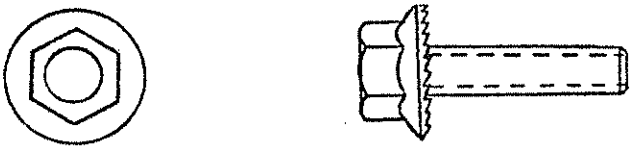
CAPSCREW HEX, SERRATED FLANGE

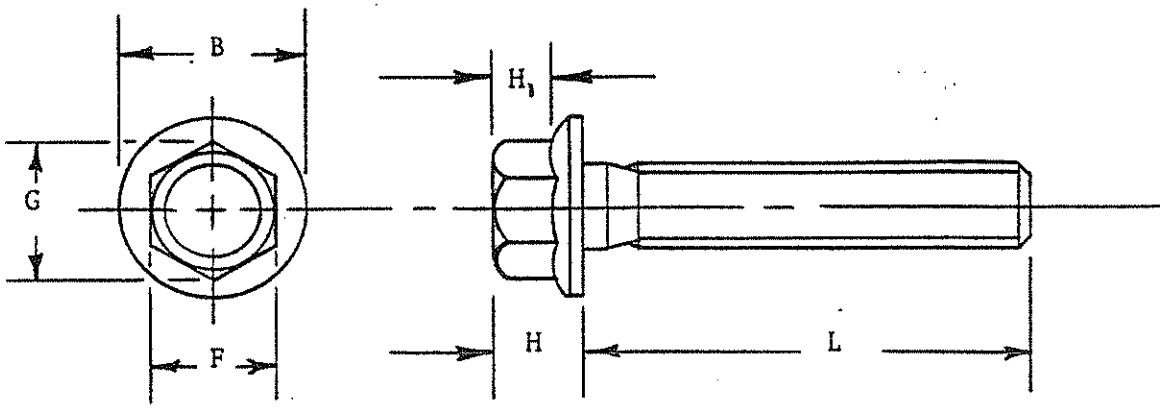


THREAD	MANUFACTURE NUMBER (MF)	PART NUMBER
1/4 -20 UNC	32WLFS 1420	23-11173- *
-28 UNF	1428	23-11174-
5/16 -18 UNC	32WLFS51618	23-11175- *
-24	51624	23-11176-
3/8 -16	32WLFS 3816	23-11177- *
-24	3824	23-11178-
7/16 -14	32WLFS71614	23-11179- *
-20	71620	23-11180-
1/2 -13	32WLFS 1213	23-11181- *
-20	1220	23-11182-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

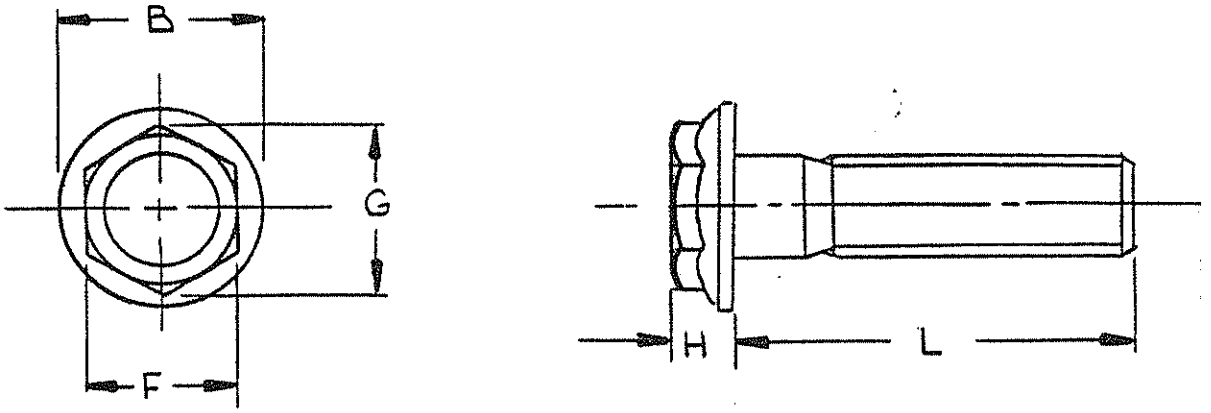
EXAMPLE: 23-11173-175 IS A 1/4-20 UNC X 1-3/4 INCH LONG HEX SERRATED FLANGE CAPSCREW.

BOLT, FLANGED HEX HEAD FULL COURSE THREAD



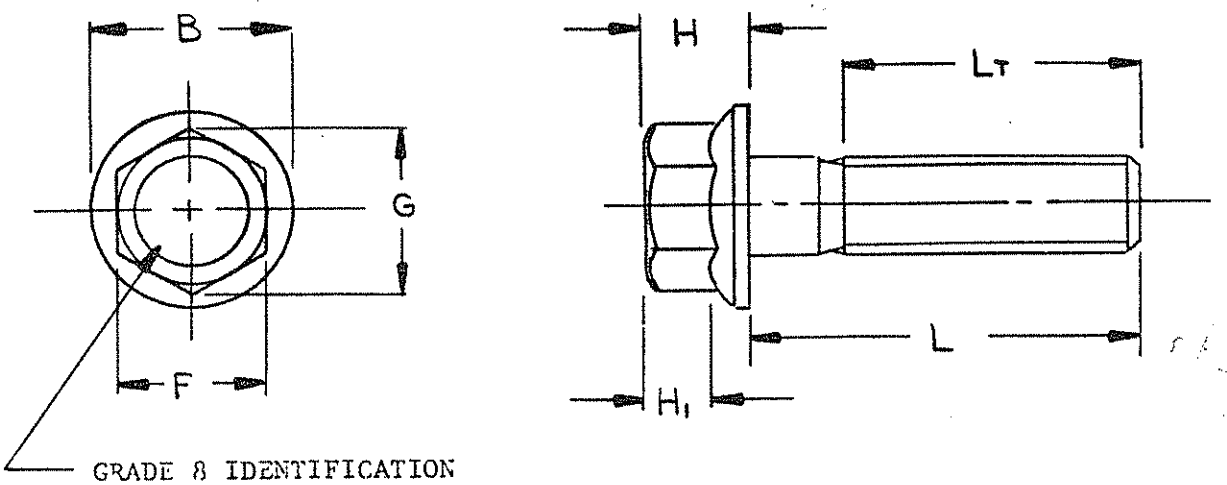
THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1	L (IN.)	PART NUMBER
7/16-14 UNC	11/16	.722	.930	.460	.300	2.25	23-11056

BOLT, LOW PROFILE HEAD

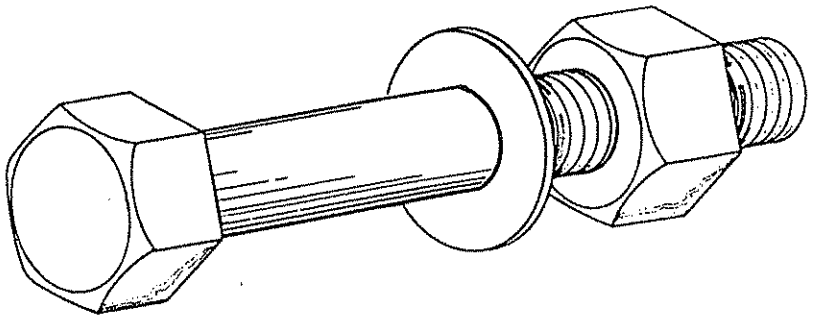


THREAD	F	G (MAX)	B (MAX)	H (MAX)	PART NUMBER
1/2 - 13 UNC 2A	3/4	.866	1.070	.312	23-11021-L
5/8 - 11 UNC	.937 .922	1.083	1.330	.420	23-11029-L

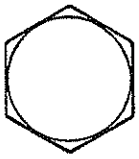
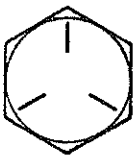
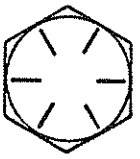
BOLT, FLANGED HEX HEAD, GRADE 8
(COURSE THREAD)



THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1 (MIN)	FINISH (2)	PART NUMBER
1/4 -20	7/16	.505	.560	.280	.170	P	23-11003- L
						C	23-11004-
5/16 - 18	1/2	.577	.680	.320	.210	P	23-11005-
						C	23-11006-
3/8 - 16	9/16	.650	.810	.390	.250	P	23-11007-
						C	23-11008-
7/16 - 14	11/16	.722	.930	.460	.300	P	23-11009-
						C	23-11010-
1/2 - 13	3/4	.866	1.070	.510	.340	P	23-11011-
						C	23-11012-
9/16 - 12	7/8	.938	1.190	.570	.380	P	23-11013-
						C	23-11014-
5/8 - 11	15/16	1.083	1.330	.620	.420	P	23-11015-
						C	23-11016-
3/4 - 10	1-1/8	1.299	1.590	.730	.510	P	23-11017-
						C	23-11018-



HOW TO IDENTIFY FASTENER QUALITY S.A.E. AND A.S.T.M. GRADES
S.A.E. (SOCIETY OF AUTOMOTIVE ENGINEERS)
A.S.T.M. (AMERICAN SOCIETY FOR TESTING MATERIALS)

GRADE MARKING			
SAE GRADE	2	5	8
MATERIAL	LOW CARBON STEEL	CARBON STEEL QUENCHED & TEMPERED	MEDIUM CARBON ALLOY STEEL QUENCHED & TEMPERED
ULTIMATE TENSILE STRENGTH P.S.I. (MIN.)	THRU — 3/4" 74,000 OVER — 3/4" 55,000	THRU — 1" 120,000 OVER — 1" 105,000	150,000
PROOF LOAD STRENGTH P.S.I. (MIN.)	THRU — 3/4" 55,000 OVER — 3/4" 33,000	THRU — 1" 85,000 OVER — 1" 74,000	120,000

GUIDE TO RECOMMENDED ASSEMBLY TORQUE VALUES FT-LBS

CALCULATED BY TORQUE FORMULA

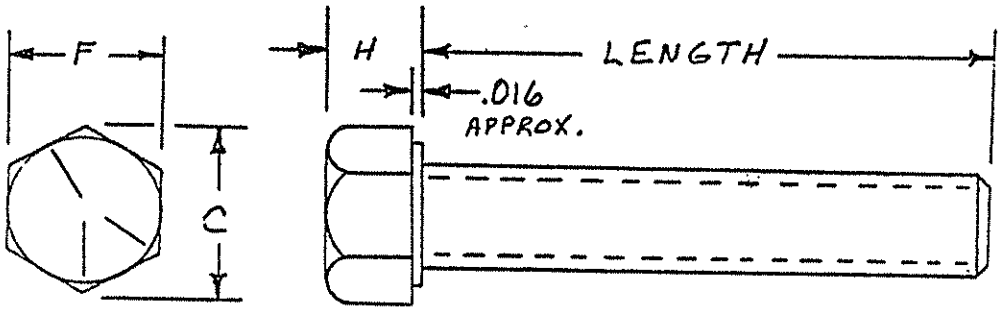
$$T = \frac{\text{Ø}.2 \times D \times \text{LOAD}}{12}$$

Ø.2 = FRICTION CONSTANT*
D = DIAMETER, INCHES
LOAD = 75% PROOF LOAD, LBS.

DIA. / PITCH	GRADE 2 UNC-UNF	GRADE 5 UNC-UNF	STANDARD GRADE 8 UNC-UNF	SUPER GRADE 6 UNC-UNF	DIA. / PITCH	GRADE 2 UNC-UNF	GRADE 5 UNC-UNF	STANDARD GRADE 8 UNC-UNF	SUPER GRADE 6 UNC-UNF
1/4 — 20	6	8	12	11	9/16 — 12	70	109	154	146
— 28	7	9	14	13	— 18	79	121	172	163
5/16 — 18	11	18	25	23	5/8 — 11	87	150	212	203
— 24	12	20	27	26	— 18	100	170	240	230
3/8 — 16	20	31	44	42	3/4 — 10	173	268	377	360
— 24	23	35	49	48	— 16	191	298	421	402
7/16 — 14	32	50	70	67	7/8 — 9	167	429	607	581
— 20	36	55	78	75	— 14	184	473	670	640
1/2 — 13	49	75	106	102	1" — 8	248	644	910	871
— 20	55	85	120	115	— 12	274	704	997	953

*THE TORQUE VALUES ARE BASED ØN UNCOATED BOLTS, PLATING MAY ALTER

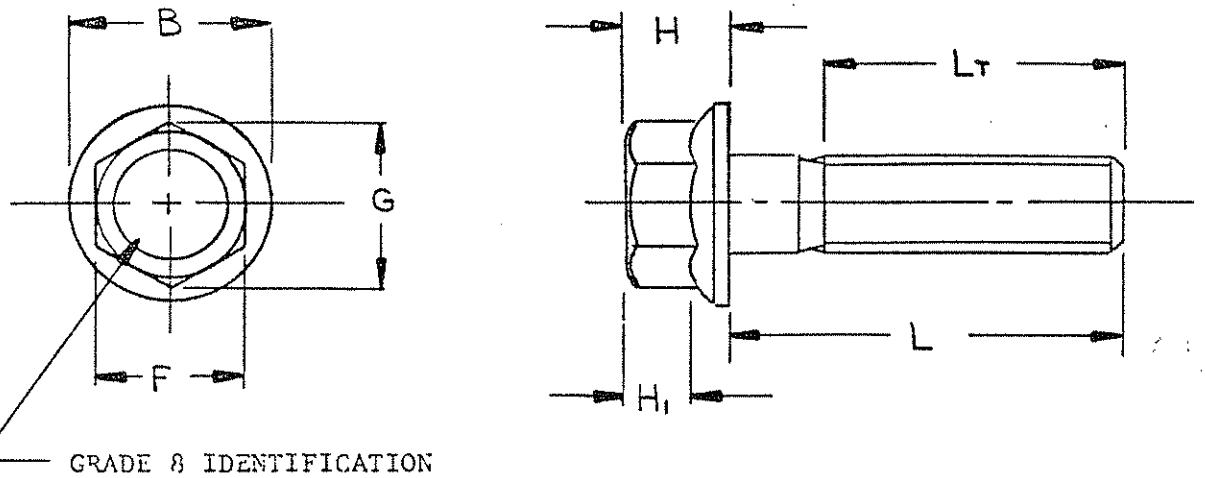
BOLT, HEX TAP
FULL THREAD, GR. 5



NOM. SIZE THREADS PER IN. AND SERIES DESIGNATION	F	C	H		FREIGHTLINER PART NUMBER *
1/4 -20 UNC-2A 1/4 -28 UNF	7/16	1/2	5/32		23-9662 23-9663
5/16-18 UNC-2A 5/16-24 UNF	1/2	9/16	13/64		23-9664 23-9665
3/8 -16 UNC-2A 3/8 -24 UNF	9/16	21/32	15/64		23-9666 23-9667
7/16-14 UNC-2A 7/16-20 UNF	5/8	23/32	9/32		23-9668 23-9669
1/2 -13 UNC-2A 1/2 -20 UNF	3/4	7/8	5/16		23-9670 23-9671
9/16-12 UNC-2A 9/16-18 UNF	13/16	15/16	23/64		23-9672 23-9673
5/8 -11 UNC-2A 5/8 -18	15/16	1	25/64		23-9674 23-9675
3/4 -10 UNC-2A 3/4 -18 UNF	1-1/8	1-9/32	15/32		23-9676 23-9677
7/8 - 9 UNC-2A 7/8 -14 UNF	1-5/16	1-1/2	35/64		23-9678 23-9679
1 - 8 UNC-2A 1 -12 UNF	1-1/2	1-23/32	29/64		23-9680 23-9681
1-1/8 - 7 UNC-2A 1-1/8 -12 UNF	1-11/16	1-15/16	11/16		23-9682 23-9683
1-1/4 - 7 UNC-2A 1-1/4 -12 UNF	1-7/8	2-5/32	25/32		23-9684 23-9685

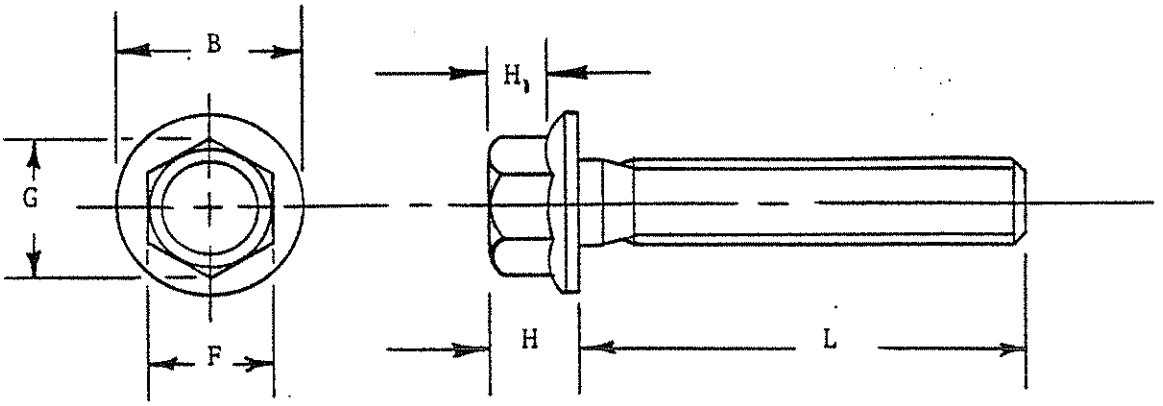
*Complete part number by adding a three-digit dash number to indicate length in hundredths of an inch. Example: 23-9663-075 specifies a 1/4-28 UNF, Grade 5 Hex Tap Bolt, 3/4" long.

BOLT, FLANGED HEX HEAD, GRADE 8
(COURSE THREAD)



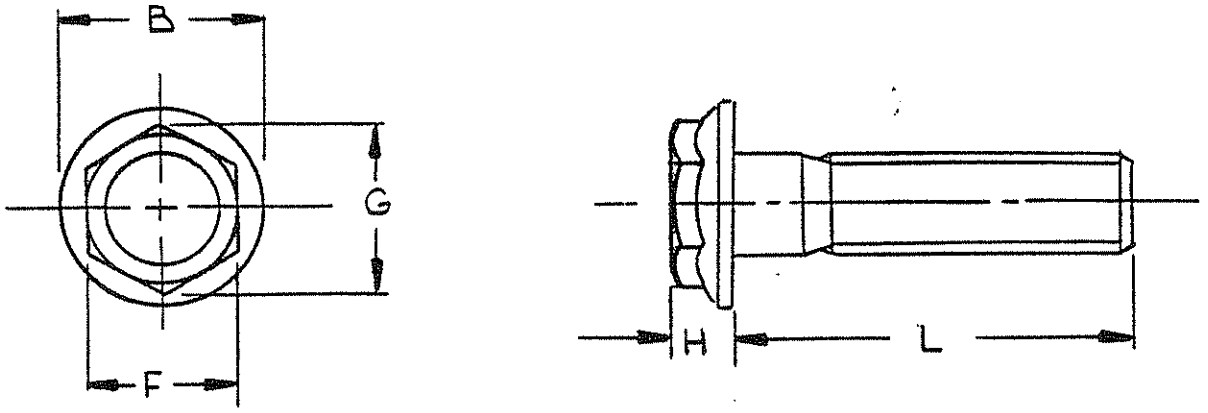
THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1 (MIN)	LT		FINISH (2)	PART NUMBER
						L≤6"	L>6"		
1/4 -20	7/16	.505	.560	.280	.170	.75	1.00	P	23-11003- L
								C	23-11004-
5/16 - 18	1/2	.577	.680	.320	.210	.88	1.12	P	23-11005-
								C	23-11006-
3/8 - 16	9/16	.650	.810	.390	.250	1.00	1.25	P	23-11007-
								C	23-11008-
7/16 - 14	11/16	.722	.930	.460	.300	1.12	1.38	P	23-11009-
								C	23-11010-
1/2 - 13	3/4	.866	1.070	.510	.340	1.25	1.50	P	23-11011-
								C	23-11012-
9/16 - 12	7/8	.938	1.190	.570	.380	1.38	1.62	P	23-11013-
								C	23-11014-
5/8 - 11	15/16	1.083	1.330	.620	.420	1.50	1.75	P	23-11015-
								C	23-11016-
3/4 - 10	1-1/8	1.299	1.590	.730	.510	1.75	2.00	P	23-11017-
								C	23-11018-

BOLT, FLANGED HEX HEAD FULL COURSE THREAD



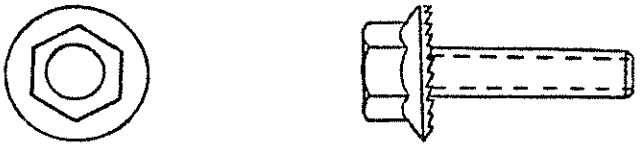
THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1	L (IN.)	PART NUMBER
7/16-14 UNC	11/16	.722	.930	.460	.300	2.25	23-11056

BOLT, LOW PROFILE HEAD



THREAD	F	G (MAX)	B (MAX)	H (MAX)	PART NUMBER
1/2 - 13 UNC 2A	3/4	.866	1.070	.312	23-11021-L
5/8 - 11 UNC	.937 .922	1.083	1.330	.420	23-11029-L

CAPSCREW HEX, SERRATED FLANGE



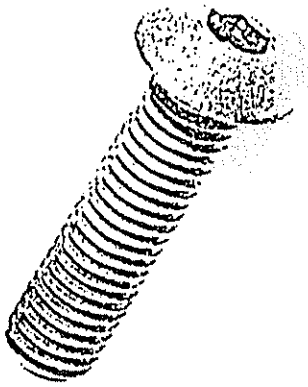
THREAD	MANUFACTURE NUMBER (MF)	PART NUMBER
1/4 -20 UNC	32WLFS 1420	23-11173- *
-28 UNF	1428	23-11174-
5/16 -18 UNC	32WLFS51618	23-11175- *
-24	51624	23-11176-
3/8 -16	32WLFS 3816	23-11177- *
-24	3824	23-11178-
7/16 -14	32WLFS71614	23-11179- *
-20	71620	23-11180-
1/2 -13	32WLFS 1213	23-11181- *
-20	1220	23-11182-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-11173-175 IS A 1/4-20 UNC X 1-3/4 INCH LONG HEX SERRATED FLANGE CAPSCREW.

BUTTON HEAD SOCKET CAP SCREWS

HEAT TREATED - HIGH STRENGTH ALLOY STEEL
BLACK OXIDE FINISH
COLD FORGED



* 170,000 P.S.I. MINIMUM
* CLASS 3A THREAD FIT (ROLLED THREADS)
* CONFORMS TO A.N.S.I. B18.3 DIMENSIONAL SPECIFICATIONS

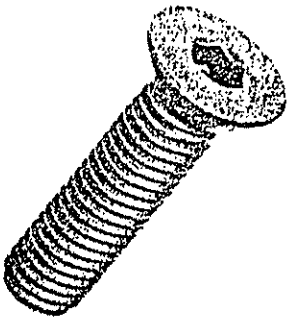
NOMINAL SIZE	KEY SIZE	MAX. LENGTH	PAPT NUMBER
1/4 -2Ø	5/32	1.ØØ	23-Ø9586- *
1/4 -28	5/32	1.ØØ	23-Ø9587- *
5/16 -18	3/16	1.ØØ	23-Ø9588- *
5/16 -24	3/16	1.ØØ	23-Ø9589- *
3/8 -16	7/32	1.25	23-Ø959Ø- *
3/8 -24	7/32	1.25	23-Ø9591- *
1/2 -13	5/16	2.ØØ	23-Ø9592- *
1/2 -2Ø	5/16	2.ØØ	23-Ø9593- *
5/8 -11	9/32	2.ØØ	23-Ø9594- *
5/8 -18	9/32	2.ØØ	23-Ø9595- *

(*)-COMPLETE PART NUMBER BY ADDING A (3) THREE-DIGIT DASH NUMBER INDICATING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-Ø9586-Ø75 SPECIFIES A BUTTON HEAD SOCKET CAP SCREW 1/4-2Ø X 3/4 INCHES LONG.

FLAT HEAD SOCKET CAP SCREWS

HEAT TREATED - HIGH STRENGTH ALLOY STEEL
BLACK OXIDE FINISH
COLD FORGED



*170,000 P.S.I. MINIMUM
*CLASS 3A THREAD FIT
(ROLLED THREADS)

NOMINAL SIZE	KEY SIZE	PART NUMBER
1/4 -20	5/32	23-09602- *
1/4 -28	5/32	23-09603- *
5/16-18	3/16	23-09604- *
5/16-24	3/16	23-09605- *
3/8 -16	7/32	23-09606- *
3/8 -24	7/32	23-09607- *
7/16-14	1/4	23-09608- *
7/16-20	1/4	23-09609- *
1/2 -13	5/16	23-09610- *
1/2 -20	5/16	23-09611- *
9/16-12		23-09612- *
9/16-18		23-09613- *
5/8 -11	3/8	23-09614- *
5/8 -18	3/8	23-09615- *
3/4 -10	3/8	23-09616- *
3/4 -16	3/8	23-09617- *
7/8 - 9		23-09618- *
7/8 -14		23-09619- *
1 - 8		23-09620- *
1 -14		23-09621- *
1-1/8 - 7		23-09622- *
1-1/8 -12		23-09623- *
1-1/4 - 7		23-09624- *
1-1/4 -12		23-09625- *
1-3/8 - 6		23-09626- *
1-3/8 -12		23-09627- *
1-1/2 - 6		23-09628- *
1-1/2 -12		23-09629- *

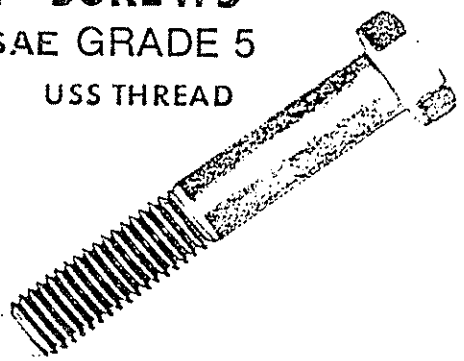
(*)-COMPLETE PART NUMBER BY ADDING A (3) THREE- DIGIT DASH NUMBER INDICATING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-09611-225 SPECIFIES A FLAT HEAD HEXAGON SOCKET CAP SCREW 1/2-20 X 2-1/4 INCHES LONG.

HEX HEAD CAP SCREWS

SAE GRADE 5

USS THREAD



*S.A.E. APPROVED FORGED HEADING STEEL
*FULL DIAMETER SHANK
*FULLY FORMED HEAD
*SHARP ACCURATE THREADS

2 x DIA + 1/2"

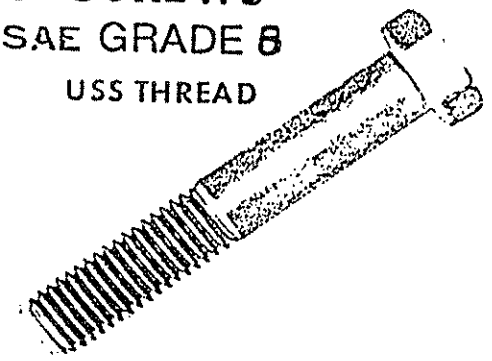
THREAD	F BASIC	H HEIGHT	PLAIN FINISH	CAD OR GALV FINISH
1/4 20 UNC 28 UNF	7/16	.163	23-Ø9462- * 23-Ø9463-	23-1Ø742- * 23-1Ø743-
5/16 18 UNC 24 UNF	1/2	.211	23-Ø9464- 23-Ø9465-	23-1Ø744- 23-1Ø745-
3/8 16 UNC 24 UNF	9/16	.243	23-Ø9466- 23-Ø9467-	23-1Ø746- 23-1Ø747-
7/16 14 UNC 20 UNF	5/8	.291	23-Ø9468- 23-Ø9469-	23-1Ø748- 23-1Ø749-
1/2 13 UNC 20 UNF	3/4	.323	23-Ø947Ø- 23-Ø9471-	23-1Ø75Ø- 23-1Ø751-
9/16 12 UNC 18 UNF	13/16	.371	23-Ø9472- 23-Ø9473-	23-1Ø752- 23-1Ø753-
5/8 11 UNC 18 UNF	15/16	.4Ø3	23-Ø9474- 23-Ø9475-	23-1Ø754- 23-1Ø755-
3/4 1Ø UNC 16 UNF	1- 1/8	.483	23-Ø9476- 23-Ø9477-	23-1Ø756- 23-1Ø757-
7/8 9 UNC 14 UNF	1- 5/16	.563	23-Ø9478- 23-Ø9479-	23-1Ø758- 23-1Ø759-
1 8 UNC 14 UNF	1- 1/2	.627	23-Ø948Ø- 23-Ø9481-	23-1Ø76Ø- 23-1Ø761-
1-1/8 7 UNC 12 UNF	1-11/16	.718	23-Ø9482- 23-Ø9483-	23-1Ø762- 23-1Ø763-
1 1/4 7 UNC 12	1- 7/8	.813	23-Ø9484- 23-Ø9485-	23-1Ø764- 23-1Ø765-

*COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH IN HUNDRETHS OF AN INCH.

HEX HEAD CAP SCREWS

SAE GRADE 8

USS THREAD

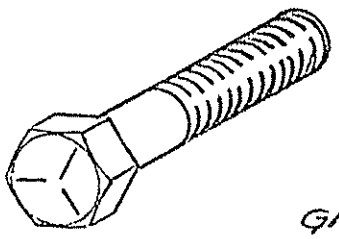


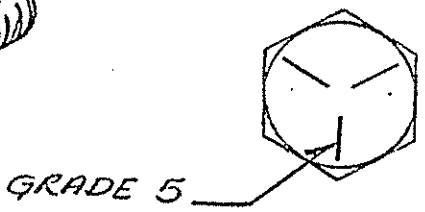
*S.A.E. APPROVED FORGED HEADING STEEL
*FULL DIAMETER SHANK
*FULLY FORMED HEAD
*SHARP ACCURATE THREADS

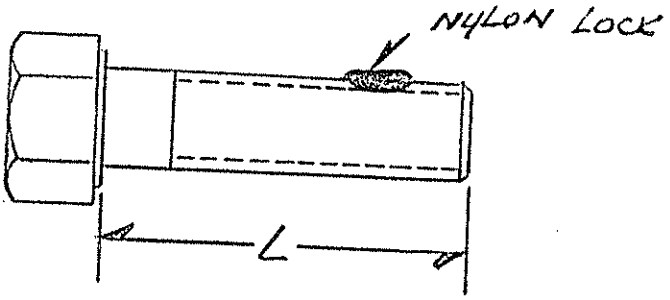
THREAD	PART NUMBER
1/4 -20 UNC	23-09432- *
1/4 -28 UNF	23-09433- *
5/16-18 UNC	23-09434- *
5/16-24 UNF	23-09435- *
3/8 -16 UNC	23-09436- *
3/8 -24 UNF	23-09437- *
7/16-14 UNC	23-09438- *
7/16-20 UNF	23-09439- *
1/2 -13 UNC	23-09440- *
1/2 -20 UNF	23-09441- *
9/16-12 UNC	23-09442- *
9/16-18 UNF	23-09443- *
5/8 -11 UNC	23-09444- *
5/8 -18 UNF	23-09445- *
3/4 -10 UNC	23-09446- *
3/4 116 UNF	23-09447- *
7/8 - 9 UNC	23-09448- *
7/8 -14 UNF	23-09449- *
1 - 8 UNC	23-09450- *
1 -14 UNF	23-09451- *
1-1/8 - 7 UNC	23-09452- *
1-1/8 -12 UNF	23-09453- *
1-1/4 - 7 UNC	23-09454- *
1-1/4 -12 UNF	23-09455- *

*COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH IN HUNDRETHS OF AN INCH.

CAPSCREW
(FINISHED HEX BOLT)







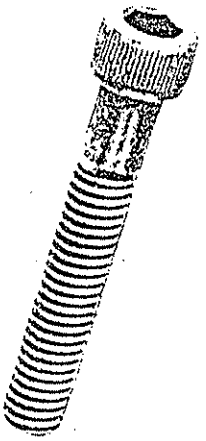
THREAD	MANUFACTURER'S NUMBER				GRADE 5	GRADE 8
	P4DS GR 5	FIN	P4GS GR 8	FIN		
1/4 -20 UNC	P4DS420R	C			23-10432- *	
-28 UNF	428	C			23-10433-	
5/16-18 UNC	P4DS518	C			23-10434- *	
-24 UNF	524	C			23-10435-	
3/8 -16 UNC	P4DS616R	P			23-10436- *	
-24 UNF	624	P			23-10437-	
7/16-14 UNC	P4DS714	P			23-10438- *	
-20 UNF	720	P			23-10439-	
1/2 -13 UNC	P4DS813	P			23-10440- *	
-20 UNF	820	P			23-10441-	
9/16-12 UNC	P4DS912	P			23-10442- *	
-18 UNF	918	P			23-10443-	
5/8 -11 UNC	P4DS1011	P	P4GS1011	P	23-10444- *	23-10895- *
-18 UNF	1016	P			23-10445-	
3/4 -10 UNC	P4DS1210	P			23-10446- *	
-16 UNF	1216	P			23-10447-	
7/8 - 9 UNC	P4DS1409	P			23-10448- *	
-14 UNF	1414	P			23-10449-	
1 - 8 UNC	P4DS1608	P			23-10450- *	
1 -14 UNF	1614	P			23-10451-	
1-1/8 - 7 UNC	--	-			23-10452- *	
-12 UNF	--	-			23-10453-	
1-1/4 - 7 UNC	--	-			23-10454- *	
-12	--	-			23-10455-	

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH (L) IN HUNDREDTHS OF AN INCH.
MPLE: 23-10437-150 IS A GRADE 5 HEX CAPSCREW WITH NYLOK PATCH, 3/8-24 UNF X 1-1/2 INCHES LONG.

C=CADMIUM PLATED
P=PLAIN FINISH

SOCKET HEAD CAP SCREWS

HEAT TREATED - HIGH STRENGTH ALLOY STEEL
COLD FORGED

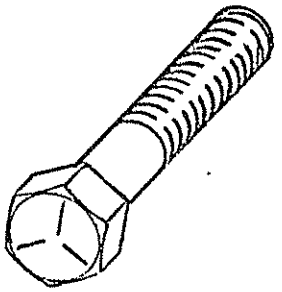


SIZE	KEY SIZE	PART NUMBER UNC	PART NUMBER UNF
#2 -56	.078	23-10562- *	
-64	.078		23-10563- *
#4 -40	.094	23-10564- *	
-48	.094		23-10565- *
#6 -32	.109	23-10566- *	
-40	.109		23-10567- *
#8 -32	9/64	23-10568- *	
-36	9/64		23-10569- *
#10 -24	5/32	23-10570- *	
-32	5/32		23-10571- *
1/4 -20	3/16	23-10572- *	
-28	3/16		23-10573- *
5/16-18	1/4	23-10574- *	
-24	1/4		23-10575- *
3/8 -16	5/16	23-10576- *	
-24	5/16		23-10577- *
7/16-14	3/8	23-10578- *	
-20	3/8		23-10579- *
1/2 -13	3/8	23-10580- *	
-20	3/8		23-10581- *
5/8 -11	1/2	23-10582- *	
-18	1/2		23-10583- *
3/4 -10	5/8	23-10584- *	
-16	5/8		23-10585- *
7/8 - 9	3/4	23-10586- *	
-14	3/4		23-10587- *
1 - 8	3/4	23-10588- *	
-14	3/4		23-10589- *
1-1/8 - 7	.875	23-10590- *	
-12	.875		23-10591- *
1-1/4 - 7	.875	23-10592- *	
-12	.875		23-10593- *

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

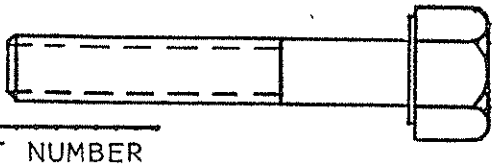
EXAMPLE: 23-10580-225, IS A SOCKET HEAD CAP SCREW, 1/2-13X2-1/4

CAPSCREW, FINISHED HEX BOLT
STAINLESS STEEL



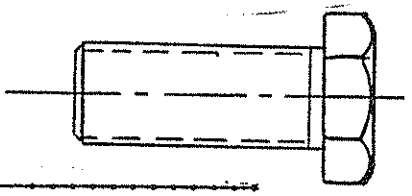
THREAD	PART NUMBER
1/4 -20 UNC	23-09981- *
5/16-18 UNC	23-10913- *
3/8 -16 UNC	23-10914- *
1/2 -13 UNC	23-10915- *

CAPSCREW, FINISHED HEX BOLT
GRADE 8, SPECIAL LENGTHS



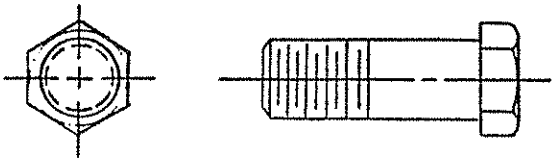
THREAD	LENGTH	PART NUMBER
3/8 -24 UNF	.88	23-11335-088
7/16-20 UNF	1.00	23-11289-100
5/8 -18 UNF	11.00	23-10090-

CAPSCREW, LOW CLEARANCE HEX HEAD
GRADE 5 AND GRADE 8



THREAD	HEAD SIZE		PART NUMBER	PART NUMBER
	MIN.	MAX	GRADE 5	GRADE 8
1/2 -20 UNF	.188	.203	23-09145- *	
5/8 -18 UNF	.245	.250		23-10682- *
3/4 -16 UNF	.300	.305		23-11288- *

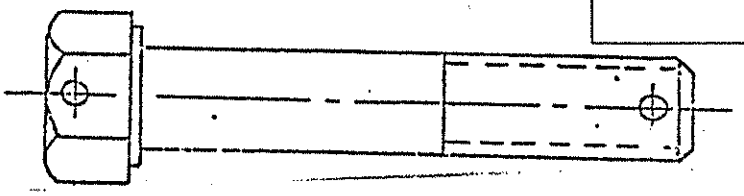
CAPSCREW, UNDERSIZE HEX HEAD
GRADE 5



THREAD	VENDOR PART NUMBER	PART NUMBER
7/16-14 UNC	SP 330231	23-11287-000

CAPSCREW, (FINISHED HEX BOLT)
GRADE 8, WITH HEAD AND SHANK HOLE

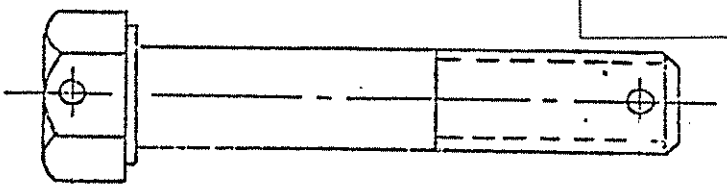
SPECIAL APPLICATIONS



THREAD	HOLE LOCATIONS		
	HEAD & SHANK	HEAD	SHANK
1/4 -20 UNC	23-09342- *	23-09372- *	23-09402- *
-28 UNF	23-09343-	23-09373-	23-09403-
5/16-18 UNC	23-09344-	23-09374-	23-09404-
-24 UNF	23-09345-	23-09375	23-09405-
3/8 -16 UNC	23-09346-	23-09376-	23-09406-
-24 UNF	23-09347-	23-09377-	23-09407-
7/16-14 UNC	23-09348-	23-09378-	23-09408-
-20 UNF	23-09349-	23-09379-	23-09409-
1/2 -13 UNC	23-09350-	23-09380-	23-09410-
-20 UNF	23-09351-	23-09381-	23-09411-
9/16-12 UNC	23-09352-	23-09382-	23-09412-
-18 UNF	23-09353-	23-09383-	23-09413-
5/8 -11 UNC	23-09354-	23-09384-	23-09414-
-18 UNF	23-09355-	23-09385-	23-09415-
3/4 -10 UNC	23-09356-	23-09386-	23-09416-
-16 UNF	23-09357-	23-09387-	23-09417-
7/8 - 9 UNC	23-09358-	23-09388-	23-09418-
-14 UNF	23-09359-	23-09389-	23-09419-
1 - 8 UNC	23-09360-	23-09390-	23-09420-
-12 UNF	23-09361-	23-09391-	23-09421-
1-1/8 - 7 UNC	23-09362-	23-09392-	23-09422-
-12 UNF	23-09363-	23-09393-	23-09423-
1-1/4 - 7 UNC	23-09364-	23-09394-	23-09424-
-12 UNF	23-09365-	23-09395-	23-09425-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-09503-075 SPECIFIES A 1/4-28 UNF GRADE 5 HEX HEAD CAPSCREW, 3/4 OF AN INCH LONG, WITH HEAD AND SHANK HOLES



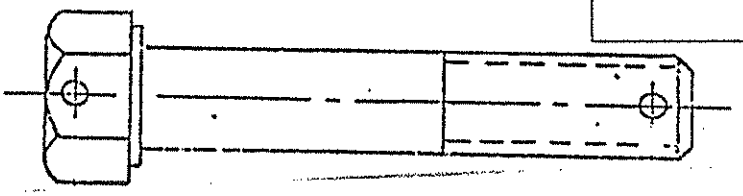
THREAD	HOLE LOCATIONS		
	HEAD & SHANK	HEAD	SHANK
1/4 -20 UNC	23-09502- *	23-09532- *	23-09562- *
-28 UNF	23-09503-	23-09533-	23-09563-
5/16-18 UNC	23-09504-	23-09534-	23-09564-
-24 UNF	23-09505-	23-09535-	23-09565-
3/8 -16 UNC	23-09506-	23-09536-	23-09566-
-24 UNF	23-09507-	23-09537-	23-09567-
7/16-14 UNC	23-09508-	23-09538-	23-09568-
-20 UNF	23-09509-	23-09539-	23-09569-
1/2 -13 UNC	23-09510-	23-09540-	23-09570-
-20 UNF	23-09511-	23-09541-	23-09571-
9/16-12 UNC	23-09512-	23-09542-	23-09572-
-18 UNF	23-09513-	23-09543-	23-09573-
5/8 -11 UNC	23-09514-	23-09544-	23-09574-
-18 UNF	23-09515-	23-09545-	23-09575-
3/4 -10 UNC	23-09516-	23-09546-	23-09576-
-16 UNF	23-09517-	23-09547-	23-09577-
7/8 - 9 UNC	23-09518-	23-09548-	23-09578-
-14 UNF	23-09519-	23-09549-	23-09579-
1 - 8 UNC	23-09520-	23-09550-	23-09580-
-12 UNF	23-09521-	23-09551-	23-09581-
1-1/8 - 7 UNC	23-09522-	23-09552-	23-09582-
-12 UNF	23-09523-	23-09553-	23-09583-
1-1/4 - 7 UNC	23-09524-	23-09554-	23-09584-
-12 UNF	23-09525-	23-09555-	23-09585-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-09503-075 SPECIFIES A 1/4-28 UNF GRADE 5 HEX HEAD CAPSCREW, 3/4 OF AN INCH LONG, WITH HEAD AND SHANK HOLES

CAPSCREW, (FINISHED HEX BOLT)
GRADE 8, WITH HEAD AND SHANK HOLE

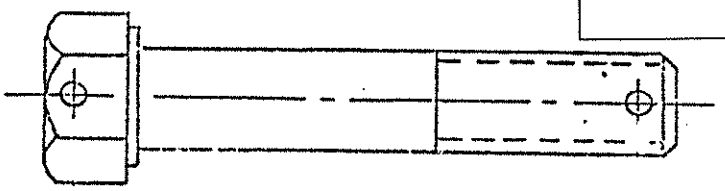
SPECIAL APPLICATIONS



THREAD	HOLE LOCATIONS		
	HEAD & SHANK	HEAD	SHANK
1/4 -20 UNC	23-09342- *	23-09372- *	23-09402- *
-28 UNF	23-09343-	23-09373-	23-09403-
5/16-18 UNC	23-09344-	23-09374-	23-09404-
-24 UNF	23-09345-	23-09375	23-09405-
3/8 -16 UNC	23-09346-	23-09376-	23-09406-
-24 UNF	23-09347-	23-09377-	23-09407-
7/16-14 UNC	23-09348-	23-09378-	23-09408-
-20 UNF	23-09349-	23-09379-	23-09409-
1/2 -13 UNC	23-09350-	23-09380-	23-09410-
-20 UNF	23-09351-	23-09381-	23-09411-
9/16-12 UNC	23-09352-	23-09382-	23-09412-
-18 UNF	23-09353-	23-09383-	23-09413-
5/8 -11 UNC	23-09354-	23-09384-	23-09414-
-18 UNF	23-09355-	23-09385-	23-09415-
3/4 -10 UNC	23-09356-	23-09386-	23-09416-
-16 UNF	23-09357-	23-09387-	23-09417-
7/8 - 9 UNC	23-09358-	23-09388-	23-09418-
-14 UNF	23-09359-	23-09389-	23-09419-
1 - 8 UNC	23-09360-	23-09390-	23-09420-
-12 UNF	23-09361-	23-09391-	23-09421-
1-1/8 - 7 UNC	23-09362-	23-09392-	23-09422-
-12 UNF	23-09363-	23-09393-	23-09423-
1-1/4 - 7 UNC	23-09364-	23-09394-	23-09424-
-12 UNF	23-09365-	23-09395-	23-09425-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-09503-075 SPECIFIES A 1/4-28 UNF GRADE 5 HEX HEAD CAPSCREW, 3/4 OF AN INCH LONG, WITH HEAD AND SHANK HOLES

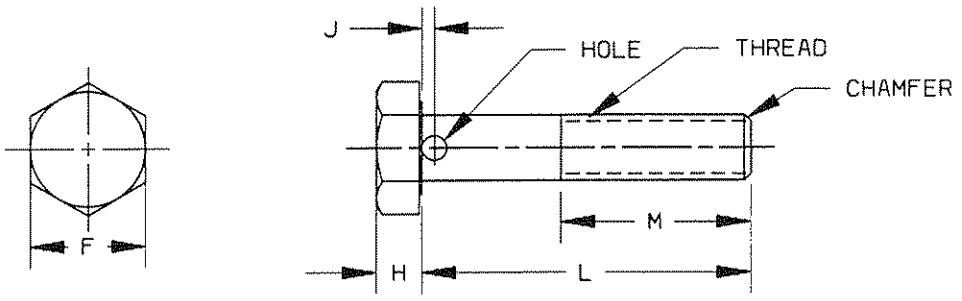


THREAD	HOLE LOCATIONS		
	HEAD & SHANK	HEAD	SHANK
1/4 -20 UNC	23-09502- *	23-09532- *	23-09562- *
-28 UNF	23-09503-	23-09533-	23-09563-
5/16-18 UNC	23-09504-	23-09534-	23-09564-
-24 UNF	23-09505-	23-09535-	23-09565-
3/8 -16 UNC	23-09506-	23-09536-	23-09566-
-24 UNF	23-09507-	23-09537-	23-09567-
7/16-14 UNC	23-09508-	23-09538-	23-09568-
-20 UNF	23-09509-	23-09539-	23-09569-
1/2 -13 UNC	23-09510-	23-09540-	23-09570-
-20 UNF	23-09511-	23-09541-	23-09571-
9/16-12 UNC	23-09512-	23-09542-	23-09572-
-18 UNF	23-09513-	23-09543-	23-09573-
5/8 -11 UNC	23-09514-	23-09544-	23-09574-
-18 UNF	23-09515-	23-09545-	23-09575-
3/4 -10 UNC	23-09516-	23-09546-	23-09576-
-16 UNF	23-09517-	23-09547-	23-09577-
7/8 - 9 UNC	23-09518-	23-09548-	23-09578-
-14 UNF	23-09519-	23-09549-	23-09579-
1 - 8 UNC	23-09520-	23-09550-	23-09580-
-12 UNF	23-09521-	23-09551-	23-09581-
1-1/8 - 7 UNC	23-09522-	23-09552-	23-09582-
-12 UNF	23-09523-	23-09553-	23-09583-
1-1/4 - 7 UNC	23-09524-	23-09554-	23-09584-
-12 UNF	23-09525-	23-09555-	23-09585-

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-09503-075 SPECIFIES A 1/4-28 UNF GRADE 5 HEX HEAD CAPSCREW, 3/4 OF AN INCH LONG, WITH HEAD AND SHANK HOLES

DRAWN	CGD	TITLE CAPSCREW, MODIFIED	DRAWING NUMBER 23-09017
APPRV	DAJ		
DATE	07/20/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. C
CATIA ORIGINAL			



NOMINAL SIZE & THREAD	MATERIAL NUMBER (1)	MATERIAL SAE GRADE	L	M	H	F	HOLE SIZE D	HOLE LOC J	FREIGHTLINER PART NUMBER
1/4-28 UNF	23-09663-100	5	1.00	1.00	.172	0.44	3/32	D/2	23-09017-000
3/4-16 UNF	23-09447-225	8	REF 2.25	REF STD	.312	1.12	-	-	23-09017-001

ENGINEERING NOTES:

1. MATERIAL: SEE TABLE
2. FINISH: PLAIN OR AS RECEIVED

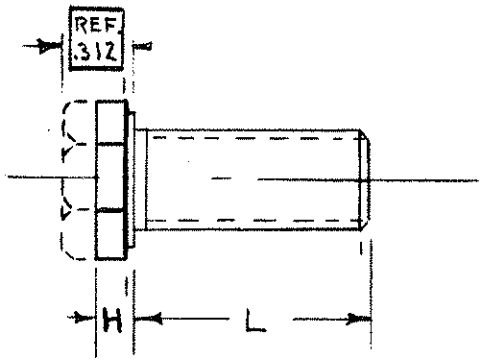
CHG	JOB NO	DATE	BY	REVISION
C	PA2042-95	07/20/99	CGD	REVISED AND REDRAWN IN CATIA.

23-9145

General Use Part

PRINT ISSUED	TITLE	PART NO
5/18/71	BOLT, HEX LOW CLEARANCE HEAD	23-9145
LAST CHG LTR C		SHEET 1 OF 1

SKETCH



PART NUMBERS

THREAD SAE	HEAD H MAX.	HEAD H MIN.		FREIGHTLINER PART NUMBER *
1/2 - 20 UNF	.203	.188		23-9145-L

* To complete part number, add three-digit dash number expressing length in 1/100th's of an inch; thus, for a low head bolt 1-1/2 inches long, write "23-9145-150".

ENGINEERING NOTES

(1) Material: Hex Capscrew (Finished Hex Bolt) of tabulated size and length L, Freightliner Part Number 23-9471-L. (Grade 5)

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
C	HJR	4-28-71	Revised & Redrawn

ns

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		4-28-71		(1)	

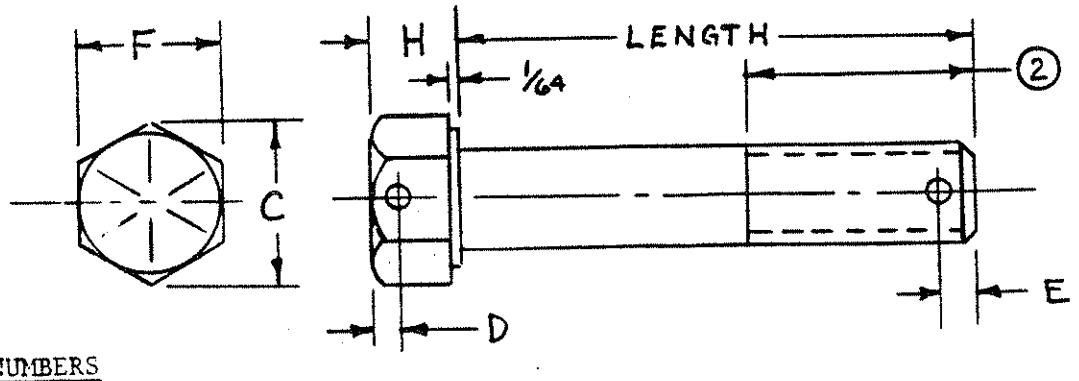
Portland FREIGHTLINER CORPORATION Oregon 97208

C

General Use Part

PRINT ISSUED	TITLE	PART NO
[illegible]	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD & SHANK HOLES, GR.8	23-9342 Thru 9365
LAST CHG LTR		SHEET 1 OF 2

SKETCH



PART NUMBERS

Nominal Size Threads Per In. and Series Designation	Across Flats F	Across Corners C	Head Height H	Head Hole		Shank Hole		Freightliner Part Numbers
				D	Drill	E	Drill	
1/4 -20 UNC 1/4 -28 UNF	7/16	1/2	5/32	.09	56(.046)	.16	48(.076)	23-9342 23-9343
5/16-18 UNC 5/16-24 UNF	1/2	9/16	13/64	.11	50(.070)	.16	48(.076)	23-9344 23-9345
3/8 -16 UNC 3/8 -24 UNF	9/16	21/32	15/64	.14	50(.070)	.18	36(.106)	23-9346 23-9347
7/16-14 UNC 7/16-20 UNF	5/8	23/32	9/32	.16	50(.070)	.25	36(.106)	23-9348 23-9349
1/2 -13 UNC 1/2 -20 UNF	3/4	7/8	5/16	.19	50(.070)	.25	36(.106)	23-9350 23-9351
9/16-12 UNC 9/16-18 UNF	13/16	15/16	23/64	.21	50(.070)	.31	28(.141)	23-9352 23-9353
5/8 -11 UNC 5/8 -15 UNF	15/16	1	25/64	.23	50(.070)	.31	28(.141)	23-9354 23-9355
3/4 -10 UNC 3/4 -16 UNF	1-1/8	1-9/32	15/32	.28	50(.070)	.38	28(.141)	23-9356 23-9357
7/8 - 9 UNC 7/8 -14 UNF	1-5/16	1-1/2	35/64	.33	50(.070)	.38	28(.141)	23-9358 23-9359
1 - 8 UNC 1 -12 UNF	1-1/2	1-23/32	39/64	.38	50(.070)	.44	28(.141)	23-9360 23-9361

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	[illegible]	11-16-70		(See Sht. 2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD & SHANK HOLES, GR.8	23-9342 thru 9365
LAST CHG LTR		SHEET 2 OF 2

PART NUMBERS (Cont.)

Nominal Size Threads Per In. and Series Designation	Across Flats F	Across Corners C	Head Height H	Head Hole D	Head Hole Drill	Shank Hole E	Shank Hole Drill	Freightliner Part Numbers*
1-1/8 - 7 UNC 1-1/8 - 12 UNF	1-11/16	1-15/16	11/16					23-9362 23-9363
1-1/4 - 7 UNC 1-1/4 - 12 UNF	1-7/8	2-5/32	25/32					23-9364 23-9365

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-9343-075 specifies a 1/4-28 UNF Grade 8 Hex Cap Screw 3/4" long.

ENGINEERING NOTES

1. Material: Grade 8 bolt material per SAE Standard J429.
2. Threaded length is two diameters plus 0.25, per SAE J105.
3. Except for head and shank holes, these capscrews are identical with the 23-9432-9455 series cap screws.

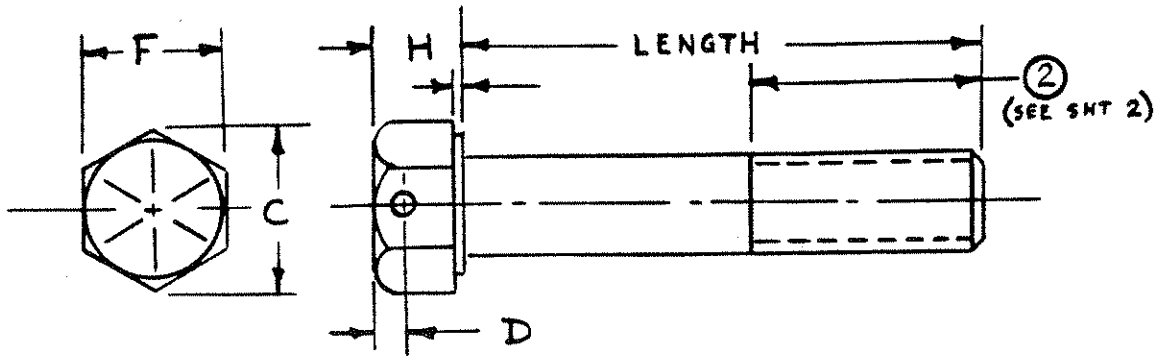
COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-16-70		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
	GAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD HOLE, GR.8	23-9372 thru 9395
LAST CHG LTR		SHEET 1 OF 2

SKETCH



PART NUMBERS

Nominal Size Threads Per In. and Series Designation	F	C	H	Head Hole D	Head Hole Drill		Freightliner Part Numbers*
1/4 -20 UNC 1/4 -28 UNF	7/16	1/2	5/32	.09	56(.046)		23-9372 23-9373
5/16-18 UNC 5/16-24 UNF	1/2	9/16	13/64	.11	50(.070)		23-9374 23-9375
3/8 -16 UNC 3/8 -24 UNF	9/16	21/32	15/64	.14	50(.070)		23-9376 23-9377
7/16-14 UNC 7/16-20 UNF	5/8	23/32	9/32	.16	50(.070)		23-9378 23-9379
1/2 -13 UNC 1/2 -20 UNF	3/4	7/8	5/16	.19	50(.070)		23-9380 23-9381
9/16-12 UNC 9/16-18 UNF	13/16	15/16	23/64	.21	50(.070)		23-9382 23-9383
5/8 -11 UNC 5/8 -18 UNF	15/16	1	25/64	.23	50(.070)		23-9384 23-9385
3/4 -10 UNC 3/4 -18 UNF	1-1/8	1-9/32	15/32	.28	50(.070)		23-9386 23-9387
7/8 - 9 UNC 7/8 -14 UNF	1-5/16	1-1/2	35/64	.33	50(.070)		23-9388 23-9389
1 - 8 UNC 1 -12 UNF	1-1/2	1-23/32	39/64	.38	50(.070)		23-9390 23-9391

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-16-70		(See Sht. 2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD HOLE GR.8	23-9372 thru 9395
LAST CHG LTR		SHEET 2 OF 2

PART NUMBERS (Continued)

Nominal Size Threads Per In. and Series Designation	F	C	H	Head Hole D	Head Hole Drill		Freightliner Part Numbers*
1- 1/8 -7 UNC 1- 1/8-12 UNF	1-11/16	1-15/16	11/16	.44	50(.070)		23-9392 23-9393
1-1/4 -7 UNC 1-1/4 -12 UNF	1-7/8	2-5/32	25/32	.44	50(.070)		23-9394 23-9395

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-9373-075 specifies a 1/4-28 UNF Grade 8 Hex Capscrew, 3/4" long.

ENGINEERING NOTES

1. Material: Grade 8 bolt material per SAE Standard J429.
2. Thread length is two diameters, plus 0.25, per SAE J105.
3. Except for headhole, these capscrews are identical with the 23-9432-9455 series cap screws.

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-16-70		(1)	

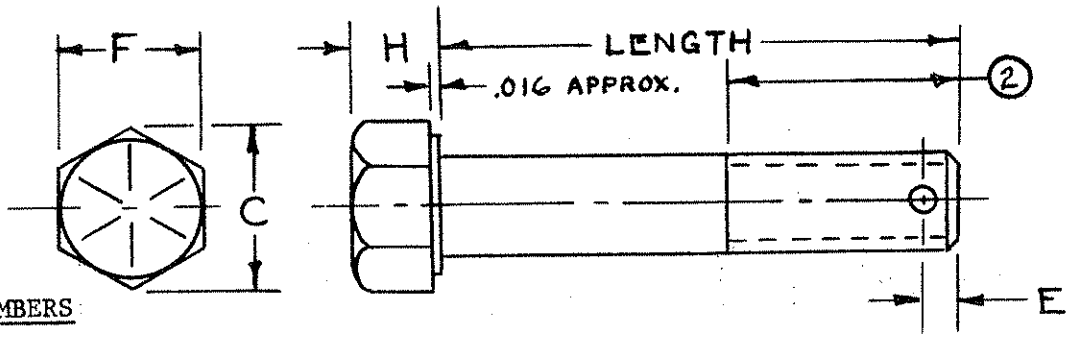
Portland FREIGHTLINER CORPORATION Oregon 97208

23-9402 Thru 23-9425

General Use Part

PRINT ISSUED	TITLE	NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH SHANK HOLE, GR.8	23-9402 thru 9425
LAST CHG. LTR.		SHEET 1 OF 2

SKETCH



PART NUMBERS

Nominal Size Threads Per In. and Series Designation	F	C	H	Shank Hole E	Shank Hole Drill	Freightliner Part Numbers*
1/4 -20 UNC 1/4 -28 UNF	7/16	1/2	5/32	.16	48(.076)	23-9402 23-9403
5/16-18 UNC 5/16-24 UNF	1/2	9/16	13/64	.16	48(.076)	23-9404 23-9405
3/8 -16 UNC 3/8 -24 UNF	9/16	21/32	15/64	.18	36(.106)	23-9406 23-9407
7/16-14 UNC 7/16-20 UNF	5/8	23/32	9/32	.25	36(.106)	23-9408 23-9409
1/2 -13 UNC 1/2 -20 UNF	3/4	7/8	5/16	.25	36(.106)	23-9410 23-9411
9/16-12 UNC 9/16-18 UNF	13/16	15/16	23/64	.31	28(.141)	23-9412 23-9413
5/8 -11 UNC 5/8 -18 UNF	15/16	1	25/64	.31	28(.141)	23-9414 23-9415
3/4 -10 UNC 3/4 -18 UNF	1-1/8	1-9/32	15/32	.38	28(.141)	23-9416 23-9417
7/8 - 9 UNC 7/8 -14 UNF	1-5/16	1-1/2	35/64	.38	28(.141)	23-9418 23-9419
1 - 8 UNC 1 -12 UNF	1-1/2	1-23/32	29/64	.38	28(.141)	23-9420 23-9421
1-1/8-7 UNC 1-1/8-12 UNF	1-11/16	1-15/16	11/16	.44	28(.141)	23-9422 23-9423
1-1/4-7 UNC 1-1/4-12 UNF	1-7/8	2-5/32	25/32			23-9424 23-9425

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	RJ	11-16-70		(See Sht. 2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

23-9402 Thru 23-9425

General Use Part

PRINT ISSUED	TITLE	NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH SHANK HOLE, GR.8	23-9402 thru 9425
LAST CHG. LTR.		SHEET 2 OF 2

PART NUMBERS (Continued)

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-9403-075 specifies a 1/4-28 UNF, Grade 8 Hex Capscrew 3/4" long.

ENGINEERING NOTES

1. Material: Grade 8 bolt material per SAE Standard J429.
2. Thread length is two diameters plus 0.25, per SAE J105.
3. Except for shank hole, these capscrews are identical with the 23-9432-9455 series cap screws.

CHG	BY	DATE	WAS

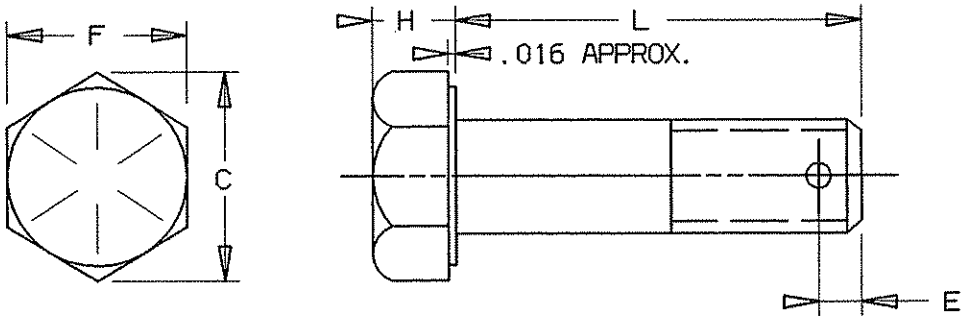
CHG	BY	DATE	WAS

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-16-70		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

ADRIENNE CHILBERG

DRAWN	HJR	TITLE	DRAWING NUMBER
APPRV	RLL	CAPSCREW-HEX GR. 8, WITH SHANK HOLE	23-09402
DATE	03/29/71	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. B
CATIA ORIGINAL			



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	DIMENSIONS			SHANK HOLE		FREIGHTLINER PART NUMBERS*
	F	C	H	E	DRILL	
5/8 -11 UNC	15/16	1-5/64	13/32	.21	28(.141)	23-12439-L
3/4 -10 UNC	1-1/8	1-9/32	15/32	.40	.281	23-09416-L
1 -12 UNF	1-1/2	1-23/32	29/64	.38	28(.141)	23-09421-L

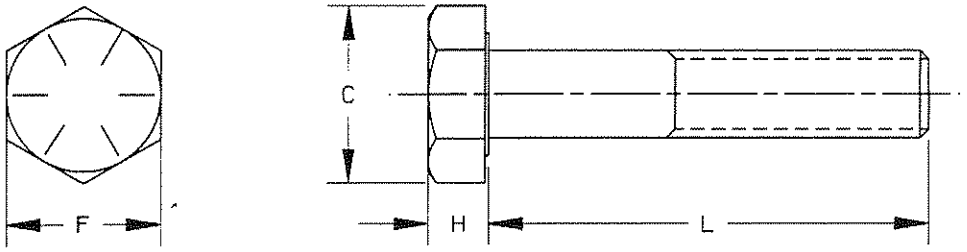
* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-09416-275 IS A 3/4-10 CAPSCREW 2 3/4 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE STANDARD J429.
2. BASIC THREAD LENGTH (REF):
   TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES).
   TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES).
3. FINISH: YELLOW ZINC PLATE PER FREIGHTLINER SPEC. 49-00005-203
4. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB NO	DATE	BY	REVISION
A	P6589P-01	05/30/96	FHC	REDRAWN. ADDED NOTE 3 & REVISED SHANK HOLE 3/4.
B	P02832-01	05/19/97	DAJ	ADDED 23-12439.

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX, GRADE 8/8.2	23-09432	
DATE	06/23/99			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2	CHG. LTR. P



THREAD SIZE	F BASIC	C MAX	H MAX	FREIGHTLINER PART NUMBER
1/4 -20 UNC -28 UNF	7/16	.505	.163	23-09432-L 23-09433-L
5/16-18 UNC -24 UNF	1/2	.577	.211	23-09434-L 23-09435-L
3/8 -16 UNC -16 UNC -24 UNF	9/16	.650	.243	23-09436-L 23-09436-001 (L=10) 23-09437-L
7/16-14 UNC -20 UNF	5/8	.722	.291	23-09438-L 23-09439-L
1/2 -13 UNC -20 UNF	3/4	.866	.323	23-09440-L 23-09441-L
9/16-12 UNC -18 UNF	13/16	.938	.371	23-09442-L 23-09443-L
5/8 -11 UNC -11 UNC -11 UNC -18 UNF	15/16	1.083	.403	23-09444-L 23-09444-000 (L=10.5) 23-09444-001 (L=11.5) 23-09445-L
3/4 -10 UNC -16 UNF	1-1/8	1.299	.483	23-09446-L 23-09447-L
7/8 - 9 UNC - 9 UNC - 9 UNC - 9 UNC -14 UNF	1-5/16	1.516	.563	23-09448-L 23-09448-000 (L=11) 23-09448-001 (L=11.5) 23-09448-002 (L=12) 23-09449-L

CHG	JOB NO	DATE	BY	REVISION
P	P07127-13	06/23/99	CGD	REVISED AND REDRAWN IN CATIA.

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX, GRADE 8/8.2	23-09432	
DATE	06/23/99			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2	CHG. LTR. P

THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER *
1 - 8 UNC -14 UNF	1-1/2	1.732	.627	23-09450-L 23-09451-L
1 1/8-7 UNC	1-11/16	1.949	.718	23-09452-L

ENGINEERING NOTES:

1. COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH EXCEPT AS NOTED.
   EXAMPLE: 23-09437-175 CALLS OUT A 3/8-24 UNF GRADE 8, HEX CAPSCREW 1.75 INCHES LONG.

2. MATERIAL: GRADE 8/8.2 PER SAE STANDARD SAE J429

3. DIMENSIONAL AND MECHANICAL PROPERTIES MUST CONFORM TO ANSI B18.2.1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

4. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

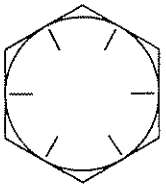
5. THREAD FORM: UNC/UNF CLASS 2A

6. BASIC THREAD LENGTH (REF):

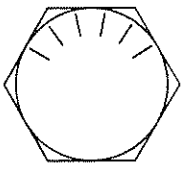
   TWICE DIA+1/4 (FOR LENGTHS UP TO 6 INCHES)

   TWICE DIA+1/2 (FOR LENGTHS ABOVE 6 INCHES)

GRADE MARKINGS PER SAE J429



GRADE 8



GRADE 8.2

CHG	JOB NO	DATE	BY	REVISION
P	P07127-13	06/23/99	CGD	REVISED AND REDRAWN IN CATIA.

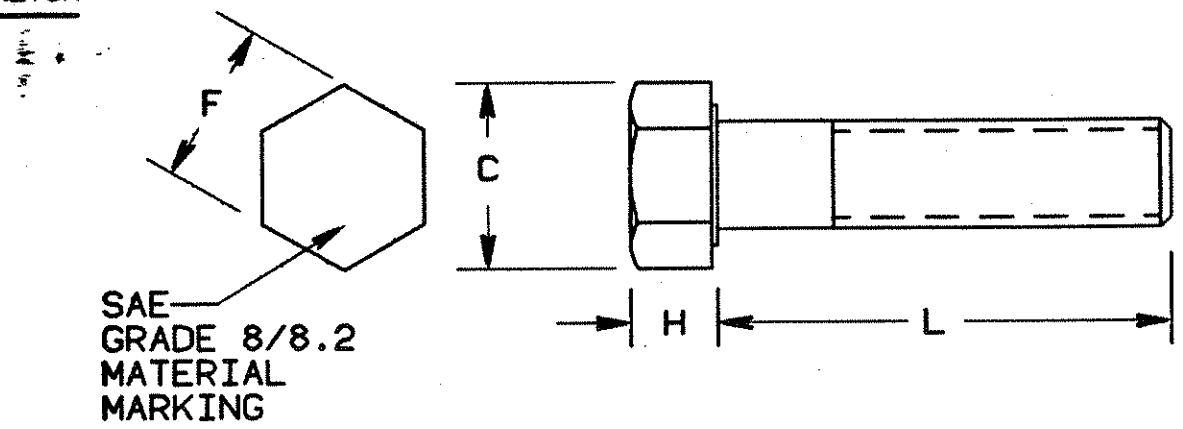
GENERAL USE PART

ORIGINAL JOB NO.	TITLE	PART NO.
3136C	CAPSCREW HEX (FINISHED HEX BOLT) GRADE 8/8.2	23-09432 THRU 23-09455
LAST CHG LTR: J		SHEET 2 OF 2

THRU 23-09455

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
H	4629D	BT	12-02-85	SEE SHEET 1
J	29865OH	FHF	11-20-86	ADDED 23-09448-000

SKETCH



PART NUMBERS (FOR CAPSCREWS 10.000 INCHES AND LONGER)

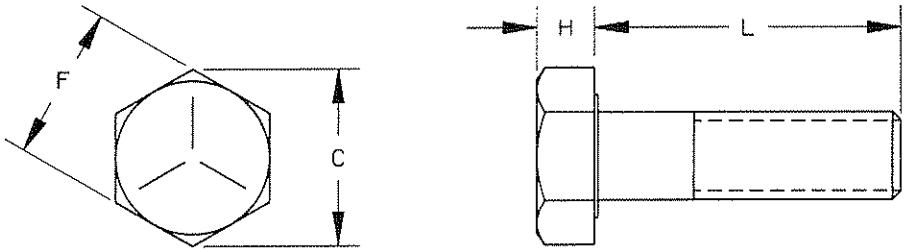
THREAD SIZE	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	L LENGTH (BASIC)		FREIGHTLINER PART NUMBER
5/8-11 UNC	15/16	1.083	.403	10.500		23-09444-000
5/8-11 UNC	15/16	1.083	.403	11.500		23-09444-001
7/8-9 UNC	1 5/16	1.516	.563	11.000		23-09448-000

4. GRADE ID: HEAD MAKINGS FOR GRADE 8/8.2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
D	3136C	FEF	04-23-84	REVISED & REDRAWN
E	H0224	DAR	05-28-85	SEE SHEET 1
F	1876D	FHF	07-08-85	SEE SHEET 1
G	1709D	FHF	09-24-85	SEE SHEET 1

					MASTER NUMBER	
COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL		01010	000D1
APPROVED	DJL	04-23-84				

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX HEAD GRADE 5, P & O	23-09462	
DATE	06/23/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. J
CATIA ORIGINAL				



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER *
1/4 -20 UNC -28 UNF	7/16	.505	.163	23-09462-L 23-09463-L
5/16-18 UNC -24 UNF	1/2	.577	.211	23-09464-L 23-09465-L
3/8 -16 UNC -24 UNF	9/16	.650	.243	23-09466-L 23-09467-L
7/16-14 UNC -20 UNF	5/8	.722	.291	23-09468-L 23-09469-L
1/2 -13 UNC -20 UNF	3/4	.866	.323	23-09470-L 23-09471-L
9/16-12 UNC -18 UNF	13/16	.938	.371	23-09472-L 23-09473-L
5/8 -11 UNC -18 UNF	15/16	1.083	.403	23-09474-L 23-09475-L
3/4 -10 UNC -16 UNF	1-1/8	1.299	.483	23-09476-L 23-09477-L
7/8 - 9 UNC -14 UNF	1-5/16	1.516	.563	23-09479-L
1 - 8 UNC -14 UNF	1-1/2	1.732	.627	23-09480-L

* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-09466-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429
2. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

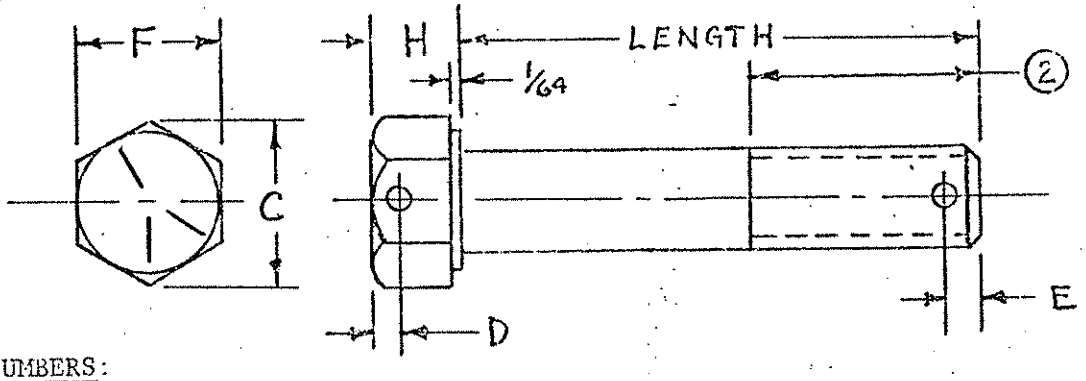
CHG	JOB NO	DATE	BY	REVISION
J	P07127-13	06/23/99	CGD	REVISED AND REDRAWN IN CATIA.

23-9502 Thru 23-9525

General Use Part

PRINT ISSUED	TITLE	PART NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD & SHANK HOLES, GR. 5	23-9502 Thru 9525
LAST CHG LTR.		SHEET 1 OF 2

SKETCH:



PART NUMBERS:

Nominal Size Threads Per In. and Series Designation	Across Flats F	Across Corners C	Head Height K	Head Hole D	Head Hole Drill	Shank Hole E	Shank Hole Drill	Freightliner Part Numbers
1/4 -20 UNC 1/4 -28 UNF	7/16	1/2	5/32	.09	56(.046)	.16	48(.076)	23-9502 23-9503
5/16-18 UNC 5/16-24 UNF	1/2	9/16	13/64	.11	50(.070)	.16	48(.076)	23-9504 23-9505
3/8 -16 UNC 3/8 -24 UNF	9/16	21/32	15/64	.14	50(.070)	.18	36(.106)	23-9506 23-9507
7/16-14 UNC 7/16-20 UNF	5/8	23/32	9/32	.16	50(.070)	.25	36(.106)	23-9508 23-9509
1/2 -13 UNC 1/2 -20 UNF	3/4	7/8	5/16	.19	50(.070)	.25	36(.106)	23-9510 23-9511
9/16-12 UNC 9/16-18 UNF	13/16	15/16	23/64	.21	50(.070)	.31	28(.141)	23-9512 23-9513
5/8 -11 UNC 5/8 -15 UNF	15/16	[illegible]	25/64	.23	50(.070)	.31	28(.141)	23-9514 23-9515
3/4 -10 UNC 3/4 -16 UNF	1-1/8	1 9/32	15/32	.28	50(.070)	.38	28(.141)	23-9516 23-9517
7/8 - 9 UNC 7/8 -14 UNF	1-5/16	1-1/2	35/64	.33	50(.070)	.38	28(.141)	23-9518 23-9519
1 - 8 UNC 1 -12 UNF	1-1/2	1-23/32	39/64	.38	50(.070)	.44	28(.141)	23-9520 23-9521

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	[signature]	3-22-71		(See Sh. 2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

WAS | DATE | BY | CHG

WAS | DATE | BY | CHG

23-9502 thru 23-9525

General Use Part

PRINT ISSUED	TITLE	PART NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD & SHANK HOLES, GR.5	23-9502 thru 9525
LAST CHG. LTR.		SHEET 2 OF 2

PART NUMBERS (Cont.)

Nominal Size Threads Per In. and Series Designation	Across Flats F	Across Corners C	Head Height H	Head Hole D	Head Hole Drill	Shank Hole E	Shank Hole Drill	Freightliner Part Numbers*
1-1/8 - 7 UNC 1-1/8 - 12 UNF	1-11/16	1-15/16	11/16					23-9522 23-9523
1-1/4 - 7 UNC 1-1/4 - 12 UNF	1-7/8	2-5/32	25/32					23-9524 23-9525

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-9503-075 specifies a 1/4-28 UNF Grade 5 Hex Cap Screw 3/4" long.

ENGINEERING NOTES

(1) Material: Grade 5 bolt material per SAE Standard J429.
(2) Threaded length is two diameters plus 0.25, per SAE J105.

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	[illegible]	3-22-71		(1)	

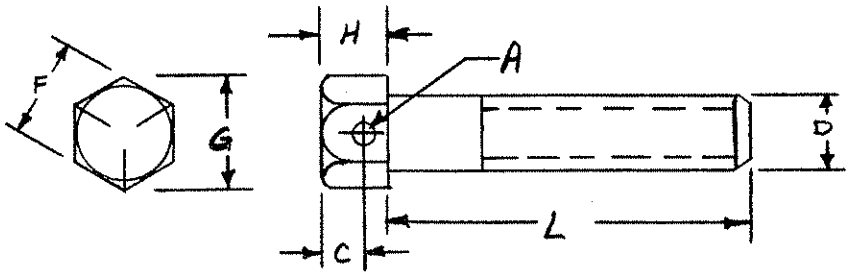
Portland FREIGHTLINER CORPORATION Oregon 97208

23-9532 Thru 23-9555

General Use Part

PRINT ISSUED	TITLE	PART NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH HEAD HOLE GRADE 5	23-9532 Thru 23-9555
LAST CHG. LTR. A		SHEET 1 OF 1

SKETCH



PART NUMBERS

THREAD	D DIAM. (BASIC)	F FLATS (MAX.)	G CORNERS (MAX.)	BASIC	HEAD HOLE C	HEAD HOLE A DRILL		FREIGHTLINER PART NUMBER*
1/4 20 UNC 28 UNF	0.2500	.4375	.505	11/64	.09	56(.046)		23-9532-L 3
5/16 18 UNC 24 UNF	0.3125	.5000	.577	7/32	.11	50(.070)		4 5
3/8 16 UNC 24 UNF	0.3750	.5625	.650	1/4	.14			6 7
7/16 14 UNC 20 UNF	0.4375	.6250	.722	19/64	.16			8 9
1/2 13 UNC 20 UNF	0.5000	.7500	.866	11/32	.19			23-9540 1
9/16 12 UNC 18 UNF	0.5625	.8125	.938	23/64	.21			2 3
5/8 11 UNC 18 UNF	0.6250	.9375	1.083	27/64	.23			4 5
3/4 10 UNC 16 UNF	0.7500	1.1250	1.299	1/2	.28			6 7
7/8 9 UNC 14 UNF	0.8750	1.3125	1.516	37/64	.33			8 9
1 8 UNC 14 UNF	1.0000	1.5000	1.732	43/64	.38			23-9550 1
1-1/8 7 UNC 12 UNF	1.1250	1.6875	1.949	3/4	.44	36(.1060)		2 3
1-1/4 7 UNC 12 UNF	1.2500	1.8750	2.165	27/32	.44			4 5

*Complete part number by adding a 3-digit dash number expressing the length, L, in hundredths of an inch.

ENGINEERING NOTES

① Material: Grade 5 bolt material meeting all applicable provisions of SAE Standard J105, Hex Bolts.

2. Finish: Plain (unplated).

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	HJR	6-13-74	Clarified Format; J#A0632

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	RJM	2-22-71		①	

Portland FREIGHTLINER CORPORATION Oregon 97208

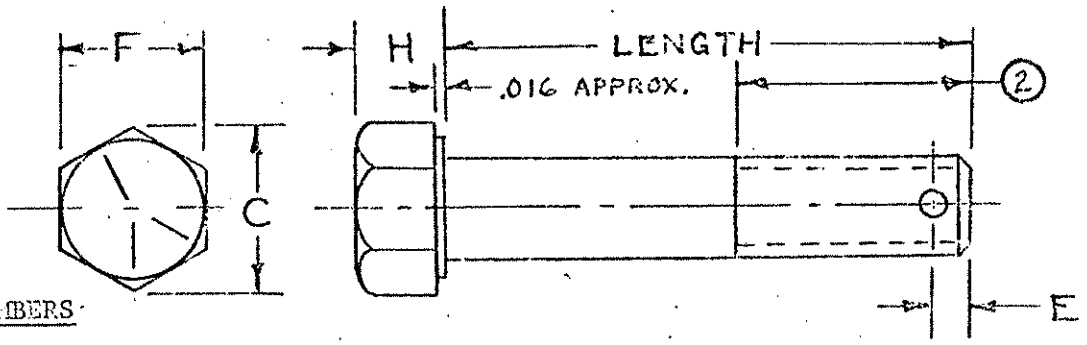
A

23-9562 Thru 23-9595

General Use Part

PRINT ISSUED	TITLE	NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH SHANK HOLE, GR.5	23-9562 thru 9585
LAST CHG. LTR.		SHEET 1 OF 2

SKETCH



PART NUMBERS

Nominal Size Threads Per In. and Series Designation	F	C	H		Shank Hole E	Shank Hole Drill	Freightliner Part Numbers*
1/4 -20 UNC 1/4 -28 UNF	7/16	1/2	5/32		.16	48(.076)	23-9562 23-9563
5/16-18 UNC 5/16-24 UNF	1/2	9/16	13/64		.16	48(.076)	23-9564 23-9565
3/8 -16 UNC 3/8 -24 UNF	9/16	21/32	15/64		.18	36(.106)	23-9566 23-9567
7/16-14 UNC 7/16-20 UNF	5/8	23/32	9/32		.25	36(.106)	23-9568 23-9569
1/2 -13 UNC 1/2 -20 UNF	3/4	7/8	5/16		.25	36(.106)	23-9570 23-9571
9/16-12 UNC 9/16-18 UNF	13/16	15/16	23/64		.31	28(.141)	23-9572 23-9573
5/8 -11 UNC 5/8 -18 UNF	15/16	1	25/64		.31	28(.141)	23-9574 23-9575
3/4 -10 UNC 3/4 -18 UNF	1-1/8	1-9/32	15/32		.38	28(.141)	23-9576 23-9577
7/8 - 9 UNC 7/8 -14 UNF	1-5/16	1-1/2	35/64		.38	28(.141)	23-9578 23-9579
1 - 8 UNC 1 -12 UNF	1-1/2	1-23/32	29/64		.38	28(.141)	23-9580 23-9581
1-1/8-7 UNC 1-1/8-12 UNF	1-11/16	1-15/16	11/16		.44	28(.141)	23-9582 23-9583
1-1/4-7 UNC 1-1/4-12 UNF	1-7/8	2-5/32	25/32				23-9584 23-9585

		DATE DRAWN		MATERIAL	
COMPILED	H.TR	11-16-70		(See Sht. 2)	
APPROVED					

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

23-9562 Thru 23-9585

General Use Part

PRINT ISSUED	TITLE	NO.
3/29/71	CAPSCREW, HEX (FINISHED HEX BOLT) WITH SHANK HOLE, GR.5	23-9562 thru 9585
LAST CHG. LTR.		SHEET 2 OF 2

PART NUMBERS (Continued)

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-9563-075 specifies a 1/4-28 UNF, Grade 5 Hex Capscrew 3/4" long.

ENGINEERING NOTES:

(1) Material: Grade 5 bolt material per SAE Standard J429.
(2) Thread length is two diameters plus 0.25, per SAE J105.

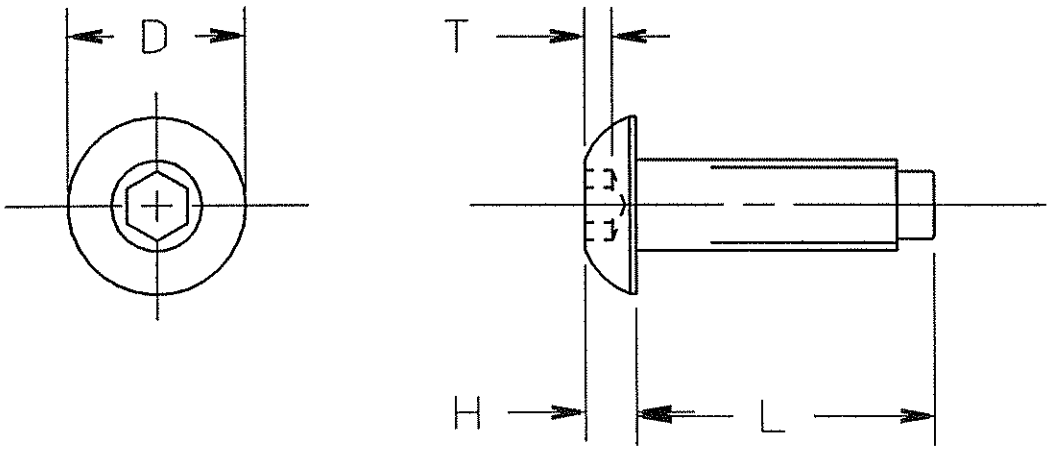
CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-16-70		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	RWG	TITLE	ITEM NUMBER
APPRV	RWG	SCREW-CAP, BUTTON HEAD HEX SOCKET, P & O	23-09586
DATE	03/25/71	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	HEX SOCKET NOM	"T" SOCKET DEPTH	"D" HEAD DIA	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
10 - 24 UNC	1/8	.070	.361	.101	23-12143-L
1/4 - 20 UNC 28 UNF	5/32	.087	.437	.132	23-09586-L
5/16 - 18 UNC 24 UNF	3/16	.105	.547	.166	23-09588-L 23-09589-L
3/8 - 16 UNC 24 UNF	7/32	.122	.656	.199	23-09590-L
1/2 - 13 UNC 20 UNF	5/16	.175	.875	.265	23-09592-L 23-09593-L

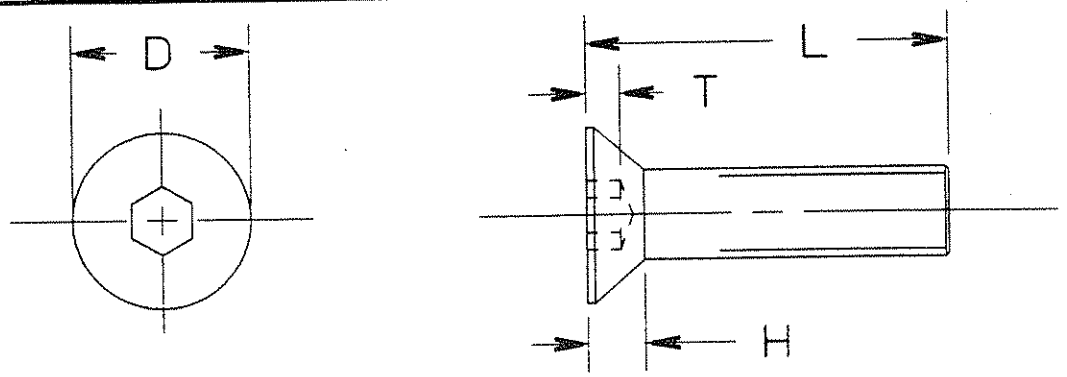
COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-09590-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:
MATERIAL: STEEL PER ASTM SECIFICATION A574
FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.3

CHG	JOB/RLSE NO	DATE	BY	REVISION
C	P*A078-77	11/02/88	ANF	REVISED AND REDRAWN
D	PA2026-97	04/22/93	ERK	ADDED 23-12143-L

DRAWN	RDF	TITLE	ITEM NUMBER
APPRV	PCK	SCREW-CAP, FLAT HEAD P & O	23-09602
DATE	06/02/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	HEX SOCKET NOM	"T" SOCKET DEPTH	"D" HEAD DIA	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC 28 UNF	5/32	.111	.480	.161	23-09602-L 23-09603
5/16 - 18 UNC 24 UNF	3/16	.135	.600	.198	23-09604 23-09605
3/8 - 16 UNC 24 UNF	7/32	.159	.720	.234	23-09606 23-09607
7/16 - 14 UNC 20 UNF	1/4	.159	.781	.234	23-09608 23-09609
1/2 - 13 UNC 20 UNF	5/16	.172	.872	.251	23-09610 23-09611
9/16 - 12 UNC 18 UNF	5/16	.220	.993	.288	23-09613
5/8 - 11 UNC 18 UNF	3/8	.220	1.112	.324	23-09614 23-09615
3/4 - 10 UNC 16 UNF	3/8	.220	1.355	.396	23-09616 23-09617
7/8 - 9 UNC 14 UNF	9/16	.248	1.604	.468	23-09618 23-09619
1 - 8 UNC 14 UNF	5/8	.297	1.841	.540	23-09620 23-09621

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-09606-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

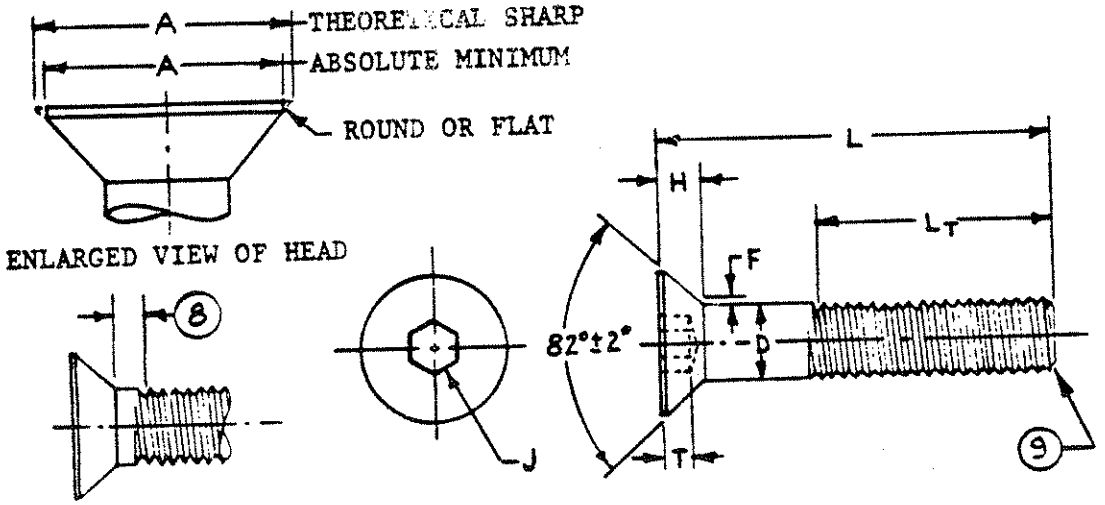
ENGINEERING NOTES:
MATERIAL: STEEL PER ASTM SPECIFICATION A574
FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

DIMENSIONS PER ANSI B18.3 ABOVE DIMENSIONS FOR REFERENCE ONLY.

CHG	JOB/RLSE NO	DATE	BY	REVISION
G	357387-94	06/02/89	RDF	REDRAWN, 23-09620 ADDED

PRINT ISSUED	TITLE	NO
6-8-71	CAP SCREW [illegible] HEAD HEX SOC[illegible], GR. 8	23-9602 thru 23-9629
LAST CHG LTR C		SHEET 1 OF 3

SKETCH



PART NUMBERS

THREAD	FREIGHTLINER PART NUMBER*
1/4 -20 UNC 1/4 -28 UNF	23-9602 23-9603
5/16-18 UNC 5/16-24 UNF	23-9604 23-9605
3/8 -16 UNC 3/8 -24 UNF	23-9606 23-9607
7/16-14 UNC 7/16-20 UNF	23-9608 23-9609
1/2 -13 UNC 1/2 -20 UNF	23-9610 23-9611
9/16-12 UNC 9/16-18 UNF	23-9612 23-9613
5/8 -11 UNC 5/8 -18 UNF	23-9614 23-9615

THREAD	FREIGHTLINER PART NUMBER*
3/4-10 UNC 3/4-16 UNF	23-9616 23-9617
7/8- 9 UNC 7/8-14 UNF	23-9618 23-9619
1 - 8 UNC 1 -14 UNS	23-9620 23-9621
1-1/8- 7 UNC 1-1/8-12 UNF	23-9622 23-9623
1-1/4- 7 UNC 1-1/4-12 UNF	23-9624 23-9625
1-3/8- 6 UNC 1-3/8-12 UNF	23-9626 23-9627
1-1/2- 6 UNC 1-1/2-12 UNF	23-9628 23-9629

*Add a three-digit dash number to express length in one-hundredths of an inch: thus for a 1/2-20 UNF Cap Screw 2-3/4" long, write 23-9611-275.

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		1-28-71		See Sht. 3	

Portland FREIGHTLINER CORPORATION Oregon 97208

B	HJR	1-29-71
C	HJR	5-25-71

Redraw: Extend to 9629
Revise: Add Data pp. 2&3

PRINT ISSUED	TITLE	NO.
6/8/7'	CAP SCREW, FLAT HEAD HEX SOCKET, GR. 8	23-9602 thru 23-9629
LAST CHG LTR C		SHEET 2 OF 3

PART NUMBERS (Cont.)

NOM. SIZE	D BODY DIAMETER MAX.	D BODY DIAMETER MIN.	A HEAD DIAMETER SHARP MAX.	A HEAD DIAMETER ABS MIN.	H HEAD HEIGHT REF.	H HEAD HEIGHT FLUSH TOL.	J HEX SOCKET NOM.	T ENGAGEMENT MIN.	F FILLET MAX.	BASIC THREAD LENGTH
1/4	0.2500	0.2435	0.531	0.480	0.161	0.016	5/32	0.111	0.015	1.000
5/16	0.3125	0.3053	0.656	0.600	0.198	0.017	3/16	0.135	0.015	1.125
3/8	0.3750	0.3678	0.781	0.720	0.234	0.018	7/32	0.159	0.015	1.250
7/16	0.4375	0.4294	0.844	0.781	0.234	0.018	1/4	0.159	0.015	1.375
1/2	0.5000	0.4919	0.937	0.872	0.251	0.018	5/16	0.172	0.015	1.500
5/8	0.6250	0.6163	1.188	1.112	0.324	0.022	3/8	0.220	0.015	1.750
3/4	0.7500	0.7406	1.438	1.355	0.396	0.024	3/8	0.220	0.015	2.000
7/8	0.8750	0.8647	1.688	1.604	0.468	0.025	9/16	0.248	0.015	2.25
1	1.0000	0.9886	1.938	1.841	0.540	0.028	5/8	0.297	0.015	2.50
1-1/8	1.1250	1.1086	2.188	2.079	0.611	0.031	3/4	0.325	0.031	2.82
1-1/4	1.2500	1.2336	2.438	2.316	0.683	0.035	7/8	0.358	0.031	3.12
1-3/8	1.3750	1.3568	2.688	2.553	0.755	0.038	7/8	0.402	0.031	3.44
1-1/2	1.5000	1.4818	2.938	2.791	0.827	0.042	1	0.435	0.031	3.75
SEE NOTES	1		2		3	4			10	8

ENGINEERING NOTES

1. Body: The term body refers to the unthreaded cylindrical portion of the shank.

2. Head Diameters: The maximum sharp values under Column A are theoretical values only, as it is not practical to make the edges of the head sharp. The maximum sharp value represents the exact diameter of a hole countersunk to exactly 82°.

3. Head Height: The tabulated values for head height are given for reference only and are calculated to the maximum formulation.

4. Flushness Tolerance: The flushness tolerance is the distance the top surface of a screw having the minimum head size will be below the flush condition in a hole countersunk exactly 82° to the maximum sharp dimension listed in Column A.

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		1-28-71		See Sht. 3	

Portland FREIGHTLINER CORPORATION Oregon 97208

C

23-9629

C | (See Sht. 1) Revise: Add data 7/8 Rad | 5-25-71 | HJR

23-9602 thru 23-9629 3 of 3

PRINT ISSUED	TITLE	PART NO.
6/8/71	CAPSCREW, FLAT HEAD, HEX SOCKET GR.8	23-9602 THRU 9629
LAST CHG. LTR. C		SHEET 3 OF 3

(5) Length. The length of the screw shall be measured on a line parallel to the axis from the plane of the top of the head to the plane of the flat of the point.

(6) Standard Lengths. The standard length increments for socket flat head cap screws shall be as tabulated below.

Nominal Screw Length	Standard Length Increment
1/8 thru 1/4	1/16
1/4 thru 1	1/8
1 thru 3-1/2	1/4
3-1/2 thru 6	1/2

(7) Length Tolerances. The allowable tolerance on length shall be:

Nominal Screw Length	Tolerance on Length
Up to 1, incl.	±0.016
Over 1 to 2, incl.	+0.031 - 0.016
Over 2 to 6, incl.	±0.031
Over 6	±0.062

(8) Thread Length. The length of the thread shall be measured from the extreme point to the last complete (full form) thread. The minimum complete thread length on the product shall conform to the basic thread length specified.

The maximum complete thread length shall be the basic thread length plus the basic screw diameter. On screws too short to accommodate the minimum thread length, the complete threads shall extend to within 2 threads of the intersection of the conical portion of the head with the basic screw diameter.

(9) Screw Point Chamfer. The point shall be flat and chamfered. The flat shall be normal to the axis of the screw. The chamfer shall extend slightly below the root of the thread and the edge between the flat and chamfer may be slightly rounded. The included angle of the point should be approximately 90 deg. Chamfering of screw sizes up to and including size 8 shall be optional.

(10) Fillet. A fillet between the conical bearing surface of the head and the shank (body) of the screw is allowable above the maximum tabulated value for D within limits listed for F.

(11) Bearing Surface. The axis of the conical bearing surface shall be parallel to the axis of the body within 1/2 deg.

(12) Concentricity. Concentricity of the thread with the body shall be within 0.005 in. per inch of body length (unthreaded portion) total indicator reading, taken directly under the head when the screw is held by the full threads closest to the head of the screw, and shall not exceed 0.025 in.

(13) Threads. Threads shall be Unified standard Class 3A in both UNC and UNF series in accordance with ASA B1.1.

(14) Material. GR. 8

Steel, high grade alloy, hardened by quenching in oil from the hardening temperature and tempered to a Rockwell "C" hardness of 36-45 at the surface for diameters of cap screws to and including 1/2 in. and Rockwell "C" hardness of 36-43 for diameters of cap screws over 1/2 in.

(15) Ultimate Tensile Load. Standard stock production sizes, in both UNC and UNF threads must withstand without failure the static tensile load values listed in the table when tested with a suitable fixture conforming to the 82 deg head.

Nominal Screw Size	Tensile Test Load lb	Nominal Screw Size	Tensile Test Load lb
No. 0	265	7/16	15,900
1	390	1/2	21,200
2	555	5/8	33,800
3	725	3/4	50,000
4	900	7/8	69,000
5	1,185	1	91,000
6	1,350	1-1/8	106,000
8	2,085	1-1/4	135,000
10	2,610	1-3/8	160,000
1/4	4,750	1-1/2	195,000
5/16	7,800		
3/8	11,600		

PRESENT NUMBER	WAS NUMBER*	
	UNC	UNF
23-9602	48-00020-001	
23-9603		48-00019-001
23-9604	48-00020-002	
23-9605		48-00019-002
23-9606	48-00020-003	
23-9607		48-00019-003
23-9608	48-00020-004	
23-9609		48-00019-004
23-9610	48-00020-005	
23-9611		48-00019-005
23-9612	—	
23-9613		—
23-9614	48-00020-006	
23-9615		48-00019-006
23-9616	48-00020-007	
23-9617		48-00019-007

*Note that 48-series numbers did not contain length information.

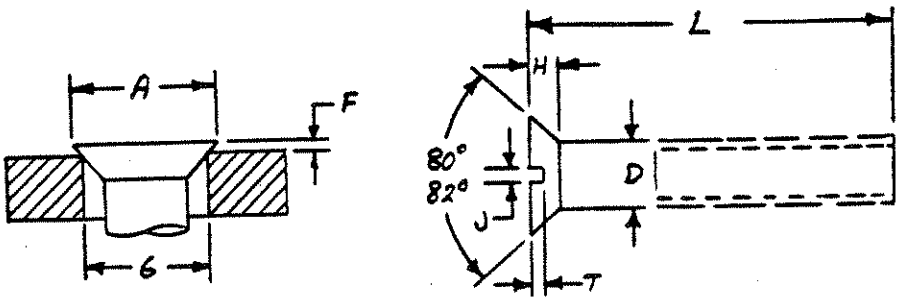
CHG	BY	DATE	WAS

General Use Part

23-9655

PRINT ISSUED	TITLE	PART NO
6/22/71	CAP SCREW, FLAT HEAD SLOTTED, GR. 5	23-9632 thru 23-9655
LAST CHG LTR: A		SHEET OF

SKETCH



PART NUMBERS

NOM. SIZE	D MAX	D MIN	A MAX	G	H AVER.	J MAX	J MIN	T MAX	T MIN	F MAX	FREIGHTLINER PART NUMBER* UNC	UNF
1/4	0.250	0.245	0.500	0.4245	0.140	0.075	0.064	0.068	0.045	0.0452	23-9632	23-9633
5/16	0.3125	0.307	0.625	0.5376	0.177	0.084	0.072	0.086	0.057	0.0523	-9634	-9635
3/8	0.375	0.369	0.750	0.6507	0.210	0.094	0.081	0.103	0.068	0.0594	-9636	-9637
7/16	0.4375	0.431	0.8125	0.7229	0.210	0.094	0.081	0.103	0.068	0.0649	-9638	-9639
1/2	0.500	0.493	0.875	0.7560	0.210	0.106	0.091	0.103	0.068	0.0705	-9640	-9641
9/16	0.5625	0.555	1.000	0.8691	0.244	0.118	0.102	0.120	0.080	0.0775	-9642	-9643
5/8	0.625	0.617	1.125	0.9822	0.281	0.133	0.116	0.137	0.091	0.0846	-9644	-9645
3/4	0.750	0.742	1.375	1.2085	0.352	0.149	0.131	0.171	0.115	0.0987	-9646	-9647
7/8	0.875	0.866	1.625	1.4347	0.423	0.167	0.147	0.206	0.138	0.1128	-9648	-9649
1	1.000	0.990	1.875	1.6610	0.494	0.188	0.166	0.240	0.162	0.1270	-9650	-9651
1-1/8	1.125	1.114	2.062	1.8262	0.529	0.196	0.178	0.257	0.173	0.1401	-9652	-9653
1-1/4	1.250	1.239	2.312	2.0525	0.600	0.211	0.193	0.291	0.197	0.1542	-9654	-9655

*To complete part number, add a three-digit dash number to express length in hundredths of an inch. Thus, for a 1/2-20 UNF Flat Head Cap Screw 2-1/4 inches long, write 23-9641-225.

ENGINEERING NOTES

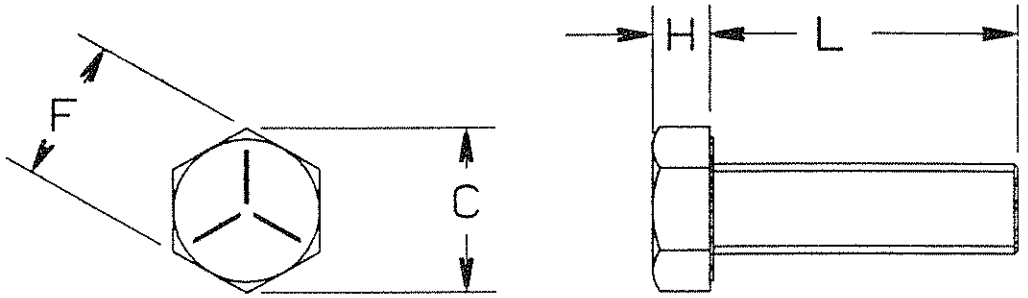
(1) Material: Grade 5 Bolt Material

CHG	BY	DATE	
A	MR	6-1-71	Length note added

COMPILED	RWG:	DATE DRAWN		MATERIAL	
APPROVED		3-19-71		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	HJR	TITLE	ITEM NUMBER
APPRV	HJR	SCREW-CAP, HEX HEAD, GR 5 FULLY THREADED, P&O	23-09662
DATE	03/22/71	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC 28 UNF	7/16	.505	.163	23-09662-L 23-09663
5/16 - 18 UNC 24 UNF	1/2	.577	.211	23-09664
3/8 - 16 UNC 24 UNF	9/16	.650	.243	23-09666
7/16 - 14 UNC 20 UNF	5/8	.722	.291	
1/2 - 13 UNC 20 UNF	3/4	.866	.323	23-09670 23-09671
9/16 - 12 UNC 18 UNF	13/16	.938	.371	23-09673
5/8 - 11 UNC 18 UNF	15/16	1.083	.403	23-09674
3/4 - 10 UNC 16 UNF	1,1/8	1.299	.483	23-09676

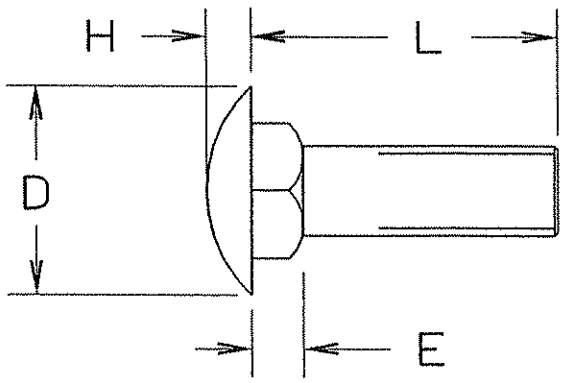
COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-09666-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

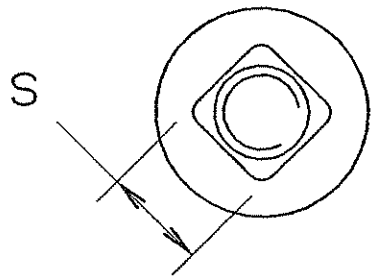
ENGINEERING NOTES:
MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429
FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041
THREAD FORM TO EXTEND TO WITHIN TWO PITCHES OF BEARING SURFACE OF HEAD, OR AS CLOSE AS PRACTICABLE.

DIMENSIONS PER ANSI B18.2.1. ABOVE DIMENSIONS FOR REFERENCE ONLY.

CHG	JOB/RLSE NO	DATE	BY	REVISION
B	P*A078-80	11/07/88	ANF	REVISED AND REDRAWN
C	PA2006-46	05/12/89	RDF	REVISED TITLE

DRAWN	RWG	TITLE	ITEM NUMBER
APPRV	RWG	BOLT-ROUND HEAD, SQUARE NECK	23-09686
DATE	03/17/71	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1





THREAD SIZE	"S" NECK SIZE	"E" NECK ENGAGE'T	"D" HEAD DIA	"H" HEAD HEIGHT	MAT'L & GRADE	FREIGHTLINER PART NUMBER
10 - 24	.199	.125	7/16	3/32	1	23-09686-L
1/4 - 20	.260	.156	9/16	1/8	2	23-09687-L
5/16 - 18	.324	.187	11/16	5/32	2	23-09688-L
3/8 - 16	.388	.219	13/16	3/16	2	23-09689-L
7/16 - 14	.452	.250	15/16	7/32	2	
1/2 - 13	.515	.281	1-1/16	1/4	2	23-09691-L
5/8 - 11	.642	.344	1-11/16	5/16	2	23-12365-L

COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-09689-300 IS A 3/8-16 ROUND HEAD BOLT 3 INCHES LONG

ENGINEERING NOTES:

MATERIAL: (1) STEEL GRADE 2 PER SAE SPECIFICATION J429
(2) STEEL GRADE 5 PER SAE SPECIFICATION J429

FINISH: CADMIUM PLATE PER FREIGHTLINER SPEC 49-00012-130, ALTERNATE ZINC PLATE PER FREIGHTLINER SPEC 49-00006-403

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	P*A078-80	11/07/88	ANF	REVISED AND REDRAWN
B	P4637M-01	10/19/95	ERK	REVISED 23-09686 FROM GR 5 TO GR 2,ADD ALT. ZN PLT
C	PA2157-H9	05/06/96	DAJ	ADDED 23-12365

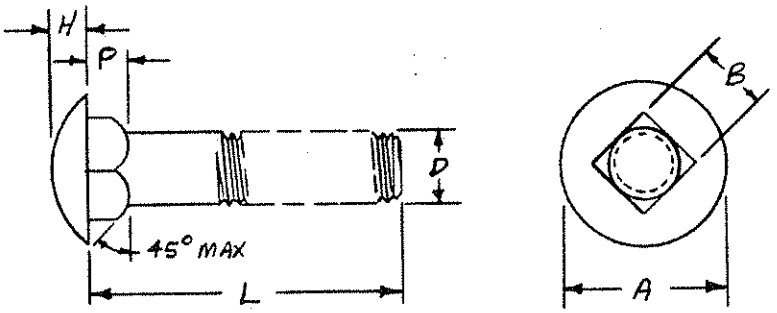
P05375 DA JACKSON 05/2

23-9686 Thru 23-9691

General Use Part

PRINT ISSUED	TITLE	PART NO.
3/29/71	CARRIAGE BOLT ROUND HEAD	23-9686 Thru-9691
LAST CHG. LTR.		SHEET 1 OF 1

SKETCH



PART NUMBERS

D	BODY DIA.	A	H	P MIN	P MAX	B MIN	B MAX	MANUFACTURER'S NUMBER	FREIGHTLINER PART * NUMBER
No. 10-24	0.199	7/16	3/32	0.094	0.125	0.185	0.199		23-9686
1/4-20	0.260	9/16	1/8	0.125	0.156	0.245	0.260		23-9687
5/16-18	0.324	11/16	5/32	0.156	0.187	0.307	0.324		23-9688
3/8-16	0.388	13/16	3/16	0.188	0.219	0.368	0.388		23-9689
7/16-14	0.452	15/16	7/32	0.219	0.250	0.431	0.452		23-9690
1/2-13	0.515	1 1/16	1/4	0.250	0.281	0.492	0.515		23-9691

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDREDTHS OF AN INCH. EXAMPLE: 23-9687-075 SPECIFIES A 1/4-20 CARRIAGE BOLT 3/4" LONG.

ENGINEERING NOTES

(1) MATERIAL: STEEL, CD. PLATED

CHG	BY	DATE	WAS

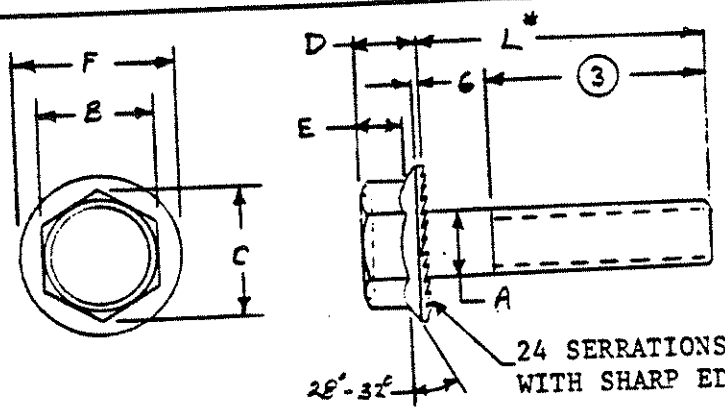
CHG	BY	DATE	WAS

COMPILED		DATE DRAWN		MATERIAL	
APPROVED		3-17-71		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

PR. N° ISSUED	TITLE	PART NO
3/29/71	SCREW, MACHINE, HEX SERRATED WASHER HEAD GR. 5	23-9730 thru 23-9751
LAST CHG LTR A		SHEET 1 OF 1

SKETCH



PART NUMBERS

NOMINAL SIZE AND THREADS PER INCH	A MAX.	B MAX.	C MIN.	D MAX.	E MIN.	F MAX.	G MAX.		FREIGHTLINER PART NUMBER *
4 -40 UNC	.1120	.187	.202	.097	.065	.266	.010		23-9730
4 -48 UNF	.1120	.187	.202	.097	.065	.266	.010		-9731
5 -40 UNC	.1250	.187	.202	.110	.075	.266	.012		-9732
5 -44 UNF	.1250	.187	.202	.110	.075	.266	.012		-9733
6 -32 UNC	.1380	.187	.202	.117	.082	.266	.012		-9734
6 -40 UNF	.1380	.187	.202	.117	.082	.266	.012		-9735
8 -32 UNC	.1640	.250	.272	.143	.102	.355	.013		-9736
8 -36 UNF	.1640	.250	.272	.143	.102	.355	.013		-9737
10 -24 UNC	.1900	.312	.340	.164	.116	.441	.016		-9738
10 -32 UNF	.1900	.312	.340	.164	.116	.441	.016		-9739
12 -24 UNC	.2160	.312	.340	.186	.135	.441	.018		-9740
12 -28 UNF	.2160	.312	.340	.186	.315	.441	.018		-9741
1/4 -20 UNC	.2500	.375	.409	.215	.156	.531	.021		-9742
1/4 -28 UNF	.2500	.375	.409	.215	.156	.531	.021		-9743
5/16 -18 UNC	.3125	.500	.545	.274	.203	.706	.023		-9744
5/16 -24 UNF	.3125	.500	.545	.274	.203	.706	.023		-9745
3/8 -16 UNC	.3750	.562	.614	.313	.234	.793	.025		-9746
3/8 -24 UNF	.3750	.562	.614	.313	.234	.793	.025		-9747
7/16 -14 UNC	.4375	.625	.668	.371	.282	.884	.027		-9748
7/16 -20 UNF	.4375	.625	.668	.371	.282	.884	.027		-9749
1/2 -13 UNC	.5000	.750	.804	.413	.312	1.058	.030		-9750
1/2 -20 UNF	.5000	.750	.804	.413	.312	1.058	.030		-9751

*Complete part number by adding a three-digit dash number to indicate length in hundredths of an inch. Example: 23-9731-075 specifies a No. 4-48 UNF Grade 5 Machine Screw, 3/4" Long.

ENGINEERING NOTES

1. Material: Steel, Grade 5 Bolt Material
2. Finish: Cadmium or Zinc Plated
3. Length of Thread: On machine screws 2" long and shorter, full formed threads shall extend to within two threads of the bearing surface of the head or closer if practicable. Screws over 2" long shall have a minimum length of 1.75" of full form thread.

CHG	BY	DATE	WAS
A	HJR	10-17-75	-975

JUD INV A0785

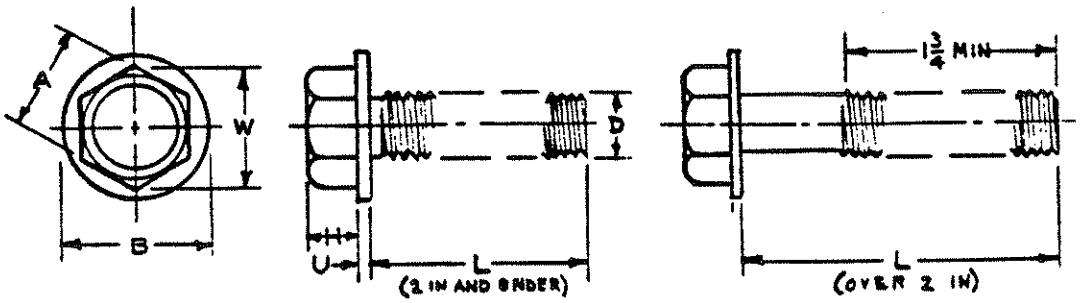
COMPILED	RWG	DATE DRAWN		MATERIAL	
APPROVED		3-23-71		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
4/30/71	SCREW, MACHINE HEXAGON WASHER HEAD, GR.5, GALV.	23-9762 thru 23-9779
LAST CHG LTR: A		SHEET 1 OF 1

SKETCH



PART NUMBERS

NOMINAL SIZE, THREADS PER INCH, SERIES DESIGNATION	FREIGHTLINER PART NUMBER *
2-56 UNC	23-9762
2-64 UNF	23-9763
4-40 UNC	23-9764
4-48 UNF	23-9765
6-32 UNC	23-9766
6-40 UNF	23-9767
8-32 UNC	23-9768
8-36 UNF	23-9769
10-24 UNC	23-9770
10-32 UNF	23-9771

NOMINAL SIZE, THREADS PER INCH SERIES DESIGNATION	FREIGHTLINER PART NUMBER *
12-24 UNC	23-9772
12-28 UNF	23-9773
1/4-20 UNC	23-9774
1/4-28 UNF	23-9775
5/16-18 UNC	23-9776
5/16-24 UNF	23-9777
3/8-16 UNC	23-9778
3/8-24 UNF	23-9779

* Complete part number by adding length in hundredths of an inch. Example: 23-9763-075 specifies a hex head machine screw 3/4" long.

ENGINEERING NOTES

1. Dimensions: (See Sketch)

NOM. SIZE	D DIAMETER OF SCREW	A WIDTH ACROSS FLATS		W WIDTH ACROSS CORNERS	H HEAD HEIGHT		B WASHER DIAMETER		U WASHER THICKNESS	
	BASIC	MAX	MIN	MIN	MAX	MIN	MAX	MIN	MAX	MIN
2	0.0860	0.125	0.120	0.134	0.050	0.040	0.166	0.154	0.016	0.010
4	0.1120	0.187	0.181	0.202	0.060	0.049	0.243	0.225	0.019	0.011
6	0.1380	0.250	0.244	0.272	0.093	0.080	0.328	0.302	0.025	0.015
8	0.1640	0.250	0.244	0.272	0.110	0.096	0.348	0.322	0.031	0.019
10	0.1900	0.312	0.305	0.340	0.120	0.105	0.414	0.384	0.031	0.019
12	0.2160	0.312	0.305	0.340	0.155	0.139	0.432	0.398	0.039	0.022
1/4	0.2500	0.375	0.367	0.409	0.190	0.172	0.520	0.480	0.050	0.030
5/16	0.3125	0.500	0.489	0.545	0.230	0.208	0.676	0.624	0.055	0.035
3/8	0.3750	0.462	0.551	0.614	0.295	0.270	0.780	0.720	0.063	0.037

(2) Material: Grade 5 Bolt Material

3. Finish: Electro galvanize or cadmium plate.

COMPILED	EJR	DATE DRAWN		MATERIAL	
APPROVED		1-8-71		(2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

83

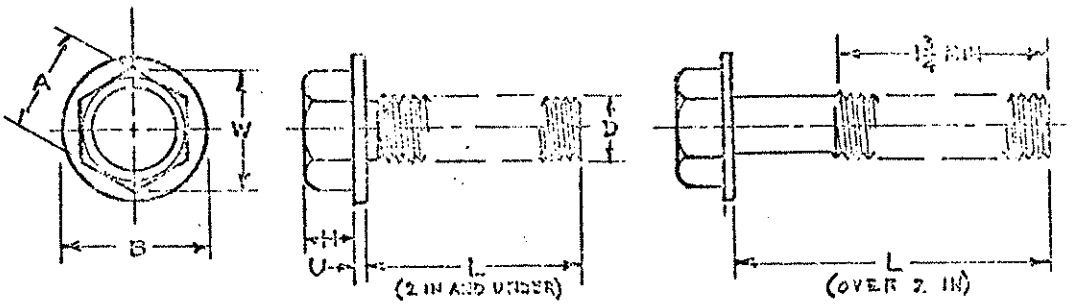
23-9879

General Use Part

PRINT ISSUED	TITLE	PART NO.
3/29/71	SCREW, MACHINE HEXAGON WASHER HEAD, GR.8	23-9862 thru 23-9879
LAST CHG LTR		SHEET 1 OF 1

WAS | DATE | BY | CHG

SKETCH



PART NUMBERS

NOMINAL SIZE, THREADS PER INCH, SERIES DESIGNATION	FREIGHTLINER PART NUMBER
2-56 UNC	23-9862
2-64 UNF	23-9863
4-40 UNC	23-9864
4-48 UNF	23-9865
6-32 UNC	23-9866
6-40 UNF	23-9867
8-32 UNC	23-9868
8-36 UNF	23-9869
10-24 UNC	23-9870
10-32 UNF	23-9871

NOMINAL SIZE, THREADS PER INCH SERIES DESIGNATION	FREIGHTLINER PART NUMBER
12-24 UNC	23-9872
12-28 UNF	23-9873
1/4-20 UNC	23-9874
1/4-28 UNF	*23-9875
5/16-18 UNC	23-9876
5/16-24 UNF	*23-9877
3/8-16 UNC	23-9878
3/8-24 UNF	*23-9879

*23-9875 was 48-00031-001
23-9877 was 48-00031-002
23-9879 was 48-00031-003

ENGINEERING NOTES

1. Dimensions: (See Sketch)

NOM. SIZE	D DIAMETER OF SCREW	A WIDTH ACROSS FLATS		W WIDTH ACROSS CORNERS	H HEAD HEIGHT		B WASHER DIAMETER		U WASHER THICKNESS	
	BASIC	MAX	MIN	MIN	MAX	MIN	MAX	MIN	MAX	MIN
2	0.0860	0.125	0.120	0.134	0.050	0.040	0.166	0.154	0.016	0.010
4	0.1120	0.187	0.181	0.202	0.060	0.049	0.243	0.225	0.019	0.011
6	0.1380	0.250	0.244	0.272	0.093	0.080	0.328	0.302	0.025	0.015
8	0.1640	0.250	0.244	0.272	0.110	0.096	0.348	0.322	0.031	0.019
10	0.1900	0.312	0.305	0.340	0.120	0.105	0.414	0.384	0.031	0.019
12	0.2160	0.312	0.305	0.340	0.155	0.139	0.432	0.398	0.039	0.022
1/4	0.2500	0.375	0.367	0.409	0.190	0.172	0.520	0.480	0.050	0.030
5/16	0.3125	0.500	0.489	0.545	0.230	0.208	0.676	0.624	0.055	0.035
3/8	0.3750	0.462	0.551	0.614	0.295	0.270	0.780	0.720	0.063	0.037

(2) Material: Grade 8 Bolt Material

COMPILED	NJR	DATE DRAWN		MATERIAL	
APPROVED		1-8-71		(2)	

Portland FREIGHTLINER CORPORATION Oregon 97208

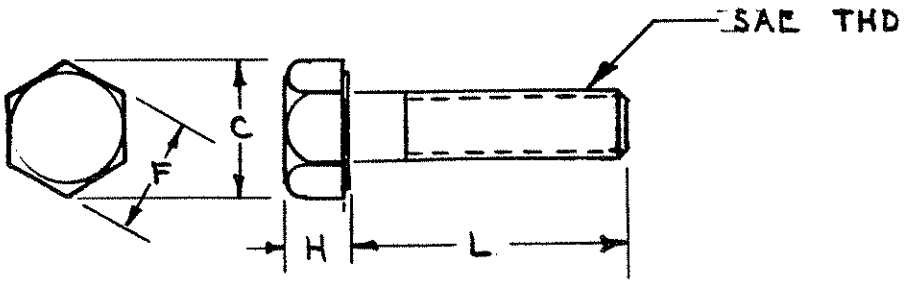
E-183

23-9981

General Use Part

PRINT ISSUED		TITLE	PART NO.
		CAPSCREW, HEX HEAD STAINLESS STEEL	23-9981
LAST CHG. LTR.	A		SHEET 1 OF 1

SKETCH



PART NUMBERS

THREAD	F BASIC	G MAX.	H MAX.		FREIGHTLINER PART NUMBER *
1/4-20 UNC	7/16	.505	.188		23-9981-L

*To complete part number add 3-digit dash number expressing length, L, in 1/100's of an inch. Thus for a 1/4-20 UNCX 1-1/4" capscrew, write 23-9981-125.

ENGINEERING NOTES

(1) Material: Stainless Steel, Type 302 or 304.

2. Thread form, thread length, and other dimensional characteristics of the capscrew shall meet pertinent provisions of SAE Standard J105.

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS	JOB
—	—	—	Job #84720	0280C
A	DDM	8-15-84	Type 316	

COMPILED	HJR	DATE DRAWN		MATERIAL	MASTER NUMBER	
APPROVED	Rollins	1-26-72		(1)	01010	00001

ns

Portland FREIGHTLINER CORPORATION Oregon 97208

A

E-183

General Use Part

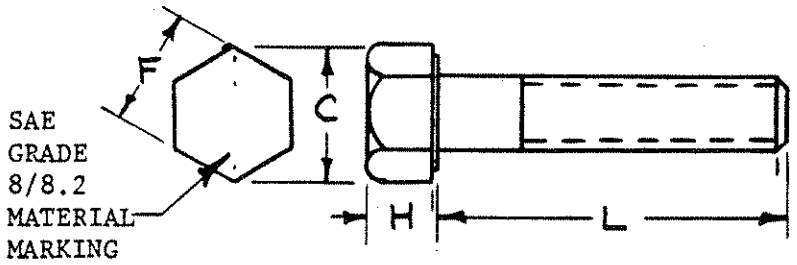
23-10090

PRINT ISSUED		TITLE	PART NO
		CAPSCREW, HEX (FINISHED HEX BOLT) 5/8-18 UNF, GRADE 8/8.2, SPECIAL LENGTH	23-10090
LAST CHG. LTR	A		SHEET 1 OF 1

CHG	BY	DATE	WAS
			A

CHG	BY	DATE	WAS
—	—	—	Job #95350
A	FHF	9-30-85	8 to 8/8.2 Add Note 4
			1709D

SKETCH



PART NUMBERS

T THREAD	L LENGTH		FREIGHTLINER PART NUMBER
5/8-18 UNF	11.00		23-10090-000

ENGINEERING NOTES

① Material: Grade 8/8.2 bolt material per SAE Std. J429.

2. Must meet all applicable provisions of SAE Std. J105, hex bolts.

3. Finish: Plain.

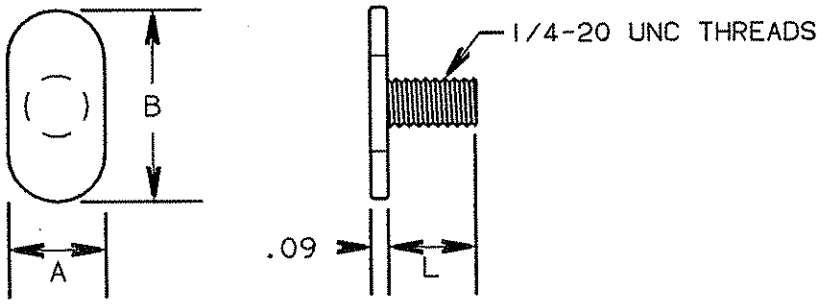
4. Grade identification: Head markings for Grade 8/8.2

COMPILED	HJR	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBERS
APPROVED	Rollins	6-27-72	EA	①	01010 000D1

Portland FREIGHTLINER CORPORATION Oregon 97208

A

DRAWN	HJR	TITLE	ITEM NUMBER
APPRV	CRS	BOLT - TEE	23-10360
DATE	08/13/74	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



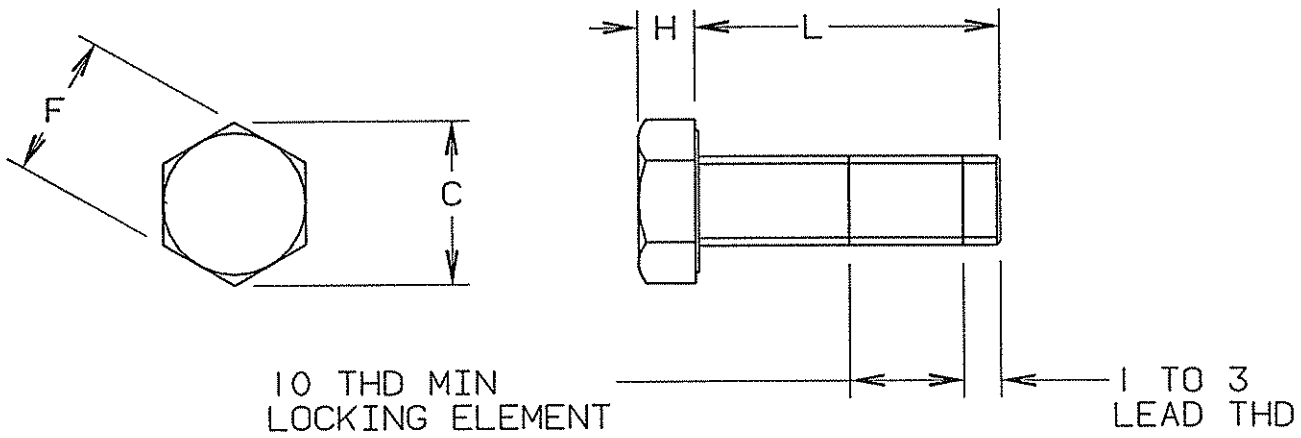
WIDTH (A)	HEIGHTH (B)	LENGTH (L)	FREIGHTLINER PART NUMBER
.44	.62	.50 .75	23-10360-050 23-10360-075
.50	1.00	.50 .62	23-10360-950 23-10360-962

SPECIFICATIONS:

1. MATERIAL: SAE GRADE 2 OR BETTER BOLT MATERIAL.
2. FINISH: CADMIUM OR ZINC PLATED.

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	P6642H-01	06/23/92	ERK	REVISED & REDRAWN; CHARTED -950 & -962.

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, HEX, GRADE 5 LOCKING	23-10432
DATE	12/10/90	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FINISH	FREIGHTLINER PART NUMBER
1/4 - 20 UNC 28 UNF	7/16	.505	.163	Z	23-10432-L 23-10433-L
5/16 - 18 UNC 24 UNF	1/2	.577	.211	Z	23-10434-L 23-10435-L
3/8 - 16 UNC 24 UNF	9/16	.650	.243	Z	23-10436-L 23-10437-L
1/2 -13 UNC	3/4	.866	.323	P	23-10440-L
5/8 -11 UNC	15/16	1.083	.403	P	23-10444-L

COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-10436-125 IS A 3/8-16 CAPSCREW 1.25 INCHES LONG.

ENGINEERING NOTES:

MATERIAL: STEEL, GRADE 5 PER SAE J429
LOCKING ELEMENT APPLIED MUST MEET REQUIREMENTS OF IFI 124
ALL DIMENSIONS ARE FOR REFERENCE ONLY. SEE ANSI B18.2.1 FOR DETAILS.

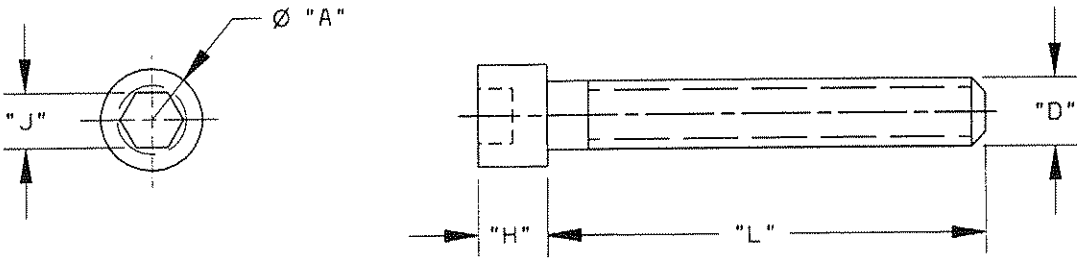
FINISH: Z=ZINC PLATE WITH YELLOW DICHROMATE PER FTL SPEC 49-00005-203.
P=PLAIN

E

CHG	JOB/RLSE NO	DATE	BY	REVISION
D	PX1917-27	12/10/90	PCK	REDRAWN. "C" WAS "P" FOR 23-10436 AND 23-10437
E	PA2042-59	11/03/95	ERK	REV FINISH; ZINC IPO CAD

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	CAPSCREW-SOCKET HEAD HEX, ASTM A574	23-10562	
DATE	10/22/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. F
CATIA ORIGINAL				

F



E

NOM SIZE	D BASIC	A MAX	H MAX	J NOM	FREIGHTLINER PART NUMBER*
6-32 UNRC	.1380	.226	.138	.109	23-10566-L
10-24 UNRC	.1900	.312	.190	.156	23-10570-L
10-32 UNRF					23-10571-L
1/4-20 UNRC	.2500	.375	.250	.188	23-10572-L
5/16-18 UNRC	.3125	.469	.312	.250	23-10574-L
5/16-24 UNRF					23-10575-L
3/8-16 UNRC	.3750	.562	.375	.312	23-10576-L
3/8-24 UNRF					23-10577-L
7/16-20 UNRF	.4375	.656	.438	.375	23-10579-L
1/2-13 UNRC	.5000	.750	.500	.375	23-10580-L
1/2-20 UNRF					23-10581-L
5/8-11 UNRC	.6250	.938	.625	.500	23-10582-L
5/8-18 UNRF					23-10583-L

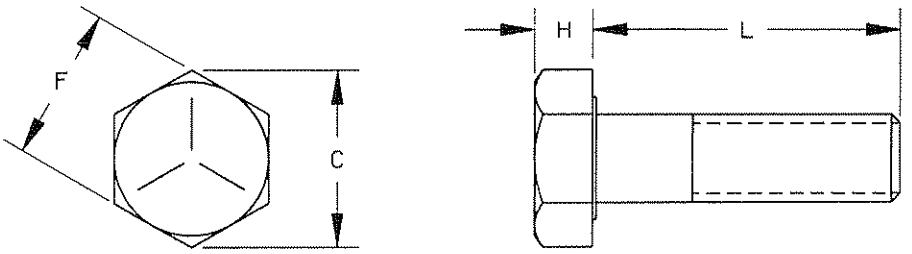
* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING LENGTHS IN 1/100THS OF AN INCH.

ENGINEERING NOTES:

1. MATERIAL: STEEL ALLOY, PROPERTIES MUST CONFORM TO ASTM A574
2. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPEC 49-00006-041

CHG	JOB NO	DATE	BY	REVISION
D	P07130-01	12/09/98	DAJ	REVISED AND REDRAWN IN CATIA.
E	PA2042-86	01/11/99	DAJ	10-32 UNRF WAS 10-24 UNRF.
F	PA2042-97	10/18/99	LFB	REVISED DIAGRAM TO SHOW D, A, H, L AND J CALLOUTS.

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX GR. 5, ZINC	23-10742	
DATE	09/03/97			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. K



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	DIMENSIONS			FREIGHTLINER PART NUMBER *
	F (BASIC)	C (MAX)	H (MAX)	
1/4 -20 UNC -28 UNF	7/16	.505	.163	23-10742-L 23-10743-L
5/16-18 UNC -24 UNF	1/2	.577	.211	23-10744-L 23-10745-L
3/8 -16 UNC -16 UNC -24 UNF	9/16	.650	.243	23-10746-L 23-10746-001(L=12.5) 23-10747-L
7/16-14 UNC -20 UNF	5/8	.722	.291	23-10748-L 23-10749-L
1/2 -13 UNC -13 UNC -13 UNC -20 UNF	3/4	.866	.323	23-10750-L 23-10750-001(L=13) 23-10750-002(L=11.5) 23-10751-L
9/16-12 UNC -18 UNF	13/16	.938	.371	23-10752-L 23-10753-L
5/8 -11 UNC -18 UNF	15/16	1.083	.403	23-10754-L 23-10755-L
3/4 -10 UNC -16 UNF	1 1/8	1.299	.483	23-10756-L 23-10757-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-10750-100 IS A 1/2-13 CAPSCREW 1 INCH LONG.

ENGINEERING NOTES:

1. MATERIAL: GRADE 5 BOLT MATERIAL PER SAE STANDARD J429.
2. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
3. FINISH: ZINC AND CLEAR PER FREIGHTLINER SPEC. 49-00005-403
4. BASIC THREAD LENGTH (REF):
   TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES).
   TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES).
5. THREAD FORM: UNC 2A

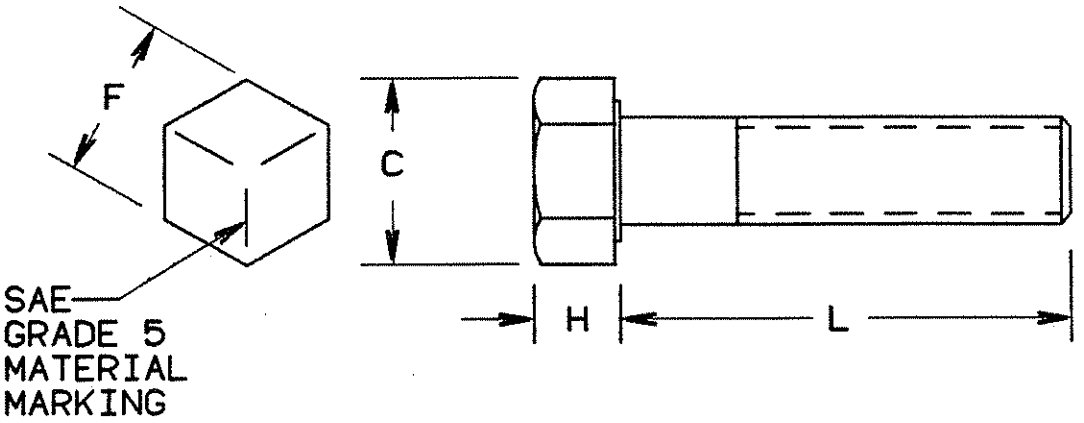
CHG	JOB NO	DATE	BY	REVISION
G	P03446-01	09/03/97	DAJ	REVISED AND REDRAWN IN CATIA. ADDED 23-10750-001.
H	PA2042-85	08/28/98	DAJ	REVISED THREAD DESIGNATION 23-10752.
J	PA2042-95	08/17/99	CGD	CORRECTED NOTE #3 ZINC AND CLEAR WAS ZINC AND WAX.
K	P10020-02	10/22/99	LFB	ADDED 23-10750-002.

ORIGINAL JOB NO.	TITLE	PART NO.
5328B	CAPSCREW HEX (FINISHED HEX BOLT) GRADE 5, ZINC PLATED AND WAXED	23-10742 THRU 23-10765
LAST CHG LTR E		SHEET 2 OF 2

THRU 23-1-765

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
C	5328B	FEF	01-12-84	REVISED & REDRAWN
D	1876D	FHF	07-08-85	SEE SHT 1 OF 2
E	8391D	RDS	05-29-87	REVISED TITLE

SKETCH



PART NUMBERS (FOR CAPSCREWS 10.000 INCHES AND LONGER)

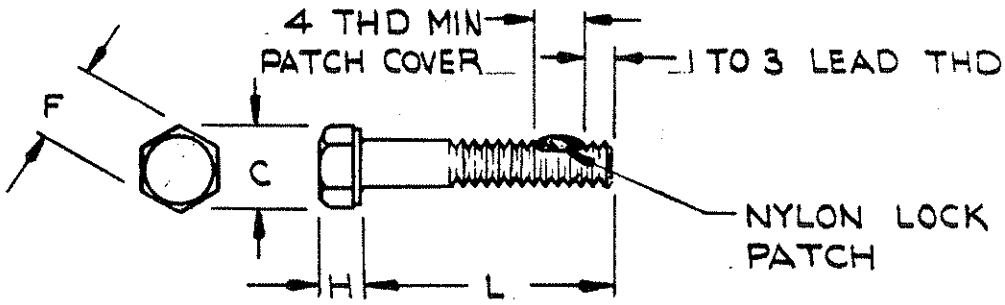
THREAD SIZE	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	L LENGTH (BASIC)		FREIGHTLINER PART NUMBER
3/8 UNC	9/16	.650	.243	12.500		23-10746-001
3/4 UNF	1 1/8	1.299	.438	10.500		23-10757-001

Use 23-09447-900
Gr. Dc 8

COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL	MATERIAL	
APPROVED	DJL	01-12-84			

23-10895

PRINT ISSUED	TITLE	PART NO
	CAP SCREW, HEX NYLON LOCK GRADE 8/8.2	23-10895
LAST CHG LTR: A		SHEET 1 OF 1



THREAD	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	MANUFACTURER'S NUMBER NYK		FREIGHTLINER PART NUMBER*
5/8-11 UNC	15/16	1.083	.403	P4GS1011 ▭ P		23-10895-L

▭ = 2 digits for length in 1/16ths of an inch.

* Complete part number by adding a three digit dash number expressing length, L, in hundredths of an inch.

ENGINEERING NOTES

1. Material: Steel, grade 8/8.2 bolt material per SAE J429.
2. Locking element consists of nylon patch applied externally to the regular thread.
3. Must conform to all applicable provisions of SAE Standard J105.
4. Finish: Plain
5. Grade identification: Head markings for Grade 8/8.2

CHG	BY	DATE	WAS	JOB NO.

CHG	BY	DATE	WAS	JOB NO.
—			NEW	D0680
A	FHF	9-30-85	8 to 8/8.2 Add	1709D
A			Note 5	

COMPILED	D. LeL.	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED	AQ	5-13-75	EA	(1)	01010 000D1

kh

Portland FREIGHTLINER CORPORATION Oregon 97208

M/F

E-183

23-10913

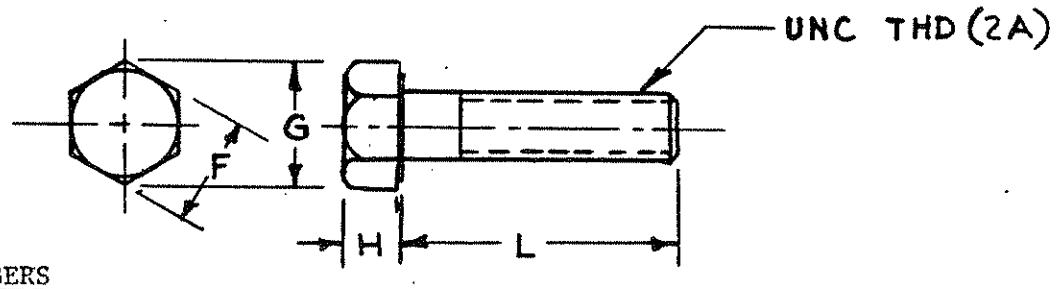
General Use Part

PRINT ISSUED		TITLE	PART NO.
		CAPSCREW, HEX HEAD STAINLESS STEEL	23-10913
LAST CHG. LTR.	C		SHEET 1 OF 1

CHG	BY	DATE	WAS	JOB NO

CHG	BY	DATE	WAS	JOB NO
—	—	—	—	A0795
A	DDM	8-15-84	Type 316	0280C
B	CGB	9-17-84	ASTM Group 1 or 2	J0254
C	PCK	6-14-88	DIMS/PART NO. HDR/325266+79 NOTES REVISED	

SKETCH



PART NUMBERS

THREAD UNC	F BASIC	G MAX.	H MAX.	FREIGHTLINER PART NUMBER*
5/16-18	1/2	.577	.211	23-10913-L
3/8-16	9/16	.650	.243	23-10914-L
1/2-13	3/4	.866	.323	23-10915-L

*To complete part number add 3-digit dash number expressing length, L, in 1/100's of an inch. Thus for a 3/8-16 UNC capscrew 1-1/4 long, write 23-10914-125.

ENGINEERING NOTES

1. Material: Stainless, steel, type 302 or ASTM F593 alloy Group 1, or 2.
2. Thread form, thread length, and other dimensional characteristics of the capscrew shall meet pertinent provisions of ANSI B18.2.1.
3. Dimensions shown are for reference only.

COMPILED	HJR	DATE DRAWN		MATERIAL	MASTER NUMBER	
APPROVED		12-22-75		1	01010	00001

Portland FREIGHTLINER CORPORATION Oregon 97208

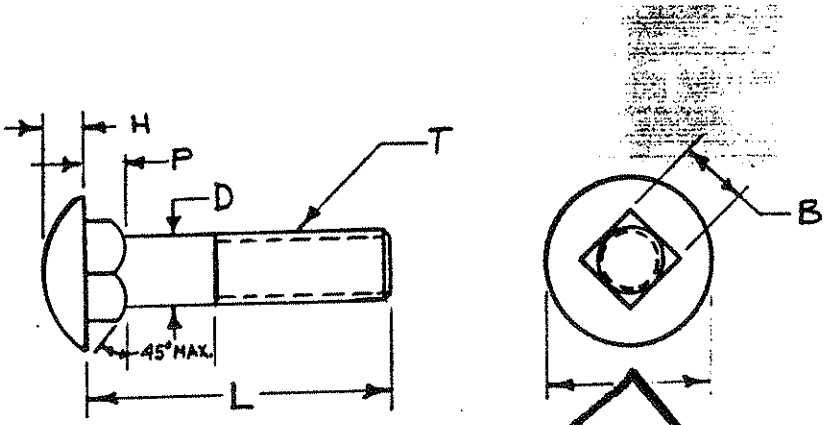
B A M/F

E-183

General Use Part

PRINT ISSUED	TITLE	PART NO.
	CARRIAGE BOLT ROUND HEAD, SQUARE NECK STAINLESS STEEL	23-10917
LAST CHG. LTR. —		SHEET 1 OF 1

SKETCH



PART NUMBERS

T THREAD UNC	BODY DIA.	A	H	P MIN.	P MAX.	MIN	FREIGHTLINER PART NUMBER*
1/4-20	0.260	9/16	1/8	0.125	0		23-10917-L

*Complete part number by add sh number to indicate length in hundredths of an inch. 5 specifies a 1/4-20 carriage bolt 3/4" long.

REMOVE & DESTROY

ENGINEERING NOTES

(1) Material: Stainless steel, type 316.

2 Finish: Plain

3 Unless otherwise noted, these bolts shall meet all pertinent provisions of SAE standard J481.

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	CRB	12-22-75		(1)	

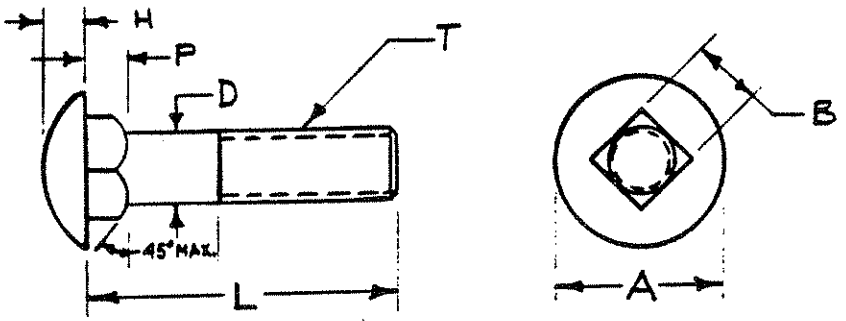
JOB NO | WAS | DATE | BY | HG

JOB NO A0705 | WAS | DATE | BY | HG

General Use Part

PRINT ISSUED	TITLE	PART NO
	CARRIAGE BOLT ROUND HEAD, SQUARE NECK STAINLESS STEEL	23-10917
LAST CHG LTR —		SHEET 1 OF 1

SKETCH



PART NUMBERS

T THREAD UNC	BODY DIA.	A	H	P MIN.	P MAX.	B MIN.	B MAX.		FREIGHTLINER PART NUMBER*
1/4-20	0.260	9/16	1/8	0.125	0.156	0.245	0.260		23-10917-L

*Complete part number by adding a three digit dash number to indicate length in hundredths of an inch. Example: 23-10917-075 specifies a 1/4-20 carriage bolt 3/4" long.

ENGINEERING NOTES

(1) Material: Stainless steel, type 316.

2 Finish: Plain

3 Unless otherwise noted, these bolts shall meet all pertinent provisions of SAE standard J481.

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		12-22-75		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

JOB NO	WAS	DATE	BY	CHG

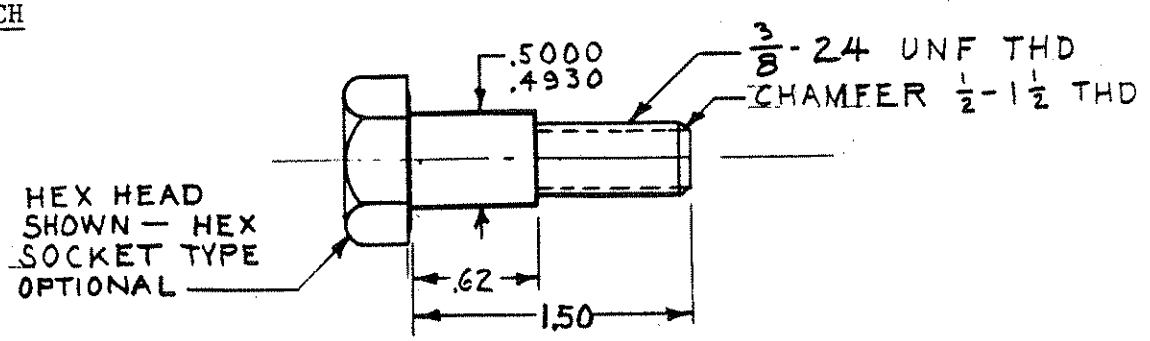
JOB NO	WAS	DATE	BY	CHG
A0705				

General Use Part

23-10999

ORIGINAL JOB NO.	TITLE	PART NO.
A0843	BOLT, SHOULDER GRADE 8/8.2	23-10999
LAST CHG LTR: A		SHEET 1 OF

SKETCH



PART NUMBERS

	FREIGHTLINER PART NUMBER
	23-10999-000

ENGINEERING NOTES

1. MATERIAL: Grade 8/8.2 Bolt Material, per SAE J429.
2. FINISH: Plain or blued
3. GRADE IDENTIFICATION: Head markings for Grade 8/8.2

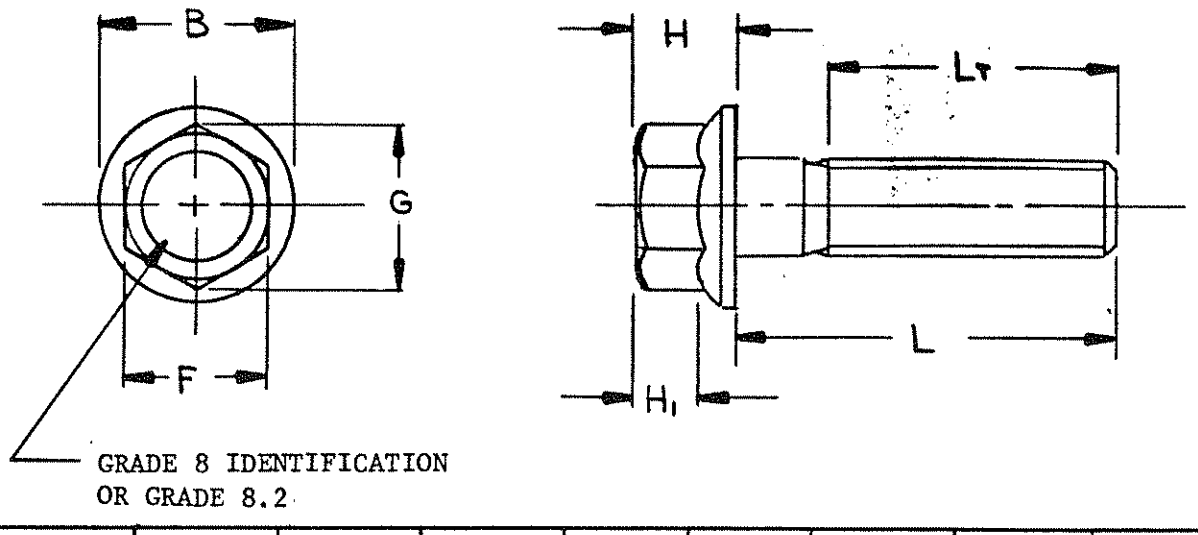
CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR
8 to 8/8.2 Add Note 3	9-30-85	FHF	1709D	A

COMPILED	HJR	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED		9-29-76	EA	(1)	01120 000D1

A M/F

ORIGINAL JOB NO.	TITLE	PART NO.
B0679	BOLT, FLANGED HEX HEAD, GRADE 8 (COARSE THREAD)	23-11003
LAST CHG LTR G		SHEET 1 OF 2



THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1 (MIN)	LT L≤6"	LT L>6"	FINISH (2)	PART NUMBER
1/4 -20	7/16	.505	.560	.280	.170	.75	1.00	P	23-11003- L
								C	23-11004-
5/16 - 18	1/2	.577	.680	.320	.210	.88	1.12	P	23-11005-
								C	23-11006-
3/8 - 16	9/16	.650	.810	.390	.250	1.00	1.25	P	23-11007-
								C	23-11008-
7/16 - 14	11/16	.722	.930	.460	.300	1.12	1.38	P	23-11009-
								C	23-11010-
1/2 - 13	3/4	.866	1.070	.510	.340	1.25	1.50	P	23-11011-
								C	23-11012-
9/16 - 12	NOT AVAILABLE							P	23-11013-
								C	23-11014-
5/8 - 11	15/16	1.083	1.330	.620	.420	1.50	1.75	P	23-11015-
								C	23-11016-
3/4 - 10	1-1/8	1.299	1.590	.730	.510	1.75	2.00	P	23-11017-
								C	23-11018-

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
E	1876D	FHF	7-12-85	Add Master No. Rev Title
F	4635D	FHF	1-20-86	23-11013 & 11014 to NA
G	P*A078-89	ANF	11/18/88	Dwg No was 23-11003/23-11038

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	64529	JK	7-5-77	ADDED GR. 8.2
B	64562	BK	7-28-77	ADDED NOTE 1 REF.
C	65655	DS	2-2-78	See Sheet 2
D	92892	SK	5/9/79	See sheet 2

COMPILED	R.D.W	DATE DRAWN		MATERIAL	MASTER NO.
APPROVED		12.16.76		(1)	01265 000D1

E-183A Litho in USA Portland

FREIGHTLINER CORPORATION Oregon 97208

M/F ED BC

ORIGINAL JOB NO.	TITLE	PART NO.
B0679	BOLT, FLANGED HEX HEAD, GRADE 8 (COARSE THREAD)	23-11003 thru 23-11018
(E) LAST CHG LTR F		SHEET 2 OF 2

Complete part number by adding a 3-digit dash number expressing the length "L" in hundredths of an inch, e.g., 23-11010-175 calls out ½ - 13 UNC 1.75" long.

NOTES:

(D) 1. Material: SAE J429 Grade 8 or 8.2

Alternate Material: R.B. & W. 10B30 steel.
Mechanical Properties to conform to SAE J429 for Grade 8.2 fasteners.

(E) 2. Finish: P = Zinc phosphate conversion coat and oil (dry to the touch) per 49-00006-041

C = Zinc plate per 49-00005-403 and wax

(E) 3. Thread: Unified coarse Class 2A.

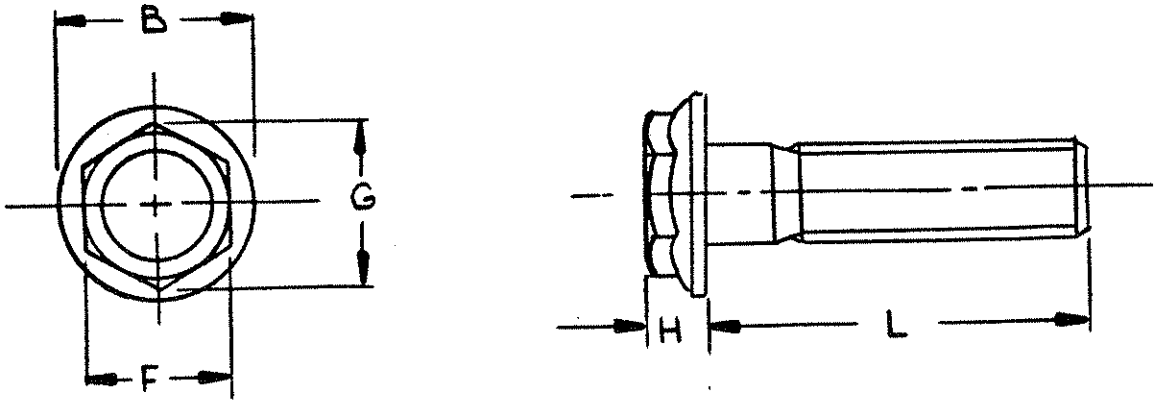
LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
E	1876D	FHF	7-21-85	See Sheet 1, Rev. Note 2 to inc. 49-00006 & 00005
F	4635D	FHF	1-20-86	See Sheet 1

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	64529	JK	7-5-77	REV. NOTE (2)
B	64562	PK	7-28-77	ADDED NOTE 1 REF.
C	65655	DS	2/2/78	Phos. & Oil to Plain
D	92892	SK	5/9/79	Revised Note (1)

COMPILED	RW	DATE DRAWN			MASTER NO.
APPROVED		12.16.76			01265 000D1

F M/F ED A B C

ORIGINAL JOB NO.	TITLE	PART NO.
B0679	BOLT, LOW PROFILE HEAD	23-11021
LAST CHG LTR B		SHEET 1 OF 1



THREAD	F	G (MAX)	B (MAX)	H (MAX)	PART NUMBER
1/2 - 13 UNC 2A	3/4	.866	1.070	.312	23-11021-L

Dash Number = Length L" in hundredths of an inch.

NOTES:

(1) Material: S.A.E. J429 Grade 8 or 8.2

(B) 2. Finish: Plain

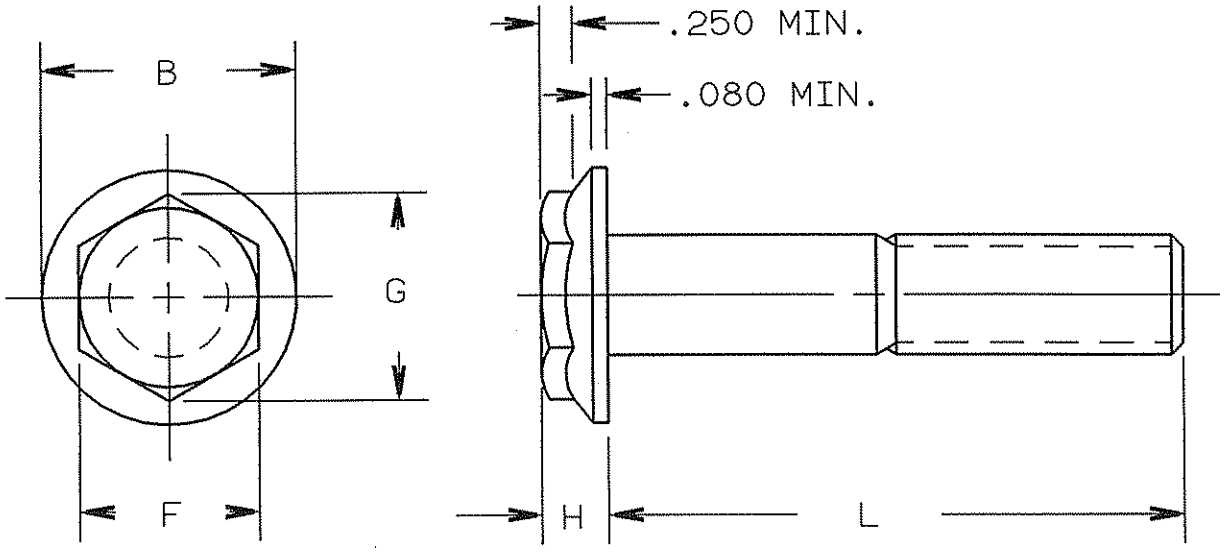
COMPILED	RW	DATE DRAWN		MATERIAL	
APPROVED	-	4.1.77		(1)	

E-183A Litho in USA Portland FREIGHTLINER CORPORATION M/F Oregon 97208 AB

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	64561	SB	7-14-77	Updated info #61561
B	65655	DS	2-2-78	Phos. & Oil to Plain

DRAWN	SH	TITLE	ITEM NUMBER
APPRV	HRL	BOLT - FLANGE LOW PROFILE	23-11029
DATE	04/11/77	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD	F	G (MAX)	B (MAX)	H (MAX)	FREIGHTLINER PART NUMBER
5/8-11 UNC	.937 .922	1.083	1.330	.420	23-11029-L

DASH NUMBER = LENGTH L IN HUNDREDTHS OF AN INCH.
EXAMPLE: 23-11029-300 IS 3.00" LONG.

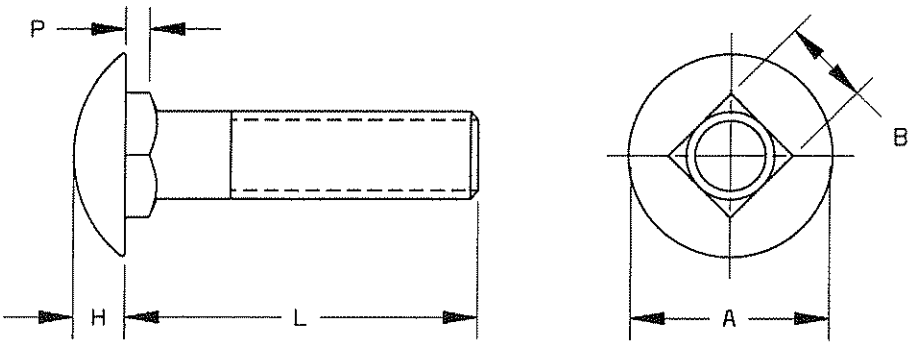
ENGINEERING NOTES:

1. MATERIAL: SAE J429 GRADE 8 OR 8.2.
2. FINISH: PLAIN
3. 23-11862-200 IS ACCEPTABLE ALTERNATE FOR 23-11029-200.

B

CHG	JOB/RLSE NO	DATE	BY	REVISION
B	P9120H-01	01/28/94	ERK	REDRAWN; ADDED ALTERNATE FOR 23-11029-200.

DRAWN	O J	TITLE	DRAWING NUMBER	
APPRV	JSJ	BOLT-CARRIAGE ROUND HEAD	23-11033	
DATE	04/21/77	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. D
CATIA ORIGINAL				



NOMINAL SIZE AND THREAD	DIMENSIONS (MAX./MIN)				FREIGHTLINER PART NUMBER*
	A	B	H	P	
1/4-20	0.594/ 0.563	0.260/ 0.245	0.145/ 0.125	0.124/ 0.093	23-11033-L
3/8-16	0.844/ 0.782	0.388/ 0.368	0.208/ 0.188	0.156/ 0.125	23-12364-L
1/2-13	1.094/ 1.032	0.515/ 0.492	0.270/ 0.250	0.156/ 0.125	23-12366-L

B

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGHT IN HUNDREDTHS OF AN INCH.
EXAMPLE: 23-11033-075 SPECIFIES A 1/4-20 CARRIAGE BOLT 3/4" LONG.

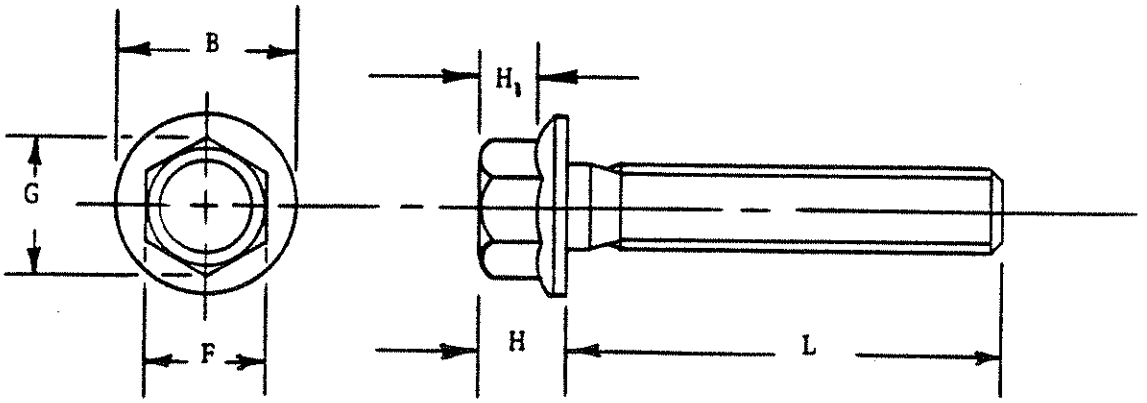
ENGINEERING NOTES:

1. MATERIAL: STAINLESS STEEL, TYPE 302
2. FINISH: ELECTRO-POLISHED
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAIL SEE ANSI B18.5.

C

CHG	JOB NO	DATE	BY	REVISION
B	PB4501-15	05/03/96	FHC	REVISED AND REDRAWN. ADDED 23-12364/23-12366
C	P05081-01	04/15/98	DAJ	ADDED NOTE 3.
D	PA2042-93	07/12/99	CGD	CORRECTED TEXT THICKNESS, CREATED SOLID.

ORIGINAL JOB NO.	TITLE	PART NO.
D1564	BOLT, FLANGED HEX HEAD FULL COURSE THREAD	23-11056
LAST CHG LTR		SHEET 1 OF 1



THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1	L (IN.)	PART NUMBER
7/16-14 UNC	11/16	.722	.930	.460	.300	2.25	23-11056

Notes:

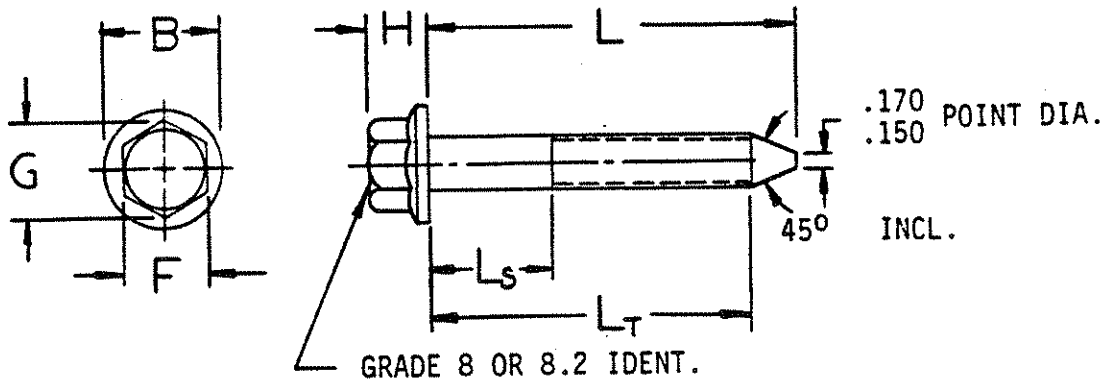
1. Material: S.A.E. J429 Grade 8 or 8.2
2. Finish: Cadmium Plate
3. Thread: Full
   Unified coursethread class 2A

COMPILED	C.J.	DATE DRAWN			
APPROVED		4-27-78		(1)	

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

ORIGINAL JOB NO.	TITLE	PART NO.
D1753	BOLT, CONICAL POINT, HEX HEAD, GRADE 8	23-11144
LAST CHG LTR		SHEET 1 OF 1



THREAD	F	G (Max)	B (Max)	H (Max)	L	Ls (Max)	Lt (Min)			PART NUMBER
5/8-11	15/16	1.083	1.330	.620	4.00	1.88	3.50			23-11144-0

Notes:

(1) Material: SAE J429 Grade 8 or 8.2
2. Finish: Plain
3. Thread: Unified coarse class 2A

COMPILED	HEILESON	DATE DRAWN		MATERIAL	
APPROVED	DCR	9/8/78		(1)	

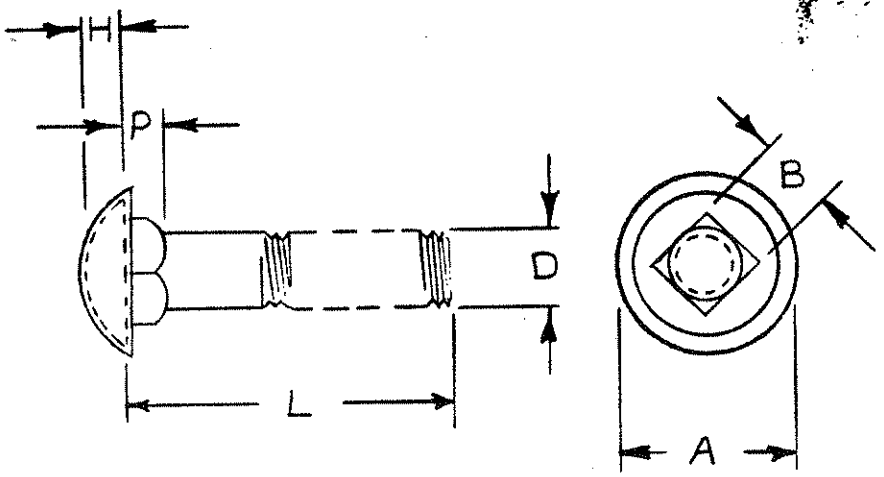
CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

ORIGINAL JOB NO.	TITLE	PART NO.
C 1369	CARRIAGE BOLT ROUND HEAD, STAINLESS STEEL CAP	23 - 11170
LAST CHG LTR		SHEET 1 OF 1

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

SKETCH



PART NUMBERS

D	BODY DIA.	A	H	P		B		MANUFACTURER'S NUMBER	FREIGHTLINER PART NUMBER ①
				MIN.	MAX.	MIN.	MAX.	RUS ③	
¼-20	.260	9/16	1/8	.125	.156	.245	.260	250XXX	23-11170-#

ENGINEERING NOTES:

① Complete part number by adding a three digit dash number to indicate length in hundredths of an inch.

② MATERIAL: Carriage Bolt: Steel, Cadmium Plated
Cap: Stainless Steel

Example: 250125 specifies a stainless steel capped carriage bolt 1¼" long.

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

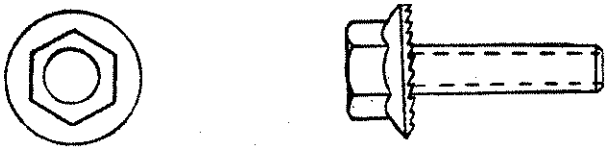
COMPILED	JSJ	DATE DRAWN		MATERIAL	
APPROVED	GEH	11-21-78		②	

General Use Part

ORIGINAL JOB NO.	TITLE	PART NO.
C1369	CAPSCREW HEX, SERRATED FLANGE	23-11173 thru 23-11182
LAST CHG LTR		SHEET 1 OF 1

CHANGE INFORMATION | DATE | BY | JOB NO.

SKETCH



PART NUMBERS

THREAD	F FLATS (BASIC)	H HEIGHT (MAX)	C FLANGE MAX	MANUFACTURES NUMBER MF	MANUFACTURES NUMBER	FREIGHTLINER PART NUMBER **
1/4 20 UNC 28 UNF	7/16	.240	.531	32WLFS 1420 1428		23-11173-L 23-11174
5/16 18 UNC 24 UNF	1/2	.298	.706	51618 51624		11175 23-11176
3/8 16 UNC 24 UNF	9/16	.331	.793	3816 3824		23-11177 23-11178
7/16 14 UNC 20 UNF	5/8	.385	.884	71614 71620		23-11179 23-11180
1/2 13 UNC 20 UNF	3/4	.460	1.062	1213 1220		23-11181 23-11182

** Complete part number by adding a 3 digit dash number expressing the length, L, in hundredths of an inch, thus: 23-11173-175 calls out a 1/4-20 serrated flange hex head capscrew 1-3/4, inches long. Maximum length for all sizes is 2 inches.

ENGINEERING NOTES

(1) Material low carbon steel, cadmium plate, must meet SAE grade 5 specificati

CHANGE INFORMATION | DATE | BY | JOB NO.

COMPILED	JSJ	DATE DRAWN		MATERIAL	
APPROVED	GEH	12/6/78		(1)	

23-11280

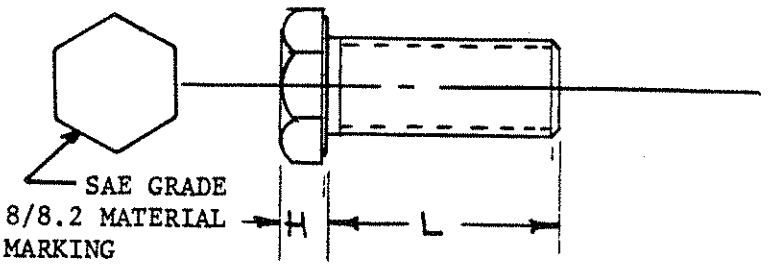
General Use Part

PRINT ISSUED		TITLE	PART NO
		BOLT, HEX, 7/8-9 UNC GRADE 8/8.2 LOW CLEARANCE HEAD	23-11280
LAST CHG LTR	A		SHEET 1 OF 1

CHG	BY	DATE	WAS	JOB NO.

CHG	BY	DATE	WAS	JOB NO
—	—	—	—	81500
A	FHF	9-30-85	8 to 8/8.2 Add Note 4	1709D
A				

SKETCH



PART NUMBERS

SAE THREAD	HEAD H MAX.	HEAD H MIN.		FREIGHTLINER PART NUMBER*
7/8-9UNC	.420	.390		23-11280-L

*To complete part number, add three digit dash number expressing length in 1/100's of an inch; thus for a low head bolt two inches long write 23-11280-200.

ENGINEERING NOTES

(1) Material: Grade 8/8.2 Bolt Material, Steel per SAE STD J429
2. Finish: Zinc or Cadmium plate. Treat for prevention of hydrogen embrittlement by suitable bake cycle.
3. Must meet all applicable provisions of SAE Std J105, Hex Bolts.
4. Grade Identification: Head markings for Grade 8/8.2

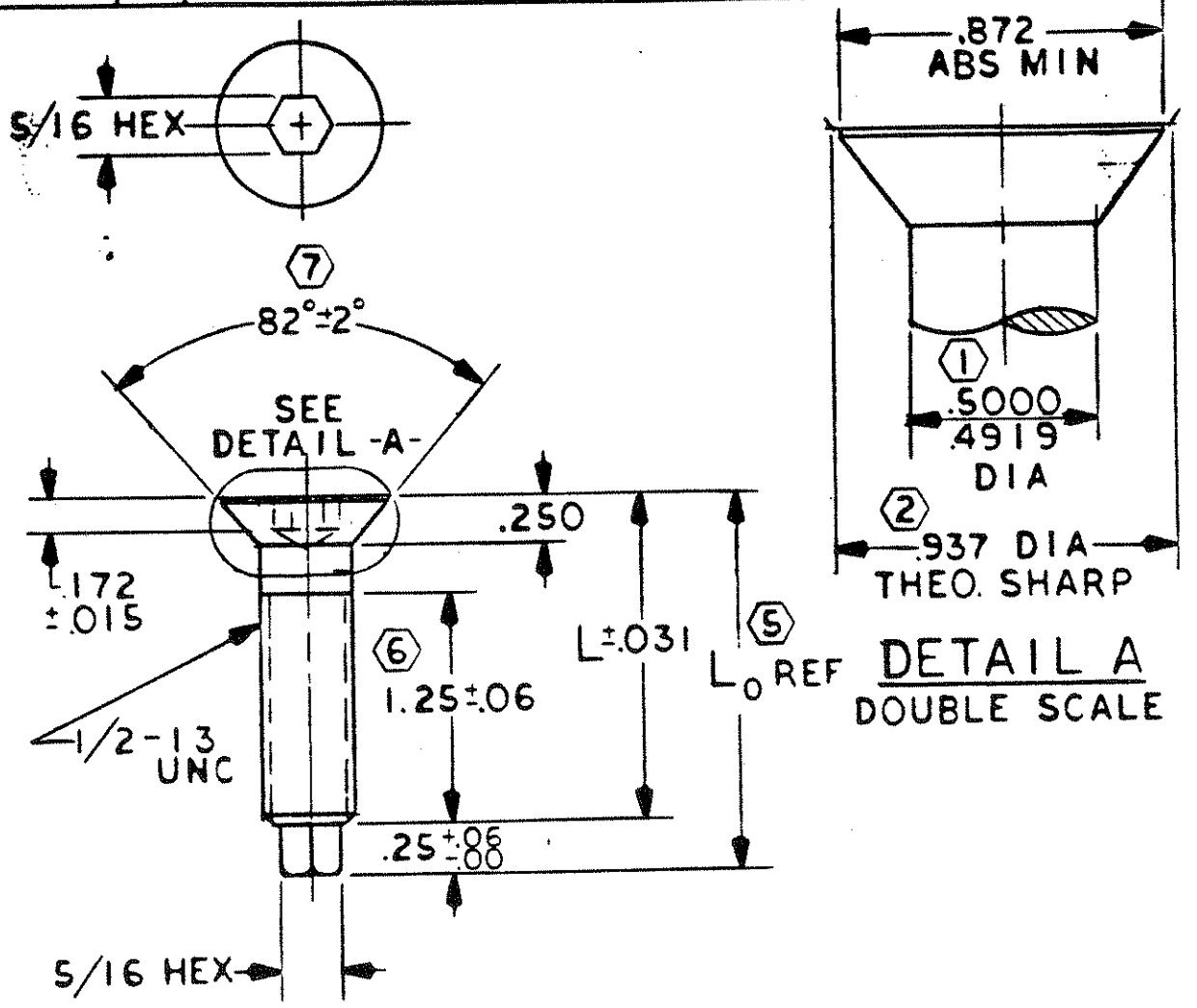
COMPILED	ERHM	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED		4-3-80	EA	(1)	01010 000D1

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

A M/F

ORIGINAL JOB NO.	TITLE	PART NO.
B1388	CAP SCREW, FLAT HEAD, HEX SOCKET, HEX ON SHANK, GRADE 8, 1/2 DIA.	23-11282
LAST CHG LTR		SHEET 1 OF 2



L	L_o REF.	FREIGHTLINER PART NO.
1.750	2	23-11282-175
2.000	2-1/4	23-11282-200
2.250	2-1/2	23-11282-225
2.500	2-3/4	23-11282-250

ENGINEERING NOTES

(1) Tolerance applies to unthreaded cylindrical portion of shank.

(2) The theoretical sharp value represents the exact diameter of a hole countersunk to exactly 82°.

		DATE DRAWN			
COMPILED	Taylor	4-11-80			
APPROVED	D Weeks				

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

Portland FREIGHTLINER CORPORATION Oregon 97208

M/F

ORIGINAL JOB NO.	TITLE	PART NO.
B1388	CAP SCREW, FLAT HEAD, HEX SOCKET, HEX ON SHANK, GRADE 8	23-11282
LAST CHG LTR		SHEET 2 OF 2

3. The value for head height is given for reference only and is calculated to maximum formulation.

4. Flushness tolerance .018. This is the distance which the top surface of the screw (having the maximum head size) will be below the flush condition in a hole countersunk exactly 82° to the theoretical sharp dim of .937.

(5.) The length of the screw shall be measured on a line parallel to the axis from the plane of the top of the head to the plane of the flat of the shank hex.

(6.) The thread length shall be measured from the extreme end to the last complete (full form) thread.

(7.) The axis of the conical bearing surface shall be parallel to the axis of the body within 1/2 degree.

8. Concentricity of the thread with the body shall be within .005 in. per in. of body length, T.I.R., taken directly under the head when the screw is held by the full threads closest to the head of the screw, and shall not exceed .025 in.

9. Threads shall be class 3A in the UNC series in accordance with ASA B1.1.

10. Material: Grade 8 steel, hardened by quenching in oil from the hardening temperature and tempered to a Rockwell "C" hardness of 35-45 at the surface.

11. The fastener must withstand without failure a static tensile load of 21,200# when tested with a suitable fixture conforming to the 82 degree head.

CHANGE INFORMATION | LTR | JOB NO. | BY | DATE

CHANGE INFORMATION | LTR | JOB NO. | BY | DATE

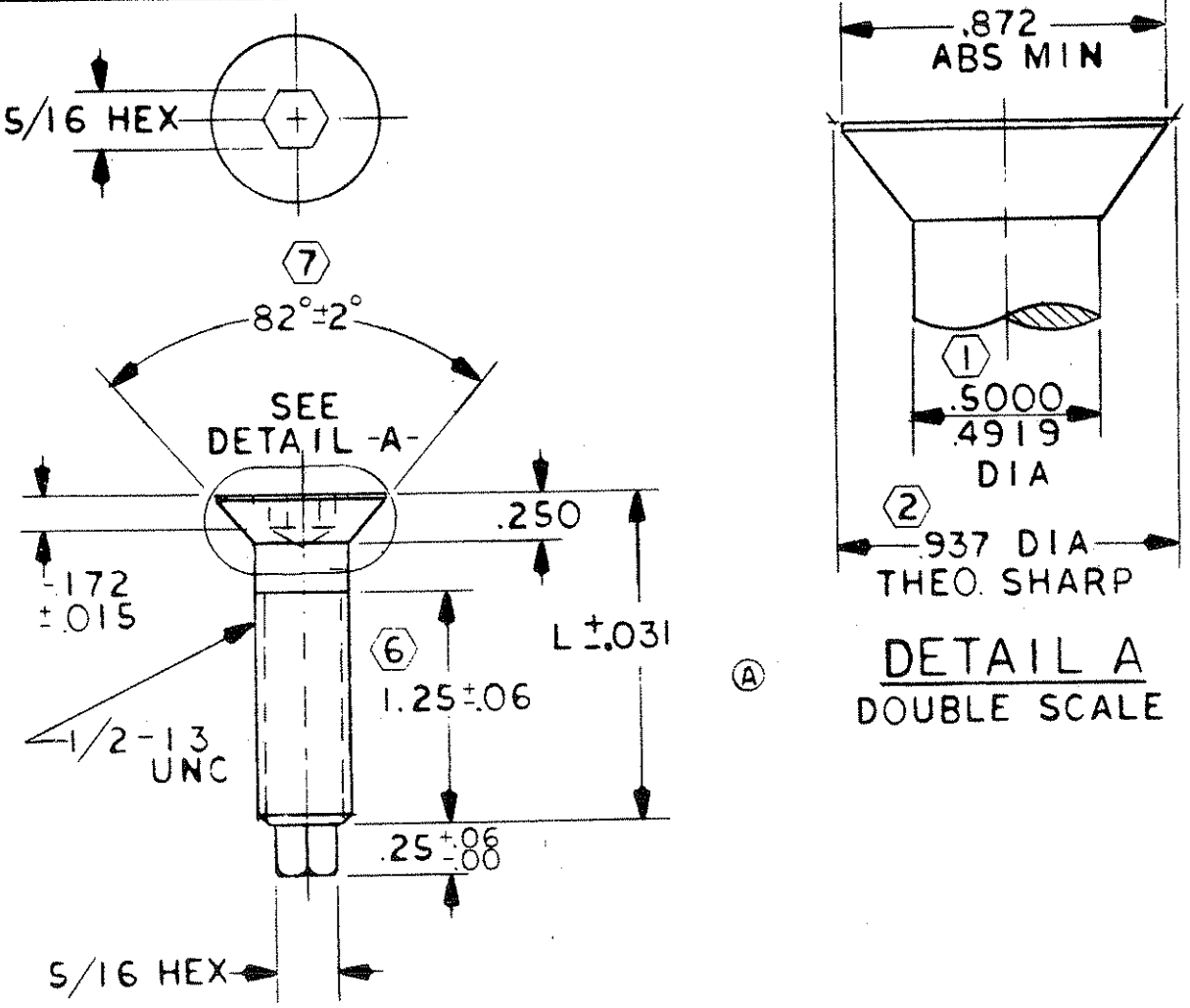
COMPILED	TAYLOR	DATE DRAWN			
APPROVED	D. Welker	4-11-80			

M/F

ORIGINAL JOB NO.	TITLE	PART NO.
B1388	CAP SCREW, FLAT HEAD, HEX SOCKET, HEX ON SHANK, GRADE 8, 1/2 DIA.	23-11282
LAST CHG LTR A		SHEET 1 OF 2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	51398	WITT	12-13-82	REMOVED DIM L_0



L	FREIGHTLINER PART NO.
1.750	23-11282-175
2.000	23-11282-200
2.250	23-11282-225
2.500	23-11282-250

ENGINEERING NOTES

1. Tolerance applies to unthreaded cylindrical portion of shank.
2. The theoretical sharp value represents the exact diameter of a hole countersunk to exactly 82°.

COMPILED	Taylor	DATE DRAWN			
APPROVED	D. Welker	4-11-80			

Portland FREIGHTLINER CORPORATION Oregon 97208

M/F K

ORIGINAL JOB NO.	TITLE	PART NO.
B1388	CAP SCREW, FLAT HEAD, HEX SOCKET, HEX ON SHANK, GRADE 8	23-11282
LAST CHG LTR A		SHEET 2 OF 2

3. The value for head height is given for reference only and is calculated to maximum formulation.

4. Flushness tolerance .018. This is the distance which the top surface of the screw (having the maximum head size) will be below the flush condition in a hole countersunk exactly 82° to the theoretical sharp dim of .937.

(A)

(6.) The thread length shall be measured from the extreme end to the last complete (full form) thread.

(7.) The axis of the conical bearing surface shall be parallel to the axis of the body within 1/2 degree.

8. Concentricity of the thread with the body shall be within .005 in. per in. of body length, T.I.R., taken directly under the head when the screw is held by the full threads closest to the head of the screw, and shall not exceed .025 in.

9. Threads shall be class 3A in the UNC series in accordance with ASA B1.1.

10. Material: Grade 8 steel, hardened by quenching in oil from the hardening temperature and tempered to a Rockwell "C" hardness of 35-45 at the surface.

11. The fastener must withstand without failure a static tensile load of 21,200# when tested with a suitable fixture conforming to the 82 degree head.

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	5139R	WLT	12-13-82	REMOVED NOTE 5.

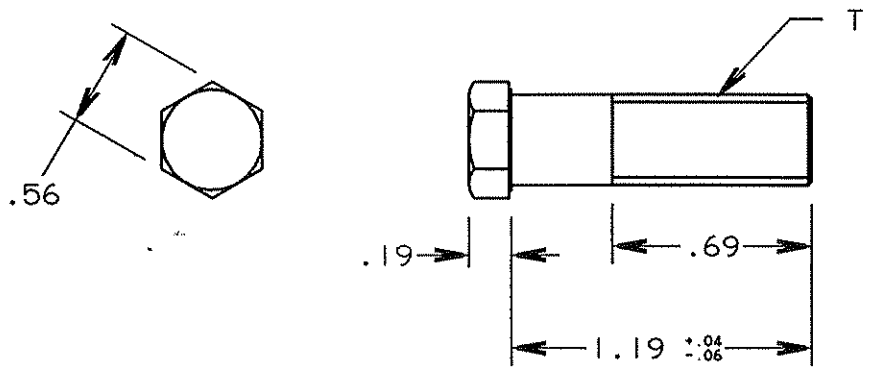
COMPILED	TAYLOR	DATE DRAWN			
APPROVED	D. Walker	4-11-80			

EAC-830

Portland FREIGHTLINER CORPORATION Oregon 97208

M/F

DRAWN	SJH	TITLE SCREW-CAP, HEX LOW PROFILE HEAD, GRADE 5	ITEM NUMBER 23-11287
APPRV	TD		
DATE	05/16/80	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE & TYPE (T)	EQUIV. VENDOR PART NUMBER	FREIGHTLINER PART NUMBER
7/16-14 UNC 3A	SP/330231	23-11287-000

B

ENGINEERING NOTES:

1. MATERIAL: GRADE 5 PER SAE J429.
2. HARDNESS: ROCKWELL C23-32.
3. FINISH: PLAIN.
4. TOLERANCE: A LIMIT OF ±.010 IS ALLOWED ON ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	PA2042-44	02/28/94	ERK	REDRAWN: SPECIFIC TOLERANCE ADDED TO 1.19.
B	PA2042-45	04/14/94	ERK	CORRECTED FREIGHTLINER PART NUMBER

23-11288

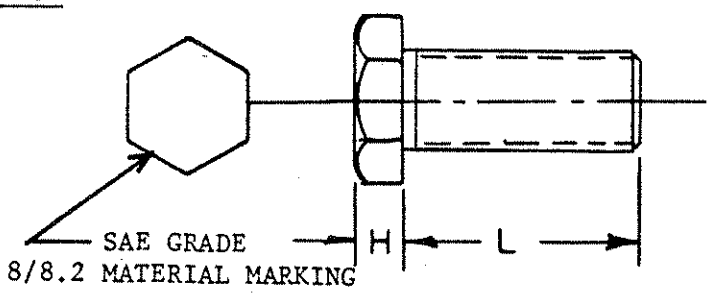
General Use Part

ORIGINAL JOB NO.	TITLE	PART NO.
	BOLT, HEX, 3/4-16 UNF GRADE 8/8.2 LOW CLEARANCE HEAD	23-11288
LAST CHG LTR B		SHEET 1 OF 1

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	4559 B	TTR	11-16-82	.300 To .290
B	1709D	FHF	9-30-85	8 to 8/8.2 Add Note 4

SKETCH



PART NUMBERS

SAE THREAD	HEAD H MAX.	HEAD H MIN.		FREIGHTLINER PART NUMBER*
3/4-16 UNF	.305	.290 (A)		23-11288-L

* To complete part number, add three digit dash number expressing length in 1/100's of an inch; thus for a low head bolt two inches long write 23-11288-200.

ENGINEERING NOTES

(1) Material: Grade 8/8.2 Bolt Material, per SAE J429.
2. Finish: Zinc or Cadmium plate. Treat for prevention of hydrogen enbrittlement by suitable bake cycle.
3. Must meet all applicable provisions of SAE Std J105, Hex Bolts.
4. Grade Identification: Head markings for Grade 8/8.2

COMPILED	RLE	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED	KRH	6-18-80	EA	(1)	01010 000D1

E-183A Litho in USA Portland

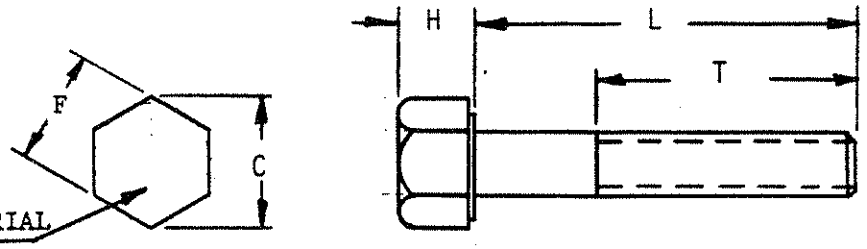
FREIGHTLINER CORPORATION Oregon 97208

BR M/F

23-11289

ORIGINAL JOB NO.	TITLE	PART NO.
B1337	CAPSCREW, HEX (FINISHED HEX BOLT) GRADE 8/8.2	23-11289
LAST CHG LTR: B		SHEET 1 OF 1

SKETCH:



PART NUMBERS:

THREAD	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	T** LENGTH ± .062		FREIGHTLINER PART NUMBER *
7/16-20 UNF	5/8	.722	.291	1.000	Note 4	23-11289-212
7/16-20 UNF	5/8	.722	.291	.750	Note 4	23-11289-175

* Complete part number by adding a 3 digit dash number expressing the length in hundredths of an inch, thus: 23-11289-212 calls out a 7/16-20 UNF Grade 8 Hex Capscrew 2.12 inches long.

** Indicate special thread length if required.

ENGINEERING NOTES:

1. MATERIAL: Grade 8/8.2 Bolt Material per SAE Std. J429
2. Must meet all applicable provisions of SAE Std. J105, Hex Bolts.
3. FINISH: Cadmium Plate - Treat for prevention of hydrogen embrittlement by suitable bake cycle.
4. Special Thread Length
5. Grade Identification: Head markings for Grade 8/8.2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	H0117	HO	9/22/83	Added Note 4 & -175
B	1709D	FHF	9-30-85	8 to 8/8.2 Add Note 5

COMPILED	KRH	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED		7/22/80	EA	(1)	01010 000D1

EAC - 832

Portland **FREIGHTLINER CORPORATION** Oregon 97208

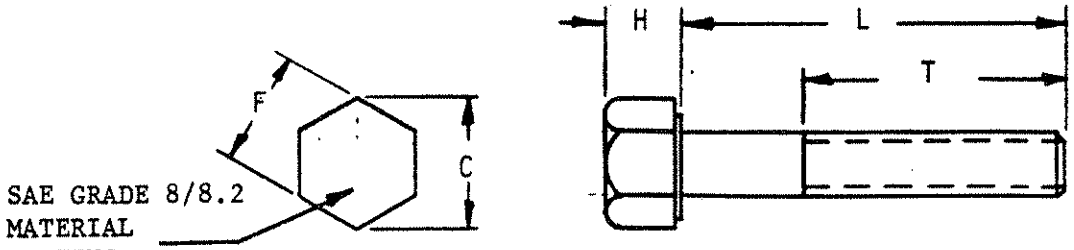
B4

MF

23-11335

ORIGINAL JOB NO.	TITLE	PART NO.
B1591	CAPSCREW, HEX (FINISHED HEX BOLT)	23-11335
LAST CHG LTR A	GRADE 8/8.2	SHEET 1 OF 1

SKETCH:



PART NUMBERS:

THREAD	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	T LENGTH ± .06		FREIGHTLINER PART NUMBER *
3/8-24 UNF	9/16	.650	.243	.88		23-11335-L

* Complete part number by adding a 3 digit dash number expressing the length, L, in hundredths of an inch, thus: 23-11335-212 calls out a 3/8-24 UNF Grade 8 Hex Capscrew 2.12 inches long.

ENGINEERING NOTES:

① MATERIAL: Grade 8/8.2 Bolt Material per SAE Std. J429

2. Must meet all applicable provisions of SAE Std. J105, Hex Bolts.

3. FINISH: Cadmium Plate. Treat for prevention of hydrogen embrittlement by suitable bake cycle.

4. Grade Identification: Head markings for Grade 8/8.2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	1709D	FHF	9-30-85	8 to 8/8,2 Add Note 4

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

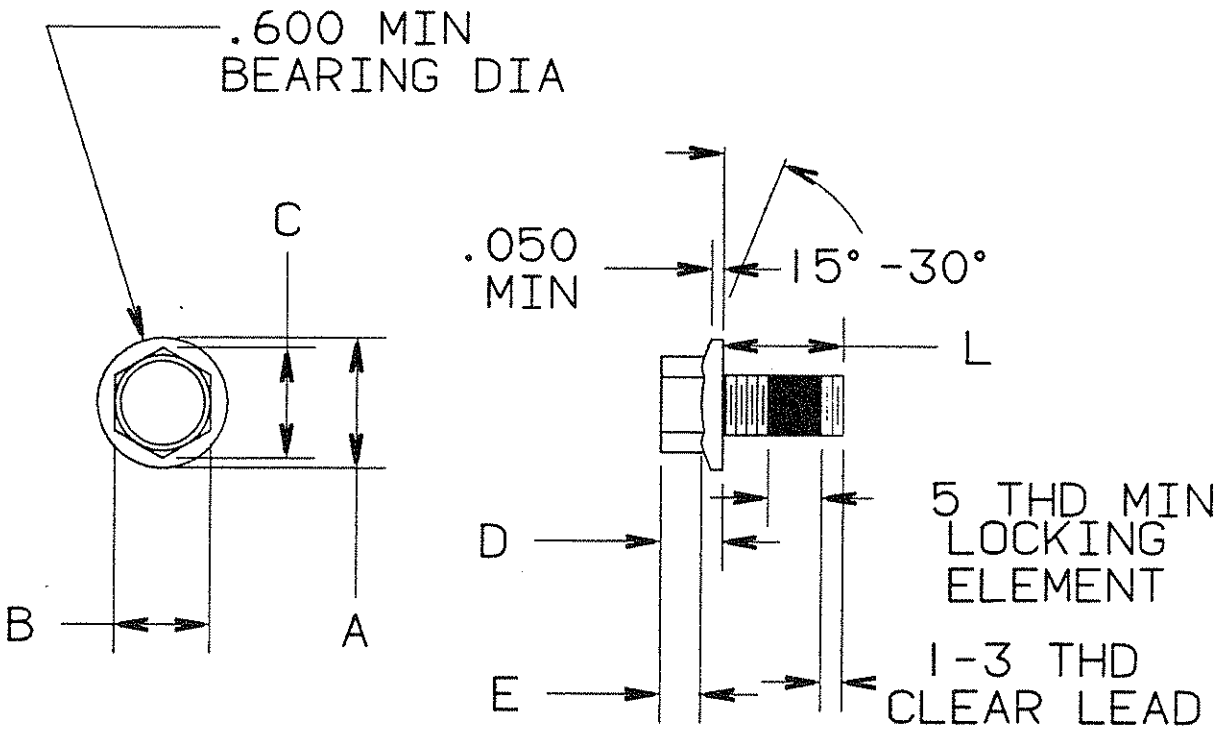
COMPILED	RLE	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED	KR 14	6/3/81	EA	①	01010 000D1

EAC - 832

Portland FREIGHTLINER CORPORATION Oregon 9720[illegible]

A

DRAWN	RDF	TITLE	ITEM NUMBER
APPRV	PCK	SCREW-CAP HEX FLANGE HEAD	23-11348
DATE	03/02/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



NOMINAL SIZE	A	B	C	D	E	L	FREIGHTLINER PART NUMBER
5/16-18 UNC	.680 MAX	.489 .500	.548 .577	.320 MAX	.210 MIN	.610 .640	23-11348-000

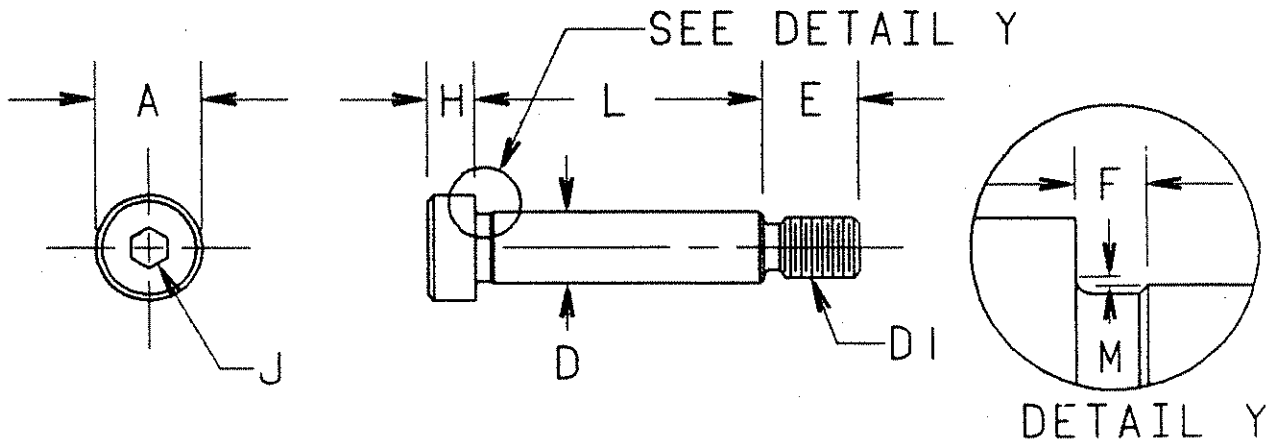
ENGINEERING NOTES

1. MATERIAL: 302 STAINLESS STEEL, PER ASTM F593.
2. DIMENSIONS MUST CONFORM TO IFI 111.
3. FINISH: PLAIN, ELECTROPOLISHED HEAD.
4. LOCKING ELEMENT TO BE EXTERNALLY APPLIED NYLON PATCH. LOCKING PERFORMANCE PER IFI 124.
5. SIMILAR TO CAMCAR 81181 LSH.

CHG	JOB/RLSE NO	DATE	BY	REVISION
E	P*A078-69	03/05/89	RDF	REDRAWN, LOCKING ELEMENT DOCUMENTED
F	PA2006-36	04/28/89	PCK	REVISED DIMENSIONS
G	PA2006-89	09/28/89	PCK	REVISED NOTE('5' ADDED TO THD MIN LOCKING ELEMENT)

XXX-XXXXX

ORIGINAL JOB NO.	TITLE	PART NO.
C1418	SHOULDER BOLT HEX SOCKET HEAD	23-11352
LAST CHG LTR: D		SHEET 1 OF 1



PART NUMBERS

NOM SIZE	D ±.001	D1	A ±.010	H ±.005	J NOM.	F MAX.	M ±.003	E NOM.	FREIGHTLINER PART NO.
1/4	.247	10-24	.366	.183	.125	.093	.012	.375	23-11352-1XX
5/16	.309	1/4-20	.429	.214	.156	.093	.014	.438	-2XX
3/8	.372	5/16-18	.553	.245	.188	.093	.018	.500	-3XX
1/2	.497	3/8-16	.740	.307	.250	.093	.023	.625	-4XX
5/8	.622	1/2-13	.864	.370	.312	.093	.027	.750	-5XX
3/4	.747	5/8-11	.989	.495	.375	.093	.034	.875	-6XX
1	.997	3/4-10	1.300	.618	.500	.125	.045	1.000	-7XX
1-1/4	1.247	7/8-9	1.737	.742	.625	.125	.055	1.125	-8XX

ENGINEERING NOTES

1. MUST MEET ANSI B18.3-1969.
2. MATERIAL: ALLOY STEEL RC 32 TO 43.
   MINIMUM ULTIMATE TENSILE STRENGTH: 140,000 PSI
3. DASH NUMBERS SPECIFIED BY SIGNIFICANT DASH NUMBER SYSTEM. THE SECOND AND THIRD DIGITS SPECIFY THE LENGTH IN EIGHTHS OF AN INCH (THEREFORE -422 SPECIFIES A 1/2 INCH DIAMETER BOLT WITH A A LENGTH OF 2.750.). THE AVAILABLE LENGTHS ARE AS FOLLOWS:

NOMINAL SCREW LENGTH	STANDARD LENGTH INCREMENT
1/4 THRU 3/4	1/8
3/4 THRU 5	1/4
OVER 5	1/2

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
D	L0123	EAM	02-01-84	REVISED AND REDRAWN. DWG. FROM X1 TO C

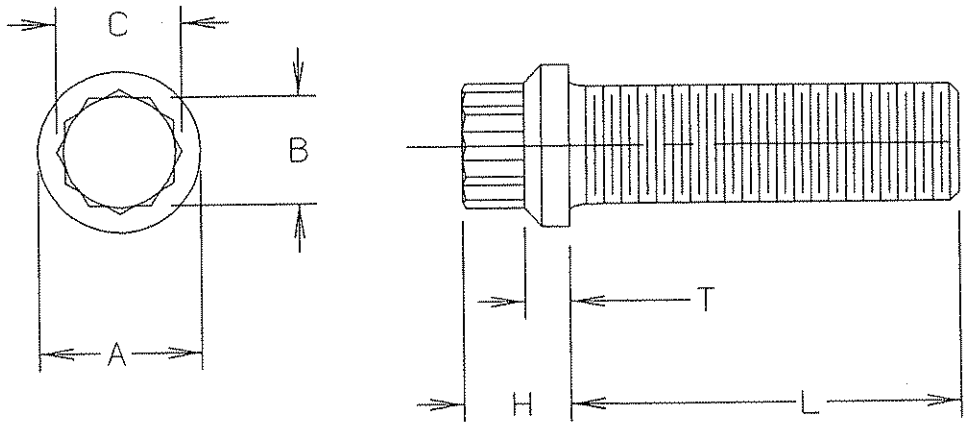
COMPILED	EAM	DATE DRAWN	CADAM ORIGINAL		MASTER NUMBER	
APPROVED	Larry	02-01-84			01270	000D1

PORTLAND FREIGHTLINER CORPORATION OREGON 97208

EAC-826

D

DRAWN	TTR	TITLE	ITEM NUMBER
APPRV	T N	SCREW-SOCKET HEAD 12 POINT	23-11386
DATE	05/07/82	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



NOMINAL BODY SIZE	A- FLANGE DIA MAX/MIN	B- WIDTH ACROSS FLATS MAX/MIN	C- MIN WIDTH ACROSS CORNERS	H-HEAD HEIGHT	T- HEIGHT OF COLLAR	FREIGHTLINER PART NUMBER*
1/2-13 UNC	.750/.735	.502/.493	.562	.500	.240	23-11394-L
5/8-11 UNC 5/8-18 UNF	.938/.921	.627/.618	.705	.625	.265	23-11398-L 23-11399-L
3/4-10 UNC	1.125/1.107	.752/.743	.847	.750	.310	23-11400-L

* COMPLETE PART NUMBER BY ADDING A 3-DIGIT DASH NUMBER EXPRESSING THE LENGTH, L, IN HUNDREDTHS OF AN INCH, THUS: 23-11398-175 CALLS OUT A 5/8-11 UNC GRADE 8 FLANGE 12-POINT SCREW 1.750 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE STANDARD J429.
2. FINISH: P&O PER FREIGHTLINER SPEC 49-00006-041
3. DIMENSIONS: PER IFI-115. ABOVE DIMENSION FOR REFERENCE ONLY.

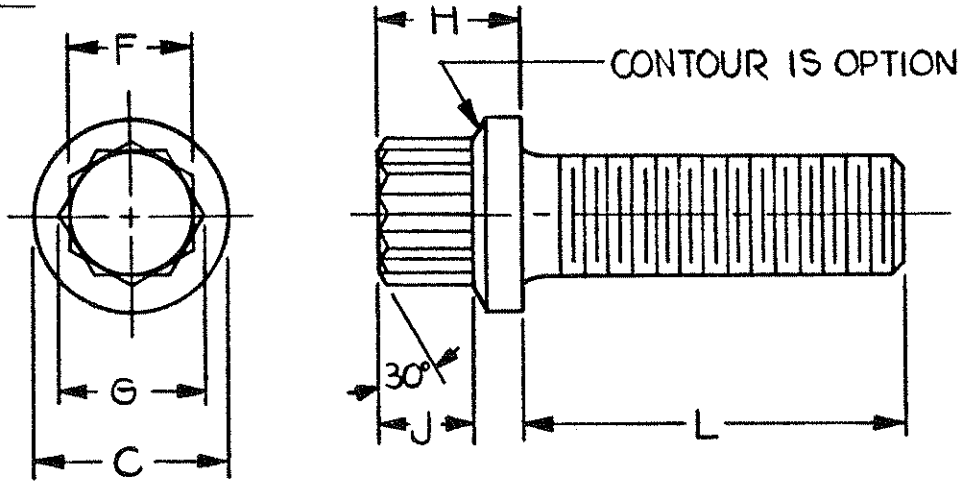
CHG	JOB/RLSE NO	DATE	BY	REVISION
B	P2A014-31	10/03/95	DAJ	REVISED AND REDRAWN
C	P2A220-C0	12/14/95	DAJ	REVISED NOTE 2 TO P&O FROM ZINC.

GENERAL USE PART

ORIGINAL JOB NO.	TITLE	PART NO.
F0261	SCREW, FLANGE 12-POINT STEEL, GRADE 8	23-11386 THRU 23-11409
LAST CHG LTR		SHEET 1 OF 2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

SKETCH:



SPECIFICATION NUMBERS:

NOMINAL SIZE THREADS PER IN. AND SERIES DESIGNATION	C FLANGE DIA. MAX	C FLANGE DIA. MIN	F WIDTH ACROSS FLATS MAX	F WIDTH ACROSS FLATS MIN	G WIDTH ACROSS CORNERS MIN	H HEAD HEIGHT MAX	J WRENCHING HEIGHT MIN	FREIGHTLINER SPECIFICATION NUMBERS *
1/4-20 UNC 1/4-28 UNF	0.375	0.365	0.252	0.244	0.278	0.260	0.15	23-11386-L 23-11387-L
5/16-18 UNC 5/16-24 UNF	0.469	0.457	0.315	0.306	0.348	0.312	0.18	23-11388-L 23-11389-L
3/8-16 UNC 3/8-24 UNF	0.562	0.550	0.377	0.368	0.420	0.375	0.21	23-11390-L 23-11391-L
7/16-14 UNC 7/16 20 UNF	0.656	0.642	0.438	0.429	0.489	0.438	0.26	23-11392-L 23-11393-L
1/2-13 UNC 1/2-20 UNF	0.750	0.735	0.502	0.493	0.562	0.500	0.29	23-11394-L 23-11395-L
9/16-12 UNC 9/16-18 UNF	0.844	0.828	0.564	0.555	0.633	0.563	0.33	23-11396-L 23-11397-L
5/8-11 UNC 5/8-18 UNF	0.938	0.921	0.627	0.618	0.705	0.625	0.36	23-11398-L 23-11399-L
3/4-10 UNC 3/4-16 UNF	1.125	1.107	0.752	0.743	0.847	0.750	0.44	23-11400-L 23-11401-L
7/8-9 UNC 7/8-14 UNF	1.312	1.293	0.877	0.866	0.987	0.875	0.51	23-11402-L 23-11403-L
1-8 UNC 1-12 UNF	1.500	1.479	1.003	0.991	1.130	1.000	0.60	23-11404-L 23-11405-L
1-1/8-7 UNC 1-1/8-12 UNF	1.688	1.665	1.128	1.115	1.271	1.125	0.66	23-11406-L 23-11407-L
1-1/4-7 UNC 1-1/4-12 UNF	1.875	1.852	1.253	1.240	1.414	1.250	0.73	23-11408-L 23-11409-L

* Complete part number by adding a 3-digit dash number expressing the length, L, in hundredths of an inch, thus: 23-11398-175 calls out a 5/8-11 UNC grade 8, flange 12-point screw 1.750 inches long.

COMPILED	TTR	DATE DRAWN		MATERIAL	
APPROVED	PF/TN	05-07-82		(1)	

FREIGHTLINER CORPORATION Oregon 97208

GENERAL USE PART

ORIGINAL JOB NO.	TITLE	PART NO.
F0261	SCREW, FLANGE 12-POINT STEEL, GRADE 8	23-11386 THRU 23-11409
LAST CHG LTR		SHEET 2 OF 2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

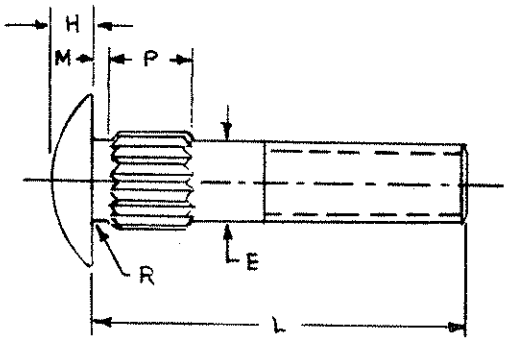
SPECIFICATIONS:

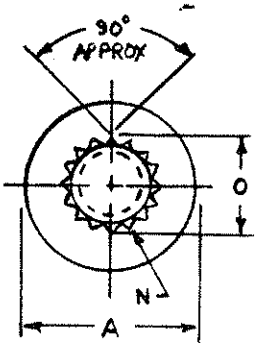
1. MATERIAL: Grade 8 bolt material per SAE standard J429.
2. FINISH: Plain.
3. Must meet all applicable provisions of IFI-115.

COMPILED	TTR	DATE DRAWN		MATERIAL	
APPROVED	TTR	05-07-82		1	

ORIGINAL JOB NO.	TITLE	PART NO.
D2744	ROUND HEAD RIBBED NECK BOLTS	23-11418
LAST CHG LTR		SHEET 1 OF 1

SKETCH:





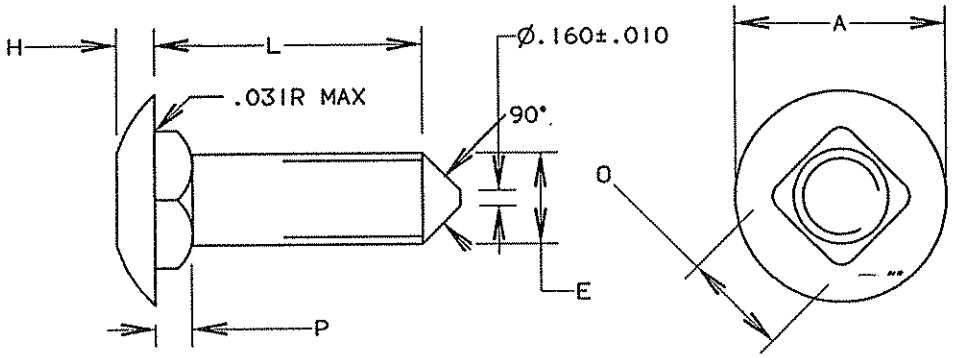
NOMINAL SIZE	E		A		H		M	N	O	P	R
	BODY DIAMETER		HEAD DIAMETER		HEAD HEIGHT		HEAD TO RIBS	# OF RIBS	DIA. OVER RIBS	DEPTH OF RIBS	FILLET RADIUS
	MAX	MIN	MAX	MIN	MAX	MIN	± .031	APPROX	MIN	± .031	MAX
5/16 0.3125	0.324	0.298	0.719	0.688	0.176	0.156	0.063	12	0.340	0.250	0.031

		DATE DRAWN			UNIT OF MEASURE
COMPILED	TJC	7/28/82			
APPROVED	TDT				

CHANGE INFORMATION | DATE | BY | JOB NO.

CHANGE INFORMATION | DATE | BY | JOB NO.

DRAWN	TTR	TITLE	ITEM NUMBER
APPRV	FF	BOLT-ROUND HEAD SQUARE NECK, SPECIAL	23-11423
DATE	10/07/82	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	E		A		H		P		O		FREIGHTLINER PART NUMBER
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
1/2-13	.444	.515	1.032	1.094	.170	.190	.159	.190	.492	.515	23-11423-L

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-11423-150 IS A 1/2-13 ROUND HEAD SQUARE NECK BOLT 1.50 INCHES LONG.

ENGINEERING NOTES:

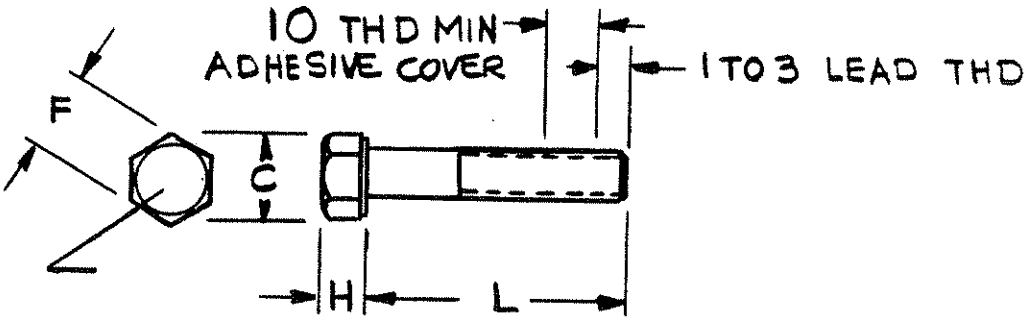
1. MATERIAL: STEEL MEETING GRADE 5 REQUIREMENTS OF SAE J429
2. FINISH: CAD PLATE, ALTERNATE ZINC W/COLORED CHROMATE PER FTL 49-00005-203.
3. MINIMUM THREAD LENGTH FROM TIP, 1.50 INCHES.

CHG	JOB/RLSE NO	DATE	BY	REVISION
D	PA2042-59	11/03/95	ERK	REDRAWN:ADDED ALT. PLATING, REV. 45° TO 90°

General Use Part

ORIGINAL JOB NO.	TITLE	PART NO.
H0117	CAP SCREW, HEX	23-11475
LAST CHG LTR A	LOCKING GRADE 8/8.2	SHEET 1 OF 1

SKETCH:



PART NUMBERS:

THREAD	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)	MANUFACTURER'S NO.	FREIGHTLINER PART NUMBER*
5/8-11 UNC	15/16	1.083	.403		23-11475-L

= 2 digits for length in 1/16ths. of an inch.

* Complete part number by adding a three digit dash number expressing length, L, in hundredths of an inch.

ENGINEERING NOTES:

① MATERIAL: Steel, Grade 8/8.2 Bolt Material per SAE J429

2. Locking element consists of a microencapsulated fastener adhesive (any color) applied to at least 10 threads of the fastener. (3M Scotchgrip #2353 or approved equivalent)

3. FINISH: Plain

4. GRADE IDENTIFICATION: Head markings for Grade 8/8.2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	1709D	FPF	9-30-85	8 to 8/8.2 Add Note 4

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

COMPILED	HOwen	DATE DRAWN	U.O.M.	MATERIAL	MASTER NUMBER
APPROVED		6/27/83	EA	①	01010 000D1

E-183A Litho in USA Portland

FREIGHTLINER CORPORATION A M/F Oregon 97208

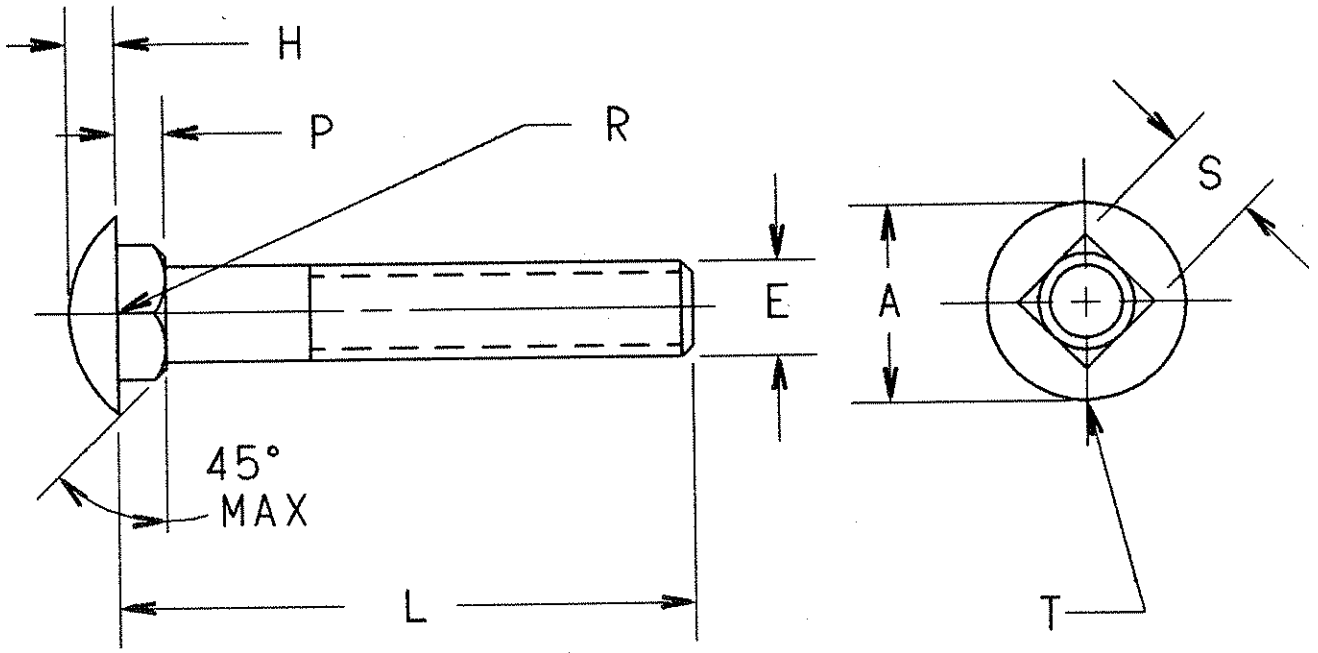
GENERAL USE PART

23-11486

ORIGINAL JOB NO.	TITLE	PART NO.
F0401	CARRIAGE BOLT ROUND HEAD, SQUARE, GRADE 5	23-11486
LAST CHG LTR —		SHEET 1 OF 1

CHANGE INFORMATION | DATE | BY | JOB NO. | TR

SKETCH



PART NUMBER

D	BODY DIA E		A		H		P		S		FREIGHTLINER PART NUMBER
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
1/2-13	.444	.515	1.032	1.094	.250	.270	.250	.281	.492	.515	23-11486-L

T	R FILLET RADIUS		MANUFACTURE'S NUMBER
MAX	MAX		
.047	.031		

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDRETHS OF AN INCH. EXAMPLE: 23-11486-075 SPECIFIES A 1/2-13 CARRIAGE BOLT 3/4" LONG.

ENGINEERING NOTES

(1) MATERIAL: STEEL, CD PLATED.

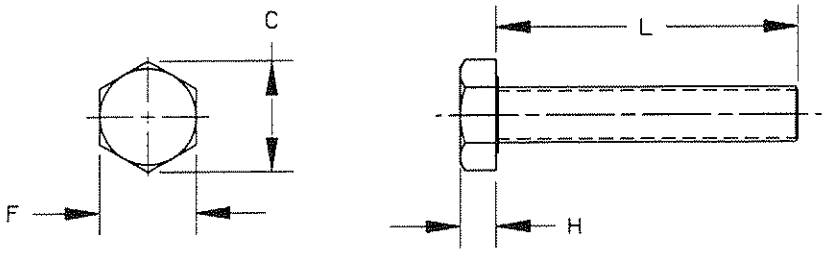
2. BOLT MUST MEET OR EXCEED SAE, 429 GRADE 5 REQUIREMENTS.

3. ROUND HEAD SQUARE NECK CARRIAGE BOLT PER SAE J481.

CHANGE INFORMATION | DATE | BY | JOB NO. | TR

COMPILED	MDJS	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	TFD	07-25-84		(1)	01270	00001

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX HEAD STAINLESS STEEL	23-11505	
DATE	08/20/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. E
CATIA ORIGINAL				



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC 28 UNF	7/16	.505	.163	23-11505-L 23-11506-L
5/16 -18 UNC 24 UNF	1/2	.577	.211	23-11507-L 23-11508-L
3/8 - 16 UNC 24 UNF	9/16	.650	.243	23-11509-L 23-11510-L
7/16 -14 UNC	5/8	.722	.291	23-11511-L
1/2 - 13 UNC	3/4	.866	.323	23-11512-L E
9/16 -12 UNC	13/16	.938	.371	23-11513-L E

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-11509-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STAINLESS STEEL, TYPE 302
2. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB NO	DATE	BY	REVISION
E	P09150-02	08/20/99	CGD	REVISED AND REDWN IN CATIA, ADDED 23-11512, 23-11513

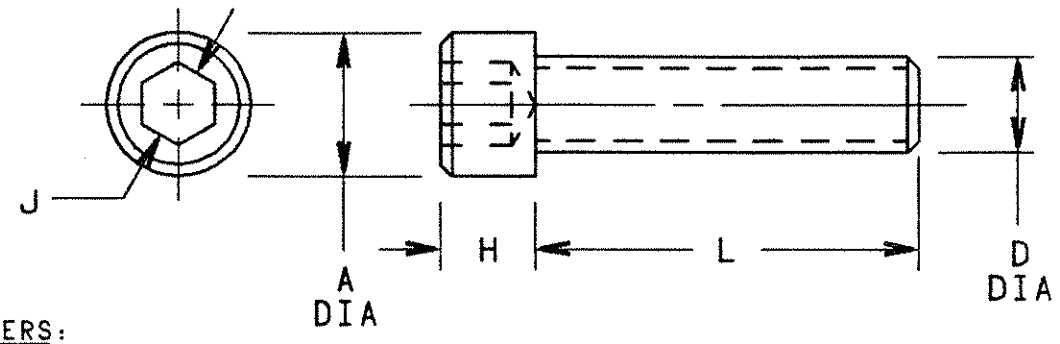
23-11529 THRU 23-11505

ORIGINAL JOB NO.	TITLE	PART NO.
0363C	CAPSCREW, HEXAGON SOCKET HEAD STAINLESS STEEL	23-11529 THRU 23-11550
LAST CHG LTR: A		SHEET 1 OF 1

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	0280C	DDM	8-16-84	REV'D NOTES 1 & 2

SKETCH



PART NUMBERS:

NOMINAL SIZE		D BSC MAJ DIA	A DIA MAX	H MAX	J NOM		FREIGHTLINER PART NUMBER *
1/4	20 UNRC 28 UNRF	.2500	.375	.250	.188		23-11529-L 23-11530-L
5/16	18 UNRC 24 UNRF	.3125	.469	.312	.250		23-11531-L 23-11532-L
3/8	16 UNRC 24 UNRF	.3750	.562	.375	.312		23-11533-L 23-11534-L
7/16	14 UNRC 20 UNRF	.4375	.656	.438	.375		23-11535-L 23-11536-L
1/2	13 UNRC 20 UNRF	.5000	.750	.500	.375		23-11537-L 23-11538-L
5/8	11 UNRC 18 UNRF	.6250	.938	.625	.500		23-11539-L 23-11540-L
3/4	10 UNRC 16 UNRF	.7500	1.125	.750	.625		23-11541-L 23-11542-L
7/8	9 UNRC 14 UNRF	.8750	1.312	.875	.750		23-11543-L 23-11544-L
1	8 UNRC 14 UNRF	1.0000	1.500	1.000	.750		23-11545-L 23-11546-L
1-1/8	7 UNRC 12 UNRF	1.1250	1.688	1.125	.875		23-11547-L 23-11548-L
1-1/4	7 UNRC 12 UNRF	1.2500	1.875	1.250	.875		23-11549-L 23-11550-L

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH.

ENGINEERING NOTES:

(1) MATERIAL: STAINLESS STEEL, TYPE 302

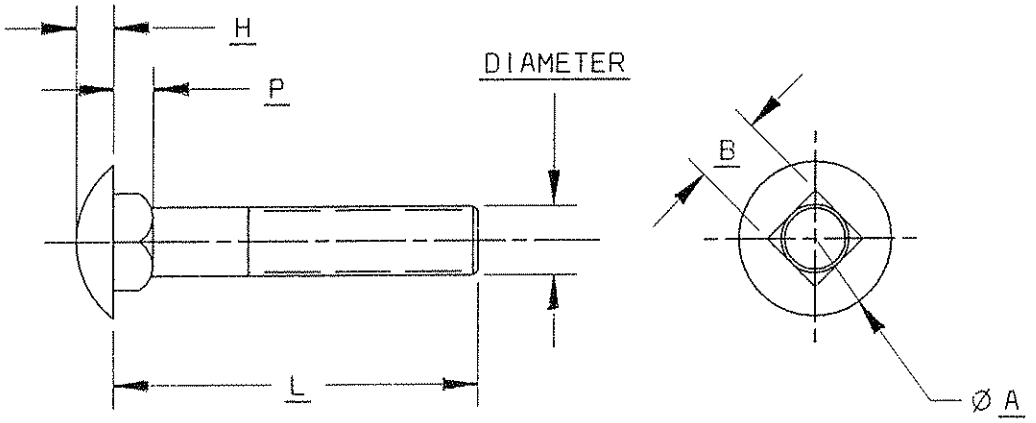
(2) ALTERNATE MATERIAL: STAINLESS STEEL, TYPE 304

3. DIMENSIONAL PROPERTIES WILL CONFORM TO ANSI B18.3 1969.

COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	DJL	11-15-83		(1) (2)	01040	0001

ADRIENNE CHILBERG

DRAWN	FEF	TITLE	DRAWING NUMBER
APPRV	DJL	BOLT-ROUND HEAD SQUARE NECK, SST	23-11554
DATE	11/28/83	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. C
CATIA ORIGINAL			



THREAD SIZE	DIAMETER (MAX)	DIMENSIONS								FREIGHTLINER PART NUMBERS*
		A		B		H		P		
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
10-24	.190	.438	.469	.185	.199	.094	.114	.094	.125	23-11554-L
1/4-20	.250	.563	.594	.245	.260	.125	.145	.125	.156	23-11555-L
5/16-18	.312	.688	.719	.307	.324	.156	.176	.156	.187	23-11556-L
3/8-16	.375	.782	.844	.368	.388	.188	.208	.188	.219	23-11557-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-11554-150 IS A 10-24 BOLT 1-1/2 INCHES LONG.

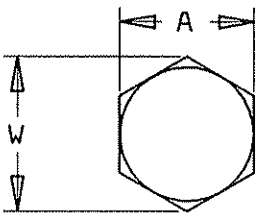
ENGINEERING NOTES:

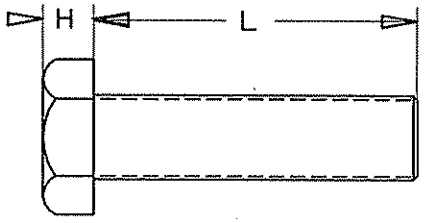
1. MATERIAL: STAINLESS STEEL, TYPE 302-304
2. DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5.

CHG	JOB NO	DATE	BY	REVISION
C	PA2042-76	05/14/97	DAJ	REVISED AND REDRAWN IN CATIA.

DRIENNE CHILBERG

DRAWN	FHC	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-SST, HEX HEAD FULLY THREADED	23-11578	
DATE	06/24/96			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -





NOM. SIZE & THREAD	BSC MAJ. DIA.	A MAX	W MIN	H MAX	FREIGHTLINER PART NUMBER
10-32 UNF	.190	.312	.340	.120	23-11585-L
3/8-16 UNC	.375	.562	.628	.243	23-11592-L

COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDREDTHS OF AN INCH.

EXAMPLE: 23-11592-300 SPECIFIED A 3/8-16 HEX HEAD SCREW 3.0 INCHES LONG.

ENGINEERING NOTES:

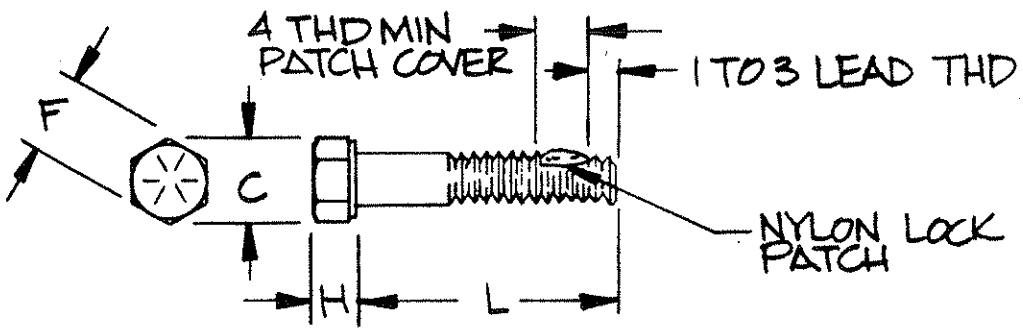
1. MATERIAL: STAINLESS STEEL, PER ASTM F593, GROUP 1 OR 2.
2. DIMENSIONS: PER ANSI B18.6.3 FOR # 12 AND SMALLER.
   PER ANSI B18.2.1 FOR 1/4 AND LARGER.

CHG	JOB NO	DATE	BY	REVISION
-	PA2042-70	06/24/96	FHC	REVISED AND REDRAWN.

3-11649
3-11650

MSTR# DWG#

ORIGINAL JOB NO.	TITLE	01010 000D1	PART NO.
SAR 28041	CAP SCREW, HEX NYLON LOCK	GRADE 8	23-11649 & 23-11650
LAST CHG LTR			SHEET 1 OF 1



THREAD	F FLATS (BASIC)	C CORNERS (MAX)	H HEIGHT (MAX)		FREIGHTLINER PART NUMBER*
1/2-20 UNF	3/4	.886	.323		23-11649-L
9/16-18 UNF	13/16	.938	.371		23-11650-L

*Complete part number by adding a three digit dash number expressing length, L, in hundredths of an inch.

ENGINEERING NOTES:

(1) Material: Steel, Grade 8 bolt material.

2. Locking element consists of nylon patch applied externally to the regular thread.

3. Must conform to all applicable provisions of SAE Standard J105.

4. Finish: Plain

CHANGE INFORMATION	DATE	BY	JOB NO.	JR

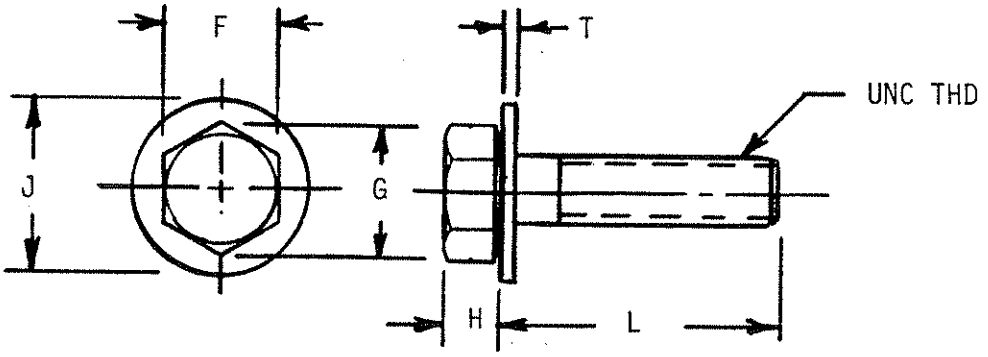
CHANGE INFORMATION	DATE	BY	JOB NO.	JR

COMPILED	DCR	DATE DRAWN		MATERIAL	MASTER NUMBER	
APPROVED		3/13/84		(1)	01010	000D1

M/F

23-11652 thru -11653

ORIGINAL JOB NO.	TITLE	PART NO.
J0254	CAPSCREW, HEX HEAD STAINLESS STEEL, WITH FLAT WASHER	23-11652 thru 23-11653
LAST CHG LTR		SHEET 1 OF 1



THREAD UNC	F BASIC	G MAX.	H MAX.	J OUTSIDE DIA. ±.010	T THICKNESS MAX.	T THICKNESS MIN.	FREIGHTLINER PART NUMBER*
5/16 - 18	1/2	0.577	0.235	0.687	0.080	0.051	23-11652-L
1/2 - 13	3/4	0.866	0.364	1.062	0.160	0.108	23-11653-L

* To complete part number add 3-digit dash number expressing length, L, in 1/100's of an inch. Thus for a 1/2 - 13 UNC capscrew 1-1/4" long, write 23-11653-125.

ENGINEERING NOTES:

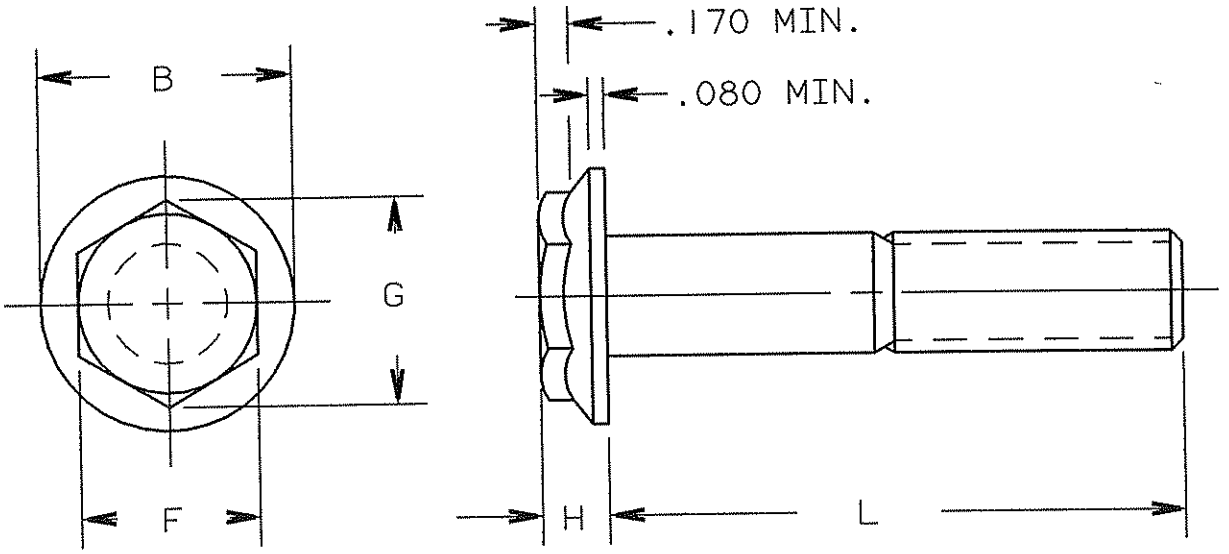
1. MATERIAL: Stainless, steel, per ASTM F593, Group 1, Condition SH, Yield Min. 95 (KSI), Tensile 120 (KSI). Rockwell Hardness C24 to C36.
2. Thread Form, thread length and other dimensional characteristics of the capscrew shall meet pertinent provisions of SAE Standard J105.
3. Captive Flat Washer, free turning.
4. "Finish": Electro-polished.

CHANGE INFORMATION	DATE	BY	JOB NO.	TR

CHANGE INFORMATION	DATE	BY	JOB NO.	TR

COMPILED	CGB	DATE DRAWN			
APPROVED		3/15/84	01010	00051	

DRAWN	BT	TITLE BOLT-FLANGE LOW PROFILE	ITEM NUMBER 23-11862
APPRV	DFW		
DATE	07/02/87	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD	F	G (MAX)	B (MAX)	H (MAX)	FREIGHTLINER PART NUMBER
5/8-11 UNC	.937 .922	1.083	1.330	.350	23-11862-L

DASH NUMBER = LENGTH L IN HUNDREDTHS OF AN INCH.
EXAMPLE: 23-11862-300 IS 3.000" LONG.

ENGINEERING NOTES:

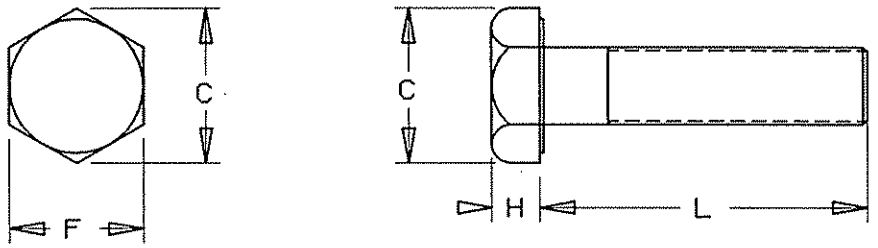
1. MATERIAL: SAE J429 GRADE 8 OR 8.2.
2. FINISH: PLAIN
3. DIMENSIONS ARE FOR REFERENCE ONLY EXCEPT HEAD HEIGHT(H). FOR DETAILS, REFER TO IFI 111.

A

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	PF0903-07	02/17/94	ERK	REDRAWN: NOTE #3 ADDED.

DRIENNE CHILBERG

DRAWN	RJN	TITLE	DRAWING NUMBER	
APPRV	KRH	SCREW-CAP, HEX, PATCHLOCK, STAINLESS STEEL	23-11681	
DATE	07/16/84			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. C



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC	7/16	.505	.163	23-11681-L
5/16 -18 UNC	1/2	.577	.211	23-11682-L
3/8 - 16 UNC	9/16	.650	.243	23-11683-L

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.

E.G. 23-11683-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:

MATERIAL: STAINLESS STEEL, TYPE 302 OR 304

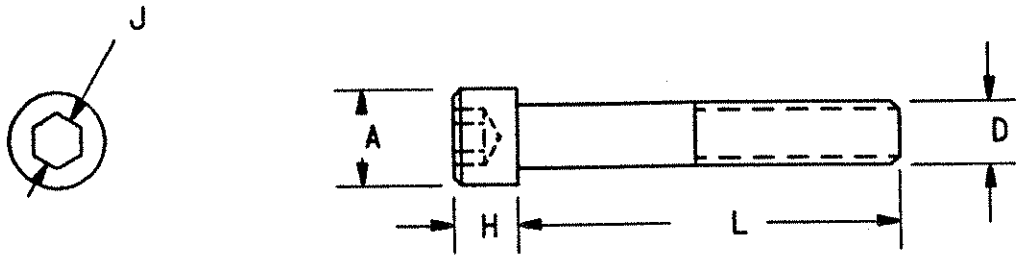
LOCKING ELEMENT MUST MEET THE PERFORMANCE REQUIREMENTS OF IFI 124.

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

BASIC THREAD LENGTH (REF): TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES.)
TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES.)

CHG	JOB NO	DATE	BY	REVISION
-	PL0156-01	07/16/84	RJN	INITIAL RELEASE
B	P*A078-99	12/21/88	ANF	REVISED AND REDRAWN
C	PA2042-70	06/24/96	FHC	REVISED AND REDRAWN TO REMOVE FULL THREAD DIA.

ORIGINAL JOB NO.	TITLE	PART NO.
L0197	CAPSCREW, HEXAGON SOCKET HEAD STAINLESS STEEL	23-11684
LAST CHG LTR		SHEET 1 OF 1



NOMINAL SIZE	D BASIC	A MAX	H MAX	J NOM		FREIGHTLINER PART NUMBER *
1/4-20 UNC	.2500	.375	.250	.188		23-11684-L

* COMPLETE PART NUMBER BY ADDING A 3-DIGIT DASH NUMBER EXPRESSING LENGTH IN 1/100THS OF AN INCH.

ENGINEERING NOTES:

(1) MATERIAL: STAINLESS STEEL, TYPE 302 OR 304
ULTIMATE STRENGTH: 80,000 PSI MIN
YIELD STRENGTH: 40,000 PSI MIN

2 DIMENSIONAL PROPERTIES WILL CONFORM TO ANSI B18.3 1969.

COMPILED	RJN	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	KRH	07-16-84		(1)	01040	000D1

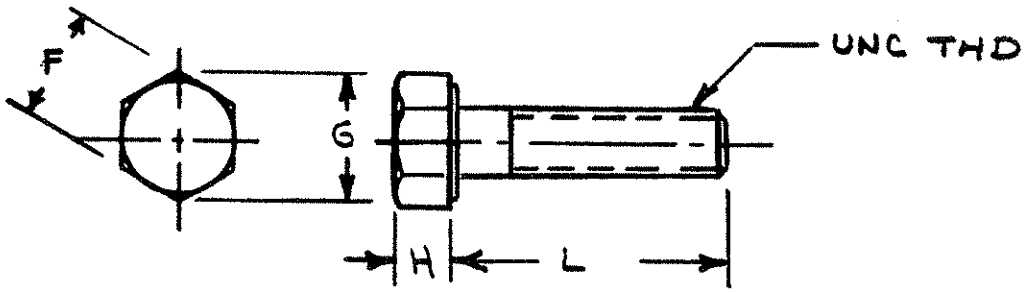
M/F

23-11691

General Use Part

ORIGINAL JOB NO.	TITLE	PART NO.
	CAPSCREW, HEX HEAD STAINLESS STEEL	23-11691
LAST CHG LTR		SHEET 1 OF 1

SKETCH



PART NUMBERS

THREAD UNC	F BASIC	G MAX.	H MAX.	FREIGHTLINER PART NUMBER*
5/8-11	15/16	1.083	.403	23-11691-125

*To complete part number add 3-digit dash number expressing length, L, in 1/100's of an inch. Thus for a 5/8-11 UNC capscrew 1-1/4 long, write 23-11691-125.

ENGINEERING NOTES

(1) Material: Stainless, steel, type 302 or ASTM alloy Group 1 or 2.

2. Thread form, thread length and other dimensional characteristics of the capscrew shall meet pertinent provisions of SAE Standard J105.

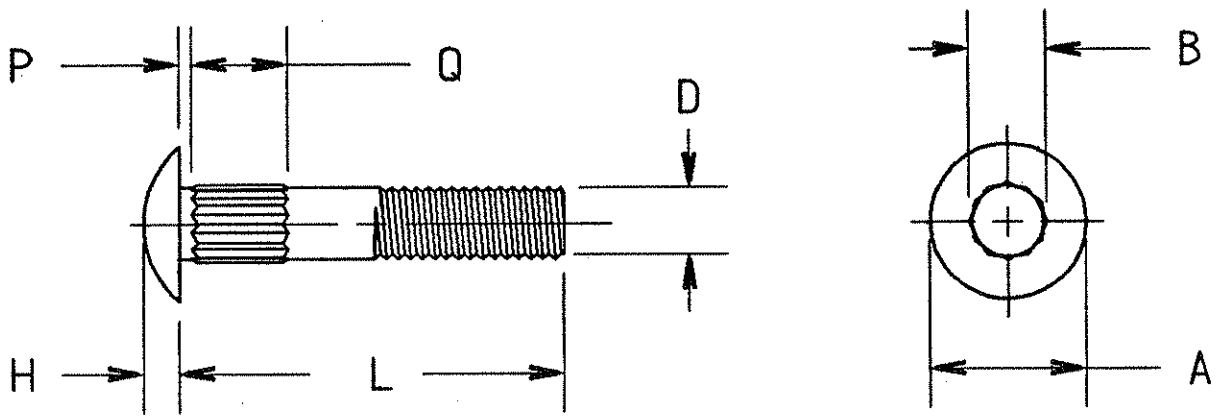
LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
	J0254	CGB	9/12/84	

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

COMPILED	CGB	DATE DRAWN		MATERIAL	MASTER NUMBER	
APPROVED		9-13-84		(1)	01010	000D1

ORIGINAL JOB NO.	TITLE	PART NO.
L0140	CARRIAGE BOLT ROUND HEAD, RIBBED NECK	23-11693
LAST CHG LTR		SHEET 1 OF 2

SKETCH:



PART NUMBERS:

SIZE		BODY DIA	A		H		B	FREIGHTLINER PART NUMBER
D	THDS PER IN.	MAX	MIN	MAX	MIN	MAX	MIN	23-11693- *
3/8	16	.388	.782	.844	.188	.208	.405	

P			Q			APPROX NO OF RIBS
FOR L = 7/8 OR LESS	FOR L = 1 OR MORE	PLUS OR MINUS	FOR L = 7/8 OR LESS	FOR L = 1 & 1 1/8	FOR L= 1 1/4 OR MORE	
.031	.063	.031	.188	.313	.500	12

* COMPLETE PART NO BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDREDTHS OF AN INCH. EXAMPLE: 23-11693-075 SPECIFIES A 3/8-16 UNC BOLT 3/4 INCH LONG.

ENGINEERING NOTES:

SEE SHEET 2 OF 2

COMPILED	RDF	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	RDF	10-10-84		1	01260	00001

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE

ORIGINAL JOB NO.	TITLE	PART NO.
L0140	CARRIAGE BOLT ROUND HEAD, RIBBED NECK	23-11693
LAST CHG LTR		SHEET 2 OF 2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION

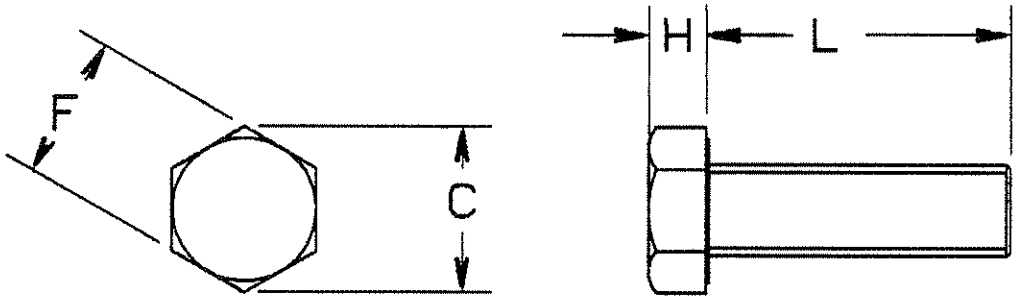
ENGINEERING NOTES:

1. MATERIAL: MILD STEEL PER SAE J429, CADMIUM OR ZINC PLATE.
2. THREADS SHALL BE UNIFIED NATIONAL COARSE, CLASS 2A.
3. MEASURE THREAD LENGTHS FROM END OF BOLT TO LAST COMPLETE THREAD. MINIMUM THREAD LENGTH IS TWO DIAMETERS PLUS 1/4 INCH FOR BOLTS UP TO AND INCLUDING 6 INCHES LONG, AND TWO DIAMETERS PLUS 1/2 INCH FOR BOLTS OVER 6 INCHES LONG. WHEN BOLTS ARE TOO SHORT FOR FORMULA THREAD LENGTH, THREAD WILL EXTEND AS CLOSE TO NECK AS PRACTICABLE.
4. TOLERANCES FOR 6 INCH LENGTH AND LESS ARE PLUS OR MINUS 1/32 INCH FOR SIZES 1/4 TO 3/8 INCH.
5. NOTE MAXIMUM BODY DIAMETER.

COMPILED	RDF	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	RDF	10-11-84		1	01260	000D1

PORTLAND FREIGHTLINER CORPORATION OREGON 97208

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, HEX, STAINLESS STEEL ELECTRO-POLISHED	23-11694
DATE	04/24/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
5/16- 18 UNC	1/2	.577	.211	23-11694-L
1/2 - 13 UNC	3/4	.866	.323	23-11695-L
5/8 - 11 UNC	15/16	1.083	.403	23-11696-L

COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-11694-300 IS A 5/16-18 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:

MATERIAL: STAINLESS STEEL, TYPE 302 OR ASTM F593 ALLOY GROUP 1 OR 2

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

FINISH :ELECTRO-POLISHED

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	P*C162-09	04/24/89	PCK	REDRAWN. C.A.D.PART NO. WAS 23-11694/23-11696

GENERAL USE PART

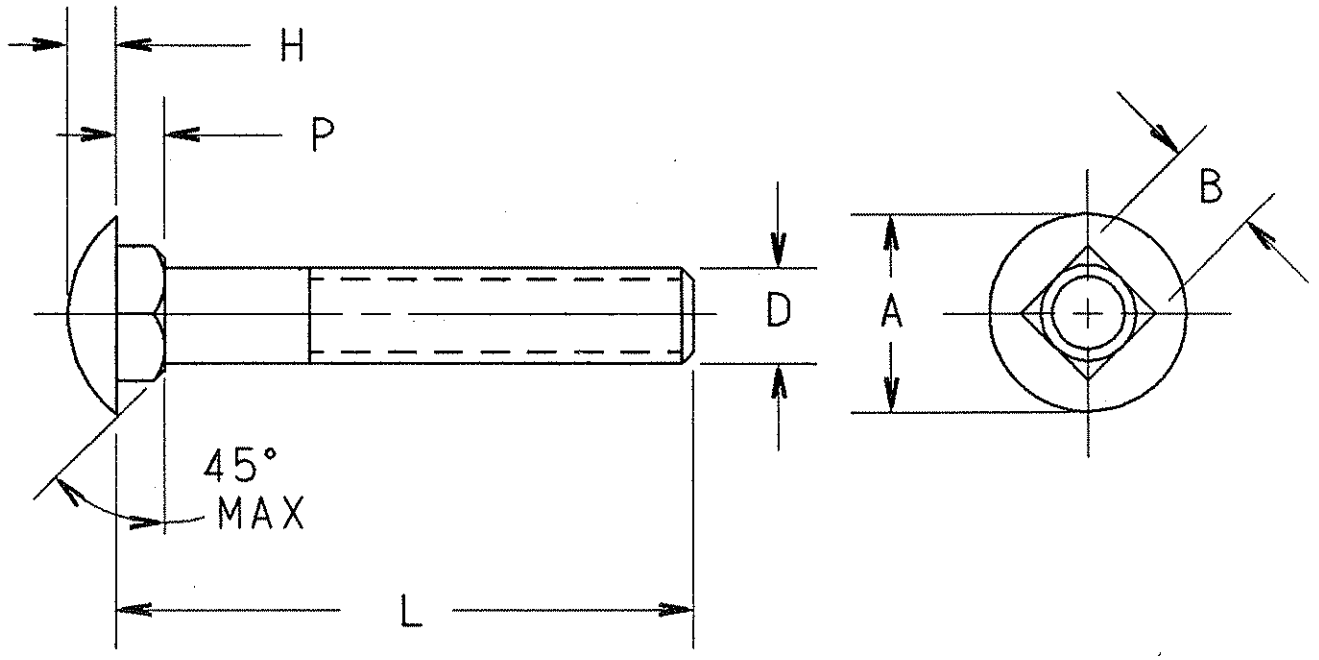
23-11697 THRU 23-11703

ORIGINAL JOB NO.	TITLE	PART NO.
J0284	CARRIAGE BOLT ROUND HEAD, SQUARE NECK , GRADE 5	23-11697 THRU 23-11703
LAST CHG LTR —		SHEET 1 OF 1

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

SKETCH



PART NUMBERS:

D	BODY DIA	A		H		P		B		FREIGHTLINER
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	PART NUMBER
1/4-20	.250	.563	.594	.125	.145	.125	.156	.245	.260	23-11697-L
5/16-18	.312	.688	.719	.156	.176	.156	.187	.307	.324	23-11698-L
3/8-16	.375	.782	.844	.188	.208	.188	.219	.368	.388	23-11699-L
7/16-14	.438	.907	.969	.219	.239	.219	.250	.431	.452	23-11700-L
1/2-13	.500	1.032	1.094	.250	.270	.250	.281	.492	.515	23-11701-L
5/8-11	.625	1.219	1.344	.313	.344	.313	.344	.616	.642	23-11702-L
3/4-10	.750	1.469	1.594	.375	.406	.375	.406	.741	.768	23-11703-L

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDRETHS OF AN INCH. EXAMPLE: 23-11701-075 SPECIFIES A 1/2-13 CARRIAGE BOLT 3/4" LONG.

ENGINEERING NOTES

(1) MATERIAL: STEEL, CD PLATED.

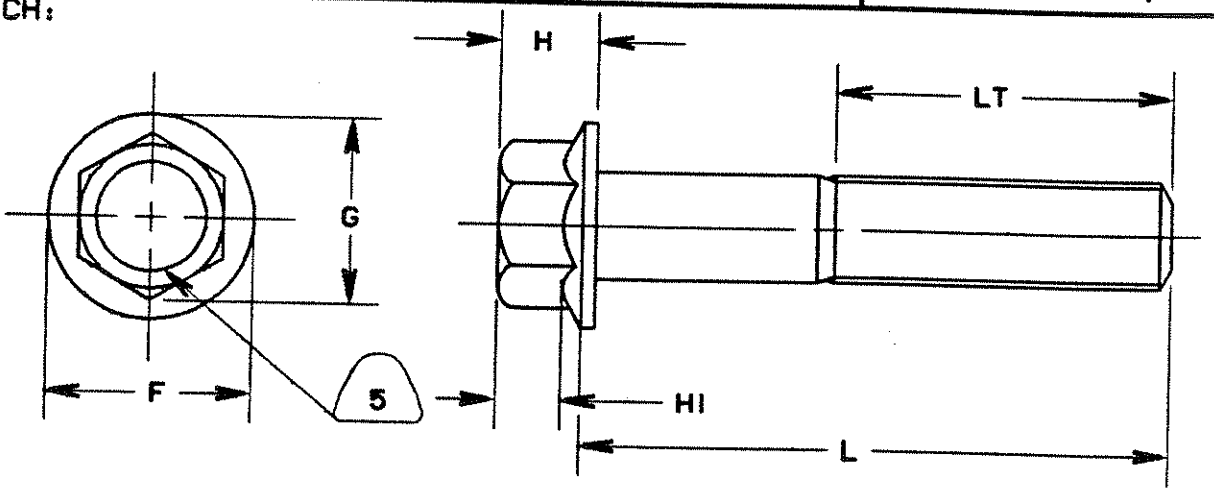
2. BOLT MUST MEET OR EXCEED SAE J429, GRADE 5 REQUIREMENTS.
3. ROUND HEAD SQUARE NECK CARRIAGE BOLT PER SAE J481.
4. THREAD LENGTH EQUALS TWO DIA PLUS 1/4 INCH.

COMPILED	BT	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	JD	10-12-84		(1)	01270	000D1

THRU 23-11740

ORIGINAL JOB NO.	TITLE	PART NO.
H0163	BOLT, FLANGED HEX HEAD, GRADE 8 COURSE THREAD, ZINC AND WAXED	23-11733 - 23-11740
LAST CHG LTR -		SHEET 1 OF 1

SKETCH:



THREAD	F	G (MAX)	B (MAX)	H (MAX)	HI (MIN)	LT		FREIGHTLINER PART NUMBER (1)
						L < 6"	L > 6"	
1/4-20	.438	.505	.560	.280	.170	.750	1.000	23-11733-L
5/16-18	.500	.577	.680	.320	.210	.875	1.125	23-11734-L
3/8-16	.562	.650	.810	.390	.250	1.000	1.250	23-11735-L
7/16-14	.688	.722	.930	.460	.300	1.125	1.375	23-11736-L
1/2-13	.750	.866	1.070	.510	.340	1.250	1.500	23-11737-L
9/16-12	.875	.938	1.190	.570	.380	1.375	1.625	23-11738-L
5/8-11	.938	1.083	1.330	.620	.420	1.500	1.750	23-11739-L
3/4-10	1.125	1.299	1.590	.730	.510	1.750	2.000	23-11740-L

(1) COMPLETE PART NUMBER BY ADDING A 3-DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDRETHS OF AN INCH, E.G., 23-11737-175 CALLS OUT 1/2-13 UNC 1.750" LONG.

(2) MATERIAL: SAE J429 GRADE 8 OR 8.2

(3) FINISH: ZINC PLATE PER 49-00005-203 AND WAX.

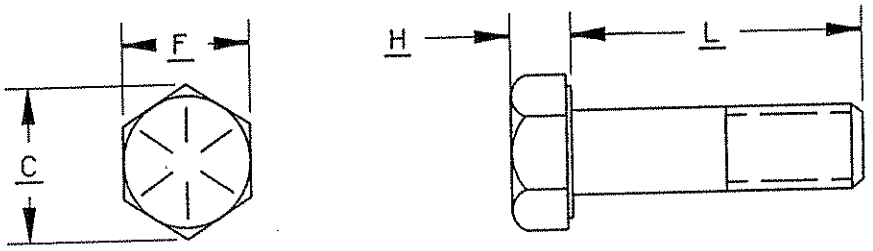
4. THREAD: UNIFIED COURSE CLASS 2A

(5) GRADE 8 OR 8.2 IDENTIFICATION

COMPILED	DAR	DATE DRAWN	CADAM ORIGINAL	MATERIAL/FINISH	MASTER NUMBER	
APPROVED	VHD	05-31-85		(2) (3)	01010	000D1

CHANGE INFORMATION | DATE | BY | JOB NO. | LTR

DRAWN	DAJ	TITLE CAPSCREW-HEX FINISHED, GR. 8, ZINC & WAX	DRAWING NUMBER 23-11743
APPRV	DAJ		
DATE	01/29/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. J
CATIA ORIGINAL			



THREAD SIZE	DIMENSIONS			FREIGHTLINER PART NUMBERS*
	F (BASIC)	C (MAX)	H (MAX)	
1/4 -20 UNC	7/16	.505	.163	23-11743-L
1/4 -28 UNF	7/16	.505	.163	23-11744-L
5/16-18 UNC	1/2	.577	.211	23-11745-L
5/16-24 UNF	1/2	.577	.211	23-11746-L
3/8 -16 UNC	9/16	.650	.243	23-11747-L
3/8 -24 UNF	9/16	.650	.243	23-11748-L
7/16-14 UNC	5/8	.722	.291	23-11749-L
7/16-20 UNF	5/8	.722	.291	23-11750-L
1/2 -13 UNC	3/4	.866	.323	23-11751-L
9/16-12 UNC	13/16	.938	.371	23-11753-L
5/8 -11 UNC	15/16	1.083	.403	23-11755-L
5/8 -18 UNF	15/16	1.083	.403	23-11756-L
3/4 -10 UNC	1 1/8	1.299	.483	23-11757-L
3/4 -16 UNF	1 1/8	1.299	.483	23-11758-L
7/8 -14 UNF	1 5/16	1.516	.563	23-11760-L
1 - 8 UNC	1 1/2	1.732	.627	23-11761-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-11755-300 IS A 5/8-11 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE STANDARD J429.
2. FINISH: ZINC PLATE AND WAX PER FTL SPEC 49-00005-203
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
2. BASIC THREAD LENGTH (REF):
   TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES).
   TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES).

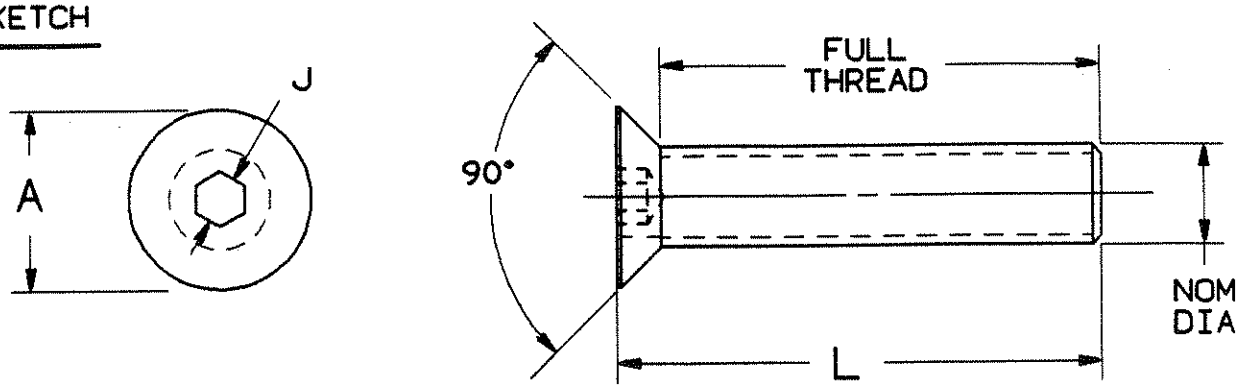
CHG	JOB NO	DATE	BY	REVISION
J	P2D360-43	01/29/98	DAJ	REVISED AND REDRAWN IN CATIA. ADDED 23-11744.

GENERAL USE PART

23-11795 THRU 23-11804

ORIGINAL JOB NO.	TITLE	PART NO.
277328P	CAP SCREW, FLAT HEAD, HEX SOCKET DIN 7991 METRIC CLASS 10.9	23-11795 THRU 23-11804
LAST CHG LTR: -		SHEET 1 OF 1

SKETCH



NOM DIA	PITCH	A	J		FREIGHTLINER PART NUMBER *
3	.5	6	2		23-11795-L
4	.7	8	2.5		23-11796-L
5	.8	10	3		23-11797-L
6	1	12	4		23-11798-L
8	1.25	16	5		23-11799-L
10	1.5	20	6		23-11800-L
12	1.75	24	8		23-11801-L
16	2	30	10		23-11802-L
18	2.5	33	12		23-11803-L
20	2.5	36	12		23-11804-L

* COMPLETE PART NUMBER BY ADDING A 3-DIGIT DASH NUMBER EXPRESSING LENGTH IN MILLIMETERS.

ENGINEERING NOTES:

1. FASTENER SHALL CONFORM TO DIN 7991, CLASS 10.9, ISO/R68, R262, R724.
2. MATERIAL: HEAT TREATED ALLOY STEEL.
   MIN TENSILE STRENGTH, KGF/MM^2: 100
   MIN YIELD STRENGTH %: 90
3. FINISH: PLAIN.
4. ALL DIMENSIONS ARE REFERENCE & IN MILLIMETERS.

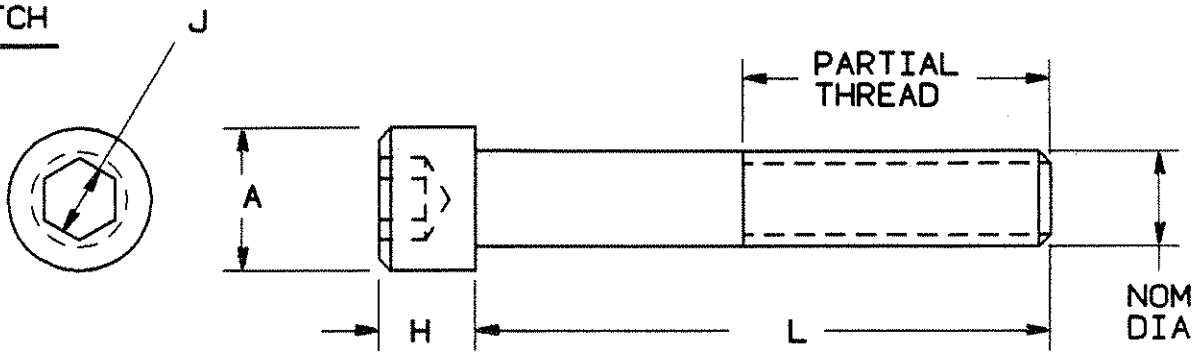
COMPILED	DWR	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	DLP	09-27-85		2	01050	000D1

GENERAL USE PART

23-11785 THRU 23-11794

ORIGINAL JOB NO.	TITLE	PART NO.
277328P	CAP SCREW, HEX SOCKET HEAD DIN 912 METRIC CLASS 12.9	23-11785 THRU 23-11794
LAST CHG LTR		SHEET 1 OF 1

SKETCH



NOM DIA	PITCH	A	H	J		FREIGHTLINER PART NUMBER *
3	.5	5.5	3	2.5		23-11785-L
4	.7	7	4	3		23-11786-L
5	.8	8.5	5	4		23-11787-L
6	1	10	6	5		23-11788-L
8	1.25	13	8	6		23-11789-L
10	1.5	16	10	8		23-11790-L
12	1.75	18	12	10		23-11791-L
16	2	24	16	14		23-11792-L
18	2.5	27	18	14		23-11793-L
20	2.5	30	20	17		23-11794-L

* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING LENGTH IN MILLIMETERS.

ENGINEERING NOTES:

1. FASTENER SHALL COMFORM TO DIN 912,CLASS 12.9,ISO/R68, R262,R724.
2. MATERIAL: HEAT TREATED ALLOY STEEL.
   MIN TENSILE STRENGTH,KGF/MM^2: 100
   MIN YIELD STRENGTH %: 90
3. FINISH: PLAIN.
4.

THREAD LENGTH:	BOLT DIA:	3	4	5	6	8	10	12	16	18	20
	UNDER 125	12	14	16	18	22	26	30	38	42	46
	130 TO 200				24	28	32	36	44	48	52
	OVER 200						45	49	57	61	65

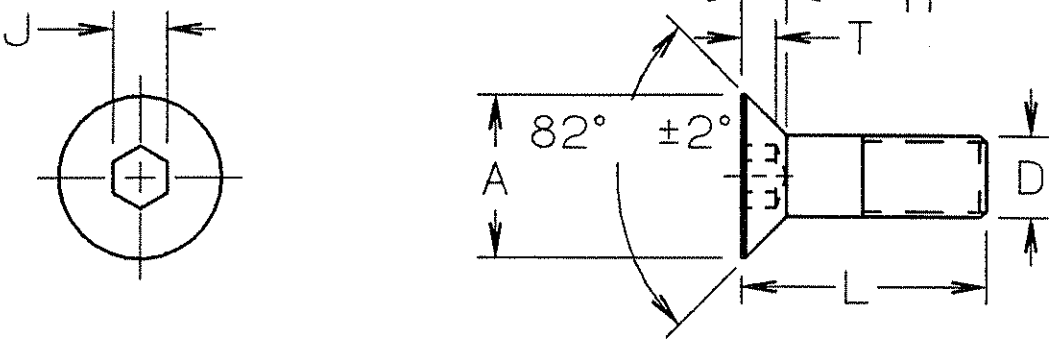
5. ALL DIMENSIONS ARE REFERENCE & IN MILLIMETERS.

COMPILED	DWR	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	DLP	09-27-85		2	01040	000D1

CHANGE INFORMATION | DATE | BY | JOB NO. | TR

CHANGE INFORMATION | DATE | BY | JOB NO. | TR

DRAWN	CKR	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, FLAT HEAD TORX AND HEX SOCKET PLATED	23-11815
DATE	06/03/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



NOM SIZE	D BODY DIA MAX	D BODY DIA MIN	A HEAD DIA MAX	A HEAD DIA MIN	H HEAD HT REF. FLUSH TOL.	J HD. SKT NOM.	T ENGA. MIN.
1/4 – 20 1/4 – 28	.2500	.2435	.531	.480	.161 .016	5/32	.111
5/16-18	.3125	.3053	.656	.600	.198 .017	3/16	.135
3/8-16	.3750	.3678	.781	.720	.234 .018	7/32	.159

NOM SIZE & THREADS	FREIGHTLINER* PART NUMBER	NOM SIZE &THREADS	FREIGHTLINER* PART NUMBER
1/4-28	23-11816-L	3/8-16	23-11819-L
5/16-18	23-12084-L		

HEX RECESS IS NON-PREFERRED
SEE SHEET 2 FOR TORX DRIVE

* ADD A THREE DIGIT DASH NUMBER TO EXPRESS LENGTH IN ONE-HUNDREDTH OF AN INCH. THUS FOR A 1/4-28 CAPSCREW 1" LONG, WRITE 23-11816-100

MATERIAL: ASTM F835

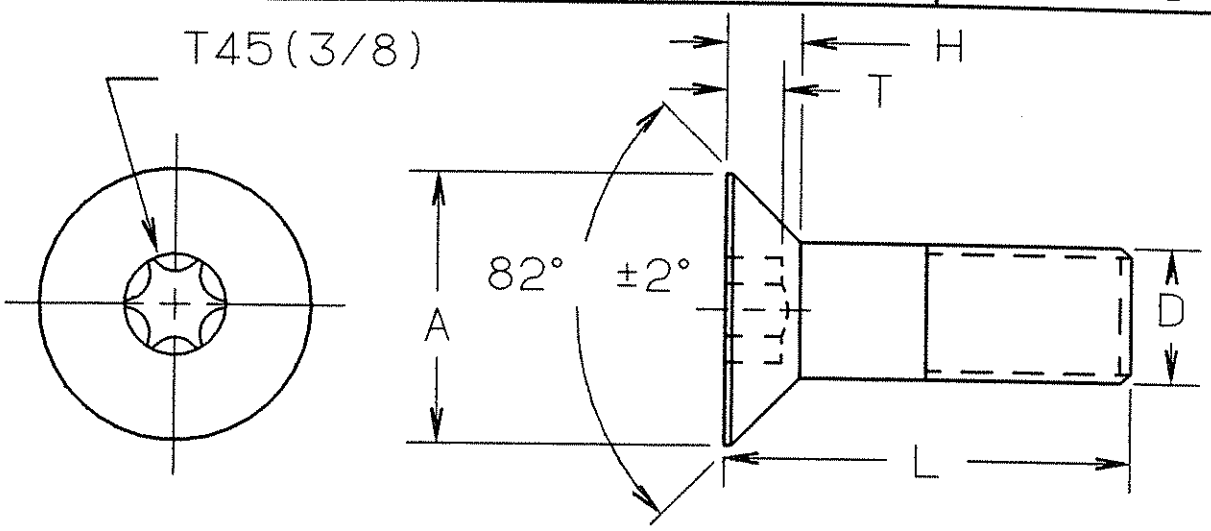
FINISH: ZINC PLATE PER FREIGHTLINER SPEC 49-00005-403

DIMENSIONS SHOWN ARE FOR REFERENCE ONLY. REFER TO ANSI B18.3 FOR DETAILS

PARTS MUST BE FREE FROM HYDROGEN EMBRITTLEMENT

CHG	JOB/RLSE NO	DATE	BY	REVISION
E	PA2029-83	06/03/91	K R	REDRAWN. DELETED 23-12084-7XX ON SHT 2, ADDED 23-12084-L ON SHEET 1

DRAWN	CKR	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, FLAT HEAD TORX AND HEX SOCKET PLATED	23-11815
DATE	06/03/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2



NOM SIZE	D	A		H	T
	BODY DIA	HEAD DIA		HEAD HT	ENGA.
	BASIC	MAX	MIN	REF.	MIN.
5/16-18	.3125	.656	.600	.198	.087
3/8-16	.3750	.781	.720	.234	.105

NOM SIZE &THREADS	FREIGHTLINER PART NUMBER *
3/8-16	23-11819-7XX

* FOR TORX DRIVE SCREWS, COMPLETE PART NUMBER WITH A 3 DIGIT SIGNIFICANT DASH NUMBER AS FOLLOWS: FIRST DIGIT - 7 INDICATES TORX DRIVE SYSTEM
SECOND DIGIT- X INDICATES WHOLE INCHES
THIRD DIGIT - X INDICATES EIGHTHS OF AN INCH (7 MAX)
E.G. 23-11819-715 IS A 3/8-16, FHIT CAP SCREW 1 5/8 INCH LONG.

MATERIAL: STEEL PER ASTM F835.
FINISH: ZINC PLATE PER FREIGHTLINER SPEC 49-00005-403
TORX RECESS: T45(3/8) PER CAMCAR STD TXH402
DIMENSIONS: PER ANSI B18.3. ABOVE DIMENSIONS FOR REFERENCE ONLY.

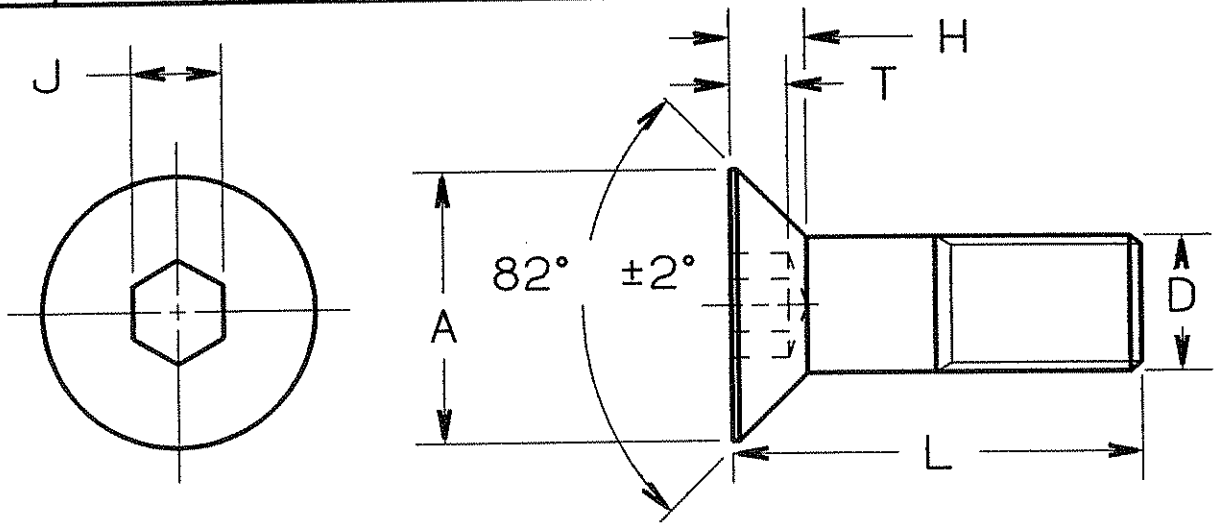
RECOMMENDED TORQUE VALUES

FOR 3/8-16 SCREWS: 37 FT-LBS MIN.,41 FT-LBS TARGET,45 FT-LBS MAX.

PARTS MUST BE FREE FROM HYDROGEN EMBRITTLEMENT

CHG	JOB/RLSE NO	DATE	BY	REVISION
E	PA2029-83	06/03/01	K R	REDRAWN. DELETED 23-12084-7XX ON SHEET 2 ADDED 23-12084-L ON SHEET 1

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-FL HD HEX SKT STAINLESS STEEL	23-11839
DATE	06/01/88	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



NOM SIZE	D		A		H		J	T
	BODY DIA		HEAD DIA		HEAD HT		HD. SKT	ENGA.
	MAX	MIN	MAX	MIN	REF.	FLUSH TOL.	NOM.	MIN.
1/4-20 28	.2500	.2435	.531	.480	.161	.016	5/32	.111
1/2-13	.5000	.4919	.937	.872	.251	.018	5/16	.172

NOM SIZE & THREADS	FREIGHTLINER PART NUMBER*	NOM SIZE &THREADS	FREIGHTLINER PART NUMBER*
1/4-20	23-11839-L	1/2-13	23-11847-L
1/4-28	23-11840-L		

* ADD A THREE DIGIT DASH NUMBER TO EXPRESS LENGTH IN ONE-HUNDREDTH OF AN INCH. THUS FOR A 1/4-28 CAPSCREW 1"LONG, WRITE 23-11840-100

MATERIAL: AISI 302/304 STAINLESS STEEL

TENSILE STRENGTH(MIN): 75,000 PSI. BRINNELL HARDNESS 160 AVE.

DIMENSIONS SHOWN ARE FOR REFERENCE ONLY. REFER TO ANSI B18.3 FOR DETAILS

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	325091-05	06/01/88	PCK	REDRAWN/DOCUMENTED

GENERAL USE PART

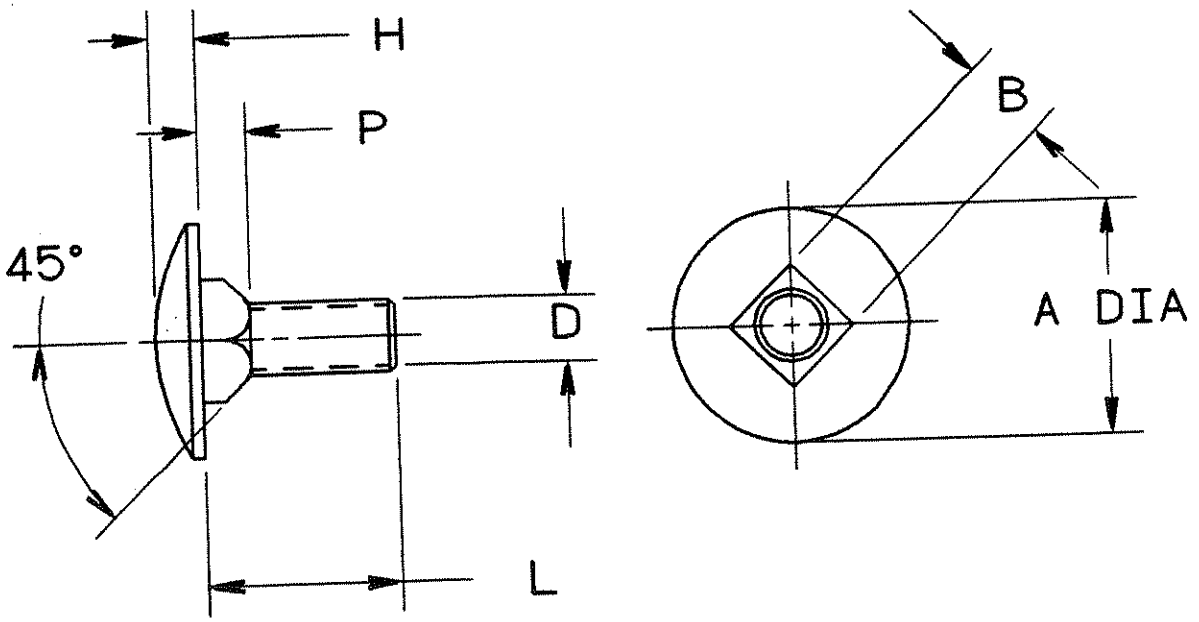
ORIGINAL JOB NO.	TITLE	PART NO.
H0277	STEP BOLT ROUND HEAD, SQUARE NECK , GRADE 2	23-11855
LAST CHG LTR: A		SHEET 1 OF 1

23-11855

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR
GRADE 5 TO 2	01-05-88	DRE	PH0277	A

SKETCH



PART NUMBERS:

D	BODY DIA	A		H		P		B		FREIGHTLINER PART NUMBER
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
3/8-16	.375	1.188	1.219	.188	.208	.188	.219	.368	.388	23-11855-L

* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDRETHS OF AN INCH. EXAMPLE: 23-11855-075 SPECIFIES A 3/8-16 STEP BOLT 3/4" LONG.

ENGINEERING NOTES

1. MATERIAL: STEEL, ZINC PLATE PER 49-00005-203.
2. BOLT MUST MEET OR EXCEED SAE J429, GRADE 2 REQUIREMENTS.
3. ROUND HEAD SQUARE NECK STEP BOLT PER SAE J481.

(A)

COMPILED	DRE	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	TAL	12-22-86		1	01250	000D1

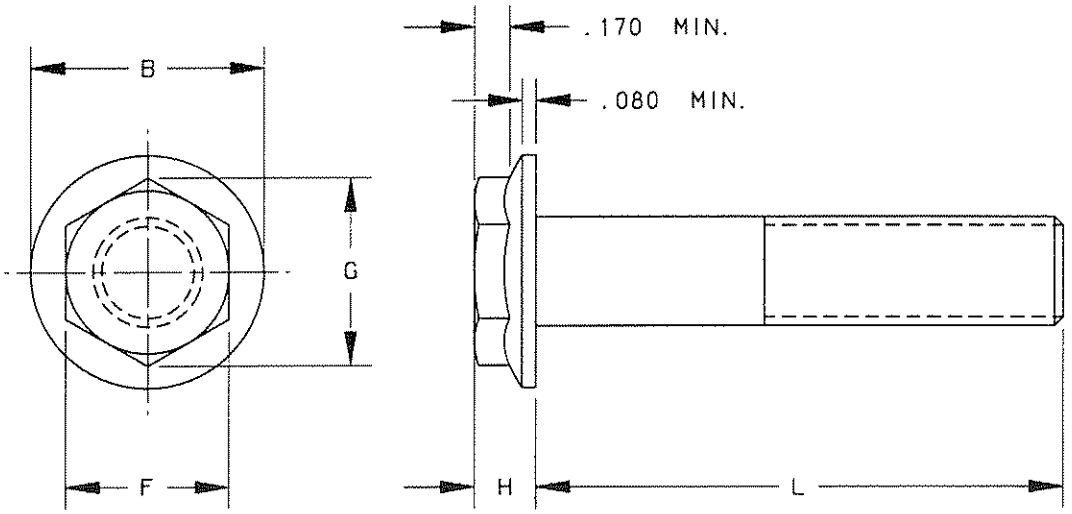
M

PORTLAND FREIGHTLINER CORPORATION OREGON 97208

EAC-826

23-11862 , B , BOLT-FLANGE

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	BOLT-FLANGE LOW PROFILE	23-11862	
DATE	08/19/99			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. B



THREAD	F	G (MAX)	B (MAX)	H (MAX)	FREIGHTLINER PART NUMBER
11/16-11 UNC	.937 .922	1.083	1.330	.350	23-11862-L

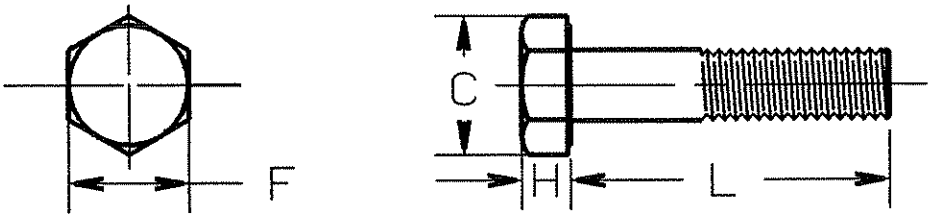
DASH NUMBER = LENGTH L IN HUNDREDTHS OF AN INCH.
EXAMPLE: 23-11862-300 IS 3.000" LONG.

ENGINEERING NOTES:

1. MATERIAL: SAE J429 GRADE 8 OR 8.2.
2. FINISH: PHOS & OIL PER F/L SPEC 49-00006-041.
3. DIMENSIONS ARE FOR REFERENCE ONLY EXCEPT HEAD HEIGHT(H). FOR DETAILS, REFER TO IFI 111.

CHG	JOB NO	DATE	BY	REVISION
B	P09678-01	08/19/99	CGD	REVISED AND REDRAWN IN CATIA. FINISH WAS PLAIN.

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	-	SCREW - CAP, HEX, GRADE 8/8.2 HIGHLY CORROSIVE RESISTANT FINISH	23-12001
DATE	06/26/92	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	L LENGTH	F BASIC	C MAX	H MAX	FREIGHTLINER PART NUMBER
5/16-18 UNC	1.500	.500	.577	.211	23-12001-150

A

1 MATERIAL :GRADE 8/8.2 PER SAE STANDARD SAE J429

2 DIMENSIONAL AND MECHANICAL PROPERTIES MUST CONFORM TO ANSI B18.2.1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY

3 FINISH TO BE BRIGHT SILVER FINISH PER FREIGHTLINER SPECIFICATION 49-00081.

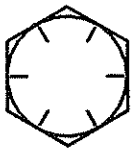
4 THREAD FORM:UNC/UNF CLASS 2A

5 BASIC THREAD LENGTH(REF):

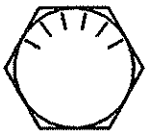
TWICE DIA+1/4(FOR LENGTHS UPTO 6 INCHES)

TWICE DIA+1/2(FOR LENGTHS ABOVE 6 INCHES)

GRADE MARKINGS PER SAE J429



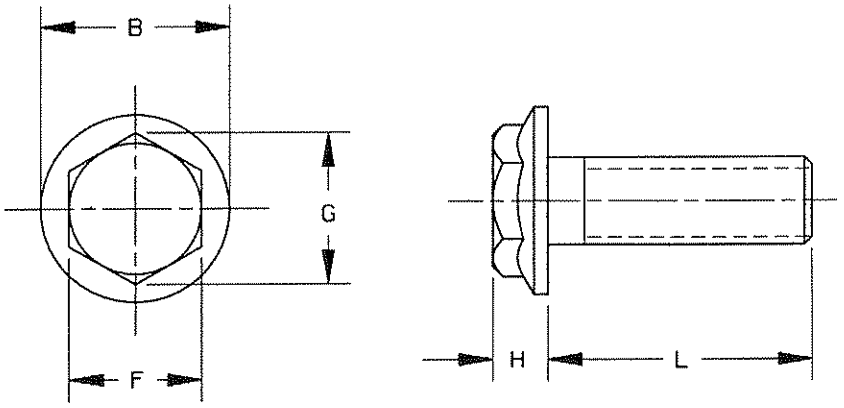
GRADE 8



GRADE 8.2

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PH0335-22	06/26/92	ERK	DOCUMENTED
A	PH0335-26	08/20/92	ERK	REFERENCE DIMENSIONS CORRECTED.

DRAWN	LFB	TITLE BOLT-FLANGE LOW PROFILE HEAD	DRAWING NUMBER 23-12008
APPRV	DAJ		
DATE	03/17/00	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



THREAD SIZE	F	G (MAX)	B (MAX)	H (MAX)	FREIGHTLINER PART NUMBER
1/2-13 UNC 2A	3/4	.866	1.070	.312	23-12008-L
1/2-13 UNC 2A	3/4	.866	1.070	.312	23-12779-L (3)

DASH NUMBER= LENGTH "L" IN HUNDREDTHS OF AN INCH.

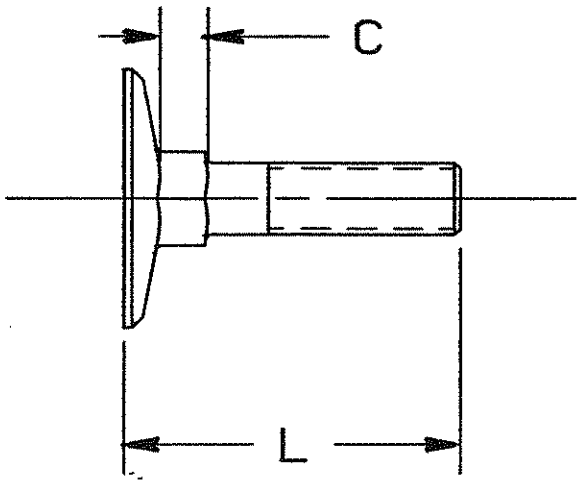
ENGINEERING NOTES:

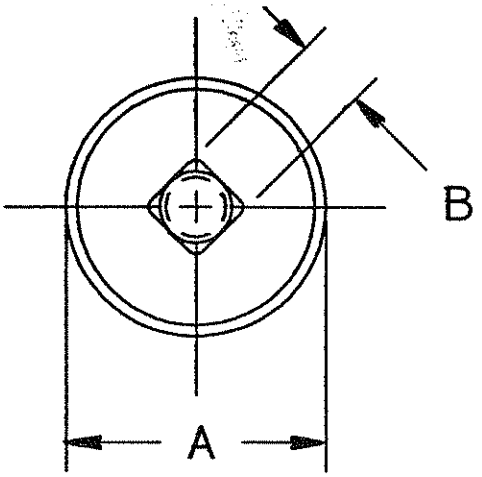
1. MATERIAL: SAE J429 GRADE 8 OR 8.2.
2. FINISH: PHOSPHATE AND OIL PER F/L 49-00006-041.

(3) LOCKING ELEMENT APPLIED MUST MEET REQUIREMENTS OF IFI 124. 10 THREAD MINIMUM LOCKING ELEMENT. TO BE APPLIED LEAVING 2-3 LEAD THREADS.

CHG	JOB NO	DATE	BY	REVISION
A	H54148-04	03/17/00	LFB	REDRAWN IN CATIA. ADDED 23-12779-L.

DRAWN	RMA	TITLE	ITEM NUMBER
APPRV	PCK	BOLT-ELEVATOR,FLAT	23-12018
DATE	09/28/88	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1





THREAD SIZE	A MAX	B MAX	C MAX	FREIGHTLINER PART NUMBER
3/8 - 16 UNC	1.352	.405	.250	23-12018-225

NOTES:

1 THE THREE DIGIT DASH NUMBER EXPRESSES THE LENGTH(L) IN 1/100THS OF AN INCH EXCEPT AS NOTED. EXAMPLE:23-12018-175 CALLS OUT A 3/8-16 UNC GRADE 2 ELEVATOR BOLT 1.75 INCHES LONG.

2 MATERIAL: GRADE 2 PER SAE STANDARD J429

3 DIMENSIONAL AND MECHANICAL PROPERTIES MUST CONFORM TO ANSI B18.5

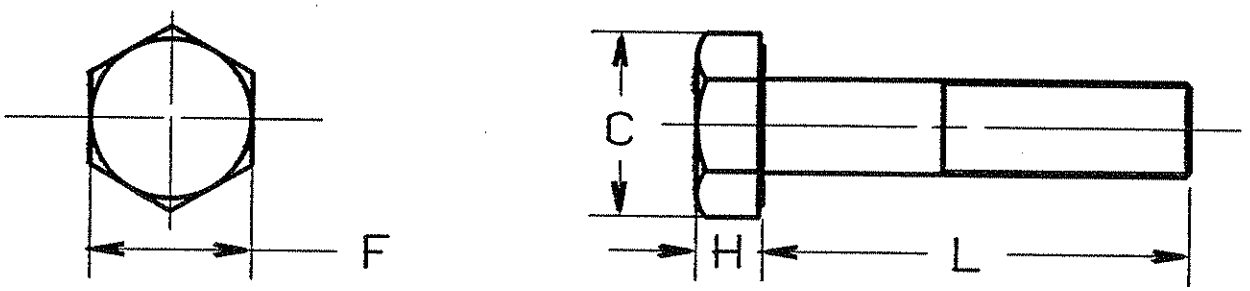
4 FINISH TO BE BLACK OXIDE

5 DIMENSIONS SHOWN ARE FOR REFERENCE ONLY

6 THREAD FORM:UNC 2A

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P•C147-74	09/28/88	RMA	DOCUMENTED
A	P•C147-79	10/06/88	PCK	23-12018-225 WAS 23-12018-175

DRAWN	EWB	TITLE	ITEM NUMBER
APPRV	RDF	SCREW-CAP, HEX-NYLON	23-12023
DATE	12/02/88	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	F BASIC	C MAX	H MAX	FREIGHTLINER PART NUMBER *
3/8 - 16 UNC	9/16	.650	.243	23-12023-L

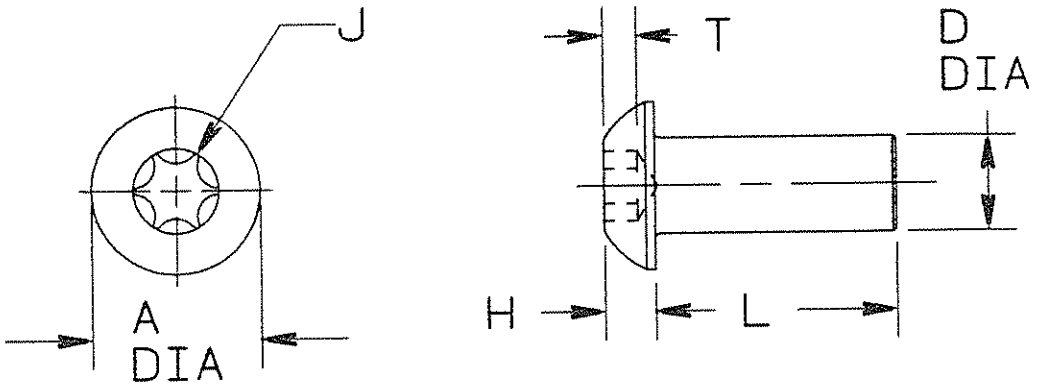
* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER EXPRESSING LENGTH IN HUNDREDTHS OF AN INCH. E.G., 23-12023-125 DESCRIBES A 3/8-16 X 1.25 NYLON HEX CAP SCREW.

1. MAT'L: NYLON 6/6
2. DIMENSIONS PER ANSI B18.2.1.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P9545E-01	12/02/88	RDF	DOCUMENTED

DRAWN	PCK	TITLE SCREW-CAP, BUTTON HEAD INTERNAL TORX	ITEM NUMBER 23-12035
APPRV	ANF		
DATE	05/02/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

SKETCH



PART NUMBER

NOM. SIZE & THREADS PER INCH	D BASIC	A MAX	H MAX	J TORX SOCKET	T MIN	L LENGTH		FREIGHTLINER PART NUMBER
1/2-13	.500	.875	.265	T-55	.140	1.25		23-12035-125 23-12035-150

*A THREE-DIGIT DASH NUMBER INDICATES LENGTH IN HUNDREDTHS OF AN INCH. EXAMPLE, 23-12035-125 INDICATES A CAPSCREW 1.25 INCHES LONG.

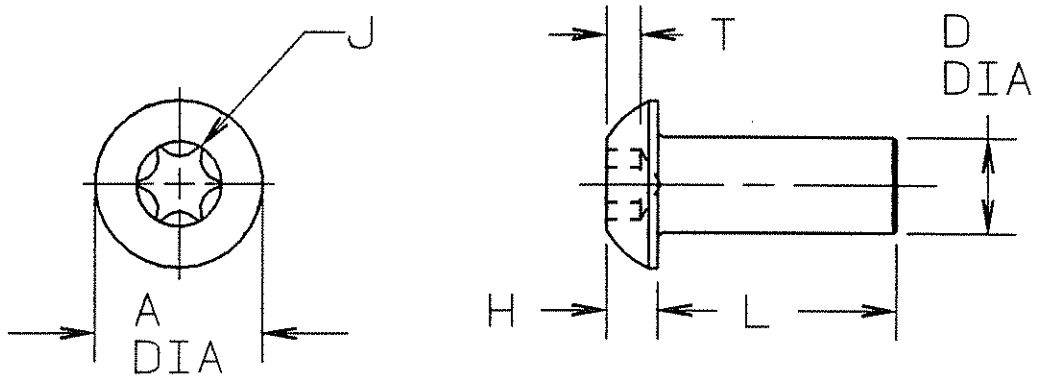
ENGINEERING NOTES

1. MATERIAL: STEEL, PER ASTM F835
2. DIMENSIONS PER ANSI B18.3. THREADS CLASS 3A AFTER PLATING.
   ABOVE DIMENSIONS FOR REFERENCE ONLY
   DRIVE RECESS TO BE TORX T-55 PER CAMCAR SPECIFICATION TXH-403.
3. FINISH: ZINC PLATE WITH CLEAR PHOSPHATE CONVERSION COATING
   PER FREIGHTLINER SPEC 49-00005-403.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P3503F-01	05/02/89	PCK	DOCUMENTED
A	PH0363-02	09/07/89	RDF	ADDED -150

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, BUTTON HEAD INTERNAL TORX	23-12039
DATE	05/02/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

SKETCH



PART NUMBER

NOM. SIZE & THREADS PER INCH	D BASIC	A MAX	H MAX	J TORX SOCKET	T MIN	L LENGTH		FREIGHTLINER PART NUMBER
5/16-18	.312	.547	.166	T-40	.090	1 1.5		23-12039-100 -150

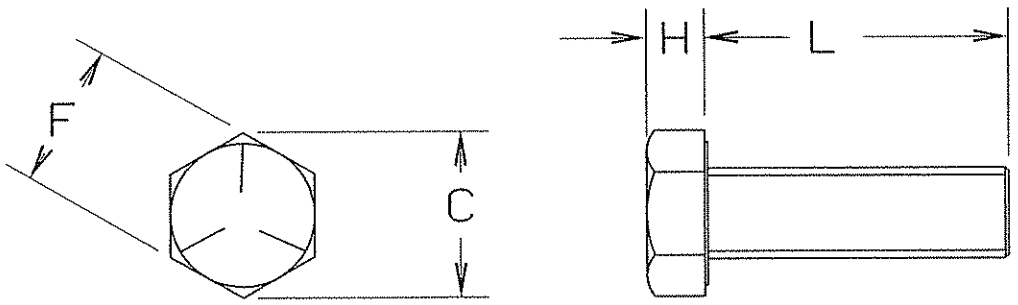
* A THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
EXAMPLE 23-12039-100 SPECIFIES A CAPSCREW 1 INCH LONG.
ABOVE DIMENSIONS FOR REFERENCE ONLY

ENGINEERING NOTES

1. MATERIAL: STEEL, PER ASTM F835
2. DIMENSIONS PER ANSI B18.3. THREADS CLASS 3A AFTER PLATING. DRIVE RECESS TO BE TORX T-40 PER CAMCAR SPECIFICATION TXH-403.
3. FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-403
4. BUTTON HEAD CONFIGURATION WILL NOT DEVELOP FULL TENSILE STRENGTH OF SHANK.
5. PARTS MUST BE FREE FROM HYDROGEN EMBRITTLEMENT

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PH0324-02	05/02/89	ANF	DOCUMENTED
A	PA2029-71	03/19/91	PCK	ADDED 23-12039-050
B	PA2029-83	06/03/91	K R	DELETED 23-12039-050

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, HEX, GRADE 5 FULLY THREADED, ZINC	23-12046
DATE	06/19/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" MAX ACROSS CORNERS	"H" MAX HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC	7/16	.505	.163	23-12046-L
5/16 - 18 UNC	1/2	.577	.211	23-12078-L

B

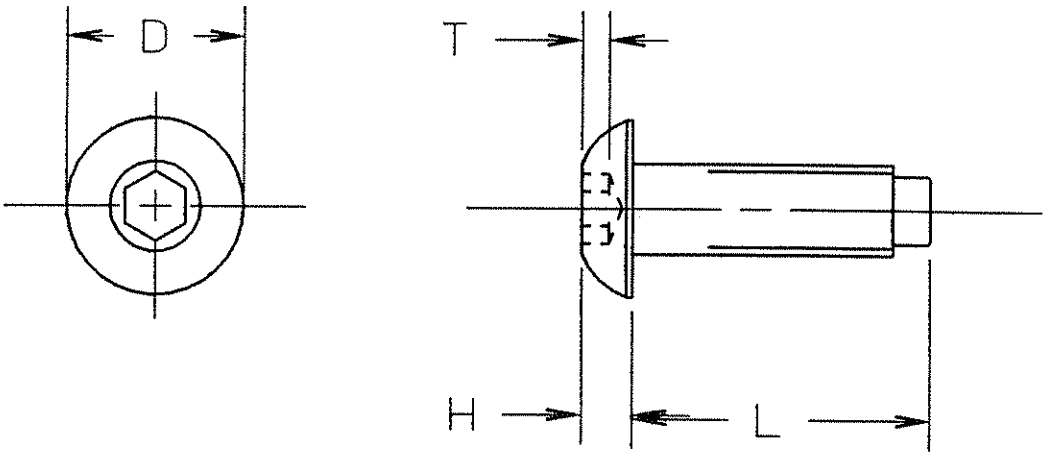
THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-12046-100 IS A 1/4-20 CAPSCREW 1 INCH LONG.

ENGINEERING NOTES:

MATERIAL: GRADE 5 PER SAE J429
ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
THREADS: UNC 2A PER ANSI B1.1
FINISH : ZINC PLATE PER FREIGHTLINER SPEC 49-00005-403
GRADE MARKING PER SAE J429

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	348058-90	06/19/89	PCK	DOCUMENTED
A	PH0407-02	02/04/91	SJT	ADDED 23-12078-300
B	P6314H-02	11/11/94	DAJ	REMOVED -100 & -300 NOTATION REPLACED BY "L"

DRAWN	K R	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, BUTTON HEAD ZINC PLATED	23-12085
DATE	06/03/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	HEX SOCKET NOM	"T" SOCKET DEPTH	"D" HEAD DIA	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC	5/32	.087	.437	.132	23-12085-L
5/16 - 18 UNC	3/16	.105	.547	.166	23-12086
3/8 - 16 UNC	7/32	.122	.656	.199	23-12088

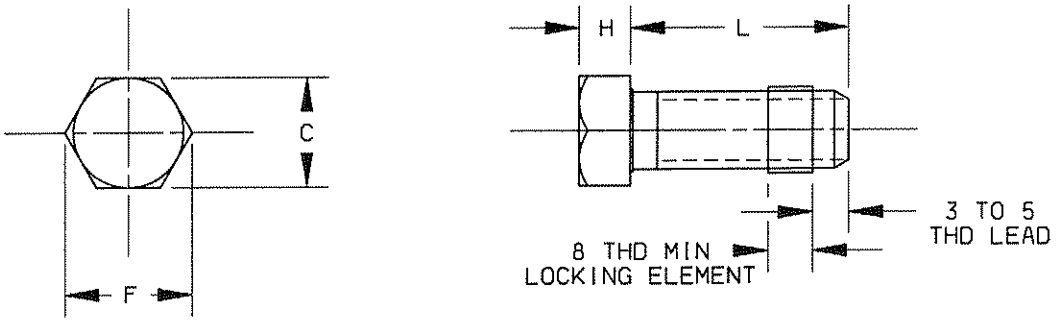
COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-12086-300 IS A 3/8-16 CAPSCREW 3 INCHES LONG.

ENGINEERING NOTES:
MATERIAL: STEEL PER ASTM SECIFICATION A574
FINISH: ZINC PLATE PER PER FREIGHTLINER SPECIFICATION 49-00005-403
ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.3

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PA2029-83	06/03/91	K R	DOCUMENTED

DEBBIE

DRAWN	LFB	TITLE	DRAWING NUMBER
APPRV	DAJ	SCREW-CAP, HEX, LOCKING PATCH GR. 8, ZN AND YELLOW	23-12094
DATE	12/02/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
7/16-14UNC	5/8	.722	.291	23-12094-L

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH
E.G. 23-12094-125 IS A 7/16-14 CAPSCREW 1.25 INCHES LONG.

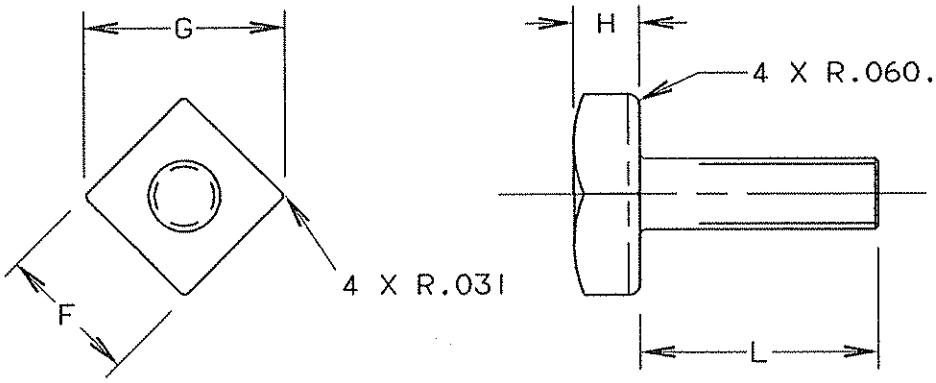
ENGINEERING NOTES:

1. MATERIAL: STEEL GRADE 8 PER SAE SPECIFICATION J429.
2. FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-203 AND WAX.
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY . FOR DETAILS SEE ANSI B18.2.1.
4. LOCKING ELEMENT MUST MEET REQUIREMENTS OF IFI 124. WAX TO BE APPLIED AFTER LOCKING PATCH.

A

CHG	JOB NO	DATE	BY	REVISION
A	PA2042-98	12/02/99	LFB	REVISED AND REDRAWN IN CATIA. REVISED NOTE 4.

DRAWN	ERK	TITLE BOLT - SQUARE HEAD GR. 5, ZINC, SPECIAL	ITEM NUMBER 23-12102
APPRV	DWP		
DATE	05/03/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"G" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
3/8-16UNC	.750	1.061	.232/.268	1.250	23-12102-125

ENGINEERING NOTES:

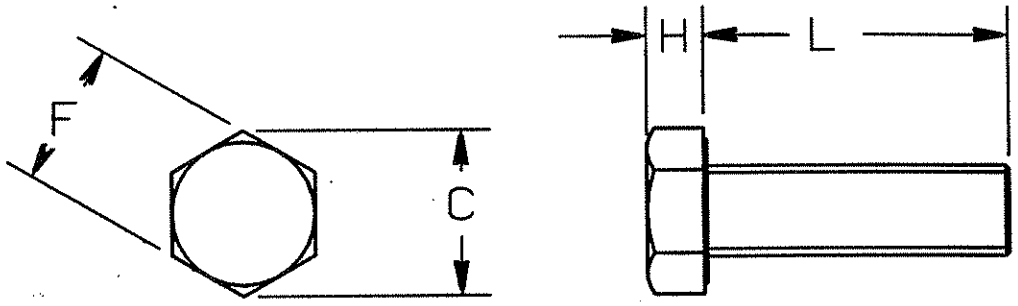
MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429.

FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-203

DIMENSIONS: THREAD AND SHANK DIMENSIONS SHALL CONFORM WITH ANSI B18.2.1 FOR 3/8 INCH SQUARE BOLT.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2A210-36	05/03/95	ERK	INITIAL RELEASE

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	HPB	SCREW-CAP, HEX SST, FULLY THREADED	23-12121
DATE	09/29/92	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
5/16-18UNC	.500	.577	.211	1.250	23-12121-125

ENGINEERING NOTES:

MATERIAL: STAINLESS STEEL, TYPE 302, 304 OR ASTM F 593, GROUP 1.

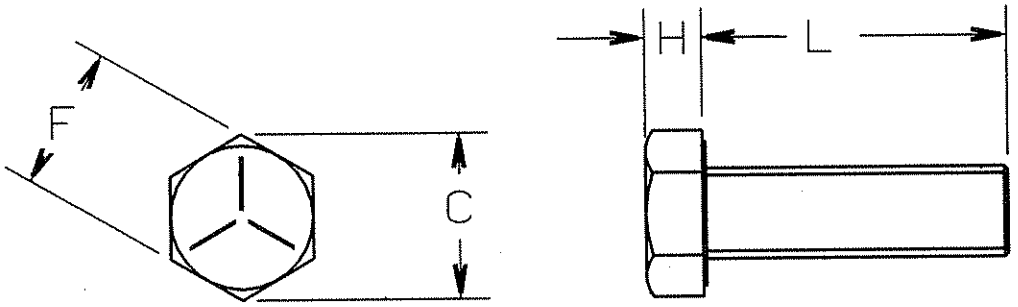
DIMENSIONS PER ANSI B18.2.1. ABOVE DIMENSIONS FOR REFERENCE ONLY.

MARKINGS: SCREWS SHALL BE MARKED WITH MANUFACTURER'S SYMBOL AND ALLOY IN CONFORMANCE WITH ASTM F 593 SUPPLEMENTARY REQUIREMENTS S7 AND S8.

SCREW FULLY THREADED.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PK0426-06	09/29/92	ERK	DOCUMENTED
A	PA2042-31	11/23/92	ERK	REMVD MARKING FROM BOLT, ADDED MARKING REQUIREMENT

DRAWN	ERK	TITLE SCREW-CAP, HEX SST, FULLY THREADED	ITEM NUMBER **23-12121**
APPRV	HPB		
DATE	09/29/92	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



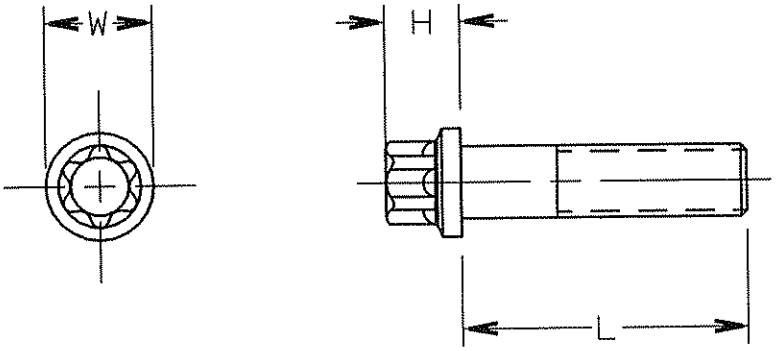
THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
5/16-18UNC	.500	.577	.211	1.250	23-12121-125

ENGINEERING NOTES:

MATERIAL: STAINLESS STEEL, TYPE 302, 304 OR ASTM F 593, GROUP 1.
DIMENSIONS PER ANSI B18.2.1. ABOVE DIMENSIONS FOR REFERENCE ONLY.
SCREW FULLY THREADED.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PK0426-06	09/29/92	ERK	DOCUMENTED

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	TJL	SCREW - EXTERNAL TORX, GRADE 8 ORGANIC COATED WITH LOCK	23-12125
DATE	10/19/92	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



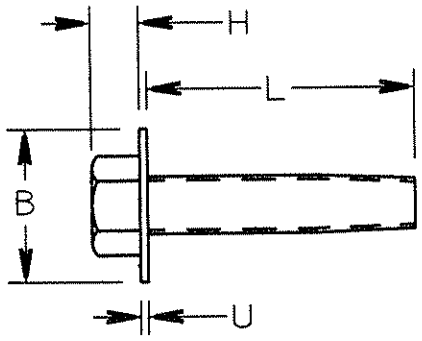
SCREW SIZE	DRIVE SIZE	WIDTH (W)	HEIGTH (H)	LENGTH (L)	FREIGHTLER PART NUMBER
3/8-16 UNC	E12	.562 .542	.394 .384	1.50	23-12125-150

1. MATERIAL :GRADE 8/8.2 PER SAE STANDARD SAE J429
2. DIMENSIONAL AND MECHANICAL PROPERTIES MUST CONFORM TO ANSI B18.2.1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.
3. FINISH TO BE BRIGHT SILVER FINISH PER FREIGHTLINER SPECIFICATION 49-00081.
4. THREAD FORM:UNC/UNF CLASS 2A
5. BASIC THREAD LENGTH(REF):
   TWICE DIA+1/4(FOR LENGTHS UPTO 6 INCHES)
   TWICE DIA+1/2(FOR LENGTHS ABOVE 6 INCHES)
6. MUST MEET LOCKING ABILITY PERFORMANCE REQUIREMENTS OF IFI 124.

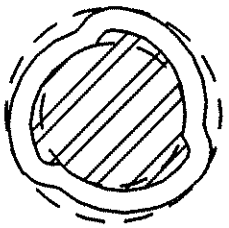
A

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PH0335-29	10/19/92	ERK	INITIAL RELEASE
A	P7015H-01	05/18/93	ERK	ADDED IFI 124 LOCKING REQUIREMENT.

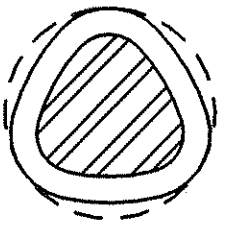
DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	---	SCREW, HEX WASHER HEAD THREAD ROLLING	23-12126
DATE	10/26/92	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD CROSS SECTIONS



ROLOK



TAPTITE

SPECIFICATION NUMBER:

THREAD SIZE	"L" LENGTH	WIDTH ACROSS FLATS (MAX)	"H" HEAD HT (MAX)	"B" WASHER DIA (MAX)	"U" WASHER THK (MAX)	FREIGHTLINER PART NUMBER
3/8-16	.75	.562	.295	.780	.063	23-12126-075

SUGGESTED PILOT HOLE SIZES

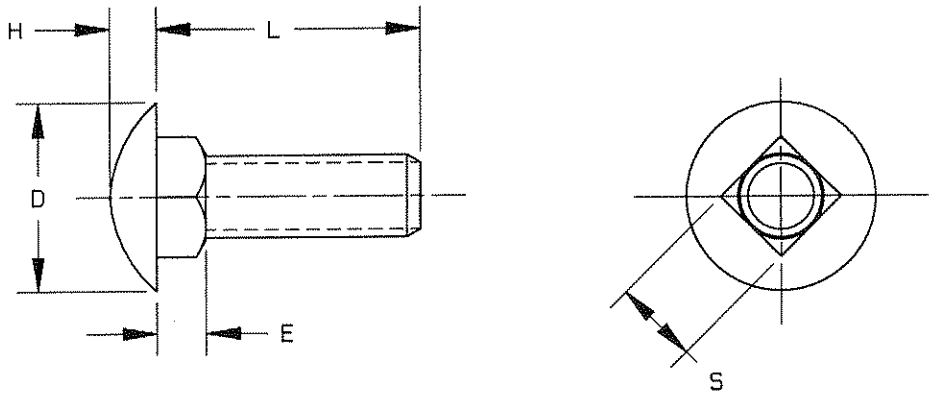
THREAD SIZE	MATERIAL TYPE	MATERIAL THICKNESS			
		.063 - .090	.091 - .250	.251 - .312	.313 - .500
3/8-16	STEEL	.335-.344	.344-.348	.345-.351	.348-.351
	ALUM	.335-.344	.344-.348	.344-.348	.344-.348

SPECIFICATIONS:

MATERIAL: STEEL, PER SAE J81.
FINISH: ZINC PLATE PER FREIGHTLINER SPEC 49-00005-403.
HEAD: HEX WASHER HEAD, PER ANSI B18.6.4.
THREADS: TYPE TT (TAPTITE II) OR RL (ROLOK) PER SAE J81.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PF0724-04	10/26/92	ERK	INITIAL RELEASE

DRAWN	LFB	TITLE	DRAWING NUMBER
APPRV	DAJ	BOLT-ROUND HEAD SQUARE NECK, FULL THREAD	23-12127
DATE	12/16/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. B
CATIA ORIGINAL			



THREAD SIZE	"S" NECK SIZE	"E" NECK ENGAGE'T	"D" HEAD DIA	"H" HEAD HEIGHT	"L" LENGTH (IN)	FREIGHTLINER PART NUMBER
5/16-18	.324	.187	.719	.176	1.000	23-12127-100
5/16-18	.324	.187	.719	.176	2.000	23-12127-200
5/16-18	.324	.187	.719	.176	3.000	23-12127-300

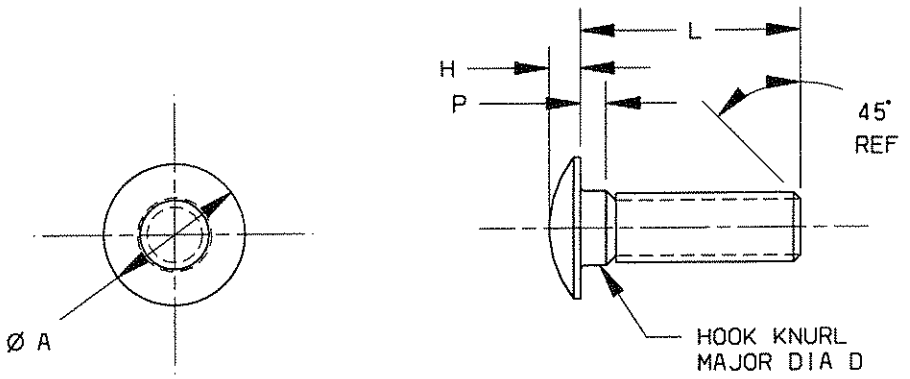
ENGINEERING NOTES:

1. MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429.
2. FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-403.
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5.

CHG	JOB NO	DATE	BY	REVISION
B	PN0554-14	12/16/99	LFB	REVISED AND REDRAWN IN CATIA. ADDED -100.

DEBBIE

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	BOLT-ROUND HEAD HOOK KNURL	23-12144	
DATE	12/15/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. B
CATIA ORIGINAL				



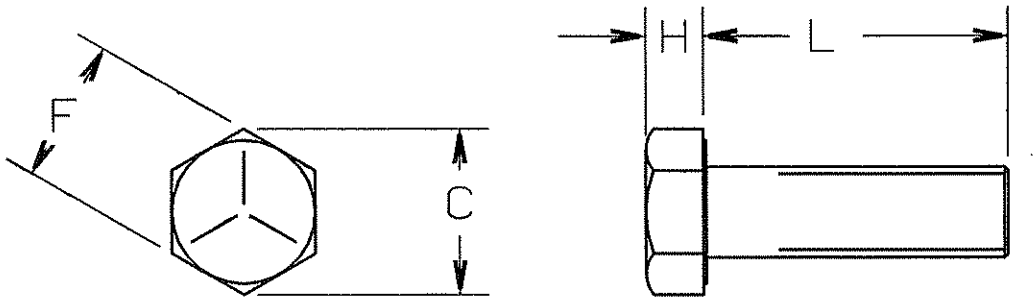
SIZE	GR	"A" MAX/MIN	"D" MAX/MIN	"H" MAX/MIN	"P" MAX/MIN	"L" MAX/MIN	FIN	FREIGHTLINER PART NUMBER
3/8-16	5	.823/.787	.428/.419	.197/.177	.157/.137	1.27/1.21	(3)	23-12144-125
3/8-16	5	.823/.787	.428/.419	.197/.177	.157/.137	1.52/1.46	PLAIN	680 990 00 34
1/2-13	8	1.094/1.032	.556/.545	.270/.250	.192/.172	1.54/1.44	PLAIN	23-12196-150

ENGINEERING NOTES:

1. MATERIAL: STEEL GRADE 5 AND 8 PER SAE J429.
2. THREADS: UNRC-2A.
3. ZINC PLATE WITH YELLOW DICHROMATE PER FREIGHTLINER 49-00005-203.
4. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5 EXCEPT FOR "P".

CHG	JOB NO	DATE	BY	REVISION
B	PA2042-98	12/15/99	LFB	REVISED AND REDRAWN IN CATIA. 49-00005 WAS 49-00006.

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	ERK	SCREW-CAP, HEX GRADE 5, YELLOW ZINC	23-12153
DATE	07/12/93	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC 28 UNF	.438	.505	.163	23-12153-L
5/16 - 18 UNC 24 UNF	.500	.577	.211	
3/8 - 16 UNC 24 UNF	.562	.650	.243	
7/16 - 14 UNC 20 UNF	.625	.722	.291	
1/2 - 13 UNC 20 UNF	.750	.866	.323	
9/16 - 12 UNC 18 UNF	.812	.938	.371	
5/8 - 11 UNC 18 UNF	.938	1.083	.403	

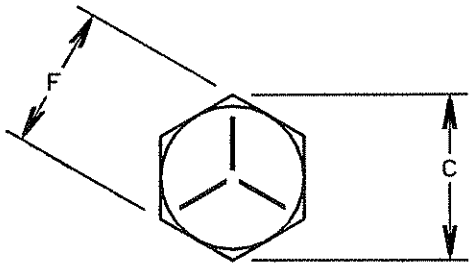
COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-12153-300 IS A 1/4-20 CAPSCREW 3 INCHES LONG.

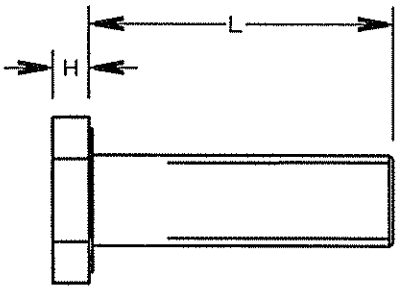
ENGINEERING NOTES:

MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429
FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-203 AND WAX
ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PN0438-08	07/12/93	ERK	INITIAL RELEASE

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	AJG	SCREW-CAP,HEX,LOW PROFILE GRADE 5, P & O	23-12156
DATE	08/06/93	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1





THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
9/16-18UNF	13/16	.938	.233±.015	.750±.015	23-12156-075

ENGINEERING NOTES:

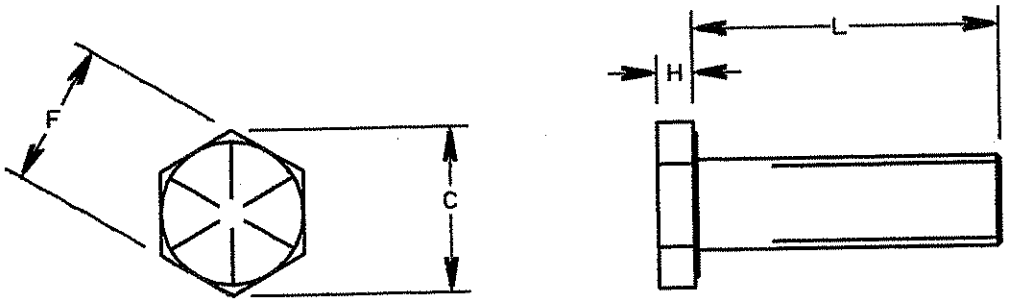
MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429
ALTERNATE METHOD MAKE FROM CAPSCREW 23-09473-075.

FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	459119-06	08/06/93	ERK	INITIAL RELEASE

DRAWN	ERK	TITLE SCREW-CAP, HEX, LOW PROFILE GRADE 8, P & O	ITEM NUMBER 23-12168
APPRV	TJM		
DATE	12/13/93	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
9/16-12UNC	.812	.938	.233±.015	2.250	23-12168-225

ENGINEERING NOTES:

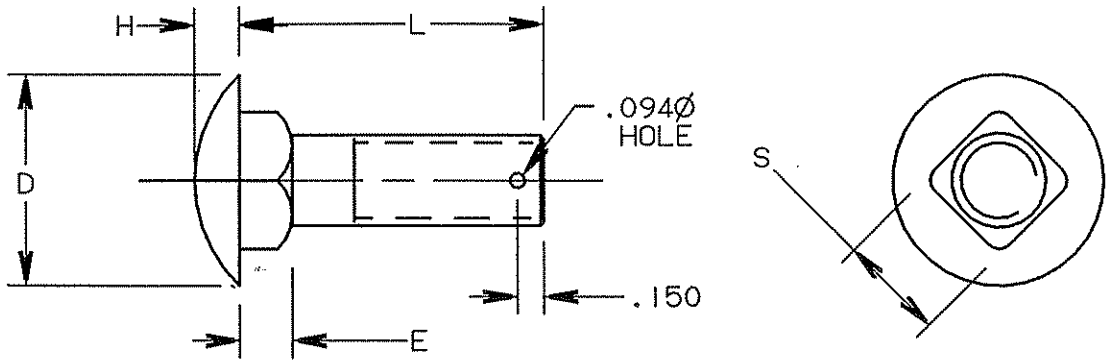
MATERIAL: STEEL GRADE 8 PER SAE SPECIFICATION J429.

FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

SCREW SHALL CONFORM WITH ANSI B18.2.1. DIMENSIONS SHOWN, EXCEPT HEAD HEIGHT, ARE FOR REFERENCE ONLY.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2247J-01	12/13/93	ERK	INITIAL RELEASE

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	P T	BOLT-ROUND HEAD, SQUARE NECK W/HOLE, STAINLESS STEEL	23-12175
DATE	03/08/94	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"S" NECK SIZE	"E" NECK ENGAGE'T	"D" HEAD DIA	"H" HEAD HEIGHT	"L" LENGTH (IN)	FREIGHTLINER PART NUMBER
5/16 - 18	.324	.187	.719	.176	1.500	23-12175-150

ENGINEERING NOTES:

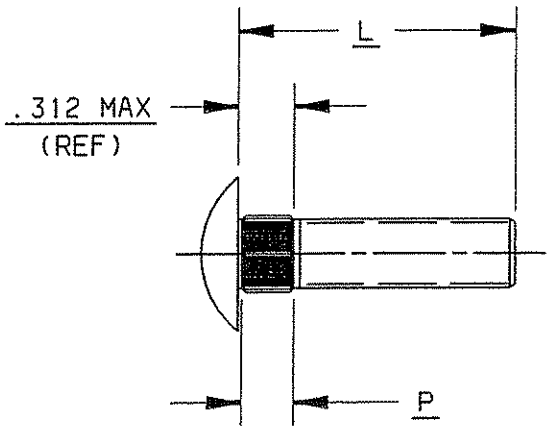
MATERIAL: STAINLESS STEEL, TYPE 302/304.
FINISH: PLAIN.

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PB1038-51	03/08/94	ERK	INITIAL RELEASE
A	PB1038-59	04/12/94	ERK	PIN HOLE .094Ø IPO .078Ø.

ADRIENNE CHILBERG

DRAWN	ERK	TITLE	DRAWING NUMBER	
APPRV	DAM	BOLT-ROUND HEAD RIBBED NECK	23-12177	
DATE	05/14/97	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. C
CATIA ORIGINAL				



THREAD SIZE	P DEPTH OVER RIBS (IN)	FREIGHTLINER PART NUMBERS*
5/16-18	.250±.031	23-12177-L

C

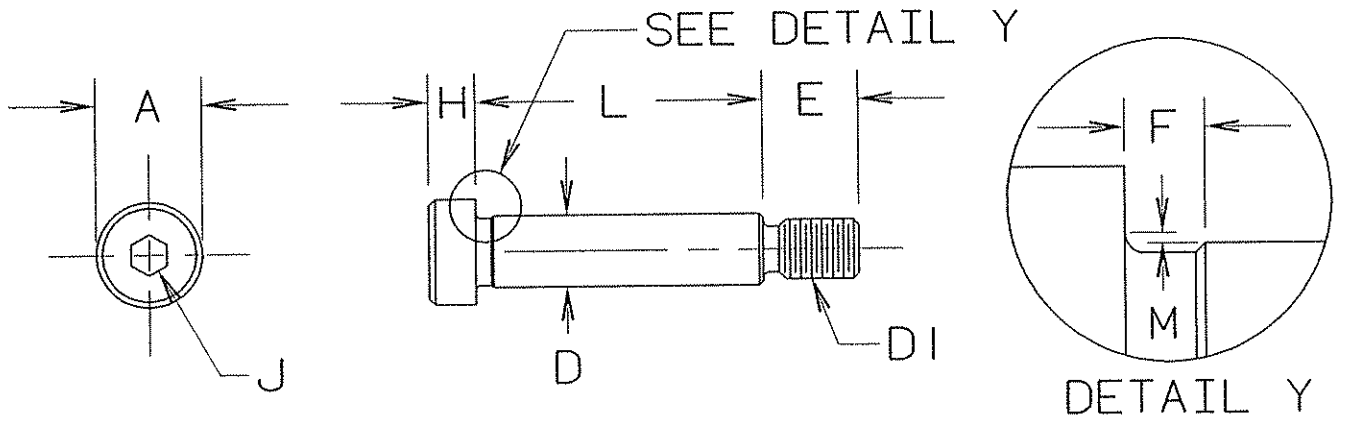
* THREE-DIGIT DASH NUMBER INDICATES LENGTH IN INCHES.
E.G.: 23-12177-300 IS A 5/16-18 RIBBED NECK BOLT
3 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 5 PER SAE J429.
2. THREADS: UNRC-2A
3. FINISH: ZINCE PLATE WITH YELLOW DICHROMATE PER FL 49-00005-203.
4. SHALL CONFORM TO ANSI B18.5 EXCET FOR "P".

CHG	JOB NO	DATE	BY	REVISION
B	P00401-03	05/27/97	DAJ	REVISED AND REDRAWN IN CATIA. ADDED -125 & -150.
C	P00560-03	04/21/98	DAJ	REMOVED L COLUMN IN TABLE, REPLACED BY P/N NOTE.

DRAWN	DAJ	TITLE	ITEM NUMBER
APPRV	ERK	BOLT-SHOULDER HEX SOCKET HEAD	23-12197
DATE	11/10/94	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



PART NUMBERS

NOM SIZE	D ±.001	D1	A ±.010	H ±.005	J NOM.	F MAX.	M ±.003	E NOM.	FREIGHTLINER PART NO.
1/4	.247	10-24	.366	.183	.125	.093	.012	.375	23-12197-1XX
5/16	.309	1/4-20	.429	.214	.156	.093	.014	.438	-2XX
3/8	.372	5/16-18	.553	.245	.188	.093	.018	.500	-3XX
1/2	.497	3/8-16	.740	.307	.250	.093	.023	.625	-4XX
5/8	.622	1/2-13	.864	.370	.312	.093	.027	.750	-5XX
3/4	.747	5/8-11	.989	.495	.375	.093	.034	.875	-6XX
1	.997	3/4-10	1.300	.618	.500	.125	.045	1.000	-7XX
1-1/4	1.247	7/8-9	1.737	.742	.625	.125	.055	1.125	-8XX

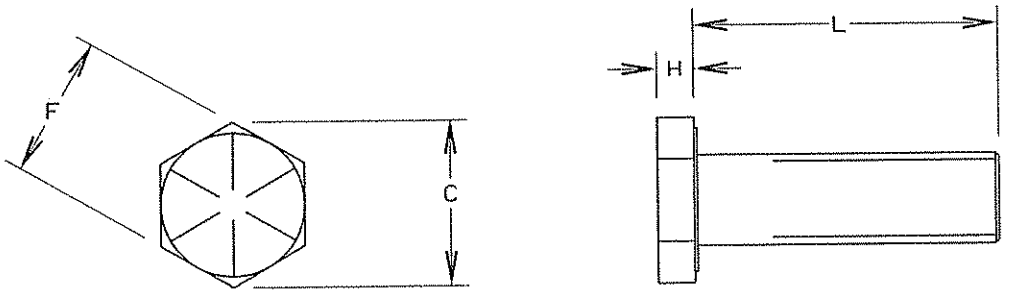
ENGINEERING NOTES

1. MUST MEET ANSI B18.3-1969.
2. MATERIAL: ALLOY STEEL RC 32 TO 43.
   MINIMUM ULTIMATE TENSILE STRENGTH: 140,000 PSI
3. DASH NUMBERS SPECIFIED BY SIGNIFICANT DASH NUMBER SYSTEM. THE SECOND AND THIRD DIGITS SPECIFY THE LENGTH IN EIGHTHS OF AN INCH (THEREFORE -422 SPECIFIES A 1/2 INCH DIAMETER BOLT WITH A A LENGTH OF 2.750.). THE AVAILABLE LENGTHS ARE AS FOLLOWS:
4. FINISH: PLAIN

NOMINAL SCREW LENGTH	STANDARD LENGTH INCREMENT
1/4 THRU 3/4	1/8
3/4 THRU 5	1/4
OVER 5	1/2

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P3441J-01	11/10/94	DAJ	INITIAL LOAD

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	DCA	SCREW-CAP, HEX, LOW PROFILE 3/4-10, GRADE 8, P & O	23-12210
DATE	02/03/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	"L" LENGTH	FREIGHTLINER PART NUMBER
3/4-10UNC	1.125	1.299	.298±.008	1.750	23-12210-175

ENGINEERING NOTES:

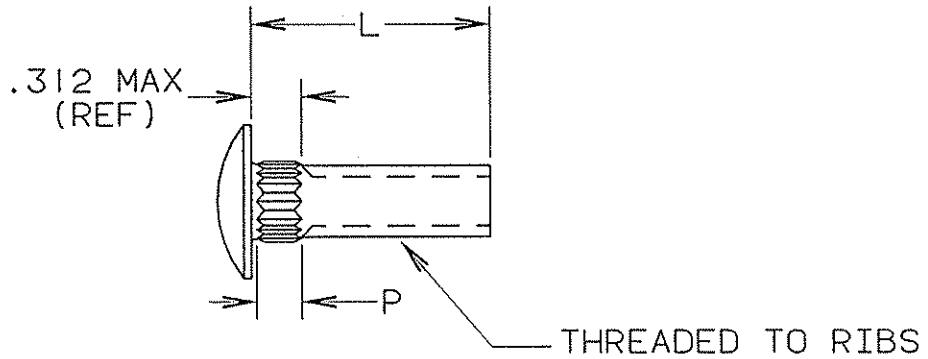
MATERIAL: STEEL GRADE 8 PER SAE SPECIFICATION J429.

FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

SCREW SHALL CONFORM WITH ANSI B18.2.1. DIMENSIONS SHOWN, EXCEPT HEAD HEIGHT, ARE FOR REFERENCE ONLY.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PF0928-05	02/03/95	ERK	INITIAL RELEASE

DRAWN	ERK	TITLE BOLT - ROUND HEAD RIBBED NECK	ITEM NUMBER 23-12242
APPRV	TAL		
DATE	05/03/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



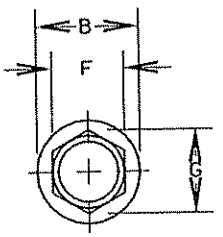
SIZE	P DEPTH OVER RIBS(IN)	L LENGTH (IN)	FREIGHTLINER PART NUMBER
3/8-16	.250±.031	2.000	23-12339-200
1/2-13	.250±.031	1.375 2.000 3.000	23-12242-138 23-12242-200 23-12242-300

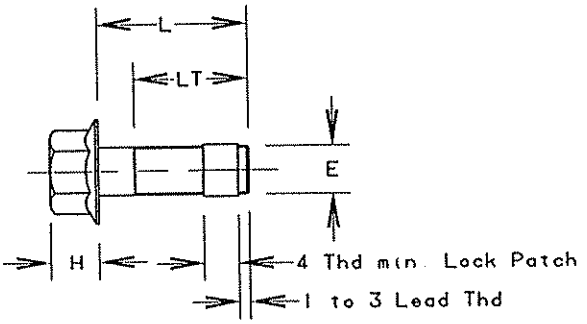
ENGINEERING NOTES:

1. MATERIAL: STAINLESS STEEL, TYPE 302/304.
2. THREADS: UNRC-2A FULLY THREADED TO RIBS.
3. SHALL CONFORM TO ANSI B 18.5 EXCEPT FOR "P" AND THREAD LENGTH.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2A242-37	05/03/95	ERK	INITIAL RELEASE.
A	P2A242-45	05/25/95	ERK	ADDED -300, REMOVED -258
B	PL0444-01	03/25/96	DAJ	ADDED -200
C	P6674P-02	04/04/96	DAJ	ADDED 23-12339-200

DRAWN	DAJ	TITLE	ITEM NUMBER
APPRV	ERK	BOLT-FLANGED, HEX HEAD 10.9, PHOS & OIL, PATCHLOCK	23-12245
DATE	05/19/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1





REFERENCE DIMENSIONS

E	M6	M8	M10	M12	M16
B (MAX)	14.2	18.0	22.3	26.6	35.0
F (MAX)	10.0	13.0	15.0	18.0	24.0
G (MAX)	10.95	14.26	17.33	20.79	27.72
H (MAX)	6.6	8.1	11.3	13.5	18.4
LT >125MM	18.0	22.0	26.0	30.0	38.0

FREIGTHLINER PART NUMBERS

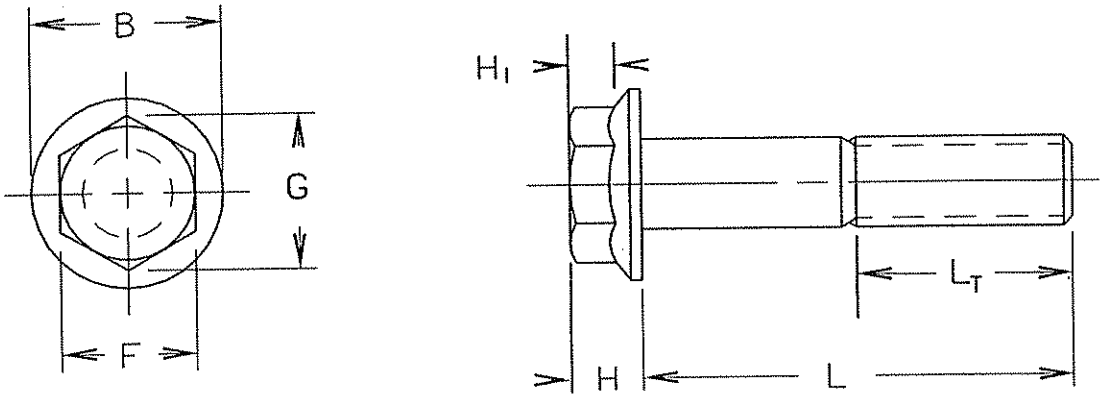
LENGTH (L)	M6X1.0	M8X1.25	M10X1.5	M12X1.75	M16X2.0
12					
20					
25					
30					
35				23-12245-175	
40					
45					
50					
55					
60					
65					
70					

ENGINEERING NOTES:

1. MATERIAL - STEEL PROPERTY CLASS 10.9 PER ISO 898/1.
2. STANDARD - M8 BOLTS AND SMALLER SHALL CONFORM TO DIN 6921
   M10 BOLTS AND LARGER SHALL CONFORM TO IFI 538
   DIMENSIONS SHOWN ARE FOR REFERENCE ONLY
3. FINISH - PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041
   BOLTS MUST BE TREATED FOR RELIEF OF HYDROGEN EMBRITTLEMENT.
4. LOCKING ELEMENT MUST MEET REQUIREMENT OF IFI 524.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2A024-18	05/19/95	DAJ	INITIAL LOAD

DRAWN	DAJ	TITLE	ITEM NUMBER
APPRV	ERK	BOLT - FLANGE HEX HEAD, GR. 8, YELLOW ZINC	23-12255
DATE	06/07/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD	F	G (MAX)	B (MAX)	H (MAX)	H_1 (MIN)	L_T		FREIGHTLINER PART NUMBER
						L≤6"	L>6"	
3/8-16	9/16	.650	.810	.390	.250	1.000	1.250	23-12255-L

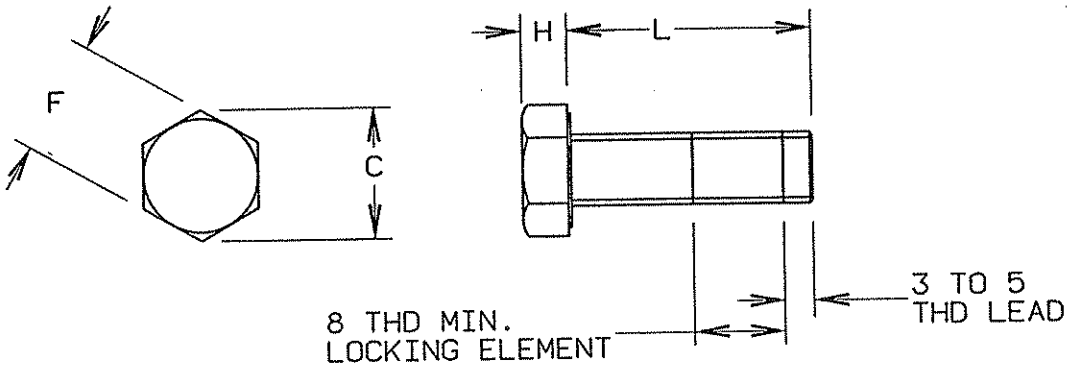
COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH. E.G. 23-12255-250 IS A FLANGED HEX HEAD BOLT 2.50 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 8 OR 8.2 PER SAE SPECIFICATION J429.
2. FINISH: YELLOW ZINC PLATE PER FL SPECIFICATIONS 49-00005-203
3. THREAD: UNC CLASS 2A
4. DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS, REFER TO IFI 111.
5. BOLTS MUST BE TREATED FOR RELIEF OF HYDROGEN EMBRITTLEMENT.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2A330-28	06/07/95	DAJ	INITIAL LOAD

DRAWN	ERK	TITLE SCREW-CAP, HEX, LOCK ELEMENT GRADE 5, ZINC & YELLOW	ITEM NUMBER 23-12294
APPRV	ERK		
DATE	11/28/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
3/8-16	.563	.650	.234	23-12294-L
9/16-12	.813	.938	.359	23-12295-L

COMPLETE PART NUMBER BY ADDDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH. E.G. 23-12294-125 IS A 3/8-16 CAPSCREW 1.25 INCHES LONG.

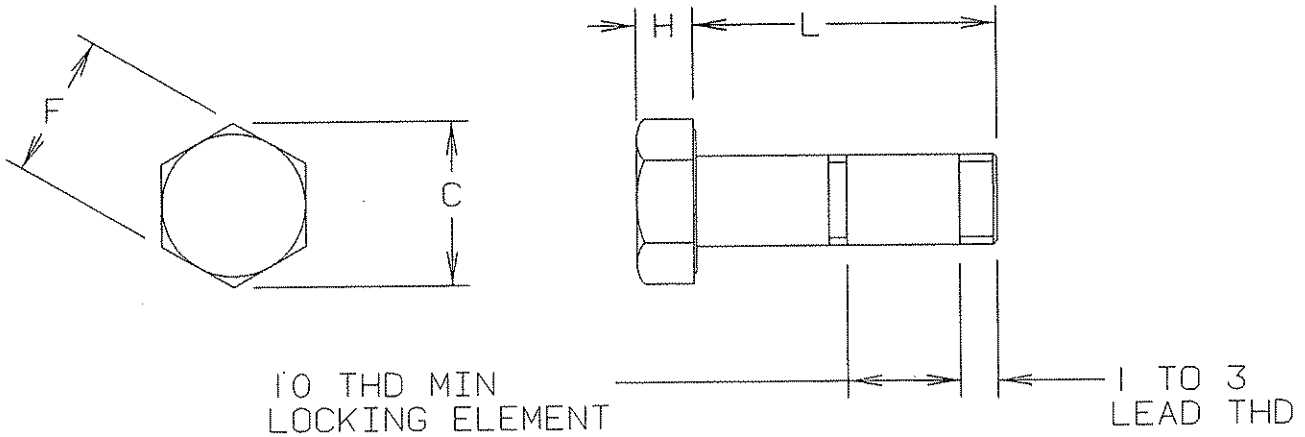
ENGINEERING NOTES:

MATERIAL: STEEL GRADE 5 PER SAE SPECIFICATION J429
FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-203

ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
LOCKING ELEMENT MUST MEET REQUIREMENTS OF IFI 124

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PA2157-35	11/28/95	ERK	INITIAL RELEASE

DRAWN	DAJ	TITLE	ITEM NUMBER
APPRV	ERK	SCREW-CAP HEX, GR 8, LOCKING	23-12304
DATE	01/24/96	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



NOMINAL SIZE & THREAD	BASIC DIA	C		F		H		FREIGHTLINER PART NUMBER
		MIN	MAX	MIN	MAX	MIN	MAX	
1/4-20 UNC	.250	.488	.505	.428	.438	.150	.163	23-12304-L

THREE DIGIT DASH NUMBER INDICATES LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-12304-100 IS A 1/4-20 CAP SCREW 1 INCH LONG.

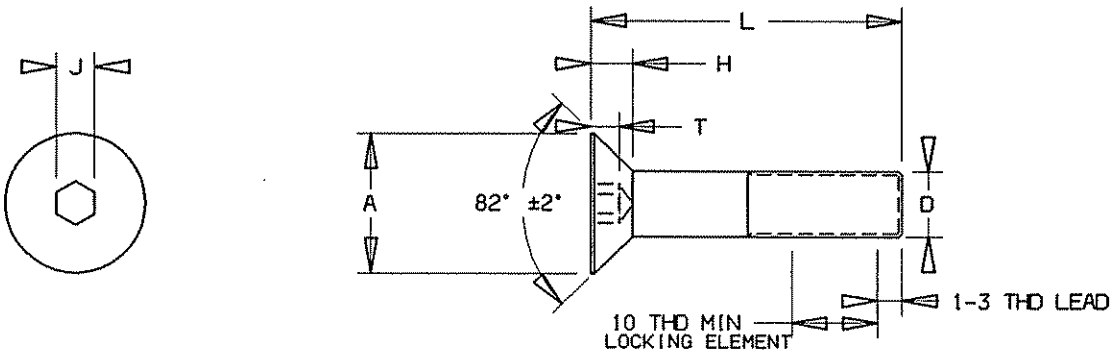
ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 8 PER SAE STANDARD J429
2. LOCKING ELEMENT CONSISTS OF NYLON PATCH EXTERNALLY APPLIED TO THREADS. MUST CONFORM TO IFI 124.
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
4. BASIC THREAD LENGTH (REF):
   TWICE DIA. PLUS 1/4 (FOR LENGTHS UP TO 6 INCHES)
   TWICE DIA. PLUS 1/2 (FOR LENGTHS ABOVE 6 INCHES)
5. FINISH: ZINC PLATE PER FL 49-00005-403
6. THREADS: UNC/UNF CLASS 2A

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2A364-D1	01/24/96	DAJ	INITIAL LOAD

DRIENNE CHILBERG

DRAWN	ERK	TITLE	DRAWING NUMBER	
APPRV	ERK	SCREW-CAP FLAT HEAD, HEX SOCKET	23-12306	
DATE	01/09/96	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. A
CATIA ORIGINAL				



HEX SOCKET SHOWN

NOM. SIZE	D		A		H		J	T	TORX. RECESS	FREIGHTLINER PART NUMBER*
	BODY DIA.		HEAD DIA.		HEAD HT.		HD. SKT.	ENGA.		
	MAX	MIN	MAX	MIN	REF.	FLUSH TOL.	NOM.	MIN		
1/4-20	.250	.244	.531	.480	.161	.016	5/32	.111	T-27	23-12306-L

* ADD A THREE DIGIT DASH NUMBER TO EXPRESS LENGTH IN ONE-HUNDREDTHS OF AN INCH. EQ. 23-12306-125 IS A HEX SOCKET 1/4-20 CAP SCREW 1 1/4 INCHES LONG.

FOR "TORX" DRIVE SCREW DESIGNATIONS; THREE DIGIT DASH NUMBER (-712) INDICATES AS FOLLOWS: EQ. 23-12306-712 IS A INTERNAL TORX 1/4-20 CAP SCREW 1 1/4 INCHES LONG.

7-REPRESENT "INTERNAL TORX" DRIVE.

1-(SECOND DIGIT) REPRESENTS WHOLE INCH LENGTH DIMENSION.

2-(THIRD DIGIT) REPRESENTS LENGTH IN EIGHTS OF AN INCH.

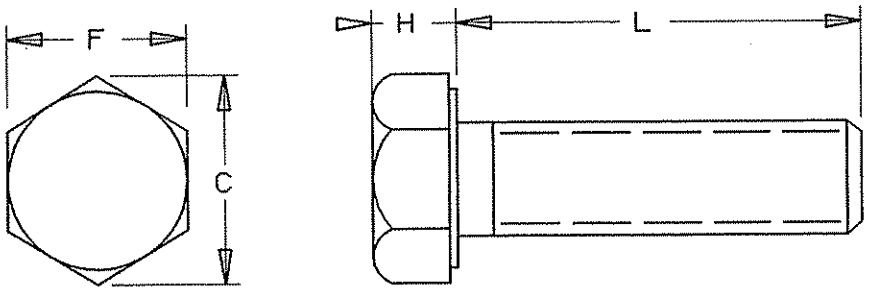
ENGINEERING NOTES:

1. MATERIAL: AISI 302/304 STAINLESS STEEL
2. TENSILE STRENGTH(MIN): 75,000 PSI.
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY. REFER TO ANSI B18.3 FOR DETAILS.
4. LOCKING ELEMENT TO COMFORM WITH PERFORMANCE REQUIREMENTS OF IFI 124.
5. TORX RECESS PER CAMCAR STANDARD TXH 203.

CHG	JOB NO	DATE	BY	REVISION
-	P2A190-52	01/09/96	ERK	INITIAL RELEASE
A	P00084-01	06/28/96	FHC	REVISED PRINT TO PROVIDE AN INTERNAL TORX OPTION.

ADRIENNE CHILBERG

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	CAPSCREW-HEX GR. 8, PLAIN	23-12345	
DATE	04/19/96	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. A
CATIA ORIGINAL				



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	BASIC DIA	DIMENSIONS						FREIGHTLINER PART NUMBERS*
		C		F		H		
		MIN	MAX	MIN	MAX	MIN	MAX	
3/8 -16 UNC	.375	.620	.650	.544	.562	.226	.268	23-12345-L
1/2 -13 UNC	.500	.826	.866	.725	.750	.302	.364	23-12224-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH. E.G. 23-12345-100 IS A 3/8-16 CAPSCREW 1 INCHES LONG.

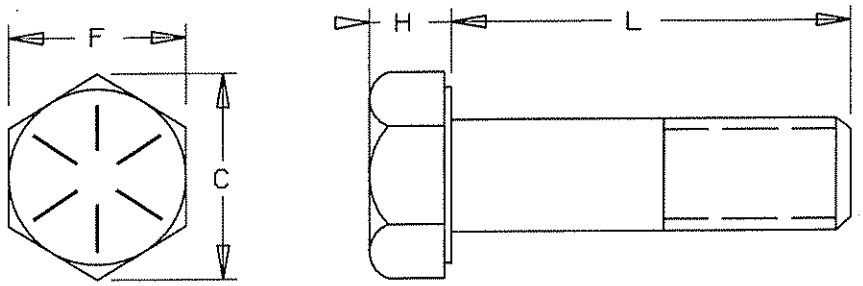
ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 8 PER SAE STANDARD J429.
2. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAIL SEE ANSI B18.2.1
3. FINISH: PLAIN
4. THREADS: UNC CLASS 2A

CHG	JOB NO	DATE	BY	REVISION
-	P5433H-03	04/19/96	DAJ	INITIAL LOAD
A	P00811-01	03/26/97	DAJ	ADDED 23-12224-L

DEBBIE

DRAWN	DAJ	TITLE CAPSCREW-HEX FINISHED, GR.8, WITH TEXACOTE	DRAWING NUMBER 23-12374
APPRV	DAJ		
DATE	05/30/96	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	DIMENSIONS			FREIGHTLINER PART NUMBERS*
	F (BASIC)	C (MAX)	H (MAX)	
5/8 -11 UNC	15/16	1.083	.403	23-12374-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH. E.G. 23-12374-275 IS A 5/8-11 CAPSCREW 2 3/4 INCHES LONG.

ENGINEERING NOTES:

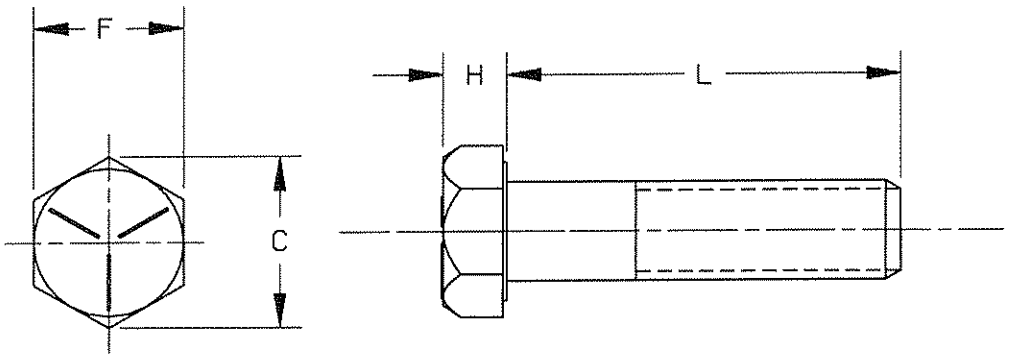
1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE STANDARD J429.
2. BASIC THREAD LENGTH (REF):
   TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES).
   TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES).

A 3. FINISH TO BE TEXACOTE 452.

4. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB NO	DATE	BY	REVISION
-	P6293P-02	05/30/96	DAJ	INITIAL LOAD
A	PA2042-98	12/09/99	LFB	ADDED SOLID TO MODEL. 452 WAS 440.

DRAWN	DAJ	TITLE CAPSCREW-HEX GR.5,PLAIN	DRAWING NUMBER 23-12403
APPRV	DAJ		
DATE	11/18/96	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	DIMENSIONS			FREIGHTLINER PART NUMBERS*
	F (BASIC)	C (MAX)	H (MAX)	
3/8 -16 UNC	9/16	.650	.243	23-12732-L
1/2 -13 UNC	3/4	.866	.323	23-12403-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH. E.G. 23-12403-200 IS A 1/2-13 CAPSCREW 2 INCHES LONG.

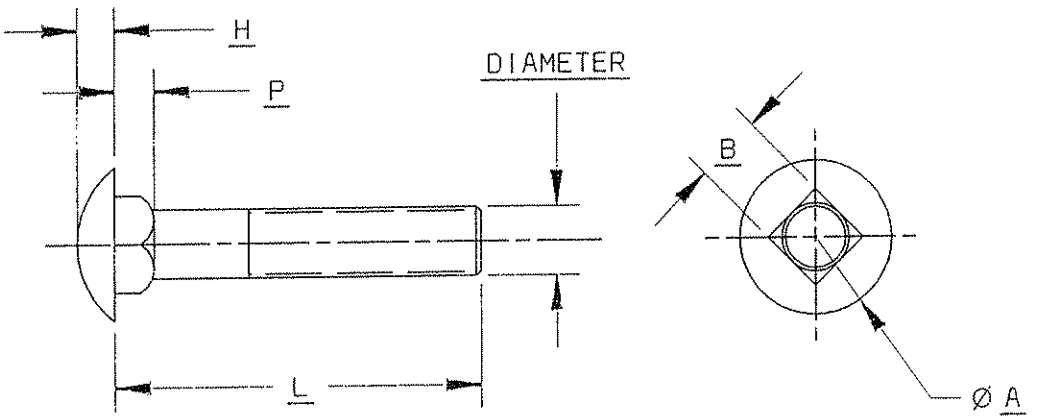
ENGINEERING NOTES:

1. MATERIAL: GRADE 5 BOLT MATERIAL PER SAE STANDARD J429.
2. BASIC THREAD LENGTH (REF):
   TWICE DIA. + 1/4 (FOR LENGTHS UP TO 6 INCHES).
   TWICE DIA. + 1/2 (FOR LENGTHS ABOVE 6 INCHES).
3. FINISH: PLAIN
4. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB NO	DATE	BY	REVISION
-	774604-01	11/18/96	DAJ	INITIAL LOAD
A	P10629-01	11/26/99	LFB	ADDED 23-12732-L.

ADRIENNE CHILBERG

DRAWN	DAJ	TITLE BOLT-ROUND HEAD SQUARE NECK, SST, POLISHED	DRAWING NUMBER 23-12434
APPRV	DAJ		
DATE	05/14/97	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



THREAD SIZE	DIAMETER (MAX)	DIMENSIONS								FREIGHTLINER PART NUMBERS*
		A		B		H		P		
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
10-24 UNC	.190	.438	.469	.185	.199	.094	.114	.094	.125	23-12434-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH.
E.G. 23-12434-100 IS A 10-24 BOLT 1 INCHES LONG.

A

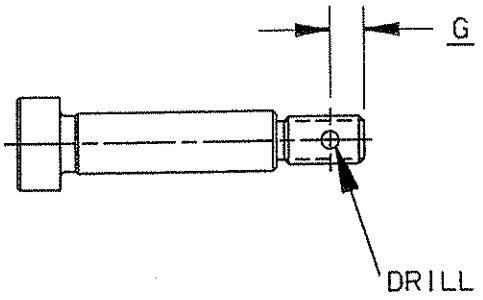
ENGINEERING NOTES:

1. MATERIAL: STAINLESS STEEL, PER ASTM F593, GROUP 1, CONDITION CW.
2. FINISH: ELECTRO-POLISHED
3. DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.5.

CHG	JOB NO	DATE	BY	REVISION
-	PB4501-K5	05/14/97	DAJ	INITIAL LOAD
A	PA2042-76	05/23/97	DAJ	REVISED NOTE 1 AND 2.

ADRIENNE CHILBERG

DRAWN	DAJ	TITLE BOLT-SHOULDER SOCKET HEAD, SHANK HOLE	DRAWING NUMBER 23-12437
APPRV	DAJ		
DATE	06/05/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



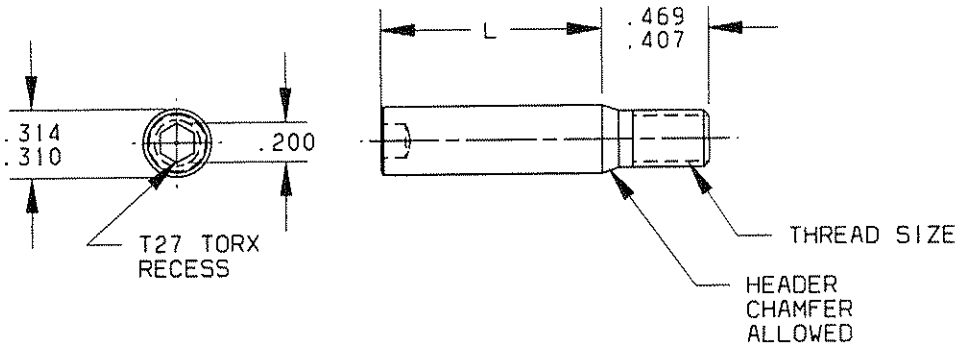
SHANK HOLE		FREIGHTLINER PART NUMBER
DIM 'G'	DRILL	
.215	22 (.157)	23-12437-000

ENGINEERING NOTES:

A 1. MATERIAL: USE 23-12527-532

CHG	JOB NO	DATE	BY	REVISION
-	P2D253-35	06/05/98	DAJ	INITIAL RELEASE
A	P2D253-45	06/20/98	DAJ	MATERIAL WAS 23-11352-532.

DRAWN	DAJ	TITLE BOLT-SHOULDER HEX SOCKET HEAD	DRAWING NUMBER 23-12461	
APPRV	DAJ			
DATE	11/04/97	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. C
CATIA ORIGINAL				



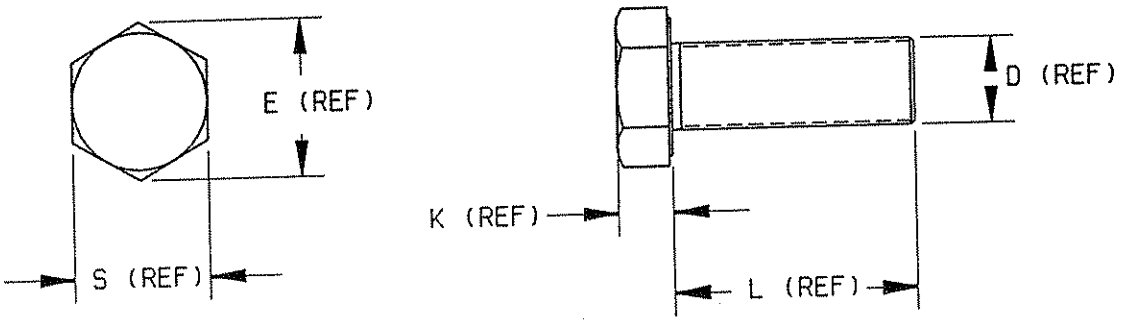
"L" DIM	THREAD SIZE	FREIGHTLINER PART NUMBER
1.714/1.654	1/4-20	23-12461-001

ENGINEERING NOTES:

1. MATERIAL: 300 SERIES SST, PER ASTM F593
2. FINISH: PLAIN
3. DIMENSIONS ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P2D241-13	11/04/97	DAJ	INITIAL RELEASE
A	P2D241-30	03/05/98	TNN	ADDED -001 & "L" DIM, REVISED NOTE 1 & 4.
B	P2D241-78	09/11/98	DAJ	ADDED "S" DIM, REMOVED -000, AND REVISED NOTES.
C	PA2042-96	08/23/99	CGD	REMOVED "S" DIM, CRCTD VARIOUS DIMS, REVISED NOTE 3.

DRAWN	DAJ	TITLE SCREW-CAP, HEX SST, METRIC, FULL THREAD	DRAWING NUMBER 23-12487	
APPRV	DAJ			
DATE	02/04/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				
UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES				



D	M6	M8
E	11.05	14.38
K	4.0	5.3
S	10.0	13.0

DIA	M6X 1.0	M8X 1.25
L	FREIGHTLINER PART NUMBERS	
20	23-12487-020	23-12488-020
25		23-12488-025
30	23-12487-030	23-12488-030
40	23-12487-040	
50	23-12487-050	

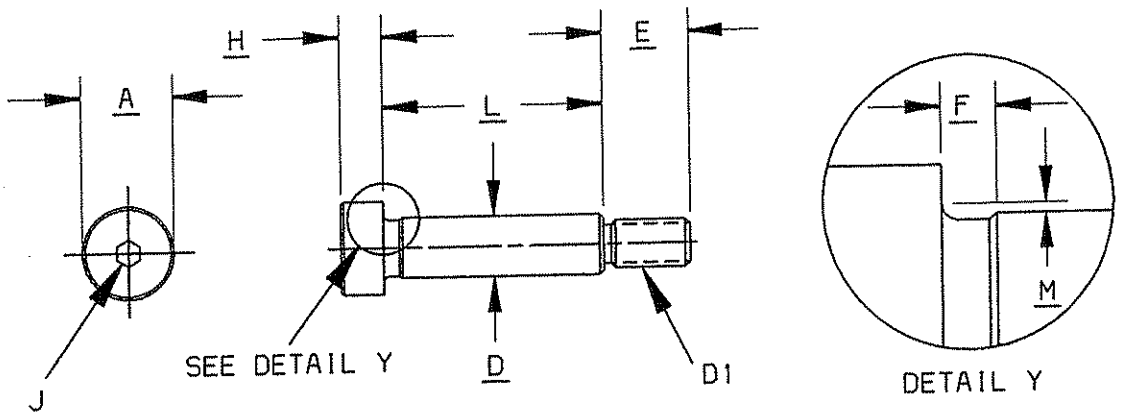
ENGINEERING NOTES:

1. DIMENSIONS ARE SHOWN FOR REFERENCE ONLY. SCREW SHALL COMFORM TO DIN 933, ISO 4017, OR ANSI B18.2.3.1M.
2. MATERIAL: STAINLESS STEEL, TYP 302 OR 304
3. SCREWS ARE FULLY THREADED.

CHG	JOB NO	DATE	BY	REVISION
-	P04072-07	02/24/98	DAJ	DOCUMENTED

ADRIENNE CHILBERG

DRAWN	DAJ	TITLE BOLT-SHOULDER HEX SOCKET HEAD, ZN	DRAWING NUMBER 23-12527
APPRV	DAJ		
DATE	06/20/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			



NOM SIZE	D ±.001	D1	A ±.010	H ±.005	J NOM	F MAX	M ±.003	E NOM	FREIGHTLINER PART NUMBER
3/8	.372	5/16-18	.553	.245	.188	.093	.018	.500	23-12527-3XX
5/8	.622	1/2-13	.864	.370	.312	.093	.027	.750	23-12527-5XX

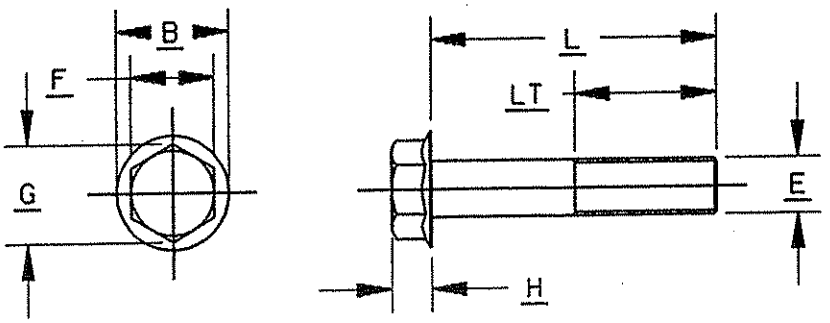
ENGINEERING NOTES:

1. MUST MEET ANSI B18.3-1969
2. MATERIAL: ALLOY STEEL RC 32 TO 43
   MINIMUM ULTIMATE TENSILE STRENGTH: 140,000 PSI
3. FINISH: ZINC PLATED PER FREIGHTLINER SPEC 49-00005-403
4. DASH NUMBERS SPECIFIED BY SIGNIFICANT DASH NUMBER SYSTEM. THE SECOND AND THIRD DIGITS SPECIFY THE LENGTH IN EIGHTS OF AN INCH (THEREFORE -322 SPECIFIES A 3/8 INCH DIAMETER BOLT WITH A LENGTH OF 2.75). THE AVAILABLE LENGTHS ARE AS FOLLOWS:

NOMINAL SCREW LENGTH	STANDARD LENGTH INCREMENT
1/4 THRU 3/4	1/8
3/4 THRU 5	1/4
OVER 5	1/2

CHG	JOB NO	DATE	BY	REVISION
-	P2D253-45	06/20/98	DAJ	INITIAL RELEASE

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	BOLT-FLANGED HEX, 10.9, ORGANIC SILVER	23-12528	
DATE	07/02/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



DIA E	M6	M8	M10	M12	M16
B MAX	14.2	18.0	22.3	26.6	35.0
F MAX	10.0	13.0	15.0	18.0	24.0
G MAX	10.95	14.26	17.33	20.79	20.79
H MAX	6.6	8.1	11.3	13.5	18.4
LT>125MM	18.0	22.0	26.0	30.0	38.0

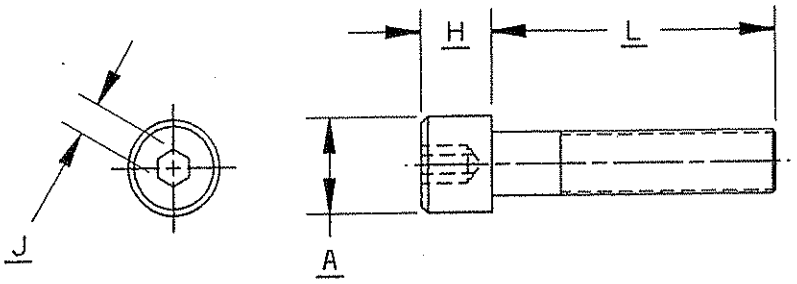
BASIC SIZE	M6 X 1.0	M8 X 1.25	M10 X 1.5	M12 X 1.75	M16 X 2.0
DIM L	FREIGHTLINER PART NUMBER				
30					
35					
45					
50					
55		23-12528-055		910105 012006	
60					
70					
80					
90					
100					

ENGINEERING NOTES:

1. MATERIAL: STEEL, PROPERTY CLASS 10.9 PER ISO 898/1.
2. STANDARD: M8 BOLTS AND SMALLER SHALL CONFORM TO DIN 6921. M10 AND LARGER SHALL CONFORM TO IFI 538.
3. FINISH: ASTM F1136-88; GRADE 2: CHROMIUM/ZINC PROTECTIVE COATING FOR FASTENERS. (SILVER)
4. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	A80512-02	07/02/98	DAJ	INITIAL LOAD

DRAWN	DAJ	TITLE	DRAWING NUMBER
APPRV	DAJ	SCREW-CAP, HEX SOCKET HEAD, METRIC, CLASS 12.9	23-12530
DATE	07/02/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			



NOMINAL SIZE	DIMENSIONS			FREIGHTLINER PART NUMBER*
	J (NOM)	A (MAX)	H (NOM)	
M8 X 1.25	6.0	13.0	8.0	23-12530-L

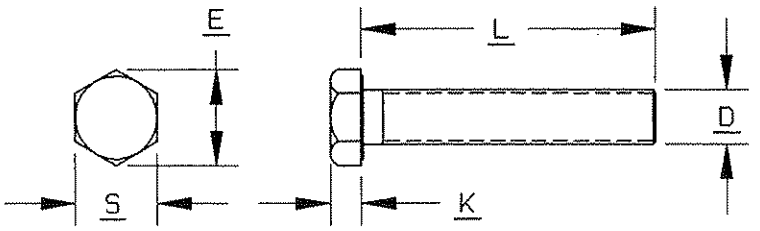
* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN MILLIMETERS. E.G. 23-12530-075 IS A M8 X 1.25 CAPSCREW 75 MILLIMETERS LONG.

ENGINEERING NOTES:

1. MATERIAL: HEAT TREATED ALLOY STEEL.
2. STANDARD: FASTENER SHALL CONFORM TO DIN 912, CLASS 12.9
3. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPEC 49-00006-041

CHG	JOB NO	DATE	BY	REVISION
-	P05309-05	07/02/98	DAJ	INITIAL LOAD

DRAWN	DAJ	TITLE	DRAWING NUMBER
APPRV	DAJ	SCREW-CAP, HEX, METRIC FINE THREAD, P&O, FULLY THREADED	23-12566
DATE	12/08/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			



DIA D	M8	M10	M12	M16	M20
E MIN	14.38	17.77	20.03	26.75	33.53
K MAX	5.5	6.4	7.5	10.0	12.5
S MAX	13	16	18	24	30

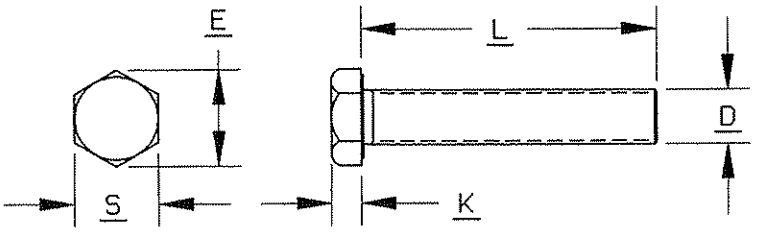
BASIC SIZE	M8 X 1.0	M10 X 1.25	M12 X 1.5	M14 X 1.5	M16 X 1.5	M20 X 2.0
LENGTH	FREIGHTLINER PART NUMBER					
30			23-12566-030			
35						
45						
50						
55						
60						
70						
80						
90						
100						
120						
130						
140						
145						
150						

ENGINEERING NOTES:

1. MATERIAL: STEEL, PROPERTY CLASS 10.9 PER ISO 898/1.
2. STANDARD: BOLT SHALL CONFORM TO DIN 933, ANSI B18.2.3.1M, OR ISO 4014.
   NOTE: DIM ACROSS FLATS IS BIGGER FOR DIN 933 BOLTS THAN ANSI OR ISO SPECIFICATIONS FOR SIZES M10, M12 AND M14.
3. FINISH: PHOSPHATE AND OIL COATING PER FREIGHTLINER SPEC 49-00006-041.
4. DIMENSIONS ARE PROVIDED FOR REFERENCE ONLY.
5. PROPERTY CLASS TO BE EMBOSSED OR INDENTED ON THE HEAD OR SIDE OF THE HEAD.
6. BOLTS MUST BE TREATED FOR RELIEF OF HYDROGEN EMBRITTLEMENT.

CHG	JOB NO	DATE	BY	REVISION
-	PF1027-26	12/08/98	DAJ	INITIAL LOAD

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX, DIN 961 FINE THREAD, FULL THREAD, ZN YL	23-12557	
DATE	10/15/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



DIA D	M12	M14	M16	M18
E MIN	21.10	24.49	26.75	30.14
K	7.5	9	10.0	12.0
S	19	22	24	27

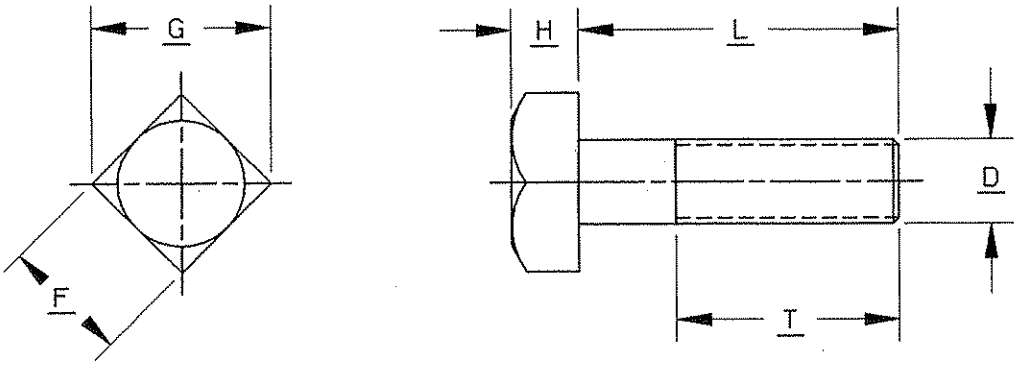
BASIC SIZE	M12 X 1.50	M14 X 1.5	M16 X 1.5	M18 X 2.0
LENGTH	FREIGHTLINER PART NUMBER			
25				
35				
38			000961 016120	
40				
45				
50				
55				

ENGINEERING NOTES:

1. BOLTS SHALL CONFORM TO DIN 961
2. 10MM AND ABOVE DIAMETER SCREWS CLASS 10.9 MATERIAL PER ISO 898/1
3. FINISH: ZINC PLATE AND YELLOW DICHROMATE PER DBL 8451.21 OR FL 49-00005-203
4. SCREWS ARE FULLY THREADED.
5. DIMENSIONS ARE PROVIDED FOR REFERENCE ONLY, SEE DIN 961 FOR DETAILS.
6. SCREWS TO BE TREATED FOR HYDROGEN EMBRITTLEMENT.

CHG	JOB NO	DATE	BY	REVISION
-	P05573-05	10/15/98	DAJ	INITIAL LOAD

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	BOLT-SQUARE HEAD ZN PLATED	23-12559	
DATE	10/30/98			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -



THREAD SIZE	DIMENSIONS (MAX)					FREIGHTLINER PART NUMBER*
	D	F	G	H	T	
5/16-18	0.324	0.500	0.707	0.220	0.875	23-12559-L

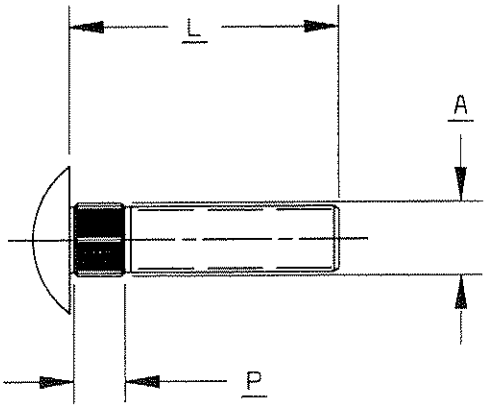
* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH. E.G. 23-12559-325 IS A 5/16-18 BOLT 3-1/4 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL GRADE 5 SAE SPECIFICATION J429
2. FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-403
3. DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ASME B18.2.1
4. FOR BOLTS LONGER THAN 6" DIMENSION "T" SHOULD BE INCREASD BY .250".

CHG	JOB NO	DATE	BY	REVISION
-	P06731-02	10/30/98	DAJ	INITIAL RELEASE

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	BOLT-ROUND HEAD, GR 8 RIBBED NECK	23-12580	
DATE	03/24/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. A
CATIA ORIGINAL				



THREAD SIZE	P DEPTH OVER RIBS (IN)	A RIB DIAMETER	FINISH	FREIGHTLINER PART NUMBERS*
3/8-16	.250 △4	.405 MIN	△3	23-12588-L
1/2-13	.192 .172 △4	.556 .545 △5	△6	23-12580-L

* THREE-DIGIT DASH NUMBER INDICATES LENGTH IN INCHES.
E.G.: 23-12580-150 IS A 1/2-13 RIBBED NECK BOLT
1 1/2 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 8 PER SAE J429.
2. THREADS: UNRC-2A

△3 FINISH: ZINC PLATE WITH YELLOW DICHROMATE PER FL 49-00005-203.

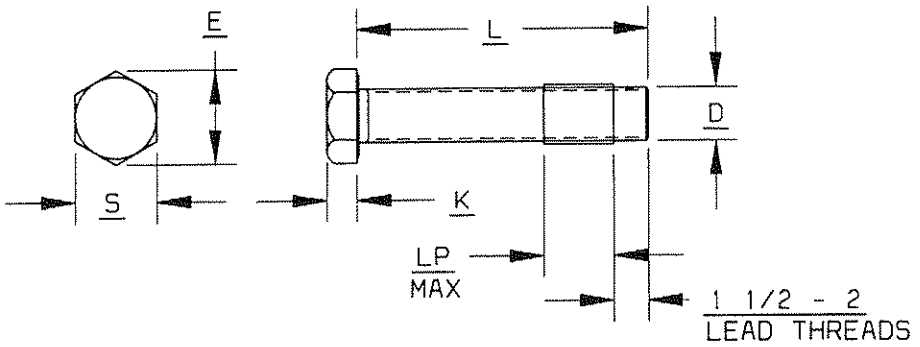
△4 SHALL CONFORM TO ANSI B18.5 EXCEPT FOR "P".

△5 SPECIAL DIA. NOT IN ACCORDANCE TO ANSI B18.5

△6 PLAIN

CHG	JOB NO	DATE	BY	REVISION
-	P06842-05	03/24/99	CGD	INITIAL LOAD
A	P07548-03	04/08/99	CGD	ADDED FINISH COLUMN AND DELTA #4 TO CHART

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX, PC 10.9 LCK PTCH, FULL THRD, ZINC & YEL	23-12594	
DATE	03/16/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. A
CATIA ORIGINAL				



DIA D	M5	M6	M8	M10	M12	M14	M16
E MIN	8.79	11.05	14.38	17.77	20.03	23.35	26.75
K	3.5	4.0	5.5	6.4	7.5	8.8	10.0
S	8	10	13	16	18	21	24
LP MAX				10			

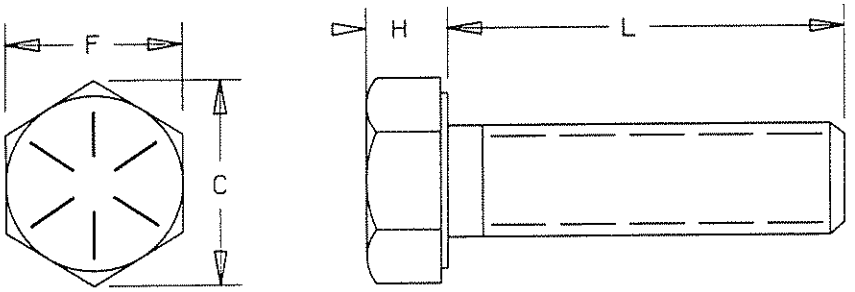
BASIC SIZE	M5 X 0.8	M6 X 1.0	M8 X 1.25	M10 X 1.5	M12 X 1.75	M14 X 2.0	M16 X 2.0
LENGTH	FREIGHTLINER PART NUMBER						
12							
16							
20							
A 25				23-12594-025			
30				23-12594-030			
35							

ENGINEERING NOTES:

1. BOLTS SHALL CONFORM TO DIN 933, ISO 4017, OR ANSI B18.2.3.1M.
2. MATERIAL: PC 10.9 PER ISO 898
3. FINISH: ZINC PLATE & YELLOW DICHROMATE PER FL 49-00005-203
4. SCREWS ARE FULLY THREADED.
5. DIMENSIONS ARE PROVIDED FOR REFERENCE ONLY.
6. SCREWS TO BE TREATED FOR HYDROGEN EMBRITTLEMENT.
7. LOCKING ELEMENT PER IFI 124

CHG	JOB NO	DATE	BY	REVISION
-	P04152-02	03/16/99	DAJ	INITIAL LOAD
A	P08882-01	06/11/99	CGD	ADDED 23-12594-025.

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	CAPSCREW-HEX FINISHED, GR. 8, SERMAGARD	23-12596	
DATE	03/23/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



NOMINAL SIZE THREADS PER INCH AND SERIES DESIGNATION	DIMENSIONS			FREIGHTLINER PART NUMBERS*
	F (BASIC)	C (MAX)	H (MAX)	
3/8 -16 UNC	9/16	0.650	.243	23-12596-L
1/2 -13 UNC 1/2 -20 UNF	3/4	0.866	.323	23-12598-L 23-12599-L
9/16-12 UNC	13/16	0.938	.371	23-12600-L
5/8 -11 UNC	15/16	1.083	.403	23-12601-L
3/4 -10 UNC	1 1/8	1.299	.483	23-12602-L

* THREE DIGIT DASH NUMBER INDICATES LENGTHS IN HUNDREDTHS OF AN INCH. E.G. 23-12596-275 IS A 3/8-16 CAPSCREW 2 3/4 INCHES LONG.

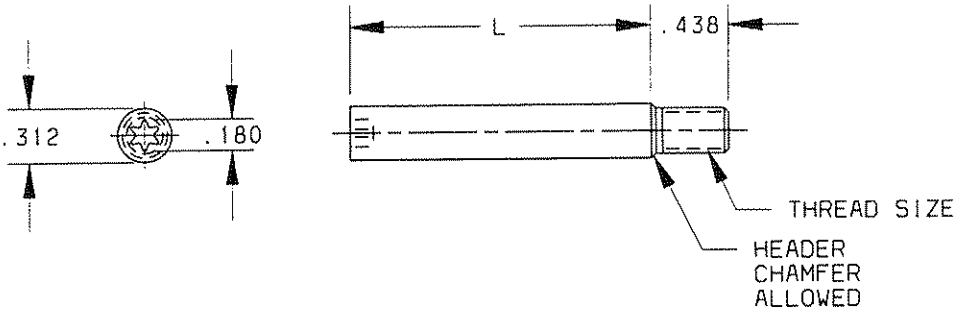
ENGINEERING NOTES:

1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE STANDARD J429.
2. FINISH: SERMAGARD OR EMPIGARD PER FL 49-00081-000
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1

CHG	JOB NO	DATE	BY	REVISION
-	P09150-01	03/23/99	DAJ	INITIAL LOAD

DRAWN	CGD	TITLE BOLT-SHOULDER TORX SOCKET HEAD	DRAWING NUMBER 23-12630
APPRV	DAJ		
DATE	06/08/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			

A



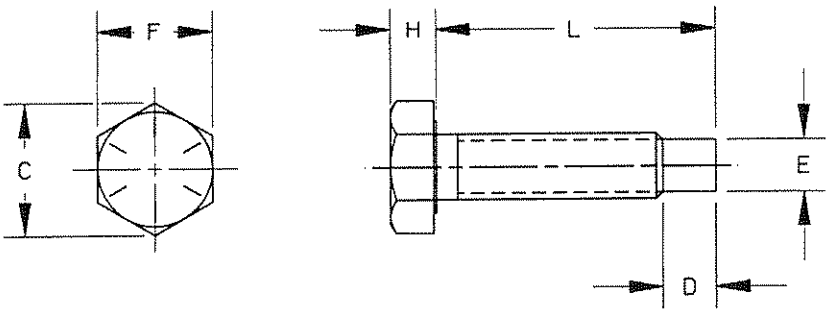
"L" DIM	THREAD SIZE	FREIGHTLINER PART NUMBER
1.714	1/4-20	23-12630-000

ENGINEERING NOTES:

1. MATERIAL: 300 SERIES SST, PER ASTM F593
2. FINISH: PLAIN
3. DIMENSIONS ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P08948-01	06/08/99	CGD	INITIAL RELEASE
A	P08948-04	11/02/99	LFB	REVISED BOLT HEAD WAS HEX

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-HEX,DOG POINT, FINISHED,GRADE.8,ZINC & WAX	23-12666	
DATE	06/30/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



THREAD SIZE	DIMENSIONS					FREIGHTLINER PART NUMBER
	F BASIC	C MAX	H MAX	D POINT	E POINT	
1/2-13 UNC	3/4	.866	.323	.19 .15	.385 .380	23-12666-L

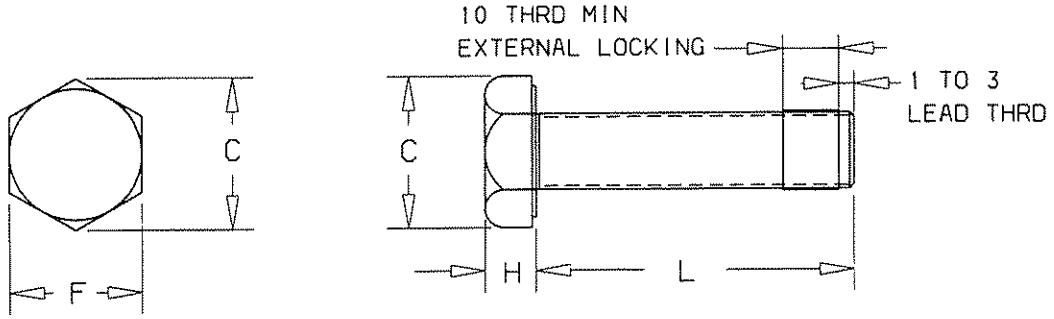
* COMPLETE PART NUMBER BY ADDING A THREE DIGIT DASH NUMBER TO INDICATE LENGTH IN HUNDREDTHS OF AN INCH.
EXAMPLE: 23-12666-150 SPECIFIES A HEX SCREW 1-1/2 INCHES LONG.

ENGINEERING NOTES:

1. MATERIAL: GRADE 8 BOLT MATERIAL PER SAE J429.
2. FINISH: ZINC AND WAX PER F/L SPEC 49-00005-403.
3. POINT: DOG POINT PER ANSI B18.6.2
4. THREAD FORM: UNC 2A.
5. DIMENSIONS SHOWN ABOVE ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P02128-21	06/30/99	CGD	INITIAL RELEASE

DRAWN	JJM	TITLE	DRAWING NUMBER	
APPRV	DAJ	SCREW-CAP, HEX, PATCHLOCK, FULL THREAD, P&O, LOCTITE 204	23-12686	
DATE	09/22/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



THREAD SIZE	"F" ACROSS FLATS	"C" ACROSS CORNERS	"H" HEAD HEIGHT	FREIGHTLINER PART NUMBER
1/4 - 20 UNC	7/16	.505	.163	23-12686-L

COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING THE LENGTH "L" IN HUNDREDTHS OF AN INCH.
E.G. 23-12686-250 IS A 1/4-20 CAPSCREW 2.5 INCHES LONG.

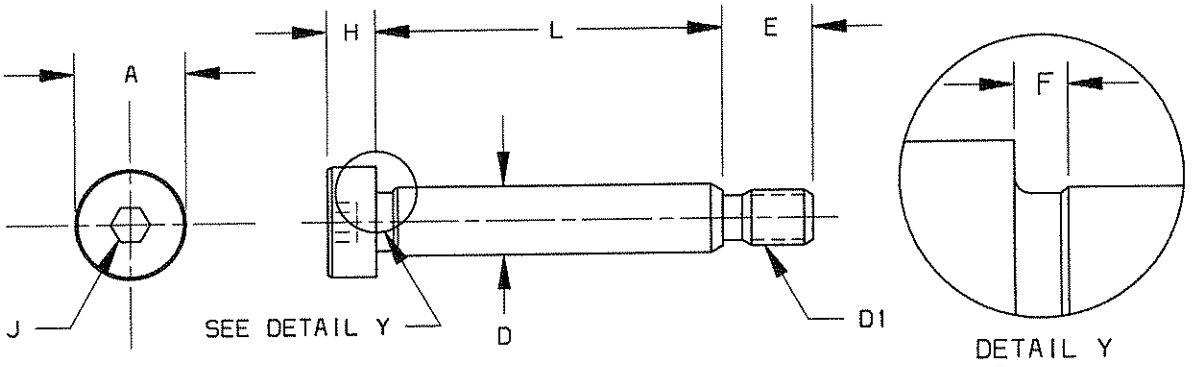
ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 8 PER SAE J429
2. LOCKING ELEMENT: LOCTITE 204 OR EQUIVELENT
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY. FOR DETAILS SEE ANSI B18.2.1
4. FINISH: PHOSPHATE AND OIL PER FL 49-00006-041
5. THREAD FORM: UNC/UNF CLASS 2A

CHG	JOB NO	DATE	BY	REVISION
-	P07437-17	09/22/99	JJM	INITIAL RELEASE

DRAWN	JJM	TITLE BOLT-SHOULDER HEX SOCKET HEAD	DRAWING NUMBER 23-12698
APPRV	DAJ		
DATE	10/19/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. C
CATIA ORIGINAL			
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM			

A



A,B,C

NOM SIZE	D ±0.018	D1	A	H MAX.	J NOM.	F MAX.	E NOM.	FREIGHTLINER PART NUMBER*
10	9.969	M8X1.25	16	7	5	2.5	13	23-12698-4LL

* THE DASH NUMBER, (FOR EXAMPLE -450). THE FIRST DIGIT (4) IDENTIFIES A 10MM SHOULDER. THE SECOND AND THIRD DIGIT (50) SPECIFIES THE LENGTH OF THE SHOULDER IN MM. E.G. A 23-12698-450 IS A 10MM SHOULDER BOLT WITH A LENGTH OF 50 MM.

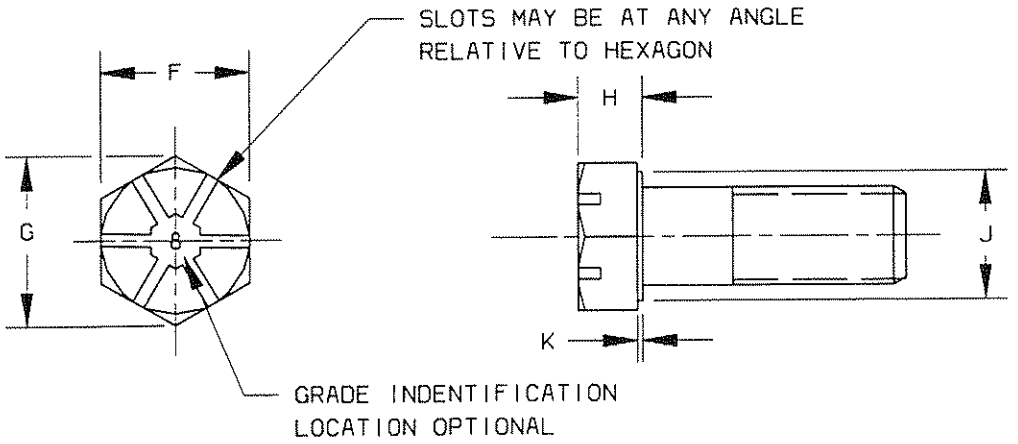
C

ENGINEERING NOTES:

1. MUST MEET ASME B18.3.3M-1993.
2. MATERIAL: ALLOY STEEL RC 32 TO 43
   MINIMUM ULTIMATE TENSILE STRENGTH: 140,000 PSI
3. FINISH: PLAIN

CHG	JOB NO	DATE	BY	REVISION
-	P10068-02	10/19/99	JJM	INITIAL RELEASE
A	P10068-04	10/28/99	LFB	ADDED (L), M8X1.25 WAS M8, 2.5 WAS -. DELETED M DIM
B	PA2042-98	11/26/99	LFB	9.969 WAS 9.696.
C	P11120-01	01/18/00	LFB	REVISED TABLE. 4L WAS 450. 7 WAS 4.2.
				REVISED NOTE 1 TO REFLECT ASME STANDARD.

DRAWN	LFB	TITLE	DRAWING NUMBER
APPRV	DAJ	SCREW-CAP, HEX, GRADE 8/8.2 TYPE AA LOCK BOLT, PH & OIL	23-12702
DATE	11/11/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			



NOMINAL SIZE	F		G		H		J		K		FREIGHTLINER PART NUMBER*
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
3/8-16	.563	.551	.650	.628	.260	.250	.484	.464	.013	.010	23-12702-L

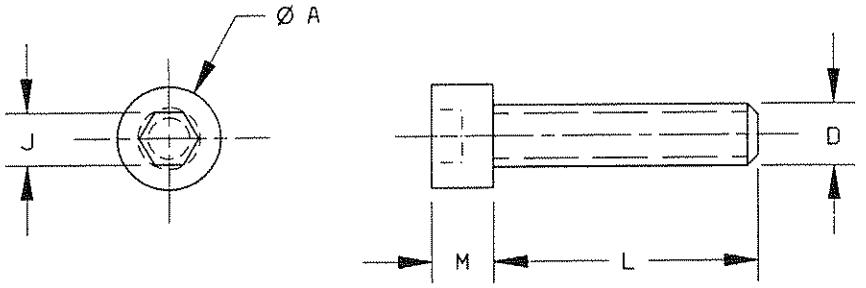
* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING LENGTHS IN 1/100THS OF AN INCH.

ENGINEERING NOTES:

1. MATERIAL: GRADE 8/8.2 PER SAE STANDARD SAE J429
2. THREAD FORM: UNC/UNF CLASS 2A
3. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION 49-00006-041

CHG	JOB NO	DATE	BY	REVISION
-	P10399-01	11/11/99	LFB	INITIAL RELEASE

DRAWN	LFB	TITLE CAPSCREW-SOCKET HEAD HEX, ASTM A574	DRAWING NUMBER 23-12718
APPRV	DAJ		
DATE	11/11/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM			



NOM SIZE	D BASIC	A MAX	H MAX	J NOM	FREIGHTLINER PART NUMBER*
M3 X 0.5	3.00	5.50	3.00	2.5	23-12718-L
M4 X 0.7	4.00	7.00	4.00	3.0	23-12719-L
M5 X 0.8	5.00	8.50	5.00	4.0	23-12720-L
M6 X 1.0	6.00	10.00	6.00	5.0	23-12721-L
M8 X 1.25	8.00	13.00	8.00	6.0	23-12722-L
M12 X 1.75	12.00	18.00	12.00	10.0	23-12723-L

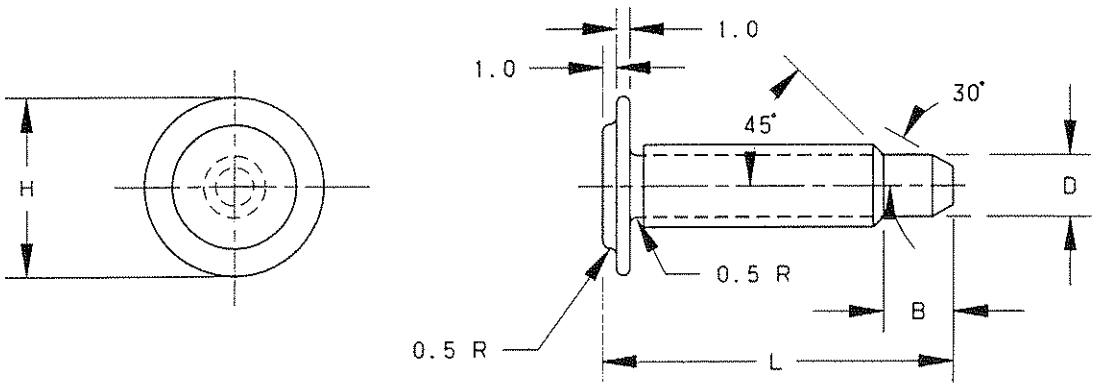
* COMPLETE PART NUMBER BY ADDING A 3 DIGIT DASH NUMBER EXPRESSING LENGTHS IN 1/100THS OF AN INCH.

ENGINEERING NOTES:

1. MATERIAL: STEEL ALLOY, PROPERTIES MUST CONFORM TO ASTM A574.
2. FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPEC 49-00006-041.

CHG	JOB NO	DATE	BY	REVISION
-	P10252-11	11/11/99	LFB	INITIAL RELEASE

DRAWN	LFB	TITLE BOLT-FLAT HEAD	DRAWING NUMBER 23-12726
APPRV	DAJ		
DATE	11/15/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM			



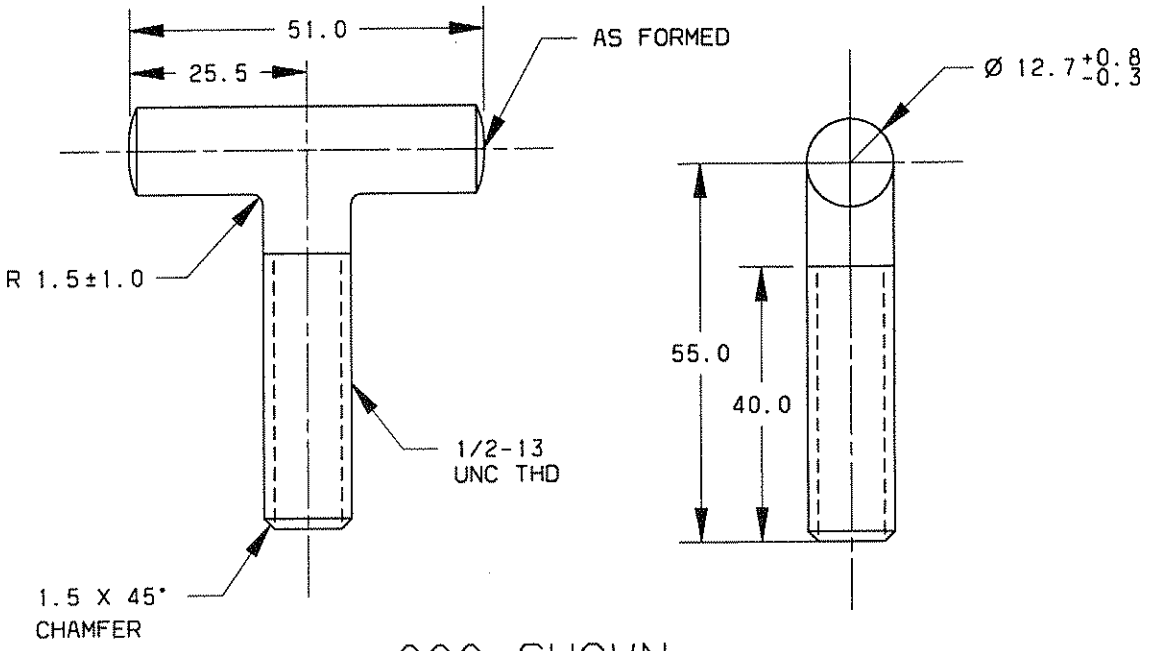
THREAD SIZE	B	D	H	L	SUPPLIER TRW	FREIGHTLINER PART NUMBER
M6-1.00	5.0	4.5	13.0	25.4	A3-101-056091	23-12726-006

ENGINEERING NOTES:

1. MATERIAL: MILD STEEL PER MPS-102. C1008-1010.
2. FINISH: PLAIN
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P07440-38	11/15/99	LFB	INITIAL RELEASE.

DRAWN	LFB	TITLE BOLT-TEE	DRAWING NUMBER 23-12746	
APPRV	DAJ			
DATE	12/29/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM				



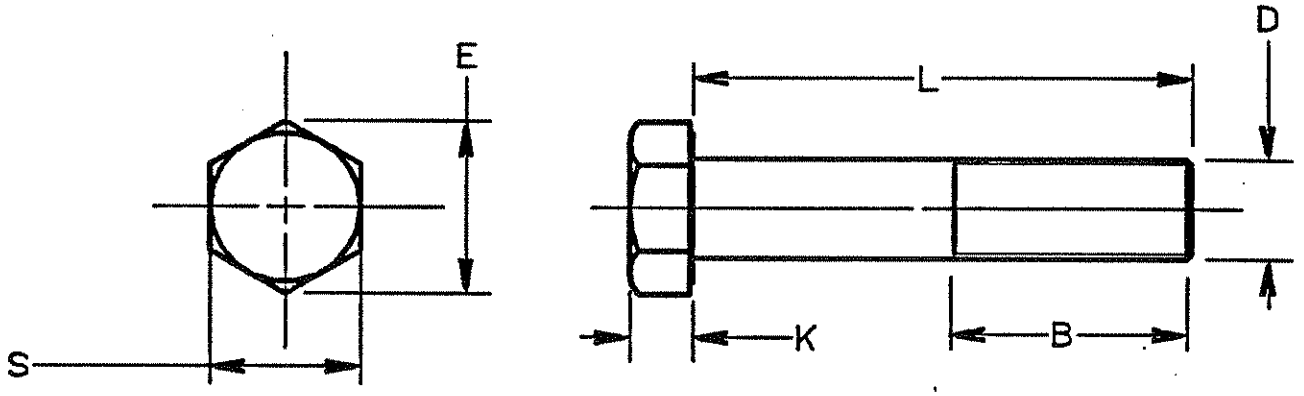
-000 SHOWN

ENGINEERING NOTES:

1. MATERIAL: GRADE 5. SAE J429.
2. FINISH: ZINC PLATE PER FREIGHTLINER SPECIFICATION 49-00005-103.
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P07590-05	12/29/99	LFB	INITIAL RELEASE

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, HEX, 8.8 PHOS/OIL	210931 008002
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



DIA D		M6	M8	M10	M12	M14	M16	M20
E	MAX	11.55	15.01	18.48	20.78	24.25	27.71	34.64
	MIN	11.05	14.38	17.77	20.03	23.35	26.75	32.95
S	MAX	10	13	16	18	21	24	30
	MIN	9.78	12.73	15.73	17.73	20.67	23.67	29.16
K	MAX	4.15	5.5	6.63	7.76	9.09	10.32	12.88
	MIN	3.85	5.1	6.17	7.24	8.51	9.68	12.12
B REF	L≤125	18	22	26	30	34	38	46
	L≥125	24	28	32	36	40	44	52

CHG	JOB/RLSE NO	DATE	BY	REVISION
J	PA2024-64	02/19/91	PCK	REDRAWN. ADDED NEW PART NUMBERS ON SHEET 2

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,8.8 PHOS/OIL	210931 008002
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

NOM DIA(D) X LENGTH(L)	PART NUMBER	NOM DIA(D) X LENGTH(L)	PART NUMBER
M8 X 16	210931 008002	M8 X 90	210931 008003
M10 X 20	210931 010001	M10 X 65	210931 010002
M10 X 70	210931 010003	M12 X 35	210931 012010
M12 X 140	210931 012008	M12 X 160	210931 012009

MATERIAL: STEEL,PROPERTY CLASS 8.8 PER ISO 898/1

STANDARD: BOLTS SHALL CONFORM TO DIN 931 OR ANSI B18.3.2.1M OR ISO 4014 EXCEPT FOR SIZES M10,M12 AND M14 WHICH MUST MEET ANSI B18.3.2.1M OR ISO 4014 ONLY

NOTE:DIM ACROSS FLATS IS BIGGER FOR DIN 931 BOLTS FOR SIZES M10,M12 AND M14

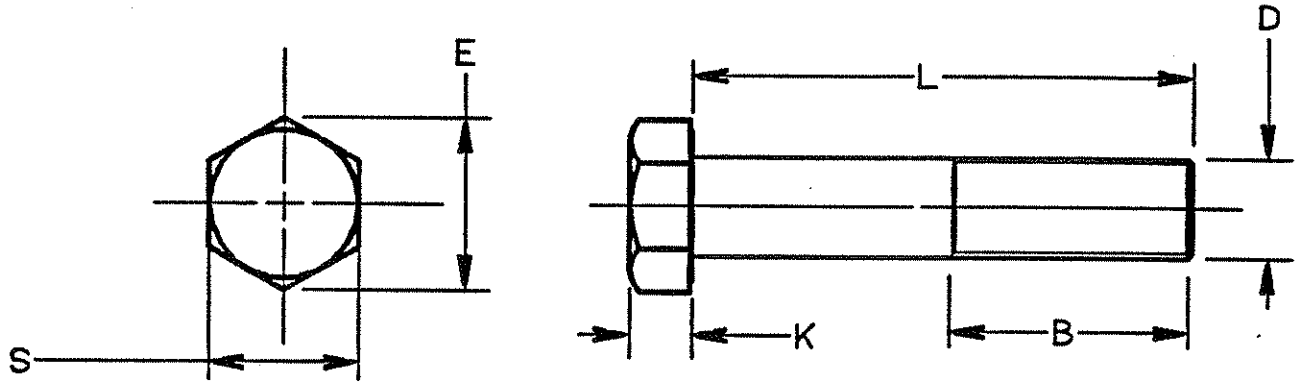
FINISH:PHOSPHATE AND OIL COATING PER FREIGHTLINER SPEC 49-00006-041

DIMENSIONS SHOWN ARE FOR REF ONLY.

PROPERTY CLASS TO BE EMBOSSED OR INDENTED ON THE HEAD OF THE CAPSCREW,OR INDENTED ON THE SIDE OF THE HEAD

CHG	JOB/RLSE NO	DATE	BY	REVISION
	PA2024-64	02/19/91	PCK	REDRAWN.ADDED NEW PART NUMBERS.

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,10.9 PHOS/OIL	210931 016002
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



DIA D		M6	M8	M10	M12	M14	M16	M20	M24	M30
E	MAX	11.55	15.01	18.48	20.78	24.25	27.71	34.64	41.57	53.12
	MIN	11.05	14.38	17.77	20.03	23.35	26.75	32.95	39.55	50.85
S	MAX	10	13	16	18	21	24	30	36	46
	MIN	9.78	12.73	15.73	17.73	20.67	23.67	29.16	35.00	45
K	MAX	4.15	5.5	6.63	7.76	9.09	10.32	12.88	15.44	19.48
	MIN	3.85	5.1	6.17	7.24	8.51	9.68	12.12	14.56	17.92
B REF	L≤125	18	22	26	30	34	38	46	54	66
	L≥125	24	28	32	36	40	44	52	60	72

CHG	JOB/RLSE NO	DATE	BY	REVISION
J	PA2024-64	02/19/91	PCK	REVISED AND REDRAWN. ADDED NEW PART NUMBERS

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,10.9 PHOS/OIL	210931 016002
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

NOM DIA(D) X LENGTH(L)	PART NUMBER	NOM DIA(D) X LENGTH(L)	PART NUMBER
M8 X 30	210931 008001	M12 X 90	210931 012007
M12 X 130	210931 012006	M14 X 50	210931 014002
M14 X 80	210931 014001	M16 X 45	210931 016002
M16 X 60	210931 016003	M16 X 70	210931 016000
M16 X 120	210931 016001	M20 X 60	210931 020001
M24 X 80	210931 024003	M24 X 140	210931 024002
M24 X 145	210931 024001	M24 X 150	210931 024000

MATERIAL: STEEL,PROPERTY CLASS 10.9 PER ISO 898/1

STANDARD: BOLTS SHALL CONFORM TO DIN 931 OR ANSI B18.3.2.1M OR ISO 4014 EXCEPT FOR SIZES M10,M12 AND M14 WHICH MUST MEET ANSI B18.3.2.1M OR ISO 4014 ONLY

NOTE:DIM ACROSS FLATS IS BIGGER FOR DIN 931 BOLTS FOR SIZES M10,M12 AND M14

FINISH:PHOSPHATE AND OIL COATING PER FREIGHTLINER SPEC 49-00006-041

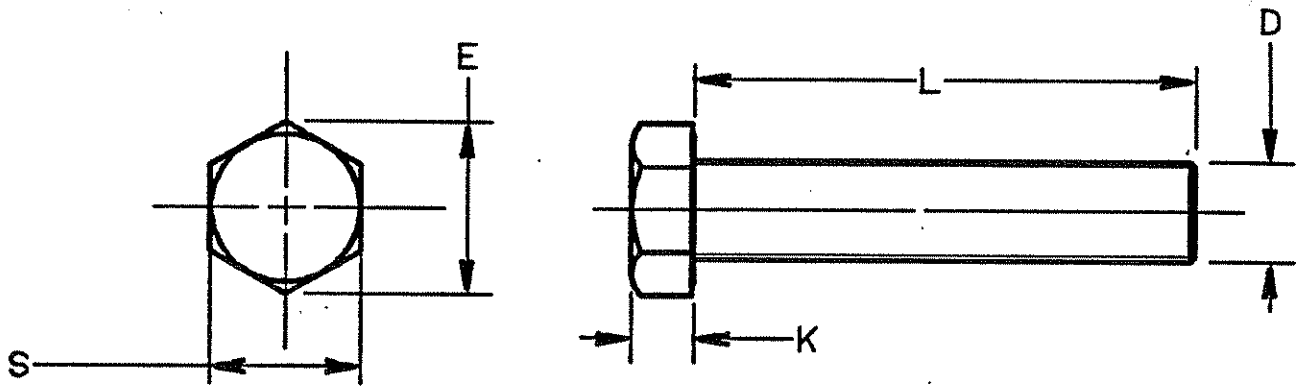
DIMENSIONS SHOWN ARE FOR REF ONLY.

PROPERTY CLASS TO BE EMBOSSED OR INDENTED ON THE HEAD OF THE CAPSCREW,OR INDENTED ON THE SIDE OF THE HEAD

BOLTS MUST BE TREATED FOR RELIEF OF HYDROGEN EMBRITTLEMENT

CHG	JOB/RLSE NO	DATE	BY	REVISION
J	PA2024-64	02/19/91	PCK	REVISED AND REDRAWN.ADDED NEW PART NUMBERS

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP, HEX, FULLY THREADED, 10.9 PHOS/OIL	210933 010000
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



DIA D		M6	M8	M10	M12	M14	M16	M20
E	MAX	11.55	15.01	18.48	20.78	24.25	27.71	34.64
	MIN	11.05	14.38	17.77	20.03	23.35	26.75	32.95
S	MAX	10	13	16	18	21	24	30
	MIN	9.78	12.73	15.73	17.73	20.67	23.67	29.16
K	MAX	4.15	5.5	6.63	7.76	9.09	10.32	12.88
	MIN	3.85	5.1	6.17	7.24	8.51	9.68	12.12
B REF	L≤125	18	22	26	30	34	38	46
	L≥125	24	28	32	36	40	44	52

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	PA2024-64	02/10/91	PCK	REDRAWN. ADDED ADDED NEW PART NUMBERS

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,FULLY THREADED,10.9 PHOS/OIL	210933 010000
DATE	02/10/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

THREAD DIA(D) X LENGTH(L)	PART NUMBER	THREAD DIA(D) X LENGTH(L)	PART NUMBER
M8 X 20	210933 008000	M10 X 12	210933 010001
M10 X 16	210933 010000	M10 X 25	210933 010003
M10 X 70	210933 010004	M16 X 30	210933 016000
M16 X 50	210933 016001	M20 X 40	210933 020000

MATERIAL: STEEL,PROPERTY CLASS 10.9 PER ISO 898/1

STANDARD: BOLTS SHALL CONFORM TO DIN 933 OR ISO 4017 EXCEPT FOR SIZES M10,M12 AND M14 WHICH MUST MEET ISO 4017 ONLY

NOTE:DIM ACROSS FLATS IS BIGGER FOR DIN 933 BOLTS FOR SIZES M10,M12 AND M14

FINISH:PHOSPHATE AND OIL COATING PER FREIGHTLINER SPEC 49-00006-041

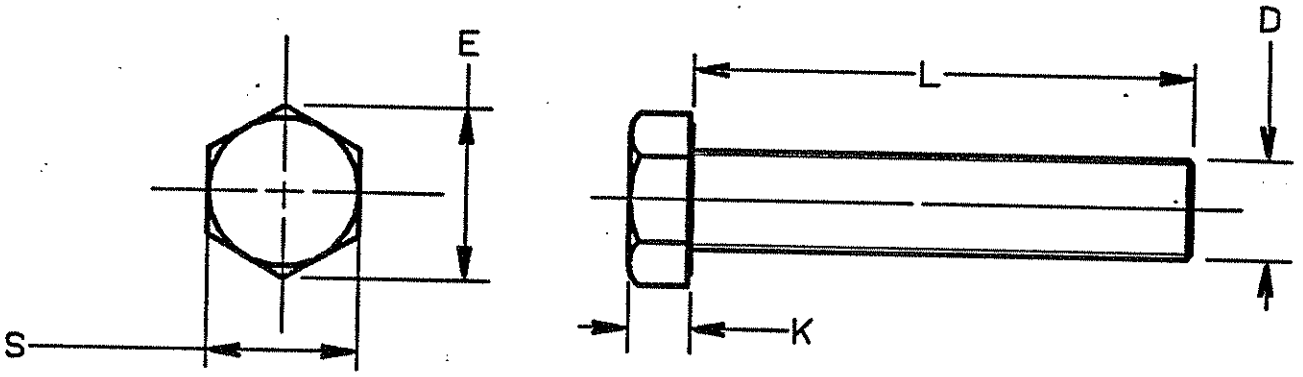
DIMENSIONS SHOWN ARE FOR REF ONLY.

PROPERTY CLASS TO BE EMBOSSED OR INDENTED ON THE HEAD OF THE CAPSCREW,OR INDENTED ON THE SIDE OF THE HEAD

BOLTS MUST BE TREATED FOR RELIEF OF HYDROGEN EMBRITTLEMENT

CHG	JOB/RLSE NO	DATE	BY	REVISION
	PA2024-64	02/10/91	PCK	REDRAWN. ADDED NEW PART NUMBERS.

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,FULLY THREADED,8.8 PHOS/OIL	210933 012004
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



DIA D		M6	M8	M10	M12	M14	M16	M20
E	MAX	11.55	15.01	18.48	20.78	24.25	27.71	34.64
	MIN	11.05	14.38	17.77	20.03	23.35	26.75	32.95
S	MAX	10	13	16	18	21	24	30
	MIN	9.78	12.73	15.73	17.73	20.67	23.67	29.16
K	MAX	4.15	5.5	6.63	7.76	9.09	10.32	12.88
	MIN	3.85	5.1	6.17	7.24	8.51	9.68	12.12

CHG	JOB/RLSE NO	DATE	BY	REVISION
B	PA2024-64	02/19/91	PCK	REDRAWN.ADDED NEW PART NUMBERS

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	SCREW-CAP,HEX,FULLY THREADED,8.8 PHOS/OIL	210933 012004
DATE	02/19/91	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

THREAD DIA(D) X LENGTH(L)	PART NUMBER	THREAD DIA(D) X LENGTH(L)	PART NUMBER
M4 X 16	210933 004000	M8 X 30	210933 008001
M10 X 20	210933 010005	M10 X 45	210933 010006
M10 X 65	210933 010007	M10 X 110	210933 010008
M12 X 25	210933 012001	M12 X 30	210933 012002
M12 X 50	210933 012003	M12 X 110	210933 012000
M12 X 150	210933 012004	M14 X 25	210933 014000
M14 X 35	210933 014001	M16 X 30	210933 016002
M16 X 90	210933 016003		

MATERIAL: STEEL,PROPERTY CLASS 8.8 PER ISO 898/1

STANDARD: BOLTS SHALL CONFORM TO DIN 933 OR ISO 4017 EXCEPT FOR SIZES M10,M12 AND M14 WHICH MUST MEET ISO 4017 ONLY

NOTE:DIM ACROSS FLATS IS BIGGER FOR DIN 933 BOLTS FOR SIZES M10,M12 AND M14

FINISH: PHOSPHATE AND OIL COATING PER FREIGHTLINER SPEC 49-00006-041

DIMENSIONS SHOWN ARE FOR REF ONLY.

PROPERTY CLASS TO BE EMBOSSED OR INDENTED ON THE HEAD OF THE CAPSCREW,OR INDENTED ON THE SIDE OF THE HEAD

CHG	JOB/RLSE NO	DATE	BY	REVISION
B	PA2024-64	02/19/91	PCK	REDRAWN.ADDED NEW PART NUMBERS