



**HOWMET  
AEROSPACE**

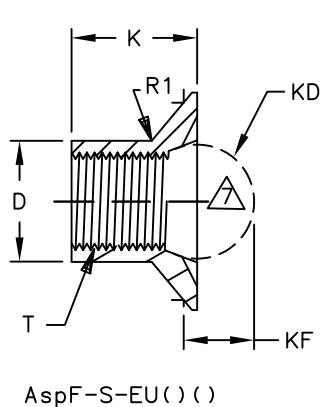
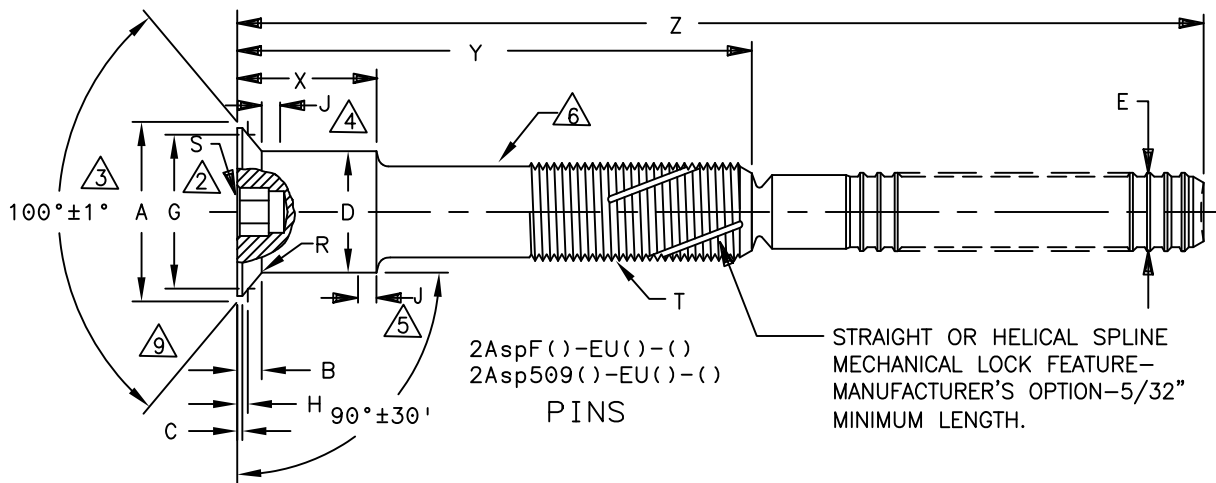
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Carson Operations  
900 E. Watson Center Road  
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Phone (310) 830-8200  
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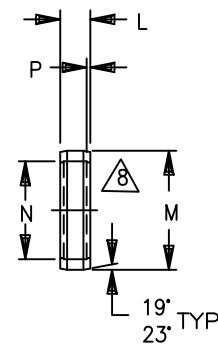
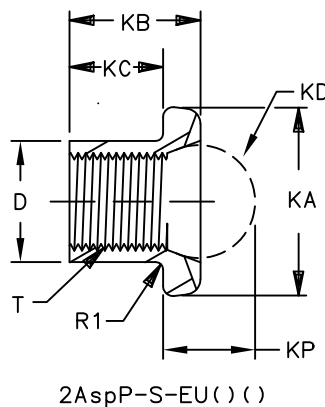
ASP®

**ENGINEERING  
STANDARD**

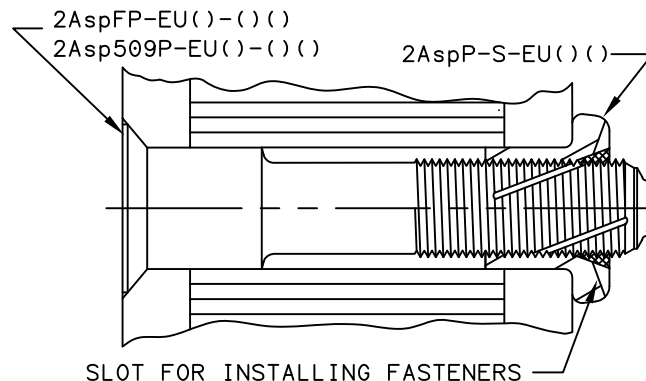
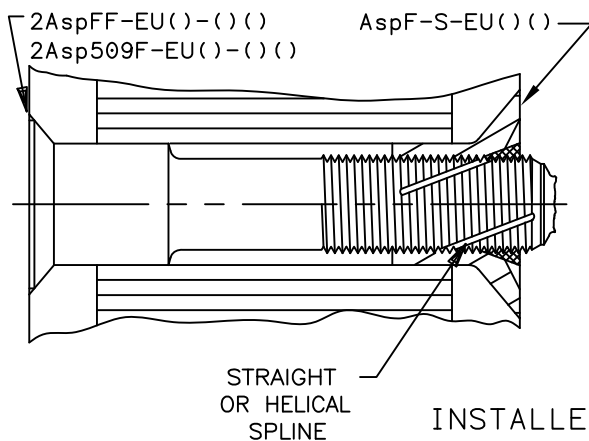
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SLEEVES



LOCK COLLARS



DIMENSIONS IN INCHES

PROCUREMENT SPECIFICATION: C2005  
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DRAWN BY	DH	FSCM (Cage Code) 17446 - Carson
CHECKED BY	HJ/BJ	

G6 REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION.  
CHANGED "KALGARD" TO "KAL-GARD" ON PAGE 2. (REF. ECR2670)

ISSUED	06/24/86
REVISED	04/01/2020
PAGE	1 OF 6

2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF  
SUSTAINING- POSITIVE MECHANICAL LOCK,  
A-286 CRES (95 KSI SHEAR).

2Asp()-EU()-()-() PINS  
AspF-S-EU()-() &  
2AspP-S-EU()-() SLEEVES  
Asp-LC-2AC  
Asp-LC-MV LOCK COLLARS

ASP104



HOWMET AEROSPACE

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Table with columns: Asp PIN PART NUMBER, NOM SIZE, A DIA MAX, B HEAD HEIGHT MAX, C MAX, D DIA BARE, D DIA COATED, E MAX DIA, G GAGE DIA, H GAGE HEIGHT (MIN, MAX BARE, MAX COATED), J MAX, K ±.005, KA DIA. Includes rows for various part numbers like 2AspFF-EU06, 2Asp509F-EU06, etc.

- 1 MINIMUM ULTIMATE TENSILE STRENGTH, OF INSTALLED FASTENER. (IN POUNDS)
2 HEX SOCKET.
3 MAXIMUM THEORETICAL INTERSECTION DIAMETER.
4 MAXIMUM LENGTH OF PERMISSIBLE TAPER. DIAMETER MAY BE .002 GREATER THAN "D" WHEN MEASURED FROM TANGENCY OF HEAD TO SHANK RADIUS.
5 MAXIMUM LENGTH OF PERMISSIBLE UNDERFILL.
6 SUFFICIENT THREAD LENGTH FOR PROPER INSTALLATION THROUGH COMPLETE GRIP RANGE.
7 FLUSH SLEEVE HEAD DIMENSIONS SAME AS 2Asp509F & 2Asp509P PINS.
8 MANUFACTURER'S OPTION TO SUPPLY SOLID OR SPLIT LOCK COLLAR.
9 CONICAL SURFACE OF HEAD TO BE CONCENTRIC WITH "D" DIAMETER WITHIN .003 FIR.
10 MINIMUM SHEAR STRENGTH OF INSTALLED FASTENER TESTED IN SINGLE SHEAR, WHEN SHEAR PLANE FALLS IN PIN THREADED SECTION ONLY.
11 .073 FOR MV MATERIAL AND .083 FOR 2AC MATERIAL.

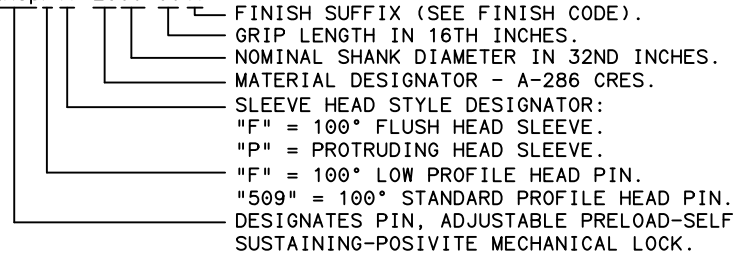
MATERIAL: PIN & SLEEVE - EU - A-286 CRES PER CHEMISTRY OF AMS5737.
LOCK COLLAR - 2AC - 2219-T6 ALUMINUM ALLOY PER CHEMISTRY OF QQ-A-430.
- MV - COMMERCIALLY PURE (CP) TITANIUM PER CHEMISTRY OF ASTM B348.
HEAT TREATMENT: PIN & SLEEVE - MINIMUM SHEAR STRENGTH 95 KSI.
FINISH: PIN & SLEEVE - NO SUFFIX - PASSIVATE PER QQ-P-35.
- SUFFIX "AC" - ALUMINUM COATED PER KAL-GARD 2242 ON HEAD AND SHANK ONLY.
LOCK COLLAR - 2AC - CHEMICAL SURFACE TREAT PER MIL-C-5541.
- MV - NONE.

LUBRICATION: PIN & SLEEVE - CETYL ALCOHOL (CHLORINE FREE).

IDENTIFICATION: SLEEVE: HUCK SYMBOL (X) & "EU"
PIN: HUCK SYMBOL (X) & "EU".

INSTALLATION: IN ACCORDANCE WITH HUCK BROCHURE HCB-135.

PART NO. EXAMPLE 2AspF()-EU06-06()



DIMENSIONS IN INCHES

Table with 4 columns: G6, REVISIONS (ISSUED, REVISED, PAGE), PART DESCRIPTION (2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF SUSTAINING-POSITIVE MECHANICAL LOCK, A-286 CRES (95 KSI SHEAR).), and REFERENCES (2Asp()-EU()-()-() PINS, AspF-S-EU() & 2AspP-S-EU() SLEEVES, Asp-LC-2AC, Asp-LC-MV LOCK COLLARS, ASP104)



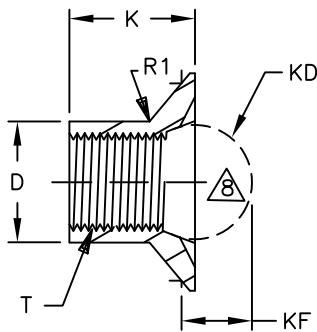
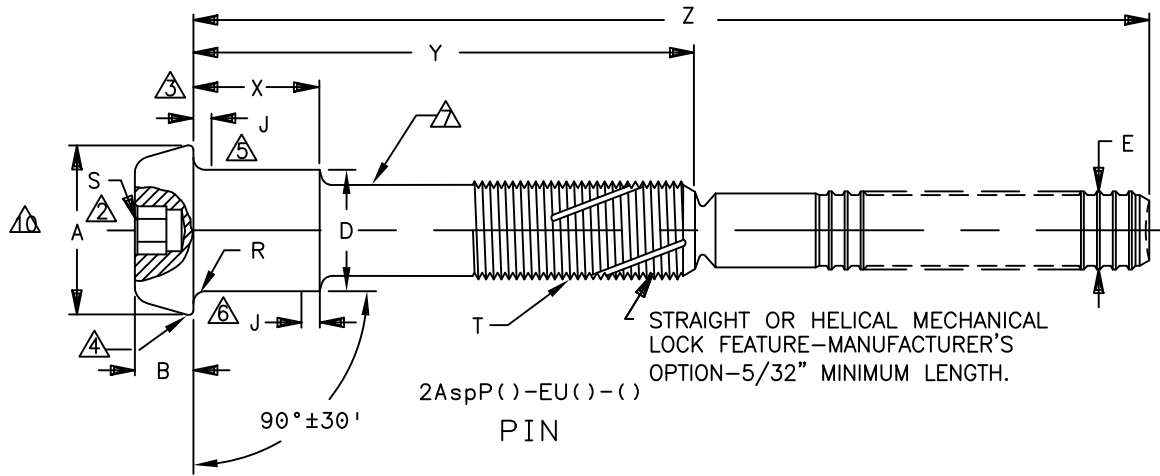
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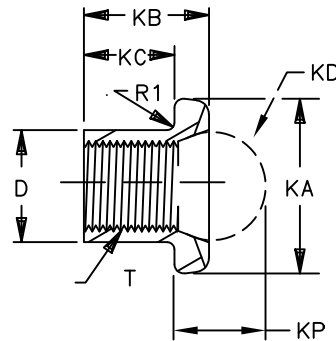
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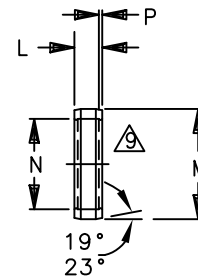
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AspF-S-EU()()

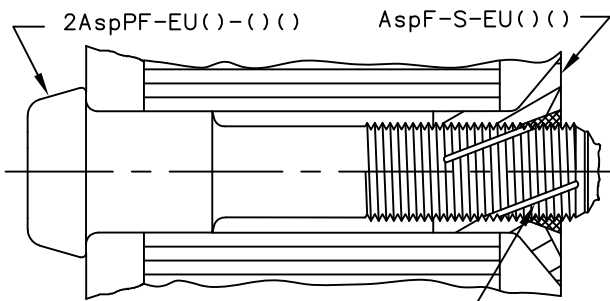


2AspP-S-EU()()

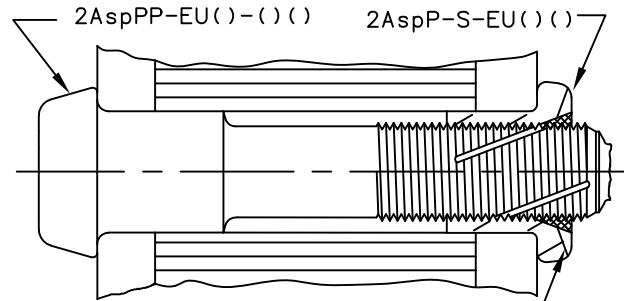


Asp-LC-2AC()  
 Asp-LC-MV()  
 LOCK COLLARS

SLEEVES



STRAIGHT  
 OR HELICAL  
 SPLINE



SLOT FOR INSTALLING FASTENERS

INSTALLED FASTENERS

DIMENSIONS IN INCHES

G6

REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION.  
 CHANGED "KALGARD" TO "KAL-GARD" ON PAGE 2. (REF. ECR2670)

ISSUED	06/24/86
REVISED	04/01/2020
PAGE	3 OF 6

2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF  
 SUSTAINING-POSITIVE MECHANICAL LOCK,  
 A-286 CRES. (95 KSI SHEAR)

2AspP(-)EU(-)()() PIN  
 AspF-S-EU() &  
 2AspP-S-EU() SLEEVES  
 Asp-LC-2AC  
 Asp-LC-MV LOCK COLLARS

ASP104



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Table with columns: Asp PIN PART NUMBER, NOM SIZE, A DIA, B HEAD HEIGHT, C MAX, D DIA BARE, D DIA COATED, E MAX DIA, J MAX, SLEEVES (K, KA, KB, KC), NOM SIZE, SLEEVE (KD, KF, KP), LOCK COLLAR (L, M, N, P, R, R1, S, T), MIN ULT TENSILE, MODIFIED THREAD, MIN SHEAR STRENGTH, HOLE LIMITS.

- 1 MINIMUM ULTIMATE TENSILE STRENGTH, OF INSTALLED FASTENER. (IN POUNDS)
2 HEX SOCKET.
3 SQUARENESS OF PROTRUDING HEAD BEARING SURFACE AND "D" DIAMETER TO BE WITHIN 90°±30'.
4 NATURAL FLOW OF MATERIAL PERMITTED.
5 MAXIMUM LENGTH OF PERMISSIBLE TAPER, DIAMETER MAY BE .002 GREATER THAN "D" WHEN MEASURED FROM TANGENCY OF HEAD TO SHANK RADIUS.
6 MAXIMUM LENGTH OF PERMISSIBLE UNDERFILL.
7 SUFFICIENT THREAD LENGTH FOR PROPER INSTALLATION THROUGH COMPLETE GRIP RANGE. A VARIABLE LENGTH UNTHREADED AREA MAY EXIST BETWEEN THE "X" LENGTH AND THREAD.
8 FLUSH SLEEVE HEAD DIMENSIONS SAME AS 2Asp509F & 2Asp509P PINS.
9 MANUFACTURER'S OPTION TO SUPPLY SOLID OR SPLIT LOCK COLLAR.
10 CONICAL SURFACE OF HEAD TO BE CONCENTRIC WITH "D" DIAMETER WITHIN .003 FIR.
11 MINIMUM SHEAR STRENGTH OF INSTALLED FASTENER TESTED IN SINGLE SHEAR, WHEN SHEAR PLANE FALLS IN PIN THREADED SECTION ONLY.
12 .073 FOR MV MATERIAL AND .083 FOR 2AC MATERIAL

MATERIAL: PIN & SLEEVE - EU - A-286 CRES PER CHEMISTRY OF AMS5737.
LOCK COLLAR - 2AC - 2219-T6 ALUMINUM ALLOY PER CHEMISTRY OF QQ-A-430.
- MV - COMMERCIAL PURE (CP) TITANIUM PER CHEMISTRY OF ASTM B348.

HEAT TREATMENT: PIN & SLEEVE - MINIMUM SHEAR STRENGTH 95 KSI.

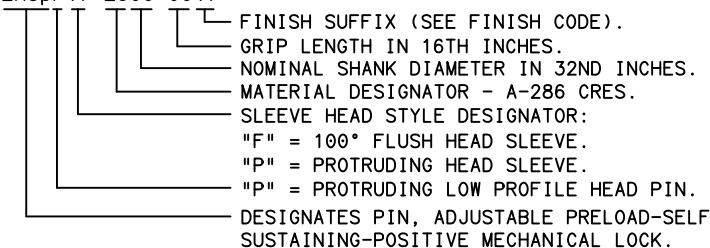
FINISH: PIN & SLEEVE - NO SUFFIX - PASSIVATE PER QQ-P-35.
- SUFFIX "AC" - CHEMICAL SURFACE TREAT PER MIL-C-5541.
LOCK COLLAR - 2AC - CHEMICAL SURFACE TREAT PER SPECIFICATION MIL-C-5541.
- MV - NONE.

LUBRICATION: PIN & SLEEVE - CETYL ALCOHOL (CHLORINE FREE).

IDENTIFICATION: SLEEVE: HUCK SYMBOL (X) & "EU",
PIN: HUCK SYMBOL (X) & "EU".

INSTALLATION: IN ACCORDANCE WITH HUCK BROCHURE HCB-135.

PART NO. EXAMPLE 2AspP()-EU06-06()



DIMENSIONS IN INCHES

Table with 4 columns: G6, REVISIONS (ISSUED, REVISED, PAGE), PART DESCRIPTION (2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF SUSTAINING-POSITIVE MECHANICAL LOCK, A-286 CRES (95 KSI SHEAR).), and PART NUMBER (ASP104).



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2AspFF-EU()-()-(), 2Asp509F-EU()-()-() & 2AspPF-EU()-()-()  
 THESE DIMENSIONS ARE FOR PINS USING FLUSH SLEEVES.  
 FOR PINS USING PROTRUDING SLEEVES SEE SHEET 6 OF 6.

GRIP NUMBER TABULATION											
GRIP DASH NO.	GRIP RANGE		Ø6 (13/64) DIA			Ø8 (17/64) DIA			10 (21/64) DIA		
	MIN.	MAX.	X +.005 -.010	Y ±.010	Z +.125 -.000	X +.005 -.010	Y ±.010	Z +.125 -.000	X +.005 -.010	Y ±.010	Z +.125 -.000
05 <sup>11</sup>	.251	.312		.342	1.09						
06	.313	.375	.090	.405	1.16						
07	.376	.438	.150	.468	1.22	.090	.478	1.38			
08	.439	.500	.180	.530	1.28	.150	.540	1.44			
09	.501	.562	.180	.592	1.34	.180	.602	1.50	.156	.607	1.63
10	.563	.625	.180	.655	1.41	.180	.665	1.57	.218	.670	1.69
11	.626	.688	.180	.718	1.47	.180	.728	1.63	.281	.732	1.75
12	.689	.750	.180	.780	1.53	.180	.790	1.69	.312	.795	1.82
13	.751	.812	.180	.842	1.59	.180	.852	1.75	.312	.857	1.88
14	.813	.875	.180	.905	1.66	.180	.915	1.82	.312	.920	1.94
15	.876	.938	.180	.968	1.72	.180	.978	1.88	.312	.982	2.00
16	.939	1.000	.180	1.030	1.78	.180	1.040	1.94	.312	1.045	2.07
17	1.001	1.062	.180	1.092	1.84	.180	1.102	2.00	.312	1.107	2.13
18	1.063	1.125	.180	1.155	1.91	.180	1.165	2.07	.312	1.170	2.19
19	1.126	1.188	.180	1.218	1.97	.180	1.228	2.13	.312	1.232	2.25
20	1.189	1.250	.180	1.280	2.03	.180	1.290	2.19	.312	1.295	2.32
21	1.251	1.312	.180	1.342	2.09	.180	1.352	2.25	.312	1.357	2.38
22	1.313	1.375	.180	1.405	2.16	.180	1.415	2.32	.312	1.420	2.44
23	1.376	1.438	.180	1.468	2.22	.180	1.478	2.38	.312	1.482	2.50
24	1.439	1.500	.180	1.530	2.28	.180	1.540	2.44	.312	1.545	2.57
25	1.501	1.562	.180	1.592	2.34	.180	1.602	2.50	.312	1.607	2.63
26	1.563	1.625	.180	1.655	2.41	.180	1.665	2.57	.312	1.670	2.69
27	1.626	1.688	.180	1.718	2.47	.180	1.728	2.63	.312	1.732	2.75
28	1.689	1.750	.180	1.780	2.53	.180	1.790	2.69	.312	1.795	2.82
29	1.751	1.812	.180	1.842	2.59	.180	1.852	2.75	.312	1.857	2.88
30	1.813	1.875	.180	1.905	2.66	.180	1.915	2.82	.312	1.920	2.94
31	1.876	1.938	.180	1.968	2.72	.180	1.978	2.88	.312	1.982	3.00
32	1.939	2.000	.180	2.030	2.78	.180	2.040	2.94	.312	2.045	3.07

<sup>11</sup> NOT AVAILABLE IN 2Asp509F-EU06-05() OR 2Asp509F-EU08-06(), AND 2Asp509F-EU08-07().  
 OMIT "X" SHOULDER FOR 2AspFF-EU06-05().

DIMENSIONS IN INCHES

G6

REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION.  
 CHANGED "KALGARD" TO "KAL-GARD" ON PAGE 2. (REF. ECR2670)

ISSUED	06/24/86
REVISED	04/01/2020
PAGE	5 OF 6

2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF  
 SUSTAINING-POSITIVE MECHANICAL LOCK,  
 A-286 CRES (95 KSI SHEAR).

2Asp()-EU()-()-() PINS  
 Asp-S-EU() &  
 2AspP-S-EU() SLEEVES  
 Asp-LC-2AC  
 Asp-LC-MV LOCK COLLARS

ASP104

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2AspFP-EU()-()-(), 2Asp509P-EU()-()-() & 2AspPP-EU()-()-()  
 THESE DIMENSIONS ARE FOR PINS USING PROTRUDING SLEEVES.  
 FOR PINS USING FLUSH SLEEVES SEE SHEET 5 OF 6.

GRIP NUMBER TABULATION											
GRIP DASH NO.	GRIP RANGE		06 (13/64) DIA			08 (17/64) DIA			10 (21/64) DIA		
	MIN.	MAX.	X	Y	Z	X	Y	Z	X	Y	Z
			+ .005 - .010	± .010	+ .125 - .000	+ .005 - .010	± .010	+ .125 - .000	+ .005 - .010	± .010	+ .125 - .000
05 <sup>13</sup>	.251	.312		.405	1.16						
06	.313	.375	.090	.468	1.22						
07	.376	.438	.150	.530	1.28	.090	.572	1.47			
08	.439	.500	.180	.592	1.34	.150	.635	1.53			
09	.501	.562	.180	.655	1.41	.180	.697	1.59	.156	.732	1.75
10	.563	.625	.180	.718	1.47	.180	.760	1.65	.218	.795	1.82
11	.626	.688	.180	.780	1.53	.180	.822	1.72	.281	.857	1.88
12	.689	.750	.180	.842	1.59	.180	.885	1.78	.312	.920	1.94
13	.751	.812	.180	.905	1.66	.180	.947	1.84	.312	.982	2.00
14	.813	.875	.180	.968	1.72	.180	1.010	1.90	.312	1.045	2.07
15	.876	.938	.180	1.030	1.78	.180	1.072	1.97	.312	1.107	2.13
16	.939	1.000	.180	1.092	1.84	.180	1.135	2.03	.312	1.170	2.19
17	1.001	1.062	.180	1.155	1.91	.180	1.197	2.09	.312	1.232	2.25
18	1.063	1.125	.180	1.218	1.97	.180	1.260	2.15	.312	1.295	2.32
19	1.126	1.188	.180	1.280	2.03	.180	1.322	2.22	.312	1.357	2.38
20	1.189	1.250	.180	1.342	2.09	.180	1.385	2.28	.312	1.420	2.44
21	1.251	1.312	.180	1.405	2.16	.180	1.447	2.34	.312	1.482	2.50
22	1.313	1.375	.180	1.468	2.22	.180	1.510	2.40	.312	1.545	2.57
23	1.376	1.438	.180	1.530	2.28	.180	1.572	2.47	.312	1.607	2.63
24	1.439	1.500	.180	1.592	2.34	.180	1.635	2.53	.312	1.670	2.69
25	1.501	1.562	.180	1.655	2.41	.180	1.697	2.59	.312	1.732	2.75
26	1.563	1.625	.180	1.718	2.47	.180	1.760	2.65	.312	1.795	2.82
27	1.626	1.688	.180	1.780	2.53	.180	1.822	2.72	.312	1.857	2.88
28	1.689	1.750	.180	1.842	2.59	.180	1.885	2.78	.312	1.920	2.94
29	1.751	1.812	.180	1.905	2.66	.180	1.947	2.84	.312	1.982	3.00
30	1.813	1.875	.180	1.968	2.72	.180	2.010	2.90	.312	2.045	3.07
31	1.876	1.938	.180	2.030	2.78	.180	2.072	2.97	.312	2.107	3.13
32	1.939	2.000	.180	2.092	2.84	.180	2.135	3.03	.312	2.170	3.19

<sup>13</sup> NOT AVAILABLE IN 2Asp509P-EU06-05(), 2Asp509P-EU06-06() AND 2Asp509P-EU08-07(),

DIMENSIONS IN INCHES

G6	REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION. CHANGED "KALGARD" TO "KAL-GARD" ON PAGE 2. (REF. ECR2670)		2Asp® FASTENER, ADJUSTABLE PRELOAD-SELF SUSTAINING-POSITIVE MECHANICAL LOCK, A-286 CRES (95 KSI SHEAR).	2Asp()-EU()-()-() PINS AspF-S-EU() & 2AspP-S-EU() SLEEVES Asp-LC-2AC & Asp-LC-MV LOCK COLLARS
	ISSUED	06/24/86		
	REVISIED	04/01/2020		
PAGE	6 OF 6	ASP104		