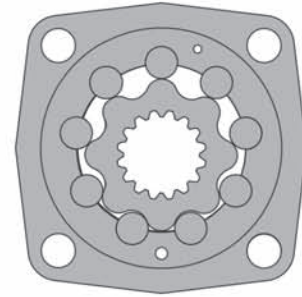


HYDRAULIC MOTORS MLHV



APPLICATION

- Conveyors
- Metal working machines
- Machines for agriculture
- Road building machines
- Mining machinery
- Food industries
- Special vehicles
- Plastic and rubber machinery etc.



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OPTIONS

- Model- Disc valve, roll-gerotor
- Flange and wheel mount
- Short motor
- Tacho connection
- Speed sensing
- Side ports
- Shafts- straight, splined and tapered
- SAE and BSPP ports
- Other special features

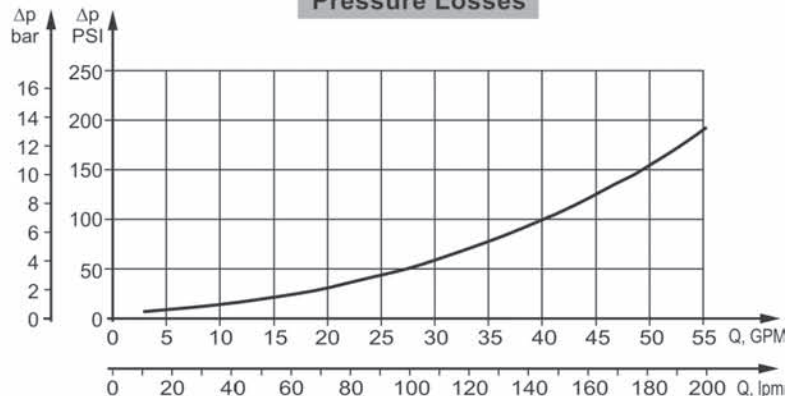
GENERAL

Displacement,	in ³ /rev [cm ³ /rev.]	19.18+48.91 [314,5+801,8]
Max. Speed,	[RPM]	250+510
Max. Torque,	in-lb [daNm]	8150+16650 [92+188]
Max. Output,	HP [kW]	44+51 [33+47]
Max. Pressure Drop,	PSI [bar]	2300+2900 [160+200]
Max. Oil Flow,	GPM [lpm]	42+53 [160+200]
Min. Speed,	[RPM]	5 10
Permissible Shaft Loads	lbs [daN]	P _a =3300 [1500]
Pressure fluid		Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range,	°F [°C]	-22+194 [-30+90]
Optimal Viscosity range, SUS [mm²/s]		98+347 [20+75]
Filtration		ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop PSI [bar]	Viscosity SUS [mm ² /s]	Oil flow in drain line GPM [lpm]
2030 [140]	98 [20]	.793 [3]
	164 [35]	.528 [2]
3045 [210]	98 [20]	.1.585 [6]
	164 [35]	1.057 [4]

Pressure Losses



SPECIFICATION DATA

Type		MLHV 315	MLHV 400	MLHV 500	MLHV 630	MLHV 800
Displacement, in. ³ /rev. [cm. ³ /rev.]		19.18 [314.5]	24.45 [400,9]	30.48 [499,6]	38.38 [629,1]	48.91 [801,8]
Max. Speed, [RPM]	Cont.	510	500	400	320	250
	Int.*	630	600	480	380	300
Max. Torque in-lb [daNm]	Cont.	8150 [92]	10450 [118]	12950 [146]	14700 [166]	16650 [188]
	Int.*	9800 [111]	12500 [141]	15550 [176]	17150 [194]	18650 [211]
	Peak**	11400 [129]	14500 [164]	18150 [205]	19550 [221]	21850 [247]
Max. Output HP [kW]	Cont.	51 [38]	63 [47]	63 [47]	54 [40]	44 [33]
	Int.*	62 [46]	76 [56]	76 [56]	76 [56]	60 [44]
Max. Pressure Drop PSI [bar]	Cont.	2900 [200]	2900 [200]	2900 [200]	2600 [180]	2300 [160]
	Int.*	3500 [240]	3500 [240]	3500 [240]	3050 [210]	2600 [180]
	Peak**	4100 [280]	4100 [280]	4100 [280]	3500 [240]	3050 [210]
Max. Oil Flow GPM [lpm]	Cont.	42 [160]	53 [200]	53 [200]	53 [200]	53 [200]
	Int.*	53 [200]	63 [240]	63 [240]	63 [240]	63 [240]
Max. Inlet Pressure PSI [bar]	Cont.	3000 [210]	3000 [210]	3000 [210]	3000 [210]	3000 [210]
	Int.*	3600 [250]	3600 [250]	3600 [250]	3600 [250]	3600 [250]
	Peak**	4400 [300]	4400 [300]	4400 [300]	4400 [300]	4400 [300]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]	Cont. 0-100 RPM	870 [60]	870 [60]	870 [60]	870 [60]	870 [60]
	Cont. 100-300 RPM	435 [30]	435 [30]	435 [30]	435 [30]	435 [30]
	Cont. >300 RPM	290 [20]	290 [20]	290 [20]	290 [20]	290 [20]
	Int.* 0-max. RPM	1100 [75]	1100 [75]	1100 [75]	1100 [75]	1100 [75]
Max. Return Pressure with Drain Line PSI [bar]	Cont.	2000 [140]	2000 [140]	2000 [140]	2000 [140]	2000 [140]
	Int.*	2500 [175]	2500 [175]	2500 [175]	2500 [175]	2500 [175]
	Peak**	3000 [210]	3000 [210]	3000 [210]	3000 [210]	3000 [210]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		120 [8]	120 [8]	120 [8]	120 [8]	120 [8]
Min. Starting Torque in-lb [daNm]	At max. press. drop Cont.	6300 [71]	8100 [91]	10000 [113]	11800 [133]	13400 [151]
	At max. press. drop Int.*	7500 [85]	9600 [109]	12000 [136]	13700 [155]	15000 [170]
Min. Speed***, [RPM]		10	10	10	10	10
Weight, lb [kg]	MLHV	67.7 [30,7]	69.5 [31,5]	71.4 [32,4]	74.1 [33,6]	77.6 [35,2]
	MLHVW	69.2 [31,4]	71.0 [32,2]	73.0 [33,1]	75.6 [34,3]	79.2 [35,9]
	MLHVS	49.2 [22,3]	50.9 [23,1]	52.9 [24,0]	55.6 [25,2]	59.1 [26,8]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 10 RPM lower than given, consult factory or your regional manager.

- Intermittent speed and intermittent pressure must not occur simultaneously.
- Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- Recommend using a premium quality, anti-wear type mineral based hydraulic oil, HLP(DIN51524) or HM(ISO6743/4). If using synthetic fluids consult the factory for alternative seal materials.
- Recommended minimum oil viscosity 70 SUS [13 cm²/s] at 122° F [50° C].
- Recommended maximum system operating temperature is 180° F [82° C].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

Performance Data MLHV 315

	Pressure (Δ PSI)							Max. Cont.	Max. Int.	Speed (theor.)
	500	1000	1500	2030	2540	2900	3500			
Flow [GPM]	3	1147 28	2520 27	3756 27	5201 26	6505 25	7406 23	8713 21	32	
	5	1309 68	2704 67	4064 66	5517 64	6911 62	7850 61	9296 58		
	13	1266 152	2716 150	4141 147	5686 145	7184 143	8199 140	9731 135		
	20	1212 231	2633 230	4122 227	5711 225	7163 223	8223 219	9771 212		
	25	1149 305	2544 302	4046 299	5626 296	7110 292	8228 289	9663 283		
	33	1050 392	2469 389	3914 387	5517 383	7035 380	8108 376	9560 367		
	40	953 471	2349 469	3845 466	5408 462	6932 456	7963 450	9490 439		
Max. Cont.	42	900 501	2347 499	3794 497	5371 491	6889 485	7933 478	9443 466	509	
Max. Int.	53	707 629	2139 627	3580 620	5194 613	6639 604	7635 597	9210 579	636	
Torque (theor.) in-lb. [daNm]		1529 [17,27]	3058 [34,55]	4587 [51,83]	6208 [70,14]	7767 [87,76]	8868 [100,2]	10704 [120,9]		

19.18 in.³/rev. [314,5 cm.³/rev.]

Torque [in-lb] 9210
Speed [RPM] 579

Performance Data MLHV 400

	Pressure (Δ PSI)							Max. Cont.	Max. Int.	Speed (theor.)
	500	1000	1500	2030	2540	2900	3500			
Flow [GPM]	3	1570 23	3299 24	5007 23	6763 22	8397 20	9597 19	11257 17	25	
	5	1703 53	3457 53	5242 52	7244 50	8896 47	10100 45	11992 43		
	13	1747 123	3540 123	5309 122	7406 119	9147 117	10521 114	12666 110		
	20	1718 186	3450 184	5287 182	7366 180	9178 176	10550 173	12713 168		
	25	1645 244	3368 242	5240 239	7259 237	9127 233	10471 229	12649 223		
	33	1505 313	3263 310	5125 310	7172 306	8969 302	10367 299	12520 291		
	40	1362 374	3141 373	5065 371	7023 368	8842 364	10336 359	12377 350		
Max. Cont.	45	1233 431	3039 430	4889 426	6910 422	8724 418	10169 413	12244 402	425	
	53	1019 498	2885 496	4728 492	6772 487	8568 481	10000 477	12077 466		
Max. Int.	63	686 595	2573 592	4417 587	6462 582	8266 575	9666 568	11711 557	599	
Torque (theor.) in-lb. [daNm]		1947 [22]	3894 [44]	5841 [66]	7906 [89,32]	9892 [111,76]	11293 [127,6]	13630 [154]		

24.45 in.³/rev. [400,9 cm.³/rev.]

Torque [in-lb] 11711
Speed [RPM] 557

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

Performance Data MLHV 315

	Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
	500	1000	1500	2030	2540	2900	3500		
Flow [GPM]	3	1147 28	2520 27	3756 27	5201 26	6505 25	7406 23	8713 21	32
	5	1309 68	2704 67	4064 66	5517 64	6911 62	7850 61	9296 58	64
	13	1266 152	2716 150	4141 147	5686 145	7184 143	8199 140	9731 135	159
	20	1212 231	2633 230	4122 227	5711 225	7163 223	8223 219	9771 212	238
	25	1149 305	2544 302	4046 299	5626 296	7110 292	8228 289	9663 283	302
	33	1050 392	2469 389	3914 387	5517 383	7035 380	8108 376	9560 367	397
	40	953 471	2349 469	3845 466	5408 462	6932 456	7963 450	9490 439	477
Max. Cont.	42	900 501	2347 499	3794 497	5371 491	6889 485	7933 478	9443 466	509
Max. Int.	53	707 629	2139 627	3580 620	5194 613	6639 604	7635 597	9210 579	636

Torque (theor.)
in-lb.
[daNm]

1529 [17,27]	3058 [34,55]	4587 [51,83]	6208 [70,14]	7767 [87,76]	8868 [100,2]	10704 [120,9]
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19.18 in.³/rev. [314,5 cm.³/rev.]

Torque [in-lb] 9210
Speed [RPM] 579

Performance Data MLHV 400

	Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
	500	1000	1500	2030	2540	2900	3500		
Flow [GPM]	3	1570 23	3299 24	5007 23	6763 22	8397 20	9597 19	11257 17	25
	5	1703 53	3457 53	5242 52	7244 50	8896 47	10100 45	11992 43	50
	13	1747 123	3540 123	5309 122	7406 119	9147 117	10521 114	12666 110	125
	20	1718 186	3450 184	5287 182	7366 180	9178 176	10550 173	12713 168	187
	25	1645 244	3368 242	5240 239	7259 237	9127 233	10471 229	12649 223	237
	33	1505 313	3263 310	5125 310	7172 306	8969 302	10367 299	12520 291	312
	40	1362 374	3141 373	5065 371	7023 368	8842 364	10336 359	12377 350	375
Max. Cont.	45	1233 431	3039 430	4889 426	6910 422	8724 418	10169 413	12244 402	425
	53	1019 498	2885 496	4728 492	6772 487	8568 481	10000 477	12077 466	499
Max. Int.	63	686 595	2573 592	4417 587	6462 582	8266 575	9666 568	11711 557	599

Torque (theor.)
in-lb.
[daNm]

1947 [22]	3894 [44]	5841 [66]	7906 [89,32]	9892 [111,76]	11293 [127,6]	13630 [154]
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24.45 in.³/rev. [400,9 cm.³/rev.]

Torque [in-lb] 11711
Speed [RPM] 557

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

Performance Data MLHV 800

	Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
	400	800	1100	1500	1900	2300	2600		
Flow [GPM]	3	2814	5509	7479	10108	12662	15374	16970	13
		14	14	13	13	13	12	11	11
	5	2896	5630	7712	10310	13022	15865	17801	25
		25	25	25	24	23	21	19	19
	13	2970	5720	7948	10778	13531	16541	18506	62
		62	62	61	60	58	54	50	50
	20	2883	5719	7904	10788	13580	16631	18559	94
		93	92	90	89	86	82	79	79
25	2700	5580	7836	10685	13583	16569	18484	18484	119
	119	118	117	115	112	107	103	103	103
33	2486	5322	7644	10527	13407	16408	18379	18379	156
	156	154	154	151	148	142	138	138	138
40	2275	5059	7380	10300	13190	16237	18155	18155	187
	186	185	185	182	180	175	170	170	170
45	2011	4801	7109	10083	13041	16013	18019	18019	212
	212	211	210	208	205	201	197	197	197
Max. Cont.	53	1657	4438	6750	9700	12727	15657	17671	249
	248	248	246	245	240	235	230	230	230
Max. Int.	63	1074	3735	6004	9087	12057	15095	17069	299
	297	296	295	293	288	283	277	277	277
Torque (theor.) in-lb. [daNm]	3118 [35,2]	6236 [76,5]	8574 [96,9]	11692 [132,1]	14810 [167,3]	17928 [202,6]	20267 [228,9]	20267 [228,9]	20267 [228,9]
48.91 in. ³ /rev. [801,8 cm. ³ /rev.]									

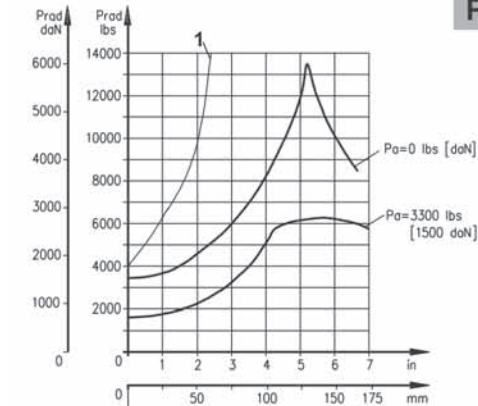
Metric Conversions

Flow 1 lpm = 0.264 GPM
 Pressure 1 bar = 14.51 PSI
 Torque 1 Nm = 8.85 in-lb

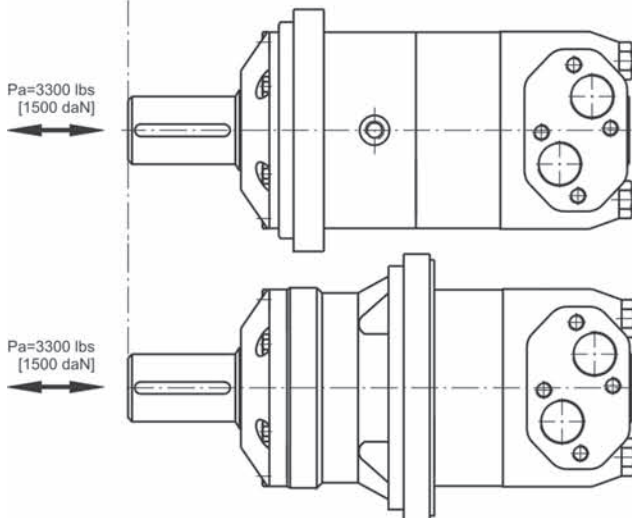
Torque [in-lb] 17069
 Speed [RPM] 277

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

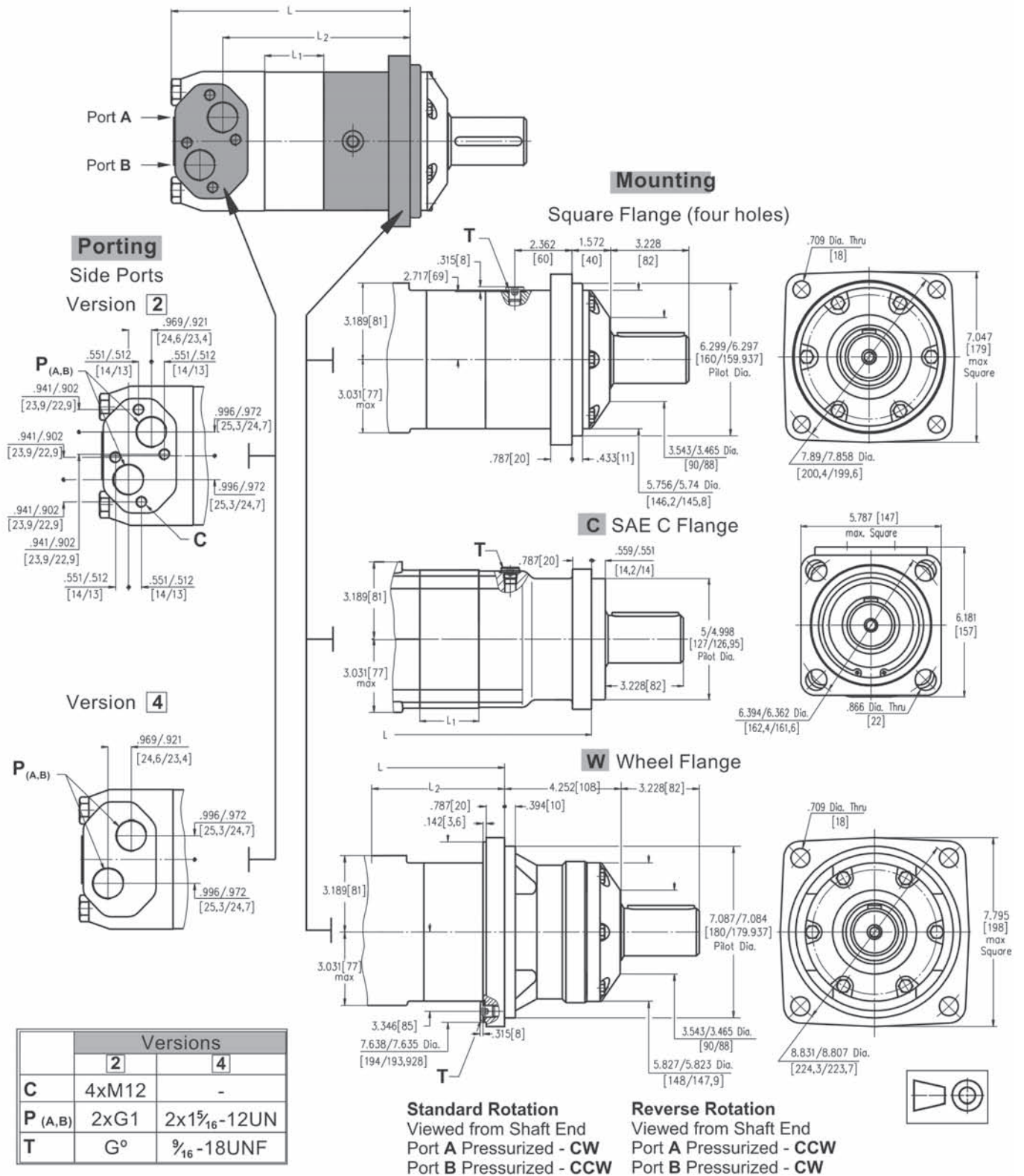
PERMISSIBLE SHAFT LOADS



The output shaft runs in tapered bearings that permit high axial and radial forces. Curve "1" shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will involve a risk of breakage. The two other curves apply to a B10 bearing life of 3000 hours at 200 RPM.



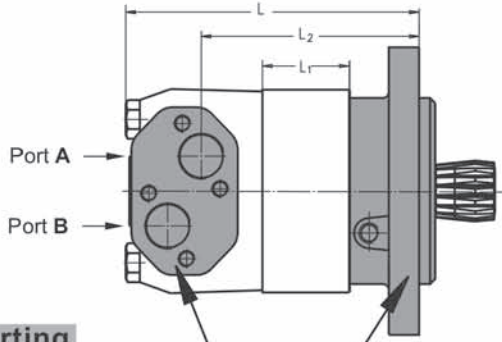
DIMENSIONS AND MOUNTING DATA



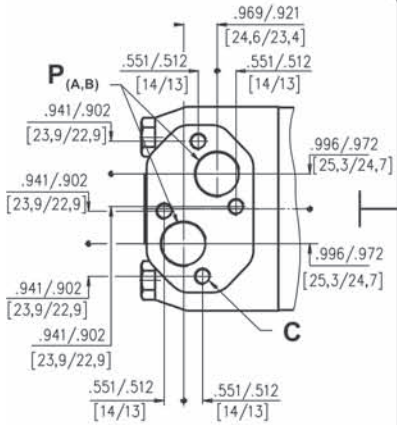
Type	L, in. [mm]	L ₂ , in. [mm]	Type	L, in. [mm]	L ₂ , in. [mm]	Type	L, in. [mm]	L ₂ , in. [mm]	*L ₁ , in. [mm]
MLHV 315	8.45 [214,5]	6.30 [160]	MLHVC 315	9.38 [238,25]	7.25 [184,26]	MLHVW 315	5.75 [146]	3.62 [92]	.87 [22,0]
MLHV 400	8.72 [221,5]	6.58 [167]	MLHVC 400	9.66 [245,25]	7.53 [191,26]	MLHVW 400	6.02 [153]	3.90 [99]	1.14 [29,0]
MLHV 500	9.04 [229,5]	6.89 [175]	MLHVC 500	9.97 [253,25]	7.85 [199,26]	MLHVW 500	6.34 [161]	4.21 [107]	1.46 [37,0]
MLHV 630	9.45 [240,0]	7.32 [186]	MLHVC 630	10.38 [263,75]	8.25 [209,76]	MLHVW 630	6.77 [172]	4.65 [118]	1.87 [47,5]
MLHV 800	10.0 [254,0]	7.87 [200]	MLHVC 800	10.94 [277,75]	8.81 [223,76]	MLHVW 800	7.28 [185]	5.20 [132]	2.42 [61,5]

* The width of the geroler is .157 in. [4 mm] greater than L₁.

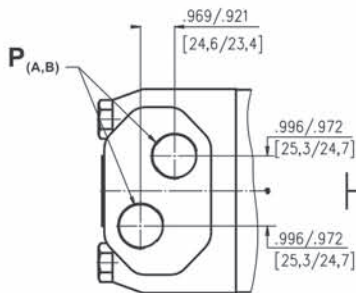
DIMENSIONS AND MOUNTING DATA - MLHVS and MLHV



Porting
Side Ports
Version **2**

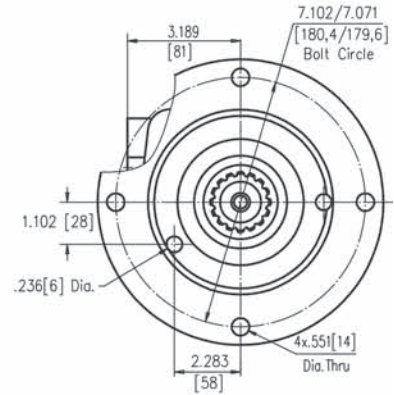
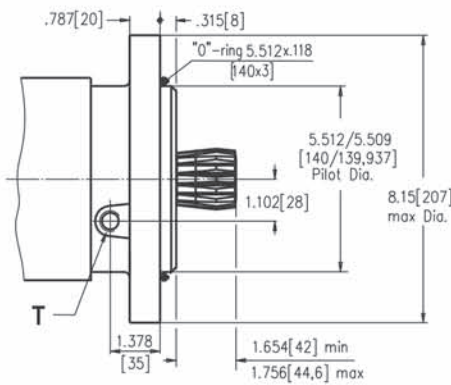


Version **4**

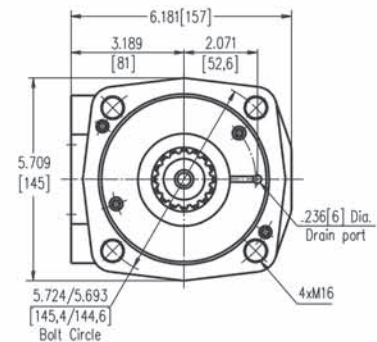
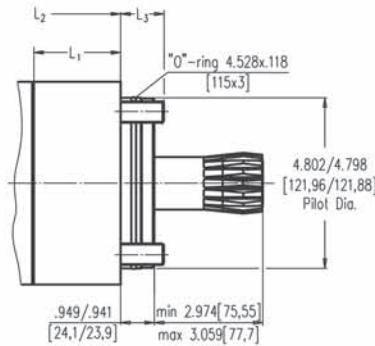


Mounting

S Short Flange



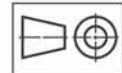
V Very Short Flange



	Versions	
	2	4
C	4xM12	-
P (A,B)	2xG1	2x1 ⁵ / ₁₆ -12UN
T	G ^o	9/ ₁₆ -18UNF

Standard Rotation
Viewed from Shaft End
Port A Pressurized - CW
Port B Pressurized - CCW

Reverse Rotation
Viewed from Shaft End
Port A Pressurized - CCW
Port B Pressurized - CW

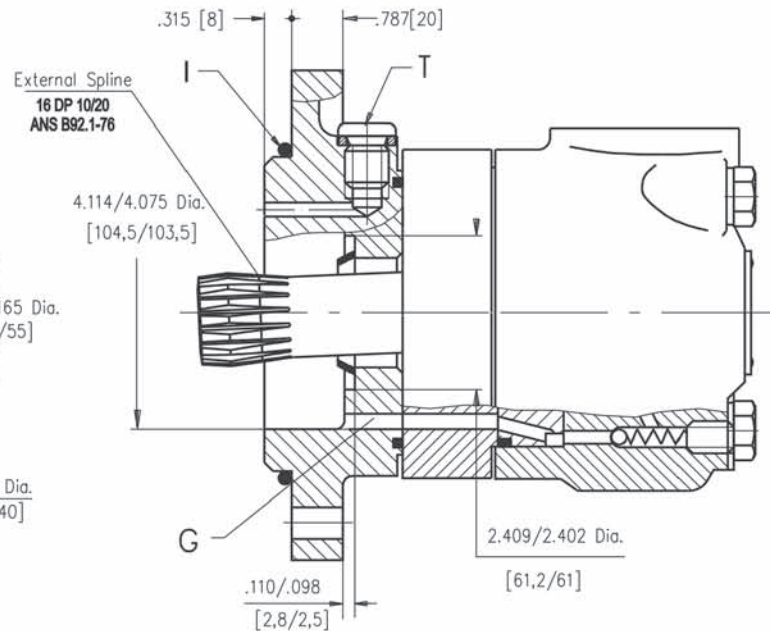
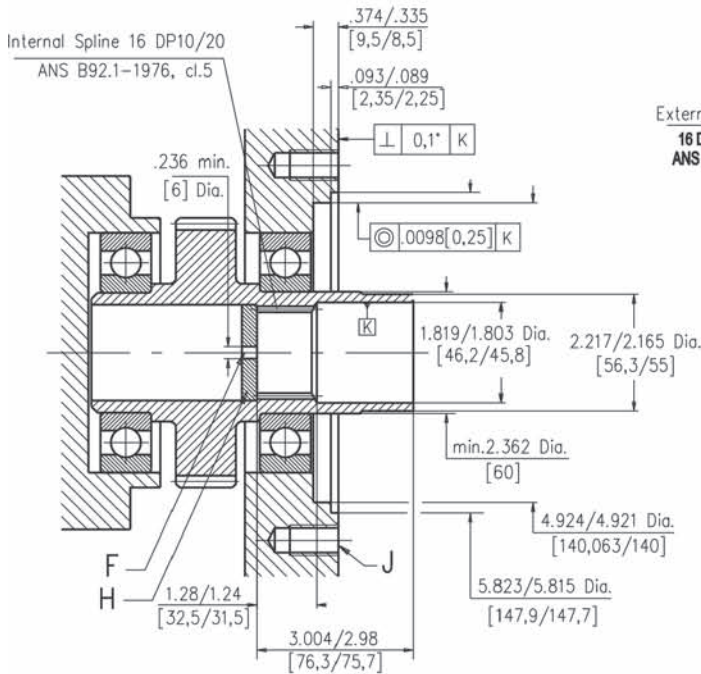


Type	L, in.[mm]	L ₂ , in.[mm]	Type	L, in.[mm]	L ₂ , in.[mm]	L ₃ , in.[mm]	*L ₁ , in.[mm]
MLHVS 315	6.73[171]	4.61[117]	MLHV 315	4.78[121,5]	2.68[68]	1.16[29,5]	.87 [22,0]
MLHVS 400	7.05[179]	4.88[124]	MLHV 400	5.06[128,5]	2.95[75]	1.28[32,5]	1.14 [29,0]
MLHVS 500	7.32[186]	5.20[132]	MLHV 500	5.37[136,5]	3.27[83]	1.36[34,5]	1.46 [37,0]
MLHVS 630	7.76[197]	5.63[143]	MLHV 630	5.79[147,0]	3.66[93]	1.34[34,0]	1.87 [47,5]
MLHVS 800	8.31[211]	6.18[157]	MLHV 800	6.34[161,0]	4.23[107,5]	1.18[30,0]	2.42 [61,5]

* The width of the gerolor is .157 in. [4 mm] greater than L₁.

DIMENSIONS OF THE ATTACHED COMPONENT

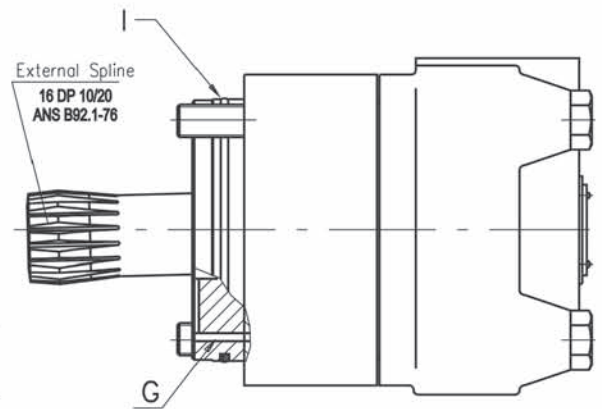
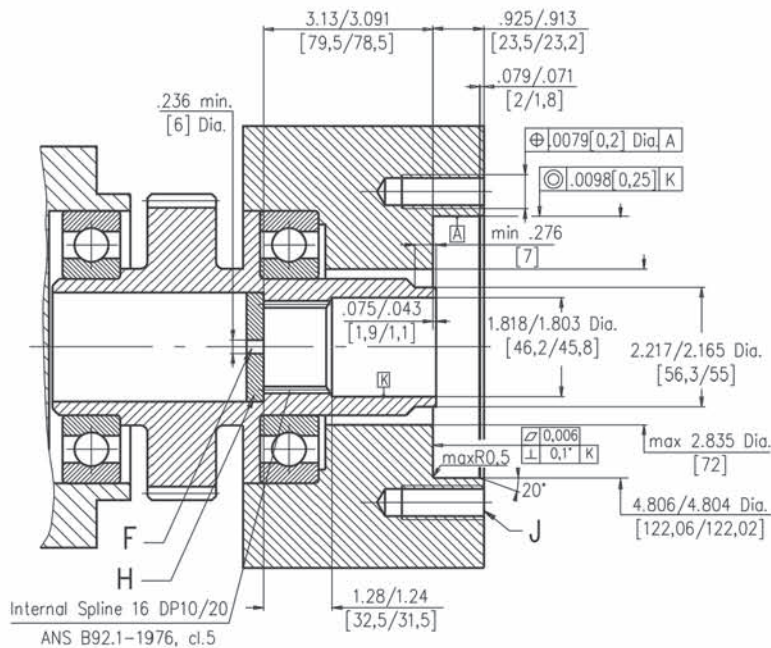
For MLHVS



F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate

I: O- Ring 5.512x.118 [140x3]
J: 4x1/2UN; 0.71 [18] Deep, 90°, 7.087 [180] Dia. B. C.
T: Drain connection G1/4 or 9/16 - 18UNF

For MLHVV



F: Oil circulation hole
G: Internal drain channel

H: Hardened stop plate
I: O- Ring 4.528x.118 [115x3mm]
J: 4xM16; 1.42 [36] Deep, 90°, 5.709 [145] Dia. B. C.

DRAIN CONNECTION

A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected:

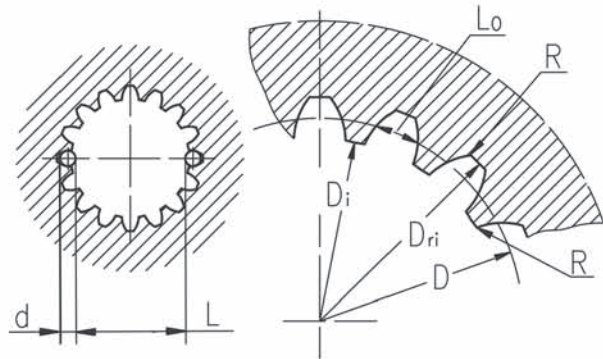
- For MLHVS at the drain port of the motor;
- For MLHVV at the drain connection of the attached component. The maximum pressure in the drain line is limited by the attached component and its shaft seal.

The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attached component and its seal.

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

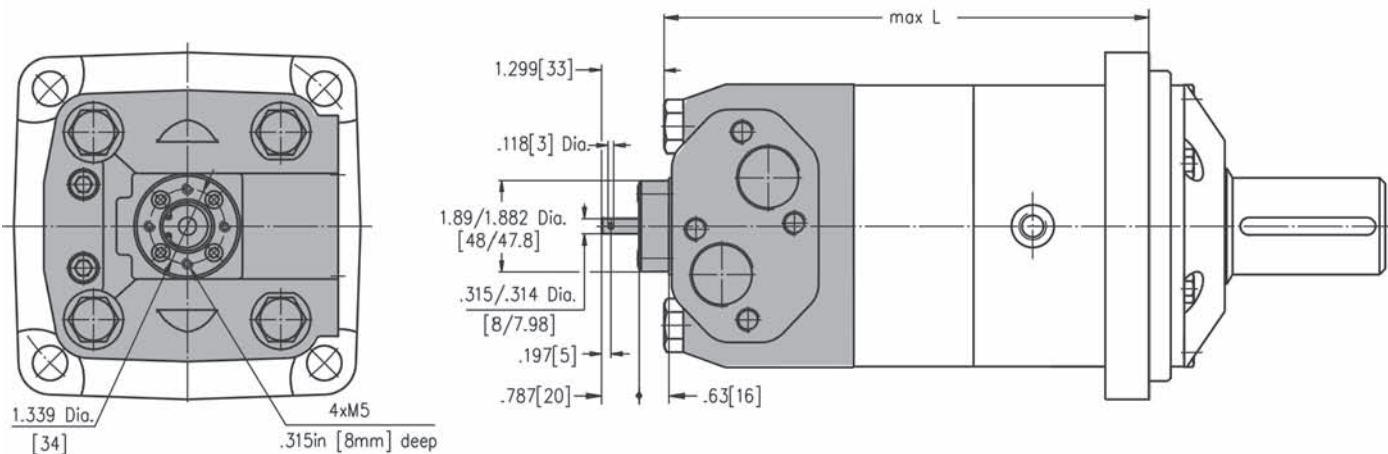
Standard ANS B92.1-1976, class 5
 [m=2.54; corrected x.m=1]

Fillet Root Side Fit		inch	mm
Number of Teeth	z	16	16
Diametral Pitch	DP	10/20	10/20
Pressure Angle		30°	30°
Pitch Dia.	D	1.6	40,640
Major Dia.	D _{ri}	1.796±1.780	45,2 ^{+0,4}
Minor Dia.	D _i	1.5175±1.516	38,5 ^{+0,039}
Space Width [Circular]	Lo	.2055±.2025	5,18±0,037
Fillet Radius	R	.015	0,4
Max. Measurement between Pins	L	1.284±1.278	32,47 ^{+0,15}
Pin Dia.	d	.22004±.21996	5,5±0,001

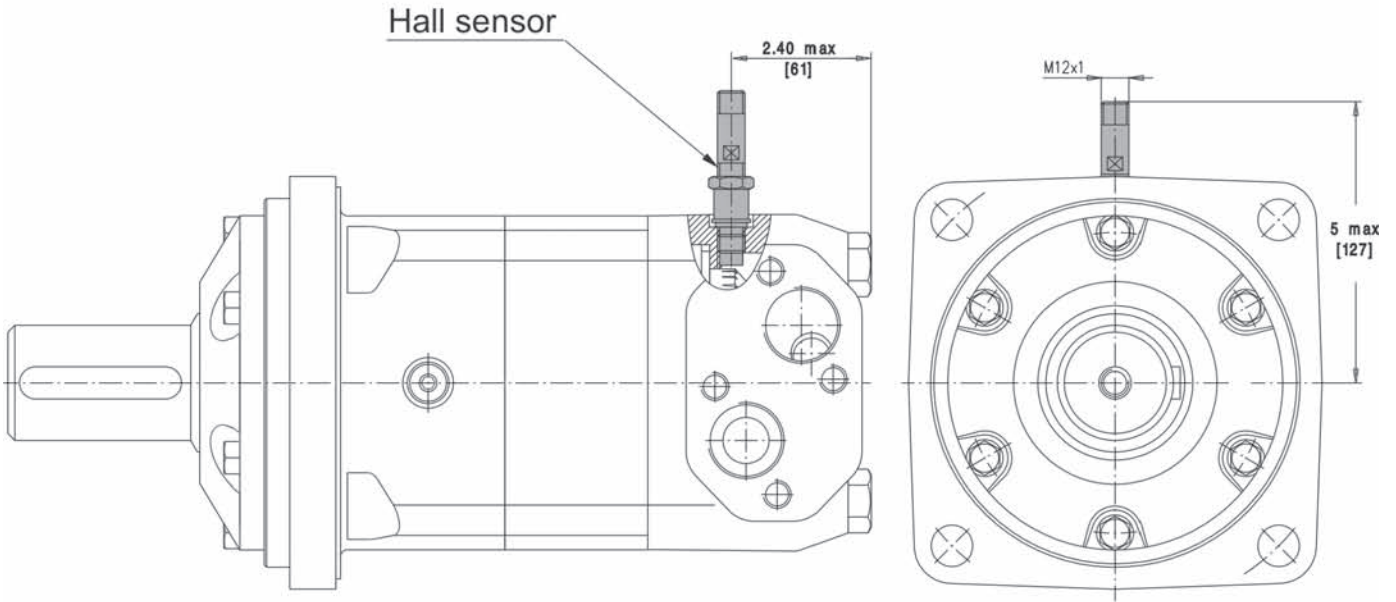


Hardening Specification:
 - On the surface: HRC 60±2
 - .036±.02 [0,7±0,2 mm] effective case depth
 under the surface: HRC 52
 Material 20 MoCr4 DIN 17210 or better

MOTOR WITH TACHO CONNECTION



MOTORS WITH SPEED SENSOR

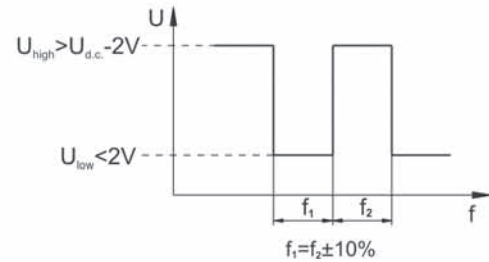


Differential Hall Sensor

Technical data

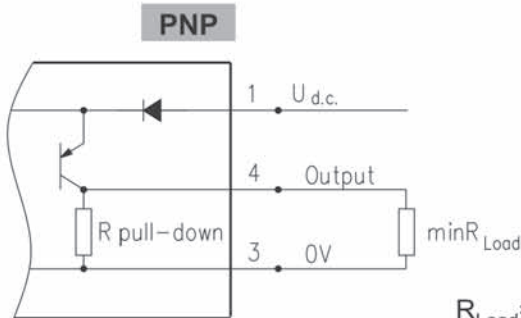
Frequency range	3...20 000 Hz
Output	PNP, NPN
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149
Pulses per revolution	102

Output signal

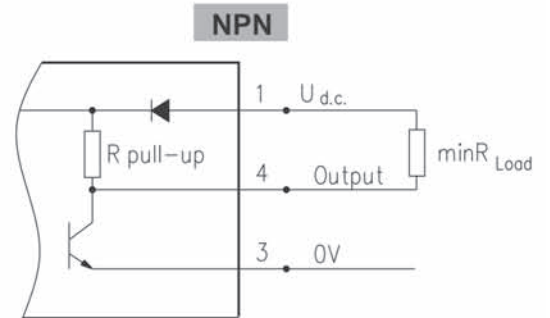


Load max.: $I_{high} = I_{low} < 50\text{mA}$
 No load current, max: 20 mA

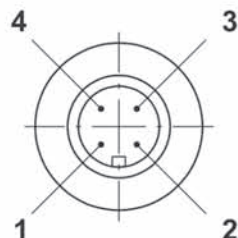
Wiring diagrams



$R_{Load} = U_{d.c.} / I_{max} (=50\text{mA})$



Stik type

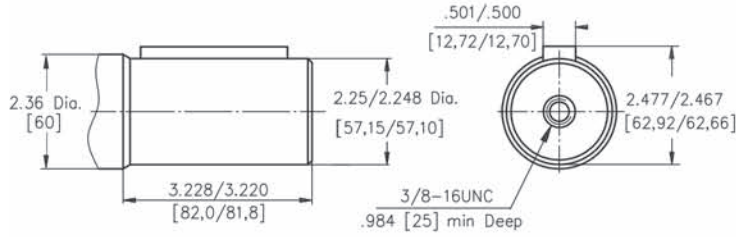


Terminal No.	Connection
1	$U_{d.c.}$
2	No connection
3	0V
4	Output signal

SHAFT EXTENSIONS

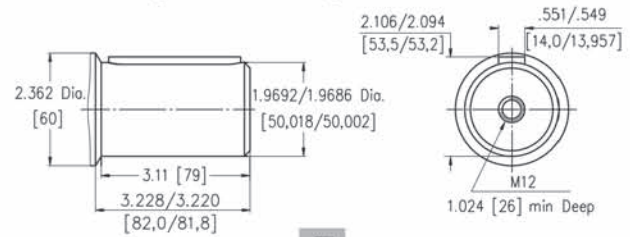
C

2 1/4" [57, 15] straight, Parallel key 1/2"x1/2"x 2 1/4" BS46



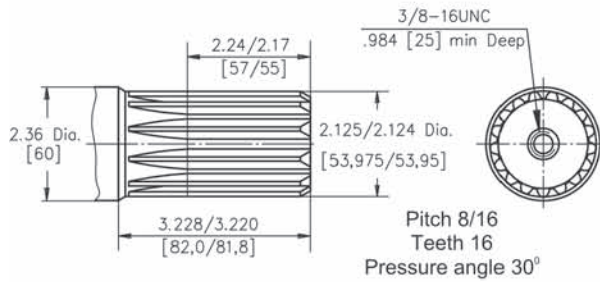
M

ø50 straight, Parallel key A14x9x70 DIN 6885



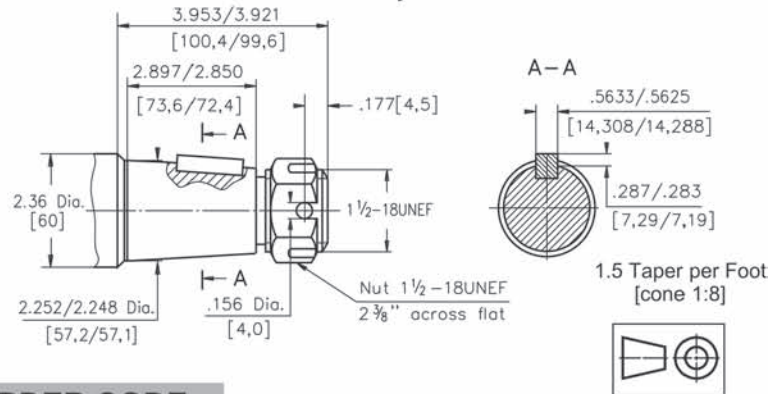
G*

16T Splined, 2 1/8" [53,975] ANS B92.1-1976



T

2 1/4" [57, 15] SAE J501 Tapered 1:8
Parallel key 9/16"x9/16"x 2" BS46



ORDER CODE

1	2	3	4	5	6	7	8	9
MLHV								

Pos. 1 - Mounting Flange

- omit - Square, 4 holes
- C** - SAE C, 4 holes
- W*** - Wheel mount
- S** - Short
- V** - Very short

Pos. 2 - Displacement code

- 315** - 19.18 [314,5] in.³/rev. [cm.³/rev.]
- 400** - 24.45 [400,9] in.³/rev. [cm.³/rev.]
- 500** - 30.48 [499,6] in.³/rev. [cm.³/rev.]
- 630** - 38.38 [629,1] in.³/rev. [cm.³/rev.]
- 800** - 48.91 [801,8] in.³/rev. [cm.³/rev.]

Pos. 3 - Shaft Extensions

- omit - for **S** and **V** mounting flange
- C** - 2 1/4" [57, 15] straight, Parallel key
- M** - 50 mm straight, Parallel key
- G*** - 2 1/8" [53,975] 16T Splined
- T** - 2 1/4" [57, 15] SAE J501 Tapered

Pos. 4 - Port Size/Type [standard manifold to each]

- 2** - side ports, 2xG1, G 1/4, BSP thread, ISO 228
- 4** - side ports, 2x1 1/2-12 UN, O-ring, 1/16-18 UNF

Pos. 5 - Speed Monitoring

- omit - none
- T** - with tacho connection (only for side ports)
- RS-P** - with speed sensor (PNP pull-down resistor)
- RS-N** - with speed sensor (NPN pull-up resistor)

Pos. 6 - Special Features

- omit - none
- LL** - Low Leakage
- LSV** - Low Speed Valve

Pos. 7 - Rotation

- omit - Standard Rotation
- R** - Reverse Rotation

Pos. 8 - Option [Paint]**

- omit - no Paint
- P** - Painted
- PC** - Corrosion Protected Paint

Pos. 9 - Design Series

- omit - Factory specified

Notes:

* The motor type MLHVW is not available with shaft type G.

** Color at customer's request.

The hydraulic motors are mangano phosphatized as standard.