



Hydroconstant® Variable Speed Fluid Drives

Typical Specifications

Hydroconstant Variable Speed Drives

The variable speed drive(s) shall be the oil filled type capable of power transmission throughout its (their) complete speed range without vibration, noise or shock loading. The drive manufacturer shall have a minimum of twenty years variable speed drive manufacturing and application experience and shall furnish and be responsible for the proper function of all motors, pumps, controls, and sensors associated with the variable speed drives.

The equipment shall be

- shipped as a prepacked, prewired packaged system.
- shipped as components for on-site installation.

Each variable speed drive shall be run tested by the manufacturer for operation at minimum and maximum speeds with the centrifugal pump load selected for the application or with the load of a dynamometer or similar calibrated device. The drive manufacturer shall provide written certification to the  consulting engineer  owner  owner's representative that each drive operated properly during test and that the pump(s) supplied delivered its (their) specified flow and conditions. Absence of test certification will be grounds for equipment rejection by the owner or his representative. The owner/operator should be present at time of startup for instructions on proper operation and routine maintenance procedures.

Drive Type

The variable speed drive shall be a horizontal, foot mounted drive with

- motor and end suction pump mounted directly on the drive housing, **Type MP drive.**
- motor mounted directly on the drive housing and the  pump  fan  load flexibly coupled to the output shaft, **Type M drive.**
- motor flexibly coupled to the drive input shaft and the  pump  fan  load flexibly coupled to the drive output shaft, **Type MO drive.**
- end suction pump mounted directly on the drive housing and motor flexibly coupled to the drive input shaft, **Type MX drive.**

All equipment furnished with flexible shaft couplings shall have coupling guards. Variable speed drives, pumps and motors shall be mounted on a  fabricated steel base  fabricated steel drip rim base. The manufacturer shall accurately align flexibly coupled shafts prior to shipment. After field installation, but prior to grouting the base, a millwright or similarly qualified person shall verify or correct shaft alignment.

Driven Equipment

The equipment driven by the variable speed drive(s) shall be

- close coupled end suction pump(s)
- frame mounted end suction pump(s)
- horizontal split-case single stage pump(s)
- horizontal multi-stage pump(s)
- \_\_\_\_\_ centrifugal pump(s)
- \_\_\_\_\_ centrifugal fan(s)

as detailed in the following specifications.

(Note to specification writer: Variable speed drive specification may be completed by inserting specification details pertinent to the equipment being driven.)

Motors

The motor shall be a NEMA standard design B horizontal ball bearing motor

- close coupled (Types M and MP drives)
- flexibly coupled (Types MO and MX drives)

to the variable speed drive with a nominal full load speed of

- |   |   |
|---|---|
| <b>60 Hertz speeds</b>                          | <b>50 Hertz speeds</b>                          |
| <input type="checkbox"/> 3500 RPM (max. HP 100) | <input type="checkbox"/> 2900 RPM (max. HP 75)  |
| <input type="checkbox"/> 1750 RPM (max. HP 250) | <input type="checkbox"/> 1450 RPM (max. HP 200) |

when powered by electrical service rated \_\_\_\_\_ volts, \_\_\_\_\_ Hertz, three phase. The motor enclosure shall be  open dripproof  totally enclosed fan cooled  Class 1, Group D explosion proof. Motors shall be supplied which have greaseable ball bearings.

Electrical Controls and Sensors

All electrical control circuitry and system function sensors shall be supplied by the variable speed drive manufacturer. The primary power controls and motor starters shall be installed in  the controls supplied by the drive manufacturer  the motor control center installed by the  owner  electrical contractor.

The sensor(s) shall be located in the system to control drive speed as a function of

- constant pump discharge pressure.
- constant system pressure at the location designated on the plans.
- differential pressure control between the system piping supply and return headers at the location designated on the plans.
- differential pressure control at the location(s) designated on the plans.
- liquid level control in the sump location designated on the plans.
- flow control in the system at the location designated on the plans.

Connection between the sensor(s) and the variable speed drive controls shall be accomplished with

- hydraulic sensing lines: copper, brass or stainless steel
- copper wiring on required leads for each sensor, not less than \_\_\_\_\_ gauge.
- telemetry as manufactured by \_\_\_\_\_ and supplied by the variable speed drive manufacturer.

All control wiring shall conform to National Electrical Code and the local electrical code of \_\_\_\_\_ (project location when applicable).

Submittals and Specification Compliance

The variable speed drive manufacturer shall provide \_\_\_\_\_ copies each of the following submittal data pertinent to the specified equipment, certified for construction, upon acceptance by the  owner  owner's representative  plant manager  consulting engineer  architect:

- outline dimension drawing for motor/drive/pump assembly
- performance curve for  pump  fan  load selected for this application
- general arrangement drawing for control panel compartments and components specified for this application
- drive manufacturer's product application brochures detailing the specified equipment to be a standard manufactured product
- installation, operation and maintenance manuals for pumps, drives and control equipment

Failure of the variable speed drive manufacturer to provide the specified data will be just cause to reject equipment.

**VARIABLE SPEED PUMPING SYSTEMS**  
Hydroconstant® Variable Speed Fluid Drives



Peerless Pump Company  
Indianapolis, IN 46207-7026

**Operating Data 60 Hertz**

NOMI- NAL RPM*	TYPE	FLUID CPLG. SIZE	BHP IN		% SLIP		CIRC LOSS HP	% EFF.		BHP OUT		RPM OUT		
			FULL LOAD	115% LOAD	FULL LOAD	115% LOAD		FULL LOAD	115% LOAD	FULL LOAD	115% LOAD	FULL LOAD	115% LOAD	
1750	M,MP,MO,MX	8C	3	3.45	5.0	5.5	.45	80.0	81.2	2.4	2.8	1640	1615	
		8C	5	5.75	6.7	7.6	.45	84.0	85.2	4.2	4.9	1610	1580	
		8C	7.5	8.62	9.3	11.0	.45	85.3	84.7	6.4	7.3	1565	1520	
	M,MP,MO,MX	9B	7.5	8.62	4.2	4.65	0.5	89.1	89.5	6.7	7.71	1675	1665	
		9B	10	11.5	5.1	5.6	0.5	89.9	90.1	9.0	10.4	1650	1640	
		11B	10	11.5	1.86	2.1	0.75	90.8	91.5	9.1	10.5	1708	1700	
		9B	15	17.25	6.65	7.3	0.5	90.0	89.8	13.5	15.5	1630	1620	
		11B	15	17.25	2.45	2.65	0.75	92.6	93.0	13.0	16.0	1705	1700	
		11B	20	23.0	2.9	3.1	0.75	93.2	93.6	18.6	21.5	1700	1695	
		11B	25	28.75	3.2	3.5	0.75	93.8	93.9	23.5	27.0	1690	1685	
		11B	30	34.5	3.6	3.95	0.75	93.4	93.9	28.0	32.4	1685	1680	
		11B	40	46.0	4.4	5.0	0.75	93.7	93.4	37.5	43.0	1670	1660	
		11B	50	57.5	5.45	6.4	0.75	93.1	92.3	46.8	53.1	1655	1635	
	MO	14B	60	69.0	2.7	3.0	1.68	94.5	94.7	56.7	65.3	1720	1700	
		14B	75	86.25	3.3	3.7	1.68	94.5	95.7	70.9	81.4	1710	1690	
		14B	100	115.0	4.5	5.0	1.68	93.9	94.6	93.9	107.7	1695	1670	
		14B	125	143.75	6.0	6.9	1.68	92.7	92.1	115.9	132.6	1675	1640	
	MO	17B	150	172.5	2.5	2.8	3.6	94.2	95.2	141.3	164.2	1706	1701	
		17B	200	230.0	3.0	3.4	3.6	94.2	95.2	188.3	218.8	1698	1691	
		17B	250	287.5	3.5	4.0	3.6	93.8	94.8	234.5	272.6	1689	1680	
3500	M,MP,MX,MO	6A	3	3.45	3.7	4.1	.55	76.7	81.2	2.3	2.8	3320	3285	
		6A	5	5.75	5.0	5.5	.55	84.0	85.2	4.2	4.9	3275	3235	
		8C	7.5	8.62	2.2	2.5	.70	88.0	89.3	6.6	7.7	3375	3340	
		8C	10	11.50	2.8	3.1	.70	90.0	91.3	9.0	10.5	3355	3320	
	MO,MX	8C	15	17.25	3.8	4.2	.75	91.3	91.6	13.7	15.8	3320	3280	
		8C	20	—	4.6	—	.90	91.0	—	18.2	—	3340	—	
		—	23.00	—	5.1	1.10	—	90.4	—	20.8	—	3300	—	
		8C	25	—	5.2	—	1.35	89.6	—	22.4	—	3320	—	
	M,MP,MO,MX	—	28.75	—	5.8	2.25	—	83.5	—	24.0	—	3275	—	
		9B	15	17.25	1.9	2.05	1.6	87.4	88.7	13.1	15.3	3430	3425	
		9B	20	23.0	2.25	2.4	1.6	89.8	90.6	17.96	20.8	3420	3415	
		9B	25	28.75	2.55	2.75	1.6	91.1	91.7	22.8	26.4	3410	3400	
		9B	30	34.5	2.8	3.0	1.6	91.9	92.4	27.6	31.9	3400	3395	
		9B	40	46.0	3.3	3.55	1.6	92.7	93.0	37.1	42.8	3385	3375	
		9B	50	57.5	3.6	4.0	1.6	93.2	93.2	46.6	53.6	3375	3360	
		MO	9B	60	69.0	4.1	4.45	1.6	93.2	93.2	55.9	64.3	3355	3345
			9B	75	86.25	4.7	5.15	1.6	93.2	93.0	69.9	80.2	3335	3320
			9B	100	115.0	5.7	6.4	1.6	92.7	92.2	92.7	106.0	3300	3275

**Heat Generation Data 60 Hertz**

Fluid Drive Size	Motor Hp	Nominal RPM	Max. Drive Heat Generation (BTU/Min.)	Fluid Drive Size	Motor Hp	Nominal RPM	Max. Drive Heat Generation (BTU/Min.)
8C	3	1750	28	9B	25	3500	251
6B	3	3500	28	11B	30	1750	265
8C	5	1750	48	9B	30	3500	290
6B	5	3500	46	11B	40	1750	353
8C, 9B	7.5	1750	78	9B	40	3500	372
8C	7.5	3500	63	11A	50	1750	447
9B, 11B	10	1750	100	9A	50	3500	453
8C	10	3500	84	14B	60	1750	525
9B, 11B	15	1750	156	9A	60	3500	537
8C	15	3500	128	14B	75	1750	647
9B	15	3500	172	9A	75	3500	666
11B	20	1750	182	14B	100	1750	861
8C	20	3500	175	9A	100	3500	892
9B	20	3500	210	14B	125	1750	1098
11B	25	1750	224	17B	150	1750	1290
8C	25	3500	230	17B	200	1750	1695
				17B	250	1750	2113

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The performance of a variable speed pumping unit will be documented to reflect the head, capacity and Bhp based on the nominal tabulated performance data above. Field performance may vary due to actual motor Rpm, normal performance tolerance for the fluid coupling, and performance tolerance for the centrifugal pump.

\* For 1150 Nominal RPM service refer to the factory for performance data (11B, 14B, 17B fluid coupling sizes only).

Subject to change without notice.



**Hydroconstant® Variable Speed Fluid Drives**

**Operating Data 50 Hertz**

NOMINAL RPM	TYPE	FLUID CPLG. SIZE	BHP IN		% SLIP		CIRC LOSS HP	% EFF.		BHP OUT		RPM OUT	
			FULL LOAD	115% LOAD	FULL LOAD	115% LOAD		FULL LOAD	115% LOAD	FULL LOAD	115% LOAD	FULL LOAD	115% LOAD
1450	M.MP.MO.MX	9B	5	5.75	4.7	5.2	.4	87.6	88	4.38	5.06	1382	1375
		9B	7.5	8.62	6.3	7.0	.4	88.7	88.7	6.65	7.63	1359	1349
		9B	10	11.5	7.8	8.6	.4	88.5	88.3	8.85	10.15	1337	1325
		11B	7.5	8.62	2.35	2.55	.6	89.9	90.7	6.74	7.82	1416	1413
		11B	10	11.5	2.75	2.95	.6	91.4	92.0	9.14	10.58	1410	1407
		11B	15	17.25	3.35	3.6	.6	92.8	93.0	13.92	16.05	1402	1398
		11B	20	23.0	3.95	4.4	.6	93.2	93.0	18.64	21.40	1393	1386
		11B	25	28.75	4.7	5.3	.6	93.0	92.5	23.25	26.66	1382	1373
1450	MO	14B	40	46.0	3.2	3.8	1.2	93.9	93.7	37.56	43.10	1404	1395
		14B	50	57.5	4.1	4.9	1.2	93.6	93.1	46.80	53.54	1391	1379
		14B	60	69.0	5.2	6.4	1.2	92.9	92.0	55.74	63.46	1375	1357
1450	MO	17B	75	86.25	1.9	2.2	2.57	94.8	94.9	71.1	81.8	1423	1418
		17B	100	115.0	2.5	2.8	2.57	95.0	95.1	95.0	109.4	1414	1410
		17B	125	143.75	3.2	3.7	2.57	94.9	94.7	118.6	136.1	1404	1397
		17B	150	172.5	4.0	5.5	2.57	94.4	93.2	141.6	160.7	1392	1371
		17B	200	230.0	6.0	8.0	2.57	92.8	91.0	185.6	209.3	1363	1334
2900	M.MP.MO.MX	8C	4.0	—	2.25	—	.5	85.2	—	3.41	—	2834	—
		8C	5.0	5.75	2.65	3.0	.5	87.6	88.5	4.38	5.09	2823	2813
		8C	7.5	8.62	3.62	3.95	.5	89.8	90.3	6.74	7.79	2795	2785
		8C	10.0	11.50	4.35	4.70	.5	90.8	91.1	9.08	10.48	2774	2763
		8C	15.0	17.25	5.45	5.90	.5	91.4	91.3	13.71	15.76	2742	2729
		8C	20.0	—	6.24	—	.5	91.2	—	18.24	—	2714	—
	M.MP.MO.MX	9B	15	17.25	2.4	2.65	1.2	89.8	90.4	13.47	15.60	2831	2823
		9B	20	23.0	2.9	3.2	1.2	91.3	91.7	18.26	21.10	2816	2807
		9B	25	28.75	3.3	3.65	1.2	92.1	92.3	23.02	26.55	2804	2794
		9B	30	34.5	3.75	4.1	1.2	92.4	92.6	27.72	31.94	2792	2781
		9B	40	46.0	4.5	4.85	1.2	92.6	92.7	37.05	42.62	2770	2759
		9B	50	57.5	5.1	5.4	1.2	92.6	92.6	46.31	53.26	2752	2743
	MO	9B	60	69.0	5.6	6.0	1.2	92.5	92.4	55.51	63.73	2740	2726
		9B	75	86.25	6.4	7.1	1.2	92.1	92.7	69.08	79.94	2715	2694

The performance of a variable speed pumping unit will be documented to reflect the head, capacity and Bhp based on the nominal tabulated performance data above. Field performance may vary due to actual motor Rpm, normal performance tolerance for the fluid coupling, and performance tolerance for the centrifugal pump.

**Heat Generation Data  
50 Hertz**

Fluid Drive Size	Motor Hp	Nominal RPM	Max. Drive Heat Generation (BTU/Min)	Fluid Drive Size	Motor Hp	Nominal RPM	Max. Drive Heat Generation (BTU/Min)*
8C	5	2900	43	11B	30	1450	286
8C	7.5	2900	65	9B	30	2900	297
8C	10	2900	85	9B	40	2900	387
8C	15	2900	135	9B	50	2900	480
8C	20	2900	185	9B	60	2900	573
9B	5	1450	60	9B	75	2900	720
9B, 11B	7.5	1450	84	14B	40	1450	375
9B, 11B	10	1450	110	14B	50	1450	466
11B	15	1450	147	14B	60	1450	566
9B	15	2900	170	17B	75	1450	690
11B	20	1450	191	17B	100	1450	900
9B	20	2900	210	17B	125	1450	1117
11B	25	1450	237	17B	150	1450	1350
9B	25	2900	253	17B	200	1450	1871

## VARIABLE SPEED PUMPING SYSTEMS



Peerless Pump Company  
Indianapolis, IN 46207-7026

### Hydroconstant® Variable Speed Drives Fluid Coupling Sizes 6B, 8C, 9B, 11B, 14B, 17B

#### APPLICATION INFORMATION FOR WATER/OIL COOLER

The liquid-to-liquid heat exchanger is furnished as standard equipment on all Hydroconstant fluid drives 3 HP and up. Heat exchangers, or "oil coolers," are essential to the operation of all drive models. Oil is the primary working fluid within the drive coupling forming the connecting link between the input and output halves of the fluid coupling. Natural, and required, slippage between fluid coupling halves generates heat in the oil which must be removed, or dangerously high temperatures result. The maximum heat production occurs at 33% slip (output shaft rpm = (.67) x input shaft rpm.) Standard oil coolers provided are sized to handle the maximum heat load that can be produced within a selected application range.

The installer must provide an adequate supply of clean cooling water at all times during periods of drive operation. A Y-strainer is provided at the inlet connection of all externally mounted coolers to help keep particulate debris from entering and clogging water tubes. It is important that the strainer be cleaned regularly so that cooling water flow is not detrimentally reduced. At maximum heat load generation, the standard oil coolers supplied will function on a water flow of 1 USGPM (3.8 l/m) per each 10 horsepower increment of drive motor used, at a pressure not to exceed 125 psig (850) kPa. and at a maximum temperature of 80° (27° C). Consult with factory Application Engineering if cooling water temperature exceeds 80° F (27° C).

Fluid coupling sizes 6B, 8C, 9B, 11B, 14B, 17B, are furnished with a manually set, thermally activated flow control valve which will adjust the cooling water flow to compensate for lower than maximum water temperature and for removal of less than maximum heat loading. CAUTION: This valve must be manually set to achieve the specified drive oil operating temperature at 33% slip speed. It will function automatically after that, adjusting water flow to hold the drive oil temperature approximately constant.

A "closed loop" cooling water system (water taken from the pump discharge pipe, passed through the cooler, and returned to the suction pipe, well or other main source) is sometimes used. If the return is to the pump inlet, or suction pipe, a check valve must be used between the cooler flow control valve and the return location, and, a thermal safety valve set for 85° (30° C) must be installed on the pump casing. It is extremely important that the installer insures that adequate pressure differential exists between the cooling water source location and the return location at all times during the periods of drive operation to keep enough cooling water flowing to satisfy heat removal requirements. CAUTION: Peerless Pump cannot recommend closed loop cooling water systems in situations where pumpage is used for human or animal consumption, or in any application where the possibility of oil contamination of pumpage can create problems, or where prohibited by local codes.

The standard oil coolers supplied have copper water tubes and cast iron end "tanks," or, as applicable, brass or carbon steel end fittings. If these materials are susceptible to corrosive attack by the cooling water consult with factory Application Engineering for the possibility of obtaining copper-nickel or 316SS cooler constructions. Note that coolers in these materials are by other manufacturers than the standard supplied and are not dimensionally interchangeable.

An optional oil temperature sensing switch is available to provide over-temperature stop for the drive motor, and to activate a drive stop alarm circuit, in such instances where cooling water flow may become inadequate or may fail, its use is highly recommended if the drive location is unattended, or, if manual flow control valves are used.

#### STANDARD WATER/OIL COOLER DATA

Fluid Coupling Size		6B, 8C					9B, 11B										14B, 17B									
Motor Size	HP	3 ▲	5	7.5	10	15	7.5	10	15	20	25	30	40	50	60	75	100	60	75	100	125	150	200	250		
Maximum Water Flow Rate Required	GPM	.3	.5	.75	1	1.5	.75	1	1.5	2	2.5	3	4	5	6	7.5	10	6	7.5	10	12.5	15	20	25		
	l/m	1.2	2	3	4	5.5	3	4	5.5	7.5	9.5	11	15	19	23	28	38	23	28	38	47	57	76	95		
Minimum Water ΔP* Required	PSI	10	10	10	10	10	10	10	10	10	10	10	10	15	15	20	25	15	20	25	15	20	15	20		
	kPa	69	69	69	69	69	69	69	69	69	69	69	69	103	103	138	172	103	138	172	103	138	103	138		
Maximum Inlet Water Pressure		←————— 125 psig (850kPa) —————→																								
Maximum Inlet Water Temp.		←————— 80° F (27° C) —————→																								
Drive Oil Temperature		←————— 140° F ± 10° F (60° C ± 6° C) —————→																								

\* On drives with 9B, 11B, 14B, 17B fluid couplings, pressure differential is measured between inlet of Y-Strainer and outlet of flow control valve.

▲ 3 Hp. drives will require cooler use only if operating temperatures exceed 160° F. (70° C.)

File 4851701  
Rev. 1-90



**Hydroconstant® Variable Speed Fluid Drives**

Fluid Coupling sizes 6B & 8C

**APPLICATION INFORMATION FOR**

**AIR/OIL COOLER**

Air/Oil coolers must be anchored to level, firm, solid foundations with vibration isolators (by others). Avoid oil or grease contact with rubber isolators. Solid piping between coolers and drives require the installation of suitable expansion joints or flexible connectors at the cooler to protect against thermal expansion damage. Solid piping must be supported independently to eliminate any stress on coolers or connectors. Provide inlet/outlet pipe disconnects as close to cooler as feasible for future servicing.

Provide access for periodic cleaning of cooler with a vacuum or compressed air. If wet cleaning is required, do not use cleaning agents or solutions not compatible with aluminum. Consult factory before purchase of air/oil cooler if atmospheric gases or vapors harmful to aluminum are present.

Caution: Carefully consider plans for locating air/oil coolers in any enclosed areas. Heat removed from the oil is added to the circulated air which will increase the ambient air temperature within the area. Such temperatures may become extreme.

Oil flows of 3 GPM (11 l/m) on fluid coupling sizes 6B, 8C must be accommodated. Use the following minimum as guide: 1/2 in. (13mm) I.D. hoses and 1/2 NPT pipe fittings are to be used. Unacceptable pressure drops may occur in oil lines that are overly long or contain many fittings. The oil used in Hydroconstant drives has viscosity characteristics of 310 SUS at 100° (68 centistokes at 38° C) and 120 SUS at 140° F (46 centistokes at 60° C). Increase ID of lines as required to keep the total oil pressure drop external to the drive to a maximum of 30 PSI (340 kPa) at 140° F(60° C) oil temperature, including losses through Air/Oil Coolers

Internal Hydroconstant drive hose assemblies are rated for 125 psi (850 kPa) maximum working pressure. Relief valve installation is recommended in the external oil circuit to protect hose assemblies against over pressure. A relief valve should be selected that will open at 75 PSI (510 kPa) oil system pressure. Connect the relief valve discharge with the drive oil sump through a tee installed in the sump drain opening. The selected valve should be capable of full bypass of the system flow at a maximum 35 psi (238kPa) over pressure.

Approximate oil fill capacity of Air/Oil coolers are listed in data tables. Additional amounts will be required to fill external oil lines. If Air/Oil coolers are located above the drive oil sump, the external oil circuit will require a check valve to keep from flooding the drive housing on shutdown.

Oil temperature sensing switches are used to provide start-stop function for the Air/Oil cooler fan and over-temperature stop protection for the hydroconstant drive motor. The 6B, 8C drive housing is provided with a tapped hole for mounting this switch as shown on page 72.1 in section 4130 and the switch will be installed by factory when fluid drive unit is ordered with air/oil cooler.

**AIR/OIL COOLER DATA TABLE**

Part Reference Number Note 1	Oil Capacity Gal (Liters)	Recommended Minimum Wall Clearance Ft (Meters) Note 2		Maximum Cooler Oil Pressure Drop PSI (kPa)			Fan Dia In (cm)	Dimensions, Wt., Motor Specs Sect. 4130, Pg. No.
		Front	Back	Fluid Drive Size	⊗ 100° F. (38° C.)	⊗ 140° F. (60° C.)		
2691648	.2 (.8)	3.0 (1.0)	3.0 (1.0)	6B, 8C	14 (96)	6.0 (41)	9.5 (24)	70
2689011	.2 (.8)	5.0 (1.5)	5.0 (1.5)	8C	6 (41)	4.5 (31)	8.0 (20)	70.1
2689012	.3 (1.2)	5.0 (1.5)	5.0 (1.5)	8C	4 (27)	3.0 (21)	10.0 (25)	71
2689013	.6 (2.3)	7.5 (2.3)	7.5 (2.3)	8C	3 (21)	2.5 (17)	14.0 (36)	71

**NOTES:**

- (1) Specific drive model application is found on page 12 of Section 4110 and is based on an entering air temperature maximum of 100° F (38° C). Refer to the factory Application Engineering Dept. if air temperature is greater than this maximum.
- (2) Recommended for complete ventilation of hot air. Absolute minimum clearance, front or back, of 2 fan diameters from wall or barrier is required. Avoid placing air/oil cooler unit in a corner.

File 4851700  
Rev. 2-86

## VARIABLE SPEED PUMPING SYSTEMS



Peerless Pump Company  
Indianapolis, IN 46207-7026

### Hydroconstant® Variable Speed Drives Fluid Coupling Sizes 9B, 11B, 14B, 17B

#### APPLICATION INFORMATION FOR AIR/OIL COOLER

Air/Oil coolers must be anchored to level, firm, solid foundations with vibration isolators (by others). Avoid oil or grease contact with rubber isolators. Solid piping between coolers and drives require the installation of suitable expansion joints or flexible connectors at the cooler to protect against thermal expansion damage. Solid piping must be supported independently to eliminate any stress on coolers or connectors. Provide inlet/outlet pipe disconnects as close to cooler as feasible for future servicing.

Provide access for periodic cleaning of cooler with a vacuum or compressed air. If wet cleaning is required, do not use cleaning agents or solutions not compatible with aluminum. Consult factory before purchase of air/oil cooler if atmospheric gases or vapors harmful to aluminum are present.

Caution: Carefully consider plans for locating air/oil coolers in any enclosed areas. Heat removed from the oil is added to the circulated air which will increase the ambient air temperature within the area. Such temperatures may become extreme.

Oil flows of 7 GPM (26 l/m) on fluid coupling sizes 9B, 11B, and 21 GPM (80 l/m) on fluid coupling sizes 14B, 17B must be accommodated. Use the following minimum as guide: 1/2 in. (13 mm) I.D. hoses and 1/2 NPT pipe fittings on 9B, 11B fluid coupling sizes; 3/4 in. (19 mm) I.D. hoses and 3/4 NPT pipe fittings on fluid coupling sizes 14B, 17B. Unacceptable pressure drops may occur in oil lines that are overly long or contain many fittings. The oil used in Hydroconstant drives has viscosity characteristics of 310 SUS at 100° (68 centistokes at 38° C) and 120 SUS at 140° F (46 centistokes at 60° C). Increase ID of lines as required to keep the total oil pressure drop external to the drive to a maximum of 50 PSI (340 kPa) at 140° F (60° C) oil temperature, including losses through Air/Oil coolers. Where applicable, make the bottom threaded connection on the Air/Oil cooler the inlet, the top connection the outlet.

Internal Hydroconstant drive hose assemblies are rated for 125 psi (850 kPa) maximum working pressure. Relief valve installation is recommended in the external oil circuit to protect hose assemblies against over pressure. A relief valve should be selected that will open at 75 PSI (510 kPa) oil system pressure. Connect the relief valve discharge with the drive oil sump through a tee installed in the sump drain opening. The selected valve should be capable of full bypass of the system flow at a maximum 35 psi (238kPa) over pressure.

Approximate oil fill capacity of Air/Oil coolers are listed in data tables. Additional amounts will be required to fill external oil lines. If Air/Oil coolers are located above the drive oil sump, the external oil circuit will require a check valve to keep from flooding the drive housing on shutdown.

Oil temperature sensing switches are used to provide start-stop function for the Air/Oil cooler fan and over-temperature stop protection for the Hydroconstant drive motor. Always install the temperature control switch on the inlet side of the Air/Oil cooler. If substitute temperature control switches are used, never allow probes to restrict or block oil flow.

AIR/OIL COOLER DATA TABLE

Part Reference Number Note 1	Oil Capacity Gal (Liters)	Recommended Minimum Wall Clearance Ft (Meters) Note 2		Maximum Cooler Oil Pressure Drop PSI (kPa)			Fan Dia In (cm)	Dimensions, Wt., Motor Specs Sect. 4130, Pg. No.
		Front	Back	Fluid Drive Size	@ 100° F. (38° C.)	@ 140° F. (60° C.)		
2689011	.2 (.8)	5.0 (1.5)	5.0 (1.5)	9B, 11B,	25 (170)	12 (82)	8.0 (20)	70
2689012	.3 (1.2)	5.0 (1.5)	5.0 (1.5)	9B, 11B	12 (82)	6 (41)	10.0 (25)	71
2689013	.6 (2.3)	7.5 (2.3)	7.5 (2.3)	9B, 11B	12 (82)	6 (41)	14.0 (36)	71
2689014	.8 (3.0)	7.5 (2.3)	7.5 (2.3)	14B, 17B	12 (82)	6 (41)	18.0 (46)	71
				9B, 11B	10 (68)	4 (27)	18.0 (46)	71
2689015	1.0 (3.8)	10.0 (3.0)	10.0 (3.0)	14B, 17B	12 (82)	6 (41)	18.0 (46)	71
				9B, 11B	10 (68)	5 (34)	18.0 (46)	71
2689016	1.5 (5.7)	10.0 (3.0)	10.0 (3.0)	14B, 17B	12 (82)	6 (41)	24.0 (61)	72
				9B, 11B	10 (68)	4 (27)	24.0 (61)	72
2689162	2.0 (7.6)	12.0 (3.6)	12.0 (3.6)	14B, 17B	12 (82)	6 (41)	30.0 (76)	72

NOTES:

- (1) Specific drive model application is found on page 12 of Section 4110 and is based on an entering air temperature maximum of 100° F (38° C). Refer to the factory Application Engineering Dept. if air temperature is greater than this maximum.
- (2) Recommended for complete ventilation of hot air. Absolute minimum clearance, front or back, of 2 fan diameters from wall or barrier is required. Avoid placing air/oil cooler unit in a corner.

File 4850834  
Rev. 6-85



Peerless Pump Company  
Indianapolis, IN 46207-7026

## VARIABLE SPEED PUMPING SYSTEMS

### Type M Fluid Coupling Sizes 6B & 8C Hydroconstant®

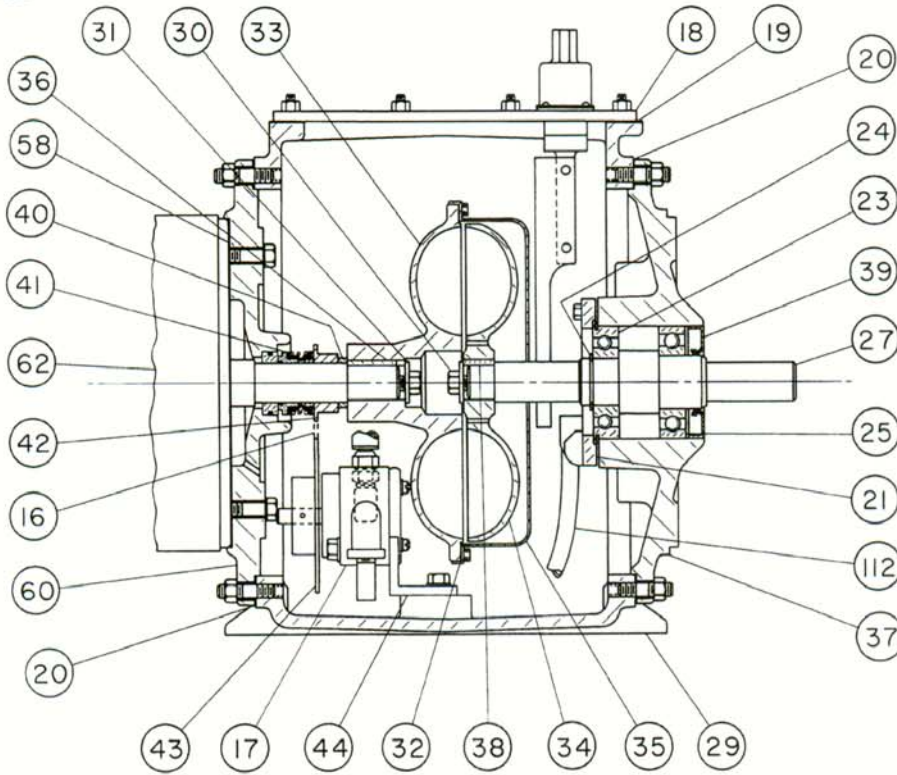
Variable Speed Fluid Drives with Close Coupled Open Drip Proof Motor  
and Hydraulic or Pneumatic Controls for Flexible Coupled Pumps  
3 & 5 HP UNITS

SECTION 4120

Page 7

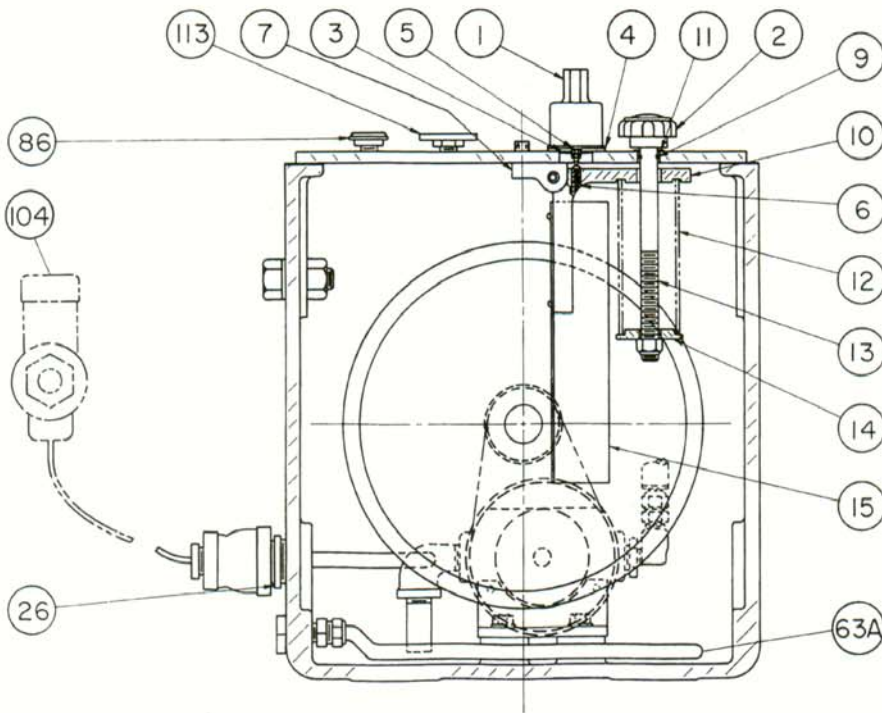
January 29, 1990

### CROSS SECTIONAL DRAWINGS



**SIDE  
VIEW**

Ref. Drg.  
4851672-D  
Rev. 1-90



See Section 4120  
page 20 for  
electric control  
detail and  
page 8.11 for  
item 104 details

Ref. Drg.  
4852615-D

**END VIEW  
(From Output  
Shaft End)**

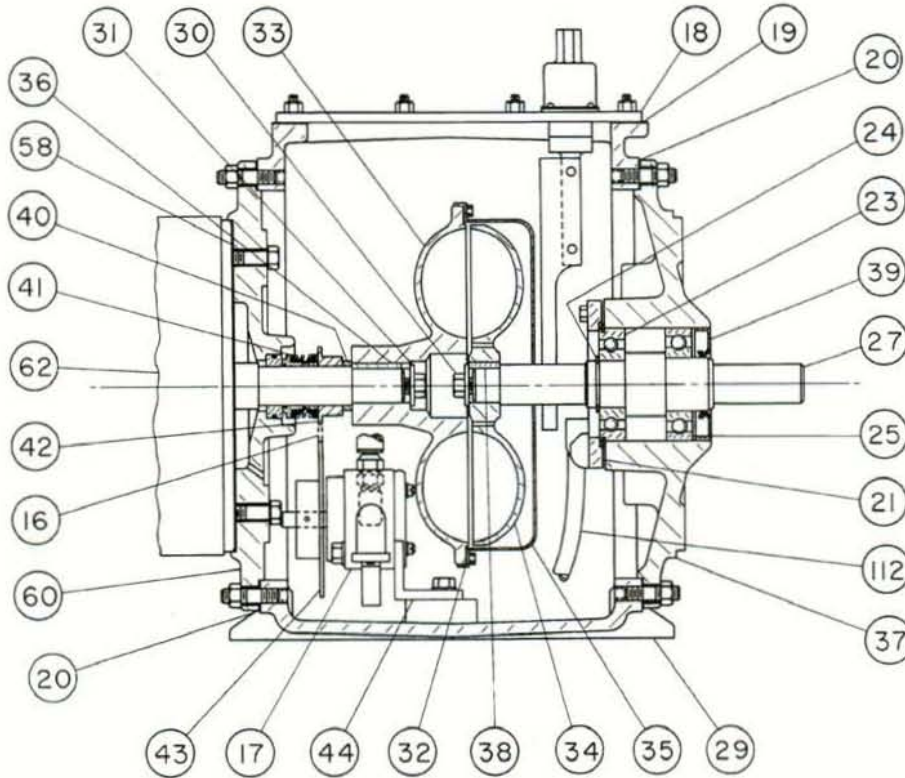
File 4852625-B  
Page 1 of 2

**VARIABLE SPEED PUMPING SYSTEMS**  
**Type M Fluid Coupling Sizes 8B Hydroconstant®**  
Variable Speed Fluid Drives with Close Coupled Open Drip Proof Motor  
and Hydraulic or Pneumatic Controls for Flexible Coupled Pumps  
**7½ HP UNITS**



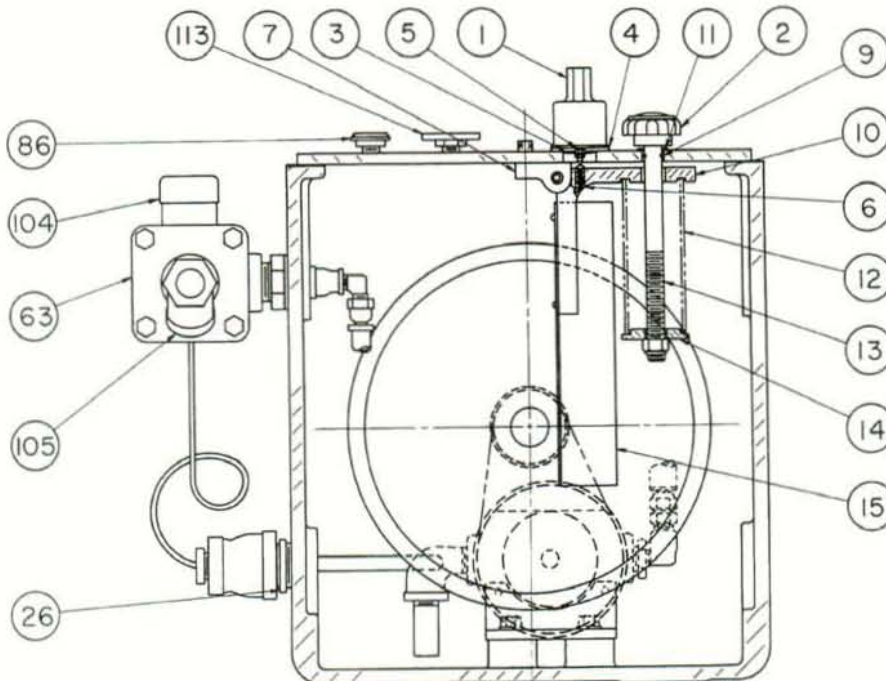
Peerless Pump Company  
Indianapolis, IN 46207-7026

**CROSS  
SECTIONAL  
DRAWINGS**



**SIDE  
VIEW**

Ref. Drg.  
4851672-D  
Rev. 1-90



See Section 4120  
page 20 for  
electric control  
detail and  
page 8.11 for items  
63 & 104 details

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**END VIEW  
(From Output  
Shaft End)**

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Page 1 of 2





## VARIABLE SPEED PUMPING SYSTEMS

### Type M

Fluid Coupling Sizes 6B & 8B  
Hydroconstant® Variable Speed Fluid Drives  
with Close Coupled Open Drip Proof Motors  
and Hydraulic or Pneumatic Controls for  
Flexible Coupled Pumps

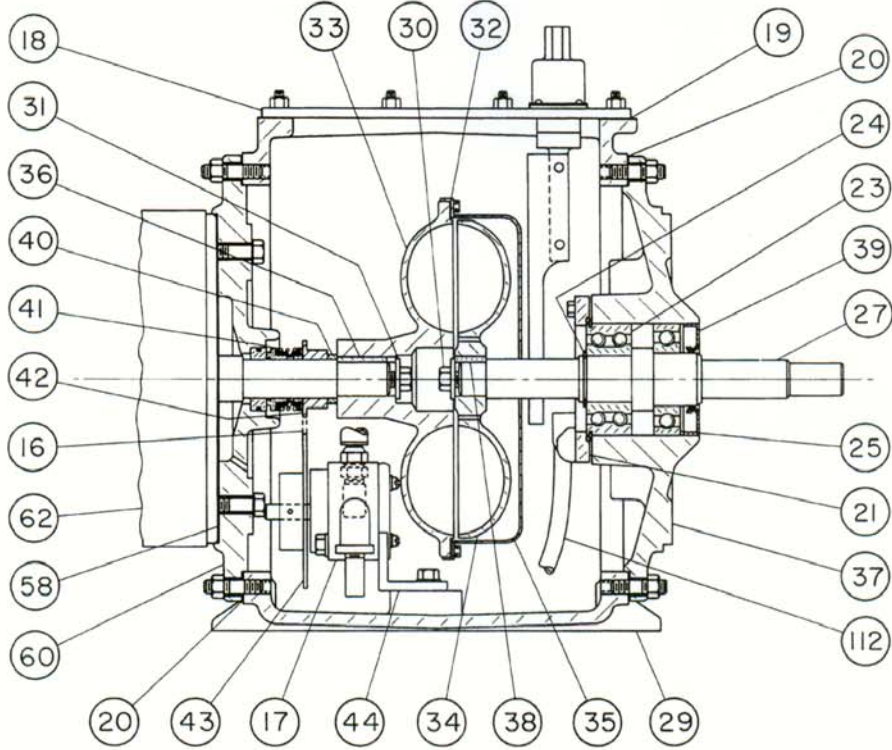
#### MATERIALS OF CONSTRUCTION

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	29	Main Housing	Cast Iron
2	Pressure Control Knob	Assembly	30	Coupling Screw	Steel
3	Diaphragm	Rubber	31	Coupling Washer	Steel
4	Spacer	Steel	32	Coupling Gasket	Vegetable Fiber
5	Jam Nut	Steel	33	Input Coupling Half	Aluminum
6	Set Screw	Steel	34	Output Coupling Half	Aluminum
7	Pivot Block	Ductile Iron	35	Coupling Cover	Steel
8	Drive Pin	Steel	36	Input Coupling Key	Steel
9	"O" Ring Seal	Rubber	37	Pump Flange	Cast Iron
10	Splitter Arm	Ductile Iron	38	Output Coupling Key	Steel
11	Retaining Ring	Steel	39	Oil Seal	Assembly
12	Compression Spring	Steel	40	Spacer	Steel
13	Adjusting Screw	Steel	41	Mechanical Seal	Assembly
14	Spring Retainer	Steel	42	Drive Sprocket	Steel
15	Splitter	Steel	43	Oil Pump Sprocket	Steel
16	Chain	Assembly	44	Oil Pump Bracket	Steel
17	Oil Pump	Assembly	58	Motor Gasket	ASTM D1170-P1151A
18	Cover Plate	Steel	60	Motor Flange	Cast Iron
19	Cover Plate Gasket	ASTM D1170-P1151A	62	Motor	Assembly
20	End Bell Gasket	ASTM D1170-P1151A	63	Heat Exchanger 7½-25 Hp.	Assembly
21	Bearing Cap	Ductile Iron	63A	Heat Exchanger 3-5 Hp.	Assembly
23	Ball Bearing	Assembly	86	Breather	Steel Assembly
24	Bearing Retaining Ring	Steel	104	Temp. Reg. Valve	Assembly
25	Ball Bearing	Assembly	105	Strainer	Assembly
26	Oil Gauge	Assembly	112	Hose	Assembly
27	Output Shaft	Steel	113	Thermometer	Assembly

**VARIABLE SPEED PUMPING SYSTEMS**  
**Type M Fluid Coupling Sizes 6B & 8C Hydroconstant®**  
 Variable Speed Fluid Drives with Close Coupled Open Drip Proof Motors  
 and Hydraulic or Pneumatic Controls for Close Coupled Series C Pumps  
**3 & 5 HP UNITS**

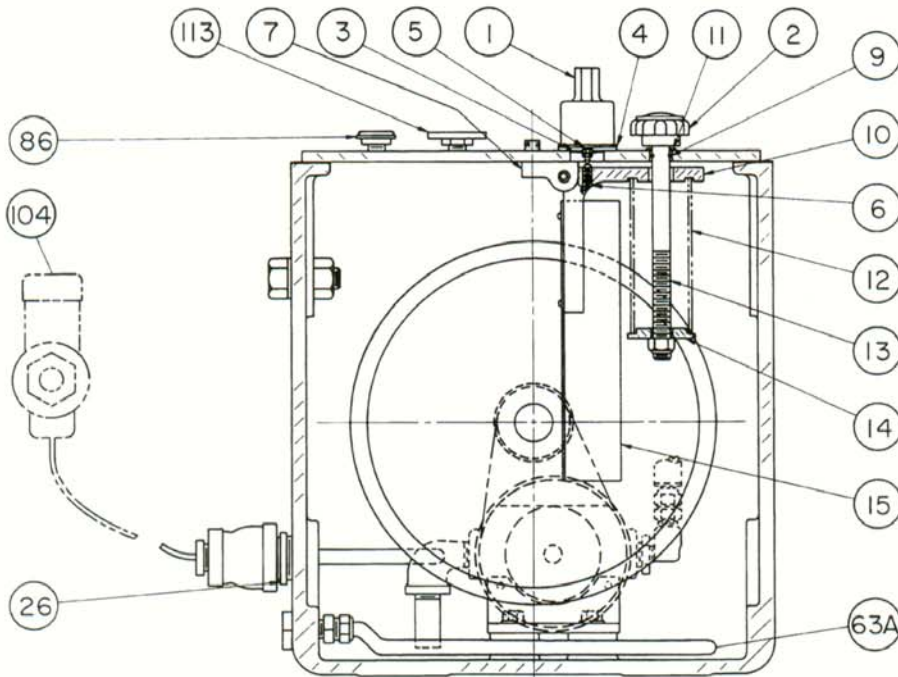


**CROSS  
 SECTIONAL  
 DRAWINGS**



**SIDE  
 VIEW**

Ref. Drg.  
 4851674-D  
 Rev. 1-90



See Section 2320  
 for Series C  
 pump materials  
 of construction

See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 8.11 for  
 item 104 details

**END VIEW  
 (From Pump End)**

Ref. Drg.  
 4852615-D

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 Page 1 of 2



Peerless Pump Company  
Indianapolis, IN 46207-7026

# VARIABLE SPEED PUMPING SYSTEMS

## Type MP Fluid Coupling Size 8C Hydroconstant®

Variable Speed Fluid Drives with Close Coupled Open Drip Proof Motors  
and Hydraulic or Pneumatic Controls for Close Coupled Series C Pumps

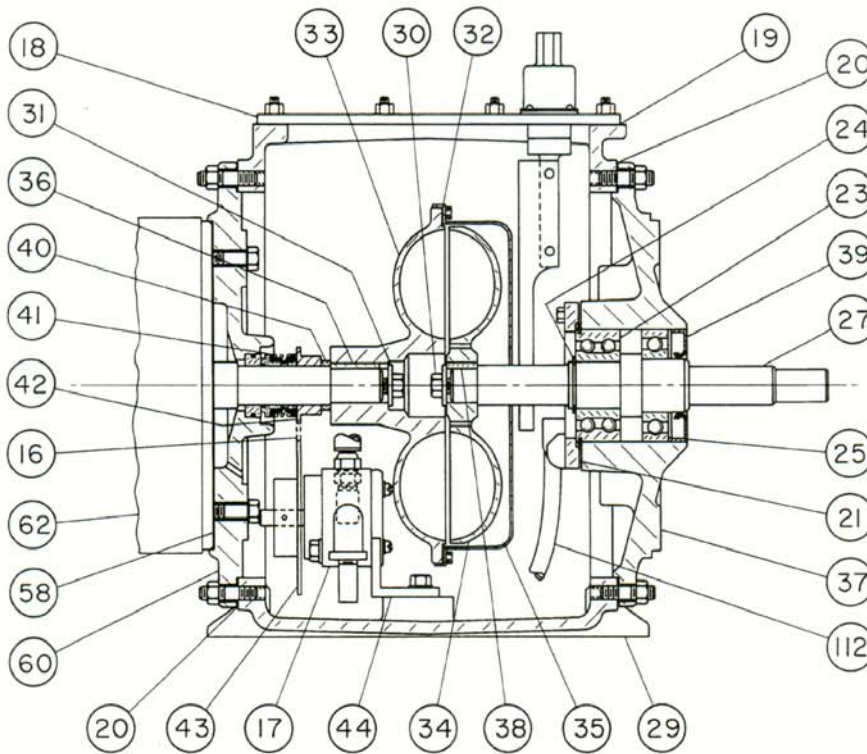
7½ HP & UP UNITS

SECTION 4120

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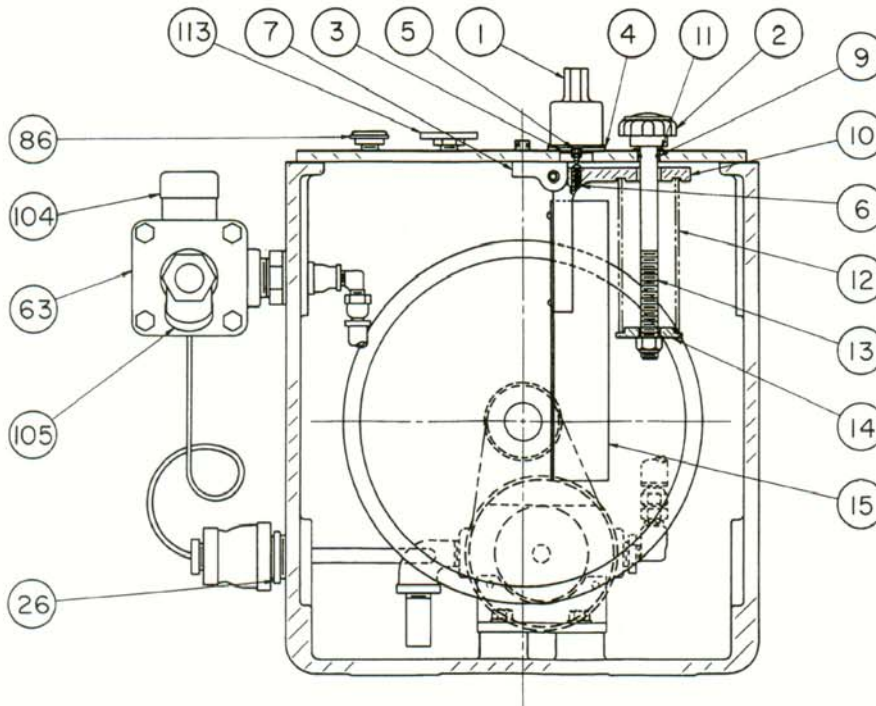
January 29, 1990

CROSS  
SECTIONAL  
DRAWINGS



SIDE  
VIEW

Ref. Drg.  
4851674-D  
Rev. 1-90



See Section 2320  
for Series C  
pump materials  
of construction

See Section 4120  
page 20 for  
electric control  
detail and  
page 8.11 for items  
63 & 104 details

END VIEW  
(From Pump End)

Ref. Drg.  
4851676-D  
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Subject to change without notice.

**VARIABLE SPEED  
PUMPING SYSTEMS**



Peerless Pump Company  
Indianapolis, IN 46207-7026

**Type MP**  
**Fluid Coupling Sizes 6B & 8C**  
**Hydroconstant® Variable Speed Fluid Drives**  
**with Close Coupled Motors and Hydraulic or**  
**Pneumatic Controls for**  
**Series C Close Coupled Pumps**

**MATERIALS OF CONSTRUCTION**

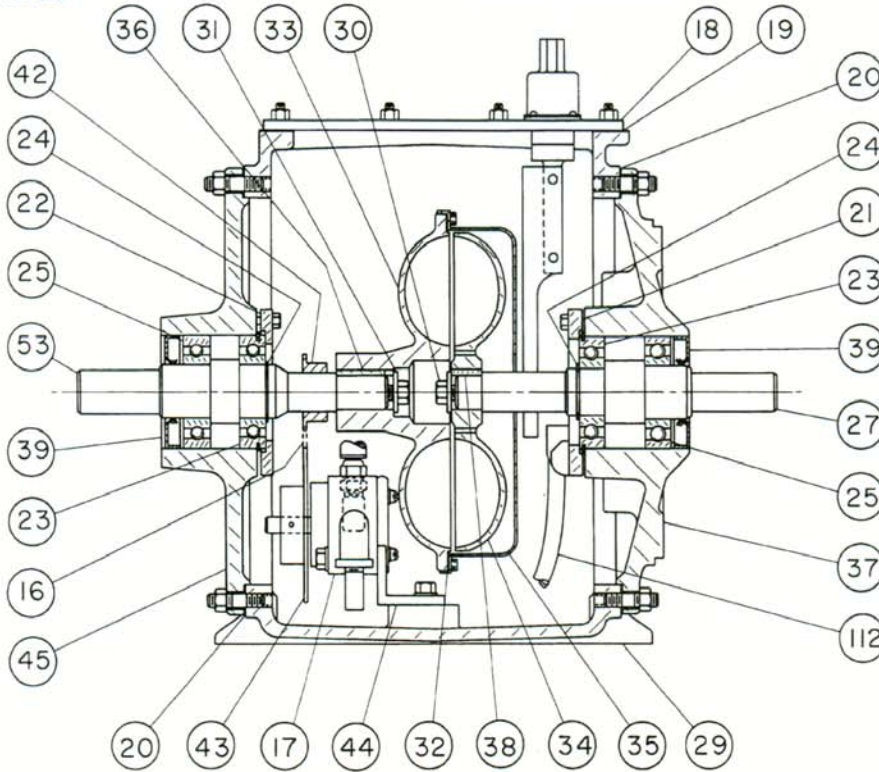
Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	29	Main Housing	Cast Iron
2	Pressure Control Knob	Assembly	30	Coupling Screw	Steel
3	Diaphragm	Rubber/Syn. Fabric	31	Coupling Washer	Steel
4	Spacer	Steel	32	Coupling Gasket	Vegetable Fiber
5	Jam Nut	Steel	33	Input Coupling Half	Aluminum
6	Set Screw	Steel	34	Output Coupling Half	Aluminum
7	Pivot Block	Ductile Iron	35	Coupling Cover	Steel
8	Drive Pin	Steel	36	Input Coupling Key	Steel
9	"O" Ring Seal	Rubber	37	Pump Flange	Cast Iron
10	Splitter Arm	Ductile Iron	38	Output Coupling Key	Steel
11	Retaining Ring	Steel	39	Oil Seal	Assembly
12	Compression Spring	Steel	40	Spacer	Steel
13	Adjusting Screw	Steel	41	Mechanical Seal	Assembly
14	Spring Retainer	Steel	42	Drive Sprocket	Steel
15	Splitter	Steel	43	Oil Pump Sprocket	Steel
16	Chain	Assembly	44	Oil Pump Bracket	Steel
17	Oil Pump	Assembly	58	Motor Gasket	ASTM D1170-P1151A
18	Cover Plate	Steel	60	Motor Flange	Cast Iron
19	Cover Plate Gasket	ASTM D1170-P1151A	62	Motor	Assembly
20	End Bell Gasket	ASTM D1170-P1151A	63	Heat Exchanger 7½-25 Hp.	Assembly
21	Bearing Cap	Ductile Iron	63A	Heat Exchanger 3-5 Hp.	Assembly
23	Ball Bearing	Assembly	86	Breather	Steel Assembly
24	Bearing Retaining Ring	Steel	104	Temp. Reg. Valve	Assembly
25	Ball Bearing	Assembly	105	Strainer	Assembly
26	Oil Gauge	Assembly	112	Hose	Assembly
27	Output Shaft	Steel	113	Thermometer	Assembly

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File 4852628-B  
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**VARIABLE SPEED PUMPING SYSTEMS**  
**Type MO Fluid Coupling Sizes 6B & 8C Hydroconstant®**  
Variable Speed Fluid Drives with Hydraulic or Pneumatic Controls  
for Flexible Coupled Motors and Pumps  
**3 & 5 HP UNITS**

**CROSS SECTIONAL  
DRAWINGS**

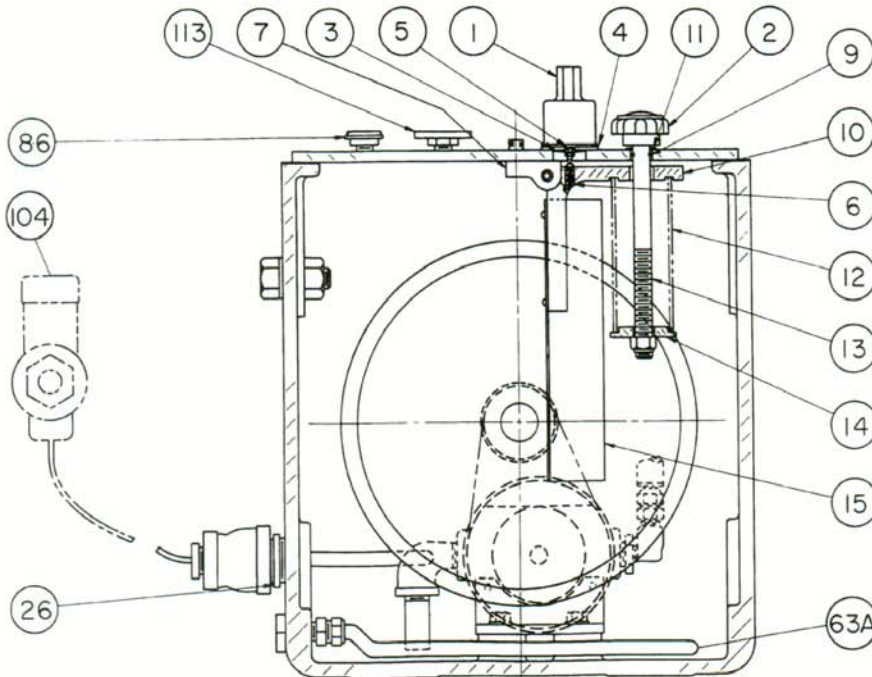


See Section 4120  
page 20 for  
electric control  
detail and  
page 8.11 for  
item 104  
details

Output Shaft  
End

**SIDE VIEW**

Ref. Drg.  
4851673-D  
Rev. 1-90



Ref. Drg.  
4852615-D

**END VIEW**  
(From Output  
Shaft END)

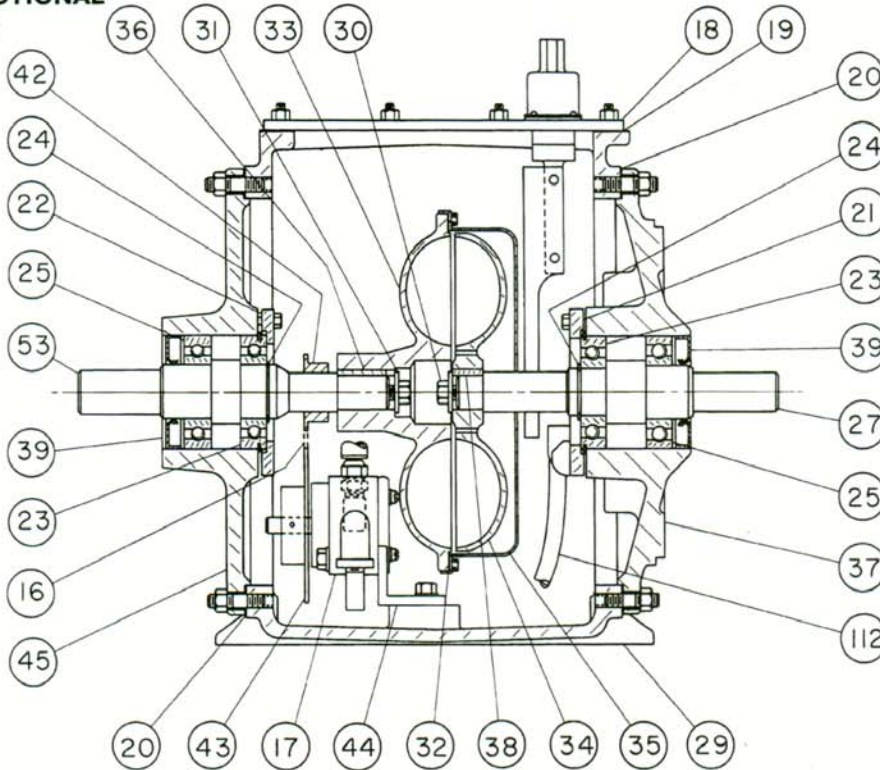
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**VARIABLE SPEED PUMPING SYSTEMS**  
**Type MO Fluid Coupling Size 8C Hydroconstant®**  
 Variable Speed Fluid Drives with Hydraulic or Pneumatic Controls  
 for Flexible Coupled Motors and Pumps  
 7½ & UP HP UNITS



Peerless Pump Company  
 Indianapolis, IN 46207-7026

**CROSS SECTIONAL  
 DRAWINGS**

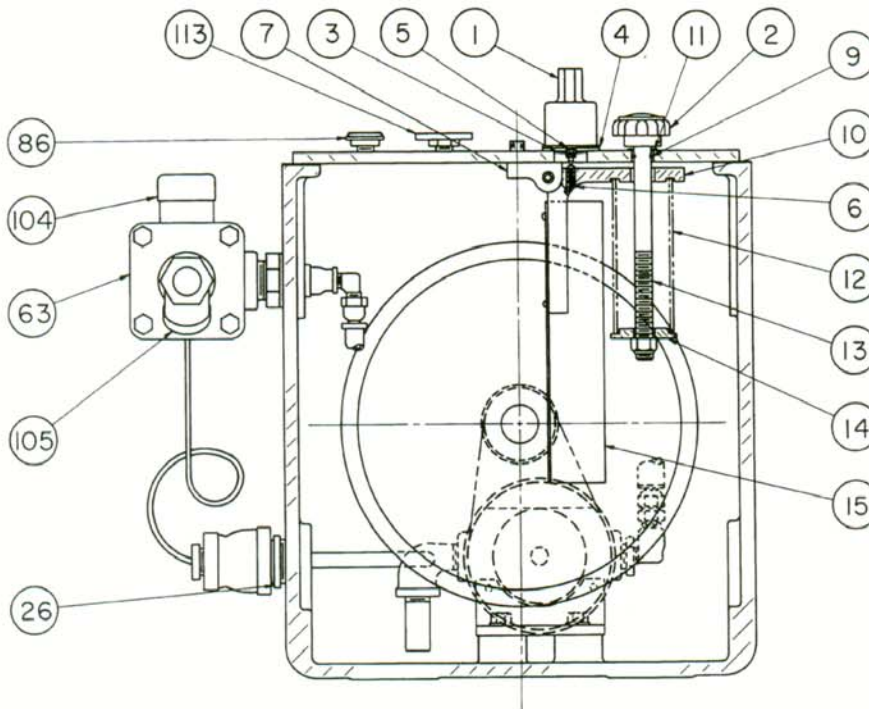


See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 8.11 for items  
 63 & 104 details

Output Shaft  
 End

**SIDE VIEW**

Ref. Drg.  
 4851673-D  
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Ref. Drg.  
 4851676-D  
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**END VIEW  
 (From Output  
 Shaft END)**

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## VARIABLE SPEED PUMPING SYSTEMS

### Type MO Fluid Coupling Sizes 6B & 8C Hydroconstant® Variable Speed Fluid Drives with Hydraulic or Pneumatic Controls for Flexible Coupled Motors and Pumps

#### MATERIALS OF CONSTRUCTION

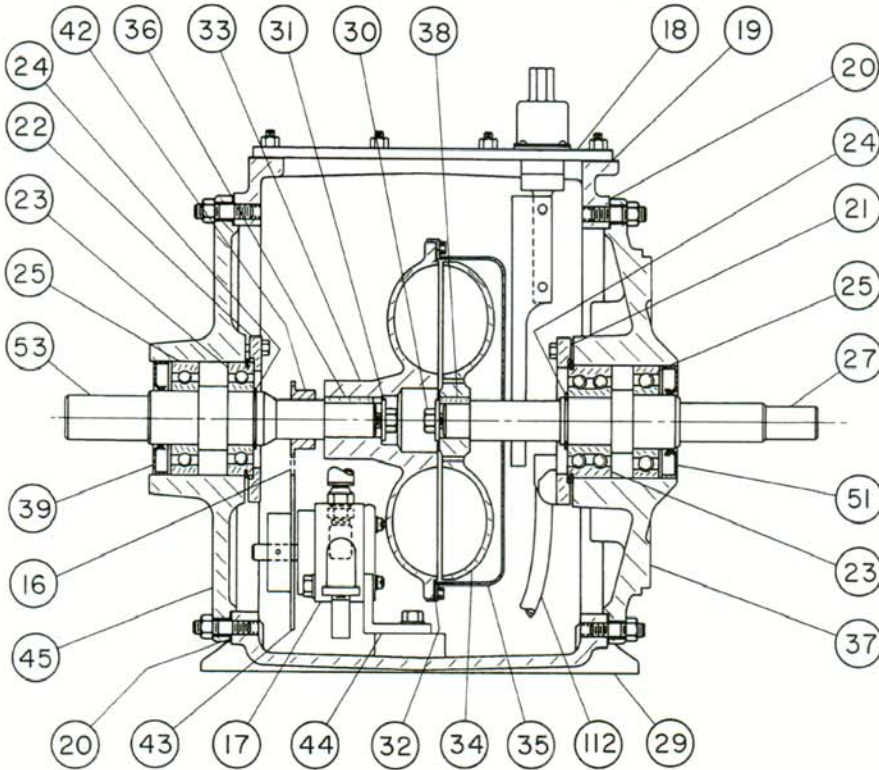
Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	26	Oil Gauge	Assembly
2	Pressure Control Knob	Assembly	27	Output Shaft	Steel
3	Diaphragm	Rubber/Syn. Fabric	28	Retaining Ring	Plated Steel
4	Spacer	Steel	29	Main Housing	Cast Iron
5	Jam Nut	Steel	30	Coupling Screw	Steel
6	Set Screw	Steel	31	Coupling Washer	Steel
7	Pivot Block	Ductile Iron	32	Coupling Gasket	Vegetable Fiber
8	Drive Pin	Steel	33	Input Coupling Half	Aluminum
9	"O" Ring Seal	Rubber	34	Output Coupling Half	Aluminum
10	Splitter Arm	Ductile Iron	35	Coupling Cover	Steel
11	Retaining Ring	Steel	36	Input Coupling Key	Steel
12	Compression Spring	Steel	37	Pump Flange	Cast Iron
13	Adjusting Screw	Steel	38	Output Coupling Key	Steel
14	Spring Retainer	Steel	39	Oil Seal	Assembly
15	Splitter	Steel	42	Drive Sprocket	Steel
16	Chain	Assembly	43	Oil Pump Sprocket	Steel
17	Oil Pump	Assembly	44	Oil Pump Bracket	Steel
18	Cover Plate	Steel	45	MO Flange	Cast Iron
19	Cover Plate Gasket	ASTM D1170-P1151A	53	Input Shaft	Steel
20	End Bell Gasket	ASTM D1170-P1151A	63	Heat Exchanger 7½-25 Hp.	Assembly
21	Bearing Cap	Ductile Iron	63A	Heat Exchanger 3-5 Hp.	Assembly
22	Bearing Cap	Steel	86	Breather	Steel Assembly
23	Ball Bearing	Assembly	104	Temp. Reg. Valve	Assembly
24	Bearing Retaining Ring	Steel	105	Strainer	Assembly
25	Ball Bearing	Assembly	112	Hose	Assembly
			113	Thermometer	Assembly

**VARIABLE SPEED PUMPING SYSTEMS**  
**Type MX Fluid Coupling Sizes 6B & 8C Hydroconstant®**  
 Fluid Drives with Hydraulic or Pneumatic Controls for  
 Close Coupled Series Pumps and Flexible Coupled Motors  
**3 & 5 HP UNITS**



Peerless Pump Company  
 Indianapolis, IN 46207-7026

**CROSS  
 SECTIONAL  
 DRAWINGS**

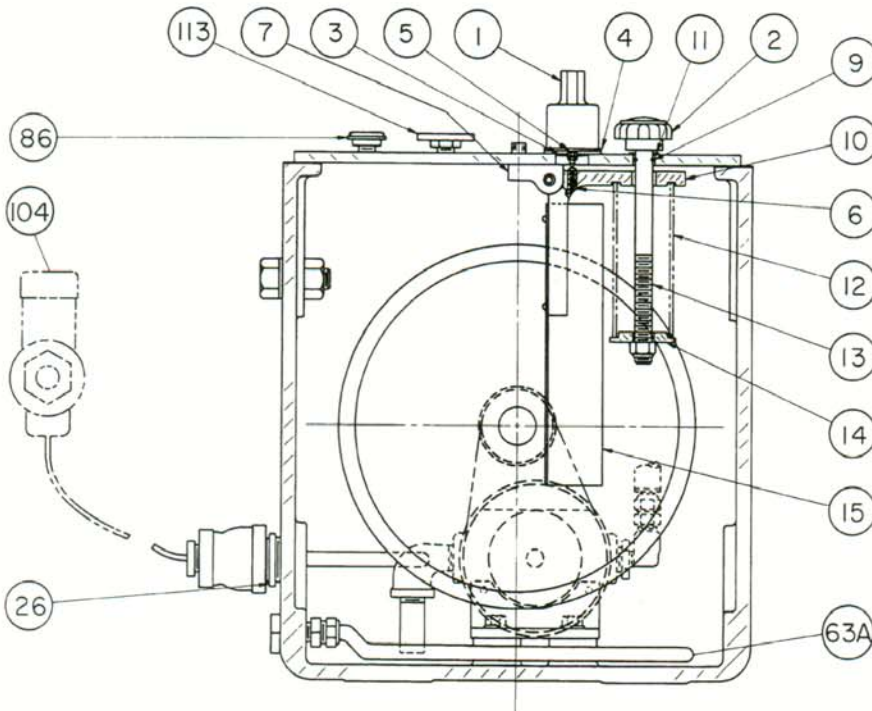


**Output Shaft  
 End**

**SIDE  
 VIEW**

Ref. Drg.  
 4851675-D  
 Rev. 1-90

See Section 2320  
 for Series C  
 pump materials  
 of construction



See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 8.11 for  
 item 104 details

**END VIEW  
 (From Pump End)**

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 4852615-D  
 Rev. 1-90

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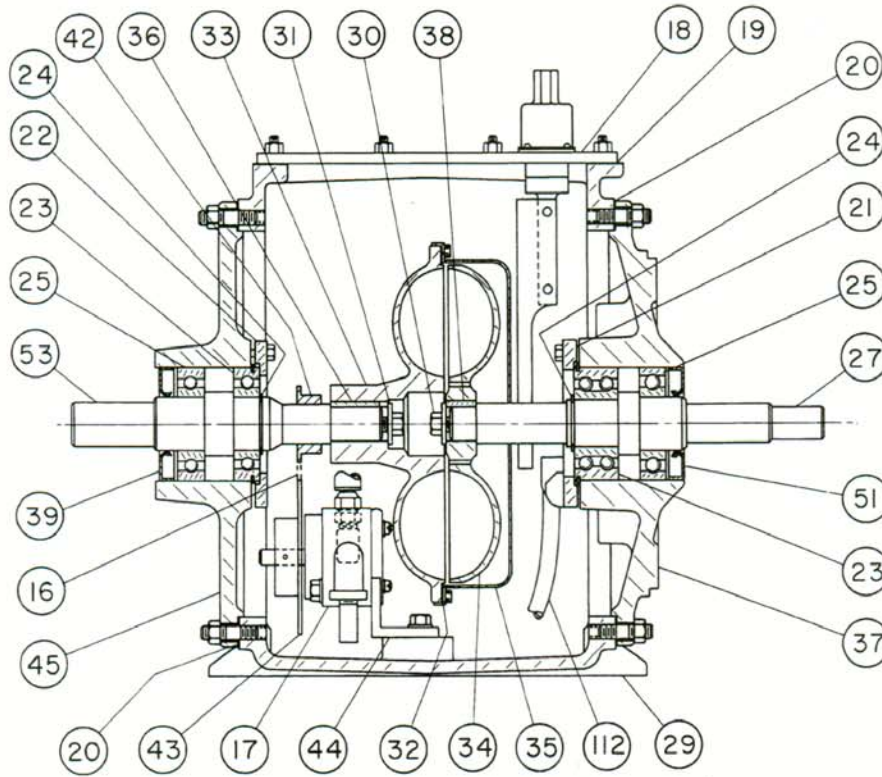


Peerless Pump Company  
Indianapolis, IN 46207-7026

**VARIABLE SPEED PUMPING SYSTEMS**  
**Type MX Fluid Coupling Size 8C Hydroconstant®**  
Fluid Drives with Hydraulic or Pneumatic Controls for  
Close Coupled Series Pumps and Flexible Coupled Motors  
**7½ HP & UP UNITS**

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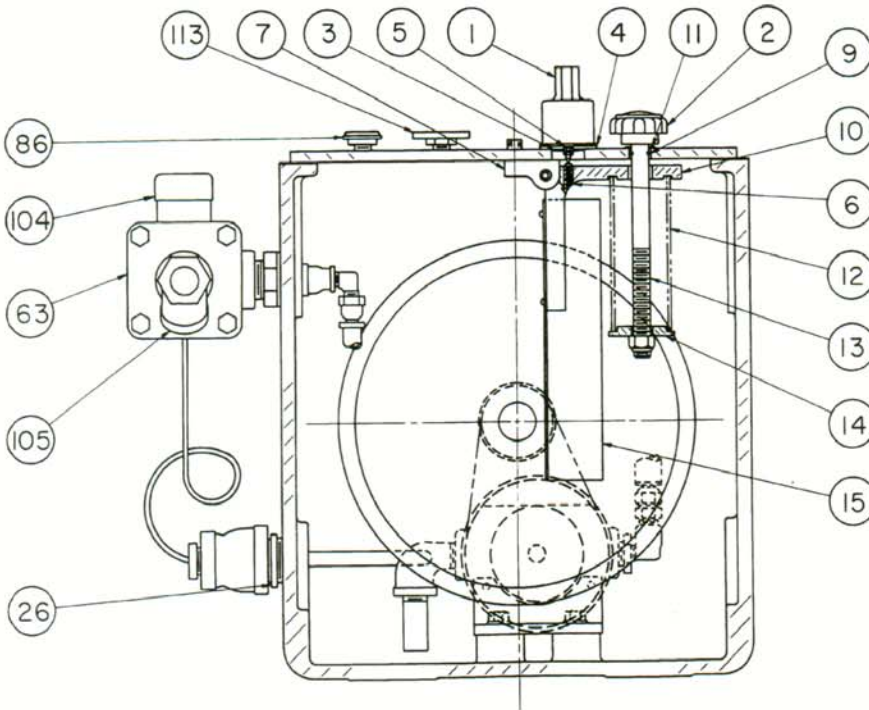
**CROSS  
SECTIONAL  
DRAWINGS**



**SIDE  
VIEW**

Ref. Drg.  
4851675-D  
Rev. 1-90

See Section 2320  
for Series C  
pump materials  
of construction



**END VIEW  
(From Pump End)**

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4852676-D  
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See Section 4120  
page 20 for  
electric control  
detail and  
page 8.11 for  
items 63 & 104  
details

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**VARIABLE SPEED  
PUMPING SYSTEMS**



**Type MX**  
**Fluid Coupling Sizes 6B & 8C**  
**Hydroconstant® Variable Speed Fluid Drives**  
**with Hydraulic or Pneumatic Controls for**  
**Close Coupled Series C Pumps**  
**and Flexible Coupled Motors**

**MATERIALS OF CONSTRUCTION**

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	27	Output Shaft	Steel
2	Pressure Control Knob	Assembly	28	Retaining Ring	Plated Steel
3	Diaphragm	Rubber/Syn. Fabric	29	Main Housing	Cast Iron
4	Spacer	Steel	30	Coupling Screw	Steel
5	Jam Nut	Steel	31	Coupling Washer	Steel
6	Set Screw	Steel	32	Coupling Gasket	Vegetable Fibre
7	Pivot Block	Ductile Iron	33	Input Coupling Half	Aluminum
8	Drive Pin	Steel	34	Output Coupling Half	Aluminum
9	"O" Ring Seal	Rubber	35	Coupling Cover	Steel
10	Splitter Arm	Ductile Iron	36	Input Coupling Key	Steel
11	Retaining Ring	Steel	37	Pump Flange	Cast Iron
12	Compression Spring	Steel	38	Output Coupling Key	Steel
13	Adjusting Screw	Steel	39	Oil Seal	Assembly
14	Spring Retainer	Steel	42	Drive Sprocket	Steel
15	Splitter	Steel	43	Oil Pump Sprocket	Steel
16	Chain	Assembly	44	Oil Pump Bracket	Steel
17	Oil Pump	Assembly	45	MO Flange	Cast Iron
18	Cover Plate	Steel	51	Oil Seal	Assembly
19	Cover Plate Gasket	ASTM D1170-P1151A	53	Input Shaft	Steel
20	End Bell Gasket	ASTM D1170-P1151A	63	Heat Exchanger 7½-25 Hp.	Assembly
21	Bearing Cap	Ductile Iron	63A	Heat Exchanger 3-5 Hp.	Assembly
22	Bearing Cap	Steel	86	Breather	Steel Assembly
23	Ball Bearing	Assembly	104	Temp. Reg. Valve	Assembly
24	Bearing Retaining Ring	Steel	105	Strainer	Assembly
25	Ball Bearing	Assembly	112	Hose	Assembly
26	Oil Gauge	Assembly	113	Thermometer	Assembly

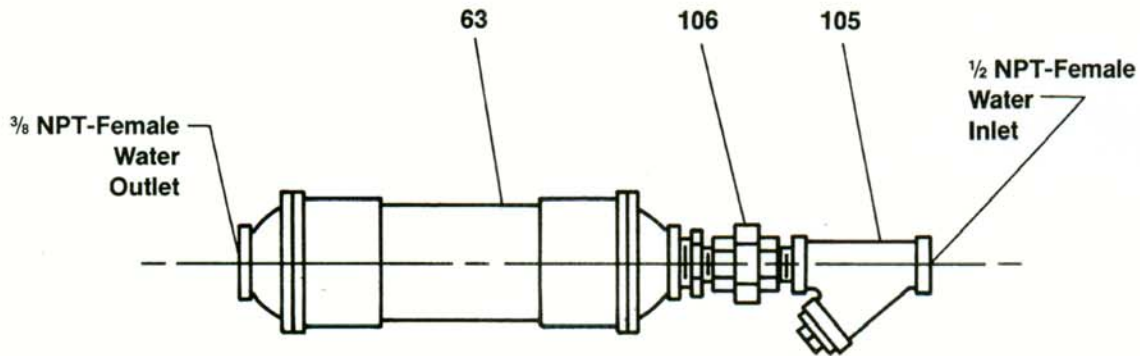


## VARIABLE SPEED PUMPING SYSTEMS

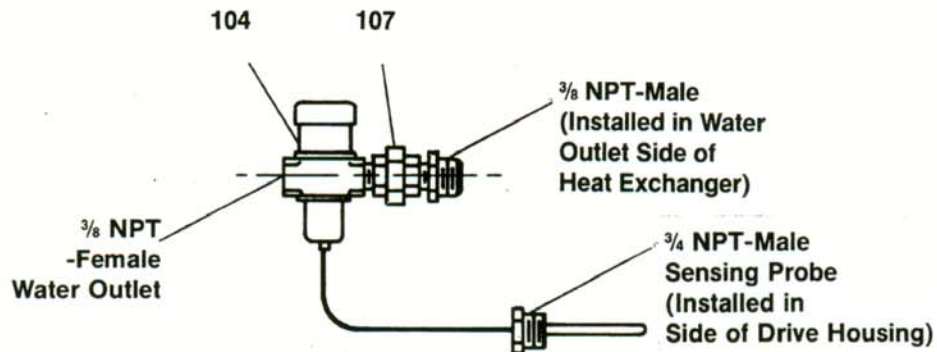
Hydroconstant® Variable Speed Drives  
Water/Oil Heat Exchanger  
Construction Details  
Standard Accessories

Standard Heat Exchanger  
(External Mounted)

Fluid Coupling Size 8C  
Single Pass Heat Exchanger  
7½-25 Hp. Units Only



Temperature Regulated Flow Control Valve  
(All 6B & 8C Units)



### Materials of Construction

Item No.	Part Description	Material
63	Heat Exchanger	Assembly
104	Temperature Regulated Flow Control Valve	Assembly
105	"Y" Strainer	Cast Iron/Stainless Steel Screen
106	Pipe Union	Steel
107	Pipe Union	Steel

File 4851691  
Rev. 11-89

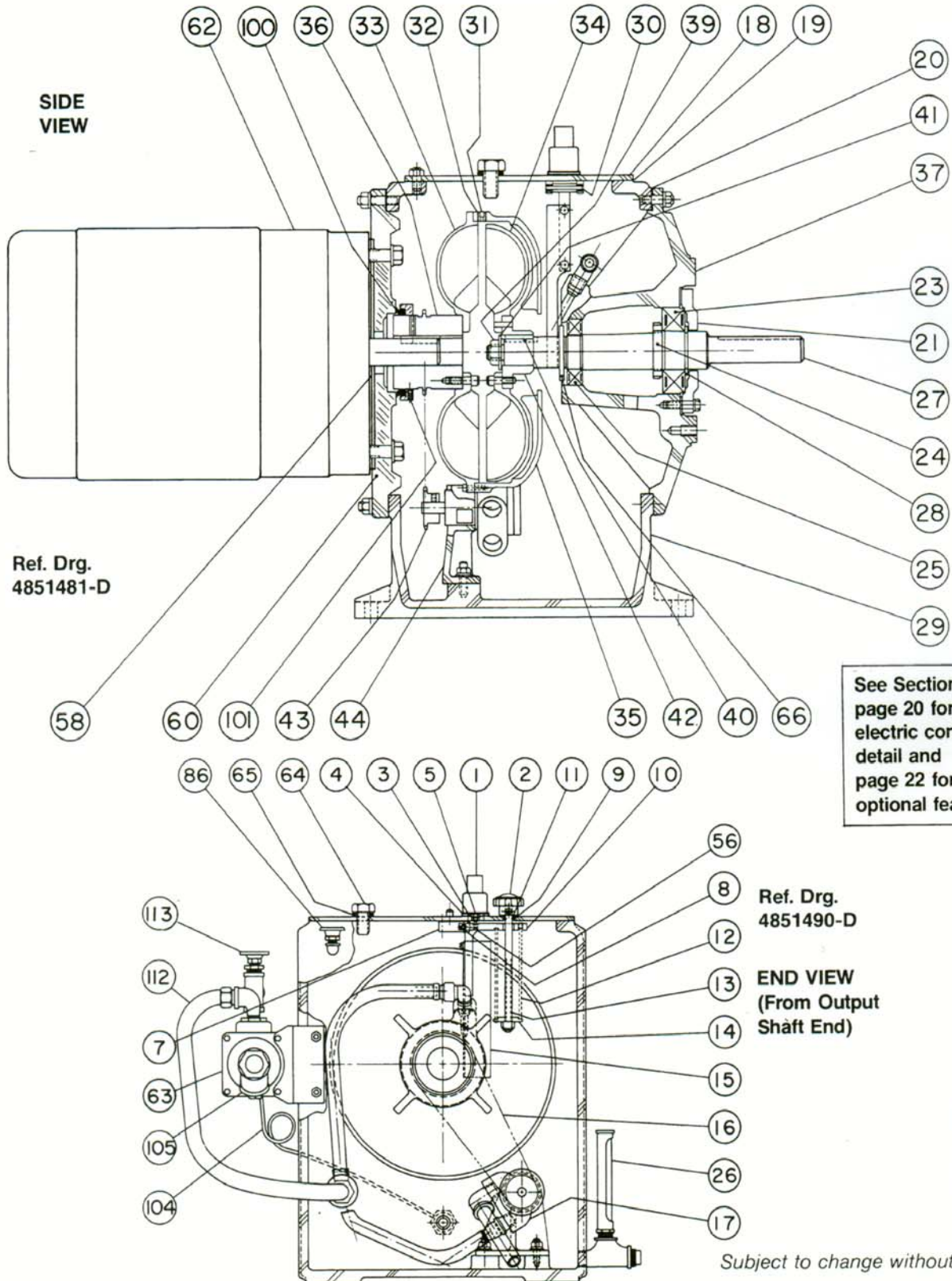
# VARIABLE SPEED PUMPING SYSTEMS



Peerless Pump Company  
Indianapolis, IN 46207-7026

**Type M**  
Fluid Coupling Sizes 9B & 11B  
Hydroconstant® Variable Speed Fluid Drives  
with Close Coupled Open Drip Proof Motor  
and Hydraulic or Pneumatic Control

## CROSS SECTIONAL DRAWINGS



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## VARIABLE SPEED PUMPING SYSTEMS

### Type M

Fluid Coupling Sizes 9B & 11B  
Hydroconstant® Variable Speed Fluid Drives  
with Close Coupled Open Drip Proof Motor  
and Hydraulic or Pneumatic Control

### MATERIALS OF CONSTRUCTION

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	29	Main Housing	Cast Iron
2	Pressure Control Knob	Assembly	30	Roller Bearing	Assembly
3	Diaphragm	Rubber	31	Bleed Orifice	18-8 Stn. Steel
4	Spacer	Steel	32	Coupling Gasket	Vegetable Fiber
5	Jam Nut	Steel	33	Input Coupling Half	Aluminum
7	Pivot Block	Steel	34	Output Coupling Half	Aluminum
8	Dowel Pin	Steel	35	Coupling Cover	Aluminum
9	"O" Ring Seal	Rubber	36	Drive Hub	Steel
10	Splitter Arm	Ductile Iron	37	Output End Bell	Cast Iron
11	Retaining Ring	Steel	39	Stop Nut	Plated Steel
12	Compression Spring	Steel	40	Output Hub Key	Steel
13	Adjusting Screw	Steel	41	Output Hub Washer	Steel
14	Spring Retainer	Steel	42	Output Hub	Steel
15	Splitter	Steel	43	Oil Pump Sprocket	Steel
16	Chain	Assembly	44	Oil Pump Bracket	Cast Iron
17	Oil Pump	Assembly	56	Set Screw	Steel
18	Cover Plate	Steel	58	Motor Gasket	Vegetable Fiber
19	Cover Plate Gasket	Vegetable Fiber	60	Motor Flange	Cast Iron
20	End Bell Gasket	Vegetable Fiber	62	Motor	Assembly
21	Bearing Cap	Cast Iron	63	Heat Exchanger	Assembly
23	Ball Bearing	Assembly	64	Oil Filler Plug	Steel
24	Bearing Locknut	Steel	65	"O" Ring Seal	Rubber
25	Ball Bearing	Assembly	66	Deflector	Rubber
26	Oil Gauge	Assembly	86	Breather	Steel Assembly
27	Output Shaft	Steel	100	"V" Ring	Buna-N Rubber
28	Retaining Ring	Plated Steel	101	"V" Ring Collar	Steel
			104	Temp. Reg. Valve	Assembly
			105	Strainer	Assembly
			112	Hose	Assembly
			113	Thermometer	Assembly

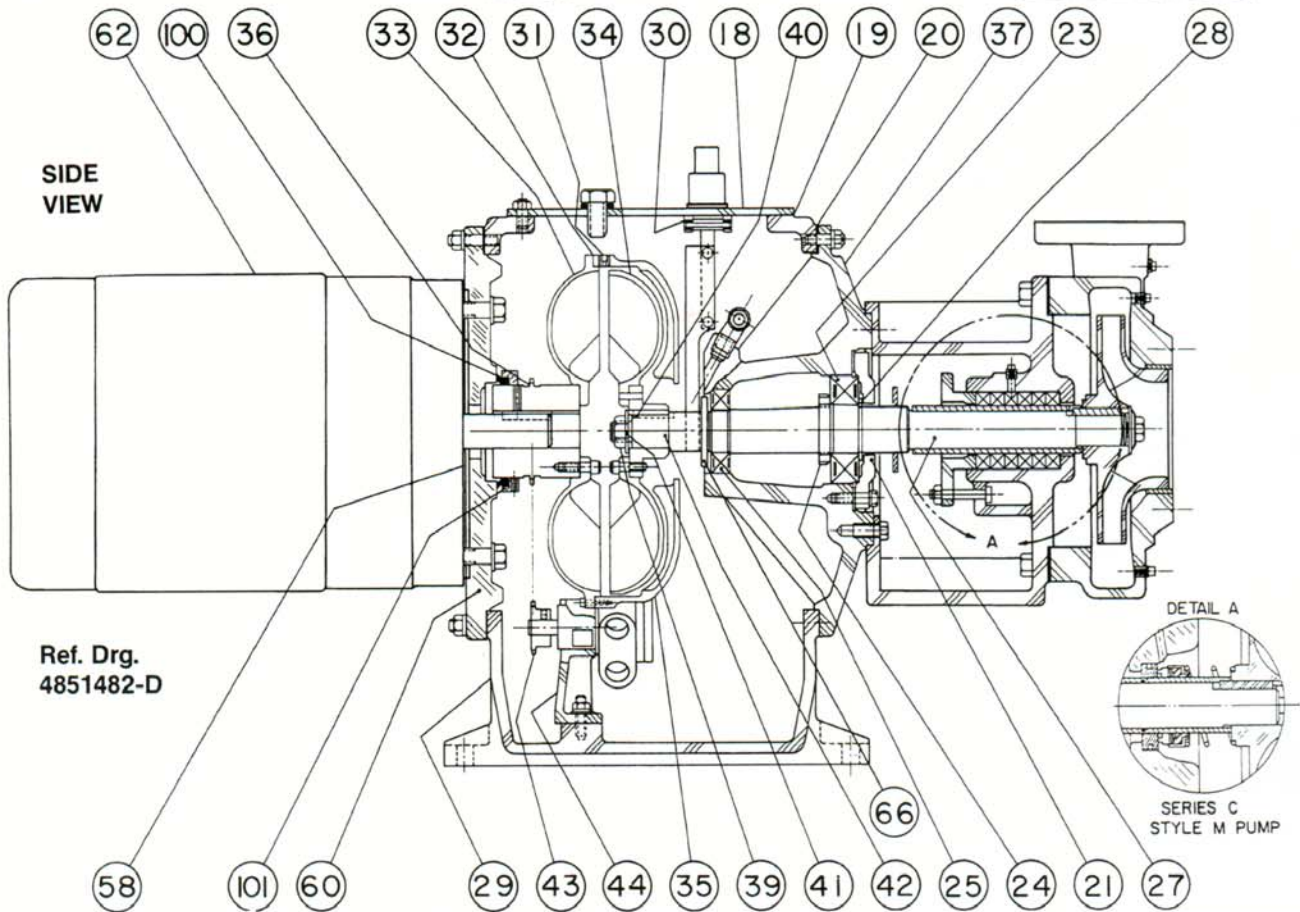
**VARIABLE SPEED  
 PUMPING SYSTEMS**



Peerless Pump Company  
 Indianapolis, IN 46207-7026

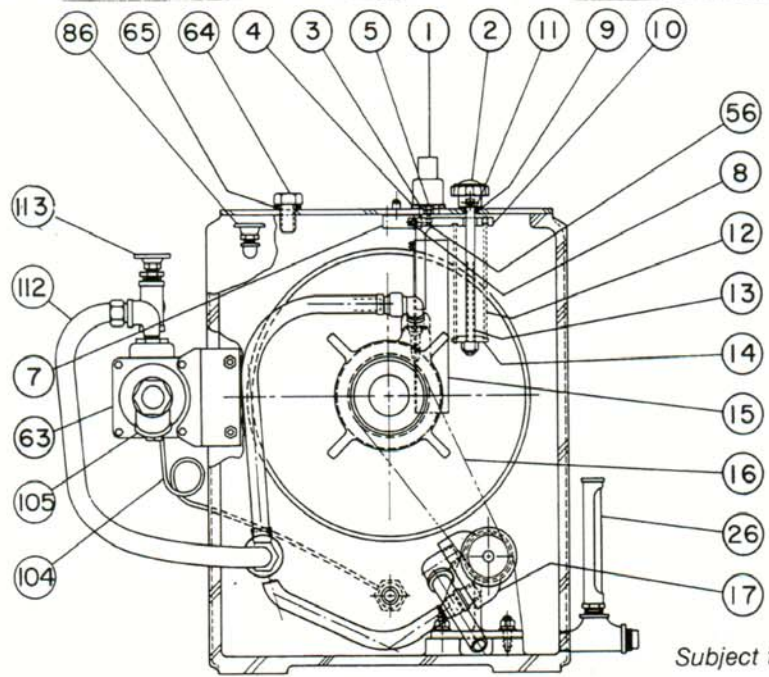
**Type MP**  
 Fluid Coupling Sizes 9B & 11B  
 with Close Coupled Motor & Series C Bronze  
 Fitted End Suction Pump  
 and Hydraulic or Pneumatic Control  
**CROSS SECTIONAL DRAWINGS**

See Section 2320  
 for Series C  
 pump materials  
 of construction



Ref. Drg.  
 4851482-D

See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 22 for  
 optional features



**END VIEW**  
 (From Pump End)

Ref. Drg.  
 4851490-D

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**VARIABLE SPEED  
PUMPING SYSTEMS**

**Type MP**

Fluid Coupling Sizes 9B & 11B  
Hydroconstant® Variable Speed Fluid Drive  
with Close Coupled Motor & Series C Bronze  
Fitted End Suction Pump  
and Hydraulic or Pneumatic Control

**MATERIALS OF CONSTRUCTION**

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	29	Main Housing	Cast Iron
2	Pressure Control Knob	Assembly	30	Roller Bearing	Assembly
3	Diaphragm	Rubber/Syn. Fabric	31	Bleed Orifice	18-8 Stn. Steel
4	Spacer	Steel	32	Coupling Gasket	Vegetable Fiber
5	Jam Nut	Steel	33	Input Coupling Half	Aluminum
7	Pivot Block	Steel	34	Output Coupling Half	Aluminum
8	Dowel Pin	Steel	35	Coupling Cover	Aluminum
9	"O" Ring Seal	Rubber	36	Drive Hub	Steel
10	Splitter Arm	Ductile Iron	37	Output End Bell	Cast Iron
11	Retaining Ring	Steel	39	Stop Nut	Plated Steel
12	Compression Spring	Steel	40	Output Hub Key	Steel
13	Adjusting Screw	Steel	41	Output Hub Washer	Steel
14	Spring Retainer	Steel	42	Output Hub	Steel
15	Splitter	Steel	43	Oil Pump Sprocket	Steel
16	Chain	Assembly	44	Oil Pump Bracket	Cast Iron
17	Oil Pump	Assembly	56	Set Screw	Steel
18	Cover Plate	Steel	58	Motor Gasket	Vegetable Fiber
19	Cover Plate Gasket	Vegetable Fiber	60	Motor Flange	Cast Iron
20	End Bell Gasket	Vegetable Fiber	62	Motor	Assembly
21	Bearing Cap	Cast Iron	63	Heat Exchanger	Assembly
23	Ball Bearing	Assembly	64	Oil Filler Plug	Steel
24	Bearing Locknut	Steel	65	"O" Ring Seal	Rubber
25	Ball Bearing	Assembly	66	Deflector	Rubber
26	Oil Gauge	Assembly	86	Breather	Steel Assembly
27	Output Shaft	Steel	100	"V" Ring	Buna-N Rubber
28	Retaining Ring	Plated Steel	101	"V" Ring Collar	Steel
			104	Temp. Reg. Valve	Assembly
			105	Strainer	Assembly
			112	Hose	Assembly
			113	Thermometer	Assembly

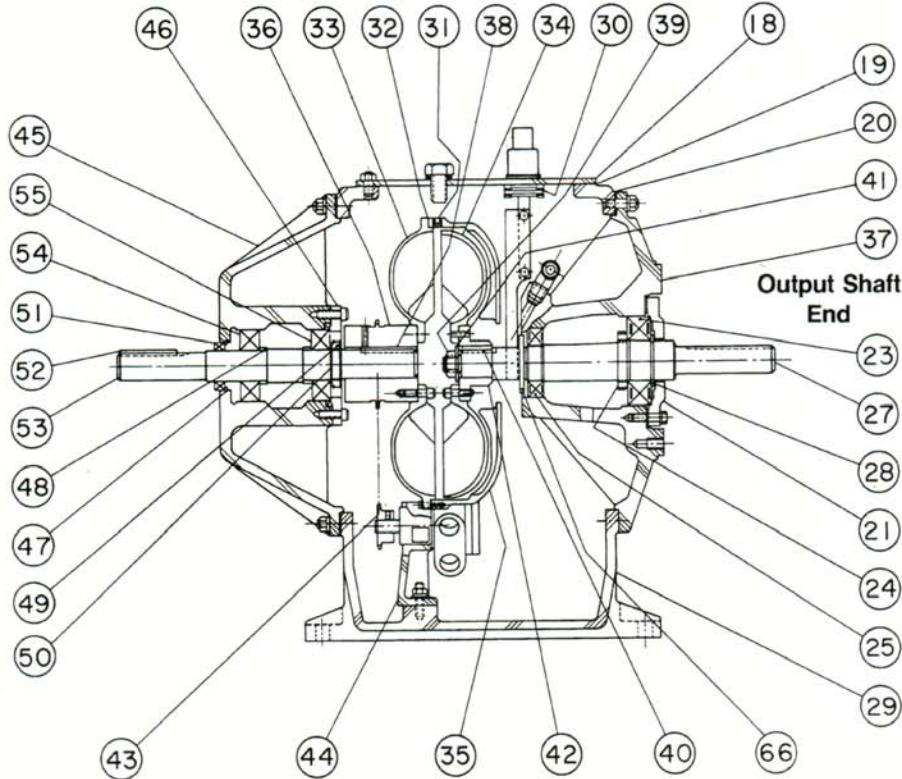
**VARIABLE SPEED  
 PUMPING SYSTEMS**



Peerless Pump Company  
 Indianapolis, IN 46207-7026

**Type MO  
 Fluid Coupling Sizes 9B & 11B  
 Hydroconstant® Variable Speed  
 Fluid Drives with  
 Hydraulic or Pneumatic Control**

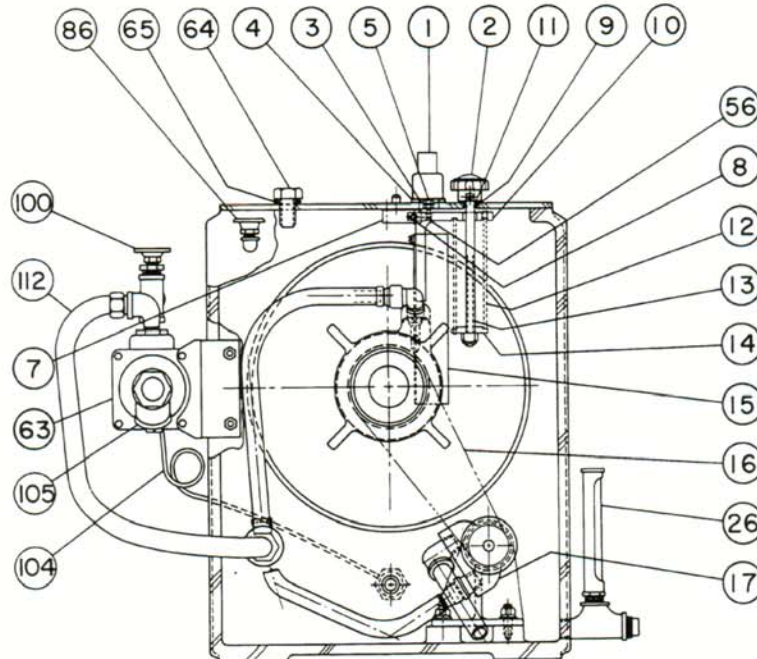
**CROSS SECTIONAL DRAWINGS**



See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 22 for  
 standard heat  
 exchanger and  
 optional features

**SIDE  
 VIEW**

Ref. Drg.  
 4846651-D



Ref. Drg.  
 4851490-D

**END VIEW  
 (From Output  
 Shaft End)**

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## VARIABLE SPEED PUMPING SYSTEMS

### Type MO Fluid Coupling Sizes 9B & 11B Hydroconstant® Variable Speed Fluid Drives with Hydraulic or Pneumatic Control

#### MATERIALS OF CONSTRUCTION

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	32	Coupling Gasket	Vegetable Fiber
2	Pressure Control Knob	Assembly	33	Input Coupling Half	Aluminum
3	Diaphragm	Rubber	34	Output Coupling Half	Aluminum
4	Spacer	Steel	35	Coupling Cover	Aluminum
5	Jam Nut	Steel	36	Drive Hub	Steel
7	Pivot Block	Steel	37	Output End Bell	Cast Iron
8	Dowel Pin	Steel	38	Drive Hub Key	Steel
9	"O" Ring Seal	Rubber	39	Stop Nut	Plated Steel
10	Splitter Arm	Ductile Iron	40	Output Hub Key	Steel
11	Retaining Ring	Steel	41	Output Hub Washer	Steel
12	Compression Spring	Steel	42	Output Hub	Steel
13	Adjusting Screw	Steel	43	Oil Pump Sprocket	Steel
14	Spring Retainer	Steel	44	Oil Pump Bracket	Cast Iron
15	Splitter	Steel	45	Input End Bell	Cast Iron
16	Chain	Assembly	46	Bearing Cap	Cast Iron
17	Oil Pump	Assembly	47	Retaining Ring	Steel
18	Cover Plate	Steel	48	Shaft Collar	Steel
19	Cover Plate Gasket	Vegetable Fiber	49	Bearing Locknut	Steel
20	End Bell Gasket	Vegetable Fiber	50	Bearing Lockwasher	Steel
21	Bearing Cap	Cast Iron	51	Oil Seal	Assembly
23	Ball Bearing	Assembly	52	Input Shaft Key	Steel
24	Bearing Locknut	Steel	53	Input Shaft	Steel
25	Ball Bearing	Assembly	54	Ball Bearing	Assembly
26	Oil Gauge	Assembly	55	Ball Bearing	Assembly
27	Output Shaft	Steel	56	Set Screw	Steel
28	Retaining Ring	Plated Steel	63	Heat Exchanger	Assembly
29	Main Housing	Cast Iron	64	Oil Filter Plug	Steel
30	Roller Bearing	Assembly	65	"O" Ring Seal	Rubber
31	Bleed Orifice	18-8 Stn. Stl.	66	Deflector	Rubber
			86	Breather	Steel Assembly
			104	Temp. Reg. Valve	Assembly
			105	Strainer	Assembly
			112	Hose	Assembly
			113	Thermometer	Assembly

**VARIABLE SPEED  
 PUMPING SYSTEMS**

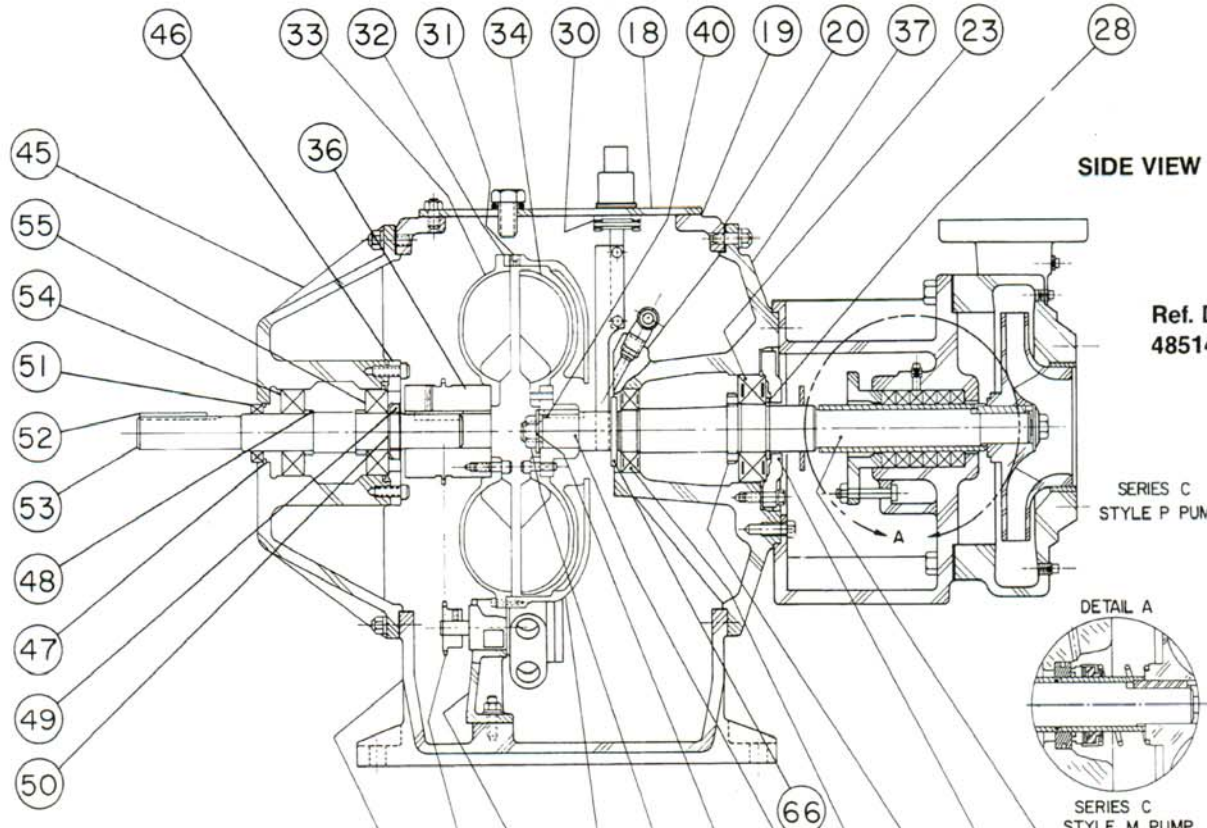


Peerless Pump Company  
 Indianapolis, IN 46207-7026

**Type MX**

Fluid Coupling Sizes 9B & 11B  
 Hydroconstant® Variable Speed  
 Fluid Drives with  
 Hydraulic or Pneumatic Control

**CROSS SECTIONAL DRAWINGS**



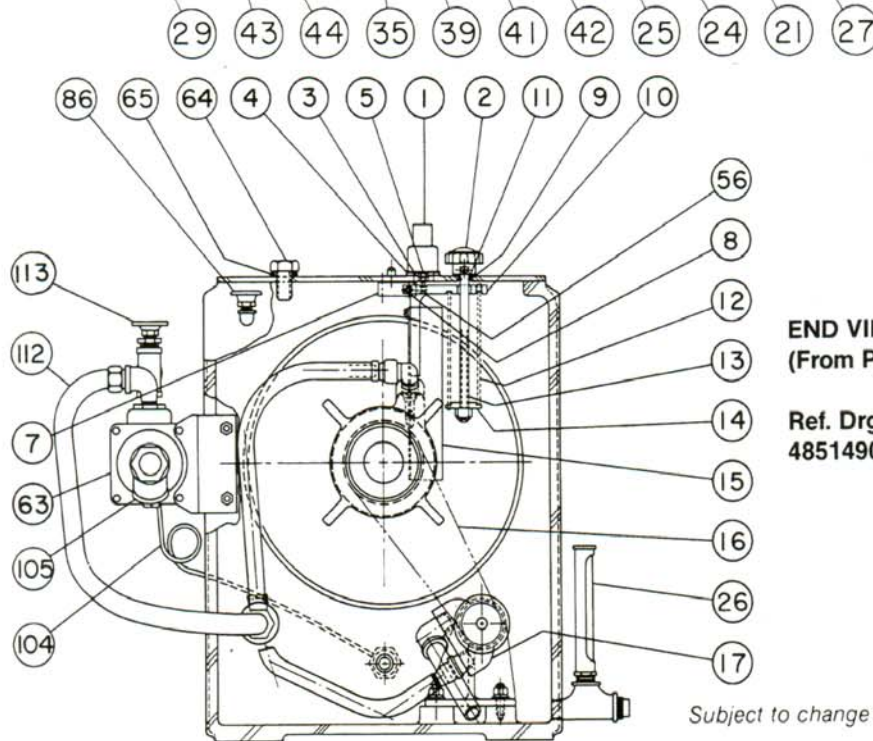
**SIDE VIEW**

Ref. Drg.  
 4851483-D

SERIES C  
 STYLE P PUMP

DETAIL A

SERIES C  
 STYLE M PUMP



**END VIEW  
 (From Pump End)**

Ref. Drg.  
 4851490-D

See Section 4120  
 page 20 for  
 electric control  
 detail and  
 page 22 for  
 standard heat  
 exchanger and  
 optional features

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## VARIABLE SPEED PUMPING SYSTEMS

### Type MX Fluid Coupling Sizes 9B & 11B Hydroconstant® Variable Speed Fluid Drives with Hydraulic or Pneumatic Control

#### MATERIALS OF CONSTRUCTION

Item No.	Description	Material	Item No.	Description	Material
1	Pressure Control	Assembly	32	Coupling Gasket	Vegetable Fiber
2	Pressure Control Knob	Assembly	33	Input Coupling Half	Aluminum
3	Diaphragm	Rubber	34	Output Coupling Half	Aluminum
4	Spacer	Steel	35	Coupling Cover	Aluminum
5	Jam Nut	Steel	36	Drive Hub	Steel
7	Pivot Block	Steel	37	Output End Bell	Cast Iron
8	Dowel Pin	Steel	38	Drive Hub Key	Steel
9	"O" Ring Seal	Rubber	39	Stop Nut	Plated Steel
10	Splitter Arm	Ductile Iron	40	Output Hub Key	Steel
11	Retaining Ring	Steel	41	Output Hub Washer	Steel
12	Compression Spring	Steel	42	Output Hub	Steel
13	Adjusting Screw	Steel	43	Oil Pump Sprocket	Steel
14	Spring Retainer	Steel	44	Oil Pump Bracket	Cast Iron
15	Splitter	Steel	45	Input End Bell	Cast Iron
16	Chain	Assembly	46	Bearing Cap	Cast Iron
17	Oil Pump	Assembly	47	Retaining Ring	Steel
18	Cover Plate	Steel	48	Shaft Collar	Steel
19	Cover Plate Gasket	Vegetable Fiber	49	Bearing Locknut	Steel
20	End Bell Gasket	Vegetable Fiber	50	Bearing Lockwasher	Steel
21	Bearing Cap	Cast Iron	51	Oil Seal	Assembly
23	Ball Bearing	Assembly	52	Input Shaft Key	Steel
24	Bearing Locknut	Steel	53	Input Shaft	Steel
25	Ball Bearing	Assembly	54	Ball Bearing	Assembly
26	Oil Gauge	Assembly	55	Ball Bearing	Assembly
27	Output Shaft	Steel	56	Set Screw	Steel
28	Retaining Ring	Plated Steel	63	Heat Exchanger	Assembly
29	Main Housing	Cast Iron	64	Oil Filter Plug	Steel
30	Roller Bearing	Assembly	65	"O" Ring Seal	Rubber
31	Bleed Orifice	18-8 Stn. Stl.	66	Deflector	Rubber
			86	Breather	Steel Assembly
			104	Temp. Reg. Valve	Assembly
			105	Strainer	Assembly
			112	Hose	Assembly
			113	Thermometer	Assembly

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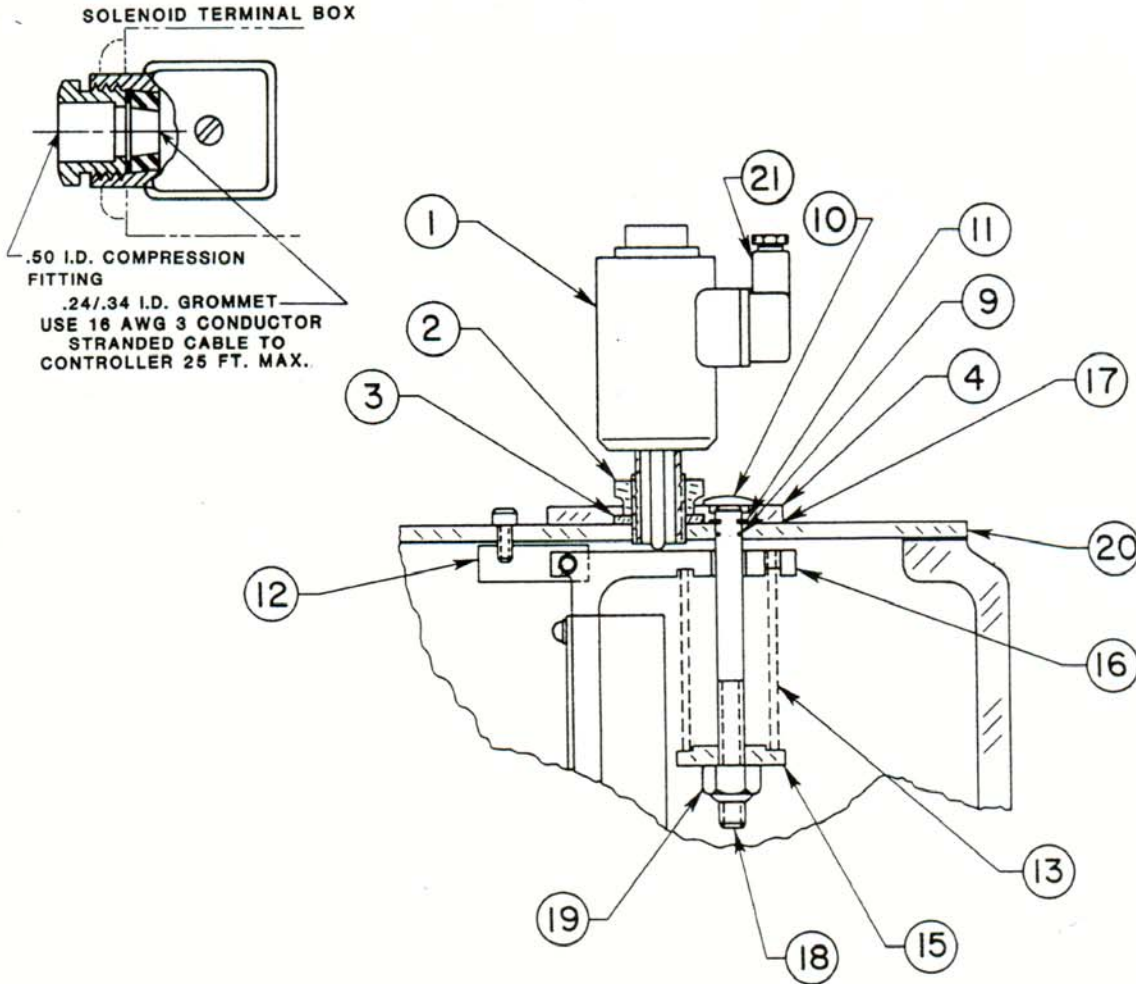
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**VARIABLE SPEED  
 PUMPING SYSTEMS**



**Hydroconstant® Variable Speed Fluid Drives  
 Fluid Coupling Sizes 6B, 8C, 9B & 11B  
 Electrical Control Detail**



**MATERIALS OF CONSTRUCTION**

Item No.	Description	Material	Item No.	Description	Material
1	Proportional Solenoid	Assembly	11	Retaining Ring	Steel
2	Locking Nut	Zinc Plated Steel	12	Pivot Block	Steel
3	Thread Seal	Assembly	13	Spring	Steel
4	Clamping Plate	Steel	15	Adjusting Nut	Steel
9	"O" Ring Seal	Buna-N Rubber	16	Splitter Arm	Steel
10	Button Plug	Cad. Plated Steel	17	Gasket	Buna-N Rubber
			18	Adjustment Screw	Brass
			19	Stop Nut	Assembly
			20	Cover Plate	Steel
			21	Conduit Connector	Assembly

File 4850606  
 Rev. 1-90

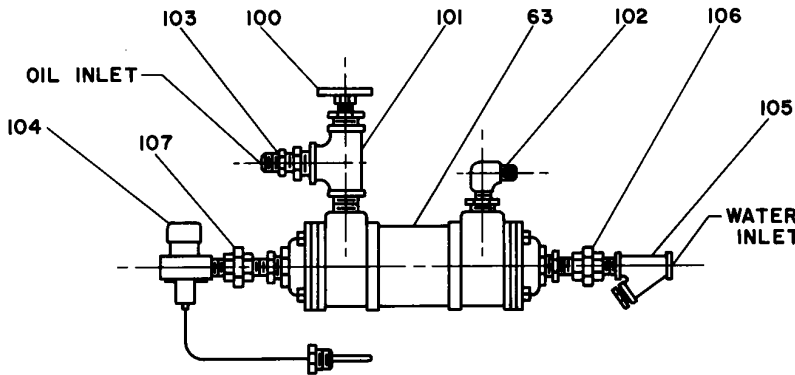
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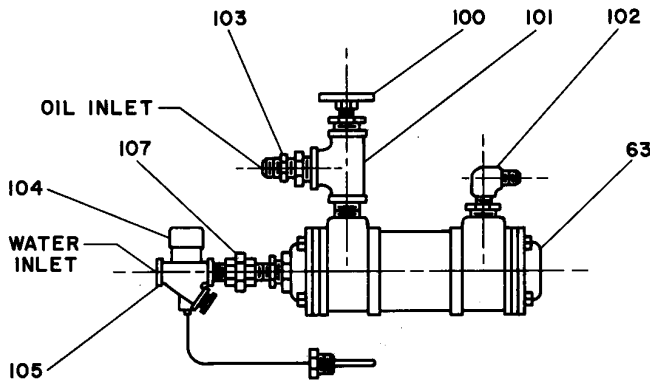
Hydroconstant Fluid Drives  
 Water/Oil Heat Exchanger  
 Construction Details  
 Standard and Optional Accessories

Standard Heat Exchangers

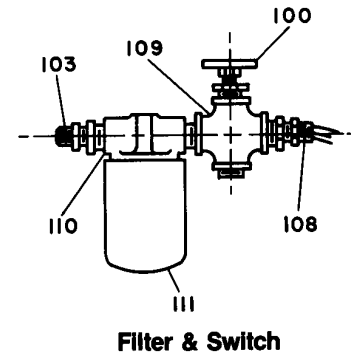
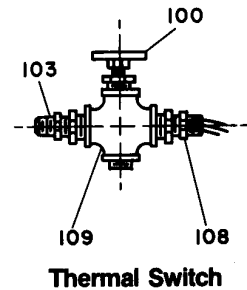
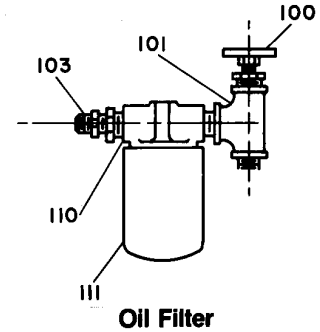
Fluid Coupling Sizes 9B & 11B  
 Single Pass Heat Exchanger



Fluid Coupling Sizes 14B, 17B  
 Two Pass Heat Exchanger



Optional Features



Materials of Construction

Item No.	Part Description	Material
63	Heat Exchanger	Assembly
100	Thermometer	Steel Case/Brass Stem
101	Pipe Tee	Steel
102/103	Hose Fitting/Pipe Adapter	Steel
104	Temperature Regulating Valve	Assembly
105	"Y" Strainer	Cast Iron/Stainless Steel Screen
106/107	Pipe Union	Steel
108	Thermal Cut-out Switch	Brass Stem/Internal Switch
109	Pipe Cross	Steel
110	Oil Filter Assembly	Aluminum Housing and Spin-on Filter Element
111	Oil Filter Element	10 Micron Filter Spin-on Type

FILE 4850612  
 Rev. 12-84