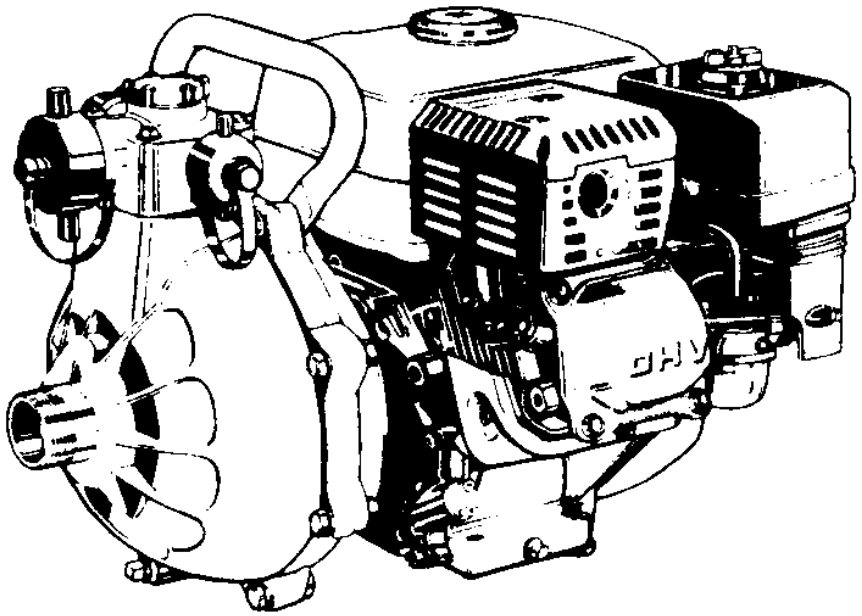
93 SERIES ENGINE DRIVEN FIREFIGHTERS™/WATER TRANSFER PUMPS



SERVICING INSTRUCTIONS

SW47/930/399 MARCH 1999

Engine service and repairs refer to engine manufacturer.

DEPEND ON
DAVEY

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MODEL DESIGNATION

The 93 Series Davey Firefighter™ pump can be distinguished by the following features:

- **Eight casing bolts.**
- **3-way replaceable discharge.**
- **One piece front casing including suction thread (inlet port).**

A pump that is coloured yellow indicates a single impeller model.
A pump that is coloured red indicates a twin impeller model.
A pump that is coloured blue is distributed in Australia by Jen-Ell and incorporates viton elastomers for boom spray applications.

Many different engines drive these pumps.
The individual model number indicates the pump and engine type.

Definition

93 1 06 – 0

Davey design level.
A change to the design level indicates major product changes generally resulting in non-interchangeability of components.

Engine Type and size.
'x'4 = Briggs & Stratton 'x'5 = Robin
'x'6 = Honda 'x'7 = Yanmar
Where 'x' relates to the engine model and size.

No. of Impellers
1 = Single Impeller
2 = Twin Impeller

93 Series Pump Design.

WARNING: IMPORTANT SAFETY INSTRUCTIONS

Read carefully before servicing these products.

Please follow these cautions to reduce risk of serious injury.

Caution: Always wear protective apparatus/clothing if an engine driven pump has caught fire.
Contact with molten viton elastomers will cause serious personal injury.
Caution: Always relieve water pressure from pump prior to servicing.
Caution: Do not service pump whilst engine is still operating.
Caution: Do not touch parts of engine that may still be hot e.g./ exhaust, exhaust manifold.
Caution: Highly inflammable liquids used in motor. **Do not use flame.**

SERVICING INFORMATION

This servicing information details the necessary procedure for re-assembly of this product. Disassembly is the reverse of these instructions.

TOOLS REQUIRED

Loctite 325		
10mm Socket	**–**	**3 way discharge bolts**
$^{9}/_{16}$" AF Socket	**–**	**Casing bolts**
$^{9}/_{16}$" AF Ring spanner	**–**	**Casing nuts**
17mm Socket	**–**	**Single stage impeller**
17mm Socket	**–**	**Retaining screw (twin impeller only)**
Posi drive Screwdriver 3 point	**–**	**Check valve retaining screw**
Circlip pliers	**–**	**Circlip on shaft extension (twin impeller only)**
Flat blade screwdriver	**–**	**Impeller removal**
23mm Socket	**–**	**Impeller 1st stage 9hp B&S, Yanmar**

TORQUE SETTINGS

Conversion: 1Nm = 0.74ft/lb 1ft/lb = 1.35Nm

3-way discharge bolts	**10 - 16Nm**
Casing bolts	**20 - 35Nm**
Yoke bolts	**13 - 20Nm**
Flap valve screw	**1.5 - 2.0Nm**
Impeller retaining screw (2 stage)	**13 - 20Nm**

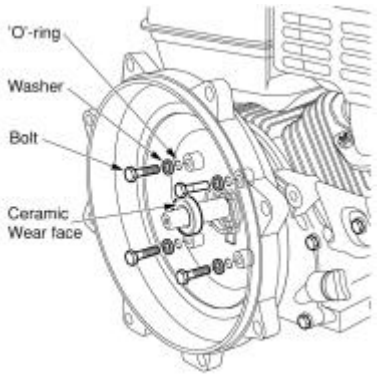
NOTE: When fixing the yoke to the engine always ensure the correct bolts are used for the applicable engine:-

–	**9hp Briggs & Stratton engine**	**$^{5}/_{16}$" UNF x 1" long**
–	**6hp Yanmar Diesel**	**M8 (1.25P) x 40 long**
–	**All other engines supplied by Davey**	**$^{5}/_{16}$" UNF x 1.5" long**
–	**9hp Yanmar Diesel**	**M8 (1.25P) x 33 long**

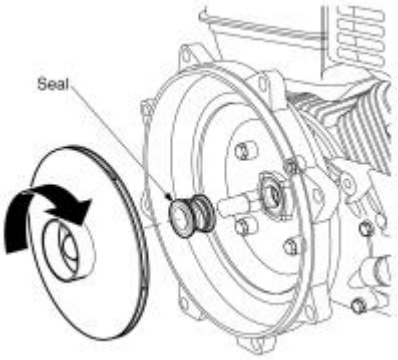
The information is true and correct at time of printing, however, Davey reserve the right to amend or alter the product and any associated information contained herein.

SINGLE STAGE FIREFIGHTER™ ASSEMBLY

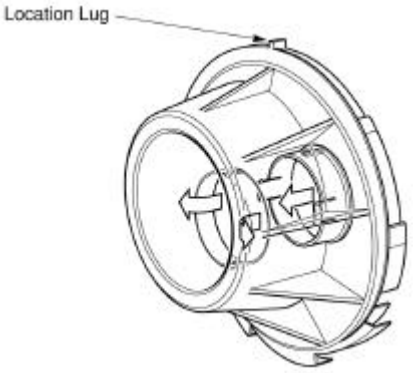
1. **Fit ceramic seal to yoke. By using a little water on the rubber boot only, it will press in easier.**
   Caution: Keep the ceramic face clean to provide a good seal.
   The ceramic seal must be inserted with the shiny surface visible, after it is inserted.



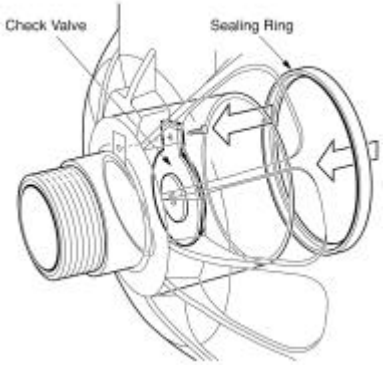
2. **Fit the yoke to the engine by means of the 4 stainless steel bolts, which are fitted with a flat washer and an oring.**
   The yoke has a boss on the back with a drain slot in it. The drain slot faces the bottom to allow drainage if the seal leaks.



3. **Fit mechanical seal with carbon face to the ceramic. Gently screw the impeller on (Clockwise rotation), hand tighten only.**
   The impeller will locate on the end of the shaft.
   Caution: Overtightening will force the shaft to break the impeller.



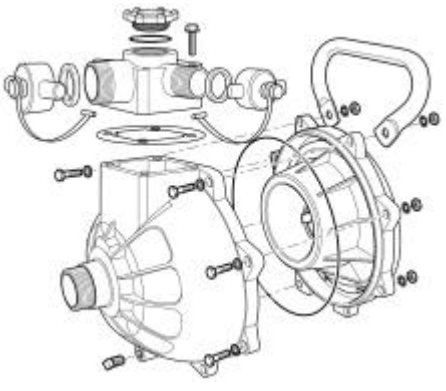
4. **Assemble the plastic insert into the diffuser.**
   The insert locates into the diffuser by 2 keyways to stop it rotating and clips in.
   Note: The insert should be able to float allowing it to centralise on the impeller.
   Assemble the diffuser onto the yoke. The diffuser has a locating lug, which locates between 2 lugs at the top of the yoke.



5. **Screw the flap valve assembly into the front casing and fit the sealing ring onto the middle boss.**
   Note: The rubber of the flap valve seats against the casing face.

6. **Fit casing oring onto the yoke rim.**

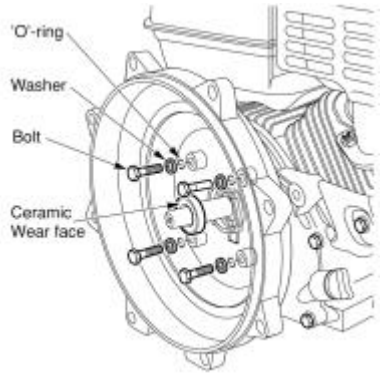
7. **Front Casing Assembly:**
   The 8 casing bolts have the flat washer under the head and the star washer under the nut.
   The carry handle is fitted to the top on the back of the yoke.
   The 3-way discharge and gasket are fitted to the top.
   $^{1}/_{4}$" BSP drain plug goes into the front casing.



Congratulations, you have successfully reassembled this product.

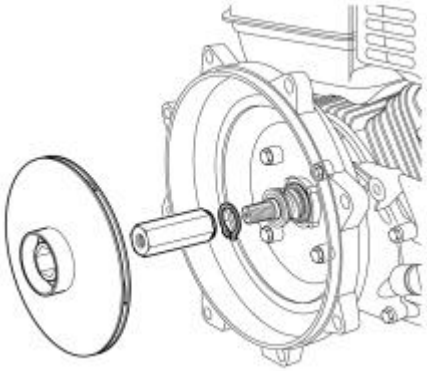
TWO-STAGE FIREFIGHTER™ ASSEMBLY

1. **Fit ceramic seal to yoke. By using a little water on the rubber boot only, it will press in easier.**
   Caution: Keep the ceramic face clean to provide a good seal. The ceramic seal must be inserted with the shiny surface visible, after it is inserted.



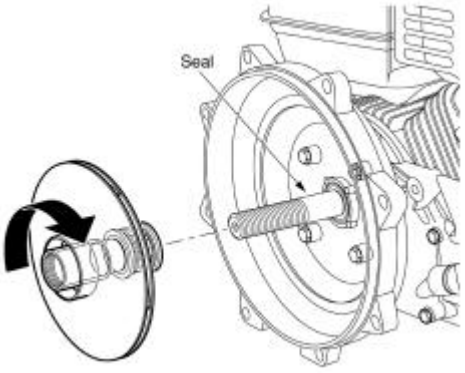
2. **Fit the yoke to the engine by means of the 4 stainless steel bolts, which are fitted with a flat washer and an oring.**
   The yoke has a boss on the back with a drain slot in it. The drain slot faces the bottom to allow drainage if the seal leaks.
   9hp Yanmar: An aluminium spacer fits onto the yoke boss to give correct location into the Yanmar 9hp engine. This spacer is fixed to the yoke with loctite 325.

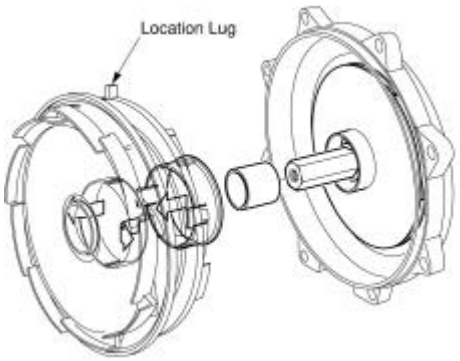
3. **Fit the mechanical seal with carbon face to the ceramic (aluminium oxide).**
   9hp B&S, Yanmar with 1" shaft: The mechanical seal is fitted onto the boss at the back of the impeller. It is fitted with the aid of lubricant (molykote 55M) for ease of fit over the impeller boss.



4. **Fit circlip to shaft extension (do not overstretch) and screw shaft extension onto the shaft until it bottoms out. Slide the impeller and then the spacer onto the shaft extension.**

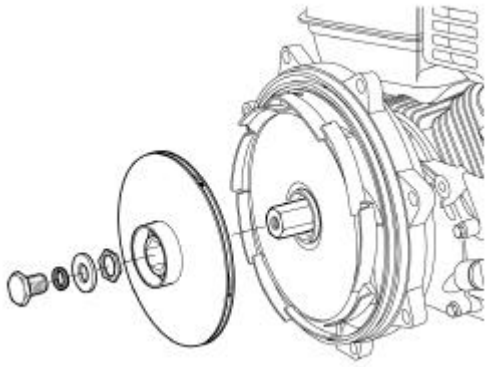
9hp B&S, Yanmar with 1" shaft: Do not require a shaft extension piece.
The impeller is then screwed on to the engine shaft by hand. It will stop when it bottoms out on the shaft.





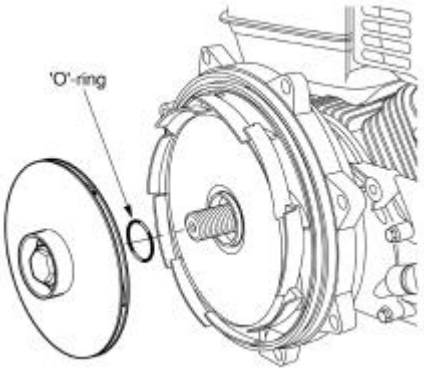
5. **Ensure neck ring insert is fitted to diffuser. The diffuser has a locating lug and is also stamped top. This side goes over the impeller and locates in the yoke.**
   Note: For ease of assembly, slightly tip engine backwards. The diffuser will be clamped when the casing is assembled to the yoke.

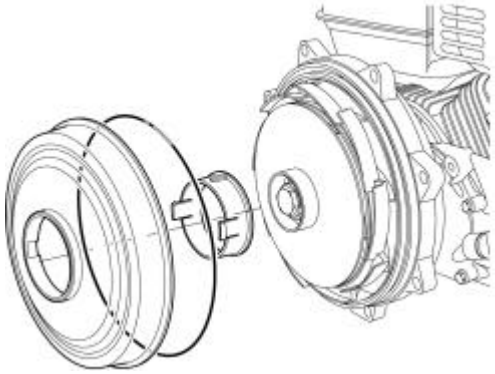
TWO-STAGE FIREFIGHTER™ ASSEMBLY (Cont'd)



6. **Slide the second impeller onto the shaft extension.**
The second impeller should be sitting slightly proud of shaft extension, enough to allow the hexagon gasket to sit inside and level with impeller boss.
The bolt, spring washer and large flat washer are then screwed in. Flat washer closest to gasket.

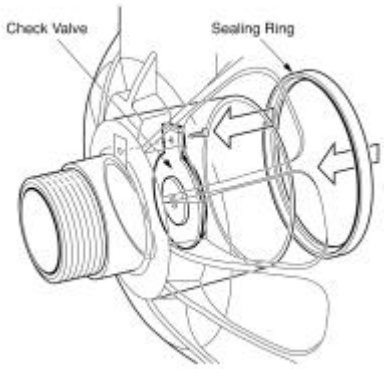
9hp B&S, Yanmar with 1" shaft:
The 1st stage impeller has an oring fitted into a groove in the boss and this one is also screwed on by hand only. The oring seals on to the 2nd stage impeller boss.





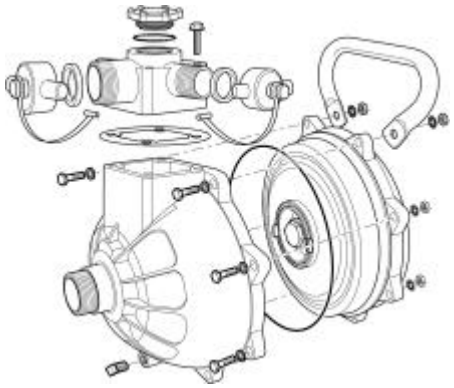
7. **An oring is fitted into a groove in outer edge of diffuser.**
Note: The diffuser oring may seem too big for recess, fit it in evenly.

8. **The two stage diffuser cover (with neck ring fitted) is placed over the impeller assembly.**



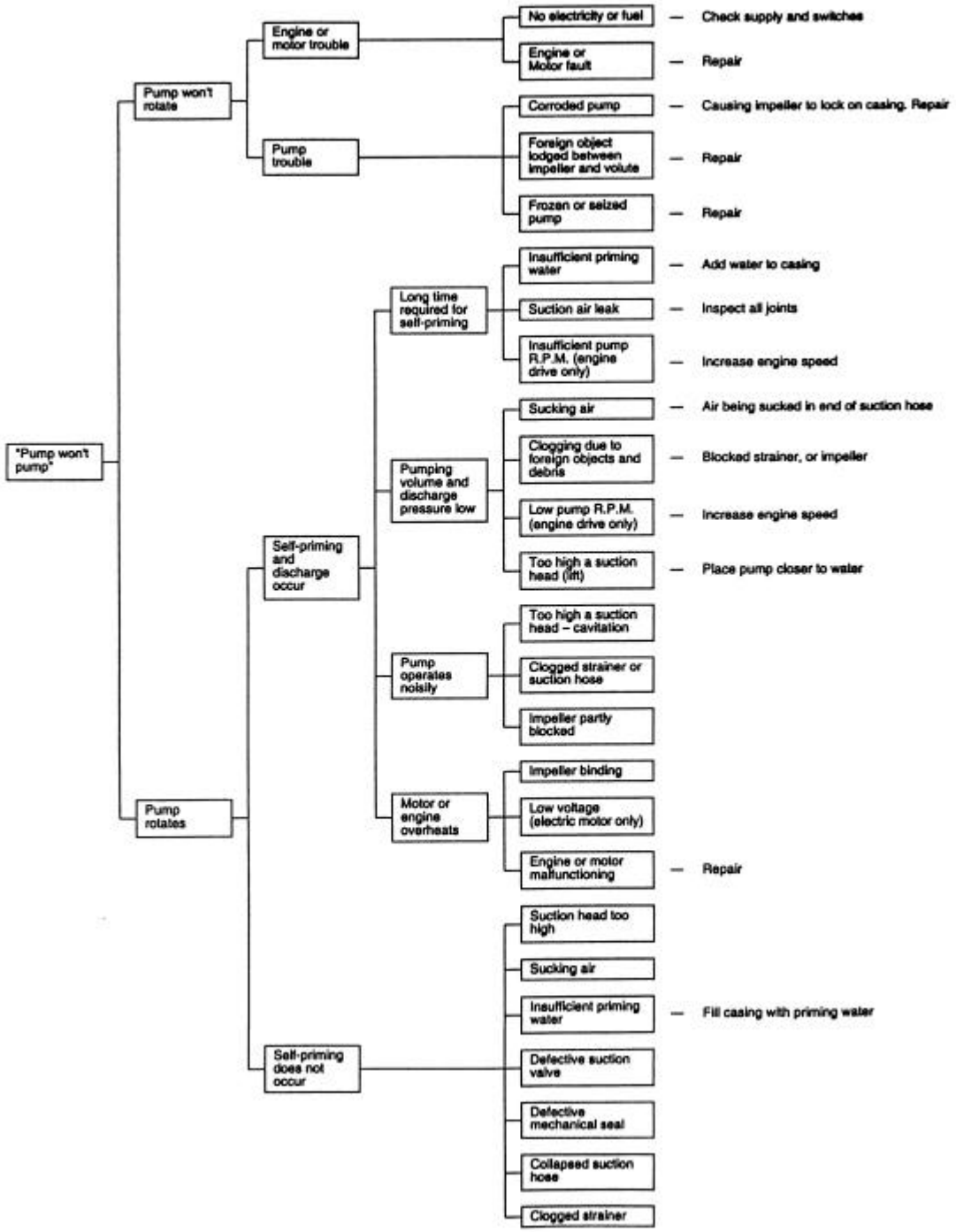
9. **Screw the flap valve assembly into the front casing and fit the sealing ring onto the middle boss.**
Note: The rubber of the flap valve seats against the casing face.

10. **Fit casing oring.**



11. **Front Casing assembly:**
The 8 casing bolts have the flat washer under the head and the star washer under the nut. The carry handle is fitted to the top on the back of the yoke. The 3-way discharge and gasket are fitted to the top.
$^1/_4$" BSP plug goes into the front casing.

TROUBLE SHOOTING GUIDE



Additional to these guidelines:

Discharge pressure low? – The sealing ring has been left out of the front casing assembly.

Discharge volumes/pressure low? – The neckring insert/s may be dislodged from the diffuser. Normally associated with sand or debris forcing the insert from the diffuser. Worst case may see the insert "machine" the neckring off the impeller.

Engine cuts out? – Oil level too low or oil alert activated. Ensure engine oil is sufficient and engine is sitting on flat/horizontal ground.

This article was released by Du Pont regarding the safe handling of fluoroelastomers. We bring to your awareness the safe handling requirements for you and your staff.

FLUOROELASTOMER

WARNING TO THOSE WHO HANDLE PARTS EXPOSED TO EXCESSIVELY HIGH TEMPERATURES

Orings, gaskets and seals made from fluoroelastomers (includes viton) are frequently used in high temperature service. When used under design conditions, fluoroelastomers are safe. However, if misused by exposing to temperatures around 600^{o}F (316^{o}C) or greater, decomposition may occur with the formation of hydrofluoric acid, which can be extremely corrosive to human tissue if not handled properly.

DO NOT TOUCH EITHER THE SEAL OR SURROUNDING EQUIPMENT without wearing neoprene or PVC gloves if degradation is suspected. A degraded seal may appear as charred or a black sticky mass. Hydrofluoric acid may be condensed out as a clear liquid on the part or equipment. Allow the equipment to cool. Then wear neoprene or heavy PVC gloves to safely handle parts or equipment. Wash parts and equipment well with 10% lime water (calcium hydroxide solution) to neutralize any hydrogen fluoride. Discard gloves after handling degraded fluoroelastomer parts.

FIRST AID: Wash affected areas of the skin IMMEDIATELY with plenty of water. Then rub a 2.5 calcium gluconate gel* into the skin until there is no further irritation, while SEEKING PROMPT MEDICAL ATTENTION. Tell the doctor that a hydrogen fluoride (HF or hydrofluoric acid) burn is suspected.

NOTE: Concentrated hydrogen fluoride solutions cause immediate pain, but dilute solutions may not cause redness, burning or pain until several minutes or even hours have elapsed. If such a delayed reaction is experienced, seek medical attention immediately.

***CALCIUM GLUCONATE GEL 2.5%. This gel is prepared by mixing 3.5 grams calcium gluconate powder with a 5-ounce tube of surgical water soluble lubricant (e.g. KY lubricating jelly, Johnson & Johnson) or by mixing 1 standard ampoule (10ml, 10%) of USP calcium gluconate with a 1-ounce of water soluble lubricant. The shelf life of the gel has not been determined. Storage of gel has limitations and refrigeration may help.**

Note: Product specifications may change without notice.
Drawings are indicative only, product appearance may change slightly.