



# OPERATING INSTRUCTIONS

SUBMERSIBLE PUMPS  
FP212G, FP212A & FP212C

010819



1300 353 986  
[flextool.com.au](http://flextool.com.au)



Parchem Construction Supplies Pty Ltd  
7 Lucca Road, Wyong NSW AUS 2259

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## INTRODUCTION

Thank you for your selection of Parchem equipment. Parchem have specialised in the design and manufacture of quality products since 1951.

We have taken care in the design, manufacture and testing of this product. Should service or spare parts be required, prompt and efficient service is available from our branches.

General Safety Instructions for the Operation of Power Equipment

The goal of Parchem is to produce power equipment that helps the operator work safely and efficiently. The most important safety device for this or any tool is the operator. Care and good judgement are the best protection against injury. All possible hazards cannot be covered here, but we have tried to highlight some of the important items. Individuals should look for and obey Caution, Warning and Danger signs placed on equipment, and displayed in the workplace. Operators should read and follow safety instructions packed with each product.

Learn how each machine works. Even if you have previously used similar machines, carefully check out each machine before you use it. Get the "feel" of it and know its capabilities, limitations, potential hazards, how it operates, and how it stops.

## APPLICATIONS

- Dams, mines, tanks, tankers, swimming pools, pits, trenches, excavations, construction sites, canal dredging, pile sinking.
- Harbour & rescue services, pork producers, abbatoirs, plumbers, drainers, builders, rural producers, government, water, sewerage, power & telecommunication authorities.
- Industrial plants, maintenance workshops, hire contractors.

The pump is suitable for continuous use at temperatures up to 65°C.

Operation at higher temperatures up to 95°C is permissible providing immersion is intermittent and is not continuous.

## FUNCTIONS AND CONTROLS

The product is a submersible pump. The pump head operates underwater, driven by a rotating flexible shaft that transmits the

torque from the drive unit to the pump head. Submersible operation of the pump head ensures that it is self priming and does not require suction hose.

The pump is designed with wide passages through the strainer, impeller and body to allow the unobstructed passage of solids. It is suitable for handling fluids with a high solid content such as sand, sludge, silt, effluent up to 60% in suspension, oil and water.

The pump is available with general purpose, abrasive resistant and chemical resistant pump head models. The pump should be selected with a model that best suits the most common applications.

Select the shortest standard flexshaft length (6 or 9 m) to suit the common application/s. Non standard flexible shaft lengths are available to order for custom installations.

The pump is fitted with a quick action 60 mm (2.36 in) diameter flexible shaft coupling for operation from a drive unit fitted with a 45 mm (1.75 in) diameter 3-tooth dog drive).

A petrol or diesel motor drive unit with a minimum of 3.7 kW (5hp), an electric motor drive unit with a minimum rating of 2.2 kW (3 hp) or an air motor drive unit with a minimum rating of 3.8 kW (5 hp) is required.

## ACCESSORIES

Drive units are available with petrol, diesel, air and electric motor drives.

Extension flexshafts (3 & 6 m) extend the length of an existing pump flexshaft and are available to enable dewatering of holes to a depth of 12 m. A sealed quick-action coupling allows underwater operation of the coupling.

A Whip hose is available to mount between the pump outlet and discharge hose. This diverts a portion of the discharge through a flexible whip hose to stir solids into suspension.

## HAZARDS AND RISKS

NEVER allow any person to operate a machine without adequate instruction.

ENSURE all operators read, understand and follow the operating instructions.

SERIOUS INJURY may result from improper or careless use of this machine. Some models of P212 pumps weigh in excess of 25 kg.

Handling and positioning may require two people of appropriate strength, along with correct lifting techniques

### ! MECHANICAL HAZARDS

DO NOT operate the pump with the body removed.

KEEP hands and feet clear of rotating and moving parts as they will cause injury if contacted.

DO NOT leave the equipment in operation while it is unattended.

ENSURE that the equipment will remain stable and will not move or fall while in operation.

DO NOT operate the pump without a discharge hose fitted.

ENSURE that the pump hose is securely fastened to the pump outlet via an appropriately sized coupling and adaptor.

ENSURE that repairs to machinery are carried out by COMPETENT personnel.

### ! ELECTRICAL HAZARDS

THE RISK OF SERIOUS OR LETHAL INJURY from electrical shock may arise from the combination of electricity and moisture.

**! FIRE & EXPLOSION HAZARDS**

PETROL is extremely flammable and explosive under certain conditions.

**! CHEMICAL HAZARDS**

CARBON MONOXIDE exhaust gases from internal combustion motor driven units can cause death in confined spaces.

**! ADDITIONAL HAZARDS**

HANDLE IMPELLERS WITH CARE when the pump body is removed. Pumps that have been subject to extensive use with abrasive materials may have impellers that are severely worn leaving sharp, thin or brittle sections.

USE GLOVES when handling and inspecting the flexible shaft outer casing. Excessive wear of the rubber cover can expose the wire braided reinforcement, allowing it to project and cause injury.

DO NOT use the pump for handling flammable liquids.

Slip/Trip/Fall is a major cause of serious injury or death.

Beware of excess hose, the flexible shaft and water left on the walking or work surface.

DO NOT allow waste water to accumulate under foot.

EXERCISE care when working in the vicinity of unprotected holes or excavations.

Sump pumping is the simplest method of dewatering.

Pumping from 'open' sumps is generally used in coarse sands and gravels. It is difficult to control the migration of 'fines' and should not be used if soil displacement is a critical factor of consideration when working near existing structures, roads, etc.

**ADDITIONAL INFORMATION**

Refer to the drive unit operation instructions for additional safety and operation information on the appropriate drive unit. These are supplied free of charge by mail or fax.

**OPERATION**

For information on correct starting procedures refer to the engine manufacturers operation manual.

Do not engage the drive coupling while the motor is rotating.

Before engaging the flexshaft with a petrol drive unit start the motor using the recoil starter, increase the speed to full throttle and allow it to warm up for a few minutes.

If using an electric motor, switch on and check the motor rotation is in an anti-clockwise direction when viewing its drive dog front on.

Stop the motor.

Turn the bell housing trigger 180 degrees. Insert the flexshaft coupling fully into the housing of the drive unit and release the trigger. Push the coupling into the housing and twist the flexible shaft until the drive dogs are fully engaged and the trigger returns to the horizontal position.

The motor may now be started.

If the pump flexible shaft is fitted with an external movable spring, it should be positioned to provide support where the shaft passes over the edge of a trench or obstruction.

When pumping from deep pits or excavations avoid subjecting the flexshaft to the total weight of the pump and the discharge hose. Support the weight of the pump by attaching a rope to one of the pump eye-nuts. Secure the other end of the rope to a support adjacent to the power unit so that it takes the weight of the pump off the flexshaft.

Drive units should be operated on a level surface. If the surface is not level the drive unit should be restrained to ensure that it does not move due to vibration or the weight of the pump and the hose.

Avoid extended running of the pump without water, or with the flexible shaft in a tight curve.

Never operate the pump flexible shaft in the reverse direction, as this will damage the flexible core. If the impeller is fouled, remove the bearing housing and manually clear the impeller.

**HOW TO GET THE BEST PERFORMANCE FROM YOUR PUMP.**

Maximum discharge performance of the pump will only be obtained when a reinforced discharge hose is used. This minimises kinking where the hose passes over obstructions and permits the unobstructed passage of solids.

If there is a tendency for the pump head to bury itself in heavy sediment, overcome this by improvising an auxiliary strainer.

Remove the top from an empty 20 litre drum and punch openings around the sides. Place the pump head in the drum below the water.

Improved head performance will be obtained by increasing the governed speed of the drive unit motor. It is recommended that a motor with a minimum output of 5.6 kW (7.5 hp) is used for continuous running above 3,000 r/min.

**PUMPING CLEAN WATER**

When there is a need to pump clean water without the sludge, grit or solids that have collected at the bottom of a stream, dam, tank or pit, keep the pump off the bottom. This will also minimise wear from pumping abrasive materials.

In a pit or excavation attach a rope to an eye nut on the pump and suspend the pump from the rope.

In dams and ponds support the pump from a float made from an empty sealed steel or plastic container or a marine buoy.

**PUMPING HEAVY SLUDGE AND SOLIDS**

Best results are obtained if the solids on the bottom of the pit or pond are stirred into the surface liquid. The most effective way of achieving this is to direct a hose from the submersible pump, a large volume tap or a second pump, using waste water, into the tank or pit for a short time until the solids are stirred from the bottom.

**USE A SUITABLE HOSE**

Layflat hose is lightweight and rolls flat to facilitate handling and storage. It is less expensive than reinforced discharge hose. However, layflat hose can kink and impede the flow of the fluid and solids. For best results when using layflat hose, lay it flat on the ground keeping it free from kinks, bends and twisting where possible.

A reinforced hose of 50 mm diameter will improve the discharge performance, while a 75 mm diameter hose will give superior discharge performance.

**QUICK ACTION HOSE FITTINGS**

Cam lever-action fittings enable quick connection of hose to the pump. They save time and eliminate problems with dirty screw threads and missing washers that are common with nut and tail screw thread fittings. Joiners are available for coupling separate hoses.

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## CARE AND PREVENTIVE MAINTENANCE

The most critical part of the pump is the seal. This is because the seal is subject to wear, particularly when the pump is handling abrasive materials. It is important that the seals and the sleeve are replaced before they have worn excessively. If the seals and sleeve are allowed to wear until failure occurs water will enter the spindle bearings.

Noisy bearings will not be apparent due to the noise level from the drive motor.

If the pump is operated unchecked in this condition water will eventually enter the flexshaft. Naturally, the cost of repairing, a pump which has been allowed to deteriorate in this way will be greater.

Regular inspection of the pump and the seal will avoid these problems.

Check the 3-tooth dog on the drive coupling to ensure that it is fully meshed and not worn.

Check the strainer for missing sections that could allow the entry of large objects and result in damage or obstruction of the impeller or volute.

Dismantle the pump and the flexible shaft every 500 hours.

Inspect for wear and lubricate before reassembling

Apply a liberal quantity of grease to the core assembly when inserting it into the casing assembly from the drive coupling end.

If the spindle is worn by the seal/s located in the adaptor and it is otherwise satisfactory for further use do not remove the existing worn seal/s from the screwed adaptor. The bore of the adaptor is deep enough to accommodate additional seal/s which will then be located on an unworn area of the spindle.

Check the flexible shaft for kinks and external damage by laying it out straight on a workbench or the floor. Although it still operates a badly kinked flexible shaft may result in a broken inner core.

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## CLEANING AND STORAGE

It is advisable to operate the pump in clean water after use each day or before storing when it has been used in sludge or water with a high solid content. This will ensure that mud and sludge do not dry out and obstruct the body or the impeller.

The three eye nuts can be unscrewed to allow removal of the pump body and access to the impeller.

Hire operators should check the impeller for rags, solidified mud and debris after each hire. While the body is removed check the spindle bearings for slackness and smooth rotation.

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## SERVICE

### ! CAUTION

- Read the operating instructions before servicing this product and note the safety information.
- Exercise care when handling flexible shaft casings. Severe wear or damage to the rubber cover may allow the internal wire braid to protrude and cause injury.
- Exercise care when handling pump impellers. Extreme wear may result in thin sections or sharp surfaces and cause injury.

## DISMANTLING

### TO REMOVE THE PUMP FROM THE FLEXIBLE SHAFT

- Remove the pump body from the housing by unscrewing the eye nuts.
- Unscrew the casing from the adaptor with spanners on the adaptor spanner flats and ferrule.
- Pull the ferrule away from the adaptor to expose the spindle and the core end.
- Unscrew the core end with a spanner on the spindle spanner flats and multi-grip pliers on the core end.

### TO REMOVE THE COUPLING FROM THE FLEXIBLE SHAFT

- Unscrew the casing from the coupling using spanners on the housing spanner flats and ferrule.
- Pull the ferrule away from the housing to expose the spindle and the core end .
- Unscrew the core end using multi-grip pliers and a lever through the teeth of the dog.

### TO REMOVE THE CORE FROM THE CASING

- Lay the flexible shaft out straight on a long workbench or the floor.
- Pull the core out by hand ,coil it and lay it on down on clean newspaper.
- Inspect
- Casing for kinks, wear and damage.
- Core for wear and kinks.
- Length relationship of core and casing. Casing is 25 mm longer than core.

### TO DISMANTLE THE PUMP

- Unscrew the impeller from the spindle with a lever through blades and a spanner on the spindle spanner flats.
- Hold the housing in a vice.
- Unscrew the adaptor from the housing using a spanner on the spanner flats.
- Drain the oil from the housing and support it with the flange uppermost.
- Press the spindle, bearings and spacer out of the housing.
- Press the spindle out of the bearings after removing the circlip
- Support the housing with the flange down and press the seals out off the housing.
- Support the adaptor with the largest thread down and press the seals out off the adaptor.
- Slide the sleeve off the spindle over the external thread and remove the o-ring.
- Remove the o-rings from the adaptor.

### INSPECT

- Pump body and plate for wear.
- Impeller for wear.
- Housing and plate for wear and corrosion
- Housing seals and seal sleeve for wear.
- Adaptor seals and spindle seal diameter for wear.
- Bearings for wear.
- Strainer for missing grille segments.

Note: Because the pump seals are subject to wear, particularly when the pump is handling abrasive materials, it is important that the seals and sleeve are replaced before they have worn excessively. If the seals and sleeve are allowed to wear until seal failure occurs allow water will enter the spindle bearings.

If the pump is operated unchecked in this condition water will eventually enter the flexshaft. Regular inspection of the pump and the seal will avoid these problems.

To dismantle the coupling

- Unscrew the socket set screw from the housing.
- Support the housing with the thread uppermost.
- Press the spindle, seal, bearings and space out of the housing.
- Support the spindle on the seal with the threaded end uppermost and press the spindle out of the bearings after removing the circlip.
- Remove the o-ring from the housing.

### INSPECT

- Spindle dog teeth for wear.
- Spindle dog seal diameter and seal for wear.
- Bearings for wear.

## ASSEMBLING

- Clean the pump and coupling parts by washing in safety solvent.
- Clean the core assembly by wiping it with a clean cloth.
- Reverse the above assembly procedure.
- Ensure that the seals are correctly assembled with the housing seal lips and the adaptor seal lips facing out when pressed into position.
- Fit the coupling to the same end of the casing that the core was inserted through.






### LUBRICATION

Pump

- Apply a grease film to o-rings, seal lips, seal sleeve and spindle seal diameter.
- Fill the housing with oil to cover bearing before screwing the adaptor into the housing.
- Coupling
- Pack the bearings and the spacer with grease.
- Apply a grease film to the o-ring, the seal lips and the dog seal diameter.

### FLEXSHAFT

- Apply a liberal coating of grease to the core as it is inserted into the casing.

Model	Flexshaft Length (m)	Operating Weight (kg)	Shaft Inner Core Dia (mm)	Shaft Casing Dia (mm)	Discharge Dia (mm)	Max Discharge Head (m)	Max Discharge (l/h)	Solids Capacity (mm)	Product Code	Barcode
FP212G-6	6	26.5	13	32	50	26	63,000	28	FT201801-UNIT	 9300611599452
FP212G-9	9	38	13	32	50	26	63,000	28	FT201803-UNIT	 9300611599483
FP212A-6	6	34	15	38	50	26	63,000	28	FT201805-UNIT	 9300611599506
FP212A-9	9	42.5	15	38	50	26	63,000	28	FT201818-UNIT	 9300611599636
FP212C-6	6	37.5	15	38	50	26	63,000	28	FT201817-UNIT	 9300611599629

**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES AND CORRECTION
The drive motor is operating but the pump is not functioning.	<ul style="list-style-type: none"> <li>■ Check that the coupling is fully inserted in the bell housing and secured by the trigger.</li> <li>■ Check that the impeller is not obstructed.</li> <li>■ Check that a kink in the discharge hose has not created an air lock preventing water from initially entering the pump.</li> <li>■ Check that the pump is sufficiently submerged to allow water to cover the impeller.</li> <li>■ Check that electric motor rotation is as shown by the direction arrow on the bell housing (anti-clockwise when viewing its drive dog).</li> <li>■ A 240 volt single phase electric motor can run in reverse due to incorrect internal connection of the motor winding when repaired.</li> <li>■ A 415 volt three phase electric motor can run in reverse if operated from a power connection with incorrect phase rotation.</li> <li>■ Check that the threaded core ends on the flexible drive core have not unscrewed from the pump or coupling spindle due to reverse rotation of the motor.</li> <li>■ Check that the inner flexible core has not failed.</li> </ul>
There is a tendency for the pump head to bury itself in the heavy sediment	<ul style="list-style-type: none"> <li>■ Overcome this by improvising an auxiliary strainer. Remove the top from an empty 20 litre drum and punch openings around the sides. Place the pump head in the drum below the water.</li> </ul>