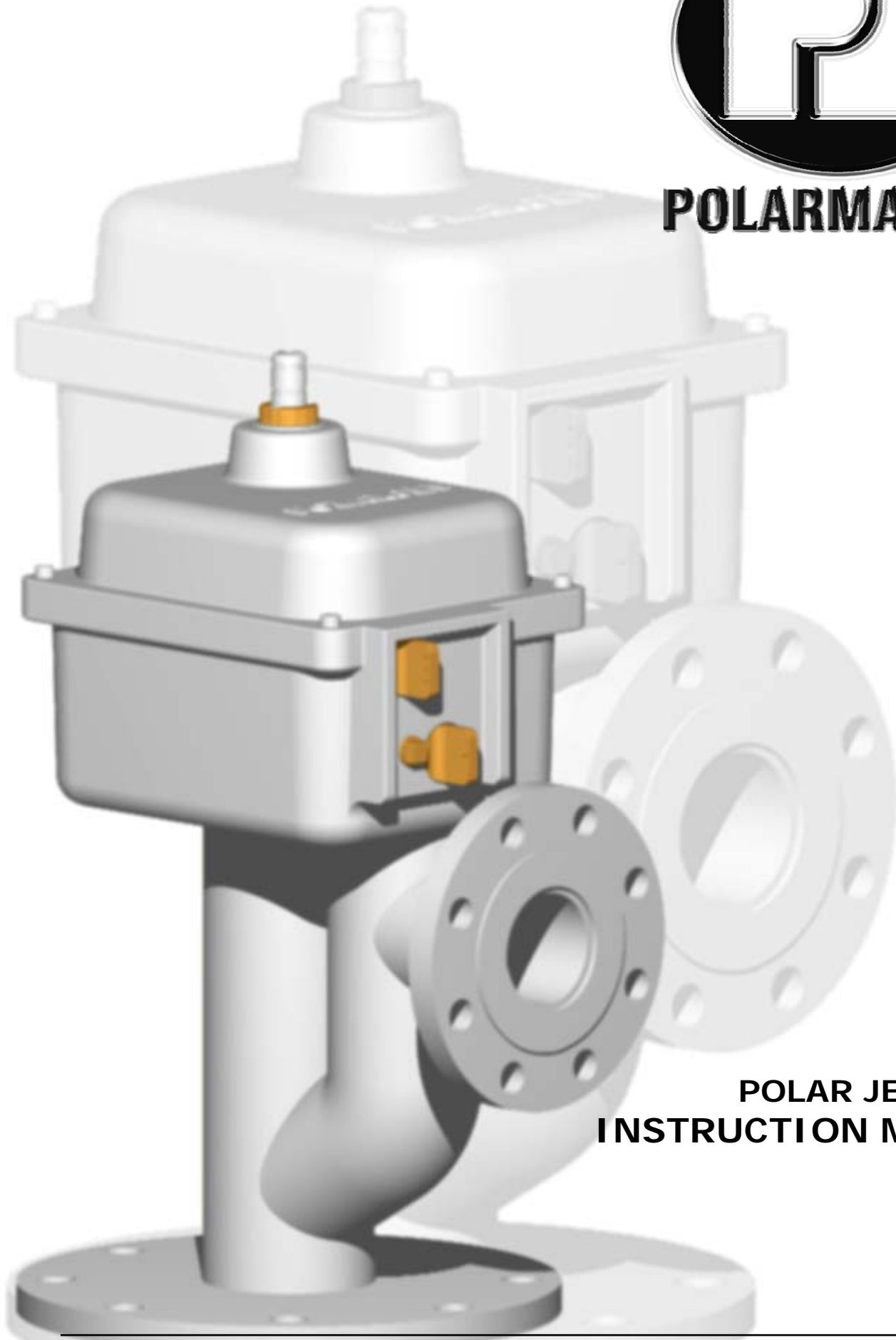




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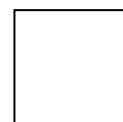


**POLAR JET® PJ 30
INSTRUCTION MANUAL**

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POLAR JET® PJ 30

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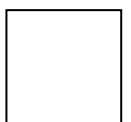


MAKE SURE THAT THE INSTRUCTIONS HAVE BEEN READ AND UNDERSTOOD BY THE PEOPLE WORKING AND OPERATING THIS EQUIPMENT.

FOR PRODUCTION LIABILITY AND SAFETY REASONS ANY MODIFICATION TO THE EQUIPMENT WHICH CAN AFFECT THE UNITS PRODUCT LIABILITY MUST BE AGREED ON BY POLARMARINE.

ALL LOCALLY LEGISLATED SAFETY RULES WITH REGARDS TO INSTALLATION, OPERATION AND MAINTENANCE SHALL BE RESPECTED AT ALL TIMES.

WHEN VISUALLY CHECKING THE JET OR JETS BE SURE TO DO THIS IN A SAFE MANNER.

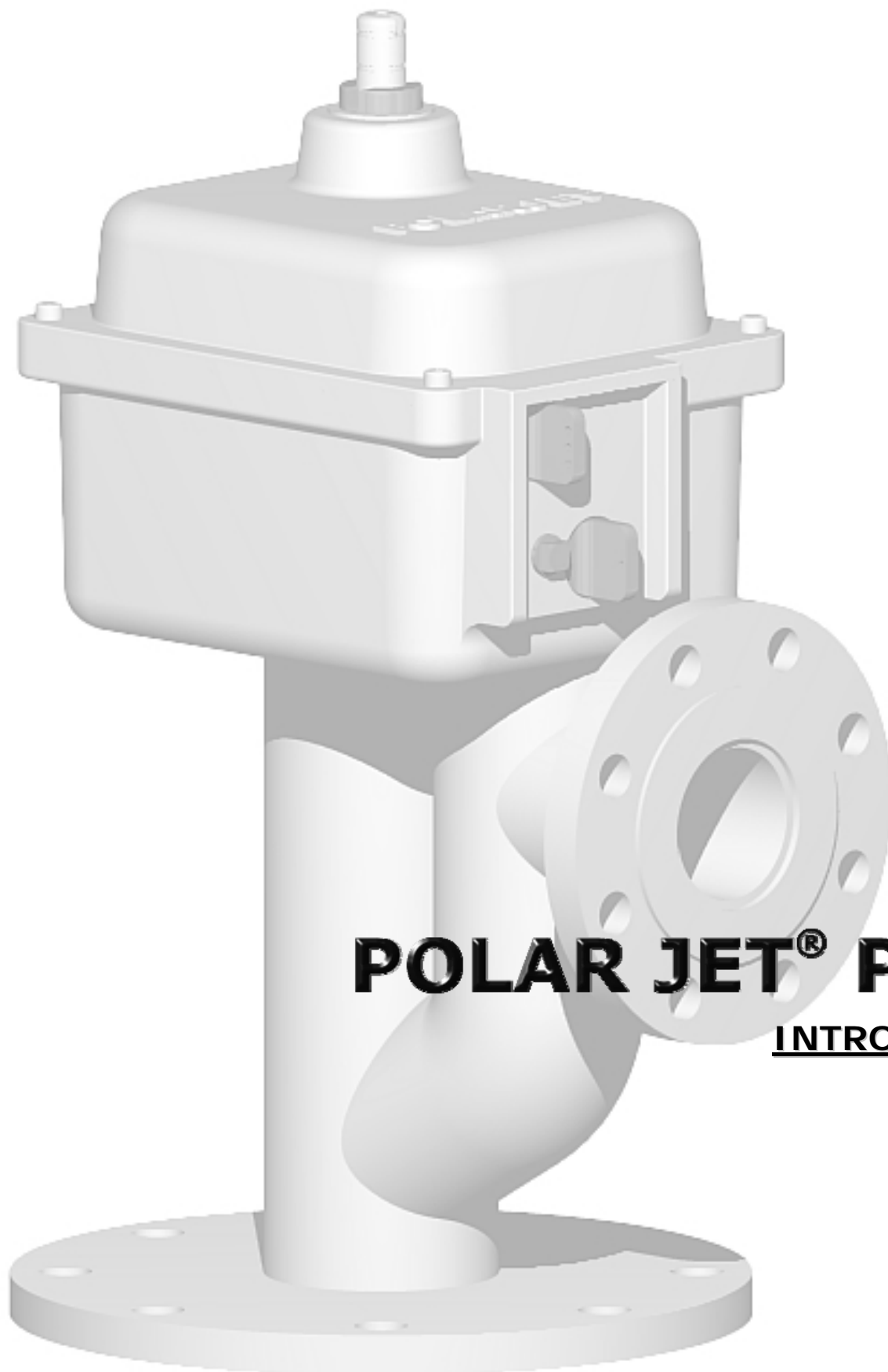




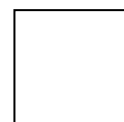
POLARMARINE



INSTRUCTION MANUAL
PJ 30



POLAR JET® PJ 30
INTRODUCTION



PM-ENSD-06



POLAR JET[®] PJ 30

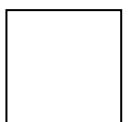
The Polar Jet[®] PJ 30 is a fully programmable, single nozzle Tank Cleaning machine equipped with pitch and speed control.

Nozzle movement is fully controlled by the integrated turbine driven control unit, which controls both the vertical pitch and rotation speed.

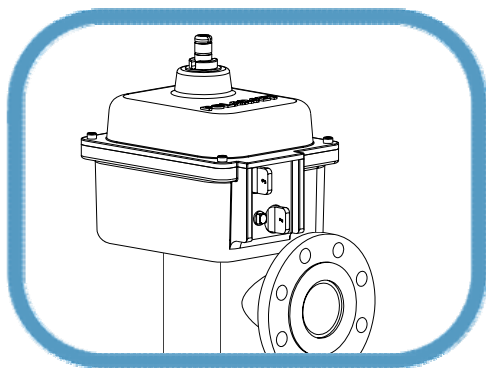
Nozzle movement is, in principle, a controlled rotation in the horizontal plane, combined with a slow, controlled vertical movement. This means that the nozzle performs helical patterns.

The PJ 30 comes with operator-friendly controls to set both vertical Pitch and rotation Speed. There are two Speed Settings and three Pitch Settings of approximately 1.5, 3 and 7 degrees providing six basic programs.

Angle adjustment allows pre-setting of the Pitch at the start of either the upward or downward cycle for optimal cleaning of specific areas such as bottom only or side only cleaning requirements.

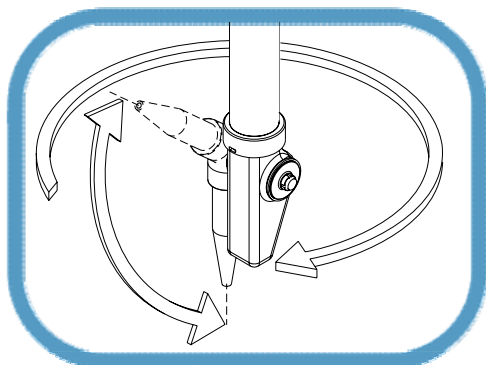


POLAR JET[®] PJ 30



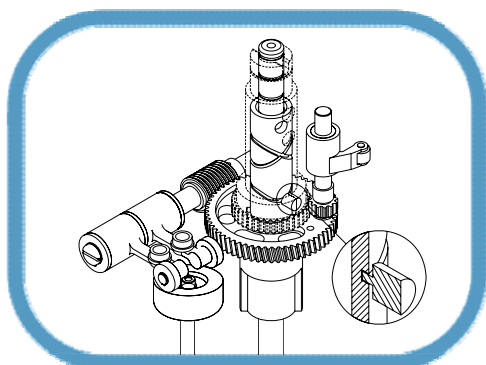
With a controllable pitch and a two-step speed control for the rotation speed.

The rotation speed can be set in two steps, full speed or about 50%-65% of full speed.

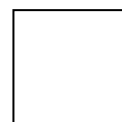


The nozzle is rotating in the horizontal Plane combined with a slow vertical movement.

The nozzle performs a helical criss-cross pattern.

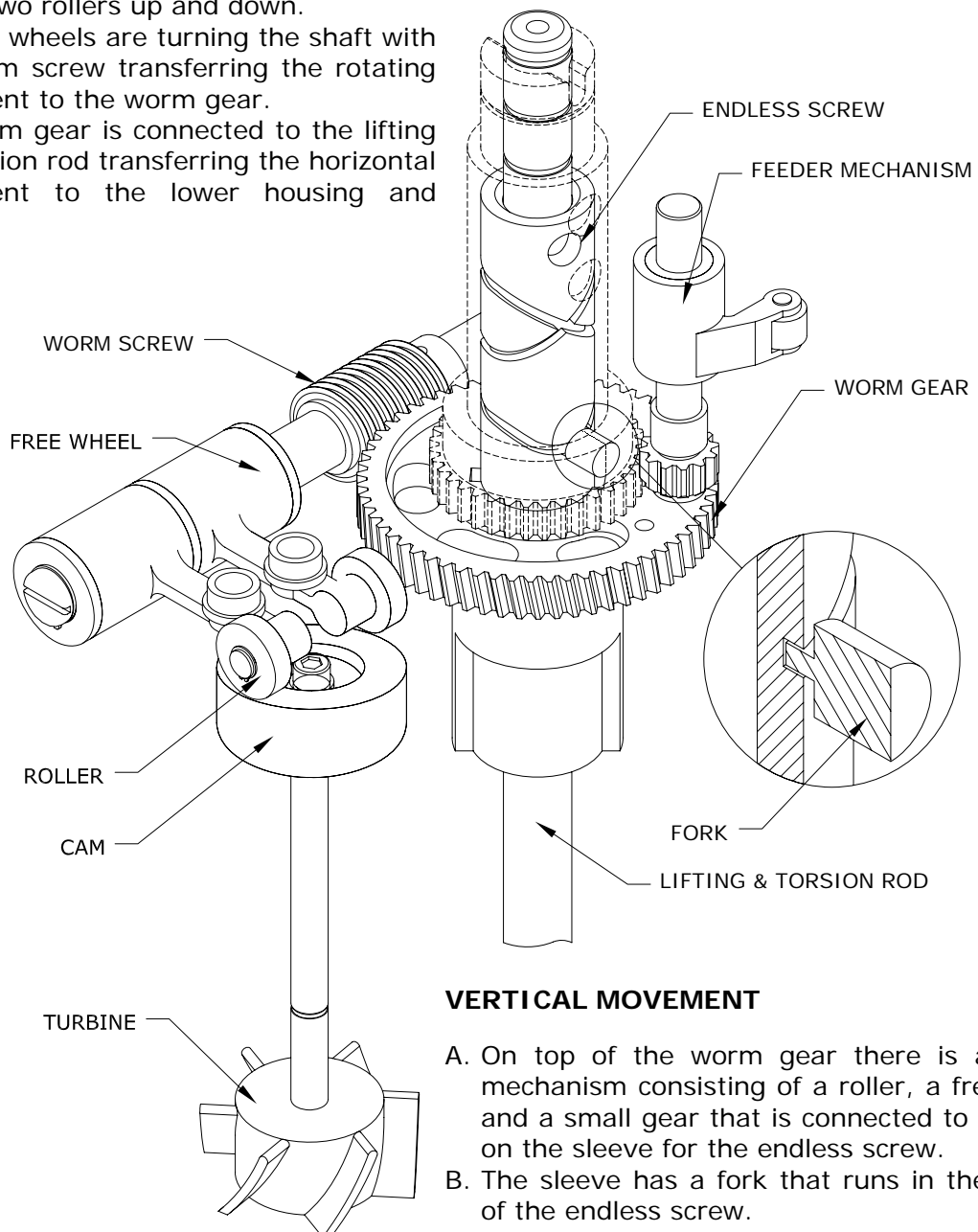


Vertical movement can be adjusted in 3 different steps using standard settings of 1.5°, 3° and 7°.



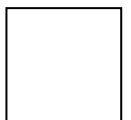
HORIZONTAL MOVEMENT

- The cleaning agent drives the turbine.
- On the turbine shaft there is a cam that moves two rollers up and down.
- The free wheels are turning the shaft with the worm screw transferring the rotating movement to the worm gear.
- The worm gear is connected to the lifting and torsion rod transferring the horizontal movement to the lower housing and nozzle.



VERTICAL MOVEMENT

- On top of the worm gear there is a feeder mechanism consisting of a roller, a free wheel and a small gear that is connected to the gear on the sleeve for the endless screw.
- The sleeve has a fork that runs in the groove of the endless screw.
- For each revolution of the worm gear the feeder mechanism will turn the sleeve a little with the result that the endless screw will move in the vertical direction.
- The endless screw is connected to the lifting and torsion rod transferring the vertical movement to the nozzle.



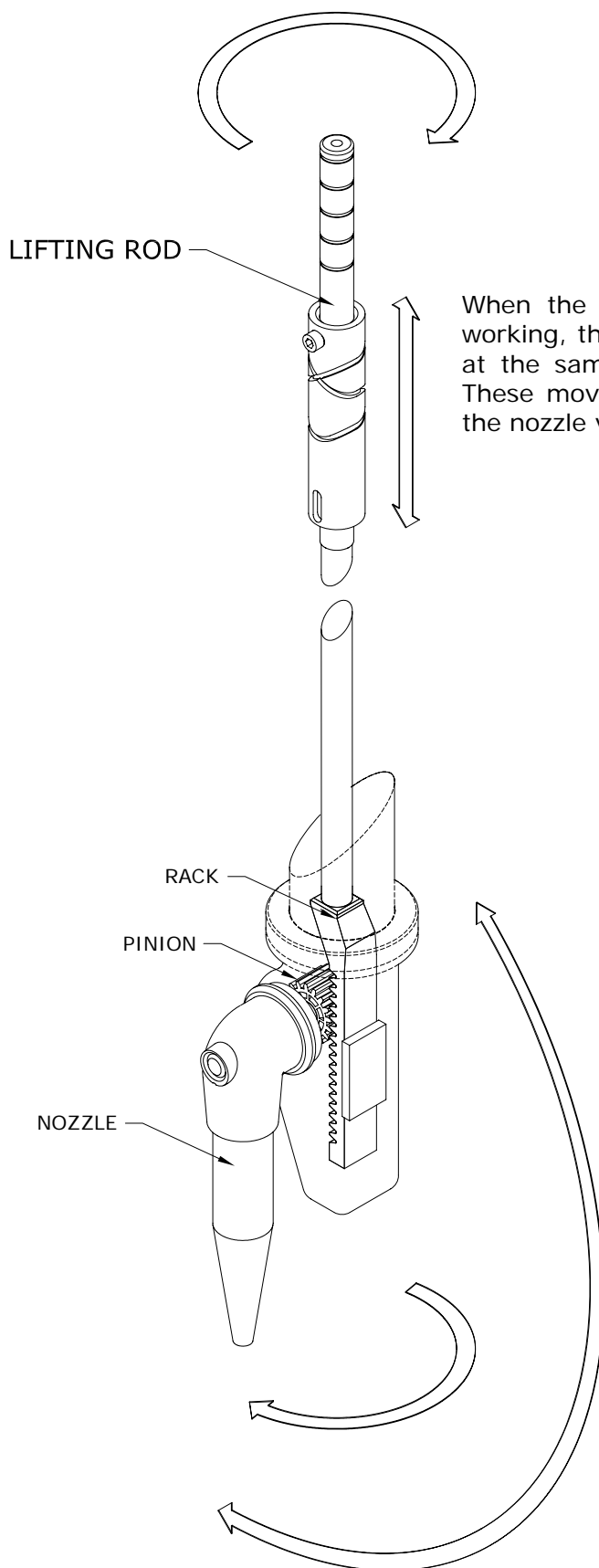


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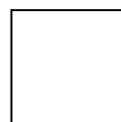


FUNCTION OF WASHING UNIT

PJ 30



When the tank cleaning machine is working, the lifting rod is turning and at the same time moving vertically. These movements are transferred to the nozzle via the rack and pinion.



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INSTRUCTION MANUAL
PJ 30

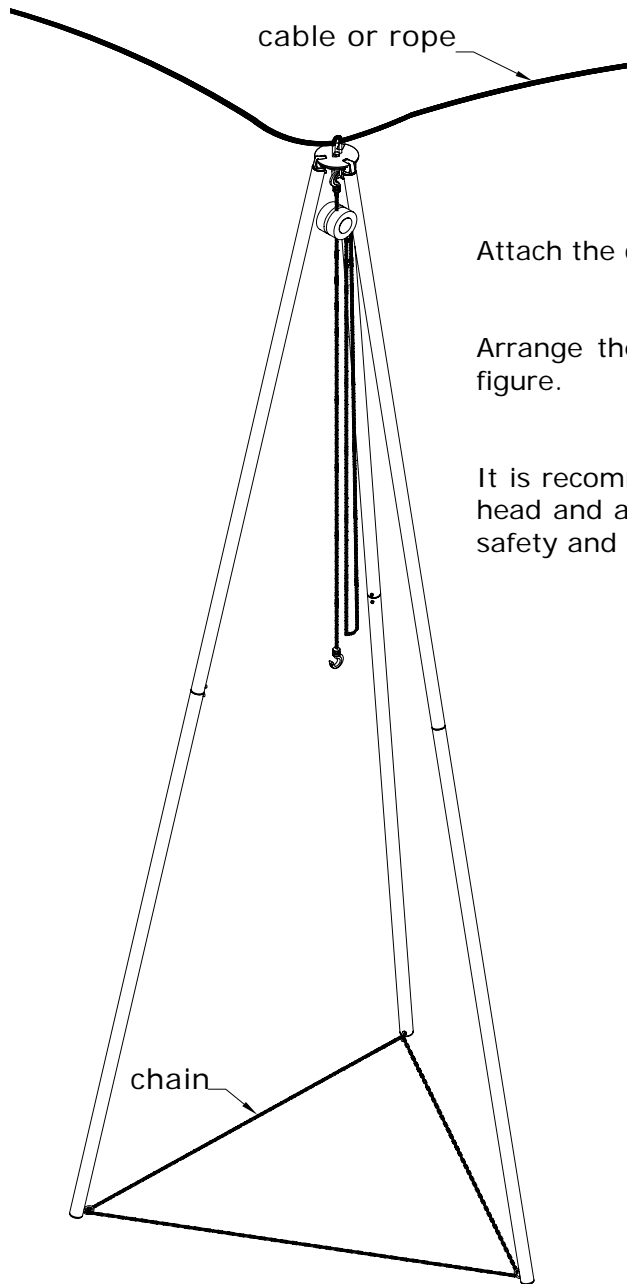


POLAR JET® PJ 30

OPERATING INSTRUCTIONS



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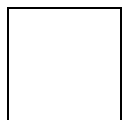


Attach the chain before setting-up the tripod.

Arrange the tripod's legs into position as shown in the figure.

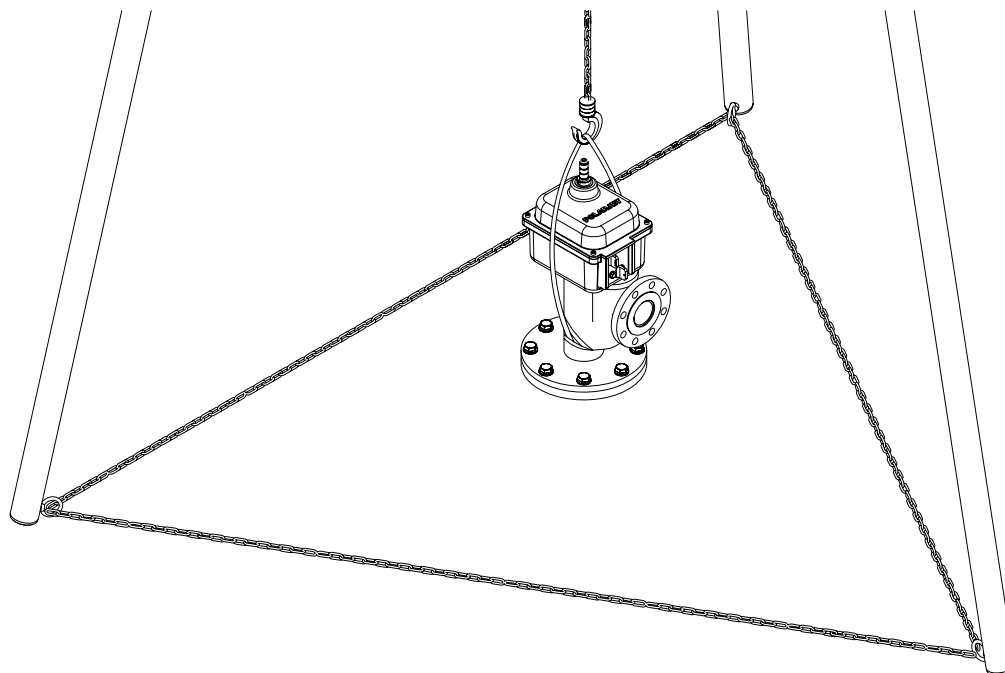
It is recommended to tie a cable or rope on the tripod's head and attaches it in a crane or in the upper deck for safety and to prevent the tripod to tip-over.

The tripod is designed for lifting tank cleaning machines.
Do not use other than to its designed purpose.



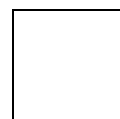
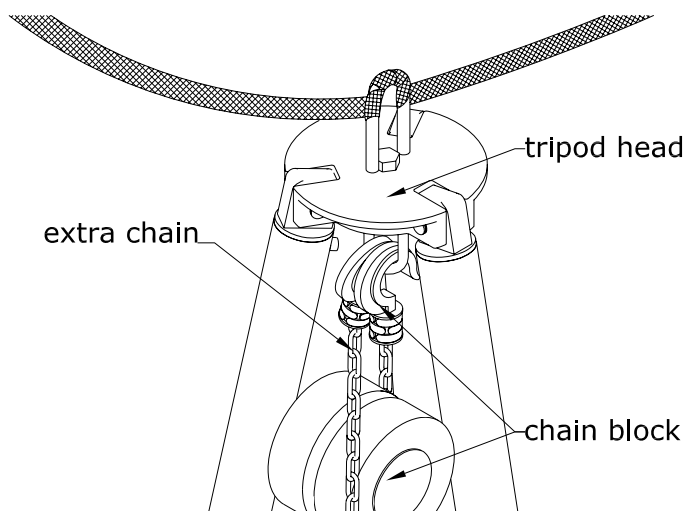
To uninstall the machine from the upper deck using the tripod

1. Lower down the chain block. Then securely tie a cable or rope around the body of the inlet housing. Hook the cable or rope on the chain block and gradually lift the machine. Support the machine not to sway to prevent it from damage.



Note:

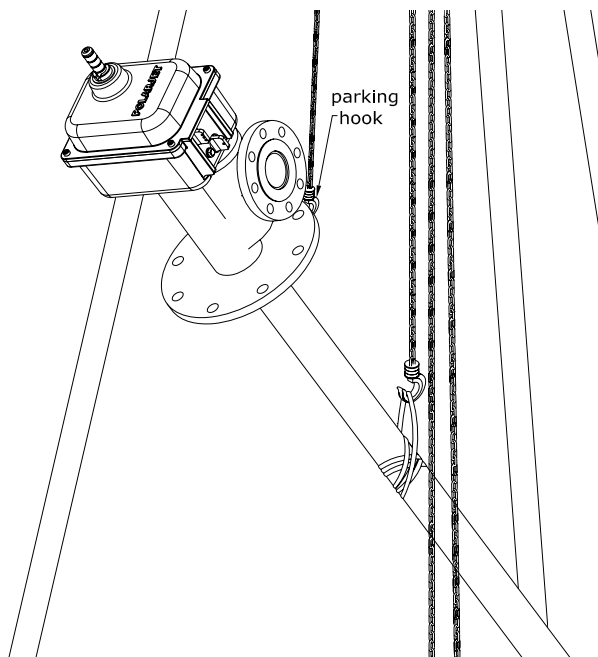
Beforehand, attach extra chain or such similar devices on the tripod's head. This should add support to the machine when being lifted.



2. When the tank cleaning machine is being pulled-out from the deck-opening, hold the machine on the deck flange using the extra chain with a parking hook on its end (as shown in the figure).

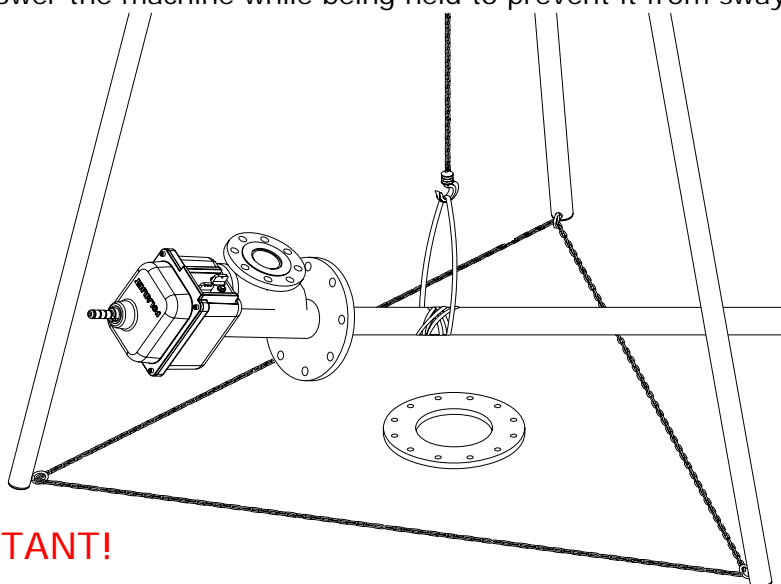
Next, untie the cable or rope from the inlet housing.

Then, tie the cable or rope on the main pipe and hang it on the chain block.



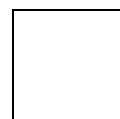
3. When the machine is securely hanged, detach the parking hook.

Then, gradually lower the machine while being held to prevent it from swaying.



IMPORTANT!

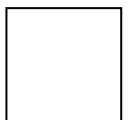
Do not lift the machine when the nozzle is not on 0° or 180° angle position.



IMPORTANT NOTE FOR INSTALLATION

After ships connection, it is common to find small pieces of debris such as cloth and other materials in the piping system. During first start up, these can become trapped in the PJ 30 nozzle or turbine.

Before installation of the machine, flash out debris out of the piping system to avoid obstruction.





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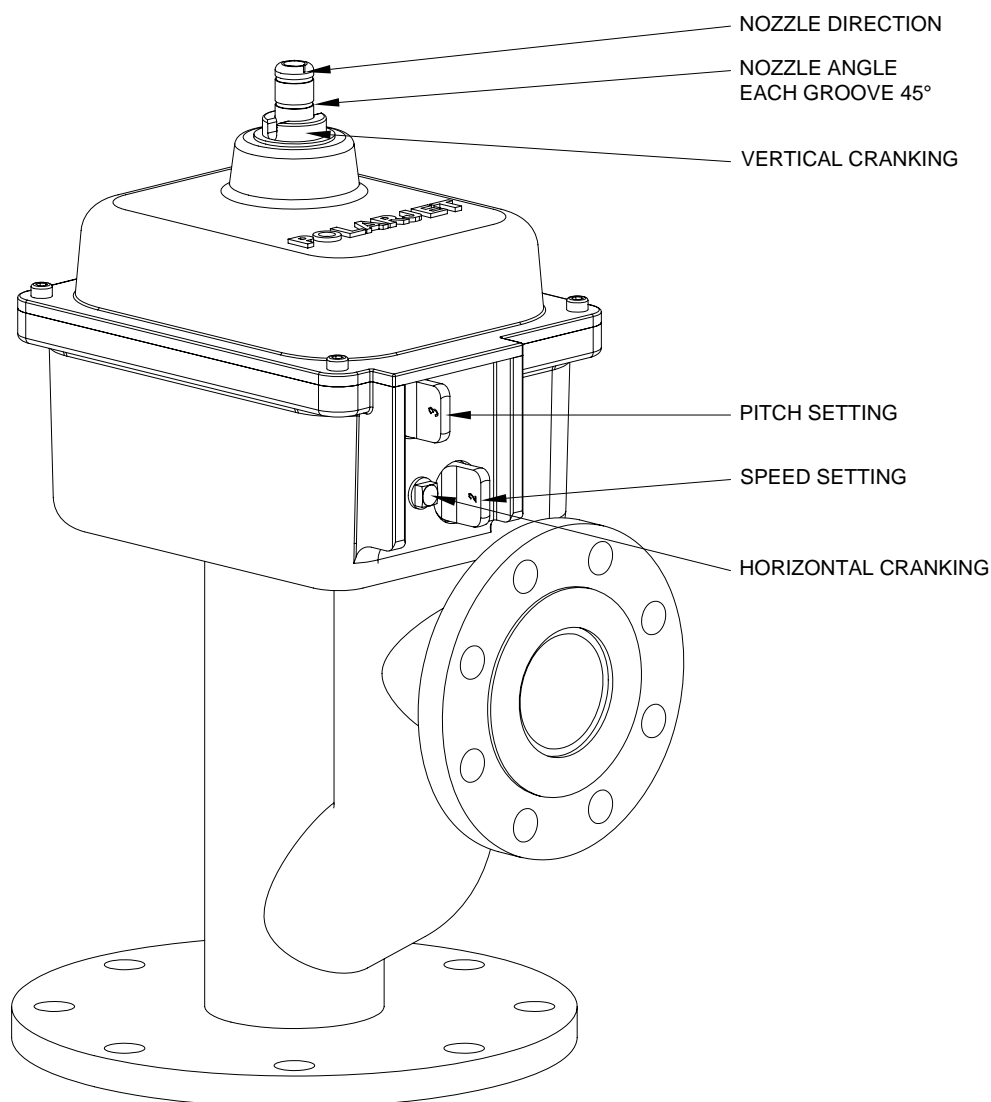


OPERATING INSTRUCTIONS

PJ 30

The Control Unit has a control panel with:

- a turning knob for pitch setting
- a turning knob for speed setting
- a nozzle indicator for vertical and horizontal

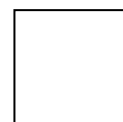


Pitch settings:

1. Fine pitch turning knob to left.
2. Medium pitch turning knob middle position.
3. Pre-wash turning knob to right position.

Speed settings:

1. Slow speed turning knob to left.
2. Faster speed turning knob to right.



PM-ENSD-06

The control unit has a panel with:

- one pitch setting knob
- one speed setting knob
- on top there is hand cranking sleeve for vertical movement
- on top there is a nozzle angle indicator
- for horizontal movement remove the plug and use a screwdriver on the drive shaft.

KNOB	POSITION	SETTING
PITCH KNOB	POSITION 1	FINE PATTERN
SPEED KNOB	POSITION 1	SLOW ROTATION
PITCH KNOB	POSITION 1	FINE PATTERN
SPEED KNOB	POSITION 2	FAST ROTATION
PITCH KNOB	POSITION 2	NORMAL PATTERN
SPEED KNOB	POSITION 1	SLOW ROTATION
PITCH KNOB	POSITION 2	NORMAL PATTERN
SPEED KNOB	POSITION 2	FAST ROTATION
PITCH KNOB	POSITION 3	PRE-WASH
SPEED KNOB	POSITION 1	SLOW ROTATION
PITCH KNOB	POSITION 3	PRE-WASH
PITCH KNOB	POSITION 2	FAST ROTATION

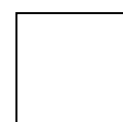
The nozzle is traveling clockwise.

The bottom position is when nozzle is pointing straight downwards at 0°.

The top position is when nozzle is pointing straight upwards at 180°.

When the nozzle has traveled 360 degrees one full cycle is completed.

Slowly open the supply valve and the machine starts to work. It will continue to work as long as there is enough pressure on the supply line.



The nozzle angle can be preset by hand cranking on the top sleeve.

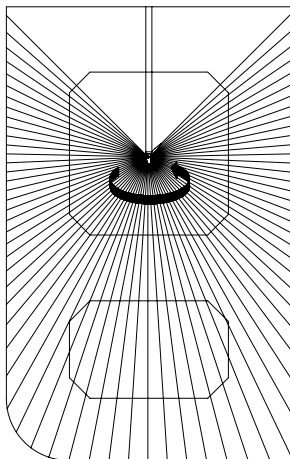


figure 1

AVERAGE CLEANING 1

(figure 1)

Set pitch knob on position 2.
Set speed knob on position 2.
Set nozzle to about 135° going downward.
Stop when nozzle is about 135° going upward.

Cleaning pattern: one side, two bottom, and one side cleaning.

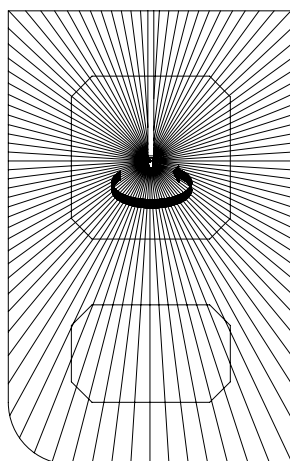


figure 2

AVERAGE CLEANING 2

(figure 2)

Set pitch knob on position 2.
Set speed knob on position 2.
Set nozzle to about 180°.
Stop when the nozzle is back to 180°.

Cleaning pattern: one under deck, one side two bottom, one side and one under cleaning.

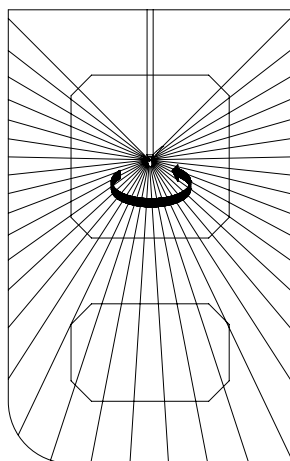


figure 3

LIGHT CLEANING 1

(figure 3)

Set pitch knob on position 2.
Set speed knob on position 2.
Set nozzle to about 135° going downward.
Stop when the nozzle reaches 0°.

Cleaning pattern: one side and one bottom cleaning.



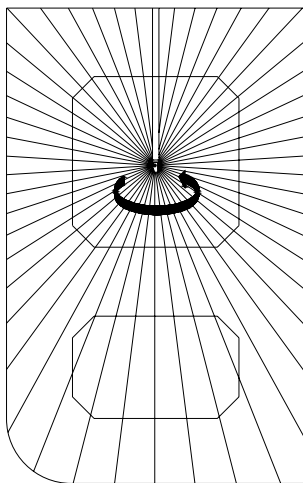


figure 4

LIGHT CLEANING 2

(figure 4)

Set pitch knob on position 2.
Set speed knob on position 2.
Set nozzle to about 180° going downward.
Stop when nozzle is at 0°.

Cleaning pattern: one deck, one side and one bottom cleaning.

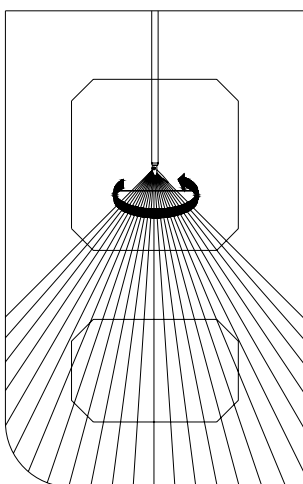


figure 5

BOTTOM CLEANING

(figure 5)

Set pitch knob on position 2.
Set speed knob on position 2.
Set nozzle at 45° going downward.
Stop when the nozzle is about 45° going upward.

Cleaning pattern: two bottom cleaning (repeat if necessary)

HEAVY CLEANING

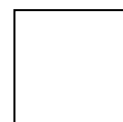
Set pitch knob on position 1.
Set speed knob on position 1.
Choose one of the nozzle settings.
Repeat the cycle until the tank is clean.

PRE-WASH

Set pitch knob on position 3.
Set speed knob on position 2.
Set nozzle to about 180°.
Stop when nozzle is in bottom position or earlier.



Always open the supply valve slowly to avoid liquid shock.





THIS SLOT INDICATES THE
HORIZONTAL NOZZLE POSITION

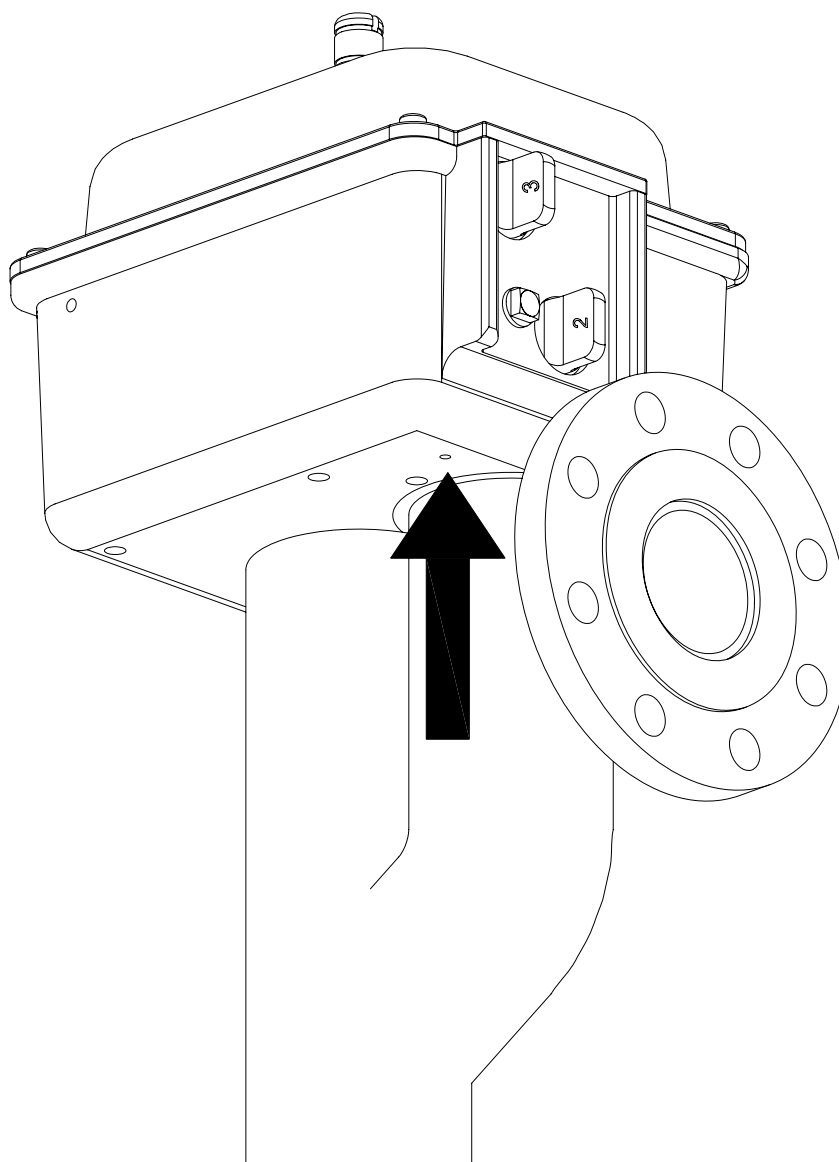


THIS GROOVE INDICATES THE
VERTICAL NOZZLE POSITION
(EACH GROOVE IS 45°)

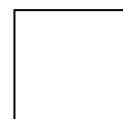


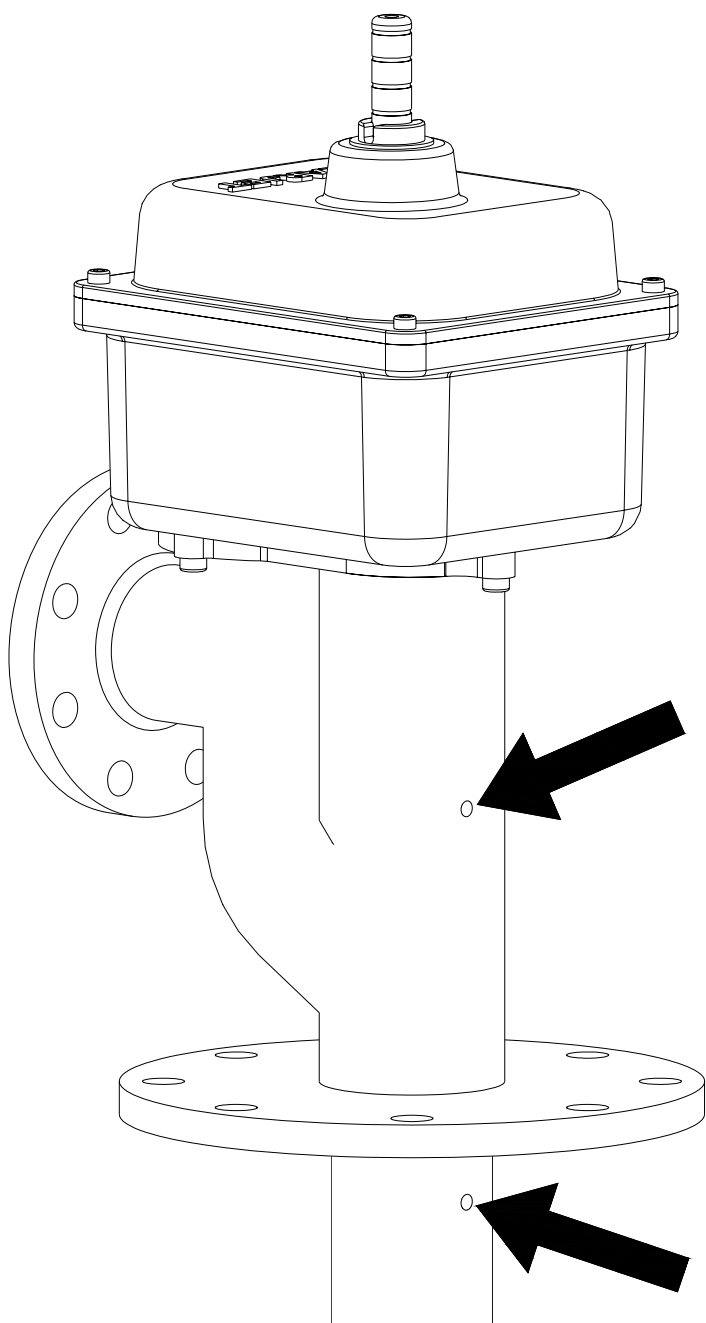
1. Start the Machine.
2. When the nozzle is in the desired Horizontal Position, adjust the Speed Setting to Stop Position (as shown on the drawing).
3. Crank the nozzle into desired Vertical position





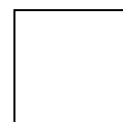
There are 2 drain holes at the bottom of the control unit. These 2 holes will drain rain and sea water that get inside through speed knobs and drive sleeve. It is also possible to see if the mechanical seal at the turbine is leaking, since the leakage from the seal will come out from these 2 drain holes.





There is 1 drain hole at the front of the inlet housing. This hole will drain rain and sea water from the drive sleeve. It is also possible to see if the lifting rod or mechanical seal is leaking, since the leaking from the seal will come out from this hole.

There is 1 drain hole on the upper part of the main pipe about 23mm below the deck flange to equalize the internal and external pressure on the main pipe. This is to minimize the pressure on the mechanical seal when the machine is not in use.



Cleaning time is dependent on settings, capacity and pressure. The PJ 30 has a range from 17 up to 60 m³/h.

The machine should operate on its working pressure of ____Bar, if the machine is operated on higher pressure then, the machine will over rev.

Due to the design of the nozzle, the figures below are approximate and based on a capacity of 30 to 60 m³/h at 8 to 10 BAR.

TIME CALCULATION GUIDE

PITCH	RPM	CLEANING TIME (in minutes)				
		0°-45° range	0°-90° range	0°-135° range	0°-180° range	0°-180°-0° range
1.5°	1	30	60	90	120	240
	1.5	20	40	60	80	160
	2	15	30	45	60	120
	2.5	12	24	36	48	96
	3	10	20	30	40	80
3°	1	15	30	45	60	120
	1.5	10	20	30	40	80
	2	7.5	15	23	30	60
	2.5	6	12	18	24	48
	3	5	10	15	20	40
7°	1	6	13	19	26	51
	1.5	4	8.5	13	17	34
	2	3	6.5	10	13	26
	2.5	2.5	5	8	10	21
	3	2	4	6	9	17

RPM depends on the pressure and capacity has to be observed and timed during machine operation.

TYPES:

- NORMAL CLEANING - Set pitch on 2 (1.5°) and speed on 2. Start with the nozzle at 180°.
- PRE-WASH - Set pitch on 3 (3°) and speed on 2. Start with the nozzle at 180°.
- EXTRA FINE CLEANING - Set pitch on 1 (7°) and speed on 2 or 1.

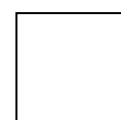
TO CALCULATE THE CLEANING TIME IN MINUTES:

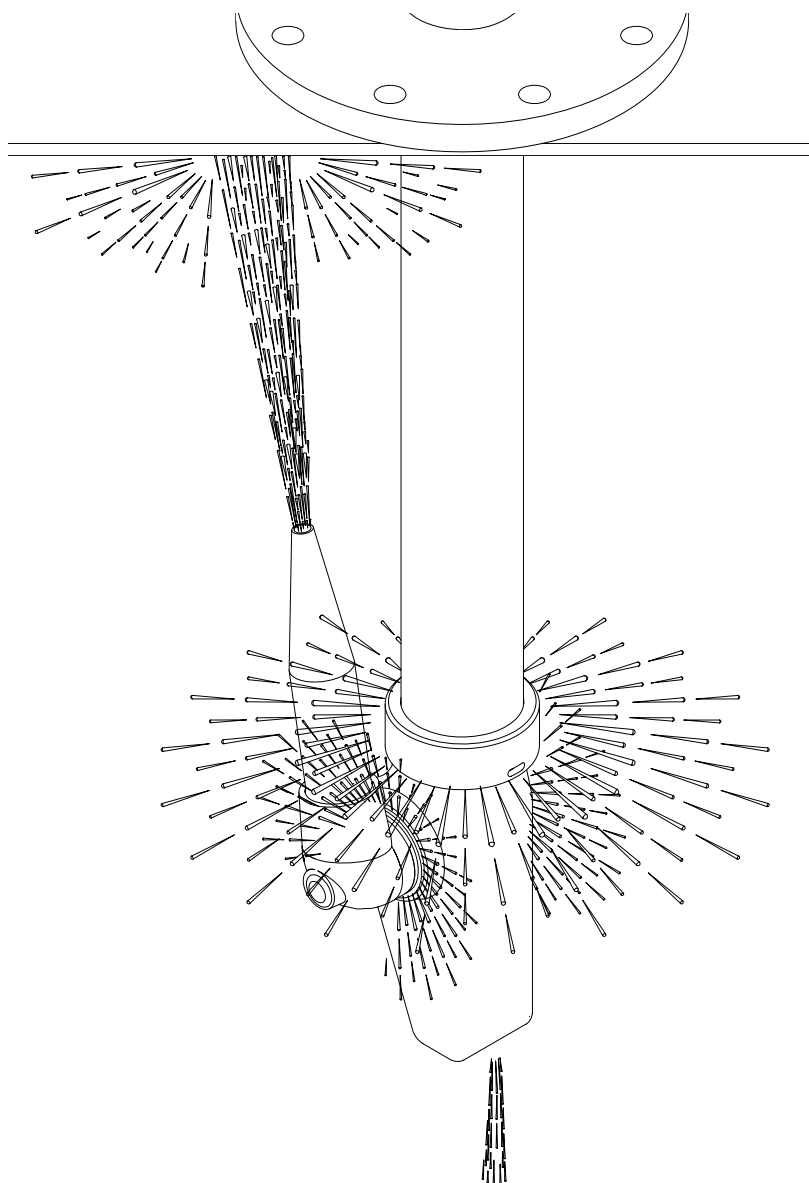
$$\text{CLEANING TIME (minutes)} = \frac{\text{NOZZLE ANGLE (degree)} / \text{PITCH (degree/revolution)}}{\text{NOZZLE REVOLUTION (revolution/minute)}}$$



The starting vertical angle can be preset by hand cranking. The position is indicated on the top torsion and lifting spindle that is marked 0°, 45°, 90°, 135° and 180°. Each groove is 45°.

To minimize the cleaning time, it is recommended to keep records of cleaning program and results.

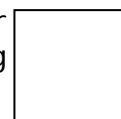




IMPORTANT

The nozzle will be positioned between 170 to 180 deg at top position due to the design of the machine. The water jet will clean to 180 deg because the nozzle is relatively close to tank top and rotates a few turn with very small pitch.

During operation the bearings of the lower assembly are rinsed and lubricated by the cleaning agent. It is only due to the umbrella effect that it can appear excessive – but it will not exceed 3% of the total capacity of the tank cleaning machine.



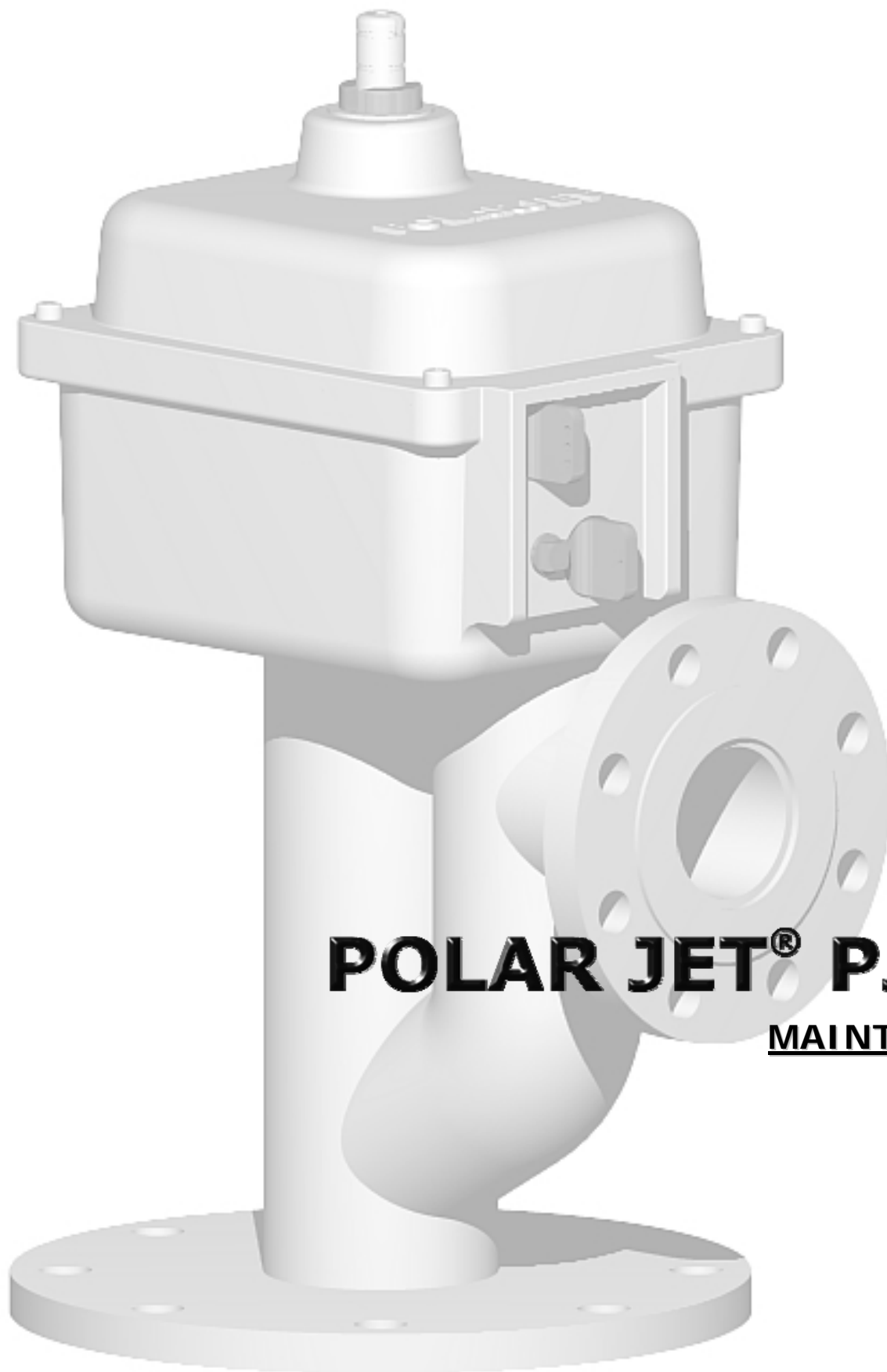
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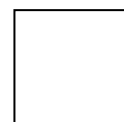
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INSTRUCTION MANUAL
PJ 30



POLAR JET® PJ 30
MAINTENANCE



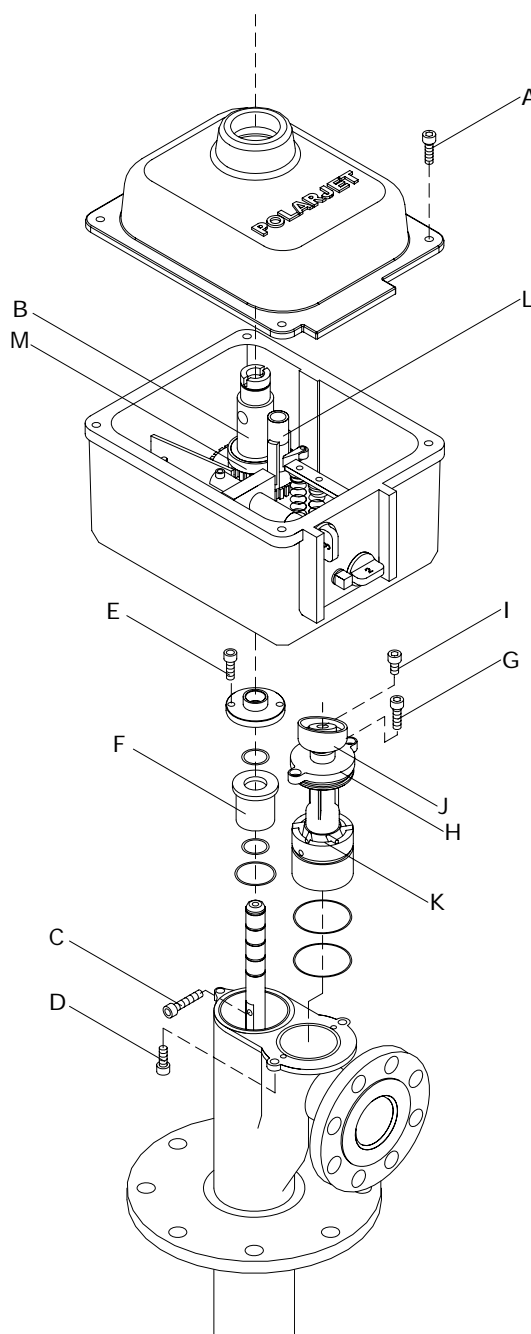
PM-ENSD-06

Once a year

Open the control unit, clean the internals and lubricate the drive sleeve, gears, free wheels and all moving parts with the recommended grease. Check that the two drain holes in the bottom are open. At the same time do a common survey of the internals. When putting back the cover use a silicon compound as gasket.

Changing of Lifting Rod Sealing

1. Loosen the four Screws (A) on the top cover and lift it off.
2. Turn the Drive Sleeve (B) until the Screw (C) can be loosened through the hole on the turning sleeve.
3. Loosen the three Screws (D) under the Control Unit and lift it off.
4. Loosen the two Screws (E) on the Gland and pull out the Bushing (F).
5. Change the O-Rings and assemble the unit.

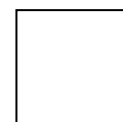


Overhauling of the Turbine Unit

1. Repeat steps 1-3 of "Changing of Lifting Rod Sealing".
2. Loosen the two Screws (G) that keep the turbine in position.
3. Pull out the Turbine unit (H) and loosen the Screw (I), remove the Cam (J) and the pin under the cam.
4. Pull out the Turbine (K) with shaft.
5. Change the Mechanical Seal and O-Rings.

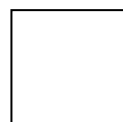
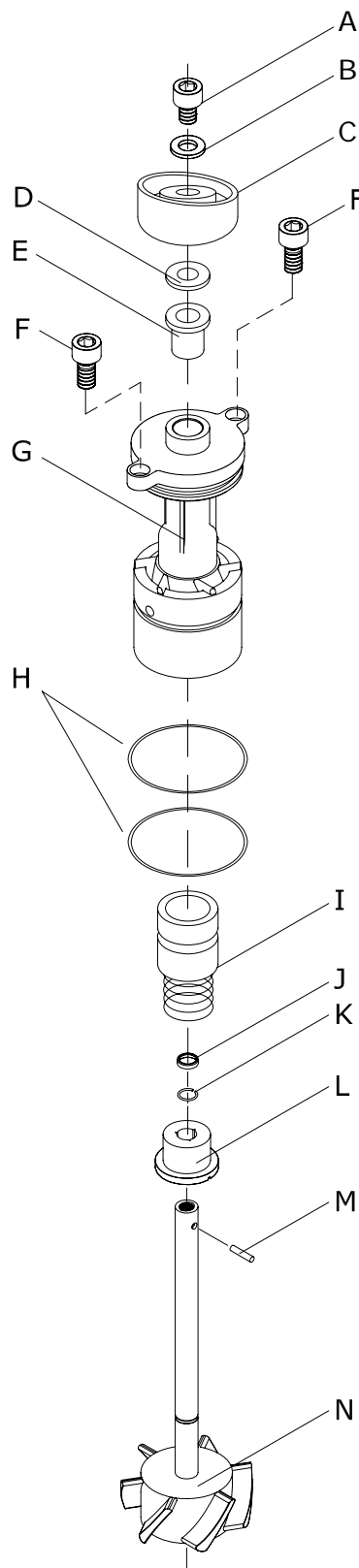
Changing of Fork and Endless Screw

1. Repeat steps 1-3 of "Changing of Lifting Rod Sealing".
2. Loosen the two screws on the Feeder Arm Support (L) and lift out the Feeder Arm Support.
3. Pull out the Drive Sleeve (B).
4. Slide off the Sleeve (M) on the Drive Sleeve and pull out the Fork and the Endless Screw.



CHANGING OF MECHANICAL SEAL PJ 30

1. Loosen the two Screws (F).
2. Pull out the Turbine unit, sometimes the lower O-ring (H) jams.
3. Loosen the Screw (A) and pull off the Cam (C).
4. Pull out the Pin (M).
5. Pull out the Turbine (N) with Shaft and Turbine Bearing (L).
6. Use a screw driver to push out the ceramic with rubber.
7. Before putting back the new ceramic put some oil or grease on the rubber that is around the ceramic.
8. If necessary, change the black rotary face of the Mechanical Seal (I).
9. When assembling be sure that the parts are in the right position.
10. Make sure that the Cam (C) is rotating smoothly by turning it by hand.
11. Before putting back the Turbine unit, change the O-rings (H).

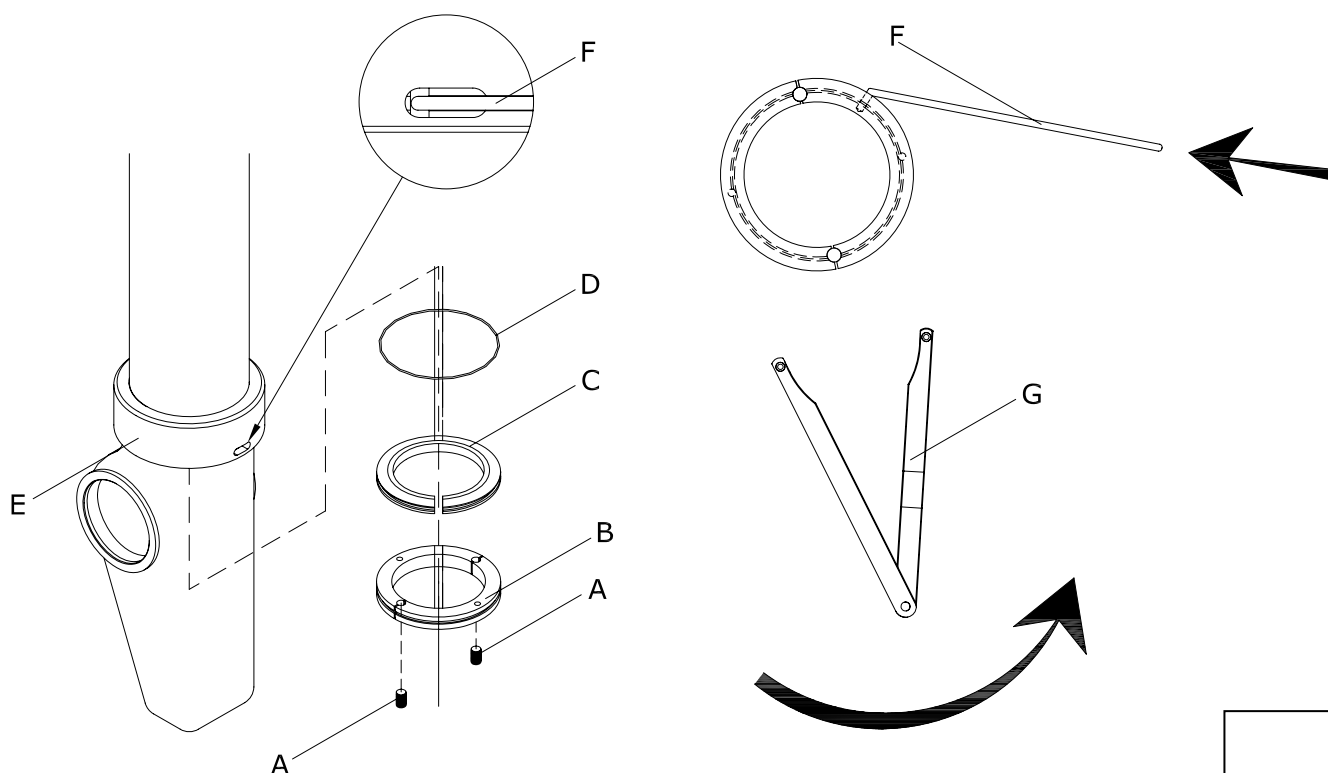


PM-ENSD-06A

Once a year –during the periodic dry dock – opportunity shall be taken to make sure that the nozzles are clear. This may be done by observing the water jets.

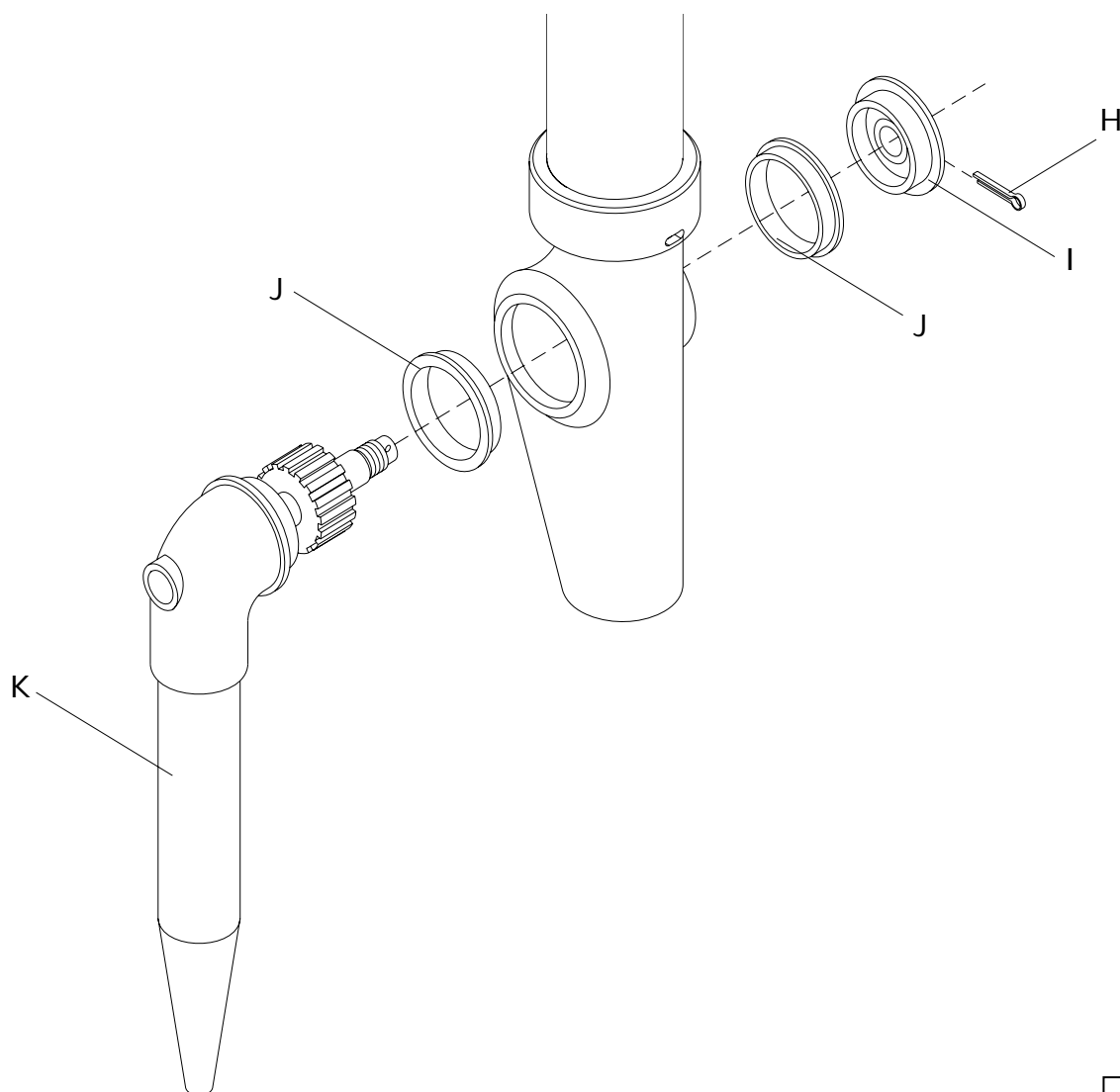
Changing of Horizontal Bearing in the Washing Head

1. Disconnect the PJ 30 from the supply line and the deck flange.
2. Crank the nozzle to 0° and pull out the cleaning unit from the tank.
3. Loosen the Stop Screw (A), turn the Retaining Ring (B) with the Hook Wrench (G) until the end of the Lock Wire (F) can be seen in the hole on the side of the Lower Flange (E).
4. Take a screw driver and bend up the Lock Wire (F). Pull out the wire while turning the Retaining Ring (B).
5. Replace the PTFE Bearing (C) and O-Ring (D) and put back the Retaining Ring (B).
6. Turn the Retaining Ring (B) counter clockwise (as seen from the bottom) with the wrench until the small hole between the grooves on the side of the Retaining Ring (B) can be seen. Put the short bent part of the Lock Wire (F) in the hole and turn counter clockwise until the entire wire is inside the groove of the Retaining Ring (B) and Lower Flange (E). Continue to turn the Retaining Ring (B) another 45°.
7. Return the Stop Screw (A) to secure the Retaining Ring (B).



Changing of Vertical Bearing in the Washing Head

1. Disconnect the PJ 30 from the supply line and the deck flange.
2. Crank the nozzle to 0° and pull out the cleaning unit from the tank.
3. Remove the Split Pin (H), unscrew the Thrust Bearing (I) and pull out the Nozzle Assembly (K). Change the two Bearings (J).
4. Be sure that the nozzle is fitted in the same position as before. Set the Thrust Bearing with 0.5-1 mm axial play. Before installing the unit, check the vertical movement by hand cranking.



BRAND	PRODUCT
CALTEX	MULTIFAK EP2
CASTROL	SPHEEROL AP2
ESSO	BEACON Q2 MO
KUWAIT	REMBRANT EP2
MOBIL	MOBIL LUX EP2
SHELL	ALVANIA EP
STATOIL	ESL 10
TEXACO	MULTIFAK EP2
BP	ENERGREASE LS-EP2

IMPORTANT

- (1) RECOMMENDED GREASE APPLIES FOR DECK MOUNTED TANK CLEANING MACHINES ONLY.
- (2) PLEASE OBSERVE THAT THE MACHINES HAVE BEEN LUBRICATED AT THE FACTORY.
- (3) THE CONTROL UNIT SHOULD HAVE AT LEAST 100-125 GRAMS. USE A BRUSH WHEN APPLYING GREASE INSIDE THE SAID COMPONENT.





CLAIM REPORT QUESTIONNAIRE

Date: _____

Ship Name : _____

Hull No. : _____

Order No. _____ :

Type of Machine : _____ **Serial No.** : _____

Configurations Nozzle _____ x \varnothing _____ mm

Capacity _____ m³/hr

Operating Condition

Machine working hours : _____

Temperature : _____

Operating Pressure : _____

Kind of Cargo : _____

Liquid used for washing : _____

Problem:

[illegible]

ORDERING SPARE PARTS AND CLAIM PROCEDURE

How to Order Spare Parts

When ordering spare parts, it is important that the following items are given correctly: position number, part number and part name. These items are identifiable on the exploded view page.

Also, indicate the machine type and the serial number (easily seen on the edge of the deck flange for deck-mounted machines and on the bottom part for portable machines).

How to Report a Claim

We, at POLARMARINE may be contacted in the event of machine problem. It is only important that the questionnaire should be accomplished accordingly. All details being asked in the questionnaire must be provided correctly for us to evaluate and analyze the problem.

Please use and fill-up the CLAIM REPORT QUESTIONNAIRE along with this manual.

How to Contact Us

We would like to accommodate your inquiries with the following contacts:

Email addresses:

SALES

shipping_spareparts@polarmarine.com.ph

CLAIM REPORTS

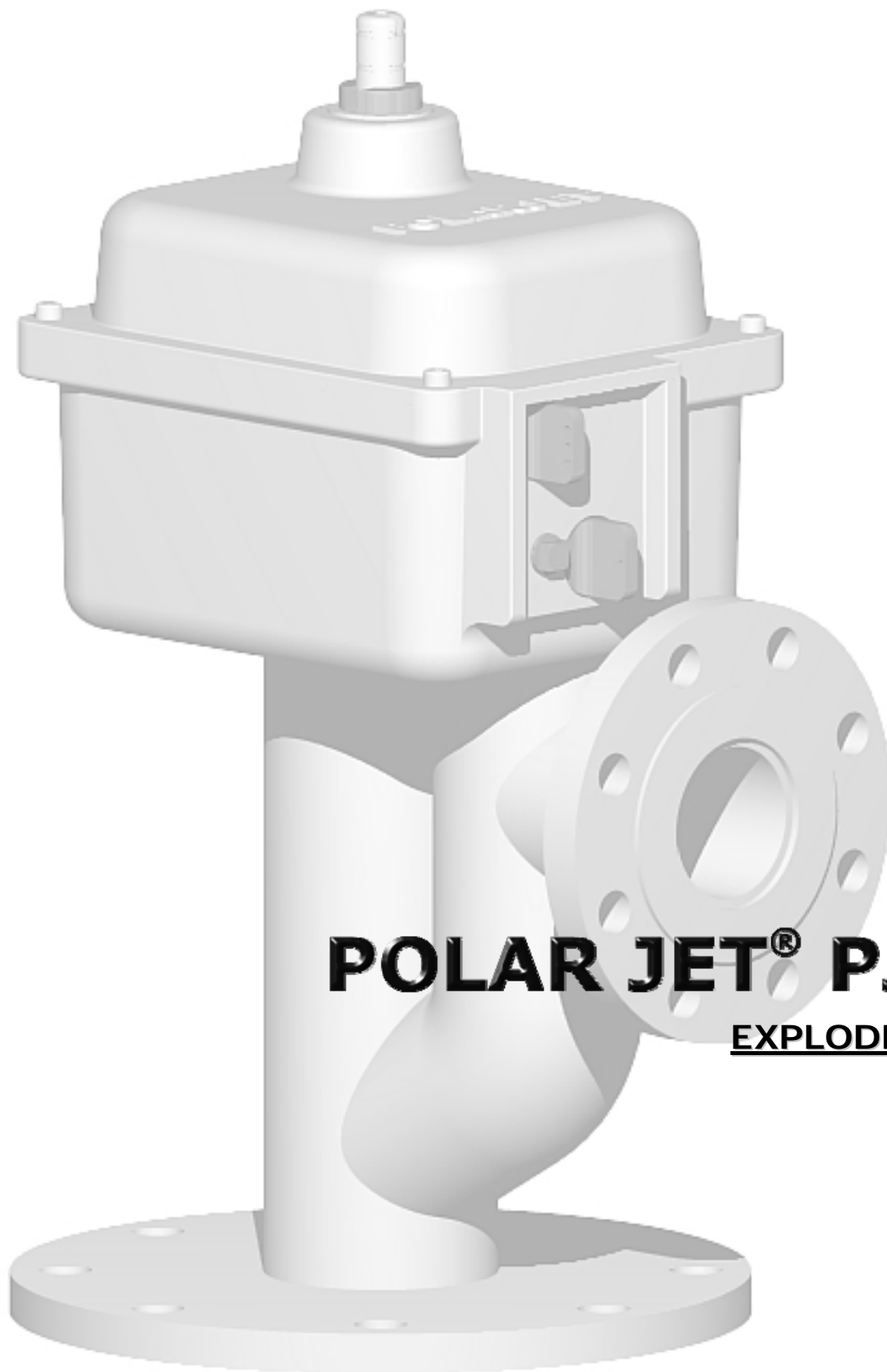
sandy_cecilio@polarmarine.com.ph



POLARMARINE

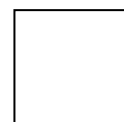


INSTRUCTION MANUAL
PJ 30

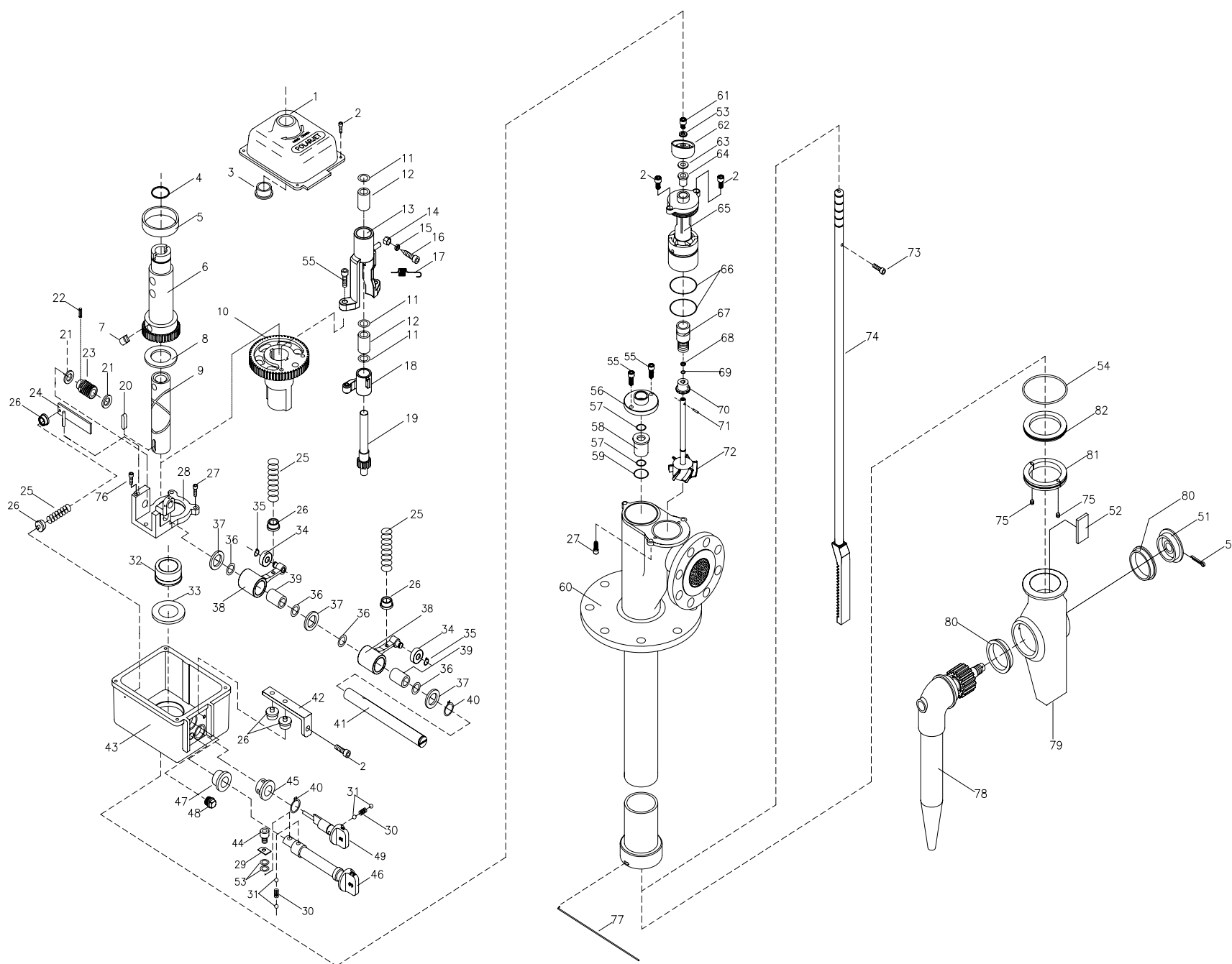


POLAR JET® PJ 30

EXPLODED VIEW

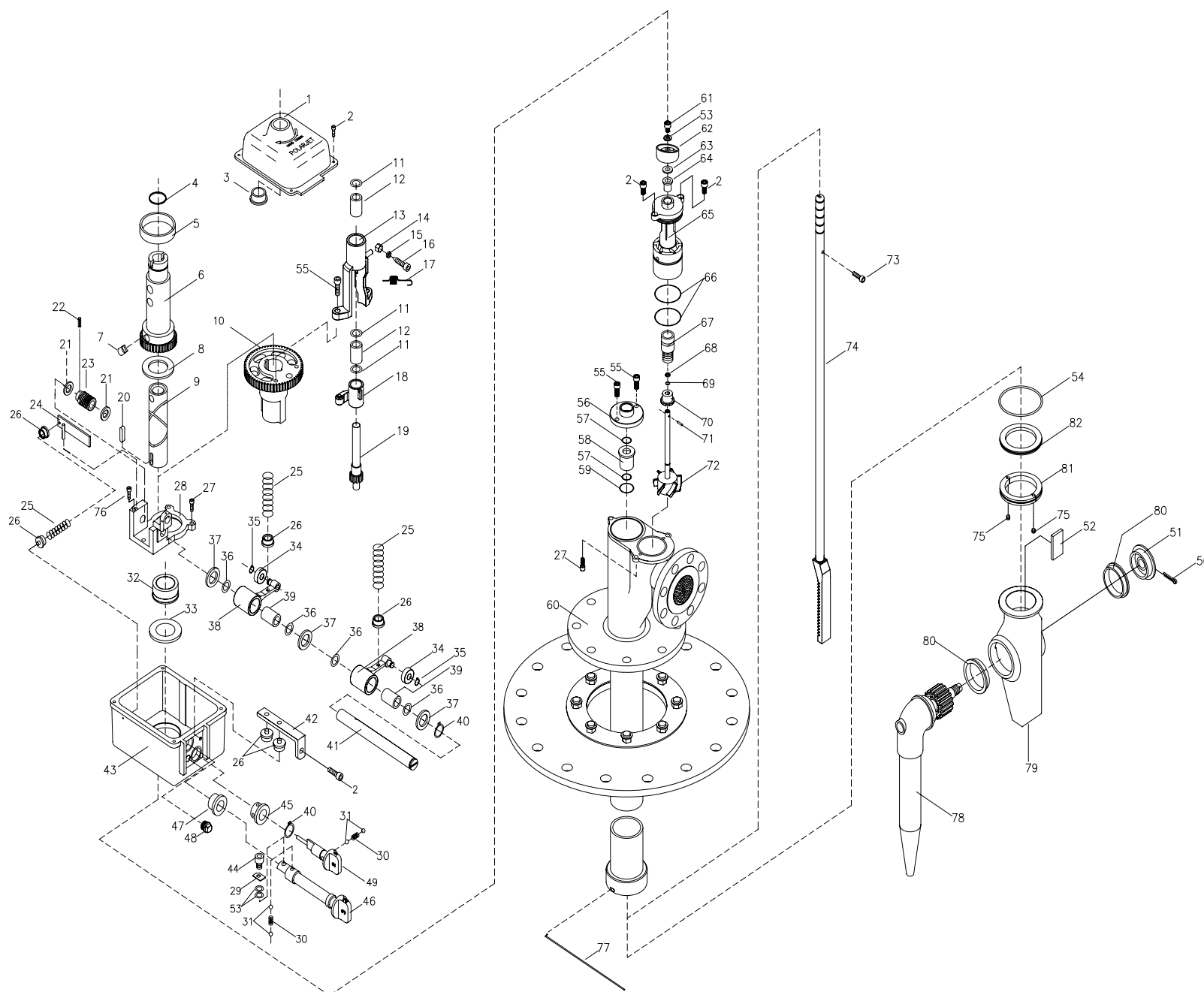


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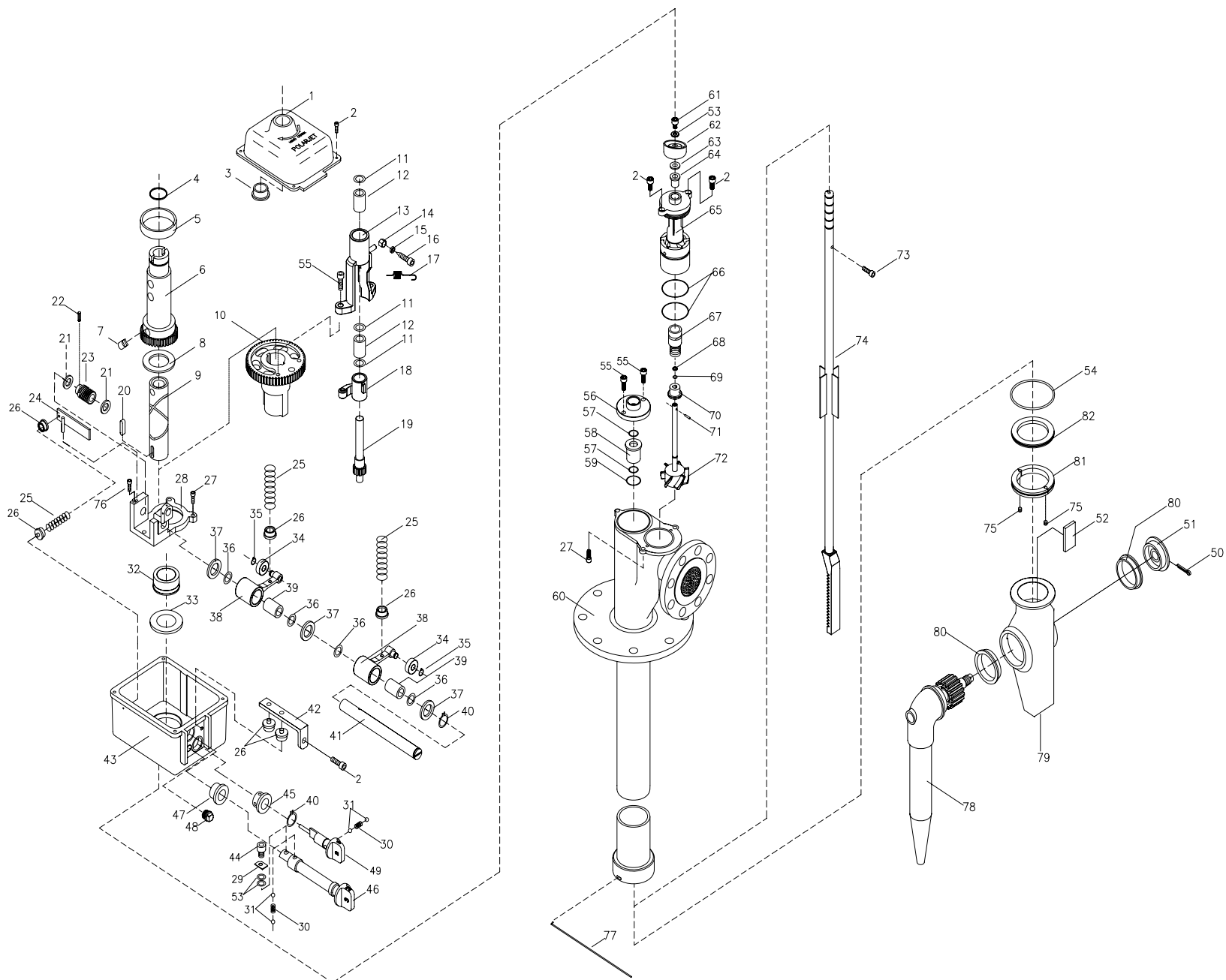
POSITION	PART NO.	PART NAME
1	PJ7490	COVER
2	PJ1055	ALLEN SCREW
3	PJ7217	BEARING
4	PJ2975	O-RING
5	PJ7219	SLEEVE
6	PJ7601	DRIVE SLEEVE
7	PJ7362	FORK
8	PJ7603	THRUST BEARING
9	PJ2760	ENDLESS SCREW
10	PJ7602	WORM GEAR
11	PJ7242	OIL SEAL
12	PJ7225	FREE WHEEL
13	PJ7223	FEEDER SUPPORT
14	PJ3225	NUT
15	PJ3070	SPACER
16	PJ7199	ALLEN SCREW
17	PJ7222	SPRING
18	PJ7237	FEEDER SLEEVE ASSY
19	PJ7218	PINION
20	PJ2849	KEY
21	PJ2702	WASHER
22	PJ2073	TUBULAR PIN
23	PJ3313	WORM SCREW, 2 ENTRANCE
24	PJ7244	PITCH CONTROL ARM ASSY
25	PJ3394	COMPRESSION SPRING
26	PJ7511	SPRING SUPPORT
27	PJ2709	ALLEN SCREW
28	PJ7028	GEAR FRAME
29	PJ7614	STOPPER
30	PJ7246	SPRING
31	PJ5037	BALL
32	PJ3314	BUSHING
33	PJ7385	SPACER
34	PJ3340	BALL BEARING
35	PJ6049	CIRCLIP
36	PJ7226	OIL SEAL
37	PJ3335	BRASS WASHER
38	PJ7510	FREE WHEEL ASSY
39	PJ6046	FREE WHEEL
40	PJ3325	CIRCLIP
41	PJ7208	DRIVE SHAFT
42	PJ7604	SPRING SUPPORT BRACKET
43	PJ7491	CONTROL UNIT HOUSING
44	PJ2088	ALLEN SCREW

POSITION	PART NO.	PART NAME
45	PJ7386	FLANGE BEARING
46	PJ7607	PITCH KNOB
47	PJ2096	FLANGE BEARING
48	PJ2070	PLUG
49	PJ7608	SPEED KNOB
50	PJ0386	SPLIT PIN
51	PJ3212	THRUST BEARING
52	PJ7390	TEFLON SUPPORT
53	PJ6059	PLAIN WASHER
54	PJ3499	O-RING
55	PJ2075	ALLEN SCREW
56	PJ3351	GLAND
57	PJ0382	O-RING
58	PJ3349	BUSHING
59	PJ5091	O-RING
60		INLET HOUSING & MAIN PIPE ASSY
61	PJ2719	ALLEN SCREW
62	PJ3386	CAM CURVE
63	PJ6063	WASHER
64	PJ3387	FLANGE BEARING
65		TURBINE HOUSING ASSY
66	PJ7241	O-RING
67	PJ2062	MECHANICAL SEAL
68	PJ2757	SPLIT RING RETAINER
69	PJ2756	SPLIT RING
70	PJ2010	TURBINE BEARING
71	PJ2730	CYLINDRICAL PIN
72		TURBINE ASSY
73	PJ2947	ALLEN SCREW
74	PJ3427	LIFTING ROD & RACK ASSY
75	PJ2923	STOP SCREW
76	PJ2722	ALLEN SCREW
77	PJ3500	LOCK WIRE
78	PJ7187	NOZZLE PIPE SUPPORT ASSY
79	PJ7609	LOWER HOUSING
80	PJ3214	BEARING
81	PJ3498	RETAINING RING
82	PJ3497	PTFE BEARING



POSITION	PART NO.	PART NAME
1	PJ7490	COVER
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7	PJ7362	FORK
8	PJ7603	THRUST BEARING
9	PJ2760	ENDLESS SCREW
10	PJ7602	WORM GEAR
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24	PJ7244	PITCH CONTROL ARM ASSY
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28	PJ7028	GEAR FRAME
29	PJ7614	STOPPER
30	PJ7246	SPRING
31	PJ5037	BALL
32	PJ3314	BUSHING
33	PJ7385	SPACER
34	PJ3340	BALL BEARING
35	PJ6049	CIRCLIP
36	PJ7226	OIL SEAL
37	PJ3335	BRASS WASHER
38	PJ7510	FREE WHEEL ASSY
39	PJ6046	FREE WHEEL
40	PJ3325	CIRCLIP
41	PJ7208	DRIVE SHAFT
42	PJ7604	SPRING SUPPORT BRACKET
43	PJ7491	CONTROL UNIT HOUSING
44	PJ2088	ALLEN SCREW

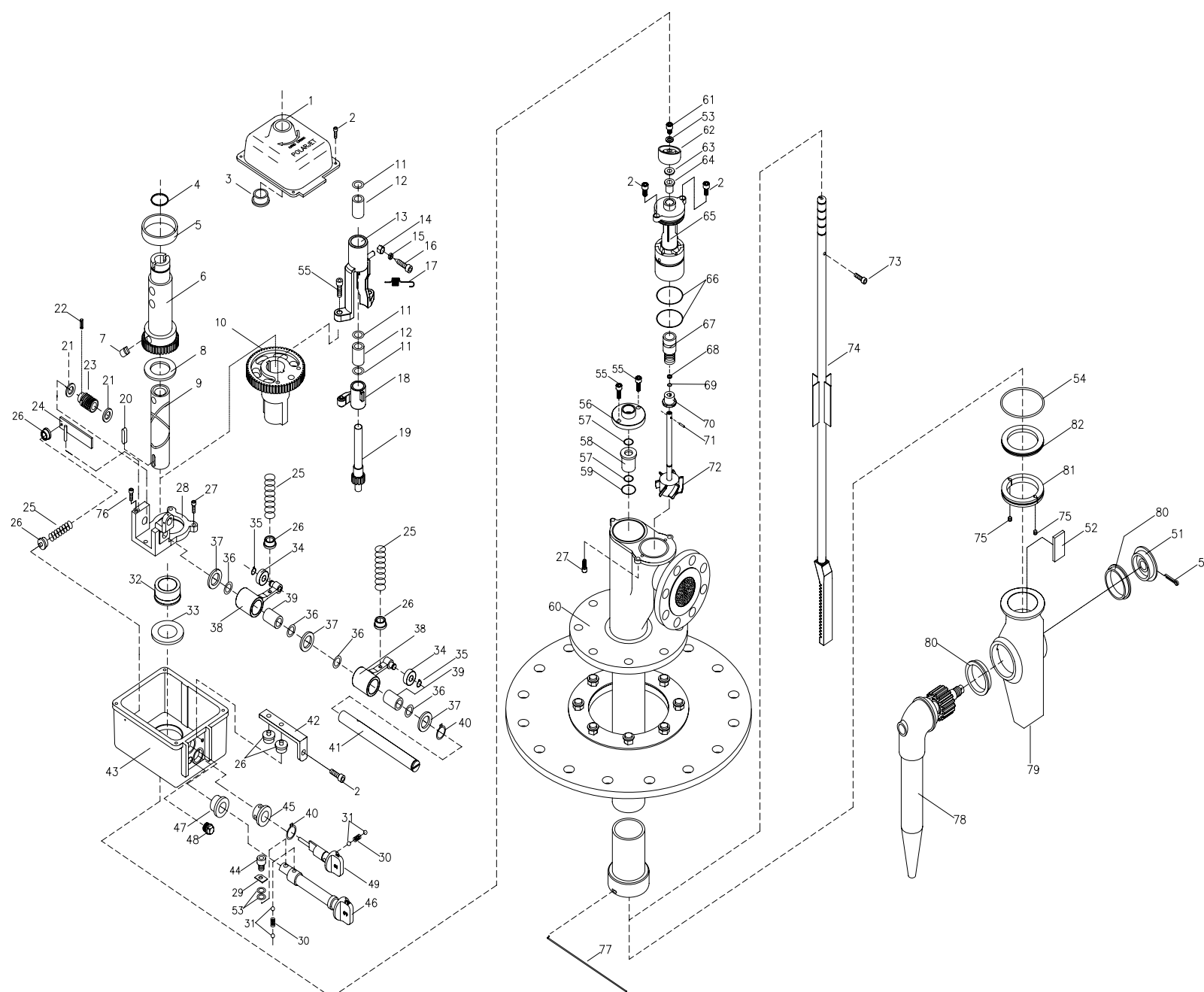
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47	PJ2096	FLANGE BEARING
48	PJ2070	PLUG
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50	PJ0386	SPLIT PIN
51	PJ3212	THRUST BEARING
52	PJ7390	TEFLON SUPPORT
53	PJ6059	PLAIN WASHER
54	PJ3499	O-RING
55	PJ2075	ALLEN SCREW
56	PJ3351	GLAND
57	PJ0382	O-RING
58	PJ3349	BUSHING
59	PJ5091	O-RING
60		INLET HOUSING & MAIN PIPE ASSY WITH SLIP-ON FLANGE
61	PJ2719	ALLEN SCREW
62	PJ3386	CAM CURVE
63	PJ6063	WASHER
64	PJ3387	FLANGE BEARING
65		TURBINE HOUSING ASSY
66	PJ7241	O-RING
67	PJ2062	MECHANICAL SEAL
68	PJ2757	SPLIT RING RETAINER
69	PJ2756	SPLIT RING
70	PJ2010	TURBINE BEARING
71	PJ2730	CYLINDRICAL PIN
72		TURBINE ASSY
73	PJ2947	ALLEN SCREW
74	PJ3427	LIFTING ROD & RACK ASSY
75	PJ2923	STOP SCREW
76	PJ2722	ALLEN SCREW
77	PJ3500	LOCK WIRE
78	PJ7187	NOZZLE PIPE SUPPORT ASSY
79	PJ7609	LOWER HOUSING
80	PJ3214	BEARING
81	PJ3498	RETAINING RING
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28	PJ7028	GEAR FRAME
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37	PJ3335	BRASS WASHER
38	PJ7510	FREE WHEEL ASSY
39	PJ6046	FREE WHEEL
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42	PJ7604	SPRING SUPPORT BRACKET
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44	PJ2088	ALLEN SCREW

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63	PJ6063	WASHER
64	PJ3387	FLANGE BEARING
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69	PJ2756	SPLIT RING
70	PJ2010	TURBINE BEARING
71	PJ2730	CYLINDRICAL PIN
72		TURBINE ASSY
73	PJ2947	ALLEN SCREW
74		LIFTING ROD & RACK ASSY WITH ROD GUIDE
75	PJ2923	STOP SCREW
76	PJ2722	ALLEN SCREW
77	PJ3500	LOCK WIRE
78	PJ7187	NOZZLE PIPE SUPPORT ASSY
79	PJ7609	LOWER HOUSING
80	PJ3214	BEARING
81	PJ3498	RETAINING RING
82	PJ3497	PTFE BEARING














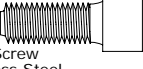













POSITION	PART NO.	PART NAME
1	PJ7490	COVER
2	PJ1055	ALLEN SCREW
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43	PJ7491	CONTROL UNIT HOUSING
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51	PJ3212	THRUST BEARING
52	PJ7390	TEFLON SUPPORT
53	PJ6059	PLAIN WASHER
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55	PJ2075	ALLEN SCREW
56	PJ3351	GLAND
57	PJ0382	O-RING
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61	PJ2719	ALLEN SCREW
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63	PJ6063	WASHER
64	PJ3387	FLANGE BEARING
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66	PJ7241	O-RING
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81	PJ3498	RETAINING RING
82	PJ3497	PTFE BEARING

SPARE PARTS AND TOOLS LIST (2-YEAR OPERATION)

PJ 30

Part No.	Description	Qty.	Part No.	Description	Qty.
for Control Unit Assembly					
PJ6046	 Free Wheel	2	PJ2073	 Tubular Pin Stainless Steel	4
PJ7225	 Free Wheel	2	PJ7603	 Thrust Bearing Nylon	2
PJ3340	 Ball Bearing Stainless Steel	6	PJ3225	 Nut Stainless Steel	2
PJ5037	 Ball Stainless Steel	2	PJ2088	 Allen Screw Stainless Steel	2
PJ7362	 Fork Stainless Steel	2	PJ2075	 Allen Screw Stainless Steel	8
PJ7511	 Spring Support Nylon	6	PJ2709	 Allen Screw Stainless Steel	2
PJ3394	 Compression Spring Stainless Steel	6	PJ3335	 Washer Brass	4
PJ6049	 Circlip Stainless Steel	6	PJ2702	 Washer Stainless Steel	4
PJ3325	 Circlip Stainless Steel	6	PJ7242	 Oil Seal	4
PJ2849	 Key Stainless Steel	4	PJ7226	 Oil Seal	4
PJ7246	 Spring Stainless Steel	2	PJ2975	 O-Ring Nitril	5
PJ7222	 Spring Stainless Steel	6			






















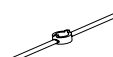
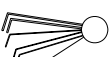



(1) When ordering spare parts, please specify the original yard's hull number and the POLARMARINE's order number as stated on the upper right and lower left corner respectively of this manual for precise identification.

(2) The actual sizes of the parts drawn above were altered simply for clarity.



SPARE PARTS AND TOOLS LIST (2-YEAR OPERATION)

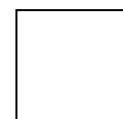
PJ 30

Part No.	Description	Qty.	Part No.	Description	Qty.
for Inlet Housing & Turbine Assembly					
PJ2719	 Allen Screw Stainless Steel	4	PJ7241	 O-Ring Nitril	4
PJ2947	 Allen Screw Stainless Steel	6	PJ2062	 Mechanical Seal LH	2
PJ2075	 Allen Screw Stainless Steel	2	PJ3349	 Bushing Teflon	2
PJ3386	 Cam Curve Nylon	4	PJ6059	 Plain Washer Stainless Steel	2
PJ2010	 Turbine Bearing Teflon	2	PJ6063	 Washer Stainless Steel	2
PJ0382	 O-Ring Nitril	10	PJ2730	 Cylindrical Pin Stainless Steel	4
PJ5091	 O-Ring Nitril	4			
for Lower Housing & Nozzle Assembly					
PJ3497	 Bearing Teflon	2	PJ3500	 Lock Wire Stainless Steel	2
PJ3499	 O-Ring Viton	2	PJ7390	 Teflon Support Teflon	4
PJ3214	 Bearing Teflon	2	PJ0386	 Split Pin Stainless Steel	4
Tools					
PJ7230	 Hand Crank Stainless Steel	2	PJ2433	 Allen Wrench Set	1
PJ7254	 Hook Wrench Assy Stainless Steel	1	PJ2431	 Tool Box	1
PJ2429	 Padlock and Keys (for Toolbox) Brass	1			



(1) When ordering spare parts, please specify the original yard's hull number and the POLARMARINE's order number as stated on the upper right and lower left corner respectively of this manual for precise identification.












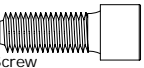

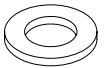

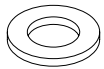






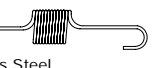
(2) The actual sizes of the parts drawn above were altered simply for clarity.



PM-ENSD-06E

SPARE PARTS AND TOOLS LIST (5-YEAR OPERATION)

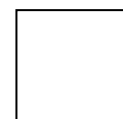
PJ 30

Part No.	Description	Qty.	Part No.	Description	Qty.
for Control Unit Assembly					
PJ6046	 Free Wheel	4	PJ2073	 Tubular Pin Stainless Steel	8
PJ7225	 Free Wheel	4	PJ7603	 Thrust Bearing Nylon	4
PJ3340	 Ball Bearing Stainless Steel	12	PJ3225	 Nut Stainless Steel	4
PJ5037	 Ball Stainless Steel	4	PJ2088	 Allen Screw Stainless Steel	4
PJ7362	 Fork Stainless Steel	4	PJ2075	 Allen Screw Stainless Steel	16
PJ7511	 Spring Support Nylon	12	PJ2709	 Allen Screw Stainless Steel	4
PJ3394	 Compression Spring Stainless Steel	12	PJ3335	 Washer Brass	8
PJ6049	 Circlip Stainless Steel	12	PJ2702	 Washer Stainless Steel	8
PJ3325	 Circlip Stainless Steel	12	PJ7242	 Oil Seal	8
PJ2849	 Key Stainless Steel	8	PJ7226	 Oil Seal	8
PJ7246	 Spring Stainless Steel	4	PJ2975	 O-Ring Nitril	10
PJ7222	 Spring Stainless Steel	12			






















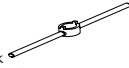
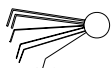



(1) When ordering spare parts, please specify the original yard's hull number and the POLARMARINE's order number as stated on the upper right and lower left corner respectively of this manual for precise identification.

(2) The actual sizes of the parts drawn above were altered simply for clarity.



SPARE PARTS AND TOOLS LIST (5-YEAR OPERATION)

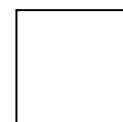
PJ 30

Part No.	Description	Qty.	Part No.	Description	Qty.
for Inlet Housing & Turbine Assembly					
PJ2719	 Allen Screw Stainless Steel	8	PJ7241	 O-Ring Nitril	8
PJ2947	 Allen Screw Stainless Steel	12	PJ2062	 Mechanical Seal LH	4
PJ2075	 Allen Screw Stainless Steel	4	PJ3349	 Bushing Teflon	4
PJ3386	 Cam Curve Nylon	8	PJ6059	 Plain Washer Stainless Steel	4
PJ2010	 Turbine Bearing Teflon	4	PJ6063	 Washer Stainless Steel	4
PJ0382	 O-Ring Nitril	20	PJ2730	 Cylindrical Pin Stainless Steel	8
PJ5091	 O-Ring Nitril	8			
for Lower Housing & Nozzle Assembly					
PJ3497	 Bearing Teflon	4	PJ3500	 Lock Wire Stainless Steel	4
PJ3499	 O-Ring Viton	4	PJ7390	 Teflon Support Teflon	8
PJ3214	 Bearing Teflon	4	PJ0386	 Split Pin Stainless Steel	8
Tools					
PJ7230	 Hand Crank Stainless Steel	2	PJ2433	 Allen Wrench Set	1
PJ7254	 Hook Wrench Assy Stainless Steel	1	PJ2431	 Tool Box	1
PJ2429	 Padlock and Keys (for Toolbox) Brass	1			



(1) When ordering spare parts, please specify the original yard's hull number and the POLARMARINE's order number as stated on the upper right and lower left corner respectively of this manual for precise identification.

(2) The actual sizes of the parts drawn above were altered simply for clarity.



PM-ENSD-06F

Service Kits

Whenever a tank cleaning operation is done, there is always a possibility of machine breakdown. The Tank Cleaning Machines are usually installed and operated in rough marine conditions. To extend our customer service, Polarmarine has developed a Polar Jet® Service Kit.

The Polar Jet® Service Kit will help you in the maintenance and assurance of safe operations on-board. Polarmarine have systematically identified the parts and mechanism that needs to be inspected for damage and wear-out. This should be done at a regular basis as a preventive action to guarantee the safety and trouble free cleaning cycle all the time.



Polarmarine has included a step-by-step instruction in conducting the proper maintenance and the usage of the components in the Polar Jet® Service Kit. With this, the vessel crew can do the maintenance themselves and prevent breakdowns during operation that will help to prolonging the life of the machines.

The Polar Jet® Service Kits are available and can easily be ordered. Furthermore, the service kits are more ideal and budget friendly than ordering individual parts.

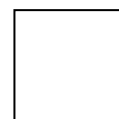
Polarmarine can also provide our customer with service engineer to support with the maintenance or repair.

Kit Numbers

Please give this number when ordering service kit and kindly indicate the serial number of the machine to assure that the correct service kits is delivered.

PJ 30 Model

- | | |
|---------------|--|
| PJ 30 SKIT300 | – After running 300 hours or 3 years operation |
| PJ 30 SKIT600 | – After running 600 hours or 6 years operation |

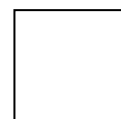


PJ 30 Service Kit

Refer to the following list of spare part replacement for PJ 30 equipment.

PJ 30 SKIT300			
Pos	Part Number	Part Name	Qty
70	PJ2010	Turbine Bearing	1
64	PJ3387	Flange Bearing	1
34	PJ3340	Ball Bearing	2
35	PJ6049	Circlip	2
4	PJ2975	O-ring	1

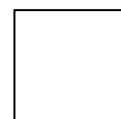
PJ 30 SKIT600			
Pos	Part Number	Part Name	Qty
70	PJ2010	Turbine Bearing	1
64	PJ3387	Flange Bearing	1
34	PJ3340	Ball Bearing	2
35	PJ6049	Circlip	2
4	PJ2975	O-ring	1
7	PJ7362	Fork	1
62	PJ3386	Cam Curve	1
19	PJ7218	Pinion	1
12	PJ7225	Free Wheel	1
39	PJ6046	Free Wheel	2
17	PJ7222	Spring	1
58	PJ3349	Bushing	1
57	PJ0382	O-ring	2
59	PJ5091	O-ring	1
80	PJ3214	Bearing	2
82	PJ3497	PTFE Bearing	1
54	PJ3499	O-ring	1



PJ 30 : Parts List

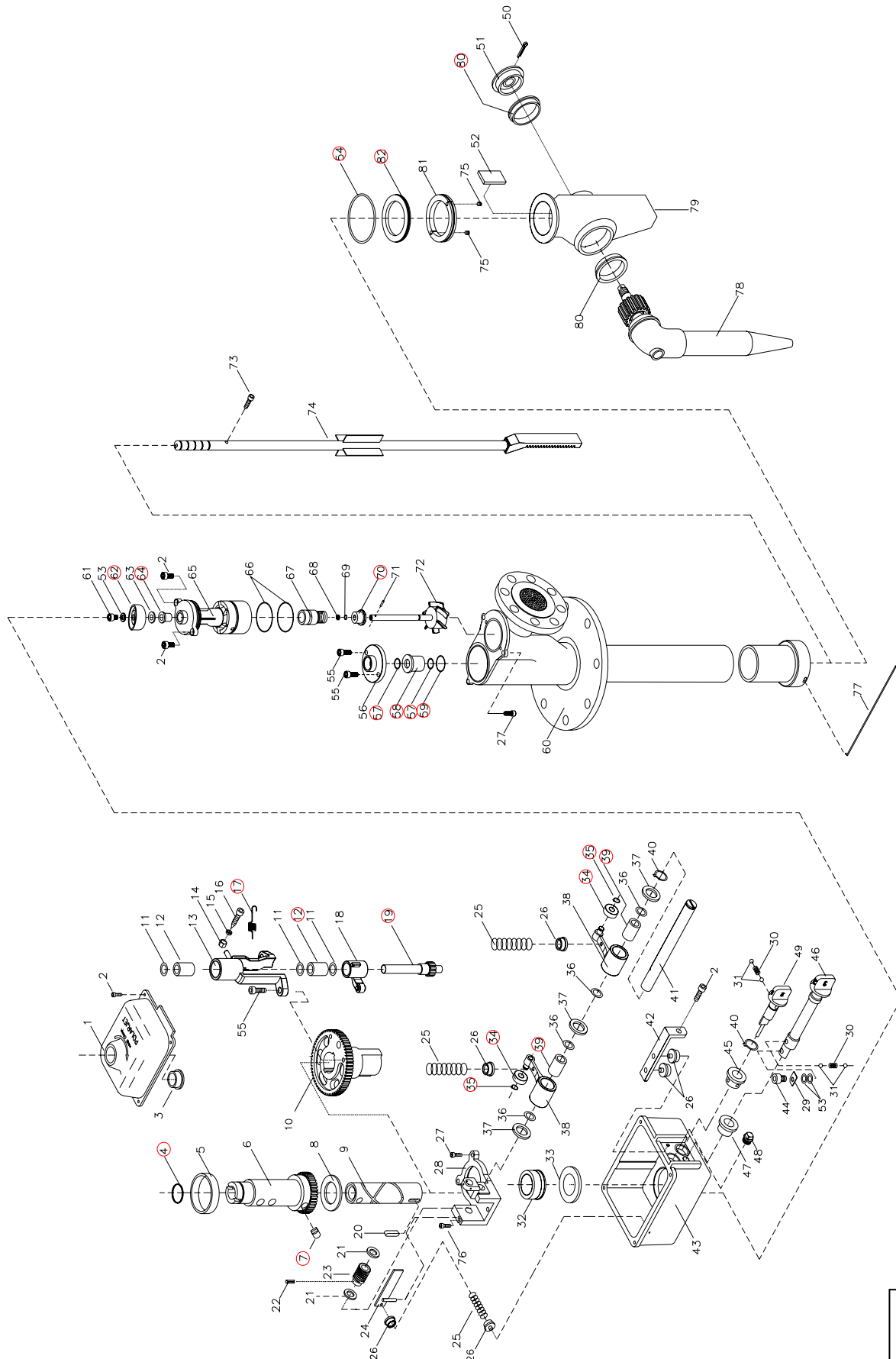
POSITION	PART NO.	PART NAME
1	PJ7490	COVER
2	PJ1055	ALLEN SCREW
3	PJ7217	BEARING
4	PJ2975	O-RING
5	PJ7219	SLEEVE
6	PJ7601	DRIVE SLEEVE
7	PJ7362	FORK
8	PJ7603	THRUST BEARING
9	PJ2760	ENDLESS SCREW
10	PJ7602	WORM GEAR
11	PJ7242	OIL SEAL
12	PJ7225	FREE WHEEL
13	PJ7223	FEEDER SUPPORT
14	PJ3225	NUT
15	PJ3070	SPACER
16	PJ7199	ALLEN SCREW
17	PJ7222	SPRING
18	PJ7237	FEEDER SLEEVE ASSY
19	PJ7218	PINION
20	PJ2849	KEY
21	PJ2702	WASHER
22	PJ2073	TUBULAR PIN
23	PJ3313	WORM SCREW, 2 ENTRANCE
24	PJ7244	PITCH CONTROL ARM ASSY
25	PJ3394	COMPRESSION SPRING
26	PJ7511	SPRING SUPPORT
27	PJ2709	ALLEN SCREW
28	PJ7028	GEAR FRAME
29	PJ7614	STOPPER
30	PJ7246	SPRING
31	PJ5037	BALL
32	PJ3314	BUSHING
33	PJ7385	SPACER
34	PJ3340	BALL BEARING
35	PJ6049	CIRCLIP
36	PJ7226	OIL SEAL
37	PJ3335	BRASS WASHER
38	PJ7510	FREE WHEEL ASSY
39	PJ6046	FREE WHEEL
40	PJ3325	CIRCLIP
41	PJ7208	DRIVE SHAFT
42	PJ7604	SPRING SUPPORT BRACKET
43	PJ7491	CONTROL UNIT HOUSING
44	PJ2088	ALLEN SCREW

POSITION	PART NO.	PART NAME
45	PJ7386	FLANGE BEARING
46	PJ7607	PITCH KNOB
47	PJ2096	FLANGE BEARING
48	PJ2070	PLUG
49	PJ7608	SPEED KNOB
50	PJ0386	SPLIT PIN
51	PJ3212	THRUST BEARING
52	PJ7390	TEFLON SUPPORT
53	PJ6059	PLAIN WASHER
54	PJ3499	O-RING
55	PJ2075	ALLEN SCREW
56	PJ3351	GLAND
57	PJ0382	O-RING
58	PJ3349	BUSHING
59	PJ5091	O-RING
60		INLET HOUSING & MAIN PIPE ASSY
61	PJ2719	ALLEN SCREW
62	PJ3386	CAM CURVE
63	PJ6063	WASHER
64	PJ3387	FLANGE BEARING
65		TURBINE HOUSING ASSY
66	PJ7241	O-RING
67	PJ2062	MECHANICAL SEAL
68	PJ2757	SPLIT RING RETAINER
69	PJ2756	SPLIT RING
70	PJ2010	TURBINE BEARING
71	PJ2730	CYLINDRICAL PIN
72		TURBINE ASSY
73	PJ2947	ALLEN SCREW
74		LIFTING ROD & RACK ASSY WITH ROD GUIDE
75	PJ2923	STOP SCREW
76	PJ2722	ALLEN SCREW
77	PJ3500	LOCK WIRE
78	PJ7187	NOZZLE PIPE SUPPORT ASSY
79	PJ7609	LOWER HOUSING
80	PJ3214	BEARING
81	PJ3498	RETAINING RING
82	PJ3497	PTFE BEARING



SPARE PARTS LIST (COMMISSIONING)

PJ 30



PM-ENSD-06B