



INSTALLATION, OPERATION and MAINTENANCE MANUAL

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Multi-Stage

PSM



Manufacturer of Pumps, Tanks, Heat Exchangers & Accessories
for HVAC Market After-Sales Parts and Services

Multi-Stage - PSM

FLO FAB INC
LAKE WORTH,
FLORIDA, USA



General Information and **Warnings**

1.1 The user must comply with all local and national regulations that apply to the installation and operation of electric pumps. Operation of the **PSM** pump must be compatible with the construction of the pump as shown in the Specification section of these instructions.

1.2 Before any work is performed on the **PSM** Pump care should be taken to ensure that electric power is disconnected to the motor to prevent electric shock or premature starting which could cause damage to persons, things or the pump.

WARNING

1.3 Before starting the **PSM** pump, make sure that all cables, electrical connections and controls are in perfect working order and properly grounded. Improper installation can result in serious or even mortal accidents to persons.



An electrical work should be performed by a licensed electrician

1.4 Pumps with motor installed tend to be top heavy, care should be taken in handling and transporting to prevent damage or injury caused by the pump falling over.

Specifications

Caution

Be careful not to exceed the given specifications in the use of your products.

Liquid handled

Type of liquid	Clean water
Temperature	5° to +248°F (-15° to 120°C)
Working pressure	230/360 PSI (16/25 Bar)

Construction

Impeller	Closed centrifugal
Seal	Mechanical shaft seal
Bearing	Sealed ball bearing / tungsten carbide
Suction/Discharge	ANSI 250 lb 11/4" 4 / 2" 8 bolt flange

Materials

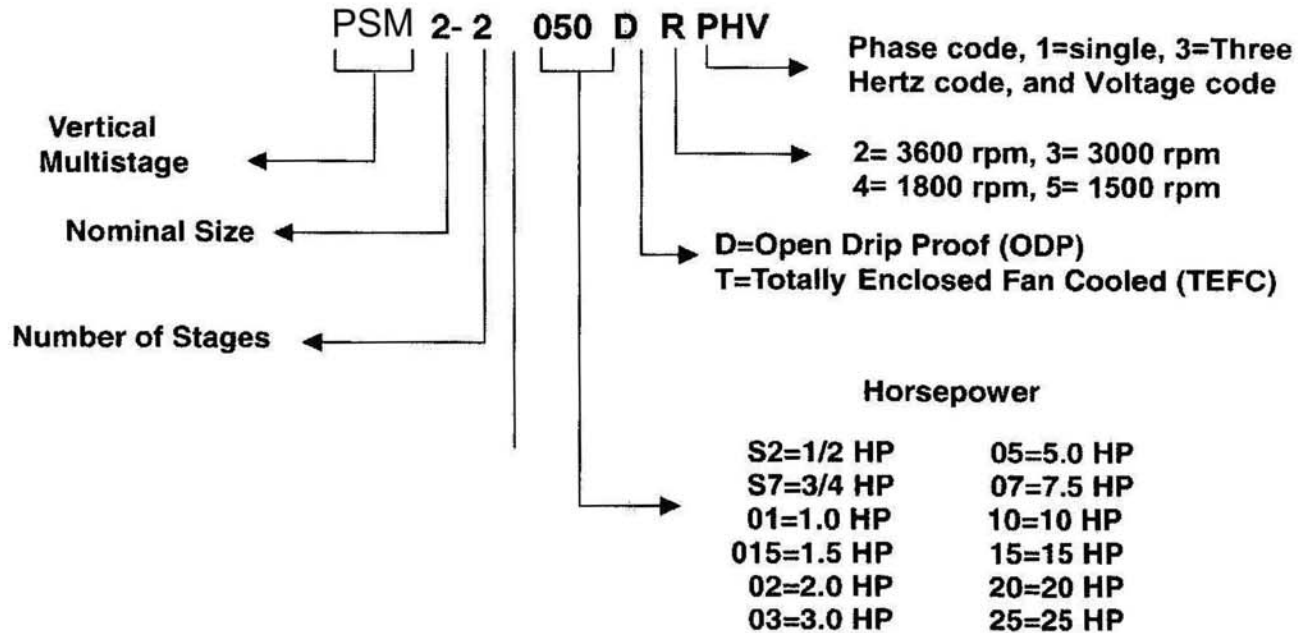
Impeller	AISI 304L
Intermediate casing	AISI 304L
Bottom casing	AISI 304L
Casing cover	AISI 304L
Outer casing	AISI 304L
Shaft	AISI 316
Liner ring	EPDM/AISI 304L
Shaft seal	Silicon-Carbon-FPM
Motor bracket	Cast iron
Base	Cast iron
Test standard	ISO 2548 Class C
Motor	NEMA C / TC frame



Pump Checks

- 3.1** Always Check to make sure pump was not damaged in shipment before accepting delivery. If damage is evident a claim should be filed with the carrier at the time.
- 3.2** Always check the pump label against the requirement to make sur you are installing the proper pump specified for the job.

Model Designation



- 3.4** Make the sure that the pump suction, marked by a sticker, is connected to the liquid source and that disarche, similarly marked, is connected to the discharge line.

⚠Caution

- 3.5** On three phase motor installation, always check for proper motor rotation prior to starting by jogging motor. Make sure the motor is correctly wired, refer to instructions on the motor name plate.
- 3.6** Make sure that the pump base is firmly secured to a solid flat surface and that the suction and discharge lines are aligned and properly supported to prevent pipe strain on the pump.
- 3.7** Ensure that the suction and discharge gaskets are properly installed to prevent leaks and that they do not restrict the flow to or from the pump. Standard ANSI mating flanges should be used to connect the pump to the piping. Suction and discharge piping should be no smaller than the respective pump port sizes.



Pump Checks (cont.)

- 3.8 Isolation valves should be installed on both the suction and discharge side of the pump in the event service of the pump is required.
- 3.9 Provide adequate space and ventilation around the pump for service and motor cooling.

Warning



- 3.10 Use standard plumbing practices to ensure unnecessary line losses, cavitation and prevent air lock.

Installation

- 3.11 Completely prime the pump by removing the vent plug (212), remove the coupling guard where necessary.

Using a funnel, fill the pump body with water until it overflows and replace plug.

Alternatively for installations with positive suction heads, close the discharge valve and remove the vent plug.

Open the suction valve until liquid flows out of the vent plug opening and then replace the vent plug securely and open discharge valve.

Caution

EXTREME CAUTION SHOULD BE USED IF PRIMING THE PUMP IN THIS MANNER IN A HOT WATER APPLICATION.

Replace coupling guards if previously removed.

Warning

OPERATING THE PUMP WITHOUT THE GUARDS IN PLACE CAN CAUSE PHYSICAL INJURY.

- 3.12 It is recommended that a bleed valve be installed in discharge line or in a line from the vent port to the reservoir. This will allow the pressure in the pump to be relieved for service.

Installing a bleed valve is especially necessary in hot water applications to prevent injury.

- 3.13 Pipe, valves and fittings must have a pressure rating equal to or greater than the maximum system pressure.



Pump Checks (cont.)

- 3.14 A bypass or pressure relief valve should be installed in the discharge line if there is any possibility the pump may operate against a closed valve in the discharge line.

Minimum flow is required for proper cooling and lubrication of the pump without which, damage and premature failure will occur.

Minimum Pumping Rate	
Model	Minimum Flow Rate
PSM 3	3.3 GPM
PSM 5	6.7 GPM
PSM 10	8 GPM
PSM 16	11 GPM

- 3.15 If the installation of the motor is necessary, refer to section 5.1 for instructions.

Operation

- 4.1 Make sure that the system is properly installed and primed as instructed in section 3.
- 4.2 Check that the suction valve is fully open and that the discharge valve is in its open position.

⚠ Caution

Prolonged operation of the PSM pump with either valve in the closed position will cause severe damage to the pump.

- 4.3 Check to make sure all electric connections are correct.
- 4.4 Apply power to the motor.

Check motor rotation.

Check that the noise, vibration, pressure, voltage and amps are at normal levels.

⚠ Warning

- 4.5 PSM pumps are designed for continuous and normal off/on operation.

RAPID CYCLING CAN CAUSE HIGH HEAT AND LOADING THAT CAN CAUSE DAMAGE TO THE PUMP OR MOTOR.

Pumps should not be starting more than the following rate:

20 times per hour on 1/2 to 5 HP models,
15 times per hour on 7 1/2 to 15 HP models,
10 times per hour on 20 and 25 HP models.



Maintenance and Service

Motor Installation on Bare Pump

5.1A Procedures for motors 3HP or greater

- (1) Follow general safety and electrical instructions on the motor name plate.
- (2) Attach a strong sling or chains to the motor lifting lugs or eyebolts to ensure that the motor may be centered when lifted vertically.

Warning



When lifting the pump, use appropriate crane (or hoist), check position and tightness of lift system so that weight of the pump is not UNBALANCED.

Failure to observe this precaution can result in serious accidents.

- (3) Position the motor, shaft down, above the pump assembly.
- (4) Ensure that the motor key has been placed firmly into the motor shaft keyway.
- (5) Align the motor key and keyway with the coupling keyway and slowly lower the motor into position ensuring that the key slides into the coupling keyway.
- (6) Prior to lowering the motor completely, rotate the motor so that the mounting holes are aligned with the motor support holes.
- (7) Insert the four motor bolts into the proper holes and tighten evenly using an alternating crossing pattern to ensure proper alignment.

5.1B Procedure for mounting motors for the following models:

PSM 3-2	PSM 5-2	PSM 10-2
PSM 3-3	PSM 5-3	PSM 10-3
PSM 3-4	PSM 5-4	
PSM 3-5	PSM 5-5	
PSM 3-6	PSM 5-6	
PSM 3-7	PSM 5-7	

Make sure the motor protection guard is removed from the pump end.

- (2) Carefully loosen the screws on the coupling.
- (3) Position the motor vertically over the pump with the keyways lined up on the motor and the pump then lower motor into place. If necessary rotate the motor so that the mounting bolt holes line up with the corresponding holes in the pump bracket.
- (4) Insert the mounting bolts and tighten firmly using a crisscrossing pattern.
- (5) Using two screwdrivers, lever between the motor bracket and the coupling raise the pump shaft until it touches the motor shaft.

Now tighten the coupling screws to secure the motor and pump shaft into position.

- (6) Rotate the coupling to assure that the pump turns freely. If rubbing occurs loosen the coupling screws on the motor side and repeat step 5.1B (5).



Maintenance and **S**ervice

5.2 Removing Motor from Complete Pump

- (1) Following general safety and electrical instructions, disconnect the power to the motor and remove power cords.

Warning



For any removal or installation procedures, **always disconnect the power first.**

Failure to observe this precaution can result in serious accidents.

- (2) Loosen and remove the four motor bolts.
- (3) Attach a strong sling or chains to the motor lifting lugs or eyebolts to ensure that the motor may be centered when lifted vertically.
- (4) Slowly lift the motor off the pump assembly being careful to retain the shaft key. If the motor does not slide easily out of the coupling do not raise the pump into the air, dropping the pump end can cause damage. Fix the pump base to the floor or bench and lift motor again.

5.3 Disassembly of pump for mechanical seal and hydraulic stack replacement

- (1) Remove the motor as detailed in Section 5.2.
- (2) Isolate the pump by closing isolation valves on the suction and discharge lines.
- (3) Carefully relieve the pressure in the pump by opening the vent or drain plugs.

Caution

Extreme caution should be exercised in this operation since the pump is under system pressure at this point.

Use a pressure bleed valve in hot water applications where water temperature could cause physical injury.

- (4) Remove the vent plug (Part No. 212).
- (5) Remove coupling guards (245) with Phillips head screwdriver.
- (6) Using an Allen wrench (a T-handle is recommended) loosen and remove the pump coupling bolts (120/1) and remove the lower coupling section.
- (7) Using 900 snap ring pliers, engage coupling snap ring (274/1) and lift up to clear end of the pump shaft.
- (8) Loosen and remove four tie rods (120/2).
- (9) Turn tie rods counter clockwise to loosen from pump base and remove. This will allow the solid coupling to clear the end of the shaft.
- (10) Gently tap the base of the motor support with a soft mallet to loosen the fit.



Maintenance and Service

5.3 Disassembly of pump for mechanical seal and hydraulic stack replacement *(continued)*

- (11) Turn the solid coupling half so that it is aligned with the vent pipe.
- (12) Lift the motor support off of the pump assembly by tilting the support towards the vent pipe and lifting.
- (13) Remove and retain the pump shaft key.
- (14) Remove the seal plate (011 casing cover) vertically off of the pump shaft assembly.
- (15) Remove the o-ring (115/1) from the top of the pump body (007 outer casing).

5.4 Replacement of mechanical seal.

- (1) Complete disassembly of pump as detailed in Section 5.3.
- (2) Remove the old rotating seal assembly by lifting vertically off the pump shaft. The rotating assembly is rubber boot mounted.
- (3) Press the old stationary seal assembly out of the seal plate (011) from the outside of the seal plate. The stationary seat is rubber cup mounted.
- (4) Place the rotating seal assembly retainer onto the shaft taking care not to scratch or touch the seal face. If touching the seal face is necessary, gently wipe with a clean soft tissue.
- (5) Carefully place the rotating seal assembly onto the shaft using a non-metallic sleeve to push the assembly into place on the shaft, seating the rubber boot snugly.
- (6) Using a non-metallic sleeve, press the stationary seal assembly into the seal plate (011) evenly, seating the rubber boot snugly.
- (7) Reassemble the pump as instructed in Section 5.5.

5.5 Replacement of pump hydraulic assembly.

- (1) Remove the old mechanical seal assembly as detailed in Section 5.4.
- (2) Remove the pump body (007) from the pump casing and remove the o-ring located in the pump casing.
- (3) Ensure that the proper replacement hydraulic (stack) assembly has been selected and *provided for the applicable pump size.*
- (4) Lift the replacement hydraulic (stack) assembly and place it onto the pump casing (006) ensuring that it is firmly seated properly. Ensure that the pump shaft keyway is aligned vertically with the drain connection on the pump casing for ease of later assembly completion.



Maintenance and **S**ervice

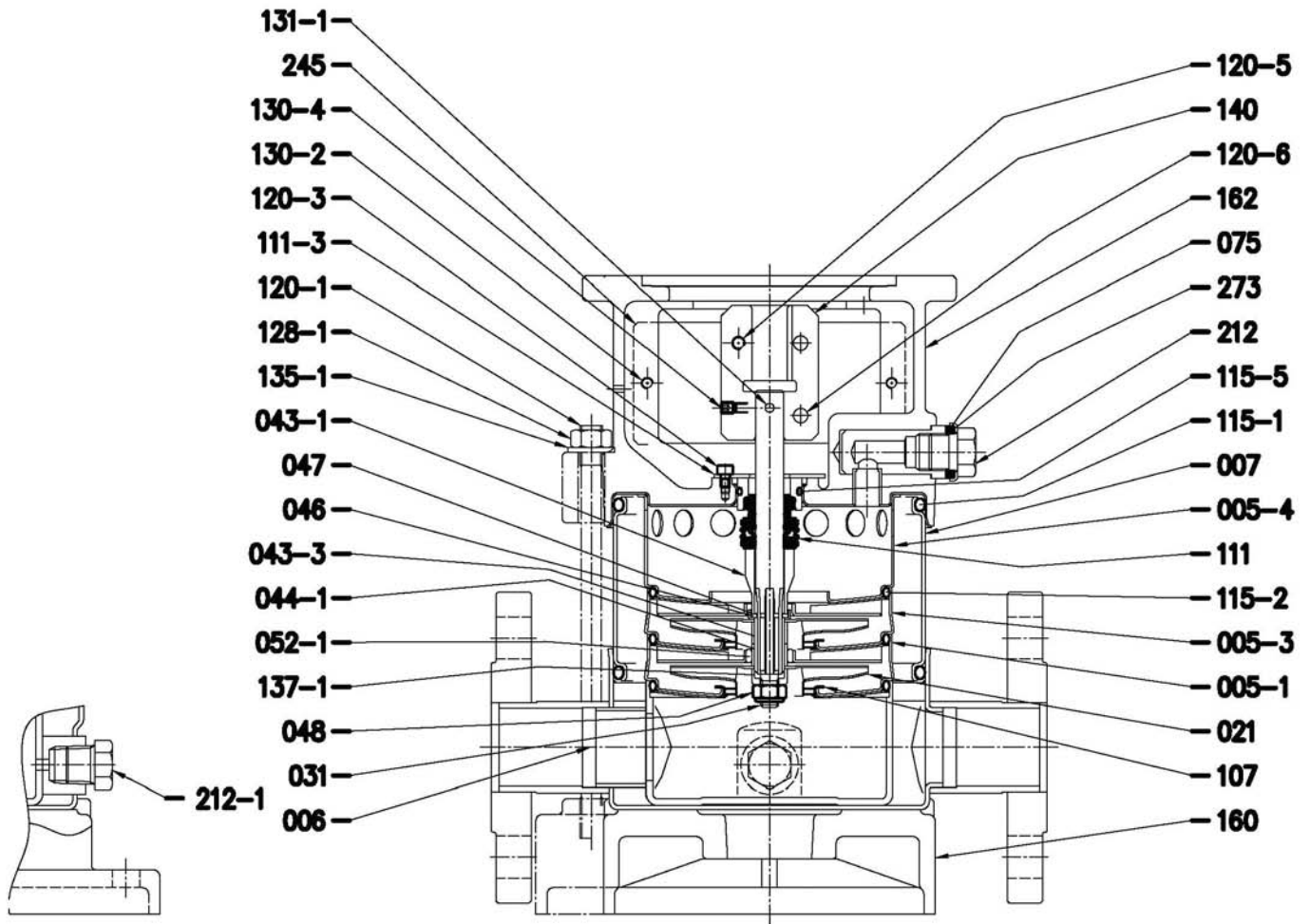
- (5) Using a new lower pump body o-ring (115/1), apply a light film of lubricant such as Dow Corning #4, or similar, to the o-ring and place it over the hydraulic assembly and into the pump casing ensuring that it is seated.
- (6) Place the pump body (007) over the entire assembly and align it with the o-ring installed into the pump casing. The tie rods will complete the seating of the pump body (007) into the pump casing.
- (7) Using a new upper pump body lower o-ring (115/1), apply a light film of lubricant such as Dow Corning #4, or similar, to the o-ring and place it into the o-ring groove on the upper pump body (007) ensuring that it is seated.
- (8) Replace the rotating mechanical seal mechanical seal assembly as detailed in Section 5.3 and 5.4.
- (9) Replace the stationary mechanical seal assembly as detailed in Section 5.3 and 5.4.
- (10) Carefully place the seal cover over the pump shaft ensuring not to damage the stationary seal face. Ensure that the vent pipe is vertically aligned with the with the drain connection of the pump casing.
- (11) Install the pump shaft key into the keyway.
- (12) Place the motor support onto the pump seal cover by tilting the assembly over the vent pipe. The solid coupling half must be turned toward the vent pipe to ensure that the pump shaft key will slide into the coupling keyway. The motor support should fit snugly onto the stationary seal assembly (011).
- (13) Replace four tie rods, threading them into the pump mounting base.
- (14) Replace the tie rod washers and nuts onto the tie rods finger tight.
- (15) Commence staggered tightening of the tie rod nuts to ensure even distribution of pressure and proper seating of the seal cover plate onto pump body (007). Tighten all nuts to fit snugly.
- (16) Place handle of soft mallet, or similar lever, into the pump suction so that the entire shaft may be raised slightly until the snap ring groove is above the lower lip of the pump coupling.
- (17) With the pump shaft assembly lifted slightly, replace the pump shaft snap ring (274/3 or 046/1) until seated into the groove at the end of the shaft. This will lock the pump shaft into the coupling.
- (18) Replace the lower coupling half and insert coupling bolts tightening them firmly. Ensure that coupling bolts are tightened evenly.
- (19) Replace coupling guards and fasten with coupling guard screws tightening them evenly.
- (20) Reinstall vent pipe plug.
- (21) For reassembly of motor, see Section 5.1.5.1 - Installing the motor on a bare pump.



SERIES PS

PARTS LIST

Model PSM3-2 thru PSM3-12

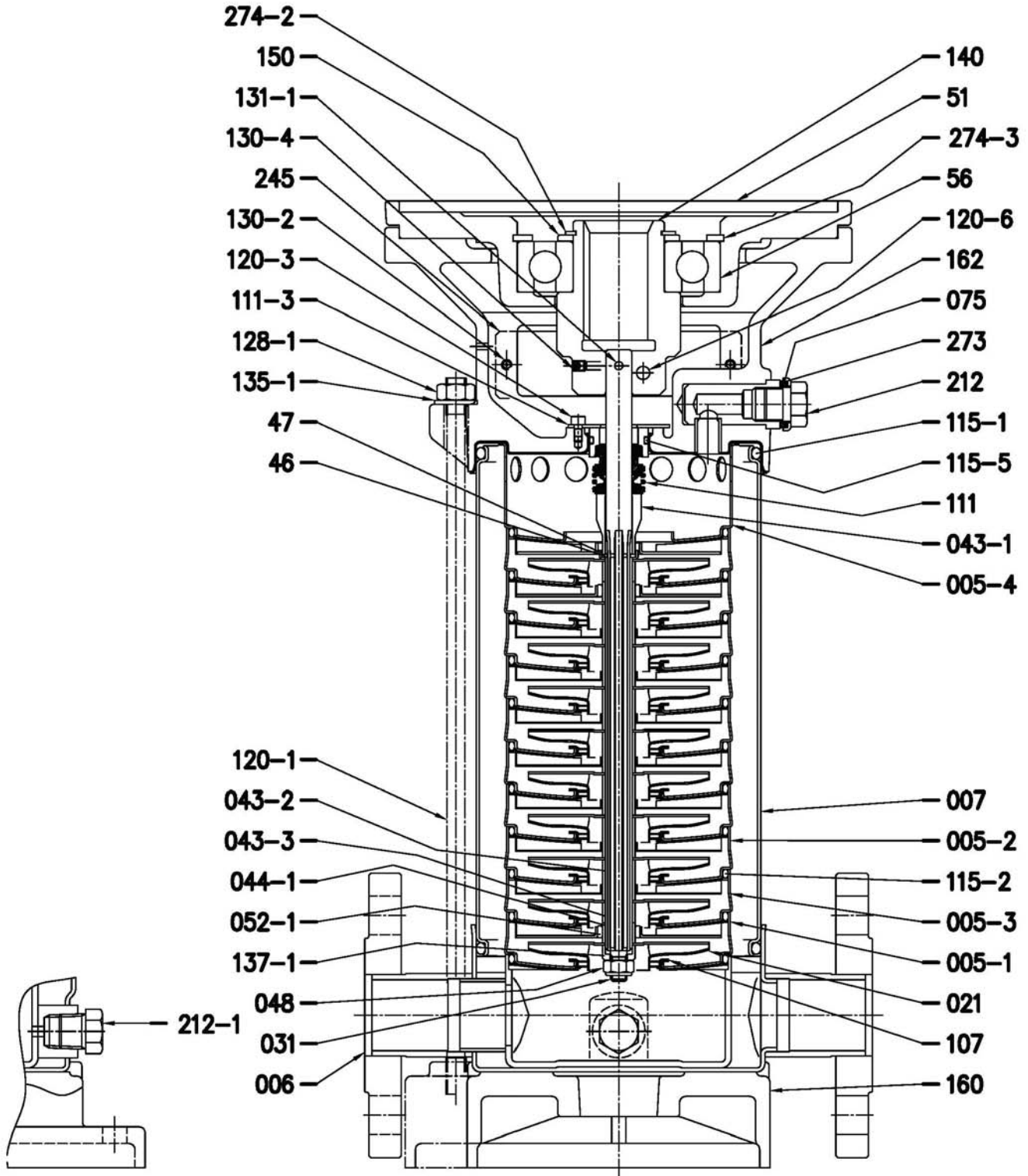




SERIES PS

PARTS LIST

Model PSM3-13 thru PSM3-18

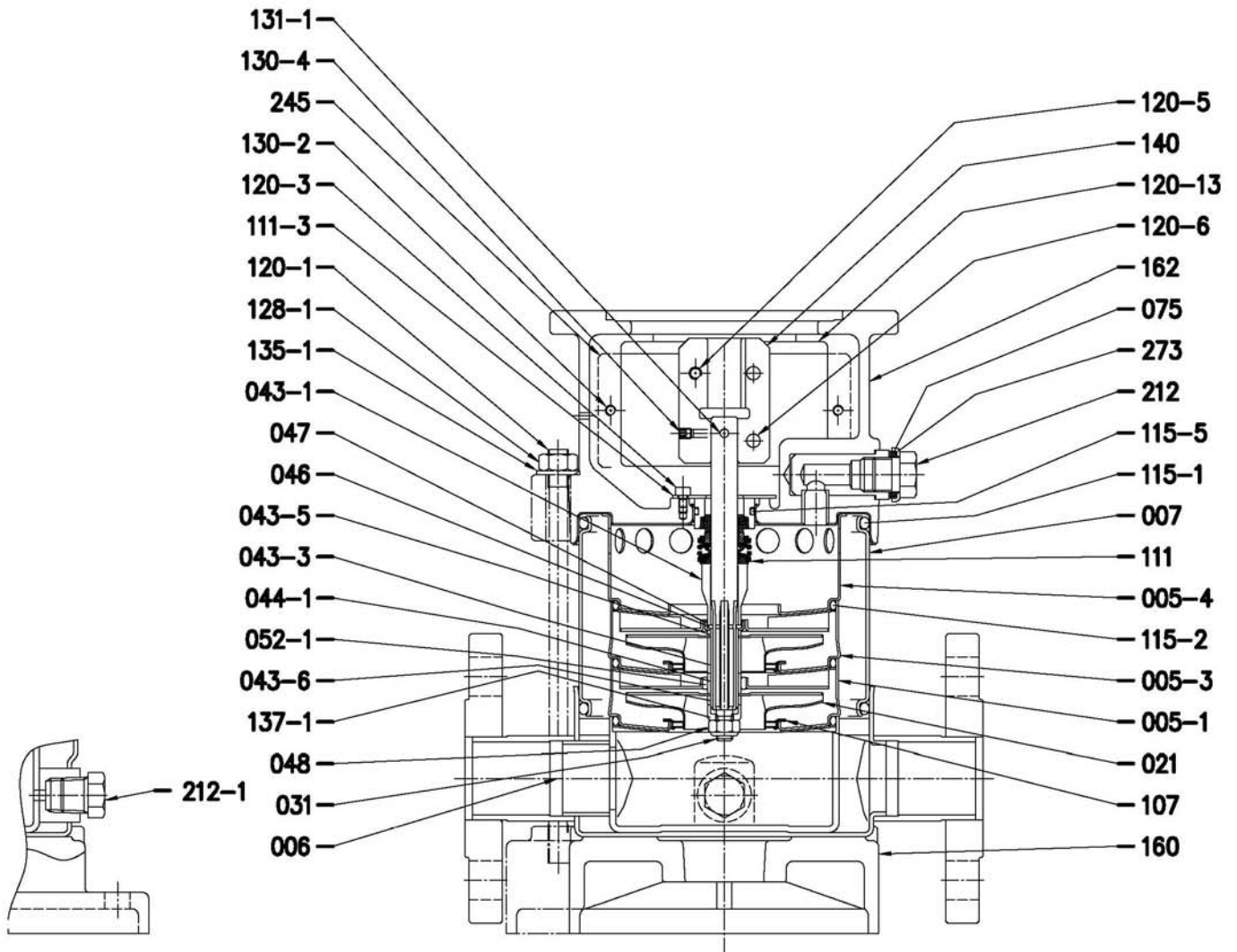




SERIES PS

PARTS LIST

Model PSM5-2 thru PSM5-6

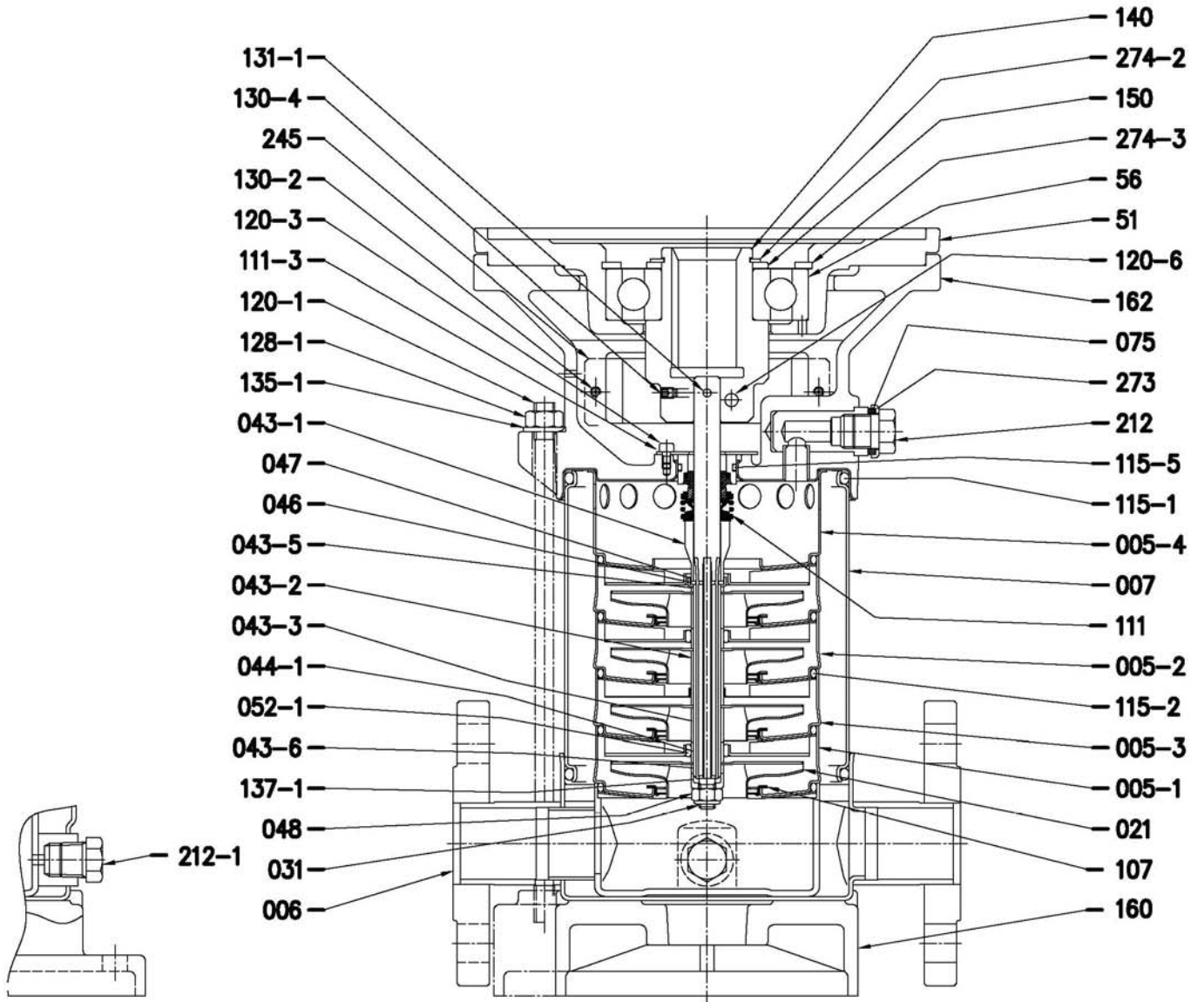




SERIES PS

PARTS LIST

Model PSM5-7 thru PSM5-16





SERIES PS
Parts List
MODEL - PSM3
PSM5

N°	Part name	Material
005-1	Suction casing	EN 1.4301(AISI 304)
005-2	Intermediate casing	EN 1.4301(AISI 304)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)
005-4	Discharge casing	EN 1.4301(AISI 304)
006	Bottom casing	EN 1.4301(AISI 304)
007	Outer casing	EN 1.4301(AISI 304)
021	Impeller	EN 1.4301(AISI 304)
031	Shaft	EN 1.4401 (AISI 316)
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)
044-1	Shaft sleeve bearing	Tungsten carbide
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)
047	Ring holder	EN 1.4301(AISI 304)
048	Impeller nut	A2-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561
052-1	Bearing	Tungsten carbide
056	Ball bearing	
070-1	Ring for bearing	EN 1.4301(AISI 304)
075	O-ring (plug)	FPM
075-1	O-ring (plug)	FPM
107	Liner ring	PTFE/EN 1.4401 (AISI 316)
111	Mechanical seal	Silicon carbide/Carbon/FPM
111-3	Mechanical seal seat	EN 1.4301(AISI 304)
115-1	O-ring (outer casing)	FPM
115-2	O-ring (intermediate casing)	FPM
115-5	O-ring	FPM



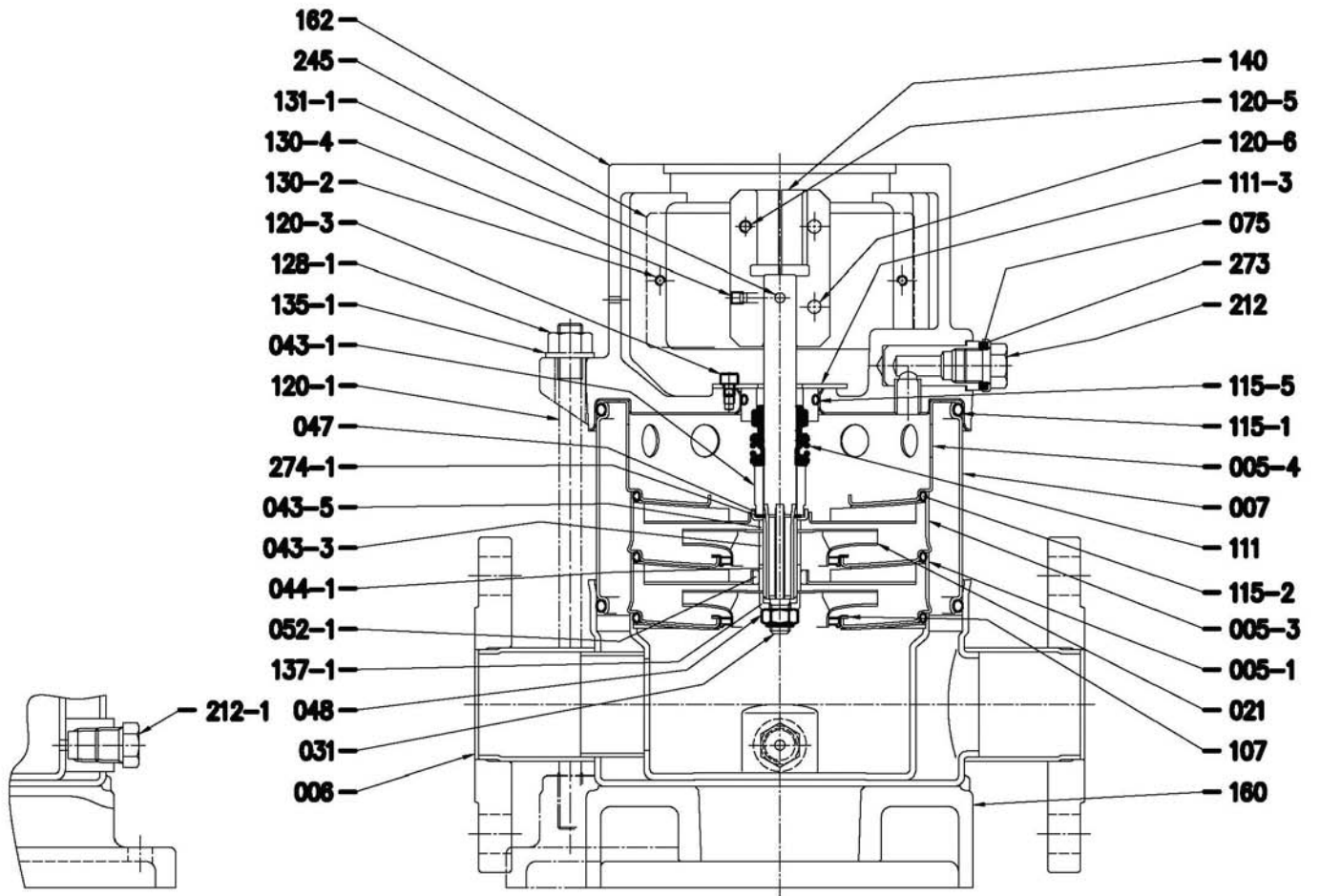
SERIES PS
Parts List
MODEL - PSM3
PSM5

N°	Part name	Material
120-1	Tie rod	Zincate steel
120-3	Screw	A2-70 UNI 7323
120-5	Screw for coupling	Zincate stl 8.8 strgth class ISO 898/1
120-6	Screw for coupling	Zincate stl 8.8 strgth class ISO 898/1
128-1	Nut for tie rod	Zincate steel
130-2	Screw for coupling guard	A2-70 UNI 7323
130-4	Set-screw	Carbon steel
131-1	Pin for shaft	Carbon steel
135-1	Washer	Zincate steel
135-4	Washer (bearing)	Carbon steel
137-1	Impeller spacer	EN 1.4301(AISI 304)
140	Coupling	Brass OT 58 UNI 5705
150	Spacer	Carbon steel
160	Base	Cast iron EN-GJL-200-EN 1561
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561
212	Plug	EN 1.4301(AISI 304)
212-1	Plug	EN 1.4301(AISI 304)
245	Coupling guard	EN 1.4301(AISI 304)
273	Washer (plug)	EN 1.4301(AISI 304)
273-1	Washer (plug)	EN 1.4301(AISI 3 04)
274-2	C-type snap ring (coupling)	EVMU3 13, EVMU5 7 ,8
		EVMU3 15, 18, EVMU5 10 to 16
274-3	C-type snap ring (bracket)	EVMU3 13, EVMU5 7 ,8
		EVMU3 15, 18, EVMU5 10 to 16



SERIES PS

Model PSM10-2 thru PSM10-3

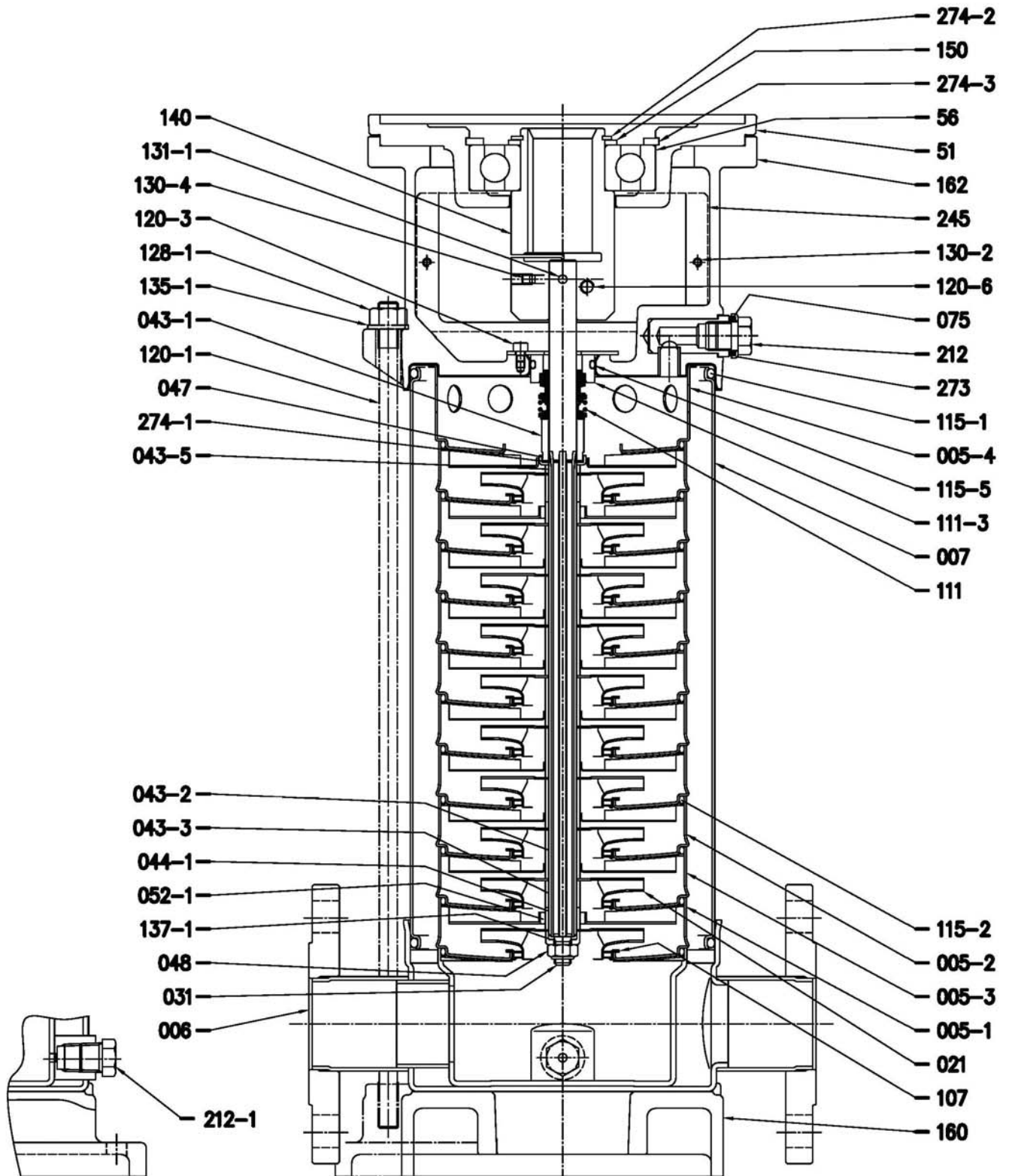




SERIES PS

PARTS LIST

Model PSM10-4 thru PSM10-12

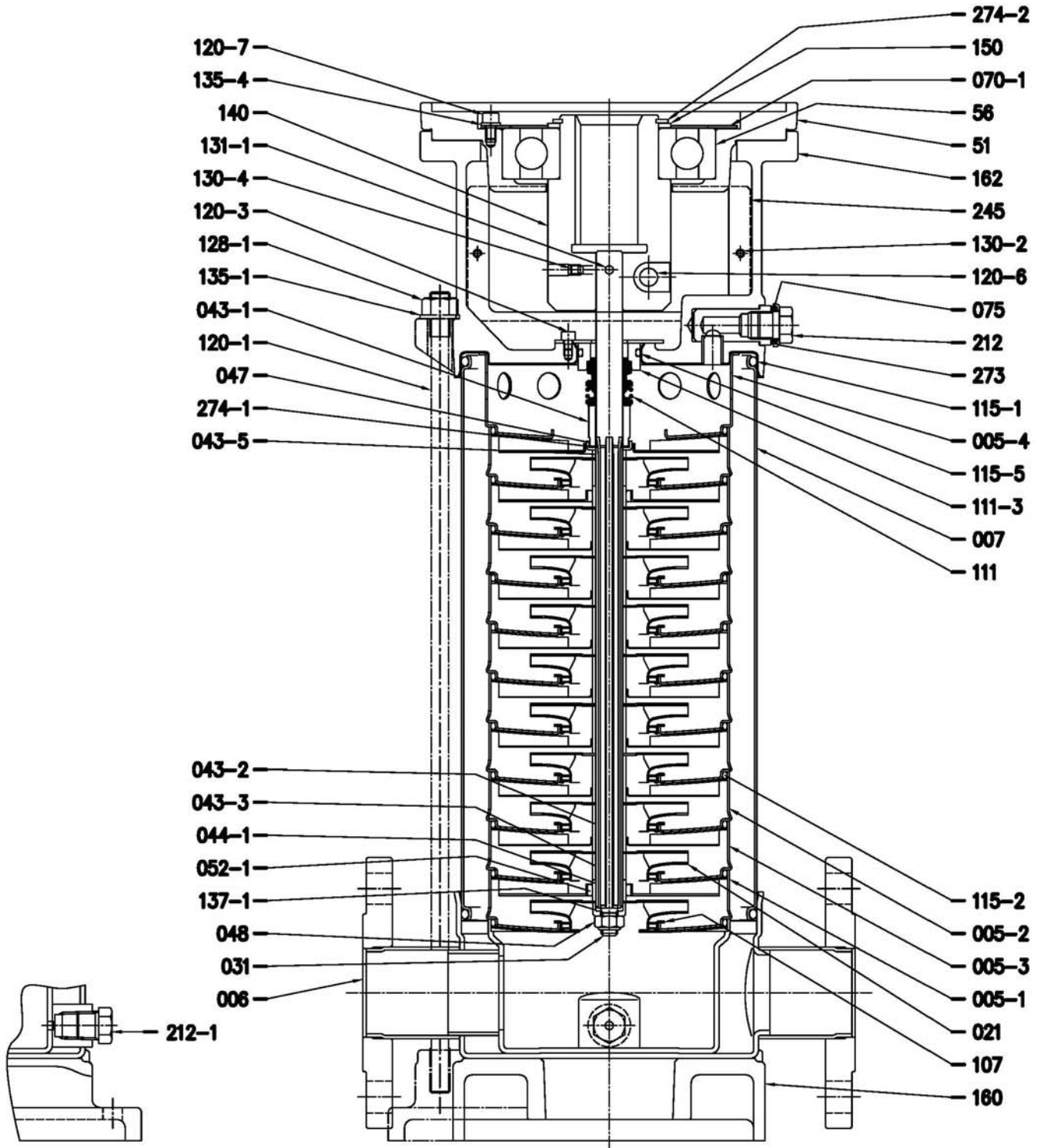




SERIES PS

PARTS LIST

Model PSM10-14 thru PSM10-16

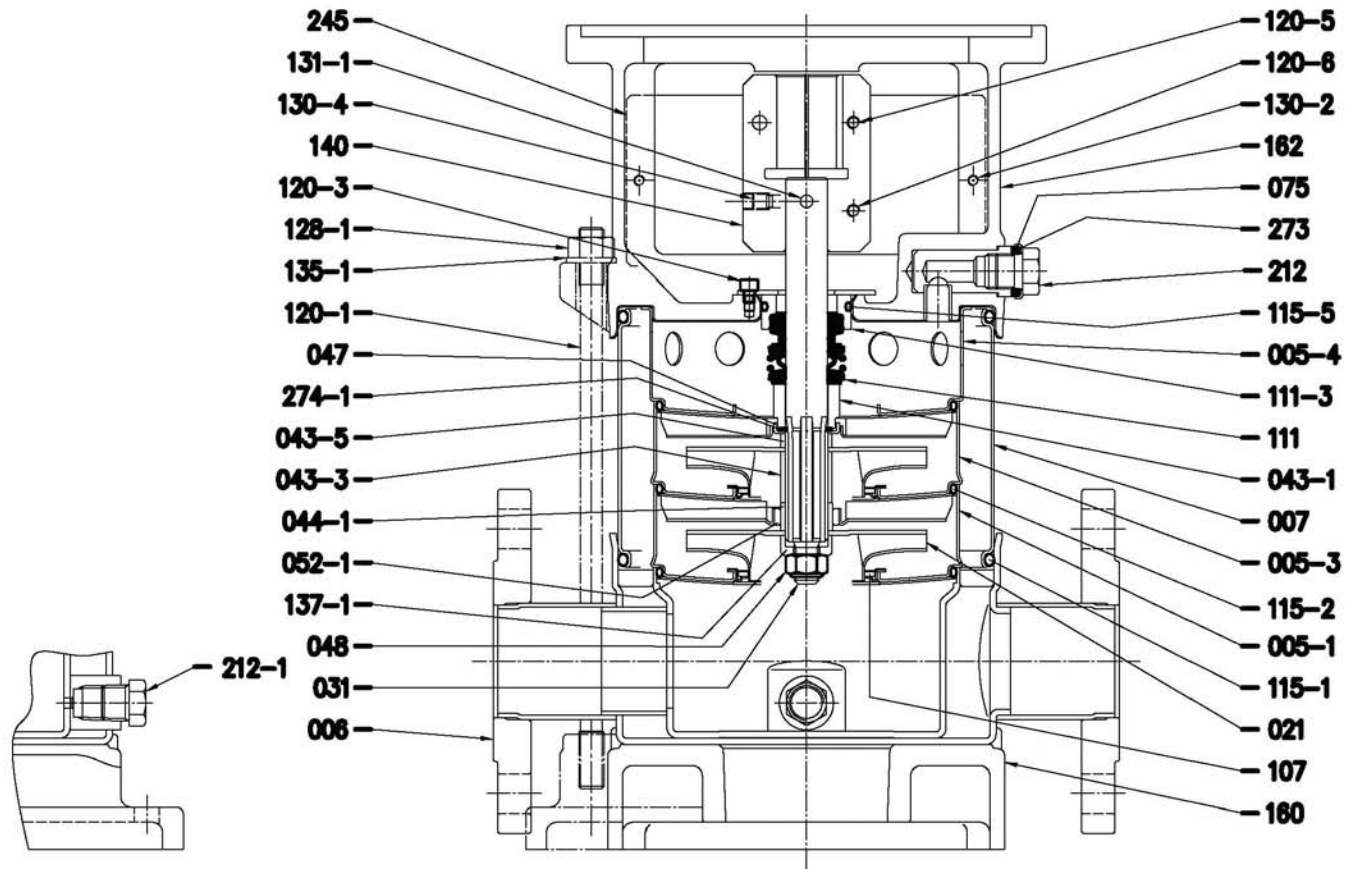




SERIES PS

PARTS LIST

Model PSM18-2

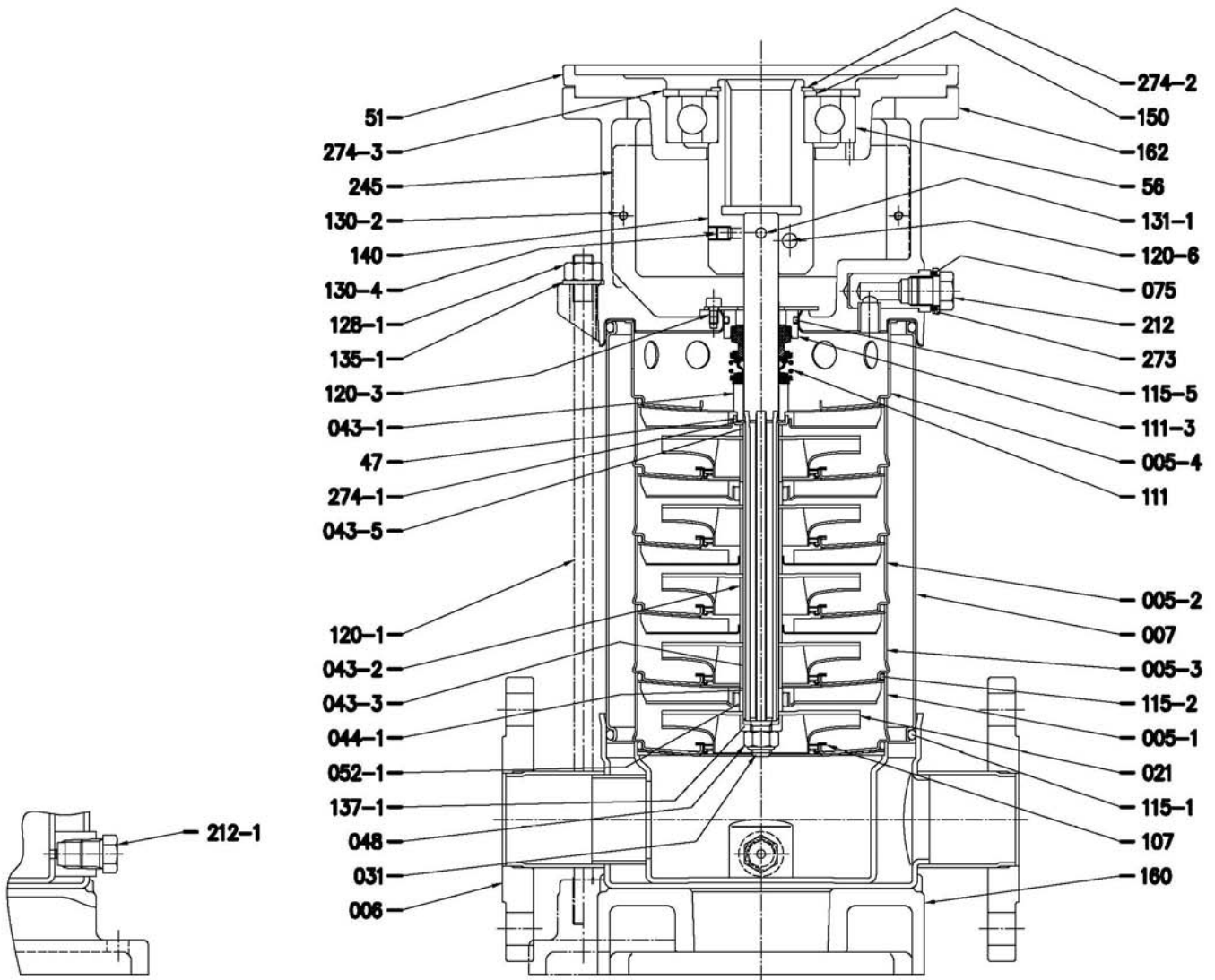




SERIES PS

PARTS LIST

Model PSM18-3 thru PSM18-5

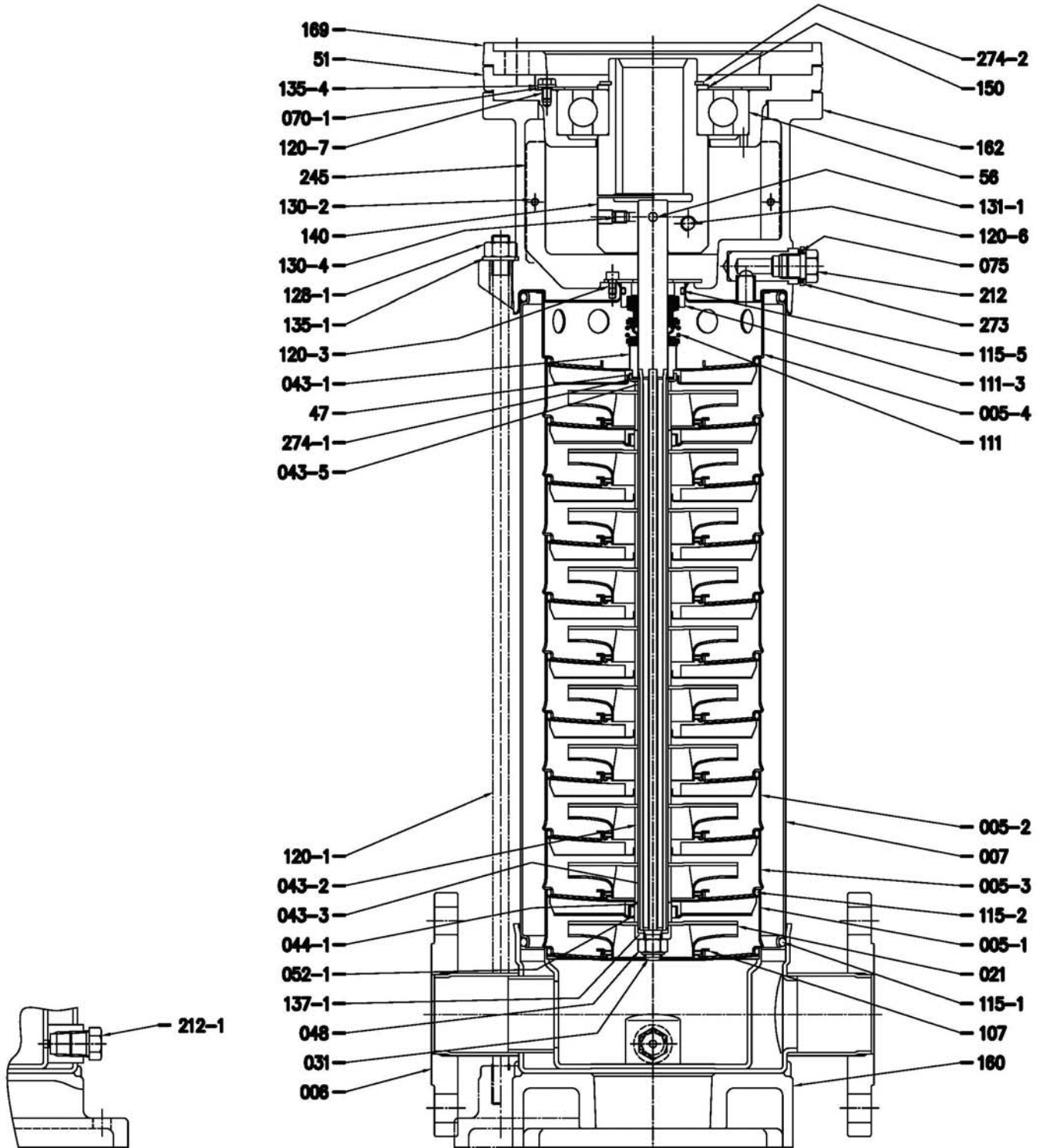




SERIES PS

PARTS LIST

Model PSM18-6 thru PSM18-11





SERIES PS
Parts List
MODEL - PSM10

N°	Part name	Material
005-1	Suction casing	EN 1.4301(AISI 304)
005-2	Intermediate casing	EN 1.4301(AISI 304)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)
005-4	Discharge casing	EN 1.4301(AISI 304)
006	Bottom casing	EN 1.4301(AISI 304)
007	Outer casing	EN 1.4301(AISI 304)
021	Impeller	EN 1.4301(AISI 304)
031	Shaft	EN 1.4401 (AISI 316)
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)
044-1	Shaft sleeve bearing	Tungsten carbide
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)
047	Ring holder	EN 1.4301(AISI 304)
048	Impeller nut	A2-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561
052-1	Bearing	Tungsten carbide
056	Ball bearing	See table pag. 500
070-1	Ring for bearing	EN 1.4301(AISI 304)
075	O-ring (plug)	FPM
075-1	O-ring (plug)	FPM
107	Liner ring	PTFE/EN 1.4401 (AISI 316)
111	Mechanical seal	Silicon carbide/Carbon/FPM
111-3	Mechanical seal seat	EN 1.4301(AISI 304)
115-1	O-ring (outer casing)	FPM
115-2	O-ring (intermediate casing)	FPM
115-5	O-ring	FPM



SERIES PS
Parts List
MODEL - PSM10

N°	Part name	Material
120-1	Tie rod	Zincate steel
120-3	Screw	A2-70 UNI 7323
120-5	Screw for coupling	Zincate steel 8.8 strength class ISO 898/1
120-6	Screw for coupling	EVMU10 2, EVMU10 3
		EVMU10 4 to12
		EVMU10 14 to16
120-7	Screw (bearing)	Zincate steel 8.8 strength class ISO 898/1
128-1	Nut for tie rod	Zincate steel
130-2	Screw for coupling guard	A2-70 UNI 7323
130-4	Set-screw	Carbon steel
131-1	Pin for shaft	Carbon steel
135-1	Washer	Zincate steel
135-4	Washer (bearing)	Carbon steel
137-1	Impeller spacer	EN 1.4301(AISI 304)
140	Coupling	Brass OT 58 UNI 5705
150	Spacer	Carbon steel
160	Base	Cast iron EN-GJL-200-EN 1561
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561
212	Plug	EN 1.4301(AISI 304)
212-1	Plug	EN 1.4301(AISI 304)
245	Coupling guard	EN 1.4301(AISI 304)
273	Washer (plug)	EN 1.4301(AISI 304)
273-1	Washer (plug)	EN 1.4301(AISI 304)
274-1	C-type snap ring (coupling)	EN 1.4301(AISI 304)
274-2	C-type snap ring (coupling)	EVMU10 4
		EVMU10 5 to 8
		EVMU10 10 to 12
		EVMU10 14 to16
274-3	C-type snap ring (bracket)	EVMU10 4
		EVMU10 5 to 8
		EVMU10 10 to 12



SERIES PS
Parts List
MODEL - PSM18

N°	Part name	Material
005-1	Suction casing	EN 1.4301(AISI 304)
005-2	Intermediate casing	EN 1.4301(AISI 304)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)
005-4	Discharge casing	EN 1.4301(AISI 304)
006	Bottom casing	EN 1.4301(AISI 304)
007	Outer casing	EN 1.4301(AISI 304)
021	Impeller	EN 1.4301(AISI 304)
031	Shaft	EN 1.4401 (AISI 316)
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)
044-1	Shaft sleeve bearing	Tungsten carbide
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)
047	Ring holder	EN 1.4301(AISI 304)
048	Impeller nut	A2-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561
052-1	Bearing	Tungsten carbide
056	Ball bearing	See table pag. 500
070-1	Ring for bearing	EN 1.4301(AISI 304)
075	O-ring (plug)	FPM
075-1	O-ring (plug)	FPM
107	Liner ring	PTFE/EN 1.4401 (AISI 316)
111	Mechanical seal	Silicon carbide/Carbon/FPM
111-3	Mechanical seal seat	EN 1.4301(AISI 304)
115-1	O-ring (outer casing)	FPM
115-2	O-ring (intermediate casing)	FPM
115-5	O-ring	FPM



SERIES PS
Parts List
MODEL - PSM18

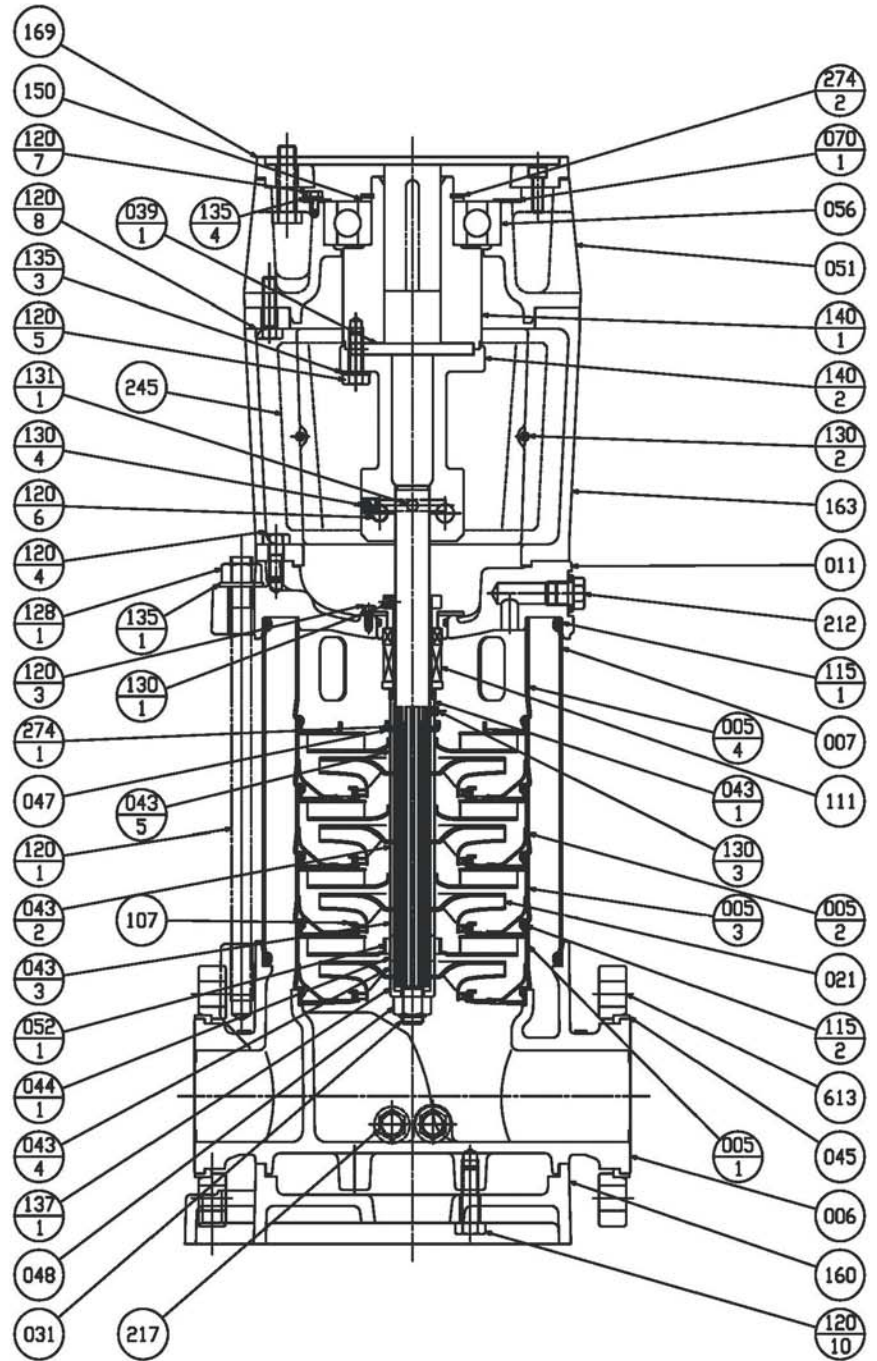
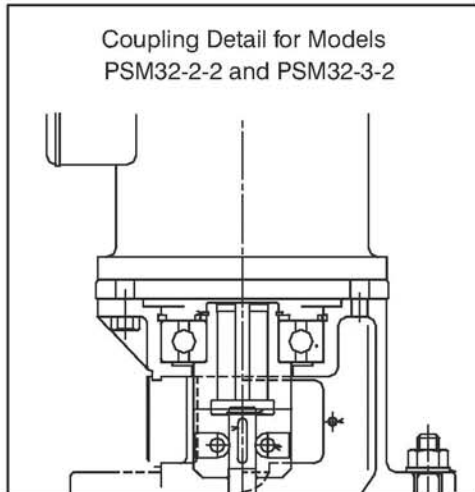
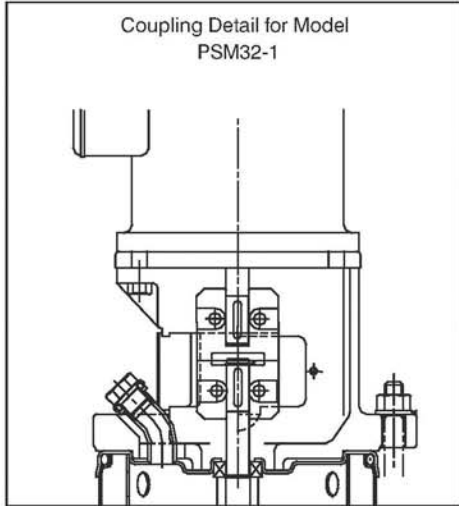
N°	Part name	Material
120-1	Tie rod	Zincate steel
120-3	Screw	A2-70 UNI 7323
120-5	Screw for coupling	Zincate steel 8.8 strength class ISO 898/1
120-6	Screw for coupling	EVMU18 2
		EVMU18 3 to 5
		EVMU18 6 to 11
120-7	Screw (bearing)	Zincate steel 8.8 strength class ISO 898/1
128-1	Nut for tie rod	Zincate steel
130-2	Screw for coupling guard	A2-70 UNI 7323
130-4	Set-screw	Carbon steel
131-1	Pin for shaft	Carbon steel
135-1	Washer	Zincate steel
135-4	Washer (bearing)	Carbon steel
137-1	Impeller spacer	EN 1.4301(AISI 304)
140	Coupling	Brass OT 58 UNI 5705
150	Spacer	Carbon steel
160	Base	Cast iron EN-GJL-200-EN 1561
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561
212	Plug	EN 1.4301(AISI 304)
212-1	Plug	EN 1.4301(AISI 304)
245	Coupling guard	EN 1.4301(AISI 304)
273	Washer (plug)	EN 1.4301(AISI 304)
273-1	Washer (plug)	EN 1.4301(AISI 304)
274-1	C-type snap ring (coupling)	EN 1.4301(AISI 304)
274-2	C-type snap ring (coupling)	EVMU18 3 to 4
		EVMU18 5
		EVMU18 6 to 10
		EVMU18 11
274-3	C-type snap ring (bracket)	EVMU18 3 to 4
		EVMU18 5



SERIES PS

PARTS LIST

Model PSM32





SERIES PS Parts List MODEL - PSM32

NO.	PART NAME	MATERIAL
005-1	Stage casing (suction)	AISI304
005-2	Stage casing	AISI304
005-3	Stage casing (bearing)	AISI304
005-4	Stage casing (Top)	AISI304
006	Bottom casing	Cast iron EN-GJL-250
007	Outer sleeve	AISI304
011	Casing cover	Cast iron EN-GJS-400-15
021	Impeller	AISI304
031	Shaft	AISI316
039-1	Key (coupling)	C45
043-1	Shaft sleeve (mechanical seal)	AISI304
043-2	Shaft sleeve (stage)	AISI304
043-3	Shaft sleeve (bearing/upper)	AISI304
043-4	Shaft sleeve (bearing/lower)	AISI304
043-5	Shaft sleeve (top)	AISI304
044-1	Bearing sleeve (stage)	Tungsten carbide
045	Adjusting ring	C40
047	Split ring retainer	AISI304
048	Friction nut	AISI304
051	Bearing housing	Cast iron EN-GJL-200
052-1	Bearing (stage)	Tungsten carbide
056	Ball bearing	-
070-1	Bearing holder	AISI304
107	Wear ring	AISI316+PTFE
111	Mechanical seal Cartridge ass'y	SiC/Carbon/FPM/316
115-1	O-ring (outer)	FPM
115-2	O-ring (stage)	FPM
120-1	Tie-rod bolt	Zincate steel with 6.8 strength class ISO 898/1
120-3	Bolt (mechanical seal)	Stainless steel A2-70 ISO3506
120-4	Bolt (casing cover)	Stainless steel A2-70 ISO3506
120-5	Bolt (coupling M-side)	Zincate steel with 8.8 strength class ISO 898/1
120-6	Bolt (coupling P-side)	Zincate steel with 8.8 strength class ISO 898/1
120-7	Bolt (bearing)	Zincate steel with 8.8 strength class ISO 898/1
120-8	Bolt (bearing housing)	Zincate steel with 8.8 strength class ISO 898/1
120-10	Bolt (base plate)	Zincate steel with 8.8 strength class ISO 898/1
128-1	Nut (tie-rod bolt)	Zincate steel with 6S strength class ISO 898/2
130-1	Screw (mechanical seal)	Stainless steel A2-70 ISO3506
130-2	Screw (coupling guard)	Stainless steel A2-70 ISO3506
130-3	Screw (mechanical seal)	Stainless steel A2-70 ISO3506
130-4	Screw (coupling pin)	Strength class 45H ISO898/5
131-1	Pin (shaft)	CF35SMnPb10
135-1	Washer (tie-rod bolt)	Zincate steel
135-3	Spring washer (coupling bolt M-side)	Zincate steel
135-4	Spring washer (bearing)	Zincate steel
137-1	Shaft end sleeve	AISI304
140-1	Coupling upper half	Steel (36SMnPb14)
140-2	Coupling lower half	Steel (36SMnPb14)
150	Spacer (coupling)	C45
160	Base plate	Cast iron EN-GJL-200
163	Motor stool	Cast iron EN-GJL-200
169	Motor liner	Cast iron EN-GJL-200
212	Vent plug (with seal ring)	AISI304/FPM
217	Plug (with seal ring)	AISI304/FPM
245	Coupling guard	AISI304
274-1	C-ring (top)	AISI304
274-2	C-ring (coupling)	Carbon tool steel (TC80)
613	Pump flange	C40

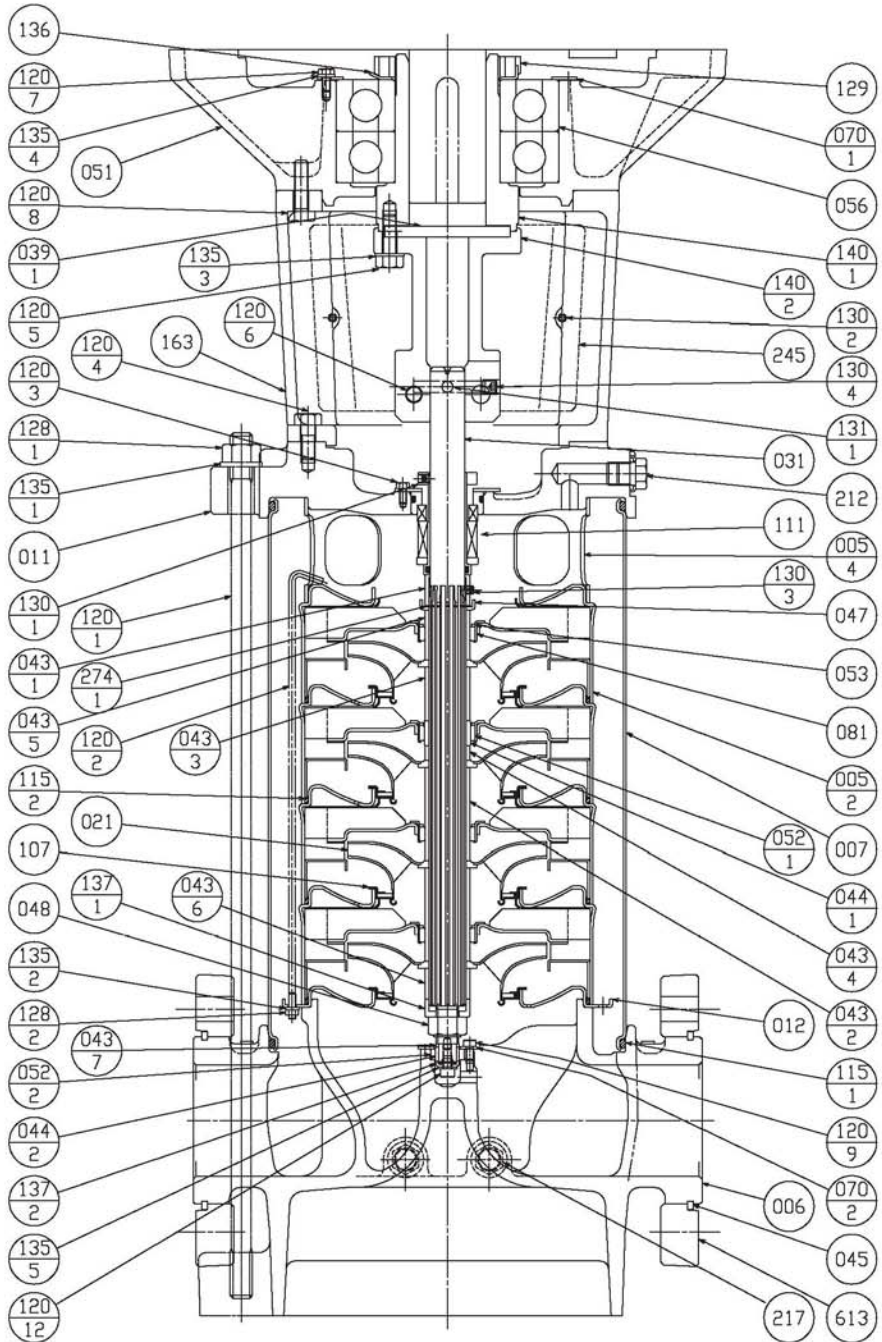
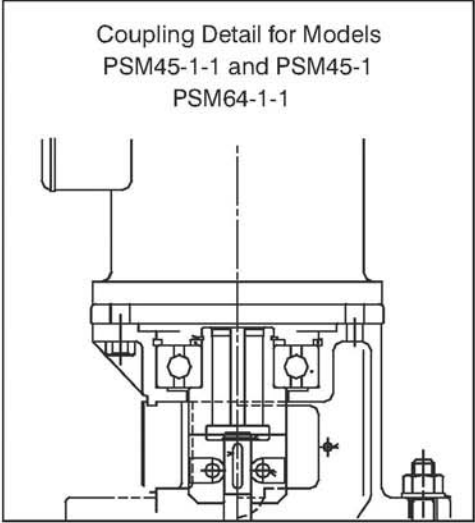


SERIES PS

PARTS LIST

Model PSM45 and PSM64

Coupling Detail for Models
PSM45-1-1 and PSM45-1
PSM64-1-1





SERIES PS
Parts List
MODEL - PSM45
PSM64

NO.	PART NAME	MATERIAL
005-2	Stage casing	AISI304
005-4	Top casing	AISI304
006	Bottom casing	16bar:Cast iron EN-GJL-250 25bar:Cast iron EN-GJS-400-15
007	Outer sleeve	AISI304
011	Casing cover	Cast iron EN-GJS-400-15
012	Suction cover	AISI304
021	Impeller	AISI304
031	Shaft	AISI316
039-1	Key (coupling)	C45
043-1	Shaft sleeve (mechanical seal)	AISI304
043-2	Shaft sleeve (stage)	AISI304
043-3	Shaft sleeve (bearing/upper)	AISI304
043-4	Shaft sleeve (bearing/lower)	AISI30
043-5	Shaft sleeve (top)	AISI304
043-6	Shaft sleeve (suction)	AISI304
043-7	Shaft sleeve (bottom bearing)	AISI304
044-1	Bearing sleeve (stage)	Tungsten carbide
044-2	Bearing sleeve (bottom bearing)	Tungsten carbide
045	Adjusting ring	C40
047	Split ring retainer	AISI304
048	Friction nut	AISI304
051	Bearing housing	Cast iron EN-GJL-200
052-1	Bearing (stage)	Tungsten carbide
052-2	Bearing (bottom)	Tungsten carbide
053	Bush holder	AISI304
056	Ball bearing	-
070-1	Bearing holder	AISI304
070-2	Bearing holder (bottom bearing)	AISI304
081	Bush	PTFE(ally)
107	Wear ring	AISI316+PTFE
111	Mechanical seal Cartridge ass'y	SiC/Carbon/FPM/316
115-1	O-ring (outer)	FPM
115-2	O-ring (stage)	FPM
120-1	Tie-rod bolt	Zincate steel with 6.8 strength class ISO 898/1
120-2	Stack bolt	AISI304
120-3	Bolt (mechanical seal)	Stainless steel A2-70 ISO3506
120-4	Bolt (casing cover)	Stainless steel A2-70 ISO3506
120-5	Bolt (coupling M-side)	Zincate steel with 8.8 strength class ISO 898/1
120-6	Bolt (coupling P-side)	Zincate steel with 8.8 strength class ISO 898/1
120-7	Bolt (bearing)	Zincate steel with 8.8 strength class ISO 898/1
120-8	Bolt (bearing housing)	Zincate steel with 8.8 strength class ISO 898/1
120-9	Bolt (bottom bearing)	Stainless steel A2-70 ISO3506
120-12	Bolt (shaft end)	Stainless steel A2-70 ISO3506
128-1	Nut (tie-rod bolt)	Zincate steel with 6S strength class ISO 898/2
128-2	Nut (Stack bolt)	AISI304
129	Bearing nut (coupling)	Carbon steel
130-1	Screw (mechanical seal)	Stainless steel A2-70 ISO3506
130-2	Screw (coupling guard)	Stainless steel A2-70 ISO3506
130-3	Screw (mechanical seal)	Stainless steel A2-70 ISO3506
130-4	Screw (coupling pin)	Strength class 45H ISO898/5
131-1	Pin (shaft)	CF35SMnPb10
135-1	Washer (tie-rod bolt)	Zincate steel
135-2	Spring washer (Stack bolt)	AISI304
135-3	Spring washer (coupling bolt M-side)	Zincate steel
135-4	Spring washer (bearing)	Zincate steel
135-5	Spring washer (shaft end)	AISI304
136	Bearing washer (coupling)	Carbon steel
137-1	Shaft end sleeve	AISI304
137-2	Shaft end sleeve	AISI304
140-1	Coupling upper half	Steel (36SMnPb14)
140-2	Coupling lower half	Steel (36SMnPb14)
163	Motor stool	Cast iron EN-GJL-200
212	Vent plug (with seal ring)	AISI304/FPM
217	Plug (with seal ring)	AISI304/FPM
245	Coupling guard	AISI304
274-1	C-ring (top)	AISI304
613	Pump flange	C40

1A1 MODEL Cartridge Filter Housing



The 1A1 MODEL Cartridge Filter Housing is an all-metal, two-piece housing, featuring centerpost-type construction. The 1 A1 Model has a maximum operating temperature and pressure of 125 psig at 200°F. The 1A1 Model Cartridge Filter Housing has flow rates to up to 6 Gallons Per Minute (GPM).

APPLICABLE FILTER CARTRIDGES

Micro-Klean— III (Series U30)

Betapure—

DESIGN FEATURES

- All-metal, two-piece construction.
- Head and Sump Durable die-cast aluminum
- Mounting pads drilled to accept self-tapping screws provided with the optional mounting bracket.
- Centerpost-type design for easy cartridge changeout.

Options

- Mounting bracket; order separately.

STANDARD MODEL SPECIFICATIONS

Table 1 gives specifications for the 1A1 Model. Note that Maximum Operating Pressure is the rating for the housing only. Actual filter operating temperature depends on temperature capability of the filter cartridge used in the housing.

Operating Data	1A1 Model
Maximum Operating Pressure and Temperature	125 psi @ 200°F
Flow Rate (GPM)	See Table 2.
Materials of Construction	
Head and Sump	Die-Cast Aluminum
Centerpost	Stainless Steel
Head Gasket	Buna N & Cork
Cap-Nut Gasket	Fiber
Connection Sizes	3/8" NPTF
Cartridge Requirements	The model uses one filter cartridge. See "Cartridge Requirements" for more information.

TABLE 1 - SPECIFICATIONS

CARTRIDGE REQUIREMENTS

The 1A1 Model Cartridge Filter Housing uses one Micro-Klean III Cartridge or one Betapure Cartridge Filter.

FLOW RATES

Table 2 gives maximum flow rates in Gallons Per Minute (GPM) for the 1A1 Model Cartridge Filter Housings. Do not use Table 2 for filter sizing. Use the table as a guide only in establishing the housing flow rates. When you know the flow rate for a selected cartridge, then use the table to determine whether or not the housing is within the recommended flow rate. Remember to consider the amount of contaminant to be removed when selecting a filter.

Housing Model	Inlet / Outlet	FLOW (GPM)					
		Water	80 SSU	150 SSU	300 SSU	600 SSU	1000 SSU
1A1	3/8" NPTF	6	5	4.5	4	3.5	3

TABLE 2 - RECOMMENDED FLOW RATES

BENEFITS

- Long Service Life
- Quick and Easy Cartridge Change-out
- Reduced Down Time for Filter Change-out
- Reduced Labor Cost
- Uses Standard Filters
- Economical
- Easily Mounted to Wall or Support Structure





STANDARD MODEL DIMENSIONS

Table 3 gives dimensions in inches and shipping weight in pounds for the 1A1 Model Cartridge Filter Housing. These should be used for rough plumbing and approximate size definition. Note that figure 1 defines a length or width by a letter symbol in the top row. The square where the row and column meet is the selected dimension.

Model	A	B	C	D	Shipping Weight
1A1	6 3/16"	4 15/16"	3 1/2"	2 3/4"	3 lbs

TABLE 3. - 1A1 HOUSING DIMENSIONS

1A1 MODEL ORDERING GUIDE

Plant Code 01 Product Code 020

Model	Catalog Number	Mounting Bracket Kit*
1A1	44109-01	35581-05

* Order Separately

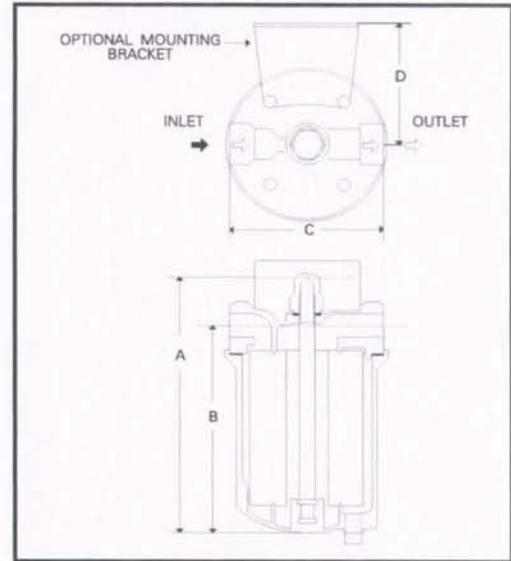


FIGURE 1. - 1A1 MODEL FILTER HOUSING

WARRANTY

Seller warrants its equipment against defects in workmanship and material for a period of 12 months from date of shipment from the factory under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by Seller and for purposes disclosed in writing at the time of purchase, if any. Any unauthorized alteration or modification of the equipment by Buyer will void this warranty. Seller's liability under this warranty shall be limited to the replacement or repair, F.O.B., point of

manufacture, of any defective equipment or part which, having been returned to the factory, transportation charges prepaid, has been inspected and determined by Seller to be defective. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, AS TO DESCRIPTION, QUALITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR ANY OTHER MATTER. Under no circumstances shall Seller be liable to Buyer or any third party for any loss of profits or



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LAKE WORTH,
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