

TECHNICAL MANUAL



MORTORQ® SPIRAL Drive Systems

Includes comprehensive engineering Head Standards, Driver Bit Standards, Gage Standards, Quality Standards , Punch Standards, and PMT Part Standards.



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MORTORQ® SPIRAL Drive System Technical Manual



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Phillips Screw Company
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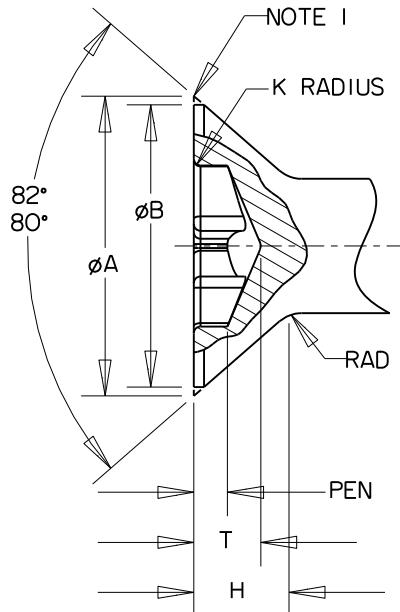
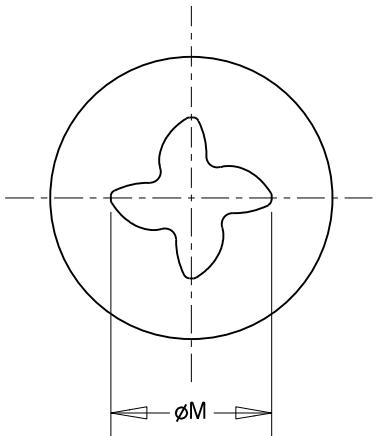
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MORTORQ® ENGINEERING MANUAL
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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS				DRIVER SIZE MT
		øA THEO.	øB MIN.	H REF.	øM REF.	T MAX. REF.	K REF	PENETRATION MAX. MIN.	
6	MT-00-2	.279 .257	.244	.083	.1210	.059	.007	.037 .028	MT-00
8	MT-0-1	.332 .308	.292	.100	.1704	.073	.008	.040 .031	MT-0
10	MT-I-7	.385 .359	.340	.116	.2405	.088	.008	.040 .031	MT-I
12	MT-I-1	.438 .410	.389	.132	.2405	.096	.010	.048 .039	MT-I
1/4	MT-2-5	.507 .477	.452	.153	.3080	.112	.010	.050 .041	MT-2
5/16	MT-3-2	.635 .600	.568	.191	.3537	.139	.013	.067 .058	MT-3
3/8	MT-4-2	.762 .722	.685	.230	.4285	.160	.014	.072 .057	MT-4
7/16	MT-4-5	.812 .767	.723	.223	.4285	.172	.017	.084 .069	MT-4
1/2	MT-4-1	.875 .825	.775	.223	.4285	.180	.018	.092 .077	MT-4
9/16	MT-5-1	1.000 .945	.889	.260	.5063	.206	.020	.102 .077	MT-5
5/8	MT-5-9	1.125 1.065	1.002	.278	.5063	.221	.023	.117 .092	MT-5
3/4	MT-6-1	1.375 1.305	1.230	.372	.5938	.275	.030	.152 .122	MT-6

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
3. DRAWING NOT TO SCALE.

REVISION ISSUED: 2/20/03 REVISED: 8/8/03 REVISED: 1/16/04 REVISED: 2/6/09

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
82° FLAT HEAD SCREWS (INCH)

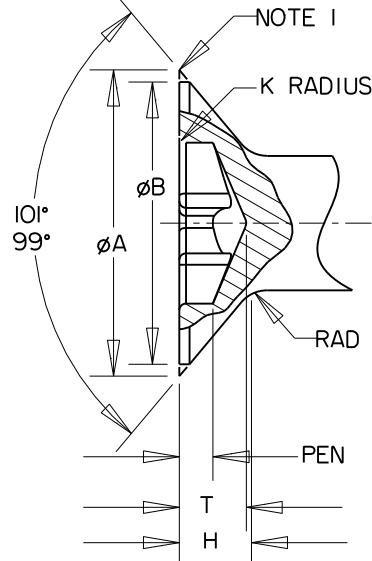
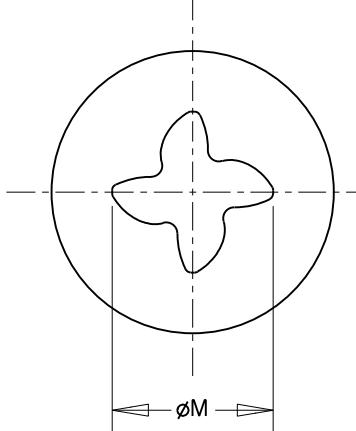
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PSC-5005

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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS				DRIVER SIZE MT
		ØA THEO.	ØB MIN.	H REF.	ØM REF.	T MAX. REF.	K REF	PENETRATION MAX.	
2	MT-000-I	.175 .165	.143	.034	.073	.031	.004	.018	.012 MT-000
4	MT-00-I	.228 .218	.191	.046	.1210	.045	.004	.022	.015 MT-00
6	MT-00-9	.279 .269	.238	.057	.1210	.052	.006	.030	.021 MT-00
8	MT-0-I2	.332 .322	.285	.068	.1704	.065	.006	.032	.023 MT-0
10	MT-1-I4	.385 .375	.333	.080	.2405	.082	.005	.027	.020 MT-1
1/4	MT-1-II	.507 .497	.442	.106	.2405	.095	.009	.047	.038 MT-1
5/16	MT-2-9	.635 .625	.556	.133	.3080	.117	.011	.055	.046 MT-2
3/8	MT-3-8	.762 .752	.670	.160	.3537	.142	.014	.070	.061 MT-3
7/16	MT-4-6	.890 .880	.783	.188	.4285	.168	.016	.080	.065 MT-4
1/2	MT-5-6	1.017 1.007	.897	.215	.5063	.186	.016	.082	.067 MT-5
9/16	MT-5-I	1.145 1.135	1.011	.242	.5063	.206	.020	.102	.077 MT-5
5/8	MT-6-3	1.272 1.262	1.124	.270	.5938	.233	.022	.110	.085 MT-6
3/4	MT-7-4	1.527 1.517	1.352	.324	.8003	.277	.022	.110	.085 MT-7
7/8	MT-7-I	1.782 1.772	1.579	.379	.8003	.307	.028	.140	.115 MT-7
1"	MT-8-I	2.037 2.027	1.807	.433	.8210	.329	.032	.162	.122 MT-8

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
3. DRAWING NOT TO SCALE.
4. SEE DRAWING "PSC-5006-A" FOR ALTERNATE 100° SCREW DESIGNS.

REVISION ISSUED: 7/2/03 REVISED: II/06/03 REVISED: III/06/04 REVISED: 3/27/06 REVISED: 4/22/08 REVISED: 6/20/08 REVISED: 2/6/09

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
100° FLAT HEAD SCREWS (INCH)

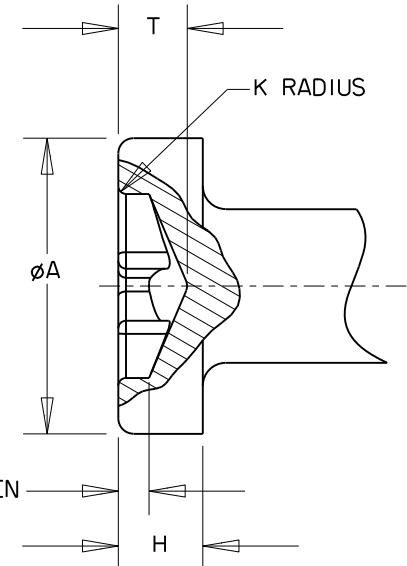
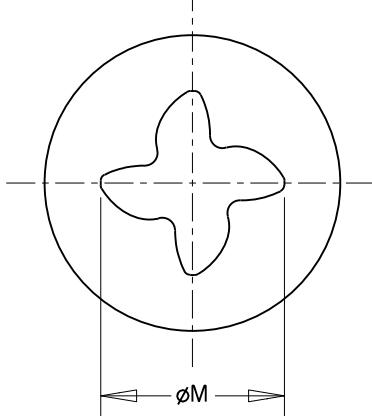
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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS		RECESS DIMENSIONS					DRIVER SIZE MT
		ØA	H	ØM REF.	T MAX. REF.	K REF	PENETRATION		
							MAX.	MIN.	
4	MT-00-9	.183 .178	.058 .048	.1210	.052	.006	.030	.021	MT-00
6	MT-00-9	.226 .221	.067 .055	.1210	.052	.006	.030	.021	MT-00
8	MT-0-12	.270 .265	.079 .065	.1704	.065	.006	.032	.023	MT-0
10	MT-0-14	.313 .306	.092 .077	.1704	.069	.007	.036	.027	MT-0
1/4	MT-I-8	.375 .367	.117 .100	.2405	.087	.008	.039	.030	MT-I
5/16	MT-I-9	.438 .429	.141 .120	.2405	.098	.010	.050	.041	MT-I
3/8	MT-2-2	.563 .552	.167 .143	.3080	.124	.012	.062	.053	MT-2
7/16	MT-3-2	.625 .615	.193 .166	.3537	.139	.013	.067	.058	MT-3
1/2	MT-4-2	.750 .739	.217 .187	.4285	.160	.014	.072	.057	MT-4

NOTES:

1. DIMENSIONS ARE IN INCHES.
2. DRAWING NOT TO SCALE.

REVISION ISSUED: 2/20/03 REVISED: 5/7/03 REVISED: 1/16/04 REVISED: 2/6/09

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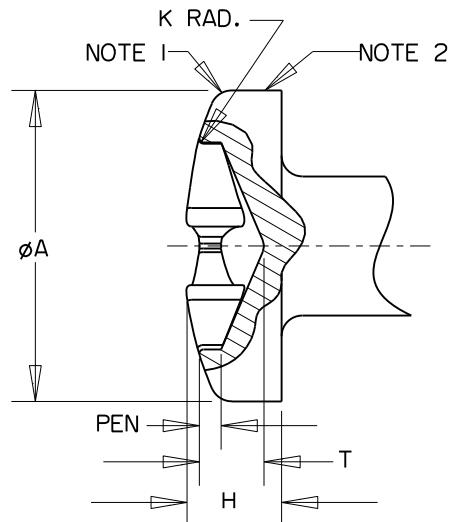
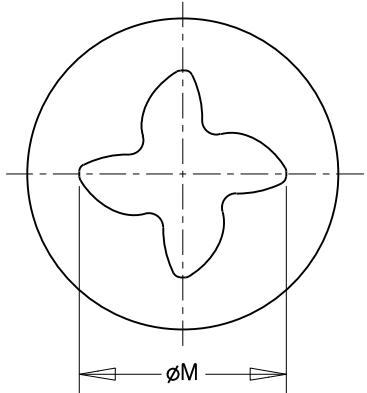
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT FILLISTER HEAD (INCH)

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SCREW SIZE	PUNCH NUMBER	HEAD DIM.		RECESS DIMENSIONS				DRIVER SIZE MT
		ØA	H	ØM REF	T MAX. REF.	K REF	PENETRATION MAX.	
4	MT-00-3	.219 .205	.070 .060	.1210	.051	.005	.027	.019
6	MT-00-10	.270 .256	.088 .078	.1210	.059	.007	.037	.029
8	MT-0-5	.339 .315	.099 .089	.1704	.071	.008	.039	.031
10	MT-I-6	.373 .357	.115 .104	.2405	.092	.008	.041	.032
12	MT-I-3	.433 .415	.130 .118	.2405	.098	.010	.052	.043
1/4	MT-I-4	.492 .473	.151 .138	.2405	.103	.011	.057	.048
5/16	MT-2-3	.615 .594	.188 .173	.3080	.157	.016	.080	.071
3/8	MT-3-3	.740 .716	.224 .207	.3537	.160	.017	.087	.078
7/16	MT-4-3	.863 .837	.261 .243	.4285	.191	.020	.102	.093
1/2	MT-5-2	.987 .958	.299 .278	.5063	.212	.021	.107	.092
9/16	MT-5-4	1.041 1.000	.326 .301	.5063	.228	.024	.122	.097
5/8	MT-6-2	1.172 1.125	.384 .356	.5938	.256	.026	.132	.107
3/4	MT-7-3	1.435 1.375	.444 .411	.8003	.320	.030	.152	.122
								MT-7

NOTES:

1. THE HEAD CROWN CORNER IS NOT CONTAINED IN THE PUNCH CAVITY AND IS TO BE FREE FLOWED.
2. TO INSURE GOOD FILL OF THE RECESS CAVITY, THE SIDES OF THE HEAD MUST BE CONTAINED IN THE HEADING DIE.
3. DIMENSIONS ARE IN INCHES.
4. DRAWING NOT TO SCALE.

REVISION ISSUED: 2/20/03 REVISED: 7/24/03 REVISED: 1/16/04 REVISED: 2/6/09

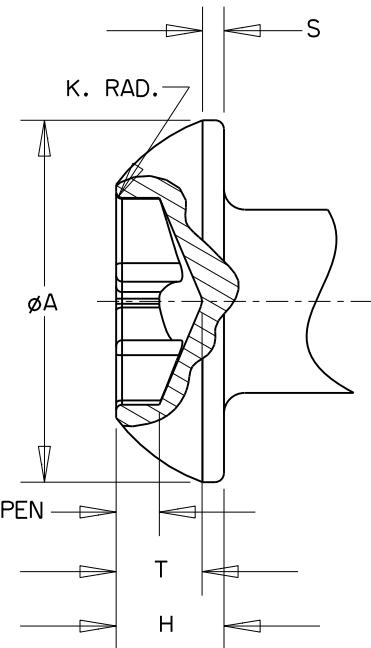
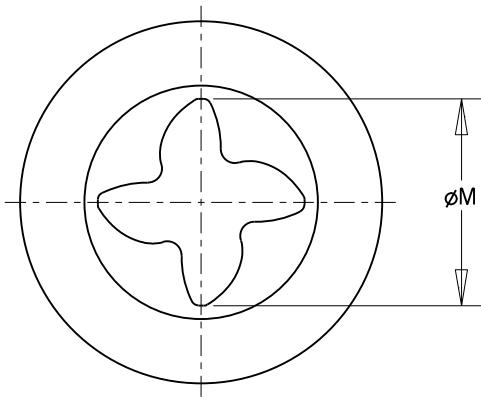
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
PAN HEAD SCREWS (INCH)

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SCREW SIZE	PUNCH NUMBER	HEAD DIM.			RECESS DIMENSIONS				DRIVER SIZE MT
		φA	H	S REF	φM REF	T MAX. REF.	K REF	PENETRATION	
MAX.	MIN.								
4	MT-00-4	.213 .201	.059 .051	.015	.1210	.051	.005	.027	.018 MT-00
6	MT-00-5	.262 .250	.073 .063	.015	.1210	.059	.007	.035	.026 MT-00
8	MT-0-3	.312 .298	.080 .070	.015	.1704	.074	.008	.040	.031 MT-0
10	MT-0-4	.361 .347	.090 .080	.020	.1704	.081	.009	.047	.038 MT-0
1/4	MT-1-5	.437 .419	.128 .118	.031	.2405	.101	.010	.052	.043 MT-1
5/16	MT-2-4	.547 .527	.149 .135	.031	.3080	.125	.012	.062	.050 MT-2
3/8	MT-3-4	.656 .636	.174 .160	.031	.3537	.160	.017	.087	.073 MT-3
1/2	MT-4-4	.875 .851	.240 .220	.046	.4285	.201	.022	.112	.098 MT-4
5/8	MT-5-3	1.000 .970	.295 .275	.062	.5063	.257	.030	.152	.127 MT-5

NOTES:

1. DIMENSIONS ARE IN INCHES.
2. DRAWING NOT TO SCALE.

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
BUTTON HEAD SCREWS (INCH)

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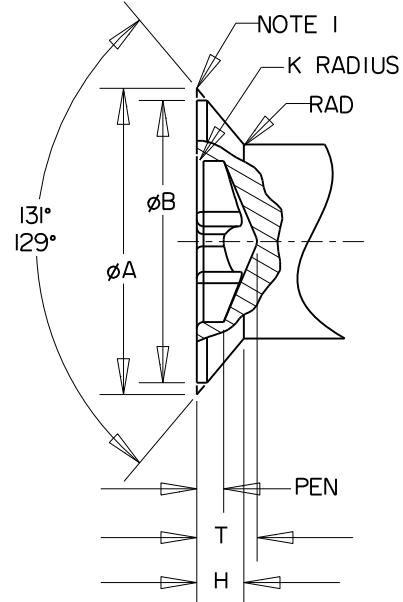
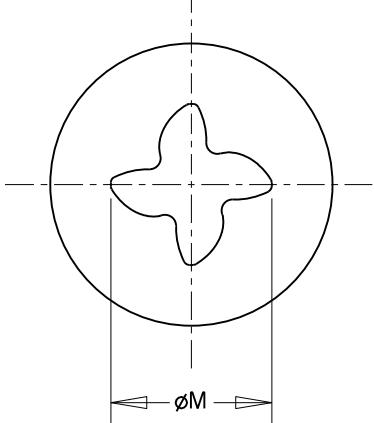
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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS					DRIVER SIZE MT
		φA THEO. SHARP MAX.	φB ABS MIN.	H REF	φM REF.	T MAX. REF.	K REF	PENETRATION		
MAX.	MIN.				MAX.	MIN.	MAX.	MIN.		
8	MT-00-6	.3393	.2793	.041	.1210	.048	.005	.026	.018	MT-00
10	MT-0-2	.3911	.3131	.047	.1704	.060	.005	.027	.019	MT-0
1/4	MT-I-2	.5111	.4382	.061	.2405	.080	.006	.032	.023	MT-I
5/16	MT-I-8	.6037	.5037	.068	.2405	.087	.008	.039	.030	MT-I
3/8	MT-2-5	.7090	.6361	.078	.3080	.112	.010	.050	.041	MT-2
7/16	MT-3-6	.8526	.7800	.097	.3537	.128	.011	.056	.047	MT-3

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
3. DRAWING NOT TO SCALE.

REVISION ISSUED: 9/2/03 REVISED: 1/16/04 REVISED: 2/6/09

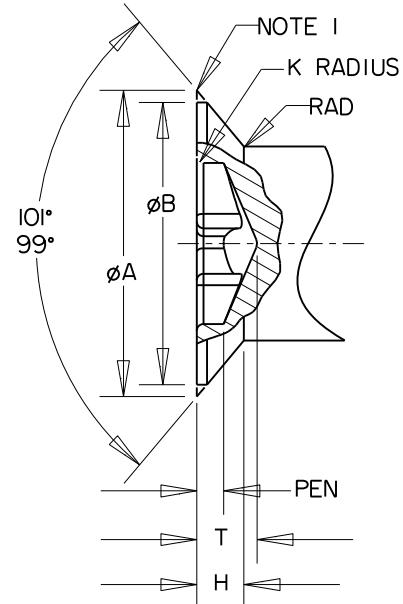
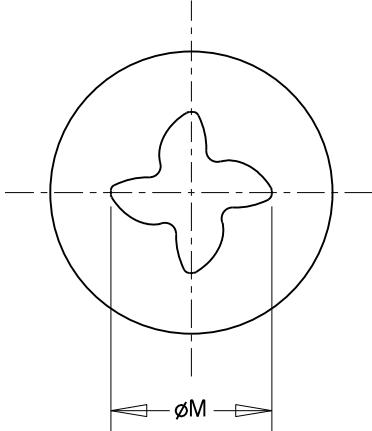
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
130° FLAT HEAD SCREWS (INCH)

DRAWN G.DILLING	DATE 8/29/03	DRAWING NUMBER PSC-5010
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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS				DRIVER SIZE MT
		ØA THEO. SHARP MAX.	ØB ABS MIN.	H MAX.	ØM REF.	T MAX. REF.	K REF	PENETRATION	
MAX.	MIN.							MAX.	MIN.
8	MT-00-9	.263	.231	.042	.1210	.052	.006	.030	.021 MT-00
10	MT-0-9	.303	.266	.049	.1704	.063	.006	.030	.023 MT-0
1/4	MT-1-12	.397	.355	.063	.2405	.078	.006	.030	.023 MT-1
5/16	MT-1-1	.477	.429	.071	.2405	.096	.010	.048	.039 MT-1
3/8	MT-2-5	.564	.510	.081	.3080	.112	.010	.050	.041 MT-2
7/16	MT-3-2	.672	.612	.101	.3537	.139	.013	.067	.058 MT-3
1/2	MT-4-2	.755	.688	.109	.4285	.160	.014	.072	.057 MT-4
9/16	MT-4-1	.838	.766	.119	.4285	.180	.018	.092	.077 MT-4
5/8	MT-5-7	.925	.848	.129	.5063	.196	.018	.092	.067 MT-5
3/4	MT-6-6	1.099	1.010	.150	.5938	.235	.022	.112	.082 MT-6
7/8	MT-6-1	1.323	1.219	.192	.5938	.275	.030	.152	.122 MT-6
1"	MT-7-2	1.522	1.406	.224	.8003	.329	.032	.162	.122 MT-7

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
3. DRAWING NOT TO SCALE.

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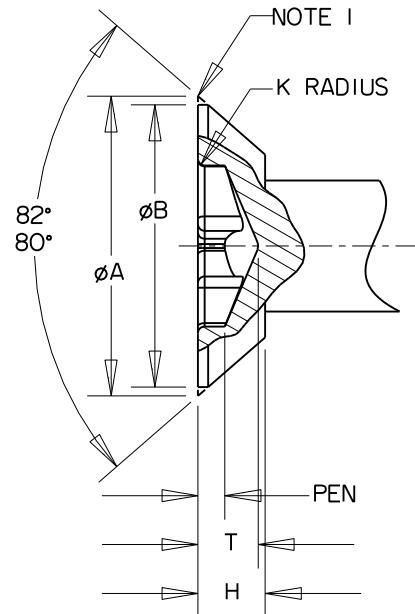
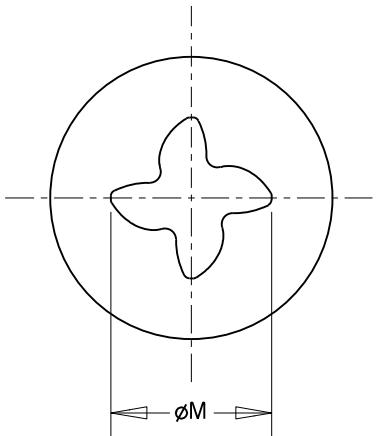
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
100° REDUCED FLAT HEAD SCREWS (INCH)

DRAWN G.DILLING	DATE 5/23/03	DRAWING NUMBER PSC-5011
CHECKED: G.DILLING	DATE 5/30/03	SHEET 1 OF 1

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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS					DRIVER SIZE MT
		φA THEO.	φB MIN.	H	φM REF.	T MAX. REF.	K REF	PENETRATION		
								MAX.	MIN.	
6	MT-00-9	.279 .257	.244	.059 .048	.1210	.052	.006	.030	.021	MT-00
8	MT-0-12	.332 .308	.292	.070 .058	.1704	.065	.006	.032	.023	MT-0
10	MT-0-14	.385 .359	.340	.081 .068	.1704	.069	.007	.036	.027	MT-0
12	MT-1-8	.438 .410	.389	.092 .078	.2405	.087	.008	.039	.030	MT-1
1/4	MT-2-6	.507 .477	.452	.107 .092	.3080	.104	.008	.042	.033	MT-2
5/16	MT-3-6	.635 .600	.568	.134 .116	.3537	.128	.011	.056	.047	MT-3
3/8	MT-4-2	.762 .722	.685	.161 .140	.4285	.160	.014	.072	.057	MT-4
7/16	MT-4-6	.812 .767	.723	.156 .133	.4285	.168	.016	.080	.065	MT-4
1/2	MT-4-1	.875 .825	.775	.156 .130	.4285	.180	.018	.092	.077	MT-4
9/16	MT-5-7	1.000 .945	.889	.182 .153	.5063	.196	.018	.092	.067	MT-5
5/8	MT-5-1	1.125 .1.065	1.002	.208 .176	.5063	.206	.020	.102	.077	MT-5
3/4	MT-6-8	1.375 1.305	1.230	.261 .222	.5938	.250	.025	.127	.097	MT-6

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
3. DRAWING NOT TO SCALE.

REVISION ISSUED: 8/8/03 REVISED: 1/6/04 REVISED: 2/6/09

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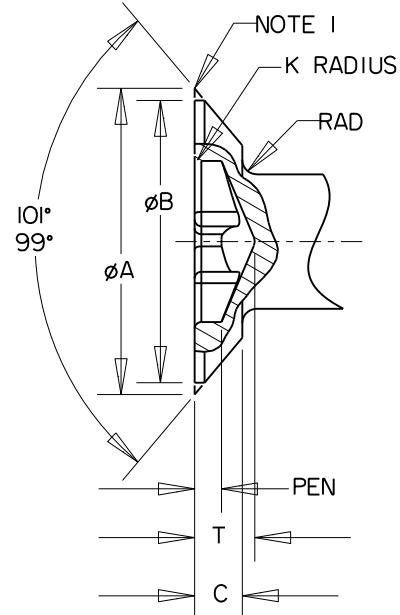
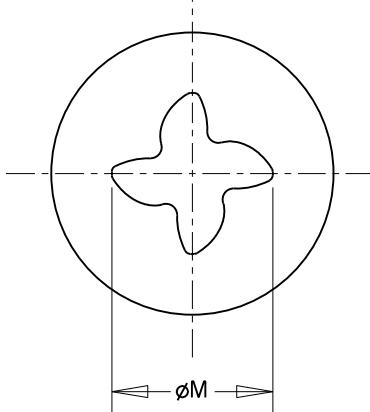
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
82° UNDERCUT FLAT HEAD SCREWS (INCH)

DRAWN G.DILLING	DATE 5/21/03	DRAWING NUMBER PSC-5012
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CHECKED: G.DILLING	DATE 5/22/03
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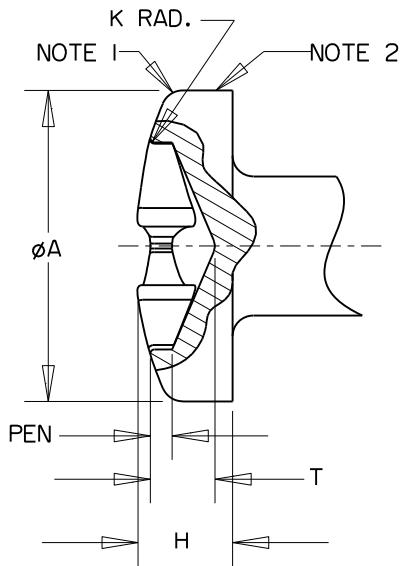
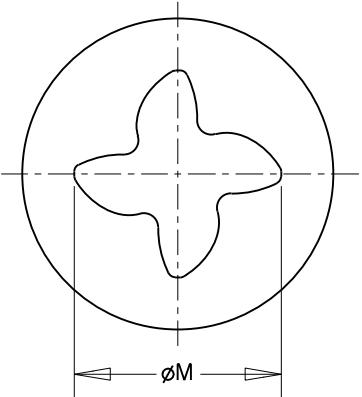


SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS				DRIVER SIZE MT
		ØA THEO. SHARP MAX.	ØB ABS MIN.	C	ØM REF.	T MAX. REF.	K REF	PENETRATION MAX.	
10	MT-0-I2	.3813	.350	.0459 .0439	.1704	.065	.006	.032	.023 MT-0
1/4	MT-I-8	.5066	.475	.0733 .0713	.2405	.087	.008	.039	.030 MT-I
5/16	MT-I-9	.6335	.602	.0899 .0878	.2405	.098	.010	.050	.041 MT-I
3/8	MT-2-2	.7604	.729	.1167 .1147	.3080	.124	.012	.062	.053 MT-2
7/16	MT-3-2	.8884	.840	.1333 .1303	.3537	.139	.013	.067	.058 MT-3
1/2	MT-4-2	1.0139	.966	.1598 .1568	.4285	.160	.014	.072	.057 MT-4

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
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DRAWN G.DILLING	DATE 11/10/03	DRAWING NUMBER PSC-5013		SHEET 1 OF 1			
CHECKED: G.DILLING	DATE 11/11/03	PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326					
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REVISION ISSUED: 11/11/03 REVISED: 1/16/04 REVISED: 2/6/09							



SCREW SIZE	PUNCH NUMBER	HEAD DIM.		RECESS DIMENSIONS				DRIVER SIZE MT	
		ØA	H	ØM REF	T MAX. REF.	K REF	PENETRATION		
MAX.	MIN.								
M2	MT-000-2	4.0 3.7	1.40 1.14	1.85	0.81	0.10	0.51	0.30	MT-000
M2.5	MT-00-7	5.0 4.7	1.73 1.47	3.07	1.14	0.11	0.56	0.36	MT-00
M3	MT-00-3	5.6 5.3	1.78 1.52	3.07	1.30	0.14	0.69	0.48	MT-00
M3.5	MT-00-10	7.0 6.6	2.24 1.98	3.07	1.50	0.18	0.91	0.71	MT-00
M4	MT-0-5	8.0 7.6	2.51 2.26	4.33	1.80	0.20	0.99	0.79	MT-0
M5	MT-I-6	9.5 9.1	2.92 2.64	6.11	2.34	0.21	1.04	0.81	MT-I
M6	MT-I-4	12.0 11.5	3.84 3.51	6.11	2.62	0.29	1.45	1.22	MT-I
M8	MT-2-3	16.0 15.5	4.78 4.39	7.82	3.99	0.41	2.03	1.80	MT-2
M10	MT-3-5	20.0 19.4	5.69 5.26	8.98	4.06	0.44	2.21	1.98	MT-3

NOTES:

1. THE HEAD CROWN CORNER IS NOT CONTAINED IN THE PUNCH CAVITY AND IS TO BE FREE FLOWED.
2. TO INSURE GOOD FILL OF THE RECESS CAVITY, THE SIDES OF THE HEAD MUST BE CONTAINED IN THE HEADING DIE.
3. DIMENSIONS ARE IN METRIC.
4. DRAWING NOT TO SCALE.

REVISION ISSUED: 12/9/03 REVISED: 1/6/04 REVISED: 2/6/09

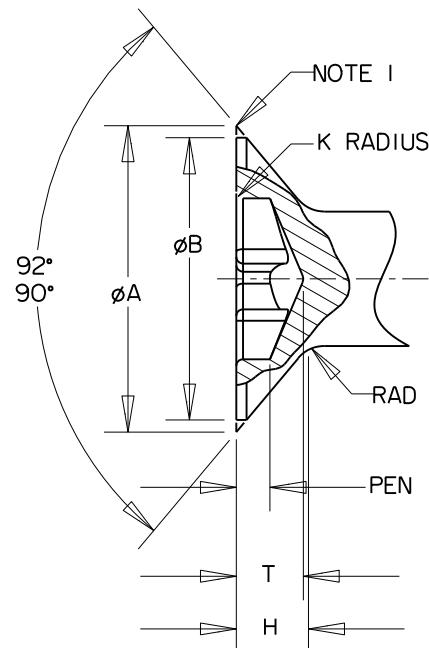
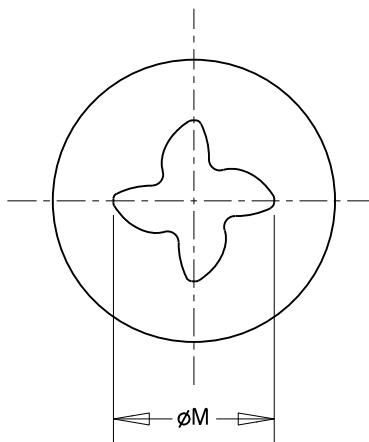
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
PAN HEAD SCREWS (METRIC)

DRAWN G.DILLING	DATE 12/5/03	DRAWING NUMBER PSC-5014
CHECKED: G.DILLING	DATE 12/08/03	SHEET 1 OF 1

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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS				DRIVER SIZE MT	
		ØA THEO.	ØB MIN.	H REF.	ØM REF.	T MAX. REF.	K REF	PENETRATION		
MAX.	MIN.									
M3	MT-00-1	6.72	5.35	1.86	3.07	1.14	0.11	0.56	0.38	MT-00
M4	MT-0-12	8.96	7.80	2.48	4.33	1.65	0.16	0.81	0.58	MT-0
M5	MT-1-17	11.20	9.75	3.10	6.11	2.08	0.17	0.86	0.64	MT-1
M6	MT-1-1	13.44	11.70	3.72	6.11	2.44	0.24	1.22	0.99	MT-1
M8	MT-2-2	17.92	15.60	4.96	7.82	3.15	0.31	1.57	1.35	MT-2
M10	MT-4-2	22.40	19.50	6.20	10.88	4.06	0.37	1.83	1.45	MT-4
M12	MT-5-6	26.88	23.40	7.44	12.86	4.72	0.42	2.08	1.45	MT-5
M16	MT-6-6	33.60	28.96	8.80	15.08	5.97	0.57	2.84	2.08	MT-6
M20	MT-6-1	40.32	34.60	10.16	15.08	6.99	0.77	3.86	3.10	MT-6

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN METRIC.
3. DRAWING NOT TO SCALE.

REVISION	ISSUED: 12/11/03	REVISED: 1/16/04	REV: 9/30/08	REV: 2/6/09
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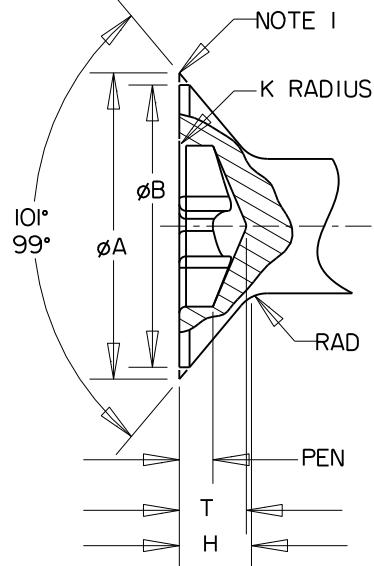
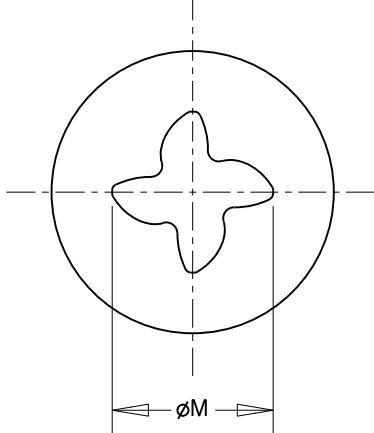
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
92° FLAT HEAD SCREWS (METRIC)

DRAWN	DATE	DRAWING NUMBER
G.DILLING	12/09/03	PSC-5015

CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	12/10/03	

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SCREW SIZE	PUNCH NUMBER	HEAD DIMENSIONS			RECESS DIMENSIONS					DRIVER SIZE MT	
		φA THEO. REF.	φB MIN.	H REF.	φM REF.	T MAX. REF.	K REF	PENETRATION			
								MAX.	MIN.		
10	MT-I-15	.378	.332	.080	.2405	.078	.006	.030	.025	MT-I	

NOTES:

1. EDGE OF HEAD MAY BE ROUNDED OR FLAT.
2. DIMENSIONS ARE IN INCHES.
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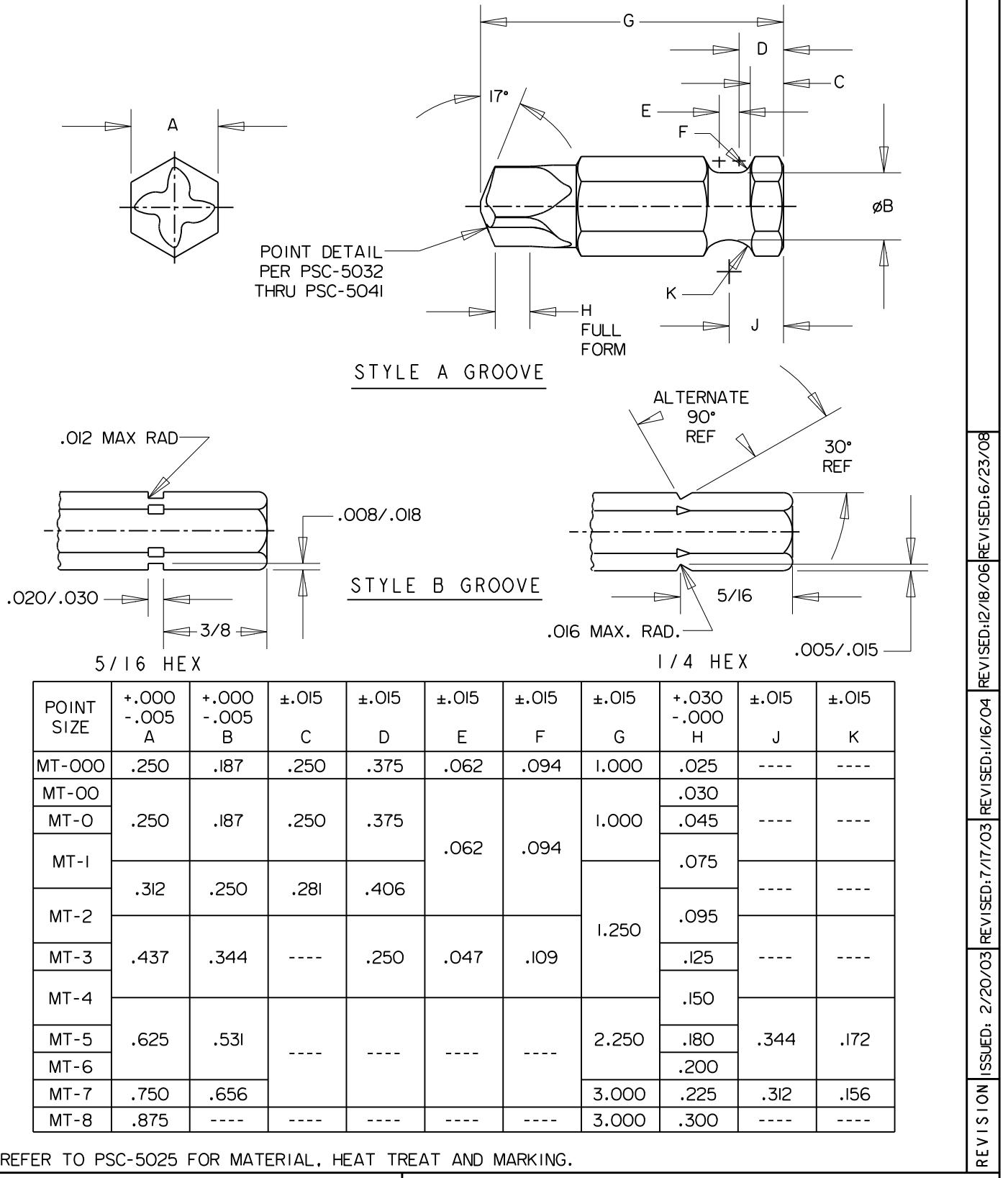
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
BOEING "BACSI2JM" 100° FLAT HEAD SCREW

DRAWN G.DILLING	DATE 9/3/08	DRAWING NUMBER PSC-5016
CHECKED: LEE DOUGAN	DATE 9/4/08	SHEET 1 OF 1
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MORTORQ® ENGINEERING MANUAL
INDEX
DRIVER STANDARDS

PSC-5026	INSERT DRIVER BITS	6/23/08
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PSC-5032	MT-00 DRIVER POINT DIMENSIONS	12/21/06
PSC-5033	MT-0 DRIVER POINT DIMENSIONS	12/21/06
PSC-5034	MT-1 DRIVER POINT DIMENSIONS	12/21/06
PSC-5035	MT-2 DRIVER POINT DIMENSIONS	12/21/06
PSC-5036	MT-3 DRIVER POINT DIMENSIONS	12/21/06
PSC-5037	MT-4 DRIVER POINT DIMENSIONS	12/21/06
PSC-5038	MT-5 DRIVER POINT DIMENSIONS	12/21/06
PSC-5039	MT-6 DRIVER POINT DIMENSIONS	12/21/06
PSC-5040	MT-7 DRIVER POINT DIMENSIONS	12/21/06
PSC-5041	MT-8 DRIVER POINT DIMENSIONS	6/23/08



REFER TO PSC-5025 FOR MATERIAL, HEAT TREAT AND MARKING.

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TITLE:
**MORTORQ®
INSERT DRIVER BIT**

DRAWN
G.DILLING

DATE
10/8/02

DRAWING NUMBER

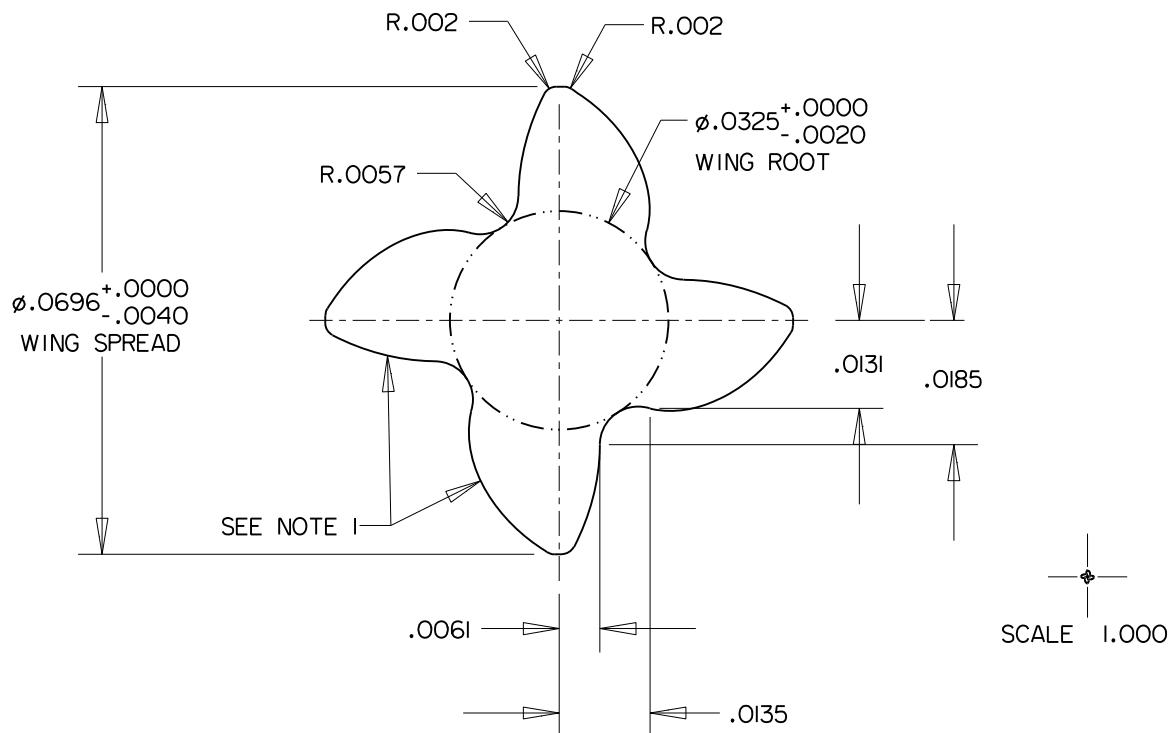
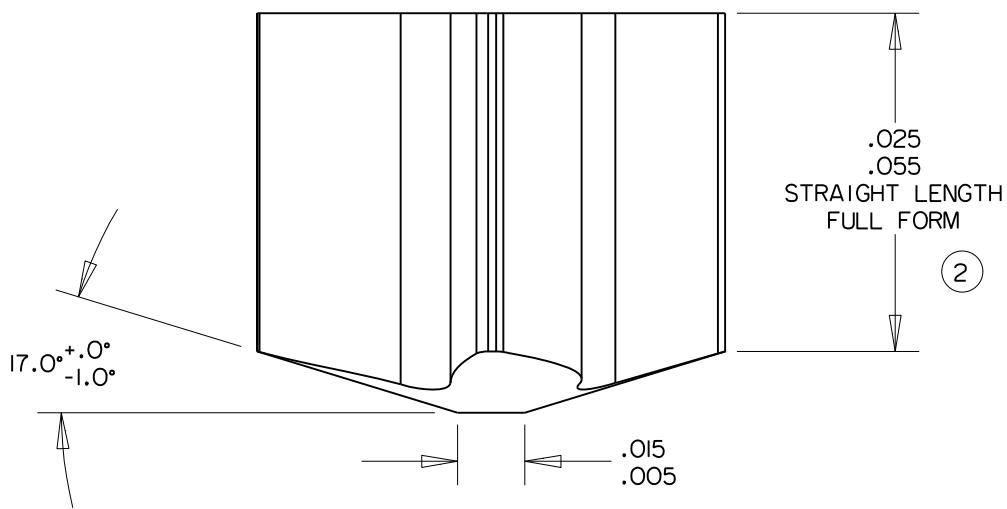
PSC-5026

SHEET 1 OF 1

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REVISION ISSUED: 2/20/03 REVISED: 7/17/03 REVISED: 1/16/04 REVISED: 2/8/06 REVISED: 6/23/08



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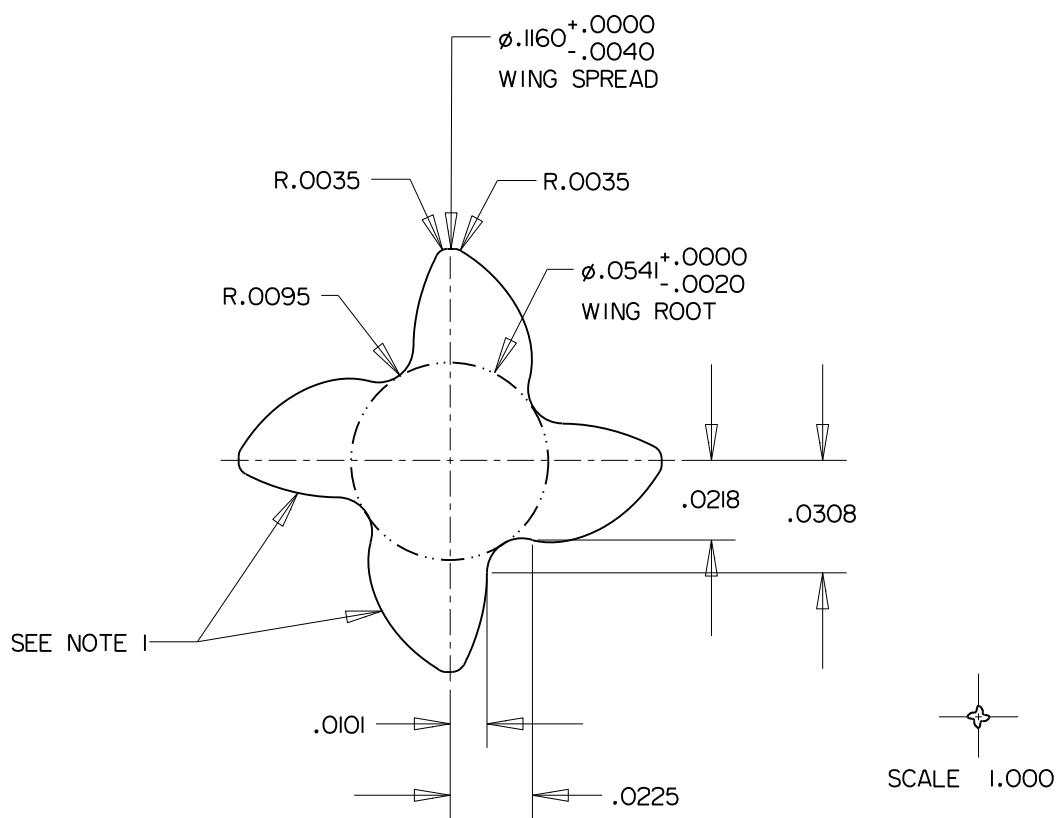
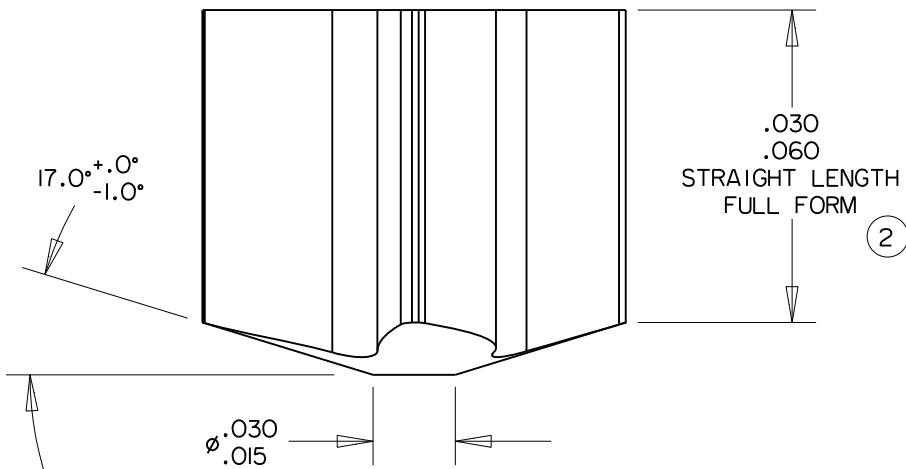
TITLE: MORTORQ®
MT-000 DRIVER POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	11/24/03	PSC-503I
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	11/25/03	

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REVISION	ISSUED: 11/25/03	REV 1: 1/16/04	REV 2: 12/21/06
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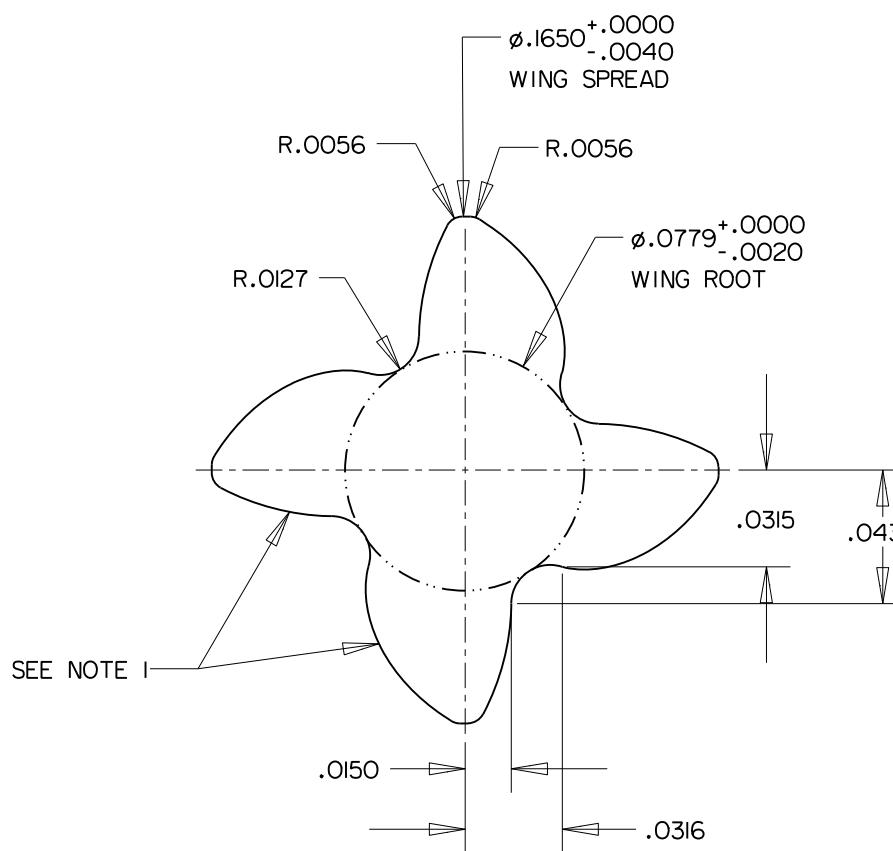
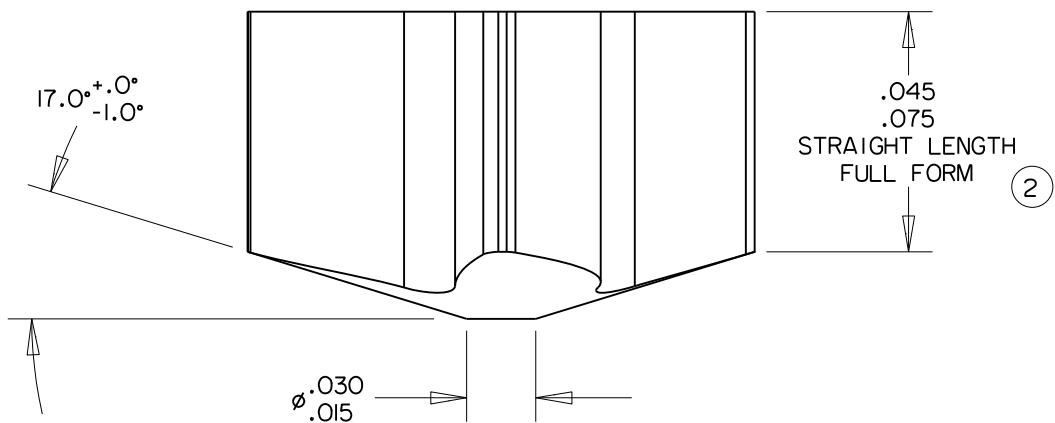
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TITLE: MORTORQ®
MT-00 DRIVER POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	9/12/02	PSC-5032
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	9/13/02	

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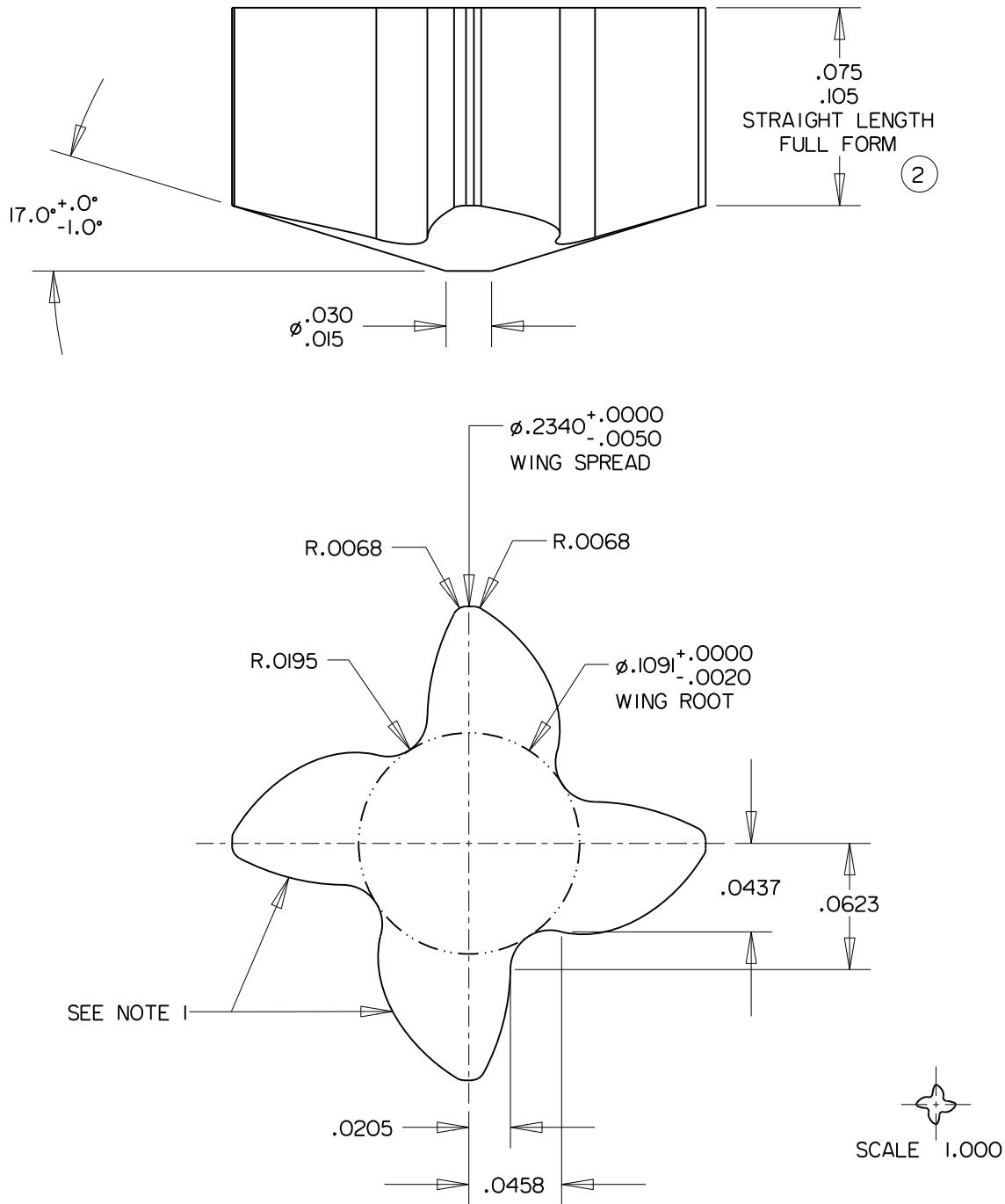
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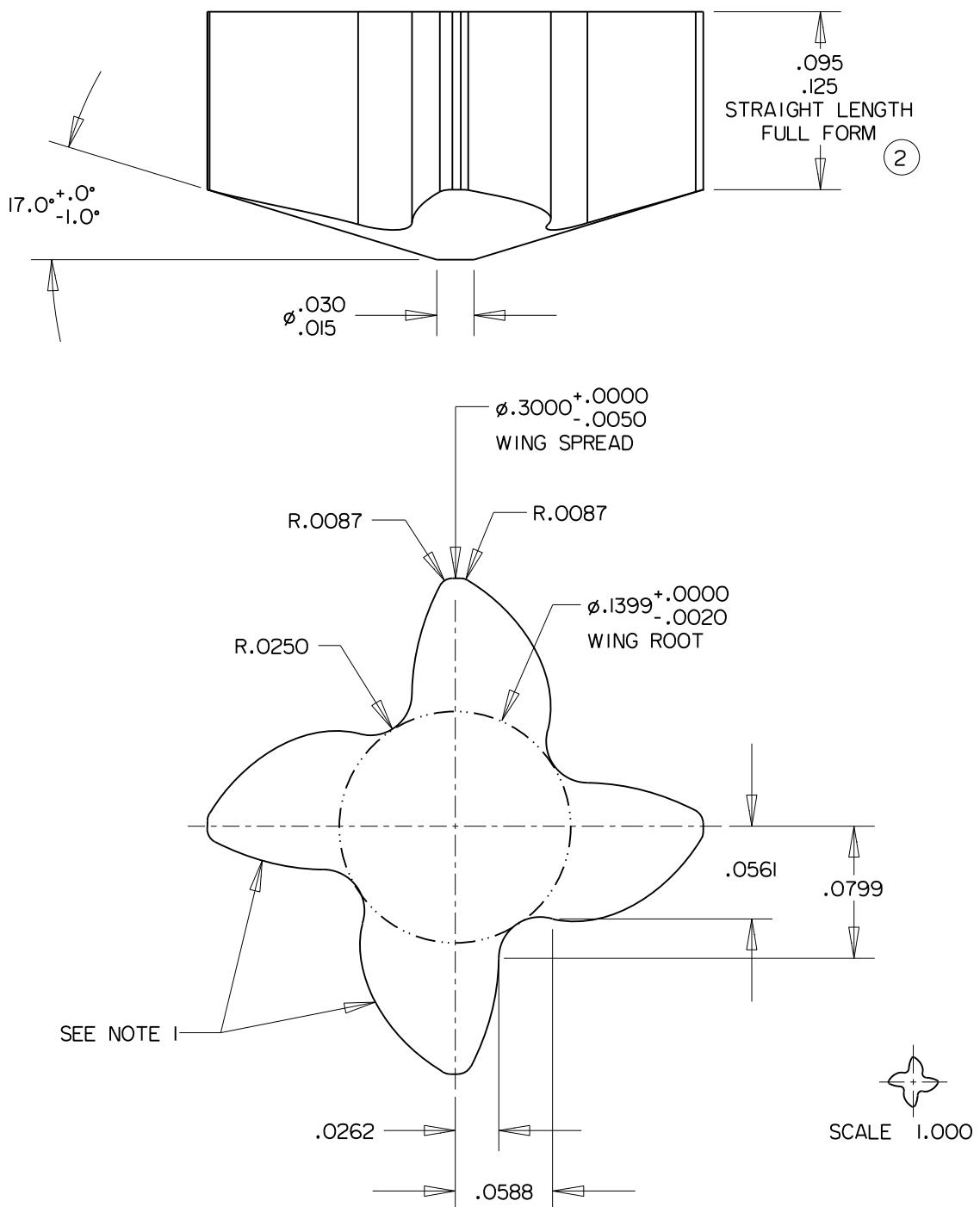
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CHECKED: G.DILLING		DATE 9/13/02	SHEET 1 OF 1			
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326						
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G.DILLING	9/13/02	PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326													
<p>PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®</p> <p>AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY</p>		REVISION ISSUED: 2/20/03 REV 1: 1/16/04 REV 2: 12/21/06													



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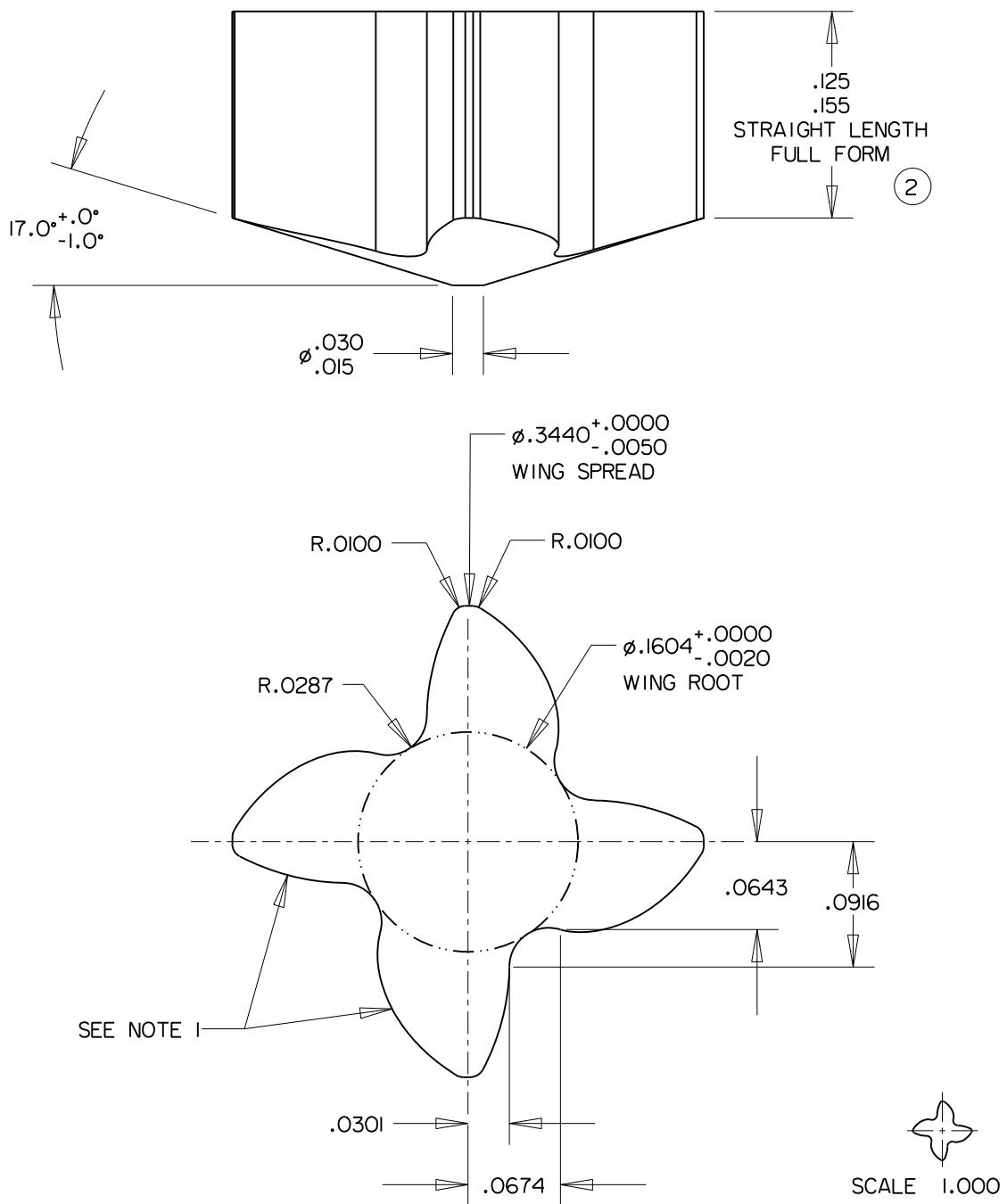
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TITLE: MORTORQ®
MT-2 DRIVER POINT DIMENSIONS

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CHECKED: G.DILLING	DATE 9/13/02	SHEET 1 OF 1
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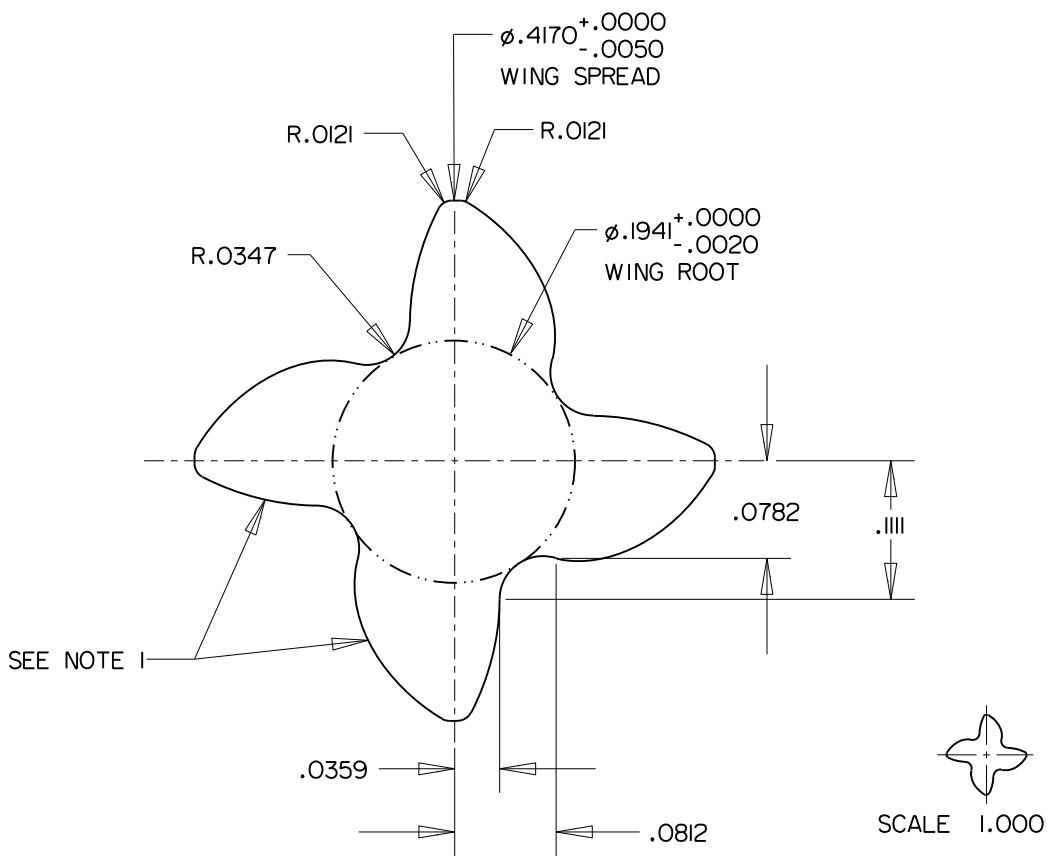
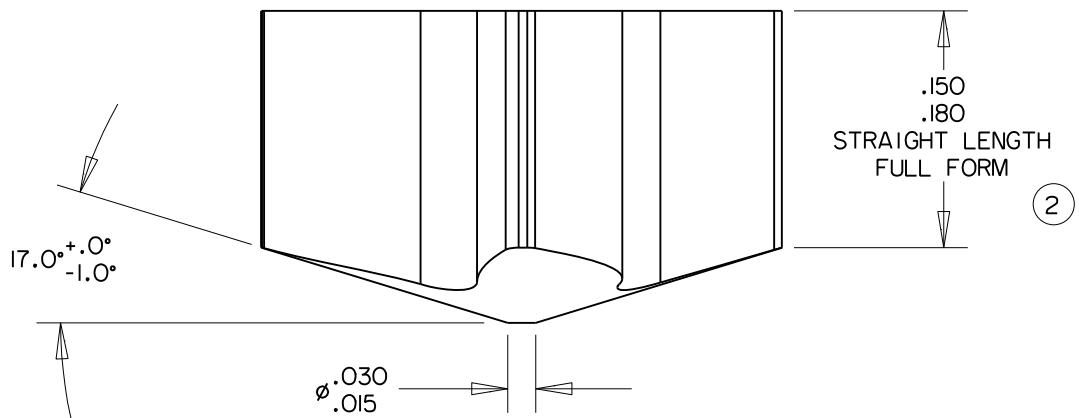
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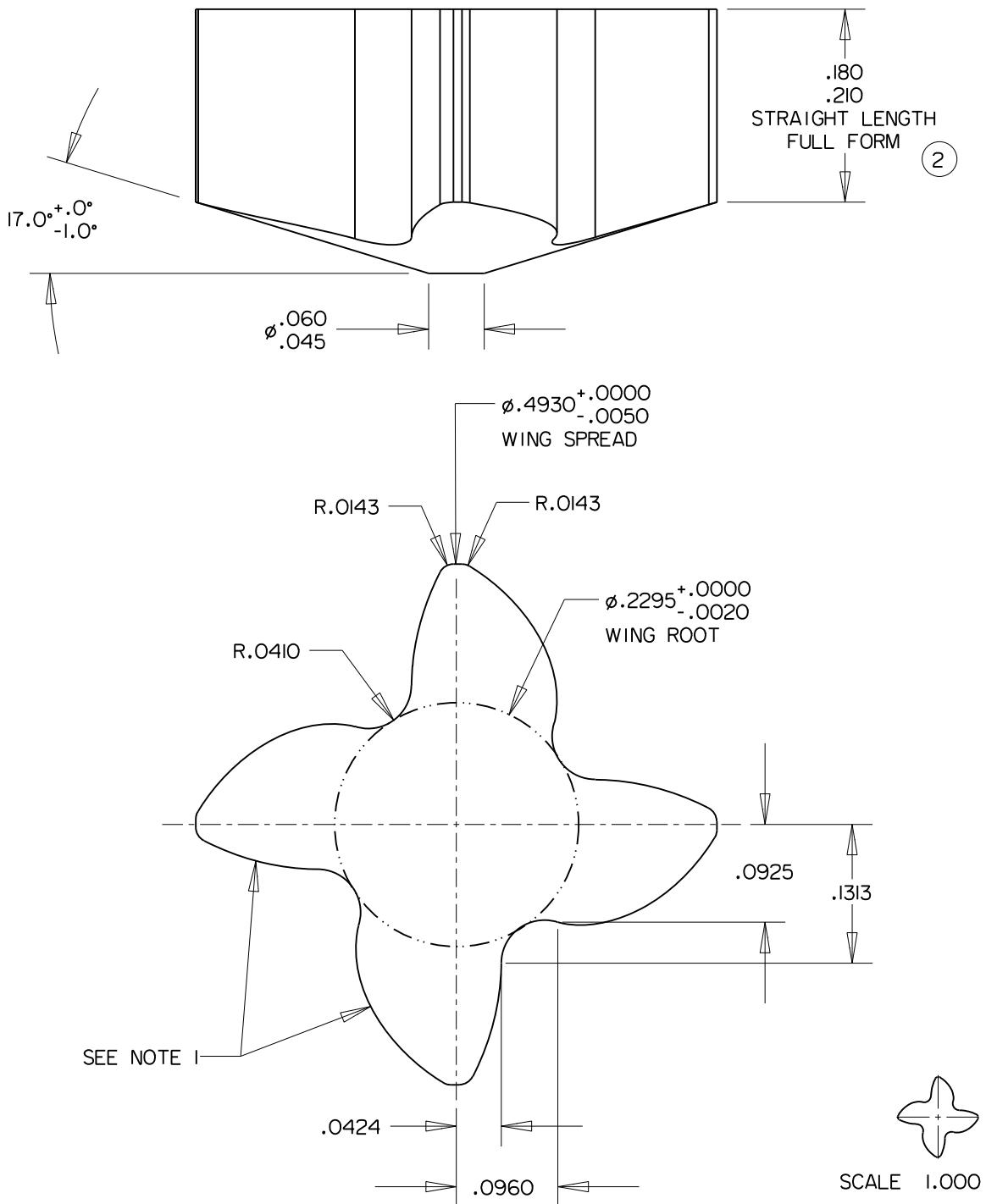
TITLE: MORTORQ®
MT-4 DRIVER POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	9/12/02	PSC-5037

CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	9/13/02	

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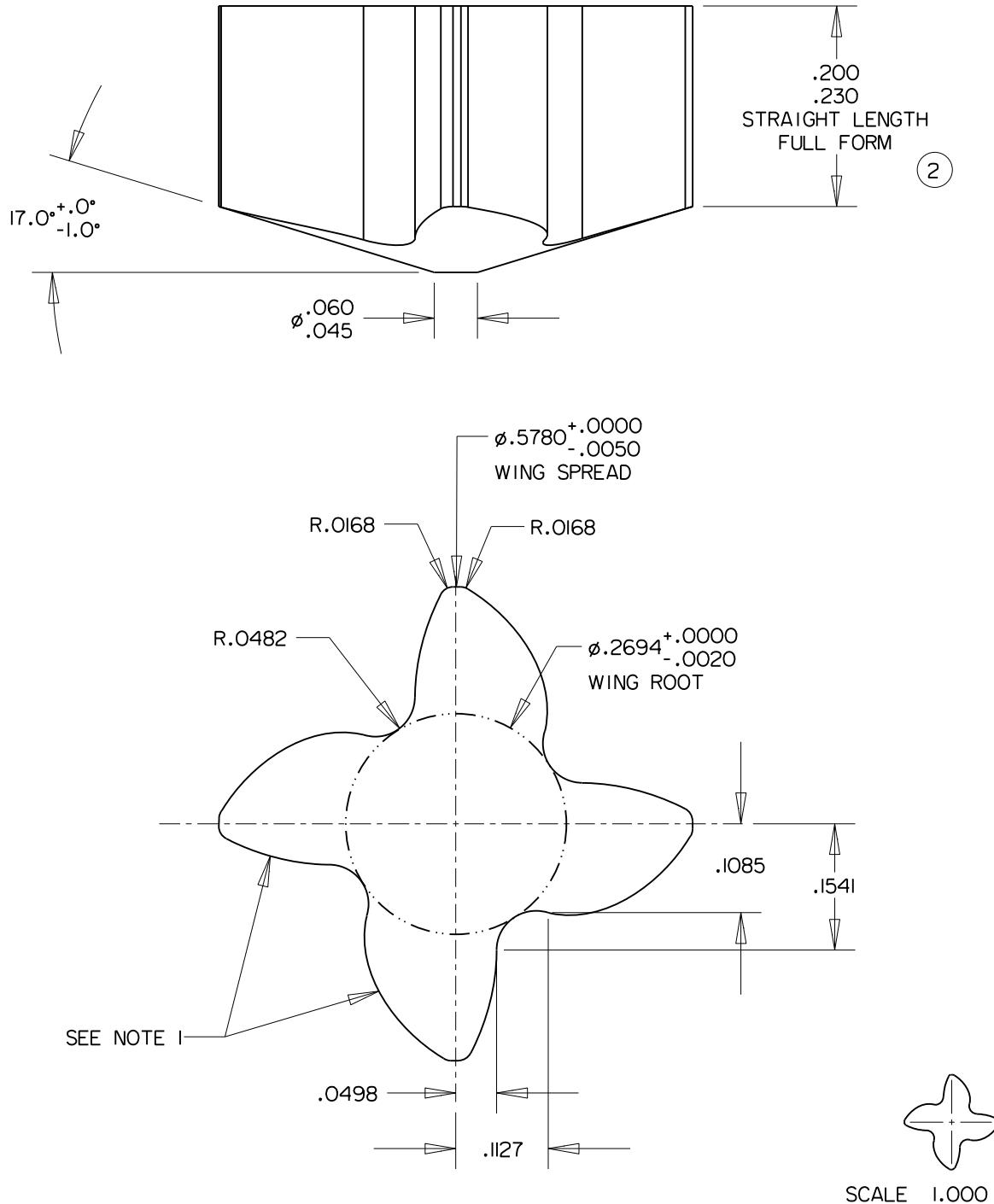
TITLE: MORTORQ®
MT-5 DRIVER POINT DIMENSIONS

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DRAWN	DATE	DRAWING NUMBER
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CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	10/04/02	

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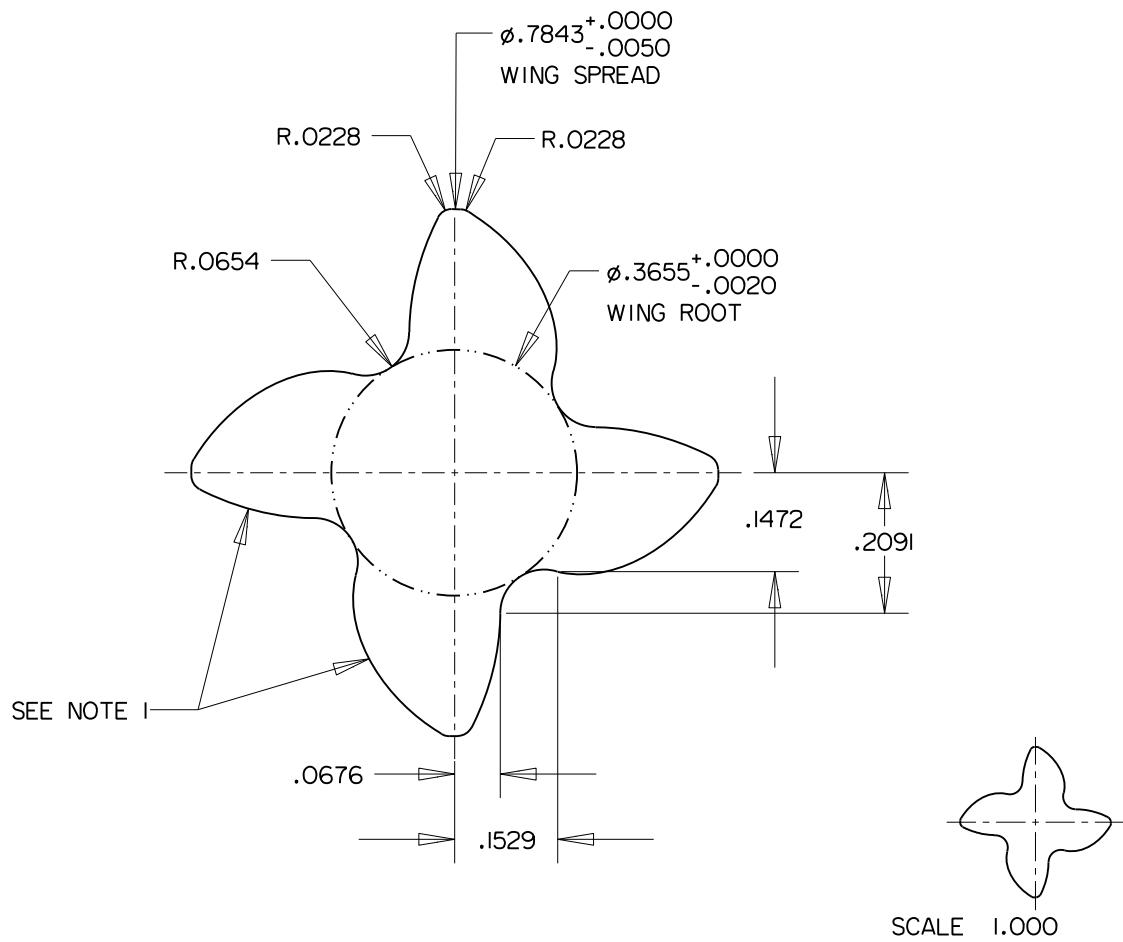
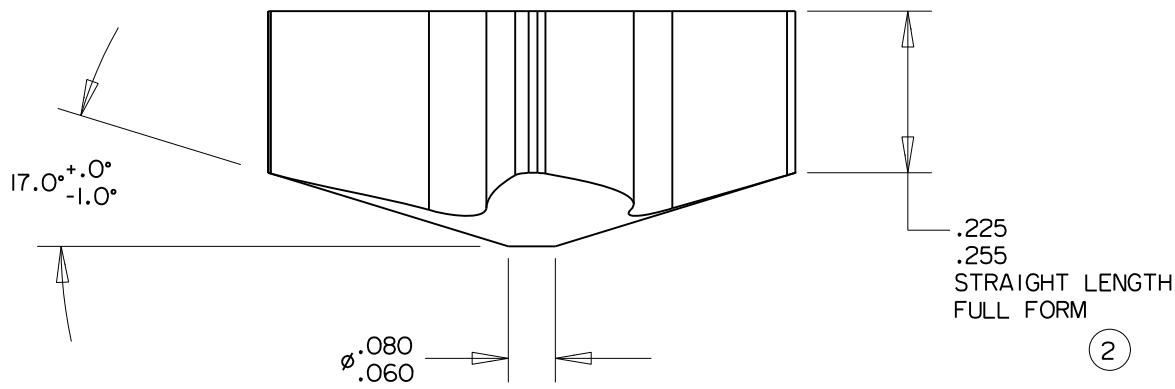


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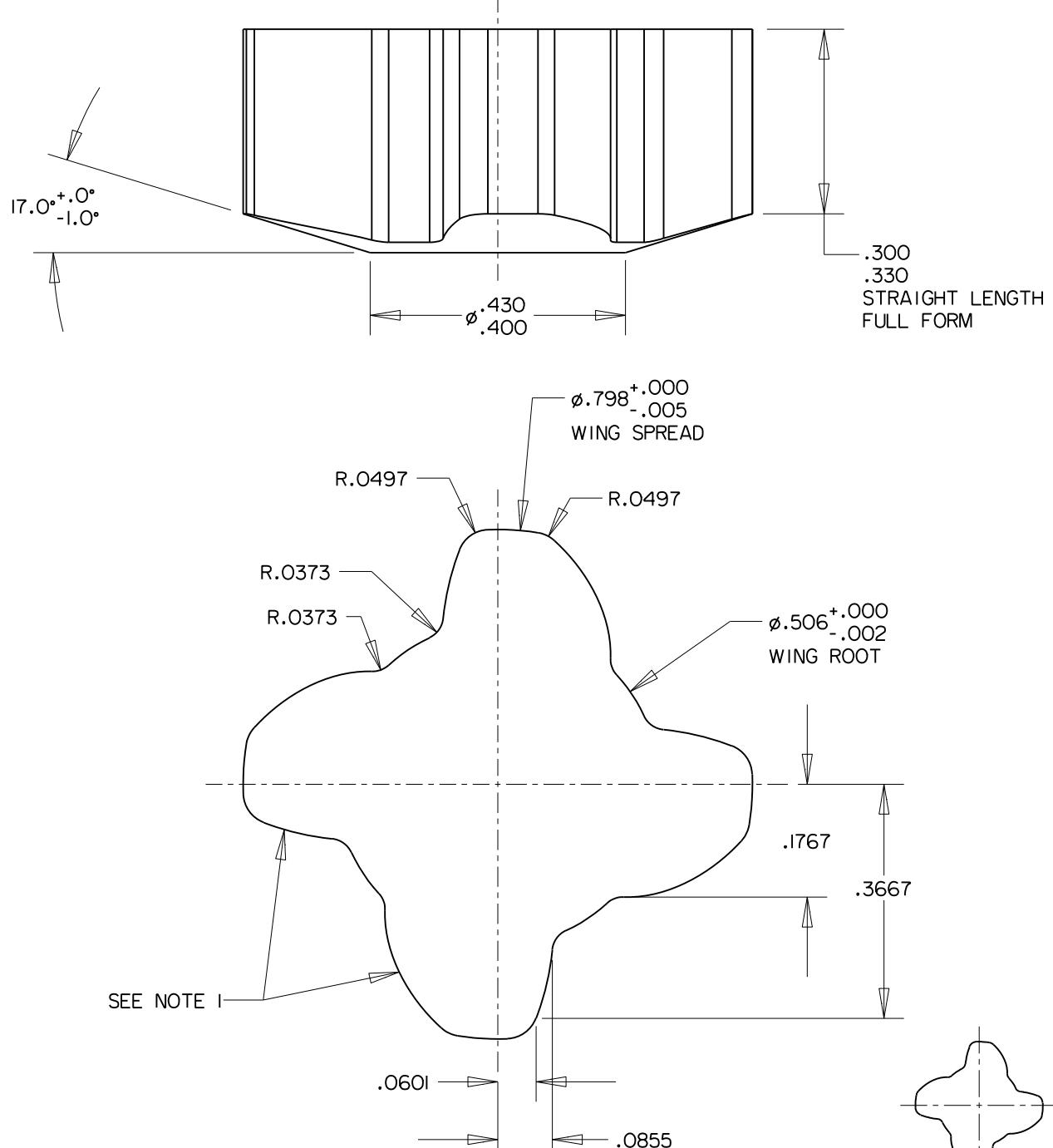
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TITLE: MORTORQ®
MT-7 DRIVER POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	5/28/03	PSC-5040
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	6/01/03	

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TITLE:
MORTORQ®
MT-8 DRIVER POINT DIMENSIONS

DRAWN G.DILLING	DATE 6/23/08	DRAWING NUMBER PSC-5041
CHECKED: G.DILLING	DATE 6/23/08	SHEET 1 OF 1

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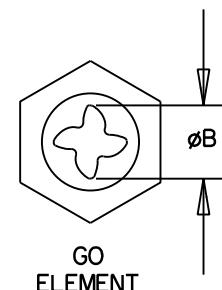
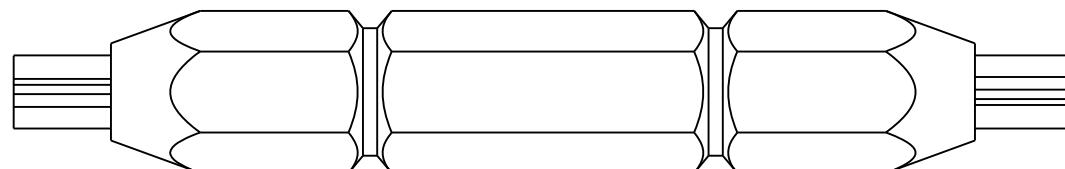
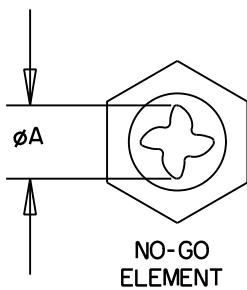
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MORTORQ® ENGINEERING MANUAL
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GAUGING STANDARDS

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7/19/II

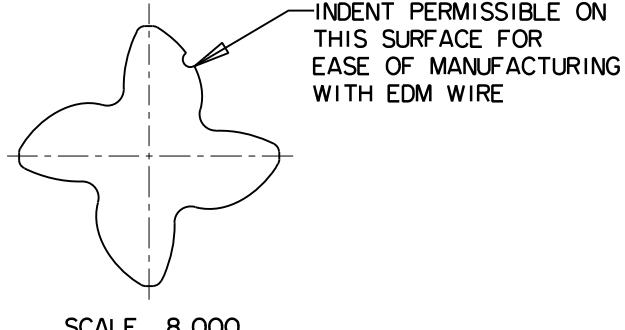
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PSC-5060	PUNCH RECESS GO, NO-GO GAGE	6/24/08
PSC-5068	PUNCH RECESS GO, NO-GO GAGE GEOMETRY	6/24/08
PSC-5069-1	MT-000 THRU MT-4 DRIVER BIT ROOT GAUGE	7/19/II
PSC-5069-2	MT-5 THRU MT-8 DRIVER BIT ROOT GAUGE	7/19/II
PSC-5071	MT-000 DRIVER BIT GO, NO-GO GAGE	1/22/04
PSC-5072	MT-00 DRIVER BIT GO, NO-GO GAGE	1/22/04
PSC-5073	MT-0 DRIVER BIT GO, NO-GO GAGE	1/22/04
PSC-5074	MT-1 DRIVER BIT GO, NO-GO GAGE	1/22/04
PSC-5075	MT-2 DRIVER BIT GO, NO-GO GAGE	1/22/04
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PSC-5080	MT-7 DRIVER BIT GO, NO-GO GAGE	1/22/04
PSC-5081	DRIVER BIT GO GAGE GEOMETRY	6/26/08
PSC-5082	MT-8 DRIVER BIT GO, NO-GO GAGE	6/24/08
PSC-5085	TORQUE TEST BLOCKS	6/26/08
PSC-5091	MT-000 PENETRATION GAGE ASSY	1/23/04
PSC-5092	MT-00 PENETRATION GAGE ASSY	1/23/04
PSC-5093	MT-0 PENETRATION GAGE ASSY	1/23/04
PSC-5094	MT-1 PENETRATION GAGE ASSY	1/23/04
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PSC-5108	MT-5 FALAWAY GAGE ASSY	1/23/04
PSC-5109	MT-6 FALAWAY GAGE ASSY	1/23/04
PSC-5110	MT-7 FALAWAY GAGE ASSY	1/23/04
PSC-5111	FALAWAY GAGE GEOMETRY	7/1/08
PSC-5113	MT-8 PENETRATION GAGE ASSY	7/1/08
PSC-5114	MT-8 FALAWAY GAGE ASSY	6/30/08



COLOR COATED
RED FOR "NO-GO"
ELEMENT

COLOR COATED
GREEN FOR "GO"
ELEMENT

DRIVE SIZE	A NO-GO	B GO
MT-000	.0750 .0752	.0706 .0708
MT-00	.1230 .1232	.1186 .1188
MT-0	.1724 .1726	.1680 .1682
MT-1	.2425 .2427	.2381 .2383
MT-2	.3100 .3102	.3056 .3058
MT-3	.3557 .3559	.3513 .3515
MT-4	.4305 .4307	.4261 .4263
MT-5	.5083 .5085	.5039 .5041
MT-6	.5958 .5960	.5914 .5916
MT-7	.8023 .8025	.7979 .7981
MT-8	.8230 .8232	.8186 .8188



NOTE:

1. ELECTRONIC FILE PER PSC-5058 WILL BE SUPPLIED TO VENDOR WITH COMPLETE ARC GEOMETRY FOR THE PURPOSE OF MANUFACTURING THIS PART.
2. MARK PART NUMBER AND DRIVE SIZE ON EACH GAGE.
3. GO, NO-GO ELEMENT MATERIAL: CARBIDE.
4. LENGTH OF GO, NO-GO ELEMENTS: 5/8 MINIMUM.

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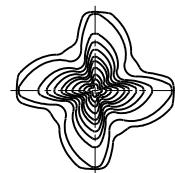
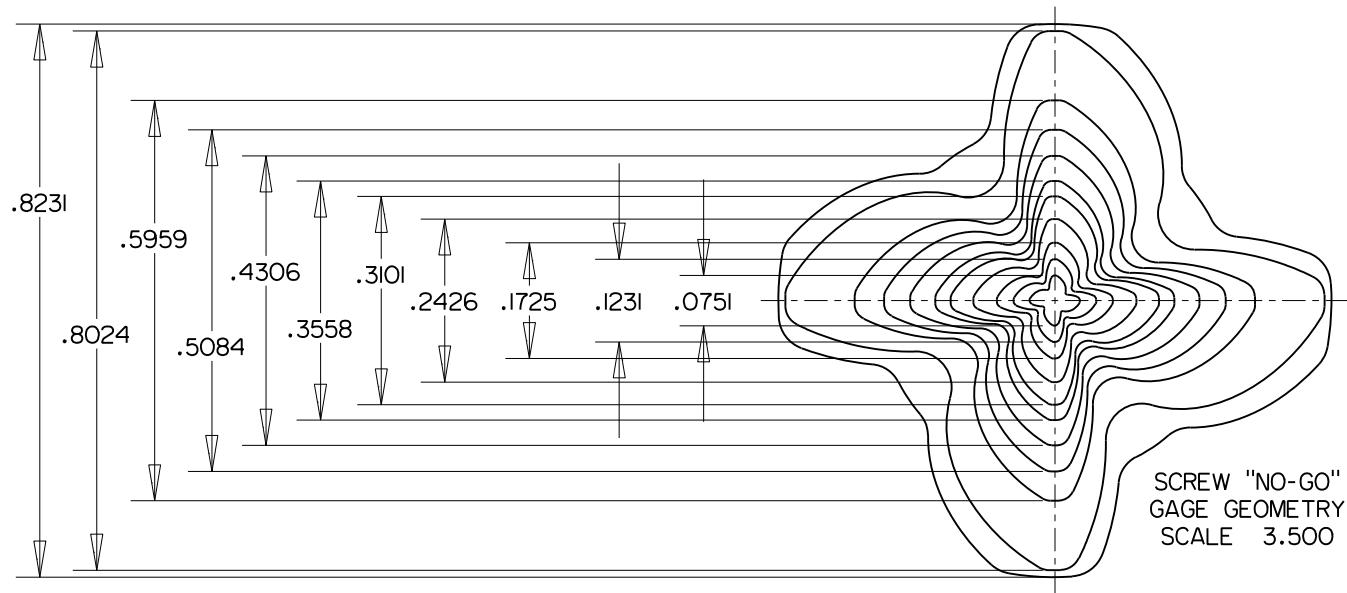
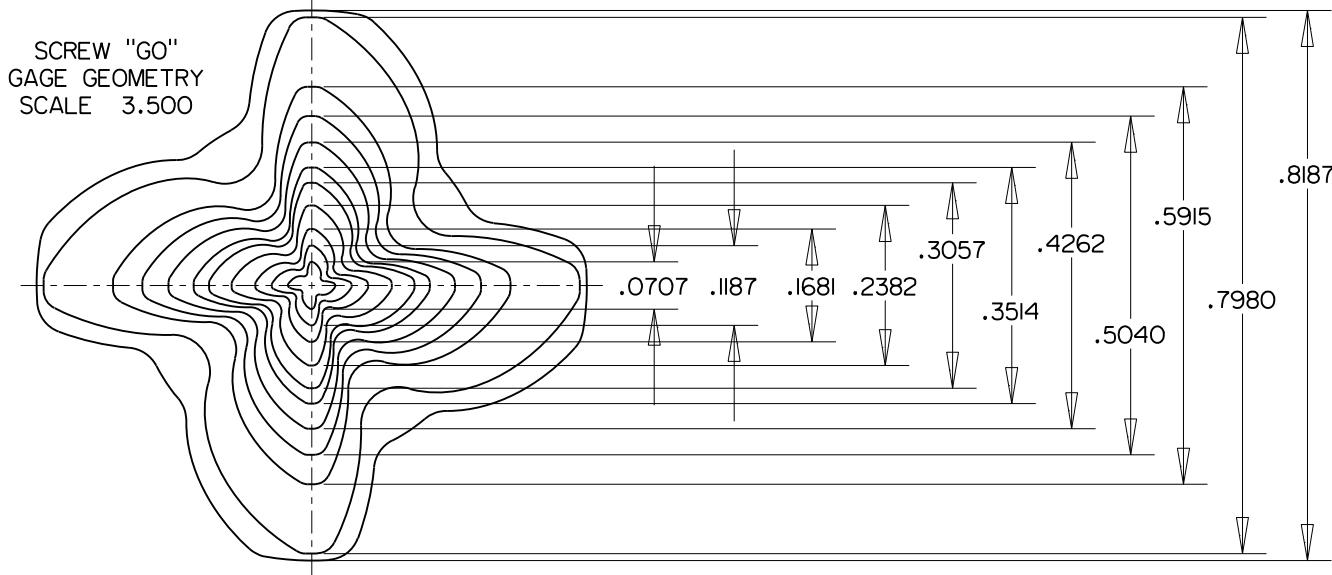
MORTORQ®
SCREW RECESS GO, NO-GO GAGE

DRAWN G.DILLING	DATE 9/2/02	DRAWING NUMBER PSC-5050
CHECKED: G.DILLING	DATE 9/11/02	SHEET 1 OF 1

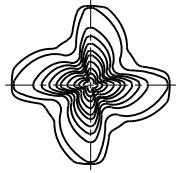
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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REVISION ISSUED:2/20/03 REVISED:1/26/04 REVISED:6/24/08



"GO" GEOMETRY
SCALE 1.000



"NO-GO" GEOMETRY
SCALE 1.000

NOTE:

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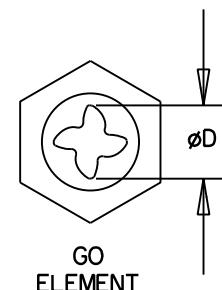
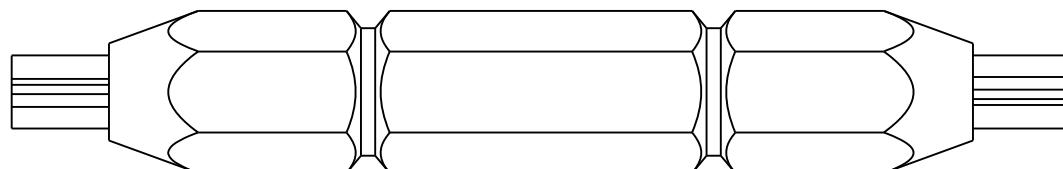
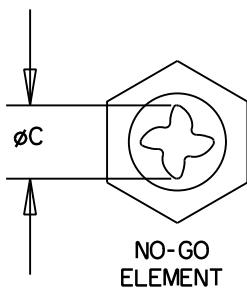
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TITLE: MORTORQ® SCREW RECESS
GO, NO-GO GAGE GEOMETRY

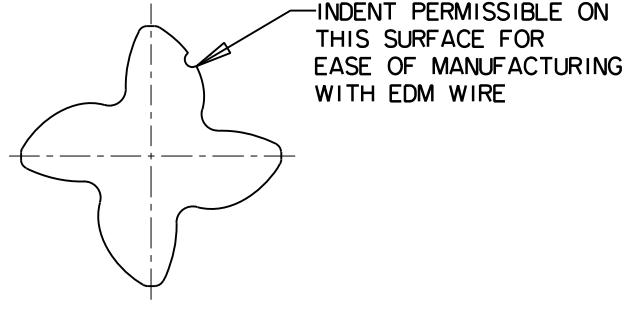
DRAWN G.DILLING	DATE 9/9/02	DRAWING NUMBER PSC-5058
CHECKED: G.DILLING	DATE 2/18/03	

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DRIVE SIZE	C NO-GO	D GO
MT-000	.0740 .0742	.0716 .0718
MT-00	.1220 .1222	.1196 .1198
MT-0	.1714 .1716	.1690 .1692
MT-1	.2415 .2417	.2391 .2393
MT-2	.3090 .3092	.3066 .3068
MT-3	.3547 .3549	.3523 .3525
MT-4	.4295 .4297	.4271 .4273
MT-5	.5073 .5075	.5049 .5051
MT-6	.5948 .5950	.5924 .5926
MT-7	.8013 .8015	.7989 .7991
MT-8	.8220 .8222	.8196 .8198



NOTE:

1. ELECTRONIC FILE PER PSC-5068 WILL BE SUPPLIED TO VENDOR WITH COMPLETE ARC GEOMETRY FOR THE PURPOSE OF MANUFACTURING THIS PART.
2. MARK PART NUMBER AND DRIVE SIZE ON EACH GAGE.
3. GO, NO-GO ELEMENT MATERIAL: CARBIDE.
4. LENGTH OF GO, NO-GO ELEMENTS: 5/8 MINIMUM.

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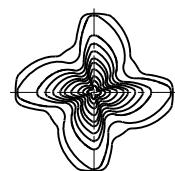
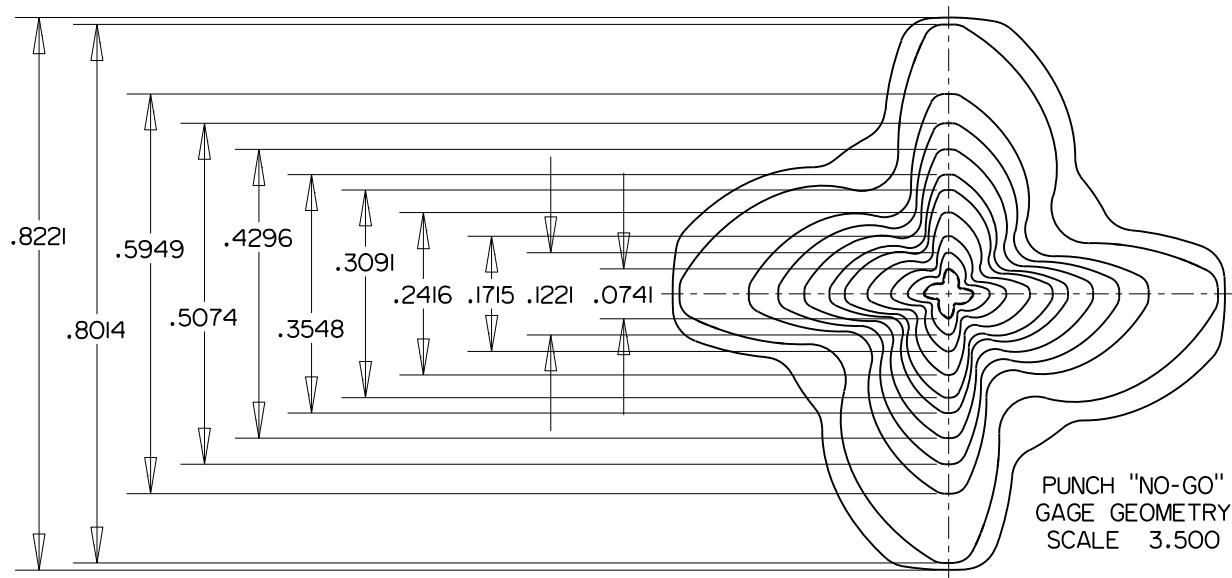
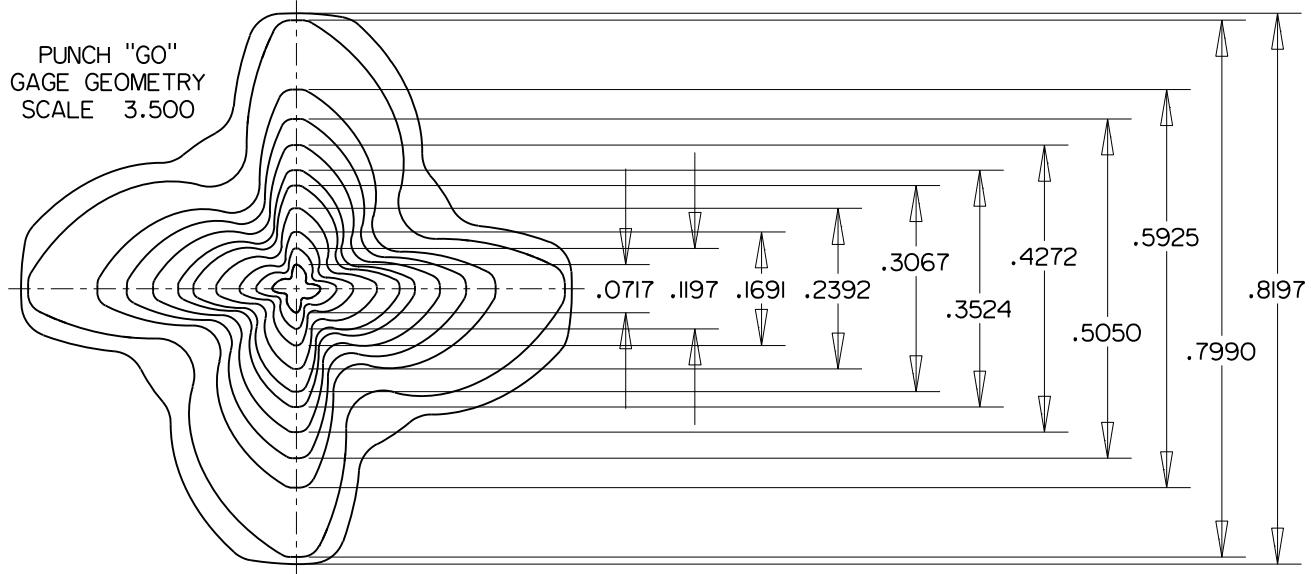
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MORTORQ®
PUNCH RECESS GO, NO-GO GAGE

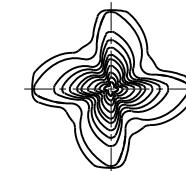
DRAWN G.DILLING	DATE 9/2/02	DRAWING NUMBER PSC-5060
CHECKED: G.DILLING	DATE 9/11/02	SHEET 1 OF 1
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REVISION ISSUED:2/20/03 REVISED:1/26/04 REVISED:6/24/08



"GO" GEOMETRY
SCALE 1.000



"NO-GO" GEOMETRY
SCALE 1.000

NOTE:

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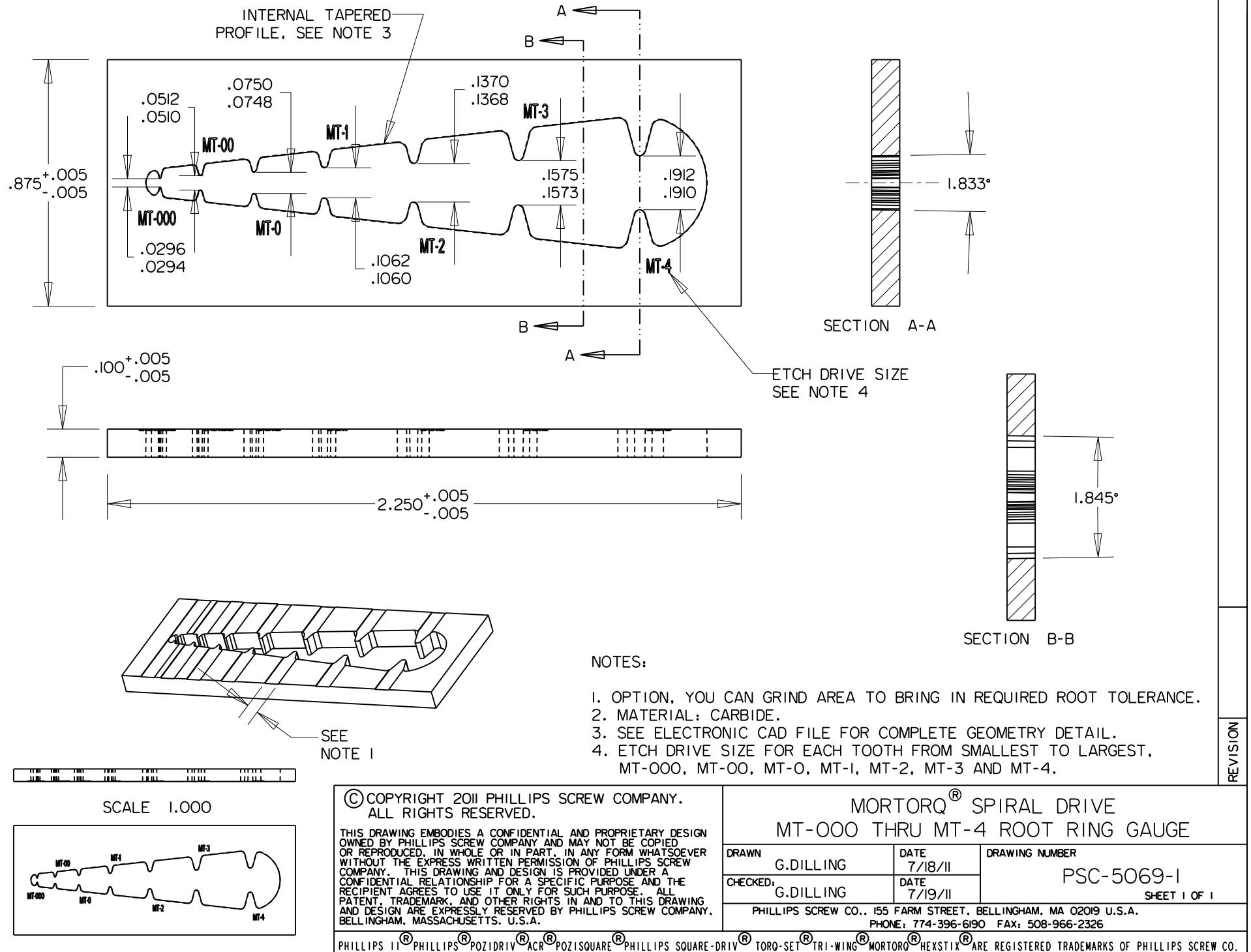
TITLE: MORTORQ® PUNCH RECESS
GO, NO-GO GAGE GEOMETRY

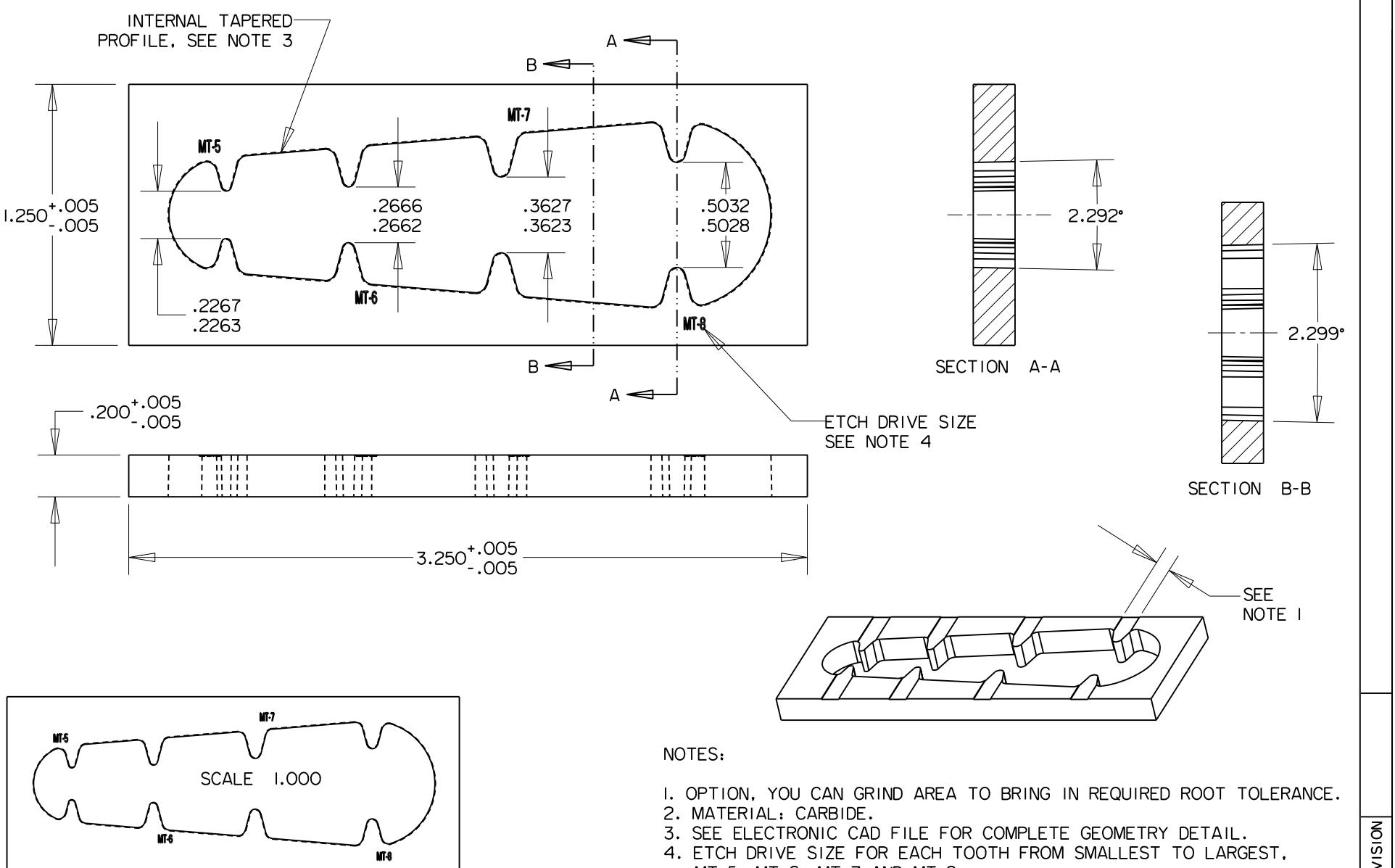
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G.DILLING	9/9/02	PSC-5068

CHECKED	DATE
G.DILLING	2/18/03

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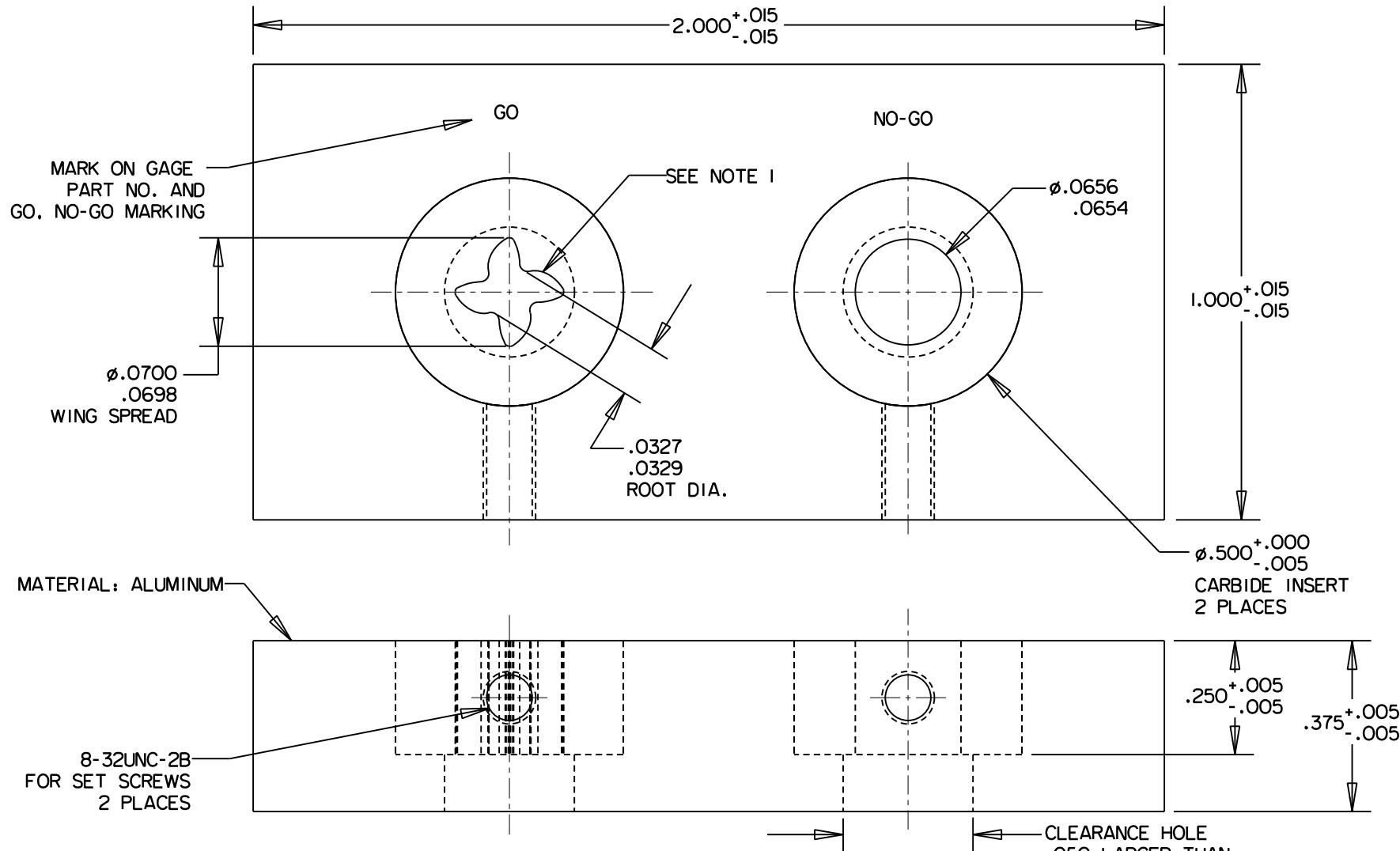
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MORTORQ® SPIRAL DRIVE
MT-5 THRU MT-8 ROOT RING GAUGE

DRAWN	DATE	DRAWING NUMBER
G.DILLING	7/18/11	PSC-5069-2

SHEET 1 OF 1
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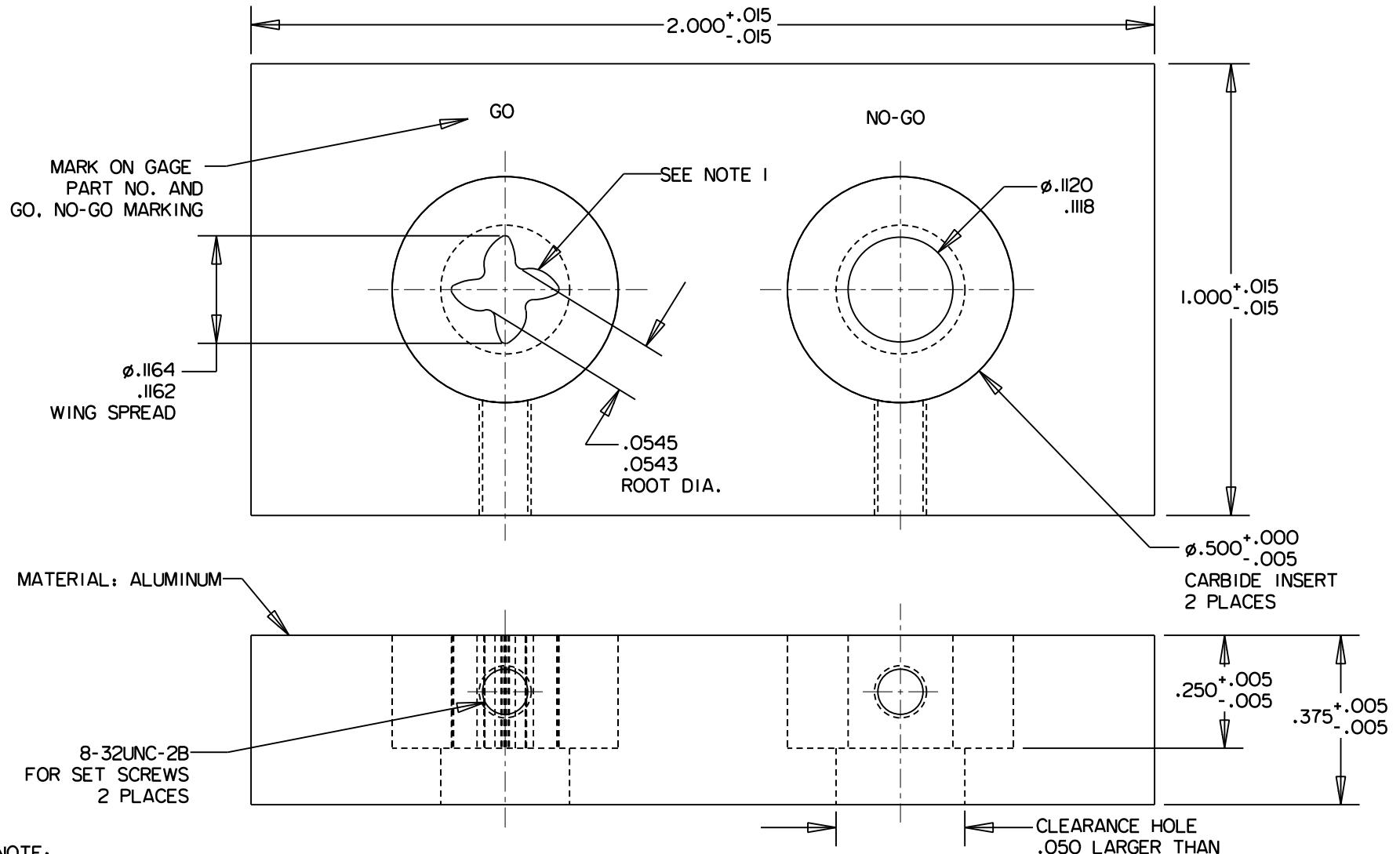
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MORTORQ®
MT-000 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	PSC-507I
		1/22/04	SHEET 1 OF 1

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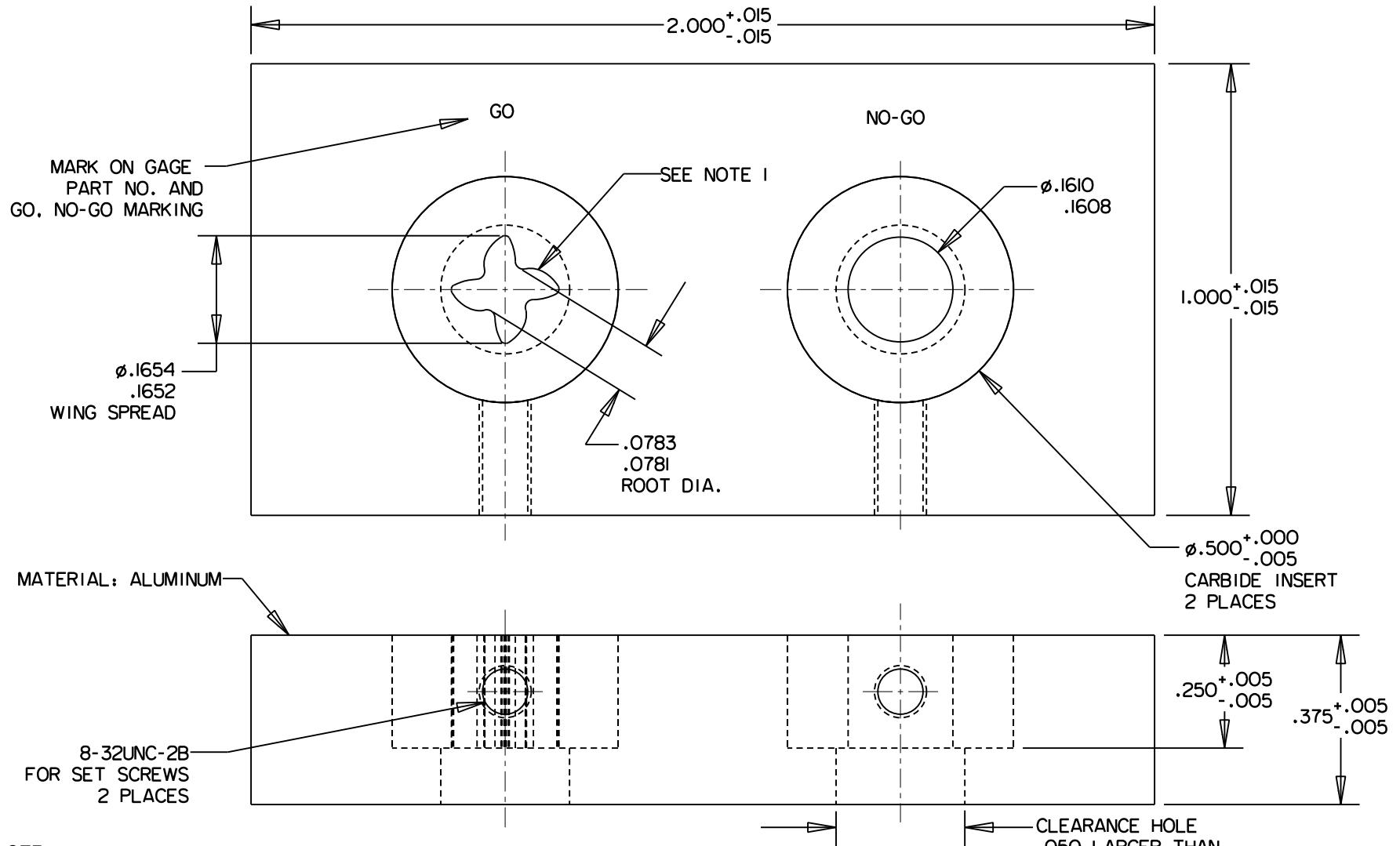
MORTORQ®
MT-00 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	
		9/10/02	PSC-5072

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REVISION ISSUED:2/20/03 REVISED:6/4/03 REVISED:1/22/04



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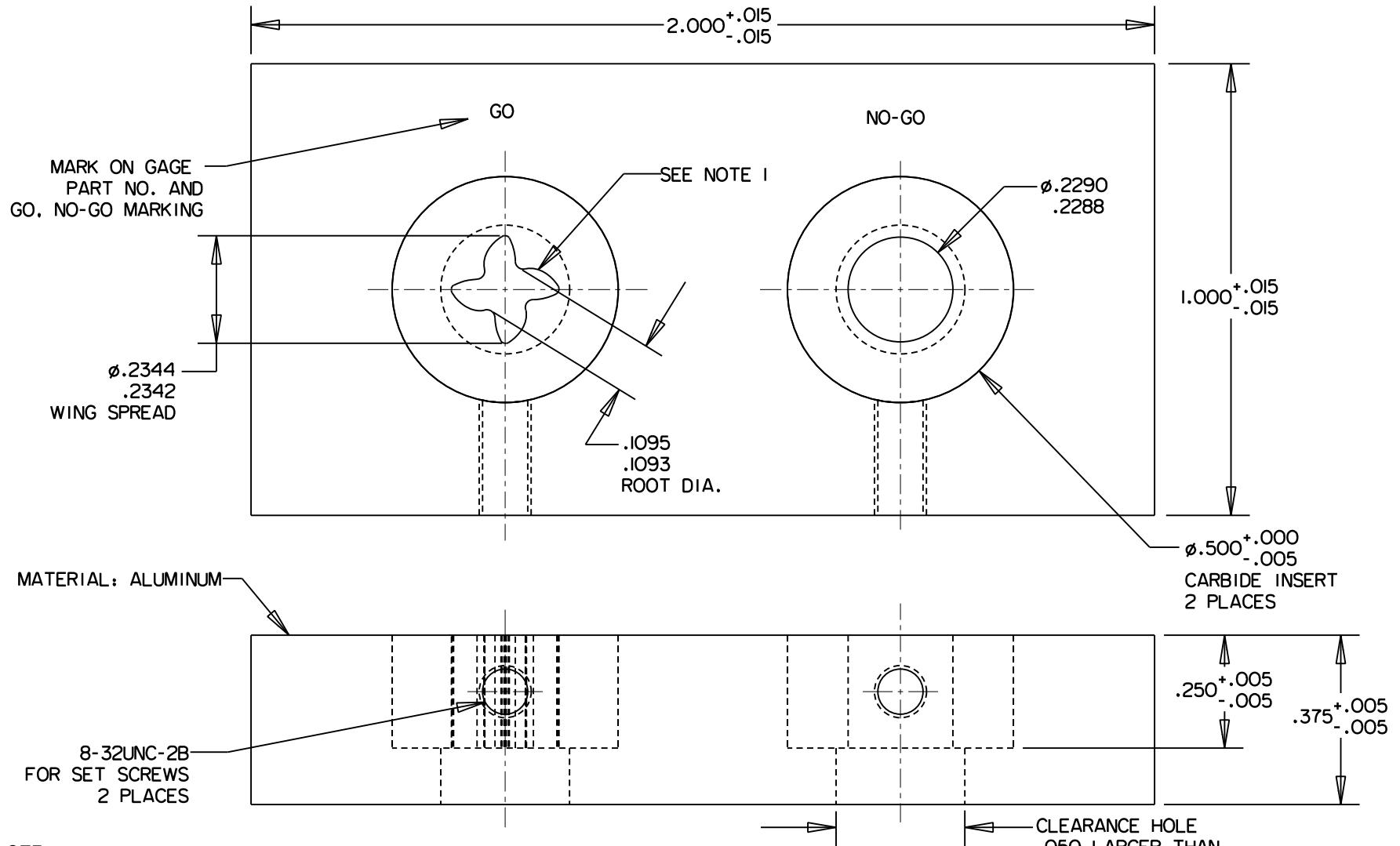
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MORTORQ®
MT-O DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	
		9/10/02	PSC-5073
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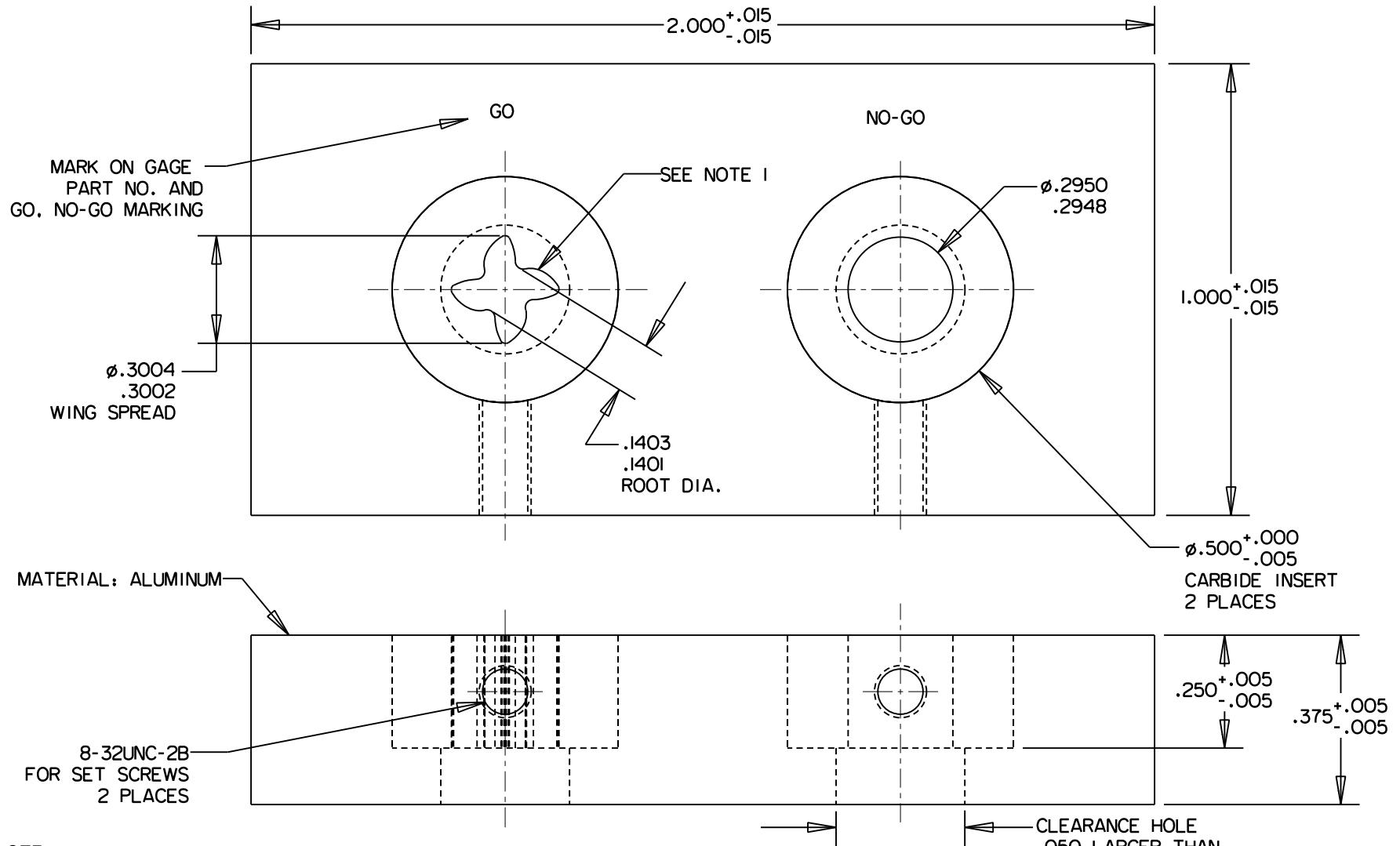
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MT-I DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

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		9/10/02	PSC-5074

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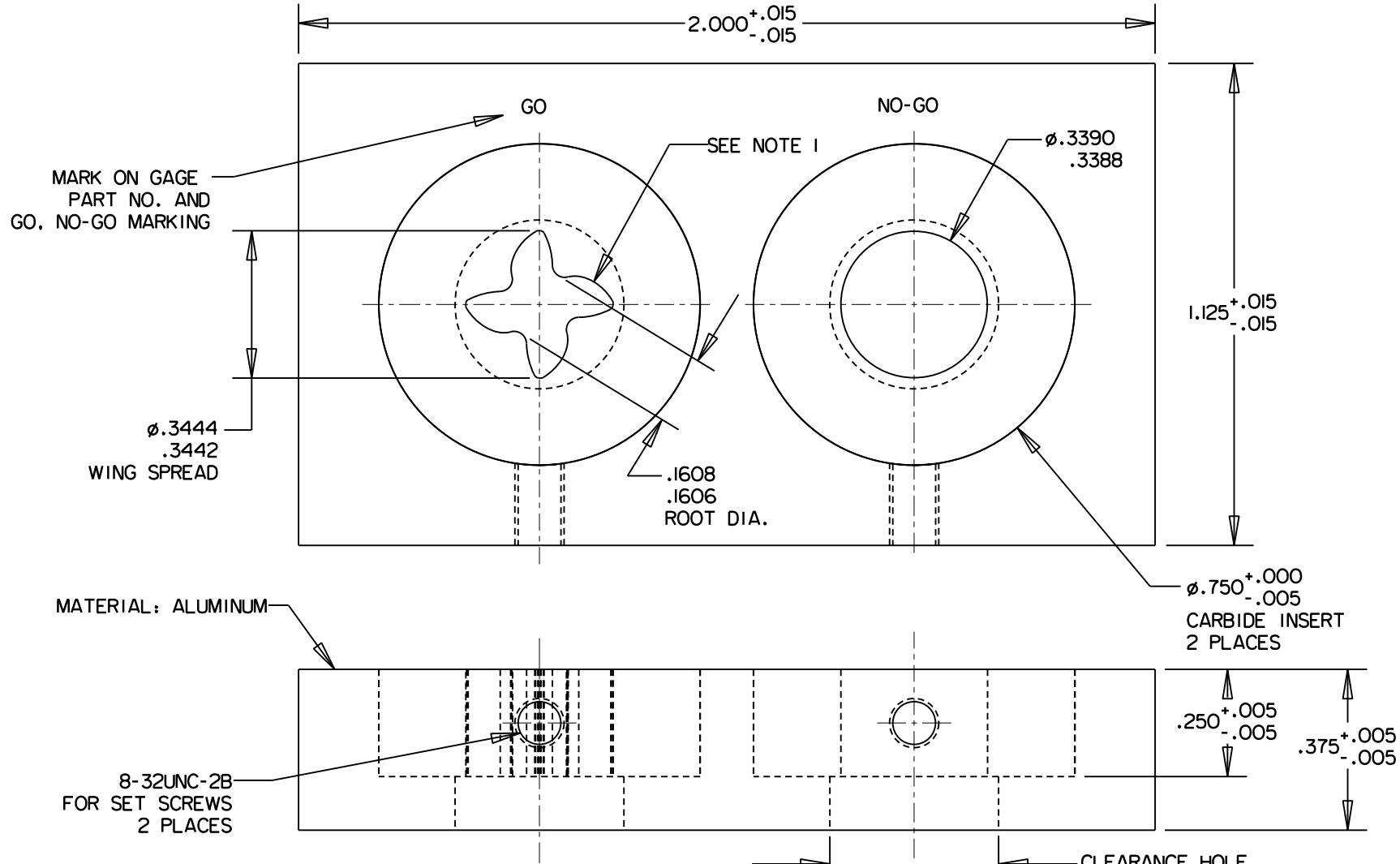
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MT-2 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
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		9/10/02	PSC-5075

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REVISION ISSUED:2/20/03 REVISED:6/4/03 REVISED:1/22/04



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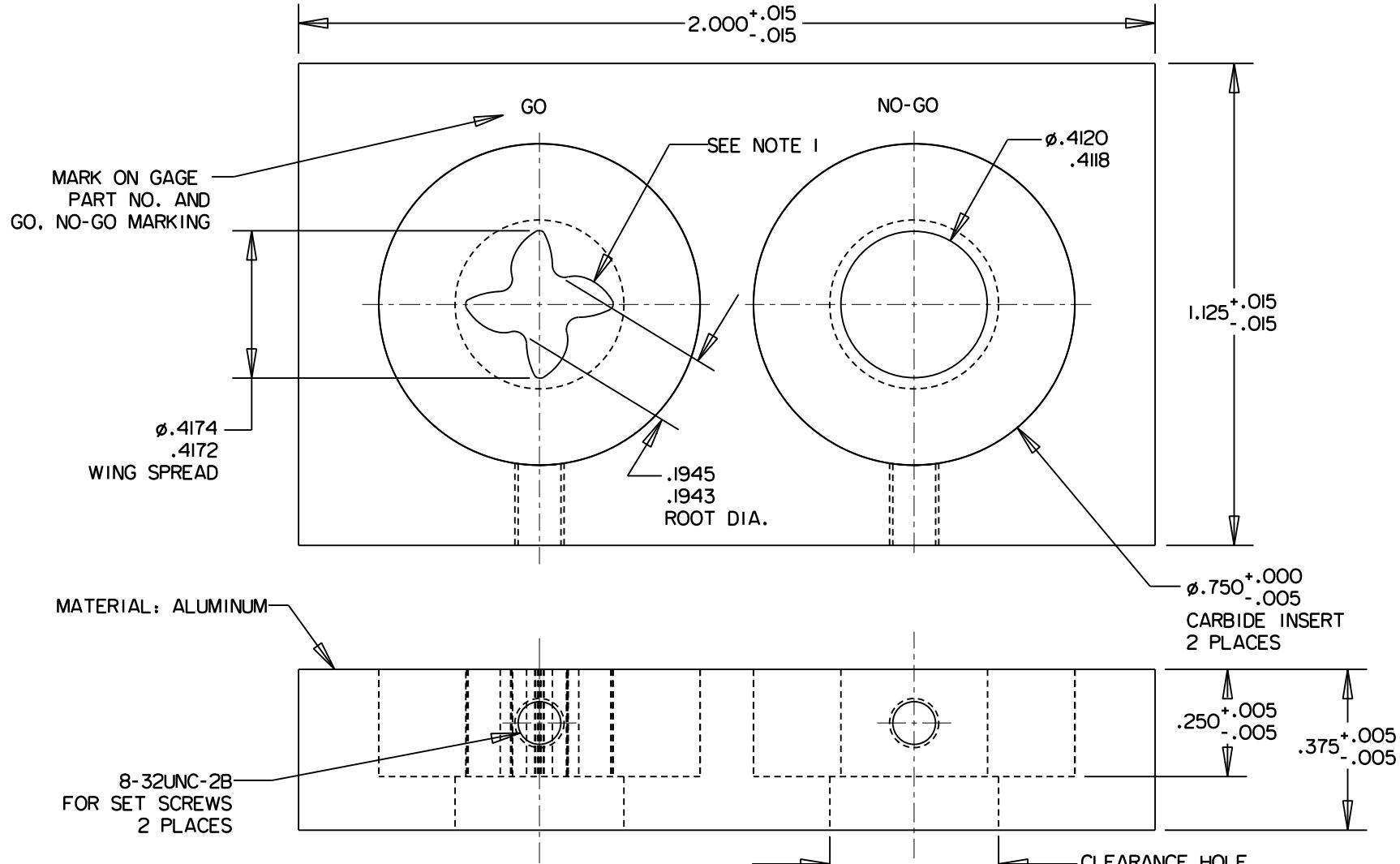
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MORTORQ®
MT-3 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
		9/4/02	PSC-5076
CHECKED:	G.DILLING	DATE	SHEET 1 OF 1
		9/10/02	

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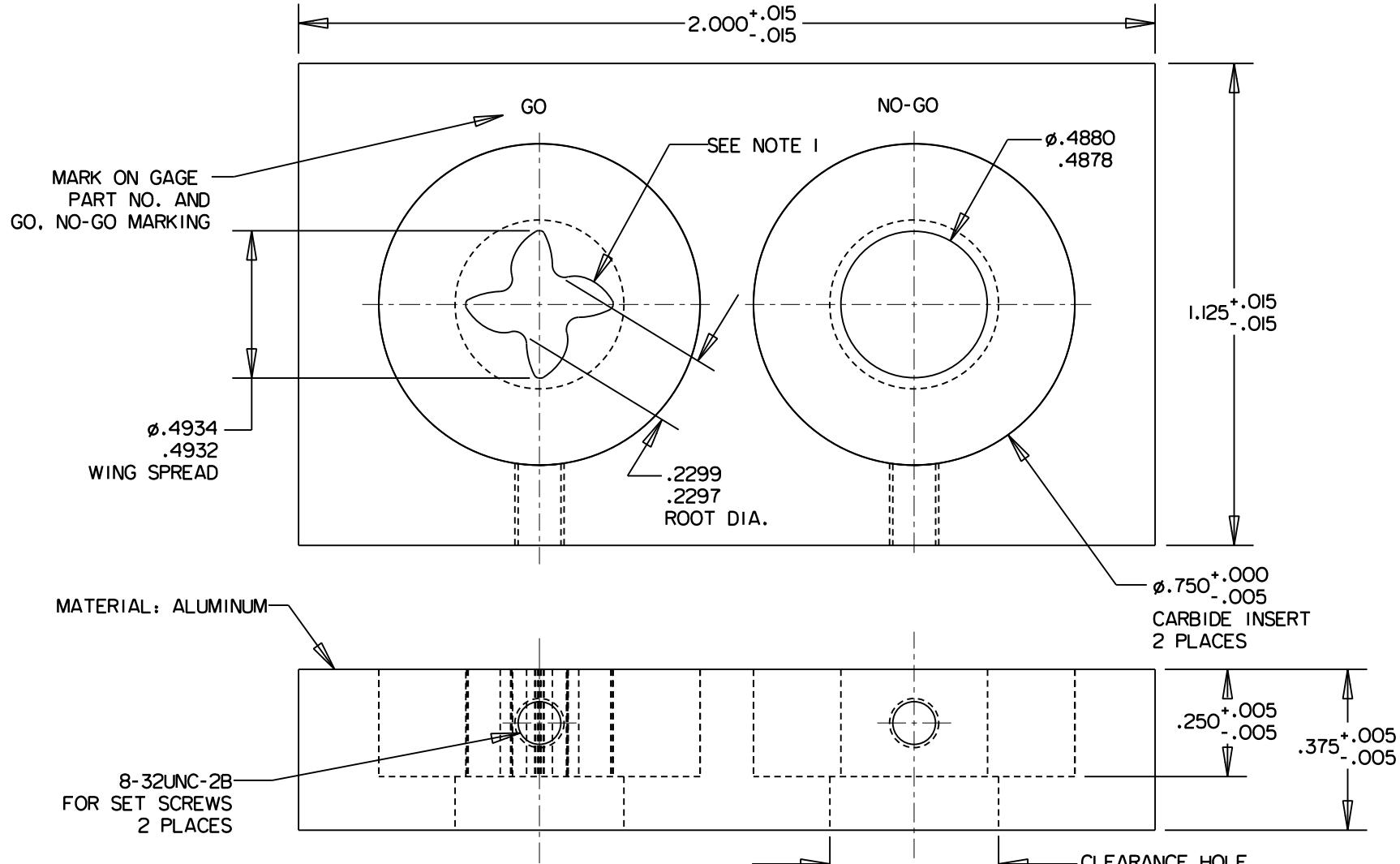
MORTORQ®
MT-4 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	
		9/10/02	PSC-5077

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REVISION ISSUED:2/20/03 REVISED:6/4/03 REVISED:1/22/04



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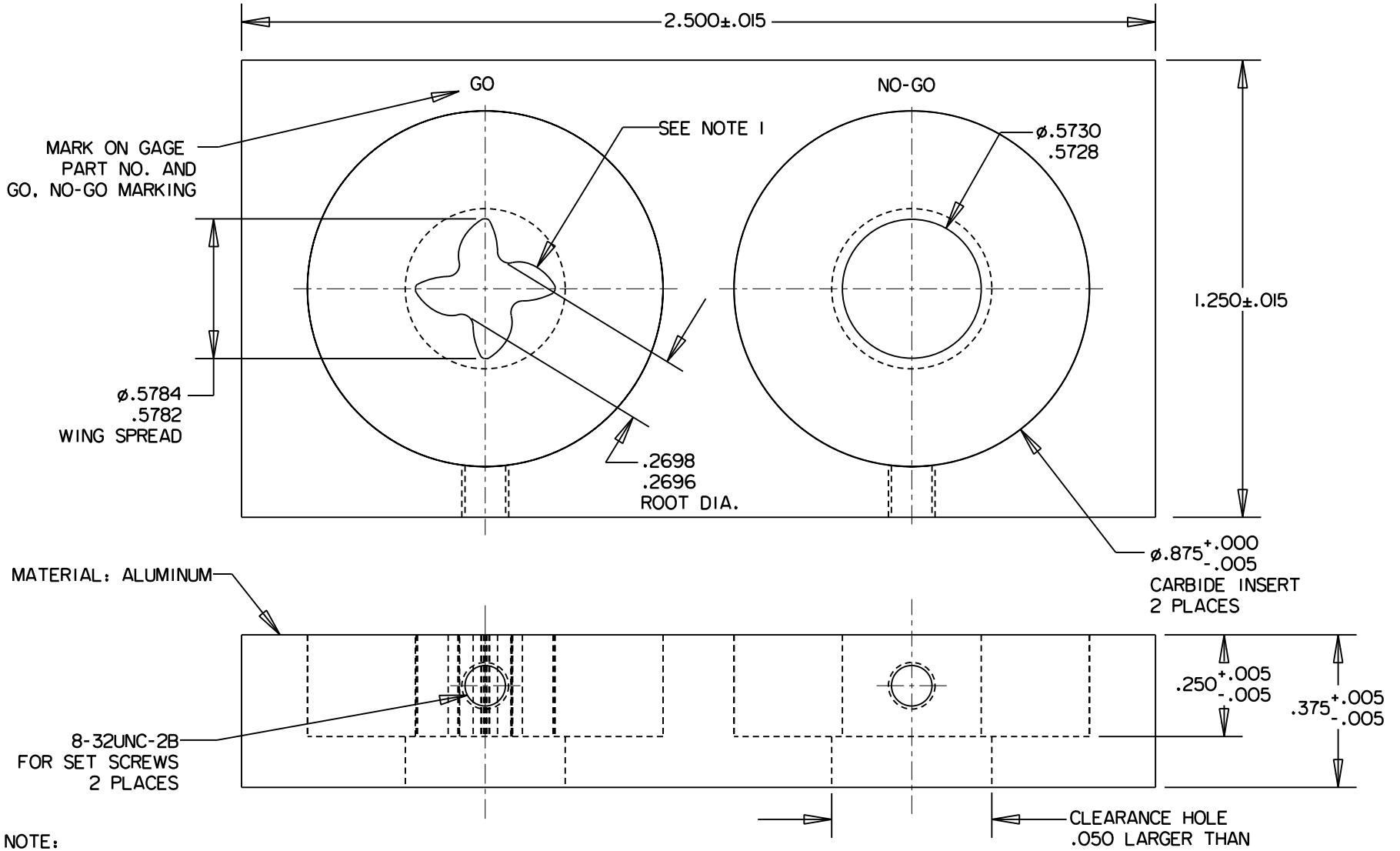
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MORTORQ®
MT-5 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	
		9/10/02	PSC-5078
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.			
PHONE: 774-396-6190 FAX: 508-966-2326			

PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORO-SET® TRI-WING® MORTORQ® HEXSTIX® ARE REGISTERED TRADEMARKS OF PHILLIPS SCREW CO.



NOTE:

I. ELECTRONIC FILE PER "PSC-508I" WILL BE SUPPLIED TO VENDOR WITH COMPLETE ARC GEOMETRY FOR THE PURPOSE OF MANUFACTURING THIS PART.

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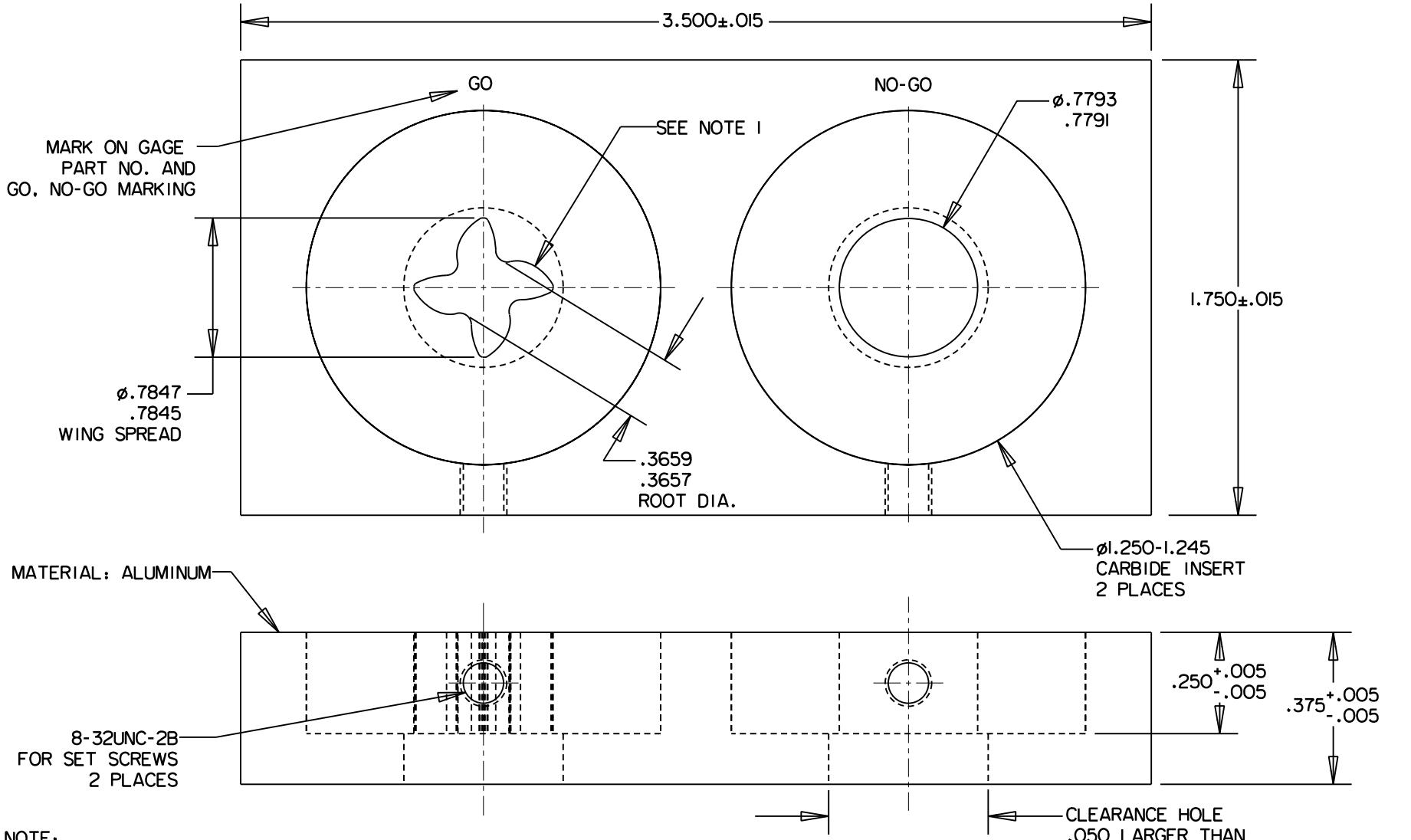
MORTORQ®
MT-6 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	
		9/10/02	PSC-5079

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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REVISION ISSUED:2/20/03 REVISED:6/4/03 REVISED:1/22/04



NOTE:

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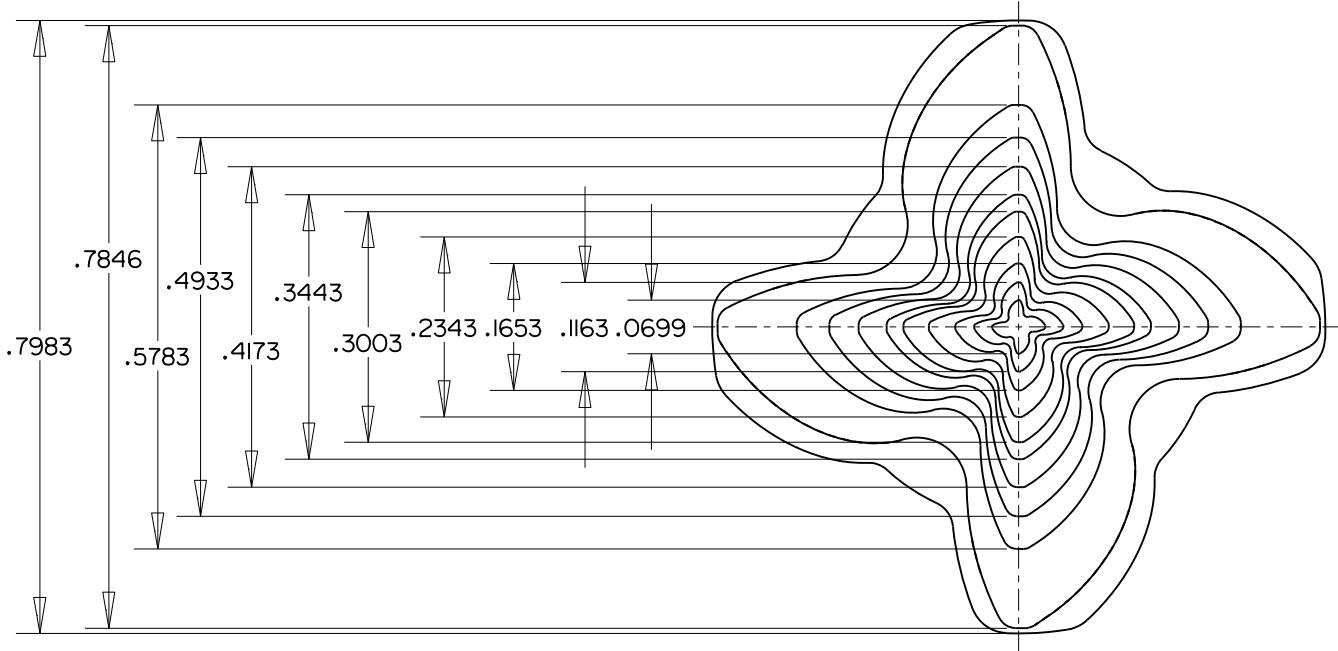
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MORTORQ®
MT-7 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

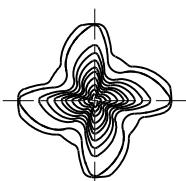
DRAWN	G.DILLING	DATE	DRAWING NUMBER
		5/28/03	PSC-5080
CHECKED:	G.DILLING	DATE	SHEET 1 OF 1
		6/01/03	

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DRIVER BIT "GO"
GAGE GEOMETRY
SCALE 4.000



"GO" GAGE GEOMETRY
SCALE 1.000

NOTE:

- I. ELECTRONIC FILE OF THIS DRAWING WILL BE SUPPLIED TO VENDOR FOR THE PURPOSE OF MANUFACTURING THE DRIVER BIT GO, NO-GO RING GAGE.

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TITLE: MORTORQ® DRIVER BIT
"GO" GAGE GEOMETRY

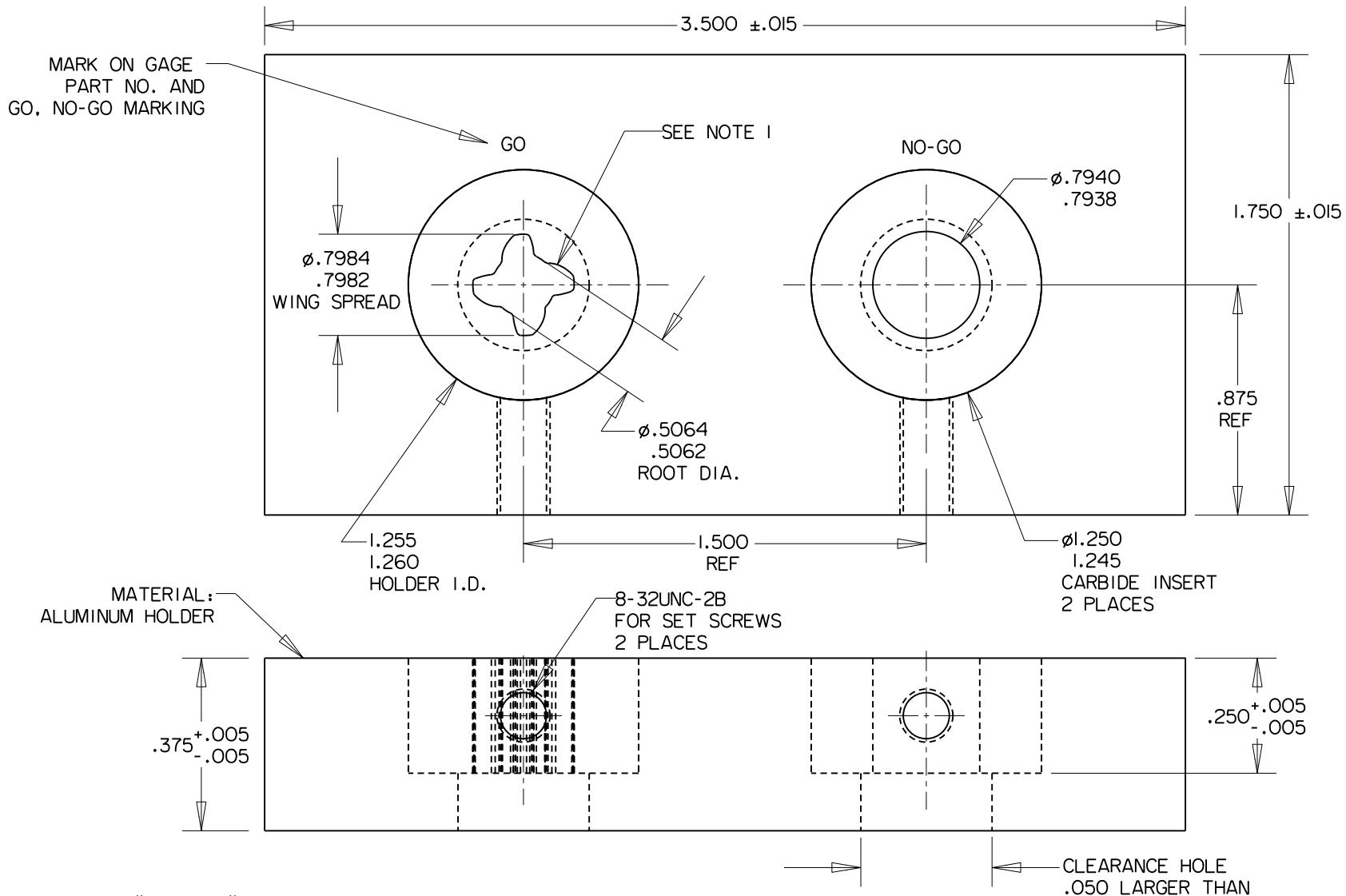
DRAWN	DATE	DRAWING NUMBER
G.DILLING	9/9/02	PSC-508I

CHECKED	DATE	SHEET 1 OF 1
G.DILLING	10/4/02	

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REVISION ISSUED:6/01/03 REVISED:1/22/04 REVISED:6/26/08



NOTE:

- ELECTRONIC FILE PER "PSC-508I" WILL BE SUPPLIED TO VENDOR WITH COMPLETE ARC GEOMETRY FOR THE PURPOSE OF MANUFACTURING GO GAGE INSERT GEOMETRY.

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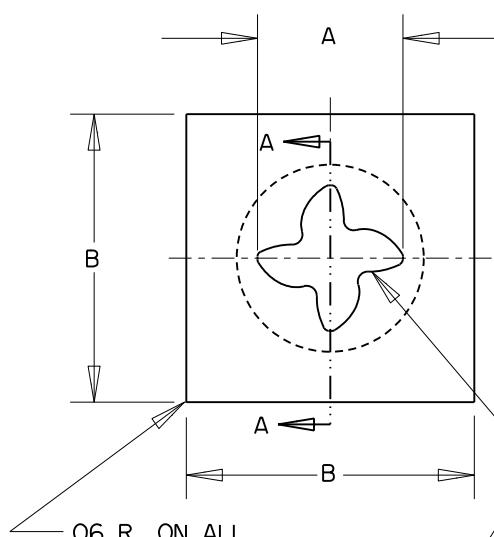
MORTORQ®
MT-8 DRIVER BIT, AND SCREWDRIVER
MANUFACTURING GAGE

DRAWN	G.DILLING	DATE	DRAWING NUMBER
		6/24/08	PSC-5082
CHECKED:	G.DILLING	DATE	SHEET 1 OF 1

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PHONE: 774-396-6190 FAX: 508-966-2326

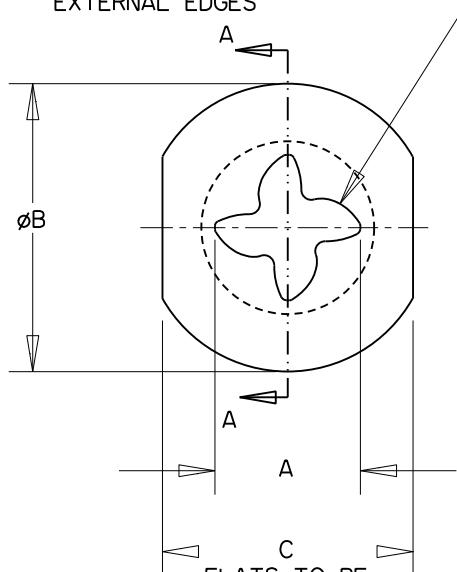
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORO-SET® TRI-WING® MORTORQ® HEXSTIX® ARE REGISTERED TRADEMARKS OF PHILLIPS SCREW CO.

REVISION

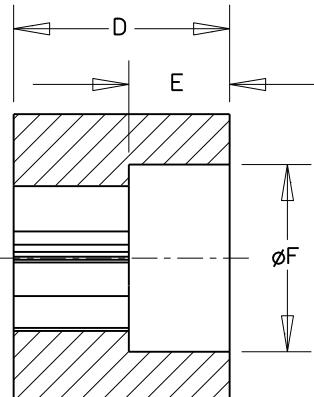


TEST BLOCK
STYLE I

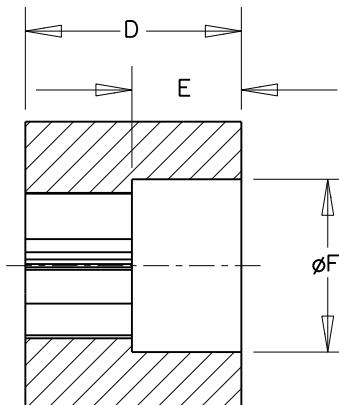
RECESS DETAIL PER
PUNCH POINT DWG. NO.
SHOWN BELOW



TEST BLOCK
STYLE II



SECTION A-A



SECTION A-A

RECESS SIZE	RECESS DRAWING	A +.000 -.001	B +.000 -.031	C REF	D REF	E REF	phi F +.005 -.005
MT-000	PSC-5I51	.074	1.000	.870	.500	-	-
MT-00	PSC-5I52	.1220	1.000	.870	.500	-	-
MT-0	PSC-5I53	.1714	1.000	.870	.500	-	-
MT-1	PSC-5I54	.2415	1.000	.870	.500	-	-
MT-2	PSC-5I55	.3090	1.000	.870	.500	-	-
MT-3	PSC-5I56	.3547	1.500	1.370	1.500	.500	.500
MT-4	PSC-5I57	.4295	1.500	1.370	2.000	.875	.500
MT-5	PSC-5I58	.5073	2.250	2.120	2.000	1.500	.750
MT-6	PSC-5I59	.5948	2.250	2.120	2.000	1.500	.750
MT-7	PSC-5I60	.8013	2.250	2.120	2.000	1.500	1.000
MT-8	PSC-5I61	.8220	3.000	2.750	2.000	1.500	1.000

NOTES:

1. MATERIAL: MI OR EQUIV., HEAT TREAT: Rc 61-63.
2. MARKING: IDENTIFY WITH THIS DWG NO. AND APPLICABLE RECESS SIZE NO., LOCATED ON TOP OR SIDE SURFACE.

REVISION ISSUED: 6/01/03 REVISED: 1/22/04 REVISED: 1/11/07 REV: 6/26/08

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TITLE:
MORTORQ®
TORQUE TEST BLOCKS

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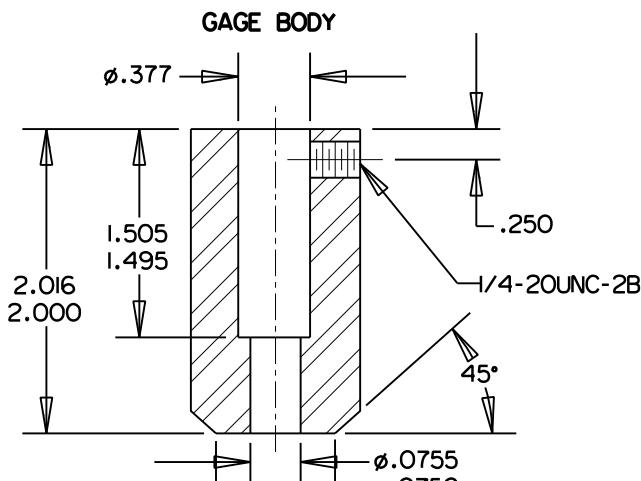
DRAWN G.DILLING DATE 9/5/02 DRAWING NUMBER

PSC-5085

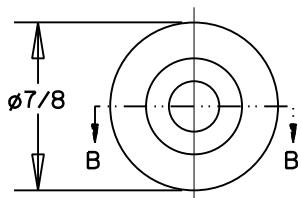
SHEET 1 OF 1

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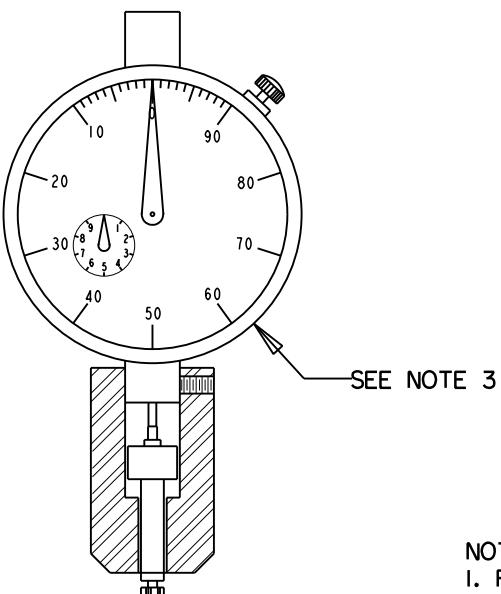
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SECTION B-B

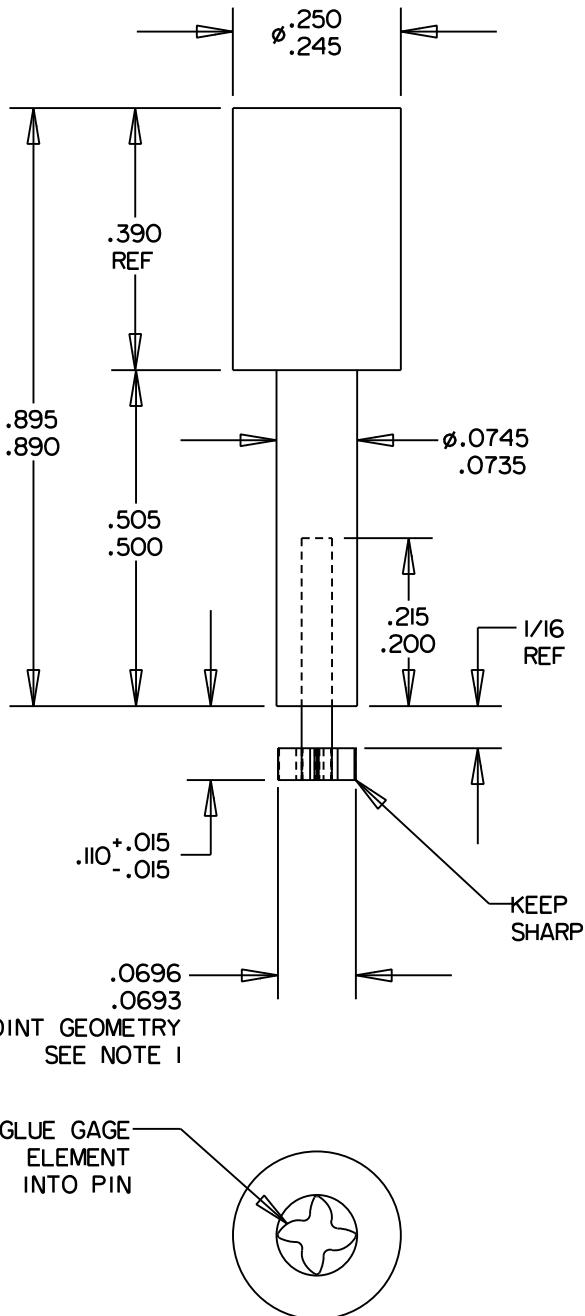


GAGE ASSEMBLY



NOTE:

1. REFER TO PSC-503I FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.



POINT GEOMETRY
SEE NOTE I

GLUE GAGE
ELEMENT
INTO PIN

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TITLE:

MORTORQ® RECESS PENETRATION GAGE ASSY MT-000

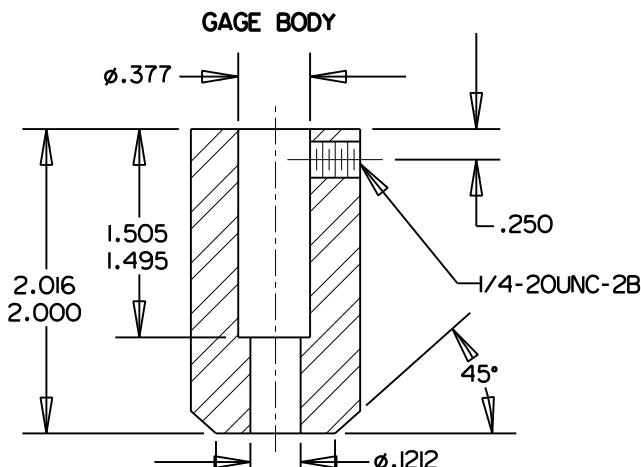
DRAWN	DATE	DRAWING NUMBER
G.DILLING	I-23-04	PSC-509I

CHECKED:	DATE
G.DILLING	I-23-04

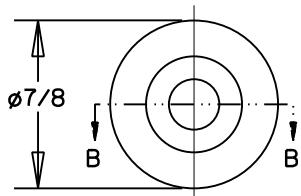
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

REVISION ISSUED: I-23-04

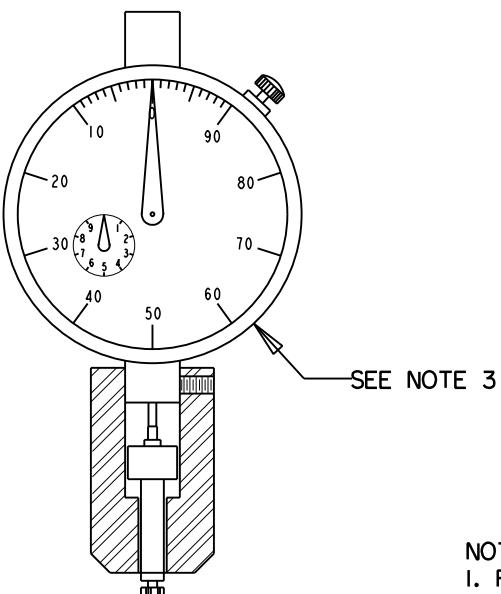
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SECTION B-B

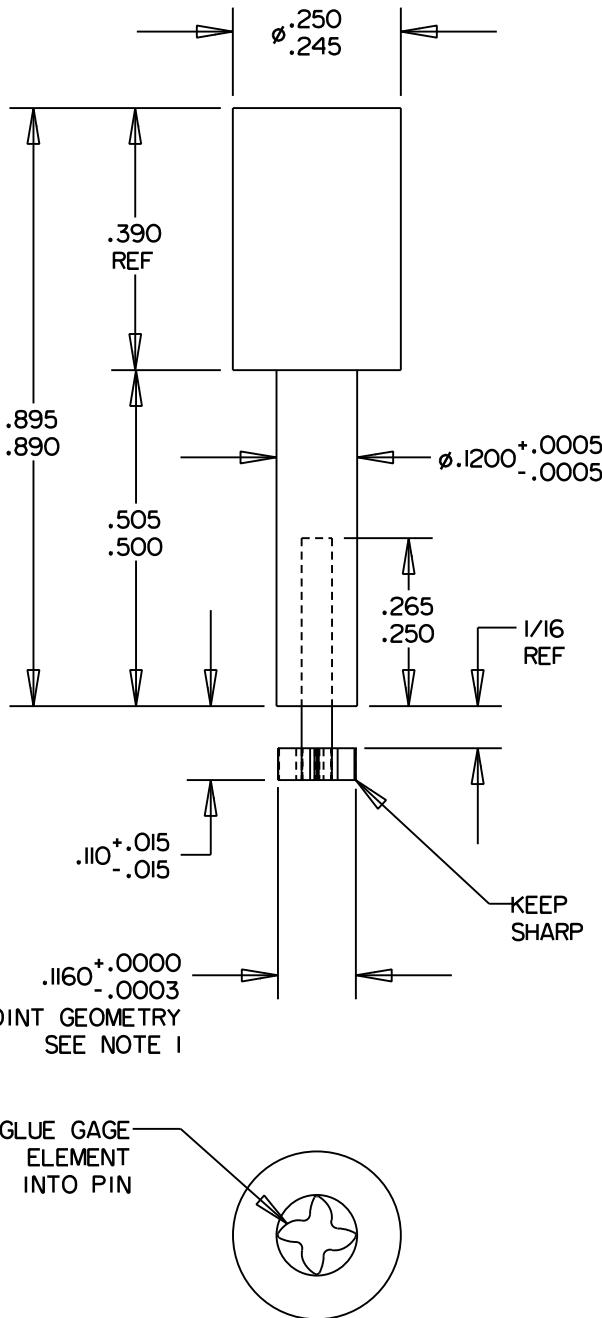


GAGE ASSEMBLY



NOTE:

1. REFER TO PSC-5032 FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.



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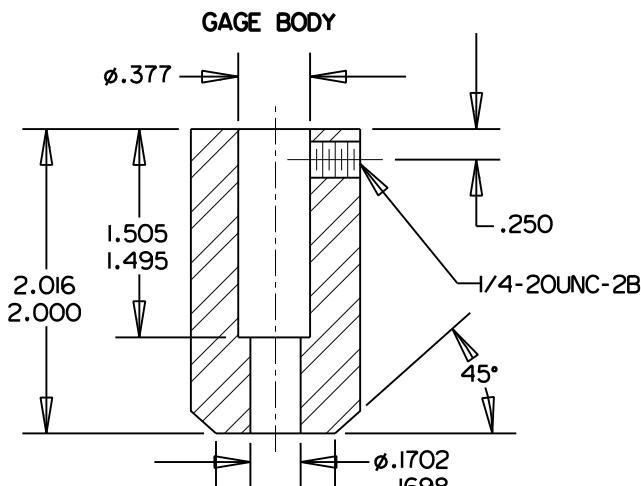
TITLE:

MORTORQ® RECESS
PENETRATION GAGE ASSY MT-00

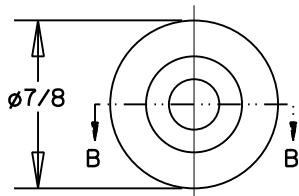
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G.DILLING	9-2-02	PSC-5092

CHECKED:	DATE
G.DILLING	9-10-02

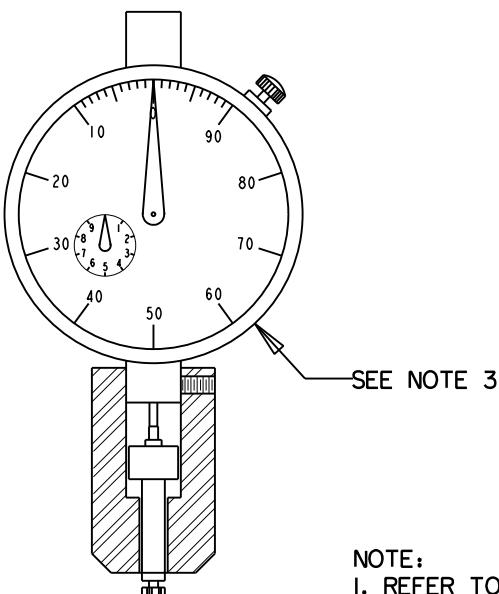
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326



SECTION B-B

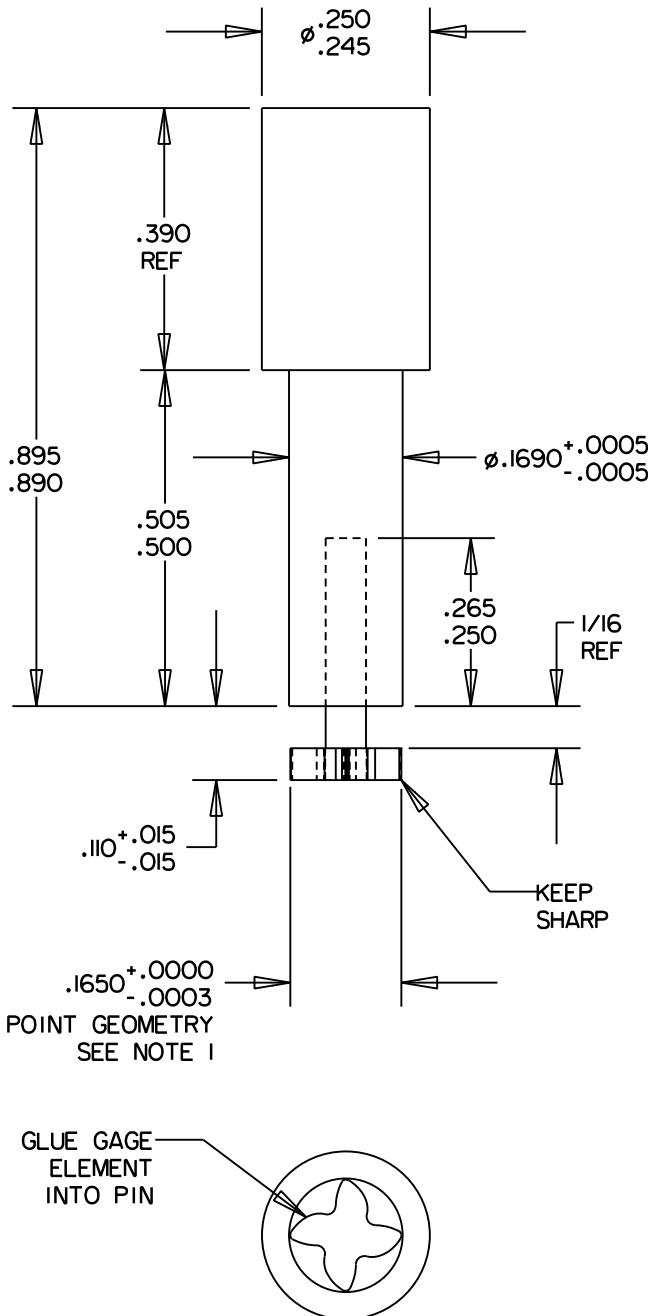


GAGE ASSEMBLY



NOTE:

1. REFER TO PSC-5033 FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.



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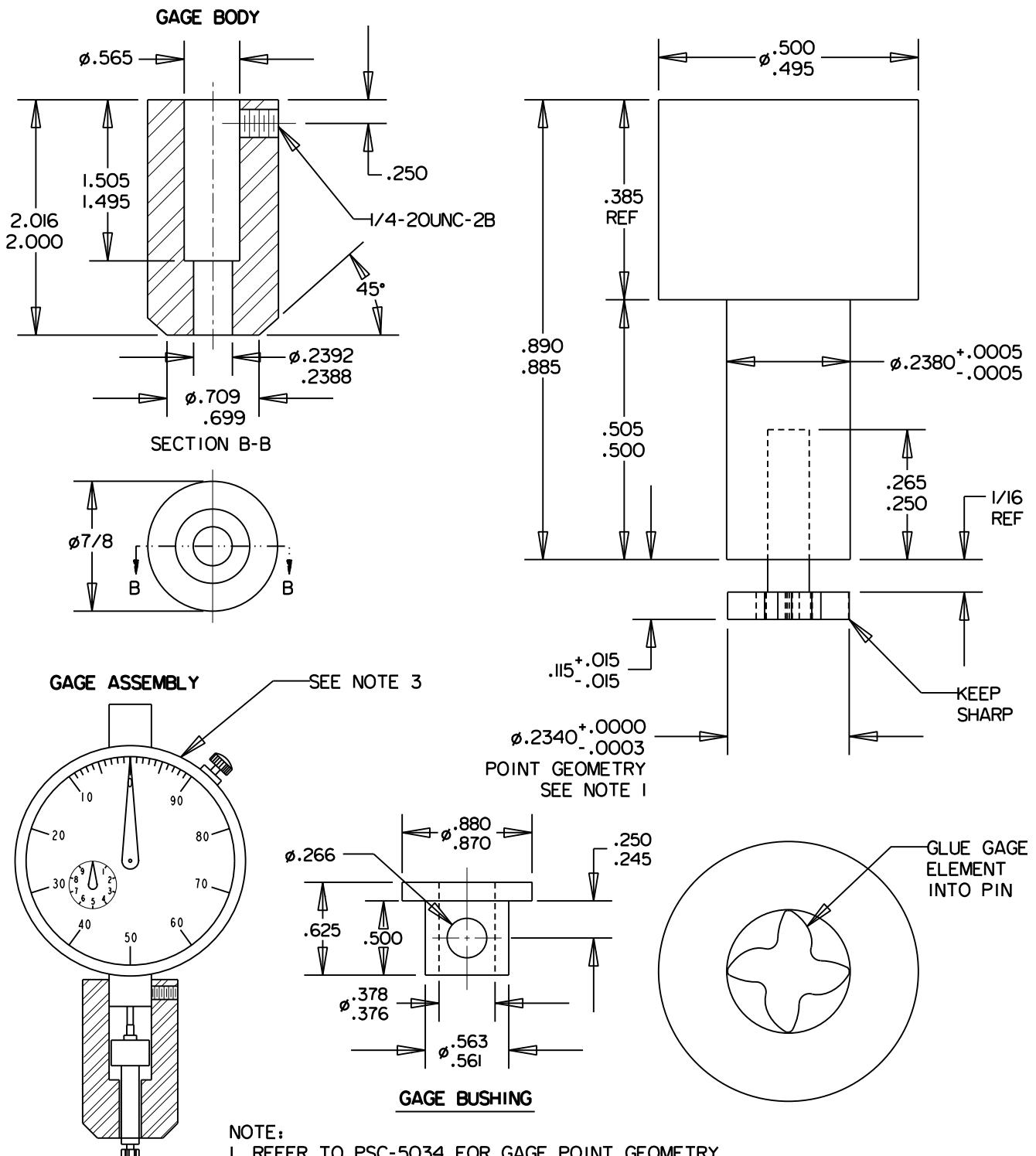
TITLE:

MORTORQ® RECESS
PENETRATION GAGE ASSY MT-0

DRAWN	DATE	DRAWING NUMBER
G.DILLING	9-2-02	PSC-5093
CHECKED:	DATE	
G.DILLING	9-10-02	SHEET 1 OF 1

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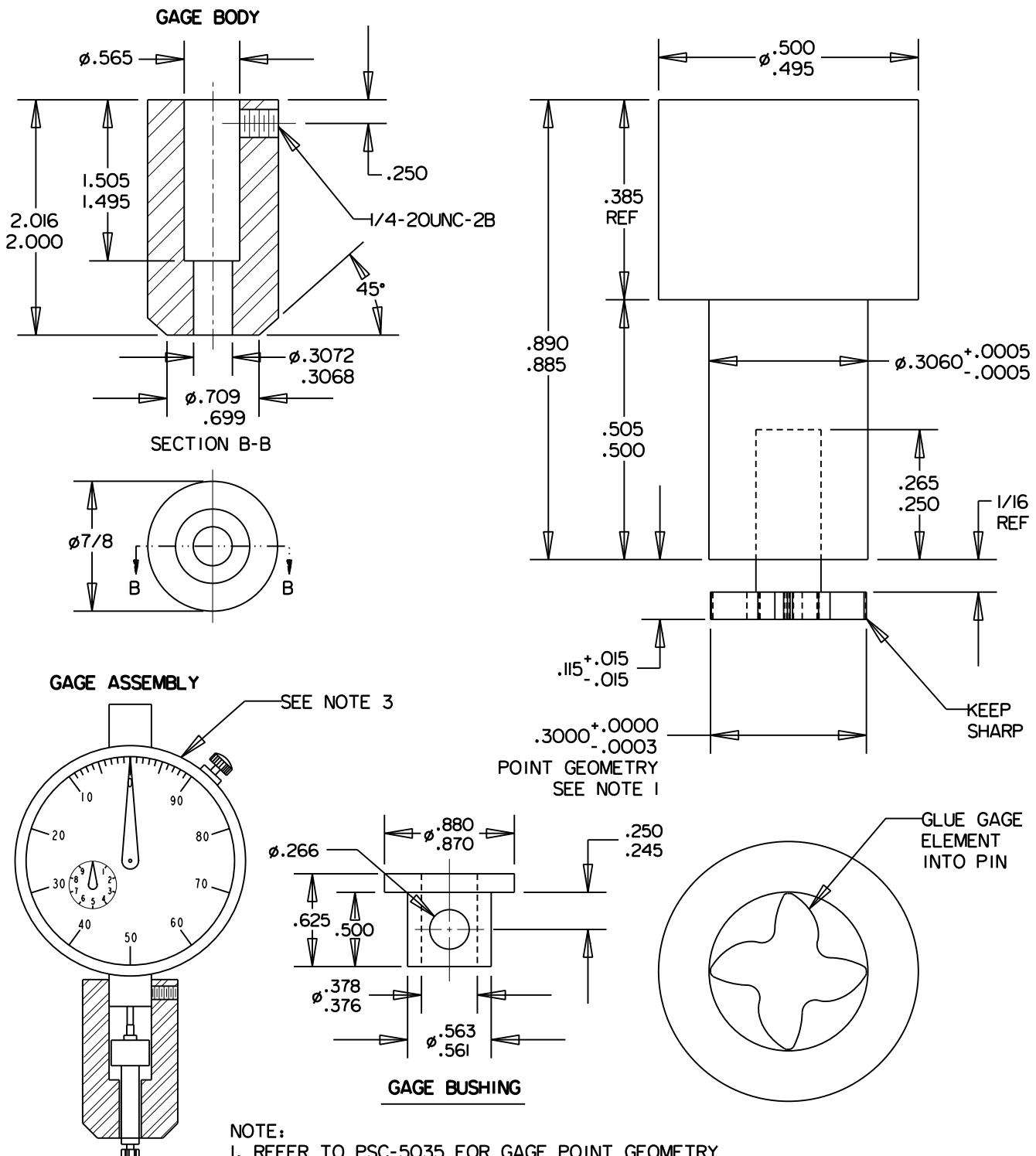
TITLE: MORTORQ® RECESS
PENETRATION GAGE ASSY MT-1

DRAWN G.DILLING	DATE 9-2-02	DRAWING NUMBER
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CHECKED: G.DILLING	DATE 9-10-02	
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NOTE:

1. REFER TO PSC-5035 FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.

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TITLE:

MORTORQ® RECESS
PENETRATION GAGE ASSY MT-2

DRAWN

G.DILLING

DATE

9-2-02

DRAWING NUMBER

PSC-5095

CHECKED:

G.DILLING

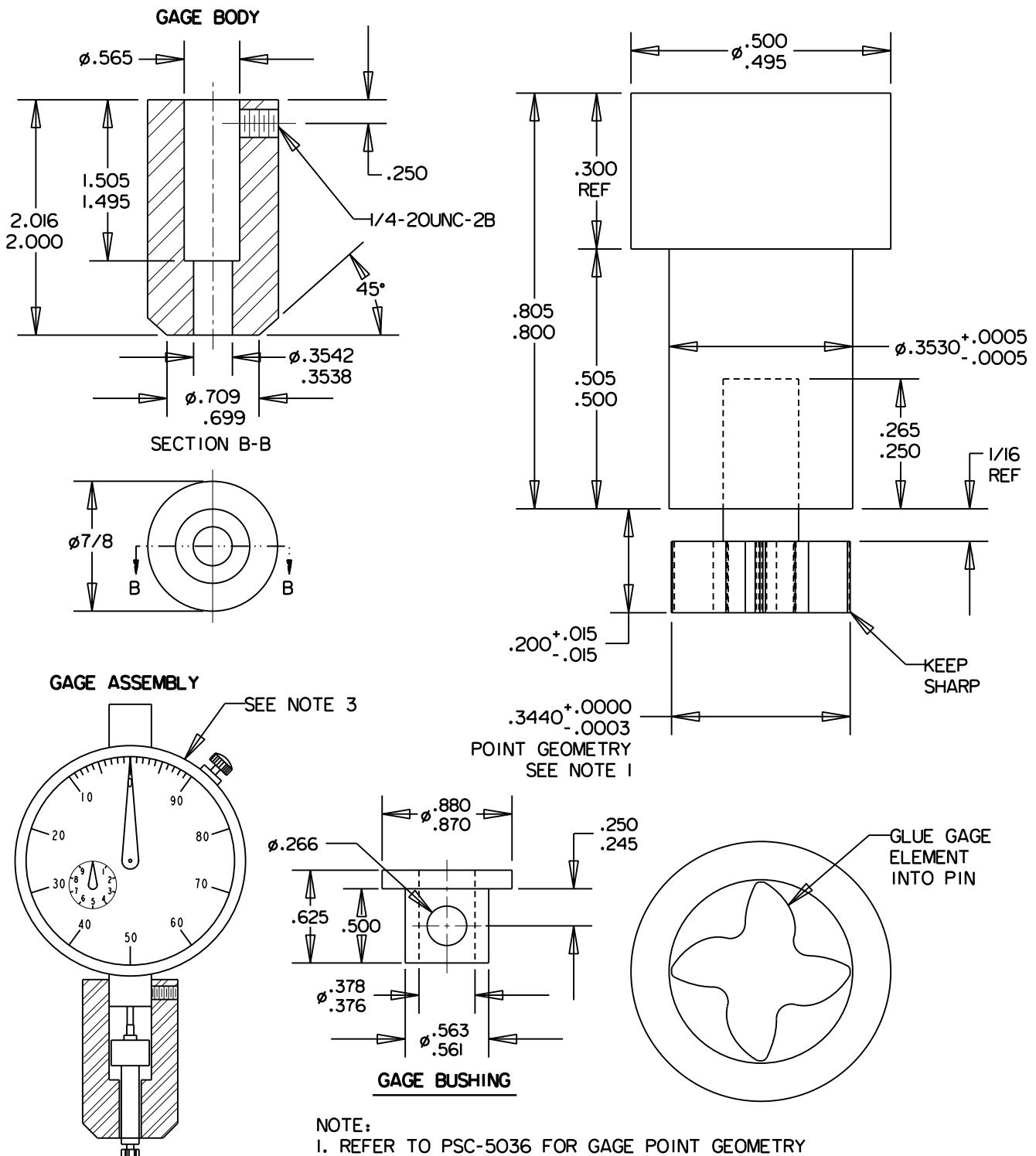
DATE

9-10-02

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PHONE: 774-396-6190 FAX: 508-966-2326

REVISION ISSUED: 2/20/03 REVISED: 1/23/04

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NOTE:

1. REFER TO PSC-5036 FOR GAGE POINT GEOMETRY ONLY. NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
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TITLE:

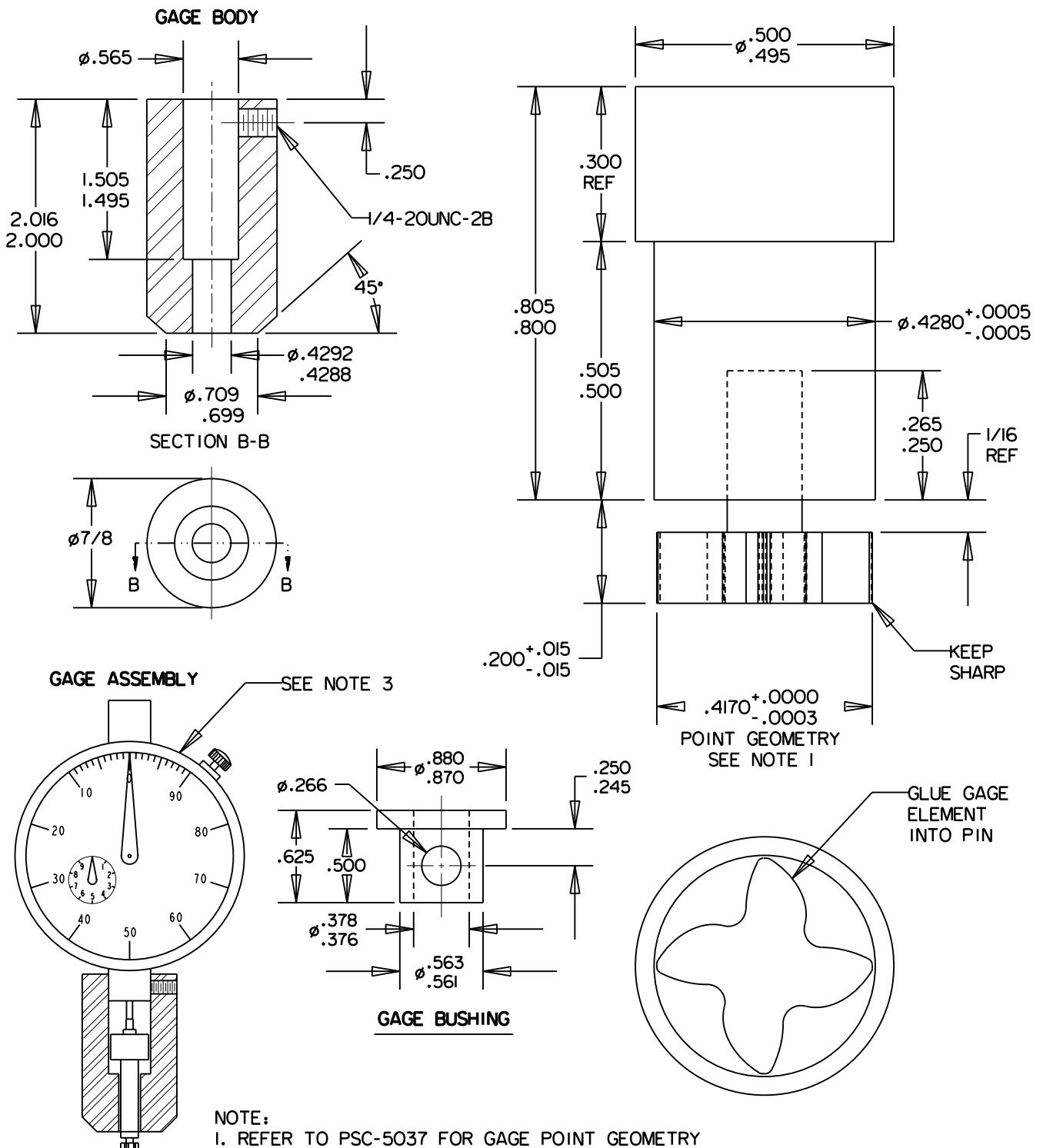
**MORTORQ® RECESS
PENETRATION GAGE ASSY MT-3**

DRAWN	DATE	DRAWING NUMBER
G.DILLING	9-2-02	PSC-5096

CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	9-10-02	

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NOTE:

1. REFER TO PSC-5037 FOR GAGE POINT GEOMETRY ONLY. NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.

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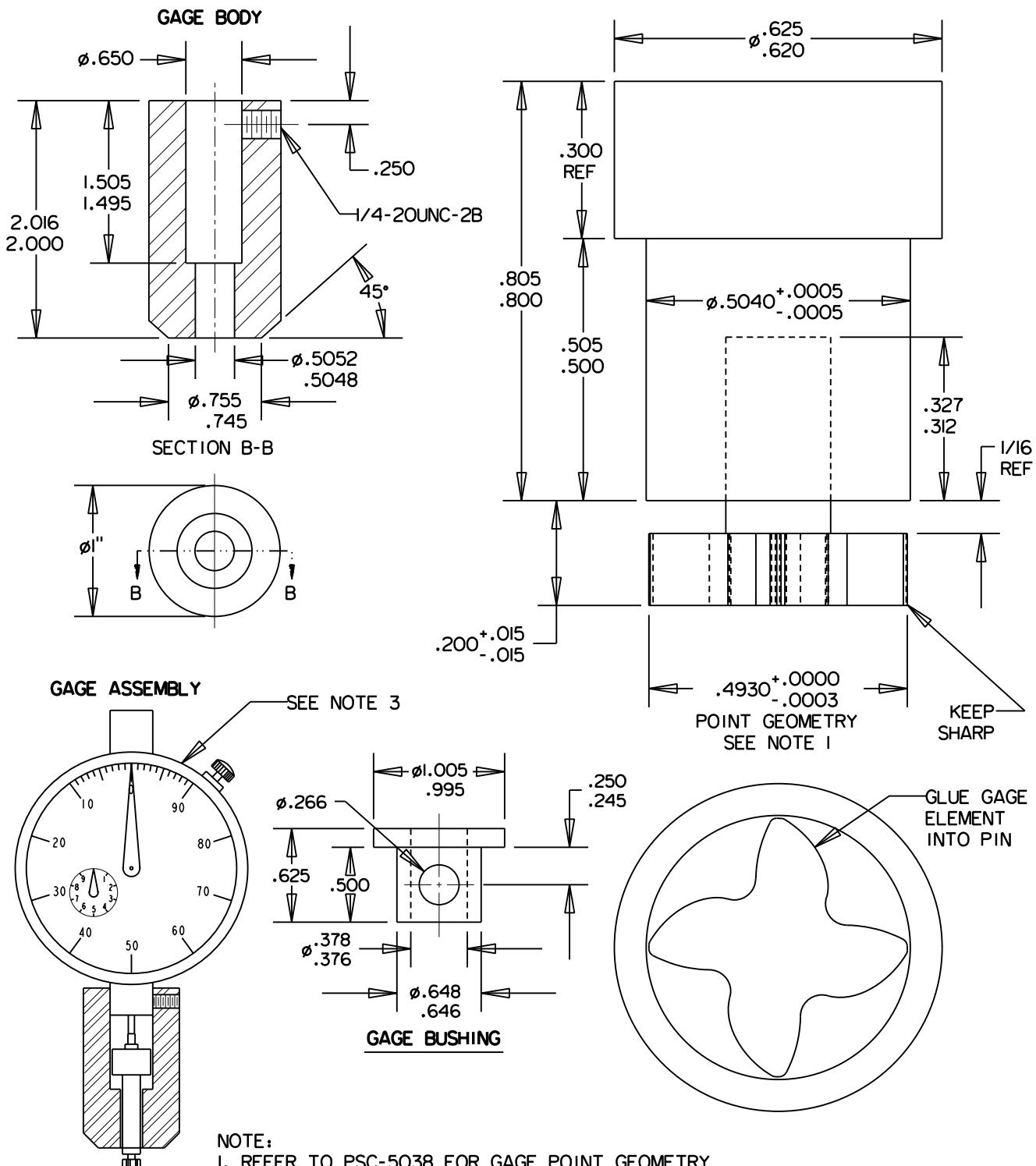
TITLE:

**MORTORQ® RECESS
PENETRATION GAGE ASSY MT-4**

DRAWN	DATE	DRAWING NUMBER
G.DILLING	9-2-02	PSC-5097
CHECKED: G.DILLING	DATE 9-10-02	SHEET 1 OF 1

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TITLE:

**MORTORQ® RECESS
PENETRATION GAGE ASSY MT-5**

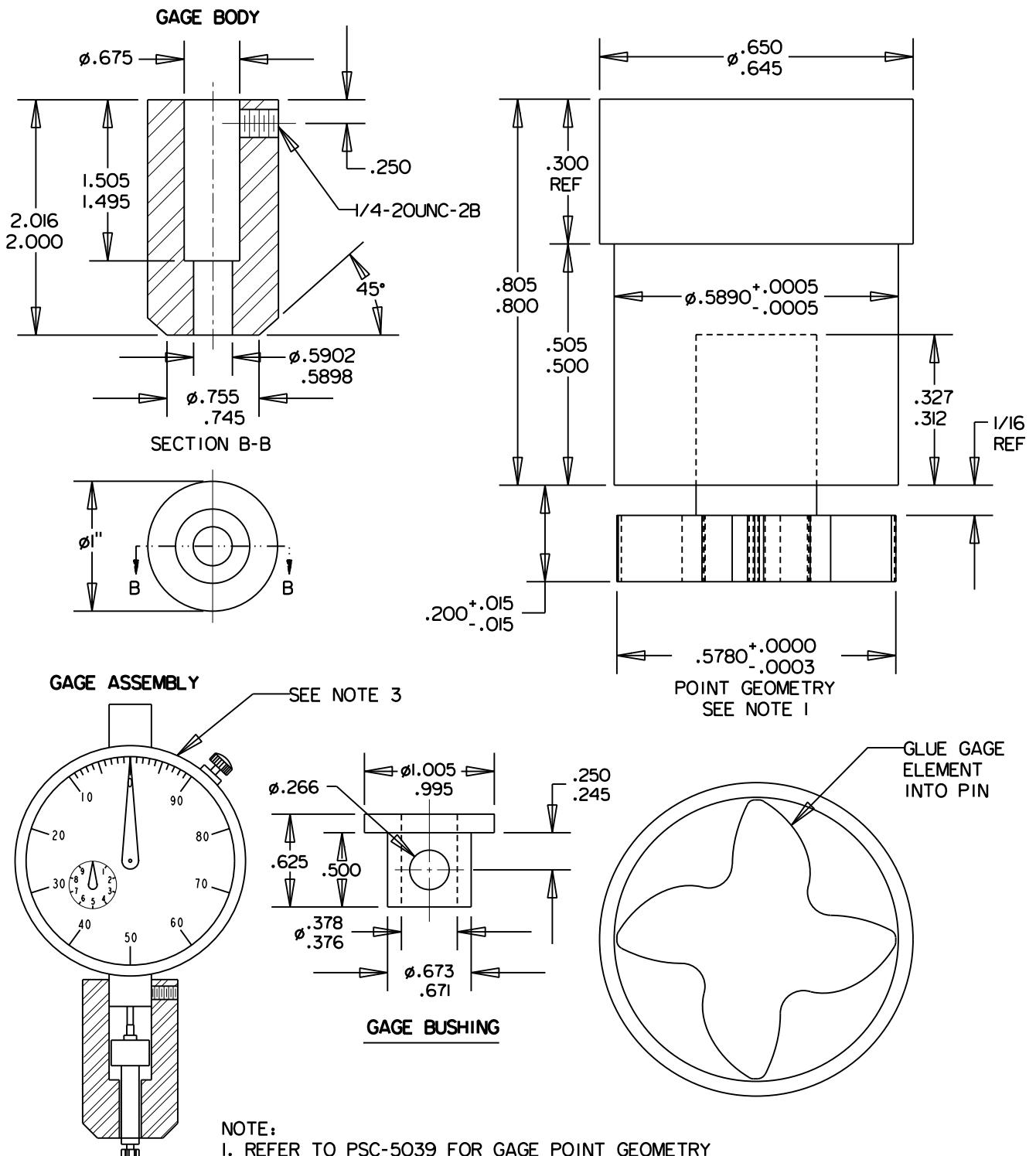
DRAWN	DATE	DRAWING NUMBER
G.DILLING	9-2-02	PSC-5098

CHECKED	DATE
G.DILLING	9-10-02

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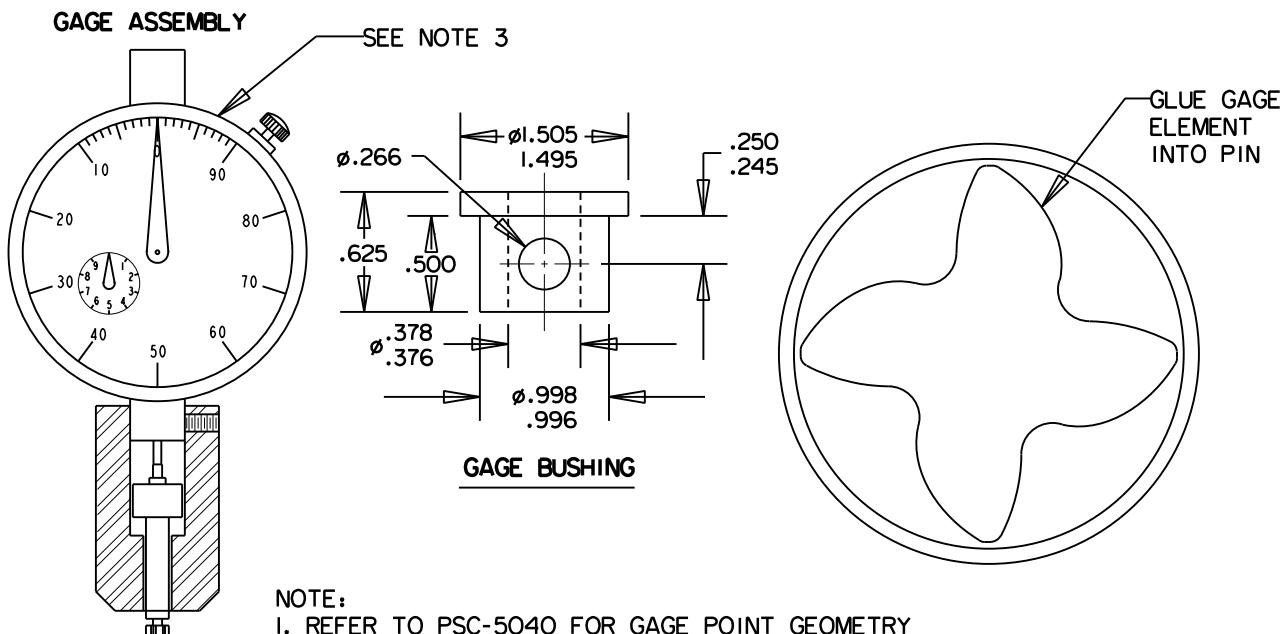
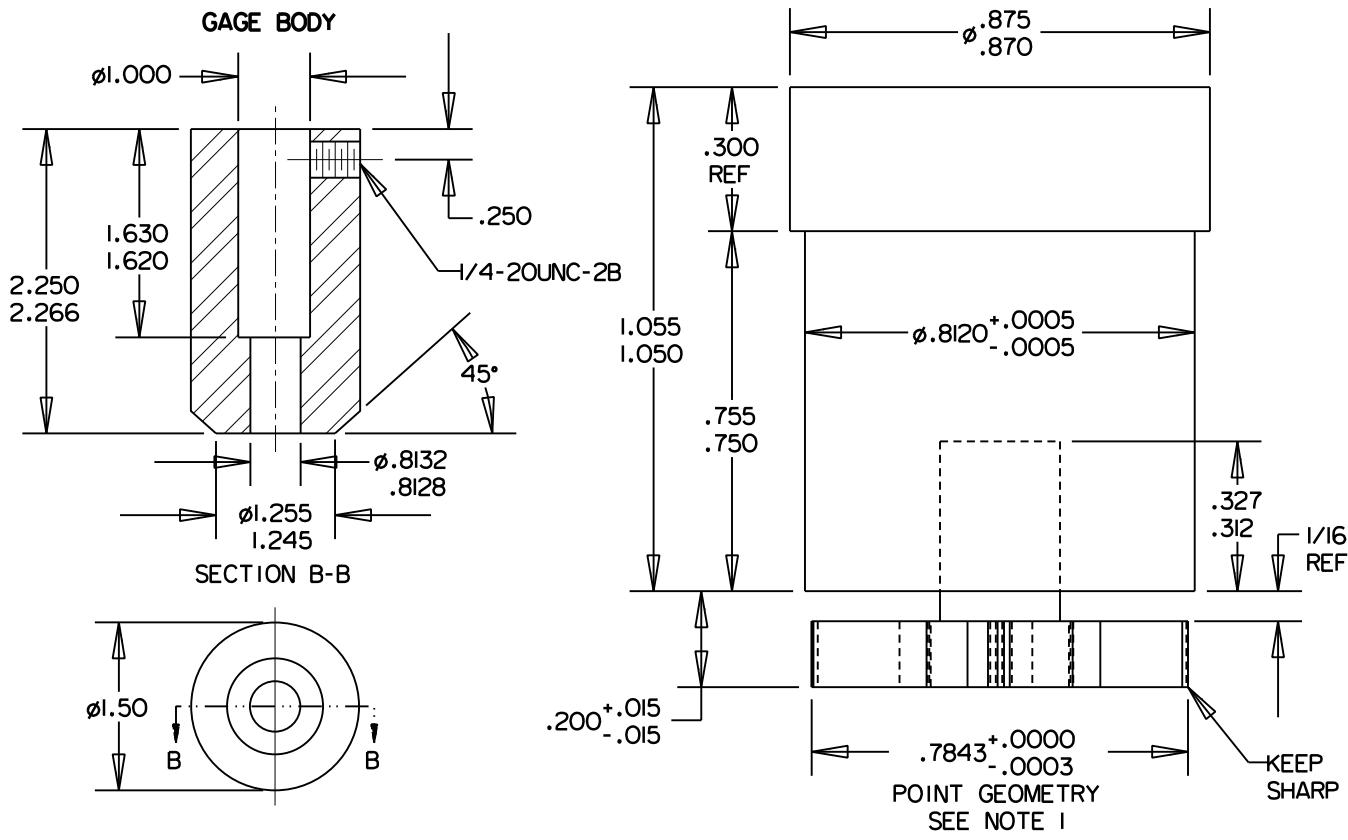
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TITLE: MORTORQ® RECESS
PENETRATION GAGE ASSY MT-6

DRAWN G.DILLING	DATE 9-2-02	DRAWING NUMBER PSC-5099
CHECKED: G.DILLING	DATE 9-10-02	SHEET 1 OF 1

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NOTE:

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2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
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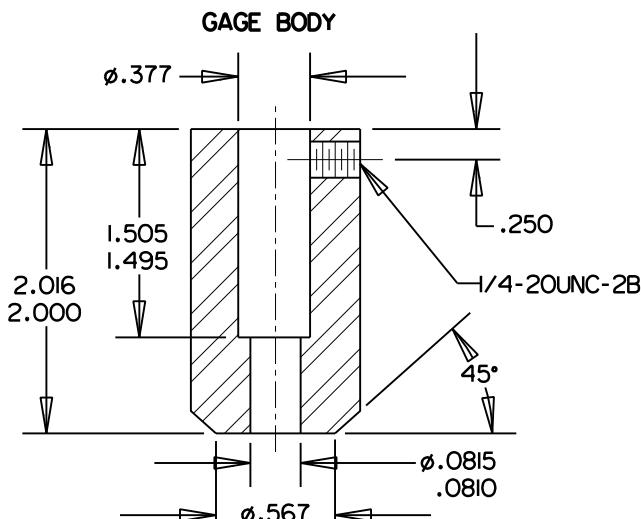
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**MORTORQ® RECESS
PENETRATION GAGE ASSY MT-7**

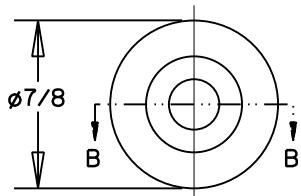
DRAWN	DATE	DRAWING NUMBER
G.DILLING	6-2-03	PSC-5100
CHECKED: G.DILLING	DATE 6-3-03	SHEET 1 OF 1

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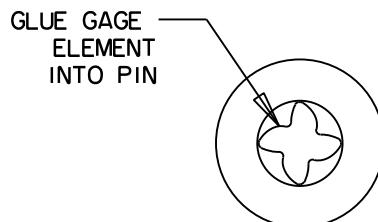
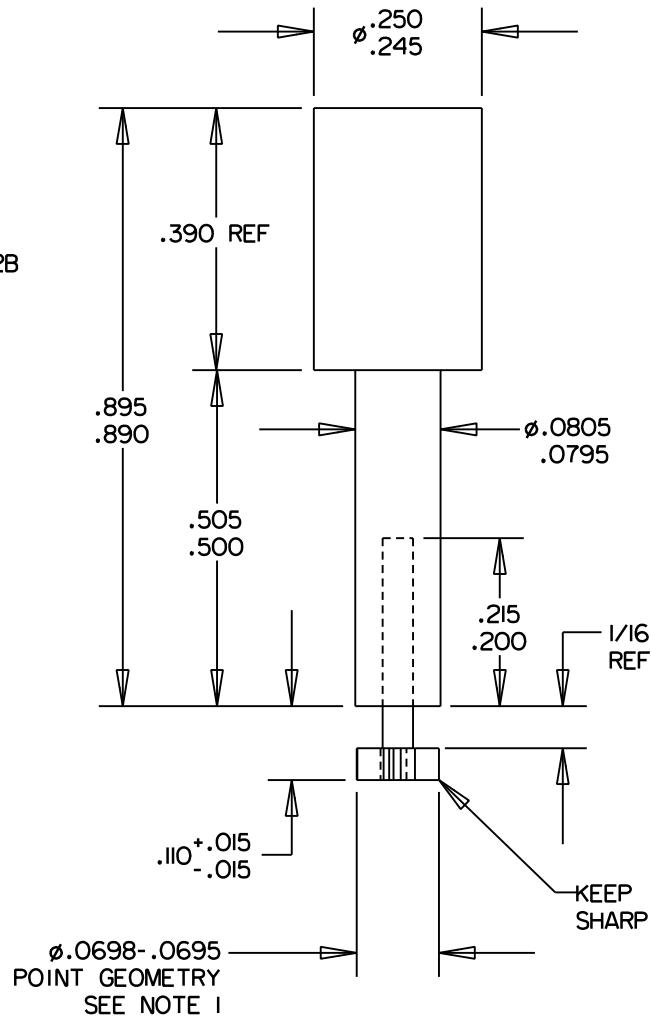
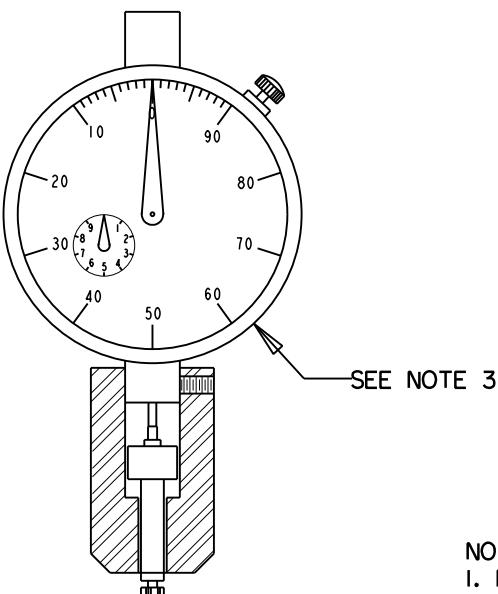
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SECTION B-B



GAGE ASSEMBLY



NOTE:

1. REFER TO PSC-5III FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
2. STAMP PART NUMBER & POINT SIZE ON BODY OF GAGE.
3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.

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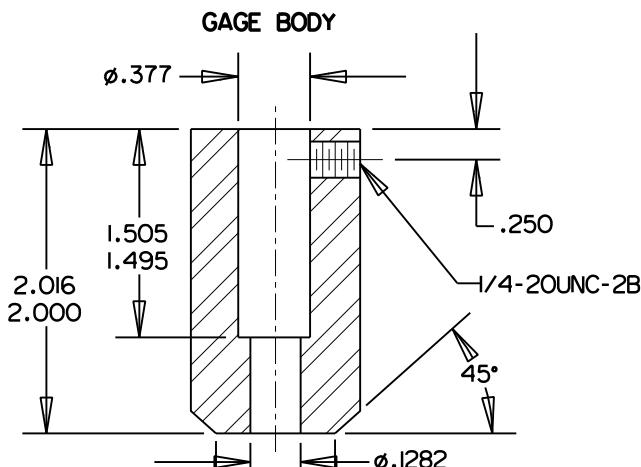
TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-000

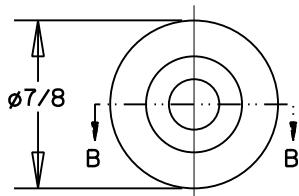
DRAWN	DATE	DRAWING NUMBER
G.DILLING	I-23-04	PSC-5101
CHECKED: G.DILLING	DATE I-23-04	SHEET 1 OF 1

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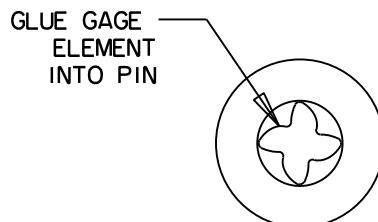
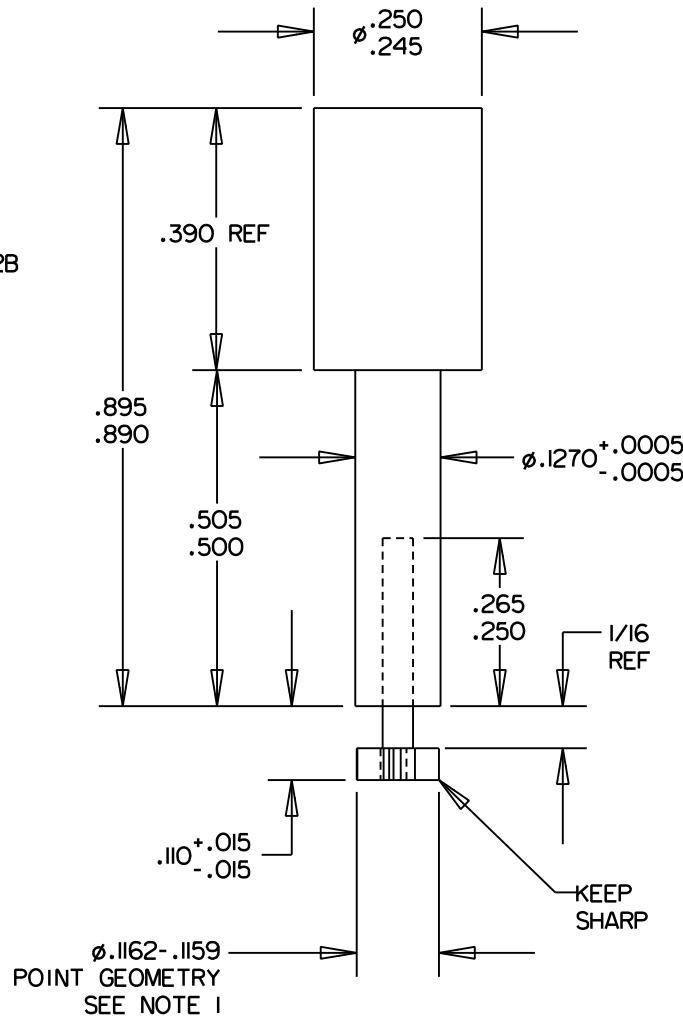
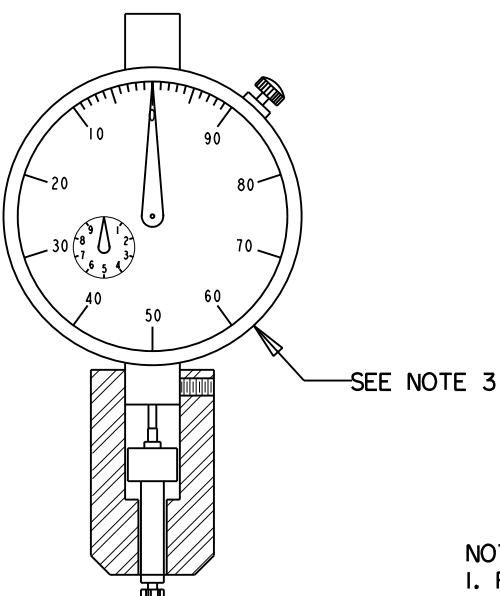
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SECTION B-B



GAGE ASSEMBLY



NOTE:

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3. STANDARD DIAL GAGE WITH NUMERALS READING COUNTER-CLOCKWISE IN THOUSANDS.

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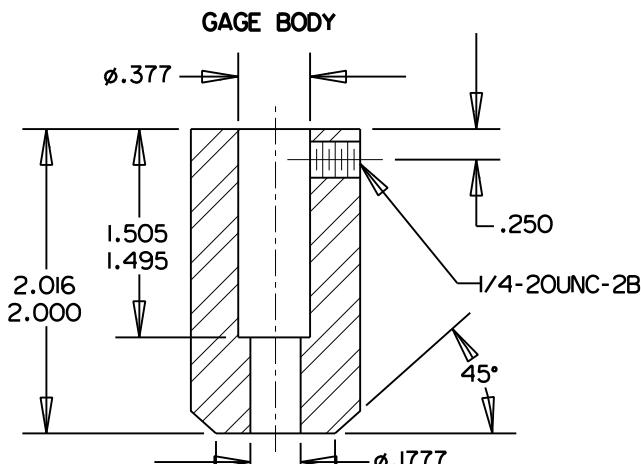
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TITLE:

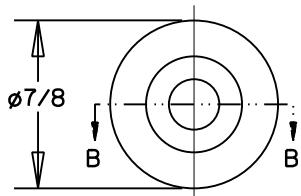
MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-00

DRAWN	DATE	DRAWING NUMBER
G.DILLING	10-7-02	PSC-5102
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	10-7-02	PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326

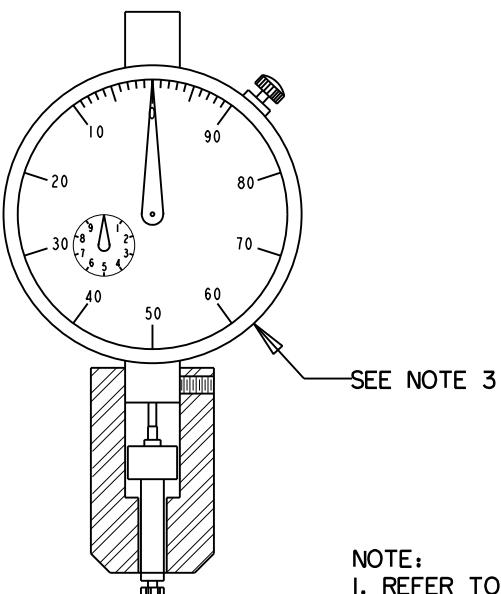
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SECTION B-B

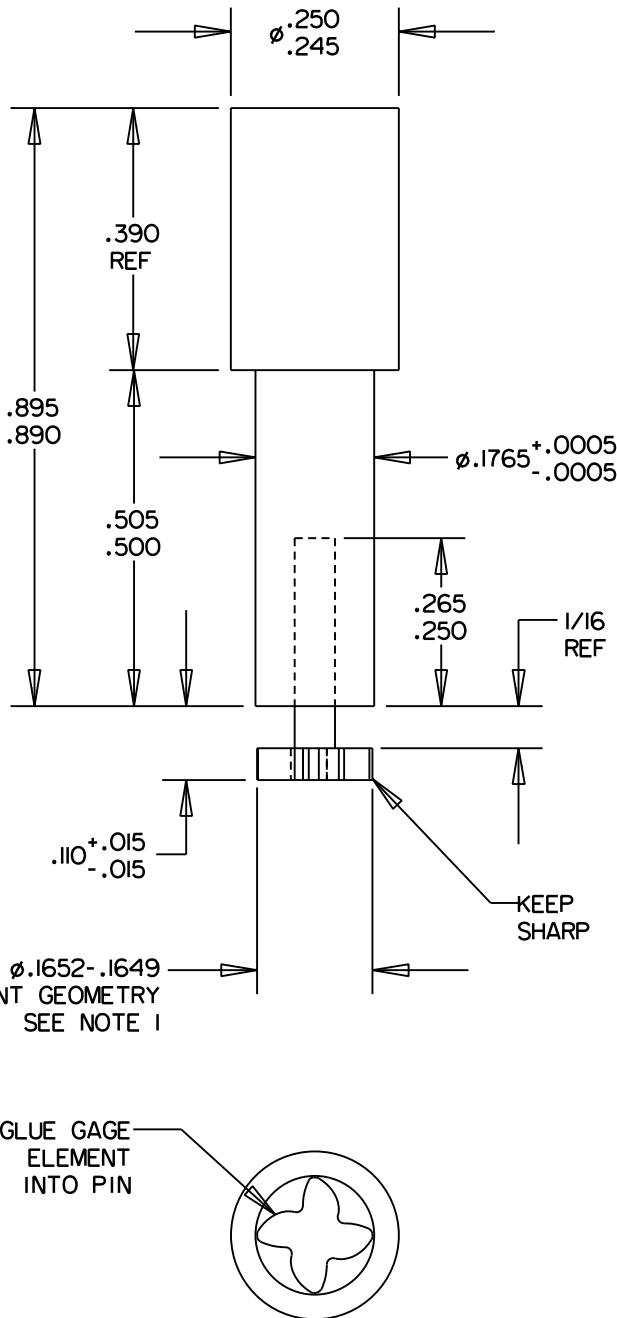


GAGE ASSEMBLY

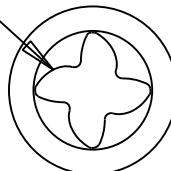


NOTE:

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GLUE GAGE
ELEMENT
INTO PIN



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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-O

DRAWN

G.DILLING

DATE

10-7-02

DRAWING NUMBER

PSC-5103

CHECKED:

G.DILLING

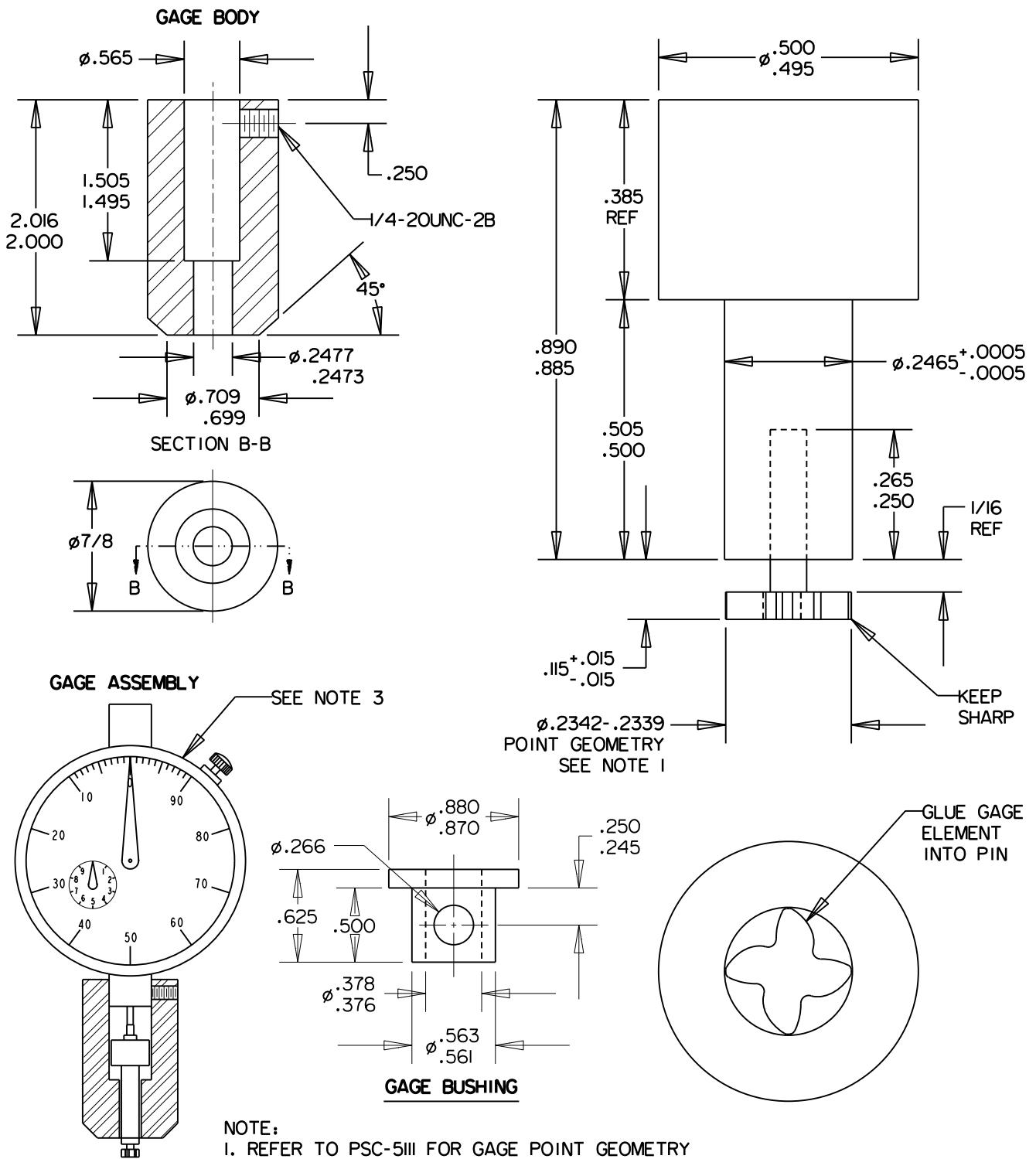
DATE

10-7-02

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REVISION ISSUED: 2/20/03 REVISED: 1/23/04

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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-I

DRAWN

G.DILLING

DATE

10-7-02

DRAWING NUMBER

PSC-5104

CHECKED:

G.DILLING

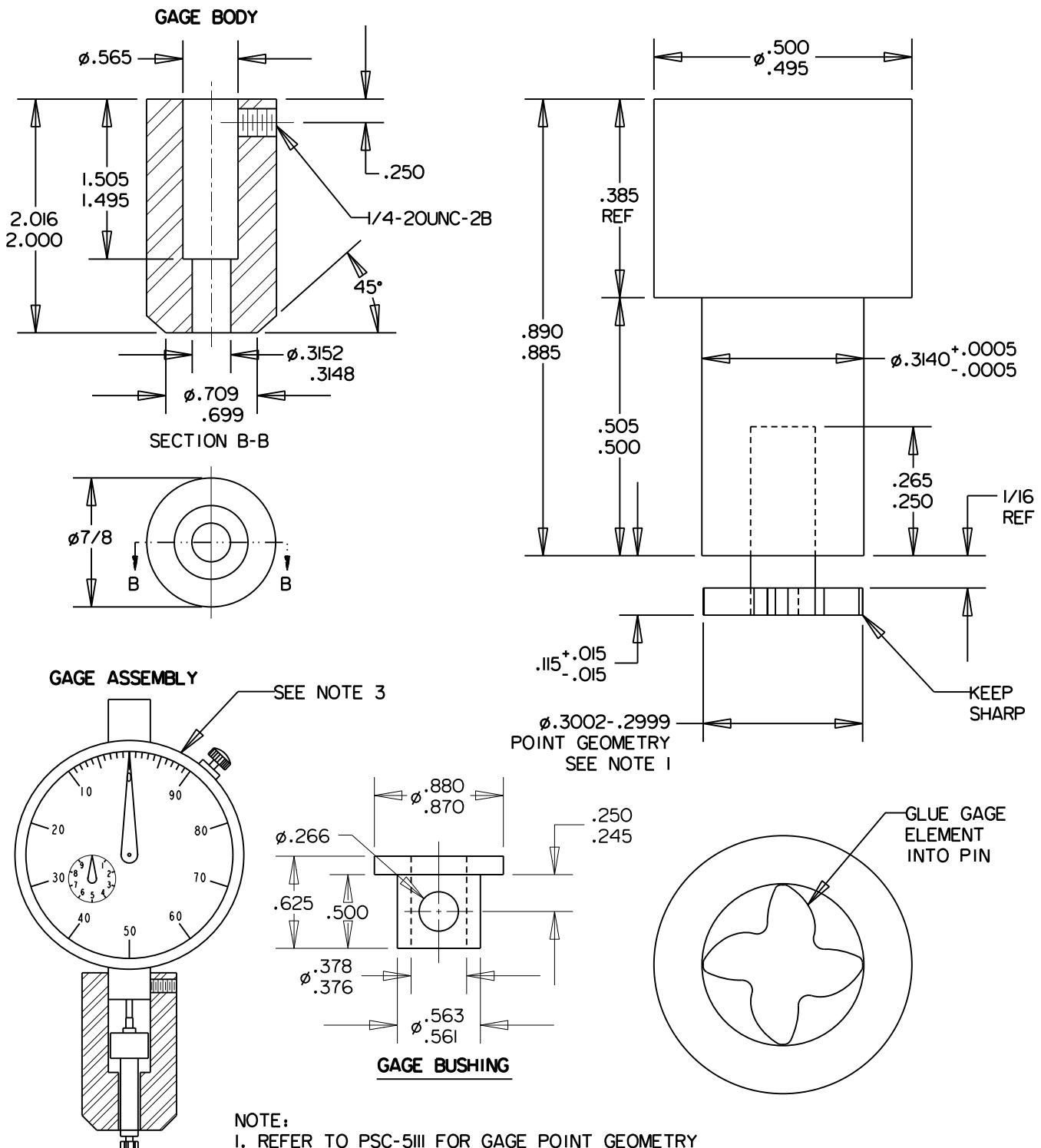
DATE

10-7-02

SHEET 1 OF 1

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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-2

DRAWN

G.DILLING

DATE

10-7-02

DRAWING NUMBER

PSC-5105

CHECKED:

G.DILLING

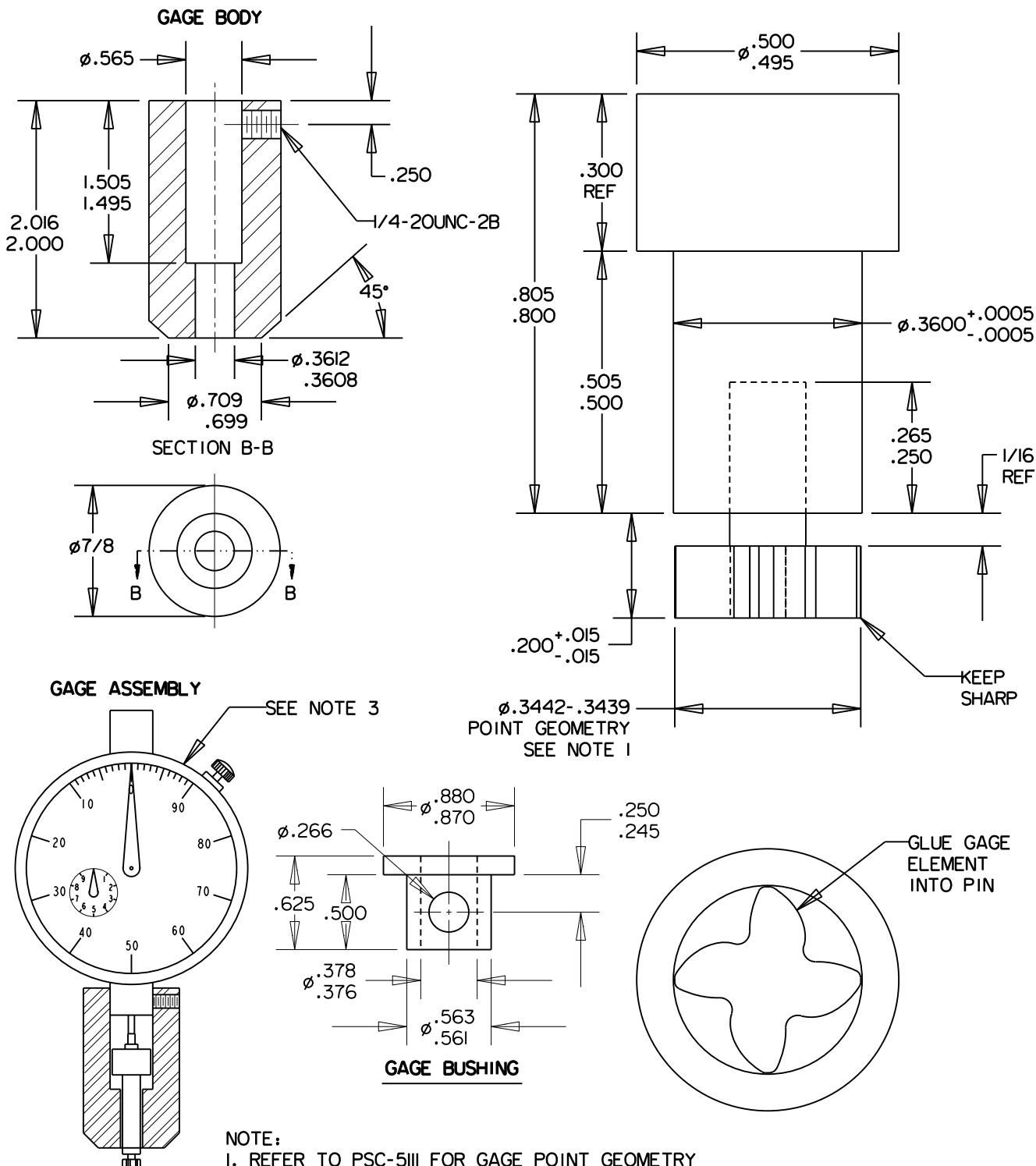
DATE

10-7-02

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REVISION ISSUED: 2/20/03 REVISED: 1/23/04

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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-3

DRAWN

G.DILLING

DATE

10-7-02

DRAWING NUMBER

PSC-5106

CHECKED:

G.DILLING

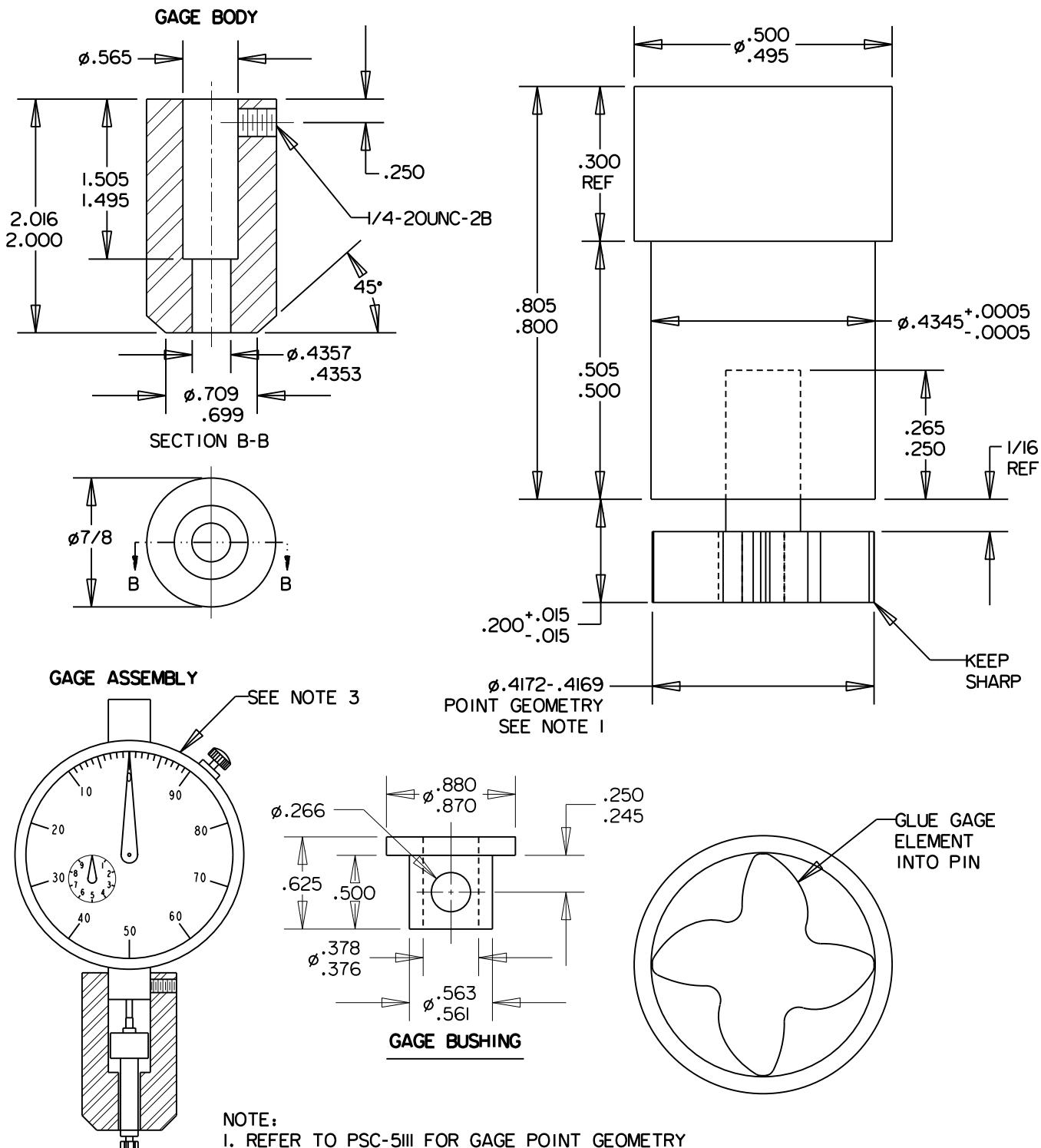
DATE

10-7-02

SHEET 1 OF 1

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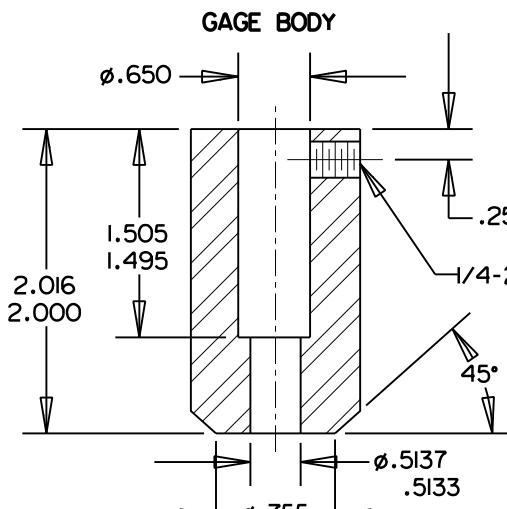
TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-4

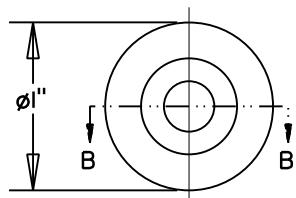
DRAWN	DATE	DRAWING NUMBER
G.DILLING	10-7-02	PSC-5107
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	10-7-02	

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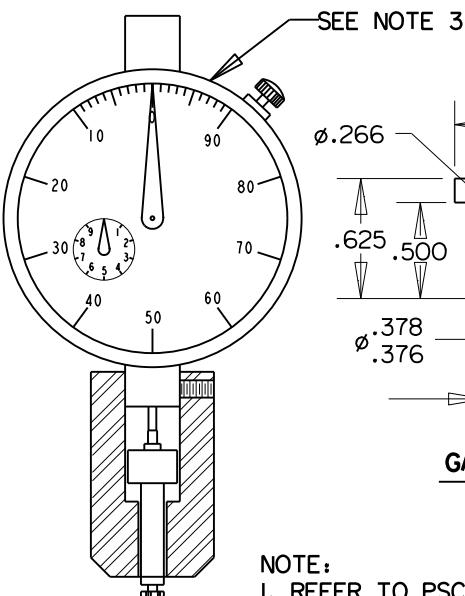
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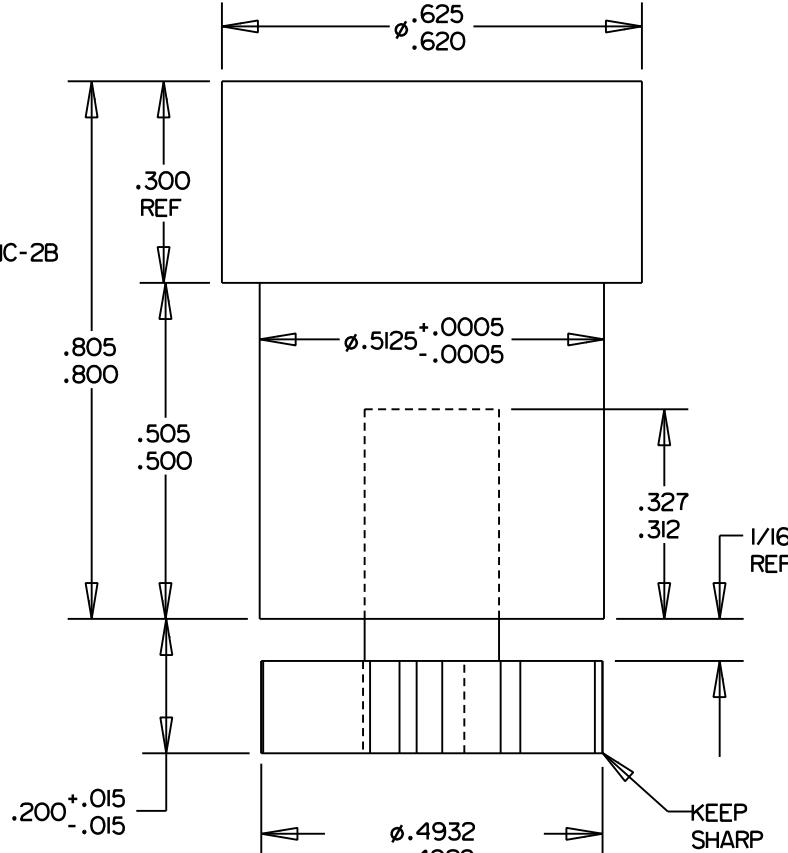
SECTION B-B



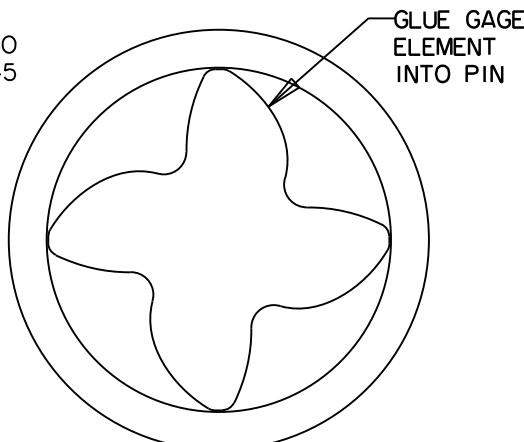
GAGE ASSEMBLY



GAGE BUSHING



POINT GEOMETRY
SEE NOTE I



NOTE:

1. REFER TO PSC-5III FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
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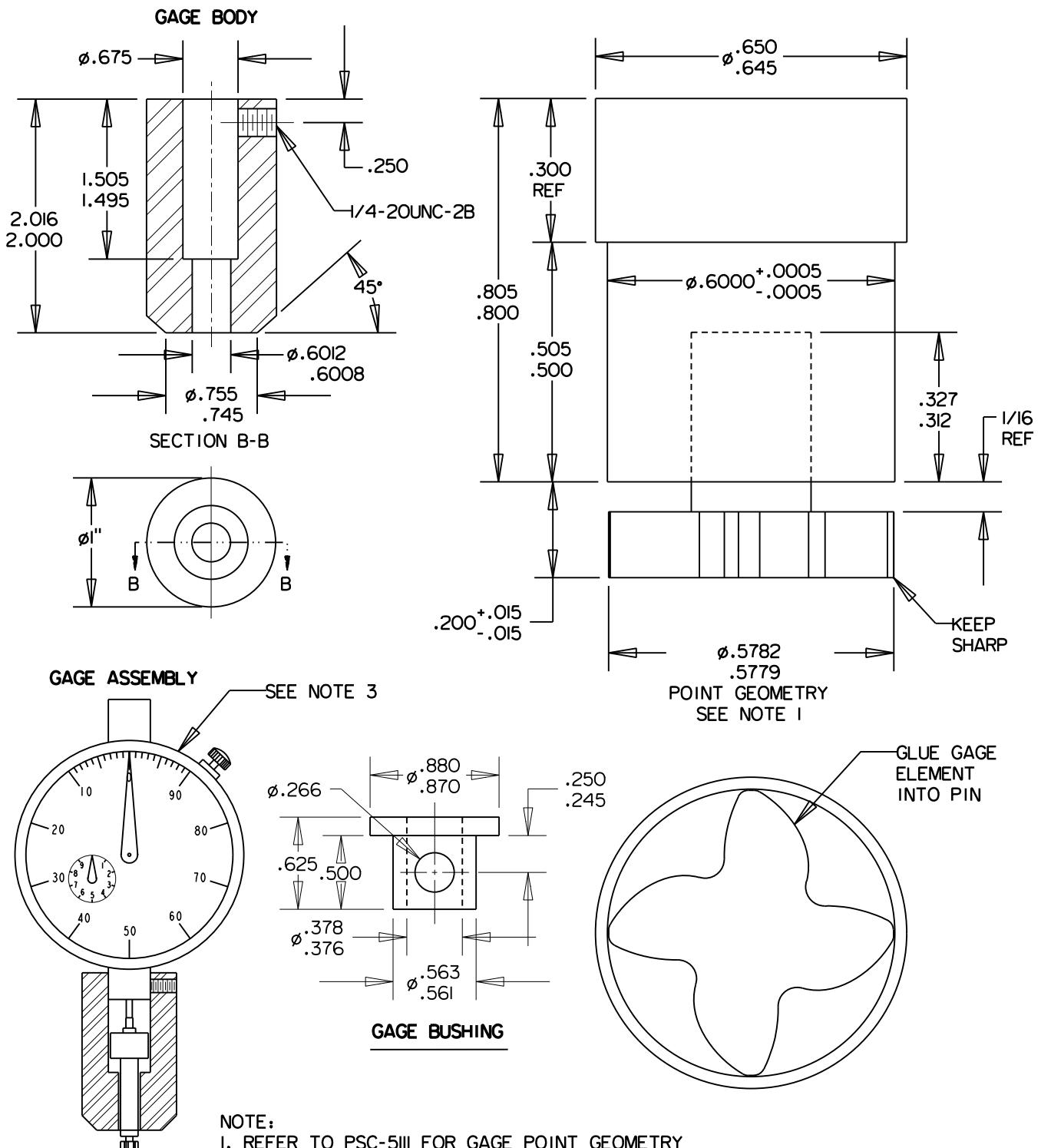
TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-5

DRAWN	DATE	DRAWING NUMBER
G.DILLING	10-7-02	PSC-5108
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	10-7-02	

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NOTE:

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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-6

DRAWN

G.DILLING

DATE

10-7-02

DRAWING NUMBER

PSC-5109

CHECKED:

G.DILLING

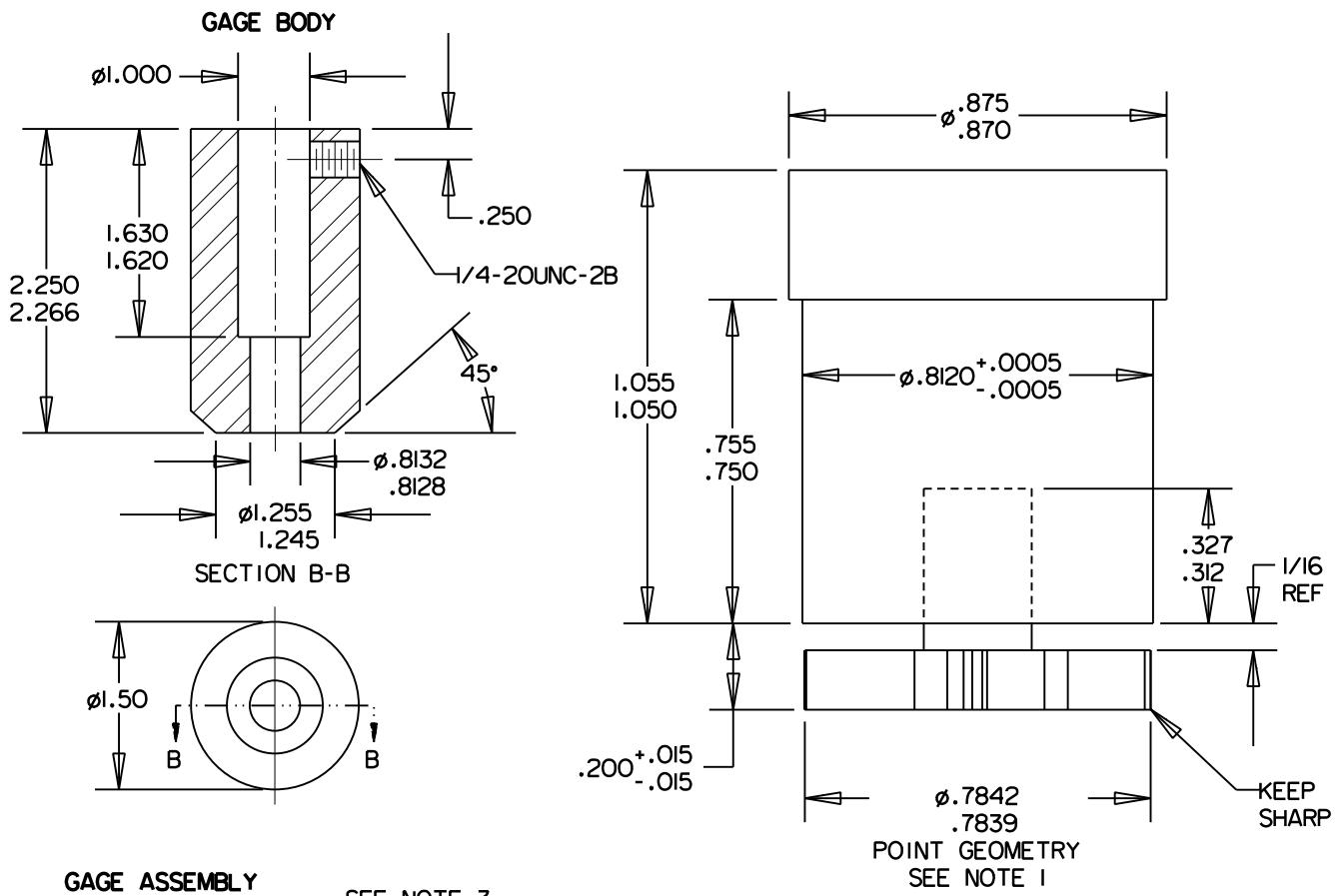
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SHEET 1 OF 1

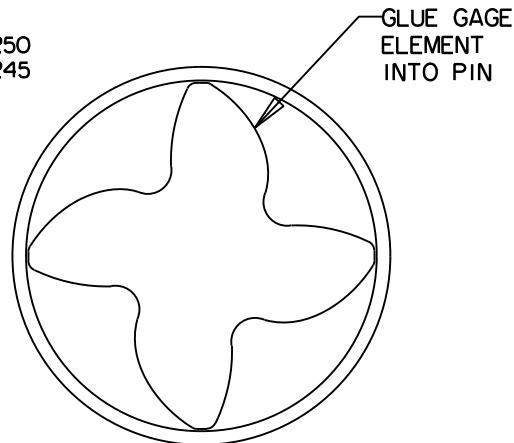
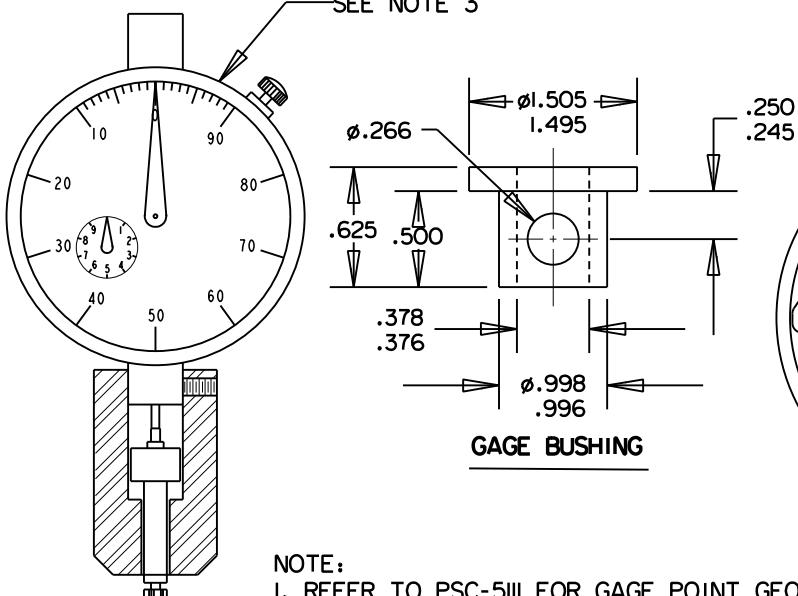
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SECTION B-B
POINT GEOMETRY
SEE NOTE I

GAGE ASSEMBLY SEE NOTE 3



NOTE:

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TITLE:

MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-7

DRAWN

G.DILLING

DATE

6-02-03

DRAWING NUMBER

PSC-5II0

CHECKED:

G.DILLING

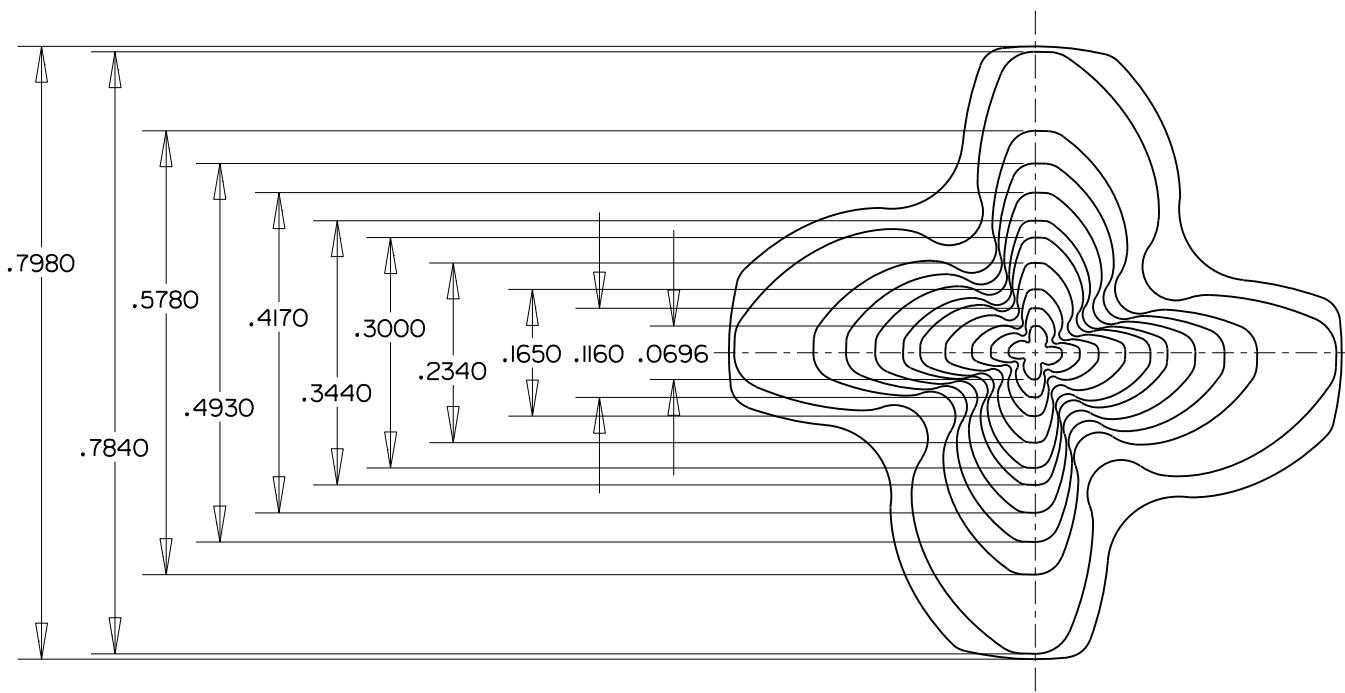
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6-04-03

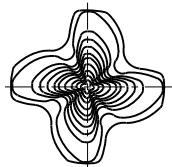
SHEET 1 OF 1

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SCREW RECESS FAWLAWAY
GAGE GEOMETRY
SCALE 4.000



FALLAWAY GEOMETRY
SCALE 1.000

NOTE:

- I. ELECTRONIC FILE OF THIS DRAWING WILL BE SUPPLIED TO VENDOR FOR THE PURPOSE OF MANUFACTURING THE SCREW RECESS FALAWAY GAGE.

REVISION	ISSUED: 6/04/03	REVISED: 1/23/04	REVISED: 7/01/08
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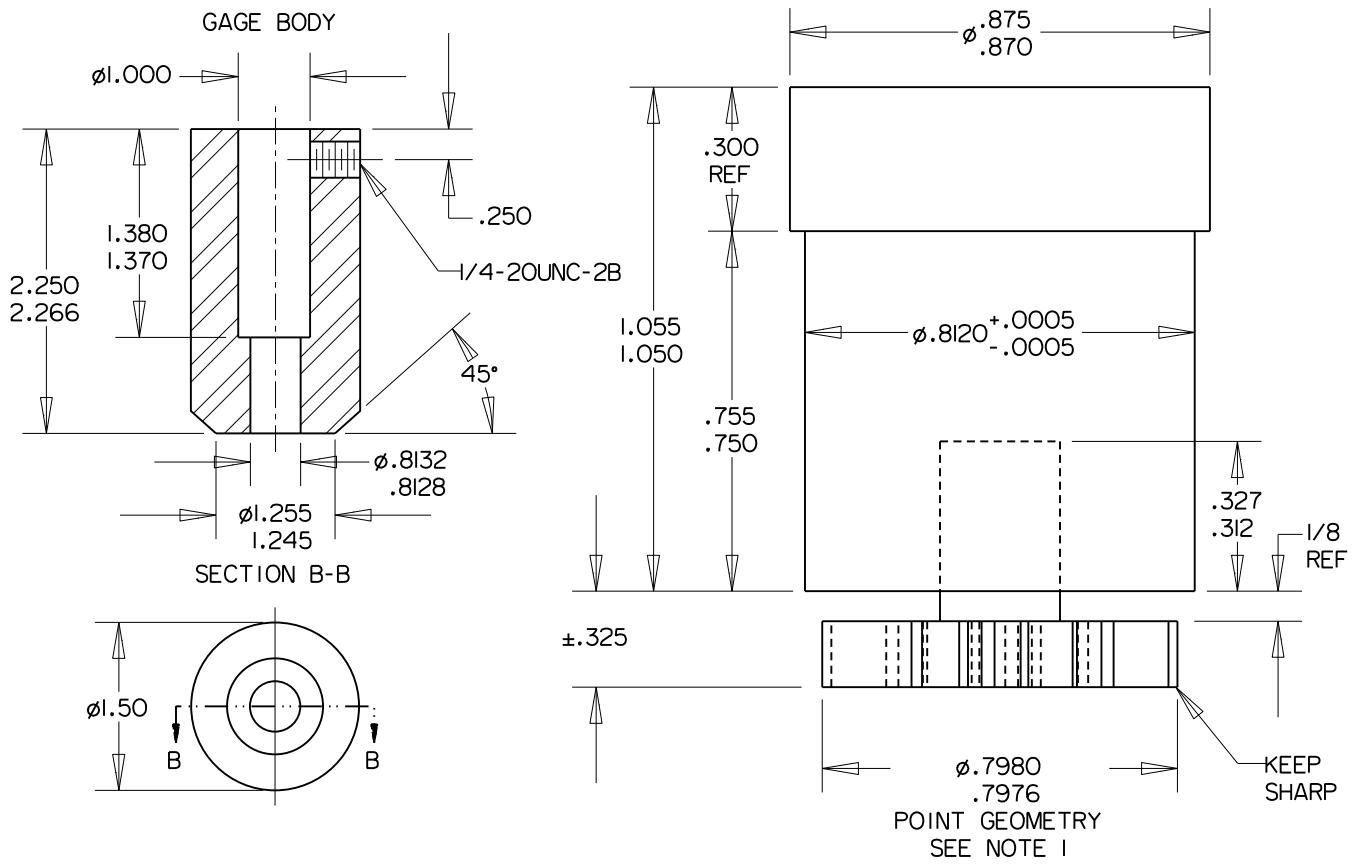
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TITLE: MORTORQ® SCREW RECESS
FALLAWAY GAGE GEOMETRY

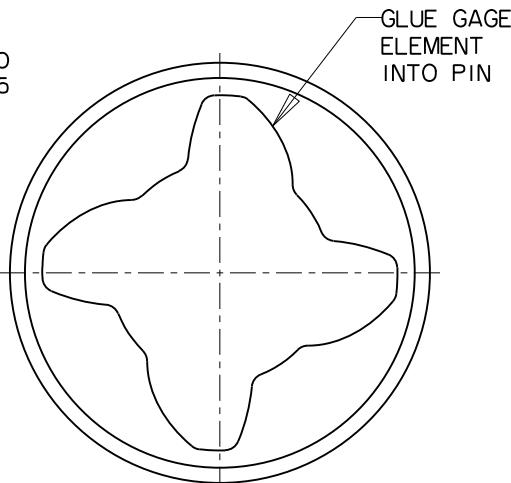
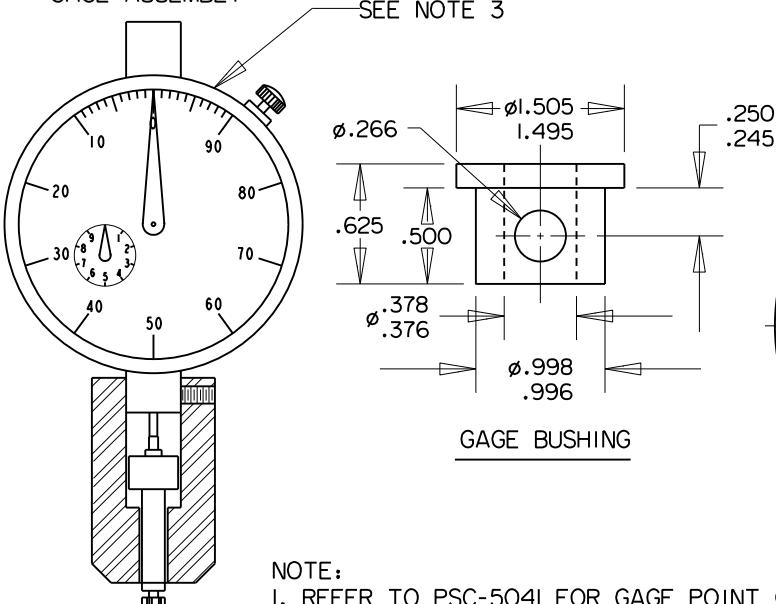
DRAWN G.DILLING	DATE 6/02/03	DRAWING NUMBER PSC-5III
CHECKED: G.DILLING	DATE 6/03/03	SHEET 1 OF 1

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GAGE ASSEMBLY



NOTE:

1. REFER TO PSC-504I FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
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TITLE:

MORTORQ® RECESS
PENETRATION GAGE ASSY MT-8

DRAWN

G.DILLING

DATE

7-1-08

DRAWING NUMBER

PSC-5113

CHECKED:

G.DILLING

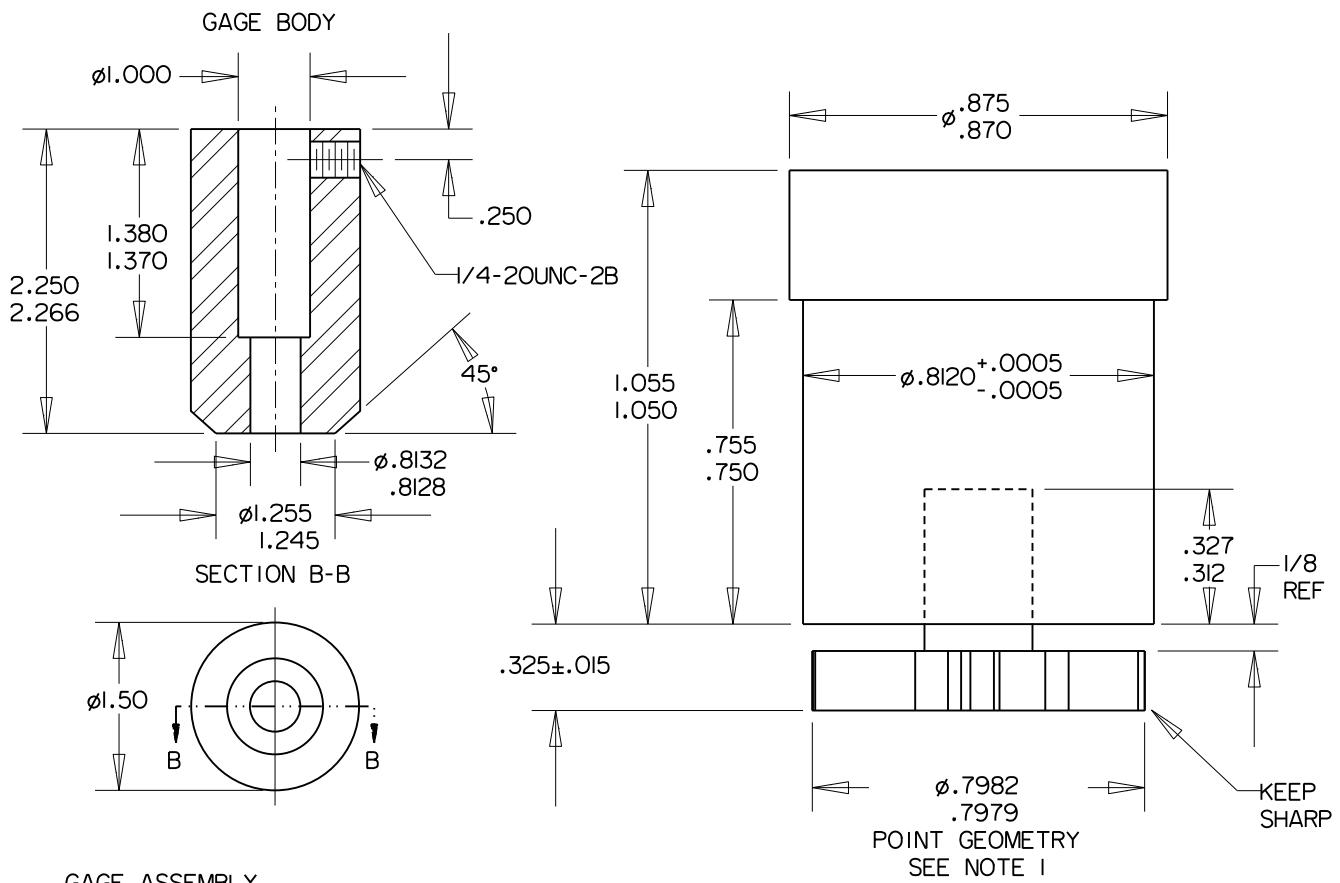
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7-1-08

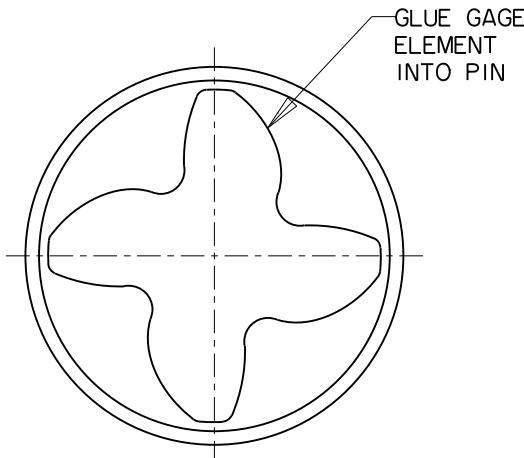
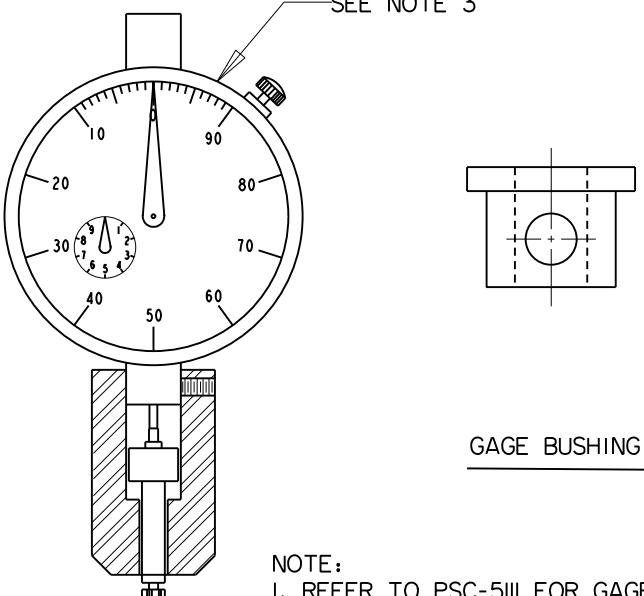
SHEET 1 OF 1

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GAGE ASSEMBLY SEE NOTE 3



NOTE:

1. REFER TO PSC-5III FOR GAGE POINT GEOMETRY ONLY, NOT FOR TOLERANCING OF POINT.
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TITLE: MORTORQ® RECESS
FALLAWAY GAGE ASSY MT-8

DRAWN	DATE	DRAWING NUMBER
G.DILLING	6-30-08	PSC-5II4

CHECKED:	DATE
G.DILLING	6-30-08

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PHONE: 774-396-6190 FAX: 508-966-2326

REVISION ISSUED: 6/30/08

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**MORTORQ® SPIRAL DRIVE SYSTEM
QUALITY SPECIFICATIONS**

INDEX

PSC-5024	SCOPE AND INSPECTION PLANS	1/30/04
PSC-5025	DRIVER BIT INSPECTION PROCEDURES	7/20/11
PSC-5027	RECESS INSPECTION PROCEDURES	12-21-12
PSC-5028	PUNCH INSPECTION PROCEDURES	7/02/08

MORTORQ® SPIRAL DRIVE SYSTEM QUALITY SPECIFICATIONS

1.0 SCOPE:

This quality specification defines inspection plans and procedures for initial inspection requirements, first article inspection, and final conformance inspection of MORTORQ spiral drive system driver bits, punches and recesses.

Inspection practice in accordance with procedures, sampling plans and specified gages set forth herein will guarantee product uniformity for dimension, appearance and function.

2.0 INSPECTION PLANS:

2.1 Initial Qualification:

Phillips Screw Company shall perform the initial qualification inspection for all new products as required under the license agreement.

A minimum of 50 pieces of each MORTORQ spiral drive system drive size and head style are to be qualified. Phillips Screw Company shall retain 25 pieces for reference material.

2.2 Periodic Inspection:

Every (4) months a letter is sent requesting a minimum of 5 pieces of each MORTORQ spiral drive system size and head style, as required by the license agreement.

2.3 First Article Inspection:

A first article inspection is required. Any defects found by visual inspection or gage readings beyond the stated limits, is reason for rejection and corrective action is required.

2.4 Final Quality Conformance Inspection:

Typical industry standards for sampling shall be used for each lot size. These samples will be inspected for visual and dimensional characteristics.

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
QUALITY SPECIFICATIONS

DRAWN L.DUGAN	DATE 6/11/03	DRAWING NUMBER PSC-5024
CHECKED: G.DILLING	DATE 1/30/04	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		
SHEET 1 OF 1		

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MORTORQ® SPIRAL DRIVE SYSTEM QUALITY SPECIFICATIONS BIT AND DRIVER INSPECTION PROCEDURES AND SPECIFICATIONS:

1.0 SCOPE:

The following document covers the equipment, procedures, test values and inspection criteria for MORTORQ spiral drive system screwdrivers, insert bits and power bits.

2.0 APPLICABLE DRAWINGS:

2.1 Insert driver bits: PSC-5026

2.2 Driver point dimensions:	MT-000	PSC-5031
	MT-00	PSC-5032
	MT-0	PSC-5033
	MT-1	PSC-5034
	MT-2	PSC-5035
	MT-3	PSC-5036
	MT-4	PSC-5037
	MT-5	PSC-5038
	MT-6	PSC-5039
	MT-7	PSC-5040
	MT-8	PSC-5041

2.3 Driver bit and screw-driver manufacturing gages:	MT-000	PSC-5071
	MT-00	PSC-5072
	MT-0	PSC-5073
	MT-1	PSC-5074
	MT-2	PSC-5075
	MT-3	PSC-5076
	MT-4	PSC-5077
	MT-5	PSC-5078
	MT-6	PSC-5079
	MT-7	PSC-5080
	MT-8	PSC-5082

2.4 Torque test blocks: PSC-5085

2.5 Root ring gauge: MT-000 - MT-4 PSC-5069-1
MT-5 - MT-8 PSC-5069-2

REVISION	REV 1 UPDATED 07-02-08	REV 2 UPDATED 07-20-11
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3.0 : REQUIREMENTS

3.1 Dimensions:

All bit and driver points shall conform to Phillips Screw Company's drawings PSC-5026 and PSC-5031 for MT-000; PSC-5032 for MT-00; PSC-5033 for MT-0; PSC-5034 for MT-1; PSC-5035 for MT-2; PSC-5036 for MT-3; PSC-5037 for MT-4; PSC-5038 for MT-5, PSC-5039 for MT-6, PSC-5040 for MT-7 and PSC-5041 for MT-8.

3.2 Quality:

The workmanship shall be of the highest quality throughout. Bits and screwdrivers shall be free from rust, fins, burrs, sharp or rough edges, corners or surfaces and defects that may impair their serviceability or durability.

3.3 Materials:

Screwdrivers and bits shall be made from the following recommended, equivalent or superior material:

3.3.1 Hand Screwdrivers - These drivers shall be made from AISI S2 steel or equivalent, and heat-treated to a hardness of HRC 58-63.

3.3.2 Insert and Power bits - These bits shall be made from AISI S2 steel or equivalent and heat-treated to a hardness of HRC 58-63.

3.3.3 Steel AISI S2 Type Analysis

Carbon .50 - .55

Manganese .45 - .55

Silicon .90 - 1.10

Molybdenum .45 - .55

Vanadium .15 - .25

3.4 Markings:

3.4.1 Bit marking shall consist of the letters "MT" and the point size (e.g. MT-2) and the manufacturer's symbol. Manufactures may also include company names, trademark, trade names, part numbers etc. if they so desire.

3.4.2 In the case of hand screwdrivers, the handle and ferrule may be utilized for the above marking.

3.4.3 In the case of insert bits, if insufficient space is available for marking, the package or shipping container shall include the required identification.

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	CHECKED: G.DILLING	DATE 1/30/04				
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3.5 Torsional strength:

3.5.1	Minimal Torsional Strength: Drive size	Fatigue Torque Limit: (Lb ins.) ±10 %
MT-000	10 *	6*
MT-00	48	29
MT-0	120	72
MT-1	315	189
MT-2	643	386
MT-3	919	551
MT-4	1800	1080
MT-5	2928*	1757*
MT-6	4736*	2842*
MT-7	11600*	6960*
MT-8	14000	8400

* Calculated values not verified by actual test results

3.5.2 Test blocks:

Screwdrivers and bits shall be tested in the test blocks having the same form and size of the recess as the bit being tested. Screwdriver and bit test blocks shall be in accordance with drawing PSC-5085.

3.5.3 Test procedures:

The torsional loads shall be applied either with suitable torque wrenches or by means of a suitable lever system with dead weights. The driver or bit must be inserted fully into the test block and restrained in a hold down device to provide firm engagement with no axial movement.

The torsional load at failure shall be taken as the strength of the driver bit.

The failure load must exceed the minimum torsional strength as shown in paragraph 3.5.1

3.6 Gaging:

3.6.1 GO Ring Gage:

The MORTORQ® spiral drive system driver bit must go through the appropriate go gage (ref . PSC-5071 thru PSC-5082) and extend into the gage for the minimum "straight length full form" dimension as shown on the appropriate driver point drawing (ref. PSC -5031 thru PSC-5041).

3.6.2 NO-GO Ring Gage:

The driver bit must not enter the appropriate no-go gage (ref. PSC-5071 thru PSC-5082).

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REV 1 UPDATED
07-02-08

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TITLE: **®**
MORTORQ® SPIRAL DRIVE SYSTEM
BIT AND DRIVER INSPECTION

DRAWN L.DOUGAN DATE 6/11/03 DRAWING NUMBER

PSC-5025

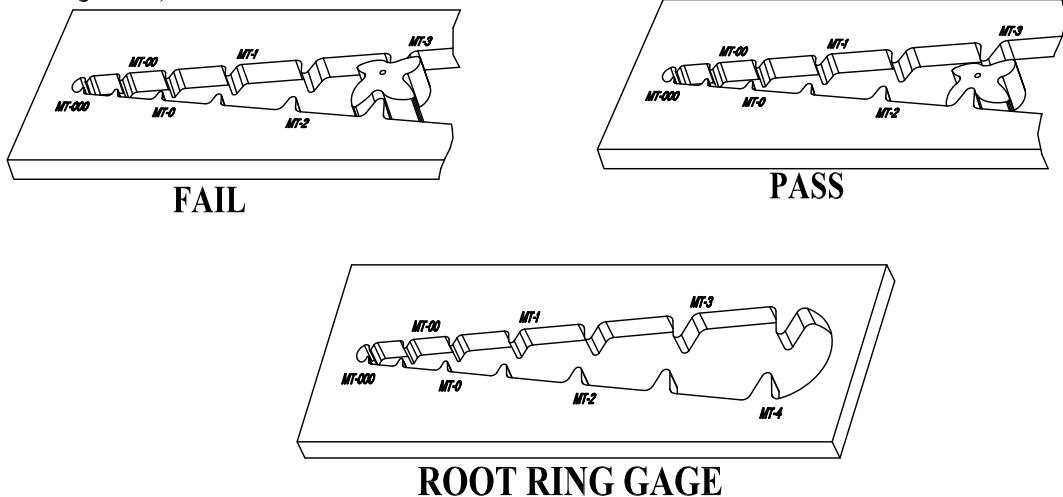
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3.6.3 Root Ring Gage:

The root ring gage (PSC-5069-1) checks the minimum root tolerance of driver bits MT-000 thru MT-4. The root ring gage (PSC-5069-2) checks the minimum root tolerance of driver bits MT-5 thru MT-8. The bit must enter the bottom of the tapered gage but not extend beyond the top of the gage. (See pass/fail drawing below).



4.0 PHYSICAL PROPERTIES

4.1 Discontinuities:

Driver bits shall be free from discontinuities such as laps, seams or inclusions greater in depth than 2 percent of the thickness at the discontinuity location.

4.2 Cracks:

Driver bits shall be free from cracks in any location or direction. A crack is defined as a clean crystalline break through the grain or grain boundary without inclusion of foreign elements.

5.0 QUALITY ASSURANCE PROVISIONS:

5.1 Responsibility for Inspection:

Unless otherwise specified in the contract or order, the manufacturer is responsible for the performance of all quality conformance inspection requirements as specified herein.

5.2 Change of Product:

After initial approval, any change of product as regards to materials, design, construction, or methods of manufacture shall require review and approval of Phillips Screw Company and may require qualification testing prior to incorporation into production lots.

5.3 Qualification Testing:

Qualification testing shall be performed per section 3.0 of this drawing.

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DRAWN	L.DUGAN	DATE	6/11/03	DRAWING NUMBER
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MORTORQ® SPIRAL DRIVE SYSTEM QUALITY SPECIFICATIONS

RECESS INSPECTION PROCEDURES AND SPECIFICATIONS:

1.0 SCOPE:

The following document covers the equipment, procedures, test values and inspection criteria for MORTORQ spiral drive system recesses.

2.0 APPLICABLE DRAWINGS:

2.1 Screw Recess MT-000 thru MT-8	PSC-5050
Go, No-Go gages:	PSC-5058

2.2 Recess Penetration Gage Assy:

MT-000	PSC-5091
MT-00	PSC-5092
MT-0	PSC-5093
MT-1	PSC-5094
MT-2	PSC-5095
MT-3	PSC-5096
MT-4	PSC-5097
MT-5	PSC-5098
MT-6	PSC-5099
MT-7	PSC-5100
MT-8	PSC-5113

2.3 Recess Fallaway Gage Assy:

MT-000	PSC-5101
MT-00	PSC-5102
MT-0	PSC-5103
MT-1	PSC-5104
MT-2	PSC-5105
MT-3	PSC-5106
MT-4	PSC-5107
MT-5	PSC-5108
MT-6	PSC-5109
MT-7	PSC-5110
MT-8	PSC-5114

REVISION REV 1 UPDATED 07-02-08

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
RECESS INSPECTION

DRAWN L.DUGAN	DATE 6/11/03	DRAWING NUMBER PSC-5027
CHECKED G.DILLING	DATE 1/30/04	SHEET 1 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS®, PHILLIPS®, POZIDRIV®, ACR®, POZISQUARE®, PHILLIPS SQUARE-DRIV®, TORQ-SET®, TRI-WING®, MORTORQ®, HEXSTIX®, POZILOCK®, ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

3.0 REQUIREMENTS:

3.1 Dimensions:

All MORTORQ® spiral drive system recesses shall conform to the appropriate Phillips Screw Company head standards.

3.2 Quality:

The workmanship shall be of the highest quality throughout. Recesses shall be free from rust, fins, burrs, sharp or rough edges, corners or surfaces and defects that may impair their serviceability or durability.

3.3 Markings:

3.3.1 No special marking is required.

3.4 Gaging:

3.4.1 Go Plug Gage:

Using light finger pressure only, place the appropriate GO gage (PSC-5050) into the recess until resistance is felt.

Failure to bottom the gage in the recess shall be cause for rejection.

3.4.2 NO-GO Plug Gage:

Using light finger pressure only, attempt to place the appropriate NO-GO gage (PSC-5050) into the recess.

Gage entry beyond the acceptable fallaway limit at the head surface is cause for rejection.

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TITLE: MORTORQ® SRIRAL DRIVE SYSTEM
RECESS INSPECTION

DRAWN L.DUGAN	DATE 6/11/03	DRAWING NUMBER PSC-5027
CHECKED: G.DILLING	DATE 1/30/04	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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3.4.3 Penetration Gage:

Using the appropriate size penetration gage (section 2.2), check the zero adjustment against a known flat piece of steel stock.

Insert the penetration element into the MORTORQ spiral drive system recess and firmly push the top of the recess against the bottom of the gage body.

Measure and record the gage penetration. The reading must be within acceptable limits per the application part standard.

Gage readings outside the stated limits are cause for rejection.

3.4.4 Fallaway gage:

Fallaway is a condition whereby the material of the screw does not completely conform to the shape of the header punch that produced it.

Using the appropriate size fallaway gage (section 2.3), check the zero adjustment against a known flat piece of steel stock.

Insert the fallaway element into the MORTORQ spiral drive system recess and firmly push the top of the recess against the bottom of the gage body.

Measure and record the gage fallaway.

A gage reading greater than the maximum limit as shown in TABLE 1 (inch series) or Table 2 (metric series) is cause for rejection.

For any non-standard head styles not in the Mortorq spiral drive system manual, the maximum fallaway gage reading shall not exceed 30% of the maximum recess penetration depth.

REVISION REV 1 UPDATED 02-04-09

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DRAWN	L.DOUGAN	DATE	6/11/03	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	1/30/04	PSC-5027
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MAXIMUM FALAWAY

TABLE 1

SCREW SIZE	PSC-5005 82° FLAT	PSC-5006 100° FLAT	PSC-5007 FLAT FILLISTER	PSC-5008 PAN	PSC-5009 BUTTON	PSC-5010 130° FLAT	PSC-5011 100° FLAT REDUCE	PSC-5012 82° UND FLAT
2	—	.005	—	—	—	—	—	—
4	—	.007	.009	.008	.008	—	—	—
6	.011	.009	.009	.011	.011	—	—	.009
8	.012	.010	.010	.012	.012	.008	.009	.010
10	.012	.008	.011	.012	.014	.008	.009	.011
12	.014	—	—	.016	—	—	—	.012
1/4	.015	.014	.012	.017	.016	.010	.009	.013
5/16	.020	.017	.015	.024	.019	.012	.014	.017
3/8	.022	.021	.019	.026	.026	.015	.015	.022
7/16	.025	.024	.020	.031	—	.017	.020	.024
1/2	.028	.025	.022	.032	.034	—	.022	.028
9/16	.031	.031	—	.037	—	—	.028	.028
5/8	.035	.033	—	.040	.046	—	.028	.031
3/4	.046	.033	—	.046	—	—	.034	.038
7/8	—	.042	—	—	—	—	.046	—
1"	—	.049	—	—	—	—	.049	—

MAXIMUM FALAWAY

TABLE 1 CONT.

SCREW SIZE	PSC-5013 100° UND FLAT	PSC-5016 100° FLAT
2	—	—
4	—	—
6	—	—
8	—	—
10	.010	.009
12	—	—
1/4	.012	—
5/16	.015	—
3/8	.019	—
7/16	.020	—
1/2	.022	—
9/16	—	—
5/8	—	—
3/4	—	—
7/8	—	—
1"	—	—

MAXIMUM FALAWAY

TABLE 2

SCREW SIZE	PSC-5014 PAN METRIC	PSC-5015 92° FLAT METRIC
M2	0.15	—
M2.5	0.17	—
M3	0.21	0.17
M3.5	0.27	—
M4	0.30	0.24
M5	0.31	0.26
M6	0.44	0.37
M8	0.61	0.47
M10	0.66	0.55
M12	—	0.62
M16	—	0.85
M20	—	1.16

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TITLE: [®]
MORTORQ SPIRAL DRIVE SYSTEM
RECESS INSPECTION

DRAWN L.DUGAN	DATE 6/11/03	DRAWING NUMBER PSC-5027
CHECKED G.DILLING	DATE 1/30/04	

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REVISION
REV 1 UPDATED
02-04-09

4.0 PHYSICAL PROPERTIES:

4.1 Head Discontinuities:

See FIGURE #1 for examples of head discontinuities that shall be considered "ACCEPTABLE". Screws will be rejected if they exhibit imperfections as shown as "NOT ACCEPTABLE".

5.0 RECESS TO SHANK ECCENTRICITY:

5.1 The recesses in screw heads shall not be eccentric with the screw bodies by more than 6% of the nominal (basic) body diameter or .015", whichever is smaller.

5.2 Generally, this inspection will be most readily accomplished by a simple visual examination.

6.0 QUALITY ASSURANCE PROVISIONS:

6.1 Responsibility for Inspection:

Unless otherwise specified in the contract or order, the manufacturer is responsible for the performance of all quality conformance inspection requirements as specified herein.

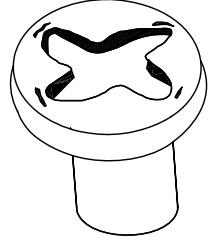
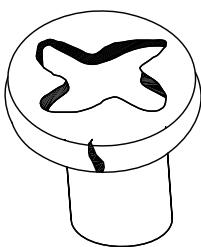
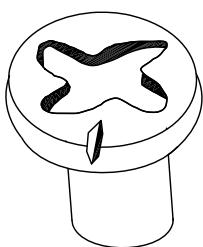
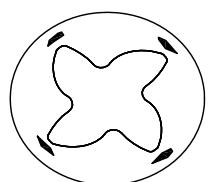
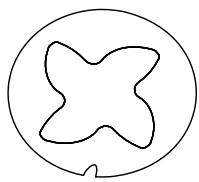
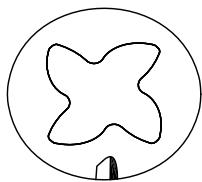
6.2 Qualification Testing:

Qualification testing shall be performed per sections 3.0, 4.0 and 5.0 of this drawing.

REVISION REV 1; 12-21-12

© COPYRIGHT 2012 PHILLIPS SCREW COMPANY. ALL RIGHTS RESERVED.		TITLE: ® MORTORQ SPIRAL DRIVE SYSTEM RECESS INSPECTION		
DRAWN	L.DUGAN	DATE	6/11/03	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	1/30/04	PSC-5027 SHEET 5 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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FIGURE #1
NOT ACCEPTABLE



(1)

(2)

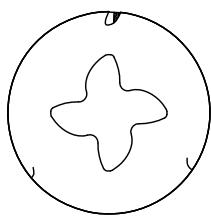
(3)

LARGE OPEN IMPERFECTIONS
EXTENDING OVER 1/2 WAY
TO RECESS

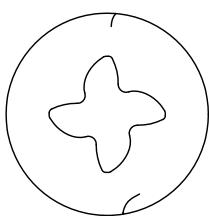
OPEN ANGULAR
IMPERFECTIONS
ON EDGE OF HEAD

SLIVERS OR LOOSE
FLAKES ON TOP OF HEAD

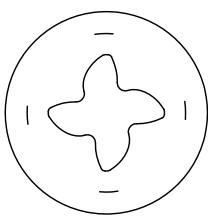
ACCEPTABLE



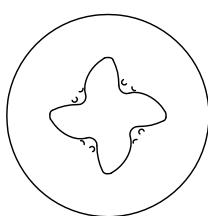
(4)



(5)



(6)



(7)

MULTIPLE IMPERFECTIONS
NOT EXTENDIND 1/2 WAY
TO RECESS AND NOT
AFFECTING USEABILITY

SLIGHT HAIR
LINES

SLIGHT RECESS FLOW
LINES

SLIGHT TOOL MARKS
SLIGHT PIN MARKS

REVISION

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RECESS INSPECTION

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DRAWN L.DUGAN DATE 7/07/03 DRAWING NUMBER

PSC- 5027

CHECKED: G.DILLING DATE 1/30/04 SHEET 6 OF 6

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MORTORQ® SPIRAL DRIVE SYSTEM QUALITY SPECIFICATIONS

PUNCH INSPECTION PROCEDURES AND SPECIFICATIONS:

1.0 SCOPE:

The following document covers the equipment, procedures, test values and inspection criteria for MORTORQ spiral drive system punches.

2.0 APPLICABLE DRAWINGS:

2.1 Punch Recess Go, No-Go gages:	MT-000 thru MT-8	PSC-5060
		PSC-5068

2.2 Punch Point Dimensions:

MT-000	PSC-5151
MT-00	PSC-5152
MT-0	PSC-5153
MT-1	PSC-5154
MT-2	PSC-5155
MT-3	PSC-5156
MT-4	PSC-5157
MT-5	PSC-5158
MT-6	PSC-5159
MT-7	PSC-5160
MT-8	PSC-5161

2.3 Recess Penetration Gage Assy:

MT-000	PSC-5091
MT-00	PSC-5092
MT-0	PSC-5093
MT-1	PSC-5094
MT-2	PSC-5095
MT-3	PSC-5096
MT-4	PSC-5097
MT-5	PSC-5098
MT-6	PSC-5099
MT-7	PSC-5100
MT-8	PSC-5113

REVISION REV 1 UPDATED 07-02-08

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CHECKED: G.DILLING		DATE 1/30/04	SHEET 1 OF 3	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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3.0 REQUIREMENTS:

3.1 Dimensions:

All MORTORQ® spiral drive system punches shall conform to the appropriate Phillips Screw Company's punch standards and punch point dimensions as shown in section 2.2.

3.2 Quality:

The workmanship shall be of the highest quality throughout. Punches shall be free from rust, fins, burrs, sharp or rough edges, corners or surfaces and defects that may impair their serviceability or durability.

3.3 Markings:

3.3.1 Punch marking shall consist of the letters "MT" and the point size (e.g. MT- 2) and the manufacturer's symbol. Manufactures may also include company names, trademark, trade names, part numbers etc., if they so desire.

3.4 Gaging:

3.4.1 Punches may be inspected using casts, plug and penetration gages. Casts must be made of a good grade casting material. (Buehler® Ultra-mount™ or equivalent)

3.4.2 Go Plug Gage:

Using light finger pressure only, place the appropriate GO gage (PSC-5060) into the recess until resistance is felt.

Failure to bottom the gage in the recess shall be cause for rejection.

3.4.3 NO-GO Plug Gage:

Using light finger pressure only, attempt to place the appropriate NO-GO gage (PSC-5060) into the recess.

Gage entry beyond the recess radius at the face of the punch is cause for rejection.

3.4.4 Special Gages:

Special GO/NO-GO Plug Gages will be required for any non-standard punch recesses.

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CHECKED: G.DILLING		DATE 1/30/04	SHEET 2 OF 3			
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3.4.5 Penetration Gage:

Using the appropriate size penetration gage (section 2.3), check the zero adjustment against a known flat piece of steel stock.

Insert the penetration element into the MORTORQ spiral drive system recess, formed in the cast and firmly push the top of the recess against the bottom of the gage body.

Measure and record the gage penetration. The reading must be within acceptable limits per the application part standard.

Gage readings outside the stated limits are cause for rejection.

4.0 QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

Unless otherwise specified in the contract or order, the manufacturer is responsible for the performance of all quality conformance inspection requirements as specified herein.

4.2 Change of Product:

After initial approval, any change of product as regards to materials, design, construction, or methods of manufacture shall require review and approval of Phillips Screw Company and may require qualification testing prior to incorporation into production lots.

4.3 Qualification Testing:

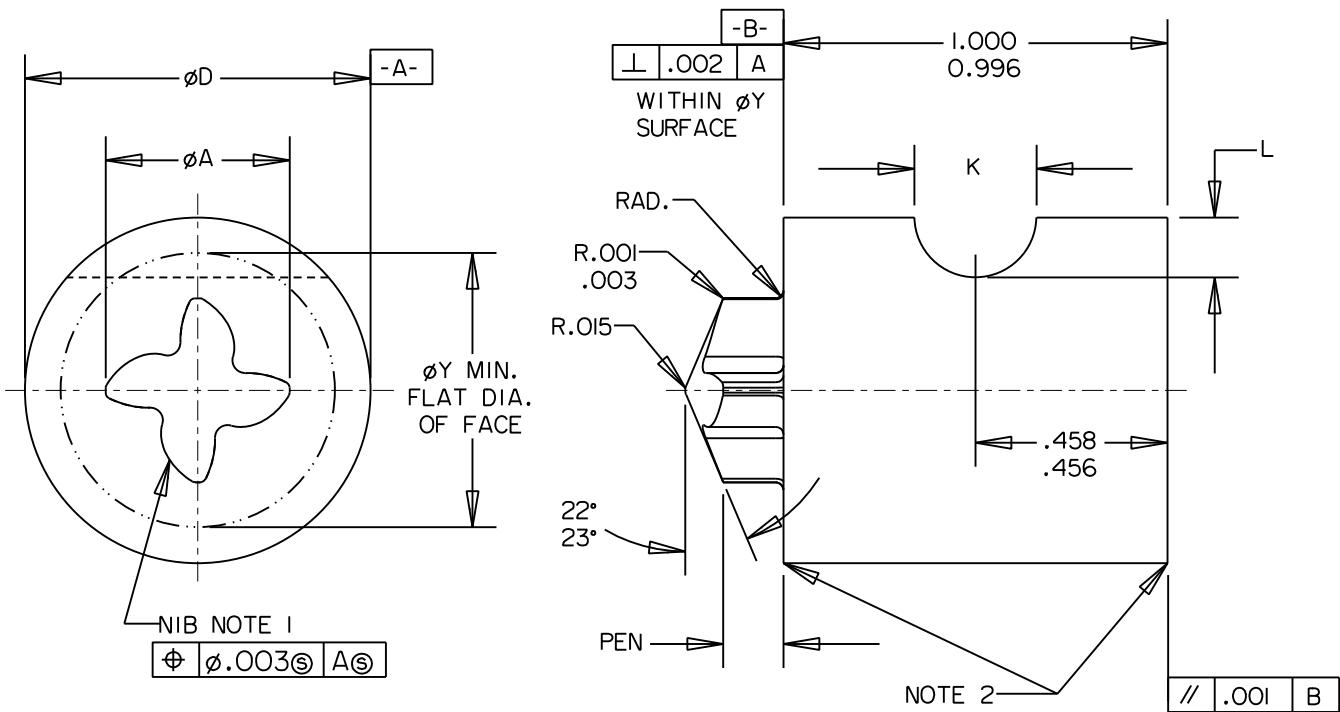
Qualification testing shall be performed per section 3.0 of this drawing.

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MORTORQ® ENGINEERING MANUAL
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PSC-5I21	100° FLAT HEAD PUNCHES (INCH)	2/9/09
PSC-5I22	FLAT FILLISTER HEAD PUNCHES (INCH)	2/9/09
PSC-5I23	PAN HEAD PUNCHES (INCH)	2/9/09
PSC-5I24	BUTTON HEAD PUNCHES (INCH)	2/9/09
PSC-5I25	130° FLAT HEAD PUNCHES (INCH)	2/9/09
PSC-5I26	100° REDUCED FLAT HEAD PUNCH (INCH)	2/9/09
PSC-5I27	82° UNDERCUT FLAT HEAD PUNCH (INCH)	2/9/09
PSC-5I28	100° UNDERCUT FLAT HEAD PUNCH (INCH)	2/9/09
PSC-5I29	PAN HEAD PUNCHES (METRIC)	2/9/09
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PSC-5I57	MT-4 PUNCH POINT DIMENSIONS	1/16/04
PSC-5I58	MT-5 PUNCH POINT DIMENSIONS	1/16/04
PSC-5I59	MT-6 PUNCH POINT DIMENSIONS	1/16/04
PSC-5I60	MT-7 PUNCH POINT DIMENSIONS	1/16/04
PSC-5I61	MT-8 PUNCH POINT DIMENSIONS	6/23/08



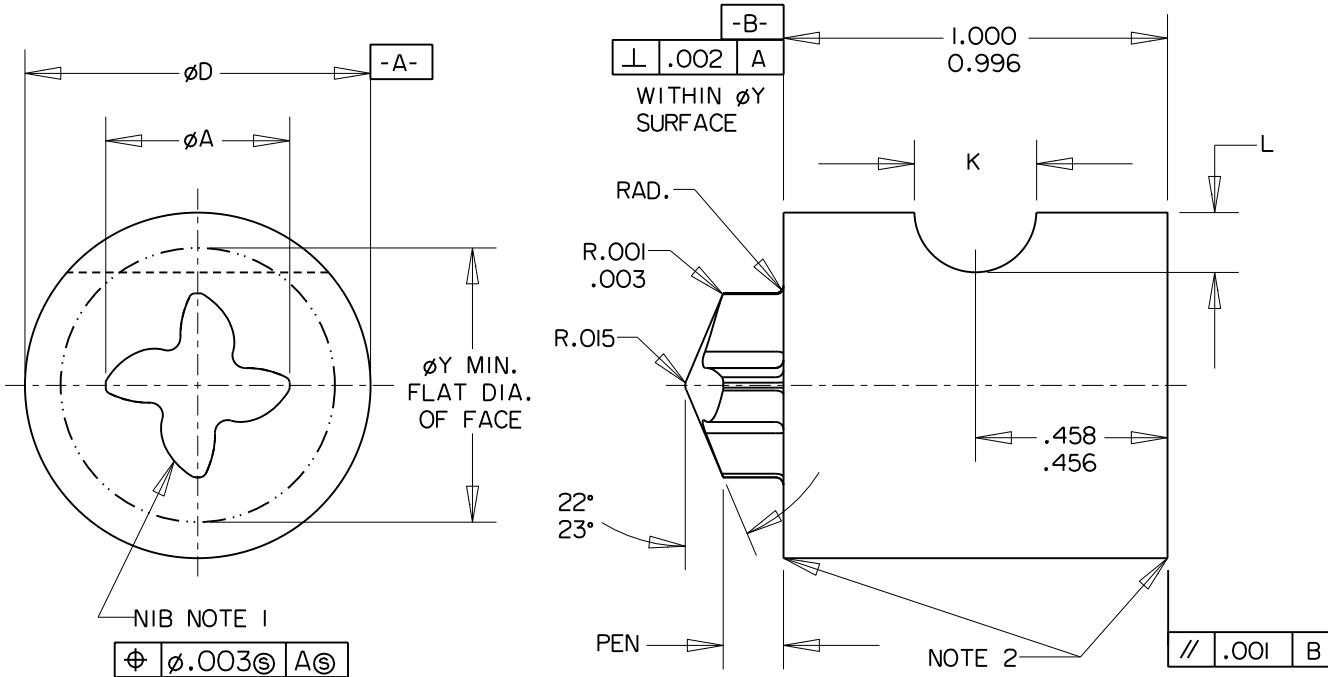
SCREW SIZE	PUNCH NO.	+.0020 -.0000	ØA	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
									MAX.	MIN.	
6	MT-00-2	.1200	.5625	.007	.212	.106	.375	.037	.034	.034	MT-00
8	MT-0-1	.1694	.8750	.008	.212	.106	.594	.040	.037	.037	MT-0
10	MT-I-7	.2395	.8750	.008	.212	.106	.400	.040	.037	.037	MT-I
12	MT-I-1	.2395	1.0000	.010	.212	.106	.688	.048	.045	.045	MT-I
1/4	MT-2-5	.3070	1.0000	.010	.212	.106	.812	.050	.047	.047	MT-2
5/16	MT-3-2	.3527	1.2500	.013	.212	.106	.890	.067	.064	.064	MT-3
3/8	MT-4-2	.4275	1.2500	.014	.212	.106	1.020	.072	.069	.069	MT-4
7/16	MT-4-5	.4275	1.2500	.017	.212	.106	1.050	.084	.081	.081	MT-4
1/2	MT-4-1	.4275	1.5000	.018	.212	.106	1.150	.092	.089	.089	MT-4
9/16	MT-5-1	.5053	1.5000	.020	.212	.106	1.200	.102	.099	.099	MT-5
5/8	MT-5-9	.5053	1.5000	.023	.212	.106	1.200	.117	.114	.114	MT-5
3/4	MT-6-1	.5928	2.0000	.030	.212	.106	1.812	.152	.149	.149	MT-6

NOTES:

1. REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION ISSUED: 9/2/03 REVISED: 1/20/04 REV: 8/29/08 LKD REVISED: 2/9/09

© COPYRIGHT 2001 PHILLIPS SCREW COMPANY. ALL RIGHTS RESERVED.		TITLE: MORTORQ® SPIRAL DRIVE SYSTEM FLAT HEAD PUNCH 82° HEAD (INCH)						
DRAWN G.DILLING	DATE 10/21/02	DRAWING NUMBER PSC-5120	SHEET 1 OF 1					
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326								
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY								



SCREW SIZE	PUNCH NO.	+.00020 -.0000	ØA	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
									MAX.	MIN.	
2	MT-000-I	.0720	.5625	.004	.212	.106	.250	.018	.015		MT-000
4	MT-00-I	.1200	.5625	.004	.212	.106	.250	.022	.019		MT-00
6	MT-00-9	.1200	.5625	.006	.212	.106	.305	.030	.027		MT-00
8	MT-0-12	.1694	.5625	.006	.212	.106	.375	.032	.029		MT-0
10	MT-1-14	.2395	.5625	.005	.212	.106	.438	.027	.024		MT-1
1/4	MT-1-I-II	.2395	.8750	.009	.212	.106	.750	.047	.044		MT-1
5/16	MT-2-9	.3070	1.0000	.011	.212	.106	.750	.055	.052		MT-2
3/8	MT-3-8	.3527	1.0000	.014	.212	.106	.844	.070	.067		MT-3
7/16	MT-4-6	.4275	1.2500	.016	.212	.106	.890	.080	.077		MT-4
1/2	MT-5-6	.5053	1.2500	.016	.212	.106	1.020	.082	.079		MT-5
9/16	MT-5-I	.5053	1.5000	.020	.212	.106	1.150	.102	.099		MT-5
5/8	MT-6-3	.5928	1.5000	.022	.212	.106	1.375	.110	.107		MT-6
3/4	MT-7-4	.7993	2.0000	.022	.212	.106	1.625	.110	.107		MT-7
7/8	MT-7-I	.7993	2.0000	.028	.212	.106	1.812	.140	.137		MT-7
1"	MT-8-I	.8200	2.5000	.032	.212	.106	2.050	.162	.159		MT-8

NOTES:

- REFER TO PUNCH DRAWING PSC-515I THRU PSC-516I FOR PUNCH POINT DIMENSIONS NOT SHOWN.
- CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
- DIMENSIONS ARE IN INCHES.
- PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

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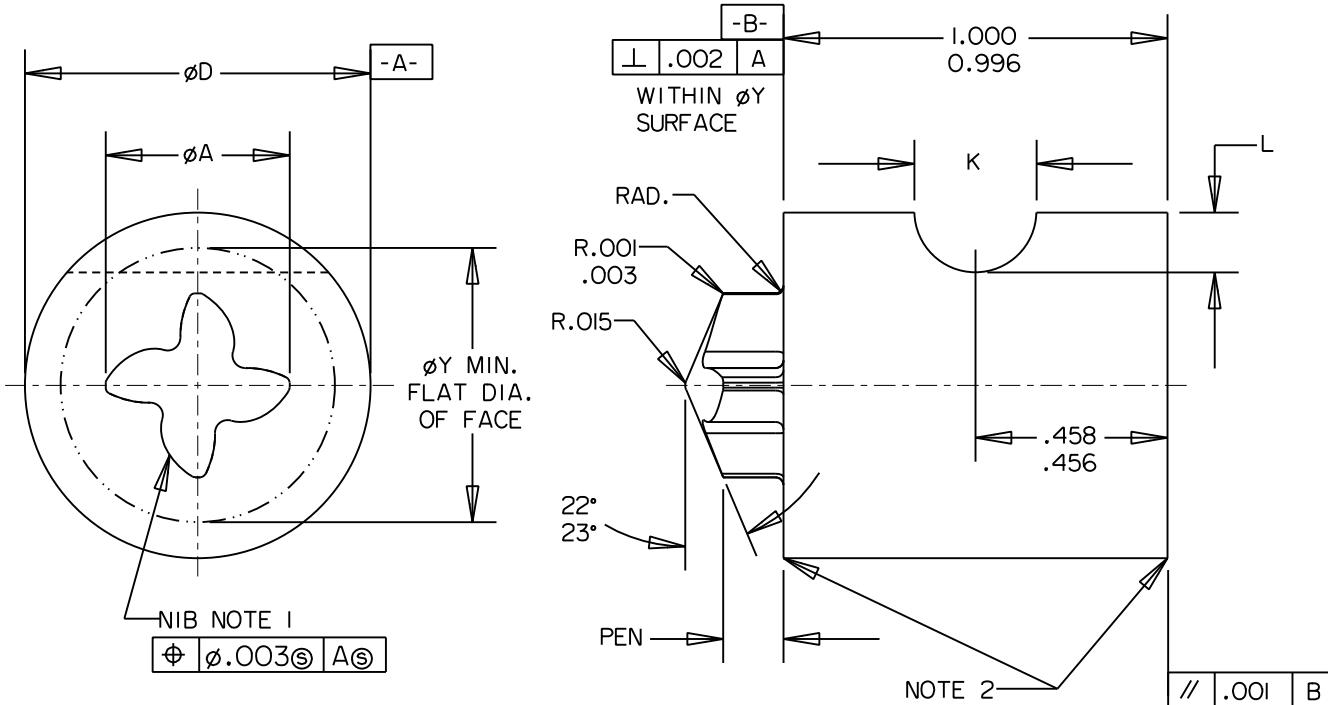
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT HEAD PUNCH 100° HEAD (INCH)

DRAWN G.DILLING	DATE 10/29/02	DRAWING NUMBER PSC-512I
CHECKED: G.DILLING	DATE 8/28/03	SHEET 1 OF 1

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
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REVISION ISSUED:9/02/03 REVISED:3/27/04 REV: 4/22/08 REV: 6/20/08 REV: 8/29/08 LKD REV:2/9/09



SCREW SIZE	PUNCH NO.	+.0020 -.0000	±.0005 ØA	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
									MAX.	MIN.	
4	MT-00-9	.1200	.5625	.006	.212	.106	.305	.030	.027		MT-00
6	MT-00-9	.1200	.5625	.006	.212	.106	.305	.030	.027		MT-00
8	MT-0-12	.1694	.5625	.006	.212	.106	.375	.032	.029		MT-0
10	MT-0-14	.1694	.5625	.007	.212	.106	.438	.036	.033		MT-0
1/4	MT-I-8	.2395	.8750	.008	.212	.106	.750	.039	.036		MT-I
5/16	MT-I-9	.2395	1.0000	.010	.212	.106	.750	.050	.047		MT-I
3/8	MT-2-2	.3070	1.0000	.012	.212	.106	.844	.062	.059		MT-2
7/16	MT-3-2	.3527	1.2500	.013	.212	.106	.890	.067	.064		MT-3
1/2	MT-4-2	.4275	1.2500	.014	.212	.106	1.020	.072	.069		MT-4

NOTES:

1. REFER TO PUNCH DRAWING PSC-5I51 THRU PSC-5I60 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION ISSUED: 9/02/03 REVISED: 1/20/04 REV: 8/29/08 LKD REV: 2/9/09

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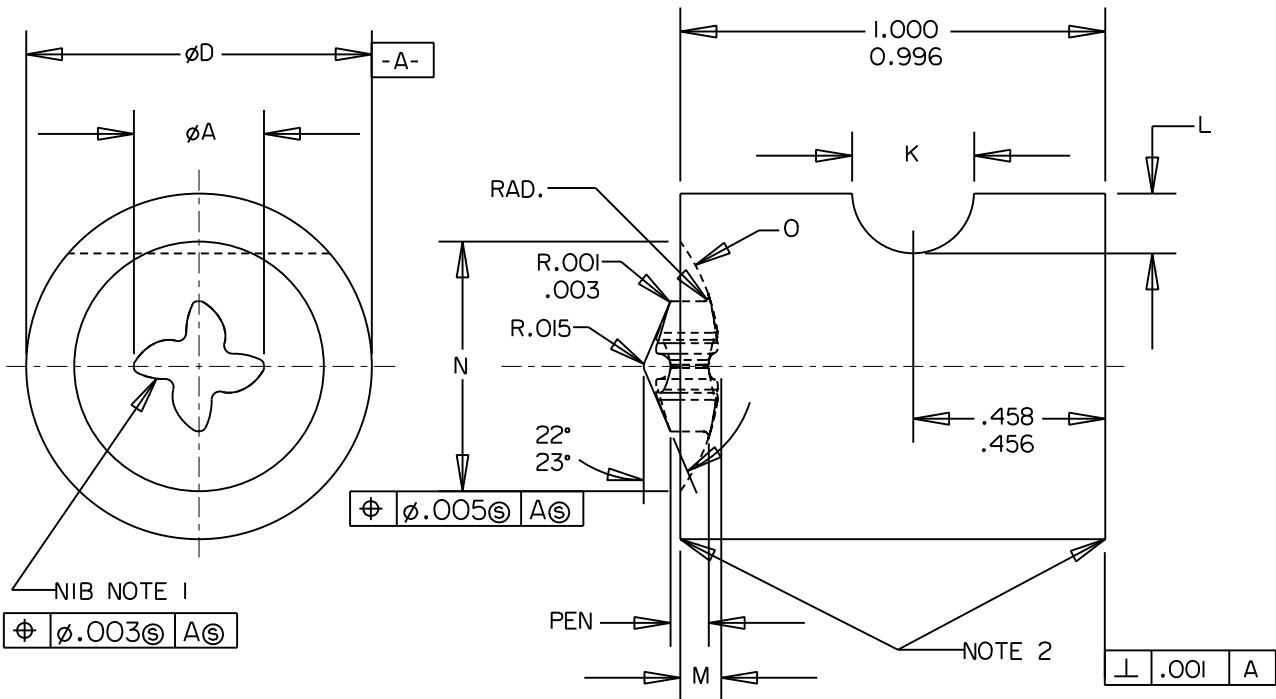
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT FILLISTER HEAD PUNCH (INCH)

DRAWN G.DILLING	DATE 10/21/02	DRAWING NUMBER PSC-5I22
CHECKED: G.DILLING	DATE 8/28/03	SHEET 1 OF 1

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
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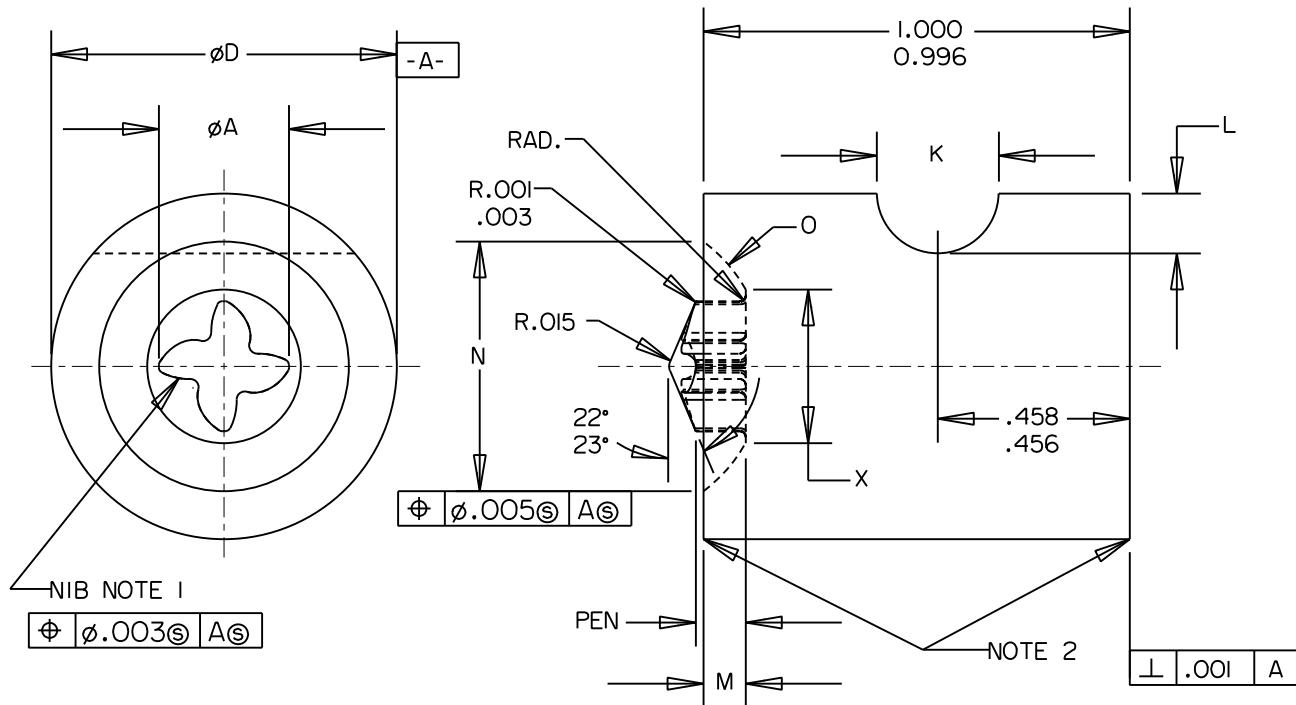
SCREW SIZE	PUNCH NO.	$+.0020$	$\pm .0005$	$+.001$	$+.000$	RAD. MAX.	$+.002$	$+.005$	$+.005$	PUNCH PENETRATION		DRIVER SIZE MT
		$-.0000$	$-.000$	$-.000$	$-.001$		M	N	O	MAX.	MIN.	
4	MT-00-3	.1200	.5625	.212	.106	.005	.031	.241	.248	.027	.024	MT-00
6	MT-00-10	.1200	.5625	.212	.106	.007	.035	.280	.301	.037	.034	MT-00
8	MT-0-5	.1694	.5625	.212	.106	.008	.045	.346	.352	.039	.036	MT-0
10	MT-I-6	.2395	.5625	.212	.106	.008	.054	.409	.413	.041	.038	MT-I
12	MT-I-3	.2395	.8750	.212	.106	.010	.056	.459	.500	.052	.049	MT-I
1/4	MT-I-4	.2395	.8750	.212	.106	.011	.067	.519	.535	.057	.054	MT-I
5/16	MT-2-3	.3070	1.0000	.212	.106	.016	.088	.665	.669	.080	.077	MT-2
3/8	MT-3-3	.3527	1.2500	.212	.106	.017	.106	.788	.784	.087	.084	MT-3
7/16	MT-4-3	.4275	1.2500	.212	.106	.020	.124	.913	.900	.102	.099	MT-4
1/2	MT-5-2	.5053	1.5000	.212	.106	.021	.145	1.038	1.000	.107	.104	MT-5
9/16	MT-5-4	.5053	1.5000	.212	.106	.024	.147	1.112	1.125	.122	.119	MT-5
5/8	MT-6-2	.5928	1.5000	.212	.106	.026	.152	1.195	1.250	.132	.129	MT-6
3/4	MT-7-3	.7993	2.0000	.212	.106	.030	.187	1.500	1.600	.152	.149	MT-7

NOTES:

- REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
- CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
- DIMENSIONS ARE IN INCHES.
- PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION ISSUED: 9/15/03 REVISED: 1/20/04 REV: 1/29/08 LKD REV: 2/9/09

(C) COPYRIGHT 2001 PHILLIPS SCREW COMPANY. ALL RIGHTS RESERVED.		TITLE: MORTORQ® SPIRAL DRIVE SYSTEM PAN HEAD PUNCH (INCH)		
DRAWN G.DILLING		DATE 11/13/02	DRAWING NUMBER PSC-5123	
CHECKED: G.DILLING		DATE 11/13/02	SHEET 1 OF 1	
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				



SCREW SIZE	PUNCH NO.	+.00020 -.0000	±.0005 -.000	+.001 -.000	+.000 -.001	RAD. MAX.	X REF	+.002 -.000	+.005 -.000	+.005 -.000	PUNCH PENETRATION		DRIVER SIZE MT
											MAX.	MIN.	
4	MT-00-4	.1200	.5625	.212	.106	.005	.130	.047	.216	.121	.027	.024	MT-00
6	MT-00-5	.1200	.5625	.212	.106	.007	.150	.058	.266	.153	.035	.032	MT-00
8	MT-0-3	.1694	.5625	.212	.106	.008	.190	.064	.315	.182	.040	.037	MT-0
10	MT-0-4	.1694	.8750	.212	.106	.009	.210	.073	.369	.221	.047	.044	MT-0
1/4	MT-I-5	.2395	.8750	.212	.106	.010	.270	.111	.447	.240	.052	.049	MT-I
5/16	MT-2-4	.3070	1.0000	.212	.106	.012	.340	.128	.557	.306	.062	.059	MT-2
3/8	MT-3-4	.3527	1.0000	.212	.106	.017	.400	.152	.666	.368	.087	.084	MT-3
1/2	MT-4-4	.4275	1.2500	.212	.106	.022	.480	.211	.885	.495	.112	.109	MT-4
5/8	MT-5-3	.5053	2.0000	.212	.106	.030	.580	.265	1.010	.540	.152	.149	MT-5

NOTES:

1. REFER TO PUNCH DRAWING PSC-5I51 THRU PSC-5I60 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION ISSUED: 9/18/03 REVISED: 1/20/04 REV 8/29/08 LKD REV:2/9/09

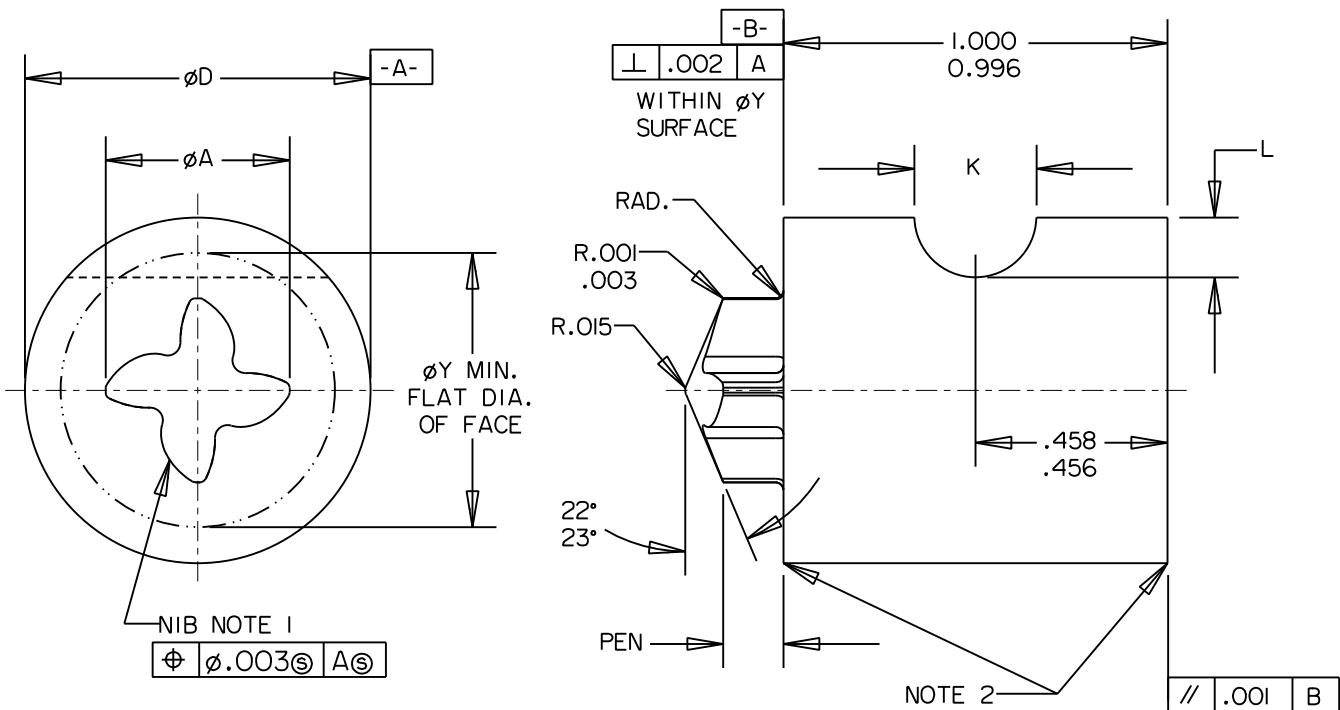
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
BUTTON HEAD PUNCH (INCH)

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DRAWN G.DILLING	DATE 11/14/02	DRAWING NUMBER PSC-5I24
CHECKED: G.DILLING	DATE 11/15/02	SHEET 1 OF 1
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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SCREW SIZE	PUNCH NO.	+.0020 -.0000	±.0005	ØA	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN.	PUNCH PENETRATION		DRIVE SIZE MT
										MAX.	MIN.	
8	MT-00-6	.1200	.5625	.005	.212	.106	.375	.026	.023	MT-00		
10	MT-0-2	.1694	.5625	.005	.212	.106	.438	.027	.024	MT-0		
1/4	MT-I-2	.2395	.8750	.006	.212	.106	.594	.032	.029	MT-I		
5/16	MT-I-8	.2395	.8750	.008	.212	.106	.750	.039	.036	MT-I		
3/8	MT-2-5	.3070	1.0000	.010	.212	.106	.812	.050	.047	MT-2		
7/16	MT-3-6	.3527	1.2500	.011	.212	.106	.938	.056	.053	MT-3		

NOTES:

1. REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

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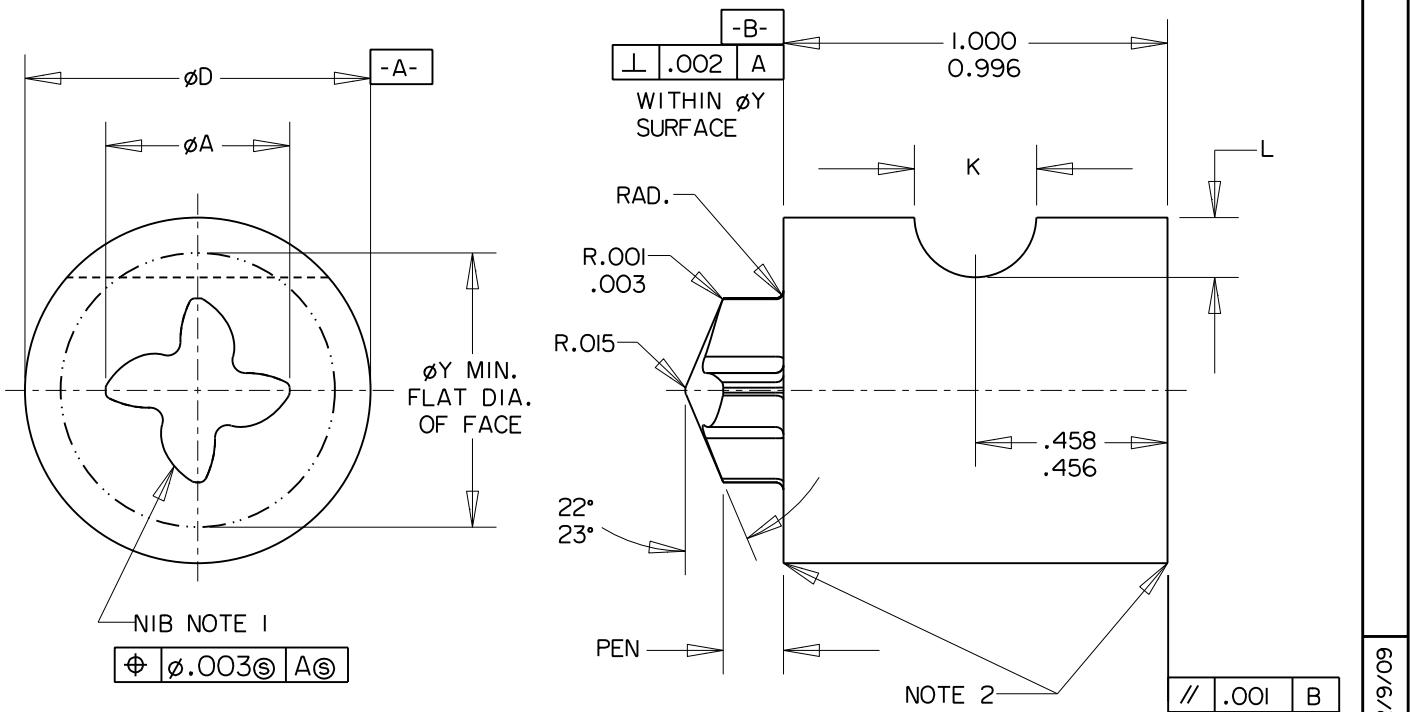
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT HEAD PUNCH 130° (INCH)

DRAWN G.DILLING	DATE 10/21/02	DRAWING NUMBER PSC-5125
CHECKED: G.DILLING	DATE 8/29/03	SHEET 1 OF 1

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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REVISION ISSUED:9/02/03 REVISED:1/20/04 REV:8/29/08 LKD REV:2/9/09



SCREW SIZE	PUNCH NO.	+.0020 -.0000	±.0005	RAD. MAX.	+.001 -.000	+.000 -.001	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
								MAX.	MIN.	
8	MT-00-9	.1200	.5625	.006	.212	.106	.305	.030	.027	MT-00
10	MT-0-9	.1694	.5625	.006	.212	.106	.375	.030	.027	MT-0
1/4	MT-1-I2	.2395	.8750	.006	.212	.106	.594	.030	.027	MT-1
5/16	MT-1-I	.2395	1.0000	.010	.212	.106	.688	.048	.045	MT-1
3/8	MT-2-5	.3070	1.0000	.010	.212	.106	.844	.050	.047	MT-2
7/16	MT-3-2	.3527	1.2500	.013	.212	.106	.890	.067	.064	MT-3
1/2	MT-4-2	.4275	1.2500	.014	.212	.106	1.020	.072	.069	MT-4
9/16	MT-4-I	.4275	1.5000	.018	.212	.106	1.150	.092	.089	MT-4
5/8	MT-5-7	.5053	1.5000	.018	.212	.106	1.375	.092	.089	MT-5
3/4	MT-6-6	.5928	2.0000	.022	.212	.106	1.625	.112	.109	MT-6
7/8	MT-6-I	.5928	2.0000	.030	.212	.106	1.812	.152	.149	MT-6
1"	MT-7-2	.7993	2.5000	.032	.212	.106	2.050	.162	.159	MT-7

NOTES:

1. REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION	ISSUED: 9/03/03	REVISED: 1/20/04	REV: 4/04/06	REV: 8/29/08 LKD	REV: 1/29/09
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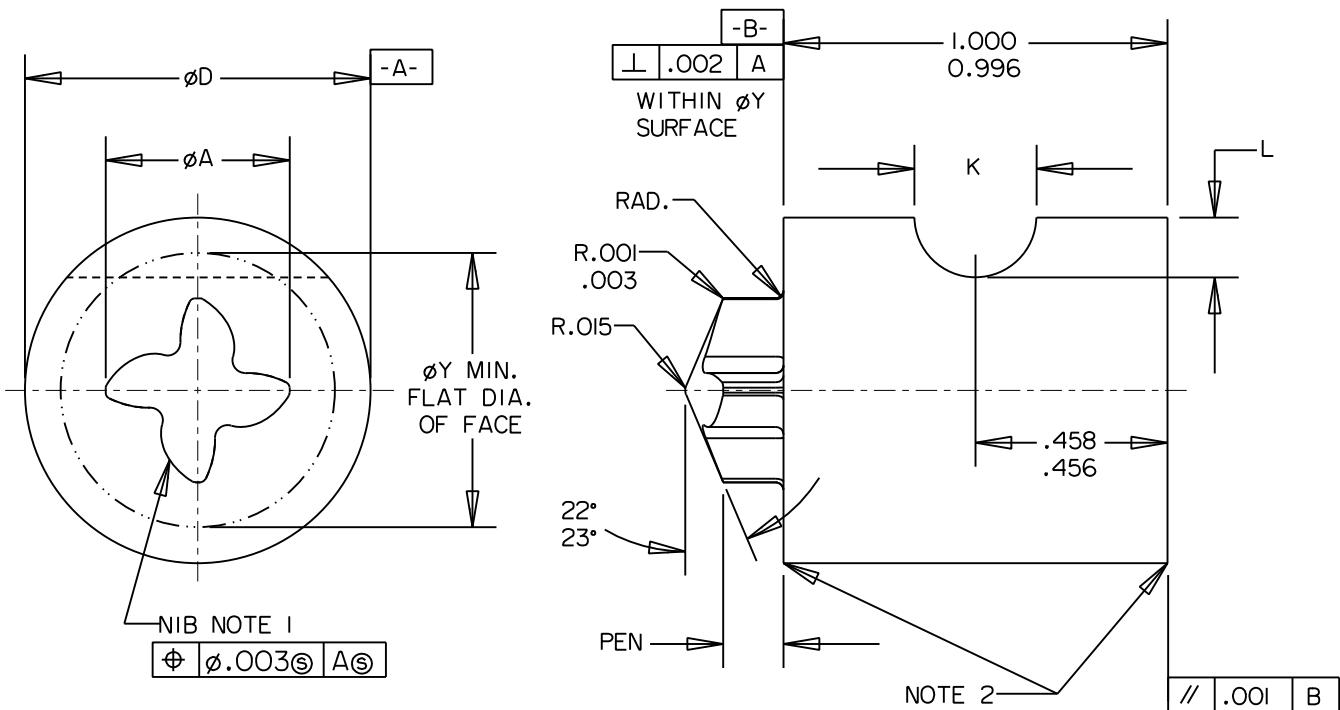
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT HEAD PUNCH 100° REDUCED (INCH)

DRAWN G.DILLING	DATE 10/29/02	DRAWING NUMBER PSC-5126
CHECKED: G.DILLING	DATE 8/29/03	SHEET 1 OF 1

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY



SCREW SIZE	PUNCH NO.	+.0020 -.0000	ØA	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
									MAX.	MIN.	
6	MT-00-9	.1200	.5625	.006	.212	.106	.305	.030	.027		MT-00
8	MT-0-12	.1694	.5625	.006	.212	.106	.375	.032	.029		MT-0
10	MT-0-14	.1694	.5625	.007	.212	.106	.438	.036	.033		MT-0
12	MT-I-8	.2395	.8750	.008	.212	.106	.750	.039	.036		MT-I
1/4	MT-2-6	.3070	.8750	.008	.212	.106	.780	.042	.039		MT-2
5/16	MT-3-6	.3527	1.2500	.011	.212	.106	.938	.056	.053		MT-3
3/8	MT-4-2	.4275	1.2500	.014	.212	.106	1.020	.072	.069		MT-4
7/16	MT-4-6	.4275	1.2500	.016	.212	.106	1.050	.080	.077		MT-4
1/2	MT-4-1	.4275	1.5000	.018	.212	.106	1.150	.092	.089		MT-4
9/16	MT-5-7	.5053	1.5000	.018	.212	.106	1.375	.092	.089		MT-5
5/8	MT-5-1	.5053	1.5000	.020	.212	.106	1.200	.102	.099		MT-5
3/4	MT-6-8	.5928	2.0000	.025	.212	.106	1.500	.127	.124		MT-6

NOTES:

1. REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN INCHES.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION ISSUED: 9/4/03 REVISED: 1/20/04 REV:8/29/08 LKD REV:2/9/09

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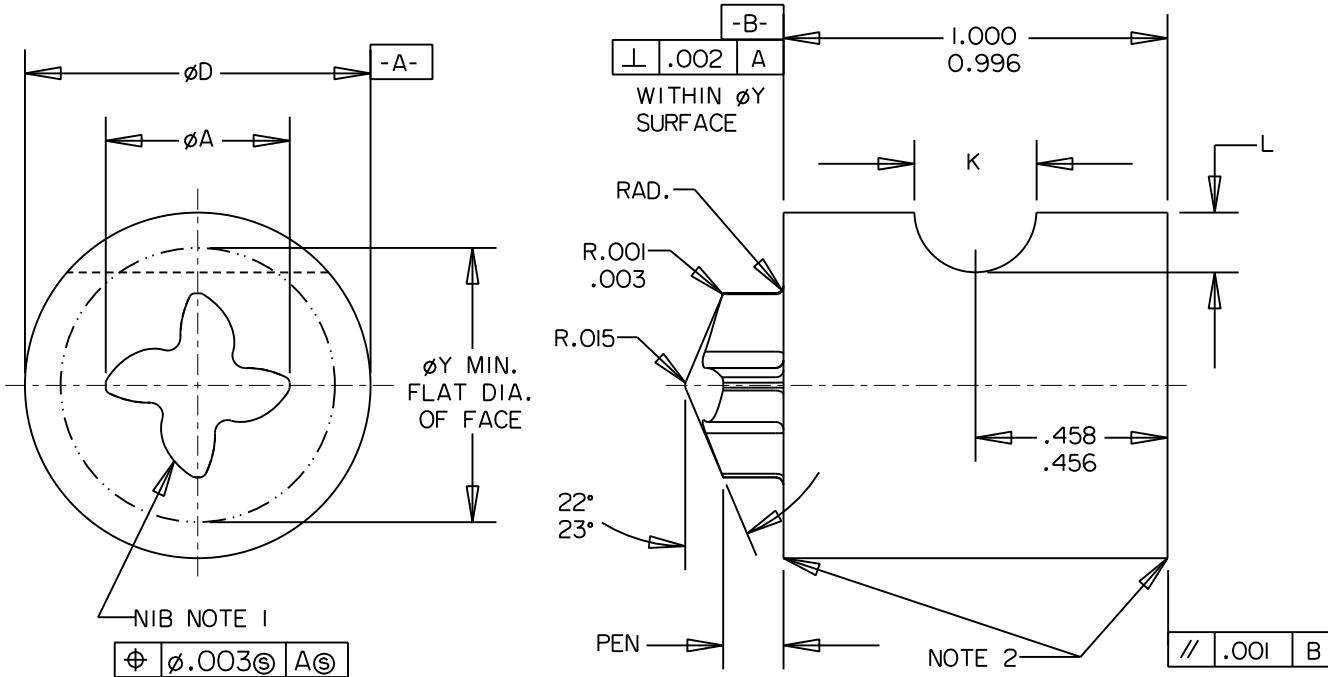
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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT HEAD PUNCH 82° UNDERCUT HEAD (INCH)

DRAWN G.DILLING	DATE 10/21/02	DRAWING NUMBER PSC-5127
CHECKED: G.DILLING	DATE 9/02/02	SHEET 1 OF 1

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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SCREW SIZE	PUNCH NO.	+.0020 -.0000	±.0005	RAD. MAX.	+.001 -.000	+.000 -.001	MIN.	PUNCH PENETRATION		DRIVE SIZE MT
								MAX.	MIN.	
10	MT-0-12	.1694	.5625	.006	.212	.106	.375	.032	.029	MT-0
1/4	MT-I-8	.2395	.8750	.008	.212	.106	.750	.039	.036	MT-I
5/16	MT-I-9	.2395	1.0000	.010	.212	.106	.750	.050	.047	MT-I
3/8	MT-2-2	.3070	1.0000	.012	.212	.106	.844	.062	.059	MT-2
7/16	MT-3-2	.3527	1.2500	.013	.212	.106	.890	.067	.064	MT-3
1/2	MT-4-2	.4275	1.2500	.014	.212	.106	1.020	.072	.069	MT-4

NOTES:

- REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
- CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
- DIMENSIONS ARE IN INCHES.
- PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

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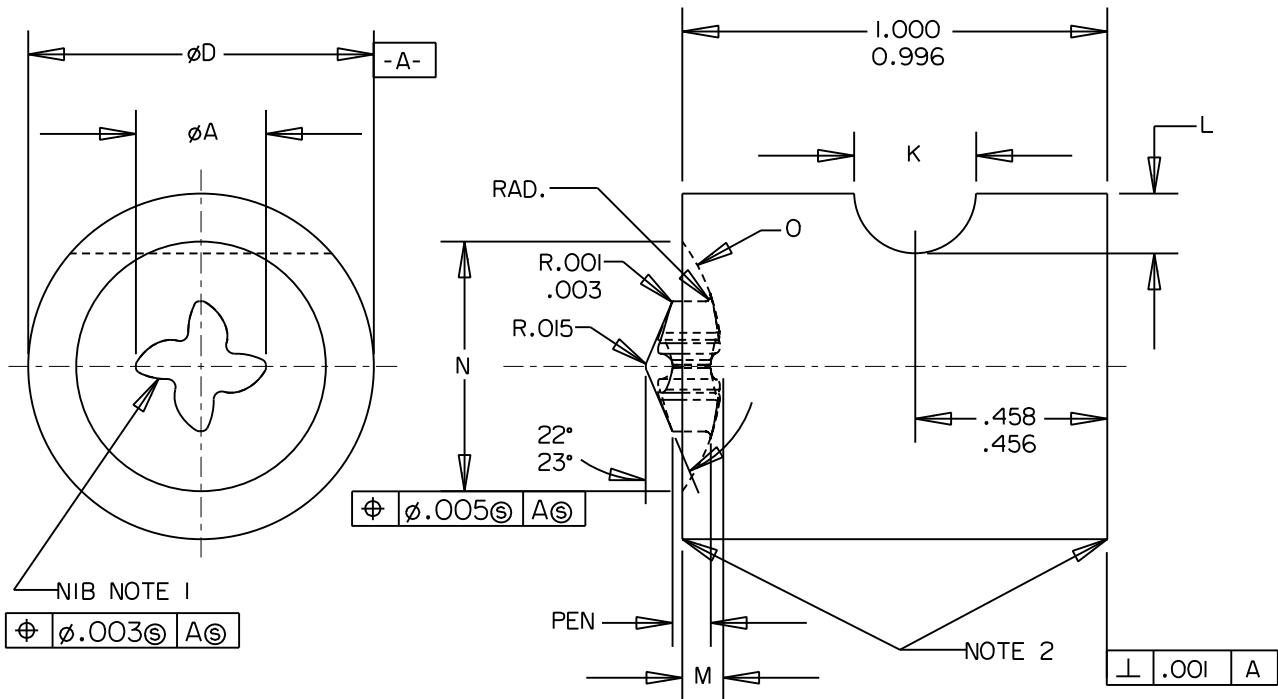
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
FLAT HEAD PUNCH 100° UNDERCUT HEAD (INCH)

DRAWN G.DILLING	DATE 11/11/03	DRAWING NUMBER PSC-5128
CHECKED: G.DILLING	DATE 11/12/03	SHEET 1 OF 1

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REVISION ISSUED: 11/12/03 REVISED: 1/20/04 REV: 8/29/08 LKD REV: 2/9/09

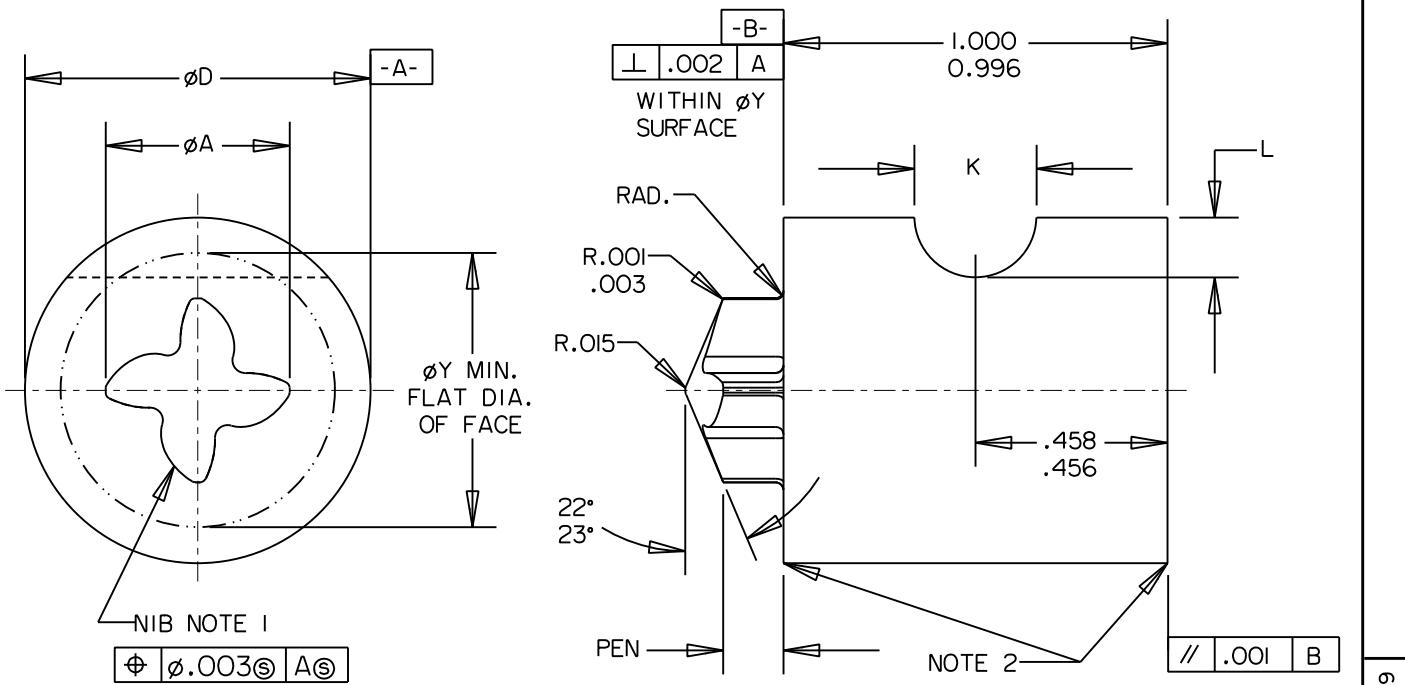


SCREW SIZE	PUNCH NO.	+.0020 -.0000	ØA	ØD	K	+.000 -.001	+.000 -.001	RAD. MAX.	+.002 -.000	+.005 -.000	+.005 -.000	PUNCH PENETRATION		DRIVER SIZE MT
												MAX.	MIN.	
M2	MT-000-2	.0720	.5625	.212	.106	.004	.018	.160	.185	.020	.017	MT-000		
M2.5	MT-00-7	.1200	.5625	.212	.106	.004	.028	.215	.220	.022	.019	MT-00		
M3	MT-00-3	.1200	.5625	.212	.106	.006	.031	.241	.248	.027	.024	MT-00		
M3.5	MT-00-10	.1200	.5625	.212	.106	.007	.035	.280	.301	.036	.033	MT-00		
M4	MT-0-5	.1694	.5625	.212	.106	.008	.045	.346	.352	.039	.036	MT-0		
M5	MT-I-6	.2395	.5625	.212	.106	.008	.054	.409	.413	.041	.038	MT-I		
M6	MT-I-4	.2395	.8750	.212	.106	.011	.067	.519	.535	.057	.054	MT-I		
M8	MT-2-3	.3070	1.0000	.212	.106	.016	.088	.665	.669	.080	.077	MT-2		
M10	MT-3-5	.3527	1.2500	.212	.106	.017	.147	.913	.782	.087	.084	MT-3		

NOTES:

1. REFER TO PUNCH DRAWING PSC-5I51 THRU PSC-5I60 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN METRIC.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

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CHECKED: G.DILLING		DATE 12/10/03	SHEET 1 OF 1	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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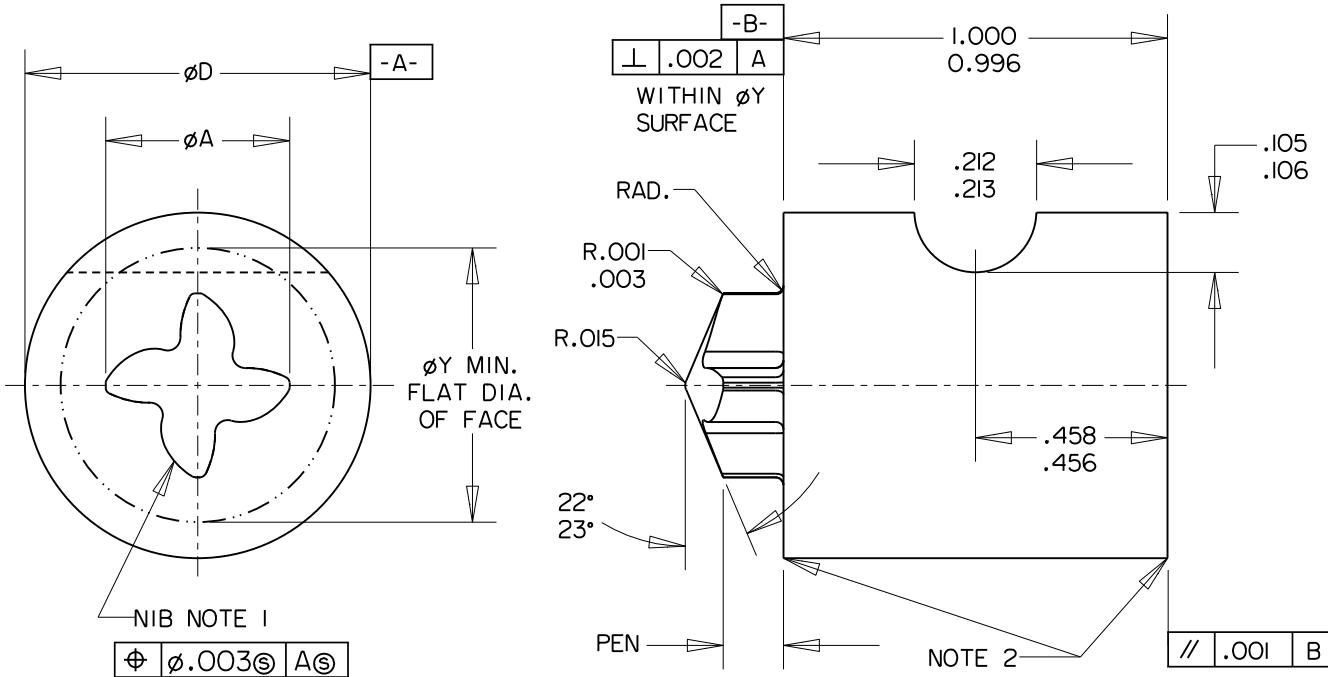
SCREW SIZE	PUNCH NO.	+.00020 -.0000	±.0005	RAD. MAX.	+.001 -.000	+.000 -.001	MIN.	PUNCH PENETRATION		DRIVE SIZE MT
								K	L	
M3	MT-00-1	.1200	.5625	.004	.212	.106	.250	.022	.019	MT-00
M4	MT-0-12	.1694	.5625	.006	.212	.106	.375	.032	.029	MT-0
M5	MT-I-17	.2395	.5625	.007	.212	.106	.438	.034	.031	MT-I
M6	MT-I-1	.2395	1.0000	.009	.212	.106	.688	.048	.045	MT-I
M8	MT-2-2	.3070	1.0000	.012	.212	.106	.844	.062	.059	MT-2
M10	MT-4-2	.4275	1.2500	.015	.212	.106	1.020	.072	.069	MT-4
M12	MT-5-6	.5053	1.5000	.017	.212	.106	1.150	.082	.079	MT-5
M16	MT-6-6	.5928	2.0000	.022	.212	.106	1.625	.112	.109	MT-6
M20	MT-6-1	.5928	2.0000	.030	.212	.106	1.812	.152	.149	MT-6

NOTES:

1. REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
2. CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
3. DIMENSIONS ARE IN METRIC.
4. PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

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DRAWN	G.DILLING	DATE	I2/09/03	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	I2/10/03	PSC-5130
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			SHEET 1 OF 1	
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REVISION ISSUED:12/12/03 REVISED:1/20/04 REV:8/29/08 LKD REV:9/30/08 REV:2/9/09



PUNCH NO.	+.0020 -.0000	ØA	ØD	RAD. MAX.	MIN. ØY	PUNCH PENETRATION		DRIVE SIZE MT
						MAX.	MIN.	
MT-2-7	.3070	1.250	.015	.875	.075	.075	.072	MT-2
MT-2-8	.3070	.8750	.017	.625	.085	.085	.082	MT-2
MT-2-9	.3070	.8750	.011	.650	.055	.055	.052	MT-2

NOTES:

- REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5160 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
- CHAMFER TO SUIT CUSTOMER OR COMPANY SPECIFICATIONS.
- DIMENSIONS ARE IN INCHES.
- PUNCH RECESS DIMENSIONS ARE PREDICATED ON COLD HEADED SCREWS. HOT FORGED SCREWS MAY REQUIRE AN OVERSIZE RECESS TO COMPENSATE FOR SHRINK FACTOR.

REVISION REVISED: 11/17/05 REV:8/29/08 LKD REV:2/9/09

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TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
SPECIAL FLAT HEAD PUNCH

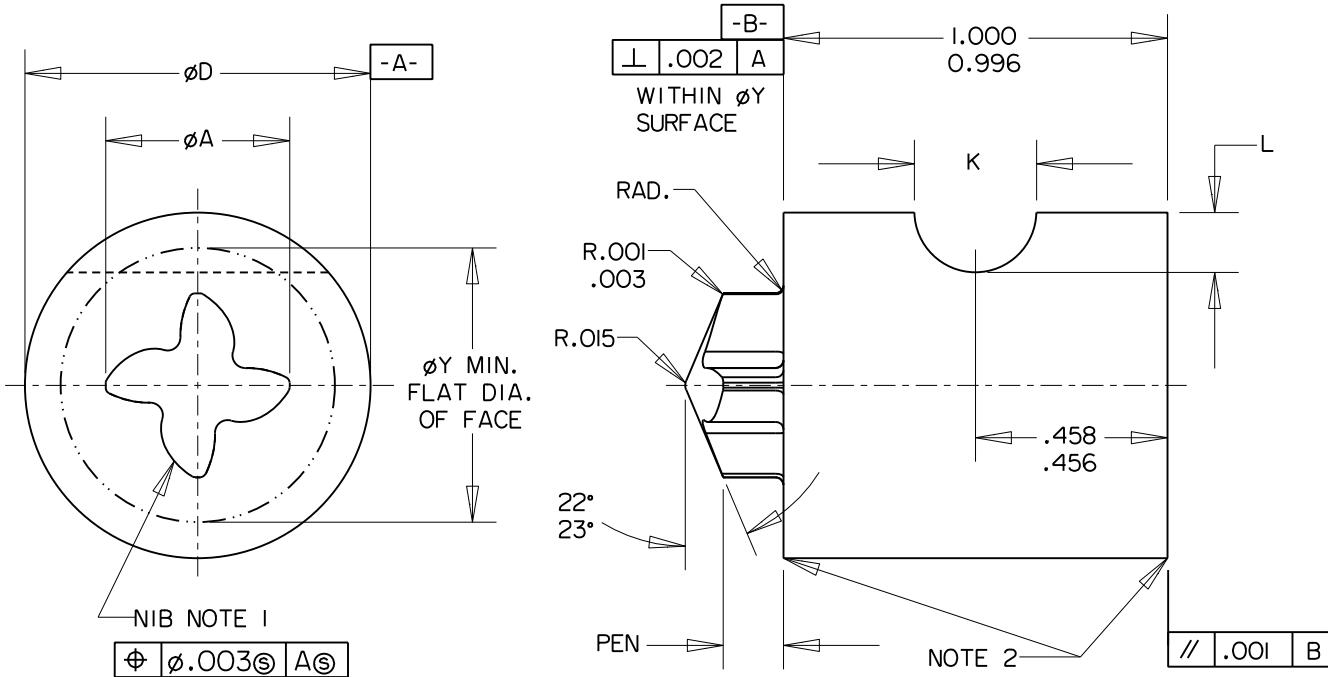
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DRAWN G.DILLING DATE 9/8/05 DRAWING NUMBER

CHECKED: G.DILLING DATE 9/8/05 SHEET 1 OF 1

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SCREW SIZE	PUNCH NO.	+.0020 -.0000	ØA	±.0005	ØD	RAD. MAX.	+.001 -.000	+.000 -.001	MIN.	PUNCH PENETRATION		DRIVE SIZE MT
										MAX.	MIN.	
10	MT-I-15	.2395	.5625	.006	.006	.212	.212	.106	.438	.030	.027	MT-I

NOTES:

- REFER TO PUNCH DRAWING PSC-515I THRU PSC-516I FOR PUNCH POINT DIMENSIONS NOT SHOWN.
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- DIMENSIONS ARE IN INCHES.
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REVISION REVISED:2/9/09

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TITLE:

MORTORQ® SPIRAL DRIVE SYSTEM
BOEING BACSI2JM FLAT HEAD PUNCH

DRAWN

G.DILLING

DATE

9/04/08

DRAWING NUMBER

PSC-5132

CHECKED:

LEE DOUGAN

DATE

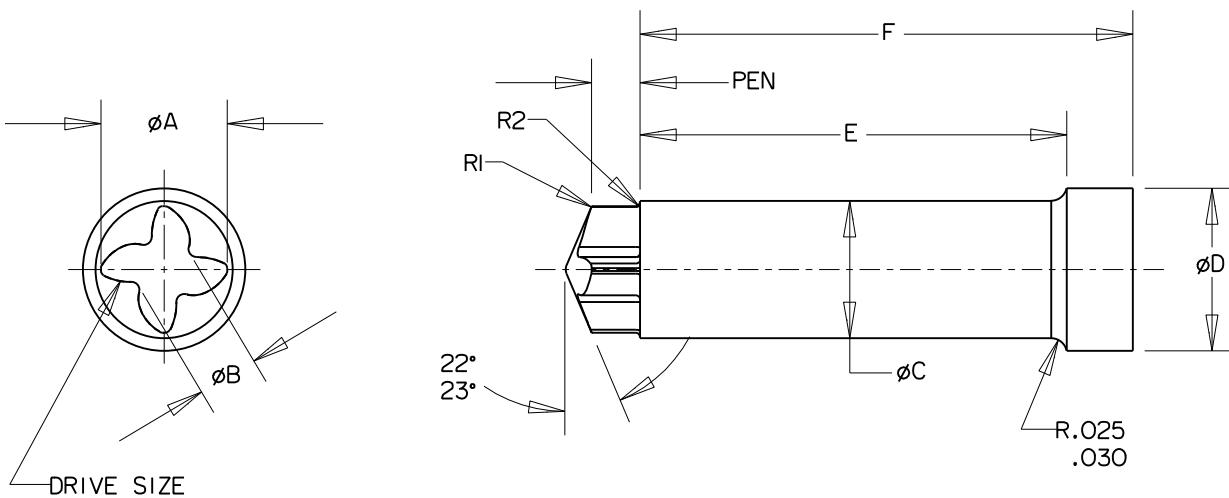
9/05/08

SHEET 1 OF 1

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EXAMPLE: PUNCH PIN NO. MT-I-080-M42

DRIVE SIZE MATERIAL
PEN = .080

DRIVE SIZE	$+.0020$ $-.0000$	$+.0020$ $-.0000$	$+.0005$ $-.0000$	$+.001$ $-.003$	$+.020$ $-.000$	$+.002$ $-.000$	RI	R2 MAX.	$+.000$ $-.003$	MAT'L	PUNCH PIN NO. SEE PIN NO. EXAMPLE	REVISION	REV: 1/03/07	REV: 6/23/08	REV: 8/29/08	LKD REV: 2/9/09
MT-000	.0720	.0345	.0740	.087 .085	.323 .313	.377 .375	.001 .003	R2 = 20% OF MAX. PEN PER CUSTOMER ORDER	MATERIAL: MI OR M42 PER CUSTOMER	MT-000-PEN - MAT'L MT-00-PEN - MAT'L MT-0-PEN - MAT'L MT-I-PEN - MAT'L MT-2-PEN - MAT'L MT-3-PEN - MAT'L MT-4-PEN - MAT'L MT-5-PEN - MAT'L MT-6-PEN - MAT'L MT-7-PEN - MAT'L MT-8-PEN - MAT'L	MT-000-PEN - MAT'L					
MT-00	.1200	.0575	.1360	.149	.441	.629	.001 .003				MT-00-PEN - MAT'L					
MT-0	.1694	.0811	.1825	.204	.444	.632	.001 .003				MT-0-PEN - MAT'L					
MT-I	.2395	.1131	.2710	.300	.572	.760	.001 .003				MT-I-PEN - MAT'L					
MT-2	.3070	.1450	.3300	.374	.822	1.010	.002 .005				MT-2-PEN - MAT'L					
MT-3	.3527	.1666	.3740	.417	.822	1.010	.002 .005				MT-3-PEN - MAT'L					
MT-4	.4275	.2020	.4690	.515	.822	1.010	.002 .005				MT-4-PEN - MAT'L					
MT-5	.5053	.2389	.5620	.592	.822	1.010	.002 .005				MT-5-PEN - MAT'L					
MT-6	.5928	.2801	.6520	.682	1.322	1.510	.004 .006				MT-6-PEN - MAT'L					
MT-7	.7993	.3777	.8295	.860	1.322	1.510	.004 .006				MT-7-PEN - MAT'L					
MT-8	.8200	.5218	.9165	.948	1.322	1.510	.004 .006				MT-8-PEN - MAT'L					

NOTES:

- REFER TO PUNCH DRAWING PSC-5151 THRU PSC-5161 FOR PUNCH POINT DIMENSIONS NOT SHOWN.
- DIMENSIONS ARE IN INCHES.
- "A" TO BE CONCENTRIC TO "C" WITHIN .002 T.I.R.
- MORTORQ PIN MATERIAL: MI, RC 61-63, OR M42, RC 63-65, DEPENDING ON CUSTOMER ORDER.

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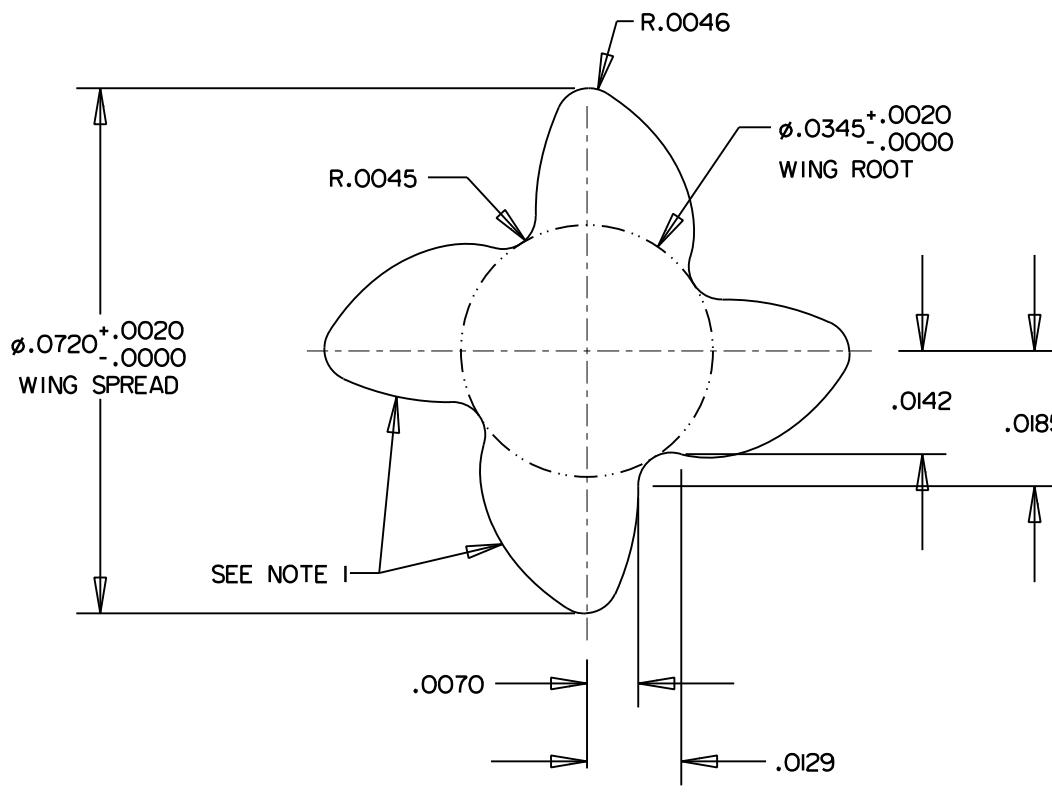
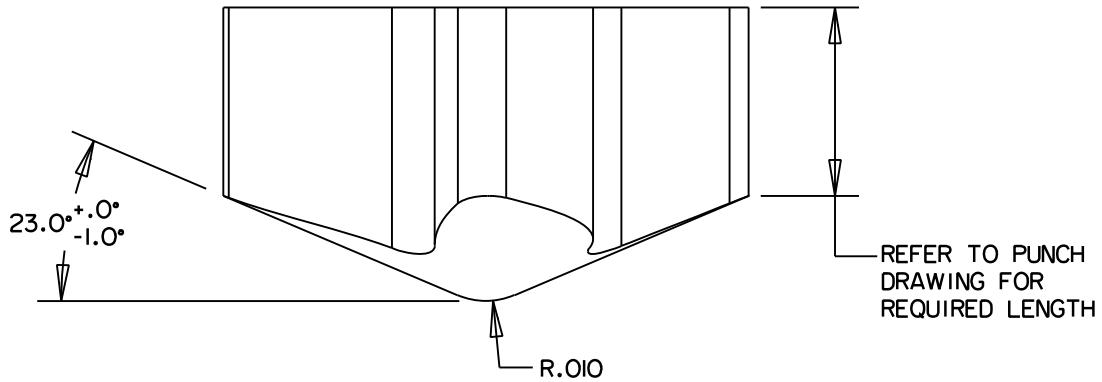
TITLE: MORTORQ® SPIRAL DRIVE SYSTEM
PIN TOOLING STANDARDS

DRAWN G.DILLING	DATE 12/14/06	DRAWING NUMBER
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CHECKED: G.DILLING	DATE 12/18/06	SHEET 1 OF 1
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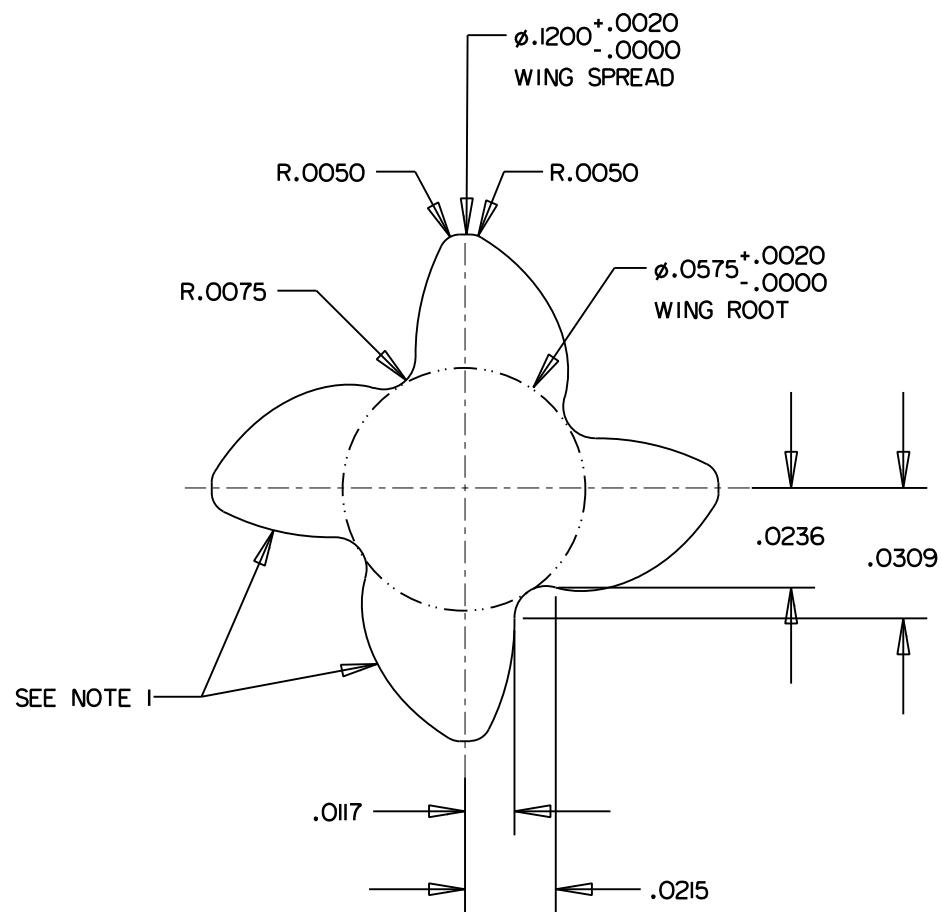
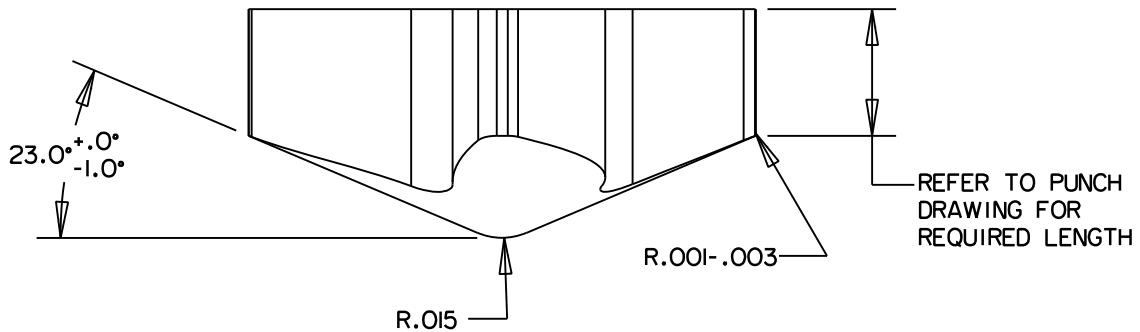
TITLE: MORTORQ®
MT-000 PUNCH POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	II/24/03	PSC-5151

CHECKED:	DATE	
G.DILLING	II/25/03	SHEET 1 OF 1

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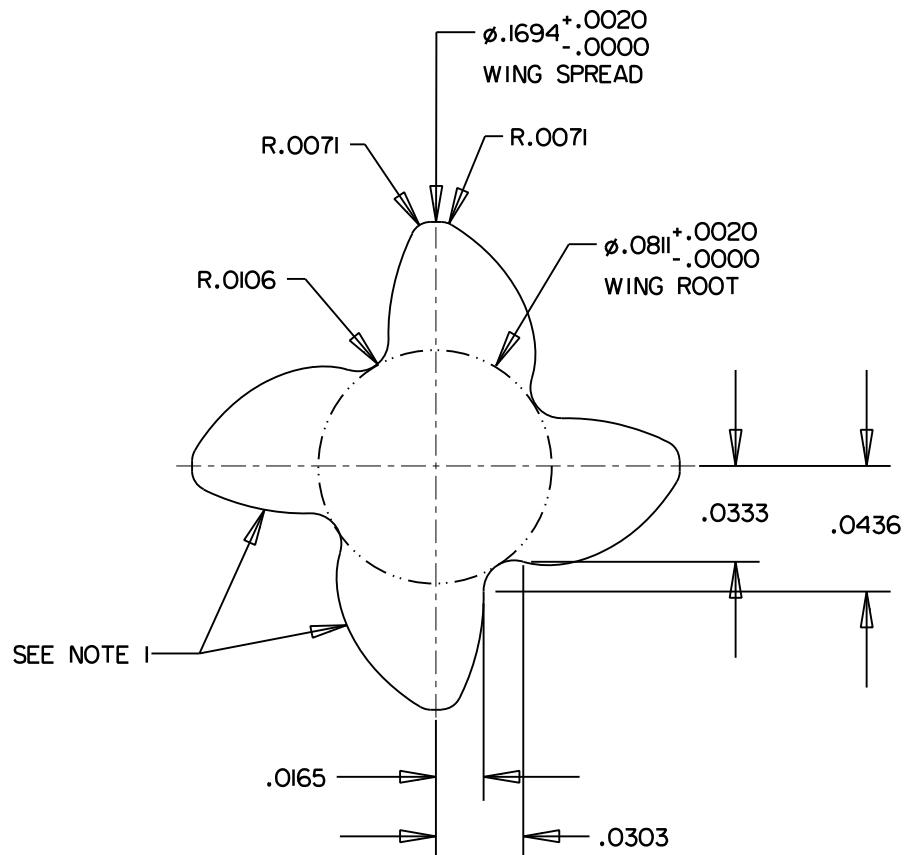
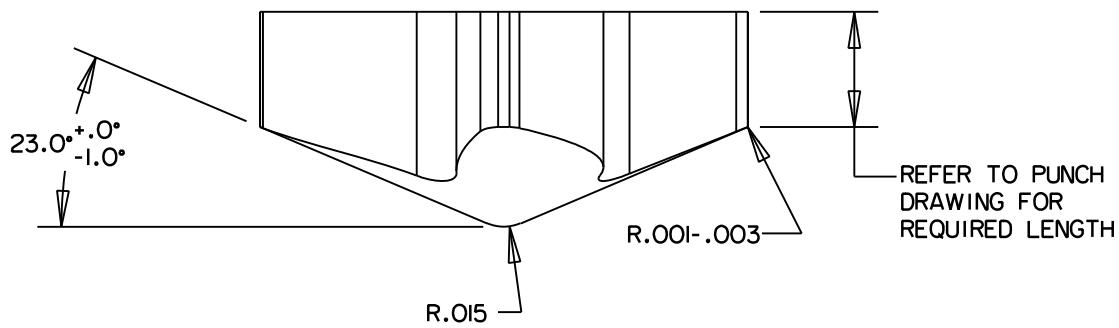
TITLE: MORTORQ®
MT-00 PUNCH POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	10/4/02	PSC-5152

CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	10/4/02	

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PUNCH POINT
SCALE 1.000

NOTES:

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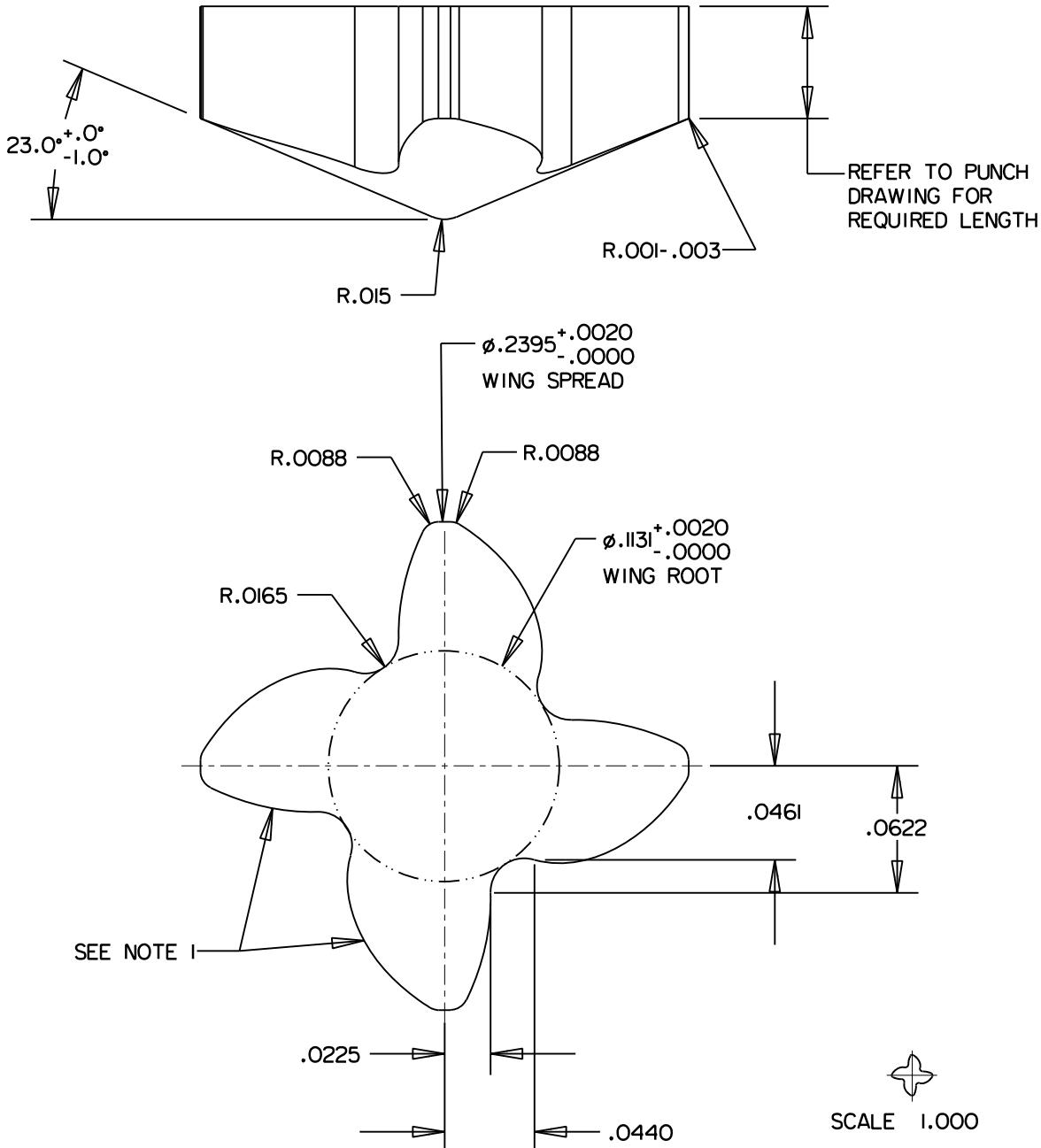
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TITLE: MORTORQ®
MT-O PUNCH POINT DIMENSIONS

DRAWN G.DILLING	DATE 9/12/02	DRAWING NUMBER PSC-5153
CHECKED: G.DILLING	DATE 9/13/02	SHEET 1 OF 1

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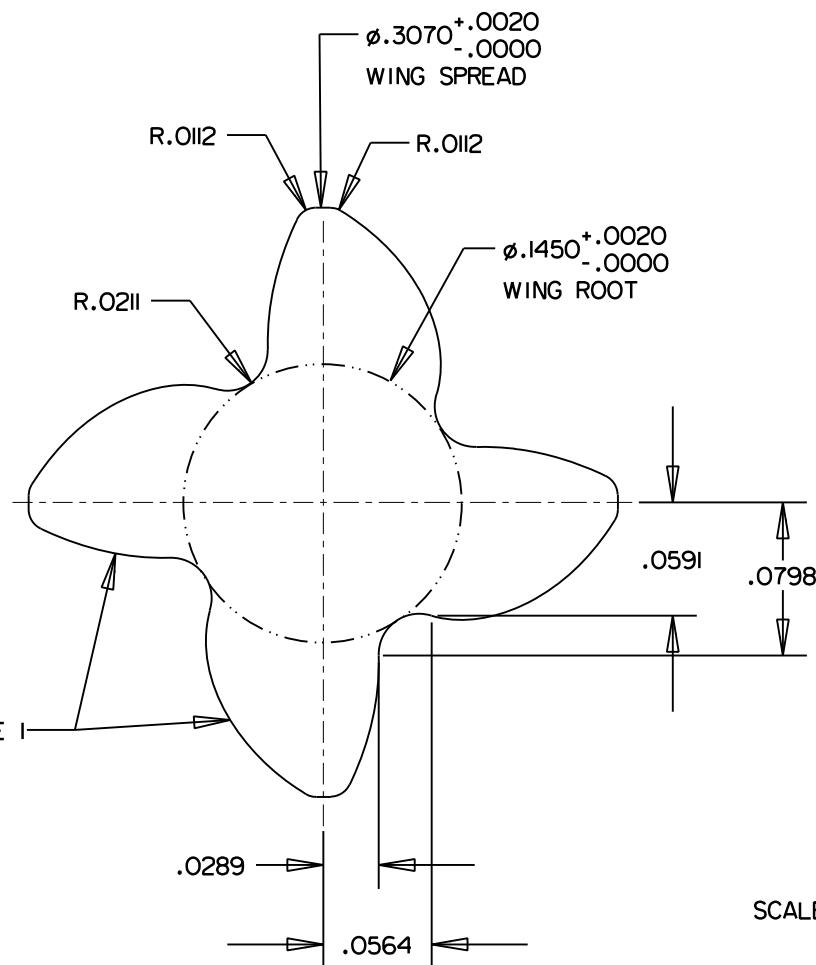
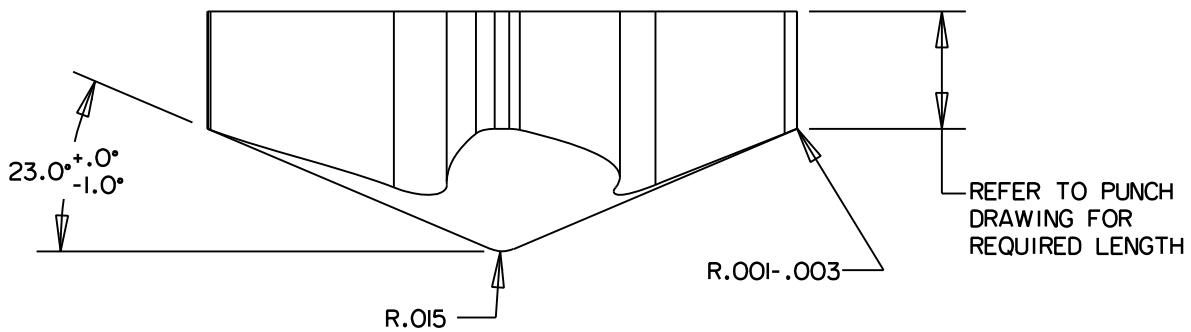
TITLE:
MORTORQ®
MT-I PUNCH POINT DIMENSIONS

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DRAWN G.DILLING	DATE 9/12/02	DRAWING NUMBER PSC-5154
CHECKED: G.DILLING	DATE 9/13/02	SHEET 1 OF 1

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SCALE 1.000

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TITLE: MORTORQ®
MT-2 PUNCH POINT DIMENSIONS

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DRAWN G.DILLING DATE 9/12/02 DRAWING NUMBER

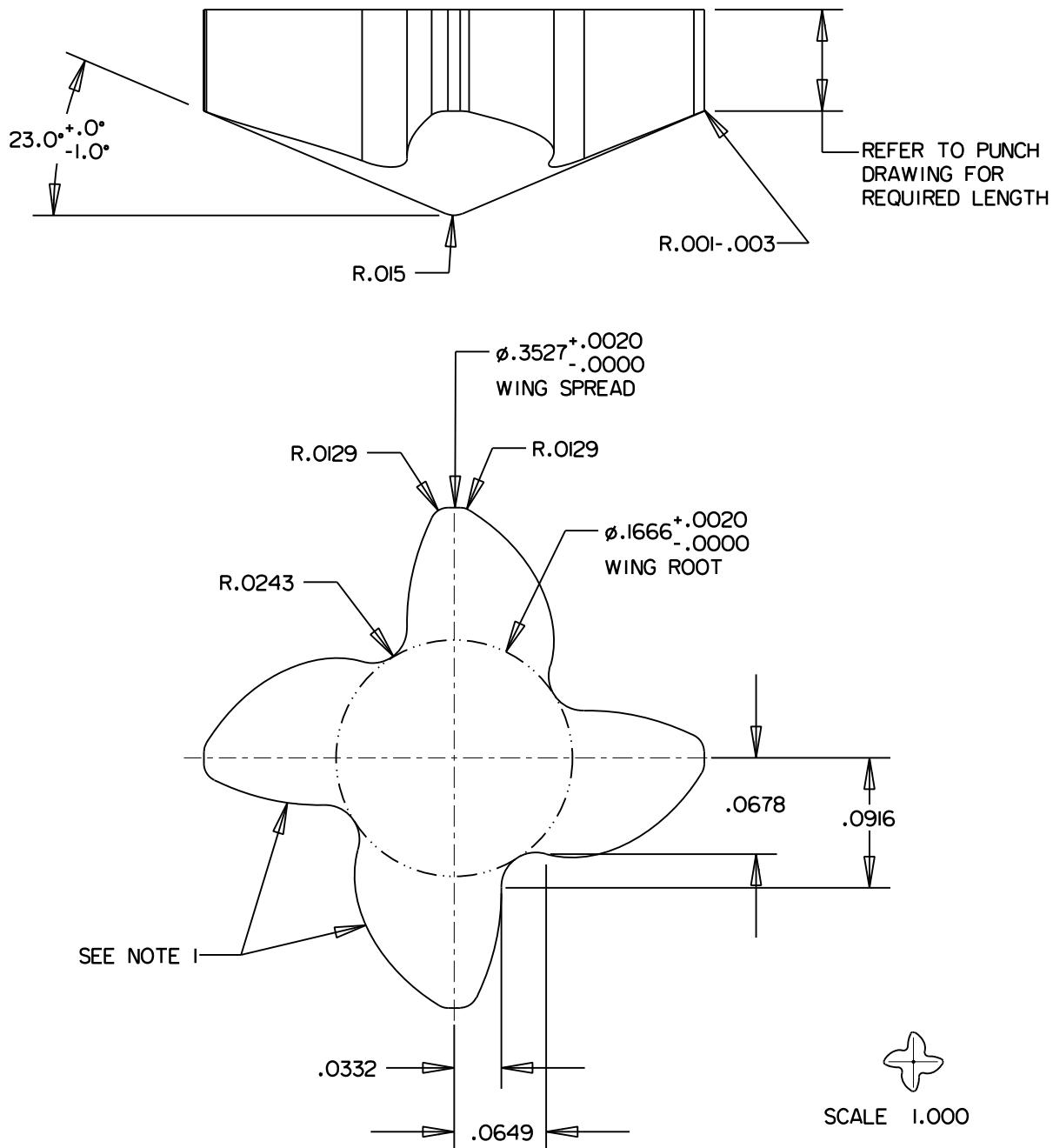
CHECKED: G.DILLING DATE 9/13/02

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PSC-5155

SHEET 1 OF 1

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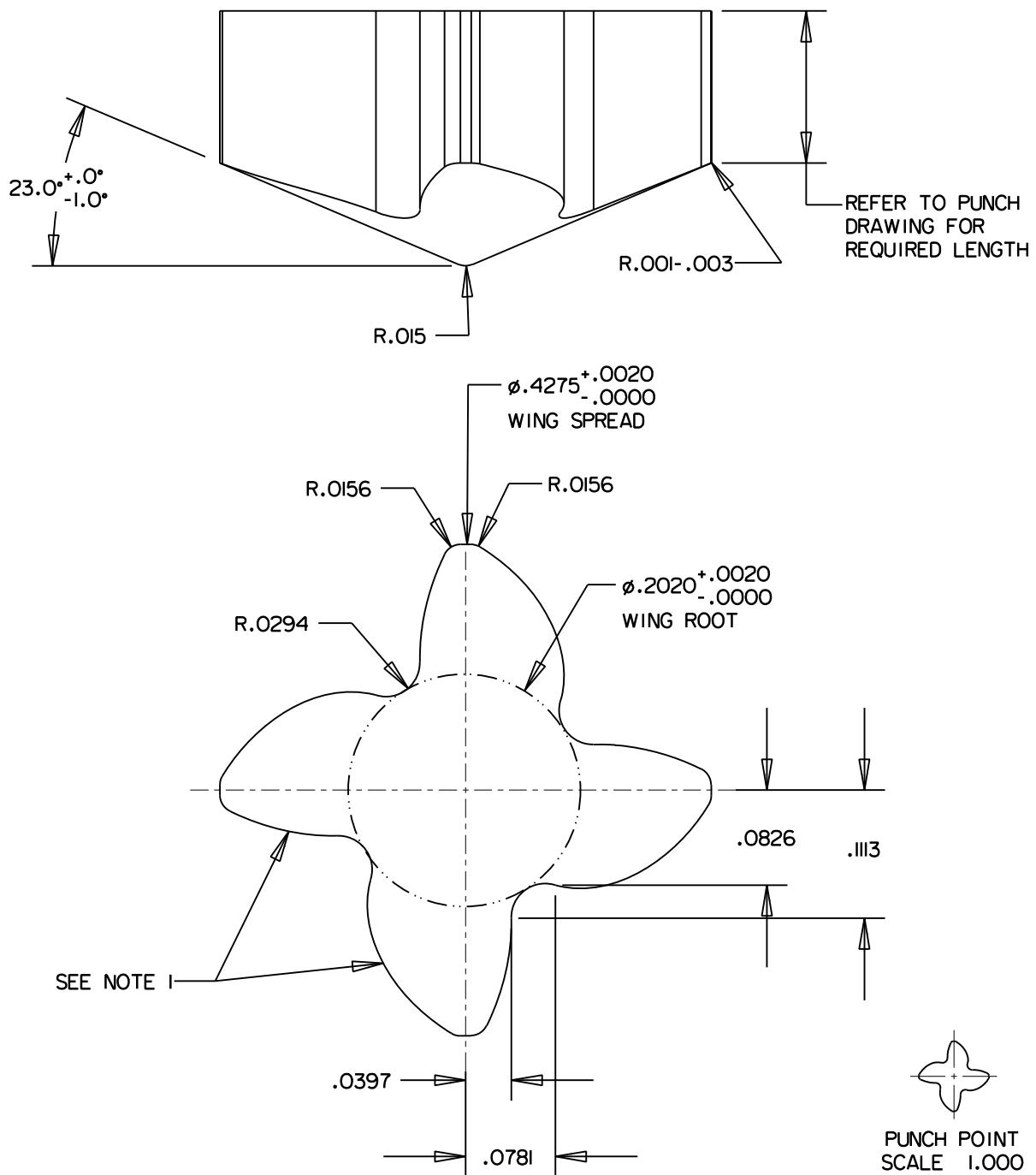
TITLE: MORTORQ®
MT-3 PUNCH POINT DIMENSIONS

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DRAWN	DATE	DRAWING NUMBER
G.DILLING	9/12/02	PSC-5156
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	9/13/02	

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TITLE: MORTORQ®

MT-4 PUNCH POINT DIMENSIONS

DRAWN

G.DILLING

DATE

10/4/02

DRAWING NUMBER

PSC-5157

CHECKED:

G.DILLING

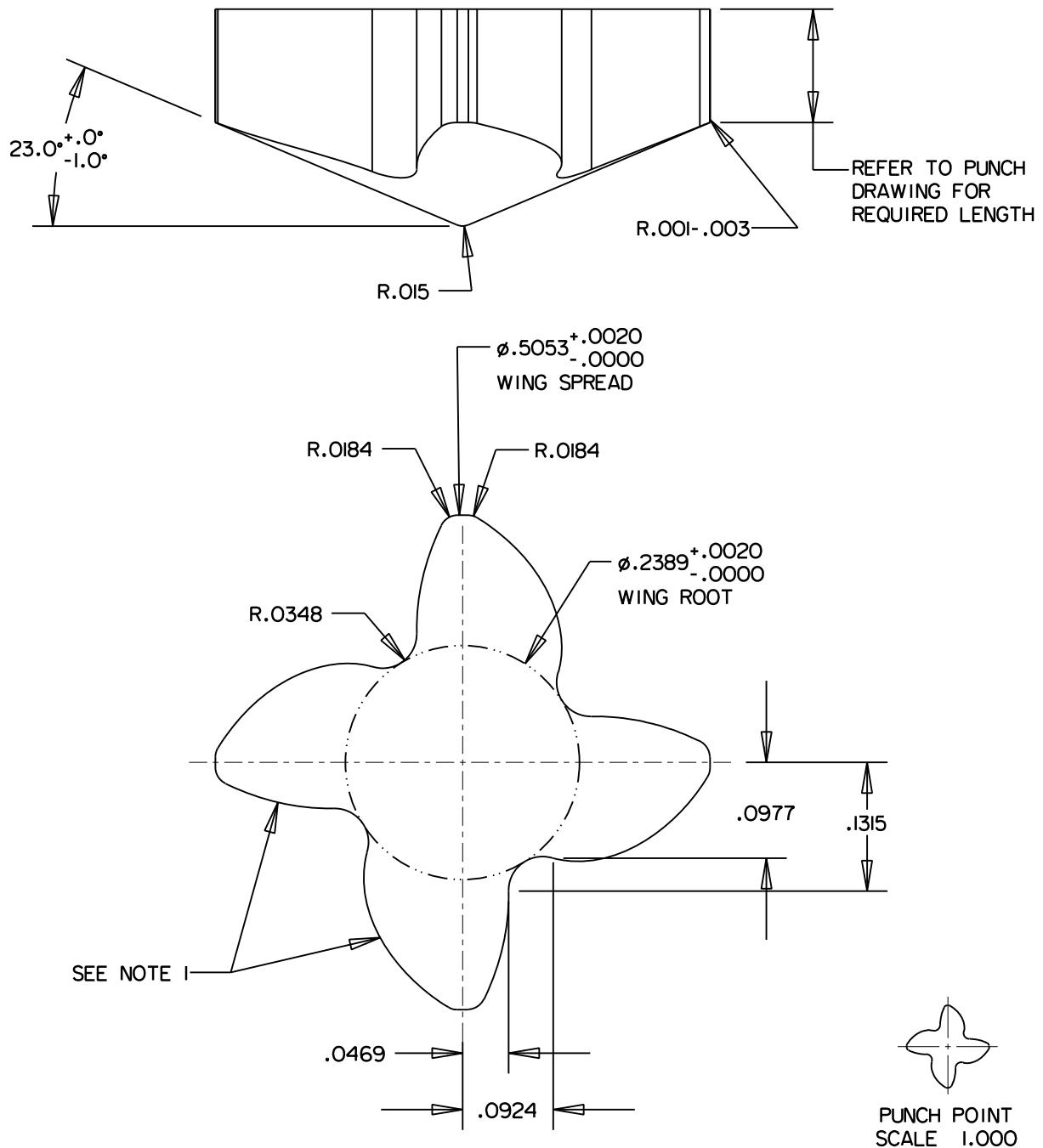
DATE

10/4/02

SHEET 1 OF 1

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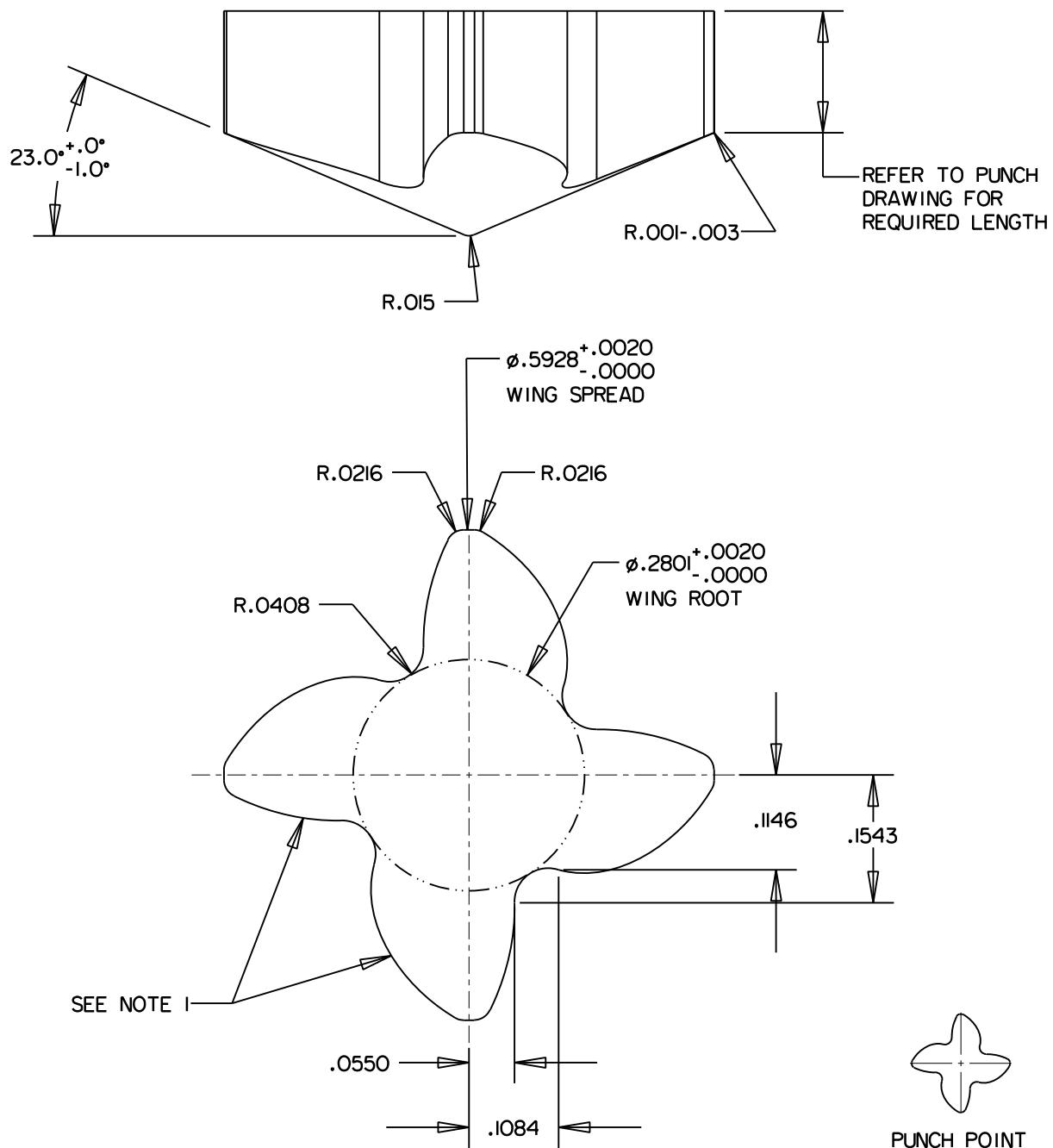


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DRAWN	DATE	DRAWING NUMBER													
G.DILLING	10/4/02	PSC-5158													
CHECKED: G.DILLING	DATE 10/4/02														
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			SHEET 1 OF 1												
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TITLE: MORTORQ®

MT-6 PUNCH POINT DIMENSIONS

DRAWN

G.DILLING

DATE

10/4/02

DRAWING NUMBER

PSC-5159

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G.DILLING

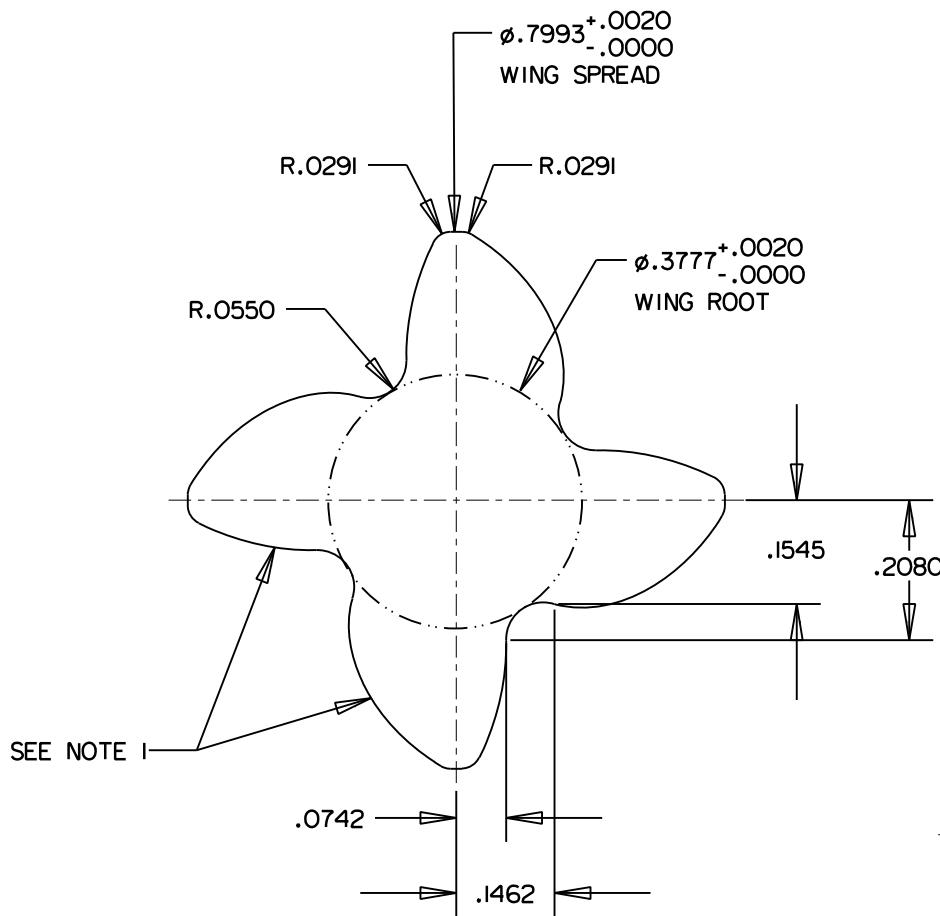
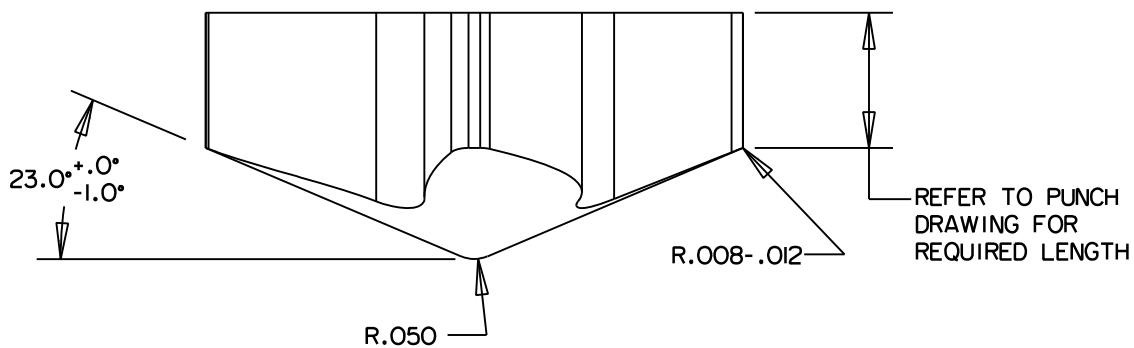
DATE

10/4/02

SHEET 1 OF 1

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PUNCH POINT
SCALE 1.000

NOTES:

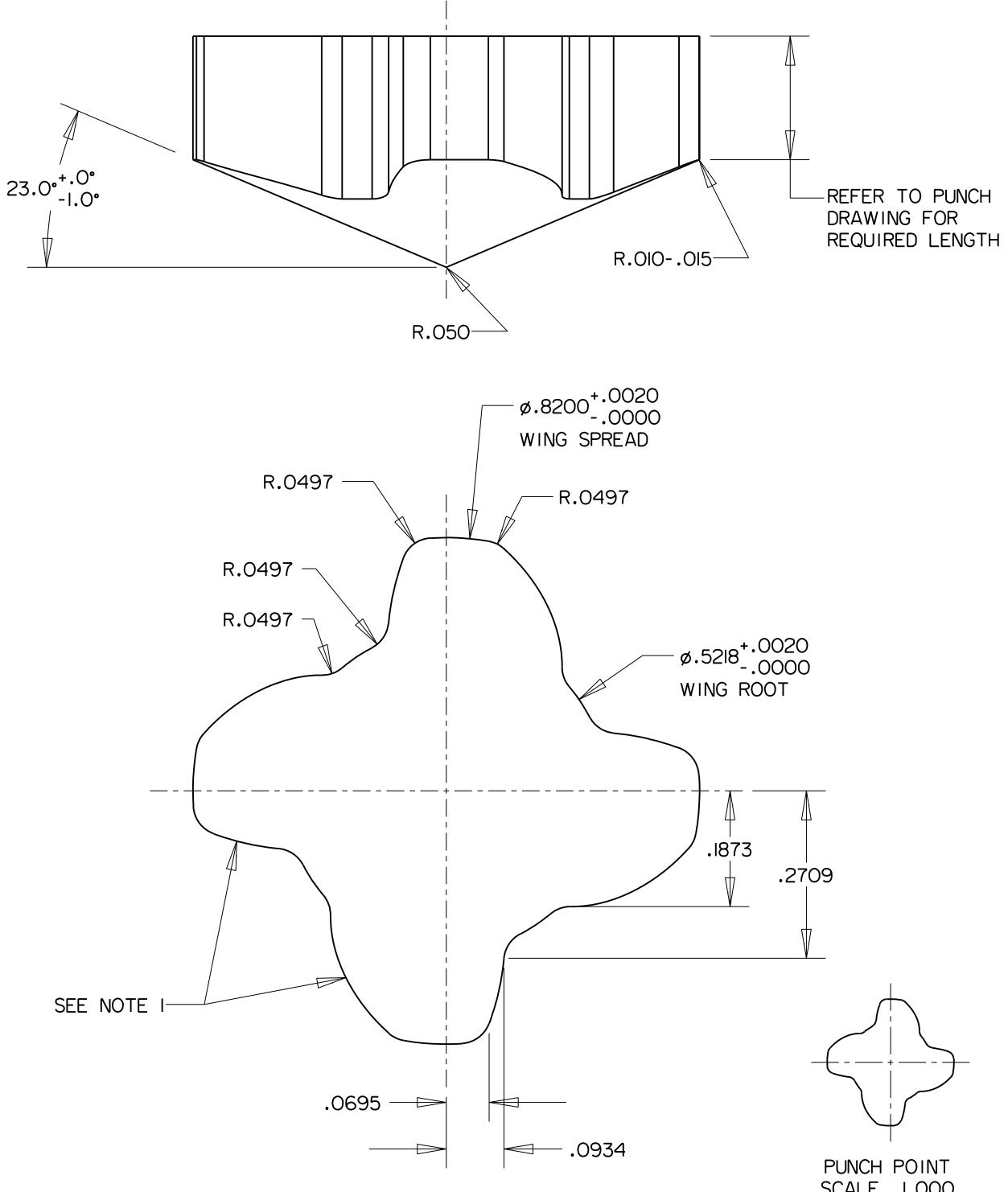
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TITLE: MORTORQ® MT-7 PUNCH POINT DIMENSIONS		
DRAWN G.DILLING	DATE 5/28/03	DRAWING NUMBER PSC-5160
CHECKED: G.DILLING	DATE 6/01/03	SHEET 1 OF 1
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TITLE: MORTORQ®
MT-8 PUNCH POINT DIMENSIONS

DRAWN	DATE	DRAWING NUMBER
G.DILLING	6/23/08	PSC-5161
CHECKED:	DATE	SHEET 1 OF 1
G.DILLING	6/23/08	

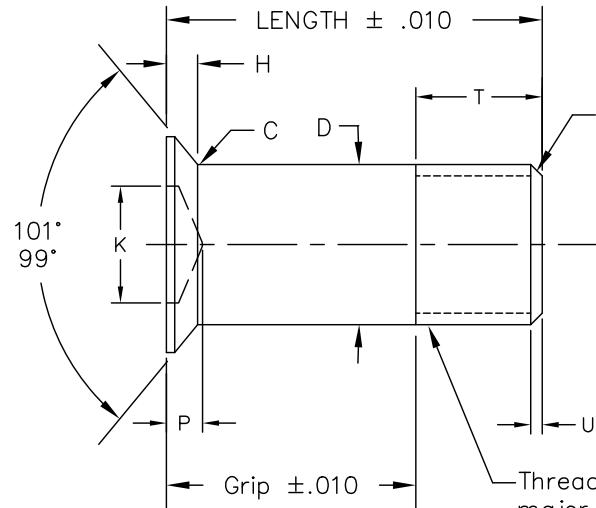
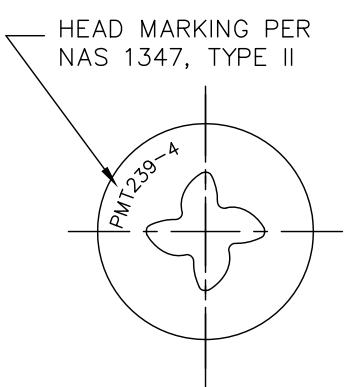
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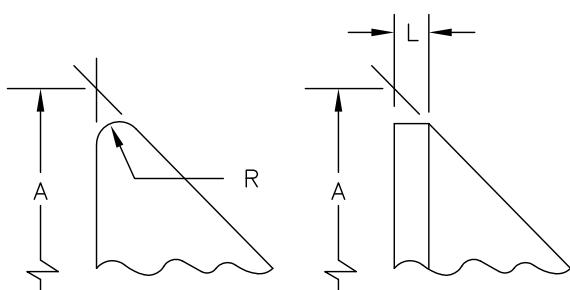
MORTORQ® ENGINEERING MANUAL
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PART STANDARDS

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PMT-600-606	PAN HEAD SCREW	2/18/11
PMT-663-668	100° FLAT HEAD SCREW	1/17/12
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PMT-I790	100° FLAT HEAD SCREW	9/02/09
PMT-2803-2810	100° FLAT HEAD SCREW	II/23/II
PMT-4024L	100° REDUCED HEAD SCREW	I/12/12
PMT-4025L	100° FLAT HEAD SCREW	I/4/12
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PMT-5307	HEX HEAD BOLT	3/15/07
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PMT-5310	130° FLAT HEAD SCREW	8/05/10
PMT-7303-7316	100° FLAT HEAD SCREW	8/14/09
PMT-8702-8716	100° FLAT REDUCED HEAD	7/19/II
PMT-24667	82° FLAT HEAD SCREW	5/24/10
PMT-27039	PAN HEAD SCREW	9/16/II
PMT-3MII69	100° FLAT HEAD SCREW	I/20/12
PMT-3MII70	100° FLAT REDUCED HEAD SCREW	2/6/12



Point to be flat and chamfered. Length of point to first complete thread not to exceed "U".

Thread per MIL-S-7742 except major diameter to be .001 below min. shank diameter and thread runout per MIL-B-7838.



OPTIONAL HEAD
ENLARGED VIEW

BASIC PART NO.	THREAD	A THEO. DIA.	D DIA.		C RAD.	H REF.	K DIA. REF.	L	P MAX. REF.	R MAX. REF.	T REF.	U REF.	(F) MIN. TORQUE IN/LBS	Z (b)	REC. PEN.	REC. and bit size
			BEFORE PLATE	AFTER PLATE												
PMT239-3	.1900-32UNF-3A	.3016 .2966	.1887 .1881	.1895 .1885	.020 .010	.046	.1704	.015 .005	.063	.010	.276	.062	50	.0040	.030 .023	MT-0
PMT239-4	.2500-28UNF-3A	.3948 .3898	.2487 .2481	.2495 .2485	.020 .010	.060	.2405	.015 .005	.078	.010	.316	.071	90	.0030	.030 .023	MT-1
PMT239-5	.3125-24UNF-3A	.4739 .4689	.3112 .3106	.3120 .3110	.025 .010	.067	.2405	.015 .005	.096	.011	.375	.083	175	.0030	.048 .039	MT-1
PMT239-6	.3750-24UNF-3A	.5604 .5554	.3737 .3731	.3745 .3735	.030 .015	.077	.3080	.015 .005	.112	.013	.391	.083	250	.0025	.050 .041	MT-2
PMT239-7	.4375-20UNF-3A	.6680 .6620	.4362 .4356	.4370 .4360	.030 .015	.096	.3537	.022 .005	.139	.015	.453	.100	550	.0025	.067 .058	MT-3
PMT239-8	.5000-20UNF-3A	.7540 .7480	.4987 .4981	.4995 .4985	.030 .015	.105	.4285	.022 .005	.160	.017	.453	.100	900	.0020	.072 .057	MT-4
PMT239-9	.5625-18UNF-3A	.8380 .8310	.5607 .5601	.5615 .5605	.030 .015	.114	.4285	.025 .005	.180	.019	.511	.110	1440	.0020	.092 .077	MT-4
PMT239-10	.6250-18UNF-3A	.9250 .9180	.6232 .6226	.6240 .6230	.030 .015	.125	.5063	.025 .005	.196	.021	.543	.110	1600	.0020	.092 .067	MT-5

(F) LISTED VALUES TO BE VERIFIED IN PRODUCTION

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TITLE: **MORTORQ® SPIRAL DRIVE RECESS
SHEAR BOLT 100° FLAT RIVET HEAD
CLOSE TOLERANCE SHORT THREAD**

DRAWN: G. LaMONICA	DATE: 11-30-05	DRAWING NUMBER
CHECKED: G. LaMONICA	DATE: 04-26-06	PMT-239

SHEET 1 OF 3
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II PHILLIPS POZIDRIV ACR POZISQUARE PHILLIPS SQUARE-DRIV TORQ-SET TRI-WING MORTORQ®
HEXSTIX® POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

MATERIAL	ALLOY STEEL PER NAS 498
HEAT TREATMENT	160,000–180,000 PSI UTS PER MIL-H-6875
FINISH	CADMUM PLATE QQ-P-416, TYPE II, CLASS 3. TYPE 1 PLATING DESIGNATED BY "W", SEE CODE.
CODE	DASH NUMBER DESIGNATES GRIP AND LENGTH. "W" AFTER DASH NUMBER DESIGNATES TYPE I PLATING.
EXAMPLE	PMT239-4-8 = .2500 DIA BOLT, .500 GRIP, TYPE II PLATING PMT239-5-10 = .3125 DIA BOLT, .625 GRIP, TYPE II PLATING PMT239-5-10W = .3125 DIA BOLT, .625 GRIP, TYPE 1 PLATING
NOTES	<p>(a) CONCENTRICITY CONICAL SURFACE OF HEAD AND "D" DIAMETER WITHIN .005 TIR. RECESS TO SHANK WITHIN .016 TIR THRU .2500 SIZE WITHIN .024 TIR ABOVE .2500 SIZE.</p> <p>(b) SHANK STRAIGHTNESS WITHIN "Z" VALUES TIR PER INCH OF LENGTH</p> <p>(c) GRIP LENGTH FROM THE TOP OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK</p> <p>(d) MORTORQ® SPIRAL DRIVE BOLTS SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED WITHOUT DAMAGE TO RECESS OR DRIVER WHEN TESTED IN THE INSTALLATION DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS AND IN THE REMOVAL DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. REFER TO PSC-5026 FOR DRIVER BIT.</p> <p>(e) BOLTS SHALL BE FREE FROM BURRS AND SHARP EDGES</p>

DIMENSIONS IN INCHES

PROCUREMENT SPECIFICATIONS

NAS 498

REVISION

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TITLE: **MORTORQ® SPIRAL DRIVE RECESS SHEAR BOLT 100° FLAT RIVET HEAD CLOSE TOLERANCE SHORT THREAD**

DRAWN: G. LaMONICA	DATE: 11-30-05	DRAWING NUMBER PMT-239
CHECKED: G. LaMONICA	DATE: 12-02-05	
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS II PHILLIPS POZIDRIV ACR POZISQUARE PHILLIPS SQUARE-DRIV TORQ-SET TRI-WING MORTORQ®
HEXSTIX® POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

DASH NUMBER	NOM. GRIP	LENGTH								NOM. GRIP
		PMT239-3	PMT239-4	PMT239-5	PMT239-6	PMT239-7	PMT239-8	PMT239-9	PMT239-10	
1	.062	.338	.378	.437	.453	.515	.515	.573	.605	.062
2	.125	.401	.441	.500	.516	.578	.578	.636	.668	.125
3	.188	.464	.504	.563	.579	.641	.641	.699	.731	.188
4	.250	.526	.566	.625	.641	.703	.703	.761	.793	.250
5	.312	.588	.628	.687	.703	.765	.765	.823	.855	.312
6	.375	.651	.691	.750	.766	.828	.828	.886	.918	.375
7	.438	.714	.754	.813	.829	.891	.891	.949	.981	.438
8	.500	.776	.816	.875	.891	.953	.953	1.011	1.043	.500
9	.562	.838	.878	.937	.953	1.015	1.015	1.073	1.105	.562
10	.625	.901	.941	1.000	1.016	1.073	1.078	1.136	1.168	.625
11	.688	.964	1.004	1.063	1.079	1.141	1.141	1.199	1.231	.688
12	.750	1.026	1.066	1.125	1.141	1.203	1.203	1.261	1.291	.750
13	.812	1.088	1.128	1.187	1.203	1.265	1.265	1.323	1.355	.812
14	.875	1.151	1.191	1.250	1.266	1.328	1.328	1.386	1.418	.875
15	.938	1.214	1.254	1.313	1.329	1.391	1.391	1.449	1.481	.938
16	1.000	1.276	1.316	1.375	1.391	1.453	1.453	1.511	1.543	1.000
17	1.062	1.338	1.378	1.437	1.453	1.515	1.515	1.573	1.605	1.062
18	1.125	1.401	1.441	1.500	1.516	1.578	1.578	1.636	1.668	1.125
19	1.188	1.464	1.504	1.563	1.579	1.641	1.641	1.699	1.731	1.188
20	1.250	1.526	1.566	1.625	1.641	1.703	1.703	1.761	1.793	1.250
21	1.312	1.588	1.628	1.687	1.703	1.765	1.765	1.823	1.855	1.312
22	1.375	1.651	1.691	1.750	1.766	1.828	1.828	1.886	1.918	1.375
23	1.438	1.714	1.754	1.813	1.829	1.891	1.891	1.949	1.981	1.438
24	1.500	1.776	1.816	1.875	1.891	1.953	1.953	2.011	2.043	1.500
25	1.562	1.838	1.878	1.937	1.953	2.015	2.015	2.073	2.105	1.562
26	1.625	1.901	1.941	2.000	2.016	2.078	2.078	2.136	2.168	1.625
27	1.688	1.964	2.004	2.063	2.079	2.141	2.141	2.199	2.231	1.688
28	1.750	2.026	2.066	2.125	2.141	2.203	2.203	2.261	2.293	1.750
29	1.812	2.088	2.128	2.187	2.203	2.265	2.265	2.323	2.355	1.812
30	1.875	2.151	2.191	2.250	2.266	2.328	2.328	2.386	2.418	1.875
31	1.938	2.214	2.254	2.313	2.329	2.391	2.391	2.449	2.481	1.938
32	2.000	2.276	2.316	2.375	2.391	2.453	2.453	2.511	2.543	2.000
34	2.125	2.401	2.441	2.500	2.516	2.578	2.578	2.636	2.668	2.125
36	2.250	2.526	2.566	2.625	2.641	2.703	2.703	2.761	2.793	2.250
38	2.375	2.651	2.691	2.750	2.766	2.828	2.828	2.886	2.918	2.375
40	2.500	2.776	2.816	2.875	2.891	2.953	2.953	3.011	3.043	2.500
42	2.625	2.901	2.941	3.000	3.016	3.078	3.078	3.136	3.168	2.625
44	2.750	3.026	3.066	3.125	3.141	3.203	3.203	3.261	3.293	2.750
46	2.875	3.151	3.191	3.250	3.266	3.328	3.328	3.386	3.418	2.875
48	3.000	3.276	3.316	3.375	3.391	3.453	3.453	3.511	3.543	3.000
50	3.125	3.401	3.441	3.500	3.516	3.578	3.578	3.636	3.668	3.125
52	3.250	3.526	3.566	3.625	3.641	3.703	3.703	3.761	3.793	3.250
54	3.375	3.651	3.691	3.750	3.766	3.828	3.828	3.886	3.918	3.375
56	3.500	3.776	3.816	3.875	3.891	3.953	3.953	4.011	4.043	3.500
58	3.625	3.901	3.941	4.000	4.016	4.078	4.078	4.136	4.168	3.625
60	3.750	4.026	4.066	4.125	4.141	4.203	4.203	4.261	4.293	3.750
62	3.875	4.151	4.191	4.250	4.266	4.328	4.328	4.386	4.418	3.875
64	4.000	4.276	4.316	4.375	4.391	4.453	4.453	4.511	4.543	4.000
66	4.125	4.401	4.441	4.500	4.516	4.578	4.578	4.636	4.668	4.125
68	4.250	4.526	4.566	4.625	4.641	4.703	4.703	4.761	4.793	4.250
70	4.375	4.651	4.691	4.750	4.766	4.828	4.828	4.886	4.918	4.375
72	4.500	4.776	4.816	4.875	4.891	4.953	4.953	5.011	5.043	4.500
74	4.625	4.901	4.941	5.000	5.016	5.078	5.078	5.136	5.168	4.625
76	4.750	5.026	5.066	5.125	5.141	5.203	5.203	5.261	5.293	4.750
78	4.875	5.151	5.191	5.250	5.266	5.328	5.328	5.386	5.418	4.875
80	5.000	5.276	5.316	5.375	5.391	5.453	5.453	5.511	5.543	5.000
82	5.125	5.401	5.441	5.500	5.516	5.578	5.578	5.636	5.668	5.125
84	5.250	5.526	5.566	5.625	5.641	5.703	5.703	5.761	5.793	5.250
86	5.375	5.651	5.691	5.750	5.766	5.828	5.828	5.886	5.918	5.375
88	5.500	5.776	5.816	5.875	5.891	5.953	5.953	6.011	6.043	5.500
90	5.625	5.901	5.941	6.000	6.016	6.078	6.078	6.136	6.168	5.625
92	5.750	6.026	6.066	6.125	6.141	6.203	6.203	6.261	6.293	5.750
94	5.875	6.151	6.191	6.250	6.266	6.328	6.328	6.386	6.418	5.875
96	6.000	6.276	6.316	6.375	6.391	6.453	6.453	6.511	6.543	6.000

DASH NO. INDICATES GRIP LENGTH IN .062 INCREMENTS. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NOS. ONLY.

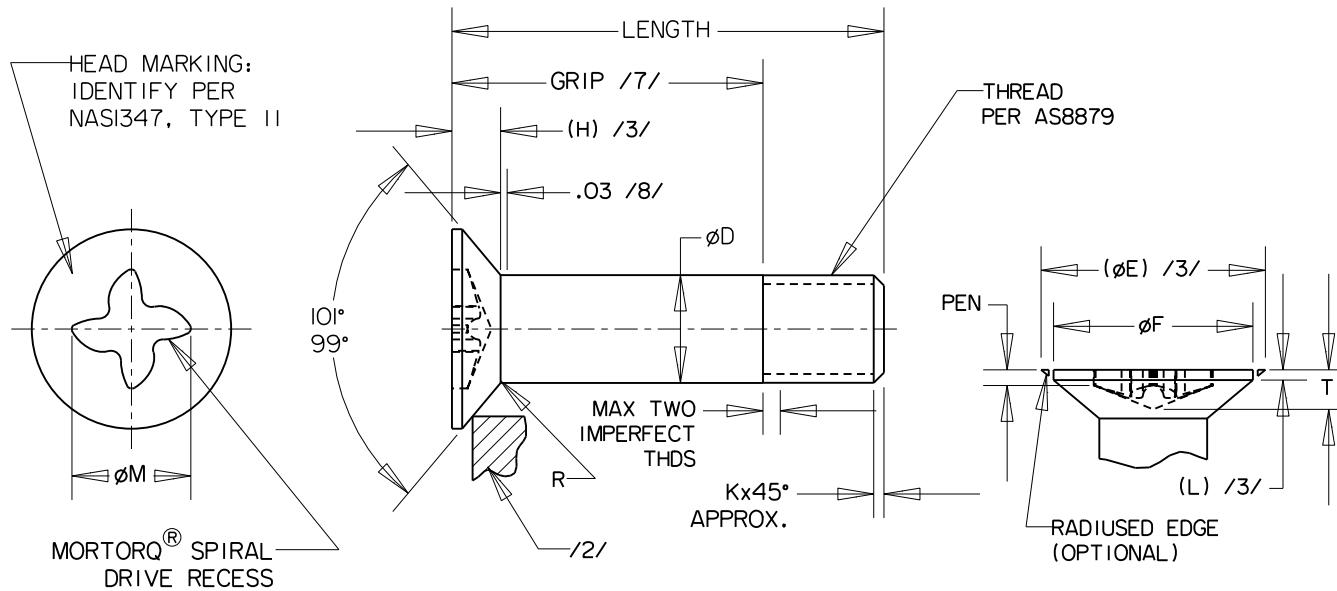
TITLE: **MORTORQ® SPIRAL DRIVE RECESS SHEAR BOLT 100° FLAT RIVET HEAD CLOSE TOLERANCE SHORT THREAD**

DRAWN: G. LaMONICA	DATE: 11-30-05	DRAWING NUMBER PMT-239
CHECKED: G. LaMONICA	DATE: 04-26-06	

SHEET 3 OF 3

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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DIA DASH NO.	THREAD	ϕD	(ϕE) AT SHAPR CORNER /3/	ϕF ABSOLUTE MIN	(H) /3/	K CHAMFER MAX	(L) /3/	ϕM	PEN	T	R RAD	DRIVE SIZE
2	.1640-32 UNJC-3A	.1640 .1610	.334 .323	.287	.068	.031	.015	.1704	.032 .023	.065	.020 .010	MT-0
3	.1900-32 UNJF-3A	.1890 .1860	.387 .375	.337	.080	.031	.016	.2405	.027 .020	.082	.020 .010	MT-1
4	.2500-28 UNJF-3A	.2490 .2460	.510 .496	.452	.106	.031	.018	.2405	.047 .038	.095	.020 .010	MT-1
5	.3125-24 UNJF-3A	.3115 .3085	.638 .622	.572	.133	.047	.021	.3080	.055 .046	.117	.025 .010	MT-2
6	.3750-24 UNJF-3A	.3740 .3710	.766 .748	.692	.159	.047	.023	.3537	.070 .061	.142	.030 .015	MT-3
7	.4375-20 UNJF-3A	.4365 .4325	.894 .874	.812	.186	.047	.026	.4285	.080 .065	.168	.035 .015	MT-4
8	.5000-20 UNJF-3A	.4990 .4950	1.022 1.000	.932	.213	.047	.028	.5063	.082 .067	.186	.040 .020	MT-5

MATERIAL: ALLOY STEEL: 4130 (UNS G41300) PER AMS-S-6758, 4140 (UNS G41400) PER AMS6382, E4340 (UNS G43400) PER AMS-S-5000 OR AMS6484, 4340 (UNS G43406) PER AMS6415, OR 8740 (UNS G87400) PER AMS6322.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER AMS2759:
160 TO 180 KSI FTU.

SHEET	1	2	3
REV	-	-	-

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TITLE:
MORTORQ® SCREW, SHEAR, 100° FLUSH HEAD,
ALLOY STEEL, CLOSE TOLERANCE, 95 KSI FSU

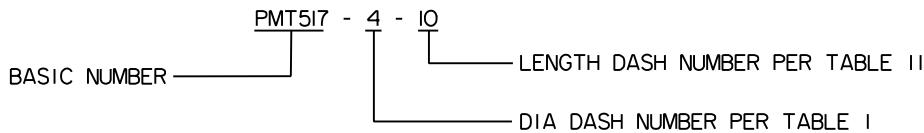
DRAWN G.DILLING	DATE 12/21/11	DRAWING NUMBER PMT-517
CHECKED: G.DILLING	DATE 12/21/11	
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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FINISH: CADMIUM PLATE PER AMS-QQ-P-416 TYPE II, CLASS 2.

CODE: DIA DASH NUMBER INDICATES DIAMETER OF BOLT AS SHOWN IN TABLE I.
LENGTH DASH NUMBER INDICATES GRIP AND LENGTH OF BOLT AS SHOWN IN TABLE II.

EXAMPLE OF PART NUMBER:



PMT5I7-4-10 = SCREW, ALLOY STEEL, CADMIUM PLATED, .2500-28 UNJF-3A THREAD, .625 GRIP, 1.093 LENGTH.

NOTES:

(1) RECESS SHALL BE IN ACCORDANCE WITH THE PHILLIPS SCREW COMPANY STANDARDS.

/2/ FLUSHNESS GAGE PROTRUSION SHALL BE INSPECTED PER NAS9800.

/3/ ϕ E, L, AND H ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. ϕ E, L, AND H VALUES ARE CALCULATED LIMITS RESULTING FROM THE ACCUMULATED TOLERANCE ON THE SHANK DIAMETER, HEAD ANGLE, AND THE APPLICABLE HEAD PROTRUSION AND GAGE DIAMETER AS DEFINED IN NAS9800.

(4) ECCENTRICITY BETWEEN CONICAL SURFACE OF HEAD AND SHANK .003 MAX FIM MEASURED AT GAGE DIAMETER, AND CHUCKED AS CLOSE TO THE HEAD AS PRACTICAL.

(5) MAX ECCENTRICITY BETWEEN RECESS AND SHANK:

FOR SIZES -2 THRU -4: .008 WITH .016 FIM.

FOR SIZES ABOVE -4: .012 WITH .024 FIM

/6/ .1640-32 SIZE NOT PREFERRED FOR NEW DESIGN.

/7/ GRIP LENGTH: FROM TOP OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.

/8/ FOR THE SPECIFIED LENGTH, AN INCREASE OF .001 OVER ϕ D MEASURED FROM THE POINT OF TANGENCY OF R RADIUS AND THE SHANK IS PERMISSIBLE.

(9) DIMENSIONS APPLY AFTER FINISH UNLESS OTHERWISE SPECIFIED.

(10) DIMENSIONS IN INCHES.

(11) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.

(12) REMOVE ALL BURRS AND SHARP EDGES.

(13) REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.

(14) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.

(15) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THE APPLICABLE DRAWING OR SPECIFICATION MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.

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TITLE:

MORTORQ® SCREW, SHEAR, 100° FLUSH HEAD,
ALLOY STEEL, CLOSE TOLERANCE, 95 KSI FSU

DRAWN G.DILLING	DATE 12/21/11	DRAWING NUMBER PMT-517
CHECKED: G.DILLING	DATE 12/21/11	SHEET 2 OF 3
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

- /16/ GRIP LENGTHS LONGER THAN THOSE SHOWN IN TABLE II MAY BE SPECIFIED IN INCREMENTS OF .0625 BY APPLICATION OF THE SIGNIFICANT SECOND DASH NUMBER. BOLT LENGTHS GREATER THAN EIGHT TIMES SHANK DIAMETER SHOULD BE AVOIDED WHERE POSSIBLE AS OPEN DIES MAY BE REQUIRED IN MANUFACTURE.
- /17/ SHORT SCREWS LISTED ABOVE THE HEAVY LINE SHALL BE THREADED TO WITHIN .030-.060 OF HEAD TO SHANK INTERSECTION.

PROCUREMENT SPECIFICATION:

NASM7839 EXCEPT SHEAR STRENGTH OF TABLE II AND HARDNESS REQUIREMENT IN PARAGRAPH 3.5.2 SHALL BE REPLACED BY SHEAR STRENGTH PER TABLE XII AND HARDNESS PER TABLE I IN NAS498.

TABLE II - LENGTH AND GRIP DIMENSIONS

LENGTH DASH NUMBER	GRIP $\pm .015$ /7/	LENGTH +.030/- .015 /16//17/						
		.1640-32 /6/	.1900-32	.2500-28	.3125-24	.3750-24	.4375-20	.5000-20
00	---	.343	.343	---	---	---	---	---
0	---	.406	.406	.469	.531	---	---	---
1	---	.469	.469	.531	.594	.688	.781	---
2	.125	.531	.531	.594	.656	.750	.844	.875
3	.188	.594	.594	.656	.719	.812	.906	.938
4	.250	.656	.656	.719	.781	.875	.969	1.000
5	.312	.719	.719	.781	.844	.938	1.031	1.062
6	.375	.781	.781	.844	.906	1.000	1.093	1.125
7	.438	.844	.844	.906	.969	1.062	1.156	1.188
8	.500	.906	.906	.969	1.031	1.125	1.219	1.250
9	.562	.969	.969	1.031	1.093	1.188	1.281	1.312
10	.625	1.031	1.031	1.093	1.156	1.250	1.343	1.375
11	.688	1.093	1.093	1.156	1.219	1.312	1.406	1.438
12	.750	1.156	1.156	1.219	1.281	1.375	1.468	1.500
13	.812	1.219	1.219	1.281	1.343	1.438	1.531	1.562
14	.875	1.281	1.281	1.343	1.406	1.500	1.594	1.625
15	.938	1.343	1.343	1.406	1.468	1.562	1.656	1.688
16	1.000	1.406	1.406	1.468	1.531	1.625	1.719	1.750
17	1.062	1.468	1.468	1.531	1.594	1.688	1.781	1.812
18	1.125	1.531	1.531	1.594	1.656	1.750	1.844	1.875
19	1.188	1.594	1.594	1.656	1.719	1.812	1.906	1.938
20	1.250	1.656	1.656	1.719	1.781	1.875	1.969	2.000
21	1.312	1.719	1.719	1.781	1.844	1.938	2.031	2.062
22	1.375	1.781	1.781	1.844	1.906	2.000	2.093	2.125
23	1.438	1.844	1.844	1.906	1.969	2.062	2.156	2.188
24	1.500	1.906	1.906	1.969	2.031	2.125	2.219	2.250
25	1.562	1.969	1.969	2.031	2.093	2.188	2.281	2.312
26	1.625	2.031	2.031	2.093	2.156	2.250	2.343	2.375
27	1.688	2.093	2.093	2.156	2.219	2.312	2.406	2.438
28	1.750	2.156	2.156	2.219	2.281	2.375	2.468	2.500
29	1.812	2.219	2.219	2.281	2.343	2.438	2.531	2.562
30	1.875	2.281	2.281	2.343	2.406	2.500	2.594	2.625
31	1.938	2.343	2.343	2.406	2.468	2.562	2.656	2.688
32	2.000	2.406	2.406	2.468	2.531	2.625	2.719	2.750

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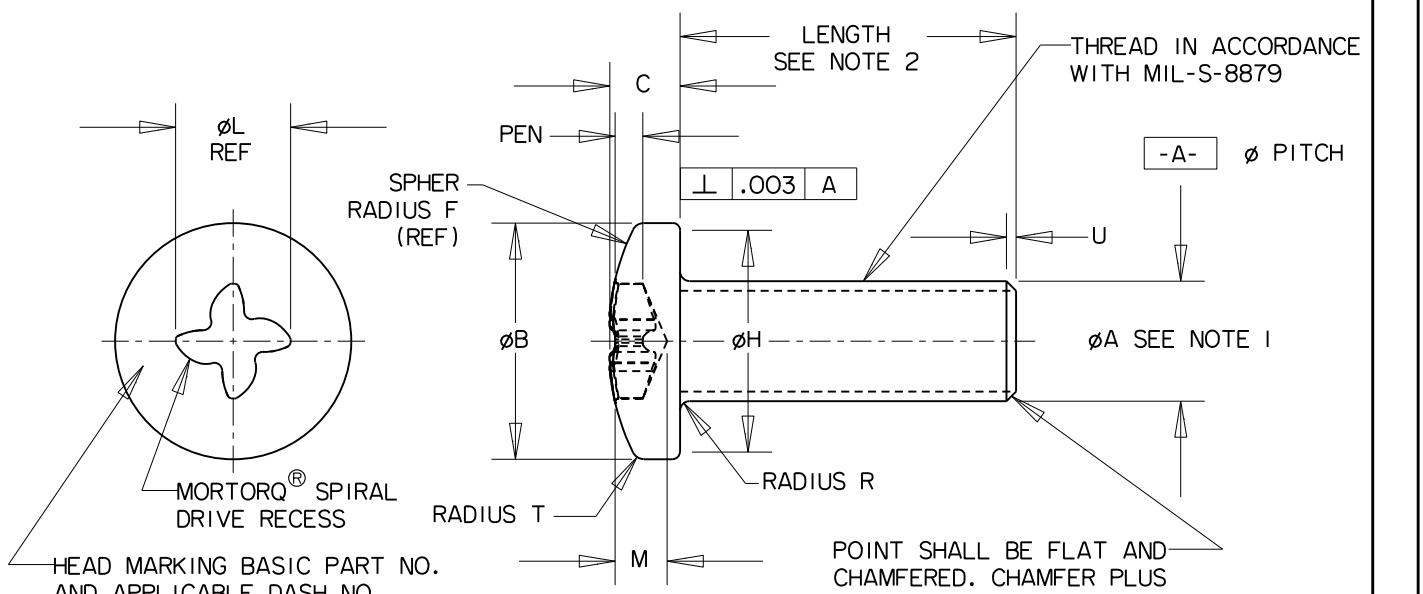
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TITLE:
MORTORQ® SCREW, SHEAR, 100° FLUSH HEAD,
ALLOY STEEL, CLOSE TOLERANCE, 95 KSI FSU

DRAWN G.DILLING	DATE 12/21/11	DRAWING NUMBER PMT-517
CHECKED: G.DILLING	DATE 12/21/11	SHEET 3 OF 3
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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HEAD MARKING BASIC PART NO.
AND APPLICABLE DASH NO.
RAISED OR DEPRESSED .010 MAX.
.1120, .1380 AND .1640 SIZE
MAY BE MARKED "0", "I" OR "2"
AS APPLICABLE PLUS APPLICABLE
DASH NO.

MANUFACTURER'S TRADE-MARK
SHALL BE ADDED. LOCATION OPTIONAL.

TABLE I.

BASIC PART NUMBER	THREAD	ØA MAX	ØB		C HEAD HEIGHT		F RAD REF	ØH MIN	MORTORQ RECESS				R RAD	U MAX	T RAD MAX	INSPECTION VALUES ULTIMATE TENSILE MIN LB		
					ØL REF				M MAX	PEN- SEE NOTE 4	MAX	MIN						
			MAX	MIN	MAX	MIN			MAX	MIN	MAX	MIN						
PMT600	.1120-40 UNJC-3A	.112	.219	.205	.070	.060	.248	.195	.121	.051	.027	.019	.010	.005	.04	.042	960	
PMT601	.1380-32 UNJC-3A	.138	.270	.256	.088	.078	.301	.242	.121	.059	.037	.029	.010	.005	.05	.046	1,430	
PMT602	.1640-32 UNJC-3A	.164	.322	.306	.099	.089	.352	.289	.170	.071	.039	.031	.020	.010	.05	.052	2,230	
PMT603	.1900-32 UNJF-3A	.190	.373	.357	.115	.104	.413	.331	.240	.092	.041	.032	.020	.010	.05	.061	3,180	
PMT604	.2500-28 UNJF-3A	.250	.492	.473	.151	.138	.535	.424	.240	.103	.057	.048	.020	.010	.06	.087	5,790	
PMT605	.3125-24 UNJF-3A	.312	.615	.594	.188	.173	.669	.518	.308	.157	.080	.071	.020	.010	.06	.099	9,260	
PMT606	.3750-24 UNJF-3A	.375	.740	.716	.224	.207	.784	.611	.354	.160	.087	.078	.025	.015	.06	.143	14,000	

TABLE II. DASH NUMBERS

DASH NO	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36 TO 96		
LENGTH	.19	.25	.31	.38	.44	.50	.56	.62	.69	.75	.81	.88	.94	.100	+.12	1.25	1.38	1.50	+.62	1.75	+.88	2.00	2.12	2.25 TO 6.00		
LENGTH TOL																								+0 -.03	+0 -.06	+0 -.09

1/ SEE NOTE 5

SHEET	I	2
REV	-	-

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TITLE: MORTORQ® SPIRAL DRIVE
SCREW, MACHINE - AIRCRAFT, PAN HEAD,
RECESS FULL THREAD ALLOY STEEL

DRAWN G.DILLING DATE 2/17/II
DRAWING NUMBER PMT-600 THRU 606

CHECKED: G.DILLING DATE 2/18/II
SHEET 1 OF 2

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MATERIAL: ALLOY STEEL, 4140 (UNS G41400) IN ACCORDANCE WITH MIL-S-5626, 4340 (UNS G43400) IN ACCORDANCE WITH MIL-S-5000 OR 8740 (UNS G87400) IN ACCORDANCE WITH MIL-S-6049.

HEAT TREATMENT: 160,000 TO 180,000 PSI TENSILE STRENGTH IN ACCORDANCE WITH MIL-H-6875. 36-40HRC.

FINISH: CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416, TYP II, CLASS 2 FOR PARTS CARRYING "B" OR "P" AFTER LAST DASH NUMBER (SEE CODE).

CODE: LAST DIGIT OF PMT BASIC PART NUMBER DESIGNATES SCREW SIZE.
FIRST DASH NUMBER DESIGNATES NOMINAL LENGTH IN .0625 INCH INCREMENTS (CONVERTED TO TWO DECIMAL PLACES IN ACCORDANCE WITH ANSI Y14.5M)
INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY.
USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREW LENGTHS FROM 2.25 TO 6.00 INCHES.
(SEE NOTE 7).
ADD "B" FOLLOWING LENGTH DASH NUMBER FOR SCREW WITH CADMIUM PLATING PER QQ-P-416,
TYPE II, CLASS 2, WITH DULL BLACK CHROMATE TREATMENT.
ADD "P" FOLLOWING LENGTH DASH NUMBER FOR SCREW WITH CADMIUM PLATING PER
QQ-P-416, TYPE II, CLASS 2.

EXAMPLES OF PART NUMBERS:

PMT600-6 = .1120-40 UNJC-3A SCREW, MACHINE, AIRCRAFT, PAN HEAD MORTORQ RECESS, FULL THREADED ALLOY STEEL, .38 INCH LONG, CADMIUM PLATE, TYPE I, CLASS 2 (SEE NOTE 7).
PMT601-8B = .1380-32 UNJC-3A SCREW, MACHINE, AIRCRAFT, PAN HEAD, MORTORQ RECESS, FULL THREADED, ALLOY STEEL, .50 INCH LONG, CADMIUM PLATE, TYPE II, CLASS 2, COLOR DULL BLACK.
PMT602-12P = .1640-32 UNJC-3A SCREW, MACHINE, AIRCRAFT, PAN HEAD, MORTORQ RECESS, FULL THREADED, ALLOY STEEL, .75 INCH LONG, CADMIUM PLATE, TYPE II, CLASS 2.

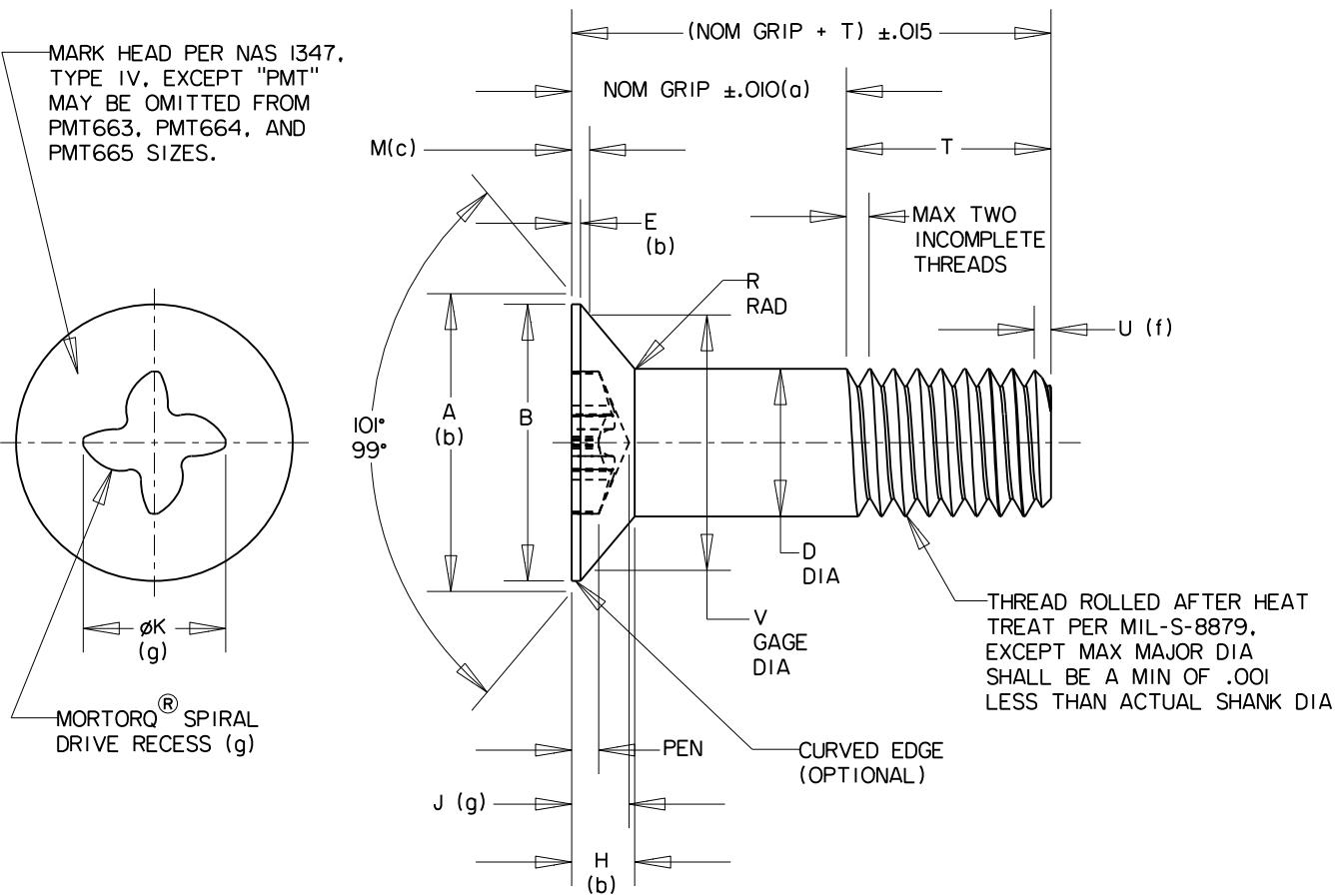
NOTES:

- (1.) DIAMETER OF UNTHEADED PORTION OF SCREWS SHALL NOT BE LESS THAN MINIMUM PITCH DIAMETER NOR MORE THAN MAXIMUM MAJOR DIAMETER OF THREAD.
- (2.) FOR SCREWS 2 INCHES LONG OR SHORTER, COMPLETE THREADS SHALL EXTEND TO WITHIN 2 THREADS OF THE BEARING SURFACE OF THE HEAD. SCREWS OF LONGER LENGTH SHALL HAVE A MINIMUM COMPLETE THREAD LENGTH OF 1.75 INCHES.
- (3.) N/A
- (4.) SEE PSC-5027 FOR GAGE REQUIREMENTS TO MEASURE DEPTH OF PENETRATION FOR MORTORQ SPIRAL DRIVE RECESS.
- (5.) DASH NUMBERS 9, II, 13, 15, 18, 22, 26, AMD 30 ARE INACTIVE FOR DESIGN AFTER MARCH 1990.
- (6.) N/A
- (7.) PART NUMBERS HAVING NO CODE LETTER FOLLOWING LENGTH DASH NUMBER ARE INACTIVE FOR DESIGN AFTER MARCH 1990. SUPERSEDED BY "P" CODE.
- (8.) ALL DIMENSIONS ARE IN INCHES.
- (9.) SCREWS SHALL BE FREE FROM BURRS OR SLIVERS. BREAK ALL SHARP EDGES.
- (10.) SHEAR TEST NOT APPLICABLE.
- (II.) FOR DESCRIPTION OF STATUS NOTES SEE NAS380.
- (12.) DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ANSI Y14.5M.

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	CHECKED: G.DILLING	DATE 2/18/11				
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326						
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MARK HEAD PER NAS 1347,
TYPE IV, EXCEPT "PMT"
MAY BE OMITTED FROM
PMT663, PMT664, AND
PMT665 SIZES.



BASIC PART	THREAD	A DIA MAX (b)	B DIA MIN	D DIA	E MAX (b)	H REF (b)	M GAGE PROT (c)	R RAD	T	U REF	V GAGE DIA	Y TIR (d)	Z TIR (e)
PMT663	.1900-32	.3813	.339	.1895 .1890	.015	.083	.0285 .0255	.035 .015	.338	.050	.3147 .3145	.005	.0040
PMT664	.2500-28	.5066	.464	.2495 .2490	.015	.111	.0338 .0309	.035 .015	.425	.050	.4245 .4243	.006	.0030
PMT665	.3125-24	.6335	.578	.3120 .3115	.015	.140	.0409 .0370	.045 .025	.469	.060	.5389 .5387	.007	.0030
PMT666	.3750-24	.7604	.717	.3745 .3740	.015	.167	.0459 .0422	.045 .025	.578	.060	.6532 .6530	.008	.0025
PMT667	.4375-20	.8884	.826	.4370 .4365	.022	.195	.0470 .0425	.055 .035	.594	.080	.7784 .7782	.009	.0025
PMT668	.5000-20	1.0139	.951	.4995 .4990	.022	.222	.0529 .0482	.055 .035	.735	.080	.8902 .8900	.010	.0020

SHEET	1	2	3	4
REV	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE RECESS
BOLT 100° FLUSH HEAD
TITANIUM ALLOY (LONG THREAD)

DRAWN G.DILLING	DATE 1/17/12	DRAWING NUMBER PMT-663 THRU 668
CHECKED: G.DILLING	DATE 1/17/12	SHEET 1 OF 4

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BASIC PART	MORTORQ SPIRAL DRIVE RECESS (g)					
	RECESS DRIVE SIZE	J	K REF	PEN		TORQUE IN/LB MIN
				MAX	MIN	
PMT663	MT-1	.082	.2405	.027	.020	50
PMT664	MT-1	.095	.2405	.047	.038	125
PMT665	MT-2	.117	.3080	.055	.046	250
PMT666	MT-3	.142	.3537	.070	.061	430
PMT667	MT-4	.168	.4285	.080	.065	925
PMT668	MT-5	.186	.5063	.082	.067	1210

- (a) GRIP LENGTH IS FROM TOP OF BOLT HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
 (b) A, E, AND H ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES A, E, AND H ARE CALCULATED LIMITS RESULTING FROM TOLERANCE ON B, D, M, V, AND HEAD ANGLE.
 (c) DIMENSIONS FOR M GAGE PROTRUSION SHALL BE INSPECTED PER NAS 527.
 (d) HEAD EDGE OUT OF ROUNDNESS SHALL NOT EXCEED "Y" TIR.
 (e) SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES TIR PER INCH OF LENGTH.
 (f) POINT SHALL BE FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREAD SHALL NOT EXCEED "U".
 (g) MORTORQ® SPIRAL DRIVE RECESS PER PHILLIPS SCREW COMPANY SPECIFICATIONS. BOLT RECESS SHALL BE TORQUE TESTED WITH APPLICABLE MORTORQ DRIVER WITH AXIAL END PRESSURE NOT EXCEEDING 15 POUNDS. BOLTS ARE REJECTABLE IF MINIMUM TORQUE VALUES LISTED ABOVE CAUSE FRACTURE OF BOLT OR DISTORTION WHICH RESULTS IN RAISE OF METAL EXCEEDING .005 ABOVE SURROUNDING AREA. SAMPLING SHALL BE PER MIL-STD-105, 4% AQL LEVEL S-I.

MATERIAL: 6AI-4V TITANIUM ALLOY PER PROCUREMENT SPEC (SEE "CODE").

HEAT TREAT: 160,000 PSI MINIMUM TENSILE STRENGTH PER PROCUREMENT SPEC.

FINISH: NONE

LUBRICANT: CETYL ALCOHOL PER MIL-L-87132, TYPE I, GRADE 8 (SEE "CODE").

CODE: DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCH INCREMENTS.

MATERIAL: CODE LETTER "V" FOLLOWING BASIC PART NUMBER INDICATES 6AI-4V MATERIAL.
 RECESS: CODE LETTER "MT" FOLLOWING DASH NUMBER INDICATE "MORTORQ" RECESS.

LUBRICANT: CODE LETTER "L" FOLLOWING RECESS CODE INDICATES CETYL ALCOHOL LUBRICANT.

EXAMPLE OF PART NUMBER: PMT 664V5MT = .2500-28 6AI-4V MATERIAL BOLT: .312 GRIP LENGTH, WITH "MORTORQ" RECESS.

PMT 664V5MTL = .2500-28 6AI-4V MATERIAL BOLT: .312 GRIP LENGTH, WITH "MORTORQ" RECESS AND CETYL ALCOHOL LUBRICANT.

- NOTES:
1. CONCENTRICITY: CONICAL SURFACE OF HEAD TO "D" DIA WITHIN .003 TIR.
 "D" DIA TO THREAD PITCH DIA WITHIN .0045 TIR FOR PMT 663 THRU PMT 665, AND WITHIN .006 TIRE FOR PMT 666 AND LARGER.
 2. SURFACE TEXTURE PER ANSI B46.1. CONICAL SURFACE OF HEAD, HEAD TO SHANK FILLET RADIUS, SHANK AND ALL THREAD ELEMENTS 32 RHR MAX. ALL OTHER SURFACES 125 RHR MAX.
 3. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
 4. DIMENSIONS IN INCHES.

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DRAWN G.DILLING	DATE 1/17/12	DRAWING NUMBER PMT-663 THRU 668
CHECKED: G.DILLING	DATE 1/17/12	SHEET 2 OF 4
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GRIP DASH NO	GRIP ±.010	LENGTH ±.015						GRIP ±.010	GRIP DASH NO
		PMT 663	PMT 664	PMT 665	PMT 666	PMT 667	PMT 668		
2	.125	.464	.551	---	---	---	---	.125	2
3	.188	.527	.614	.658	.767	---	---	.188	3
4	.250	.589	.676	.720	.829	.844	.985	.250	4
5	.312	.651	.738	.782	.891	.906	1.047	.312	5
6	.375	.714	.801	.845	.954	.969	1.110	.375	6
7	.438	.777	.864	.908	1.017	1.032	1.173	.438	7
8	.500	.839	.926	.970	1.079	1.094	1.235	.500	8
9	.562	.901	.988	1.032	1.141	1.156	1.297	.562	9
10	.625	.964	1.051	1.095	1.204	1.219	1.360	.625	10
11	.688	1.027	1.114	1.158	1.267	1.282	1.423	.688	11
12	.750	1.089	1.176	1.220	1.329	1.344	1.485	.750	12
13	.812	1.151	1.238	1.282	1.391	1.406	1.547	.812	13
14	.875	1.214	1.301	1.345	1.454	1.469	1.610	.875	14
15	.938	1.277	1.364	1.408	1.517	1.532	1.673	.938	15
16	1.000	1.339	1.426	1.470	1.579	1.594	1.735	1.000	16
17	1.062	1.401	1.488	1.532	1.641	1.656	1.797	1.062	17
18	1.125	1.464	1.551	1.595	1.704	1.719	1.860	1.125	18
19	1.188	1.527	1.614	1.658	1.767	1.782	1.923	1.188	19
20	1.250	1.589	1.676	1.720	1.829	1.844	1.985	1.250	20
21	1.312	1.651	1.738	1.782	1.891	1.906	2.047	1.312	21
22	1.375	1.714	1.801	1.845	1.954	1.969	2.110	1.375	22
23	1.438	1.777	1.864	1.908	2.017	2.032	2.173	1.438	23
24	1.500	1.839	1.926	1.970	2.079	2.094	2.235	1.500	24
25	1.562	1.901	1.988	2.032	2.141	2.156	2.297	1.562	25
26	1.625	1.964	2.051	2.095	2.204	2.219	2.360	1.625	26
27	1.688	2.027	2.114	2.158	2.267	2.282	2.423	1.688	27
28	1.750	2.089	2.176	2.220	2.329	2.344	2.485	1.750	28
29	1.812	2.151	2.238	2.282	2.391	2.406	2.547	1.812	29
30	1.875	2.214	2.301	2.345	2.454	2.469	2.610	1.875	30
31	1.938	2.277	2.364	2.408	2.517	2.532	2.673	1.938	31
32	2.000	2.339	2.426	2.470	2.579	2.594	2.735	2.000	32
34	2.125	2.464	2.551	2.595	2.704	2.719	2.860	2.125	34
36	2.250	2.589	2.676	2.720	2.829	2.844	2.985	2.250	36
38	2.375	2.714	2.801	2.845	2.954	2.969	3.110	2.375	38
40	2.500	2.839	2.926	2.970	3.079	3.094	3.235	2.500	40
42	2.625	2.964	3.051	3.095	3.204	3.219	3.360	2.625	42
44	2.750	3.089	3.176	3.220	3.329	3.344	3.485	2.750	44
46	2.875	3.214	3.301	3.345	3.454	3.469	3.610	2.875	46
48	3.000	3.339	3.426	3.470	3.579	3.594	3.735	3.000	48
50	3.125	3.464	3.551	3.595	3.704	3.719	3.860	3.125	50
52	3.250	3.589	3.676	3.720	3.829	3.844	3.985	3.250	52
54	3.375	3.714	3.801	3.845	3.954	3.969	4.110	3.375	54
56	3.500	3.839	3.926	3.970	4.079	4.094	4.235	3.500	56

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TITLE: MORTORQ® SPIRAL DRIVE RECESS BOLT 100° FLUSH HEAD TITANIUM ALLOY (LONG THREAD)

DRAWN G.DILLING	DATE 1/17/12	DRAWING NUMBER PMT-663 THRU 668
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CHECKED: G.DILLING	DATE 1/17/12	SHEET 3 OF 4
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GRIP DASH NO	GRIP ±.010	LENGTH ±.015						GRIP ±.010	GRIP DASH NO
		PMT 663	PMT 664	PMT 665	PMT 666	PMT 667	PMT 668		
58	3.625	3.964	4.051	4.095	4.204	4.219	4.360	3.625	58
60	3.750	4.089	4.176	4.220	4.329	4.344	4.485	3.750	60
62	3.875	4.214	4.301	4.345	4.454	4.469	4.610	3.875	62
64	4.000	4.339	4.426	4.470	4.579	4.594	4.735	4.000	64
66	4.125	4.464	4.551	4.595	4.704	4.719	4.860	4.125	66
68	4.250	4.589	4.676	4.720	4.829	4.844	4.985	4.250	68
70	4.375	4.714	4.801	4.845	4.954	4.969	5.110	4.375	70
72	4.500	4.839	4.926	4.970	5.079	5.094	5.235	4.500	72
74	4.625	4.964	5.051	5.095	5.204	5.219	5.360	4.625	74
76	4.750	5.089	5.176	5.220	5.329	5.344	5.485	4.750	76
78	4.875	5.214	5.301	5.345	5.454	5.469	5.610	4.875	78
80	5.000	5.339	5.426	5.470	5.579	5.594	5.735	5.000	80
82	5.125	5.464	5.551	5.595	5.704	5.719	5.860	5.125	82
84	5.250	5.589	5.676	5.720	5.829	5.844	5.985	5.250	84
86	5.375	5.714	5.801	5.845	5.954	5.969	6.110	5.375	86
88	5.500	5.839	5.926	5.970	6.079	6.094	6.235	5.500	88
90	5.625	5.964	6.051	6.095	6.204	6.219	6.360	5.625	90
92	5.750	6.089	6.176	6.220	6.329	6.344	6.485	5.750	92
94	5.875	6.214	6.301	6.345	6.454	6.469	6.610	5.875	94
96	6.000	6.339	6.426	6.470	6.579	6.594	6.735	6.000	96

REVISION

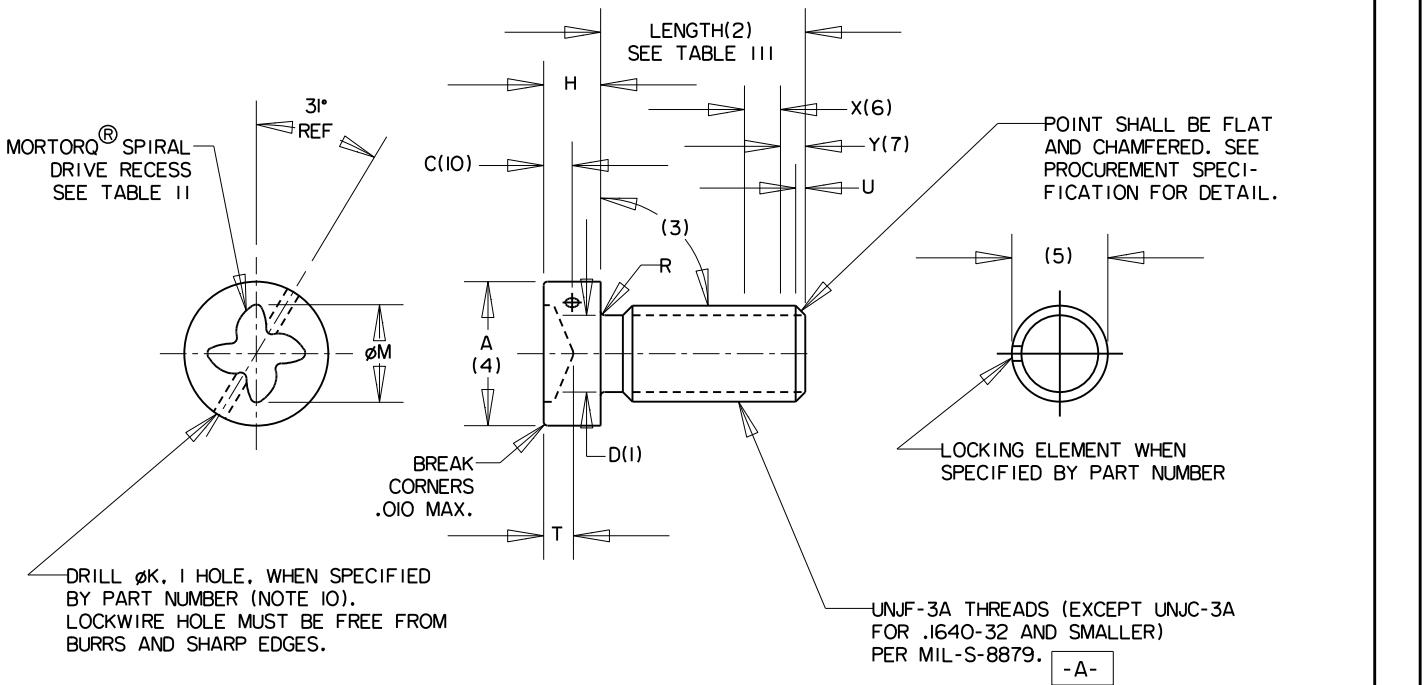
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TITLE: MORTORQ® SPIRAL DRIVE RECESS
BOLT 100° FLUSH HEAD
TITANIUM ALLOY (LONG THREAD)

DRAWN G.DILLING	DATE 1/17/12	DRAWING NUMBER PMT-663 THRU 668
CHECKED: G.DILLING	DATE 1/17/12	SHEET 4 OF 4
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY



CONCENTRICITY: ϕM OF RECESS TO PITCH DIAM. WITHIN .010" FOR -4 AND BELOW, WITHIN .015" FOR -5 AND ABOVE.

HEAD MARKING SHALL BE DEPRESSED (.010 MAX) AND ARRANGED AS FOLLOWS:

- FIRST SECTOR - MARK WITH BASIC PART NUMBER ("PMT" OPTIONAL) EXCEPT MARK .I120-40 SIZE WITH "4", .I380-32 SIZE WITH "6", .I640-32 SIZE WITH "8", AND OPTIONAL .I900-32 SIZE WITH "10". THESE SIZES ALSO TO BE MARKED "C" FOR A286 CRES.
- SECOND SECTOR - MARK WITH MANUFACTURER'S SYMBOL OR TRADEMARK (SYMBOL LOCATION OPTIONAL IN ANY SECTOR) LENGTH DASH NUMBER AND "L" OR "P" WHEN APPLICABLE. (SEE NOTE 9)
"L" IDENTIFIES SCREWS WITH OPTIONAL LOCKING ELEMENT.
"P" IDENTIFIES SCREWS WITH PATCH TYPE LOCKING ELEMENT ONLY.
- THIRD SECTOR - MARK WITH RECESS DASH NUMBER, ENCIRCLED. RECESS NUMBER SHOULD BE APPROXIMATELY 25% LARGER THAN OTHER NUMERALS IN HEAD MARKING.

TABLE I - DIMENSIONS

Ø DASH NUMBER	THREAD SIZE	NOTE 4 ØA	NOTE 1 ØD	H	ØK	+.000 -.010 C	RADIUS R	MAX. U	NOTE 6 X	NOTE 7 Y	RECESS SIZE
-04	.I120-40	.183 .178	.I120 .0939	.069 .059	.042 .034	.034	.010 .005	.031	.125	.075	MT-00
-06	.I380-32	.226 .221	.I380 .1156	.086 .074		.044		.039	.156	.094	MT-00
-08	.I640-32	.270 .265	.I640 .1415	.102 .088		.049					MT-0
-3	.I900-32	.313 .306	.I900 .1674	.118 .103		.056	.020 .010	.045	.179	.107	MT-0
-4	.2500-28	.375 .367	.2500 .2243	.150 .133		.075					MT-1
-5	.3125-24	.438 .429	.3125 .2827	.183 .162		.068 .060	.094	.052	.208	.125	MT-1
-6	.3750-24	.563 .552	.3750 .3450	.215 .191		.113	.025 .015				MT-2

REVISION IV REVISED 07-01-09 5/ REVISED 10-15-13

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TITLE: SCREW, FLAT FILLISTER HEAD, FULL THREAD, MORTORQ® SPIRAL DRIVE RECESS A286 CRES, SELF-LOCK AND NON-LOCK

DRAWN G. LaMONICA	DATE 08-13-04	DRAWING NUMBER PMT-735
CHECKED: G. LaMONICA	DATE 08-18-04	SHEET 1 OF 4

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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TABLE II - RECESS DIMENSIONS

Ø DASH NUMBER	THREAD SIZE	RECESS SIZE	T MAX. REF.	ØM MAX. REF.	GAGE PENETRATION		TORQUE IN-LBS MIN (8)	RAISED METAL MAX (8)
					MAX.	MIN.		
-04	.1120-40	MT-00	.052	.1210	.030	.021	13	.005
-06	.1380-32	MT-00	.052	.1210	.030	.021	30	.005
-08	.1640-32	MT-0	.065	.1704	.032	.023	50	.005
-3	.1900-32	MT-0	.069	.1704	.036	.027	60	.005
-4	.2500-28	MT-1	.087	.2405	.039	.030	140	.005
-5	.3125-24	MT-1	.098	.2405	.050	.041	220	.005
-6	.3750-24	MT-2	.124	.3080	.062	.053	520	.006

TABLE III

	DASH NUMBER FOR PREFERRED LENGTH																						
	DASH NO.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32
LENGTH	.19	.25	.31	.38	.44	.50	.56	.62	.69	.75	.81	.88	.94	1.00	1.12	1.25	1.38	1.50	1.62	1.75	1.88	2.00	2.12 TO 6.00
LENGTH TOL.																							+.00 -.09

MATERIAL: A286 CRES PER AMS 5731 OR AMS 5737.
LOCKING ELEMENT- PLASTIC PER MIL-F-18240 AND QPL-18240.

HEAT TREAT: 160 AND 180 KSI ULTIMATE TENSILE.

FINISH: UNPLATED SCREWS - PASSIVATE TO MEET REQUIREMENTS OF NAS4003.

PLATED SCREWS - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2. EMBRITTLEMENT TEST PER QQ-P-416 DOES NOT APPLY. CADMIUM PLATED A286 CRES SCREWS SHALL BE IDENTIFIED WITH GREEN DYE OR PAINT ON THE THREAD END. MAXIMUM COVERAGE MAY INCLUDE THE CHAMFER PLUS ONE COMPLETE THREAD.

COATED SCREWS - ALUMINUM COATING PER NAS4006.

CODE: BASIC PART NUMBER = NON-LOCKING, PLATED SCREW.
FIRST DASH NUMBER INDICATES DIAMETER. SEE TABLE I AND II.
SECOND DASH NUMBER INDICATES LENGTH IN .0625 INCREMENTS (ROUNDED TO TWO DECIMAL PLACES). SEE TABLE III FOR TABULATIONS OF LENGTH DIMENSIONS. USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREWS OVER 3 INCHES LONG. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY.
ADD "A" AFTER DIAMETER DASH NUMBER FOR ALUMINUM COATED SCREWS. MAY BE USED WITH "L" OR "P" CODE.
ADD "H" AFTER DIAMETER DASH NUMBER FOR DRILLED HEAD SCREWS.
ADD "L" AFTER DIAMETER DASH NUMBER FOR SELF-LOCKING SCREWS. OPTIONAL CONFIGURATION. DO NOT USE WITH "P" CODE.
ADD "U" AFTER DIAMETER DASH NUMBER FOR UNPLATED SCREWS. MAY BE USED WITH "L" OR "P" CODE.
ADD "P" AFTER DIAMETER DASH NUMBER FOR SELF-LOCKING SCREWS, PATCH TYPE LOCKING ELEMENT. DO NOT USE WITH "L" CODE.
WHEN MULTIPLE LETTER CODES ARE USED, SEQUENCE MUST BE IN ALPHABETICAL ORDER.

REVISION 1/ REVISED 03-14-08 2/ REVISED 07-01-09

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TITLE: SCREW, FLAT FILLISTER HEAD, FULL THREAD, MORTORQ® SPIRAL DRIVE RECESS A286 CRES, SELF-LOCK AND NON-LOCK

DRAWN G. LaMONICA	DATE 08-13-04	DRAWING NUMBER PMT-735 SHEET 2 OF 4
CHECKED G. LaMONICA	DATE 08-18-04	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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EXAMPLE OF PART NUMBER:

PMT735-3-10 = SCREW. .1900-32 THREAD. .62 LENGTH, NON-LOCKING, PLATED.
 PMT735-3A10 = SCREW. .1900-32 THREAD. .62 LENGTH, NON-LOCKING, ALUMINUM COATED.
 PMT735-3H10 = SCREW. .1900-32 THREAD. .62 LENGTH, NON-LOCKING, DRILLED HEAD, PLATED.
 PMT735-3L10 = SCREW. .1900-32 THREAD. .62 LENGTH, SELF-LOCKING, OPTIONAL CONFIGURATION, PLATED.
 PMT735-3LU10 = SCREW. .1900-32 THREAD. .62 LENGTH, SELF-LOCKING, OPTIONAL CONFIGURATION, UNPLATED.
 PMT735-3PU10 = SCREW. .1900-32 THREAD. .62 LENGTH, SELF-LOCKING, PATCH TYPE, UNPLATED.

NOTES:

- (1) DIAMETER OF UNTHEADED PORTION OF SCREW SHALL NOT BE LESS THAN MINIMUM PITCH DIAMETER NOR MORE THAN MAXIMUM MAJOR DIAMETER OF THREAD.
- (2) SCREWS LESS THAN 2 DIAMETERS IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF BEARING SURFACE OF HEAD AND INCOMPLETE THREADS MAY EXTEND UP TO BEARING SURFACE.
SCREWS 2 DIAMETERS THRU 2 INCHES IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF TANGENCY OF "R" AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
SCREWS LONGER THAN 2 INCHES - COMPLETE THREADS SHALL EXTEND A MINIMUM OF 1.75 INCHES FROM END OF SCREW AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
INCOMPLETE THREADS - SEE NAS4003.
- (3) BEARING SURFACE SQUARENESS: WITHIN .003 FIM OF SHANK DIAMETER.
- (4) CONCENTRICITY: OUTSIDE DIAMETER "A" TO THREAD PITCH DIAMETER WITHIN .008 FIM.
- (5) PROTRUSION OF LOCKING ELEMENTS SHALL BE CONTROLLED SO THAT IT WILL PASS FREELY OR WITH FINGER PRESSURE THROUGH A RING GAGE WITH DIAMETER OF .010 (+.001, -.000) GREATER THAN MAXIMUM MAJOR DIAMETER OF SCREW THREAD.
- (6) "X" MINIMUM (5 THREAD PITCHES) = REGION OF MINIMUM ENGAGEMENT WITH FEMALE THREAD REQUIRED TO MEET MIL-F-18240 REQUIREMENTS. LOCKING ELEMENT WITHIN "X" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED PER MIL-F-18240.
- (7) FOR EASE OF STARTING, LOCKING ELEMENT SHALL NOT BE EFFECTIVE IN "Y" AREA (3 THREAD PITCHES).
- (8) MORTORQ SPIRAL DRIVE SCREW SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED IN TABLE II WITHOUT DAMAGE TO RECESS OR DRIVER. SCREW RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTIONS. APPLY TABULATED TORQUE IN CW DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED WITHOUT RESTRICTION ON RAISED METAL.
- (9) "A". ALUMINUM COATED, "H". DRILLED HEAD, AND "U". UNPLATED CODES NEED NOT APPEAR ON THE HEAD OF THE SCREW.
- (10) THE LOCKWIRE HOLE WILL BREAK THRU INTO THE RECESS. THE LOCATION OF THE DRILLED HOLE IS CONTROLLED BY THE DIMENSION "C" DEPTH AND ORIENTATION OF HOLE MUST CUT THRU THE RECESS THROAT AS SHOWN ON SHEET I. PENETRATION THRU TOP OR BASE OF HEAD IS NOT PERMITTED. RECESS MUST BE FREE OF BURRS OR SLIVERS THAT INTERFERE WITH DRIVER ENGAGEMENT.
- (II) MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR FIELD STRENGTH H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER MIL-I-17214 OR EQUIVALENT.
- (I2) DIMENSIONS TO BE MET AFTER PLATING.
- (I3) DIMENSIONS ARE IN INCHES.

SURFACE TEXTURE:

(AA MAX PER ANSI B46.1) BEARING SURFACE OF THE HEAD, THREAD FLANKS AND THREAD ROOT 32;
 OTHER SURFACES I25.

PROCUREMENT SPECIFICATION:

NAS4003, EXCEPT AS NOTED. COLD WORK OF HEAD TO SHANK FILLET IS NOT REQUIRED.
 LOCKING ELEMENT FOR SELF-LOCKING SCREWS: PER MSI598I AND MIL-F-18240. ANY TYPE OF CONFIGURATION IS OPTIONAL WHEN "L" CODE IS SPECIFIED. PATCH TYPE LOCKING ELEMENT (WITH NO METAL REMOVED) IS REQUIRED WHEN "P" CODE IS SPECIFIED. LOCKING ELEMENT MUST BE SUPPLIED BY A QUALIFIED SOURCE LISTED IN QPL18240. SHIPPING NOTICE SHOULD IDENTIFY THE SUPPLIER OF SCREW AND LOCKING ELEMENT SEPARATELY. RECESS TORQUE VALUES SHALL NOT APPLY.

PREPARED FOR ROLLS-ROYCE TO REPLACE NAS5400-5406.

REVISION

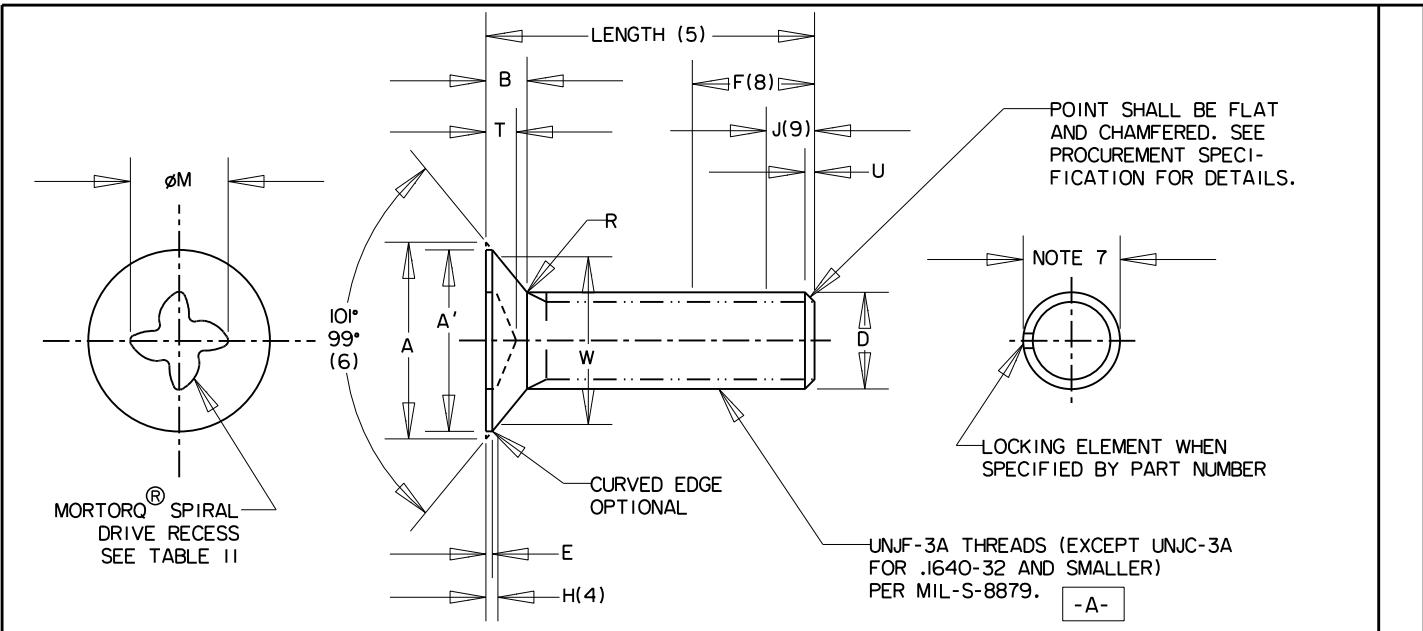
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DRAWN	DATE	DRAWING NUMBER									
G. LaMONICA	08-13-04	PMT-735									
CHECKED: G. LaMONICA	DATE 08-18-04										
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**ROLLS-ROYCE APPROVED SOURCES OF MORTORQ® PMT-735 BOLTS
ADDITIONAL SOURCES FOR OTHER END USERS AVAILABLE FROM
PHILLIPS SCREW COMPANY UPON REQUEST**

APPROVED SOURCES OF SUPPLY	ADDRESS	IDENTITY CODE
A F FASTENERS, LTD	UNIT 14-15 GLOSSOP BROOK BUSINESS PARK GLOSSOP DERBYSHIRE SK13 7AJ ENGLAND	J
LINREAD NORTHBIDGE	CROSSGATE ROAD PARK FARM, REDDITCH WORCESTERSHIRE B98 7TD ENGLAND	L
SPS TECHNOLOGIES, LTD T. J. BROOKS DIV.	191 BARKBY ROAD TROON INDUSTRIAL AREA LEICESTER LE4 9HX ENGLAND	TBJ
MONOGRAM AEROSPACE FASTENERS	3423 SOUTH GARFIELD AVENUE P.O. BOX 6847 LOS ANGELES, CA 90022-0547	M I

REVISION 3/ REVISED 4/ REVISED
 09-22-10 07-15-II

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DRAWN	L. DOUGAN	DATE	DRAWING NUMBER	PMT-735
CHECKED:	G. DILLING	DATE		SHEET 4 OF 4
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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CONCENTRICITY: ϕM OF RECESS TO PITCH DIAM, WITHIN .010" FOR -4 AND BELOW, WITHIN .015" FOR -5 AND ABOVE.

HEAD MARKING SHALL BE DEPRESSED (.010 MAX) AND ARRANGED AS FOLLOWS:

MARK WITH BASIC PART NUMBER ("PMT" OPTIONAL) EXCEPT MARK .I120-40 SIZE WITH "4", .I380-32 SIZE WITH "6", .I640-32 SIZE WITH "8", AND OPTIONAL .I900-32 SIZE WITH "10". THESE SIZES ALSO TO BE MARKED "C" FOR A286 OR "W" FOR WASPALOY.

MARK WITH MANUFACTURER'S SYMBOL OR TRADEMARK (SYMBOL LOCATION OPTIONAL IN ANY SECTOR) LENGTH DASH NUMBER AND "L" OR "P" WHEN APPLICABLE. (SEE NOTE II)
 "L" IDENTIFIES SCREWS WITH OPTIONAL LOCKING ELEMENT.
 "P" IDENTIFIES SCREWS WITH PATCH TYPE LOCKING ELEMENT ONLY.

MARK WITH RECESS DASH NUMBER, ENCIRCLED. RECESS NUMBER SHOULD BE APPROXIMATELY 25% LARGER THAN OTHER NUMERALS IN HEAD MARKING.

TABLE I - DIMENSIONS

ϕ DASH NUMBER	THREAD SIZE	NOTE 3 MAX. ϕA	NOTE 3 ABSOLUTE MIN. $\phi A'$	NOTE 3 MAX. B	MAX. ϕD	MAX. E	NOTE 8 F	H GAGE (4) PROTRUSION		NOTE 9 J	RADIUS R	MAX. U	+.0002 -.0000 ϕW GAGE	RECESS SIZE
								NOM.	TOL.					
-04	.I120-40	.226	.193	.044	.I12	.010	.I25	.0202	$\pm .0010$.075	.012 .002	.031	.I740	MT-00
-06	.I380-32	.280	.246	.061	.I38	.010		.0232	$\pm .0011$.2208	MT-00
-08	.I640-32	.331	.296	.072	.I64	.012	.I56	.0186	$\pm .0012$.094	.039	.2830	MT-0	
-3	.I900-32	.381	.338	.082	.I90	.015		.0210	$\pm .0013$					
-4	.2500-28	.508	.456	.I31	.250	.018	.I78	.0299	$\pm .0015$.I07	.020 .010	.045	.4318	MT-1
-5	.3I25-24	.635	.575	.I38	.312	.021	.208	.0354	$\pm .0017$.I25	.025 .010 .030 .015	.5449	MT-2	
-6	.3750-24	.763	.692	.I66	.375	.025		.0414	$\pm .0019$					

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TITLE: SCREW 100° FLAT HD., FULL THREAD
MORTORQ SPIRAL® DRIVE, A286 CRES AND WASPALOY
SELF-LOCKING AND NON-LOCKING

DRAWN G. LaMONICA	DATE 07-28-04	DRAWING NUMBER PMT-738
CHECKED: G. LaMONICA	DATE 03-13-06	SHEET 1 OF 4

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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REVISION	IV AUTOCAD UPDATE 08-18-04	2/ REVISED 03-13-06	3/ REVISED 07-31-07	4/ REVISED 05-01-09	5/ REVISED 06-03-09	6/ REVISED 08-21-13
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TABLE II - RECESS DIMENSIONS

Ø DASH NUMBER	THREAD SIZE	RECESS SIZE	T MAX. REF.	ØM MAX. REF.	GAGE PENETRATION		TORQUE IN-LBS MIN (10)	RAISED METAL MAX (10)	TENSILE STRENGTH LBS. A286	TENSILE STRENGTH LBS. WASPALOY
					MAX.	MIN.				
-04	.1120-40	MT-00	.045	.1210	.022	.015	13	.005	830	1,104
-06	.1380-32	MT-00	.052	.1210	.030	.021	30	.005	1,260	1,662
-08	.1640-32	MT-0	.065	.1704	.032	.023	50	.005	1,950	2,542
-3	.1900-32	MT-1	.078	.2405	.027	.020	60	.005	2,860	3,610
-4	.2500-28	MT-1	.095	.2405	.047	.038	140	.005	5,820	6,539
-5	.3125-24	MT-2	.117	.3080	.055	.046	220	.005	9,260	10,416
-6	.3750-24	MT-3	.142	.3537	.070	.061	520	.006	14,000	15,687

TABLE III

	DASH NUMBER FOR PREFERRED LENGTH																						
	DASH NO.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32
LENGTH	.19	.25	.31	.38	.44	.50	.56	.62	.69	.75	.81	.88	.94	1.00	1.12	1.25	1.38	1.50	1.62	1.75	1.88	2.00	2.12 TO 6.00
LENGTH TOL.	+.00 -.03																+.00 -.06				+.00 -.09		

MATERIAL: UNS N07001 (WASPALOY) HEAT RESISTANT ALLOY WITH COMPOSITION PER AMS 5708 OR DTD5639 OR EN2959 OR EN3220
A286 CORROSION RESISTANT STEEL WITH COMPOSITION PER AMS 573I OR AMS 5737.
LOCKING ELEMENT- PLASTIC PER MIL-F-18240 AND QPL-18240.

HEAT TREAT: WASPALOY 175 KSI MINIMUM ULTIMATE TENSILE. HEAT TREAT; IF HOT FORMED, THE FORGING TEMPERATURE SHALL NOT EXCEED 1150°C AND SHALL BE AIR COOLED. PRIOR TO MACHINING, THE HEADED BLANKS SHALL BE SOLUTION HEAT TREATED AT A TEMPERATURE IN THE RANGE 1020 TO 1080°C FOR 1 TO 4 HOURS AND AIR COOLED OR FASTER. FINAL HEAT TREATMENT SHALL BE CARRIED AFTER COMPLETION OF MACHINING AND THREAD ROLLING. THE PARTS SHALL BE STABILIZED AT 850°C+/-10°C FOR 4 HOURS AND AIR COOLED OR FASTER TO ROOM TEMPERATURE, THEN PRECIPITATION HEAT TREATED AT A TEMPERATURE OF 760°C+/-10°C FOR 16 HOURS IN AIR, ARGON OR EQUIVALENT AND COOLED TO ROOM TEMPERATURE IN AIR OR FASTER.

A286 CRES 160 KSI MINIMUM ULTIMATE TENSILE.

FINISH: UNPLATED SCREWS - PASSIVATE TO MEET REQUIREMENTS OF NAS4003.
PLATED SCREWS - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2. EMBRITTLEMENT TEST PER QQ-P-416 DOES NOT APPLY. CADMIUM PLATED A286 CRES SCREWS SHALL BE IDENTIFIED WITH GREEN DYE OR PAINT ON THE THREAD END. MAXIMUM COVERAGE MAY INCLUDE THE CHAMFER PLUS ONE COMPLETE THREAD.

COATED SCREWS - ALUMINUM COATING PER NAS4006.

CODE: BASIC PART NUMBER = NON-LOCKING, PLATED SCREW.
FIRST DASH NUMBER INDICATES DIAMETER. SEE TABLE I AND II.
SECOND DASH NUMBER INDICATES LENGTH IN .0625 INCREMENTS (ROUNDED TO TWO DECIMAL PLACES). SEE TABLE III FOR TABULATIONS OF LENGTH DIMENSIONS. USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREWS OVER 3 INCHES LONG. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY.
ADD "A" AFTER DIAMETER DASH NUMBER FOR ALUMINUM COATED SCREWS. MAY BE USED WITH "L" OR "P" CODE.
ADD "L" AFTER DIAMETER DASH NUMBER FOR SELF-LOCKING SCREWS, OPTIONAL CONFIGURATION. DO NOT USE WITH "P" CODE.
ADD "U" AFTER DIAMETER DASH NUMBER FOR UNPLATED SCREWS. MAY BE USED WITH "L" OR "P" CODE.
ADD "P" AFTER DIAMETER DASH NUMBER FOR SELF-LOCKING SCREWS, PATCH TYPE LOCKING ELEMENT. DO NOT USE WITH "L" CODE.
WHEN MULTIPLE LETTER CODES ARE USED, SEQUENCE MUST BE IN ALPHABETICAL ORDER.
ADD "W" IN PLACE OF FIRST DASH TO INDICATE N07001 (WASPALOY) MATERIAL

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TITLE: SCREW 100° FLAT HD., FULL THREAD MORTORQ SPIRAL® DRIVE, A286 CRES AND WASPALOY SELF-LOCKING AND NON-LOCKING

DRAWN G. LaMONICA	DATE 07-28-04	DRAWING NUMBER
CHECKED G. LaMONICA	DATE 03-13-06	PMT-738

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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REVISION IV AUTOCAD UPDATE 08-18-04 2/ REVISED 03-13-06 3/ REVISED 09-11-07 4/ REVISED 03-14-08 5/ REVISED 07-02-08 6/ REVISED 05-01-09 7/ REVISED 06-03-09 8/ REVISED 06-21-13

SHEET 2 OF 4

EXAMPLE OF PART NUMBER:

PMT738W3-10 = SCREW, .1900-32 THREAD, .62 LENGTH, NON LOCKING, WASPALOY PER UNS N0700I
 PMT738-3-10 = SCREW, .1900-32 THREAD, .62 LENGTH, NON-LOCKING, PLATED.
 PMT738-3A10 = SCREW, .1900-32 THREAD, .62 LENGTH, NON-LOCKING, ALUMINUM COATED.
 PMT738-3L10 = SCREW, .1900-32 THREAD, .62 LENGTH, SELF-LOCKING, OPTIONAL CONFIGURATION, PLATED.
 PMT738-3LU10 = SCREW, .1900-32 THREAD, .62 LENGTH, SELF-LOCKING, OPTIONAL CONFIGURATION, UNPLATED.
 PMT738-3PU10 = SCREW, .1900-32 THREAD, .62 LENGTH, SELF-LOCKING, PATCH TYPE, UNPLATED.

NOTES:

- (1) DIAMETER OF UNTHEADED PORTION OF SCREW SHALL NOT BE LESS THAN MINIMUM PITCH DIAMETER NOR MORE THAN MAXIMUM MAJOR DIAMETER OF THREAD.
- (2) DASH 3 LENGTH IS NOT PRACTICAL FOR SIZE .1900-32 AND LARGER. DASH 4 IS NOT PRACTICAL FOR SIZE .2500-28 AND LARGER. DASH 5 LENGTH IS NOT PRACTICAL FOR SIZES .3125-24 AND .3750-24.
- (3) DIMENSIONS A, A', AND B ARE INCLUDED FOR ENGINEERING REFERENCE ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES A, A', AND B ARE CALCULATED LIMITS RESULTING FROM TOLERANCES ON W, H, E, AND HEAD ANGLE.
- (4) DIMENSIONS FOR H GAGE PROTRUSION SHALL BE INSPECTED PER NAS527.
- (5) SCREWS LESS THAN 2 DIAMETERS IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF BEARING SURFACE OF HEAD AND INCOMPLETE THREADS MAY EXTEND UP TO BEARING SURFACE.
 SCREWS 2 DIAMETERS THRU 2 INCHES IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF TANGENCY OF "R" AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
 SCREWS LONGER THAN 2 INCHES - COMPLETE THREADS SHALL EXTEND A MINIMUM OF 1.75 INCHES FROM END OF SCREW AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
INCOMPLETE THREADS - SEE NAS4003.
- (6) CONCENTRICITY: CONICAL SURFACE OF HEAD TO THREAD PITCH DIAMETER WITHIN .005 FIM.
- (7) PROTRUSION OF LOCKING ELEMENTS SHALL BE CONTROLLED SO THAT IT WILL PASS FREELY OR WITH FINGER PRESSURE THROUGH A RING GAGE WITH DIAMETER OF .010 (.001, -.000) GREATER THAN MAXIMUM MAJOR DIAMETER OF SCREW THREAD.
- (8) "F" MINIMUM (5 THREAD PITCHES) = REGION OF MINIMUM ENGAGEMENT WITH FEMALE THREAD REQUIRED TO MEET MIL-F-18240 REQUIREMENTS. LOCKING ELEMENT WITHIN "F" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED PER MIL-F-18240.
- (9) FOR EASE OF STARTING, LOCKING ELEMENT SHALL NOT BE EFFECTIVE IN "J" AREA (3 THREAD PITCHES).
- (10) MORTORQ SPIRAL DRIVE SCREW SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED IN TABLE II WITHOUT DAMAGE TO RECESS OR DRIVER. SCREW RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTIONS. APPLY TABULATED TORQUE IN CW DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED WITHOUT RESTRICTION ON RAISED METAL.
- (II) "A" ALUMINUM COATED AND "U" UNPLATED CODES NEED NOT APPEAR ON THE HEAD OF THE SCREW.
- (12) MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR FIELD STRENGTH H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER MIL-I-17214 OR EQUIVALENT.
- (13) DIMENSIONS TO BE MET AFTER PLATING.
- (14) DIMENSIONS ARE IN INCHES.

SURFACE TEXTURE:

(AA MAX PER ANSI B46.1) BEARING SURFACE OF THE HEAD, THREAD FLANKS AND THREAD ROOT 32;
 OTHER SURFACES I25.

PROCUREMENT SPECIFICATION:

NAS4003, EXCEPT AS NOTED. COLD WORK OF HEAD TO SHANK FILLET IS NOT REQUIRED.
 LOCKING ELEMENT FOR SELF-LOCKING SCREWS: PER MSI598I AND MIL-F-18240. ANY TYPE OF CONFIGURATION IS OPTIONAL WHEN "L" CODE IS SPECIFIED. PATCH TYPE LOCKING ELEMENT (WITH NO METAL REMOVED) IS REQUIRED WHEN "P" CODE IS SPECIFIED. LOCKING ELEMENT MUST BE SUPPLIED BY A QUALIFIED SOURCE LISTED IN QPL18240. SHIPPING NOTICE SHOULD IDENTIFY THE SUPPLIER OF SCREW AND LOCKING ELEMENT SEPARATELY. RECESS TORQUE VALUES SHALL NOT APPLY.

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	DRAWN G. LaMONICA	DATE 07-28-04	DRAWING NUMBER PMT-738
CHECKED: G. LaMONICA	DATE 03-13-06	SHEET 3 OF 4	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			REVISION IV AUTOCAD UPDATE 08-18-04 2/ REVISED 03-13-06 3/ REVISED 05-01-09 4/ REVISED 8-21-13

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**ROLLS-ROYCE APPROVED SOURCES OF MORTORQ® PMT-738 BOLTS
ADDITIONAL SOURCES FOR OTHER END USERS AVAILABLE FROM
PHILLIPS SCREW COMPANY UPON REQUEST**

APPROVED SOURCES OF SUPPLY	ADDRESS	IDENTITY CODE	WASPALOY APPROVAL
A F FASTENERS, LTD	UNIT 14-15 GLOSSOP BROOK BUSINESS PARK GLOSSOP DERBYSHIRE SK13 7AJ ENGLAND	J	N
LINREAD NORTHRIDGE	CROSSGATE ROAD PARK FARM, REDDITCH WORCESTERSHIRE B98 7TD ENGLAND	L	Y
SPS TECHNOLOGIES, LTD T. J. BROOKS DIV.	191 BARKBY ROAD TROON INDUSTRIAL AREA LEICESTER LE4 9HX ENGLAND	TBJ	Y
MONOGRAM AEROSPACE FASTENERS	3423 SOUTH GARFIELD AVENUE P.O. BOX 6847 LOS ANGELES, CA 90022-0547	M I	N
ALCOA FASTENING SYSTEMS CITY OF INDUSTRY AEROSPACE PRODUCTS	135 N. UNRUH AVE. CITY OF INDUSTRY, CA 91744	VS	Y

REVISION	1/ REVISED 03-02-10	2/ REVISED 09-22-10	3/ REVISED 07-15-11	4/ REVISED 8-21-13
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	CHECKED: G. DILLING	DATE 05-01-09	SHEET 4 OF 4
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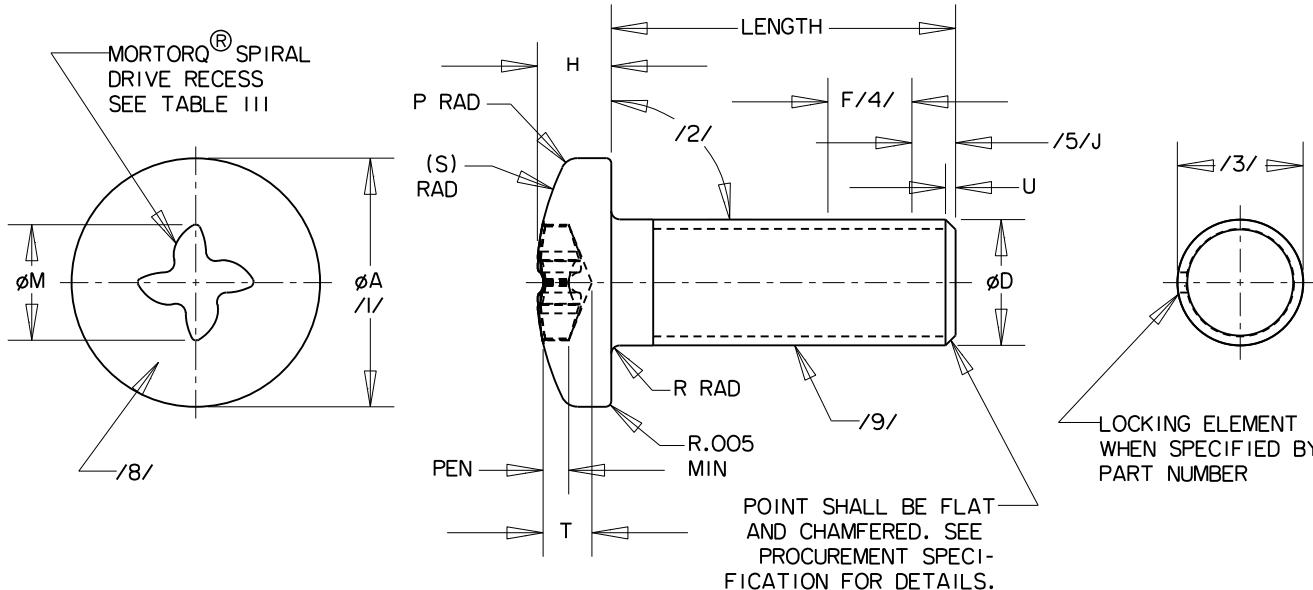


TABLE I - DIMENSIONS

Ø DASH NUMBER /13/	THREAD SIZE /9/	ØA /1/	ØD MAX	F /4/	H	J /5/	R RAD	P RAD MIN	(S) RAD	U MAX	RECESS SIZE
-04	.1120-40	.219 .205	.112	.125	.070 .060	.075	.005 .010	.010	.248	.031	MT-00
-06	.1380-32	.270 .256	.138	.156	.088 .078	.094	.005 .010	.015	.301	.039	MT-00
-08	.1640-32	.322 .306	.164	.156	.099 .089	.094	.010 .020	.015	.352	.039	MT-0
-3	.1900-32	.373 .357	.190	.156	.115 .104	.094	.010 .020	.020	.413	.039	MT-1
-4	.2500-28	.492 .473	.250	.178	.151 .138	.107	.010 .020	.035	.535	.045	MT-1
-5	.3125-24	.615 .594	.312	.208	.188 .173	.125	.010 .020	.040	.669	.052	MT-2
-6	.3750-24	.740 .716	.375	.208	.224 .207	.125	.015 .025	.040	.784	.052	MT-3

MATERIAL:

CRES - A286 (UNS S66286) CONFORMING TO THE CHEMISTRY OF AMS5731, AMS5732, AMS5737 OR AMS5853.

HEAT TREATMENT:

DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER AMS2759 160-190 KSI FTU /20/

FINISH:

CADMUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2. IDENTIFY WITH GREEN DYE OR PAINT ON THE THREAD END. MAXIMUM COVERAGE MAY INCLUDE CHAMFER PLUS ONE FULL THREAD.

UNPLATED - PASSIVATED PER AMS2700, METHOD I, CLASS 4

ALUMINUM COATED - ALUMINUM COAT PER NAS4006

BLACK OXIDE COATED - BLACK OXIDE COAT IN ACCORDANCE WITH MIL-DTL-13924, CLASS 3

SHEET	1	2	3	4	5
REV	-	-	-	-	-

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TITLE: SCREW, PAN HEAD, FULL
THREAD, MORTORQ® SPIRAL DRIVE RECESS
A286 CRES, SELF-LOCK AND NON-LOCK

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AWN G.DILLING	DATE 2-19-14	DRAWING NUMBER PMT-744
ECKED: G.DILLING	DATE 2-19-14	SHEET 1 OF 5
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CODE:

NO FINISH CODE AFTER BASIC NUMBER FOR CADMIUM PLATED SCREW.

ADD "A" AFTER BASIC NUMBER FOR ALUMINUM COATED SCREW, MAY BE USED WITH "L" OR "P" CODE.

ADD "B" AFTER BASIC NUMBER FOR BLACK OXIDE COATED SCREW, MAY BE USED WITH "L" OR "P" CODE.

ADD "L" AFTER BASIC NUMBER FOR SELF-LOCKING SCREW WITH LOCKING ELEMENT TYPE OPTIONAL.

ADD "P" AFTER BASIC NUMBER FOR SELF-LOCKING SCREW WITH PATCH TYPE LOCKING ELEMENT ONLY.

ADD "U" AFTER BASIC NUMBER FOR UNPLATED SCREW, MAY BE USED WITH "L" OR "P" CODE.

WHEN MULTIPLE LETTER CODES ARE USED, SEQUENCE SHALL BE IN ALPHABETICAL ORDER.

EXAMPLE OF PART NUMBER:

PMT-744-3-10 = SCREW, .1900-32 THREAD, .62 LONG, NONLOCKING, CADMIUM PLATED.

PMT-744-3A10 = SCREW, .1900-32 THREAD, .62 LONG, NONLOCKING, ALUMINUM COATED.

PMT-744-3L10 = SCREW, .1900-32 THREAD, .62 LONG, SELF-LOCKING, (LOCKING TYPE OPTIONAL), CADMIUM PLATED.

PMT-744-3LU10 = SCREW, .1900-32 THREAD, .62 LONG, SELF-LOCKING, (LOCKING TYPE OPTIONAL), UNPLATED.

PMT-744-3P10 = SCREW, .1900-32 THREAD, .62 LONG, SELF-LOCKING, (PATCH TYPE ONLY), CADMIUM PLATED.

PMT-744-3B10 = SCREW, .1900-32 THREAD, .62 LONG, NONLOCKING, BLACK OXIDE COATED.

NOTES:

- /1/ CONCENTRICITY: " ϕA " TO THREAD PITCH DIAMETER WITHIN .008 FIM.
- /2/ BEARING SURFACE SQUARENESS: WITHIN .003 FIM OF ϕD .
- /3/ PROTRUSION OF LOCKING ELEMENT SHALL BE CONTROLLED SO THAT IT WILL PASS FREELY, OR WITH FINGER PRESSURE, THROUGH A RING GAGE WITH $\phi .010$ (+.001, -.000) GREATER THAN MAXIMUM MAJOR DIAMETER OF SCREW THREAD.
- /4/ "F" MINIMUM (5 THREAD PITCHES) = REGION OF MINIMUM ENGAGEMENT WITH FEMALE THREAD REQUIRED TO MEET MIL-DTL-18240 REQUIREMENTS. LOCKING ELEMENT WITHIN "F" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED PER MIL-DTL-18240.
- /5/ FOR EASE OF STARTING, LOCKING ELEMENT SHALL NOT BE EFFECTIVE IN "J" AREA (3 THREAD PITCHES).
- /6/ MORTORQ SPIRAL DRIVE SCREW SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED IN TABLE III WITHOUT DAMAGE TO RECESS OR DRIVER. SCREW RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTIONS. APPLY TABULATED TORQUE IN CW DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED WITHOUT RESTRICTION ON RAISED METAL.
- (7) MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER ASTM A342/A342M, TEST METHOD 3.
- /8/ HEAD MARKING SHALL BE RAISED OR DEPRESSED (.010 MAX) AND ARRANGED AS FOLLOWS:
MARK WITH BASIC NUMBER ("PMT" OPTIONAL) EXCEPT MARK .112-40 SIZE WITH "4", .1380-32 SIZE WITH "6", .1640-32 SIZE WITH "8". THESE THREE SMALLER SIZES ALSO TO BE MARKED WITH "C" FOR A286.
MARK WITH MANUFACTURER'S SYMBOL, LENGTH DASH NUMBER, "L" OR "P" WHEN APPLICABLE AND RECESS NUMBER ENCIRCLED. RECESS NUMBER TO BE APPROXIMATELY 25% LARGER THAN OTHER NUMBERS.
"L" IDENTIFIES SCREW WITH OPTIONAL LOCKING ELEMENT.
"P" IDENTIFIES SCREW WITH PATCH TYPE LOCKING ELEMENT ONLY.
- /9/ UNJF-3A (EXCEPT UNJC-3A FOR .1640-32 AND SMALLER) PER AS8879.

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DRAWN	G.DILLING	DATE	DRAWING NUMBER	PMT-744
CHECKED:	G.DILLING	DATE		SHEET 2 OF 5
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- (IO) DIAMETER OF UNTHREADED PORTION OF SHANK SHALL NOT BE LESS THAN MIN PITCH DIAMETER NOR MORE THAN MAX MAJOR DIAMETER OF THREAD.
- (II) THREAD LENGTH:
SCREWS LESS THAN 2 x "ØD" IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF BEARING SURFACE OF HEAD AND INCOMPLETE THREADS MAY EXTEND UP TO BEARING SURFACE.
SCREWS 2 x "ØD" THROUGH 2" IN LENGTH - COMPLETE THREADS SHALL EXTEND TO WITHIN 2 PITCHES OF TANGENCY OF "R" AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
SCREWS LONGER THAN 2" - COMPLETE THREADS SHALL EXTEND 1.75 MIN FROM END OF SCREW AND INCOMPLETE THREADS MAY EXTEND UP TO "R" FILLET AREA.
- (I2) INCOMPLETE THREADS: SEE PROCUREMENT SPECIFICATION.
- /13/ "DASH NUMBER" OF THE BASIC NUMBER DESIGNATES THE SIZE. SEE SHEET 2 FOR "L", "P" AND "B" CODES.
- (I4) SURFACE ROUGHNESS: HEAD TO SHANK FILLET, THREAD FLANKS AND THREAD ROOT: 32 MICROINCHES Ra; BEARING SURFACE OF HEAD: 63 MICROINCHES Ra; ALL OTHER SURFACES: 125 MICROINCHES Ra PER ASME B46.1.
- (I5) DIMENSIONS IN INCHES AND APPLY AFTER FINISH UNLESS OTHERWISE SPECIFIED.
- (I6) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
- (I7) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THE APPLICABLE DRAWING OR SPECIFICATION MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.
- (I8) UNLESS OTHERWISE SPECIFIED HEREIN, REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF MANUFACTURE. HOWEVER, EXISTING MATERIAL INVENTORY CERTIFIED TO A PREVIOUS REVISION OF THE APPLICABLE MATERIAL SPECIFICATION(S) IS ACCEPTABLE FOR USE UNTIL DEPLETION.
- (I9) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
- /20/ THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE STRENGTH OF THE FINISHED PART, BUT ANY PART (TYPE I, II OR III AS LISTED IN NAS4003) SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED TYPE I MINIMUM TENSILE VALUES AS LISTED IN NAS4003 TABLE III.

PROCUREMENT SPECIFICATION:

NAS4003, EXCEPT AS NOTED. RECESS TORQUE VALUES AS NOTED IN TABLE III. COLD WORKING OF HEAD TO SHANK FILLET IS NOT REQUIRED. LOCKING ELEMENT FOR SELF-LOCKING SCREWS PER NASMI598I AND MIL-DTL-18240. ANY TYPE OF LOCKING ELEMENT OPTION INCLUDING PATCH TYPE IS OPTIONAL WHEN "L" CODE IS SPECIFIED. PATCH TYPE (WITH NO METAL REMOVED) IS REQUIRED WHEN "P" CODE IS SPECIFIED. CERTIFICATION SHALL IDENTIFY SUPPLIER OF SCREW AND LOCKING ELEMENT SEPARATELY.

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CHECKED: G.DILLING		DATE 2-19-14	SHEET 3 OF 5	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

TABLE II

	DASH NUMBER FOR PREFERRED LENGTH																						
DASH NO.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34 TO 96
LENGTH	.19	.25	.31	.38	.44	.50	.56	.62	.69	.75	.81	.88	.94	.100	.112	.125	.138	.150	.162	.175	.188	.200	.212 TO 6.00
LENGTH TOL.	+.00 -.03												+.00 -.06				+.00 -.09						

DASH NUMBER INDICATES LENGTH IN .0625 INCREMENTS (ROUNDED TO TWO DECIMAL PLACES). USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREWS OVER 3 INCHES LONG. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY.

TABLE III - RECESS DIMENSIONS

Ø DASH NUMBER	THREAD SIZE	RECESS SIZE	T REF	ØM REF	GAGE PENETRATION		TORQUE IN-LBS MIN /6/	RAISED METAL MAX /6/
					MAX.	MIN.		
-04	.1120-40	MT-00	.051	.1210	.027	.019	13	.005
-06	.1380-32	MT-00	.059	.1210	.037	.029	30	.005
-08	.1640-32	MT-0	.071	.1704	.039	.031	50	.005
-3	.1900-32	MT-1	.092	.2405	.041	.032	60	.005
-4	.2500-28	MT-1	.103	.2405	.057	.048	140	.005
-5	.3125-24	MT-2	.157	.3080	.080	.071	220	.005
-6	.3750-24	MT-3	.160	.3537	.087	.078	520	.006

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TITLE: SCREW, PAN HEAD, FULL THREAD, MORTORQ® SPIRAL DRIVE RECESS A286 CRES, SELF-LOCK AND NON-LOCK

DRAWN G.DILLING	DATE 2-19-14	DRAWING NUMBER PMT-744
CHECKED: G.DILLING	DATE 2-19-14	SHEET 4 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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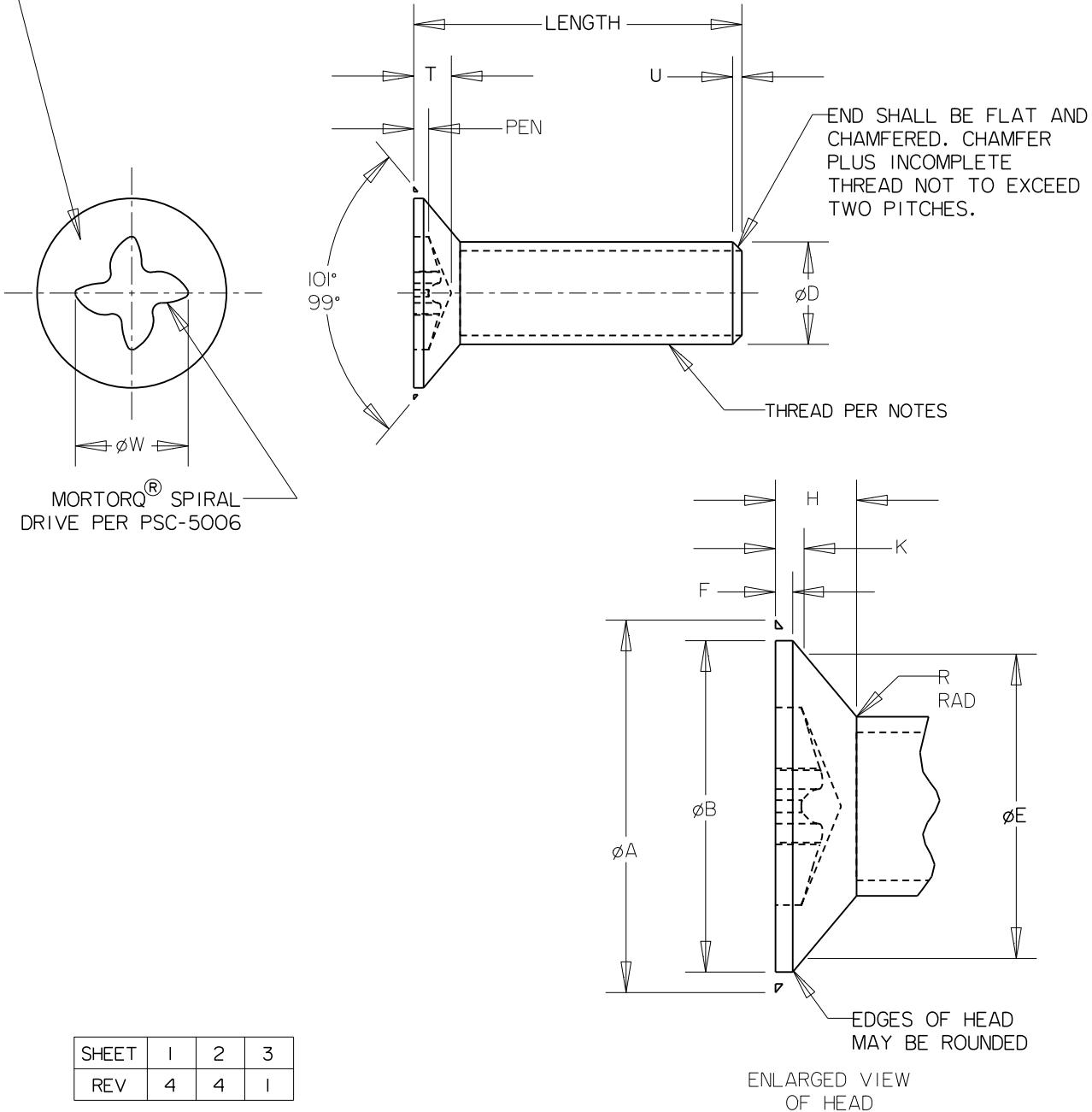
**ROLLS-ROYCE APPROVED SOURCES OF MORTORQ® PMT-744 BOLTS
ADDITIONAL SOURCES FOR OTHER END USERS AVAILABLE FROM
PHILLIPS SCREW COMPANY UPON REQUEST**

APPROVED SOURCES OF SUPPLY	ADDRESS	IDENTITY CODE
A F FASTENERS, LTD	UNIT 14-15 GLOSSOP BROOK BUSINESS PARK GLOSSOP DERBYSHIRE SK13 7AJ ENGLAND	J
ALCOA, REDDITCH	CROSSGATE ROAD PARK FARM, REDDITCH WORCESTERSHIRE B98 7TD ENGLAND	L
SPS TECHNOLOGIES, LTD T. J. BROOKS DIV.	191 BARKBY ROAD TROON INDUSTRIAL AREA LEICESTER LE4 9HX ENGLAND	TBJ
MONOGRAM AEROSPACE FASTENERS	3423 SOUTH GARFIELD AVENUE P.O. BOX 6847 LOS ANGELES, CA 90022-0547	M
HEARTLAND PRECISION FASTENERS	301 PRAIRIE VILLAGE DRIVE NEW CENTURY KANSAS 66031	♥

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DRAWN	DATE	DRAWING NUMBER										
G.DILLING	2-19-14	PMT-744										
CHECKED: G.DILLING	DATE 2-19-14											

HEAD MARKING: BASIC PART NUMBER, MANUFACTURER'S TRADEMARK, AND FIRST DASH NUMBER ON SIZES 3 AND LARGER. FIRST DASH NUMBER ONLY ON SIZES 04, 06, AND 08. NO MARKING REQUIRED ON SIZE 02. MARK MATERIAL PER CODE TO INDICATE CRES OR TITANIUM WHERE APPLICABLE. RAISED OR DEPRESSED .010 MAX. LOCATION OPTIONAL.



SHEET	1	2	3
REV	4	4	1

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TITLE: SCREW, MACHINE-FLAT 100° HEAD
FULL THREAD, MORTORQ® SPIRAL DRIVE

DRAWN G.DILLING	DATE 4/14/05	DRAWING NUMBER PMT-1102
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CHECKED: G.DILLING	DATE 4/14/05	SHEET 1 OF 3
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PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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REVISION	ISSUED: 5/3/05	REV 1: 3/28/06	REV 2: 3/9/07	REV 3: 11/07/07	REV 4: 6/20/08
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PART NUMBER	THREAD SEE THD NOTE I	RECESS SIZE MT-	ϕA	ϕB MIN.	F	H REF	R	U REF	D DIA. MAX.	T MAX. REF	W REF	RECESS GAGE PENETRATION (c)		K	E DIA.
												MAX.	MIN.		
PMTIIO2-02	.0860-56 UNJC-3A	000	.172 .162	.143	.015 .005	.036	.015 .005	.010	.086	.031	.0730	.018	.012	---	---
PMTIIO2-04	.1120-40 UNJC-3A	00	.225 .213	.191	.015 .005	.045	.015 .005	.013	.112	.045	.1210	.022	.015	---	---
PMTIIO2-06	.1380-32 UNJC-3A	00	.279 .267	.238	.015 .005	.057	.020 .010	.016	.138	.052	.1210	.030	.021	---	---
PMTIIO2-08	.1640-32 UNJC-3A	0	.332 .319	.285	.020 .010	.068	.020 .010	.016	.164	.065	.1704	.032	.023	.0268 .0240	.2671 .2667
PMTIIO2-3	.1900-32 UNJF-3A	I	.385 .371	.333	.020 .010	.080	.020 .010	.016	.190	.078	.2405	.027	.020	.0290 .0263	.3147 .3143
PMTIIO2-4	.2500-28 UNJF-3A	I	.507 .491	.442	.020 .010	.106	.020 .010	.018	.250	.095	.2405	.047	.038	.0342 .0316	.4245 .4241
PMTIIO2-5	.3125-24 UNJF-3A	2	.635 .617	.568	.020 .010	.133	.020 .010	.021	.312	.117	.3080	.055	.046	.0395 .0370	.5389 .5385
PMTIIO2-6	.3750-24 UNJF-3A	3	.762 .742	.694	.020 .010	.160	.020 .010	.021	.375	.142	.3537	.070	.061	.0450 .0426	.6532 .6528

LENGTH CHART					
TOLERANCE +.000 -.031		TOLERANCE +.000 -.031		TOLERANCE +.000 -.031	
DASH NO.	LENGTH	DASH NO.	LENGTH	DASH NO.	LENGTH
3	.188	18	1.125	34 to 96	2.125 to 6.000
4	.250	20	1.250		
5	.312	22	1.375		
6	.375	24	1.500		
7	.438	26	1.625		
8	.500	28	1.750		
10	.625	30	1.875		
12	.750	32	2.000		
14	.875				
16	1.000				

MIN TENSILE STRENGTH, LBS	
PART NUMBER	ALLOY STEEL CRES (160KSI) TI (6AL-4V)
PMTIIO2-02	435
PMTIIO2-04	765
PMTIIO2-06	1,200
PMTIIO2-08	1,950
PMTIIO2-3	2,860
PMTIIO2-4	5,520
PMTIIO2-5	9,200
PMTIIO2-6	14,000

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TITLE:

SCREW, MACHINE-FLAT 100° HEAD FULL THREAD, MORTORQ® SPIRAL DRIVE

DRAWN
G.DILLING

DATE
4/14/05

DRAWING NUMBER

PMT-IIO2

CHECKED:
G.DILLING

DATE
4/14/05

SHEET 2 OF 3

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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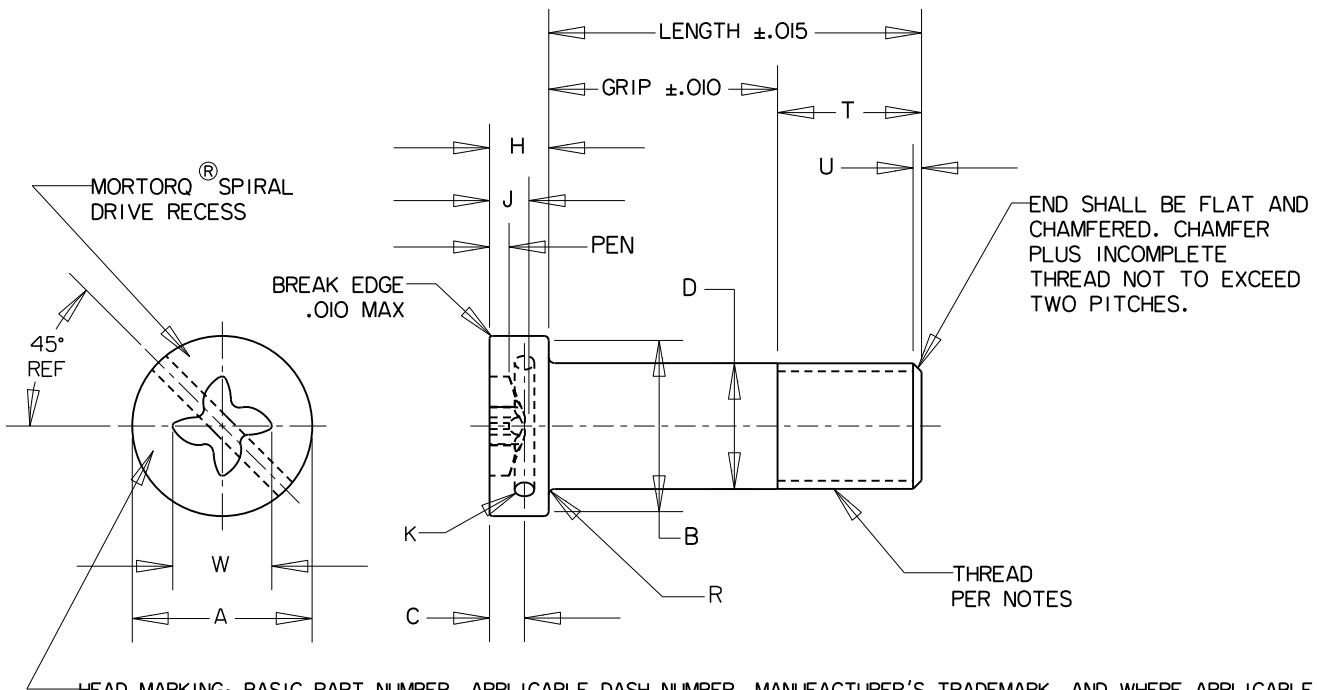
REVISION ISSUED: 5/3/05 REV 1: 3/28/06 REV 2: 3/19/07 REV 3: 11/07/07 REV 4: 6/20/08

MATERIAL:	ALLOY STEEL – 4140 (UNS G41400) PER MIL-S-5626, 4340 (UNS G43400) PER MIL-2-5000, OR 8740 (UNS G87400) PER MIL-S-6049. CRES – A286 (UNS S66286) PER AMS5737, EXCEPT FOR HEAT TREATMENT. TITANIUM ALLOY – 6AL-4V (UNS R56400) PER AMS4967.
HEAT TREATMENT:	ALLOY STEEL – 160,000-180,000 PSI UTS PER MIL-H-6875. CRES – 160,000 PSI UTS MIN. AT ROOM TEMPERATURE. TITANIUM ALLOY – 160,000 PSI UTS MIN.
FINISH:	ALLOY STEEL – CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2 (NO CODE) OR CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2 WITH DULL BLACK CHROMATE TREATMENT (B CODE) CRES – CLEAN AND PASSIVATE IN ACCORDANCE WITH QQ-P-35 (NO CODE) OR CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2 (P CODE). TITANIUM ALLOY – NONE (NO CODE) OR ALUMINUM COAT PER NAS4006 (A CODE) OR ALUMINUM COAT PER MIL-C-83488, TYPE II, CLASS 3 (C CODE).
CODE:	FIRST DASH NUMBER DESIGNATES DIAMETER AND THREAD. SECOND DASH NUMBER INDICATES LENGTH IN .0625 INCREMENTS (AS CONVERTED TO THREE DECIMAL PLACES PER ANSI Y14.5). INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY. USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREWS OVER 3 INCHES LONG. “A” FOLLOWING LAST DASH NUMBER DESIGNATES ALUMINUM COAT PER NAS4006. “B” FOLLOWING LAST DASH NUMBER DESIGNATES DULL BLACK CADMIUM PLATING. “C” FOLLOWING LAST DASH NUMBER DESIGNATES ALUMINUM COAT PER MIL-C-83488, TYPE II, CLASS 3. “E” IN LIEU OF FIRST DASH DESIGNATES CRES. “P” FOLLOWING LAST DASH NUMBER DESIGNATES CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2. “V” IN LIEU OF FIRST DASH DESIGNATES TITANIUM ALLOY.
EXAMPLE:	PMT-1102-3-8 = .1900-32 SCREW, .500 LENGTH, ALLOY STEEL, MORTORQ RECESS, TYPE II PLATING. PMT-1102E5-10P = .3125-24 SCREW, .625 LENGTH, CRES, MORTORQ RECESS, TYPE II PLATING PMT-1102V510 = .3125-24 SCREW, .625 LENGTH, TITANIUM ALLOY, MORTORQ RECESS. PMT-1102-5-10B = .3125-24 SCREW, .625 LENGTH, ALOY STEEL, MORTORQ RECESS, DULL BLACK CADMIUM PLATING.
NOTES:	<ul style="list-style-type: none"> (A) DIAMETER OF UNTHREADED PORTION OF SCREWS SHALL NOT BE LESS THAN MINIMUM PITCH DIAMETER NOR MORE THAN MAXIMUM MAJOR DIAMETER OF THREAD. (B) FOR SCREWS 2 INCHES LONG OR SHORTER, COMPLETE THREADS SHALL EXTEND TO WITHIN 2 THREADS OF THE BEARING SURFACE OF THE HEAD. SCREWS OF LONGER LENGTH SHALL HAVE A MINIMUM COMPLETE THREAD LENGTH OF 1.750 INCHES. (C) RECESS GAGING IN ACCORDANCE WITH PHILLIPS SCREW COMPANY SPECIFICATIONS PSC-5000. (D) SCREWS SHALL BE FREE FROM BURRS AND SHARP EDGES. (E) MORTORQ SPIRAL DRIVE SCREWS TO BE INSTALLED AND REMOVED WITH DRIVERS PER PSC-5026 AS APPLICABLE. (F) CONCENTRICITY: CONICAL SURFACE OF HEAD AND PITCH DIA. OF SCREW WITHIN .005 TIR. (G) FOR CRES, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS. (MAGNETIC PERMEABILITY INDICATOR PER MIL-1-17214.) (H) TENSILE STRESS AREAS USED FOR CALCULATION OF ULTIMATE TENSILE STRENGTH VALUES ARE BASED ON FED-STD-H28. (K) FOR DESCRIPTION OF STATUS NOTES, SEE NAS380. (L) THREADS IN ACCORDANCE WITH MIL-S-8879. (M) SURFACE ROUGHNESS: “D” DIA., UNDERSIDE OR HEAD, AND SIDES AND ROOT OF THREADS -32 MICROINCHES, OTHER SURFACES - 125 MICROINCHES, PER ANSI B46.1. (N) DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING AND COATING. (Q) TYPE I PLATING (“W” CODE IS INACTIVE FOR NEW DESIGN.

PROCUREMENT MIL-B-87114, EXCEPT AS NOTED. TENSILE LOAD VALUES AS TABULATED HEREIN. COLD WORKING SPECIFICATION: HEAD TO SHANK FILLET AND FATIGUE REQUIREMENTS ARE NOT APPLICABLE.

REVISION ISSUED:5/3/05 REV 1:3/28/06

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DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	PMT-1102
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			SHEET 3 OF 3
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY			



HEAD MARKING: BASIC PART NUMBER, APPLICABLE DASH NUMBER, MANUFACTURER'S TRADEMARK, AND WHERE APPLICABLE, THE MATERIAL CODE TO INDICATE CORROSION RESISTANT STEEL OR TITANIUM RAISED OR DEPRESSED .010 MAX. LOCATION OPTIONAL. .I380 AND .I640 SIZE MAY BE MARKED 1 AND 2 AS APPLICABLE - PLUS DASH NUMBERS (AND MATERIAL CODE, WHERE APPLICABLE) ONLY.

BASIC PART NO	THREAD SEE THD NOTE (n)	RECESS DRIVE SIZE	D DIA (k) PLATED SHANK TYPE		A DIA	B DIA MIN	H	R RAD	T REF	U REF	C +.000 -.010	K DIA	J MAX	W MAX
			BEFORE PLATE	AFTER PLATE										
PMTII21	.I380-32 UNJC-3A	MT-00	.I367 .I361	.1375 .1365	.226 .221	.086 .074	.010 .005	.276	.016	.044	.042 .034	.052	.1210	
PMTII22	.I640-32 UNJC-3A	MT-0	.I627 .I621	.I635 .I625	.270 .265	.255	.102 .088	.020 .010	.276	.016	.049	.042 .034	.065	.1704
PMTII23	.I900-32 UNJF-3A	MT-0	.I887 .I881	.I895 .I885	.313 .306	.296	.118 .103	.020 .010	.276	.016	.056	.042 .034	.069	.1704
PMTII24	.2500-28 UNJF-3A	MT-1	.2487 .2481	.2495 .2485	.375 .365	.357	.150 .133	.020 .010	.316	.018	.075	.068 .060	.087	.2405
PMTII25	.3125-24 UNJF-3A	MT-1	.3112 .3106	.3120 .3110	.438 .429	.413	.183 .162	.020 .010	.375	.021	.094	.068 .060	.098	.2405
PMTII26	.3750-24 UNJF-3A	MT-2	.3737 .3731	.3745 .3735	.563 .552	.536	.215 .191	.025 .015	.391	.021	.113	.068 .060	.124	.3080
PMTII27	.4375-20 UNJF-3A	MT-3	.4362 .4356	.4370 .4360	.625 .615	.595	.248 .221	.025 .015	.453	.025	.131	.068 .060	.139	.3537
PMTII28	.5000-20 UNJF-3A	MT-4	.4987 .4981	.4995 .4985	.750 .739	.719	.280 .250	.030 .020	.453	.025	.150	.068 .060	.160	.4285

MATERIAL: ALLOY STEEL - 4140 PER MIL-S-5626, 4340 PER MIL-S-5000, OR 8740 PER MIL-S-6049. CRES PER AMS5737 (A286), EXCEPT FOR HEAT TREATMENT, DESIGNATED BY "E" CODE. TITANIUM ALLOY PER AMS4967, 6AL-4V, DESIGNATED BY "V" CODE.

HEAT TREATMENT: ALLOY STEEL - 160,000-180,000 PSI UTS PER MIL-H-6875. CRES - 160,000 PSI UTS MIN. AT ROOM TEMPERATURE. TITANIUM ALLOY - 160,000 PSI UTS MIN. (6AL-4V)

SHEET	1	2	3	4	5
REV	I	-	-	-	-

REVISION REV I: 2-10-12

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, MACHINE-FLAT FILLISTER HEAD, CLOSE TOL., SHORT THREAD

DRAWN G.DILLING	DATE 2/18/II	DRAWING NUMBER PMT-II21 THRU II28
CHECKED: G.DILLING	DATE 2/22/II	SHEET 1 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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BASIC PART NUMBER	INSPECTION DATA						RECESS DRIVE SIZE	
	TIR VALUES							
	X (a)	Y (a)	Z (b)	RECESS GAGE PENETRATION (c)	MAX	MIN		
PMTII2I	.005	.0045	.0040	.030	.021	24	1,450	MT-00
PMTII22	.005	.0045	.0040	.032	.023	37	2,240	MT-0
PMTII23	.005	.0045	.0040	.036	.027	50	3,180	MT-0
PMTII24	.006	.0045	.0030	.039	.030	125	5,820	MT-1
PMTII25	.008	.006	.0030	.050	.041	250	9,200	MT-1
PMTII26	.009	.006	.0025	.062	.053	430	14,000	MT-2
PMTII27	.010	.006	.0025	.067	.058	925	18,900	MT-3
PMTII28	.011	.006	.0020	.072	.057	1,210	25,600	MT-4

FINISH: ALLOY STEEL - NO CODE, CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2.
 "B" CODE - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, WITH DULL BLACK CHROMATE TREATMENT
 CRES - PASSIVATE PER QQ-P-35.
 TITANIUM ALLOY - NONE.
 CRES - OPTIONAL CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, DESIGNATED BY "P" PER CODE.

CODE: DASH NUMBER DESIGNATES GRIP AND LENGTH (SEE SHEET 3). WHEN MORE THAN ONE CODE LETTER IS REQUIRED, ARRANGE THEM ALPHABETICALLY.

"E" IN LIEU OF DASH DESIGNATES CRES (160 KSI).
 "H" AFTER DASH NUMBER DESIGNATES DRILLED HEAD.
 "P" AFTER DASH NUMBER DESIGNATES QQ-P-416, TYPE II, CLASS 2 PLATING.
 "V" IN LIEU OF DASH DESIGNATES 6AL-4V TITANIUM ALLOY.
 "B" AFTER DASH NUMBER DESIGNATES BLACKENED QQ-P-416, TYPE II, CLASS 2 DULL BLACK PLATING.

EXAMPLE: PMTII24-8 = .2500-28 BOLT, .500 GRIP, ALLOY STEEL, TYPE II PLATING, MORTORQ SPIRAL DRIVE RECESS.
 PMTII27E14P = .4375-20 BOLT, 8.5 GRIP, CRES (160 KSI), TYPE II PLATING, MORTORQ SPIRAL DRIVE RECESS.
 PMTII27V14 = .4375-20, .875 GRIP TITANIUM ALLOY (6AL-V), MORTORQ SPIRAL DRIVE RECESS.
 PMTII27-I2BH = .4375-20 BOLT, .750 GRIP, ALLOY STEEL, DRILLED HEAD, BLACKENED TYPE II,
 DULL BLACK PLATING, MORTORQ SPIRAL DRIVE RECESS.

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CHECKED: G.DILLING		DATE 2/22/II	SHEET 2 OF 5	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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- NOTES:
- a) CONCENTRICITY: "D" AND TREAD PITCH DIAMETERS WITHIN "Y" VALUES TIR.
"B" AND "D" DIAMETERS WITHIN "X" VALUES TIR.
 - b) RECESS TO SHANK WITHIN .016 TIR THRU .2500 SIZE: WITHIN .024 TIR ABOVE .2500 SIZE
 - c) SHANK STRAIGHTNESS: WITHIN "Z" VALUES TIR PER INCH OF LENGTH.
 - d) RECESS GAGING IN ACCORDANCE WITH PSC-5027.
 - e) GRIP LENGTH: FROM UNDERSIDE OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
 - f) BOLTS SHALL BE FREE FROM BURRS AND SHARP EDGES.
 - f) "MORTORQ SPIRAL DRIVE" BOLTS SHALL WITHSTAND MIN. TORQUE LISTED ON SHEET 2 WITHOUT DAMAGE TO RECESS OR DRIVER IN BOTH INSTALLATION AND REMOVAL DIRECTION.
 - g) BEARING SURFACE SQUARENESS: WITHIN .003 TIR OF SHANK DIA.
 - h) FOR CRES, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS (MAGNETIC PERMEABILITY INDICATOR PER MIL-I-17214).
 - j) TENSILE STRESS AREAS USED FOR CALCULATION OF ULTIMATE TENSILE STRENGTH VALUES ARE BASED ON FED-STD-H28.
 - k) UNPLATED SHANK D DIA. SHALL BE THE SAME AS THE AFTER PLATE DIA.
 - n) THREADS IN ACCORDANCE WITH MIL-S-8879. FOR THREADS PER MIL-S-7742, MAJOR DIAMETER SHALL BE .001 BELOW MIN. SHANK DIA., AND THREAD RUNOUT PER MIL-B-7838.
 - p) DIMENSIONS IN INCHES.
 - r) FOR DESCRIPTION OF STATUS NOTES, SEE NAS380.
 - s) SURFACE ROUGHNESS. "D" DIAMETER, UNDERSIDE OF HEAD, AND SIDES AND ROOT OF THREADS -32 MICROINCHES, OTHER SURFACES -125 MICROINCHES, PER ANSI B46.1.
 - t) TYPE I PLATING ("W" CODE) IS INACTIVE FOR NEW DESIGN.
 - v) RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTION WITH APPLICABLE DRIVER WITH AXIAL END NOT EXCEEDING 15 POUNDS. SCREWS ARE REJECTABLE IF MINIMUM RECESS TORQUE VALUES LISTED HEREIN CAUSE FRACTURE OF SCREW OR DISTORTION WHICH RESULTS IN RAISE OF METAL AT EDGE OF RECESS EXCEEDING .005 ABOVE SURROUNDING AREA. SAMPLING SHALL BE PER MIL-STD-105, 4 PERCENT, AQL LEVEL S-1.
 - w) CADMIUM PLATED TITANIUM ALLOY IS INACTIVE FOR NEW DESIGN AFTER DEC 1991. FOR DESCRIPTION OF STATUS NOTES SEE NAS380.

PROCUREMENT SPECIFICATION: MIL-B-87II4, EXCEPT AS NOTED. RECESS STRENGTH AND TENSILE LOAD VALUES AS TABULATED HEREIN. FATIGUE STRENGTH AND COLD WORKING HEAD TO SHANK FILLET IS NOT APPLICABLE FOR ALLOY STEEL AND CRES SCREWS. FOR TITANIUM SCREWS, FATIGUE AND FILLET ROLLING ARE APPLICABLE PER NAS61. FOR SHEAR VALUES FOR PMTII2I AND II22, USE NAS498.

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DRAWN	G.DILLING	DATE	DRAWING NUMBER	PMT-II2I THRU II28
CHECKED:	G.DILLING	DATE		SHEET 3 OF 5
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DASH NO	NOM GRIP	NOMINAL LENGTH FOR SIZES LISTED								NOM GRIP	DASH NO
		PMTII2I	PMTII22	PMTII23	PMTII24	PMTII25	PMTII26	PMTII27	PMTII28		
1	.062	.338	.338	.338	.378	.437	.453	.515	.515	.062	1
2	.125	.401	.401	.401	.441	.500	.516	.578	.578	.125	2
3	.188	.464	.464	.464	.504	.563	.579	.641	.641	.188	3
4	.250	.526	.526	.526	.566	.625	.641	.703	.703	.250	4
5	.312	.588	.588	.588	.628	.687	.703	.765	.765	.312	5
6	.375	.651	.651	.651	.691	.750	.766	.828	.828	.375	6
7	.438	.714	.714	.714	.754	.813	.829	.891	.891	.438	7
8	.500	.776	.776	.776	.816	.875	.891	.953	.953	.500	8
9	.562	.838	.838	.838	.878	.937	.953	1.015	1.015	.562	9
10	.625	.901	.901	.901	.941	1.000	1.016	1.078	1.078	.625	10
11	.688	.964	.964	.964	1.004	1.063	1.079	1.141	1.141	.688	11
12	.750	1.026	1.026	1.026	1.066	1.125	1.141	1.203	1.203	.750	12
13	.812	1.088	1.088	1.088	1.128	1.187	1.203	1.265	1.265	.812	13
14	.875	1.151	1.151	1.151	1.191	1.250	1.266	1.328	1.328	.875	14
15	.938	1.214	1.214	1.214	1.254	1.313	1.329	1.391	1.391	.938	15
16	1.000	1.276	1.276	1.276	1.316	1.375	1.391	1.453	1.453	1.000	16
17	1.062	1.338	1.338	1.338	1.378	1.437	1.453	1.515	1.515	1.062	17
18	1.125	1.401	1.401	1.401	1.441	1.500	1.516	1.578	1.578	1.125	18
19	1.188	1.464	1.464	1.464	1.504	1.563	1.579	1.641	1.641	1.188	19
20	1.250	1.526	1.526	1.526	1.566	1.625	1.641	1.703	1.703	1.250	20
21	1.312	1.588	1.588	1.588	1.628	1.687	1.703	1.765	1.765	1.312	21
22	1.375	1.651	1.651	1.651	1.691	1.750	1.766	1.828	1.828	1.375	22
23	1.438	1.714	1.714	1.714	1.754	1.813	1.829	1.891	1.891	1.438	23
24	1.500	1.776	1.776	1.776	1.816	1.875	1.891	1.953	1.953	1.500	24
25	1.562	1.838	1.838	1.838	1.878	1.937	1.953	2.015	2.015	1.562	25
26	1.625	1.901	1.901	1.901	1.941	2.000	2.016	2.078	2.078	1.625	26
27	1.688	1.964	1.964	1.964	2.004	2.063	2.079	2.141	2.141	1.688	27
28	1.750	2.026	2.026	2.026	2.066	2.125	2.141	2.203	2.203	1.750	28
29	1.812	2.088	2.088	2.088	2.128	2.187	2.203	2.265	2.265	1.812	29
30	1.875	2.151	2.151	2.151	2.191	2.250	2.266	2.328	2.328	1.875	30
31	1.938	2.214	2.214	2.214	2.254	2.313	2.329	2.391	2.391	1.938	31
32	2.000	2.276	2.276	2.276	2.316	2.375	2.391	2.453	2.453	2.000	32
34	2.125	2.401	2.401	2.401	2.441	2.500	2.516	2.578	2.578	2.125	34
36	2.250	2.526	2.526	2.526	2.566	2.625	2.641	2.703	2.703	2.250	36
38	2.375	2.651	2.651	2.651	2.691	2.750	2.766	2.828	2.828	2.375	38
40	2.500	2.776	2.776	2.776	2.816	2.875	2.891	2.953	2.953	2.500	40
42	2.625	2.901	2.901	2.901	2.941	3.000	3.016	3.078	3.078	2.625	42
44	2.750	3.026	3.026	3.026	3.066	3.125	3.141	3.203	3.203	2.750	44
46	2.875	3.151	3.151	3.151	3.191	3.250	3.266	3.328	3.328	2.875	46
48	3.000	3.276	3.276	3.276	3.316	3.375	3.391	3.453	3.453	3.000	48
50	3.125	3.401	3.401	3.401	3.441	3.500	3.516	3.578	3.578	3.125	50
52	3.250	3.526	3.526	3.526	3.566	3.625	3.641	3.703	3.703	3.250	52
54	3.375	3.651	3.651	3.651	3.691	3.750	3.766	3.828	3.828	3.375	54

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, MACHINE-FLAT FILLISTER HEAD, CLOSE TOL., SHORT THREAD

DRAWN G.DILLING	DATE 2/18/11	DRAWING NUMBER PMT-II2I THRU II28
CHECKED: G.DILLING	DATE 2/22/11	SHEET 4 OF 5

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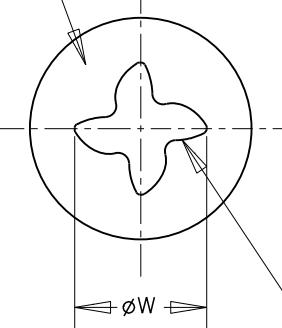
DASH NO	NOM GRIP	NOMINAL LENGTH FOR SIZES LISTED								NOM GRIP	DASH NO
		PMTII2I	PMTII22	PMTII23	PMTII24	PMTII25	PMTII26	PMTII27	PMTII28		
56	3.500	3.776	3.776	3.776	3.816	3.875	3.891	3.953	3.953	3.500	56
58	3.625	3.901	3.901	3.901	3.941	4.000	4.016	4.078	4.078	3.625	58
60	3.750	4.026	4.026	4.026	4.066	4.125	4.141	4.203	4.203	3.750	60
62	3.875	4.151	4.151	4.151	4.191	4.250	4.266	4.328	4.328	3.875	62
64	4.000	4.276	4.276	4.276	4.316	4.375	4.391	4.453	4.453	4.000	64
66	4.125	4.401	4.401	4.401	4.441	4.500	4.516	4.578	4.578	4.125	66
68	4.250	4.526	4.526	4.526	4.566	4.625	4.641	4.703	4.703	4.250	68
70	4.375	4.651	4.651	4.651	4.691	4.750	4.766	4.828	4.828	4.375	70
72	4.500	4.776	4.776	4.776	4.816	4.875	4.891	4.953	4.953	4.500	72
74	4.625	4.901	4.901	4.901	4.941	5.000	5.016	5.078	5.078	4.625	74
76	4.750	5.026	5.026	5.026	5.066	5.125	5.141	5.203	5.203	4.750	76
78	4.875	5.151	5.151	5.151	5.191	5.250	5.266	5.328	5.328	4.875	78
80	5.000	5.276	5.276	5.276	5.316	5.375	5.391	5.453	5.453	5.000	80
82	5.125	5.401	5.401	5.401	5.441	5.500	5.516	5.578	5.578	5.125	82
84	5.250	5.526	5.526	5.526	5.566	5.625	5.641	5.703	5.703	5.250	84
86	5.375	5.651	5.651	5.651	5.691	5.750	5.766	5.828	5.828	5.375	86
88	5.500	5.776	5.776	5.776	5.816	5.875	5.891	5.953	5.953	5.500	88
90	5.625	5.901	5.901	5.901	5.941	6.000	6.016	6.078	6.078	5.625	90
92	5.750	6.026	6.026	6.026	6.066	6.125	6.141	6.203	6.203	5.750	92
94	5.875	6.151	6.151	6.151	6.191	6.250	6.266	6.328	6.328	5.875	94
96	6.000	6.276	6.276	6.276	6.316	6.375	6.391	6.453	6.453	6.000	96

DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCREMENTS. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY.

REVISION

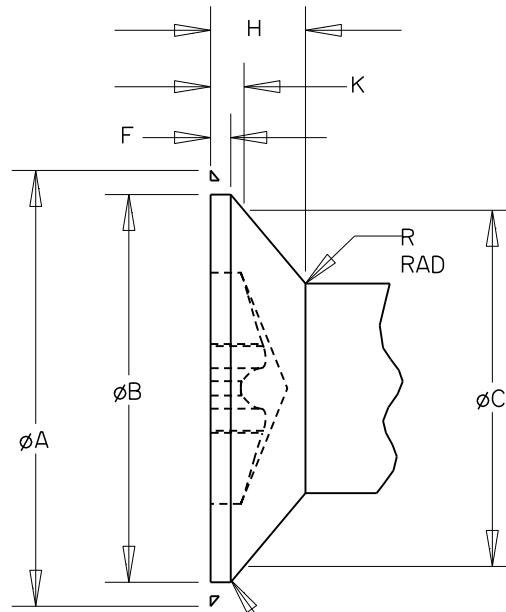
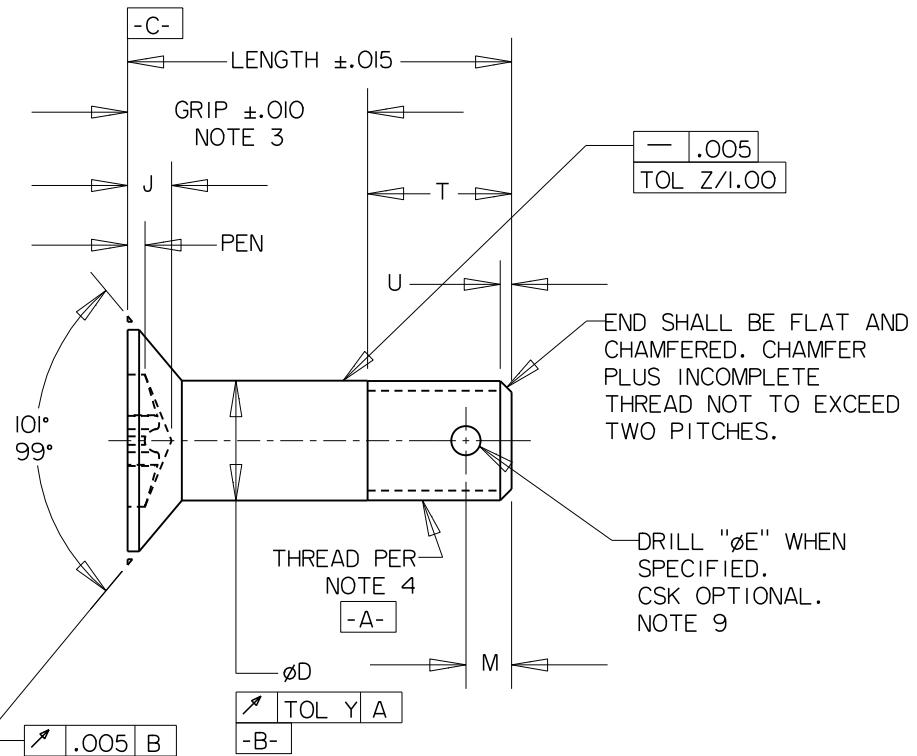
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DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	PMT-II2I THRU II28
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			SHEET 5 OF 5
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HEAD MARKING:
IDENTIFY PER
NASI347, TYPE IV



MORTORQ® SPIRAL
DRIVE PER PSC-5006
SEE TABLE I

\oplus TOL X \ominus B \ominus C



ENLARGED VIEW
OF HEAD

SHEET	1	2	3	4	5	6	7
REV	4	4	2	2	2	2	2

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TITLE: MORTORQ® 100° MACHINE-FLAT HEAD,
CLOSE TOLERANCE, SHORT THREAD, 160 KSI

DRAWN G.DILLING	DATE 9/18/02	DRAWING NUMBER PMT-1151 THRU 1158
CHECKED: G.DILLING	DATE 9/18/02	SHEET 1 OF 7

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REVISION ISSUED: 2/20/03 REV 1: 4/12/05 REV 2: 3/28/06 REV 3: 11/07/07 REV 4: 6/20/08

TABLE I NOTE I

BASIC PART NO	THREAD NOTE 4	RECESS SIZE	ϕA NOTE 16	ϕB MIN NOTE 16	ϕD	ϕE +.010 -.000 NOTE 9	H NOTE 16	J MAX REF	M +.010 -.000 NOTE 9	R RAD	T	U	ϕW REF	F LAND NOTE 16
PMTII51	.1380-32 UNJC-3A	00	.279 .269	.238	.1375 .1365	---	.057	.052	---	.020 .010	.276	.016	.1210	.015
PMTII52	.1640-32 UNJC-3A	0	.337 .328	.285	.1635 .1625	---	.068	.065	---	.020 .010	.276	.016	.1704	.015
PMTII53	.1900-32 UNJF-3A	1	.385 .376	.333	.1895 .1885	.070	.080	.078	.117	.020 .010	.276	.016	.2405	.015
PMTII54	.2500-28 UNJF-3A	1	.507 .497	.449	.2495 .2485	.076	.106	.095	.116	.020 .010	.316	.018	.2405	.015
PMTII55	.3125-24 UNJF-3A	2	.635 .625	.577	.3120 .3110	.076	.133	.117	.119	.025 .010	.375	.021	.3080	.015
PMTII56	.3750-24 UNJF-3A	3	.762 .752	.704	.3745 .3735	.106	.160	.142	.120	.030 .015	.391	.021	.3537	.015
PMTII57	.4375-20 UNJF-3A	4	.890 .880	.832	.4370 .4360	.106	.188	.168	.124	.030 .015	.453	.025	.4285	.015
PMTII58	.5000-20 UNJF-3A	5	1.017 1.007	.959	.4995 .4985	.106	.215	.186	.123	.030 .015	.453	.025	.5063	.015

TABLE II

BASIC PART NO	INSPECTION DATA									
	HEAD GAGING		TOLERANCE			RECESS GAGE PENETRATION		TEST VALUES MIN TENSILE STRENGTH, LB NOTE 10		
	ϕC GAGE CIRCLE NOTE 16	K HEAD PROTRUSION NOTE 16	ϕX	Y	Z	MAX	MIN	TORQUE IN-LB MIN	RAISED METAL MAX	STEEL T1(6A1-4V) CRES 160 KSI NOTE 7
PMTII51	---	---	.016	.0045	.0040	.030	.021	30	.005	1,450
PMTII52	.2671 .2667	.0268 .0240	.016	.0045	.0040	.032	.023	50	.005	2,240
PMTII53	.3147 .3143	.0290 .0263	.016	.0045	.0040	.027	.020	60	.005	3,180
PMTII54	.4245 .4241	.0342 .0316	.016	.0045	.0030	.047	.038	140	.005	5,820
PMTII55	.5389 .5385	.0395 .0370	.024	.0060	.0030	.055	.046	220	.005	9,200
PMTII56	.6532 .6528	.0450 .0426	.024	.0060	.0025	.070	.061	520	.006	14,000
PMTII57	.7676 .7672	.0503 .0481	.024	.0060	.0025	.080	.065	750	.007	18,900
PMTII58	.8820 .8816	.0557 .0537	.024	.0060	.0020	.082	.067	900	.008	25,600

REVISION ISSUED: 2/20/03 REV I: 4/12/05 REV 2:3/28/06 REV 3:11/07/07 REV 4:6/20/08

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TITLE: MORTORQ® 100° MACHINE-FLAT HEAD,
CLOSE TOLERANCE, SHORT THREAD, 160 KSI

DRAWN G.DILLING	DATE 9/18/02	DRAWING NUMBER PMT-II51 THRU II58
CHECKED: G.DILLING	DATE 9/18/02	SHEET 2 OF 7

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MATERIAL

STEEL 4140 (UNS G41400) PER MIL-S-5626, 4340 (UNS G43400) PER MIL-S-8844, OR 8740 (UNS G87400) PER MIL-S-6049.

TITANIUM ALLOY 6AI-4V (UNS R56400) PER AMS 4967, DESIGNATED BY "V" CODE.

CRES A286 (UNS S66286) PER AMS 5737, EXCEPT FOR HEAT TREATMENT, DESIGNATED BY "E" CODE.

HEAT TREATMENT

DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER MIL-H-6875.

STEEL 160,000 TO 180,000 PSI Uts PER MIL-H-6875.

CRES 160,000 TO 190,000 PSI Uts PRECIPITATION HARDENING PER AMS 5853. SEE NOTE 7.

TITANIUM ALLOY 6AI-4V, 160,000 PSI Uts MIN PER MIL-H-81200.

FINISH

STEEL NO CODE LETTER FOLLOWING DASH NUMBER DESIGNATES CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2.

CRES NO CODE LETTER FOLLOWING DASH NUMBER DESIGNATES PASSIVATE PER QQ-P-35, TYPE II OR VIII.

LETTER "P" FOLLOWING DASH NUMBER DESIGNATES CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2.

LETTER "A" FOLLOWING DASH NUMBER DESIGNATES ALUMINUM COATED PER NAS4006.

TITANIUM ALLOY NO CODE LETTER FOLLOWING DASH NUMBER DESIGNATES NONE.

LETTER "A" FOLLOWING DASH NUMBER DESIGNATES ALUMINUM COATED PER NAS4006.

CODE

DASH NUMBER DESIGNATES GRIP AND LENGTH. SEE TABLE III.

"A" AFTER DASH NUMBER INDICATES SCREW WITH ALUMINUM COATING, APPLICABLE TO CRES AND TITANIUM ONLY.

"D" AFTER DASH NUMBER DESIGNATES DRILL SHANK.

"E" IN LIEU OF DASH DESIGNATES CRES, 160 KSI.

"P" AFTER DASH NUMBER DESIGNATES TYPE II PLATING.

"V" IN LIEU OF DASH DESIGNATES 6AI-4V TITANIUM ALLOY.

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TITLE: MORTORQ® 100° MACHINE-FLAT HEAD,
CLOSE TOLERANCE, SHORT THREAD, 160 KSI

DRAWN G.DILLING	DATE 9/18/02	DRAWING NUMBER PMT-II51 THRU II58
CHECKED: G.DILLING	DATE 9/18/02	SHEET 3 OF 7

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

EXAMPLES OF PART NUMBERS:

PMTII54-8 = .2500-28 SCREW, .500 GRIP, STEEL, TYPE II PLATING.
 PMTII56E12P = .3750-24 SCREW, .750 GRIP, CRES, 160 KSI, TYPE II PLATING.
 PMTII56V12 = .3750-24 SCREW, .750 GRIP, 6Al-4V TITANIUM ALLOY.
 PMTII56V12A = .3750-24 SCREW, .750 GRIP, TITANIUM ALLOY, ALUMINUM COATED.

NOTES:

1. DIMENSIONS APPLY AFTER FINISH.
2. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M-1982.
3. GRIP LENGTH: FROM THE TOP OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
4. THREADS IN ACCORDANCE WITH MIL-S-8879. MAXIMUM MAJOR DIAMETER OF THREADS SHALL BE .001 LESS THAN THE MINIMUM SHANK DIAMETER AND THREAD RUNOUT PER MIL-B-7838.
5. SCREW SHALL BE FREE FROM BURRS AND SHARP EDGES.
6. MORTORQ SCREW SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED IN TABLE II WITHOUT DAMAGE TO RECESS OR DRIVER. SCREW RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTIONS. APPLY TABULATED TORQUE IN CW DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED WITHOUT RESTRICTION ON RAISED METAL.
7. A286 CRES ONLY, THE EFFECT OF COLD WORK INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE VALUE OF THE FINISHED PART, BUT THIS SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED MINIMUM TENSILE VALUE.
8. FOR CRES, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS MAGNETIC PERMEABILITY INDICATOR PER ASTM A342, METHOD 6.
9. COTTER PIN HOLE CENTERLINE WITHIN .010 AND PERPENDICULAR WITHIN 2 DEGREES OF SCREW CENTERLINE.
10. TENSILE STRESS AREAS USED FOR CALCULATION OF ULTIMATE TENSILE STRENGTH VALUES ARE BASED ON FED-STD-H28. SIZE .4375 AND LARGER ARE DERATED TO 78 PERCENT OF FULL STRENGTH. IF REQUIRED, TENSILE TESTING OF SCREWS REQUIRING CROSS-DRILLED THREADS SHOULD BE PERFORMED PRIOR TO DRILLING AND THE APPLICATION OF PLATING AND/OR COATINGS. WHEN SCREWS HAVE BEEN DRILLED, STRENGTH MAY BE VERIFIED BY SHEAR TESTING, IN LIEU OF TENSILE TESTING, IN ACCORDANCE WITH MIL-STD-1312. USERS SHOULD BE AWARE THAT SCREWS WITH CROSS-DRILLED THREADS MAY EXHIBIT A REDUCTION IN TENSILE STRENGTH.

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DRAWN	DATE	DRAWING NUMBER										
G.DILLING	9/18/02	PMT-II51 THRU II58										
CHECKED: G.DILLING	DATE 9/18/02											

NOTES: (CONTINUED)

- II. DIMENSIONS IN INCHES.
12. FOR DESCRIPTION OF STATUS NOTES, SEE NAS380.
13. SURFACE TEXTURE: SEE PROCUREMENT SPECIFICATION.
14. TYPE I PLATING (CODE "W") INACTIVE FOR NEW DESIGN.
15. THE FULL LENGTH OF THE SHANK AND THREADS SHALL BE PROTECTED FROM ABRASION AND CHAFING DURING HANDLING, TRANSPORTATION AND STORAGE. REQUIRED ON TITANIUM ALLOY PARTS .1900 DIAMETER AND ABOVE ON OTHER MATERIALS .250 DIAMETER AND ABOVE.
16. A, F, AND H ARE INCLUDED FOR ENGINEERING PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES A, F AND H ARE CALCULATED LIMITS RESULTING FROM TOLERANCE ON C, D, K AND HEAD ANGLE.

PRECUREMENT SPECIFICATION

MIL-B-87II4, EXCEPT AS NOTED. TENSILE LOAD VALUES AS TABULATED HEREIN, FATIGUE STRENGTH AND COLD WORKING HEAD TO SHANK FILLET ARE NOT APPLICABLE FOR STEEL AND CRES SCREWS. FOR TITANIUM SCREWS, FATIGUE, SHEAR VALUES AND FILLET ROLLING ARE APPLICABLE PER NAS62I. FOR SHEAR VALUES FOR PMTII51 AND PMTII52, USE NAS498.

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DRAWN G.DILLING	DATE 9/18/02	DRAWING NUMBER PMT-II51 THRU II58	SHEET 5 OF 7	
CHECKED: G.DILLING	DATE 9/18/02	PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		
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TABLE III

DASH NO	NOM GRIP NOTE 3	NOMINAL LENGTH FOR SIZES LISTED							
		PMTII51	PMTII52	PMTII53	PMTII54	PMTII55	PMTII56	PMTII57	PMTII58
1	.062	.338	---	---	---	---	---	---	---
2	.125	.401	.401	.401	.441	---	---	---	---
3	.188	.464	.464	.464	.504	.563	---	---	---
4	.250	.526	.526	.526	.566	.625	.641	.703	---
5	.312	.588	.588	.588	.628	.687	.703	.765	.765
6	.375	.651	.651	.651	.691	.750	.766	.828	.828
7	.438	.714	.714	.714	.754	.813	.829	.891	.891
8	.500	.776	.776	.776	.816	.875	.891	.953	.953
9	.562	.838	.838	.838	.878	.937	.953	1.015	1.015
10	.625	.901	.901	.901	.941	1.000	1.016	1.078	1.078
11	.688	.964	.964	.964	1.004	1.063	1.079	1.141	1.141
12	.750	1.026	1.026	1.026	1.066	1.125	1.141	1.203	1.203
13	.812	1.088	1.088	1.088	1.128	1.187	1.203	1.265	1.265
14	.875	1.151	1.151	1.151	1.191	1.250	1.266	1.328	1.328
15	.938	1.214	1.214	1.214	1.254	1.313	1.329	1.391	1.391
16	1.000	1.276	1.276	1.276	1.316	1.375	1.391	1.453	1.453
17	1.062	1.338	1.338	1.338	1.378	1.437	1.453	1.515	1.515
18	1.125	1.401	1.401	1.401	1.441	1.500	1.516	1.578	1.578
19	1.188	1.464	1.464	1.464	1.504	1.563	1.579	1.641	1.641
20	1.250	1.526	1.526	1.526	1.566	1.625	1.641	1.703	1.703
21	1.312	1.588	1.588	1.588	1.628	1.687	1.703	1.765	1.765
22	1.375	1.651	1.651	1.651	1.691	1.750	1.766	1.828	1.828
23	1.438	1.714	1.714	1.714	1.754	1.813	1.829	1.891	1.891
24	1.500	1.776	1.776	1.776	1.816	1.875	1.891	1.953	1.953
25	1.562	1.838	1.838	1.838	1.878	1.937	1.953	2.015	2.015
26	1.625	1.901	1.901	1.901	1.941	2.000	2.016	2.078	2.078
27	1.688	1.964	1.964	1.964	2.004	2.063	2.079	2.141	2.141
28	1.750	2.026	2.026	2.026	2.066	2.125	2.141	2.203	2.203
29	1.812	2.088	2.088	2.088	2.128	2.187	2.203	2.265	2.265
30	1.875	2.151	2.151	2.151	2.191	2.250	2.266	2.328	2.328
31	1.938	2.214	2.214	2.214	2.254	2.313	2.329	2.391	2.391
32	2.000	2.276	2.276	2.276	2.316	2.375	2.391	2.453	2.453
34	2.125	2.401	2.401	2.401	2.441	2.500	2.516	2.578	2.578
36	2.250	2.526	2.526	2.526	2.566	2.625	2.641	2.703	2.703
38	2.375	2.651	2.651	2.651	2.691	2.750	2.766	2.828	2.828
40	2.500	2.776	2.776	2.776	2.816	2.875	2.891	2.953	2.953
42	2.625	2.901	2.901	2.901	2.941	3.000	3.016	3.078	3.078
44	2.750	3.026	3.026	3.026	3.066	3.125	3.141	3.203	3.203
46	2.875	3.151	3.151	3.151	3.191	3.250	3.266	3.328	3.328
48	3.000	3.276	3.276	3.276	3.316	3.375	3.391	3.453	3.453
50	3.125	3.401	3.401	3.401	3.441	3.500	3.516	3.578	3.578
52	3.250	3.526	3.526	3.526	3.566	3.625	3.641	3.703	3.703
54	3.375	3.651	3.651	3.651	3.691	3.750	3.766	3.828	3.828

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CLOSE TOLERANCE, SHORT THREAD, 160 KSI

DRAWN G.DILLING	DATE 9/18/02	DRAWING NUMBER PMT-II51 THRU II58
CHECKED: G.DILLING	DATE 9/18/02	SHEET 6 OF 7

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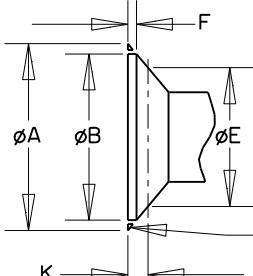
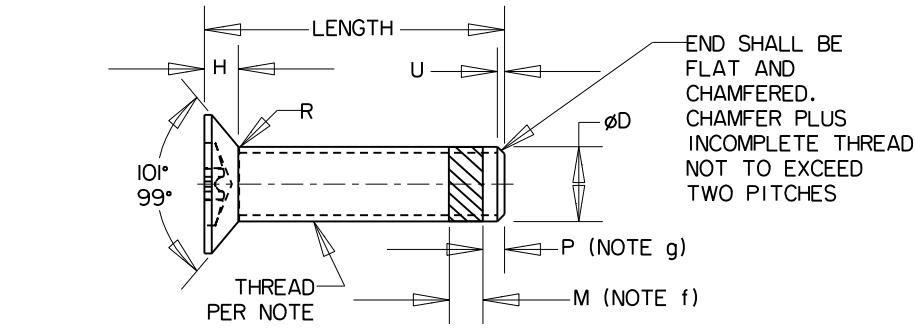
TABLE III (CONTINUED)

DASH NO	NOM GRIP NOTE 3	NOMINAL LENGTH FOR SIZES LISTED							
		PMTII51	PMTII52	PMTII53	PMTII54	PMTII55	PMTII56	PMTII57	PMTII58
56	3.500	3.776	3.776	3.776	3.816	3.875	3.891	3.953	3.953
58	3.625	3.901	3.901	3.901	3.941	4.000	4.016	4.078	4.078
60	3.750	4.026	4.026	4.026	4.066	4.125	4.141	4.203	4.203
62	3.875	4.151	4.151	4.151	4.191	4.250	4.266	4.328	4.328
64	4.000	4.276	4.276	4.276	4.316	4.375	4.391	4.453	4.453
66	4.125	4.401	4.401	4.401	4.441	4.500	4.516	4.578	4.578
68	4.250	4.526	4.526	4.526	4.566	4.625	4.641	4.703	4.703
70	4.375	4.651	4.651	4.651	4.691	4.750	4.766	4.828	4.828
72	4.500	4.776	4.776	4.776	4.816	4.875	4.891	4.953	4.953
74	4.625	4.901	4.901	4.901	4.941	5.000	5.016	5.078	5.078
76	4.750	5.026	5.026	5.026	5.066	5.125	5.141	5.203	5.203
78	4.875	5.151	5.151	5.151	5.191	5.250	5.266	5.328	5.328
80	5.000	5.276	5.276	5.276	5.316	5.375	5.391	5.453	5.453
82	5.125	5.401	5.401	5.401	5.441	5.500	5.516	5.578	5.578
84	5.250	5.526	5.526	5.526	5.566	5.625	5.641	5.703	5.703
86	5.375	5.651	5.651	5.651	5.691	5.750	5.766	5.828	5.828
88	5.500	5.776	5.776	5.776	5.816	5.875	5.891	5.953	5.953
90	5.625	5.901	5.901	5.901	5.941	6.000	6.016	6.078	6.078
92	5.750	6.026	6.026	6.026	6.066	6.125	6.141	6.203	6.203
94	5.875	6.151	6.151	6.151	6.191	6.250	6.266	6.328	6.328
96	6.000	6.276	6.276	6.276	6.316	6.375	6.391	6.453	6.453

DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCREMENTS ROUNDED OFF TO THREE (3) PLACES. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY.

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		CHECKED: G.DILLING	DATE 9/18/02	SHEET 7 OF 7
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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HEADMARKING:

FOR - 3 SIZES AND LARGER BASIC PART NO., APPLICABLE DIAMETER DASH NO., MANUFACTURER'S TRADE MARK, AND A CIRCLE OF SIX (MINIMUM) DOTS. RAISED OR DEPRESSED .010 MAX. LOCATION OPTIONAL 04, 06 AND 08 SIZES SHALL BE MARKED WITH THE DIAMETER DASH NO. ONLY. MANUFACTURER'S TRADE MARK AND A CIRCLE OF SIX (MINIMUM) DOTS. NO MARKING REQUIRED ON SIZE 02. MARK "E" TO INDICATE CRES WHERE APPLICABLE.

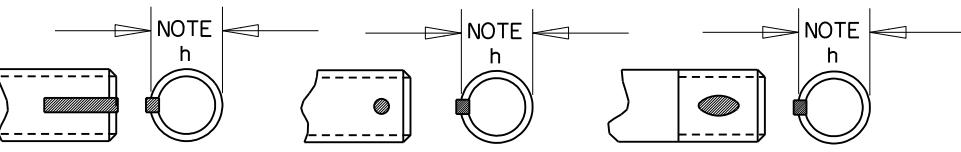


TABLE I

PART NUMBER	SEE THREAD NOTE	A DIA	B MIN	D DIA MAX	F	H REF	R RAD	U REF	K DIM	E DIM	MIN TENSILE STRENGTH, LBS
											ALLOY STEEL CRES, Ti (k)
PMTII89-02	.0860-56 UNJC-3A	.176 .162	.126	.086	.015 .005	.036	.015 .005	.010			435
PMTII89-04	.1120-40 UNJC-3A	.225 .213	.177	.112	.015 .005	.045	.015 .005	.013			765
PMTII89-06	.1380-32 UNJC-3A	.279 .267	.231	.138	.015 .005	.057	.020 .010	.016			1,200
PMTII89-08	.1640-32 UNJC-3A	.332 .319	.270	.164	.020 .010	.068	.020 .010	.016	.0268 .0240	.2671 .2667	1,950
PMTII89-3	.1900-32 UNJF-3A	.385 .371	.322	.190	.020 .010	.080	.020 .010	.016	.0290 .0263	.3147 .3143	2,860
PMTII89-4	.2500-28 UNJF-3A	.507 .491	.442	.250	.020 .010	.106	.020 .010	.018	.0342 .0316	.4245 .4241	5,520
PMTII89-5	.3125-24 UNJF-3A	.635 .617	.568	.312	.020 .010	.133	.020 .010	.021	.0395 .0370	.5389 .5385	9,200
PMTII89-6	.3750-24 UNJF-3A	.762 .742	.694	.375	.020 .010	.160	.020 .010	.021	.0450 .0426	.6532 .6528	14,000

MATERIAL: ALLOY STEEL PER NAS498. CORR RES STEEL A286 (UNS.S66286) PER AMS5737, EXCEPT FOR HEAT TREATMENT, DESIGNATED BY "E" CODE. TITANIUM ALLOY 6AL-4V (UNS R56400) PER AMS4928 OR AMS4967.

LOCKING ELEMENT: NYLON OR EQUIVALENT, COLOR PER MIL-DTL-18240, 250 DEGREE F MAX. POLYCHLOROTRIFLUOROETHYLENE UNPLASTICIZED (PCTFE) PER AMS 3650, COLOR OPTIONAL, 390 DEGREE F MAX. POLYETHYLENE TEREPHTHALATE (POLYESTER) PER AMS3612, OR POLYAMIDE-IMIDE PER AMS3670, 400 DEGREES F MAX., COLOR OPTIONAL.

HEAT TREATMENT: ALLOY STEEL - 160,000-180,000 PSI UTS PER MIL-H-6875. CORR RES STEEL-160,000 PSI UTS MIN. AT ROOM TEMPERATURE. TITANIUM-160,000 PSI UTS MIN. PER MIL-H-81200

SHEET	I	2	3
REV	-	-	-

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TITLE:
MORTORQ® SPIRAL DRIVE SCREW, SELF-LOCKING,
FLAT 100 DEG HEAD, FULL THREAD

DRAWN G.DILLING	DATE 12/30/11	DRAWING NUMBER
CHECKED: G.DILLING	DATE 12/30/11	PMT-1189
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

SHEET 1 OF 3

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TABLE II

LENGTH CHART					
TOLERANCE +.000 -.031		TOLERANCE +.000 -.062		TOLERANCE +.000 -.094	
DASH NO.	LENGTH	DASH NO.	LENGTH	DASH NO.	LENGTH
3	.188	18	1.125	34 TO 96	2.125 TO 6.000
4	.250	20	1.250		
5	.312	22	1.375		
6	.375	24	1.500		
7	.438	26	1.625		
8	.500	28	1.750		
10	.625	30	1.875		
12	.750	32	2.000		
14	.875				
16	1.000				

FINISH: ALLOY STEEL - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, TYPE I PLATING DESIGNATED BY "W". SEE CODE. CORR RES. STEEL-CLEAN AND PASSIVATE IN ACCORDANCE WITH QQ-P-35. CORR RES. STEEL-OPTIONAL CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, DESIGNATED BY "H" PER CODE. TITANIUM -NO CODE-NONE TITANIUM "A" CODE - ALUMINUM COAT PER NAS 4006

CODE: FIRST DASH NUMBER DESIGNATES DIAMETER AND THREAD. USE "M" FOR MORTORQ SPIRAL DRIVE RECESS. SECOND DASH NUMBER INDICATES LENGTH IN .0625 INCREMENTS (CONVERTED TO THREE DECIMAL PLACES PER ANSI Y14.5). INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY. USE OF .25 INCH INCREMENTS IS RECOMMENDED FOR SCREWS OVER 3 INCHES LONG. "E" IN LIEU OF FIRST DASH DESIGNATES CORR RES. STEEL (160 KSI). "H" AFTER SECOND DASH NUMBER DESIGNATES TYPE II PLATING. "W" FOLLOWING SECOND DASH NUMBER DESIGNATES TYPE I PLATING. SPECIFY TYPE OF LOCKING ELEMENT BY "L" FOLLOWING LAST DASH NUMBER FOR NYLON STRIP TYPE ELEMENT, BY "N" FOR NYLON PELLET TYPE, BY "B" FOR NYLON PATCH TYPE. OMIT IF TYPE OF ELEMENT FOR NYLON IS OPTIONAL. SPECIFY "LK" FOR PCTFE STRIP TYPE ELEMENT, BY "NK" FOR PCTFE PELLET TYPE, BY K FOR PCTFE WITH OPTIONAL ELEMENT. NOTE THAT PCTFE LOCKING PERFORMANCE APPLICABLE FOR ONE TORQUE CYCLE. SPECIFY "J" FOR POLYETHYLENE TEREPHTHALATE (POLYESTER) OR POLYAMIDE-IMIDE AVAILABLE ONLY AS PATCH TYPE ELEMENT. LOCKING TORQUE APPLICABLE FOR 5 TORQUE CYCLES. "V" IN LIEU OF DASH DESIGNATED TITANIUM ALLOY.

EXAMPLE: PMTI189-3M8L = .1900-32 SCREW, .500 LENGTH, ALLOY STEEL, TYPE II PLATING, STRIP TYPE NYLON LOCKING ELEMENT, MORTORQ SPIRAL DRIVE RECESS
 PMTI189-5M1OW = .3125-24 SCREW, .625 LENGTH, ALLOY STEEL TYPE I PLATING, OPTIONAL TYPE NYLON LOCKING ELEMENT, MORTORQ SPIRAL DRIVE RECESS.
 PMTI189E5M1OLKH = .3125-24 SCREW, .625 LENGTH CORR. RES STEEL (160 KSI), TYPE II PLATING, PCTFE STRIP TYPE LOCKING ELEMENT, MORTORQ SPIRAL DRIVE RECESS.
 PMTI189V3M8B = .1900-32 SCREW, .500 LENGTH, TITANIUM, PATCH TYPE LOCKING ELEMENT, MORTORQ SPIRAL DRIVE RECESS.
 PMTI189V3M8A = .1900-32 SCREW, .500 LENGTH, TITANIUM, MORTORQ SPIRAL DRIVE RECESS, ALUMINUM COATED.
 PMTI189E3M8J = .1900-32 SCREW, .500 LENGTH, CORR. RES STEEL (160 KSI), PATCH TYPE, POLYETHYLENE TEREPHTHALATE (POLYESTER) OR POLYAMIDEIMIDE LOCKING ELEMENT, MORTORQ SPIRAL DRIVE RECESS.

NOTES: (a) DIAMETER OF UNTHREADED PORTION OF SCREWS SHALL NOT BE LESS THAN MINIMUM PITCH DIAMETER NOR MORE THAN MAXIMUM MAJOR DIAMETER OF THREAD.
 (b) FOR SCREWS 2 INCHES LONG OR SHORTER, COMPLETE THREADS SHALL EXTEND TO WITHIN 2 THREADS OF THE BEARING SURFACE OF THE HEAD. SCREWS OF LONGER LENGTH SHALL HAVE A MINIMUM COMPLETE THREAD LENGTH OF 1.75.
 (c) SCREWS SHALL BE FREE FROM BURRS AND SHARP EDGES.
 (d) CONCENTRICITY: CONICAL SURFACES OF HEAD AND PITCH DIA. OF SCREW WITHIN .005 TIR.
 (e) FOR CORR RES. STEEL, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS. (MAGNETIC PERMEABILITY INDICATOR PER MIL-I-I7214.)

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CHECKED: G.DILLING		DATE 12/30/II	SHEET 2 OF 3	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

- (f) "M" MIN. (5 THREAD PITCHES) - REGION OF MINIMUM ENGAGEMENT WITH FULL FEMALE THREAD REQUIRED TO MEET MIL-DTL-18240 REQUIREMENTS. LOCKING ELEMENT WITHIN "M" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED PER MIL-DTL-18240. LENGTH OR DIAMETER OF LOCKING ELEMENT MAY BE MORE OR LESS THAN "M" PROVIDING ALL OTHER REQUIREMENTS ARE MET.
- (g) "P" = ONE COMPLETE THREAD PLUS UNTHREADED PORTION OF END. FOR CASE IN STARTING, LOCKING ELEMENT SHALL NOT BE EFFECTIVE WITHIN THIS AREA.
- (h) PROTRUSION OF LOCKING ELEMENT SHALL BE CONTROLLED SO THAT IT WILL PASS FREELY OR WITH FINGER PRESSURE THROUGH A RING GAGE WITH DIAMETER EQUAL TO MAXIMUM MAJOR THREAD DIA.
- (j) RECESS GAGING IN ACCORDANCE WITH PHILLIPS SCREW COMPANY SPECIFICATION.
- (k) TENSILE STRESS AREAS USED FOR CALCULATION OF ULTIMATE TENSILE STRENGTH VALUES ARE BASED ON FED-STD-H28 SIZES .2500 AND BELOW ARE DERATED FROM FULL STRENGTH.
- (l) "C" CODE MATERIAL INACTIVE FOR DESIGN AFTER 1 JUNE 1971, USE "E" CODE. ("E" PARTS MAY BE DOUBLE IDENTIFIED "CE") (m) THREADS IN ACCORDANCE WITH AS8879. THREADS IN ACCORDANCE WITH MIL-S-7742 ARE ACCEPTABLE UNTIL 31 DEC 1969. (n) DIMENSIONS IN INCHES.
- (p) FOR DESCRIPTION OF STATUS NOTES, SEE NAS380.
- (r) SURFACE ROUGHNESS: "D" DIAMETER, UNDERSIDE OF HEAD, AND SIDES AND ROOT OF THREADS -.32 MICROINCHES, OTHER SURFACES -.125 MICROINCHES, PER ANSI/ASME B46.1.

PROCUREMENT SPECIFICATION:

NAS498 FOR ALLOY STEEL; AMS7478 FOR CORROSION RESISTANT STEEL EXCEPT THAT STRESS RUPTURE REQUIREMENTS ARE NOT APPLICABLE; MIL-DTL-18240 FOR SELF-LOCKING REQUIREMENTS, WHERE APPLICABLE. OPTIONAL CORROSION RESISTANT STEEL PER AMS7479 EXCEPT STRESS RUPTURE AND HEAT TREATMENT ARE NOT APPLICABLE. TENSILE LOAD VALUES ARE TABULATED HEREIN.

NAS4004 FOR TITANIUM ALLOY EXCEPT FOR RECESS WRENCHING TORQUES.

TABLE III

MORTORQ SPIRAL DRIVE RECESS					
FIRST DASH NUMBER	T MAX	W REF	RECESS GAGE PENETRATION (J)		RECESS DRIVE SIZE
			MAX	MIN	
02	.031	.0730	.018	.012	MT-000
04	.045	.1210	.022	.015	MT-00
06	.052	.1210	.030	.021	MT-00
08	.065	.1704	.032	.023	MT-0
3	.082	.2405	.027	.020	MT-1
4	.095	.2405	.047	.038	MT-1
5	.117	.3080	.055	.046	MT-2
6	.142	.3537	.070	.061	MT-3

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TITLE:
MORTORQ® SPIRAL DRIVE SCREW, SELF-LOCKING,
FLAT 100 DEG HEAD, FULL THREAD

DRAWN G.DILLING	DATE 12/30/11	DRAWING NUMBER PMT-1189
CHECKED: G.DILLING	DATE 12/30/11	SHEET 3 OF 3
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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WHEN SELF-LOCKING ELEMENT IS SPECIFIED:
HEAD MARKING OF A MINIMUM OF SIX (6)
DOTS, RAISED OR DEPRESSED, IS REQUIRED.
TOP OR SIDE LOCATION OPTIONAL.
(SCREW SIZES 04 AND LARGER)

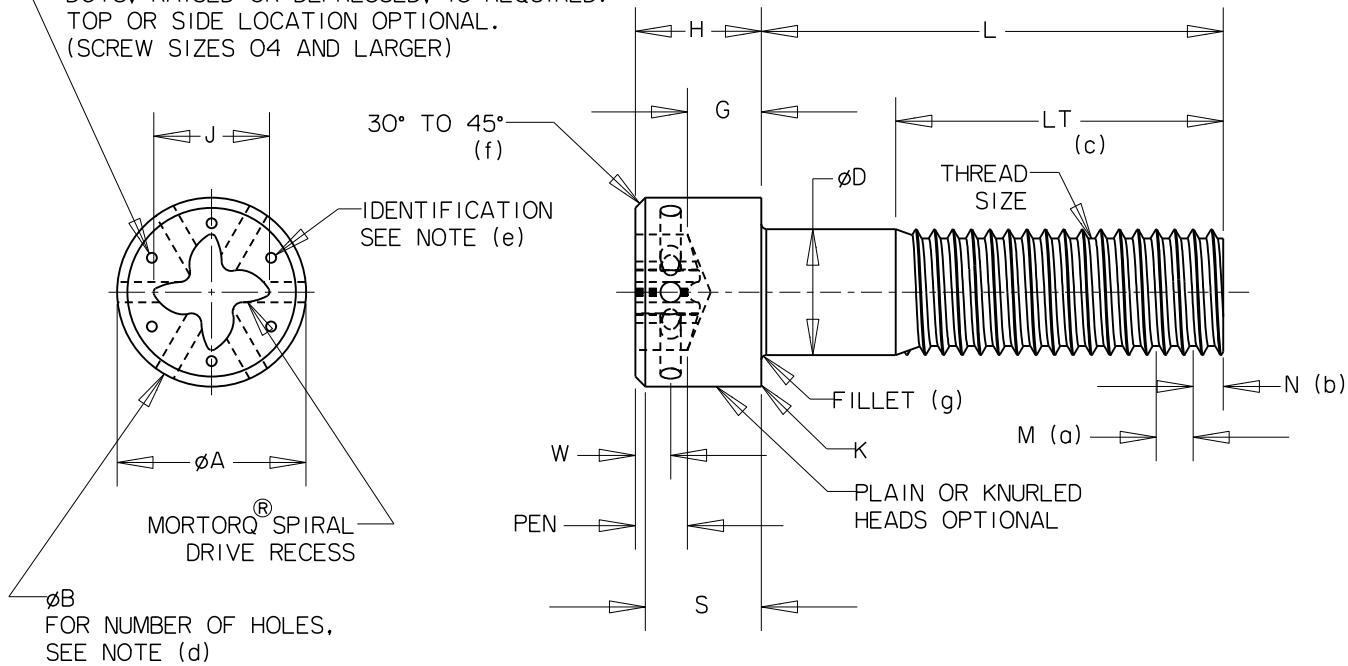


TABLE I

NOM SIZE DASH NO.	THREAD SIZE	D BODY DIAMETER		A HEAD DIAMETER		H HEAD HEIGHT		S HEAD SIDE HEIGHT MIN	J REF	PEN ENGAGEMENT		G WALL THICKNESS MIN	K CHAMFER OR RADIUS MAX	DRIVE SIZE
		MAX	MIN	MAX	MIN	MAX	MIN			MAX	MIN			
01	.0730-64	.073	.0695	.118	.112	.054	.051	.047	.0730	.026	.020	.025	.003	MT-000
02	.0860-56	.086	.0822	.140	.134	.058	.055	.049	.0730	.026	.020	.029	.003	MT-000
03	.0990-48	.099	.0949	.161	.154	.068	.064	.058	.0730	.030	.024	.034	.003	MT-000
04	.1120-40	.112	.1075	.183	.176	.084	.080	.073	.1210	.042	.035	.038	.005	MT-00
06	.1380-32	.138	.1329	.226	.218	.097	.093	.083	.1210	.046	.039	.047	.005	MT-00
08	.1640-32	.164	.1585	.270	.262	.121	.116	.105	.1704	.060	.051	.056	.005	MT-0
3	.1900-24	.190	.1840	.312	.303	.135	.130	.116	.1704	.065	.056	.065	.005	MT-0
4	.2500-20	.250	.2435	.375	.365	.185	.179	.160	.2405	.084	.075	.095	.008	MT-1
5	.3125-18	.3125	.3053	.469	.457	.217	.211	.186	.3080	.092	.083	.119	.008	MT-2
6	.3750-16	.375	.3678	.562	.550	.256	.249	.218	.3537	.106	.097	.143	.008	MT-3
7	.4375-14	.4375	.4294	.656	.642	.314	.307	.271	.4285	.141	.126	.166	.010	MT-4
8	.5000-13	.500	.4919	.750	.735	.350	.342	.300	.5063	.152	.137	.190	.010	MT-5
10	.6250-11	.625	.6163	.937	.921	.425	.416	.362	.5938	.178	.153	.238	.010	MT-6
12	.7500-10	.750	.7406	1.125	1.107	.513	.503	.438	.7250	.218	.188	.285	.010	MT-7
14	.8750-9	.875	.8647	1.312	1.293	.590	.579	.502	.8200	.246	.216	.333	.015	MT-8
16	1.0000-8	1.000	.9886	1.500	1.479	.638	.626	.538	.8200	.246	.216	.380	.015	MT-8

SHEET	1	2	3	4	5
REV	-	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, CAP, SOCKET HEAD, UNDRILLED AND DRILLED, PLAIN AND SELF-LOCKING, ALLOY STEEL, CORROSION-RESISTANT STEEL AND HEAT-RESISTANT STEEL, UNRC-3A AND UNRC-2A

DRAWN G.DILLING	DATE 6/17/10	DRAWING NUMBER PMT-1352
CHECKED G.DILLING	DATE 6/22/10	

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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TABLE II

NOM SIZE DASH NO.	L MINIMUM BASIC THREAD LENGTH (c)	SAFETY WIRE HOLE WHEN SPECIFIED				MINIMUM BREAKING STRENGTH (POUNDS)		
		W DRILLED HOLE LOCATION		ØB DRILLED HOLE (d)		ALLOY STEEL	CORROSION RESISTANT STEEL	HEAT RESISTANT STEEL
		MAX	MIN	MAX	MIN			
01						470	210	412
02	.625	(d)	(d)	(d)	(d)	665	300	592
03						875	390	780
04	.750	.040	.026	.039	.033	1,090	480	966
06		.050	.035			1,640	730	1,458
08	.875	.060	.040	.050	.044	2,520	1,120	2,240
3		.065	.045			3,150	1,400	2,800
4	1.000	.085	.065			5,700(h)	2,540	5,090
5	1.125	.104	.084			9,400(h)	4,190	8,380
6	1.250	.123	.103			13,900(h)	6,200	12,410
7	1.375	.141	.121	.067	.061	19,100(h)	8,500	17,010
8	1.500	.160	.140			25,500(h)	11,300	22,700
10	1.750	.198	.178			38,400	18,100	36,200
12	2.000	.235	.215			56,800	23,400	53,500
14	2.250	.273	.253	.097	.091	78,500	32,300	73,900
16	2.500	.310	.290			103,000	42,400	96,950

- (a) "M" MIN. (5 THREAD PITCHES) = REGION OF MINIMUM ENGAGEMENT WITH FULL FEMALE THREAD REQUIRED TO MEET MIL-DTL-18240 REQUIREMENTS.
 LOCKING ELEMENT WITHIN "M" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED IN ACCORDANCE WITH MIL-DTL-18240.
 LENGTH OR DIAMETER OF LOCKING ELEMENT MAY BE MORE OR LESS THAN "M" PROVIDING ALL OTHER REQUIREMENTS ARE MET
- (b) "N" = ONE (1) COMPLETE THREAD PLUS UNTHREADED PORTION OF END FOR EASE OF STARTING LOCKING ELEMENT SHALL NOT BE EFFECTIVE WITHIN THIS AREA.
- (c) SCREWS WHICH HAVE A LENGTH LESS THAN THE MINIMUM BASIC THREAD LENGTH, SHALL BE THREADED AS CLOSE TO HEAD AS PRACTICABLE. FOR SCREWS WHICH HAS A LENGTH GREATER THAN THE MINIMUM BASIC THREAD LENGTH, THE BODY AND GRIP LENGTH SHALL BE IN ACCORDANCE WITH B18.3.
- (d) DRILLED HOLE DATA IN ACCORDANCE WITH PROCUREMENT SPEC FF-S-86.
 PARTS SHALL HAVE DRILLED HEADS IF SPECIFIED BY CODE H.
 SCREW SIZES 04 AND 06 SHALL HAVE TWO (2) DRILLED HOLES SPACED 180°
 SCREW SIZES 08 THRU 16 SHALL HAVE SIX (6) DRILLED HOLES SPACED 60°
 (DRILLED HOLES NOT APPLICABLE TO SCREW SIZES BELOW 04 AND ABOVE 16).
- (e) IDENTIFICATION LETTER "N" IMPRESSED ON THE TOP OR SIDE OF THE HEAD, FOR SCREW SIZES 04 AND LARGER ONLY, TO DENOTE HEAT-RESISTANT STEEL.
- (f) THE INTERSECTION OF THE TOP AND SIDE OF THE HEAD MAY BE CHAMFERED OR RADIUSED AT THE MANUFACTURES OPTION PER ASME B18.3.
- (g) THE FILLET SHALL BE IN ACCORDANCE WITH ASME B18.3.
- (h) MINIMUM BREAKING STRENGTH VALUES ARE BASED ON 180 KSI HEAD TREATMENT. LINED THROUGH STRENGTH VALUES WERE BASED ON 170 KSI.

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, CAP, SOCKET HEAD, UNDRILLED AND DRILLED, PLAIN AND SELF-LOCKING, ALLOY STEEL, CORROSION-RESISTANT STEEL AND HEAT-RESISTANT STEEL, UNRC-3A AND UNRC-2A

DRAWN G.DILLING	DATE 6/17/10	DRAWING NUMBER PMT-1352
CHECKED: G.DILLING	DATE 6/22/10	SHEET 2 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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TABLE III

L SCREW LENGTH (I)	O1	O2	O3	O4	O6	O8	3	4	5	6	7	8	10	12	14	16
.125	-01-2															
.188	-01-3	-02-3														
.250	-01-4	-02-4	-03-4	-04-4	-06-4	-08-4										
.375	-01-6	-02-6	-03-6	-04-6	-06-6	-08-6	-3-6	-4-6	-5-6							
.500		-02-8	-03-8	-04-8	-06-8	-08-8	-3-8	-4-8	-5-8	-6-8						
.625			-03-10	-04-10	-06-10	-08-10	-3-10	-4-10	-5-10	-6-10						
.750				-04-12	-06-12	-08-12	-3-12	-4-12	-5-12	-6-12	-7-12	-8-12				
.875					-06-14	-08-14	-3-14	-4-14	-5-14	-6-14	-7-14	-8-14				
1.000					-06-16	-08-16	-3-16	-4-16	-5-16	-6-16	-7-16	-8-16	-10-16			
1.250						-08-20	-3-20	-4-20	-5-20	-6-20	-7-20	-8-20	-10-20			
1.500						-08-24	-3-24	-4-24	-5-24	-6-24	-7-24	-8-24	-10-24	-12-24		
1.750							-3-28	-4-28	-5-28	-6-28	-7-28	-8-28	-10-28	-12-28		
2.000							-3-32	-4-32	-5-32	-6-32	-7-32	-8-32	-10-32	-12-32	-14-32	
2.250								-4-36	-5-36	-6-36	-7-36	-8-36	-10-36	-12-36	-14-36	
2.500									-5-40	-6-40	-7-40	-8-40	-10-40	-12-40	-14-40	-16-40
2.750										-6-44	-7-44	-8-44	-10-44	-12-44	-14-44	-16-44
3.000										-6-48	-7-48	-8-48	-10-48	-12-48	-14-48	-16-48
3.250														-12-52	-14-52	-16-52
3.500														-12-56	-14-56	-16-56
4.000															-14-64	-16-64
4.500															-14-72	-16-72
5.000																-16-80
5.500																
6.000																

NOTE: SEE CODE FOR ADDITIONAL LENGTHS. (I) LENGTH TOLERANCE SHALL BE AS FOLLOWS:

NOMINAL LENGTH	SIZE		
	O THRU .375	OVER .375 THRU .750	OVER .750 THRU 1.500
	TOLERANCES		
UP TO AND INCL. 1.000	+.000 -.030	+.000 -.030	+.000 -.050
OVER 1.000 AND INCL. 2.500	+.000 -.040	+.000 -.060	+.000 -.100
OVER 2.500 AND INCL. 6.000	+.000 -.060	+.000 -.080	+.000 -.140

THREADS: IN ACCORDANCE WITH PROCUREMENT SPECIFICATION, UNRC-3A FOR NOMINAL DIAMETERS 1.000 INCH AND SMALLER, UNRC-2A FOR NOMINAL DIAMETERS GREATER THAN 1.000 INCH.

MATERIAL: ALLOY STEEL IN ACCORDANCE WITH PROCUREMENT SPEC FF-S-86.
CORROSION-RESISTANT STEEL IN ACCORDANCE WITH PROCUREMENT SPEC FF-S-86.
HEAT-RESISTANT STEEL CONFORMING TO CHEMISTRY OF AMS5731 (UNS S66286) OR AMS5737 (UNS S66286) COLD WORKED AND AGE HARDENED TO MEET THE FASTENER REQUIREMENTS OF FF-S-86 AND THIS STANDARD.

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, CAP, SOCKET HEAD, UNDRILLED AND DRILLED, PLAIN AND SELF-LOCKING, ALLOY STEEL, CORROSION-RESISTANT STEEL AND HEAT-RESISTANT STEEL, UNRC-3A AND UNRC-2A

DRAWN G.DILLING	DATE 6/17/10	DRAWING NUMBER PMT-1352
CHECKED: G.DILLING	DATE 6/22/10	SHEET 3 OF 5

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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- FINISH: ALLOY STEEL - CADMIUM PLATE IN ACCORDANCE WITH AMS-QQ-P-416, TYPE II, CLASS 2.
 - BLACK OXIDE IN ACCORDANCE WITH MIL-DTL-13924, CLASS I.
- CORROSION RESISTANT STEEL - CADMIUM PLATE IN ACCORDANCE WITH AMS-QQ-P-416, TYPE I, CLASS 2.
 - SILVER FLASH IN ACCORDANCE WITH AMS24II.
 - PASSIVATE IN ACCORDANCE WITH AMS2700, METHOD I, TYPE 6 OR TYPE 7, CLASS I.
- HEAT-RESISTANT STEEL - SILVER FLASH IN ACCORDANCE WITH AMS24II.
 - PASSIVATE IN ACCORDANCE WITH AMS2700, METHOD I, TYPE 2 OR TYPE 8, CLASS I.
 - BLACK OXIDE IN ACCORDANCE WITH MIL-DTL-13924, CLASS 3.
 - CADMIUM PLATE IN ACCORDANCE WITH AMS-QQ-P-416, TYPE II, CLASS 2.

CODE: MATERIAL CODE AFTER BASIC NUMBER. "-" = ALLOY STEEL.
 "C" = CORROSION-RESISTANT STEEL.
 "N" = HEAT-RESISTANT STEEL.

FIRST DASH NUMBER DESIGNATES SCREW THREAD SIZE AS TABULATED.

TYPE CODE AFTER FIRST DASH NUMBER:

- "H" = DRILLED HEAD.
 "LE" = SELF-LOCKING MALE THREADED FASTENER.
 (OPTIONAL TYPE LOCKING ELEMENT IN ACCORDANCE WITH NASI283).
 "LL" = SELF LOCKING MALE THREADED FASTENER.
 "LN" = SELF LOCKING MALE THREADED FASTENER.
 (PELLET LOCKING ELEMENT IN ACCORDANCE WITH NASI283, TYPE N).
 "LB" = SELF-LOCKING MALE THREADED FASTENER.
 (PATCH TYPE LOCKING ELEMENT IN ACCORDANCE WITH NASI283, TYPE P).

SECOND DASH NUMBER DESIGNATES NOMINAL LENGTH IN SIXTEENTHS OF AN INCH AS TABULATED.
 TABULATED CODING INDICATES PREFERRED LENGTHS.

ADDITIONAL LENGTHS AVAILABLE ON SPECIAL ORDER, MINIMUM RUN BASIS.

FOR SUCH LENGTHS ADDITIONAL CODING MAY BE ASSIGNED TO LENGTHS IN .0625 INCH INCREMENTS UP TO 3.500 INCHES, AND IN .125 INCH INCREMENTS FROM 3.500 INCHES UP TO AND INCLUDING 6.000 INCHES.

FINISH CODE AFTER SECOND DASH NUMBER:	ALLOY STEEL,	"P" = CADMIUM PLATE NO SUFFIX FOR BLACK OXIDE.
	CORROSION-RESISTANT STEEL,	"P" = CADMIUM PLATE. "S" = SILVER FLASH. NO SUFFIX FOR PASSIVATE.
	HEAT-RESISTANT STEEL,	"S" = SILVER FLASH. "B" = BLACK OXIDE. "P" = CADMIUM PLATE NO SUFFIX FOR PASSIVATE.

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TITLE: MORTORQ® SPIRAL DRIVE SCREW, CAP, SOCKET HEAD, UNDRILLED AND DRILLED, PLAIN AND SELF-LOCKING, ALLOY STEEL, CORROSION-RESISTANT STEEL AND HEAT-RESISTANT STEEL, UNRC-3A AND UNRC-2A

DRAWN	DATE	DRAWING NUMBER
G.DILLING	6/17/10	PMT-1352
CHECKED: G.DILLING	DATE 6/22/10	SHEET 4 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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EXAMPLE: PMTI352-02-8	= .0860-56 UNRC-3A	SCREW, CAP, SOCKET HEAD, ALLOY STEEL, UNDRILLED HEAD, PLAIN, .500 INCH LONG, BLACK OXIDE FINISH.
PMTI352CO4HI2	= .1120-40 UNRC-3A	SCREW, CAP, SOCKET HEAD, CORROSION-RESISTANT STEEL, DRILLED HEAD, PLAIN, .750 INCH LONG, PASSIVATED.
PMTI352-O8LEI6P	= .1640-32 UNRC-3A	SCREW, CAP, SOCKET HEAD, ALLOY STEEL, SELF-LOCKING, OPTIONAL TYPE LOCKING ELEMENT, 1.000 INCH LONG, CADMIUM PLATE, UNDRILLED HEAD.
PMTI352C4LL24P	= .2500-20 UNRC-3A	SCREW, CAP, SOCKET HEAD, CORROSION-RESISTANT STEEL, SELF-LOCKING, LONGITUDINAL STRIP LOCKING ELEMENT, 1.500 INCHES LONG, CADMIUM PLATE, UNDRILLED HEAD.
PMTI352NIOLN32	= .625-II UNRC-3A	SCREW, CAP, SOCKET HEAD, HEAT-RESISTANT STEEL, SELF-LOCKING, PELLET LOCKING ELEMENT, 2.000 INCHES LONG, PASSIVATED, UNDRILLED HEAD.
PMTI352NI2LB36S	= .7500-10 UNRC-3A	SCREW, CAP, SOCKET HEAD, HEAT-RESISTANT STEEL, SELF-LOCKING, PATCH TYPE LOCKING ELEMENT, 2.250 INCHES LONG, SILVER FLASH, UNDRILLED HEAD.
PMTI352N4LB16B	= .2500-20 UNRC-3A	SCREW, CAP SOCKET HEAD, HEAT-RESISTANT STEEL, SELF-LOCKING, PATCH TYPE LOCKING ELEMENT, 1.000 INCH LONG, BLACK OXIDE COATING, UNDRILLED HEAD.

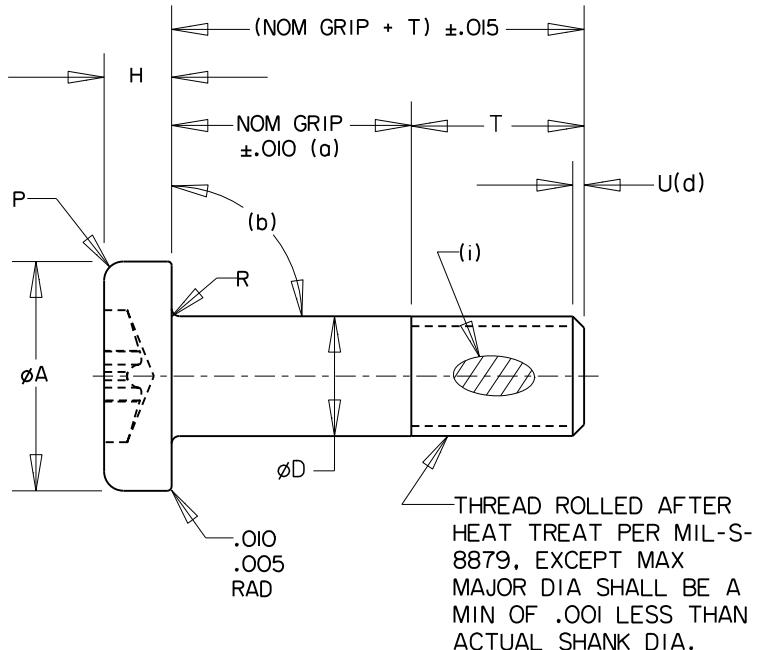
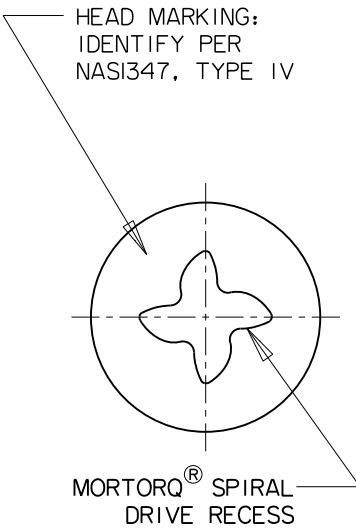
NOTES:

- (1) LOCKING ELEMENT: EXCEPT AS NOTED HEREIN, THE LOCKING ELEMENT WHEN SPECIFIED SHALL BE IN ACCORDANCE WITH MIL-DTL-18240 AND SHALL BE FULLY ENGAGED WHEN USED.
- (2) IDENTIFICATION: MANUFACTURER TO IDENTIFY ALL MINIMUM PACKAGES BY PACKAGE MARKING OF APPLICABLE COMPLETE PMT STANDARD PART NO. IN ACCORDANCE WITH MIL-STD-130.
- (3) DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES SHALL BE IN ACCORDANCE WITH FF-S-86, TYPE VI AND ASME B18.3.
- (4) REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON THE DATE OF INVITATION FOR BID.
- (5) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS SPECIFIED HEREIN.
- (6) ADDITIONAL PART MARKING SHALL BE IN ACCORDANCE WITH FF-S-86.
- (7) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THE APPLICABLE DRAWING OR SPECIFICATION MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.
- (8) REMOVE ALL BURRS AND SHARP EDGES.

PRECUREMENT SPECIFICATION: FF-S-86: UNLESS OTHERWISE SPECIFIED, CAP SCREWS FURNISHED UNDER THIS STANDARD SHALL BE SUBJECT TO IN-PROCESS CONTROL AND/OR END PRODUCT INSPECTION WHICH WILL INSURE MECHANICAL, METALLURGICAL, CHEMICAL AND COATING OR TREATMENT CHARACTERISTICS WHEN SAMPLED IN ACCORDANCE WITH ASQ Z1.4, INSPECTION LEVEL S-I, 1% AQL.

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DRAWN G.DILLING	DATE 6/17/10	DRAWING NUMBER PMT-1352	SHEET 5 OF 5			
CHECKED: G.DILLING	DATE 6/22/10	PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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FIRST DASH NO.	THREAD UNJF-3A	A DIA	D DIA		H	P RAD	R RAD	T	U REF	Z TIR	TENSILE STRENGTH LBS. MIN (g) (8)
			UNPLATED	PLATED							
-3	.1900-32	.374 .360	.1895 .1890	.1895 .1885	.125 .115	.035 .025	.020 .010	.363	.050	.0040	3,180
-4	.2500-28	.492 .477	.2495 .2490	.2495 .2485	.150 .140	.040 .025	.020 .010	.403	.050	.0030	5,790
-5	.3125-24	.612 .597	.3120 .3115	.3120 .3110	.188 .176	.050 .035	.025 .010	.501	.060	.0030	9,260
-6	.3750-24	.740 .722	.3745 .3740	.3745 .3735	.220 .204	.050 .035	.025 .015	.594	.060	.0025	14,000
-7	.4375-20	.813 .795	.4370 .4365	.4370 .4360	.245 .230	.060 .040	.025 .015	.675	.080	.0025	19,000
-8	.5000-20	.925 .905	.4995 .4990	.4995 .4985	.280 .262	.065 .045	.030 .020	.768	.080	.0020	25,600

- (a) GRIP LENGTH IS FROM BEARING SURFACE OF BOLT HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
- (b) BEARING SURFACE OF HEAD SHALL BE PERPENDICULAR TO SHANK WITHIN .003 FIM.
- (c) SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
- (d) POINT SHALL BE FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREADS SHALL NOT EXCEED "U".
- (e) BOLT RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTIONS WITH APPLICABLE MORTORQ DRIVER. APPLY TABULATED TORQUE IN CW DIRECTION WITH MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED, WITHOUT RESTRICTION ON RAISED METAL. RECESS CONFIGURATIONS MAY EXHIBIT DIFFERENT PERFORMANCE, BUT ALL CONFIGURATIONS WILL MEET THE MINIMUM REQUIREMENTS STATED HEREIN. SAMPLING SHALL BE PER ANSI/ASQC Z1.4, 4% AQL LEVEL S-I.
- (f) THESE TENSILE VALUES APPLY TO ALLOY STEEL AND CRES PARTS ONLY. TENSILE VALUES FOR TITANIUM ALLOY ARE LISTED IN MIL-B-871I4.
- (i) PATCH TYPE LOCKING ELEMENT DIMENSIONS PER MIL-F-18240 AND LOCATION PER MSI598I WHEN SPECIFIED BY CODE LETTER "L".

SHEET	1	2	3	4	5
REV	-	-	-	-	-

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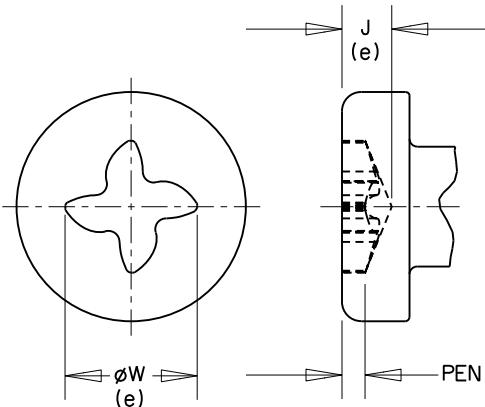
TITLE: MORTORQ® BOLT, FLAT PAN HEAD

DRAWN G.DILLING	DATE 11/30/11	DRAWING NUMBER PMT-1578
CHECKED: G.DILLING	DATE 12/5/11	SHEET 1 OF 5

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MORTORQ® SPIRAL DRIVE RECESS



FIRST DASH NO.	RECESS DRIVE SIZE	J MAX (e)	W DIA (e) REF	GAGE PENETRATION		RECESS TORQUE IN. LBS. MIN (e)	RAISED METAL IN. (e) MAX
				MAX	MIN		
-3	MT-1	.087	.2405	.039	.030	60	.005
-4	MT-1	.098	.2405	.050	.041	140	.005
-5	MT-3	.139	.3537	.067	.058	220	.005
-6	MT-4	.160	.4285	.072	.057	520	.006
-7	MT-4	.172	.4285	.084	.069	750	.007
-8	MT-5	.206	.5063	.102	.077	900	.008

MATERIAL: ALLOY STEEL - 4140 (UNS G41400) PER MIL-S-5626, 4340 (UNS G43400) PER AMS6415, E4340 (UNS G43406) PER MIL-S-5000 OR 8740 (UNS G87400) PER MIL-S-6049.

CRES - A286 (UNS S66286) CONFORMING TO THE CHEMISTRY OF AMS5731, AMS5732, AMS5737 OR AMS5853.

TITANIUM ALLOY -6AL-4V (UNS R56400) PER AMS4928 OR AMS4967.
LOCKING ELEMENT NYLON OR EQUIVALENT.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER MIL-H-6875.
ALLOY STEEL: 160-180 KSI Ftu PER MIL-H-6875.
CRES: 160-190 KSI Ftu. PRECIPITATION HARDENING PER AMS5853. (8)
TITANIUM: 160-180 KSI Ftu PER AMS4928 OR AMS4967.

FINISH: PASSIVATE PER QQ-P-35 OR CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, (SEE "CODE"). POST-PLATE HYDROGEN EMBRITTLEMENT BAKING AND TESTING PER QQ-P-416 ARE NOT REQUIRED FOR A286 MATERIAL.

CODE: FIRST DASH NUMBER INDICATES NOMINAL DIAMETER IN 16THS, SECOND DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCREMENTS. (CONVERTED TO THREE DECIMAL PLACES PER ANSI Y14.5).

MATERIAL: CODE LETTER "A" FOLLOWING BASIC PART NUMBER INDICATES ALLOY STEEL.
CODE LETTER "C" FOLLOWING BASIC PART NUMBER INDICATES CRES.
CODE LETTER "V" FOLLOWING BASIC PART NUMBER INDICATES TITANIUM.

FINISH: ALLOY STEEL: TYPE II, CLASS 2, CADMIUM PLATE
CRES: NO CODE LETTER FOLLOWING SECOND DASH NUMBER INDICATES PASSIVATE. CODE LETTER "P" FOLLOWING SECOND DASH NUMBER INDICATES TYPE II, CLASS 2 CADMIUM PLATE.
TITANIUM: NO FINISH.

RECESS: CODE LETTER "M" FOLLOWING FIRST DASH NUMBER INDICATES MORTORQ RECESS.

SELF-LOCKING: CODE LETTER "L" FOLLOWING SECOND DASH NUMBER DESIGNATES A SELF-LOCKING BOLT.

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TITLE:

MORTORQ® BOLT, FLAT PAN HEAD

DRAWN

G.DILLING

DATE

11/30/11

DRAWING NUMBER

PMT-1578

CHECKED:

G.DILLING

DATE

12/5/11

SHEET 2 OF 5

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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EXAMPLE OF PART NUMBER:

PMTI578C4M5	.2500-28 CRES BOLT: .312 GRIP LENGTH; PASSIVATED; MORTORQ SPIRAL DRIVE RECESS.
PMTI578C4M5P	.2500-28 CRES BOLT: .312 GRIP LENGTH; TYPE II, CLASS 2 CADMIUM PLATE; MORTORQ SPIRAL DRIVE RECESS.
PMTI578V4M5L	.2500-28 TITANIUM BOLT: .312 GRIP LENGTH; SELF-LOCKING, MORTORQ SPIRAL DRIVE RECESS.

- NOTES:
1. CONCENTRICITY: "A" DIA TO "D" DIA WITHIN .008 FIM.
"D" DIA TO THREAD PITCH DIA. WITHIN .0045 FIM FOR PMTI578-3 THRU PMTI578-5 AND WITHIN .006 FIM FOR PMTI578-6 AND LARGER.
 2. SURFACE TEXTURE: SEE PROCUREMENT SPECIFICATION.
 3. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
 4. DIMENSIONS IN INCHES AND TO BE MET AFTER PLATING (WHEN REQUIRED).
 5. THE FULL LENGTH OF THE SHANK AND THREADS SHALL BE PROTECTED FROM ABRASIONS AND CHAFING DURING HANDLING, TRANSPORTATION, AND STORAGE, INCLUDE TITANIUM PARTS .190 DIAMETER AND ABOVE; ON OTHER MATERIALS INCLUDE .250 DIAMETER AND ABOVE.
 6. THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE VALUE OF THE FINISHED PART, BUT THIS SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED MINIMUM TENSILE VALUE.

PROCUREMENT
SPECIFICATION: MIL-B-87114 EXCEPT AS NOTED. TENSILE STRENGTH AND RECESS TORQUE VALUES AS TABULATED HEREIN. SELF-LOCKING REQUIREMENTS: MIL-F-18240 AND MSI598I. SHIPPING NOTICE SHALL IDENTIFY SUPPLIER OF BOLT AND LOCKING ELEMENT SEPARATELY. TENSILE FATIGUE LIFE TESTS APPLY TO TITANIUM ONLY. USE NAS621 FOR FATIGUE LOADS. COLD WORKING OF HEAD TO SHANK FILLET IS NOT REQUIRED ON ALLOY STEEL OR CRES BOLTS.

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TITLE:

MORTORQ® BOLT, FLAT PAN HEAD

DRAWN

G.DILLING

DATE

11/30/11

DRAWING NUMBER

PMT-1578

CHECKED:

G.DILLING

DATE

12/5/11

SHEET 3 OF 5

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GRIP DASH NO	GRIP ±.010	LENGTH ±.015						GRIP ±.010	GRIP DASH NO
		PMTI578-3	PMTI578-4	PMTI578-5	PMTI578-6	PMTI578-7	PMTI578-8		
2	.125	.487	.528	---	---	---	---	.125	2
3	.187	.549	.590	---	---	---	---	.187	3
4	.250	.613	.653	.751	.844	.925	1.018	.250	4
5	.312	.675	.715	.813	.906	.987	1.080	.312	5
6	.375	.738	.778	.876	.969	1.050	1.143	.375	6
7	.438	.801	.841	.939	1.032	1.113	1.206	.438	7
8	.500	.863	.903	1.001	1.094	1.175	1.268	.500	8
9	.562	.925	.965	1.063	1.156	1.237	1.330	.562	9
10	.625	.988	1.028	1.126	1.219	1.300	1.393	.625	10
11	.688	1.051	1.091	1.189	1.282	1.363	1.456	.688	11
12	.750	1.113	1.153	1.251	1.344	1.425	1.518	.750	12
13	.812	1.175	1.215	1.313	1.406	1.487	1.580	.812	13
14	.875	1.238	1.278	1.376	1.469	1.550	1.643	.875	14
15	.938	1.301	1.341	1.439	1.532	1.613	1.706	.938	15
16	1.000	1.363	1.403	1.501	1.594	1.675	1.768	1.000	16
17	1.062	1.425	1.465	1.563	1.656	1.737	1.830	1.062	17
18	1.125	1.488	1.528	1.626	1.719	1.800	1.893	1.125	18
19	1.188	1.551	1.591	1.689	1.782	1.863	1.956	1.188	19
20	1.250	1.613	1.653	1.751	1.844	1.925	2.018	1.250	20
21	1.312	1.675	1.715	1.813	1.906	1.987	2.080	1.312	21
22	1.375	1.738	1.778	1.876	1.969	2.050	2.143	1.375	22
23	1.438	1.801	1.841	1.939	2.032	2.113	2.206	1.438	23
24	1.500	1.863	1.903	2.001	2.094	2.175	2.268	1.500	24
25	1.562	1.925	1.965	2.063	2.156	2.237	2.330	1.562	25
26	1.625	1.988	2.028	2.126	2.219	2.300	2.393	1.625	26
27	1.688	2.051	2.091	2.189	2.282	2.363	2.456	1.688	27
28	1.750	2.113	2.153	2.251	2.344	2.425	2.518	1.750	28
29	1.812	2.175	2.215	2.313	2.406	2.487	2.580	1.812	29
30	1.875	2.238	2.278	2.376	2.469	2.550	2.643	1.875	30
31	1.938	2.301	2.341	2.439	2.532	2.613	2.706	1.938	31
32	2.000	2.363	2.403	2.501	2.594	2.675	2.768	2.000	32
34	2.125	2.488	2.528	2.626	2.719	2.800	2.893	2.125	34
36	2.250	2.613	2.653	2.751	2.844	2.925	3.018	2.250	36
38	2.375	2.738	2.778	2.876	2.969	3.050	3.143	2.375	38
40	2.500	2.863	2.903	3.001	3.094	3.175	3.268	2.500	40
42	2.625	2.988	3.028	3.126	3.219	3.300	3.393	2.625	42
44	2.750	3.113	3.153	3.251	3.344	3.425	3.518	2.750	44
46	2.875	3.238	3.278	3.376	3.469	3.550	3.643	2.875	46
48	3.000	3.363	3.403	3.501	3.594	3.675	3.768	3.000	48
50	3.125	3.488	3.528	3.626	3.719	3.800	3.893	3.125	50
52	3.250	3.613	3.653	3.751	3.844	3.925	4.018	3.250	52
54	3.375	3.738	3.778	3.876	3.969	4.050	4.143	3.375	54

REVISION

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TITLE:

MORTORQ® BOLT, FLAT PAN HEAD

DRAWN

G.DILLING

DATE

11/30/11

DRAWING NUMBER

PMT-1578

CHECKED:

G.DILLING

DATE

12/5/11

SHEET 4 OF 5

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

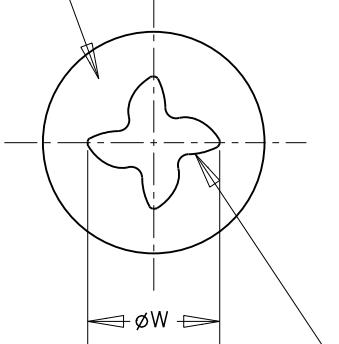
GRIP DASH NO	GRIP ±.010	LENGTH ±.015						GRIP ±.010	GRIP DASH NO
		PMTI578-3	PMTI578-4	PMTI578-5	PMTI578-6	PMTI578-7	PMTI578-8		
56	3.500	3.863	3.903	4.001	4.094	4.175	4.268	3.500	56
58	3.625	3.988	4.028	4.126	4.219	4.300	4.393	3.625	58
60	3.750	4.113	4.153	4.251	4.344	4.425	4.518	3.750	60
62	3.875	4.238	4.278	4.376	4.469	4.550	4.643	3.875	62
64	4.000	4.363	4.403	4.501	4.594	4.675	4.768	4.000	64
66	4.125	4.488	4.528	4.626	4.719	4.800	4.893	4.125	66
68	4.250	4.613	4.653	4.751	4.844	4.925	5.018	4.250	68
70	4.375	4.738	4.778	4.876	4.969	5.050	5.143	4.375	70
72	4.500	4.863	4.903	5.001	5.094	5.175	5.268	4.500	72
74	4.625	4.988	5.028	5.126	5.219	5.300	5.393	4.625	74
76	4.750	5.113	5.153	5.251	5.344	5.425	5.518	4.750	76
78	4.875	5.238	5.278	5.376	5.469	5.550	5.643	4.875	78
80	5.000	5.363	5.403	5.501	5.594	5.675	5.768	5.000	80
82	5.125	5.488	5.528	5.626	5.719	5.800	5.893	5.125	82
84	5.250	5.613	5.653	5.751	5.844	5.925	6.016	5.250	84
86	5.375	5.738	5.778	5.876	5.969	6.050	6.143	5.375	86
88	5.500	5.863	5.903	6.001	6.094	6.175	6.268	5.500	88
90	5.625	5.988	6.028	6.126	6.219	6.300	6.393	5.625	90
92	5.750	6.113	6.153	6.251	6.344	6.425	6.518	5.750	92
94	5.875	6.238	6.278	6.376	6.469	6.550	6.643	5.875	94
96	6.000	6.363	6.403	6.501	6.594	6.675	6.768	6.000	96

NOTE: GRIP EQUALS GRIP DASH NUMBER TIMES .0625 (CONVERTED TO 3 DECIMAL PLACES PER ANSI Y14.5) LENGTH EQUALS GRIP PLUS "T" (SEE SHEET 1).

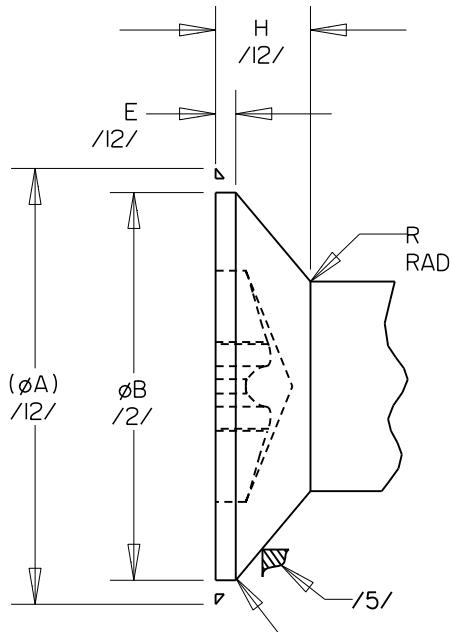
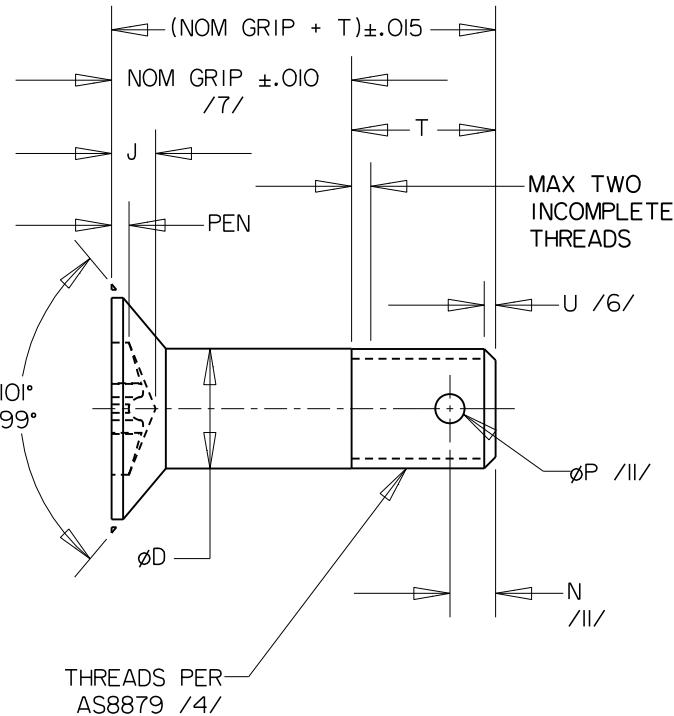
REVISION

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		DRAWN	G.DILLING	DATE	II/30/11	DRAWING NUMBER	
		CHECKED:	G.DILLING	DATE	I2/5/11	PMT-1578	
		PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326					
SHEET 5 OF 5							
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY							

HEAD MARKING:
IDENTIFY PER
NASI347, TYPE IV



MORTORQ® RECESS
SEE TABLE II
/15/ /16/



ENLARGED VIEW
OF HEAD

SHEET	1	2	3	4	5	6	7
REV	3	5	5	2	3	3	1

REVISION REV 1 -7/31/07 REV 2 -9/04/09 REV 3 -8/6/12

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TITLE:

95 KSI SHEAR
MORTORQ® BOLT, 100° FLUSH HEAD

DRAWN
G.LaMONICA

DATE
4/18/03

DRAWING NUMBER

PMT-1580

CHECKED
G.LaMONICA

DATE
4/18/03

SHEET 1 OF 7

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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TABLE I

DIA. DASH NO.	THREAD UNJF-3A /4/	(ØA) /12/	ØB MIN /2/	ØD		(ØE) /12/	(H) /12/	N /11/	P DIA /11/	R RAD	(T)	(U) /6/	Y TOL /2/	Z TOL /3/	TENSILE STRENGTH /13/ /14/ LBS MIN
				PLATED	UNPLATED										
-3	.1900-32	.3813	.339	.1895 .1885	.1895 .1890	.015	.083	.126 .106	.080 .070	.035 .015	.363	.050	.005	.0040	3,180
-4	.2500-28	.5066	.464	.2495 .2485	.2495 .2490	.015	.111	.126 .106	.086 .076	.035 .015	.403	.050	.006	.0030	5,790
-5	.3125-24	.6335	.578	.3120 .3110	.3120 .3115	.015	.140	.130 .110	.086 .076	.045 .025	.501	.060	.007	.0030	9,260
-6	.3750-24	.7604	.717	.3745 .3735	.3745 .3740	.015	.167	.130 .110	.116 .106	.045 .025	.594	.060	.008	.0025	14,000
-7	.4375-20	.8884	.826	.4370 .4360	.4370 .4365	.022	.195	.134 .114	.116 .106	.055 .035	.675	.080	.009	.0025	19,000
-8	.5000-20	1.0139	.951	.4995 .4985	.4995 .4990	.022	.222	.134 .114	.116 .106	.055 .035	.768	.080	.010	.0020	25,600
-9	.5625-18	1.1408	1.071	.5615 .5605	.5615 .5610	.025	.250	.134 .114	.151 .141	.055 .035	.881	.090	.010	.0020	32,400
-10	.6250-18	1.2723	1.201	.6240 .6230	.6240 .6235	.025	.280	.134 .114	.151 .141	.055 .035	.981	.090	.010	.0020	40,900

TABLE II

DIA. DASH NO.	RECESS NO.	J MAX	W DIA NOM. REF	GAGE PENETRATION		RECESS TORQUE IN-LBS. MIN	RAISED METAL MAX
				MAX	MIN		
-3	MT-1	.082	.2405	.027	.020	60	.005
-4	MT-1	.095	.2405	.047	.038	140	.005
-5	MT-2	.117	.3080	.055	.046	220	.005
-6	MT-3	.142	.3537	.070	.061	520	.006
-7	MT-4	.168	.4285	.080	.065	750	.007
-8	MT-5	.186	.5063	.082	.067	900	.008
-9	MT-5	.206	.5063	.102	.077	1300	.009
-10	MT-6	.233	.5938	.110	.085	2100	.010

REVISION	REV 1 -7/31/07	REV 2 -7/02/08	REV 3 -09/04/09	REV 4 -10/21/11	REV 5 -8/6/12
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TITLE: 95 KSI SHEAR
MORTORQ® BOLT, 100° FLUSH HEAD

DRAWN G.LaMONICA	DATE 4/18/03	DRAWING NUMBER
---------------------	-----------------	----------------

CHECKED: G.LaMONICA	DATE 4/18/03	PMT-1580
------------------------	-----------------	----------

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

SHEET 2 OF 7

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

MATERIAL: ALLOY STEEL: 4140 (UNS G41400) PER AMS6349 OR AMS6382.
 4340 (UNS G43406) PER AMS6484 OR AMS6415.
 8740 (UNS G87400) PER AMS6322, AMS6325 OR AMS6327.

CRES: A286 (UNS S66286) SHALL CONFORM TO THE CHEMISTRY OF AMS573I,
 AMS5732, AMS5737 OR AMS5853.

TITANIUM ALLOY: 6AL-4V (UNS R56400) PER AMS4928 OR AMS4967.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER AMS2759 FOR ALLOY
 STEEL AND CRES AND AMS-H-81200 OR AMS280I FOR TITANIUM.

ALLOY STEEL: 160-180 KSI FTU
 CRES: 160-190 KSI FTU /I/
 TITANIUM: 160 KSI FTU MIN

FINISH: ALLOY STEEL: CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2.

CRES: PASSIVATE IN ACCORDANCE WITH AMS2700 METHOD I, CLASS 4 OR
 CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2. (SEE CODE
 FOR FINISH)

TITANIUM: NONE OR ALUMINUM COATING PER NAS4006. (SEE CODE FOR FINISH)

CODE: THE DIAMETER DASH NUMBER FOLLOWING THE MATERIAL CODE DESIGNATES THE NOMINAL DIAMETER
 IN .0625 INCH INCREMENTS AND THE GRIP DASH NUMBER FOLLOWING THE RECESS CODE DESIGNATES
 THE GRIP LENGTH IN .0625 INCH INCREMENTS. IF MORE THAN ONE CODE LETTER IS USED IN THE
 PART NUMBER FOLLOWING THE GRIP DASH NUMBER, ARRANGE THE CODE LETTERS ALPHABETICALLY.

MATERIAL: CODE LETTER "A" FOLLOWING BASIC PART NUMBER INDICATES ALLOY STEEL.
 CODE LETTER "C" FOLLOWING BASIC PART NUMBER INDICATES CRES A286.
 CODE LETTER "V" FOLLOWING BASIC PART NUMBER INDICATES TITANIUM 6AL-4V.

FINISH: ALLOY STEEL: NO CODE LETTER FOLLOWING DIAMETER DASH NUMBER INDICATES
 CADMIUM PLATE.
 CRES: NO CODE LETTER FOLLOWING GRIP DASH NUMBER INDICATES PASSIVATE.
 CODE LETTER "P" FOLLOWING GRIP DASH NUMBER INDICATES CADMIUM
 PLATE.
 TITANIUM: NO CODE FOLLOWING GRIP DASH NUMBER INDICATES NO FINISH.
 CODE LETTER "G" FOLLOWING GRIP DASH NUMBER INDICATES ALUMINUM
 COAT.

RECESS: CODE LETTER "M" FOLLOWING FIRST DASH NUMBER INDICATES MORTORQ RECESS.

DRILL: CODE LETTER "D" FOLLOWING THE GRIP DASH NUMBER INDICATES DRILLED THREADS.

OVERSIZE: CODE LETTER "X" AND "Y" FOLLOWING THE GRIP DASH NUMBER INDICATES REPLACEMENT
 OVERSIZE REPAIR BOLT. (SEE LAST SHEET)

EXAMPLE OF PART NUMBER:

PMTI580C4M5 = .2500-28 CRES A286 BOLT, .312 GRIP LENGTH, PASSIVATED, MORTORQ RECESS.
 PMTI580C4M5P = .2500-28 CRES A286 BOLT, .312 GRIP LENGTH, CADMIUM PLATE, MORTORQ
 RECESS.
 PMTI580V4M5D = .2500-28 TITANIUM BOLT, .312 GRIP LENGTH, MORTORQ RECESS, DRILLED
 THREADS.
 PMTI580C4M5DP = .2500-28 CRES A286 BOLT, .312 GRIP LENGTH, CADMIUM PLATE, MORTORQ
 RECESS, DRILLED THREADS.
 PMTI580V4M5G = .2500-28 TITANIUM BOLT, .312 GRIP LENGTH, MORTORQ RECESS, ALUMINUM
 COATING.
 PMTI580A4M5 = .2500-28 ALLOY STEEL BOLT, .312 GRIP LENGTH, CADMIUM PLATE, MORTORQ
 RECESS.

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 BELLINGHAM, MASSACHUSETTS U.S.A.

TITLE: 95 KSI SHEAR
 MORTORQ® BOLT, 100° FLUSH HEAD

DRAWN G.LaMONICA	DATE 4/18/03	DRAWING NUMBER PMT-1580
CHECKED: G.LaMONICA	DATE 4/18/03	SHEET 3 OF 7
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
 AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

REVISION REV 1 -7/31/07 REV 2 -5/14/09 REV 3 -8/25/09 REV 4 -9/04/09 REV 5 -8/6/12

PROCUREMENT SPECIFICATION:

NAS4002 FOR ALLOY STEEL, NAS4003 FOR CRES AND NAS4004 FOR TITANIUM EXCEPT AS NOTED.
 COLD WORKING OF HEAD TO SHANK FILLET AND FATIGUE TESTING IS NOT REQUIRED ON ALLOY
 STEEL OR CRES A286 BOLTS. THE HEAD TO SHANK FILLET RADIUS OF TITANIUM BOLTS SHALL BE
 COLD WORKED AND THE BOLTS SHALL BE TENSION FATIGUED IN ACCORDANCE WITH NAS4004.

TABLE III - GRIP AND LENGTH DIMENSIONS /23/ /24/

GRIP DASH NO.	NOMINAL GRIP	LENGTH FOR DIA DASH NUMBERS LISTED								NOMINAL GRIP	GRIP DASH NO.
		3	4	5	6	7	8	9	10		
2	.125	.487	.528							.125	2
3	.187	.549	.590	.688						.187	3
4	.250	.613	.653	.751	.844	.925	1.018			.250	4
5	.312	.675	.715	.813	.906	.987	1.080			.312	5
6	.375	.738	.778	.876	.969	1.050	1.143	1.256	1.356	.375	6
7	.438	.801	.841	.939	1.032	1.113	1.206	1.319	1.419	.438	7
8	.500	.863	.903	1.001	1.094	1.175	1.268	1.381	1.481	.500	8
9	.562	.925	.965	1.063	1.156	1.237	1.330	1.443	1.543	.562	9
10	.625	.988	1.028	1.126	1.219	1.300	1.393	1.506	1.606	.625	10
11	.688	1.051	1.091	1.189	1.282	1.363	1.456	1.569	1.669	.688	11
12	.750	1.113	1.153	1.251	1.344	1.425	1.518	1.631	1.731	.750	12
13	.812	1.175	1.215	1.313	1.406	1.487	1.580	1.693	1.793	.812	13
14	.875	1.238	1.278	1.376	1.469	1.550	1.643	1.756	1.856	.875	14
15	.938	1.301	1.341	1.439	1.532	1.613	1.706	1.819	1.919	.938	15
16	1.000	1.363	1.403	1.501	1.594	1.675	1.768	1.881	1.981	1.000	16
17	1.062	1.425	1.465	1.563	1.656	1.737	1.830	1.943	2.043	1.062	17
18	1.125	1.488	1.528	1.626	1.719	1.800	1.893	2.006	2.106	1.125	18
19	1.188	1.551	1.591	1.689	1.782	1.863	1.956	2.069	2.169	1.188	19
20	1.250	1.613	1.653	1.751	1.844	1.925	2.018	2.131	2.231	1.250	20
21	1.312	1.675	1.715	1.813	1.906	1.987	2.080	2.193	2.293	1.312	21
22	1.375	1.738	1.778	1.876	1.969	2.050	2.143	2.256	2.356	1.375	22
23	1.438	1.801	1.841	1.939	2.032	2.113	2.206	2.319	2.419	1.438	23
24	1.500	1.863	1.903	2.001	2.094	2.175	2.268	2.381	2.481	1.500	24
25	1.562	1.925	1.965	2.063	2.156	2.237	2.330	2.443	2.543	1.562	25
26	1.625	1.988	2.028	2.126	2.219	2.300	2.393	2.506	2.606	1.625	26
27	1.688	2.051	2.091	2.189	2.282	2.363	2.456	2.569	2.669	1.688	27
28	1.750	2.113	2.153	2.251	2.344	2.425	2.518	2.631	2.731	1.750	28
29	1.812	2.175	2.215	2.313	2.406	2.487	2.580	2.693	2.793	1.812	29
30	1.875	2.238	2.278	2.376	2.469	2.550	2.643	2.756	2.856	1.875	30
31	1.938	2.301	2.341	2.439	2.532	2.613	2.706	2.819	2.919	1.938	31
32	2.000	2.363	2.403	2.501	2.594	2.675	2.768	2.881	2.981	2.000	32
34	2.125	2.488	2.528	2.626	2.719	2.800	2.893	3.006	3.106	2.125	34
36	2.250	2.613	2.653	2.751	2.844	2.925	3.018	3.131	3.231	2.250	36
38	2.375	2.738	2.778	2.876	2.969	3.050	3.143	3.256	3.356	2.375	38
40	2.500	2.863	2.903	3.001	3.094	3.175	3.268	3.381	3.481	2.500	40
42	2.625	2.988	3.028	3.126	3.219	3.300	3.393	3.506	3.606	2.625	42
44	2.750	3.113	3.153	3.251	3.344	3.425	3.518	3.631	3.731	2.750	44
46	2.875	3.238	3.278	3.376	3.469	3.550	3.643	3.756	3.856	2.875	46
48	3.000	3.363	3.403	3.501	3.594	3.675	3.768	3.881	3.981	3.000	48
50	3.125	3.488	3.528	3.626	3.719	3.800	3.893	4.006	4.106	3.125	50
52	3.250	3.613	3.653	3.751	3.844	3.925	4.018	4.131	4.231	3.250	52
54	3.375	3.738	3.778	3.876	3.969	4.050	4.143	4.256	4.356	3.375	54

REVISION REV : 7/31/07 REV 2 -8/6/12

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MORTORQ® BOLT, 100° FLUSH HEAD

DRAWN G.LaMONICA DATE 4/18/03 DRAWING NUMBER

CHECKED G.LaMONICA DATE 4/18/03 PMT-1580

SHEET 4 OF 7
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
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TABLE III - GRIP AND LENGTH DIMENSIONS (CONT'D) /23/ /24/

GRIP DASH NO.	NOMINAL GRIP	LENGTH FOR DIA DASH NUMBERS LISTED								NOMINAL GRIP	GRIP DASH NO.
		3	4	5	6	7	8	9	10		
56	3.500	3.863	3.903	4.001	4.094	4.175	4.268	4.381	4.481	3.500	56
58	3.625	3.988	4.028	4.126	4.219	4.300	4.393	4.506	4.606	3.625	58
60	3.750	4.113	4.153	4.251	4.344	4.425	4.518	4.631	4.731	3.750	60
62	3.875	4.238	4.278	4.376	4.469	4.550	4.643	4.756	4.856	3.875	62
64	4.000	4.363	4.403	4.501	4.594	4.675	4.768	4.881	4.981	4.000	64
66	4.125	4.488	4.528	4.626	4.719	4.800	4.893	5.006	5.106	4.125	66
68	4.250	4.613	4.653	4.751	4.844	4.925	5.018	5.131	5.231	4.250	68
70	4.375	4.738	4.778	4.876	4.969	5.050	5.143	5.256	5.356	4.375	70
72	4.500	4.863	4.903	5.001	5.094	5.175	5.268	5.381	5.481	4.500	72
74	4.625	4.988	5.028	5.126	5.219	5.300	5.393	5.506	5.606	4.625	74
76	4.750	5.113	5.153	5.251	5.344	5.425	5.518	5.631	5.731	4.750	76
78	4.875	5.238	5.278	5.376	5.469	5.550	5.643	5.756	5.856	4.875	78
80	5.000	5.363	5.403	5.501	5.594	5.675	5.768	5.881	5.981	5.000	80
82	5.125	5.488	5.528	5.626	5.719	5.800	5.893	6.006	6.106	5.125	82
84	5.250	5.613	5.653	5.751	5.844	5.925	6.018	6.131	6.231	5.250	84
86	5.375	5.738	5.778	5.876	5.969	6.050	6.143	6.256	6.356	5.375	86
88	5.500	5.863	5.903	6.001	6.094	6.175	6.268	6.381	6.481	5.500	88
90	5.625	5.988	6.028	6.126	6.219	6.300	6.393	6.506	6.606	5.625	90
92	5.750	6.113	6.153	6.251	6.344	6.425	6.518	6.631	6.731	5.750	92
94	5.875	6.238	6.278	6.376	6.469	6.550	6.643	6.756	6.856	5.875	94
96	6.000	6.363	6.403	6.501	6.594	6.675	6.768	6.881	6.981	6.000	96

NOTES:

- (I) CONCENTRICITY: CONICAL SURFACE OF THE HEAD TO ØD SHALL BE WITHIN .003 FIM. ØD TO THREAD PITCH DIAMETER SHALL BE WITHIN .0045 FIM FOR DIA DASH NUMBER -3 THRU -5, AND SHALL BE WITHIN .006 FIM FOR DIA DASH NUMBER -6 AND LARGER.
- /2/ THE HEAD EDGE OUT OF ROUNDNESS SHALL NOT EXCEED "Y" FIM.
- /3/ THE SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
- /4/ THE THREADS SHALL BE ROLLED AFTER HEAT TREATMENT IN ACCORDANCE WITH AS8879 EXCEPT THAT THE THREAD MAJOR DIAMETER SHALL BE .001 INCH LESS THAN THE ACTUAL SHANK DIAMETER.
- /5/ FLUSHNESS GAGE PROTRUSION SHALL BE INSPECTED PER NAS9800.
- /6/ BOLT POINT END SHALL BE RELATIVELY FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREAD SHALL NOT EXCEED "U".
- /7/ GRIP LENGTHS SHALL BE MEASURED FROM THE TOP OF BOLT HEAD TO THE END OF THE FULL CYLINDRICAL PORTION OF THE SHANK.
- (8) DIMENSIONS IN INCHES AND APPLY AFTER FINISH UNLESS OTHERWISE SPECIFIED.
- (9) SURFACE ROUGHNESS: HEAD BEARING SURFACE, HEAD TO SHANK FILLET, SHANK AND THREADS: 32 MICROINCHES Ra; ALL OTHER SURFACES: I25 MICROINCHES Ra PER ASME B46.1.
- (10) REMOVE ALL BURRS AND SHARP EDGES.
- /11/ DRILL COTTER PIN HOLE ØP WHEN SPECIFIED BY THE PART NUMBER. THE COTTER PIN HOLE CENTERLINE SHALL BE WITHIN .010 AND PERPENDICULAR WITHIN 2° OF THE BOLT CENTERLINE. A COUNTERSINK IS OPTIONAL.

REVISION REV : 7/31/07 REV 2: 9/04/09 REV 3: 8/6/12

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TITLE:

95 KSI SHEAR
MORTORQ® BOLT, 100° FLUSH HEAD

DRAWN

G.LaMONICA

DATE

4/18/03

DRAWING NUMBER

PMT-1580

CHECKED:

G.LaMONICA

DATE

4/18/03

SHEET 5 OF 7

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

NOTES CONTINUED:

- /12/ ØA, E, AND H ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. ØA, E AND H ARE CALCULATED LIMITS RESULTING FROM THE ACCUMULATED TOLERANCES ON THE SHANK DIAMETER, HEAD ANGLE AND THE APPLICABLE HEAD PROTRUSION AND GAGE DIAMETER AS DEFINED IN NAS9800.
- /13/ IF REQUIRED, TENSILE TESTING OF BOLTS REQUIRING CROSS DRILLED THREADS SHALL BE PERFORMED PRIOR TO DRILLING AND THE APPLICATION OF PLATING AND/OR COATINGS. WHEN BOLTS HAVE BEEN DRILLED, STRENGTH MAY BE VERIFIED BY SHEAR TESTING, IN LIEU OF TENSILE TESTING, IN ACCORDANCE WITH NASM1312. USERS SHOULD BE AWARE THAT FASTENERS WITH CROSS DRILLED THREADS MAY EXHIBIT A REDUCTION IN THE FASTENER TENSILE STRENGTH.
- /14/ TENSILE STRENGTH OF A286 BOLTS: THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE STRENGTH OF THE FINISHED PART, BUT ANY PART (TYPE I, II, OR III) AS LISTED IN NAS4003 SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED TYPE I MINIMUM TENSILE VALUES AS STATED IN NAS4003, TABLE III.
- /15/ MORTORQ SPIRAL DRIVE RECESS ARE APPLICABLE TO ALL BOLT SIZES.
- /16/ MORTORQ BOLT RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTION WITH DRIVER. APPLY TABULATED TORQUE IN CW DIRECTION WITH A MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUE. APPLY TABULATED TORQUE IN CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS ATTAINED WITHOUT RESTRICTION ON RAISED METAL. RECESS CONFIGURATION MAY EXHIBIT DIFFERENT PERFORMANCE, BUT BOTH CONFIGURATIONS WILL MEET THE MINIMUM REQUIREMENTS STATED HEREIN. SAMPLING SHALL BE PER ANSI/ASQC Z1.4 4 PERCENT AQL LEVEL S-1.
- (17) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THIS PART STANDARD MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.
- (18) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
- (19) FOR A286 CRES, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER ASTM A342/A342M, TEST METHOD 3.
- (20) UNLESS OTHERWISE SPECIFIED HEREIN, REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF MANUFACTURE. HOWEVER, EXISTING MATERIAL INVENTORY CERTIFIED TO A PREVIOUS REVISION OF THE APPLICABLE MATERIAL SPECIFICATIONS(S) IS ACCEPTABLE FOR USE UNTIL DEPLETION.
- (21) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
- (22) INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY THE USE OF WHOLE DASH NUMBERS ONLY.
- /23/ TOLERANCES UNLESS OTHERWISE SPECIFIED: DECIMALS: $\pm .030$, ANGLES: $\pm 1^\circ$.
- /24/ GRIP EQUALS GRIP DASH NUMBER TIMES .0625 (CONVERTED TO 3 DECIMAL PLACES PER ASME Y14.5M-1994).

REVISION REV 1: 7/31/07 REV 2: 5/14/09 REV 3: 8/6/12

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RESTRICTED USAGE FOR REPAIR WORK ONLY
.0156 AND .0312 OVERSIZE SHANK FOR REPLACEMENT OF BOLTS SHOWN ON SHEET I

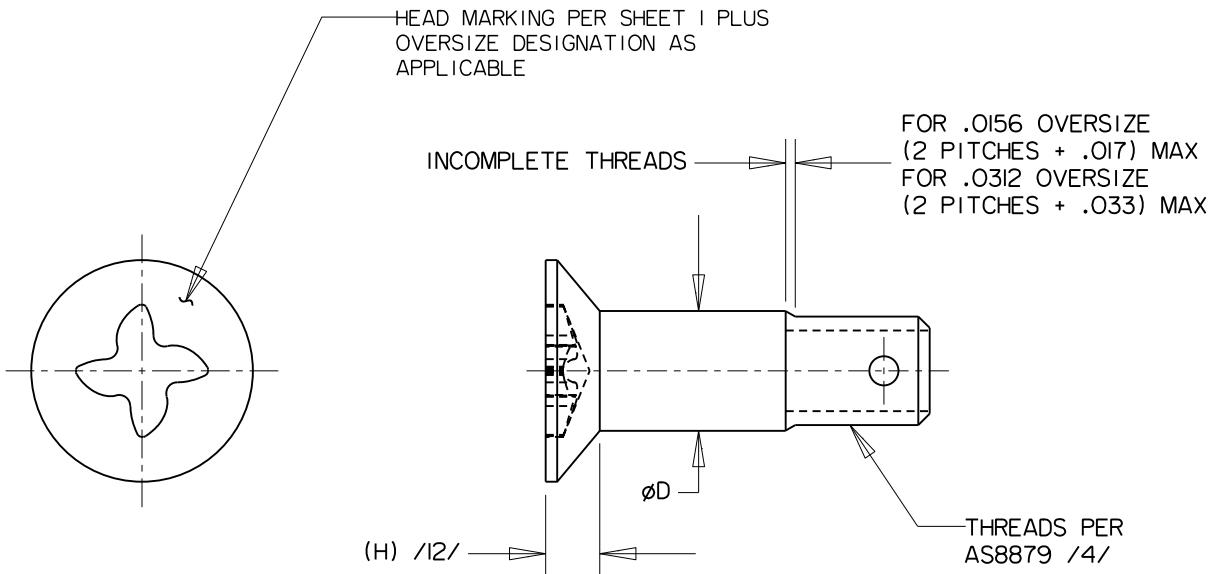


TABLE IV - OVERSIZE DIMENSIONS

.0156 OVERSIZE			(H) /12/	.0312 OVERSIZE			(H) /12/
OVERSIZE DIA. DASH NO.	ØD			OVERSIZE DIA. DASH NO.	ØD		
	UNPLATED	PLATED		UNPLATED	PLATED		
3() () X	.2051 .2046	.2051 .2041	.073	3() () Y	.2207 .2202	.2207 .2197	.067
4() () X	.2651 .2646	.2651 .2641	.099	4() () Y	.2807 .2802	.2807 .2797	.095
5() () X	.3276 .3271	.3276 .3266	.126	5() () Y	.3432 .3427	.3432 .3422	.120
6() () X	.3901 .3896	.3901 .3891	.153	6() () Y	.4057 .4052	.4057 .4047	.147
7() () X	.4526 .4521	.4526 .4516	.181	7() () Y	.4682 .4677	.4682 .4672	.175
8() () X	.5151 .5146	.5151 .5141	.206	8() () Y	.5307 .5302	.5307 .5297	.202
9() () X	.5771 .5766	.5771 .5761	.235	9() () Y	.5927 .5922	.5927 .5917	.229
10() () X	.6396 .6391	.6396 .6386	.268	10() () Y	.6552 .6547	.6552 .6542	.257

(a) SEE SHEETS I THRU 6 FOR MATERIAL, FINISH, PROCUREMENT INFORMATION AND DIMENSIONS NOT SHOWN.

(b) MINIMUM TENSILE LOADS FOR "X" AND "Y" CODED PARTS ARE 85% OF THE STANDARD LEADS TABULATED ON SHEET 2, IN TABLE I.

REVISION REV I: 8/6/12 ADDED SHEET 7

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TITLE: 95 KSI SHEAR
MORTORQ® BOLT, 100° FLUSH HEAD

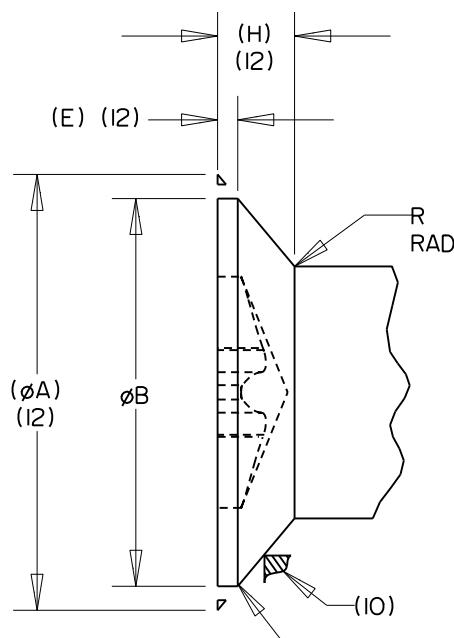
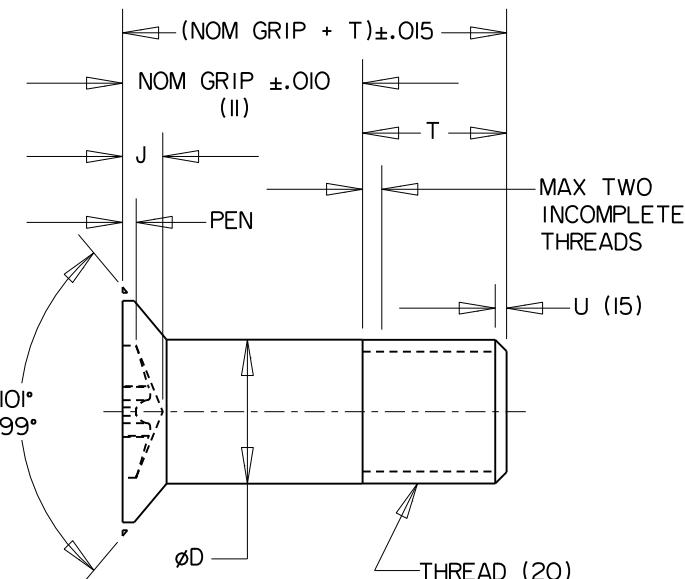
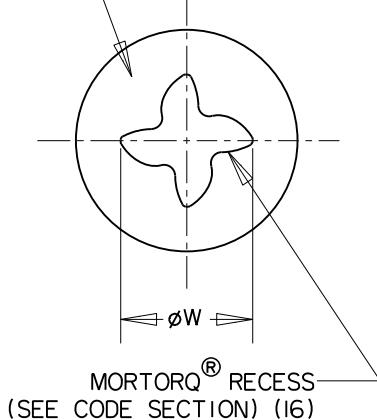
DRAWN G.DILLING	DATE 8/6/12	DRAWING NUMBER PMT-1580
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CHECKED: G.DILLING	DATE 8/6/12	SHEET 7 OF 7
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HEAD MARKING:
IDENTIFY PER
NASI347, TYPE IV



SHEET	1	2	3	4	5	6	7
REV	5	4	4	2	2	4	1

ENLARGED VIEW
OF HEAD

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TITLE:

BOLT, 100° FLUSH REDUCED HEAD
MORTORQ® SPIRAL DRIVE RECESS

DRAWN
G.LaMONICA

DATE
03-20-06

DRAWING NUMBER

PMT-1581

CHECKED:

G.LaMONICA

DATE

04-21-06

SHEET 1 OF 7

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REVISION REV 1: 04-21-06 REV 2: 12-26-06 REV 3: 1-3-07 REV 4: 1-25-07 REV 5: 9-7-12

TABLE I

DIA. DASH NO.	THREAD UNJF-3A (20)	ϕA REF (12)	ϕB MIN	ϕD		ϕE REF (12)	H REF (12)	R RAD	T REF	U REF (15)	Y TOL (13)	Z TOL (14)	TENSILE STRENGTH LBS.MIN	
				PLATED	UNPLATED								MAT CODE C (9) (17)	MAT CODE F,K (18)
-3	.1900-32	.3047	.2578	.1895 .1885	.1895 .1890	.015	.049	.020 .010	.363	.050	.005	.0040	2,000	1,600
-4	.2500-28	.3988	.3504	.2495 .2485	.2495 .2490	.015	.063	.020 .010	.403	.050	.006	.0030	3,700	3,200
-5	.3125-24	.4787	.4289	.3120 .3110	.3120 .3115	.015	.070	.025 .010	.501	.060	.007	.0030	5,000	4,230
-6	.3750-24	.5662	.5149	.3745 .3735	.3745 .3740	.015	.081	.030 .015	.594	.060	.008	.0025	7,200	6,160
-7	.4375-20	.6741	.6047	.4370 .4360	.4370 .4365	.022	.100	.030 .015	.675	.080	.009	.0025	9,000	8,320
-8	.5000-20	.7611	.6901	.4995 .4985	.4995 .4990	.022	.111	.030 .015	.768	.080	.010	.0020	13,500	11,300
-9	.5625-18	.8449	.7655	.5615 .5605	.5615 .5610	.025	.119	.030 .015	.881	.090	.010	.0020	17,000	14,300
-10	.6250-18	.9329	.8518	.6240 .6230	.6240 .6235	.025	.130	.030 .015	.981	.090	.010	.0020	21,000	18,000

TABLE II

DIA. DASH NO.	RECESS NO.	J MAX	W DIA NOM. REF	GAGE PENETRATION		RECESS TORQUE IN-LBS. MIN	RAISED METAL MAX
				MAX	MIN		
-3	MT-0	.063	.1704	.030	.023	33	.005
-4	MT-1	.078	.2405	.030	.023	60	.005
-5	MT-1	.096	.2405	.048	.039	120	.005
-6	MT-2	.112	.3080	.050	.041	240	.006
-7	MT-3	.139	.3537	.067	.058	340	.007
-8	MT-4	.160	.4285	.072	.057	560	.008
-9	MT-4	.180	.4285	.092	.077	800	.009
-10	MT-5	.196	.5063	.092	.067	1000	.010

REVISION REV 1: 4-21-06 REV 2: 1-03-07 REV 3: 1-25-07 REV 4: 9-7-12

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TITLE: BOLT, 100° FLUSH REDUCED HEAD MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.LaMONICA DATE 03-20-06 DRAWING NUMBER PMT-1581

CHECKED: G.LaMONICA DATE 04-21-06 SHEET 2 OF 7

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MATERIAL:	ALLOY STEEL:	4140 (UNS G41400) PER AMS6382. 4340 (UNS G43406) PER AMS6484 OR AMS6415. 8740 (UNS G87400) PER AMS6322.
CRES:		A286 (UNS S66286) SHALL CONFORM TO THE CHEMISTRY OF AMS5731, AMS5732, AMS5737 OR AMS5853.
TITANIUM ALLOY:		6AL-4V (UNS R56400) PER AMS4928 OR AMS4967.
HEAT TREAT:		DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER AMS2759 FOR ALLOY STEEL AND CRES AND AMS2801 FOR TITANIUM.
	ALLOY STEEL:	160-180 KSI FTU
	CRES:	160-190 KSI FTU (9)
	TITANIUM:	160 KSI FTU MIN
FINISH:	ALLOY STEEL:	CADMUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2.
	CRES:	PASSIVATE IN ACCORDANCE WITH AMS2700 METHOD I, TYPE 2 OR 8, CLASS I OR CADMUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2. (SEE CODE FOR FINISH)
	TITANIUM:	NONE OR ALUMINUM COATING PER NAS4006. (SEE CODE FOR FINISH)
CODE:		THE DIAMETER DASH NUMBER FOLLOWING THE MATERIAL CODE DESIGNATES THE NOMINAL DIAMETER IN .0625 INCH INCREMENTS AND THE GRIP DASH NUMBER FOLLOWING THE RECESS CODE DESIGNATES THE GRIP LENGTH IN .0625 INCH INCREMENTS. IF MORE THAN ONE CODE LETTER IS USED IN THE PART NUMBER FOLLOWING THE GRIP DASH NUMBER, ARRANGE THE CODE LETTERS ALPHABETICALLY.
	MATERIAL:	CODE LETTER "F" FOLLOWING BASIC PART NUMBER INDICATES ALLOY STEEL. CODE LETTER "C" FOLLOWING BASIC PART NUMBER INDICATES CRES. CODE LETTER "K" FOLLOWING BASIC PART NUMBER INDICATES TITANIUM.
FINISH:	ALLOY STEEL:	NO CODE LETTER FOLLOWING DIAMETER DASH NUMBER INDICATES CADMIUM PLATE.
	CRES:	NO CODE LETTER FOLLOWING GRIP DASH NUMBER INDICATES PASSIVATE. CODE LETTER "P" FOLLOWING GRIP DASH NUMBER INDICATES CADMIUM PLATE.
	TITANIUM:	NO CODE FOLLOWING GRIP DASH NUMBER INDICATES NO FINISH. CODE LETTER "G" FOLLOWING GRIP DASH NUMBER INDICATES ALUMINUM COAT.
RECESS:		CODE LETTER "M" FOLLOWING FIRST DASH NUMBER INDICATES MORTORQ RECESS.
Oversize:		CODE LETTER "X" FOLLOWING THE GRIP DASH NUMBER INDICATES REPLACEMENT OVERSIZE REPAIR BOLT. (SEE LAST SHEET)

EXAMPLE OF PART NUMBER:

PMTI58IC4M5 = .2500-28 CRES BOLT, .312 GRIP LENGTH, PASSIVATED, MORTORQ RECESS.
 PMTI58IC4M5P = .2500-28 CRES BOLT, .312 GRIP LENGTH, CADMIUM PLATE, MORTORQ RECESS.
 PMTI58IK4M5 = .2500-28 TITANIUM BOLT, .312 GRIP LENGTH, MORTORQ RECESS.
 PMTI58IK4M5G = .2500-28 TITANIUM BOLT, .312 GRIP LENGTH, MORTORQ RECESS, ALUMINUM COATING.
 PMTI58IF4M5 = .2500-28 ALLOY STEEL BOLT, .312 GRIP LENGTH, CADMIUM PLATE, MORTORQ RECESS.

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TITLE: BOLT, 100° FLUSH REDUCED HEAD
 MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.LaMONICA	DATE 03-20-06	DRAWING NUMBER PMT-158I
CHECKED: G.LaMONICA	DATE 3-30-06	SHEET 3 OF 7

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
 PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
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REVISION REV 1: 3-30-06 REV 2: 12-26-06 REV 3: 1-03-07 REV 4: 9-7-12

PROCUREMENT SPECIFICATION:

NAS4002, NAS4003, NAS4004 AS APPLICABLE, EXCEPT AS NOTED. TENSILE STRENGTH AND RECESS TORQUE VALUES AS TABULATED HEREIN. TENSILE FATIGUE LIFE TESTS APPLY TO TITANIUM ONLY. FATIGUE TESTING SHALL BE PER NAS62I EXCEPT FATIGUE TEST LOAD SHALL BE 33.3% OF PMT158I TABULATED TENSILE LOAD FOR HIGH LOAD AND R = .25. COLD WORKING OF HEAD TO SHANK FILLET IS NOT REQUIRED ON ALLOY STEEL OR CRES BOLTS.

TABLE III - GRIP AND LENGTH DIMENSIONS /25/

GRIP DASH NO.	NOMINAL GRIP	LENGTH FOR DIA DASH NUMBERS LISTED ± 0.015								NOMINAL GRIP	GRIP DASH NO.
		3	4	5	6	7	8	9	10		
2	.125	.487	.528							.125	2
3	.187	.549	.590	.688						.187	3
4	.250	.613	.653	.751	.844	.925	1.018			.250	4
5	.312	.675	.715	.813	.906	.987	1.080			.312	5
6	.375	.738	.778	.876	.969	1.050	1.143	1.256	1.356	.375	6
7	.438	.801	.841	.939	1.032	1.113	1.206	1.319	1.419	.438	7
8	.500	.863	.903	1.001	1.094	1.175	1.268	1.381	1.481	.500	8
9	.562	.925	.965	1.063	1.156	1.237	1.330	1.443	1.543	.562	9
10	.625	.988	1.028	1.126	1.219	1.300	1.393	1.506	1.606	.625	10
11	.688	1.051	1.091	1.189	1.282	1.363	1.456	1.569	1.669	.688	11
12	.750	1.113	1.153	1.251	1.344	1.425	1.518	1.631	1.731	.750	12
13	.812	1.175	1.215	1.313	1.406	1.487	1.580	1.693	1.793	.812	13
14	.875	1.238	1.278	1.376	1.469	1.550	1.643	1.756	1.856	.875	14
15	.938	1.301	1.341	1.439	1.532	1.613	1.706	1.819	1.919	.938	15
16	1.000	1.363	1.403	1.501	1.594	1.675	1.768	1.881	1.981	1.000	16
17	1.062	1.425	1.465	1.563	1.656	1.737	1.830	1.943	2.043	1.062	17
18	1.125	1.488	1.528	1.626	1.719	1.800	1.893	2.006	2.106	1.125	18
19	1.188	1.551	1.591	1.689	1.782	1.863	1.956	2.069	2.169	1.188	19
20	1.250	1.613	1.653	1.751	1.844	1.925	2.018	2.131	2.231	1.250	20
21	1.312	1.675	1.715	1.813	1.906	1.987	2.080	2.193	2.293	1.312	21
22	1.375	1.738	1.778	1.876	1.969	2.050	2.143	2.256	2.356	1.375	22
23	1.438	1.801	1.841	1.939	2.032	2.113	2.206	2.319	2.419	1.438	23
24	1.500	1.863	1.903	2.001	2.094	2.175	2.268	2.381	2.481	1.500	24
25	1.562	1.925	1.965	2.063	2.156	2.237	2.330	2.443	2.543	1.562	25
26	1.625	1.988	2.028	2.126	2.219	2.300	2.393	2.506	2.606	1.625	26
27	1.688	2.051	2.091	2.189	2.282	2.363	2.456	2.569	2.669	1.688	27
28	1.750	2.113	2.153	2.251	2.344	2.425	2.518	2.631	2.731	1.750	28
29	1.812	2.175	2.215	2.313	2.406	2.487	2.580	2.693	2.793	1.812	29
30	1.875	2.238	2.278	2.376	2.469	2.550	2.643	2.756	2.856	1.875	30
31	1.938	2.301	2.341	2.439	2.532	2.613	2.706	2.819	2.919	1.938	31
32	2.000	2.363	2.403	2.501	2.594	2.675	2.768	2.881	2.981	2.000	32
34	2.125	2.488	2.528	2.626	2.719	2.800	2.893	3.006	3.106	2.125	34
36	2.250	2.613	2.653	2.751	2.844	2.925	3.018	3.131	3.231	2.250	36
38	2.375	2.738	2.778	2.876	2.969	3.050	3.143	3.256	3.356	2.375	38
40	2.500	2.863	2.903	3.001	3.094	3.175	3.268	3.381	3.481	2.500	40
42	2.625	2.988	3.028	3.126	3.219	3.300	3.393	3.506	3.606	2.625	42
44	2.750	3.113	3.153	3.251	3.344	3.425	3.518	3.631	3.731	2.750	44
46	2.875	3.238	3.278	3.376	3.469	3.550	3.643	3.756	3.856	2.875	46
48	3.000	3.363	3.403	3.501	3.594	3.675	3.768	3.881	3.981	3.000	48
50	3.125	3.488	3.528	3.626	3.719	3.800	3.893	4.006	4.106	3.125	50
52	3.250	3.613	3.653	3.751	3.844	3.925	4.018	4.131	4.231	3.250	52
54	3.375	3.738	3.778	3.876	3.969	4.050	4.143	4.256	4.356	3.375	54

REVISION REV 1: I-03-07 REV 2: 9-7-12

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TITLE: BOLT, 100° FLUSH REDUCED HEAD MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.LaMONICA	DATE 03-20-06	DRAWING NUMBER PMT-158I
CHECKED: G.LaMONICA	DATE 3-21-06	SHEET 4 OF 7
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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TABLE III - GRIP AND LENGTH DIMENSIONS (CONT'D)

GRIP DASH NO.	NOMINAL GRIP	LENGTH FOR DIA DASH NUMBERS LISTED $\pm .015$								NOMINAL GRIP	GRIP DASH NO.
		3	4	5	6	7	8	9	10		
56	3.500	3.863	3.903	4.001	4.094	4.175	4.268	4.381	4.481	3.500	56
58	3.625	3.988	4.028	4.126	4.219	4.300	4.393	4.506	4.606	3.625	58
60	3.750	4.113	4.153	4.251	4.344	4.425	4.518	4.631	4.731	3.750	60
62	3.875	4.238	4.278	4.376	4.469	4.550	4.643	4.756	4.856	3.875	62
64	4.000	4.363	4.403	4.501	4.594	4.675	4.768	4.881	4.981	4.000	64
66	4.125	4.488	4.528	4.626	4.719	4.800	4.893	5.006	5.106	4.125	66
68	4.250	4.613	4.653	4.751	4.844	4.925	5.018	5.131	5.231	4.250	68
70	4.375	4.738	4.778	4.876	4.969	5.050	5.143	5.256	5.356	4.375	70
72	4.500	4.863	4.903	5.001	5.094	5.175	5.268	5.381	5.481	4.500	72
74	4.625	4.988	5.028	5.126	5.219	5.300	5.393	5.506	5.606	4.625	74
76	4.750	5.113	5.153	5.251	5.344	5.425	5.518	5.631	5.731	4.750	76
78	4.875	5.238	5.278	5.376	5.469	5.550	5.643	5.756	5.856	4.875	78
80	5.000	5.363	5.403	5.501	5.594	5.675	5.768	5.881	5.981	5.000	80
82	5.125	5.488	5.528	5.626	5.719	5.800	5.893	6.006	6.106	5.125	82
84	5.250	5.613	5.653	5.751	5.844	5.925	6.018	6.131	6.231	5.250	84
86	5.375	5.738	5.778	5.876	5.969	6.050	6.143	6.256	6.356	5.375	86
88	5.500	5.863	5.903	6.001	6.094	6.175	6.268	6.381	6.481	5.500	88
90	5.625	5.988	6.028	6.126	6.219	6.300	6.393	6.506	6.606	5.625	90
92	5.750	6.113	6.153	6.251	6.344	6.425	6.518	6.631	6.731	5.750	92
94	5.875	6.238	6.278	6.376	6.469	6.550	6.643	6.756	6.856	5.875	94
96	6.000	6.363	6.403	6.501	6.594	6.675	6.768	6.881	6.981	6.000	96

NOTE: GRIP EQUALS GRIP DASH NUMBER TIMES .0625 (CONVERTED TO 3 DECIMAL PLACES PER ANSI Y14.5M-1982). LENGTH EQUALS GRIP LENGTH PLUS "T".

NOTES:

- (1) CONCENTRICITY: CONICAL SURFACE OF THE HEAD TO ϕD SHALL BE WITHIN .003 FIM. ϕD TO THREAD PITCH DIAMETER SHALL BE WITHIN .0045 FIM FOR DIA DASH NUMBER -3 THRU -5, AND SHALL BE WITHIN .006 FIM FOR DIA DASH NUMBER -6 AND LARGER.
- (2) SURFACE TEXTURE: SEE PROCUREMENT SPECIFICATION.
- (3) DELETED.
- (4) BREAK SHARP EDGES AND REMOVE ALL BURRS.
- (5) DIMENSIONS IN INCHES AND SHALL BE MET AFTER FINISH, IF APPLICABLE.
- (6) MORTORQ SPIRAL DRIVE RECESS IS APPLICABLE TO ALL DIA DASH NUMBERS.
- (7) DELETED.
- (8) MATERIAL CODES "A" AND "V" CANCELLED AFTER DECEMBER 1991. SEE "F", "K", OR "C" CODES. "F" AND "K" CODES REPRESENT REDUCED TENSILE VALUES BASED ON HEAD STRENGTH. FOR DESCRIPTION OF STATUS NOTES SEE NAS380.
- (9) FOR CRES ONLY, THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE STRENGTH OF THE FINISHED PART, BUT ANY PART (TYPE I, II OR III AS LISTED IN NAS403) SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED TYPE I MINIMUM TENSILE VALUES AS LISTED IN NAS4003.
- (10) FLUSH HEAD PROTRUSION VALUES AND GAGING METHOD PER NAS9800.
- (II) GRIP LENGTH SHALL BE MEASURED FROM THE TOP OF BOLT HEAD TO THE END OF THE FULL CYLINDRICAL PORTION OF THE SHANK.
- (I2) ϕA , E, AND H ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION, VALUES ϕA , E AND H ARE CALCULATED LIMITS RESULTING FROM THE TOLERANCE ON ϕD , HEAD ANGLE AND THE APPLICABLE HEAD PROTRUSION AND GAGE DIAMETER AS DEFINED IN NAS9800.
- (I3) HEAD EDGE OUT OF ROUNDNESS SHALL NOT EXCEED "Y" FIM.

REVISION REV 1: 12-26-06 REV 2: 9/7/12

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TITLE: BOLT, 100° FLUSH REDUCED HEAD
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.LaMONICA	DATE 03-20-06	DRAWING NUMBER PMT-1581
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CHECKED: G.LaMONICA	DATE 3-21-06	SHEET 5 OF 7
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NOTES CONTINUED:

- (14) SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
(15) POINT SHALL BE FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREAD SHALL NOT EXCEED "U".
(16) PER APPLICABLE PROCUREMENT SPECIFICATION, THE MORTORQ BOLT RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTION WITH APPLICABLE DRIVER WITH AXIAL END PRESSURE NOT EXCEEDING 15 POUNDS. BOLTS ARE REJECTABLE IF MINIMUM TORQUE VALUES LISTED BELOW CAUSE FRACTURE OF BOLTS OR DISTORTION WHICH RESULTS IN RAISED OF METAL AT EDGE OF RECESS EXCEEDING .005 ABOVE SURROUNDING AREA.
(17) THESE TENSILE VALUES APPLY TO CRES PARTS. SEE NOTE 8.
(18) THESE TENSILE VALUES APPLY TO ALLOY STEEL AND TITANIUM PARTS.
(19) DELETED.
(20) THREADS IN ACCORDANCE WITH AS8879; MAJOR DIAMETER SHALL BE .001 BELOW MINIMUM SHANK DIAMETER.
(21) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
(22) FOR A286 CRES, MAGNETIC PERMEABLE SHALL BE LESS THAN 2.0 (AIR =1.0) FOR FIELD STRENGTH H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER ASTM/5 342/A 342M, TEST METHOD 3.
(23) REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.
(24) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
(25) TOLERANCES UNLESS OTHERWISE SPECIFIED: DECIMALS $\pm .030$, ANGLES $\pm 1^\circ$.
(26) INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY THE USE OF WHOLE DASH NUMBERS.

REVISION | REV 1: 4-21-06 | REV 2: 12-26-06 | REV 3: 1-3-07 | REV 4: 9-7-12

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DRAWN	G.LaMONICA	DATE	DRAWING NUMBER	PMT-158I
CHECKED:	G.LaMONICA	DATE		SHEET 6 OF 7
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

RESTRICTED USAGE FOR REPAIR WORK ONLY
.0156 AND .0312 OVERSIZE SHANK FOR REPLACEMENT OF BOLTS SHOWN ON SHEET I

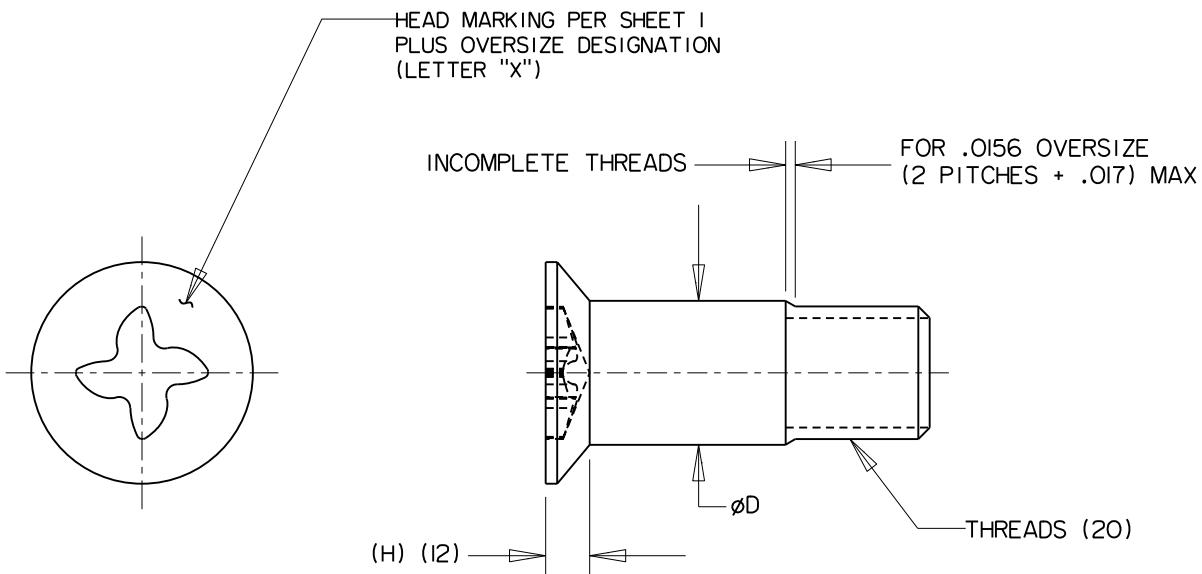


TABLE IV - OVERSIZE DIMENSIONS

OVERSIZE DIA. DASH NO.	.0156 OVERSIZE		H REF (I2)	.0312 OVERSIZE
	UNPLATED	PLATED		
3()()X	.2051 .2046	.2051 .2041	.043	USE PMT158()3()()Y
4()()X	.2651 .2646	.2651 .2641	.057	USE PMT158()4()()Y
5()()X	.3276 .3271	.3276 .3266	.065	USE PMT158()5()()Y
6()()X	.3901 .3896	.3901 .3891	.075	USE PMT158()6()()Y
7()()X	.4526 .4521	.4526 .4516	.095	USE PMT158()7()()Y
8()()X	.5151 .5146	.5151 .5141	.103	USE PMT158()8()()Y
9()()X	.5771 .5766	.5771 .5761	.113	USE PMT158()9()()Y
10()()X	.6396 .6391	.6396 .6386	.123	USE PMT158()10()()Y

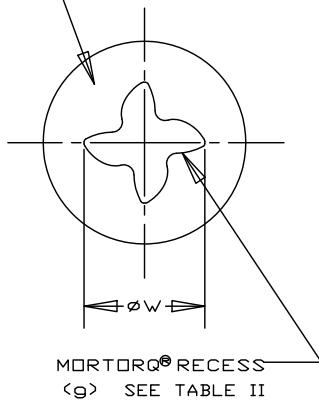
(1) SEE SHEETS I THRU 6 FOR MATERIAL, FINISH, PROCUREMENT INFORMATION AND DIMENSIONS NOT SHOWN.

(2) MINIMUM TENSILE LOADS FOR "X" CODED PARTS ARE 85% OF THE STANDARD LOADS TABULATED ON SHEET 2, IN TABLE I.

REVISION REV: 9-7-12
ADDED SHEET 7

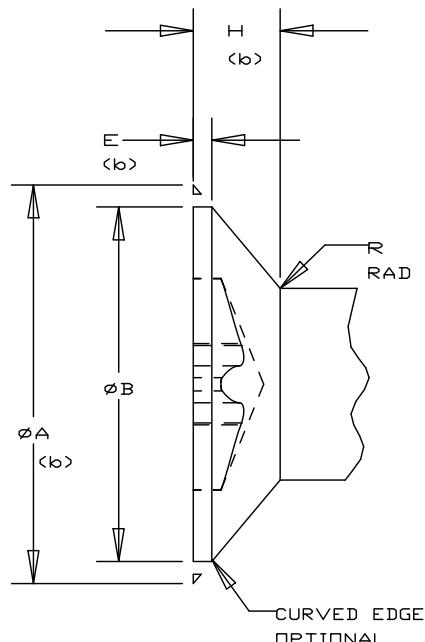
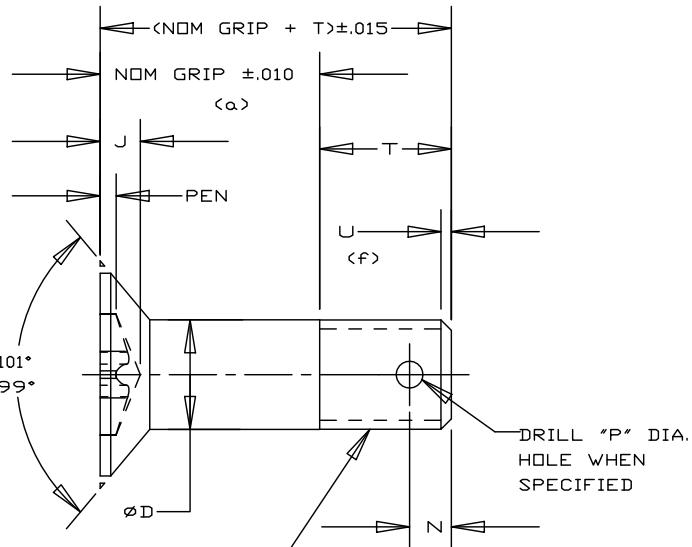
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DRAWN G.DILLING	DATE 9/7/12	DRAWING NUMBER PMT-158I											
CHECKED: G.DILLING	DATE 9/7/12	SHEET 7 OF 7											
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY													

HEAD MARKING:
IDENTIFY PER
NAS1347, TYPE IV



MORTORQ® RECESS
(g) SEE TABLE II

THREAD ROLLED AFTER
HEAT TREAT PER MIL-S-8879,
EXCEPT MAX MAJOR DIA SHALL
BE A MIN OF .001 LESS THAN
ACTUAL SHANK DIA.



ENLARGED VIEW
OF HEAD

LIST OF CURRENT SHEETS				
SHEET	1	2	3	4
REV.	5	5	2	3

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TITLE:

BOLT, 100° FLUSH HEAD MORTORQ® SPIRAL DRIVE RECESS 160,000 PSI UTS

DRAWN:

G. LaMONICA

DATE:

03-17-06

DRAWING NUMBER

PMT-1790

CHECKED:

G. LaMONICA

DATE:

04-21-06

SHEET 1 OF 4

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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REVISION	REV 1-UPDATED 04-21-06	REV 2-UPDATED 07-06-06	REV 3-UPDATED 1-11-07	REV 4-UPDATED 1-25-07	REV 5-UPDATED 9-02-09
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TABLE I

FIRST DASH NO.	THREAD UNJF-3A	ϕA MAX 	ϕB MIN	ϕD		ϕE MAX 	H REF 	N	P DIA	R RAD	T	U REF 	Y FIM <d>	Z FIM <e>
				PLATED	UN-PLATED									
-3	.1900-32	.381	.339	.1895 .1885	.1895 .1890	.015	.083	.126 .106	.080 .070	.035 .015	.338	.050	.005	.0040
-4	.2500-28	.506	.464	.2495 .2485	.2495 .2490	.015	.111	.126 .106	.086 .076	.035 .015	.425	.050	.006	.0030
-5	.3125-24	.634	.578	.3120 .3110	.3120 .3115	.015	.140	.130 .110	.086 .076	.045 .025	.469	.060	.007	.0030
-6	.3750-24	.760	.717	.3745 .3735	.3745 .3740	.015	.167	.130 .110	.116 .106	.045 .025	.578	.060	.008	.0025
-7	.4375-20	.889	.826	.4370 .4360	.4370 .4365	.022	.195	.134 .114	.116 .106	.055 .035	.694	.080	.009	.0025
-8	.5000-20	1.014	.951	.4995 .4985	.4995 .4990	.022	.222	.134 .114	.116 .106	.055 .035	.735	.080	.010	.0020
-9	.5625-18	1.141	1.071	.5615 .5605	.5615 .5610	.025	.250	.134 .114	.151 .141	.055 .035	.840	.090	.010	.0020
-10	.6250-18	1.272	1.201	.6240 .6230	.6240 .6235	.025	.280	.134 .114	.151 .141	.055 .035	.902	.090	.010	.0020

TABLE II

FIRST DASH NO.	RECESS NO.	J MAX	W DIA NOM. REF	GAGE PENETRATION		RECESS TORQUE IN-LBS. MIN	RAISED METAL MAX
				MAX	MIN		
-3	MT-1	.075	.2405	.027	.020	60	.005
-4	MT-1	.095	.2405	.047	.038	140	.005
-5	MT-2	.117	.3080	.055	.046	220	.005
-6	MT-3	.142	.3537	.070	.061	520	.006
-7	MT-4	.168	.4285	.080	.065	750	.007
-8	MT-5	.186	.5063	.082	.067	900	.008
-9	MT-5	.206	.5063	.102	.077	1300	.009
-10	MT-6	.233	.5938	.110	.085	2100	.010

- (a) GRIP LENGTH IS FROM TOP OF BOLT HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
- (b) A, E, AND H ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES A, E, AND H ARE CALCULATED LIMITS RESULTING FROM TOLERANCES ON D, M, V AND HEAD ANGLE.
- (c) DELETED.
- (d) HEAD EDGE OUT OF ROUNDNESS SHALL NOT EXCEED "Y" FIM.
- (e) SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
- (f) POINT SHALL BE FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREAD SHALL NOT EXCEED "U".

REVISION	REV 1-UPDATED 03-30-06	REV 2-UPDATED 04-21-06	REV 3-UPDATED 11-11-07	REV 4-UPDATED 04-21-06	REV 5-UPDATED 1-25-07
					9-02-09

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TITLE: **BOLT, 100° FLUSH HEAD
MORTORQ® SPIRAL DRIVE RECESS
160,000 PSI UTS**

DRAWN: G. LaMONICA	DATE: 03-17-06	DRAWING NUMBER PMT-1790
CHECKED: G. LaMONICA	DATE: 04-21-06	
SHEET 2 OF 4		
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS II PHILLIPS POZIDRIV ACR POZISQUARE PHILLIPS SQUARE-DRIV TORQ-SET TRI-WING® MORTORQ®
HEXSTIX® POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

(g) BOLT RECESS SHALL BE TORQUE TESTED IN BOTH INSTALLATION AND REMOVAL DIRECTION WITH DRIVER. APPLY TABULATED TORQUE IN CW DIRECTION WITH A MAXIMUM END LOAD OF 20 POUNDS. PARTS ARE ACCEPTABLE IF RAISED METAL AT EDGE OF RECESS DOES NOT EXCEED TABULATED VALUES. APPLY TABULATED TORQUE IN THE CCW DIRECTION WITH MAXIMUM END LOAD OF 40 POUNDS. PARTS ARE ACCEPTABLE IF TORQUE IS OBTAINED WITHOUT RESTRICTION ON RAISED METAL. RECESS CONFIGURATION WILL MEET THE MINIMUM REQUIREMENTS STATED HEREIN. SAMPLING SHALL BE PER ANSI/ASQC Z1.4 4 PERCENT AQL LEVEL S-1.

MATERIAL: ALLOY STEEL - 4140 (UNS G41400) PER MIL-S-5626, 4340 (UNS G43400) PER AMS6415, (SEE "CODE") E4340 (UNS C43406) PER MIL-S-5000 OR 8740 (UNS G87400) PER MIL-S-6049. TITANIUM ALLOY - 6AL-4V (UNS R56400) PER AMS4928 OR AMS4967. CRES - A286 (UNS S66286) SHALL CONFORM TO THE CHEMISTRY OF AMS5731, AMS 5732, AMS5737 OR AMS5853.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER MIL-H-6875: ALLOY STEEL: 160KSI - 180KSI Ftu PER MIL-H-6875. CRES A286: 160KSI - 190KSI Ftu. PRECIPITATION HARDENING PER AMS5853. (6) TITANIUM 6AL-4V: 160KSI - 180KSI Ftu PER AMS4928 OR AMS4967.

FINISH: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2; PASSIVATE PER QQ-P-35; ALUMINUM COAT PER NAS4006; RESIN BOND ALUMINUM COAT PER MIL-C-85614; OR NONE (SEE "CODE"). POST PLATE HYDROGEN EMBRITTLEMENT BAKING AND TESTING PER QQ-P-416 IS NOT REQUIRED FOR A286 MATERIAL.

LUBRICATION: DRY FILM LUBRICANT PER MIL-L-46010, TYPE I.

CODE: FIRST DASH NUMBER INDICATES NOMINAL DIAMETER IN 16THS. SECOND DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCH INCREMENTS.

MATERAIL: NO CODE LETTER FOLLOWING BASIC PART NUMBER INDICATES ALLOY STEEL. CODE LETTER "C" FOLLOWING BASIC PART NUMBER INDICATES CRES A286. CODE LETTER "V" FOLLOWING BASIC PART NUMBER INDICATES TITANIUM 6AL-4V.

FINISH: ALLOY STEEL: NO CODE LETTER INDICATES TYPE II, CLASS 2 CADMIUM PLATE. CODE LETTER "A" FOLLOWING THE SECOND DASH NUMBER INDICATES ALUMINUM COAT.

CRES A286: NO CODE LETTER FOLLOWING SECOND NUMBER INDICATES PASSIVATE. CODE LETTER "P" FOLLOWING SECOND DASH NUMBER INDICATES TYPE II, CLASS 2 CADMIUM PLATE. CODE LETTER "A" FOLLOWING THE SECOND DASH NUMBER INDICATES ALUMINUM COAT.

TI 6AL-4V: NO CODE INDICATES NO FINISH. CODE LETTER "A" FOLLOWING THE SECOND DASH NUMBER INDICATES ALUMINUM COAT.

RECESS: CODE LETTER "M" FOLLOWING FIRST DASH NUMBER INDICATES MORTORQ RECESS.

LUBRICATION: CODE LETTER "L" FOLLOWING SECOND DASH NUMBER INDICATES DRY FILM LUBRICANT PER MIL-L-46010, TYPE I.

DRILL: CODE LETTER "D" FOLLOWING SECOND DASH NUMBER INDICATES DRILLED THREADS. (7)

OVERSIZE: CODE LETTER "X" OR "Y" FOLLOWING SECOND DASH NUMBER INDICATE REPLACEMENT BOLT.

WHEN MORE THAN ONE CODE LETTER IS USED FOLLOWING SECOND DASH NUMBER, ARRANGE LETTERS ALPHABETICALLY.

EXAMPLE
OF PART
NUMBER:

PMT1790-4M10 BOLT; .2500-28 THREAD; .625 GRIP LENGTH; ALLOY STEEL; CADMIUM PLATED; MORTORQ RECESS.
 PMT1790C4M10P BOLT; .2500-28 THREAD; .625 GRIP LENGTH; CRES; CADMIUM PLATED; MORTORQ RECESS.
 PMT1790V4M10L BOLT; .2500-28 THREAD; .625 GRIP LENGTH; TITANIUM; DRY FILM LUBRICATED; MORTORQ RECESS.
 PMT1790C4M10D BOLT; .2500-28 THREAD; .625 GRIP LENGTH; DRILLED; PASSIVATED; DRILLED; MORTORQ RECESS.

PRECUREMENT: NAS4002, NAS4003 AND NAS4004, EXCEPT AS NOTED. TENSILE STRENGTH AND RECESS TORQUE VALUES AS SPECIFICATION: TABULATED HEREIN. FATIGUE TESTING FOR TITANIUM ONLY. TENSION FATIGUE TEST PROCEDURES AND LOADING IN ACCORDANCE WITH NAS621. COLD WORKING OF HEAD TO SHANK FILLET IS NOT REQUIRED ON ALLOY STEEL OR CRES BOLTS.

NOTES:

1. CONCENTRICITY: CONICAL SURFACE OF HEAD TO "D" DIA WITHIN .003 FIM.
 "D" DIA TO THREAD PITCH DIA WITHIN .0045 FIM FOR PMT1790-3 THRU PMT1790-5,
 AND WITHIN .006 FIM FOR PMT1790-6 AND LARGER.
2. SURFACE TEXTURE: PER ANSI/ASME B46.1. CONICAL SURFACE OF HEAD, HEAD TO SHANK FILLET RADIUS, SHANK AND ALL THREAD ELEMENTS 32 RHR MAX. ALL OTHER SURFACES 125 RHR MAX.

(NOTES CONTINUED ON SHEET 4)

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TITLE: **BOLT, 100° FLUSH HEAD
MORTORQ® SPIRAL DRIVE RECESS
160,000 PSI UTS**

DRAWN: G. LaMONICA DATE: 03-17-06 DRAWING NUMBER

CHECKED: G. LaMONICA DATE: 03-30-06

PMT-1790

SHEET 3 OF 4

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

® PHILLIPS II PHILLIPS POZIDRIV ® ACR POZISQUARE ® PHILLIPS SQUARE-DRIV ® TORQ-SET ® TRI-WING ® MORTORQ ®
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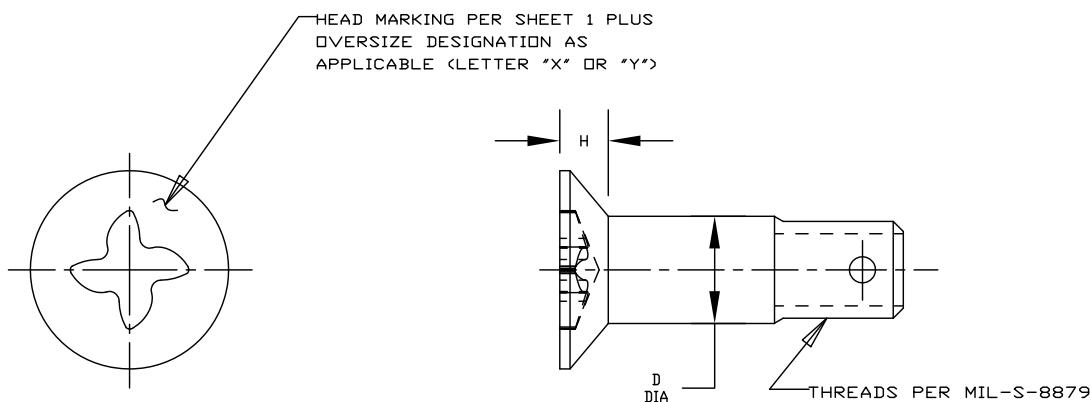
REVISION	REV 1-UPDATED 03-30-06	REV 2-UPDATED 07-06-06
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NOTES: (CONTINUED FROM SHEET 3)

3. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
4. DIMENSIONS IN INCHES AND TO BE MET AFTER PLATING BUT PRIOR TO LUBRICATION (AS APPLICABLE).
5. THE FULL LENGTH OF THE SHANK AND THREADS SHALL BE PROTECTED FROM ABRASIONS AND CHAFING DURING HANDLING, TRANSPORTATION AND STORAGE. INCLUDE TITANIUM PARTS .190 DIAMETER AND ABOVE; OTHER MATERIAL INCLUDE .250 DIAMETER AND ABOVE.
6. FOR A286 THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE VALUE OF THE FINISHED PART, BUT THIS SHALL NOT EXCEED 1.3 TIMES THE MINIMUM TYPE I LOAD AS SPECIFIED IN NAS4003.
7. IF REQUIRED, TENSILE TESTING OF BOLTS WITH CROSS-DRILLED THREADS SHALL BE PERFORMED PRIOR TO DRILLING AND THE APPLICATION OF PLATING AND/OR COATINGS. WHEN BOLTS HAVE BEEN DRILLED, STRENGTH MAY BE VERIFIED BY SHEAR TESTING IN LIEU OF TENSILE TESTING IN ACCORDANCE WITH MIL-STD-1312. USERS SHOULD BE AWARE THAT FASTENERS WITH CROSS DRILLED THREADS MAY EXHIBIT A REDUCTION IN TENSILE STRENGTH.
8. FLUSH HEAD PROTRUSION VALUES AND GAGING METHOD PER NAS 9800.

RESTRICTED USAGE FOR REPAIR WORK ONLY

.0156 AND .0312 O VERSIZE SHANK FOR REPLACEMENT OF BOLTS SHOWN ON SHEET 1



PART NUMBER		D DIA	H REF (b)		PART NUMBER	D DIA	H REF (b)	
		PLATED				PLATED		
PMT1790C >3< X X X X		.2051 .2041	.073		PMT1790C >3< X X Y Y	.2207 .2197	.067	
PMT1790C >4< X X X X		.2651 .2641	.099		PMT1790C >4< X X Y Y	.2807 .2797	.095	
PMT1790C >5< X X X X		.3276 .3266	.126		PMT1790C >5< X X Y Y	.3432 .3422	.120	
PMT1790C >6< X X X X		.3901 .3891	.153		PMT1790C >6< X X Y Y	.4057 .4047	.147	
PMT1790C >7< X X X X		.4526 .4516	.181		PMT1790C >7< X X Y Y	.4682 .4672	.175	
PMT1790C >8< X X X X		.5151 .5141	.208		PMT1790C >8< X X Y Y	.5307 .5297	.202	
PMT1790C >9< X X X X		.5771 .5761	.235		PMT1790C >9< X X Y Y	.5927 .5917	.229	
PMT1790C >10< X X X X		.6396 .6386	.268		PMT1790C >10< X X Y Y	.6552 .6542	.257	

1. FOR MATERIAL, FINISH, PROCUREMENT INFORMATION AND DIMENSIONS NOT SHOWN, SEE SHEETS 1, 2 AND 3.
2. MINIMUM TENSILE LOADS FOR "X" AND "Y" CODED PARTS ARE 85 PERCENT OF STANDARD LOADS TABULATED ON SHEET 2.

REVISION	REV 1-UPDATED 03-30-06	REV 2-UPDATED 07-06-06	REV 3-UPDATED 1-11-07
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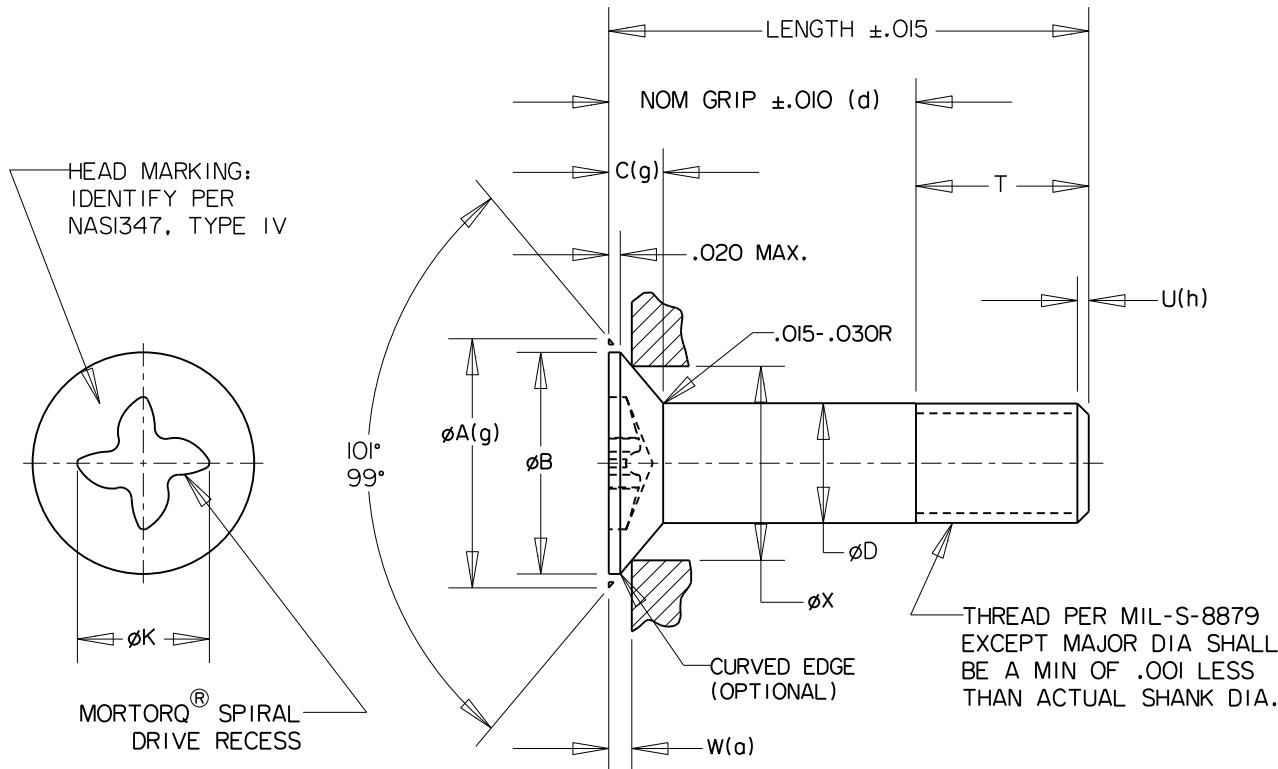
TITLE: **BOLT, 100° FLUSH HEAD
MORTORQ® SPIRAL DRIVE RECESS
160,000 PSI UTS**

DRAWN: G. LaMONICA	DATE: 03-17-06	DRAWING NUMBER
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CHECKED: G. LaMONICA	DATE: 03-30-06	SHEET 4 OF 4
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PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II ® PHILLIPS POZIDRIV ® ACR POZISQUARE ® PHILLIPS SQUARE-DRIV ® TORQ-SET ® TRI-WING ® MORTORQ ®
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BASIC PART NO	THREAD UNJF-3A	ϕD	ϕA MAX	ϕB MIN	C (REF)	HEAD GAGING		T (REF)	U (REF)
						W HEAD PROTRUSION	ϕX GAGE CIRCLE		
PMT2803	.1900-32	.1895 .1885	.385	.328	.080	.0290 .0263	.3147 .3143	.338	.016
PMT2804	.2500-28	.2495 .2485	.507	.449	.106	.0342 .0316	.4245 .4241	.456	.018
PMT2805	.3125-24	.3120 .3110	.635	.577	.133	.0395 .0370	.5389 .5385	.530	.021
PMT2806	.3750-24	.3745 .3735	.762	.704	.160	.0450 .0426	.6532 .6528	.577	.021
PMT2807	.4375-20	.4370 .4360	.890	.832	.188	.0503 .0481	.7676 .7672	.656	.025
PMT2808	.5000-20	.4995 .4985	1.017	.959	.215	.0557 .0537	.8820 .8816	.703	.025
PMT2809	.5625-18	.5615 .5605	1.145	1.087	.242	.0611 .0592	.9964 .9960	.776	.028
PMT2810	.6250-18	.6240 .6230	1.272	1.214	.270	.0665 .0647	1.1108 1.1104	.823	.028

SHEET	1	2	3	4
REV	-	-	-	-

REVISION

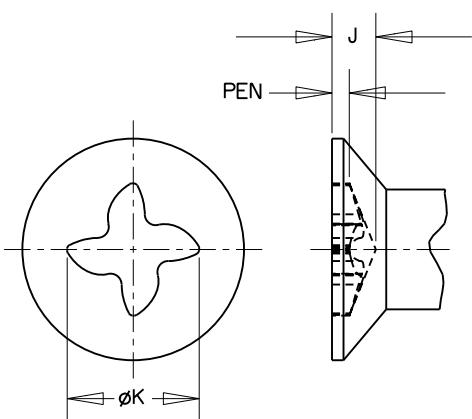
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TITLE: MORTORQ® 100° FLAT HEAD CLOSE TOLERANCE, 180,000 PSI

DRAWN G.DILLING	DATE 11/22/11	DRAWING NUMBER PMT-2803 THRU 2810
CHECKED: G.DILLING	DATE 11/23/11	SHEET 1 OF 4
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY



BASIC PART NO.	J REF	K REF	RECESS GAGE PENETRATION (c)		FIM VALUES		RECESS DRIVE SIZE
			MAX	MIN	Y (a)	Z (b)	
PMT2803	.078	.2405	.027	.020	.0045	.0040	MT-1
PMT2804	.095	.2405	.047	.038	.0045	.0030	MT-1
PMT2805	.117	.3080	.055	.046	.0045	.0030	MT-2
PMT2806	.142	.3537	.070	.061	.0060	.0025	MT-3
PMT2807	.168	.4285	.080	.065	.0060	.0025	MT-4
PMT2808	.186	.5063	.082	.067	.0060	.0020	MT-5
PMT2809	.206	.5063	.102	.077	.0060	.0020	MT-5
PMT2810	.233	.5938	.110	.085	.0060	.0020	MT-6

MATERIAL: ALLOY STEEL - 4140 (UNS G41400) PER MIL-S-5626, 4340 (UNS G43400) PER MIL-S-5000 OR 8740 (UNS G87400) PER MIL-S-6049.

HEAT TREATMENT: 180,000-200,000 PSI UTS PER MIL-H-6875.

FINISH: CADMIUM PLATE PER SPECIFICATION NAS672.

CODE: DASH NUMBER DESIGNATES GRIP AND LENGTH (SEE SHEET 3).

EXAMPLE: PMT2804-8, .250 DIA. BOLT, .500 GRIP
PMT2805-10, .312 DIA. BOLT, .625 GRIP

NOTES: (a) CONCENTRICITY: "D" AND THREAD PITCH DIAMETERS WITHIN "Y" VALUES FIM.
CONICAL SURFACES OF HEAD AND "D" DIA WITHIN .005 FIM.
RECESS TO SHANK WITHIN .016 FIM THRU .250 SIZE
WITHIN .240 FIM ABOVE .250 SIZE

- (b) SHANK STRAIGHTNESS: WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
- (c) RECESS GAGING IN ACCORDANCE WITH PHILLIPS SCREW COMPANY SPECIFICATION.
- (d) GRIP LENGTH: FROM THE TOP OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
- (e) REFER TO NAS518 AND NAS519 FOR FLUSHNESS GAGING DETAILS.
- (f) FASTENERS WITH MIL-S-7742 THREADS MAY BE USED UNTIL STOCK IS DEPLETED.
- (g) A AND C DIMENSIONS ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION.
- VALUES A AND C ARE CALCULATED LIMITS RESULTING FROM TOLERANCES ON D,X, W AND HEAD ANGLE.
- (h) POINT SHALL BE FLAT AND CHAMFERED. CHAMFER PLUS INCOMPLETE THREADS SHALL NOT EXCEED TWO THREAD PITCHES.
- (i) ALL DIMENSIONS IN INCHES AND ARE TO BE MET AFTER PLATING.

PROCUREMENT SPECIFICATION: MIL-B-87114, EXCEPT AS NOTED.
FLUSHNESS GAGING DETAILS AS NOTED HEREIN.
PACKAGING PER NAS498.
TENSILE FATIGUE LIFE TESTS DO NOT APPLY.

REVISION

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DRAWN G.DILLING	DATE 11/22/11	DRAWING NUMBER PMT-2803 THRU 2810											
CHECKED: G.DILLING	DATE 11/23/11	SHEET 2 OF 4											
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326													
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DASH NO	NOM GRIP	NOMINAL LENGTH FOR SIZES INDICATED								NOM GRIP	DASH NO
		PMT2803	PMT2804	PMT2805	PMT2806	PMT2807	PMT2808	PMT2809	PMT2810		
2	.125	.463	---	---	---	---	---	---	---	.125	2
3	.188	.526	.644	.718	.765	---	---	---	---	.188	3
4	.250	.588	.706	.780	.827	---	---	---	---	.250	4
5	.312	.650	.768	.842	.889	.968	1.015	1.088	1.135	.312	5
6	.375	.713	.831	.905	.952	1.031	1.078	1.151	1.198	.375	6
7	.438	.776	.894	.968	1.015	1.094	1.141	1.214	1.261	.438	7
8	.500	.838	.956	1.030	1.077	1.156	1.203	1.276	1.323	.500	8
9	.562	.900	1.018	1.092	1.139	1.218	1.265	1.338	1.385	.562	9
10	.625	.963	1.081	1.155	1.202	1.281	1.328	1.401	1.448	.625	10
11	.688	1.026	1.144	1.218	1.265	1.344	1.391	1.464	1.511	.688	11
12	.750	1.088	1.206	1.280	1.327	1.406	1.453	1.526	1.573	.750	12
13	.812	1.150	1.268	1.342	1.389	1.468	1.515	1.588	1.635	.812	13
14	.875	1.213	1.331	1.405	1.452	1.531	1.578	1.651	1.698	.875	14
15	.938	1.276	1.394	1.468	1.515	1.594	1.641	1.714	1.761	.938	15
16	1.000	1.338	1.456	1.530	1.577	1.656	1.703	1.776	1.823	1.000	16
17	1.062	1.400	1.518	1.592	1.639	1.718	1.765	1.838	1.885	1.062	17
18	1.125	1.463	1.581	1.655	1.702	1.781	1.828	1.901	1.948	1.125	18
19	1.188	1.526	1.644	1.718	1.765	1.844	1.891	1.964	2.011	1.188	19
20	1.250	1.588	1.706	1.780	1.827	1.906	1.953	2.026	2.073	1.250	20
21	1.312	1.650	1.768	1.842	1.889	1.968	2.015	2.088	2.135	.312	21
22	1.375	1.713	1.831	1.905	1.952	2.031	2.078	2.151	2.198	1.375	22
23	1.438	1.776	1.894	1.968	2.015	2.094	2.141	2.214	2.261	1.438	23
24	1.500	1.838	1.956	2.030	2.077	2.156	2.203	2.276	2.323	1.500	24
25	1.562	1.900	2.018	2.092	2.139	2.218	2.265	2.338	2.385	1.562	25
26	1.625	1.963	2.081	2.155	2.202	2.281	2.328	2.401	2.448	1.625	26
27	1.688	2.026	2.144	2.218	2.265	2.344	2.391	2.464	2.511	1.688	27
28	1.750	2.088	2.206	2.280	2.327	2.406	2.453	2.526	2.573	1.750	28
29	1.812	2.150	2.268	2.342	2.389	2.468	2.515	2.588	2.635	1.812	29
30	1.875	2.213	2.331	2.405	2.452	2.531	2.578	2.651	2.698	1.875	30
31	1.938	2.276	2.394	2.468	2.515	2.594	2.641	2.714	2.761	1.938	31
32	2.000	2.338	2.456	2.530	2.577	2.656	2.703	2.776	2.823	2.000	32
34	2.125	2.463	2.581	2.655	2.702	2.781	2.828	2.901	2.948	2.125	34
36	2.250	2.588	2.706	2.780	2.827	2.906	2.953	3.026	3.073	2.250	36
38	2.375	2.713	2.831	2.905	2.952	3.031	3.078	3.151	3.198	2.375	38
40	2.500	2.838	2.956	3.030	3.077	3.156	3.203	3.276	3.323	2.500	40
42	2.625	2.963	3.081	3.155	3.202	3.281	3.328	3.401	3.448	2.625	42
44	2.750	3.088	3.206	3.280	3.327	3.406	3.453	3.526	3.573	2.750	44
46	2.875	3.213	3.331	3.405	3.452	3.531	3.578	3.651	3.698	2.875	46
48	3.000	3.338	3.456	3.530	3.577	3.656	3.703	3.776	3.823	3.000	48
50	3.125	3.463	3.581	3.655	3.702	3.781	3.828	3.901	3.948	3.125	50
52	3.250	3.588	3.706	3.780	3.827	3.906	3.953	4.026	4.073	3.250	52
54	3.375	3.713	3.831	3.905	3.952	4.031	4.078	4.151	4.198	3.375	54

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TITLE: MORTORQ® 100° FLAT HEAD
CLOSE TOLERANCE, 180,000 PSI

DRAWN	DATE	DRAWING NUMBER
G.DILLING	II/22/II	PMT-2803 THRU 2810

CHECKED:	DATE	SHEET 3 OF 4
G.DILLING	II/23/II	PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326

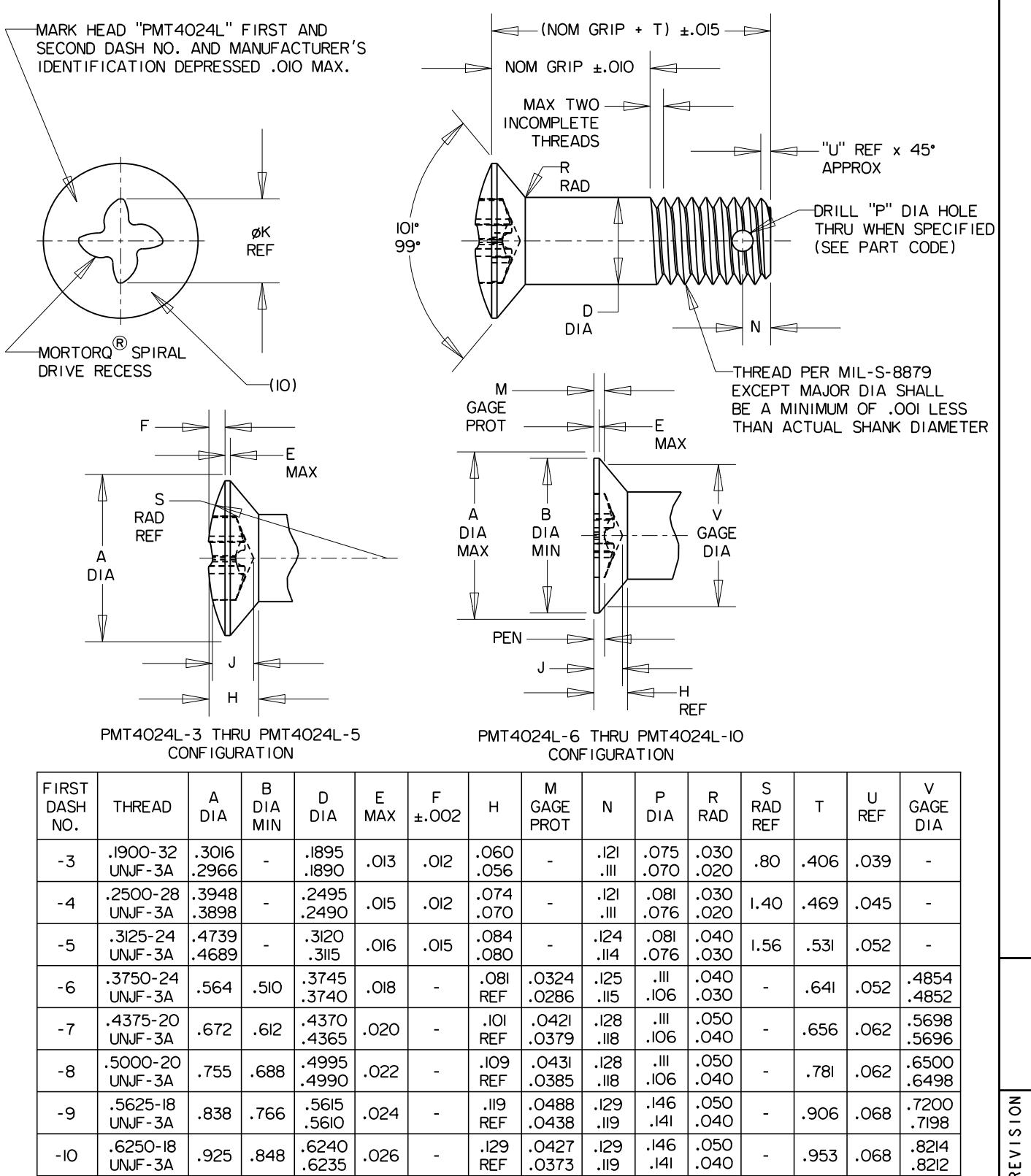
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AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

DASH NO	NOM GRIP	NOMINAL LENGTH FOR SIZES INDICATED								NOM GRIP	DASH NO
		PMT2803	PMT2804	PMT2805	PMT2806	PMT2807	PMT2808	PMT2809	PMT2810		
56	3.500	3.838	3.956	4.030	4.077	4.156	4.203	4.276	4.323	3.500	56
58	3.625	3.963	4.081	4.155	4.202	4.281	4.328	4.401	4.448	3.625	58
60	3.750	4.088	4.206	4.280	4.327	4.406	4.453	4.526	4.573	3.750	60
62	3.875	4.213	4.331	4.405	4.452	4.531	4.578	4.651	4.698	3.875	62
64	4.000	4.338	4.456	4.530	4.577	4.656	4.703	4.776	4.823	4.000	64
66	4.125	4.463	4.581	4.655	4.702	4.781	4.828	4.901	4.948	4.125	66
68	4.250	4.588	4.706	4.780	4.827	4.906	4.953	5.026	5.073	4.250	68
70	4.375	4.713	4.831	4.905	4.952	5.031	5.078	5.151	5.198	4.375	70
72	4.500	4.838	4.956	5.030	5.077	5.156	5.203	5.276	5.323	4.500	72
74	4.625	4.963	5.081	5.155	5.202	5.281	5.328	5.401	5.448	4.625	74
76	4.750	5.088	5.206	5.280	5.327	5.406	5.453	5.526	5.573	4.750	76
78	4.875	5.213	5.331	5.405	5.452	5.531	5.578	5.651	5.698	4.875	78
80	5.000	5.338	5.456	5.530	5.577	5.656	5.703	5.776	5.823	5.000	80
82	5.125	5.463	5.581	5.655	5.702	5.781	5.828	5.901	5.948	5.125	82
84	5.250	5.588	5.706	5.780	5.827	5.906	5.953	6.026	6.073	5.250	84
86	5.375	5.713	5.831	5.905	5.952	6.031	6.078	6.151	6.198	5.375	86
88	5.500	5.838	5.956	6.030	6.077	6.156	6.203	6.276	6.323	5.500	88
90	5.625	5.963	6.081	6.155	6.202	6.281	6.328	6.401	6.448	5.625	90
92	5.750	6.088	6.206	6.280	6.327	6.406	6.453	6.526	6.573	5.750	92
94	5.875	6.213	6.331	6.405	6.452	6.531	6.578	6.651	6.698	5.875	94
96	6.000	6.338	6.456	6.530	6.577	6.656	6.703	6.776	6.823	6.000	96

DASH NUMBER INDICATES GRIP LENGTH IN .062 INCREMENTS. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY.

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		G.DILLING	II/22/11	PMT-2803 THRU 2810	
CHECKED:		DATE	SHEET 4 OF 4		
		G.DILLING	II/23/11	PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326	
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY					



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TITLE: MORTORQ® SPIRAL DRIVE RECESS
100° REDUCED HEAD, PHI3-8Mo
CLOSE TOLERANCE, LONG THREAD 125 KSI MIN SHEAR

DRAWN G.DILLING	DATE 1/12/12	DRAWING NUMBER PMT4024L
CHECKED: G.DILLING	DATE 1/12/12	

SHEET 1 OF 2

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

FIRST DASH NO.	MORTORQ SPIRAL DRIVE RECESS (7)				
	RECESS DRIVE SIZE	J MAX REF	K REF	PEN	TORQUE IN/LB MIN
-3	MT-0	.072	.1704	.037 .030	65
-4	MT-1	.086	.2405	.036 .027	150
-5	MT-1	.109	.2405	.059 .050	165
-6	MT-2	.112	.3080	.050 .041	260
-7	MT-3	.139	.3537	.067 .058	400
-8	MT-4	.160	.4285	.072 .057	730
-9	MT-4	.180	.4285	.092 .077	1,220
-10	MT-5	.196	.5063	.092 .067	1,620

PROCUREMENT SPECIFICATION: MCDONNELL DOUGLAS SPEC. 23MII2, TYPE (d).

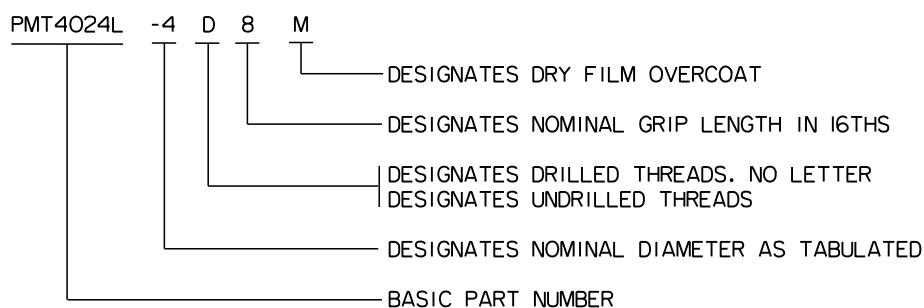
MATERIAL: PH13-8Mo PER AMS 5629.

HEAT TREAT: 125,000 PSI MINIMUM SHEAR.

FINISH CODE: PASSIVATE PER QQ-P-35.

LUBRICATION: DRY FILM OVERCOAT MIL-L-8937 (9)

PART CODE AND EXAMPLE:



NOTES:

1. CONCENTRICITY: CONICAL SURFACE OF HEAD TO "D" DIA WITHIN .003 TIR.
"D" DIA TO THREAD PITCH DIAMETER WITHIN .005 TIR.
RECESS TO "D" DIA WITHIN .010 TIR FOR -3, WITHIN .012 TIR
FOR -4 THRU -6, WITHIN .015 TIR FOR -7 THRU -10.
2. SHANK SHALL BE STRAIGHT WITHIN .003 TIR PER INCH OF BOLT LENGTH.
3. HEAD TO SHANK FILLET RADIUS TO BE ROLLED AFTER HEAT TREAT.
4. COTTER PIN HOLE CENTERLINE WITHIN .010 AND NORMAL WITHIN 2° OF
BOLT CENTERLINE.
5. SURFACE ROUGHNESS PER ANSI B46.1. BEARING SURFACE OF HEAD, HEAD TO SHANK
FILLET, SHANK AND ALL THREAD ELEMENTS 32 MAX RHR; ALL OTHER SURFACES 125 MAX RHR.
6. FLUORESCENT PENETRANT INSPECT PER MIL-I-6866.
- (7) RECESS SHALL WITHSTAND THE RECESS INSPECTION TORQUE VALUES TABULATED,
WITH AN AXIAL END PRESSURE NOT EXCEEDING 15 POUNDS, WITHOUT FAILURE
OF RECESS OR APPLICABLE MORTORQ DRIVER.
8. DIMENSIONS IN INCHES AND TO BE MET PRIOR TO LUBRICATION (WHEN APPLICABLE).
- (9). ALTERNATE DRY FILM APPLICATION SUBJECT TO MCAIR APPROVAL. DRY FILM SHALL BE APPLIED TO SHANK
AND THREADS ONLY WITH 100% COVERAGE OF THREADS AND 80% TO 100% COVERAGE OF SHANK LENGTH.
- (10). ALL SCREWS SHALL BE SUPPLIED WITH A MINIMUM OF 40% OF THE NON-BEARING HEAD SURFACE COATED
WITH WHITE PAINT COLOR NO. 37875 PER FED-STD-595. PAINT SHALL BE REMOVABLE WITH A MEK WIPE.

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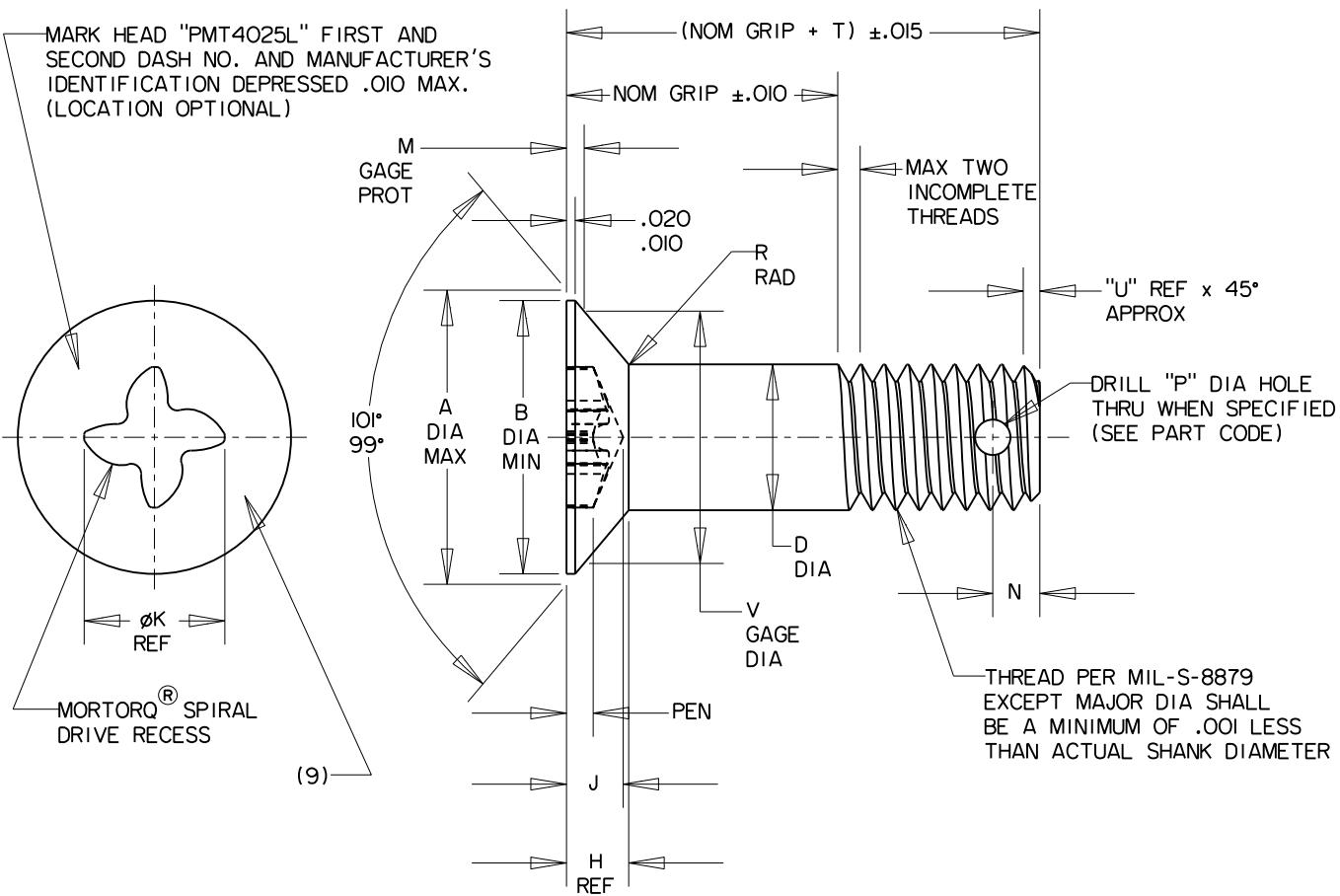
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TITLE: MORTORQ® SPIRAL DRIVE RECESS
100° REDUCED HEAD, PH13-8Mo
CLOSE TOLERANCE, LONG THREAD 125 KSI MIN SHEAR

DRAWN G.DILLING	DATE 1/12/12	DRAWING NUMBER PMT4024L
CHECKED: G.DILLING	DATE 1/12/12	SHEET 2 OF 2
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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MARK HEAD "PMT4025L" FIRST AND
SECOND DASH NO. AND MANUFACTURER'S
IDENTIFICATION DEPRESSED .010 MAX.
(LOCATION OPTIONAL)



FIRST DASH NO.	THREAD	A DIA MAX	B DIA MIN	D DIA	H REF	M GAGE PROT	N	P DIA	R RAD	T BASIC	U REF	V GAGE DIA	Z
-3	.1900-32 UNJF-3A	.381	.338	.1895 .1890	.082	.0222 .0196	.121 .111	.075 .070	.029 .019	.406	.039	.3272 .3270	.003
-4	.2500-28 UNJF-3A	.508	.456	.2495 .2490	.111	.0313 .0283	.121 .111	.081 .076	.035 .025	.469	.045	.4320 .4318	.003
-5	.3125-24 UNJF-3A	.635	.575	.3120 .3115	.138	.0371 .0337	.124 .114	.081 .076	.041 .031	.531	.052	.5451 .5449	.003
-6	.3750-24 UNJF-3A	.763	.692	.3745 .3740	.166	.0432 .0394	.125 .115	.111 .106	.047 .037	.641	.052	.6582 .6580	.003
-7	.4375-20 UNJF-3A	.889	.810	.4370 .4365	.193	.0456 .0414	.128 .118	.111 .106	.053 .043	.675	.062	.7784 .7782	.003
-8	.5000-20 UNJF-3A	1.016	.928	.4995 .4990	.221	.0519 .0473	.128 .118	.111 .106	.060 .050	.781	.062	.8902 .8900	.003
-10	.6250-18 UNJF-3A	1.276	1.169	.6240 .6235	.279	.0674 .0620	.129 .119	.146 .141	.072 .062	.953	.068	1.1124 1.1122	.003
-12	.7500-16 UNJF-3A	1.531	1.406	.7490 .7485	.334	.0771 .0709	.254 .244	.146 .141	.072 .062	.912	.078	1.3440 1.3438	.003

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TITLE: MORTORQ® SPIRAL DRIVE RECESS
100° FLUSH TENSION HEAD, PHI3-8Mo
CLOSE TOLERANCE, LONG THREAD I25 KSI MIN SHEAR

DRAWN G.DILLING	DATE 1/4/12	DRAWING NUMBER PMT4025L
CHECKED: G.DILLING	DATE 1/4/12	SHEET 1 OF 2
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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FIRST DASH NO.	MORTORQ SPIRAL DRIVE RECESS (7)					TENSILE STRENGTH LBS/MIN	DOUBLE SHEAR STRENGTH LBS/MIN
	RECESS DRIVE SIZE	J MAX REF	K REF	PEN	TORQUE IN/LB MIN		
-3	MT-1	.082	.2405	.027 .020	76	4,090	7,090
-4	MT-1	.095	.2405	.047 .038	165	7,530	12,300
-5	MT-2	.117	.3080	.055 .046	260	12,080	19,200
-6	MT-3	.142	.3537	.070 .061	400	18,450	27,600
-7	MT-4	.168	.4285	.080 .065	730	24,910	37,600
-8	MT-5	.186	.5063	.082 .067	1220	33,790	49,100
-10	MT-6	.233	.5938	.110 .085	2500	54,300	76,700
-12	MT-7	.277	.8003	.110 .085	3200	79,400	110,500

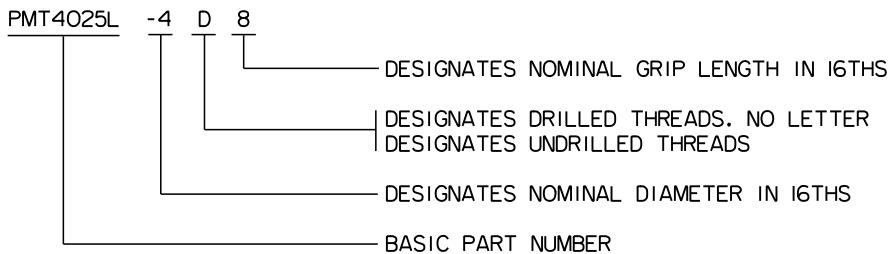
PROCUREMENT SPECIFICATION: MCDONNELL DOUGLAS 23MII2, TYPE (c).

MATERIAL: PH13-8Mo PER AMS 5629.

HEAT TREAT: 125,000 PSI MINIMUM SHEAR.

FINISH: PASSIVATE PER QQ-P-35.

PART CODE AND EXAMPLE:



NOTES:

- I. CONCENTRICITY: CONICAL SURFACE OF HEAD TO "D" DIA WITHIN .003 TIR.
"D" DIA TO THREAD PITCH DIAMETER WITHIN .005 TIR.
RECESS TO "D" DIA WITHIN .010 TIR FOR -08 AND -3.
WITHIN .012 TIR FOR -4 THRU -6, WITHIN .015 FOR -7 THRU -10.
- (2). SHANK SHALL BE STRAIGHT WITHIN "Z" VALUES PER INCH OF BOLT LENGTH.
3. HEAD TO SHANK FILLET RADIUS TO BE ROLLED AFTER HEAT TREAT.
4. COTTER PIN HOLE CENTERLINE WITHIN .010 AND NORMAL WITHIN 2° OF BOLT CENTERLINE.
5. SURFACE ROUGHNESS PER ANSI B46.1. BEARING SURFACE OF HEAD, HEAD TO SHANK FILLET, SHANK AND ALL THREAD ELEMENTS 32 Ra MAX. ALL OTHER SURFACES 125 Ra MAX.
6. FLUORESCENT PENETRANT INSPECT PER MIL-STD-6866.
- (7) RECESS SHALL WITHSTAND THE RECESS INSPECTION TORQUE VALUES TABULATED, WITH AN AXIAL END PRESSURE NOT EXCEEDING 15 POUNDS, WITHOUT FAILURE OF RECESS OR APPLICABLE MORTORQ DRIVER.
8. DIMENSIONS IN INCHES.
- (9). APPLY WHITE PAINT (MINIMUM 40% OF AREA) TO TOP OF HEAD FOR MATERIAL IDENTIFICATION.

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TITLE: MORTORQ® SPIRAL DRIVE RECESS
100° FLUSH TENSION HEAD, PH13-8Mo
CLOSE TOLERANCE, LONG THREAD 125 KSI MIN SHEAR

DRAWN G.DILLING	DATE 1/4/12	DRAWING NUMBER PMT4025L
CHECKED: G.DILLING	DATE 1/4/12	SHEET 2 OF 2
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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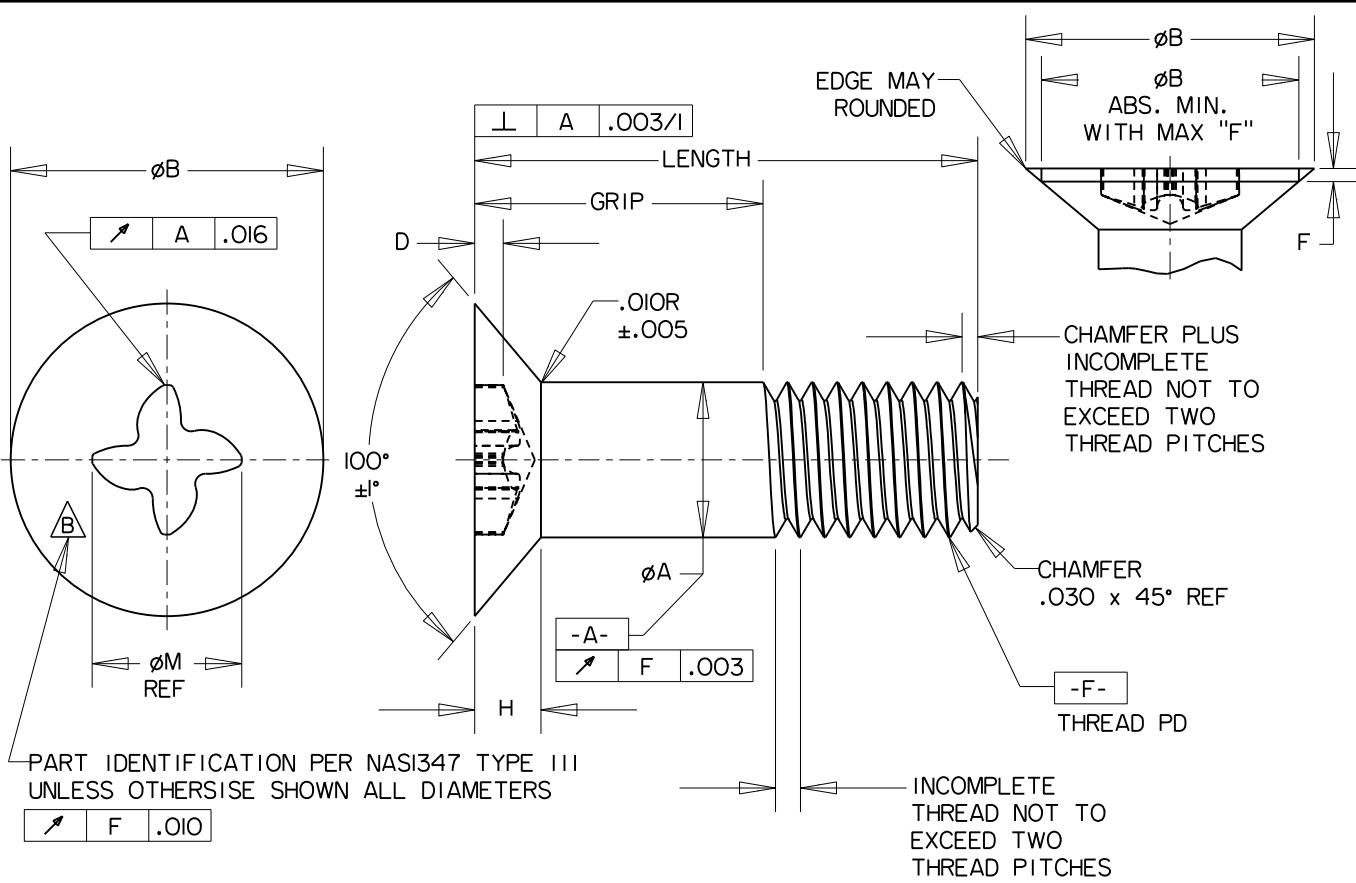


TABLE I

THREAD PER FED-STD-H28/4	ϕA		DRIVE SIZE	ϕB		ϕB		D		F FLAT		ϕM REF	ULTIMATE TENSILE LBS. MIN. (a)					
				SHARP		ABS.				STEEL CRES TI								
	MAX	MIN		MAX	MIN	MIN	MAX.	MIN.	MAX.	REF.								
.164-32 UNJC-3A	.1640	.1610	MT-0	.332	.319	.283	.032	.023	.015	.068	.1704	1,750	1,190	1,820				
.190-32 UNJF-3A	.1890	.1860	MT-I	.385	.371	.327	.027	.020	.016	.080	.2405	2,500	1,700	2,600				
.250-28 UNJF-3A	.2490	.2460	MT-I	.507	.491	.447	.047	.038	.018	.106	.2405	4,550	3,090	4,730				

(a) ULTIMATE TENSILE BASED ON 125,000 PSI STEEL, 85,000 PSI CRES, 130,000 PSI TITANIUM.
THE STRESS AREA USED FOR THE CALCULATIONS OF TENSILE LOAD PER FED-STD-H28/4.

REQUIREMENTS:

MATERIAL:

ALLOY STEEL (UNS G86300), (UNS G87400) OR (UNS G41300) IN ACCORDANCE WITH MIL-S-7839.
CORROSION RESISTANT STEEL (UNS S30430) (UNS S30400) 300 SERIES IN ACCORDANCE WITH QQ-S-763.

PROTECTIVE COATING:

TITANIUM ALLOY (6Al-4V ANN) PER AMS4928 OR AMS4967

STEEL : CADMIUM PLATE PER QQ-P-416 TYPE II CLASS 2.

CRES: PASSIVATE PER QQ-P-35. TYPE VI. AFTER REMOVAL OF ALL OIL AND GREASE, CONDUCT

PASSIVATION TEST PER METHOD I02 OF MIL-STD-753.

TITANIUM: NO COATING OR ALUMINUM COAT

"A" MATERIAL CODE FOR ALUMINUM COAT PER NAS4006.

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TITLE: SCREW, MACHINE
100° FLAT HEAD STRUCTURAL,
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING	DATE 2/6/08	DRAWING NUMBER PMT-5302
CHECKED: G.DILLING	DATE 2/6/08	SHEET 1 OF 3

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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TENSILE STRENGTH: ALLOY STEEL: 125,000 TO 145,000 PSI, ULTIMATE TENSILE STRENGTH.
CORROSION RESISTANT STEEL: 85,000 PSI ULTIMATE TENSILE STRENGTH (MINIMUM).
TITANIUM: ANNEALED 130,000 PSI ULTIMATE TENSILE STRENGTH.

THREAD: THREAD SHALL BE IN ACCORDANCE WITH FED-STD-H28/4. ACCEPTABILITY OF SCREW THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/20 SYSTEM 22.

RECESS: THE MORTORQ SPIRAL DRIVE RECESS PER PSC-5006 PHILLIPS SCREW COMPANY STANDARDS.

PROCUREMENT SPECIFICATION: STEEL, CRES: MIL-S-7839 EXCEPT AS NOTED HEREIN.

TITANIUM = NAS4004 EXCEPT AS NOTED HEREIN, FATIGUE LIFE NOT REQUIRED.
MATERIAL SHALL NOT BE HEAT TREATED. MICROSTRUCTURAL REQUIREMENTS SPECIFICALLY PERTAINING TO HEAT TREATED MATERIAL DO NOT APPLY.

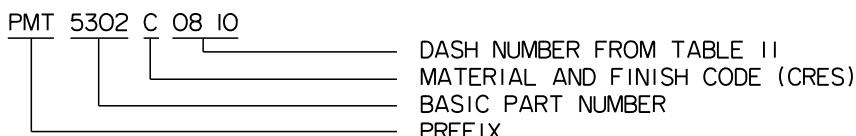
MATERIAL AND FINISH CODE: " - " BEFORE DASH NUMBERS FOR CADMIUM PLATED ALLOY STEEL SCREW.

"C" BEFORE DASH NUMBER FOR CORROSION RESISTANT STEEL SCREW.

"V" BEFORE DASH NUMBER FOR TITANIUM ALLOY

ADD "A" TO THE MATERIAL CODE FOR ALUMINUM COATED PER NAS4006 EX: ("CA")

PART NUMBERING:



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. SCREWS SHALL BE FREE OF BURRS, SLIVERS AND SHARP EDGES.
3. DIMENSION SHALL BE MET AFTER PLATING.
4. IN THE EVENT OF CONFLICT BETWEEN THE TEXT OF THIS DOCUMENT AND THE REFERENCES CITED HEREIN THE TEXT OF THIS DOCUMENT WILL TAKE PRECEDENCE.
5. DIMENSIONING AND TOLERANCING PER SS9209.
6. PART MARKING PER SS8798 UNLESS OTHERWISE SPECIFIED.
7. ADDITIONAL LENGTHS, NOT IN TABLE II, MAY BE SELECTED USING .063 PER DASH NUMBER INCREMENT.
8. USE ANNEALED PROPERTIES FOR SHEAR STRENGTH.
9. PARTS FOR APPROVAL MAY BE PURCHASED FROM; SPS TECHNOLOGIES, AND ALCOA FASTENERS.

REVISION REV 1:6/20/08

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DRAWN	G.DILLING	DATE 2/6/08	DRAWING NUMBER	PMT-5302
CHECKED:	G.DILLING	DATE 2/6/08		SHEET 2 OF 3
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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SCREW LENGTHS TABLE II								
.I64-32 UNJC-3A			.I90-32 UNJF-3A			.250-28 UNJF-3A		
DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015
0804	.281	.094*	I-04	.281	.109*	4-04	.281	.141*
0805	.344	.094*	I-05	.344	.109*	4-05	.344	.141*
0806	.406	.094*	I-06	.406	.109*	4-06	.406	.141*
0807	.469	.094*	I-07	.469	.109*	4-07	.469	.141*
0808	.531	.094*	I-08	.531	.109*	4-08	.531	.141*
0809	.594	.156	I-09	.594	.109*	4-09	.594	.141*
0810	.656	.219	I-10	.656	.188	4-10	.656	.141*
0811	.719	.281	I-11	.719	.250	4-11	.719	.188
0812	.781	.344	I-12	.781	.312	4-12	.781	.250
0813	.844	.406	I-13	.844	.375	4-13	.844	.312
0814	.906	.469	I-14	.906	.438	4-14	.906	.375
0815	.969	.531	I-15	.969	.500	4-15	.969	.438
0816	1.031	.594	I-16	1.031	.563	4-16	1.031	.500
0817	1.094	.656	I-17	1.094	.625	4-17	1.094	.563
0818	1.156	.719	I-18	1.156	.688	4-18	1.156	.625

* SHORT SCREWS SHALL HAVE A TOLERANCE OF +.015/-0.000

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TITLE: SCREW, MACHINE
100° FLAT HEAD, STRUCTURAL
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING	DATE 2/6/08	DRAWING NUMBER PMT-5302
CHECKED: G.DILLING	DATE 2/6/08	SHEET 3 OF 3

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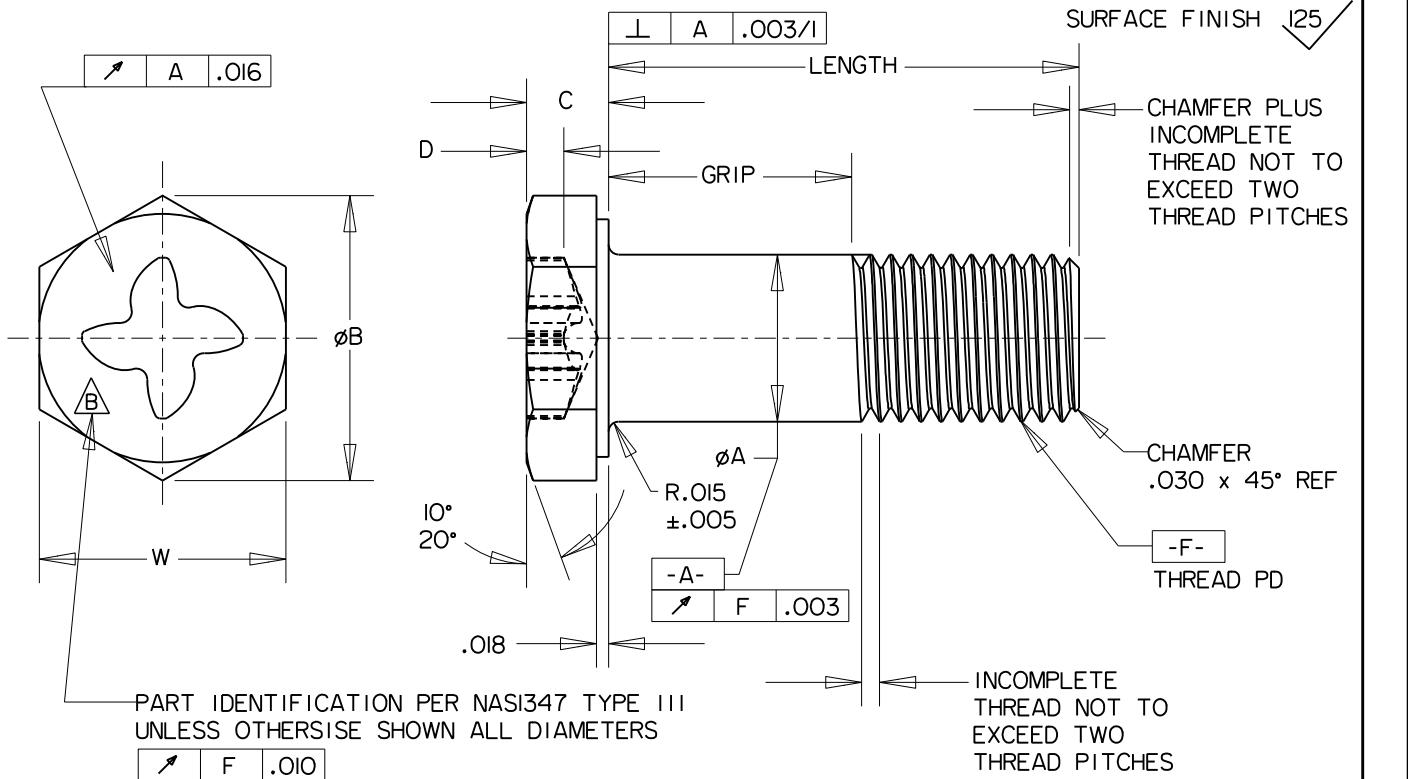


TABLE I

THREAD PER MIL-S-8879	W		DRIVE SIZE	ØA		B	C		D +.005 -.004	ULTIMATE TENSILE LBS MIN	ULTIMATE DOUBLE SHEAR LBS MIN
	MAX	MIN		MAX	MIN	MIN	MAX	MIN			
.164-32 UNJC-3A	.251	.243	MT-0	.1635	.1625	.277	.089	.079	.035	2,170	4,010
.190-32 UNJF-3A	.314	.305	MT-0	.1895	.1885	.348	.103	.092	.035	3,180	5,380
.250-28 UNJF-3A	.376	.367	MT-1	.2495	.2485	.410	.135	.122	.050	5,820	9,300
.3125-24 UNJF-3A	.439	.429	MT-2	.3120	.3110	.480	.141	.125	.050	9,260	14,600
.3750-24 UNJF-3A	.502	.482	MT-2	.3745	.3735	.552	.156	.141	.065	14,000	21,000
.4375-20 UNJF-3A	.564	.554	MT-3	.4370	.4360	.623	.179	.164	.075	19,000	28,600

REQUIREMENTS:

MATERIAL:

ALLOY STEEL (UNS G86300), (UNS G87400) OR (UNS G41300) IN ACCORDANCE WITH MIL-S-7839.

CORROSION RESISTANT STEEL (UNS S66286) IN ACCORDANCE WITH AMS 5731 OR AMS5737

TITANIUM ALLOY (R56400) PER AMS4928 OR AMS 4967.

PROTECTIVE COATING:

STEEL : CADMIUM PLATE PER QQ-P-416 TYPE II CLASS 2.

CRES: PASSIVATE PER AMS-QQ-P-35. TYPE II. AFTER REMOVAL OF ALL OIL AND GREASE, CONDUCT

PASSIVATION TEST PER METHOD 102 OF MIL-STD-753.

TITANIUM: NO FINISH OR
CODE "A" ALUMINUM COAT PER NAS4006

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TITLE: BOLT

HEX HEAD, STRUCTURAL
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING DATE 3/9/07 DRAWING NUMBER

PMT-5307

CHECKED: G.DILLING DATE 3/15/07 SHEET 1 OF 4

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TENSILE STRENGTH: ALLOY STEEL: 160,000 TO 180,000 PSI, ULTIMATE TENSILE STRENGTH.
CORROSION RESISTANT STEEL: 160,000 TO 190,000 PSI ULTIMATE TENSILE STRENGTH.
TITANIUM: 160,000 PSI MIN. ULTIMATE TENSILE STRENGTH (MINIMUM).

THREAD: THREAD SHALL BE IN ACCORDANCE WITH MIL-S-8879. ACCEPTABILITY OF SCREW THREADS
SHALL BE IN ACCORDANCE WITH FED-STD-H28/20 SYSTEM 22.

RECESS: THE MORTORQ SPIRAL DRIVE RECESS PER PHILLIPS SCREW COMPANY STANDARDS.

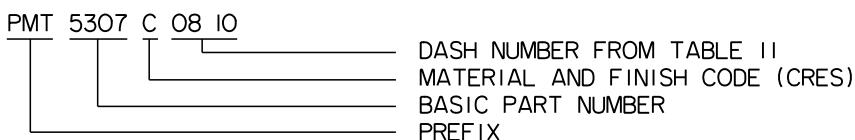
PROCUREMENT SPECIFICATION: STEEL = NAS 4002 EXCEPT AS NOTED HEREIN, FATIGUE LIFE IS REQUIRED.
A266 CRES = NAS 4003 EXCEPT AS NOTED HEREIN, FATIGUE LIFE IS REQUIRED.
TITANIUM = NAS 4004 EXCEPT AS NOTED HEREIN, FATIGUE LIFE IS REQUIRED.

QUALIFICATION: APPROVED SUPPLIERS SHALL HAVE SUPPLIED SIKORSKY AIRCRAFT A QUALIFICATION
REPORT VERIFYING THE CAPABILITY OF PRODUCING PRODUCT MEETING ALL APPLICABLE
REQUIREMENTS OF THE PROCUREMENT SPECIFICATION.

APPROVED SOURCES:

MATERIAL AND FINISH CODE: " - " BEFORE DASH NUMBERS FOR CADMIUM PLATED ALLOY STEEL SCREW.
"C" BEFORE DASH NUMBER FOR CORROSION RESISTANT STEEL SCREW.
"V" BEFORE DASH NUMBER FOR TITANIUM "VA" ALUMINUM COATED.

PART NUMBERING:



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. SCREWS SHALL BE FREE OF BURRS, SLIVERS AND SHARP EDGES SURFACE FINISH TO ASME B46.I.
3. DIMENSION SHALL BE MET AFTER PLATING.
4. SHANK DIAMETER MAY BE .001 OVERSIZE FOR A MAXIMUM DISTANCE OF .031 ADJACENT TO THE HEAD.
5. IN THE EVENT OF CONFLICT BETWEEN THE TEXT OF THIS DOCUMENT AND THE REFERENCES CITED
HEREIN THE TEXT OF THIS DOCUMENT WILL TAKE PRECEDENCE.
6. DIMENSIONING AND TOLERANCING PER SS9209.
7. PART MARKING PER SS8798 UNLESS OTHERWISE SPECIFIED.
8. ADDITIONAL LENGTHS, NOT IN TABLE II, MAY BE SELECTED USING .063 PER DASH NUMBER INCREMENT.
9. PARTS FOR APPROVAL MAY BE PURCHASED FROM; SPS TECHNOLOGIES, AND ALCOA FASTENERS.

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DRAWN	G.DILLING	DATE 3/15/07	DRAWING NUMBER	PMT-5307
CHECKED:	G.DILLING	DATE 3/15/07		SHEET 2 OF 4
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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SCREW LENGTHS TABLE II								
.164-32 UNJC-3A			.190-32 UNJF-3A			.250-28 UNJF-3A		
DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015
0804	.281	*	I-04	.281	*	4-04	.281	*
0805	.344	*	I-05	.344	*	4-05	.344	*
0806	.406	.094	I-06	.406	.062	4-06	.406	*
0807	.469	.156	I-07	.469	.125	4-07	.469	.062
0808	.531	.219	I-08	.531	.188	4-08	.531	.125
0809	.594	.281	I-09	.594	.250	4-09	.594	.188
0810	.656	.344	I-10	.656	.312	4-10	.656	.250
0811	.719	.406	I-11	.719	.375	4-11	.719	.312
0812	.781	.469	I-12	.781	.438	4-12	.781	.375
0813	.844	.531	I-13	.844	.500	4-13	.844	.438
0814	.906	.594	I-14	.906	.563	4-14	.906	.500
0815	.969	.656	I-15	.969	.625	4-15	.969	.563
0816	1.031	.719	I-16	1.031	.688	4-16	1.031	.625
0817	1.094	.782	I-17	1.094	.750	4-17	1.094	.688
0818	1.156	.844	I-18	1.156	.813	4-18	1.156	.750

* SHORT SCREWS SHALL BE THREADED TO WITHIN .032/.064 OF THE HEAD.

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TITLE: BOLT
HEX HEAD, STRUCTURAL
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING	DATE 3/15/07	DRAWING NUMBER PMT-5307
CHECKED: G.DILLING	DATE 3/15/07	SHEET 3 OF 4

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SCREW LENGTHS TABLE II CONT.								
.3125-24 UNJF-3A			.375-24 UNJF-3A			.4375-20 UNJF-3A		
DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015
5-05	.359	*	6-05	.406	*			
5-06	.422	*	6-06	.469	*	7-06	.453	*
5-07	.484	*	6-07	.531	*	7-07	.516	*
5-08	.547	.094	6-08	.594	*	7-08	.578	*
5-09	.609	.155	6-09	.656	.094	7-09	.641	.062
5-10	.672	.219	6-10	.719	.156	7-10	.703	.125
5-11	.734	.281	6-11	.781	.219	7-11	.766	.188
5-12	.797	.344	6-12	.844	.281	7-12	.828	.250
5-13	.859	.406	6-13	.906	.344	7-13	.891	.312
5-14	.922	.469	6-14	.969	.406	7-14	.953	.375
5-15	.984	.531	6-15	1.031	.469	7-15	1.016	.438
5-16	1.047	.594	6-16	1.094	.531	7-16	1.078	.500
5-17	1.109	.656	6-17	1.156	.594	7-17	1.141	.563
5-18	1.172	.719	6-18	1.219	.656	7-18	1.203	.625
5-19	1.234	.781	6-19	1.281	.719	7-19	1.266	.688
5-20	1.297	.844	6-20	1.344	.781	7-20	1.328	.750
5-21	1.359	.906	6-21	1.406	.844	7-21	1.391	.813
5-22	1.422	.969	6-22	1.469	.906	7-22	1.453	.875
5-23	1.484	1.031	6-23	1.531	.969	7-23	1.516	.938
5-24	1.547	1.094	6-24	1.594	1.031	7-24	1.578	1.000
5-25	1.609	1.156	6-25	1.656	1.094	7-25	1.641	1.062
5-26	1.672	1.218	6-26	1.719	1.156	7-26	1.703	1.125
5-27	1.734	1.281	6-27	1.781	1.218	7-27	1.766	1.187

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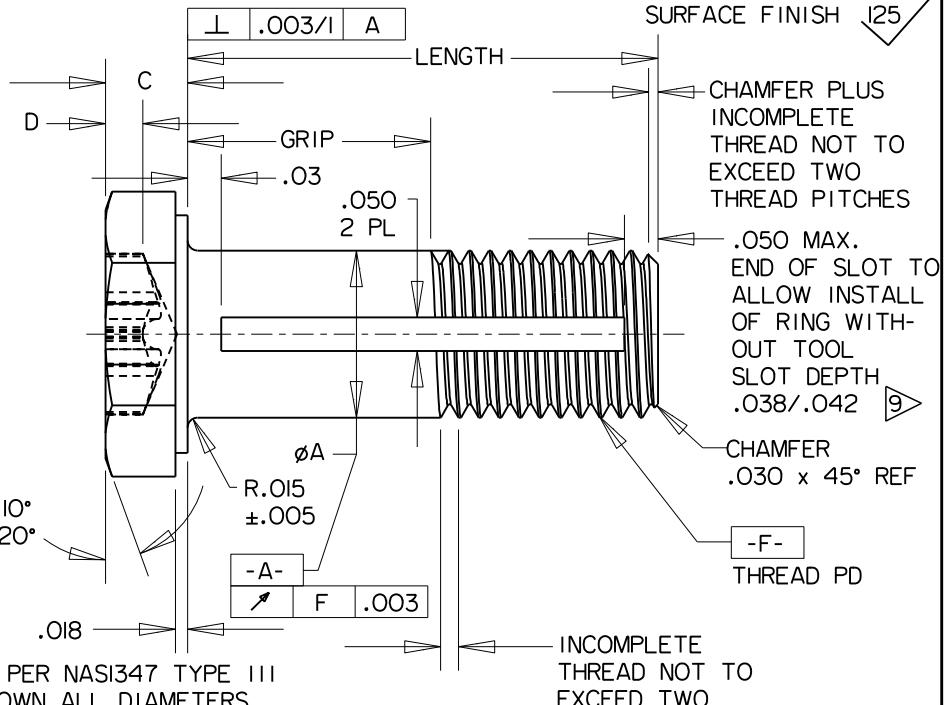
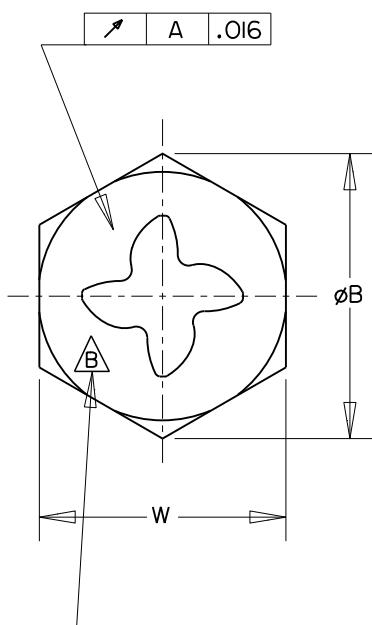
TITLE: BOLT
 HEX HEAD, STRUCTURAL
 MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING	DATE 3/15/07	DRAWING NUMBER PMT-5307
CHECKED: G.DILLING	DATE 3/15/07	

SHEET 4 OF 4

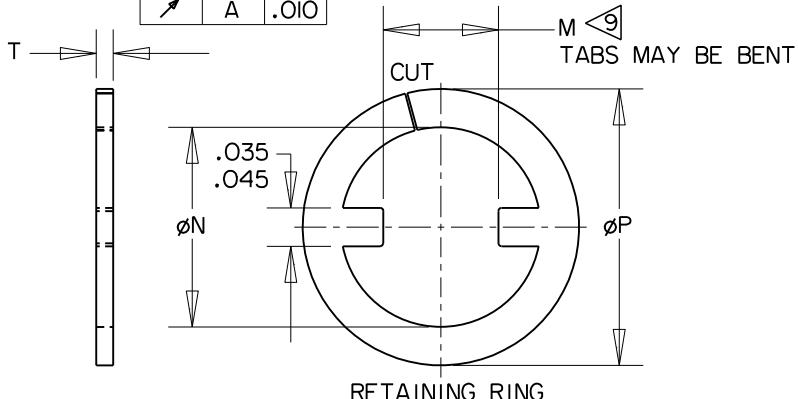
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PART IDENTIFICATION PER NASI347 TYPE III
UNLESS OTHERWISE SHOWN ALL DIAMETERS

A .010



RETAINING RING TABLE I				
DASH NO.	P ±.005	N ±.005	T MAX	M REF
08	.280	.175	.022	.095
10	.300	.215	.022	.120
4	.360	.260	.022	.150
5	.420	.320	.022	.215

TABLE II

THREAD PER MIL-S-8879	W		DRIVE SIZE	ØA		B	C		D +.005 -.004	ULTIMATE TENSILE LBS MIN	ULTIMATE DOUBLE SHEAR LBS MIN
	MAX	MIN		MAX	MIN	MIN	MAX	MIN			
.164-32 UNJC-3A	.251	.243	MT-0	.1635	.1625	.277	.089	.079	.035	1,950	3,609
.190-32 UNJF-3A	.314	.305	MT-0	.1895	.1885	.348	.103	.092	.035	2,660	4,842
.250-28 UNJF-3A	.376	.367	MT-1	.2495	.2485	.410	.135	.122	.050	5,238	8,370
.3125-24 UNJF-3A	.439	.429	MT-2	.3120	.3110	.480	.141	.125	.050	8,334	13,140

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TITLE: SCREW MACHINE, HEX HEAD
STRUCTURAL, CAPTIVE
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING DATE 3/16/07 DRAWING NUMBER PMT-5308

CHECKED: G.DILLING DATE 3/16/07

SHEET 1 OF 3

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

REQUIREMENTS:

MATERIAL: SCREW

CORROSION RESISTANT STEEL (UNS S66286) PER AMS 5853 OR CONFORMING TO THE CHEMISTRY OF AMS 5731 OR AMS5737.

TITANIUM ALLOY (R56400) PER AMS4928 OR AMS 4967

RETAINING RING: 302/304 CRES PER AMS 5906 OR 17-7 TO MIL-S-25043 TO MEET REQUIREMENT HEREIN.
PROTECTIVE COATING:

CRES: PASSIVATE PER AMS-QQ-P-35 TYPE III. AFTER REMOVAL OF ALL OIL AND GREASE, CONDUCT PASSIVATION TEST PER METHOD 102 OF MIL-STD-753.

TITANIUM: NO FINISH OR CODE "A"

"A" CODE = ALUMINUM COAT PER NAS4006

BLACK PAINT OPTION: PRIME PER MIL-P-85582 AND PAINT HEAD BLACK(#37038) IN ACCORDANCE WITH MIL-C-46168 OVER-SPRAY PERMITTED

TENSILE STRENGTH: CORROSION RESISTANT STEEL: 160,000 TO 190,000 PSI ULTIMATE TENSILE STRENGTH.
TITANIUM: 160,000 PSI MIN. ULTIMATE TENSILE STRENGTH (MINIMUM).

THREAD: THREAD SHALL BE IN ACCORDANCE WITH MIL-S-8879. ACCEPTABILITY OF SCREW THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/20 SYSTEM 22.

RECESS: THE MORTORQ SPIRAL DRIVE RECESS PER PHILLIPS SCREW COMPANY STANDARDS.

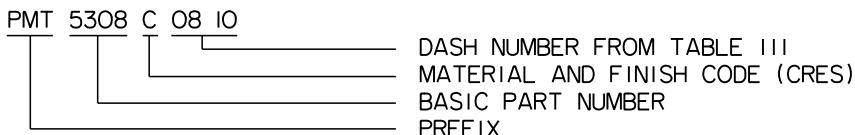
TOLERANCE: RETAINING RING ID (N) TO OD (P) WITHIN THE TOLERANCE OF THE ID (N)

PROCUREMENT SPECIFICATION: CRES NAS 4003, TITANIUM NAS 4004 EXCEPT AS NOTED HEREIN,
FATIGUE LIFE REQUIRED.

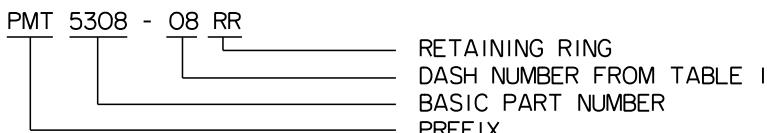
APPROVED SOURCES:

MATERIAL AND FINISH CODE: "C" BEFORE DASH NUMBER FOR CORROSION RESISTANT STEEL "CA"
ALUMINUM COATED
"V" BEFORE DASH NUMBER FOR TITANIUM "VA" ALUMINUM COATED.
SUFIX DASH NUMBER WITH "B" FOR BLACK PAINTED OPTION

PART NUMBERING:



RETAINING RING ONLY:



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. SCREWS SHALL BE FREE OF BURRS, SLIVERS AND SHARP EDGES SURFACE FINISH TO ASME B46.1.
ALL SHARP CORNERS TO BE RADIUSED .005 TO .015.
3. DIMENSION SHALL BE MET AFTER PLATING.
4. SHANK DIAMETER MAY BE .001 OVERSIZE FOR A MAXIMUM DISTANCE OF .031 ADJACENT TO THE HEAD.
5. IN THE EVENT OF CONFLICT BETWEEN THE TEXT OF THIS DOCUMENT AND THE REFERENCES CITED HEREIN THE TEXT OF THIS DOCUMENT WILL TAKE PRECEDENCE.
6. DIMENSIONING AND TOLERANCING PER SS9209.
7. PART MARKING PER SS8798 UNLESS OTHERWISE SPECIFIED.
8. PARTS FOR APPROVAL MAY BE PURCHASED FROM; SPS TECHNOLOGIES, AND ALCOA FASTENERS.

9. TABS SHALL BE SIZED, RADIUSED AND DEBURRED TO INSTALL ON THE BOLT AND SLIDE FREELY IN THE SLOTS WHILE MEETING A 50 LBS MINIMUM PUSH - OUT FORCE.

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DRAWN G.DILLING	DATE 3/16/07	DRAWING NUMBER PMT-5308	SHEET 2 OF 3				
CHECKED: G.DILLING				PHONE: 774-396-6190 FAX: 508-966-2326			
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY							

SCREW LENGTHS TABLE III								
.164-32 UNJC-3A			.190-32 UNJF-3A			.250-28 UNJF-3A		
DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015	DASH NO.	LENGTH ±.015	GRIP ±.015
0804	.281	*	I-04	.281	*	4-04	.281	*
0805	.344	*	I-05	.344	*	4-05	.344	*
0806	.406	.094	I-06	.406	.062	4-06	.406	*
0807	.469	.156	I-07	.469	.125	4-07	.469	.062
0808	.531	.219	I-08	.531	.188	4-08	.531	.125
0809	.594	.281	I-09	.594	.250	4-09	.594	.188
0810	.656	.344	I-10	.656	.312	4-10	.656	.250
0811	.719	.406	I-11	.719	.375	4-11	.719	.312
0812	.781	.469	I-12	.781	.438	4-12	.781	.375
0813	.844	.531	I-13	.844	.500	4-13	.844	.438
0814	.906	.594	I-14	.906	.563	4-14	.906	.500
0815	.969	.656	I-15	.969	.625	4-15	.969	.563
0816	1.031	.719	I-16	1.031	.688	4-16	1.031	.625
0817	1.094	.782	I-17	1.094	.750	4-17	1.094	.688
0818	1.156	.844	I-18	1.156	.813	4-18	1.156	.750

ADDITIONAL LENGTHS NOT IN TABLE MAY BE SELECTED USING .063 PER DASH NUMBER INCREMENT.

.3125-24 UNJF-3A		
DASH NO.	LENGTH ±.015	GRIP ±.015
5-05	.359	*
5-06	.422	*
5-07	.484	*
5-08	.547	.094
5-09	.609	.155
5-10	.672	.219
5-11	.734	.281
5-12	.797	.344
5-13	.859	.406
5-14	.922	.469
5-15	.984	.531
5-16	1.047	.594
5-17	1.109	.656
5-18	1.172	.719
5-19	1.234	.781
5-20	1.297	.844
5-21	1.359	.906
5-22	1.422	.969

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TITLE: SCREW MACHINE, HEX HEAD
STRUCTURAL, CAPTIVE
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING DATE 3/16/07 DRAWING NUMBER PMT-5308

CHECKED: G.DILLING DATE 3/16/07 SHEET 3 OF 3

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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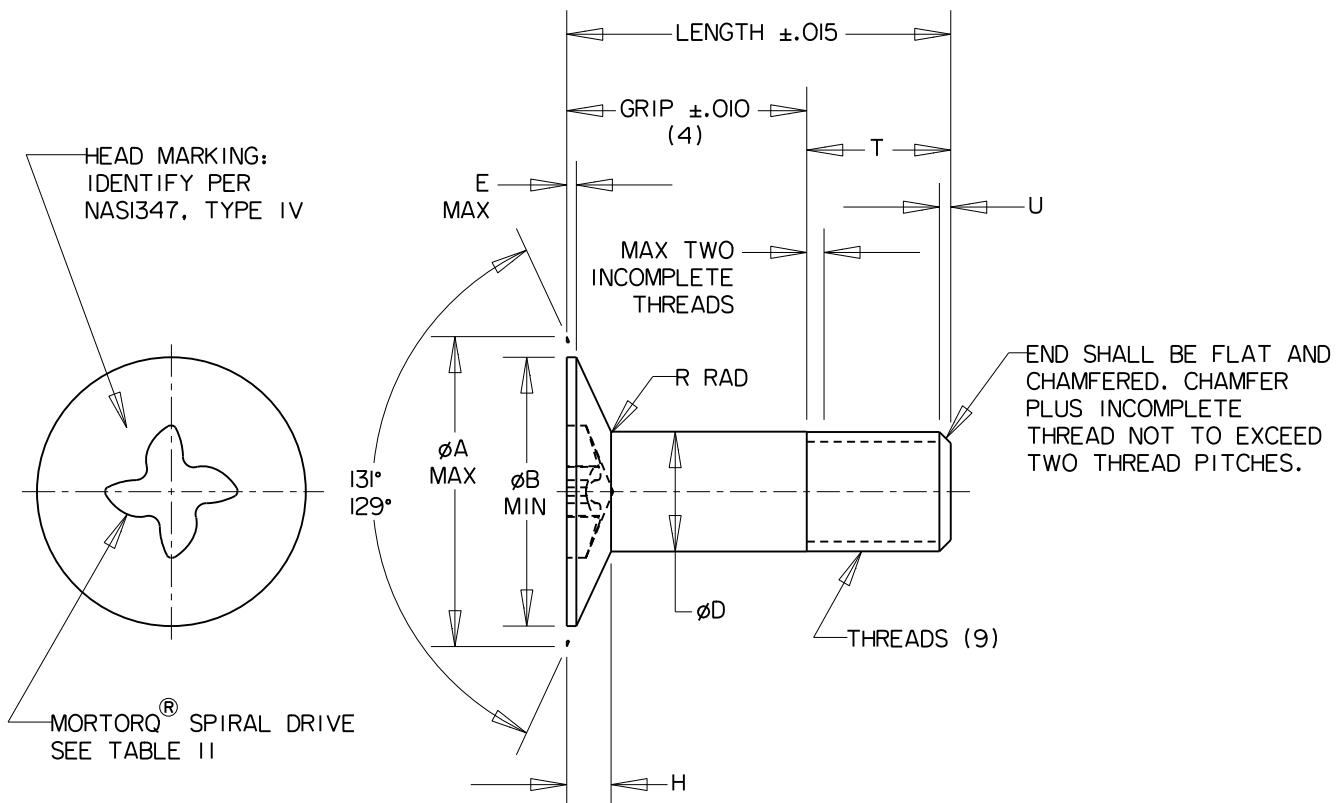


TABLE I											
DIA DASH NO.	THREAD UNJF-3A (9)	RECESS SIZE	ØA MAX (14)	ØB MIN	ØD		E MAX (14)	H REF (14)	R RAD	T REF	U REF
					AFTER PLATING OR COATING	UNPLATED					
3	.1900-32	MT-0	.4045	.3206	.1895 .1885	.1895 .1890	.013	.049	.020 .010	.363	.050
4	.2500-28	MT-1	.5260	.4421	.2495 .2485	.2495 .2490	.015	.063	.020 .010	.403	.050
5	.3125-24	MT-1	.6192	.5353	.3120 .3110	.3120 .3115	.018	.070	.025 .010	.501	.060
6	.3750-24	MT-2	.7300	.6461	.3745 .3735	.3745 .3740	.021	.081	.030 .015	.594	.060

SHEET	1	2	3	4	5
REV	-	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE, SCREW, SHEAR,
130° FLUSH HEAD, CLOSE TOLERANCE, 95 KSI FSU

DRAWN G.DILLING	DATE 8/5/10	DRAWING NUMBER PMT-5310
CHECKED: G.DILLING	DATE 8/5/10	SHEET 1 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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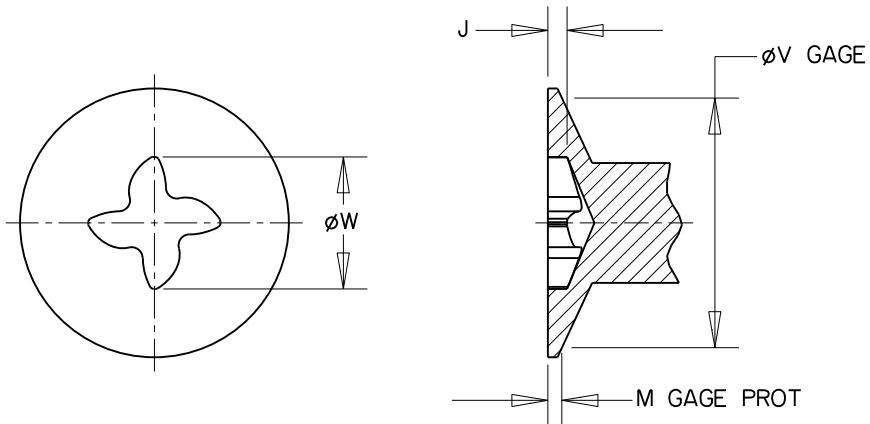


TABLE II

DIA DASH NO.	TOLERANCES		HEAD GAGING		J RECESS GAGING PENETRATION (3)	TORQUE MIN IN-LBS (5)	RAISED METAL MAX (5)	TENSILE STRENGTH LBS MIN (12)	DOUBLE SHEAR LBS MIN	ØW REF
	Y (1)	Z (2)	M HEAD PROTRUSION (7)	ØV GAGE CIRCLE (7)						
3	.0045	.0040	.0362 .0324	.2441 .2439	.027 .019	45	.005	2000	5,380	.1704
4	.0045	.0030	.0435 .0390	.3315 .3313	.032 .023	75	.005	3700	9,300	.2405
5	.0045	.0030	.0479 .0429	.4047 .4045	.039 .030	175	.005	5000	14,600	.2405
6	.0060	.0025	.0546 .0490	.4854 .4852	.050 .041	300	.006	7200	21,000	.3080

SEE SHEETS 4 AND 5 FOR NOTES (1), (2), (3), (5), (7) AND (12).

TABLE III

GRIP DASH NO.	GRIP ±.010	LENGTH FOR DIA DASH NUMBERS LISTED ±.015			
		3	4	5	6
2	.125	.487	.528	---	---
3	.187	.549	.590	---	---
4	.250	.613	.653	.751	.844
5	.312	.675	.715	.813	.906
6	.375	.738	.778	.876	.969
7	.438	.801	.841	.939	1.032
8	.500	.863	.903	1.001	1.094
9	.562	.925	.965	1.063	1.156
10	.625	.988	1.028	1.126	1.219
11	.688	1.051	1.091	1.189	1.282
12	.750	1.113	1.153	1.251	1.344
13	.812	1.175	1.215	1.313	1.406
14	.875	1.238	1.278	1.376	1.496
15	.938	1.301	1.341	1.439	1.532
16	1.000	1.363	1.403	1.501	1.594
17	1.062	1.425	1.465	1.563	1.656
18	1.125	1.488	1.528	1.626	1.719
19	1.188	1.551	1.591	1.689	1.782
20	1.250	1.613	1.653	1.751	1.844

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TITLE: MORTORQ® SPIRAL DRIVE, SCREW, SHEAR,
130° FLUSH HEAD, CLOSE TOLERANCE, 95 KSI FSU

DRAWN G.DILLING	DATE 8/5/10	DRAWING NUMBER PMT-5310
CHECKED: G.DILLING	DATE 8/5/10	SHEET 2 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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TABLE III (CONT'D)

GRIP DASH NO.	GRIP ±.010	LENGTH FOR DIA DASH NUMBERS LISTED ±.015			
		3	4	5	6
21	1.312	1.675	1.715	1.813	1.906
22	1.375	1.738	1.778	1.876	1.969
23	1.438	1.801	1.841	1.939	2.032
24	1.500	1.863	1.903	2.001	2.094
25	1.562	1.925	1.965	2.063	2.156
26	1.625	1.988	2.028	2.126	2.219
27	1.688	2.051	2.091	2.189	2.282
28	1.750	2.113	2.153	2.251	2.344
29	1.812	2.175	2.215	2.313	2.406
30	1.875	2.238	2.278	2.376	2.469
31	1.938	2.301	2.341	2.439	2.532
32	2.000	2.363	2.403	2.501	2.594
34	2.125	2.488	2.528	2.626	2.719
36	2.250	2.613	2.653	2.751	2.844
38	2.375	2.738	2.778	2.876	2.969
40	2.500	2.863	2.903	3.001	3.094
42	2.625	2.988	3.028	3.126	3.219
44	2.750	3.113	3.153	3.251	3.344
46	2.875	3.238	3.278	3.376	3.469
48	3.000	3.363	3.403	3.501	3.594
50	3.125	3.488	3.528	3.626	3.719
52	3.250	3.613	3.653	3.751	3.844
54	3.375	3.738	3.778	3.876	3.969
56	3.500	3.863	3.903	4.001	4.094
58	3.625	3.988	4.028	4.126	4.219
60	3.750	4.113	4.153	4.251	4.344
62	3.875	4.238	4.278	4.376	4.469
64	4.000	4.363	4.403	4.501	4.594
66	4.125	4.488	4.528	4.626	4.719
68	4.250	4.613	4.653	4.751	4.844
70	4.375	4.738	4.778	4.876	4.969
72	4.500	4.863	4.903	5.001	5.094
74	4.625	4.988	5.028	5.126	5.219
76	4.750	5.113	5.153	5.251	5.344
78	4.875	5.238	5.278	5.376	5.469
80	5.000	5.363	5.403	5.501	5.594
82	5.125	5.488	5.528	5.626	5.719
84	5.250	5.613	5.653	5.751	5.844
86	5.375	5.738	5.778	5.876	5.969
88	5.500	5.863	5.903	6.001	6.094
90	5.625	5.988	6.028	6.126	6.219
92	5.750	6.113	6.153	6.251	6.344
94	5.875	6.238	6.278	6.376	6.469
96	6.000	6.363	6.403	6.501	6.594

GRIP DASH NUMBER INDICATES GRIP LENGTH IN .0625 INCREMENTS ROUNDED OFF TO THREE PLACES. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY

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TITLE: MORTORQ® SPIRAL DRIVE, SCREW, SHEAR, 130° FLUSH HEAD, CLOSE TOLERANCE, 95 KSI FSU

DRAWN G.DILLING	DATE 8/5/10	DRAWING NUMBER PMT-5310
CHECKED G.DILLING	DATE 8/5/10	

SHEET 3 OF 5

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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MATERIAL: CRES - A286 (UNS S66286) CONFORMING TO THE CHEMISTRY OF AMS 5731, AMS 5732, AMS 5737 OR AMS 5853.

TITANIUM ALLOY - 6AL-4V (UNS R56400) PER AMS 4928 OR AMS 4967.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER AMS-H-6875 OR AMS 2759 FOR CRES AND AMS-H-81200 OR AMS 280I FOR TITANIUM.

CRES = I60 = I90 KSI FTU. PRECIPITATION HARDENING PER AMS 5853 OR AMS 2759. (I2)

TITANIUM - I60 KSI FTU MIN PER AMS-H-81200 OR AMS 280I.

FINISH: CRES - PASSIVATE IN ACCORDANCE WITH AMS 2700, METHOD I, TYPE 2 OR TYPE 8, CLASS I OR CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2. POST PLATE HYDROGEN EMBRITTLEMENT BAKING AND TESTING PER AMS-QQ-P-416 ARE NOT REQUIRED.

TITANIUM ALLOY - NONE OF OPTIONAL ALUMINUM PIGMENTED COATING PER NAS4006 WITH CETYL ALCOHOL LUBRICANT PER MIL-L-87132, TYPE III, GRADE B.

CODE: BASIC PART NUMBER = SCREW, I30° FLUSH HEAD, MORTORQ SPIRAL DRIVE MATERIAL CODE AFTER BASIC PART NUMBER:

- ADD "E" FOR CRES.
- ADD "V" FOR TITANIUM.

DIAMETER DASH NUMBER DESIGNATES DIAMETER AND THREAD.

FINISH CODE AFTER DIAMETER DASH NUMBER:

- ADD "-" FOR PASSIVATION (CRES ONLY).
- ADD "-" FOR BARE TITANIUM
- ADD "A" FOR ALUMINUM PIGMENTED COATING WITH CETYL ALCOHOL (TITANIUM ONLY)
- ADD "P" FOR CADMIUM PLATING (CRES ONLY)

GRIP DASH NUMBER DESIGNATES GRIP IN .0625 INCREMENTS. (SEE TABLE III)

EXAMPLES OF PART NUMBERS:

PMT5310E3-10 = SCREW, .1900-32 THREAD, PASSIVATED CRES, .625 GRIP.

PMT5310V5A15 = SCREW, .3125-24 THREAD, ALUMINUM PIGMENTED COATED TITANIUM, .938 GRIP.

PMT5310V5-15 = SCREW, .3125-24 THREAD, TITANIUM ALLOY, .938 GRIP.

PMT5310E3PIO = SCREW, .1900-32 THREAD, CADMIUM PLATED CRES, .625 GRIP.

NOTES:

- I. CONCENTRICITY: CONICAL SURFACE OF HEAD AND "ØD" WITHIN .003 FIM. "ØD" AND THREAD PITCH DIAMETER WITHIN "Y" VALUES FIM. RECESS TO "ØD" WITHIN .016 FIM THRU .2500 SIZE: WITHIN .024 FIM ABOVE .2500 SIZE.
2. SHANK STRAIGHTNESS: WITHIN "Z" VALUES FIM PER INCH OF LENGTH.
3. RECESS GAGING IN ACCORDANCE WITH PHILLIPS SCREW COMPANY SPECIFICATIONS PSC-5027.
4. GRIP LENGTH: FROM TOP OF HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
5. SCREW RECESSES SHALL MEET THE TORQUE TEST REQUIREMENTS SPECIFIED HEREIN WHEN TESTED IN ACCORDANCE WITH THE APPLICABLE PROCUREMENT SPECIFICATION.

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	CHECKED: G.DILLING	DATE 8/5/10				
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326						
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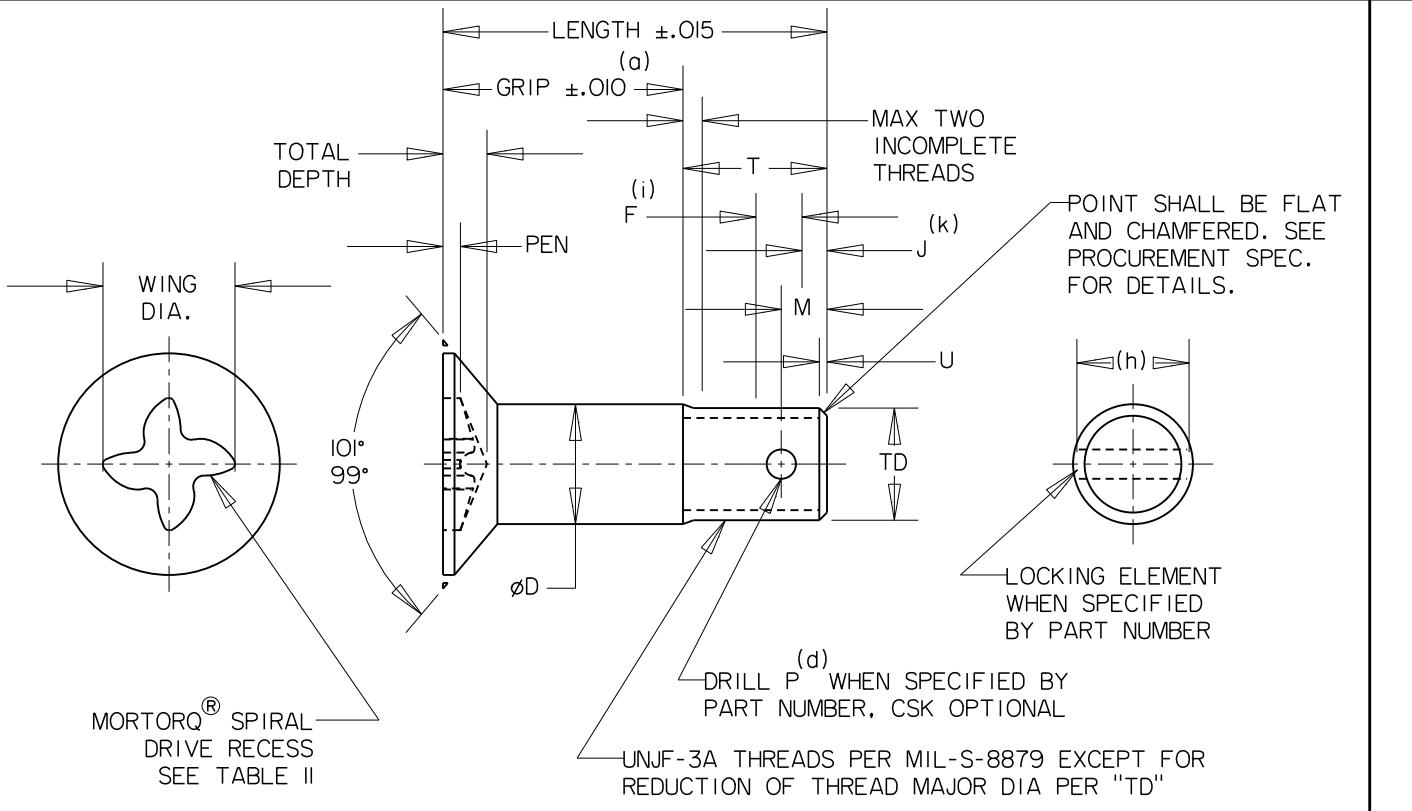
NOTES: (CONTINUED)

6. SCREWS SHALL BE FREE FROM BURRS AND SHARP EDGES.
7. FLUSHNESS GAGE PROTRUSION SHALL BE INSPECTED PER NAS527.
8. SURFACE ROUGHNESS: " ϕD " UNDERSIDE OF HEAD, THREAD ROOT AND THREAD FLANKS 32 MICROINCHES MAX, ALL OTHER SURFACES 125 MICROINCHES MAX PER ASME B46.1.
9. THREADS IN ACCORDANCE WITH AS8879; MAJOR DIA SHALL BE .001 BELOW MIN SHANK DIAMETER.
10. DIMENSIONS ARE IN INCHES AND APPLY TO THE FINISHED PRODUCT.
- II. FOR CRES, MAGNETIC PERMEABILITY SHALL BE LESS THAN 2.0 (AIR = 1.0) FOR A FIELD STRENGTH OF H = 200 OERSTEDS USING A MAGNETIC PERMEABILITY INDICATOR PER ASTM A 342.
12. THE EFFECT OF COLD WORK AND AGING INDUCED DURING THE MANUFACTURING CYCLE MAY INCREASE THE ULTIMATE TENSILE LOAD (LBS) OF THE FINISHED PART, BUT ANY PART (TYPE I, II OR III) SHALL NOT EXCEED 1.3 TIMES THE SPECIFIED TYPE I MINIMUM TENSILE LOAD (LBS).
13. THREADS SHALL BE PROTECTED FROM ABRASION AND CHAFING DURING HANDLING, TRANSPORTATION AND STORAGE IN ACCORDANCE WITH PROCUREMENT SPECIFICATION REQUIREMENTS.
14. "A", "E" AND "H" ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES "A", "E" AND "H" ARE CALCULATED LIMITS RESULTING FROM TOLERANCES ON " ϕD ", "M" AND " ϕV " AND HEAD ANGLE.

PROCUREMENT SPECIFICATION: NAS4003 FOR CRESS, NAS4004 FOR TITANIUM, EXCEPT AS NOTED HEREIN. THE HEAD TO SHANK FILLET RADIUS SHALL BE COLD WORKED, BUT FATIGUE TESTING IS NOT REQUIRED.

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	CHECKED: G.DILLING	DATE 8/5/10				
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326						
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY						



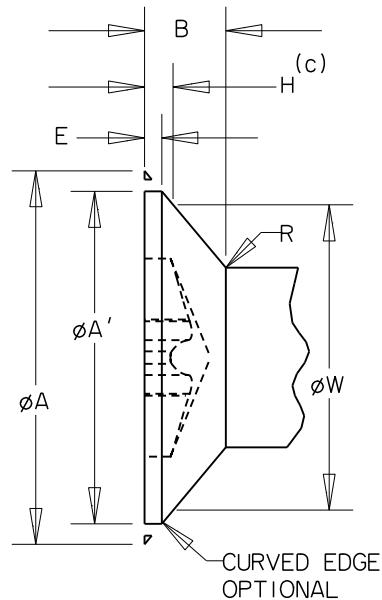
HEAD MARKING SHALL BE DEPRESSED (.010 MAX)
AND ARRANGED AS FOLLOWS:

MARK WITH BASIC NUMBER (PMT OPTIONAL). MANUFACTURER'S SYMBOL.
GRIP DASH NUMBER "D" "L" OR "P" WHEN APPLICABLE (I) AND RECESS
NUMBER ENCIRCLED. RECESS NUMBER TO BE APPROXIMATELY 25% LARGER
THAN OTHER NUMBERS.

"D" IDENTIFIES BOLT WITH DRILLED SHANK

"L" IDENTIFIES BOLT WITH OPTIONAL LOCKING ELEMENT.

"P" IDENTIFIES BOLT WITH PATCH TYPE LOCKING ELEMENT ONLY



ENLARGED VIEW
OF HEAD

SHEET	1	2	3	4	5	6
REV	-	-	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE BOLT 100° HEAD,
CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
LONG THREAD, SELF-LOCKING AND NON-LOCKING

DRAWN G.DILLING	DATE 8/10/09	DRAWING NUMBER PMT-7303 THRU 7316
CHECKED: L DOUGAN	DATE 8/14/09	SHEET 1 OF 6

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TABLE I DIMENSIONS

BASIC PART NO	NOM. THREAD SIZE	A DIA MAX (b)	A' ABSO-LUTE MIN DIA (b)	B MAX (b)	D DIA UNCOATED		D DIA COATED		H GAGE PROTRUSION (c)		W GAGE DIA +.0002 -.0000
					MAX	MIN	MAX	MIN	NOM	±TOL	
PMT-7303	.1900-32	.381	.338	.082	.1895	.1890	.1895	.1885	.0210	.0013	.3270
PMT-7304	.2500-28	.508	.456	.111	.2495	.2490	.2495	.2485	.0299	.0015	.4318
PMT-7305	.3125-24	.635	.575	.138	.3120	.3115	.3120	.3110	.0354	.0017	.5449
PMT-7306	.3750-24	.763	.692	.166	.3745	.3740	.3745	.3735	.0414	.0019	.6580
PMT-7307	.4375-20	.889	.810	.193	.4370	.4365	.4370	.4360	.0435	.0021	.7782
PMT-7308	.5000-20	1.016	.928	.221	.4995	.4990	.4995	.4985	.0496	.0023	.8900
PMT-7309	.5625-18	1.144	1.047	.249	.5615	.5610	.5615	.5605	.0556	.0025	1.0026
PMT-7310	.6250-18	1.276	1.169	.279	.6240	.6235	.6240	.6230	.0649	.0027	1.1122
PMT-7312	.7500-16	1.531	1.406	.334	.7490	.7485	.7490	.7480	.0738	.0031	1.3438
PMT-7314	.8750-14	1.786	1.644	.390	.8740	.8735	.8740	.8730	.0840	.0035	1.5730
PMT-7316	1.0000-12	2.043	1.882	.446	.9990	.9985	.9990	.9980	.0950	.0039	1.8024

TABLE I DIMENSIONS (CONTINUED)

BASIC PART NO	E MAX	(i) F	(k) J	M ±.010	P ^(d) +.010 -.000	R RAD		(e) T REF	TD DIA		U MAX	(f) Y	(g) Z
						MAX	MIN		MAX	MIN			
PMT-7303	.015	.156	.094	.164	.070	.020	.010	.365	.184	.181	.039	.0045	.0045
PMT-7304	.018	.178	.107	.178	.076	.020	.010	.425	.244	.241	.045	.0045	.0030
PMT-7305	.021	.208	.125	.181	.076	.025	.010	.469	.306	.302	.052	.0045	.0030
PMT-7306	.025	.208	.125	.197	.106	.030	.015	.578	.368	.364	.052	.0045	.0025
PMT-7307	.028	.250	.150	.201	.106	.030	.015	.694	.431	.426	.062	.0060	.0025
PMT-7308	.031	.250	.150	.216	.106	.030	.015	.735	.493	.488	.062	.0060	.0020
PMT-7309	.034	.278	.167	.218	.141	.030	.015	.840	.555	.550	.068	.0060	.0020
PMT-7310	.038	.278	.167	.249	.141	.030	.015	.902	.618	.612	.068	.0060	.0020
PMT-7312	.044	.312	.188	.252	.141	.030	.015	1.041	.743	.737	.078	.0060	.0020
PMT-7314	.050	.357	.214	.257	.141	.030	.015	1.184	.868	.861	.089	.0090	.0020
PMT-7316	.057	.416	.250	.264	.141	.030	.015	1.309	.993	.986	.104	.0090	.0020

TABLE II RECESS PERFORMANCE AND DIMENSIONS

BASIC PART NO	MIN. TORQUE (I)		PENETRATION		TOTAL DEPTH REF	WING DIA. REF
	TORQUE INCH POUNDS	RECESS NUMBER	MAX	MIN		
PMT-7303	50	MT-1	.027	.020	.082	.2405
PMT-7304	125	MT-1	.047	.038	.095	.2405
PMT-7305	-	MT-2	.055	.046	.117	.3080
PMT-7306	-	MT-3	.070	.061	.142	.3537
PMT-7307	-	MT-4	.080	.065	.168	.4285
PMT-7308	-	MT-5	.082	.067	.186	.5063
PMT-7309	-	MT-5	.102	.077	.206	.5063
PMT-7310	-	MT-6	.110	.085	.233	.5938
PMT-7312	-	MT-7	.110	.085	.277	.8003
PMT-7314	-	MT-7	.140	.115	.307	.8003
PMT-7316	-	MT-8	.162	.122	.329	.8210

**THE LAST TWO DIGITS OF THE BASIC NUMBER DESIGNATE THE SIZE. SEE SHEET 3 FOR "D", "L", "P" AND "U" CODES. SEE SHEETS 4 AND 5 FOR GRIP DASH NUMBERS.

(a), (b) ETC SEE NOTES ON SHEET 3

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TITLE: MORTORQ® SPIRAL DRIVE 100° HEAD,
CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
LONG THREAD, SELF LOCKING AND NON-LOCKING

DRAWN G.DILLING	DATE 8/10/09	DRAWING NUMBER PMT-7303 THRU 7316
CHECKED: L DOUGAN	DATE 8/14/09	SHEET 2 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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MATERIAL: TITANIUM ALLOY - 6AL-4V (UNS R56400) PER AMS4928 OR AMS4967.
LOCKING ELEMENT - PLASTIC PER MIL-F-18240 AND QPL18240.

HEAT TREAT: DEVELOP BASIC MATERIAL PROPERTIES AS FOLLOWS, WITH CONTROLS PER MIL-H-6875.
160-180 KSI FTU, 95 KSI MINIMUM SHEAR, PER AMS4928 OR AMS4967.

FINISH UNCOATED BOLTS - NONE.
COATED BOLTS - ALUMINUM COATING PER NAS4006.

CODE: DASH NUMBER INDICATES GRIP IN .0625 INCREMENTS (CONVERTED TO THREE DECIMAL PLACES PER ANSI Y14.5M). SEE SHEET 4 AND 5 FOR TABULATIONS OF GRIP AND LENGTH DIMENSIONS. INTERMEDIATE OR LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY. BASIC PART NUMBER = NONLOCKING BOLT WITH UNDRILLED SHANK.
ADD "A" AFTER BASIC NUMBER FOR ALUMINUM COATED BOLT. MAY BE USED WITH "D", "L" OR "P" CODE.
ADD "D" AFTER BASIC NUMBER FOR DRILLED SHANK BOLT. DO NOT USE WITH "L" OR "P" CODE. (m)
ADD "L" AFTER BASIC NUMBER FOR SELF-LOCKING BOLT WITH ANY APPROVED OPTIONAL LOCKING ELEMENT (INCLUDING PATCH TYPE - NO METAL REMOVED). DO NOT USE WITH "D" OR "P" CODE.
ADD "P" AFTER BASIC NUMBER FOR SELF-LOCKING BOLT WITH PATCH TYPE LOCKING ELEMENT ONLY (NO METAL REMOVED). DO NOT USE WITH "D" OR "L" CODE.
ADD "U" AFTER BASIC NUMBER FOR UNCOATED BOLTS. MAY BE USED WITH "D", "L" OR "P" CODE.
WHEN MULTIPLE LETTER CODES ARE USED, SEQUENCE SHALL BE IN ALPHABETICAL ORDER.

EXAMPLE OF PART NUMBER: (SEE SHEET 6 FOR OVERSIZE BOLTS.)

PMT7304A10 = BOLT, .2500-28 THREAD, .625 GRIP, UNDRILLED SHANK, NONLOCKING, ALUMINUM COATED.
PMT7304DU10 = BOLT, .2500-28 THREAD, .625 GRIP, DRILLED SHANK, UNCOATED, NON-LOCKING.
PMT7304LU10 = BOLT, .2500-28 THREAD, .625 GRIP, UNDRILLED SHANK, UNCOATED, SELF-LOCKING (OPTIONAL TYPE).

- NOTES: (a) GRIP LENGTH OF BOLT SHALL BE MEASURED FROM THE TOP OF BOLT HEAD TO THE END OF THE FULL CYLINDRICAL PORTION OF THE SHANK.
(b) DIMENSIONS A, A' AND B ARE INCLUDED FOR ENGINEERING REFERENCE ONLY AND ARE NOT TO BE USED FOR INSPECTION. VALUES A, A' AND B ARE CALCULATED LIMITS RESULTING FROM TOLERANCES ON W, H, E AND HEAD ANGLE.
(c) DIMENSIONS FOR H GAGE PROTRUSION SHALL BE INSPECTED PER NAS527.
(d) COTTER PIN HOLE CENTERLINE: WITHIN 2° OF BOLT CENTERLINE.
(e) REFERENCE DIMENSIONS ARE FOR DESIGN PURPOSES ONLY. NOT AN INSPECTION REQUIREMENT.
(f) CONCENTRICITY: CONICAL SURFACE OF HEAD TO "D" DIAMETER WITHIN .003 FIM. "D" DIA TO THREAD PITCH DIA WITHIN "Y" FIM.
(g) SHANK STRAIGHTNESS: WITHIN "Z" FIM PER INCH ON LENGTH.
(h) SELF-LOCKING BOLTS SHALL BE USED IN ACCORDANCE WITH MSI598I. PROTRUSION OF LOCKING ELEMENT SHALL BE CONTROLLED SO THAT IT WILL PASS FREELY, OR WITH FINGER PRESSURE, THROUGH A RING GAGE WITH DIAMETER OF .010 (+.001-.000) GREATER THAN MAXIMUM MAJOR DIAMETER OF BOLT THREAD.
(i) "F" MIN (5 THREAD PITCHES) = REGION OF MINIMUM ENGAGEMENT WITH FEMALE THREAD REQUIRED TO MEET MIL-F-18240 REQUIREMENTS. LOCKING ELEMENT WITHIN "F" REGION MUST DEVELOP REQUIRED TORQUE WHEN TESTED PER MIL-F-18240.
(j) "A", ALUMINUM COATED AND "U", UNCOATED CODES NEED NOT APPEAR ON THE HEAD OF THE BOLT.
(k) FOR EASE IN STARTING, LOCKING ELEMENT SHALL NOT BE EFFECTIVE IN "J" AREA (3 THREAD PITCHES).
(l) MIN. TORQUE VALUES (INCH POUNDS) WHICH RECESS MUST DEVELOP DURING REMOVAL MODE WITH APPROPRIATE MORTORQ SPIRAL DRIVER AND 5 POUNDS MAX. END LOAD. CAMOUT OF THE DRIVER OR EXCESSIVE DEFORMATION OF THE RECESS SHALL BE CAUSE FOR REJECTION OF THE LOT.
(m) IF REQUIRED, TENSILE TESTING OF BOLTS REQUIRING CROSS-DRILLED THREADS SHALL BE PERFORMED PRIOR TO DRILLING AND THE APPLICATION OF PLATING AND/OR COATINGS. WHEN BOLTS HAVE BEEN DRILLED, STRENGTH MAY BE VERIFIED BY SHEAR TESTING, IN LIEU OF TENSILE TESTING, IN ACCORDANCE WITH MIL-STD-1312. USERS SHOULD BE AWARE THAT FASTENERS WITH CROSS-DRILLED THREADS MAY EXHIBIT A REDUCTION IN TENSILE STRENGTH.

DIMENSIONS TO BE MET AFTER COATING, EXCEPT AS NOTED ON SHEETS 1 AND 6.

DIMENSIONS IN INCHES.

PROCUREMENT SPECIFICATION: MIL-B-87II4, EXCEPT AS NOTED., RECESS TORQUE VALUES SHALL NOT APPLY, TENSION, SHEAR, AND FATIGUE PROPERTIES PER NAS4004, PACKAGING PER NAS4004.

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TITLE: MORTORQ® SPIRAL DRIVE BOLT 100° HEAD,
CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
LONG THREAD, SELF-LOCKING AND NON-LOCKING

DRAWN	DATE	DRAWING NUMBER
G.DILLING	8/10/09	PMT-7303 THRU 7316
CHECKED:	DATE 8/14/09	SHEET 3 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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TABLE III GRIP AND LENGTH DIMENSIONS (CONTINUED ON SHEET 5)

GRIP DASH NUMBER	GRIP $\pm .010$	LENGTH $\pm .015$ (SEE NOTES BELOW)					
		BASIC NUMBER AND THREAD SIZE					
		PMT7303 .1900-32	PMT7304 .2500-28	PMT7305 .3125-24	PMT7306 .3750-24	PMT7307 .4375-20	PMT7308 .5000-20
2	.125	.490	.550	.594			
3	.188	.553	.613	.657	.766	.882	.985
4	.250	.615	.675	.719	.828	.944	
5	.312	.678	.737	.781	.890	1.006	1.047
6	.375	.740	.800	.844	.953	1.069	1.110
7	.438	.803	.863	.907	1.016	1.132	1.173
8	.500	.865	.925	.969	1.078	1.194	1.235
9	.562	.928	.987	1.031	1.140	1.256	1.297
10	.625	.990	1.050	1.094	1.203	1.319	1.360
11	.688	1.053	1.113	1.157	1.266	1.382	1.423
12	.750	1.115	1.175	1.219	1.328	1.444	1.485
13	.812	1.178	1.237	1.281	1.390	1.506	1.547
14	.875	1.240	1.300	1.344	1.453	1.569	1.610
15	.938	1.303	1.363	1.407	1.516	1.632	1.673
16	1.000	1.365	1.425	1.469	1.578	1.694	1.735
17	1.062	1.428	1.487	1.531	1.640	1.756	1.797
18	1.125	1.490	1.550	1.594	1.703	1.819	1.860
19	1.188	1.553	1.613	1.657	1.766	1.882	1.923
20	1.250	1.615	1.675	1.719	1.828	1.944	1.985
21	1.312	1.678	1.737	1.781	1.890	2.006	2.047
22	1.375	1.740	1.800	1.844	1.953	2.069	2.110
23	1.438	1.803	1.863	1.907	2.016	2.132	2.173
24	1.500	1.865	1.925	1.969	2.078	2.194	2.235
25	1.562	1.928	1.987	2.031	2.140	2.256	2.297
26	1.625	1.990	2.050	2.094	2.203	2.319	2.360
27	1.688	2.053	2.113	2.157	2.266	2.382	2.423
28	1.750	2.115	2.175	2.219	2.328	2.444	2.485
29	1.812	2.178	2.237	2.281	2.390	2.506	2.547
30	1.875	2.240	2.300	2.344	2.453	2.569	2.610
31	1.938	2.303	2.363	2.407	2.516	2.632	2.673
32	2.000	2.365	2.425	2.469	2.578	2.694	2.735
34	2.125	2.490	2.550	2.594	2.703	2.819	2.860
36	2.250	2.615	2.675	2.719	2.828	2.944	2.985
38	2.375	2.740	2.800	2.844	2.953	3.069	3.110
40	2.500	2.865	2.925	2.969	3.078	3.194	3.235
42	2.625	2.990	3.050	3.094	3.203	3.319	3.360
44	2.750	3.115	3.175	3.219	3.328	3.444	3.485
46	2.875	3.240	3.300	3.344	3.453	3.569	3.610
48	3.000	3.365	3.425	3.469	3.578	3.694	3.735
50	3.125	3.490	3.550	3.594	3.703	3.819	3.860
52	3.250	3.615	3.675	3.719	3.828	3.944	3.985
54	3.375	3.740	3.800	3.844	3.953	4.069	4.110
56	3.500	3.865	3.925	3.969	4.078	4.194	4.235
58	3.625	3.990	4.050	4.094	4.203	4.319	4.360
60	3.750	4.115	4.175	4.219	4.328	4.444	4.485
62	3.875	4.240	4.300	4.344	4.453	4.569	4.610
64	4.000	4.365	4.425	4.469	4.578	4.694	4.735

SEE
NOTE
BELOW

INTERMEDIATE AND LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE GRIP DASH NUMBERS ONLY.
 NOMINAL GRIP DIMENSIONS EQUALS GRIP DASH NUMBER TIMES .0625 (ROUNDED TO 3 DECIMAL PLACES).
 NOMINAL LENGTH EQUALS NOMINAL GRIP PLUS "T" (SEE SHEET 2).

NOTE: SHORT BOLTS LISTED ABOVE HEAVY LINE SHALL BE THREADED TO WITHIN .030 TO .060
 OF HEAD TO SHANK INTERSECTION. NAS4004 TENSILE REQUIREMENTS DO NOT APPLY
 TO THESE SHORT BOLTS.

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TITLE: MORTORQ® SPIRAL DRIVE 100° BOLT HEAD,
 CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
 LONG THREAD, SELF-LOCKING AND NON-LOCKING

DRAWN G.DILLING	DATE 8/10/09	DRAWING NUMBER PMT-7303 THRU 7316
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CHECKED: L.DOUGAN	DATE 8/14/09	SHEET 4 OF 6
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PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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TABLE III GRIP AND LENGTH DIMENSIONS (CONTINUED)

GRIP DASH NUMBER	GRIP $\pm .010$	LENGTH $\pm .015$ (SEE NOTES BELOW)				
		BASIC NUMBER AND THREAD SIZE				
		PMT7309 .5625-18	PMT7310 .6250-18	PMT7312 .7500-16	PMT7314 .8750-14	PMT7316 1.0000-12
5	.312	1.152				
6	.375	1.215	1.277			
7	.438	1.278	1.340	1.479		
8	.500	1.340	1.402	1.541	1.684	
9	.562	1.402	1.464	1.603	1.746	1.871
10	.625	1.465	1.527	1.666	1.809	1.934
11	.688	1.528	1.590	1.729	1.872	1.997
12	.750	1.590	1.652	1.791	1.934	2.059
13	.812	1.652	1.714	1.853	1.996	2.121
14	.875	1.715	1.777	1.916	2.059	2.184
15	.938	1.778	1.840	1.979	2.122	2.247
16	1.000	1.840	1.902	2.041	2.184	2.309
17	1.062	1.902	1.964	2.103	2.246	2.371
18	1.125	1.965	2.027	2.166	2.309	2.434
19	1.188	2.028	2.090	2.229	2.372	2.497
20	1.250	2.090	2.152	2.291	2.434	2.559
21	1.312	2.152	2.214	2.353	2.496	2.621
22	1.375	2.215	2.277	2.416	2.559	2.684
23	1.438	2.278	2.340	2.479	2.622	2.747
24	1.500	2.340	2.402	2.541	2.684	2.809
25	1.562	2.402	2.464	2.603	2.746	2.871
26	1.625	2.465	2.527	2.666	2.809	2.934
27	1.688	2.528	2.590	2.729	2.872	2.997
28	1.750	2.590	2.652	2.791	2.934	3.059
29	1.812	2.652	2.714	2.853	2.996	3.121
30	1.875	2.715	2.777	2.916	3.059	3.184
31	1.938	2.778	2.840	2.979	3.122	3.247
32	2.000	2.840	2.902	3.041	3.184	3.309
34	2.125	2.965	3.027	3.166	3.309	3.434
36	2.250	3.090	3.152	3.291	3.434	3.559
38	2.375	3.215	3.277	3.416	3.559	3.684
40	2.500	3.340	3.402	3.541	3.684	3.809
42	2.625	3.465	3.527	3.666	3.809	3.934
44	2.750	3.590	3.652	3.791	3.934	4.059
46	2.875	3.715	3.777	3.916	4.059	4.184
48	3.000	3.840	3.902	4.041	4.184	4.309
50	3.125	3.965	4.027	4.166	4.309	4.434
52	3.250	4.090	4.152	4.291	4.434	4.559
54	3.375	4.215	4.277	4.416	4.559	4.684
56	3.500	4.340	4.402	4.541	4.684	4.809
58	3.625	4.465	4.527	4.666	4.809	4.934
60	3.750	4.590	4.652	4.791	4.934	5.059
62	3.875	4.715	4.777	4.916	5.059	5.184
64	4.000	4.840	4.902	5.041	5.184	5.309

SEE SHEET 4 REGARDING INTERMEDIATE OR LONGER LENGTHS.

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TITLE: MORTORQ® SPIRAL DRIVE 100° BOLT HEAD,
CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
LONG THREAD, SELF-LOCKING AND NON-LOCKINGDRAWN G.DILLING DATE 8/10/09 DRAWING NUMBER
CHECKED: L DOUGAN DATE 8/14/09 PMT-7303 THRU 7316SHEET 5 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

RESTRICTED USAGE: FOR REPAIR WORK ONLY

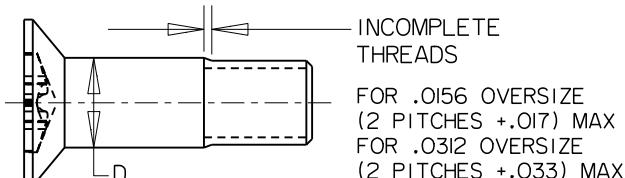
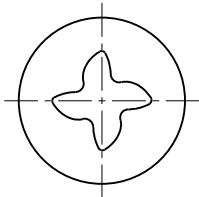
.0156 AND .0312 OVERSIZE SHANK FOR REPLACEMENT OF BOLTS SHOWN ON SHEET 1

HEAD MARKING: SAME AS SHOWN ON SHEET 1
PLUS IDENTIFICATION FOR OVERSIZE, AS APPLICABLE

IDENTIFY .0156 OVERSIZE BY "X"
IDENTIFY .0312 OVERSIZE BY "Y"

SEE SHEETS 1 THRU 5 FOR DIMENSIONS NOT SHOWN.

HEAD HEIGHT DIMENSIONS (B MAX. REFERENCE)
ARE REDUCED WITH OVERSIZE SHANKS
REDUCTION IS: .0065 FOR .0156 OVERSIZE BOLTS.
.0130 FOR .0312 OVERSIZE BOLTS.



MAJOR DIAMETER OF THREADS MAY
CONFORM TO "TD" ON SHEET 2 OR
TO MIL-S-8879 TOLERANCE.

TABLE IV OVERSIZE PART NUMBERS AND DIMENSIONS

PART NUMBER (COATED, ** NONLOCKING & UNDRILLED)	NOMINAL THREAD SIZE	D DIAMETER, .0156 OVERSIZE SHANK			
		UNCOATED BOLTS		COATED BOLTS	
		MAX	MIN	MAX	MIN
.0156 OVERSIZE		D DIAMETER, .0156 OVERSIZE SHANK			
PMT-7303A*X 7304A*X 7305A*X 7306A*X 7307A*X 7308A*X 7309A*X 7310A*X 7312A*X 7314A*X 7316A*X	.1900-32 .2500-28 .3125-24 .3750-24 .4375-20 .5000-20 .5625-18 .6250-18 .7500-16 .8750-14 1.0000-12	.2026 .2651 .3276 .3901 .4526 .5151 .5771 .6396 .7646 .8896 1.0146	.2021 .2646 .3271 .3896 .4521 .5146 .5766 .6391 .7641 .8891 1.0141	.2026 .2651 .3276 .3901 .4526 .5151 .5771 .6396 .7646 .8896 1.0146	.2016 .2641 .3266 .3891 .4516 .5141 .5761 .6386 .7636 .8886 1.0136
.0312 OVERSIZE		D DIAMETER, .0312 OVERSIZE SHANK			
PMT-7303A*Y 7304A*Y 7305A*Y 7306A*Y 7307A*Y 7308A*Y 7309A*Y 7310A*Y 7312A*Y 7314A*Y 7316A*Y	.1900-32 .2500-28 .3125-24 .3750-24 .4375-20 .5000-20 .5625-18 .6250-18 .7500-16 .8750-14 1.0000-12	.2182 .2807 .3432 .4057 .4682 .5307 .5927 .6552 .7802 .9052 1.0302	.2177 .2802 .3427 .4052 .4677 .5302 .5922 .6547 .7797 .9047 1.0297	.2182 .2807 .3432 .4057 .4682 .5307 .5927 .6552 .7802 .9052 1.0302	.2172 .2797 .3422 .4047 .4672 .5297 .5917 .6542 .7792 .9042 1.0292

* GRIP DASH NUMBER IN .0625 INCREMENTS. SEE SHEETS 4 AND 5 FOR GRIP AND LENGTH DIMENSIONS.

FOR MATERIAL, FINISH AND PROCUREMENT INFORMATION, SEE SHEET 3.

**FOR UNCOATED BOLTS, REPLACE "A" WITH "U"

EXAMPLE: PMT-7304U*X UNCOATED, .0156 OVERSIZE BOLT.

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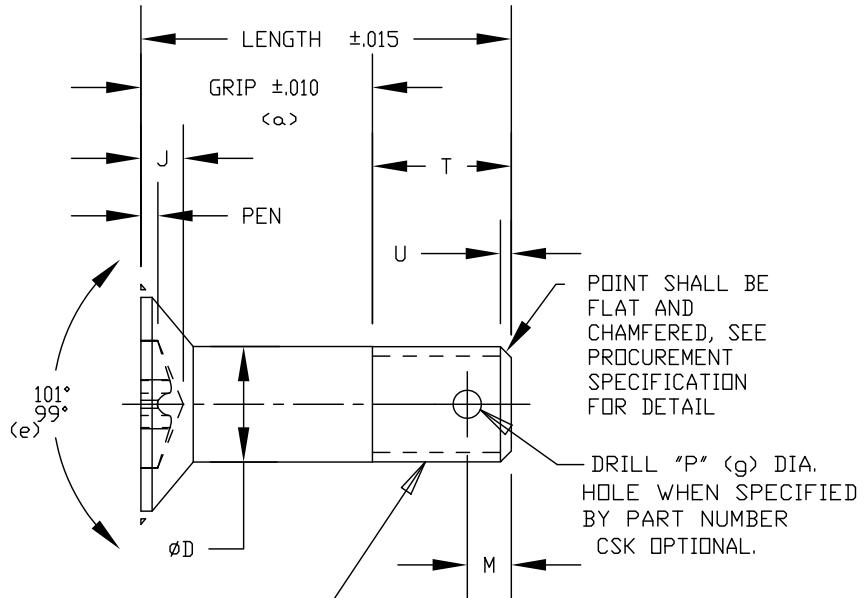
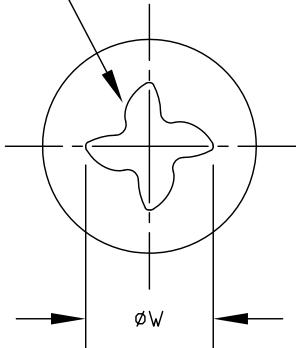
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TITLE: MORTORQ® SPIRAL DRIVE 100° BOLT HEAD,
CLOSE TOLERANCE, 6AL-4V TITANIUM ALLOY,
LONG THREAD, SELF-LOCKING AND NON-LOCKING

DRAWN G.DILLING	DATE 8/10/09	DRAWING NUMBER PMT-7303 THRU 7316
CHECKED L DOUGAN	DATE 8/14/09	SHEET 6 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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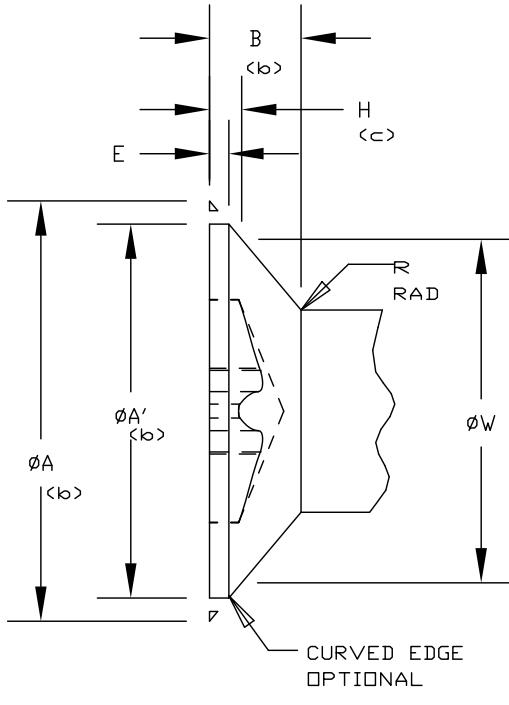
MORTORQ® RECESS
(k) SEE TABLE II



UNJF-3A THREADS
PER MIL-S-8879, EXCEPT
FOR REDUCTION OF THREAD
MAJOR DIA PER "TD"

HEAD MARKING SHALL BE DEPRESSED (.010 MAX)
AND ARRANGED AS FOLLOWS:

MARK WITH BASIC NUMBER ("PMT" OPTIONAL),
EXCEPT MARK .1900-32 SIZE WITH "10" AND
MARK .1640-32 SIZE WITH "8", THESE SIZES
ALSO TO BE MARKED "C" FOR A-286. MARK
WITH MANUFACTURER'S SYMBOL, GRIP DASH
NUMBER, "D" WHEN APPLICABLE (h) AND
RECESS NUMBER ENCIRCLED. RECESS NUMBER TO
BE APPROXIMATELY 25% LARGER THAN OTHER
NUMBERS. "D" IDENTIFIES BOLT WITH DRILLED
SHANK.



ENLARGED VIEW
OF HEAD

(a), (b), ETC: SEE NOTES ON SHEET 4.

REVISION REV 1: UPDATED SHTS. 3 & 4
07-19-11

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ® RECESS CLOSE TOLERANCE, A-286, SHORT THREAD

DRAWN: L. DOUGAN	DATE: 10-27-07	DRAWING NUMBER PMT-8702 THRU 8716
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CHECKED: L. DOUGAN	DATE: 10-27-07	SHEET 1 OF 9
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TABLE I DIMENSIONS (CONTINUED ON SHEET 3)

BASIC NUMBER **	THREAD UNJF-3A	ϕA MAX (b)	$\phi A'$ ABSOLUTE MIN (b)	B MAX (b)	ϕD						E MAX	RECESS SIZE		
					UNPLATED		BEFORE PLATE OR COAT		AFTER PLATE OR COAT					
					MAX	MIN	MAX	MIN	MAX	MIN				
PMT-8702	.1640-32	.257	.226	.039	.1635	.1630	.1625	.1619	.1635	.1625	.010	MT-00		
PMT-8703	.1900-32	.303	.266	.049	.1895	.1890	.1885	.1879	.1895	.1885	.012	MT-0		
PMT-8704	.2500-28	.397	.355	.063	.2495	.2490	.2485	.2479	.2495	.2485	.014	MT-1		
PMT-8705	.3125-24	.477	.429	.071	.3120	.3115	.3110	.3104	.3120	.3110	.016	MT-1		
PMT-8706	.3750-24	.564	.510	.081	.3745	.3740	.3735	.3729	.3745	.3735	.018	MT-2		
PMT-8707	.4375-20	.672	.612	.101	.4370	.4365	.4360	.4354	.4370	.4360	.020	MT-3		
PMT-8708	.5000-20	.755	.688	.109	.4995	.4990	.4985	.4979	.4995	.4985	.022	MT-4		
PMT-8709	.5625-18	.838	.766	.119	.5615	.5610	.5605	.5599	.5615	.5605	.024	MT-4		
PMT-8710	.6250-18	.925	.848	.129	.6240	.6235	.6230	.6224	.6240	.6230	.026	MT-5		
PMT-8712	.7500-16	1.099	1.010	.150	.7490	.7485	.7480	.7474	.7490	.7480	.030	MT-6		
PMT-8714	.8750-14	1.323	1.219	.192	.8740	.8735	.8730	.8724	.8740	.8730	.034	MT-6		
PMT-8716	1.0000-12	1.522	1.406	.224	.9990	.9985	.9980	.9974	.9990	.9980	.038	MT-7		

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** THE LAST TWO DIGITS OF THE BASIC NUMBER DESIGNATE THE SIZE.
 SEE SHEET 4 FOR "D"

SEE SHEETS 5 , 6, 7 AND 8 FOR GRIP DASH NUMBERS

(b): SEE NOTE ON SHEET 4.

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ® RECESS CLOSE TOLERANCE, A-286, SHORT THREAD

DRAWN: L. DOUGAN DATE: 10-27-07 DRAWING NUMBER

CHECKED: L. DOUGAN DATE: 10-27-07

PMT-8702 THRU 8716

SHEET 2 OF 9

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TABLE I DIMENSIONS (CONTINUED)

BASIC NUMBER	H GAGE (c) PROTRUSION		W GAGE DIA +.0002 -.0000	M ±.010	P (g) +.005 -.000	R RAD		T (d) REF	TD DIA		U MAX	Y(e)	Z(f)
	NOM.	± TOL.				MAX	MIN		MAX	MIN			
PMT-8702	.0213	.0013	.2026	---	---	.020	.010	.323	.1595	.157	.039	.0045	.0040
PMT-8703	.0230	.0013	.2438	.164	.070	.020	.010	.323	.184	.181	.039	.0045	.0040
PMT-8704	.0255	.0015	.3312	.170	.076	.020	.010	.370	.244	.241	.045	.0045	.0030
PMT-8705	.0280	.0017	.4045	.182	.076	.025	.010	.438	.306	.302	.052	.0045	.0030
PMT-8706	.0305	.0019	.4852	.183	.106	.030	.015	.454	.368	.364	.052	.0045	.0025
PMT-8707	.0400	.0021	.5696	.199	.106	.030	.015	.528	.431	.426	.062	.006	.0025
PMT-8708	.0408	.0023	.6498	.198	.106	.030	.015	.528	.493	.488	.062	.006	.0020
PMT-8709	.0463	.0025	.7198	.207	.141	.030	.015	.594	.555	.550	.068	.006	.0020
PMT-8710	.0400	.0027	.8212	.207	.141	.030	.015	.626	.618	.612	.068	.006	.0020
PMT-8712	.0500	.0031	.9700	.222	.141	.030	.015	.666	.743	.737	.078	.006	.0020
PMT-8714	.0832	.0035	1.1122	.241	.141	.030	.015	.759	.868	.861	.089	.009	.0020
PMT-8716	.0918	.0039	1.2894	.264	.141	.030	.015	.895	.993	.986	.104	.009	.0020

TABLE II RECESS SPECIFICATIONS

BASIC NUMBER	J MAX	ØW MAX	GAGE PENETRATION		MINIMUM TORQUE (k)	
			MAX	MIN	TORQUE INCH POUNDS	RECESS NUMBER
PMT-8702	.052	.1210	.030	.021	25	MT-00
PMT-8703	.063	.1704	.030	.023	45	MT-0
PMT-8704	.078	.2405	.030	.023	75	MT-1
PMT-8705	.096	.2405	.048	.039	175	MT-1
PMT-8706	.112	.3080	.050	.041	300	MT-2
PMT-8707	.139	.3537	.067	.058	460	MT-3
PMT-8708	.160	.4285	.072	.057	1100	MT-4
PMT-8709	.180	.4285	.092	.077	1500	MT-4
PMT-8710	.196	.5063	.092	.067	2100	MT-5
PMT-8712	.235	.5938	.112	.082	2700	MT-6
PMT-8714	.275	.5938	.152	.122	3000	MT-6
PMT-8716	.329	.8003	.162	.122	4200	MT-7

(c), (d), etc: SEE NOTES ON SHEET 4

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ® RECESS CLOSE TOLERANCE, A-286, SHORT THREAD

DRAWN: L. DOUGAN DATE: 10-27-07 DRAWING NUMBER

PMT-8702 THRU 8716

CHECKED: L. DOUGAN DATE: 10-27-07 SHEET 3 OF 9

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
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MATERIAL: A-286 Corrosion Resistant Steel with composition per AMS 5731 or AMS 5737

HEAT TREAT: 160 KSI minimum ultimate tensile; 95 KSI minimum ultimate shear.

FINISH: Unplated bolts - Passivate to meet requirements of NAS4003.

Plated bolts - Cadmium plate per QQ-P-416, Type II, Class 2

Embrittlement test per QQ-P-416 does not apply.

Coated bolts - Aluminum coating per NAS4006.

Cadmium plated A-286 CRES bolts shall be identified with green dye or paint on the threaded end. Maximum coverage may include the chamfer plus one incomplete thread.

CODE: Basic part number = plated bolt with undrilled shank.

Add "A" after basic number for aluminum coated bolts.

Add "D" after basic number for drilled shank bolt.

Add "U" after basic number for unplated bolt. May be used with "D" code.

Dash number indicates grip in .0625 increments (converted to three decimal places per ANSI Y14.5). See Sheets 5, 6, 7 and 8 for tabulations of grip and length dimensions. Intermediate or longer lengths may be specified by usage of whole dash number only.

Examples of part numbers: (See Sheet 9 for oversize bolts.)

PMT8703-10 = Bolt, .1900-32 thread, .625 grip, undrilled shank, plated.

PMT8703A-10 = Bolt, .1900-32 thread, .625 grip, undrilled shank, aluminum coated.

PMT870310 = Bolt, .1900-32 thread, .625 grip, undrilled shank, plated.

PMT8703D10 = Bolt, .1900-32 thread, .625 grip, drilled shank, plated.

PMT8703DU10 = Bolt, .1900-32 thread, .625 grip, drilled shank, unplated.

- NOTES:
- (a) Grip length of bolt shall be measured from the top of the bolt head to the end of the full cylindrical portion of the shank.
 - (b) Dimensions A, A' and B are included for engineering reference only and are not to be used for inspection. Values A, A' and B are calculated limits resulting from tolerances on W, H, E, and head angle.
 - (c) Dimensions for H gage protrusion shall be inspected per NAS527.
 - (d) Reference dimensions are for design purposes only. Not an inspection requirement.
 - (e) Concentricity: Conical surface of head to "D" diameter within .003 TIR. "D" dia to thread pitch dia within "Y" TIR.
 - (f) Shank straightness: Within "Z" TIR per inch of length.
 - (g) Cotter pin hole centerline: Within .010 and normal within 2° of bolt centerline.
 - (h) "A", aluminum coated and "U", unplated codes need not appear on the head of the bolt.
 - (j) Magnetic permeability shall be less than 2.0 (Air = 1.0) for a field strength H = 200 oersteds using a magnetic permeability indicator per MIL-I-17214 or equivalent.
 - (k) Min Torque values (LBF-in) which recess must develop during removal mode with appropriate driver and 15 pound max. end load. Camout or excessive deformation of the recess shall be cause for rejection of the lot.

SURFACE TEXTURE: (Ra max per ANSI B46.1) "D" dia, conical surface of head, thread flanks and thread root 32; other surfaces 125.

Dimensions to be met after plating or coating, except on Sheets 2 and 9
Dimensions in inches.

PROCUREMENT SPECIFICATIONS: NAS4003, except as noted. Fatigue testing is not required. Cold working of head to shank fillet is not required for PMT8702 (.1640-32) or PMT8703 (.1900-32) bolts only. Recess Torque values of Table II herein shall apply.

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ RECESS CLOSE TOLERANCE, A-286, SHORT THREAD ®

DRAWN: L. DOUGAN DATE: 10-27-07 DRAWING NUMBER

PMT-8702 THRU 8716

SHEET 4 OF 9

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

® PHILLIPS II ® PHILLIPS POZIDRIV ® ACR ® POZISQUARE ® PHILLIPS SQUARE-DRIV ® TORQ-SET ® TRI-WING ® MORTORQ ®
HEXSTIX ® POZILOCK ® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

TABLE III

GRIP AND LENGTH DIMENSIONS (CONTINUED ON SHEETS 6, 7 AND 8)

GRIP DASH NO.	GRIP ±.010	LENGTH ±.015 (SEE NOTES BELOW)						GRIP ±.010	GRIP DASH NO.
		BASIC NUMBER AND THREAD SIZE							
	PMT8702	PMT8703	PMT8704	PMT8705	PMT8706	PMT8707			
	.1640-32	.1900-32	.2500-28	.3125-24	.3750-24	.4375-20			
1	.062	.385	.385	---	---	---	.062	1	
2	.125	.448	.448	.495	.563	.579	.125	2	
3	.188	.511	.511	.558	.626	.642	.188	3	
4	.250	.573	.573	.620	.688	.704	.250	4	
5	.312	.635	.635	.682	.750	.766	.312	5	
6	.375	.698	.698	.745	.813	.829	.375	6	
7	.438	.761	.761	.808	.876	.892	.438	7	
8	.500	.823	.823	.870	.938	.954	.500	8	
9	.562	.885	.885	.932	1.000	1.016	.562	9	
10	.625	.948	.948	.995	1.063	1.079	.625	10	
11	.688	1.011	1.011	1.058	1.126	1.142	.688	11	
12	.750	1.073	1.073	1.120	1.188	1.204	.750	12	
13	.812	1.135	1.135	1.182	1.250	1.266	.812	13	
14	.875	1.198	1.198	1.245	1.313	1.329	.875	14	
15	.938	1.261	1.261	1.308	1.376	1.392	.938	15	
16	1.000	1.323	1.323	1.370	1.438	1.454	1.000	16	
17	1.062	1.385	1.385	1.432	1.500	1.516	1.062	17	
18	1.125	1.448	1.448	1.495	1.563	1.579	1.125	18	
19	1.188	1.511	1.511	1.558	1.626	1.642	1.188	19	
20	1.250	1.573	1.573	1.620	1.688	1.704	1.250	20	
21	1.312	1.635	1.635	1.682	1.750	1.766	1.312	21	
22	1.375	1.698	1.698	1.745	1.813	1.829	1.375	22	
23	1.438	1.761	1.761	1.808	1.876	1.892	1.438	23	
24	1.500	1.823	1.823	1.870	1.938	1.954	1.500	24	
25	1.562	1.885	1.885	1.932	2.000	2.016	1.562	25	

INTERMEDIATE AND LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE GRIP DASH NUMBERS ONLY.

NORMAL GRIP DIMENSION EQUALS GRIP DASH NUMBERS TIMES .0625 (ROUNDED TO 3 DECIMAL PLACES).

NOMINAL LENGTH EQUALS NOMINAL GRIP PLUS "T" (SEE SHEET 3)

REVISION

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DRAWN: L. DOUGAN		DATE: 10-27-07	DRAWING NUMBER PMT-8702 THRU 8716	
CHECKED: L. DOUGAN		DATE: 10-27-07	SHEET 5 OF 9	
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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TABLE III

GRIP AND LENGTH DIMENSIONS (CONTINUED ON SHEETS 7 AND 8)

GRIP DASH NO.	GRIP ±.010	LENGTH ±.015 (SEE NOTES BELOW)						GRIP ±.010	GRIP DASH NO.
		BASIC NUMBER AND THREAD SIZE							
		PMT8702	PMT8703	PMT8704	PMT8705	PMT8706	PMT8707		
		.1640-32	.1900-32	.2500-28	.3125-24	.3750-24	.4375-20		
26	1.625	1.948	1.948	1.995	2.063	2.079	2.153	1.625	26
27	1.688	2.011	2.011	2.058	2.126	2.142	2.216	1.688	27
28	1.750	2.073	2.073	2.120	2.188	2.204	2.278	1.750	28
29	1.812	2.135	2.135	2.182	2.250	2.266	2.340	1.812	29
30	1.875	2.198	2.198	2.245	2.313	2.329	2.403	1.875	30
31	1.938	2.261	2.261	2.308	2.376	2.392	2.466	1.938	31
32	2.000	2.323	2.323	2.370	2.438	2.454	2.528	2.000	32
34	2.125	2.448	2.448	2.495	2.563	2.579	2.653	2.125	34
36	2.250	2.573	2.573	2.620	2.688	2.704	2.778	2.250	36
38	2.375	2.698	2.698	2.745	2.813	2.829	2.903	2.375	38
40	2.500	2.823	2.823	2.870	2.938	2.954	3.028	2.500	40
42	2.625	2.948	2.948	2.995	3.063	3.079	3.153	2.625	42
44	2.750	3.073	3.073	3.120	3.188	3.204	3.278	2.750	44
46	2.875	3.198	3.198	3.245	3.313	3.329	3.403	2.875	46
48	3.000	3.323	3.323	3.370	3.438	3.454	3.528	3.000	48
50	3.125	3.448	3.448	3.495	3.563	3.579	3.653	3.125	50
52	3.250	3.573	3.573	3.620	3.688	3.704	3.778	3.250	52
54	3.375	3.698	3.698	3.745	3.813	3.829	3.903	3.375	54
56	3.500	3.823	3.823	3.870	3.938	3.954	4.028	3.500	56
58	3.625	3.948	3.948	3.995	4.063	4.079	4.153	3.625	58
60	3.750	4.073	4.073	4.120	4.188	4.204	4.278	3.750	60
62	3.875	4.198	4.198	4.245	4.313	4.329	4.403	3.875	62
64	4.000	4.323	4.323	4.370	4.438	4.454	4.528	4.000	64

INTERMEDIATE AND LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE GRIP DASH NUMBERS ONLY.

NORMAL GRIP DIMENSION EQUALS GRIP DASH NUMBERS TIMES .0625 (ROUNDED TO 3 DECIMAL PLACES).

NOMINAL LENGTH EQUALS NOMINAL GRIP PLUS "T" (SEE SHEET 3)

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		DRAWN: L. DOUGAN	DATE: 10-27-07
		CHECKED: L. DOUGAN	DATE: 10-27-07
DRAWING NUMBER PMT-8702 THRU 8716			
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			
SHEET 6 OF 9			
PHILLIPS II PHILLIPS POZIDRIV ACR POZISQUARE PHILLIPS SQUARE-DRIV TORQ-SET TRI-WING MORTORQ HEXSTIX® POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY			

TABLE III

GRIP AND LENGTH DIMENSIONS (CONTINUED ON SHEET 8)

GRIP DASH NO.	GRIP ±.010	LENGTH ±.015 (SEE NOTES BELOW)						GRIP ±.010	GRIP DASH NO.
		BASIC NUMBER AND THREAD SIZE							
	PMT8708	PMT8709	PMT8710	PMT8712	PMT8714	PMT8716			
	.5000-20	.5625-18	.6250-18	.7500-16	.8750-14	1.000-12			
3	.188	.716	.782	.814	---	---	.188	3	
4	.250	.778	.844	.876	.916	---	.250	4	
5	.312	.840	.906	.938	.978	1.071	---	.312	5
6	.375	.903	.969	1.001	1.041	1.134	1.270	.375	6
7	.438	.966	1.032	1.064	1.104	1.197	1.333	.438	7
8	.500	1.028	1.094	1.126	1.166	1.259	1.395	.500	8
9	.562	1.090	1.156	1.188	1.228	1.321	1.457	.562	9
10	.625	1.153	1.219	1.251	1.291	1.384	1.520	.625	10
11	.688	1.216	1.282	1.314	1.354	1.447	1.583	.688	11
12	.750	1.278	1.344	1.376	1.416	1.509	1.645	.750	12
13	.812	1.340	1.406	1.438	1.478	1.571	1.707	.812	13
14	.875	1.403	1.469	1.501	1.541	1.634	1.770	.875	14
15	.938	1.466	1.532	1.564	1.604	1.697	1.833	.938	15
16	1.000	1.528	1.594	1.626	1.666	1.759	1.895	1.000	16
17	1.062	1.590	1.656	1.688	1.728	1.821	1.957	1.062	17
18	1.125	1.653	1.719	1.751	1.791	1.884	2.020	1.125	18
19	1.188	1.716	1.782	1.814	1.854	1.947	2.083	1.188	19
20	1.250	1.778	1.844	1.876	1.916	2.009	2.145	1.250	20
21	1.312	1.840	1.906	1.938	1.978	2.071	2.207	1.312	21
22	1.375	1.903	1.969	2.001	2.041	2.134	2.270	1.375	22
23	1.438	1.966	2.032	2.064	2.104	2.197	2.333	1.438	23
24	1.500	2.028	2.094	2.126	2.166	2.259	2.395	1.500	24
25	1.562	2.090	2.156	2.188	2.228	2.321	2.457	1.562	25

INTERMEDIATE AND LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE GRIP DASH NUMBERS ONLY.

NORMAL GRIP DIMENSION EQUALS GRIP DASH NUMBERS TIMES .0625 (ROUNDED TO 3 DECIMAL PLACES).

NOMINAL LENGTH EQUALS NOMINAL GRIP PLUS "T" (SEE SHEET 3)

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ® RECESS CLOSE TOLERANCE, A-286, SHORT THREAD

DRAWN: L. DOUGAN	DATE: 10-27-07	DRAWING NUMBER
CHECKED: L. DOUGAN	DATE: 10-27-07	PMT-8702 THRU 8716

SHEET 7 OF 9
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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TABLE III

GRIP AND LENGTH DIMENSIONS (CONTINUED)

GRIP DASH NO.	GRIP ±.010	LENGTH ±.015 (SEE NOTES BELOW)						GRIP ±.010	GRIP DASH NO.
		BASIC NUMBER AND THREAD SIZE							
		PMT8708	PMT8709	PMT8710	PMT8712	PMT8714	PMT8716		
		.5000-20	.5625-18	.6250-18	.7500-16	.8750-14	1.0000-12		
26	1.625	2.153	2.219	2.251	2.291	2.384	2.520	1.625	26
27	1.688	2.216	2.282	2.314	2.354	2.447	2.583	1.688	27
28	1.750	2.278	2.344	2.376	2.416	2.509	2.645	1.750	28
29	1.812	2.340	2.406	2.438	2.478	2.571	2.707	1.812	29
30	1.875	2.403	2.469	2.501	2.541	2.634	2.770	1.875	30
31	1.938	2.466	2.532	2.564	2.604	2.697	2.833	1.938	31
32	2.000	2.528	2.594	2.626	2.666	2.759	2.895	2.000	32
34	2.125	2.653	2.719	2.751	2.791	2.884	3.020	2.125	34
36	2.250	2.778	2.844	2.876	2.916	3.009	3.145	2.250	36
38	2.375	2.903	2.969	3.001	3.041	3.134	3.270	2.375	38
40	2.500	3.028	3.094	3.126	3.166	3.259	3.395	2.500	40
42	2.625	3.153	3.219	3.251	3.291	3.384	3.520	2.625	42
44	2.750	3.278	3.344	3.376	3.416	3.509	3.645	2.750	44
46	2.875	3.403	3.469	3.501	3.541	3.634	3.770	2.875	46
48	3.000	3.528	3.594	3.626	3.666	3.759	3.895	3.000	48
50	3.125	3.653	3.719	3.751	3.791	3.884	4.020	3.125	50
52	3.250	3.778	3.844	3.876	3.916	4.009	4.145	3.250	52
54	3.375	3.903	3.969	4.001	4.041	4.134	4.270	3.375	54
56	3.500	4.028	4.094	4.126	4.166	4.259	4.395	3.500	56
58	3.625	4.153	4.219	4.251	4.291	4.384	4.520	3.625	58
60	3.750	4.278	4.344	4.376	4.416	4.509	4.645	3.750	60
62	3.875	4.403	4.469	4.501	4.541	4.634	4.770	3.875	62
64	4.000	4.528	4.594	4.626	4.666	4.759	4.895	4.000	64

INTERMEDIATE AND LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE GRIP DASH NUMBERS ONLY.

NORMAL GRIP DIMENSION EQUALS GRIP DASH NUMBERS TIMES .0625 (ROUNDED TO 3 DECIMAL PLACES).

NOMINAL LENGTH EQUALS NOMINAL GRIP PLUS "T" (SEE SHEET 3)

REVISION

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		CHECKED: L. DOUGAN	DATE: 10-27-07	SHEET 8 OF 9
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
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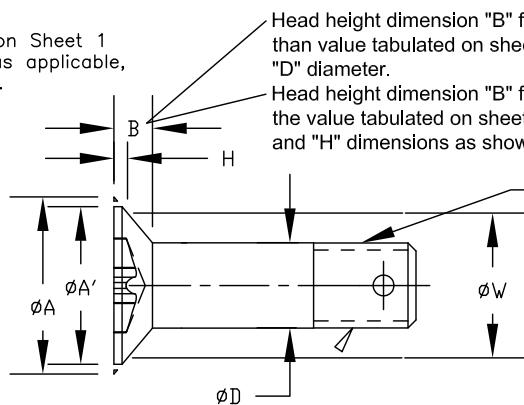
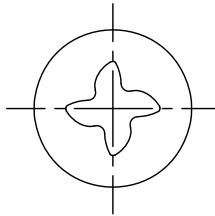
RESTRICTED USAGE: FOR REPAIR WORK ONLY

.0156 and .0312 Oversize Shank for Replacement Bolts Shown SH 1

Head Marking: Same as shown on Sheet 1 plus identification for oversize, as applicable, to be included in second sector.

Identify .0156 oversize by "X".

Identify .0312 oversize by "Y".



Head height dimension "B" for .0156 oversize bolts is .0065 less than value tabulated on sheet 2, because of the increase in the "D" diameter.

Head height dimension "B" for .0312 oversize bolts is the same as the value tabulated on sheet 2. This results in an increase of "A", "A'" and "H" dimensions as shown in table below.

MAJOR DIAMETER OF THREADS
SHALL CONFORM TO "TD" ON
SHEET 3 OR TO MIL-S-8879
TOLERANCE

See Sheets 1 thru 8 for
dimensions not shown.

TABLE IV OVERSIZE PART NUMBERS AND DIMENSIONS

PART NUMBER (NONLOCKING, & UNDRILLED)	NOMINAL THREAD SIZE	D DIA. .0156 OVERSIZE SHANK						A DIA SHARP TO CORNER MAX (b)	A' DIA ABSOL- UTE MIN (b)	H GAGE PROTRUSION		W GAGE DIA. + .0002 - .0000		
		UNPLATED BOLTS		BEFORE PLATE OR COAT		AFTER PLATE OR COAT				NOM.	± TOL.			
		MAX	MIN	MAX	MIN	MAX	MIN							
PMT8703-*X	.1900-32	.2026	.2021	.2016	.2010	.2026	.2016							
PMT8704-*X	.2500-28	.2651	.2646	.2641	.2635	.2651	.2641							
PMT8705-*X	.3125-24	.3276	.3271	.3266	.3260	.3276	.3266							
PMT8706-*X	.3750-24	.3901	.3896	.3891	.3885	.3901	.3891							
PMT8707-*X	.4375-20	.4526	.4521	.4516	.4510	.4526	.4516							
PMT8708-*X	.5000-20	.5151	.5146	.5141	.5135	.5151	.5141							
PMT8709-*X	.5625-18	.5771	.5766	.5761	.5755	.5771	.5761							
PMT8710-*X	.6250-18	.6396	.6391	.6386	.6380	.6396	.6386							
PMT8712-*X	.7500-16	.7646	.7641	.7636	.7630	.7646	.7636							
PMT8714-*X	.8750-14	.8896	.8891	.8886	.8880	.8896	.8886							
PMT8716-*X	1.0000-12	1.0146	1.0141	1.0136	1.0130	1.0146	1.0136							
.0312 OVERSIZE	D DIA. .0312 OVERSIZE SHANK							NOM.	± TOL.					

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TITLE: BOLT, 100° REDUCED HEAD, MORTORQ® RECESS
CLOSE TOLERANCE, A-286, SHORT THREAD

DRAWN: DATE:
L. DOUGAN 10-27-07

CHECKED: DATE:
L. DOUGAN 10-27-07

PMT-8702 THRU 8716

SHEET 9 OF 9

PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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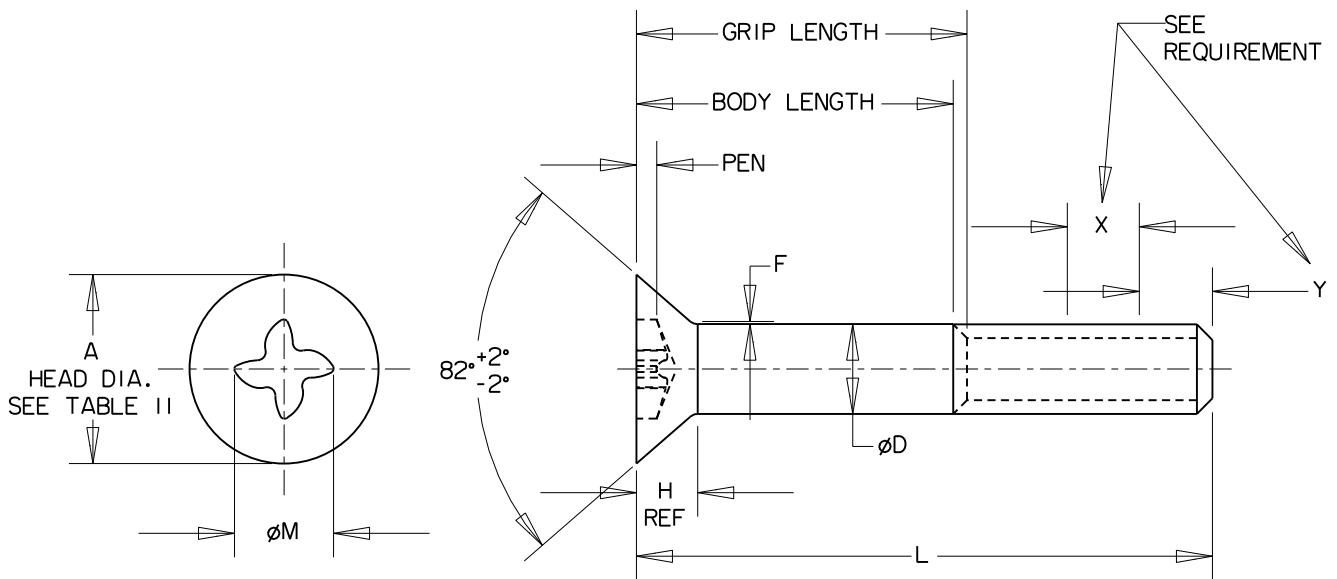


TABLE I

THREAD SIZE	.1120-40UNC-3A	.1380-32UNC-3A	.1640-32UNC-3A	.1900-24UNC-3A	.2500-20UNC-3A	.3125-18UNC-3A
ØD BODY MAX MIN	.1120 .1075	.1380 .1329	.1640 .1585	.1900 .1840	.2500 .2435	.3125 .3053
ØH HEAD HEIGHT MAX MIN	.083	.097	.112	.127	.161	.198
DRIVE SIZE	MT-00	MT-0	MT-0	MT-1	MT-2	MT-3
PEN	.037-.028	.040-.031	.055-.046	.047-.038	.055-.046	.080-.071
ØM RECESS DIA.	.1210	.1704	.1704	.2405	.3080	.3537
F FILLET EXTENSION ABOVE D. MAX	.012	.015	.015	.015	.015	.015
TENSILE STRENGTH, LBS-MIN	900	1,350	2,085	2,610	4,750	7,800
L LENGTH	TOLERANCE SIZE .112 THRU .3125	DASH NO.				
.250		I	7	I3	I9	27
.375		2	8	I4	20	28
.500	+.000 -.030	3	9	I5	21	29
.625		4	10	I6	22	30
.750		5	II	I7	23	31
1.000					24	32
1.250					25	33
1.500						34
1.750	+.000 -.040					35
2.000						.75
2.250						.50
2.500						.50

SHEET	1	2	3	4
REV	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE
FLAT COUNTERSUNK SCREW 82° ALLOY STEEL, UNC-3A

DRAWN G.DILLING DATE 5/21/10 DRAWING NUMBER PMT-24667

CHECKED: G.DILLING DATE 5/24/10

SHEET 1 OF 4

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TABLE I CONTINUED

THREAD SIZE		.3750-16UNC-3A		.4375-14UNC-3A		.5000-13UNC-3A		.6250-11UNC-3A		.7500-10UNC-3A			
ØD BODY	MAX	.3750		.4375		.5000		.6250		.7500			
	MIN	.3678		.4294		.4919		.6163		.7406			
ØH HEAD	MAX	.234		.234		.251		.324		.396			
HEIGHT	MIN												
DRIVE SIZE		MT-4		MT-4		MT-5		MT-6		MT-7			
PEN		.092-.077		.105-.090		.117-.092		.152-.122		.162-.122			
ØM RECESS DIA.		.4285		.4285		.5063		.5938		.8003			
F FILLET EXTENSION	ABOVE D.	MAX	.015		.015		.015		.015		.015		
TENSILE STRENGTH,	LBS-MIN		11,600		15,900		21,200		33,800		50,000		
L LENGTH	TOLERANCE		DASH NO.	GRIP LENGTH MAX	BODY LENGTH MIN	DASH NO. 1 /	GRIP LENGTH MAX	BODY LENGTH MIN	DASH NO.	GRIP LENGTH MAX	BODY LENGTH MIN	DASH NO.	DASH NO.
	SIZE	SIZE .4375 THRU .750											
.500			49										
.625	+.000	+.000	50										
.750	-.030	-.030	51			62			73				
1.000			52			63			74				
1.250			53			64			75			84	
1.500			54			65			76			85	
1.750	+.000	+.000	55			66			77			86	
2.000	-.040	-.060	56			67			78			87	
2.250			57	1.00	.69	68			79			88	
2.500			58	1.00	.69	69	1.12	.77	80	1.00	.62	89	
2.750	+.000	+.000	59	1.50	1.19	70	1.12	.77	81	1.00	.62	90	
3.000	-.060	-.080	60	1.50	1.19	71	1.62	1.27	82	1.00	.62	91	
												100	

1 / SEE NOTE 5

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TITLE: MORTORQ® SPIRAL DRIVE
FLAT COUNTERSUNK SCREW 82° ALLOY STEEL, UNC-3A

DRAWN G.DILLING	DATE 5/21/10	DRAWING NUMBER PMT-24667
CHECKED: G.DILLING	DATE 5/24/10	SHEET 2 OF 4

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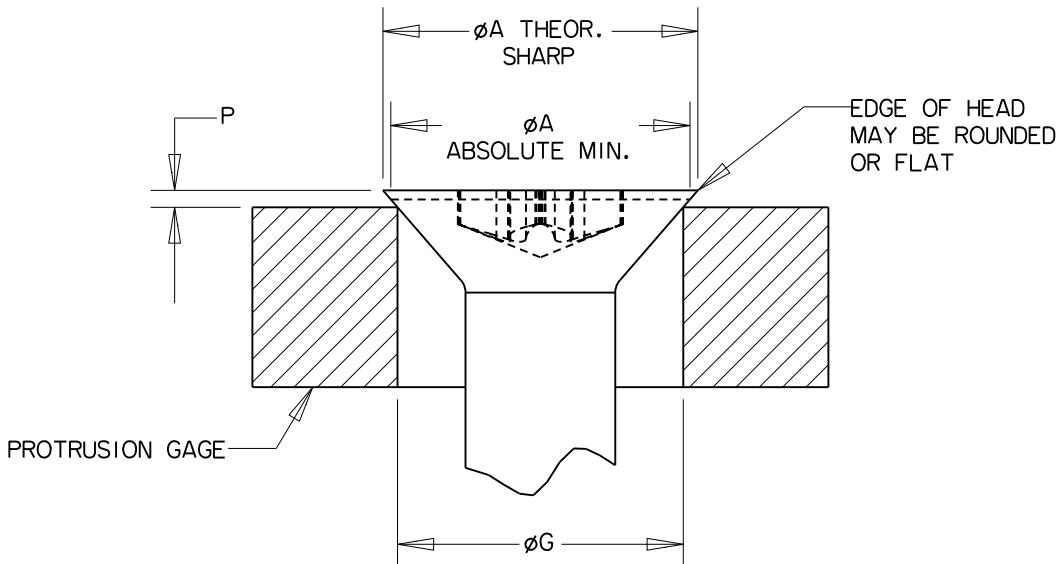


TABLE II 2 /

NOMINAL SIZE	ϕA		ϕG	P	
	HEAD DIAMETER		PROTRUSION GAGE DIAMETER $+.000/- .001$	HEAD PROTRUSION	
	THEORETICAL SHARP MAX.	ABSOLUTE MIN.		MAX.	MIN.
.1120	.255	.218	.172	.049	.025
.1380	.307	.263	.220	.052	.023
.1640	.359	.311	.267	.055	.024
.1900	.411	.359	.313	.058	.025
.2500	.531	.480	.424	.064	.031
.3125	.656	.600	.539	.070	.033
.3750	.781	.720	.653	.076	.037
.4375	.844	.781	.690	.092	.050
.5000	.938	.872	.739	.119	.073
.6250	1.188	1.112	.962	.135	.083
.7500	1.438	1.355	1.186	.150	.093

2 / SEE REQUIREMENT 7

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TITLE: MORTORQ® SPIRAL DRIVE
FLAT COUNTERSUNK SCREW 82° ALLOY STEEL, UNC-3A

DRAWN G.DILLING	DATE 5/21/10	DRAWING NUMBER PMT-24667
CHECKED: G.DILLING	DATE 5/24/10	SHEET 3 OF 4

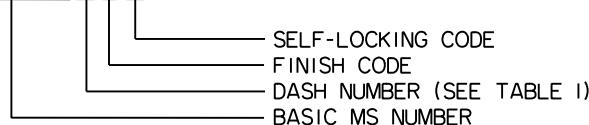
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REQUIREMENTS:

1. MATERIAL: ALLOY STEEL, IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.
2. PROTECTIVE COATING: ZINC COATING IN ACCORDANCE WITH ASTM B 633, TYPE II, CLASS FE/ZN 5. CADMIUM PLATING IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 3 (SEE REQUIREMENT 8 AND NOTE 5).
3. SELF-LOCKING ELEMENT: THE SELF-LOCKING ELEMENT SHALL BE A PATCH TYPE OR LONGITUDINAL STRIP IN ACCORDANCE WITH MIL-F-18240. FOR "X" AND "Y" DIMENSIONS AND DESIGN AND USAGE LIMITATION, SEE MSI598I (SEE REQUIREMENT 8).
4. HARDNESS: IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.
5. THREADS: THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/2. ACCEPTABILITY OF SCREW THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/20. SYSTEM 22.
6. MINIMUM THREAD LENGTH: SCREWS ABOVE HEAVY LINE SHALL HAVE COMPLETE (FULL FORM) THREADS EXTENDING WITHIN TWO THREADS OF THE INTERSECTION OF THE CONICAL PORTION OF THE HEAD WITH THE BASIC SCREW DIAMETER AS MEASURED WITH A THREAD RING GAGE.
7. HEAD FLUSHNESS: SCREWS SHALL MEET THE HEAD PROTRUSION LIMITS CITED IN TABLE II, DIMENSION P. FLUSHNESS IS DETERMINED BY PLACING A FLAT HEAD SCREW INTO A GAGING RING OF THE SIZE DETERMINED IN TABLE II AND MEASURING THE HEIGHT THAT THE HEAD EXTENDS ABOVE THE FACE OF THE GAGING RING.
8. CODE:
Z - ZINC COATED
NO CODE - CADMIUM PLATED (SEE NOTE 5)
L - SELF - LOCKING
9. PART NUMBERS: THE PART NUMBER SHALL CONSIST OF THE BASIC PMT NUMBER FOLLOWED BY A DASH NUMBER TAKEN FROM TABLE I, FOLLOWED BY A FINISH CODE, FOLLOWED BY A SELF-LOCKING CODE LETTER, IF APPLICABLE.

EXAMPLE: PMT24667-1 Z L



PMT24667-1ZL INDICATES - SCREW, CAP, SOCKET HEAD, FLAT COUNTERSUNK, 82°, ALLOY STEEL, .1120-40 UNC-3A, .250 LENGTH, ZINC COATED, SELF LOCKING.
PMT24667-1Z INDICATES - SCREW, CAP, SOCKET HEAD, FLAT COUNTERSUNK, 82°, ALLOY STEEL, .1120-40 UNC-3A, .250 LENGTH, ZINC COATED.
PMT24667-1L INDICATES - SCREW, CAP, SOCKET HEAD, FLAT COUNTERSUNK, 82°, ALLOY STEEL, .1120-40 UNC-3A, .250 LENGTH, CADMIUM PLATED, SELF LOCKING.
PMT24667-1 INDICATES - SCREW, CAP, SOCKET HEAD, FLAT COUNTERSUNK, 82°, ALLOY STEEL, .1120-40 UNC-3A, .250 LENGTH, CADMIUM PLATED.

10. IDENTIFICATION: SCREWS WITH NOMINAL SIZES .1900 AND LARGER SHALL BE PERMANENTLY MARKED WITH A SYMBOL IDENTIFYING ITS MANUFACTURER OR PRIVATE LABEL DISTRIBUTOR. MARKINGS SHALL BE PLACED ON THE TOP OF HEAD, INDENTED. METHOD AND SIZE OF MARKINGS SHALL CONFORM TO THE REQUIREMENTS FOR PERMANENT MARKINGS SPECIFIED IN SAE AS478.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. INTERPRET DIMENSIONS IN ACCORDANCE WITH ANSI Y14.5M.
3. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS DOCUMENT AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS DOCUMENT SHALL TAKE PRECEDENCE.
4. UNLESS OTHERWISE SPECIFIED, ISSUES OF REFERENCED DOCUMENTS ARE THOSE IN EFFECT AT THE TIME OF SOLICITATION.
5. CADMIUM PLATED PARTS COVERED BY THIS STANDARD ARE INACTIVE FOR NEW DESIGN AFTER 31 DEC 1994. DASH NUMBERS 62 THRU 71 ARE INACTIVE FOR NEW DESIGN AFTER 28 JULY 1975.

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	CHECKED: G.DILLING	DATE 5/24/10			
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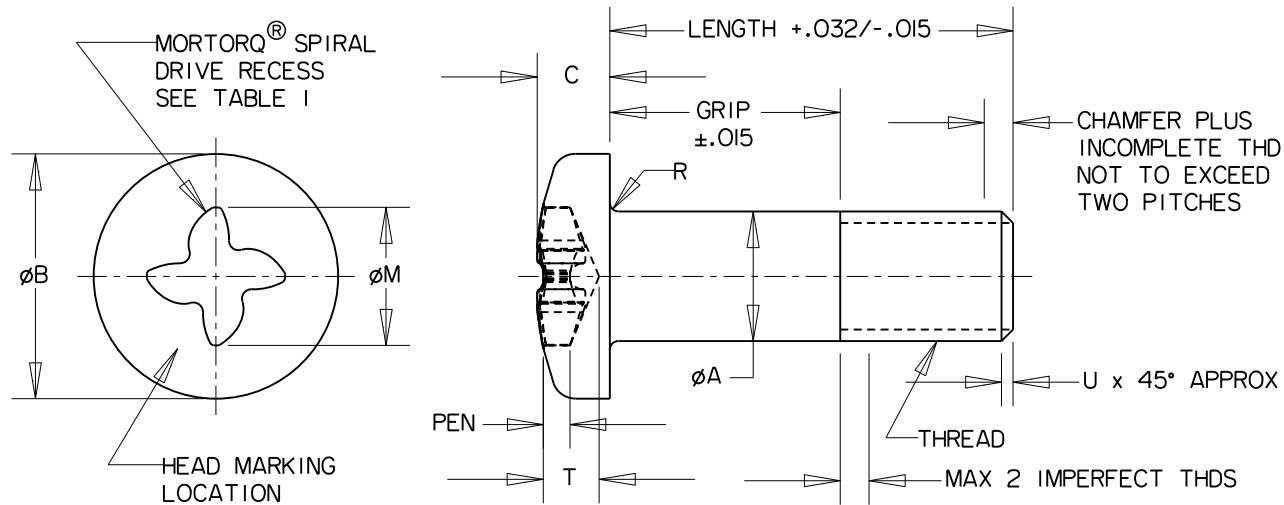


TABLE I - DIMENSIONS

THREAD	ØA		ØB		C		R RAD		U	MAX ECCENTRICITY		M REF	T REF	PEN		DRIVE SIZE
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN		HEAD TO SHANK FIM	RECESS TO SHANK FIM			MAX	MIN	
.164-32 UNC-3A	.1640	.1610	.322	.306	.115	.105				.020	.016	.1704	.071	.039	.031	MT-0
.190-32 UNF-3A	.1890	.1860	.373	.357	.133	.122				.032	.024	.2405	.092	.041	.032	MT-1
.250-28 UNF-3A	.2490	.2460	.492	.473	.175	.162	.020	.010		.030	.024	.2405	.103	.057	.048	MT-1
.3125-24 UNF-3A	.3115	.3085	.615	.594	.218	.203				.036		.3080	.157	.080	.071	MT-2
.375-24 UNF-3A	.3740	.3710	.740	.716	.261	.244				.042		.3537	.160	.087	.078	MT-3
.4375-20 UNF-3A	.4365	.4325	.868	.838	.304	.286	.025	.015		.048		.4285	.191	.102	.093	MT-4
.500-20 UNF-3A	.4990	.4950	.987	.958	.348	.327	.030	.020		.056		.5063	.212	.107	.092	MT-5

TABLE II - MECHANICAL PROPERTIES

THREAD	ULTIMATE TENSILE LOAD POUNDS MIN /9/				ULTIMATE DOUBLE SHEAR LOAD POUNDS MIN /10/			
	ALUM ALLOY	MANGANESE BRONZE	ALLOY STEEL	CRES	ALUM ALLOY	MANGANESE BRONZE	ALLOY STEEL	CRES
.164-32 UNC-3A	868	1,190	1,750	1,750	1,570	2,150	3,170	3,170
.190-32 UNF-3A	1,240	1,700	2,500	2,500	2,110	2,890	4,250	4,250
.250-28 UNF-3A	2,260	3,090	4,550	4,550	3,650	5,010	7,360	7,360
.3125-24 UNF-3A	3,600	4,930	7,250	7,250	5,700	7,820	11,500	11,500
.375-24 UNF-3A	5,440	7,460	11,000	11,000	8,220	11,300	16,600	16,600
.4375-20 UNF-3A	7,360	10,100	14,800	14,800	11,200	15,300	22,500	22,500
.500-20 UNF-3A	9,900	13,600	20,000	20,000	14,700	20,000	29,400	29,400

SHEET	I	2	3	4	5
REV	-	-	-	-	-

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TITLE: SCREW, MACHINE, PAN HEAD,
MORTORQ® SPIRAL DRIVE RECESS

DRAWN G.DILLING	DATE 9/16/11	DRAWING NUMBER PMT-27039
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CHECKED: G.DILLING	DATE 9/16/11	SHEET 1 OF 5
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MATERIAL:

ALUMINUM ALLOY 2024 (UNS A92024) IN ACCORDANCE WITH QQ-A-430, TEMPER 2024-D, OR AMS-QQ-A-225/6, TEMPER T4.

MANGANESE BRONZE (UNS C67000) IN ACCORDANCE WITH ASTM B 138/B 138M.

ALLOY STEEL 8630 (UNS G86300) IN ACCORDANCE WITH MIL-S-6050, 26-32 HRC; OR 8740 (UNS G87400) IN ACCORDANCE WITH AMS6322; OR 4130 (UNS G41300) IN ACCORDANCE WITH AMS-S-6758 OR AMS6346 HEAT AND CORROSION-RESISTANT STEEL, A286 (UNS S66286) IN ACCORDANCE WITH AMS573I OR AMS5732.

FINISH:

ALUMINUM ALLOY: ANODIZE, IN ACCORDANCE WITH MIL-A-8625, TYPE I OR II.

MANGANESE BRONZE: CADMIUM PLATE, IN ACCORDANCE WITH AMS-QQ-P-416, TYPE II, CLASS 3.

MANGANESE BRONZE: UNCOATED.

ALLOY STEEL: CADMIUM PLATE, IN ACCORDANCE WITH AMS-QQ-P-416, TYPE II, CLASS 2.

HEAT AND CORROSION-RESISTANT STEEL: PASSIVATE IN ACCORDANCE WITH AMS2700, METHOD I, TYPE 2 OR 8, CLASS I, TEST METHOD 102.

TENSILE STRENGTH:

ALUMINUM ALLOY: 62,000 PSI MIN ULTIMATE TENSILE STRENGTH.

MANGANESE BRONZE: 85,000 PSI MIN ULTIMATE TENSILE STRENGTH.

ALLOY STEEL: 125,000 TO 145,000 PSI ULTIMATE TENSILE STRENGTH.

HEAT AND CORROSION-RESISTANT STEEL: 130,000 PSI MIN ULTIMATE TENSILE STRENGTH.

THREADS:

THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/2. ACCEPTABILITY OF SCREW THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/20, SYSTEM 2I.

CODE:

ADD "DD" BEFORE DASH NUMBER FOR ANODIZED ALUMINUM ALLOY.

ADD "BP" BEFORE DASH NUMBER FOR CADMIUM PLATED MANGANESE BRONZE.

ADD "B" BEFORE DASH NUMBER FOR UNCOATED MANGANESE BRONZE.

ADD "-" BEFORE DASH NUMBER FOR CADMIUM PLATED ALLOY STEEL.

ADD "C" BEFORE DASH NUMBER FOR HEAT AND CORROSION-RESISTANT STEEL.

EXAMPLE OF PART NUMBER:

THE PART NUMBER SHALL CONSIST OF BASIC PMT NUMBER FOLLOWED BY THE MATERIAL AND FINISH CODE FOLLOWED BY THE DASH NUMBER FROM TABLE III.

PMT27039DD0809 - SCREW, MACHINE - PAN HEAD, MORTORQ RECESS: .164-32 UNC-3A
.594 LENGTH, ANODIZED ALUMINUM ALLOY.

PMT27039BP0809 - SCREW, MACHINE - PAN HEAD, MORTORQ RECESS: .164-32 UNC-3A.
.594 LENGTH, CADMIUM PLATED MANGANESE BRONZE.

PMT27039B0809 - SCREW, MACHINE - PAN HEAD, MORTORQ RECESS: .164-32 UNC-3A.
.594 LENGTH, UNCOATED MANGANESE BRONZE.

PMT27039-0809 - SCREW, MACHINE - PAN HEAD, MORTORQ RECESS: .164-32 UNC-3A.
.594 LENGTH, CADMIUM PLATED ALLOY STEEL.

PMT27039C0809 - SCREW, MACHINE - PAN HEAD, MORTORQ RECESS: .164-32 UNC-3A.
.594 LENGTH, HEAT AND CORROSION-RESISTANT STEEL.

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TITLE:

SCREW, MACHINE, PAN HEAD,
MORTORQ® SPIRAL DRIVE RECESS

DRAWN

G.DILLING

DATE

9/16/11

DRAWING NUMBER

PMT-27039

CHECKED:

G.DILLING

DATE

9/16/11

SHEET 2 OF 5

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HEAD MARKING:

- A. BASIC PART NO. AND APPLICABLE DASH NO. (BASIC PART NO. OPTIONAL FOR .164-32 SCREW SIZES).
- B. MATERIAL AS FOLLOWS: ALUMINUM ALLOY - NON, BRONZE - "B", ALLOY STEEL - "-", HEAT AND CORROSION-RESISTANT STEEL - "C".
- C. MANUFACTURER'S TRADE-MARK SHALL BE ADDED, LOCATION OPTIONAL.

NOTES:

- (1) DIMENSIONS IN INCHES.
- (2) SCREWS SHALL BE FREE FROM BURRS AND SHARP EDGES.
- (3) DIMENSIONS APPLY AFTER FINISH UNLESS OTHERWISE SPECIFIED.
- (4) SHANK DIAMETER MAY BE .001 OVERSIZE FOR A MAXIMUM DISTANCE OF .031 ADJACENT TO THE HEAD.
- (5) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
- (6) REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.
- (7) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
- (8) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THE APPLICABLE DRAWING OR SPECIFICATION MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.
- /9/ BASED ON 62,000 PSI FOR ALUM ALLOY, 85,000 PSI FOR MANGANESE BRONZE, 125,000 PSI FOR ALLOY STEEL, 125,000 PSI FOR CORROSION-RESISTANT STEEL. THE STRESS AREAS USED FOR THE CALCULATIONS OF THE TENSILE LOAD VALUES ARE LISTED ON FED-STD-H28/2.
- /10/ BASED ON 60% OF THE MINIMUM ULTIMATE TENSILE STRENGTH AT NOMINAL SHANK DIAMETER TIMES TWO.
- /11/ SHORT SCREWS LISTED ABOVE LINES SHALL BE THREADED TO WITHIN .032 +.032/-.000 OF THE HEAD.

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TITLE:

SCREW, MACHINE, PAN HEAD,
MORTORQ® SPIRAL DRIVE RECESS

DRAWN

G.DILLING

DATE

9/16/11

DRAWING NUMBER

PMT-27039

CHECKED:

G.DILLING

DATE

9/16/11

SHEET 3 OF 5

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TABLE III - DASH NUMBERS AND DIMENSIONS /II/

THREAD								
.164-32 UNC-3A			.190-32 UNF-3A			.250-28 UNF-3A		
DASH NO.	LENGTH	GRIP	DASH NO.	LENGTH	GRIP	DASH NO.	LENGTH	GRIP
0804	.281		I-04	.281		4-04	.281	
0805	.344	/II/	I-05	.344	/II/	4-05	.344	5-05 .359
0806	.406		I-06	.406		4-06	.406	5-06 .422
0807	.469		I-07	.469		4-07	.469	5-07 .484
0808	.531		I-08	.531	.062	4-08	.531	5-08 .547
0809	.594		I-09	.594	.125			5-09 .609
0810	.656		I-10	.656	.188	4-10	.656	5-10 .672
0811	.719		I-11	.719	.250	4-11	.719	5-11 .734
0812	.781		I-12	.781	.312	4-12	.781	5-12 .797
0813	.844		I-13	.844	.375	4-13	.844	5-13 .859
0814	.906	.469	I-14	.906	.438	4-14	.906	5-14 .922
0815	.969		I-15	.969	.500	4-15	.969	5-15 .984
0816	1.031		I-16	1.031	.563	4-16	1.031	5-16 1.047
0817	1.094		I-17	1.094	.625	4-17	1.094	5-17 1.109
0818	1.156		I-18	1.156	.688	4-18	1.156	5-18 1.172
0819	1.219	.781	I-19	1.219	.750	4-19	1.219	5-19 1.234
0820	1.281		I-20	1.281	.813	4-20	1.281	5-20 1.297
0821	1.344		I-21	1.344	.875	4-21	1.344	5-21 1.359
0822	1.406		I-22	1.406	.938	4-22	1.406	5-22 1.422
0823	1.469		I-23	1.469	1.000	4-23	1.469	5-23 1.484
0824	1.531	1.094	I-24	1.531	1.062	4-24	1.531	5-24 1.547
0825	1.594		I-25	1.594	1.125	4-25	1.594	5-25 1.609
0826	1.656		I-26	1.656	1.188	4-26	1.656	5-26 1.672
0827	1.719		I-27	1.719	1.250	4-27	1.719	5-27 1.734
0828	1.781		I-28	1.781	1.312	4-28	1.781	5-28 1.797
0829	1.844	1.406	I-29	1.844	1.375	4-29	1.844	5-29 1.859
0830	1.906		I-30	1.906	1.438	4-30	1.906	5-30 1.922
0831	1.969		I-31	1.969	1.500	4-31	1.969	5-31 1.984
0832	2.031		I-32	2.031	1.563	4-32	2.031	5-32 2.047
0833	2.094		I-33	2.094	1.625	4-33	2.094	5-33 2.109
0834	2.156	1.719	I-34	2.156	1.688	4-34	2.156	5-34 2.172
0835	2.219		I-35	2.219	1.750	4-35	2.219	5-35 2.234
0836	2.281		I-36	2.281	1.813	4-36	2.281	5-36 2.297
0837	2.344		I-37	2.344	1.875	4-37	2.344	5-37 2.359
0838	2.406		I-38	2.406	1.938	4-38	2.406	5-38 2.422
			I-39	2.469	2.000	4-39	2.469	5-39 2.484
			I-40	2.531	2.062	4-40	2.531	5-40 2.547
			I-41	2.594	2.125	4-41	2.594	5-41 2.609
			I-42	2.656	2.188	4-42	2.656	5-42 2.672
			I-43	2.719	2.250	4-43	2.719	5-43 2.734
			I-44	2.781	2.312	4-44	2.781	5-44 2.797
			I-45	2.844	2.375	4-45	2.844	5-45 2.859
			I-46	2.906	2.438	4-46	2.906	5-46 2.922
			I-47	2.969	2.500	4-47	2.969	5-47 2.984
			I-48	3.031	2.563	4-48	3.031	5-48 3.047
			I-49	3.094	2.626			
			I-50	3.156	2.688			
			I-51	3.219	2.751			
			I-52	3.281	2.813			
			I-53	3.344	2.876			
			I-54	3.406	2.938			
			I-55	3.469	3.000			
			I-56	3.531	3.063			

REVISION

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TITLE:

SCREW, MACHINE, PAN HEAD,
MORTORQ® SPIRAL DRIVE RECESSDRAWN
G.DILLINGDATE
9/16/11

DRAWING NUMBER

PMT-27039

SHEET 4 OF 5

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

TABLE III - DASH NUMBERS AND DIMENSIONS /II/ (CONTINUED)								
THREAD								
.375-24 UNF-3A			.4375-20 UNF-3A			.500-20 UNF-3A		
DASH NO.	LENGTH	GRIP	DASH NO.	LENGTH	GRIP	DASH NO.	LENGTH	GRIP
6-05	.406		7-06	.453		8-06	.453	
6-06	.469		7-07	.516		8-07	.516	
6-07	.531		7-08	.578	/II/	8-08	.578	
6-08	.594	/II/	7-09	.641		8-09	.641	
6-09	.656		7-10	.703		8-10	.703	
6-10	.719					8-II	.766	
						8-12	.828	
6-11	.781	.094	7-II	.766	.062	8-13	.891	.062
6-12	.844	.156	7-12	.828	.125			
6-13	.906	.219	7-13	.891	.188			
6-14	.969	.281	7-14	.953	.250	8-14	.953	.125
6-15	1.031	.344	7-15	1.016	.312	8-15	1.016	.188
6-16	1.094	.406	7-16	1.078	.375	8-16	1.078	.250
6-17	1.156	.469	7-17	1.141	.438	8-17	1.141	.312
6-18	1.219	.531	7-18	1.203	.500	8-18	1.203	.375
6-19	1.281	.594	7-19	1.266	.563	8-19	1.266	.438
6-20	1.344	.656	7-20	1.328	.625	8-20	1.328	.500
6-21	1.406	.719	7-21	1.391	.688	8-21	1.391	.563
6-22	1.469	.781	7-22	1.453	.750	8-22	1.453	.625
6-23	1.531	.844	7-23	1.516	.813	8-23	1.516	.688
6-24	1.594	.906	7-24	1.578	.875	8-24	1.578	.750
6-25	1.656	.969	7-25	1.641	.938	8-25	1.641	.813
6-26	1.719	1.031	7-26	1.703	1.000	8-26	1.703	.875
6-27	1.781	1.094	7-27	1.766	1.062	8-27	1.766	.938
6-28	1.844	1.156	7-28	1.828	1.125	8-28	1.828	1.000
6-29	1.906	1.219	7-29	1.891	1.188	8-29	1.891	1.062
6-30	1.969	1.281	7-30	1.953	1.250	8-30	1.953	1.125
6-31	2.031	1.344	7-31	2.016	1.312	8-31	2.016	1.188
6-32	2.094	1.406	7-32	2.078	1.375	832	2.078	1.250
6-33	2.156	1.469	7-33	2.141	1.438	8-33	2.141	1.312
6-34	2.219	1.531	7-34	2.203	1.500	8-34	2.203	1.375
6-35	2.281	1.594	7-35	2.266	1.563	8-35	2.266	1.438
6-36	2.344	1.656	7-36	2.328	1.625	8-36	2.328	1.500
6-37	2.406	1.719	7-37	2.391	1.688	8-37	2.391	1.563
6-38	2.469	1.781	7-38	2.453	1.750	8-38	2.453	1.625
6-39	2.531	1.844	7-39	2.516	1.813	8-39	2.516	1.688
6-40	2.594	1.906	7-40	2.578	1.875	8-40	2.578	1.750
6-41	2.656	1.969	7-41	2.641	1.938	8-41	2.641	1.813
6-42	2.719	2.031	7-42	2.703	2.000	8-42	2.703	1.875
6-43	2.781	2.094	7-43	2.766	2.062	8-43	2.766	1.938
6-44	2.844	2.156	7-44	2.828	2.125	8-44	2.828	2.000
6-45	2.906	2.219	7-45	2.891	2.188	8-45	2.891	2.062
6-46	2.969	2.281	7-46	2.953	2.250	8-46	2.953	2.125
6-47	3.031	2.344	7-47	3.016	2.312	8-47	3.016	2.188
6-48	3.094	2.406	7-48	3.078	2.375	8-48	3.078	2.250

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TITLE:

SCREW, MACHINE, PAN HEAD,
MORTORQ® SPIRAL DRIVE RECESS

DRAWN

G.DILLING

DATE

9/16/11

DRAWING NUMBER

PMT-27039

SHEET 5 OF 5

CHECKED:

G.DILLING

DATE

9/16/11

PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A.
PHONE: 774-396-6190 FAX: 508-966-2326

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HEAD MARKING PER NASI347.
TYPE IV, EXCEPT MARK
MATERIAL CODE IN LIEU OF
MATERIAL SYMBOL, AND
MANUFACTURER'S IDENTIFICATION.
LOCATION OPTIONAL. [3.16]

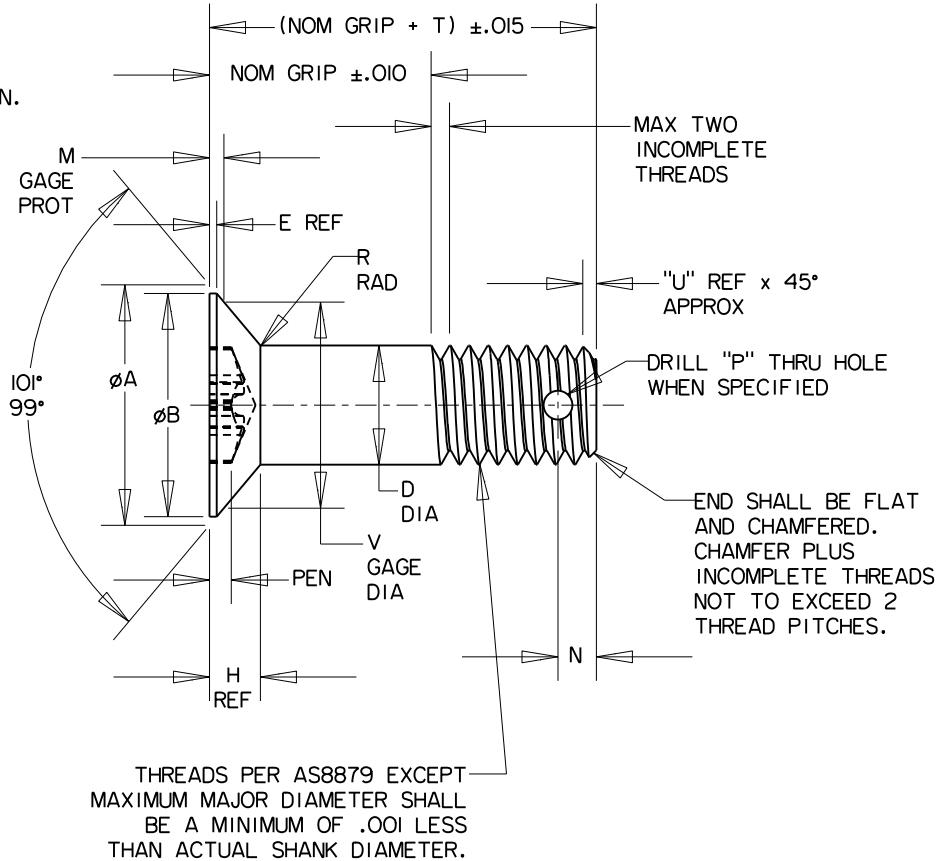
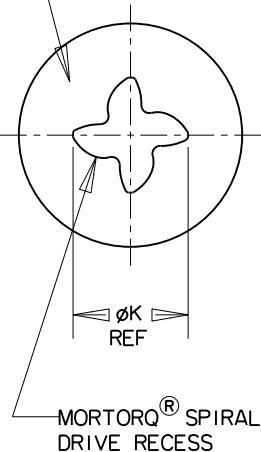


TABLE I - DIMENSIONS

APPROVED CALLOUT	THREAD	A DIA [3.12]	B DIA	D DIA		E REF [3.12]	F [3.6]	H REF [3.12]	M GAGE PROT.	N +.020 -.000 [3.14]
				UNCOATED	COATED					
PMT3MII69()3()()	.1900-32 UNJF-3A	.3813 .3729	.352 .345	.1895 .1890	.1895 .1885	.015	.008	.084	.0223 .0196	.106
PMT3MII69()4()()	.2500-28 UNJF-3A	.5066 .4970	.477 .470	.2495 .2490	.2495 .2485	.015	.009	.110	.0308 .0278	.106
PMT3MII69()5()()	.3125-24 UNJF-3A	.6335 .6230	.604 .597	.3120 .3115	.3120 .3110	.015	.011	.138	.0365 .0333	.110
PMT3MII69()6()()	.3750-24 UNJF-3A	.7604 .7490	.731 .724	.3745 .3740	.3745 .3735	.015	.012	.166	.0422 .0388	.110
PMT3MII69()7()()	.4375-20 UNJF-3A	.8884 .8746	.845 .835	.4370 .4365	.4370 .4360	.022	.014	.194	.0454 .0411	.114
PMT3MII69()8()()	.5000-20 UNJF-3A	1.0139 1.0001	.970 .960	.4995 .4990	.4995 .4985	.022	.016	.222	.0510 .0470	.114

SHEET	1	2	3	4	5
REV	-	-	-	-	-

REVISION

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TITLE: MORTORQ® SPIRAL DRIVE RECESS
BOLT, 100° TENSION HEAD, GEAR DRIVE RECESS -
PH13-8Mo (125 KSI SHEAR), INCONEL 718
(125 KSI SHEAR), 6AL-4V TITANIUM (95 KSI SHEAR)

DRAWN G.DILLING	DATE 1/20/12	DRAWING NUMBER PMT-3MII69
CHECKED: G.DILLING	DATE 1/20/12	SHEET 1 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX®
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TABLE I - DIMENSIONS (CONTINUED)

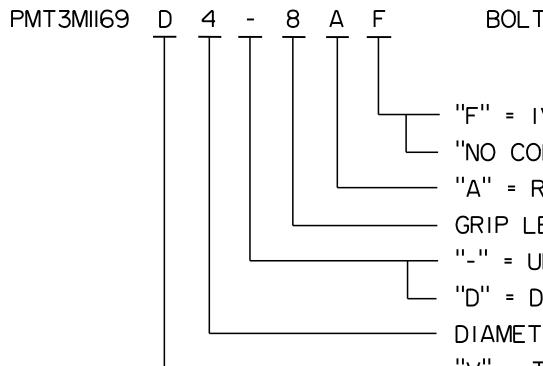
APPROVED CALLOUT	ϕP +.010 -.000	R RAD	T BASIC	U REF	V GAGE DIA	Y TIR [3.4]	Z [3.5]	MORTORQ® SPIRAL DRIVE				TORQUE IN-LBS MIN [3.7]
								RECESS NO.	K REF	PENETRATION		
										MAX.	MIN.	
PMT3MII69()3()()	.070	.020 .010	.345	.039	.3272 .3270	.0045	.0040	MT-1	.2405	.027	.020	90
PMT3MII69()4()()	.076	.020 .010	.425	.045	.4320 .4318	.0045	.0030	MT-1	.2405	.047	.038	240
PMT3MII69()5()()	.076	.025 .015	.469	.052	.5451 .5449	.0045	.0030	MT-2	.3080	.055	.046	265
PMT3MII69()6()()	.106	.030 .015	.578	.052	.6582 .6580	.0060	.0025	MT-3	.3537	.070	.061	440
PMT3MII69()7()()	.106	.030 .015	.694	.062	.7784 .7782	.0060	.0025	MT-4	.4285	.080	.065	1,080
PMT3MII69()8()()	.106	.030 .015	.735	.062	.8902 .8900	.0060	.0020	MT-5	.5063	.082	.067	1,520

I. SCOPE:

I.1 THIS DOCUMENT DESCRIBES THE REQUIREMENTS FOR A BOLT INTENDED FOR USE IN COUNTERSUNK APPLICATIONS OF SUFFICIENT THICKNESS TO ALLOW COMPLETE SEATING OF THE FASTENER HEAD AND INSURE 30% COLUMN BEARING IN THE HEAD BEARING MEMBER. THIS CONFIGURATION IS GENERALLY ACCEPTABLE FOR REMOVEABLE APPLICATIONS AND REQUIRED IN C/E STRUCTURE.

I.2 THESE PARTS SHALL BE SPECIFIED, PROCURED, AND USED UNDER THE APPROVED CALLOUT NUMBER.

I.3 THE APPROVED CALLOUT SHALL CONSIST OF THIS DOCUMENT NUMBER AND AN ASSIGNED DASH NUMBER AS SHOWN IN THE FOLLOWING EXAMPLE:



- "F" = IVD ALUMINUM COAT + CETYL ALCOHOL (CRES ONLY) [6.2]
- "NO CODE" = PASSIVATE (CRES) OR NONE (TITANIUM)
- "A" = REDEFINED HEAD GEOMETRY PER [3.12]
- GRIP LENGTH IN 1/16THS
- "-" = UNDRILLED SHANK
- "D" = DRILLED SHANK
- DIAMETER IN 1/16THS
- "V" = TITANIUM
- "C" = INCONEL 718 CRES [6.1]
- "D" = PH13-8Mo CRES (INACTIVE FOR DESIGN AND PROCUREMENT AFTER 2002. SUPERSEDED BY "C" CODE PARTS)

REVISION

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DRAWN G.DILLING		DATE 1/20/12	DRAWING NUMBER PMT-3MII69	
CHECKED: G.DILLING		DATE 1/20/12	SHEET 2 OF 5	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS II® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

2. APPLICABLE DOCUMENTS:

- 2.1 THIS DOCUMENT IS THE CONTROLLING DOCUMENT AND TAKES PRECEDENCE OVER ALL REFERENCED DOCUMENTS
- 2.2 REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BID
- 2.3 THE FOLLOWING DOCUMENTS FORM A PART OF THIS DOCUMENT TO THE EXTENT SPECIFIED HEREIN.

SPECIFICATIONS:

INDUSTRY:

ASME B46.1	SURFACE TEXTURE (SURFACE ROUGHNESS, WAVINESS, AND LAY)
AMS 5629	STEEL, CORROSION-RESISTANT, BARS WIRE, FORGINGS, RINGS AND EXTRUSIONS, I3 CR-8.0Ni - 2.2Mo - I.IAL VACUUM INDUCTION PLUS CONSUMABLE ELECTRODE MELTED SOLUTION HEAT TREATED, PRECIPITATION HARDENABLE
AMS 5662	NICKEL ALLOY, CORROSION AND HEAT RESISTANT, BARS, FORGINGS, AND RINGS 52.5Ni - I9Cr - 3.0Mo - 5.Icb = 0.90Ti = 0.50Al - I8Fe CONSUMABLE ELECTRODE OR VACUUM INDUCTION METLED 1775°F (968°C) SOLUTION HEAT TREATED, PRECIPITATION HARDENABLE
AS8879	SCREW THREADS = UNJ PROFILE, INCH CONTROLLED RADIUS ROOT WITH INCREASED MINOR DIAMETER
NASM13I2-25	FASTENER TEST METHODS; METHOD 25, DRIVING RECESS TORQUE QUALITY CONFORMANCE TEST
MILITARY:	
MIL-DTL-83488	COATING, ALUMINUM, HIGH PURITY
MIL-L-87132	LUBRICANT, CETYL ALCOHOL, I-HEXADECANOL, APPLICATION TO FASTENERS

STANDARDS:

INDUSTRY:

NASI347	IDENTIFICATION OF MALE THREADED FASTENERS
PSC-5027	RECESS, MORTORQ SPIRAL DRIVE - INTERNAL - DIMENSIONS
NAS4004	FASTENER, 6AL-4V TITANIUM ALLOY EXTERNALLY THREADED, 160 KSI FTU, 95 KSI FSU, 450°F
NAS9800	HEAD PROTRUSION GAGING 100 DEGREE FLUSH HEAD FASTENERS GAGE BLOCK, GAGE DIMETERS, AND STYLUS
MILITARY:	
MIL-STD-I29	MILITARY MARKING FOR SHIPMENT AND STORAGE
MIL-STD-I285	MARKING OF ELECTRICAL AND ELECTRONIC PARTS

3. REQUIREMENTS:

3.1 PROCUREMENT SPECIFICATION:

3.1.1 "V" SERIES - NAS4004, EXCEPT AS NOTED HEREIN:

- 3.1.1.1 MICROEXAMINATION FOR DISCONTINUITIES, MICROSTRUCTURE AND SURFACE CONTAMINATION SHALL BE CONDUCTED BETWEEN 100X AND 200X DIAMETERS. (HIGHER MAGNIFICATIONS MAY BE USED TO IDENTIFY POTENTIAL DEFECTS FOUND AT THE LOWER MAGNIFICATION RANGE.)
- 3.1.1.2 "RATEABLE" THREAD DISCONTINUITIES DEFINITION/CRITERIA NOT APPLICABLE.
- 3.1.1.3 "ALTERED"/"CHARGED" MICROSTRUCTURE ON THE BEARING SURFACE OF THE HEAD TO A MAXIMUM DEPTH OF 0.003 INCH IS PERMISSIBLE ONLY IF IT IS VISIBLE DESCERNIBLE FROM SURFACE CONTAMINATION, SURFACE CONTAMINATION LIMITS PER NAS 4004 REVISION 5, TABLE VI.

REVISION

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DRAWN G.DILLING		DATE 1/20/12	DRAWING NUMBER PMT-3MII69	
CHECKED: G.DILLING		DATE 1/20/12	SHEET 3 OF 5	
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

- 3.I.I.4 AN AQUEOUS SOLUTION OF 2% HYDROFLUORIC ACID SHALL BE USED AS THE ETCHANT WHEN PERFORMING EXAMINATIONS FOR DISCONTINUITIES, MICROSTRUCTURE AND SURFACE CONTAMINATION.
- 3.I.I.5 SHEAR DEFORMATION STRAIN LINES ARE PERMITTED ONLY IF THE FAILURE MODE/FRACTURE PATH OF FASTENERS FAILED DURING FATIGUE TESTING ARE NOT COINCIDENT WITH THE LOCATION AND ORIENTATION OF THE STRAIN LINES.
- 3.I.I.6 TENSION AND TENSION FATIGUE REQUIREMENTS TO BE VERIFIED BY ACCEPTANCE TESTS.
- 3.I.I.7 SAMPLING MAY BE BASED ON "INSPECTION LOT" (*) SIZE, WITH PROPORTIONAL REPRESENTATION FROM THE INDIVIDUAL PRODUCTION LOTS, TO THE MAXIMUM EXTENT POSSIBLE. EACH PRODUCTION LOT SHALL BE REPRESENTED BY AT LEAST ONE PART PER TEST. IN THOSE CASES WHERE THE PART IS TOO SHORT TO TEST, PRODUCTION LOTS WITH PARTS OF SUFFICIENT LENGTH TO TEST, SHALL BE INCLUDED IN THE INSPECTION LOT. AN "INSPECTION REPORT" SHALL BE SUPPLIED WITH EACH LOT REPRESENTED IN THE SHIPMENT. (*) "THE INSPECTION LOT" SHALL CONSIST OF ONE OR MORE (SIX MAX) PRODUCTION LOTS OF FASTENERS OF THE SAME DIAMETER AND HEAD CONFIGURATION, MANUFACTURED FROM THE SAME HEAT OF MATERIAL. THE PRODUCTION LOTS SHALL HAVE COMMON OPERATION "SET-UPS" RELATIVE TO THE HEADING, HEAT TREAT, FILLET AND THREAD ROLLING PROCESSES.
- 3.I.2 "C" SERIES - 23MII8, TYPE E
- 3.I.3 "D" SERIES - 23MII2, TYPE E
- 3.2 MATERIAL:
- 3.2.1 "V" SERIES - 6AL-4V TITANIUM ALLOY PER NAS4004, 160 KSI ULTIMATE TENSILE STRENGTH.
- 3.2.2 "C" SERIES - INCONEL 718, PER AMS 5662, 125 KSI ULTIMATE SHEAR STRENGTH.
- 3.2.3 "D" SERIES - PH13-8MO PER AMS 5629, 125 KSI ULTIMATE SHEAR STRENGTH.
- 3.3 FINISH:
- 3.3.1 "V" SERIES - NONE.
- 3.3.2 "C" AND "D" SERIES -
- 3.3.2.1 "NO CODE" - PASSIVATE.
- 3.3.2.2 "F" CODE - IVD ALUMINUM COAT PER MIL-DTL-83488, TYPE II, CLASS 3 PLUS CETYL ALCOHOL PER MIL-L-87132, TYPE I, GRADE B.
- 3.4 CONCENTRICITY:
- 3.4.1 CONICAL SURFACE OF HEAD TO "D" DIAMETER WITHIN 0.005 TIR.
- 3.4.2 "D" DIAMETER TO THREAD PITCH DIAMETER WITHIN "Y" TIR.
- 3.4.3 RECESS TO "D" DIAMETER WITHIN 0.010 TIR FOR -3 AND -4 SIZE; 0.015 TIR FOR -5 AND LARGER SIZES
- 3.5 SHANK SHALL BE STRAIGHT WITHIN "Z" PER INCH OF LENGTH.
- 3.6 HEAD OUT OF ROUNDNESS SHALL NOT EXCEED "F" TIR.
- 3.7 GEAR DRIVE RECESS SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED WITHOUT DAMAGE TO RECESS OR DRIVER WHEN TESTED IN ACCORDANCE WITH NASMI312-25.
- 3.8 SURFACE ROUGHNESS PER ASME B46.1. CONICAL SURFACE OF HEAD, HEAD TO SHANK FILLET SHANK AND ALL THREAD ELEMENTS 32 RHR MAXIMUM. ALL OTHER SURFACES 125 RHR MAXIMUM.
- 3.9 DIMENSIONS IN INCHES.
- 3.10 GRIP LENGTH IS FROM TOP OF BOLT HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
- 3.11 GAGE PROTRUSION SHALL BE INSPECTED PER NAS9800.
- 3.12 "A" DIMENSIONS ARE APPLICABLE AND COMPATIBLE WITH GAGE PROTRUSION LIMITS. "E" AND "H" ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. PROTRUSION LIMITS MAY BE USED TO VERIFY BASIC HEAD GEOMETRY. HOWEVER, COMPARATOR READINGS OR SIMILAR METHOD SHALL BE USED TO VERIFY "A" LIMITS IN CASE OF CONFLICT. BREAK ALL SHARP EDGES AND REMOVE BURRS.
- 3.13 COTTER PIN HOLE CENTERLINE WITHIN 0.010 AND NORMAL WITHIN 2° OF BOLT CENTERLINE.
- 3.14 PARTS PRODUCED TO PREVIOUS REVISIONS MAY BE SUPPLIED UNTIL DEPLETION OF EXISTING STOCK.
- 3.15 SUBSEQUENT HEAD MARKING; AN INDENTED "●" PRECEDING THE MANUFACTURER'S HEAD MARKING SHALL BE
- 3.16 APPLIED TO ALL FASTENERS MEETING 3.12 REQUIREMENTS.

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DRAWN	G.DILLING	DATE	DRAWING NUMBER	PMT-3MII69
CHECKED:	G.DILLING	DATE		SHEET 4 OF 5
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326				
PHILLIPS® PHILLIPS® POZIDRIV® ACR® POZISQUARE® PHILLIPS SQUARE-DRIV® TORQ-SET® TRI-WING® MORTORQ® HEXSTIX® AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY				

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 SEE PROCUREMENT SPECIFICATION NAS4004 AS APPLICABLE.
4.2 ALL INSPECTIONS AND/OR TESTS TO ENSURE COMPLIANCE WITH THIS SPECIFICATION
AND TO ACCEPT OR REJECT LOTS IN ACCORDANCE WITH QUALITY ASSURANCE PROVISIONS.

4.2.1 QUALITY MAY ALLOW ADDITIONAL SAMPLE TESTING WHEN THE REJECTION CRITERIA
(ONE FAILURE) HAS BEEN REACHED DURING LOT TESTING.

4.2.1.1 IN THOSE CASES WHERE THE TABULATED SAMPLE PLAN VARIES WITH LOT SIZE, THE SAMPLE
SIZE WILL BE INCREASED TO THE MAXIMUM SAMPLE FOUND IN THE TABLE. NO ADDITIONAL
FAILURES ARE PERMITTED.

4.2.1.2 IN THOSE CASES WHERE SAMPLING DOES NOT VARY WITH LOT SIZE, THE SAMPLE WILL BE
INCREASED TO (3) TIMES THE ORIGINAL REQUIREMENT. NO ADDITIONAL FAILURES ARE
PERMITTED.

4.2.1.3 THESE PROVISIONS DO NOT APPLY WHERE SPECIFIC A.Q.L.'S HAVE BEEN ESTABLISHED OR
WHERE APPLICABLE ATTRIBUTE OR VARIABLE SAMPLING PLANS CONTAIN PROVISION(S) FOR
ALTERNATE SAMPLING, I.E., MULTIPLE OR REDUCED SAMPLING.

4.2.2 QUALITY WILL CONSIDER APPROVAL FOR USE OF THESE PROVISION(S) ON A "CASE-BY-CASE" BASIS.

5. PREPARATION FOR DELIVERY:

5.1 PACKAGING: UNLESS OTHERWISE SPECIFIED IN THE PROCUREMENT SPECIFICATION OR PURCHASE ORDER, THE
ITEM FURNISHED SHALL BE SUITABLY PACKAGED FOR ACCEPTANCE AND DELIVERY BY COMMON CARRIER, FOR
RECEIPT WITHOUT DAMAGE.

5.2 PACKAGE MARKING: ALL INTERIOR PACKAGES SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129.

6. NOTES:

[6.1] THE INCONEL 718 ("C" SERIES) FASTENER IS PREFERRED IN HIGH STRENGTH, NON-MAGNETIC APPLICATIONS
AND IN C/E STRUCTURE WHERE EITHER THE "V" OR "D" SERIES SCREWS WILL NOT MEET REQUIREMENTS.

[6.2] THE IVD ALUMINUM COATED CRESS ("C" OR "D" SERIES) SCREW IS INTENDED FOR USE IN ALUMINUM
STRUCTURE WHERE APPLIED SEALANT WOULD NOT BE SUITABLE.

6.3 THIS PART MAY BE USED ONLY WHERE THE GEAR DRIVE RECESS IS PERMITTED BY CONTRACT.

6.4 TOTAL FASTENER LENGTH CAN BE DETERMINED BY ADDING THE MAXIMUM FASTENER GRIP LENGTH [SPECIFIED
IN SIXTEENTHS OF AN INCH (SEE EXAMPLE OF CALLOUT) TO THE FASTENER THREAD LENGTH (SEE TABLE I,
DIMENSION T)].

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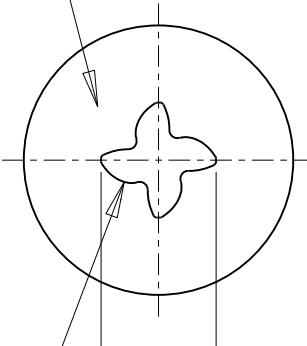
TITLE: MORTORQ® SPIRAL DRIVE RECESS
BOLT, 100° TENSION HEAD, GEAR DRIVE RECESS -
PH13-8Mo (125 KSI SHEAR), INCONEL 718
(125 KSI SHEAR), 6AL-4V TITANIUM (95 KSI SHEAR)

DRAWN	DATE	DRAWING NUMBER
G.DILLING	1/20/12	PMT-3MII69
CHECKED:	DATE	SHEET 5 OF 5
G.DILLING	1/20/12	

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HEAD MARKING PER NASI347.
TYPE IV, EXCEPT MARK
MATERIAL CODE IN LIEU OF
MATERIAL SYMBOL, AND
MANUFACTURER'S IDENTIFICATION.
LOCATION OPTIONAL. [3.15]



MORTORQ® SPIRAL
DRIVE RECESS

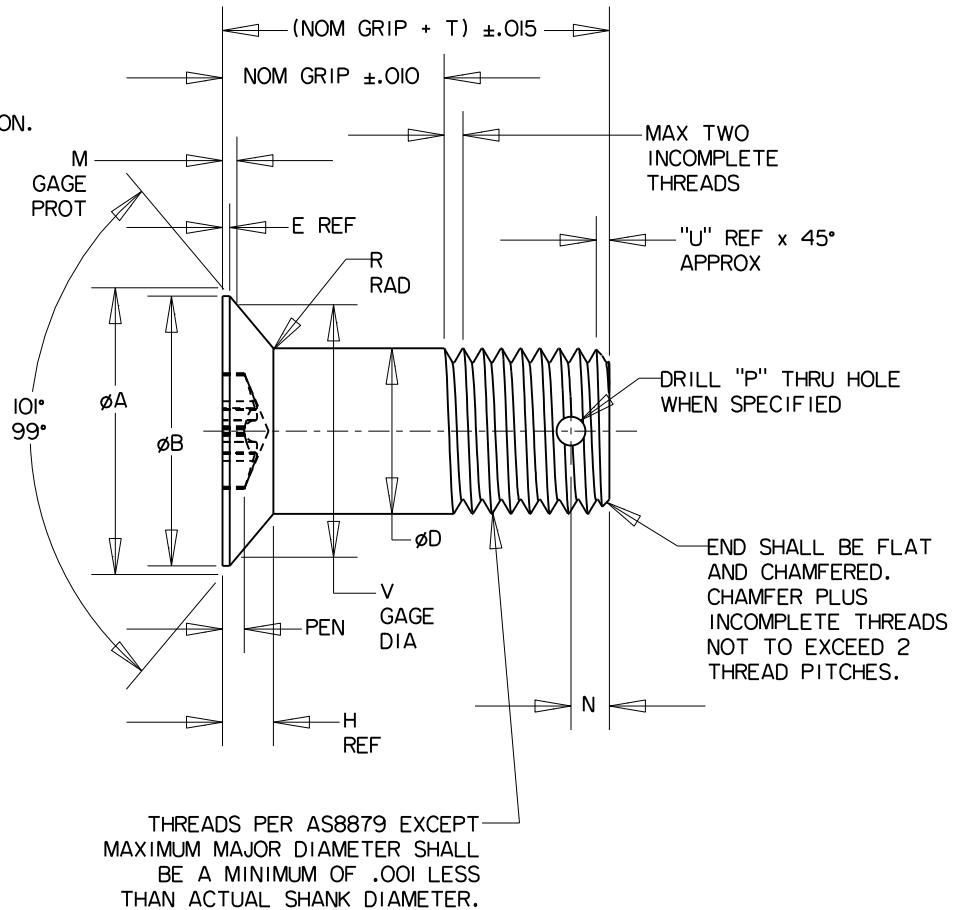


TABLE I - DIMENSIONS

APPROVED CALLOUT	THREAD	A DIA [3.12]	B DIA	D DIA		E REF [3.12]	F [3.6]	H REF [3.12]	M GAGE PROT. [3.14]	N +0.010 -0.000 [3.14]
				UNCOATED	COATED					
PMT3MII70C3() () ()	.1900-32	.3016	.272	.1895	.1895	.015	.005	.046	.0238	.106
PMT3MII70D3() () () [6.5]	UNJF-3A	.2931	.265	.1890	.1885				.0210	
PMT3MII70()4() () ()	.2500-28	.3948	.365	.2495	.2495	.015	.006	.060	.0262	.106
	UNJF-3A	.3859	.358	.2490	.2485				.0233	
PMT3MII70()5() () ()	.3125-24	.4739	.445	.3120	.3120	.015	.007	.067	.0286	.110
	UNJF-3A	.4645	.438	.3115	.3110				.0256	
PMT3MII70()6() () ()	.3750-24	.5604	.531	.3745	.3745	.015	.008	.077	.0309	.110
	UNJF-3A	.5504	.524	.3740	.3735				.0278	
PMT3MII70()7() () ()	.4375-20	.6680	.624	.4370	.4370	.022	.009	.095	.0405	.114
	UNJF-3A	.6554	.614	.4365	.4360				.0366	
PMT3MII70()8() () ()	.5000-20	.7540	.710	.4995	.4995	.022	.010	.105	.0429	.114
	UNJF-3A	.7412	.700	.4990	.4985				.0390	

SHEET	I	2	3	4	5	6
REV	-	-	-	-	-	-

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TITLE: MORTORQ® SPIRAL DRIVE RECESS -
BOLT, 100° REDUCED HEAD, GEAR DRIVE RECESS -
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(125 KSI SHEAR), 6AL-4V TITANIUM (95 KSI SHEAR)

DRAWN G.DILLING	DATE 2/6/12	DRAWING NUMBER PMT-3MII70
CHECKED: G.DILLING	DATE 2/6/12	SHEET 1 OF 6
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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TABLE I - DIMENSIONS (CONTINUED)

APPROVED CALLOUT	THREAD	A DIA 3.12	B DIA	D DIA		E REF 3.12	F	H REF 3.12	M GAGE PROT.	N +0.010 -0.000 3.14
				UNCOATED	COATED					
PMT3MII70()9()()()	.5625-18 UNJF-3A	.8380 .8242	.794 .784	.5615 .5610	.5615 .5605	.022	.010	.114	.0486 .0445	.119
PMT3MII70()10()()()	.6250-18 UNJF-3A	.9250 .9112	.881 .871	.6240 .6235	.6240 .6230	.022	.010	.124	.0510 .0470	.119

TABLE I - DIMENSIONS (CONTINUED)

APPROVED CALLOUT	ϕP +.005 -.000	R RAD	T BASIC	U REF	V GAGE DIA	Y TIR 3.4	Z 3.5	MORTORQ® SPIRAL DRIVE			TORQUE IN-LBS MIN 3.7	
								RECESS NO.	K REF	PENETRATION		
										MAX.	MIN.	
PMT3MII70C3()()()												
PMT3MII70D3()()() 6.5	.070	.020 .010	.345	.039	.2440 .2438	.0045	.0030	MT-0	.1704	.030	.023	80
PMT3MII70()4()()()	.076	.020 .010	.425	.045	.3314 .3312	.0045	.0030	MT-1	.2405	.030	.023	90
PMT3MII70()5()()()	.076	.025 .015	.469	.052	.4047 .4045	.0045	.0030	MT-1	.2405	.048	.039	220
PMT3MII70()6()()()	.106	.030 .015	.578	.052	.4854 .4852	.0060	.0025	MT-2	.3080	.050	.041	240
PMT3MII70()7()()()	.106	.030 .015	.694	.062	.5698 .5696	.0060	.0025	MT-3	.3537	.067	.058	440
PMT3MII70()8()()()	.106	.030 .015	.735	.062	.6500 .6498	.0060	.0020	MT-4	.4285	.072	.057	1,080
PMT3MII70()9()()()	.141	.030 .015	.840	.070	.7200 .7198	.0060	.0020	MT-4	.4285	.092	.077	1,520
PMT3MII70()10()()()	.141	.030 .015	.902	.070	.8012 .8010	.0060	.0020	MT-5	.5063	.092	.067	1,520

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DRAWN	G.DILLING	DATE	DRAWING NUMBER
CHECKED:	G.DILLING	DATE	PMT-3MII70
PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326			SHEET 2 OF 6
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TABLE II - TENSILE STRENGTH

APPROVED CALLOUT	TENSILE STRENGTH, LBS MIN	
	"V" SERIES	"C" AND "D" SERIES
PMT3MII7O()3()()	6.5	2,200
PMT3MII7O()4()()	3,200	4,400
PMT3MII7O()5()()	4,230	5,820
PMT3MII7O()6()()	6,160	8,470
PMT3MII7O()7()()	8,320	11,440
PMT3MII7O()8()()	11,300	15,000
PMT3MII7O()9()()	14,300	19,000
PMT3MII7O()10()()	18,000	23,800

I. SCOPE:

- I.1 THIS DOCUMENT DESCRIBES THE REQUIREMENTS FOR A BOLT INTENDED FOR USE IN PERMANENT THIN SHEET APPLICATIONS. THIS HEAD CONFIGURATION IS NOT INTENDED FOR USE IN C/E STRUCTURE.
- I.2 THESE PARTS SHALL BE SPECIFIED, PROCURED, AND USED UNDER THE APPROVED CALLOUT NUMBER.
- I.3 THE APPROVED CALLOUT SHALL CONSIST OF THIS DOCUMENT NUMBER AND AN ASSIGNED DASH NUMBER AS SHOWN IN THE FOLLOWING EXAMPLE:

PMT3MII7O D 4 - 8 A F BOLT

- "F" = IVD ALUMINUM COAT + CETYL ALCOHOL (CRES ONLY) [6.2]
- "NO CODE" = PASSIVATE (CRES) OR NONE (TITANIUM)
- "A" = REDEFINED HEAD GEOMETRY PER [3.12]
- GRIP LENGTH IN 1/16THS
- "-" = UNDRILLED SHANK
- "D" = DRILLED SHANK
- DIAMETER IN 1/16THS
- "V" = TITANIUM [6.5]
- "C" = INCONEL 718 CRES [6.1]
- "D" = PH13-8Mo CRES (INACTIVE FOR DESIGN AND PROCUREMENT AFTER 2002. [6.6] SUPERSEDED BY "C" CODE PARTS)

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DRAWN G.DILLING		DATE 2/6/12	DRAWING NUMBER PMT-3MII7O	SHEET 3 OF 6
CHECKED: G.DILLING		DATE 2/6/12	PHILLIPS SCREW CO., 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326	
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2. APPLICABLE DOCUMENTS:

- 2.1 THIS DOCUMENT IS THE CONTROLLING DOCUMENT AND TAKES PRECEDENCE OVER ALL REFERENCED DOCUMENTS
- 2.2 REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BID
- 2.3 THE FOLLOWING DOCUMENTS FORM A PART OF THIS DOCUMENT TO THE EXTENT SPECIFIED HEREIN.

SPECIFICATIONS:

INDUSTRY:

ASME B46.1	SURFACE TEXTURE (SURFACE ROUGHNESS, WAVINESS, AND LAY)
AMS 5629	STEEL, CORROSION-RESISTANT, BARS WIRE, FORGINGS, RINGS AND EXTRUSIONS, I3 CR-8.0Ni - 2.2Mo - I.IAL VACUUM INDUCTION PLUS CONSUMABLE ELECTRODE MELTED SOLUTION HEAT TREATED, PRECIPITATION HARDENABLE
AMS 5662	NICKEL ALLOY, CORROSION AND HEAT RESISTANT, BARS, FORGINGS, AND RINGS 52.5Ni - I9Cr - 3.0Mo - 5.ICb = 0.90Ti = 0.50AL - I8Fe CONSUMABLE ELECTRODE OR VACUUM INDUCTION METLED 1775°F (968°C) SOLUTION HEAT TREATED, PRECIPITATION HARDENABLE
AS8879	SCREW THREADS = UNJ PROFILE, INCH CONTROLLED RADIUS ROOT WITH INCREASED MINOR DIAMETER
NASMI3I2-25	FASTENER TEST METHODS; METHOD 25, DRIVING RECESS TORQUE QUALITY CONFORMANCE TEST
MILITARY:	
MIL-DTL-83488	COATING, ALUMINUM, HIGH PURITY
MIL-L-87I32	LUBRICANT, CETYL ALCOHOL, I-HEXADECANOL, APPLICATION TO FASTENERS

STANDARDS:

INDUSTRY:

NASI347	IDENTIFICATION OF MALE THREADED FASTENERS
PSC-5027	RECESS, MORTORQ SPIRAL DRIVE - INTERNAL - DIMENSIONS
NAS4004	FASTENER, 6AL-4V TITANIUM ALLOY EXTERNALLY THREADED, 160 KSI FTU, 95 KSI FSU, 450°F
NAS9800	HEAD PROTRUSION GAGING 100 DEGREE FLUSH HEAD FASTENERS GAGE BLOCK, GAGE DIMETERS, AND STYLUS
MILITARY:	
MIL-STD-I29	MILITARY MARKING FOR SHIPMENT AND STORAGE
MIL-STD-I30	IDENTIFICATION MARKING OF U.S. MILITARY PROPERTY

3. REQUIREMENTS:

3.1 PROCUREMENT SPECIFICATION:

- 3.1.1 "V" SERIES - NAS4004, EXCEPT AS NOTED HEREIN:
 - 3.1.1.1 MICROEXAMINATION FOR DISCONTINUITIES, MICROSTRUCTURE AND SURFACE CONTAMINATION SHALL BE CONDUCTED BETWEEN 100X AND 200X DIAMETERS. (HIGHER MAGNIFICATIONS MAY BE USED TO IDENTIFY POTENTIAL DEFECTS FOUND AT THE LOWER MAGNIFICATION RANGE.)
 - 3.1.1.2 "RATEABLE" THREAD DISCONTINUITIES DEFINITION/CRITERIA NOT APPLICABLE.
 - 3.1.1.3 "ALTERED"/"CHARGED" MICROSTRUCTURE ON THE BEARING SURFACE OF THE HEAD TO A MAXIMUM DEPTH OF 0.003 INCH IS PERMISSIBLE ONLY IF IT IS VISIBLE DESCERNIBLE FROM SURFACE CONTAMINATION, SURFACE CONTAMINATION LIMITS PER NAS 4004 REVISION 5, TABLE VI.

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- 3.I.I.4 AN AQUEOUS SOLUTION OF 2% HYDROFLUORIC ACID SHALL BE USED AS THE ETCHEANT WHEN PERFORMING EXAMINATIONS FOR DISCONTINUITIES, MICROSTRUCTURE AND SURFACE CONTAMINATION.
- 3.I.I.5 SHEAR DEFORMATION STRAIN LINES ARE PERMITTED ONLY IF THE FAILURE MODE/FRACTURE PATH OF FASTENERS FAILED DURING FATIGUE TESTING ARE NOT COINCIDENT WITH THE LOCATION AND ORIENTATION OF THE STRAIN LINES.
- 3.I.I.6 TENSION STRENGTH PER TABLE II. PROPERTY TO BE VERIFIED BY ACCEPTANCE TESTS.
- 3.I.I.7 TENSION FATIGUE PROPERTIES ARE APPLICABLE (HIGH LOAD = 33% OF TABLE II TENSION VALUES, R=0.1). PROPERTY TO BE VERIFIED BY ACCEPTANCE TESTS.
- 3.I.I.8 SAMPLING MAY BE BASED ON "INSPECTION LOT" (*) SIZE, WITH PROPORTIONAL REPRESENTATION FROM THE INDIVIDUAL PRODUCTION LOTS, TO THE MAXIMUM EXTENT POSSIBLE. EACH PRODUCTION LOT SHALL BE REPRESENTED BY AT LEAST ONE PART PER TEST. IN THOSE CASES WHERE THE PART IS TOO SHORT TO TEST, PRODUCTION LOTS WITH PARTS OF SUFFICIENT LENGTH TO TEST, SHALL BE INCLUDED IN THE INSPECTION LOT. AN "INSPECTION REPORT" SHALL BE SUPPLIED WITH EACH LOT REPRESENTED IN THE SHIPMENT. (*) "THE INSPECTION LOT" SHALL CONSIST OF ONE OR MORE (SIX MAX) PRODUCTION LOTS OF FASTENERS OF THE SAME DIAMETER AND HEAD CONFIGURATION, MANUFACTURED FROM THE SAME HEAT OF MATERIAL. THE PRODUCTION LOTS SHALL HAVE COMMON OPERATION "SET-UPS" RELATIVE TO THE HEADING, HEAT TREAT, FILLET AND THREAD ROLLING PROCESSES.

- 3.I.2 "C" SERIES - 23MII8, TYPE F
 3.I.3 "D" SERIES - 23MII2, TYPE F
- 3.2 MATERIAL:
 3.2.1 "V" SERIES - 6AL-4V TITANIUM ALLOY PER NAS4004, 160 KSI ULTIMATE TENSILE STRENGTH.
 3.2.2 "C" SERIES - INCONEL 718, PER AMS 5662, 125 KSI ULTIMATE SHEAR STRENGTH.
 3.2.3 "D" SERIES - PH13-8MO PER AMS 5629, 125 KSI ULTIMATE SHEAR STRENGTH.
- 3.3 FINISH:
 3.3.1 "V" SERIES - NONE.
 3.3.2 "C" AND "D" SERIES -
 3.3.2.1 "NO CODE" - PASSIVATE.
 3.3.2.2 "F" CODE - IVD ALUMINUM COAT PER MIL-DTL-83488, TYPE II, CLASS 3 PLUS CETYL ALCOHOL PER MIL-L-87132, TYPE I, GRADE B.

- [3.4]** CONCENTRICITY:
 3.4.1 CONICAL SURFACE OF HEAD TO "D" DIAMETER WITHIN 0.005 TIR.
 3.4.2 "D" DIAMETER TO THREAD PITCH DIAMETER WITHIN "Y" TIR.
 3.4.3 RECESS TO "D" DIAMETER WITHIN 0.010 TIR FOR -3 AND -4 SIZE; 0.015 TIR FOR -5 AND LARGER SIZES
- [3.5]** SHANK SHALL BE STRAIGHT WITHIN "Z" PER INCH OF LENGTH.
[3.6] HEAD OUT OF ROUNDNESS SHALL NOT EXCEED "F" TIR.
[3.7] GEAR DRIVE RECESS SHALL WITHSTAND MINIMUM TORQUE VALUES LISTED WITHOUT DAMAGE TO RECESS OR DRIVER WHEN TESTED IN ACCORDANCE WITH NASM1312-25.
- 3.8 SURFACE ROUGHNESS PER ASME B46.1. CONICAL SURFACE OF HEAD, HEAD TO SHANK FILLET SHANK AND ALL THREAD ELEMENTS 32 RHR MAXIMUM. ALL OTHER SURFACES 125 RHR MAXIMUM.
- 3.9 DIMENSIONS IN INCHES.
- 3.10 GRIP LENGTH IS FROM TOP OF BOLT HEAD TO END OF FULL CYLINDRICAL PORTION OF SHANK.
- 3.11 GAGE PROTRUSION SHALL BE INSPECTED PER NAS9800.
- [3.12]** "A" DIMENSIONS ARE APPLICABLE AND COMPATIBLE WITH GAGE PROTRUSION LIMITS. "E" AND "H" ARE INCLUDED FOR ENGINEERING REFERENCE PURPOSES ONLY AND ARE NOT TO BE USED FOR INSPECTION. PROTRUSION LIMITS MAY BE USED TO VERIFY BASIC HEAD GEOMETRY. HOWEVER, COMPARATOR READINGS OR SIMILAR METHOD SHALL BE USED TO VERIFY "A" LIMITS IN CASE OF CONFLICT.
- 3.13 BREAK ALL SHARP EDGES AND REMOVE BURRS.
- [3.14]** COTTER PIN HOLE CENTERLINE WITHIN 0.010 AND NORMAL WITHIN 2° OF BOLT CENTERLINE.
- [3.15]** SUBSEQUENT HEAD MARKING: AN INDENTED "●" PRECEDING THE MANUFACTURER'S HEAD MARKING SHALL BE APPLIED TO ALL FASTENERS MEETING **[3.12]** REQUIREMENTS.
- [3.16]** PARTS PRODUCED TO PREVIOUS REVISIONS MAY BE SUPPLIED UNTIL DEPLETION OF EXISTING STOCK.

REVISION

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TITLE: MORTORQ® SPIRAL DRIVE RECESS -
 BOLT, 100° REDUCED HEAD, GEAR DRIVE RECESS -
 PH13-8Mo (125 KSI SHEAR), INCONEL 718
 (125 KSI SHEAR), 6AL-4V TITANIUM (95 KSI SHEAR)

DRAWN	DATE	DRAWING NUMBER
G.DILLING	2/6/12	PMT-3MII70
CHECKED: G.DILLING	DATE 2/6/12	SHEET 5 OF 6
PHILLIPS SCREW CO. 155 FARM STREET, BELLINGHAM, MA 02019 U.S.A. PHONE: 774-396-6190 FAX: 508-966-2326		

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 AND POZILOCK® ARE REGISTERED TRADEMARKS OF THE PHILLIPS SCREW COMPANY

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 SEE PROCUREMENT SPECIFICATION NAS4004 AS APPLICABLE.
4.2 ALL INSPECTIONS AND/OR TESTS TO ENSURE COMPLIANCE WITH THIS SPECIFICATION
AND TO ACCEPT OR REJECT LOTS IN ACCORDANCE WITH QUALITY ASSURANCE PROVISIONS.

5. PREPARATION FOR DELIVERY:

- 5.1 PACKAGING: UNLESS OTHERWISE SPECIFIED IN THE PROCUREMENT SPECIFICATION OR PURCHASE ORDER, THE ITEM FURNISHED SHALL BE SUITABLY PACKAGED FOR ACCEPTANCE AND DELIVERY BY COMMON CARRIER, FOR RECEIPT WITHOUT DAMAGE.
5.2 PACKAGE MARKING: ALL INTERIOR PACKAGES SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129.

6. NOTES:

- [6.1] THE INCONEL 718 ("C" SERIES) FASTENER IS PREFERRED IN HIGH STRENGTH, NON-MAGNETIC APPLICATIONS AND IN C/E STRUCTURE WHERE EITHER THE "V" OR "D" SERIES SCREWS WILL NOT MEET REQUIREMENTS.
[6.2] THE IVD ALUMINUM COATED CRESS ("C" OR "D" SERIES) SCREW IS INTENDED FOR USE IN ALUMINUM STRUCTURE WHERE APPLIED SEALANT WOULD NOT BE SUITABLE.
6.3 THIS PART MAY BE USED ONLY WHERE THE GEAR DRIVE RECESS IS PERMITTED BY CONTRACT.
6.4 TOTAL FASTENER LENGTH CAN BE DETERMINED BY ADDING THE MAXIMUM FASTENER GRIP LENGTH [SPECIFIED IN SIXTEENTHS OF AN INCH (SEE EXAMPLE OF CALLOUT) TO THE FASTENER THREAD LENGTH (SEE TABLE I, DIMENSION T)].
[6.5] THE O.190 SIZE FASTENER IS LIMITED TO "C" AND "D" SERIES ONLY (NOT APPLICABLE TO TITANIUM "V" SERIES).
[6.6] SUPERSEDITION OF THE PHI3-8Mo ("D" SERIES) FASTENER WITH THE INCONEL 718 ("C" SERIES) FASTENER IS OPTIONAL FOR SUBCONTRACTORS/LICENSEES.

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