

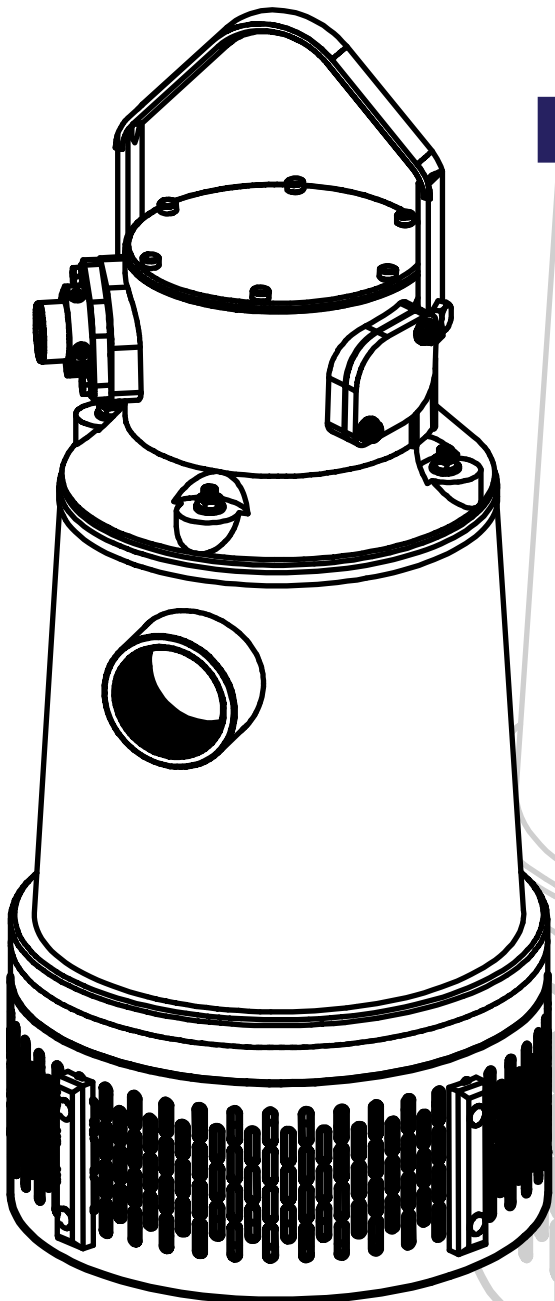


Installation, care & maintenance manual

of the

Raptor 8kw

**high head
submersible pump**



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Warranty



PumpEng will repair faults in the products we manufacture within the following constraints:

- The fault has been caused by defects in materials or workmanship.
- The fault has occurred when the product is used in circumstances to which the product was intended to be operated in and in accordance with installation and operating recommendations.
- All repairs and regular maintenance is performed by an authorized PumpEng repair dealership.
- All components used in servicing and repairs must be genuine PumpEng components
- The fault is not caused by inadequate maintenance.
- The fault occurs and is reported to PumpEng or an authorized PumpEng dealership within twelve (12) months of purchase.
- The product is returned to PumpEng or an authorized dealer at nil expense to the receiver.
- PumpEng accepts nil liability for consequential damage or losses
- PumpEng reserves the right to alter information and specifications without notice.

Pump Description

The PumpEng manufactured “Raptor” series of pumps are electro submersible de-watering pumps.

By incorporating a water cooled, jacketed motor these pumps can run both fully and partly submerged.

This feature allows de-watering to be achieved to a lower level than that which can be achieved with non jacketed submersible pump designs.

To further enhance this feature the “Raptor” pump series are supplied with class H (180 C) insulated motors thereby increasing the allowable temperature rise which would be applicable if a standard class F(150 C) motor was used.

This feature increases the life expectancy of the motor when dry run or snore operation is encountered.

Another design feature which helps to extend pump life during dry run or snore operation is the incorporation of dual mechanical seals running in an oil bath.

The standard motor configuration is 3 phase, 50 cycle. Motor speed is 2 pole and motors are available in both 415v and 1000v.

Variations on these standard motor specifications are available to suit specific requirements. **Note that the “Raptor” series of pump are not Ex-approved and as such cannot be used in explosive or flammable environments.**

The design speed of these pumps is set at 2 pole so as to allow high head pumping to be achieved. All pump Impellers are of a semi open design with full rear shrouds to help maintain constant discharge head over the wear life of the Impeller.

The pumps are designed as a wear resistant de-watering pump, incorporating unique features to minimize both the effects of wear and the costs associated with damage that occurs through wear. Due to the high speed and high head design of these pumps they are not intended for use as a slurry pump.

8 KW Raptor Technical Specifications

Motor Details	415 volt	1000 volt
Full Load Amps	15 amps	6 amps
Full Load Torque	26 Nm	26 Nm
Locked Torque/Full Torque	2.6	2.9
Speed	2890 RPM	2890 RPM
Phase	3	3
Hz	50	50
Winding Insulation	Class H	Class H
Pump Details		
Max Discharge Head	70 m	
Max Flow	15 Litres/second	
Gross Packed Weight	115 kg	
Oil Type	Hydraulic 68 (ISO 68) or equiv	
Oil Qty	2.0 Litres	
Max Water Temp	40 C	
Max Pump Submergence	22 m	
Max SG of Pumped Water	1.1	

Transportation, Storage and Installation

- Always lift the pump via the lifting handle. Never lift or drag the pump via the electrical power cable.
- Always ensure the pump is secured and packaged to prevent damage during transportation. When transporting along unsealed roads, pack the pump so as to prevent damage which can be caused to the bearings and seals by excessive vibration
- Do not drop the pump as not only can this cause physical damage to the exterior of the pump it can also cause damage to bearings and mechanical seals.
- Where pumps are stored for extended periods ensure that the cable, seal sleeve and mechanical seals, are intact before putting the pump into operation, also ensure that the impeller can rotate freely and that oil/grease levels are correct.
- Installation must be undertaken by suitably qualified persons. Ensure all relevant safety standards are adhered to and be aware of hazards which exist in the area in question.
- When positioning the pump in an operating environment take measures to reduce the amount of solids and fines which can enter the pump. Wear and associated repair costs are directly related to the amount of solids being pumped.
- Ensure that all electrical connections are correct and that suitable overload/motor protection devices are used and that the pump is operating within its designed current range.
- Ensure the direction of rotation is correct.
- Ensure discharge lines and fittings are properly secured and rated for the installation's design pressure. All discharge lines must be free of kinks and blockages.

Maintenance

The Raptor series of pumps are designed for long periods of trouble free operation.

The frequency of service inspections is determined by the operating conditions which the pump is operating in.

As a minimum the following inspections should be made every six (6) months, however site maintenance staff should set inspection intervals based on the operating conditions which the pumps are operating in.

Note that a drop in output capacity or changes in operating current are an indication that the pump is in need of inspection.

- Ensure all inspection work is performed by suitably qualified and trained persons.
- Inspect the electrical power cable for damage and replace as necessary.
- Measure the insulation resistance of the power cable and motor windings. If the winding resistance is not correct then remove the cable and measure the resistance of the windings only. If this reading returns to normal replace the cable. If the reading does not return to normal the pump should be sent to a PumpEng dealership for repairs.
- Visually inspect all external components of the pump and replace any damaged components.
- Ensure that the cooling jacket internal waterways are free of obstruction, flush/clear as required.
- Check that all nuts, bolts and screws are secure. Remove the oil inspection screws. **(Danger this area may be under pressure, take appropriate precautions)** Lay the pump on its side and pour the oil into a suitable container, check the condition of the lower bearing housing oil. If there is any indication of contaminants in the oil then it is probable that the mechanical seals or bearing housing o-rings have failed and as such the pump should be sent to a PumpEng dealership for repairs. If the oil is not contaminated replace with new oil (quantity required is 2.0Litres) ensuring that the inspection screw o-rings are replaced and the inspection screws are tightened to 20 Nm.
- Remove the stator inspection screw. **(Danger this area may be under pressure, take appropriate precautions)** lay the pump on its side and check if there is any water or oil in the stator casing. If evidence of oil or water are present it is indicative of a mechanical seal or o-ring failure and as such it is recommended that the pump be repaired by a PumpEng dealership. If nil water or oil is evident replace the stator inspection screw O-ring and ensure that the inspection screw is tightened to 20 Nm.
- Remove the junction box cover and inspect for signs of water. **(Danger this area may be under pressure, take appropriate precautions)** If evidence of water exists determine where the water has entered. If the water has entered from the stator casing the pump should be returned to a PumpEng dealership for repairs. If on the other hand the water has entered via the lid or power cable then replace the cable, o-rings and seal sleeve as necessary. When re-fitting the seal sleeve ensure that the seal sleeve seals on a new area of the electric power cable, also ensure that the cable entry clamps are tightened securely on the electric power cable.
- Inspect all wet end components & replace as necessary.

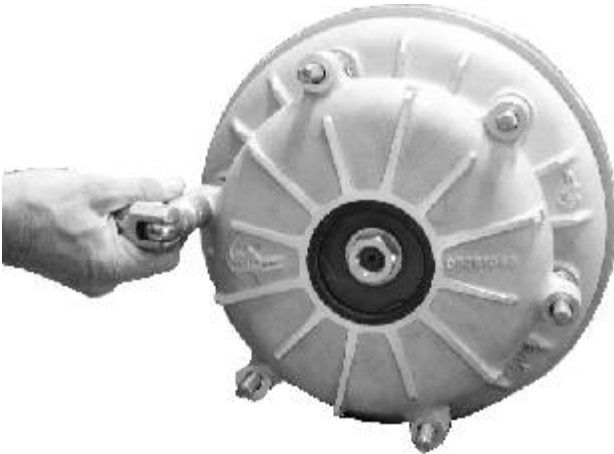
Wet end dismantling

Remove the lower Impeller & shims
Do not lever the impeller as it can damage both the impeller and diffuser disc

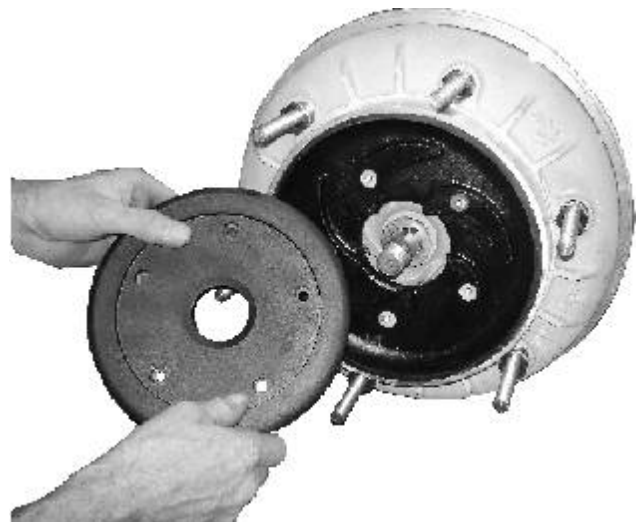
Remove the suction strainer



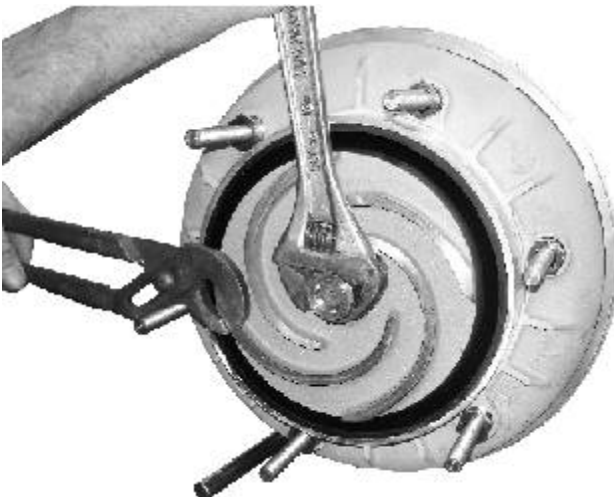
Remove the suction cover



Remove the diffuser disc



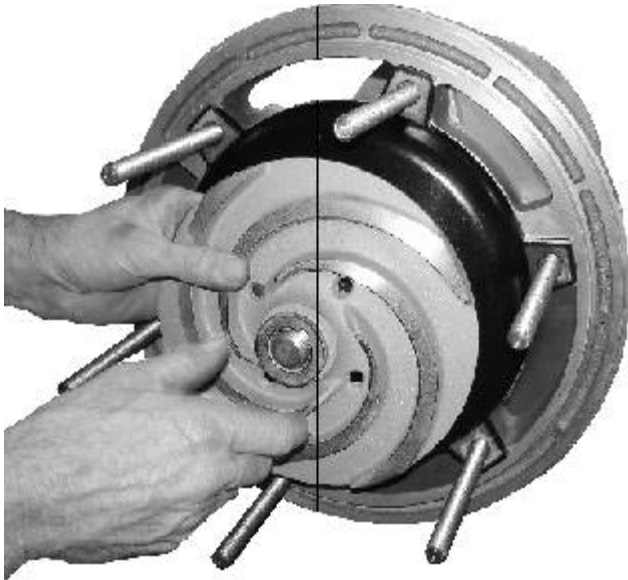
Prevent the impeller from rotating
Remove the Impeller nut
Be careful of sharp edges



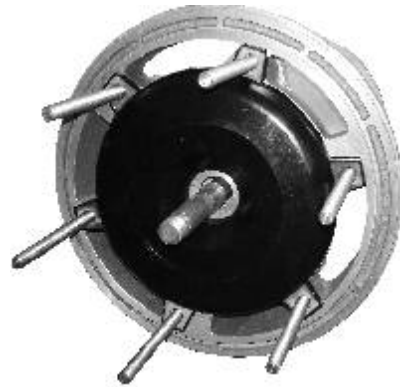
Remove the shimless diffuser



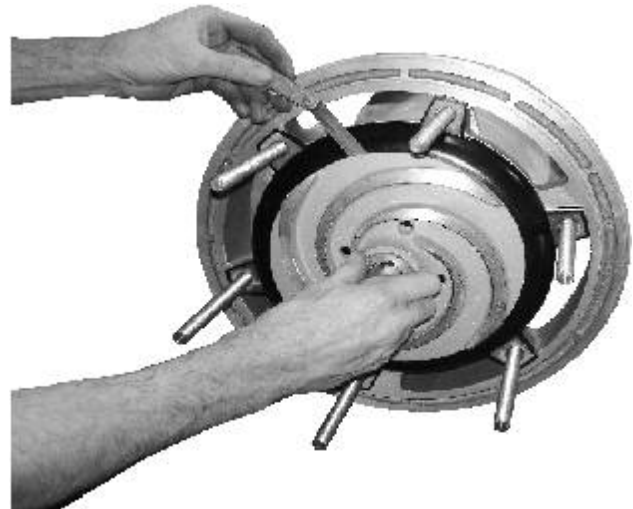
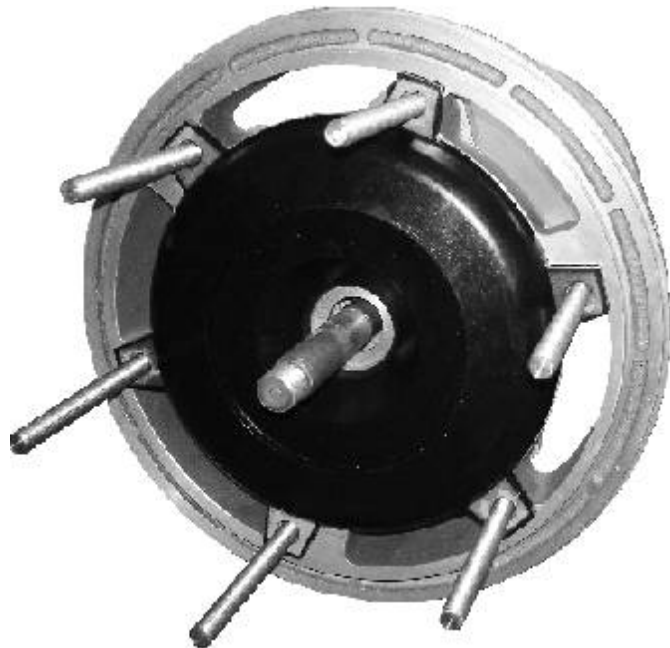
Remove the upper impeller & shims
Do not lever the impeller as this can
damage both the impeller and oil housing
Remove the impeller key



Wet end assembly



Fit the impeller key
Fit upper impeller shims
Fit the upper impeller
Lock the impeller so that it cant rotate
Be careful of sharp edges
Fit the spacer & tighten the impeller nut
to 70 Nm



Ensure upper impeller to oil housing
clearance is set between 0.2 to 0.3mm



Fit the shimless diffuser
 Adjust clearance of upper impeller to diffuser to 0.2 to 0.3mm. See page 10
 For adjustment of the Shimless diffuser
 Tighten shimless diffuser lock nuts to 60Nm
 Ensure the upper impeller can rotate freely



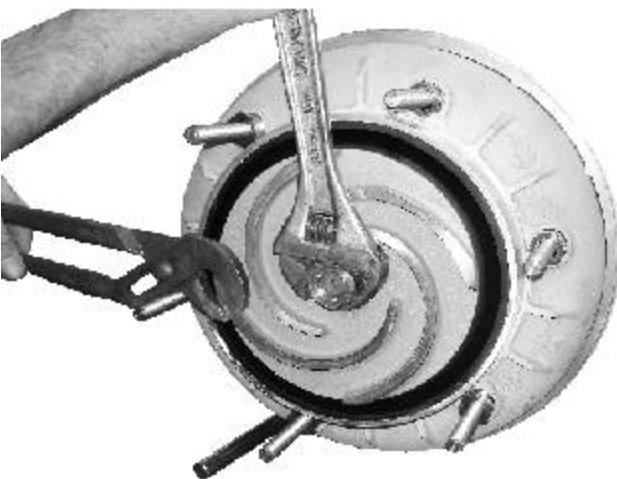
Fit & tighten the impeller nut to 70 Nm
 Be careful of sharp edges
 Ensure lower impeller to diffuser disc clearances are 0.2 to 0.3mm
 Ensure the lower impeller can rotate freely



Fit the diffuser disc & tighten bolts to 8 Nm



Fit suction cover
 Adjust suction cover to obtain 0.2 to 0.3mm lower impeller to suction cover clearance
 Tighten suction cover nuts to 60 Nm
 Ensure that both the impellers can rotate freely



Remove the impeller nut & remove the spacer
 Fit lower impeller shims
 Fit the lower impeller
 Lock the impeller so it cant rotate



Fit suction strainer
 Tighten suction strainer bolts to 60 Nm

Installation instructions for the Raptor 8kw H seals:

General: The seals fitted to this pump have tungsten carbide rotary and stationary faces. The upper and lower seals are identical, and made to fit directly into the pump assembly.

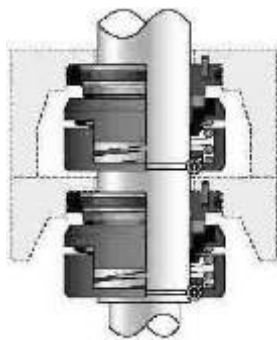
Caution: Mechanical Seals are precision components and should be stored in the protective packaging supplied, until they are required for use. Handle the seal carefully, as some parts can be easily damaged through heavy handling or knocks. Do not use a hammer to install under any circumstances.

Old Seal Removal: Drain oil from pump, dismantle pump housing, impeller and key as previously described.



Exploded view of Seal components.

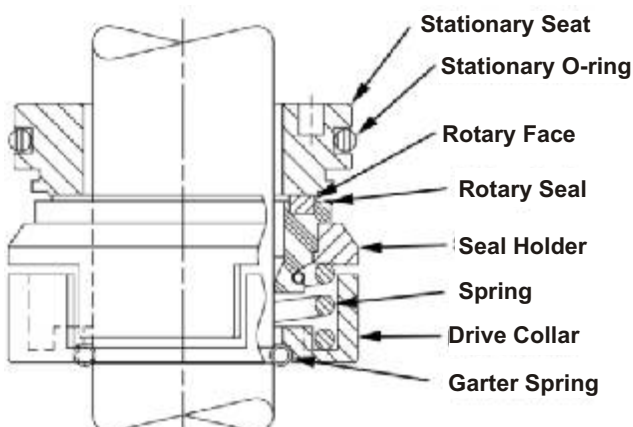
Seal Assemblies Installed.



Upper Seal Assembly

Lower Seal Assembly

Component Parts of Seal Assembly.



Lower Seal: Push the Drive collar forward to remove the garter spring, followed by the drive collar, compression spring, seal holder and seal assembly.

Upper Seal: Remove the oil housing and dismantle the upper seal in the same manner as the lower seal.

Preparation: Ensure that all seal and pump parts are present, and that the pump shaft and housing are clean and free from any burrs or sharp corners. Check that the anti-rotation pins are in place for the stationary seats and do not stand out more than the hole in the seat. The pump shaft should have a chamfer to assist entering seal onto the shaft and the same chamfer is required in the housing for the seat. Assemble pump as previously outlined ready for the seal assembly. Clean hands before installing seal.

Installation: (Upper Seal) Check the O-ring is installed on a stationary seat. Lubricate the outside of the O-ring and the motor housing with lube oil or liquid soap. Carefully slide the stationary seat into the motor housing, making sure the drive pin is in line with the hole in the seat. Push the stationary firmly into place with finger pressure, until it is securely mounted in the cavity. Wipe the face with a clean lint free cloth. Clean the face of the rotary seal, lubricate the rubber inside of the seal and shaft, then slide seal and seal holder along the shaft until the seal faces are in contact. Install the compression spring and drive collar, making sure to engage the tangs between the seal holder and drive collar. Push the drive collar forward until it is possible to fit the garter spring into the groove on the shaft. Ensure the ball is correctly engaged in hole provided. Release the pressure on the drive collar and make sure the ball also engages in slot provided.

Installation: (Lower Seal) Install the oil housing in place and follow the same process as for the installation of the Upper Seal. Re-install the key, impeller and pump housing as previously instructed.

Note: It is recommended that if mechanical seals need replacement that the pump is sent to an authorised PumpEng dealership.

Fitting instructions for the Shimless Diffuser

Part No: 08291076A when using diffuser setting tool

The “PUMP ENG Shimless Diffuser” is designed to make the ultimate assembly of this component simple and uncomplicated.

- 1) When fitting the “Shimless Diffuser”, washers and shims (items 12 & 101) should NOT be used anywhere in the entire wet end assembly. The only shims required in the wet end assembly are those needed to set the back face running clearance of both the upper and lower impellers.
- 2) Having set the running clearance between the upper impeller and oil housing it is a simple operation to slide the shimless diffuser on to the adjusting studs (item 86a) Ensure the adjusting nuts (item 76B) are backed off. The next stage involves tightening six of the diffuser nuts (item 96) until they just touch the diffuser adjusting nuts (item 76B)
- 3) Position the Diffuser setting tool onto four (4) of the adjusting studs (item 86a). Tighten down four nuts (item 96) evenly so that the setting tool is pulled down square onto the underside of the diffuser.
- 4) Position the Diffuser until the rotation of the Impeller becomes locked. This can be achieved by tightening down the four (4) adjusting studs (item 86) evenly whilst turning the Impeller shaft by hand. When you can no longer turn the shaft by hand then the setting is correct.
- 5) Screw the six (6) Diffuser adjusting nuts (item 76B) in a clockwise direction until they touch (and just nip) onto the oil housing hold down tabs.
- 6) The six locknuts (item 96) can now be positioned onto the heads of Diffuser adjusting nuts (item 76B) & locked into position. Two spanners may be required to prevent the Adjusting nut (item 76B) from moving whilst the locknut (item 96) is being nipped up tight.
- 7) Next remove the four (4) nuts & the setting tool from the pump. Check to ensure that the impeller turns freely & that Impeller to Diffuser clearances are correct. Minor adjustment can be made by screwing the Shimless diffuser nut (item 76B) in or out as required & then locking this nut into position with item 76B

Note: PumpEng can supply special adjusting spanners.

By using the Shimless Diffuser a very high pump efficiency can be obtained through setting extremely close clearances, (to achieve the same result with shims would be very time consuming and difficult).

The lower impeller, suction cover and suction strainer are fitted in the normal way excepting washers should not be used.

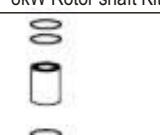
TIPS.

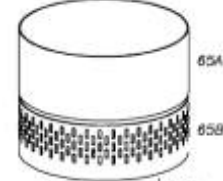
Always ensure that the threads of the adjusting bolt part no 08190076B have a liberal coating of nickel anti seize.

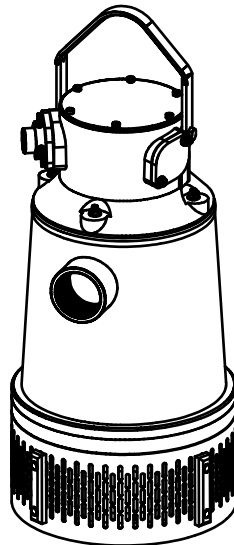
A speed wrench should only be use to run down the lock nuts and the ultimate adjustment and tension should be set with the 2 adjusting spanners.


Note: Australian patent number 2002950496 is applicable to Shimless diffuser p/n 08291076A


Enhanced performance part numbers

ACCESSORIES		
PART NO.	DESCRIPTION	CONSISTS OF:
08SK	8kW Rotor shaft Kit	Item #62C - O-Rings Item #62B - Sleeve Item #62D - Circlip
		

ACCESSORIES		
PART NO.	DESCRIPTION	CONSISTS OF:
08BSK	8kW Bottom Suction Kit	Item #65A - Btm Suction Strainer Item #65B - Half Strainer Item #65C - Bolt
		



ACCESSORIES		
PART NO.	DESCRIPTION	CONSISTS OF:
08RK	8kW Repair Kit	Item #2 - Seal Item #13 - Seal Item #103 - Circlip Item #122 - Bearing Item #123 - Bearing + 1x O-Ring Kit #080K
		

ACCESSORIES		
PART NO.	DESCRIPTION	CONSISTS OF:
080K	8kW O-Ring Kit	Item #33b - O-Ring Item #104 - O-Ring Item #105 - O-Ring Item #107 - O-Ring Item #111 - O-Ring Item #112 - O-Ring Item #113 - O-Ring Item #114 - O-Ring Item #115 - O-Ring
		

ENHANCED PERFORMANCE PARTS

ITEM NO.	PART NO.	DESCRIPTION	MATERIAL	QTY.	ITEM NO.	PART NO.	DESCRIPTION	MATERIAL	QTY.
1	08120001	Impeller Nut	S/Steel	1	71	08201071	Diffuser Disc	Poly	1
2	08128002	Mechanical Seal	TC	1	72	08130072	Screw Inspection	S/Steel	3
11	08120011	Shim Impeller 0.3mm	S/Steel	-	74	08200074	Stator 415V	-	1
11a	08120011A	Shim Impeller 1.5mm	S/Steel	-	74a	08200074A	Stator 1000V	-	1
12	08120012	Shim Diffuser 0.3mm	S/Steel	-	76	08291076	Diffuser	Alum/Poly	1
12a	08120012A	Shim Diffuser 1.5mm	S/Steel	-	76a	08291076A	Diffuser Shimless	Alum/Poly	1
13	08128002	Mechanical Seal	TC	1	76b	08291076B	Diffuser Adjusting Screw	Aluminium	6
21	08190021	Cable Entry Unit 14-22mm	Aluminium	1	82	08130082	Impeller Key	S/Steel	1
21a	08190021A	Junction Box Flange	Aluminium	1	84	08120084	Stud	S/Steel	4
21b	08190021B	Cable Flange Gasket	N.A.G	1	85	08120085	Stud	S/Steel	6
27	08120027	Sleeve Washer 14-16mm	S/Steel	2	86a	08120086A	Stud	S/Steel	6
27a	08120027A	Sleeve Washer 16-18mm	S/Steel	2	86b	08120086B	Stud	S/Steel	4
27b	08120027B	Sleeve Washer 18-20mm	S/Steel	2	87	08120087	Screw	S/Steel	2
27c	08120027C	Sleeve Washer 20-22mm	S/Steel	2	88	08120088	Screw	S/Steel	2
31	08102031	Seal Sleeve 14-16mm	Rubber	1	89	08120089	Screw	S/Steel	11
31a	08102031A	Seal Sleeve 16-18mm	Rubber	1	90	08120090	Screw	S/Steel	4
31b	08102031B	Seal Sleeve 18-20mm	Rubber	1	91	08120091	Screw	S/Steel	1
31c	08102031C	Seal Sleeve 20-22mm	Rubber	1	93	08120093	Screw	S/Steel	4
33	08190033	Junction Box	Aluminium	1	95	08120095	Nut	S/Steel	48
33a	08190033A	Junction Box Cover	Aluminium	1	96	08120096	Nut	S/Steel	4
33b	08190033B	O-Ring Junction Box	NBR	1	97	08120097	Washer	S/Steel	1
34	08630034	Outer Casing	S/Steel	1	98	08120098	Washer	S/Steel	42
35	08630035	Stator Casing	Aluminium	1	101	08120101	Washer	S/Steel	4
36	08190036	Bearing Housing Lower	Aluminium	1	102	08120102	Washer Spring	HTS	1
41	08191041	Oil Housing	Alum/Poly	1	103	08120103	Circlip	NBR	3
43	0829143	Suction Cover HT	Alum/Poly	1	104	08100104	O-Ring	NBR	1
44	08190044	Bearing Housing Upper	Aluminium	1	105	08100105	O-Ring	NBR	1
45	08190045	Bearing Cover	Aluminium	1	107	08100107	O-Ring	NBR	1
56	08710056	Impeller Lower HT-Std	Cr27	1	111	08100111	O-Ring	NBR	1
56a	08710056A	Impeller Lower c/w Bush	Cr27	1	112	08100112	O-Ring	NBR	1
56b	08710056B	Impeller Lower Neck Bush	Cr16	1	113	08100113	O-Ring	NBR	1
57	08710057	Impeller Upper HT	Cr27	1	114	08100114	O-Ring	NBR	1
62	08100062	Rotor Standard	S/Steel	1	115	08100115	O-Ring	NBR	1
62a	08100062A	Rotor-Modified for Shaft Sleeve Option	S/Steel	1	117	08100117	Washer Bearing Support	S/Steel	1
62b	08100062B	Shaft Sleeve- Modified Rotor Shaft	S/Steel	1	122	08100122	Bearing Upper	-	1
62c	08100062C	O-Ring - suit Shaft Sleeve	NBR	1	123	08100123	Bearing Lower	-	1
62d	08100062D	Shaft Sleeve - Circlip	S/Steel	1	126	08100126	Earthing Plate	S/Steel	1
63	08102063	Lead Through	Rubber	1	131	08100131	Handle	Galv/St	1
65	08100065	Standard Strainer	Galv/St	1	139	GP2400139	Anode	Zinc	4
65a	08100065A	Bottom Suction Strainer	Galv/St	1	140	08600140	Carry Handle	Galv/St	1
65b	08100065B	Half Strainer	Galv/St	1	141	08120141	Screw	S/Steel	6
65c	08100065C	Bolt	Galv/St	3	142	08120142	Washer	S/Steel	6

This document is subject to change without notice

Raptor Motors

INSTALLATION INSTRUCTIONS FOR 3 PHASE SUBMERSIBLE MOTORS.

WARNING

CATASTROPHIC OR FATAL ELECTRIC SHOCK MAY RESULT FROM FAILURE TO CONNECT THE MOTOR CONTROL ENCLOSURE, METAL PLUMBING, AND ALL OTHER METAL NEAR THE MOTOR OR CABLE, TO THE POWER SUPPLY GROUND TERMINAL. TO REDUCE THE RISK OF ELECTRICAL SHOCK, DISCONNECT POWER BEFORE WORKING ON OR AROUND THE WATER SYSTEM.

THIS EQUIPMENT IS INTENDED FOR INSTALLATION BY TECHNICALLY QUALIFIED PERSONNEL. FAILURE TO INSTALL IN COMPLIANCE WITH NATIONAL AND LOCAL REGULATIONS, MAY RESULT IN ELECTRIC SHOCK OR FIRE HAZARD, UNSATISFACTORY PERFORMANCE, AND EQUIPMENT FAILURE. SUBMERSIBLE MOTOR INSTALLATION INFORMATION IS AVAILABLE FROM PUMP MANUFACTURERS AND DISTRIBUTORS.

HANDLING AND INITIAL CHECKS

1. Inspect the motor and cable for transport damage. Report any visible damage to the transport company and to your supplier immediately.
2. Do not lift the motor using the supply cable. Do not pull the supply cable. The supply cable needs to be protected at all times as a damaged cable may allow water into the individual conductors causing an Earth fault.
3. Check the motor nameplate data and ensure that it matches your purchase order and meets your requirements.
4. Motors are usually supplied with factory-installed oil in the Mechanical Seal chamber. Please check for any signs of oil leakage, and advise the supplier immediately if there appears to be any oil leakage.
5. On new installations and if the motor has not been used for a long period it must be "Meggered" at 1000V prior to operation. The Megger reading / Insulation Resistance should be at least 100 Mohms before operation and at least 50 Mohm when hot after running.
6. Verify that the motor Mechanical Seal chamber is full of oil to the fill plug level prior to installation. *(FAILURE TO ENSURE THAT THE SEAL CHAMBER IS FULL OF OIL PRIOR TO OPERATION WILL VOID ANY WARRANTY CLAIMS.)*

The oil chamber should only be filled to the level, as indicated in the specific pump model technical specs.) Ensure all filling plugs, drain plugs, cable connections, and mounting bolts are tight.

IF THERE IS A WARRANTY INSPECTION THE MOTOR MUST BE RETURNED TO THE ORIGINAL SUPPLIER, OR PUMPENG, WITH CABLES INTACT.

CHECK LIST PRIOR TO INSTALLATION

Please check the following:

1. Ambient Temperature of the water to be pumped and ensure that it is less than the temperature rating of the motor.
2. The PH of the water is between 6.5 and 8.
3. Maximum Chlorine content in water is less than 500 PPM.
4. Maximum Sulphuric Acid Iron content in the water is less than 15 PPM.
5. Maximum Fluorine content in the water is less than 0.8 PPM.
6. Maximum Sand content is less than 50 PPM.
7. The electrical control equipment includes suitable fast acting current overload protection, which is set to shut the motor down within 3 seconds under locked rotor current or starting current conditions.
8. The electrical control equipment includes suitable fuses or circuit breakers to disconnect the system if there is a fault.
9. Variation of the supply voltage and frequency combination is within 5% of the motor nameplate voltage and frequency.
10. Maximum voltage unbalance is less than 5%.
11. The cable sizes are calculated to ensure that the voltage at the motor is still within 2% of the motor nameplate voltage after allowing for volt drop at full load current.
12. Waterproof submersible type cables must be used with these motors.
13. The motor has been correctly selected to suit the pump, thrust load from the pump, electrical supply capacity, and water availability. The motor should be installed to be submerged at all times as this will ensure a long service life.
14. These motors may overheat if they are run continuously on full load while not submerged or whilst running on the snore.
15. Connection of the motor to an incorrect supply will void any warranty.
16. Protection against single phasing is strongly recommended. If the motor fails due to single phasing the warranty will be void.
17. Installation of Lighting Arrestors is also recommended to protect the control panel, motor cables, and the motor. Any failure due to lightening will not be covered by warranty.
18. Any cable joints must be done properly by technically competent technicians. They must be waterproof and give a good electrical connection with no significant volt drop.
19. Reduced voltage starting using Soft Starters, VVVF drives, Autotransformers, (or Star-Delta starters if the motor has been supplied with 6 leads out), can create additional problems for submersible motors. Please ensure compliance with the following points.
 - A. Correctly selected Overloads or Circuit Breakers are correctly installed and correctly set to protect the motor.
 - B. Suitable Short Circuit Protection is installed.

C. The starter will allow the motor to generate sufficient torque to start the pump and run it up to speed. (In general the torque is reduced by the square of the voltage a small reduction in voltage will lead to a large reduction in starting torque).

D. Timers are set to ensure that the motor has enough voltage for enough time to run the motor up to speed as quickly as possible, and also switch the motor over to full voltage as quickly as possible and prolonged running at reduced voltage will stress the motor windings.

COMMISSIONING and OPERATION

1. After energising the motor for the first time, ensure that the starting current drops to below the nameplate current within 5 seconds, which means that the motor has run up to full speed.
2. Check the starting reaction, flow rate and pressure from the pump to make sure the motor is running in the correct direction of rotation. Swapping any 2 of the 3 phase supply leads will change the direction of rotation.
3. While the motor is running for the first time check the water for sand. If sand appears continue to pump until the water clears. If the motor is switched off while the pump is still pumping sand this could accumulate in the pump and cause it to seize up.
4. During testing or checking rotation the number of starts and the time between starts needs to be

controlled. As a general rule the motor should be allowed 5 minutes to cool down between each start.

5. It is strongly recommended that the "Over Current" protection is set to trip at about 5% higher than the steady state current recorded when the motor/pump is commissioned. It is not recommended that the "Over Current" protection is set at just above Full Load Nameplate Current, as, in a lot of cases, this will not protect the motor if the current increases, especially if the motor is not fully loaded. We believe that the operator needs to know if the current starts to increase, so they can determine why.
6. All temperatures and all 3 phases of voltage and current and insulation levels should be recorded throughout the life of the installation and monitored and reviewed as a form of preventative maintenance.

MAINTENANCE

The ball bearings have been greased for life during assembly - there is no need for additional oil or greasing during the operating life of the motor and bearings. The motor cannot be accessed unless it is removed from the sump, so everything that can be monitored needs to be monitored on a regular basis, and any unexplained changes investigated.

1. The normal running current, and voltage on all 3 phases need to be recorded on a regular basis.
2. The motor winding and the cable insulation needs to be recorded on a

regular basis. If the cold insulation drops below 2 Megohms the installation needs to be carefully checked out so as to determine the cause of the low Megohm reading.

3. The output pressure and flow from the pump should also be monitored on a regular basis.

The overall performance of the pump and motor can be reviewed based on the information being recorded and this can be used to determine any need for maintenance or overhauling, which might be required

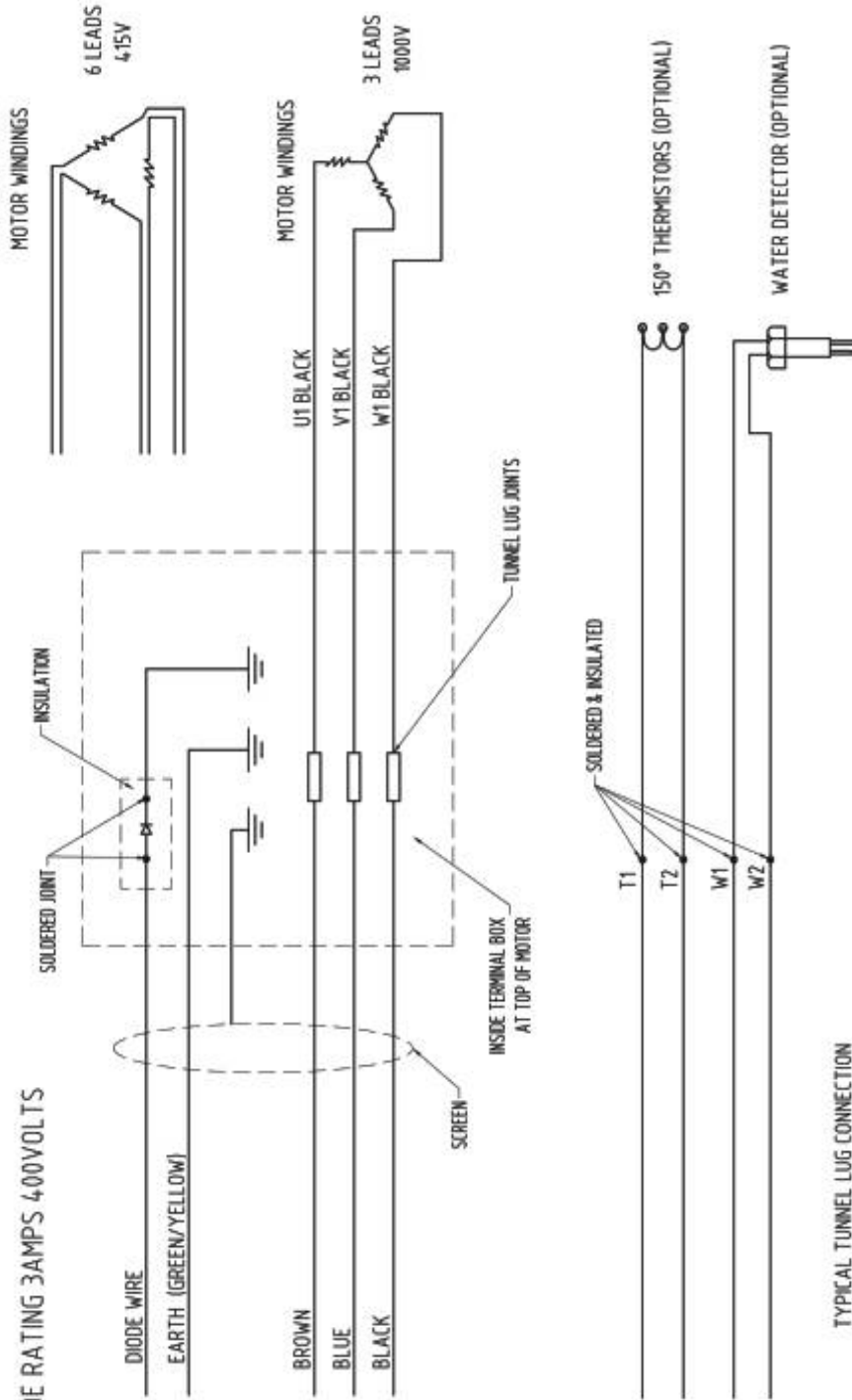
Raptor Motors - Connection arrangement

8-866-0214

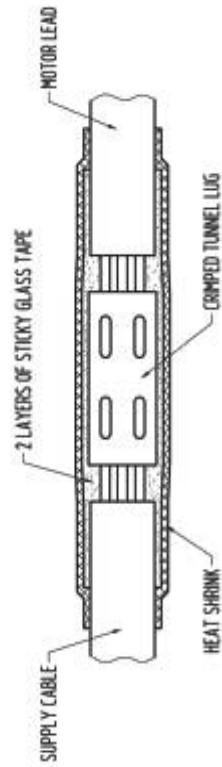
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DIODE RATING 3AMPS 400VOLTS



TYPICAL TUNNEL LUG CONNECTION



TYPE		CONNECTION ARRANGEMENT				MATERIAL
RAPTOR MOTORS		NAME	REVISION	WEIGHT	SCALE	
NO.	8-866-0214					PUMPENG
DESIGN BY		APPROVED BY	DATE	21/05/2005		
CHECKED BY						

8KW Raptor Torque List

Item #	Part #	Item	Description	Recmd Torque Nm
1	0812001	Impeller Nut	Special nut G1/2	70
72	08130072	Oil/Stator Inspection Screws	Special bolt 5/8 unc	20
87	08120087	Bearing Cover Bolt	1/4 unc x 13mm	8
89	08120089	Handle bolt	1/2 unc x 3/4	30
90	08120090	Diffuser Disk Bolts	1/4 uncx 13mm	8
91	08120091	Bearing Housing Upper Bolt	3/8 unc x 3/4	25
95	08120095	Cable Entry Nut	3/8 unc	Tighten until it bottoms out to metal
96	08120096	Suction Cover Nut	1/2 unc	60
	"	Diffuser Nut	1/2 unc	60
	"	Strainer Nut	1/2 unc	60
	"	Oil Housing Nut	1/2 unc	60
	"	Stator Housing Nut	1/2 unc	60
	"	Outer Casing Nut	1/2 unc	60
	"	Lid Nut	1/2 unc	60
141	08120141	Top Cover Bolt	3/8 unc x 3/4	10



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