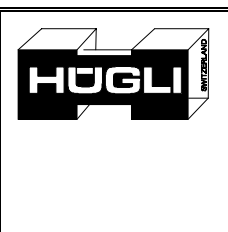
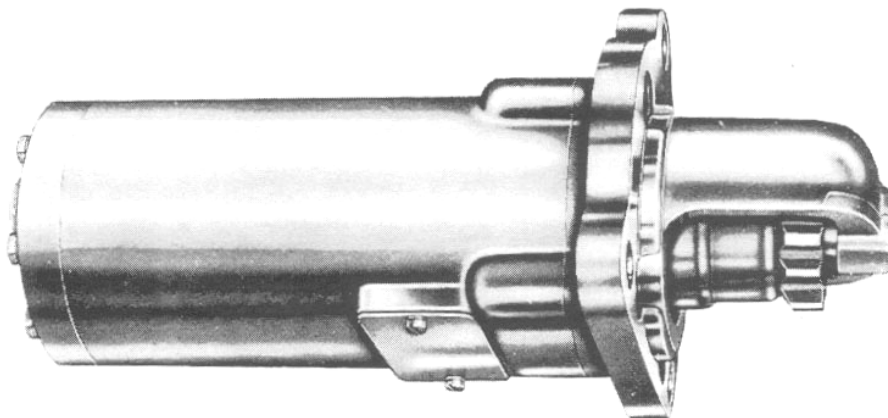
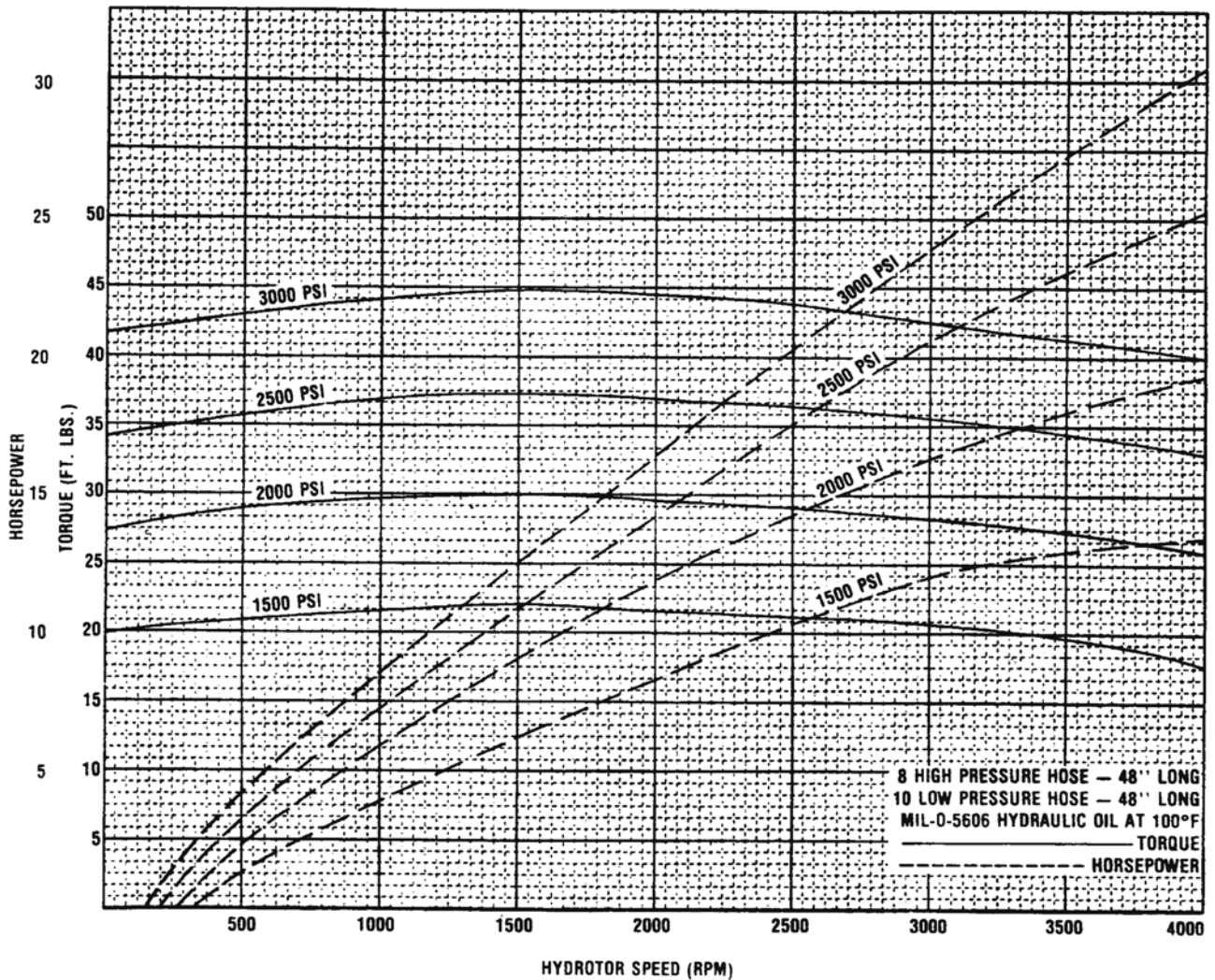
 Engine Starting Systems	Document: Data Sheet Version: 1 Status: actual Author: bs Date: 02-05-06 Approved: rs Date: 02-05-06 File: PC	CMA Hydrotor Data Sheet	
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CMA Hydrotor Specifications

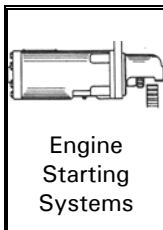


Motor Housing	Aluminum
Pinion Housing	Aluminum
Cylinder	Steel
Piston	Bronze
Number of Pistons	7
Displacement	1.35 in ³ (22.12 cm ³) /rev.
Speed Range	0-7000 RMP
Drive Type	Inertia
Maximum Working Pressure	3000 PSI (207 bar)
Rotation (Viewing Drive End)	CW standard (CCW optional)
Duty Cycle	Intermittent
Torque Chart	see page
Dimensions	see pages
Weight	25.1 lbs (11.4 kg)
Overall Volumetric Efficiency	92 %
Recommended Fluid	Hydraulic oil spec see operation manual
Variations	see page

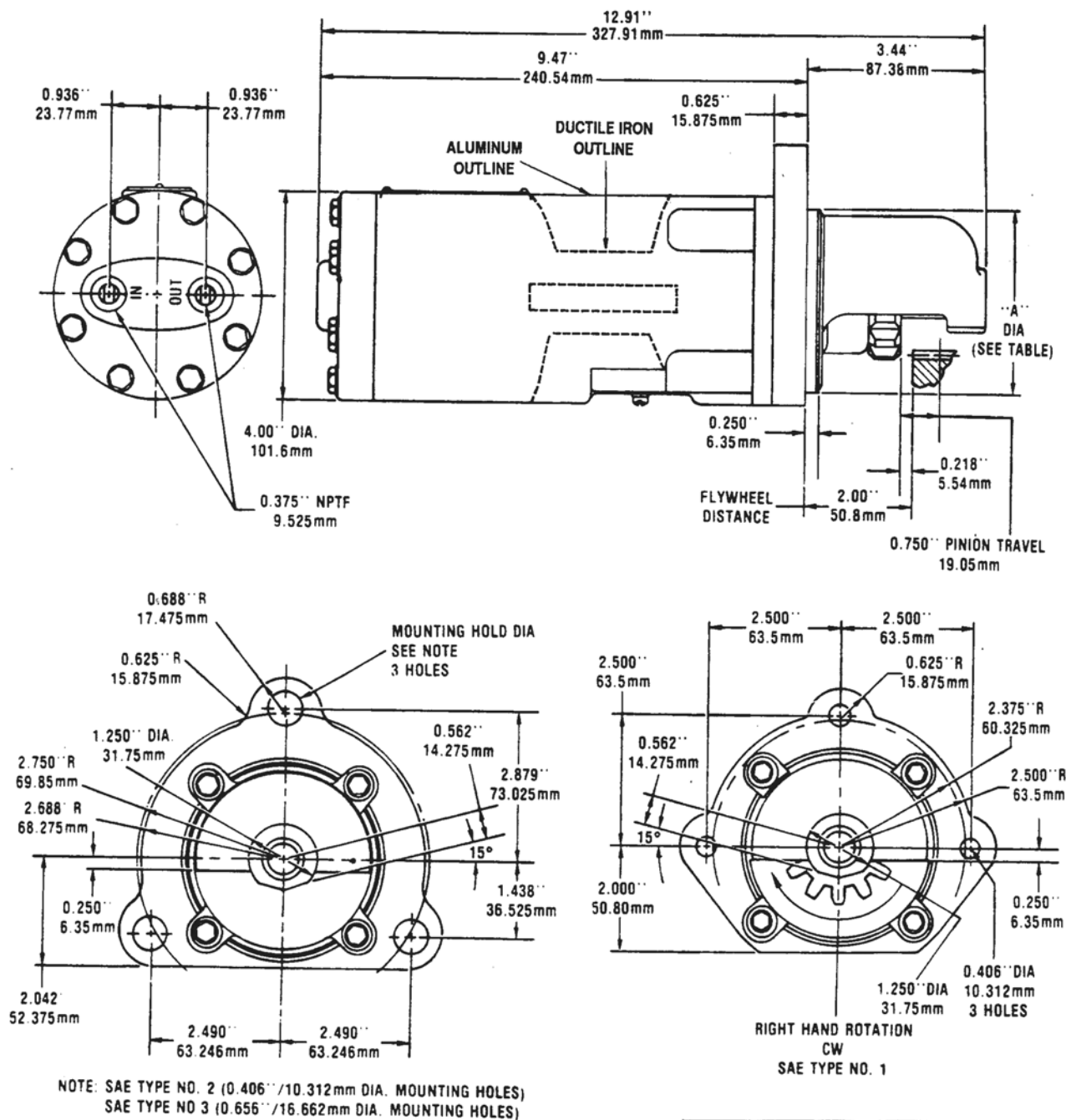
Torque Chart



Horsepower and Torque vs RPM of CMA Hydrotor

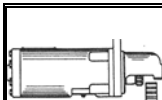
 Engine Starting Systems	Document: Data Sheet Version: 1 Status: actual Author: bs Date: 02-05-06 Approved: rs Date: 02-05-06 File: PC	CMA Hydrotor Data Sheet	 HUEGLI HUEGLI TECH LTD SWITZERLAND Tel.: +41-62-916 50 30 Fax: +41-62-916 50 35 www.huegli-tech.com
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Dimensions for Standard Applications

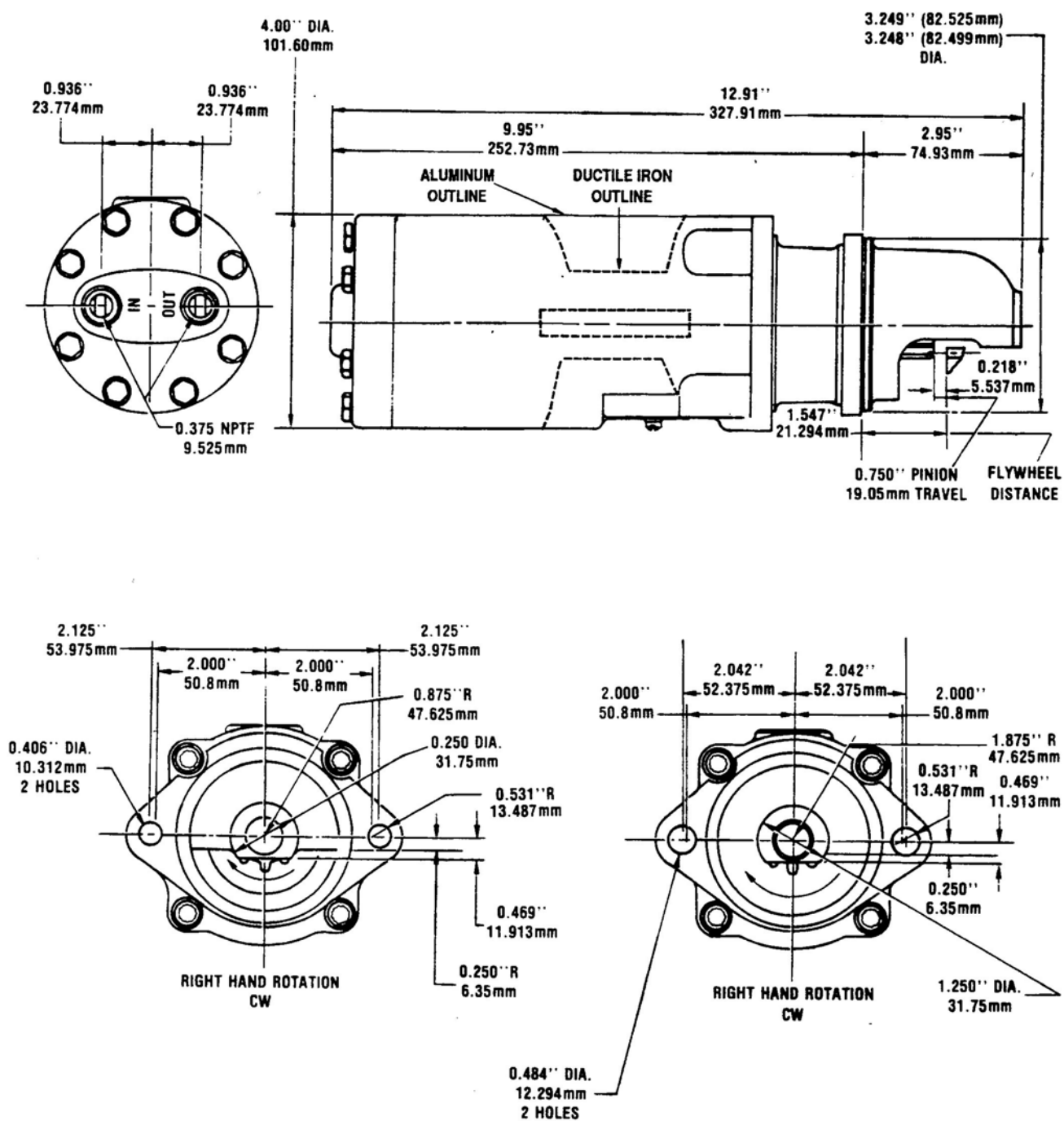


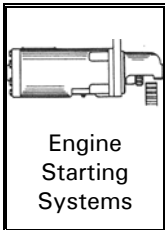
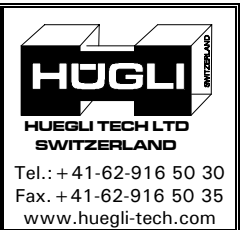
SAE TYPE MOUNTING FLANGE	"A" DIA. (PILOT DIA.)
SAE NO. 1	3.495" - 3.499" (88.773mm - 88.875mm)
SAE NO. 2	3.620" - 3.624" (91.948mm - 92.050mm)
SAE NO. 3	3.620" - 3.624" (91.948mm - 92.050mm)

Table A

 Engine Starting Systems	Document: Data Sheet Version: 1 Status: actual Author: bs Date: 02-05-06 Approved: rs Date: 02-05-06 File: PC	CMA Hydrotor Data Sheet	 HUEGLI TECH LTD SWITZERLAND Tel.: +41-62-916 50 30 Fax: +41-62-916 50 35 www.huegli-tech.com
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Dimensions for Non-Standard Applications

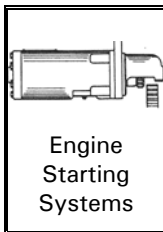


 Engine Starting Systems	Document: Data Sheet Version: 1 Status: actual Author: bs Date: 02-05-06 Approved: rs Date: 02-05-06 File: PC	CMA Hydrotor Data Sheet	 HUGLI HUEGLI TECH LTD SWITZERLAND Tel.: +41-62-916 50 30 Fax: +41-62-916 50 35 www.huegli-tech.com
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Hydrotor Model Variations

MODEL TYPE	MOUNTING FLANGE TYPE	FLANGE TO RING GEAR DIMENSION INCHES (MM)	FLANGE MOUNTING HOLES INCH (MM)	NUMBER OF TEETH	DIAM-ETRAL PITCH	PINION O.D. INCHES (MM)	PRESSURE ANGLE	ROTA-TION	REMARKS
CMA 300111	SAE #1	2.00 (50.8)	.41 (10.4)	11/12	6/8	2.250 (57.150)	20°	CW	
* CMA 300422	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CW	REPLACED BY CMA 300426
* CMA 300423	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CCW	REPLACED BY CMA 300427
CMA 300425	SPEC (FORD)	0.51 (13.0)	.41 (10.4)	9/10	10/12	1.690 (42.926)	20°	CW	FORD 172
* CMA 300426	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CW	REPLACED BY CMA 300430
* CMA 300427	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CCW	REPLACED BY CMA 300431
* CMA 300430	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.000 (50.800)	20°	CW	
* CMA 300431	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.000 (50.800)	20°	CCW	
CMA 308001	2 BOLT	1.55 (39.4)	.48 (12.2)	9/10	10	1.200 (30.480)	14.5°	CW	
CMA 308002	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CW	
CMA 308003	SPEC. "K"	0.94 (23.9)	.45 (11.4)	10/11	8/10	1.575 (40.005)	20°	CW	
CMA 308004	2 BOLT	1.55 (39.4)	.48 (12.2)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308005	SAE #1	2.00 (50.8)	.41 (10.4)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308006	SAE #3	2.00 (50.8)	.66 (16.8)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308007	SPECIAL	2.88 (73.2)	.66 (16.8)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308008	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CW	
* CMA 308009	SAE #1	2.00 (50.8)	.41 (10.4)	11	6/8	2.083 (52.908)	20°	CW	OBSOLETE
* CMA 308010	SAE #3	2.00 (50.8)	.66 (16.8)	11	6/8	2.083 (52.908)	20°	CW	OBSOLETE
CMA 308017	2 BOLT SP.	1.55 (39.4)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CCW	
CMA 308020	SAE #3	2.00 (50.8)	.66 (16.8)	10/11	8/10	1.575 (40.005)	20°	CW	
CMA 308021	SAE #2	2.00 (50.8)	.41 (10.4)	11/12	6/8	2.250 (57.150)	20°	CW	
* CMA 308022	SAE #2	2.00 (50.8)	.41 (10.4)	11	6/8	2.083 (52.908)	20°	CW	OBSOLETE
CMA 308023	SAE #2	2.00 (50.8)	.66 (16.8)	11/12	6/8	1.825 (46.355)	20°	CW	
CMA 308024	SAE #3	2.00 (50.8)	.66 (16.8)	12	6/8	2.250 (57.150)	20°	CCW	
CMA 308026	2 BOLT SP.	1.34 (34.0)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CW	
* CMA 308027	SAE #2	2.50 (63.5)	.41 (10.4)	12/13	8/10	1.825 (46.355)	20°	CW	
* CMA 308028	SAE #1	2.50 (63.5)	.41 (10.4)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308029	SAE #2	2.00 (50.8)	.41 (10.4)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308032	SAE #2	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CW	
* CMA 308034	3 BOLT SP.	2.00 (50.8)	.66 (16.8)	11/12	6/8	1.825 (46.355)	20°	CW	
CMA 308035	2 BOLT	1.55 (39.4)	.48 (12.2)	10/11	8/10	1.575 (40.005)	20°	CW	
* CMA 308036	SAE #3	2.00 (50.8)	.66 (16.8)	12/13	10/12	1.467 (37.262)	20°	CW	OBSOLETE
CMA 308037	SAE #3	2.00 (50.18)	.66 (16.8)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308038	SAE #2	2.00 (50.8)	.41 (10.4)	9/10	10/12	1.167 (29.642)	20°	CW	
* CMA 308039	SPECIAL	2.00 (50.8)	.45 (11.4)	14	8/10	1.950 (49.530)	20°	CW	
* CMA 308041				12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308043	SAE #3	2.00 (50.8)	.53 (13.5)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308044	SAE #3	2.00 (50.8)	.53 (13.5)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308045	SAE #1	2.00 (50.8)	.41 (10.4)	9/10	10	1.200 (30.480)	14.5°	CW	
* CMA 308047	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CCW	SPECIAL

* OBSOLETE - NOT AVAILABLE

 Engine Starting Systems	Document: Data Sheet Version: 1 Status: actual Author: bs Date: 02-05-06 Approved: rs Date: 02-05-06 File: PC	CMA Hydrotor Data Sheet	 HUEGLI TECH LTD SWITZERLAND Tel.: +41-62-916 50 30 Fax: +41-62-916 50 35 www.huegli-tech.com
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Hydrotor Model Variations (continued)

(Continued)

MODEL TYPE	MOUNTING FLANGE TYPE	FLANGE TO RING GEAR DIMENSION INCHES (MM)	FLANGE MOUNTING HOLES INCH (MM)	NUMBER OF TEETH	DIAM-ETRAL PITCH	PINION O.D. INCHES (MM)	PRESSURE ANGLE	ROTA-TION	REMARKS
* CMA-308048	2 BOLT	1.55 (39.4)	.48 (12.2)	15	8/10	2.075 (52.075)	20°	CW	
CMA 308052	SAE #1	2.00 (50.8)	.41 (10.4)	12/13	8/10	1.825 (46.355)	20°	CCW	
CMA 308067	SAE #3 MOD	2.00 (50.8)	.53 (13.5)	11/12	6/8	2.250 (57.150)	20°	CW	
CMA 308070	SPECIAL	2.00 (50.8)	.53 (13.5)	11/12	6/8	2.250 (57.150)	20°	CW	
CMA 308071	SPECIAL	2.00 (50.8)	.53 (13.5)	12	6/8	2.250 (57.150)	20°	CCW	
CMA 308082	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CW	
* CMA 308088	SAE #1	2.00 (50.8)	.41 (10.4)						
CMA 308093	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)		CW	SPECIAL
CMA 308099	SAE #3 MOD	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)		CW	R.H. CUTOUT
CMA 308109	SPECIAL	2.00 (50.8)	.53 (13.5)	12/13	8/10	1.825 (46.355)	20°	CW	
CMA 308110	SPECIAL	2.00 (50.8)	.53 (13.5)	12/13	8/10	1.825 (46.355)	20°	CCW	
CMA 308113	SAE #3	2.00 (50.8)	.66 (16.8)	12/13	8/10	1.825 (46.355)	20°	CCW	
CMA 308119	SAE #3	2.00 (50.8)	.66 (16.8)	12/12	6/8	2.250 (57.150)	20°	CCW	WET CLUTCH
CMA 308120	SAE #3 SP.	2.00 (50.8)	.66 (16.8)	12/12	6/8	2.250 (57.150)	20°	CCW	WET CLUTCH
CMA 308123	SAE #1	2.00 (50.8)	.66 (16.8)	11	MOD 3	1.618 (41.097)	15°	CW	METRIC PINION
CMA 308125	2 BOLT SP.	0.95 (24.1)	.48 (12.2)	11/11.7	MOD 3	1.618 (41.097)	15°	CW	METRIC PINION
CMA 308127	2 BOLT	1.55 (39.4)	.48 (12.2)	9/10	10/12	1.167 (29.642)	20°	CW	
CMA 308129	SAE #1	2.00 (50.8)	.66 (16.8)	9	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308130	2 BOLT SP.	0.95 (24.1)	.48 (12.2)	9	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308136	4 BOLT SP.			9/9.5	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308137	4 BOLT SP.			9/9.5	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308138	4 BOLT SP.			11/11.7	MOD 3	1.618 (41.097)	15°	CW	METRIC PINION
CMA 308139	4 BOLT SP.			11/11.7	MOD 3	1.618 (41.097)	15°	CW	METRIC PINION
CMA 308144	SAE #1	2.00 (50.8)	.41 (10.4)	9/9.5	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308148	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	8/10	1.575 (40.005)	20°	CCW	
CMA 308149	SPECIAL "K"	0.94 (23.9)	.45 (11.4)	10/11	8/10	1.575 (40.005)	20°	CCW	
CMA 308150	SAE #3	2.00 (50.8)	.66 (16.8)	9/9.5	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308151	SPECIAL			11/11.7	MOD 3	1.618 (41.097)	15°	CW	METRIC PINION
CMA 308152	SPECIAL "K"	0.94 (23.9)	.45 (11.4)	9/9.5	MOD 3	1.358 (34.493)	15°	CW	METRIC PINION
CMA 308154	SAE #1	2.00 (50.8)	.41 (10.4)	10/11	10/12	1.2667 (32.174)	20°	CW	
CMA 308174	SAE #3	2.00 (50.8)	.66 (16.8)	10/11	10/12	1.2667 (32.174)	20°	CW	

Ductile Iron

CMA 309006	SAE #3	2.00 (50.8)	.66 (16.8)	12/13	8/10	1.825 (46.355)	20°	CW
CMA 309008	SAE #3	2.00 (50.8)	.66 (16.8)	11/12	6/8	2.250 (57.150)	20°	CW

* OBSOLETE - NOT AVAILABLE



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