Eaton Fixed Displacement HHD Motor and Variable ACA Pump

Pump Eaton 3923 4623 5423 6423 7620 7640

Motor Eaton 3933 4633 5433 6433 7630

Eaton ACA Pump Technical Data

Table of values (theoretical values)

Eaton ACA pump		Eaton 3923	Eaton 4623	Eaton 5423	Eaton 6423	Eaton 7620
Displacement	in3/rev	3.89	4.6	5.44	6.44	7.62
	cm3/rev	63,7	75,3	89,1	105,5	124,8
Maximum Shaft Speed	Rpm @ 18°	4160	4160	3720	3720	2775
Nominal Pressure	psi	6000	6000	6000	6000	6000
	(bar)	(420)	(420)	(420)	(420)	(420)
Peak Pressure	psi	7000	7000	7000	7000	7000
	(bar)	(480)	(480)	(480)	(480)	(480)
Output Flow	g/m @3500 psi	67.3	79.2	84.1	99.1	87.9
	l/m @241 bar	255	300	318	375	333
Input Torque	lb-in @3500 psi	2346	2786	3285	3900	4552
	Nm @241 bar	265	315	371	441	514

Eaton heavy duty variable pump

The Eaton heavy duty variable displacement pump contains a rotating cylinder barrel and pistons. The displacement control directs control pressure to the two servo pistons that position the swash plate. The variable pump is powered into stroke and springs, on the servo pistons, bring it out of stroke. The swash plate pivots on tapered roller bearings. A bolt-on charge pump, with a cartridge type charge pressure relief valve, is available in four displacements. One lever controls direction, varies speed and provides dynamic braking. This ease of operation, in conjunction with a wide variety of control options, allows Eaton hydrostatic transmissions to be readily adapted to many applications.

Power Limiter Valve Operation

Power limiter valves (PLV) are high pressure relief valves built into the pump's end cover. When pressure in the high pressure loop gets too high, the PLV opens to the pump case. Besides an immediate drop in the loop high pressure, the open PLV also causes control pressure to drop. This in turn allows the centering springs on the servo pistons to bring the pump out of stroke until the pressure drops to the relief valve setting and the PLV closes. The PLV will also act as a check valve to prevent cavitations in the event of a rapid pressure rise and hose expansion. A motor with integral shuttle valve is used in conjunction with the power limiter valve pump.

Tandem Pump Applications

Tandem pumps are most typically used in applications where two independent sources of hydraulic power are required while taking advantage of using only one power source to drive the two pumps. This saves on the expense of driving two pumps by eliminating the split drive gear box or eliminating another power source such as a second engine or motor. Tandem pumps can be used on machines such as track drive equipment where independent power is required at each track. Speed and power can be controlled to each side of the vehicle for steering and vehicle speed control both in forward and reverse directions. Tandem pumps can also be used to create the equivalent flow of one larger displacement pump by combining the flows of the two pumps. This is an economic advantage over using a single large displacement pump. Tandem pumps may also be used in industrial, construction or mining applications where several sources of hydraulic power are required while taking advantage of using only one power source to drive the two pumps.

The variable displacement pump provides a flow of high pressure oil. Pump output flow can be varied to obtain the desired motor output speed. For example, when the pump's displacement is zero, no oil is pumped and the transmission's motor output shaft is stopped. Conversely, maximum pump displacement produces maximum motor shaft speed. The direction of high pressure flow can also be reversed; doing so reverses the direction the motor output shaft rotates. A charge pump is integrated into the piston pump and driven by the shaft of the piston pump. The drawing illustrates a suction filtration circuit. Eaton recommends a suction filter without a bypass valve. The charge pump has a Low Pressure Relief Valve.

Performance – Charge Pump

Eaton offers a choice of four charge pump displacements to go with their heavy duty transmission. These charge pumps are available with one or more of the following options: a pressure sensing port, remote pressure side filter ports; a spin-on pressure side filter; mounting flanges for auxiliary pump. An internal charge relief valve regulates charge pressure. Charge pressure supplies the control with pressure to operate the swash plate and to maintain a minimum pressure in the low side of the transmission loop.

The charge pressure setting is referenced to case pressure. Charge pressure is the differential pressure above case pressure.

Minimum charge pressure is the lowest pressure allowed to maintain a safe working condition in the low side of the loop. Minimum control pressure requirements are a function of speed, pressure, and swash plate angle, and may be higher than the minimum charge pressure shown in the Operating parameters tables. Maximum charge pressure is the highest charge pressure allowed by the charge relief adjustment, and which provides normal component life. Elevated charge pressure can be used as a secondary means to reduce the swash plate response time. At normal operating temperature charge inlet pressure must not fall below rated charge inlet pressure (vacuum). Minimum charge inlet pressure is only allowed at cold start conditions. In some applications it is recommended to warm up the fluid (e.g. in the tank) before starting the engine and then run the engine at limited speed. Maximum charge pump inlet pressure may be applied continuously.

Temperature and Viscosity

Temperature: The high temperature limits apply at the hottest point in the transmission, which is normally the motor case drain. The system should generally be run at or below the quoted rated temperature.

The maximum intermittent temperature is based on material properties and should never be exceeded.

Cold oil will generally not affect the durability of the transmission components, but it may affect the ability of oil to flow and transmit power; therefore temperatures should remain 16 °C [30 °F] above the pour point of the hydraulic fluid. The minimum temperature relates to the physical properties of component materials. Size heat exchangers to keep the fluid within these limits. Viscosity: For maximum efficiency and bearing life, ensure the fluid viscosity remains in the recommended range.

The minimum viscosity should be encountered only during brief occasions of maximum ambient temperature and severe duty cycle operation. The maximum viscosity should be encountered only at cold start.

Filtration System

To prevent premature wear, ensure only clean fluid enters the hydrostatic transmission circuit. A filter capable of controlling the fluid cleanliness to ISO 4406 class 22/18/13

(SAE J1165) or better, under normal operating conditions, is recommended. These cleanliness levels cannot be applied for hydraulic fluid residing in the component housing/case or any other cavity after transport. The filter may be located on the pump (integral) or in another location (remote). The integral filter has a filter bypass sensor to signal the machine operator when the filter requires changing. Filtration strategies include suction or pressure filtration. The selection of a filter depends on a number of factors including the contaminant ingression rate, the generation of contaminants in the system, the required fluid cleanliness, and the desired maintenance interval. Filters are selected to meet the above requirements using rating parameters of efficiency and capacity. Filter efficiency can be measured with a Beta ratio[1] (β X). For simple suction-filtered closed circuit transmissions and open circuit transmissions with return line filtration, a filter with a β -ratio within the range of β 35-45 = 75 (β 10 ≥ 2) or better has been found to be satisfactory. For some open circuit systems, and closed circuits with cylinders being supplied from the same reservoir, considerably higher filter efficiency is recommended. This also applies to systems with gears or clutches using a common reservoir. For these systems, a charge pressure or return filtration system with a filter β -ratio in the range of β 15-20 = 75 (β 10 ≥ 10) or better is typically required.

Control Options – Pump Electronic Proportional Displacement Control with Swash plate Mechanical Feedback

The Electronic Proportional displacement control is ideal for applications requiring electronic pump displacement control. The EP displacement control has been designed to withstand the rigors of off-highway equipment environmental conditions.

Pump Electronic Proportional Displacement Control with Swash plate Mechanical and Electronic Sensor Feedback

The Electronic Proportional displacement control with both swash plate mechanical and electronic sensor feedback is ideal for applications requiring both precise electronic pump displacement control and inherently safe operation. The dual feedback enables safety integrity level (SIL) compliance.

Standard Control with Neutral Lock-out

The neutral lock-out feature is an electrical switch that is closed when the transmission is in neutral. This switch can be used to prevent the activation of certain functions that require the pump to be in neutral. The lock-out feature is commonly used to prevent starting the prime mover or activating auxiliary functions. The electrical switch is available as normally open or normally closed.

Remote Pressure override

The remote pressure override control provides a means to remotely adjust the pressure setting of the pressure override valve.

This control may be used in applications requiring variable system pressure protection to prevent overloads and excessive heat generation. This valve operates similarly to the IPOR control.

De-stroke Control

The heavy duty De-stroke Control is a solenoid valve mounted on the standard variable pump control.

When energized, the valve cross-ports control pressure allowing centering springs to bring the pump out of stroke. It can be energized with a single switch, push button, or dead man's switch. The solenoid coils are available in 12 volt or 24 volt DC and normally open and normally closed configurations.

Component Descriptions

A typical heavy duty hydrostatic transmission. The axial piston pump and axial piston motor are the main components. The filter, reservoir, heat exchanger, and oil lines make up the rest of the system. The function of each of these components is described: A separate energy source, such as an electric motor or internal combustion engine, turns the input shaft of the pump.

Variable Displacement Axial Piston Pump

The variable displacement pump provides a flow of high pressure oil. Pump output flow can be varied to obtain the desired motor output speed. For example, when the pump's displacement is zero, no oil is pumped and the transmission's motor output shaft is stopped. Conversely, maximum pump displacement produces maximum motor shaft speed. The direction of high pressure flow can also be reversed; doing so reverses the direction the motor output shaft rotates.

A charge pump is integrated into the piston pump and driven by the shaft of the piston pump. The drawing illustrates a suction filtration circuit. Eaton recommends a suction filter without a bypass valve. The charge pump has a Low Pressure Relief Valve that regulates the output pressure. Power limiter valves and high pressure relief valves are available as options.

Fixed Displacement

Axial Piston Motor The motor uses the high pressure oil flow from the pump to produce transmission output. The high pressure oil comes to the motor through one of the high pressure lines. It enters the motor, turns the output shaft, and then returns to the pump. Eaton piston motor integrates a hot oil shuttle and low pressure relief valve into the end cover. The shuttle valve and low pressure relief valve direct excess charge pump flow into the motor case. The shuttle valve is activated by high pressure and directs excess charge pump flow over the low pressure relief valve. This flushing action allows the charge pump to provide clean, cool oil to the closed loop circuit.

Eaton HHD motor Technical Data

Table of values (theoretical values)

Eaton HHD motor		Eaton 3933	Eaton 4633	Eaton 5433	Eaton 6433	Eaton 7630
Displacement	in3/rev	3.89	4.6	5.44	6.44	7.62
	cm3/rev	63,7	75,3	89,1	105,5	124,8
Nominal Pressure	psi	6000	6000	6000	6000	6000
	(bar)	(420)	(420)	(420)	(420)	(420)
Peak Pressure	psi	7000	7000	7000	7000	7000
	(bar)	(480)	(480)	(480)	(480)	(480)
Maximum	rpm @ 18°	4160	4160	3720	3720	2775
Shaft Speed	rpm @ 10°	5380˜	5380˜	4810˜	4810˜	3425˜
Maximum	lb-in	3511	4149	4916	5807	6911
Output Torque	Nm	397	469	556	656	781

The motor uses the high pressure oil flow from the pump to produce transmission output. The high pressure oil comes to the motor through one of the high pressure lines. It enters the motor, turns the output shaft, and then returns to the pump. Eaton piston motors integrate a hot oil shuttle and low pressure relief valve into the end cover. The shuttle valve and low pressure relief valve direct excess charge pump flow into the motor case. The shuttle valve is activated by high pressure and directs excess charge pump flow over the low pressure relief valve. This flushing action allows the charge pump to provide clean, cool oil to the closed loop circuit.

Eaton ACA pump part number and its model			
3923-002	ACA392314L0A00MAD000000010D00000B	5423-402	ACA542323R1B00MAE002M0EH00000000B
3923-003	ACA392314R0A00MAD000000010D00000B	5423-417	ACA5423-14L0A00MAG002K0DF 30H-00000B
3923-200	ACA392314R0B00MDBBB0000A30D00000B	5423-493	ACA542314R0D00MADC00000F 30D00000D
3923-210	ACA392321R0B00MAD002M0D010D00000B	5423-518	ACA542337R0B00MAD0000000 30D00000B
3923-282	ACA392321R0ALLRGD0000000OBSOLETE	5423-715	ACA542337L0BLLMAD0000000 30D00000B
3923-295	ACA392336R0A00MCD000080020G00000B	5423-867	ACA542337R0B00MCD000080030D00000B
3923-352	ACA392336R0AJJEKD000000B20K00000B	5423-889	ACA542314L0B00MAG00000FA50D0150UB
3923-355	ACA392321R0ALLMAD000000030L00000B	6423-005	ACA642323R1B00MAG0000000 30G00000B
3923-371	ACA392339R0A00MCD000080020G00000B	6423-020	ACA642314R0A00MAG002K0 D030D00000B
4623-002	ACA462314L0A00MAD000000010D00000B	6423-034	ACA642314R0B00MDG0000000 30D00000B
4623-003	ACA462314R0A00MAD000000010D00000B	6423-071	ACA642323R1B00MAG00000EE 00000000B
4623-115	ACA462314R0D000B0000000010D00000B	6423-073	ACA6423-23L1A00MAG00000E E000-00000A
4623-231	ACA462321L0A00MAD000000A10D00000B	6423-081	ACA642330L1B00MDC002M0D030D013A0B
4623-294	ACA462321L0A00MAD00000EE00000000B	6423-279	ACA642337R0B00MAB0000000 30D00000B
4623-396	ACA462314R0A00MDA000000B30D00000B	6423-338	ACA642314R0A00MAD002L0A0 40D00000B
4623-432	ACA4623140A00MAD00000AA30D00000B	6423-449	ACA642323R0A00MDB0000000 20D00000B
4623-472	ACA462314L0A00HB000000AB30D00000B	6423-511	ACA642323R1B00FSA00000EL 00004000B
4623-503	ACA462314L0A00MAG002L0EE00000000B	7620-000	ACA762013L0A00MAG0000000 30D00000A
4623-524	ACA462314R0B00MAG00000AB30G00000B	7620-001	ACA762013R0A00MAG0000000 30D00000A
4623-552	ACA462337R0B00MAB000000030D00000B	7620-010	ACA762027L0A00MAG0000000 30D00000A
4623-553	ACA462337L0B00MAB000000030D00000B	7620-011	ACA762027R0A00MAG0000000 30D00000A
4623-608	ACA462314R0A00HB000000AB30D00000B	7620-037	ACA762027R0A00MAG0000000
4623-654	ACA462314L0B00MAD00000FA40D0BB0UB	7620-039	ACA762013R0A00MAG000000B 30D00000A
5423-003	ACA542314L0A00MAG000000010D00000B	7620-058	ACA762027L0B000B00000000
5423-004	ACA542314R0A00MAG000000010D00000B	7620-094	ACA762027R0B00MAG002J0D0 40D01800A
5423-016	ACA542323R0A00MAG000000010D0000UB	7620-316	ACA762013L0E00EJB005J7YF 30K00000A
5423-295	ACA542314R1A00HAG0000000	7620-371	ACA762013R0B00MDB002L0DB 50KA0000A
5423-367	ACA542323R0A00MAG00000EE00000000B	7640-032	ACE764013MBB1B1M1MRBGG00
Eaton HHD motor part number and its model			
3933-001	HHD393314AB1B1M1M00000B	5433-005	HHD543314AB1B1K1K00000B
3933-002	HHD393321AB1B1M1M00000B	5433-008	HHD543323AB1B1K1K00000B
3933-092	HHD393321BG1B000000000B	5433-080	HHD543321BB1B1M1M00000B
4633-002	HHD463314AB1B1K1K00000B	5433-116	HHD543314AB1B1J1J00000B
4633-010	HHD463321AB1B1L1L0000B	5433-138	HHD543321BB1B1K1K00000A
4633-029	HHD463314AC00000000000B	5433-142	HHD543330JG1H000000000B
4633-036	HHD463314AB2B1K1K00500B	5433-203	HHD543321G_001N1N00000B
4633-045	HHD463321BB1B1K1K00000B	5433-216	HD543321BB1B1M1M02200B
4633-047	HHD463321AG1B000000000B	6433-002	HHD643314BA1B1K1K00000B
4633-111	HHD463321BB1B1L1L00000B	6433-009	HHD643314AA1B1K1K00000B
4633-132	HHD463321AG1B0000D00A0B	6433-011	HHD643321AA1B1K1K00000B
4633-139	HHD463301BH1B0000B0000B	6433-042	HHD643321BB1B1M1M00000B
4633-143	HHD463321BG1B000000000B	6433-120	HHD643323BA1B1L1L00000B
4633-153	HHD463321AG1B0000C00A0BH	6433-154	HHD643323BA1H1L1LA0000B
4633-164	HHD463314AB1B1K1KC0000B	6433-187	HHD643336KR000000C3500B
4633-190	HHD463321GZ001N1N00000B	7630-014	HHD763027AB1B1N1N00000A

Model Code

ACA Series 1 Variable Pump

The following 33 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Variable Displacement Pump. Use this model code to specify a pump with the desired features. All 33 digits of the code must be present to release a new product number for ordering.

ACA	39	2	03	02	L	1	A	C	C	EA	A	A	A	2	C	N	A	A	1	0	D	A	15	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15,16	17	18	19	20	21	22	23	24	25	26	27	28	29,30	31	32	33

Note: Options in bold fonts are commonly used.

1, 2, 3 Pump Series

ACA – Hydrostatic - Heavy Duty Variable Pump

4,5 Displacement

39 – 63.66 cm^3/r (3.885 in^3/r)
46 – 75.28 cm^3/r (4.594 in^3/r)
54 – 89.13 cm^3/r (5.439 in^3/r)
64 – 105.4 cm^3/r (6.431 in^3/r)
76 – 124;8 cm^3/r (7.616 in^3/r)

6 Type

2 – Variable Displacement Pump

7 Design Type

0 – Ball-Guide (Model 76)
3 – Series 1 (Models 39-64)

8, 9 Input Shaft

01 – (1.500) Diameter straight with (.3750) x (2.5) square key (Models 39-64)
02 – (1.750) Diameter straight with (.4375) x (3.0) square key (Model 76)
13 – 13 Tooth 8/16 pitch spline (Model 76)
14 – 14 Tooth 12/24 pitch spline (Models 33-64)
21 – 21 Tooth 16/32 pitch spline (Models 39-64)
22 – 21 Tooth 16/32 pitch spline with (3.22) extension (Models 46-64)
23 – 23 Tooth 16/32 pitch spline (Models 39-64)
24 – 23 Tooth 16/32 pitch Sspline with 3/8-24 UNF hole (Models 39-64)
25 – 21 Tooth 16/32 pitch spline with 3/8-24 UNF hole (Models 39-64)
27 – 27 Tooth 16/32 pitch spline (Model 76)
30 – 13 Tooth 8/16 pitch spline with (2.93) extension and for 76 seal (Models 54-64)
33 – 13 Tooth 8/16 pitch spline with (2.19) extension and for 76 seal (Model 54)
36 – 21 Tooth 16/32 pitch spline with M10 x 1.5 threaded hole (Models 39-46)
37 – 23 Tooth 16/32 pitch spline with M10 x 1.5 threaded hole (Models 39-54)
38 – 27 Tooth 16/32 pitch spline with (2.93) extension and for 76 seal (Models 54-64)
39 – 34.9 (1.375) Diameter tapered with 9.5 (.3750) x 25.4 (1.00) square key (Models 39-64)
40 – 38 (1.50) Diameter tapered with 9.5 (.3750) x 25.4 (1.00) square key (Models 54-64)
41 – 44 (1.75) Diameter tapered with 11 (.4375) x 25.4 (1.00) square key (Model 76)
44 – 14 Tooth 12/24 pitch spline with M10 x 1.5 threaded hole (Models 39-46)

10 Input Rotation

L – Counterclockwise (Lefthand)
R – Clockwise (Righthand)

11 Valve Plate

0 – Standard (V-groove)
1 – Propel

12 Main Ports

A – 25.4 (1.00) - Code 61 per SAE J518
B – 25.4 (1.00) - Code 62 per SAE J518
D – (1.00) - Code 61 per SAE J518 with port A and B gage ports
E – (1.00) - Code 62 per SAE J518 with port A and B gage ports

13,14 Power Limiter Valve Setting Port A (position 13 and Port B (position 14)

0 – None
C – 103 bar (1500 lbf/in^2)
D – 138 bar (2000 lbf/in^2)
E – 172 bar (2500 lbf/in^2)
F – 207 bar (3000 psi)
G – 241 bar (3500 psi)
H – 276 bar (4000 psi)
J – 310 bar (4500 psi)
K – 345 bar (5000 psi)
L – 379 bar (5500 psi)
M – 414 bar (6000 psi)
N – 448 bar (6500 psi)

15,16 Control Option

0B – Shipping cover, with control feedback link

Electro-proportional

EJ – Electronic proportional control 12 volt DC
EK – Electronic proportional control 24 volt DC
FD – Electronic proportional control, 12VDC, swash plate electronic sensor feedback, de-stroking valve
FE – Electronic proportional control, 24VDC, swash plate electronic sensor feedback, de-stroking valve
SC – Electric control 12 volt with swashplate feedback sensor, with electrical connectors DIN 43650
SD – Electric control 24 volt with swashplate feedback sensor, with electrical connectors DIN 43650

Forward-Neutral-Reverse

FR – Forward-neutral-reverse control 12 volt DC with 2-pin weatherpack connector
FS – Forward-neutral-reverse control 24 volt DC with 2-pin weatherpack connector

Hydraulic Remote

HA – Hydraulic remote 1.4-14.1 bar (20-205 psi)
HB – Hydraulic remote 1.4-14.1 bar (20-205 psi) with wide band neutral
HC – Hydraulic remote 3.1-14.5 bar (45-210 psi)
HD – Hydraulic remote 4.5-20.0 bar (65-290 psi)
HF – Hydrualic remote 4.5-20.0 bar (65-290 psi) with wide band neutral
HG – Hydraulic remote 4,5-20,0 bar (65-290 lbf/in^2) with 12vdc (NC) destroke valve (non-manifold) with electrical connector (male only) per din 43650
HH – Hydraulic remote 11,0-32,4 bar (160-470 lbf/in^2)
HJ – Hydraulic remote 3.1-14.5 bar (45-210 psi) with wide band neutral
HK – Hydraulic remote 4,5-20,0 bar (65-290 lbf/in^2) with 12vdc (NC) destroke valve (non-manifold) with electrical connectors (male & female) per din 43650 for 6,0-10,0 (.24-.39) diameter cable

Model Code

ACA Series 1 Variable Pump

The following 33 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Variable Displacement Pump. Use this model code to specify a pump with the desired features. All 33 digits of the code must be present to release a new product number for ordering.

ACA	39	2	03	02	L	1	A	C	C	EA	A	A	A	2	C	N	A	A	1	0	D	A	15	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15,16	17	18	19	20	21	22	23	24	25	26	27	28	29,30	31	32	33

Note: Options in bold fonts are commonly used.

Mechanical Manual

MA – Manual

MB – Manual with wide band neutral and 3/4-16UN plug in neutral lockout port

MC – Manual with wide band neutral

MD – Manual With (NC) neutral lockout switch (wide band neutral)

ME – Manual with neutral detent (wide band neutral)

MJ – Manual with destroke valve (manifold) 12vdc (NO) 3 pin weatherpack connector

MK – Manual With Neutral Detent (Wide Band Neutral) And 24Vdc (Nc) Destroke Valve (Non-Manifold) With Electrical Connectors (Male & Female) Per Din 43650 For 4,5-8,0(.18-.31) Diameter cable

ML – Manual with (NC) neutral lockout switch (wide band neutral) and 12vdc (NC) destroke valve (non-manifold) with electrical connectors (male & female) per DIN 43650 for 4,5-8,0(.18-.31) diameter cable

MM – Manual with (NO) neutral lockout switch (wide band neutral) and destroke valve (manifold) 12vdc with 2 pin weather pack connector

MN – Manual with (NC) neutral lockout switch (wide band neutral) and destroke valve 12vdc (NO), (non-manifold), no manual override, 2 pin weatherpack connector mounted connector down

MP – Manual with destroke valve (non-manifold) 12vdc (NO), 3 pin packard connector mounted right angle up

MS – Manual with wide band neutral and 24vdc (NC) destroke valve (non-manifold) with electrical connectors (male & female) per din 43650 for 4,5-8,0(.18-.31) diameter cable

MT – With wide band neutral and inching valve with seal

MU – Manual with wide band neutral, inching valve with seal and neutral detent

MV – With wide band neutral, inching valve with seal and neutral lockout switch (NC)

MW – Manual with destroke valve (manifold) 12vdc (NO) with 2 pin weatherpack connector

MZ – Manual with (NC) neutral lockout switch (wide band neutral) with packard 2 pin connector

NA – Manual with destroke valve (manifold) 12vdc (NO) 3 pin weatherpack connector and (NC) neutral lockout switch (wide band neutral) with packard 2 pin connector

NB – Manual with destroke valve (manifold) 24vdc (NO) 2 pin weatherpack connector

NC – Manual with wide band neutral, inching valve with seal and neutral lockout switch (NC) with packard 2 pin connector

ND – Manual with destroke valve (manifold) 12vdc (NO) with 2 pin weatherpack connector with (NC) neutral lockout switch (wide band neutral) with packard 2 pin connector

NG – Manual with (NC) neutral lockout switch (wide band neutral) and destroke valve (manifold) 12vdc (NC) with 2 pin weatherpack connector

NH – Manual with neutral detent (wide band neutral) and 12vdc (NO) destroke valve (manifold) with manual override and electrical connectors (male & female) per DIN 43650 for 4.5-8.0(.18-.31) diameter cable

NK – Manual with wide band neutral, inching valve with seal and neutral lockout switch (NO)

NR – Manual with destroke valve (manifold) 12vdc (NO) with 2 pin weatherpack connector. no manual override. (NC) neutral lockout switch (wide band neutral) with packard 2 pin connector

NS – Manual with (NC) neutral lockout switch (wide band neutral) and destroke valve (manifold) 24vdc (NC) with 2 pin weatherpack connector

NT – Manual with (NC) neutral lockout switch (wide band neutral) and destroke valve (manifold) 12vdc (NO) with 2 pin metri-pack connector

NV – Manual with (NC) neutral lockout switch (wide band neutral) and destroke valve (manifold) 24vdc (NO) with 2 pin weatherpack connector

NW – Manual with (NC) neutral lockout switch (wide band neutral) with weatherpack (2) pin connector and destroke valve (manifold) 12vdc (NO) with 2 pin metri-pack connector

PA – Port plate, no control feedback link

Remote Electric

RD – Remote electric with (NC) destroke valve, (3) 12vdc with (1) 2 pin and (1) 4 pin weatherpak connectors, no displacement control, with 0,33 (.013) control supply orifice

RE – Remote electric with (NC) destroke valve, (3) 12vdc with (3) 2 pin weatherpak connectors, no displacement limiter, with 0,33 (.013) control supply orifice

RF – Remote electric with (nc) destroke valve including 3,58 (.141) orifice, (3) 12vdc with (3) 2 pin weatherpak connectors, no displacement limiter, with 0,33 (.013) control supply orifice

RG – Remote electric with (NC) destroke valve, (3) 24vdc with (3) 2 pin weatherpak connectors, no displacement limiter, with 0,33 (.013) control supply orifice

Model Code

ACA Series 1 Variable Pump

The following 33 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Variable Displacement Pump. Use this model code to specify a pump with the desired features. All 33 digits of the code must be present to release a new product number for ordering.

ACA	39	2	03	02	L	1	A	C	C	EA	A	A	A	2	C	N	A	A	1	0	D	A	15	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15,16	17	18	19	20	21	22	23	24	25	26	27	28	29,30	31	32	33

Note: Options in bold fonts are commonly used.

RH – Remote electric with (NC) destroke valve including 3,18 (.125) orifice, (3) 12vdc with (1) 2 pin and (1) 4 pin weatherpak connectors, no displacement limiter, with 0,33 (.013) control supply orifice

RJ – Remote electric with (NO) destroke valve including 3,58(.141) orifice, (3) 12vdc with (3) 2 pin weatherpak connectors, no displacement limiter, with 0,33 (.013) control supply orifice

RK – Remote electric with (NC) destroke valve, (3) 12vdc with wireleads, no displacement limiter, with 0,33 (.013) control supply orifice

17,18,19 Control Supply Orifice

P (pos. 17)
Upper Servo (S1 pos. 18)
Lower Servo (S2 pos. 19)

0 – None
A – 0.71 (.028) Diameter
B – 0.91 (.036) Diameter
C – 1.12 (.044) Diameter
D – 1.32 (.052) Diameter
E – 1.45 (.057) Diameter
F – 1.65 (.065) Diameter
G – 1.85 (.073) Diameter
H – 2.39 (.094) Diameter
J – 2.59 (.102) Diameter

20 Pressure Override

0 – None
2 – Internal Pressure Override
5 – Internal Pressure Override Externally Adjustable

21 Pressure Setting for Pressure Override

0 – None
1 – 196 bar (2850 lbf/in^2)
D – 138 bar (2000 psi)
E – 172 bar (2500 psi)
F – 207 bar (3000 psi)
G – 241 bar (3500 psi)
H – 276 bar (4000 psi)
J – 310 bar (4500 psi)
K – 345 bar (5000 psi)
L – 379 bar (5500 psi)
M – 414 bar (6000 psi)
P – 362 bar (5250 lbf/in^2)

22 Control Special Features

0 – No control special features
3 – Manual control lever with attachment holes located 66;7 (2.625) and 82;6 (3.25) and 98;4 (3.875) from control shaft mounting hole
6 – Control special features severe duty coils with boots for electronic proportional control with weather-pack connector
7 – Severe duty coils with boots for electronic proportional control
8 – Manual control lever with attachment hole located 98;4 (3.875) from control shaft mounting hole
A – No manual control lever
B – Hardened Standard Manual Control lever mounted parallel to the pump drive shaft towards the mounting flange
D – Hardened standard manual control lever
E – Manual control lever with attachment hole 71;9 (2.83) from control shaft mounting hole. lever mounted parallel to pump drive shaft towards the mounting flange
H – Manual control lever with ball stud mounted 50;8 (2.00) from control shaft mounting hole. lever mounted parallel to pump drive shaft towards mounting flange
K – Manual control lever with 10;4 (0.41) diameter attachment hole 50;8 (2.00) from control shaft mounting hole
M – Manual control lever with ball stud mounted 76;2 (3.00) from control shaft mounting hole. Lever mounted parallel to pump drive shaft towards mounting flange.
N – Manual control lever with external torsion spring mechanism for neutral return
S – Manual control lever with two 1/4-28 UNF attachment holes located at 85;7 (3.375) and 98;4 (3.875) from control shaft mounting hole. Lever mounted parallel to pump drive shaft towards mounting flange.
W – Manual control lever mounted 1 to 2 spline teeth from vertical with external torsion spring mechanism for neutral return
Y – Manual control lever with two 1/4-28 UNF attachment holes located at 85;7 (3.375) and 98;4 (3.875) from control shaft mounting hole

23 Charge Pump

0 – Charge pump included
2 – Charge pump with integral pressure filter mounted on the -A- port side
3 – Charge pump with short element integral pressure filter mounted on the -A- port side and external discharge port for 7/8-14 UNF-2B SAE O-ring fitting with steel hex plug
A – Charge pump with remote pressure filter ports on the -A- port side
B – Charge pump with integral pressure filter mounted on the -B- port side
C – Charge pump with J.Deere integral pressure filter mounted on the -B- port side. diagnostic fitting included
D – Charge pump with external discharge port for 7/8-14 UNF SAE O-ring fitting. With steel hex plug
E – No charge pump

Model Code

ACA Series 1 Variable Pump

The following 33 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Variable Displacement Pump. Use this model code to specify a pump with the desired features. All 33 digits of the code must be present to release a new product number for ordering.

ACA	39	2	03	02	L	1	A	C	C	EA	A	A	A	2	C	N	A	A	1	0	D	A	15	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15,16	17	18	19	20	21	22	23	24	25	26	27	28	29,30	31	32	33

Note: Options in bold fonts are commonly used.

F – Charge pump with external discharge port with 90 degree. 7/8-14 UNF. 37 degree flare tube fitting

G – Charge pump with integral pressure filter and diagnostic fitting mounted on the -B- port side plus inlet gage port with hex plug

H – Charge pump with remote pressure filter ports on -A- port side and inlet gage port on -B- port side

J – Charge pump with integral pressure filter and diagnostic fitting; mounted on the -B- port side and external discharge port with 90 degree; 7/8-14 UNF; 37 degree flare; tube fitting

K – Charge pump with remote pressure filter ports on the -B- port side and external discharge port with 90 degree; 7/8-14 UNF; 37 degree flare; tube fitting

L – Charge pump with integral pressure filter and diagnostic fitting; mounted on the -B- port side and external discharge port with straight; 7/8-14 UNF; 37 degree flare; tube fitting

M – Charge pump with remote pressure filter ports on the -B- port side and external discharge port with straight 7/8-14 UNF SAE O-ring to 3/4-16 UNF; 37 degree flare; tube fitting

P – Charge pump with remote pressure filter ports on the -B- port side and external discharge port with straight 7/8-14 UNF; 37 degree flare; tube fitting

R – No charge pump; with remote pressure filter ports on the -B- port side and external discharge port with 90 degree; 7/8-14 UNF; 37 degree flare; tube fitting

S – Charge pump with integral pressure filter and diagnostic fitting; mounted on the -B- port side and external discharge port for 7/8-14 UNF-2B SAE O-ring fitting; with steel hex plug

T – Charge pump with external discharge port with straight 7/8-14 UNF; 37 degree flare; tube fitting

U – Charge pump with integral pressure filter; mounted on the -B- port side and external discharge port for 7/8-14 UNF-2B SAE O-ring fitting; with steel hex plug

W – Charge pump with integral pressure filter mounted on the -A- port side and external discharge port for 7/8-14 UNF-2B SAE O-ring fitting with steel hex plug

Y – Charge pump with remote pressure filter ports on the -B- port side and external discharge port for 7/8-14 UNF-2B SAE O-ring fitting with steel hex plug

Z – Charge pump with remote pressure filter ports on the -B- port side

24 Auxiliary Mounting

0 – No auxiliary mounting

1 – SAE B-pad, no shaft seal and M12x 1.75-6H Thd

A – SAE A-pad. With shaft seal (dry)

B – SAE B-pad. With shaft seal (dry)

C – SAE A-pad. No shaft seal (wet)

E – SAE C-pad. (Typically front pump of tandem) no shaft seal. Includes 14 tooth 12/24 pitch spline coupling. Charge pressure inlet port with 7/8-14 UNF. 37 degree flare. Tube fitting (45 degree for models 33-46 and straight for models 54-64)

F – SAE B-pad; no shaft seal

G – SAE C-pad; (typically front pump of tandem) no shaft seal; Includes 21 tooth 16/32 pitch spline coupling; Charge pressure inlet port with 7/8-14 UNF; 37 degree flare; Tube fitting (45 degree for models 33-46 and straight for models 54-64)

H – SAE C-pad; (typically front pump of tandem) no shaft seal; Includes 23 tooth 16/32 pitch spline coupling; Charge pressure inlet port with 7/8-14 UNF; 37 degree flare; Tube fitting (45 degree for models 33-46 and straight for models 54-64)

L – SAE C-pad; (typically front pump of tandem) no shaft seal; Includes 14 tooth 12/24 pitch spline coupling; With 7/8-14 SAE O-ring port for charge pressure inlet (no fitting provided)(models 54-64)

N – SAE C-pad; (Typically front pump of tandem) no shaft seal; Includes 14 tooth 12/24 pitch spline coupling; Charge pressure inlet port with 45 deg 7/8-14 UNF; 37 Degree flare; Tube fitting (For models 54-64 Only)

P – SAE C-pad; (Front of tandem) No shaft seal; includes 14 tooth 12/24 Pitch spline coupling; Chg press inlet port with 7/8-14 UNF; 37 deg flare; Tube fitting (45 deg for models 33-64);Chg press gage port 7/8-14 UNF-2A capped

R – SAE A-pad With 11 tooth 16/32 pitch internal spline; No shaft seal (wet)

S – SAE C-pad; (Typically front pump of tandem) no shaft seal; Includes 14 tooth 12/24 pitch spline coupling; Charge pressure inlet port with 7/8-14 UNF; 37 Degree flare; Tube fitting (Straight for models 33-46)

U – SAE C-pad; (Typically front pump of tandem) no shaft seal; Includes 14 tooth 12/24 pitch spline coupling; Charge pressure inlet port on pump centerline with 7/8-14 UNF; 37 Deg flare; Tube fitting (45 degree for models 33-46 and straight for models 54-64)

25 Charge Pump Displacement

0 – No Charge Pump

1 – 13.9 cm^3/r (0.85 in^3/r)

2 – 17.4 cm^3/r (1.06 in^3/r)

3 – 21.0 cm^3/r (1.28 in^3/r)

4 – 27.9 cm^3/r (1.70 in^3/r)

5 – 34.7 cm^3/r (2.12 in^3/r)

Model Code

ACA Series 1 Variable Pump

The following 33 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Variable Displacement Pump. Use this model code to specify a pump with the desired features. All 33 digits of the code must be present to release a new product number for ordering.

ACA	39	2	03	02	L	1	A	C	C	EA	A	A	A	2	C	N	A	A	1	0	D	A	15	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15,16	17	18	19	20	21	22	23	24	25	26	27	28	29,30	31	32	33

Note: Options in bold fonts are commonly used.

26 2nd Displacement of Dual Element

0 – No Dual Element

27 Charge Pressure Rel Valve Setting

0 – None
D – 15 bar (220 psi) - Standard
E – 16 bar (240 lbf/in²)
F – 18 bar (260 lbf/in²)
G – 19 bar (280 psi)
H – 21 bar (300 lbf/in²)
J – 22 bar (320 lbf/in²)
K – 23 bar (340 psi)
L – 24 bar (350 lbf/in²)
M – 26 bar (380 lbf/in²)
N – 28 bar (410 lbf/in²)

28 Charge Pump Special Features

0 – No charge pump special features
A – Steel core charge pump gasket
B – Steel core charge pump gasket and 90 degree inlet fitting; 1 5/8-12 UN threaded end for 37 degree flare tubing ((1.25) OD tubing; (1.25) ID hose)
J – Steel core charge pump gasket; needle bearing
M – Charge inlet manifold with charge relief valve
N – Steel core charge pump gasket and charge inlet mainifold with charge relief valve
P – Charge inlet manifold with external discharge port for 7/8-14 unf sae o-ring port and steel hex plug in inlet port

29,30 Special Pump Assembly Features

00 – No special features
05 – Bottom servo piston with 0.0 degree stop
11 – Both servo sleeves have 1/2-20 UNF-2B thread and steel hex bolts
12 – Bottom servo sleeve has 7/8-14 UNF SAE O-ring port with hex steel plug
13 – Model 76 shaft seal and grade 8 bolts in mounting flange to pump housing (models 54-64)
14 – Special thick section end cover gasket
15 – Rear pump unit for tandem pump assembly (no shaft seal)
18 – Hi-Speed rotating group (model 76)
32 – Both servo sleeves have 7/8-14 UNF SAE O-Ring ports and steel hex plugs
39 – Bottom servo piston with externally adjustable stop
40 – Both servo pistons with externally adjustable stops
53 – Model 76 shaft seal
58 – 1350 Series end yoke assembled to drive shaft (Pos 8,9 must be Code 40)
59 – 1310 Series end yoke assembled to drive shaft (Pos 8,9 must be Code 40)
67 – Metal case drain plug in both ports
79 – Rear pump unit for tandem pump assembly (no shaft seal), both servo pistons with externally adjustable stops
82 – Rear pump unit for tandem assembly (no shaft seal), top servo piston with externally adjustable stop
83 – Externally adjustable displacement stops set at 3.32 in³/rev (54.4cc/rev)

31 Paint and Packaging

0 – Painted primer blue (standard)
A – Painted finish black

32 Identification on Unit

0 – Standard

33 Design Code

A – A
B – B

Model Code

HHD Fixed Motor

The following 23 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Fixed Displacement Motor. Use this model code to specify a motor with the desired features. All 23-digits of the code must be present to release a new product number for ordering.

HHD	39	3	0	01	A	A	0	0	0	0	0	0	0	00	0	0	B
1, 2, 3	4, 5	6	7	8, 9	10	11	12	13	14	15	16	17	18	19,20	21	22	23

Note: Options in bold fonts are commonly used.

1, 2, 3 Pump Series

HHD – Heavy Duty Hydrostatic Fixed Displacement Motor

4,5 Displacement

33 – 54 cm^3/r (3.3 in^3/r) at 15.5 deg. swashplate angle
39 – 64 cm^3/r (3.9 in^3/r) at 18 deg. swashplate angle
46 – 75 cm^3/r (4.6 in^3/r) at 18 deg. swashplate angle
54 – 89 cm^3/r (5.4 in^3/r) at 18 deg. swashplate angle
64 – 105 cm^3/r (6.4 in^3/r) at 18 deg. swashplate angle
76 – 125 cm^3/r (7.6 in^3/r) at 18 deg. swashplate angle

6 Type

3 – Fixed displacement motor

7 Design Type

0 – Ball-guide - (model 76)
3 – Bixed clearance - (models 39-64)

8, 9 Input Shaft

01 – (1.50) Diameter straight with (.38) x (2.5) square key (models 39-64)
02 – (1.75) Diameter straight with (.44) x (3.0) square key (model 76)
06 – (1.50) Diameter straight with (.38 x (2.5) square key with 3/8-24 UNF x (.75) DP hole in end of shaft (models 39-64)
07 – (1.75) Diameter straight with (.44) x (3.0) square key with 3/8-24 UNF x (.75) dp hole in end of shaft (model 76)
13 – 13 Tooth 8/16 pitch spline (model 76)
14 – 14 Tooth 12/24 pitch spline (models 39-64)
21 – 21 Tooth 16/32 pitch spline (models 39-64)
23 – 23 Tooth 16/32 pitch spline (models 39-64)
24 – 23 Tooth 16/32 pitch spline with (1.92) extension (models 39-64)
25 – 23 Tooth 16/32 pitch spline with 3/8-24 UNF x (.75) DP hole in end of shaft (models 39-64)
27 – 27 Tooth 16/32 pitch spline (model 76)
29 – 14 Tooth 12/24 pitch spline with 3/8-24 UNF x (.75) DP hole in end of shaft (models 39-64)
30 – 21 Tooth 16/32 pitch spline with 3/8-24 UNF x (.75) DP hole in end of shaft (models 39-64)
31 – 17 Tooth 12/24 pitch spline with (2.54) extension (model 76)
32 – (1.50) Diameter tapered with (.38) x (1.00) square key (models 39-64)
33 – 21 Tooth 16/32 pitch spline with M10 x 1.5 threaded hole (models 39-64)
34 – (1.38) Diameter tapered with (.38) x (1.00) square key (models 39-64)
35 – 14 Tooth 12/24 pitch spline (models 39-64) shot peened shaft
37 – 13 Tooth 8/16 pitch spline with (2.93) extension and for 76 seal (models 54-64)
38 – (1.75) Diameter tapered with (.44) x (1.00) square key (model 76)
39 – (1.75) diameter straight with (.38) x (2.00) square key with (2.22) extension (model 39-64 with 76 seal)
41 – 27 tooth 16/32 pitch spline with 2.19 extension and for 76 seal (models 39-64)

10 Main Ports

A – (1.00) SAE 4-bolt split flange port, standard pressure series (code 61)
B – (1.00) SAE 4-bolt split flange port, high pressure series (code 62)
C – 1 5/16-12 UN-2B SAE O-ring port
F – (1.00) SAE 4-bolt split flange port, standard pressure series (code 61) with (2) gauge/pilot pressure ports for .4375-20 UNF-2B SAE O-ring fittings
G – (1.00) SAE 4-bolt split flange port, high pressure series (code 62) with (2) gauge/pilot pressure ports for .4375-20 UNF-2b SAE O-ring fittings
J – Rear ports - (1.00) SAE 4-bolt split flange port, standard pressure series (code 61)
K – Rear ports - (1.00) SAE 4-bolt split flange port, high pressure series (code 62) with diagnostic fittings per SAE J1502 (U.S. units)

11 End Cover and Composite Valve Block Assy

A – Standard end cover, composite valve block with high-rate shuttle valve springs
B – Standard end cover, composite valve block with low-rate shuttle valve springs
C – No composite valve block - with cover plate
D – No composite valve block
G – Integral shuttle valve with low-rate shuttle valve springs and charge pressure relief valve
H – Integral shuttle valve with high-rate shuttle valve springs and charge pressure relief valve
J – Composite valve block without charge pressure relief valve or shuttle valve, but with high pressure relief valves
K – Integral shuttle valve and low pressure relief valve not included - rear ports
N – Integral shuttle valve with low-rate shuttle valve springs and charge pressure relief valve, valve block with high pressure relief valve on side -A- only
P – Standard end cover, shuttle valve block with high-rate shuttle valve springs
R – Integral shuttle valve and low press relief valve not included, removable orifice (.073), rear ports
S – Integral shuttle valve with high-rate shuttle valve springs and charge pressure relief valve, valve block with high pressure relief valves with threaded retainer
T – Composite valve block without charge pressure relief valve or shuttle valve, but with high pressure relief valve with threaded retainer on side -A- only
U – standard end cover, shuttle valve block with low-rate shuttle valve springs

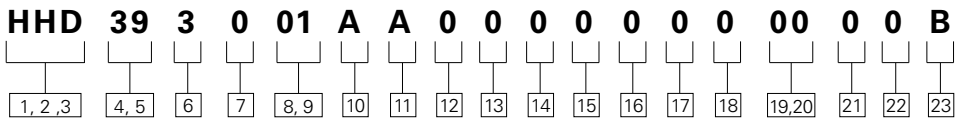
12 Charge Pressure Relief Valve

0 – No relief valve
1 – Standard
2 – Orificed charge pressure relief valve (for composite valve blocks only)
3 – Plugged, no relief valve function

Model Code

HHD Fixed Motor

The following 23 digit coding system has been developed to identify standard configuration options for the Series 1 Hydrostatic Fixed Displacement Motor. Use this model code to specify a motor with the desired features. All 23-digits of the code must be present to release a new product number for ordering.



Note: Options in bold fonts are commonly used.

13 Charge Pressure Relief Valve Setting

0 – none
B – 11,0 bar (160 lbf/in²)
C – 12,4 bar (180 lbf/in²)
D – 13,8 bar (200 lbf/in²)
E – 15,2 bar (220 lbf/in²)
F – 16,6 bar (240 lbf/in²)
G – 17,9 bar (260 lbf/in²)
H – 19,3 bar (280 lbf/in²)
J – 20,7 bar (300 lbf/in²)
K – 24,0 bar (350 lbf/in²)
L – 22,5 bar (326.6 lbf/in²)

14,16 High Pressure Relief Valve – Port A (Pos. 14) Port B (Pos. 16)

0 – None
1 – Standard
2 – Remote pilot operated relief valve
3 – Standard with threaded retainer
4 – Remote pilot operated relief valve with threaded retainer
7 – Remote pilot operated relief valve with o-ring face seal fitting
8 – Remote pilot operated relief valve with threaded retainer, special orifice and spring, with o-ring face seal fitting
9 – Anti-cavitation check valve

15,17 High Pressure Relief Valve Setting – Port A (Pos. 15) Port B (Pos. 17)

0 – None
1 – 11 bar (160 lbf/in²)
2 – 12,4 bar (180 lbf/in²)
3 – 13,8 bar (200 lbf/in²)
4 – 15,2 bar (220 lbf/in²)
5 – 16,6 bar (240 lbf/in²)
6 – 17,9 bar (260 lbf/in²)
7 – 19,3 bar (280 lbf/in²)
8 – 28,3 bar (410 lbf/in²)
C – 103 bar (1500 lbf/in²)
D – 138 bar (2000 lbf/in²)
E – 172 bar (2500 lbf/in²)
F – 207 bar (3000 lbf/in²)
G – 241 bar (3500 lbf/in²)
H – 276 bar (4000 lbf/in²)
J – 310 bar (4500 lbf/in²)
K – 345 bar (5000 lbf/in²)
L – 379 bar (5500 lbf/in²)
M – 414 bar (6000 lbf/in²)
N – 448 bar (6500 lbf/in²)
P – 483 bar (7000 lbf/in²)
Q – 155 bar (2250 lbf/in²)
R – 362 bar (5250 lbf/in²)
S – 466 bar (6750 lbf/in²)
T – 359 bar (5200 lbf/in²)
U – 366 bar (5300 lbf/in²)
V – 400 bar (5800 lbf/in²)
W – 431 bar (6250 lbf/in²)

18 Speed Sensor

0 – No speed sensor
A – Magnetic sensor with 2 wire weather pack connector
B – Digital sensor with 3 wire weather pack connector
C – Speed sensor hole (5/8-18 UNF thread) plugged (for digital or magnetic sensor)
D – Quadrature speed sensor with 4 wire weather pack connector (one 24 pulse per rev speed signal and one directional signal)
E – Quadrature speed sensor with 4 wire weather pack connector (two 12 pulse per rev speed signal in quadrature)
F – Speed sensor hole (9/16-32 UN thread) plugged (for quadrature sensor)

19,20 Special Features

00 – No special features
03 – Bypass valve-spool stem is on the opposite side from the low pressure relief valve in the composite valve block
04 – Int hex case drain plug in motor housing
05 – Case drain plug located opposite the swashplate dowel plug
22 – Nametag opposite dowel
23 – High speed rotating group
26 – Lightweight pistons and nametag opposite dowel
31 – Lightweight pistons
32 – Metal case drain plug in both ports
33 – Nametag opposite dowel and bar code label
34 – Shot peened barrel splines
35 – Metal case drain plug in both ports, shot peened barrel splines, SAE mounting flange tapped with 5/8-18 UNF-2B threads
36 – Bar code label on unit and one on packaging
37 – Lightweight pistons and nametag opposite dowel and bar code label
39 – Lightweight pistons - nametag and case drain plug located opposite the swashplate dowel plug

21 Paint and Packaging

0 – Painted primer blue (standard)
J – Rust preventative spray

22 Identification on Unit

0 – Standard

23 Design Code

A – A
B – B

Performance – Charge Pump

Charge Pump Performance

Eaton offers a choice of four charge pump displacements to go with their heavy duty transmission line: .85, 1.28, 1.70, and 2.12 in³/rev (13,9; 21,0; 27,8; 34,7 cm³/rev).

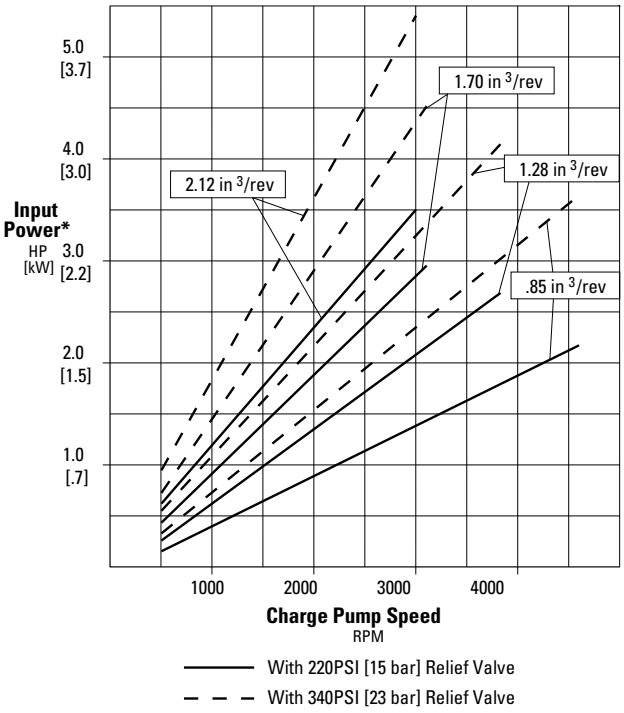
These charge pumps are available with one or more of the following options:

- a pressure sensing port
- remote pressure side filter ports
- a spin-on pressure side filter
- mounting flanges for auxiliary pumps

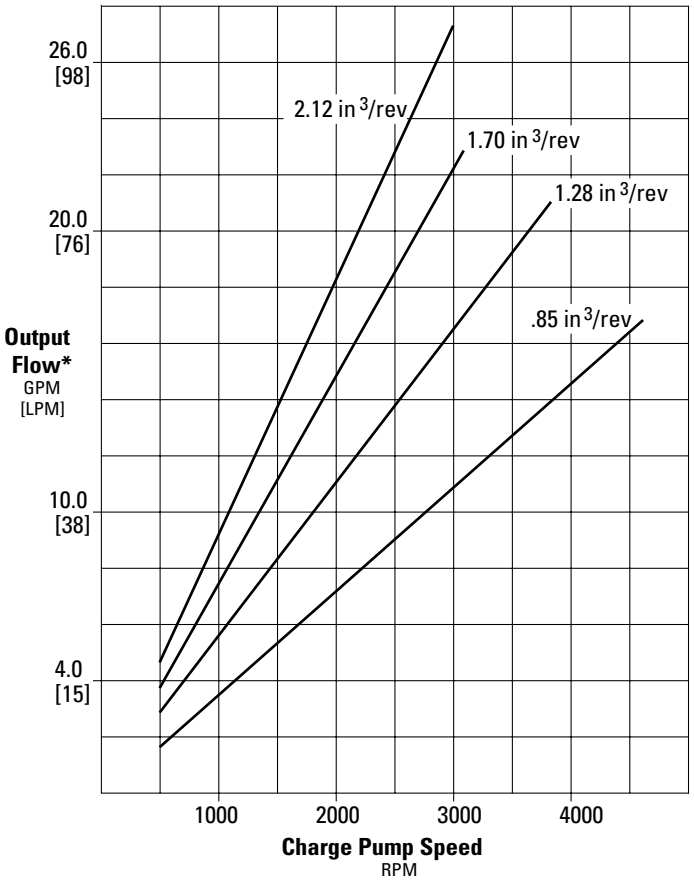
Displacement	in³/rev	.85	1.28	1.70	2.12
	cm³/rev	13,9	21,0	27,9	34,7
Maximum Shaft Speed	rpm	4600	3800	3100	3000
Output Flow @	gpm	16.9	21.0	22.8	27.5
Maximum Speed*	lpm	64,0	79,5	86,3	104,2
Input Power @ 220 psi	hp	2.17	2.70	2.93	3.54
(15 bar) and Maximum Speed*	kW	1,62	2,01	2,18	2,64

*Theoretical Values

Charge Pump Power vs Speed



Charge Pump Flow vs Speed



Oil Viscosity . . . . . 60 SUS
Temperature . . . . . 180°F (82°C)
* Theoretical Values