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GHJM – General Horizontal, Close-Coupled Pumps

Technical Specification Pages

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1.0 Overview.

The GHJM Close-Coupled Pump is Carver's horizontal, end suction pump for handling water, oils, and chemicals in process, marine, and general industrial applications. Available as a close coupled (GHJMC) unit, the GHJM is based on the same product platform as our horizontal GH and vertical G2V and shares many of the same parts.

All GHJM models are a back pull-out design with removable suction covers and rotatable casings to accommodate different piping orientations.

Other standard features include 316 SS shaft sleeves, keyed impellers for more positive driving and to prevent accidental spin off, dynamic balancing to ISO G2.5 guidelines, and regreasable bearings secured with lock nuts.

The GHJM is the natural evolution of the L & H. While designed for maximum dimensional and parts interchangeability, the GHJM is nonetheless a new pump series and all parts are not necessarily identical to everything that preceded it. External dimensions, however, are unchanged.

1.1 Basic Hydraulic Features

Standard hydraulic features for the GHJM are given in the table below.

Basic Hydraulic Features										
Pagia Dump Siza	General Design Features					Hydraulic Performance				
Basic Pump Size	Discharge Type	Maximum Solids	Casing Volutes	Connection Type	Bearing Frame	Impeller Type	Max RPM	Max / Min diameter	Specific Speed N _S	Suction Sp. Speed N _{SS}
AA - 1 ¼ x 1 x 5		0.187"							996	3,303
AB - 2 x 1 ½ x 5	Tangential	0.250"	Single	NPT	10 M	Semi-open	3500	5.0" / 3.5"	1,646	2,450
AC - 2 ½ x 2 x 5		0.313"							1,982	5,181
BA - 1 ¼ x 1 x 7		0.187"							703	2,582
BB - 1 ½ x 1 ¼ x 7		0.218"	Single	NPT					894	2,856
BC - 2 ½ x 2 x 7	Tangential	0.313"			10 M	Enclosed	3500	7.0" / 4.5"	1,143	3,984
BD - 3 x 2 ½ x 7		0.437"							1,435	6,824
BE - 4 x 3 x 7		0.562"	Quad	Flanged					2,070	7,937
BF - 5 x 4 x 7		0.750"	Dual						2,091	5,821
CA - 1 ½ x 1 ¼ x 10		0.218"							474	1,996
CB - 2 x 1 ½ x 10		0.250"	Single	NPT					740	4,811
CC - 2 1/2 x 2 x 10		0.313"	Olligie				3500		970	3,244
CD - 3 x 2 1/2 x 10	Tangential	0.437"			20 M	Enclosed	0000	9.8" / 7.0"	1,017	5,018
CE - 4 x 3 x 10		0.562"	Quad	Flanged					1,311	5,693
CF - 5 x 4 x 10		0.750"	Dual	riangeu					1,687	5,808
CG - 6 x 5 x 10		0.875"	Duar				1750		2,598	5,635

1.2 GHJM Ordering Code.

The following Ordering Code defines the GHJM pump and pump/motor arrangements. When quoting or ordering a GHJM pump, **this Ordering Code must be used**.

This Ordering Code enables Carver Pump Company to accept orders quickly, assuring timely and correct manufacture of the desired pump.

<u>GHJM C – BC</u>	<u> </u>	<u> <u> </u></u>	
Pump Series: GHJM – GHJM Pump		Motor Mounting, Enclosur A – Foot mounted, ODP, St	re and Efficiency: andard (EPACT) Efficiency (GHF only)
Mounting Style:		B – Foot mounted, TEFC, S C – Foot mounted, X-P, Sta	standard (EPACT) Efficiency (GHF only) Indard Efficiency (GHF only)
C – Close Coupled F – Frame Mounted		D – Close coupled, ODP, S E – Close coupled, TEFC, S	tandard Efficiency (GHJMC only) Standard Efficiency (GHJMC only)
Volute Nozzle and Impeller Sizes:		F – Close coupled, X-P, Sta	andard Efficiency (GHJMC only)
AA – 1 ¼ x 1 x 5 AB – 2 x 1 ½ x 5 AC – 2 ½ x 2 x 5		X – Special Z – No Motor or Customer S	Supplied Motor
BA – 1 ¼ x 1 x 7		Motor Speed, Voltage and	Frequency:
BB - 1 ½ x 1 ¼ x 7 BC - 2 ½ x 2 x 7 BD - 3 x 2 ½ x 7 BE - 4 x 3 x 7		A – 1150 RPM, 230/460 Vo B – 1750 RPM, 230/460 Vo C – 3500 RPM, 230/460 Vo	lt, 60 Hz lt, 60 Hz lt, 60 Hz
BF – 5 x 4 x 7		X – Special Z – No Motor (GHF only)	
CA – 1 ½ x 1 ¼ x 10 CB – 2 x 1 ¼ x 10			
$CC - 2\frac{1}{2} \times 2 \times 10$		Motor Power Rating:	I 25 HP
CD – 3 x 2 ½ x 10		B – 2.0 HP	K – 30 HP
$CE - 4 \times 3 \times 10$		C – 3.0 HP	
$CF = 5 \times 4 \times 10$ $CG = 6 \times 5 \times 10$		D – 5.0 HP	
		E – 7.5 HP	
		G – 15 HP	
Material of Construction:		H – 20 HP	
\mathbf{A} – All Cast Iron Construction			
		X – Special	Z – No Motor – Bare Pump
C – 316 SS Fitted Cast Iron Construction		Base Plate:	
X – Special			
		X – Special Z – No Baseplate, Coupling	or Coupling Guard (Standard w/GHJMC)
		Seal Flush Arrangements	:
		A – Plan 11 Seal Flush	
		X – Special Z – No seal Flush (Standar	d)
		Seal Arrangement:	
		B – Type 1, Carbon on Cera B – Type 1, Carbon on Silic	amic Faces (Standard) on Carbide Faces
		X - Special	

1.3 <u>Standard Surface Treatment.</u>

All GHJM pumps handling liquids less than 230 °F are painted per Carver Standard PA-001. This provides for one coat of Carver Blue, industrial alkyd metal enamel with a 3-5 mils dry film thickness.

All paint is applied over a clean, dry, bare metal surface. All iron castings are spot primed over any area exhibiting minor discoloration from rust or oxidation.

Surface Preparation of Key Components								
Component	Material	Specification						
Backcover/Adaptor	Cast iron	Carver Standard PA-001						
Base	Steel	Carver Standard PA-001						
Volute	Steel	Carver Standard PA-001						
Motor	Any	Mfg. Std. Coating						

Since all pumps and parts are assumed to be installed and operated soon after receipt, we do not include any special preservation for long term storage. We also assume no responsibility for storage deterioration after shipment unless explicitly stated in our quotation and purchase order acknowledgment.

Users can also provide their own protection by sealing all ports and openings and coating the pump internals with a water soluble preservative.

1.4 Material of Construction.

The standard GHJM materials and material specifications are given in the table below:

Key Component Materials								
Component	Material	Specification						
Volute	Cast Iron	ASTM A48, Class 30						
Impollor	Cast Iron	ASTM A48, Class 30						
Impeller	316 SS	ASTM A744, Grade CF-8M						
Backcover/Adaptor	Cast Iron	ASTM A48, Class 30						
O-Rings	Elastomer	Viton						
Shaft Sleeve	316 SS	ASTM A276, CL. 316						
Standard Seal	Type 1 or 21	XF1C1 (316)						
		Viton with carbon on ceramic faces, 316 SS metal parts.						
Optional Seal	Type 1 or 21	XF10 ₅₈ 1 (316)						
		Viton with carbon on silicon carbide faces, 316 SS metal parts						

1.5 GHJM Standard Parts Identification.

Standard parts for frame mounted units with enclosed impellers are shown with the exploded view.

Wet End Kit						
Item	Description					
001	Casing					
002*	Impeller, Enclosed					
003*	Impeller, Semi-Open					
009	Suction Cover					
073B*	Shim – Suction Cover					
119B	O-ring – Suction Cover Casing					
550	Pipe Plug – Casing					
800A	Bolt – Suction Cover/Casing					
	Adaptor Kit					
Item	Description					
014	Shaft Sleeve					
026	Impeller Capscrew					
028	Impeller Screw Washer					
032	Impeller Key					
040	Slinger					
071	Adaptor					
073A	Sleeve Gasket					
073C	Impeller Gasket					
089	Mechanical Seal Assembly					
119A	O-ring – Adaptor/Casing					
119C	O-ring – Impeller Cap Screw					
119D	O-ring – Shaft Sleeve					
550A	Pipe Plug – Adaptor					
800B	Bolt – Adaptor/Casing					
800C	Bolt – Adaptor/Motor					

* Parts are options that vary by pumping unit.



Close coupled units use a NEMA GHJM frame motor. For further detailed descriptions, material designations and/or quantities for the items shown refer to the GHJM Series Price book.

1.6 <u>A Typical GHJM Specification.</u> (Specifier's options in parentheses)

Each pump shall be a horizontal, end suction, close-coupled centrifugal pump capable of developing (1,800) US GPM at a total head of (150) feet when pumping (water) at a temperature of (125) °F with a fluid specific gravity of (1.00) without the use of special clearances, materials, or other internal or external modifications. In meeting these hydraulic conditions, the pump shall have an NPSH requirement of not more than (10) feet and a hydraulic operating efficiency at the normal duty point of at least (70.0)% as defined by the Hydraulic Institute Level A requirements, which includes all mechanical seal and/or bearing losses.

The pump shall include separate liquid end, mechanical seal, and adaptor sections for ease of maintenance. The liquid end shall be cast iron, with all components fully compatible with the temperature, corrosion and abrasion properties of the pumped fluid. All pressure retaining parts of the pump shall be hydrostatically tested to 150% of its operating pressure and all piping connections shall be NPT threaded connections for discharge connections up to and including 2" nominal pipe size, and ANSI 150 lb flanges for all larger sizes. The entire assembly shall be secured to a mounting plate with a minimum of four steel tie down bolts to assure complete hydraulic and structural integrity of the unit.

The impellers shall be precision, enclosed type cast iron (316 stainless steel) for highest efficiency without the need for axial adjustments to compensate for wear as is typical with other impeller types. The impellers shall also be positively keyed to the pump drive shaft for more positive driving and to prevent the impeller from spinning off the shaft and damaging itself and/or the pump casing in the event of accidental reverse rotation. As a further means of assuring longer component life, all impellers shall be dynamically balanced in accordance with ISO G2.5 guidelines. A replaceable 316 stainless steel sleeve for added protection from erosion and corrosion over the life of the pump.



The pump shall have one mechanical seal. The seals shall have Viton elastomers, 316 stainless steel metal components, carbon on ceramic (silicon carbide) faces, and capable of operating up to 230 °F without external cooling. When conditions warrant, the pump shall also be equipped with a 316 stainless steel balance line to facilitate flushing and cooling in the stuffing box area of the pump.

For added ease of operation, the entire pump casing shall be rotatable in 90° increments to accommodate different field piping orientations and shall be the back pull-out type to allow disassembly, inspection, and assembly without otherwise disturbing the pump mounting or system piping.

The pump shall be supplied complete with a baseplate, coupling, and coupling guard. If an electric motor is also provided, it shall be sized to operate throughout the entire range of the pump performance curve without exceeding the nameplate horsepower rating of the motor. In all cases, the pump shall be a heavy-duty industrial design, GHJM Close-Coupled Pump as manufactured by the Carver Pump Company of Muscatine, Iowa, or ISO-9001 certified, United States manufactured approved equal.

1.7 GHJM Hydraulic Coverage and Performance by Individual Size.

GHJM hydraulic performance extends to 1,800 GPM and 400 feet of head. This range is covered by sixteen sizes in cast iron or 316 SS fitted cast iron construction.



All 5", 7", and 10" pumps with 2" or smaller discharges have NPT connections. All other sizes have ANSI flat face 125 lb. (cast iron) or 150 lb. (316 SS) flanges.



Notes:





Notes:





Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.



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TOTAL HEAD (FEET)

TOTAL HEAD (FEET)



2 HP 1-1/2 HP

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1 HP

FLOW (GPM)

Notes:



2. Impeller diameters between minimum and maximum shown are available in 1/8 inch increment trims.

NPSH(r) @ full diameter

30 (100 C) 20 (100 C)



Notes:





Notes:





Notes:

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10

20

75

50

TOTAL HEAD (FEET)

TOTAL HEAD (FEET)

Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines. 1.

40

NPSH(r) @ full diameter

50 FLOW (GPM)

60

70

80

90

2. Impeller diameters between minimum and maximum shown are available in 1/8 inch increment trims.

30

20

10

100

TOTAL HEAD (FEET)

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TOTAL HEAD (FEET)



3 HP

2 HP

Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

FLOW (GPM)

2. Impeller diameters between minimum and maximum shown are available in 1/8 inch increment trims.

NPSH(r) @ full diameter

30 (L33) 20 HSdN 10 Nb2H



Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

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500

400

300

9.75

9.50" 9.00"

8.50"

8.00"

7.50"



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500



Notes:

^{1.} Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Impeller diameters between minimum and maximum shown are available in 1/8 inch increment trims. 2.



Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.



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5", 7", and 10" Impeller Sizes, Close Coupled





	Pump Dimensions							
Pump Size	х	Y	z	DD	L 143- 215 JM	P 254- 326 JM		
1¼ x1x5	4.00	1.72	3.00	4.00	6.08	NA		
2 x 1 ½ x 5	3.50	2.07	3.25	4.75	6.40	NA		
2½ x2x5	4.50	2.38	3.50	5.00	6.76	NA		
1¼ x1x7	4.25	2.65	3.81	5.25	7.13	NA		
1½ x1¼ x7	4.50	3.38	4.00	5.50	7.50	NA		
2½ x2x7	5.00	3.75	4.13	6.00	7.80	8.76		
3 x 2 ½ x 7	5.75	4.33	4.25	6.25	8.37	9.33		
4 x 3 x 7	6.00	4.90	4.50	6.75	9.12	10.09		
5 x 4 x 7	7.50	5.19	4.75	7.25	9.35	10.31		
1 ½ x 1 ¼ x 10	6.00	3.30	5.25	7.00	7.18	8.10		
2 x 1 ½ x 10	6.00	4.43	5.44	8.00	8.45	9.36		
2 ½ x 2 x 10	6.25	4.81	5.50	7.25	8.91	9.81		
3 x 2 ½ x 10	7.00	5.75	5.75	8.00	9.85	10.75		
4 x 3 x 10	7.00	5.38	6.00	8.25	9.47	10.38		
5 x 4 x 10	8.50	4.71	6.50	9.50	NA	9.71		
6 x 5 x 10	8.38	5.81	7.63	10.75	NA	11.60		

NEMA	Motor Dimensions (Approximate)								
Frame	A (max)	AG	B (max)	BG	D	Е	F	G	н
143 JM	7.00	10.50	6.00	4.88	3.50	2.75	2.00	0.44	0.34
145 JM	7.00	11.50	6.00	5.38	3.50	2.75	2.50	0.44	0.34
182 JM	9.00	12.63	6.75	5.88	4.50	3.75	2.25	0.56	0.41
184 JM	9.00	13.63	6.75	6.38	4.50	3.75	2.75	0.56	0.41
213 JM	10.50	15.25	7.00	7.25	5.25	4.25	2.75	0.63	0.44
215 JM	10.50	16.75	8.50	8.00	5.25	4.25	3.50	0.63	0.44
254 JM	12.50	19.13	10.50	9.13	6.25	5.00	4.13	0.63	0.53
256 JM	12.50	20.88	12.25	10.0	6.25	5.00	5.00	0.63	0.53
284 JM	13.88	21.00	12.25	9.75	7.00	5.50	4.75	0.75	0.53
286 JM	13.88	22.44	13.75	10.50	7.00	5.50	5.50	0.75	0.53
324 JM	15.88	23.13	13.75	10.75	8.00	6.25	5.25	0.81	0.69
326 JM	15.88	24.63	15.25	11.50	8.00	6.25	6.00	0.81	0.69

Notes:

 All 5", 7", and 10" pumps with suction sizes 1.25" thru 2.5" have NPT connections. All other Sizes have 125 lb. FF flange (cast iron) or 150 lb. FF flange (316 SS).

S CARVER PUMP	 All dimensions in inches, all tolerances +/- 0.125 inch. All motor dimensions are approximate. Not valid for construction unless certified. 	Dwg: SP-GHJM-1, Rev: 0
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