	System	D	Direct injection combution			
Bore x Strok	e (mm)	73 x 59	78 x 62	86 x 70	88 x 75	
Piston Displ	acement (L)	0.247	0.296	0.406	0.456	
	Revolution (rpm)	3600				
Output	Max. kW(PS) /3600rpm	3.7 (5.0)	4.4 (6.0)	6.9 (9.4)	7.5 (10.2)	
	Rated kW(PS) /3600rpm	3.3 (4.5)	4.0 (5.4)	6.3 (8.6)	7.0 (9.5)	
Shaft Rotatio	on Direction	Anticlocky	vise viewe	d from the	output shaft	
	Spray Presure kgf/cm2(MPa)	200 (19.6)				
Fuel Oil	Applicable Fuel Oil	Diesel				
	Fuel Tank Capacity (L)	2.5	3.5	5	5.5	
	Lubricating Method	Forced Lubrication				
Lubricating	Applicable Lubricant Oil	SAE	SAE 10W30 beyond CC grade			
Oystern	Lubricant Oil Capacity (L)	0.75	1.1	1.65		
Stopping System		Fuel cutting				
Starting Sys	tem	Recoil starter				
Cooling System		Forced air-cooled				



#### APPENDIX A

Battery enclosure kit assembly and installation instructions for electric starter type.



Ref.	Parts No.	Description.	Qty	Ref.
50	1530 2531 010	BATT.FRAME	2	
51	1530 2551 010	BATT.PLATE	1	
52	1530 2552 010	BATT.PROTECTION PLATE	1	
53	1555 0184 000	U BOLT	2	M8
54	1555 0489 000	BATT.SETTING BOLT	2	M6
55	1530 1551 001	BATT.SETTING PLATE	1	
56	1555 0250 000	FLANGE BOLT	8	M8 × 35
57	203 200 100	FLANGE NUT	14	M8
58	19N1 0906 000	FLANGE NUT	2	M6
59	1555 0261 000	FLANGE BOLT	2	M8×16

### CHECK KIT CONTENTS

Check to make sure the parts listed above are included in the kit. Contact your shop to obtain any missing parts.

## ASSEMBLY OF BATTERY ENCLOSURE

- 1. Align holes in base plate (51) with holes in battery support tube(50) Install two bolts(59) and two nuts(57).
- 2. Repeat step 1 for second battery support tube (50).
- 3. Align holes in plate(52) with holes in battery support tubes (50). Install four bolts(56) and four nuts(57). Tighten all fasteners.
- 4. Attach the top of the battery support tube in two nuts(57) of the U-bolt (53) .
- 5. Repeat step 4 for second battery support tube (50) .



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