	DWG. NO.	TITLE
1	25B450_6_B	**RAFT 1 SUB-ASSEMBLY**
2	25B451_6_B	**RAFT 2 SUB-ASSEMBLY**
3	25B452_6_B	**RAFT 3 SUB-ASSEMBLY**
4	25B456_2_B	X-SHIM, QUAD
5	25B457_2_B	Y-SHIM, QUAD
6	25B458_2_B	RAIL, X-SHIM
7	25B459_2_A	RAIL, JACKING, TYPE A
8	25B460_2_F	Z-SHIM
9	25B462_2_D	X-SHIM, REBUNCHER
10	25B463_3_B	Y-SHIM, CHOPPER
11	25B464_2_A	X-SHIM, CHOPPER
12	25B465_2_A	RAIL, JACKING, TYPE B
13	25B466_2_B	Y-SHIM, TARGET
14	25B467_2_B	X-SHIM, TARGET
15	25B475_3_D	Y-SHIM, SIMPLEX, REBUNCHER
16	25B479_3_D	Y-SHIM, DUPLEX, REBUNCHER
17	25B702_3_B	T-BAR, REBUNCHER
18	25B710_2_A	RAIL, JACKING, TYPE C

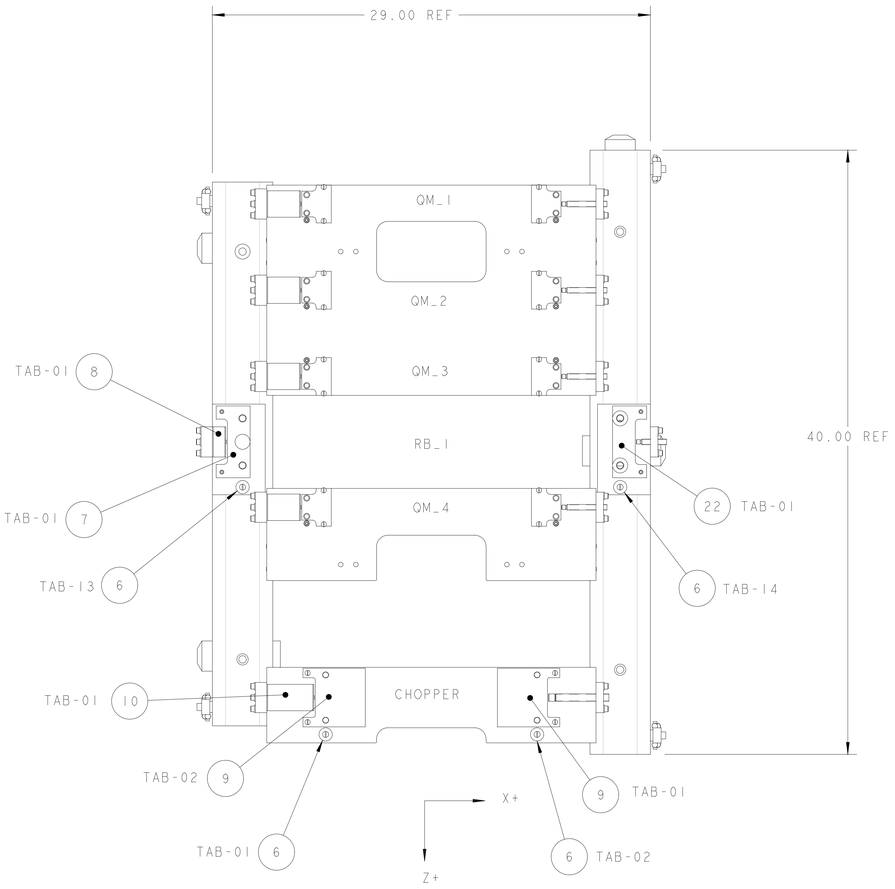
Active links shown in blue.
Drawing number format: *serial no_drawing size_revision letter.*
Assembly titles shown in bold face type.

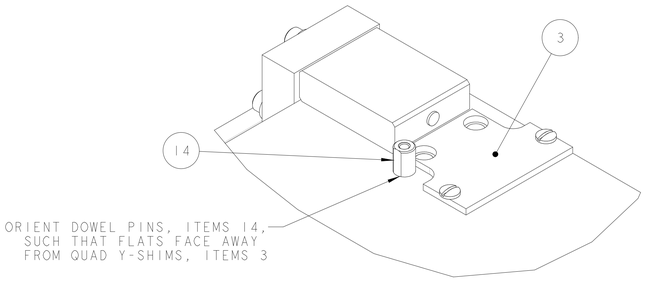
NOTES:

1) APPROXIMATE ASSEMBLY WEIGHT: 500_LB (227_KG).

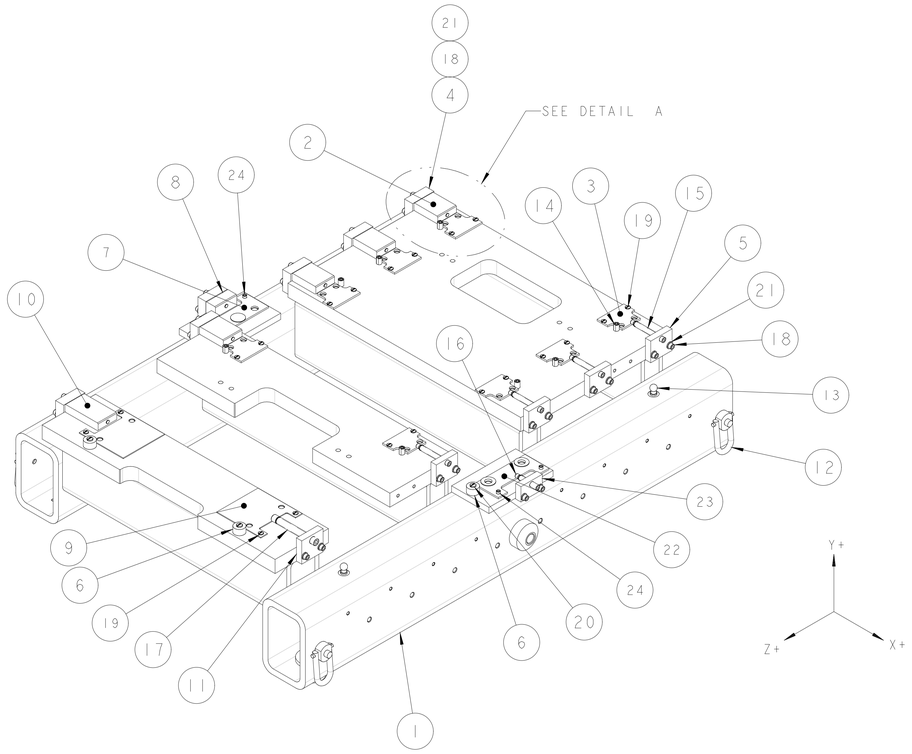
2) AXIS LABELS X,Y,Z REFER TO MEBT COORDINATE SYSTEM.

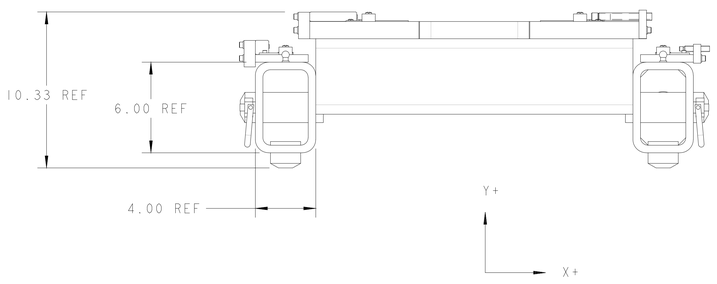
3) LABEL ABBREVIATIONS: "QM" = QUADRUPOLE MAGNET, "RB" = REBUNCHER CAVITY.

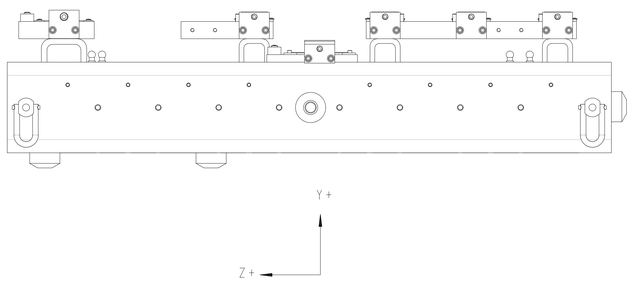




DETAIL A
SCALE 1/1







ITEM	PART NO	REQD	DESCRIPTION	MATERIAL
24	-	4	SCREW, SCH, 8-32 UNC-2A X 3/8 L	18-8 SS
23	25B710	1	RAIL, JACKING, TYPE C	304 SS PRODEC
22	25B479	1	Y-SHIM, DUPLEX, REBUNCHER	SST, 304 PRODEC
21		30	1/4'' NARROW FLAT WASHER	STAINLESS STEEL
20	-	4	SCR, BDGH, 10-32 X 1/2 L	SS
19	-	20	SCR, BDGH, 8-32 X 5/8 L	SS
18	-	30	SHCS 1/4-20 X 1.25 SS	18-8 SS
17	-	1	SCR,SWIVEL, 1/2-13 X 4, CARR-LANE CL-40-SSC-S OR EQL	STK
16	-	1	SCR, SWIVEL, 3/8-16 X 2, CARR-LANE CL-12-SSC-S OR EQL	STK
15	-	4	SCR, SWIVEL, 3/8-16 X 3, CARR-LANE CL-39-SSC-S OR EQL	STK
14	-	12	DOWEL PIN, PULL-OUT, FLAT VENT, MMC 97365A250 OR EQL	18-8 SS
13	-	4	FIDUCIAL BALL, CARR-LANE CL-2-SCB OR EQL	STK
12	-	4	HOIST RING, CARR-LANE CL-1000-SHR-1 OR EQL	STK
11	25B465	1	RAIL, JACKING, TYPE B	304 SS PRODEC
10	25B464	1	X-SHIM, CHOPPER	304 SS PRODEC
9	25B463	2	Y-SHIM, CHOPPER	304 SS PRODEC
8	25B462	1	X-SHIM, REBUNCHER	304 SS PRODEC
7	25B475	1	Y-SHIM, SIMPLEX, REBUNCHER	SST, 304 PRODEC
6	25B460	4	Z-SHIM	304 SS PRODEC
5	25B459	4	RAIL, JACKING, TYPE A	304 SS PRODEC
4	25B458	6	RAIL, X-SHIM	304 SS PRODEC
3	25B457	8	Y-SHIM, QUAD	304 SS PRODEC
2	25B456	4	X-SHIM, QUAD	304 SS PRODEC
1	25B453	1	RAFT #1 WELDMENT ASSEMBLY	CARBON STEEL

REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		10/03/01	UPDATED ITEMS 7, 13. ADDED ITEMS 22-25. ANNOTATED TABULATED SHIMS.
A	PL				INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 FRAC. ± 1/64; X.XX ± 0.01 Angles ± 1.0°; X.XXX ± 0.005 FINISH 125
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS
SER NO. -
ACCT NO. | NO. REQD | DATE ISSD
REL TO | DATE REQD
SURFACE TREATMT -
IDENT METHOD TAG
PROJECT NUMBER no
PROJECT NAME N/A
DWG BY PAL | DATE 08-May-01
CHK BY - | DATE
APP BY D. OSHATZ | DATE

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
SUPPORT AND ALIGNMENT
RAFT 1 SUB-ASSEMBLY

MICROFILMED: | DWG. TYPE ASSEM | SHOWN ON 25B610 | SCALE: 1/4 | DO NOT SCALE PRINT
PATENT CLEAR: | DESIGN ACCT. NO. - | CATEGORY CODE FE3313 | DWG. NO. 25B4506 | SIZE B | REV. B
SHEET 1 OF 1

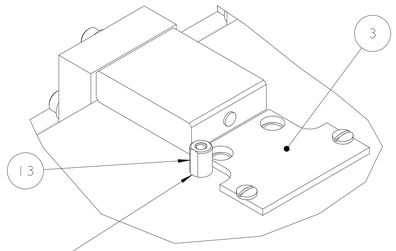
DWG. NO. 25B4506 REV. B SH 1

NOTES:

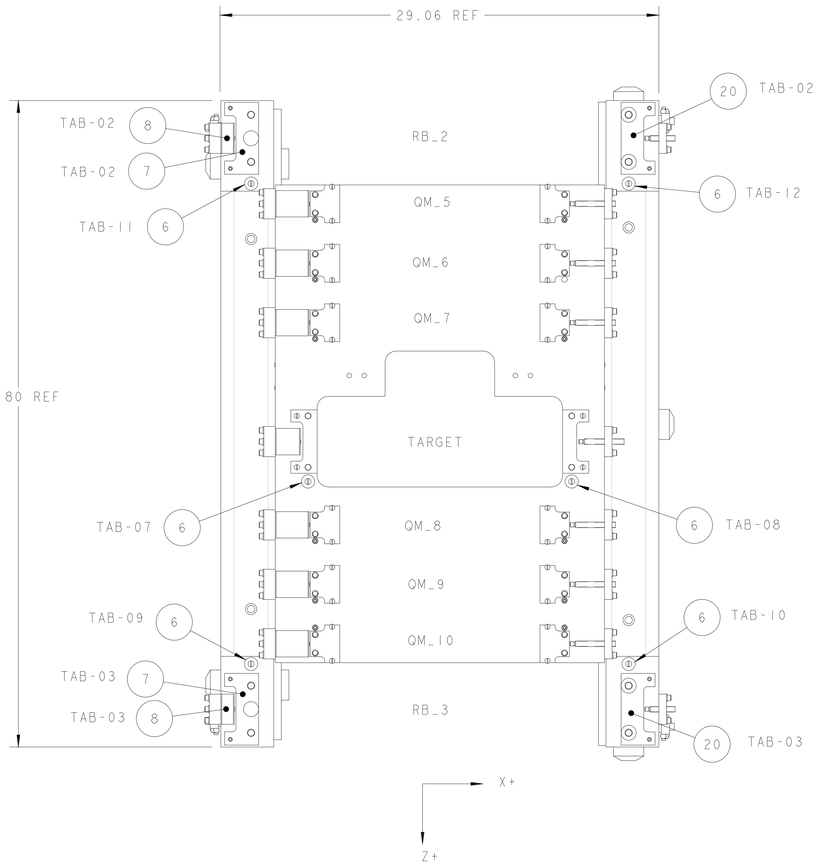
1) APPROXIMATE ASSEMBLY WEIGHT: 572_LB (259_KG).

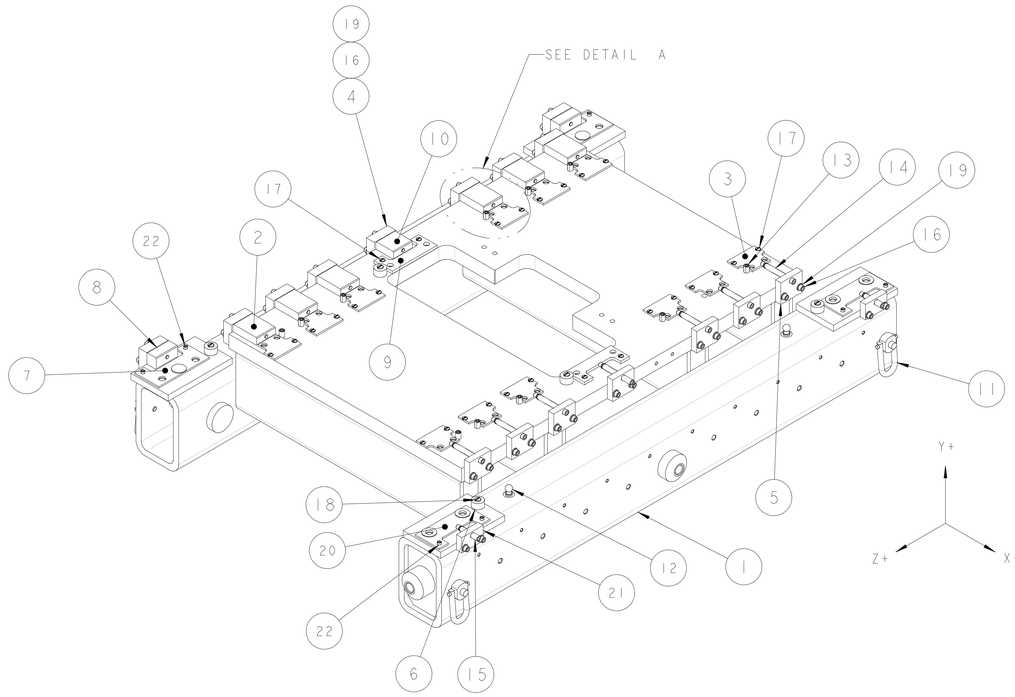
2) AXIS LABELS X,Y,Z REFER TO MEBT COORDINATE SYSTEM.

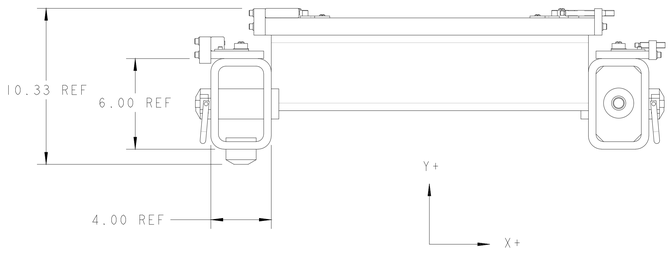
3) LABEL ABBREVIATIONS: "QM" = QUADRUPOLE MAGNET, "RB" = REBUNCHER CAVITY.

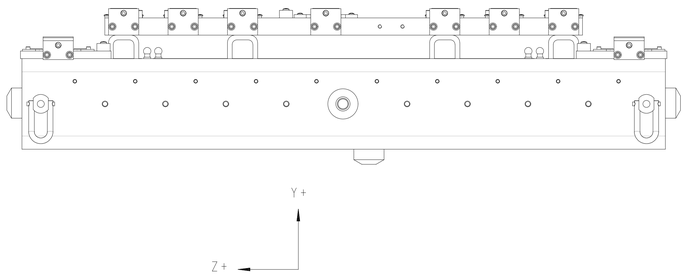


DETAIL A
SCALE 1/1









ITEM	PART NO	REQD	DESCRIPTION	MATERIAL
22	-	8	SCREW, SCH, 8-32 UNC-2A X 3/8 L	18-8 SS
21	25B710	2	RAIL, JACKING, TYPE C	304 SS PRODEC
20	25B479	2	Y-SHIM, DUPLEX, REBUNCHER	SST, 304 PRODEC
19		45	1/4'' NARROW FLAT WASHER	STAINLESS STEEL
18	-	6	SCR, BDGH, 10-32 X 1/2 L	SS
17	-	28	SCR, BDGH, 8-32 X 5/8 L	SS
16	-	45	SHCS 1/4-20 X 1.25 SS	18-8 SS
15	-	2	SCR, SWIVEL, 3/8-16 X 2, CARR-LANE CL-12-SSC-S OR EQL	STK
14	-	7	SCR, SWIVEL, 3/8-16 X 3, CARR-LANE CL-39-SSC-S OR EQL	STK
13	-	18	DOWEL PIN, PULL-OUT, FLAT VENT, MMC 97365A250 OR EQL	18-8 SS
12	-	4	FIDUCIAL BALL, CARR-LANE CL-2-SCB OR EQL	STK
11	-	4	HOIST RING, CARR-LANE CL-1000-SHR-1 OR EQL	STK
10	25B467	1	X-SHIM, TARGET	304 SS PRODEC
9	25B466	2	Y-SHIM, TARGET	304 SS - PRODEC
8	25B462	2	X-SHIM, REBUNCHER	304 SS PRODEC
7	25B475	2	Y-SHIM, SIMPLEX, REBUNCHER	SST, 304 PRODEC
6	25B460	6	Z-SHIM	304 SS PRODEC
5	25B459	7	RAIL, JACKING, TYPE A	304 SS PRODEC
4	25B458	9	RAIL, X-SHIM	304 SS PRODEC
3	25B457	12	Y-SHIM, QUAD	304 SS PRODEC
2	25B456	6	X-SHIM, QUAD	304 SS PRODEC
1	25B454	1	RAFT #2 WELDMENT ASSEMBLY	CARBON STEEL

REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		10/03/01	UPDATED ITEMS 7, 12. ADDED ITEMS 20, 21, 22. ANNOTATED TABULATED SHIMS.
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 FRAC. ± 1/64; X.XX ± 0.01 Angles ± 1.0°; X.XXX ± 0.005 FINISH 125/
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS
ACCT NO. - REQD
DEL TO - REQD
ISR NO. -
DATE -
ISSD -
DATE -
REQD -
SURFACE TREATMT -
IDENT METHOD TAG
PROJECT NUMBER no
PROJECT NAME N/A
DWG BY PAL DATE 04-May-01
CHK - DATE
APP BY D. OSHATZ DATE

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
SUPPORT AND ALIGNMENT
RAFT 2 SUB-ASSEMBLY

MICROFILMED:
DWG. TYPE ASSEM
SHOWN ON 25B611
SCALE: 1/4
DO NOT SCALE PRINT
SHEET 1 OF 1
PATENT CLEAR:
DESIGN ACCT. NO. -
CATEGORY CODE FE3313
DWG. NO. 25B4516
SIZE B
REV. B

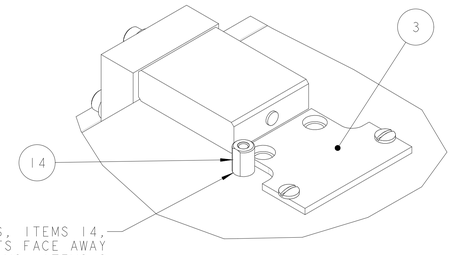
SIZE REV SH: 1
B 25B4516
DWG. NO.

NOTES:

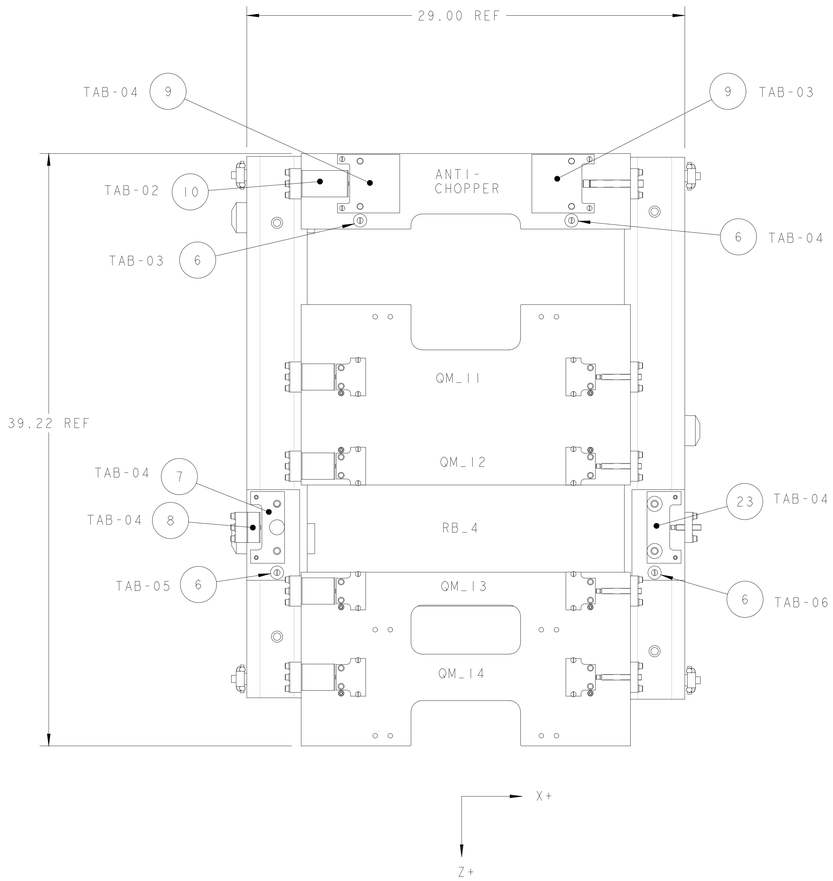
1) APPROXIMATE ASSEMBLY WEIGHT: 529_LB (240_KG).

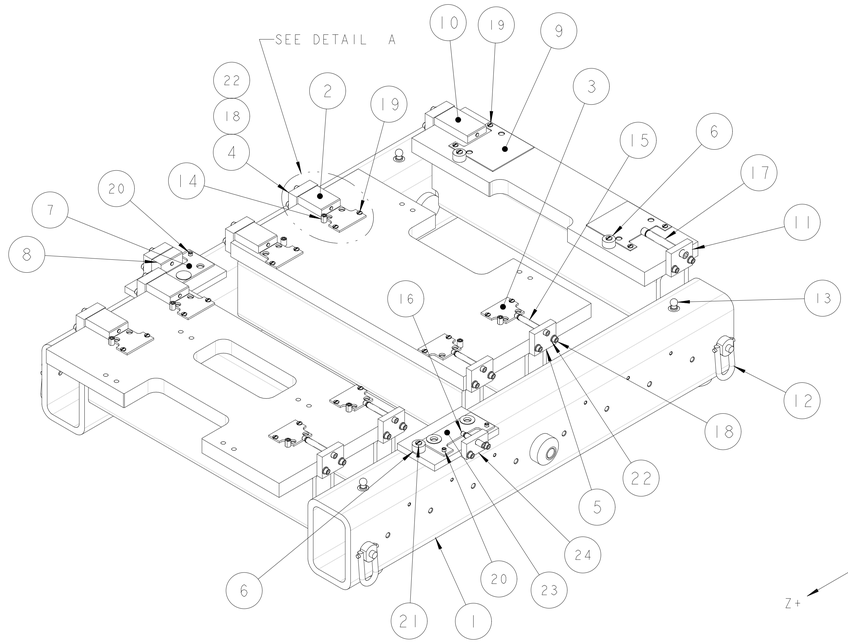
2) AXIS LABELS X,Y,Z REFER TO MEBT COORDINATE SYSTEM.

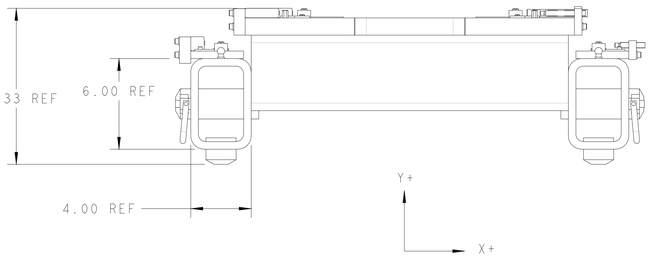
3) LABEL ABBREVIATIONS: "QM" = QUADRUPOLE MAGNET, "RB" = REBUNCHER CAVITY.

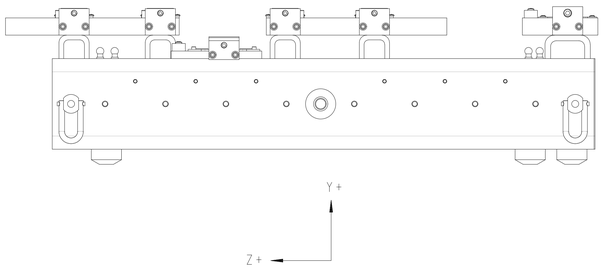


DETAIL A
SCALE 1/1









ITEM	PART NO	REQD	DESCRIPTION	MATERIAL
24	25B710	1	RAIL, JACKING, TYPE C	304 SS PRODEC
23	25B479	1	Y-SHIM, DUPLEX, REBUNCHER	SST, 304 PRODEC
22		31	1/4'' NARROW FLAT WASHER	STAINLESS STEEL
21	-	4	SCR, BDGH, 10-32 X 1/2 L	SS
20	-	4	SCREW, SCH, 8-32 UNC-2A X 3/8 L	18-8 SS
19	-	20	SCR, BDGH, 8-32 X 5/8 L	SS
18	-	30	SHCS 1/4-20 X 1.25 SS	18-8 SS
17	-	1	SCR,SWIVEL, 1/2-13 X 4, CARR-LANE CL-40-SSC-S OR EQL	STK
16	-	1	SCR, SWIVEL, 3/8-16 X 2, CARR-LANE CL-12-SSC-S OR EQL	STK
15	-	4	SCR, SWIVEL, 3/8-16 X 3, CARR-LANE CL-39-SSC-S OR EQL	STK
14	-	12	DOWEL PIN, PULL-OUT, FLAT VENT, MMC 97365A250 OR EQL	18-8 SS
13	-	4	FIDUCIAL BALL, CARR-LANE CL-2-SCB OR EQL	STK
12	-	4	HOIST RING, CARR-LANE CL-1000-SHR-1 OR EQL	STK
11	25B465	1	RAIL, JACKING, TYPE B	304 SS PRODEC
10	25B464	1	X-SHIM, CHOPPER	304 SS PRODEC
9	25B463	2	Y-SHIM, CHOPPER	304 SS PRODEC
8	25B462	1	X-SHIM, REBUNCHER	304 SS PRODEC
7	25B475	1	Y-SHIM, SIMPLEX, REBUNCHER	SST, 304 PRODEC
6	25B460	4	Z-SHIM	304 SS PRODEC
5	25B459	4	RAIL, JACKING, TYPE A	304 SS PRODEC
4	25B458	6	RAIL, X-SHIM	304 SS PRODEC
3	25B457	8	Y-SHIM, QUAD	304 SS PRODEC
2	25B456	4	X-SHIM, QUAD	304 SS PRODEC
1	25B455	1	RAFT #3 WELDMENT ASSEMBLY	CARBON STEEL

REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		10/03/01	UPDATED ITEMS 7, 13. ADDED ITEM 23. ANNOTATED TABULATED SHIMS
A	PAL				INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 FRAC. ± 1/64; X.XX ± 0.01 Angles ± 1.0°; X.XXX ± 0.005 FINISH 125
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS
ACCT NO.: REQ. REQD
DEL TO:
SURFACE TREATMT: -
IDENT METHOD: TAG
PROJECT NUMBER: no
PROJECT NAME: N/A
DWG BY: PAL DATE: 09-Apr-01
CHK BY: - DATE:
APP BY: D. OSHATZ DATE:

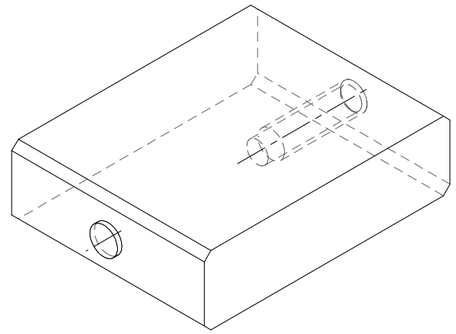
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

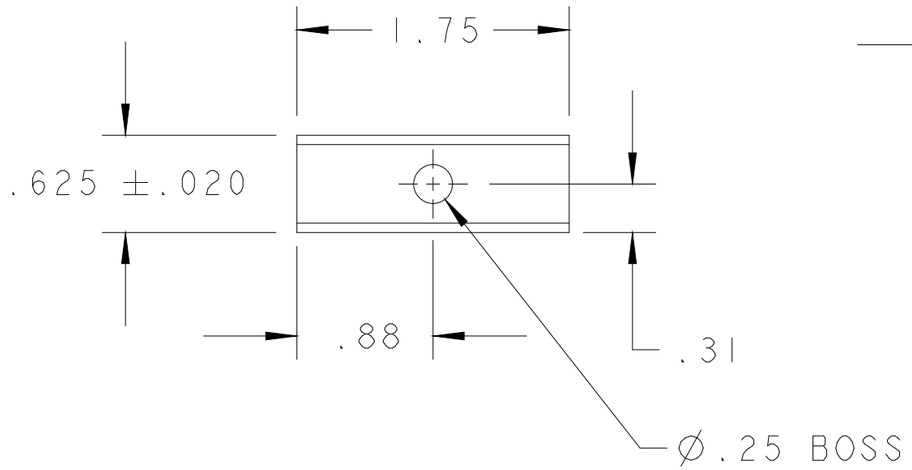
SNS - FES MEBT
SUPPORT AND ALIGNMENT
RAFT 3 SUB-ASSEMBLY

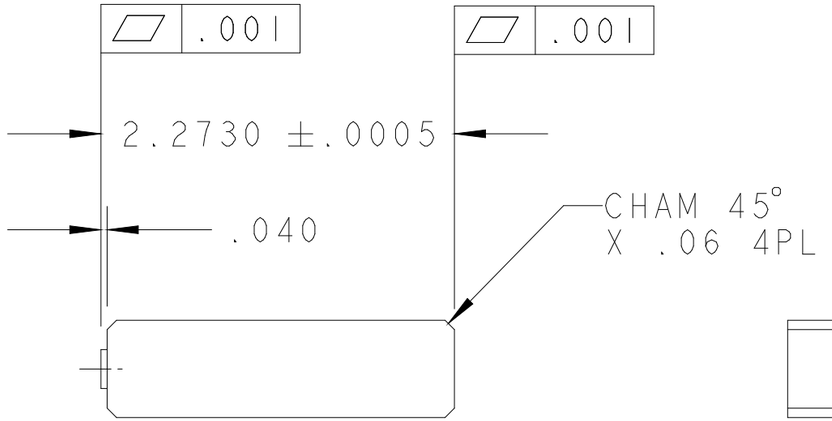
MICROFILMED: | DWG. TYPE: ASSEM | SHOWN ON: - | SCALE: 1/4 | DO NOT SCALE PRINT
SHEET 1 OF 1
PATENT CLEAR: | DESIGN ACCT. NO.: - | CATEGORY CODE: FE3313 | DWG. NO.: 25B4526 | SIZE: B | REV.: B

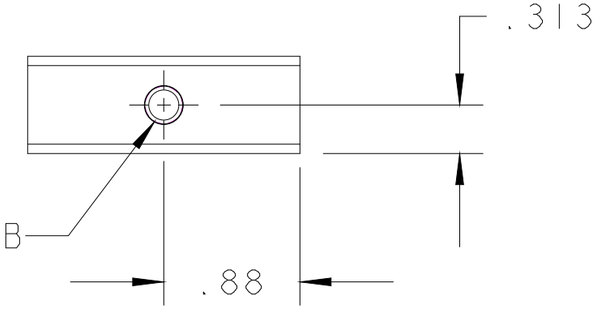
SIZE REV SH. 25B4526 B 1
DWG NO

DWG. NO.	SIZE	REV.	SH.
25B4562	B	1	









-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		9/26/01	.625 ±.020 DIM WAS BLOCK TOL
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	26-Sep-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D. OSHATZ	DATE	5-14-01

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

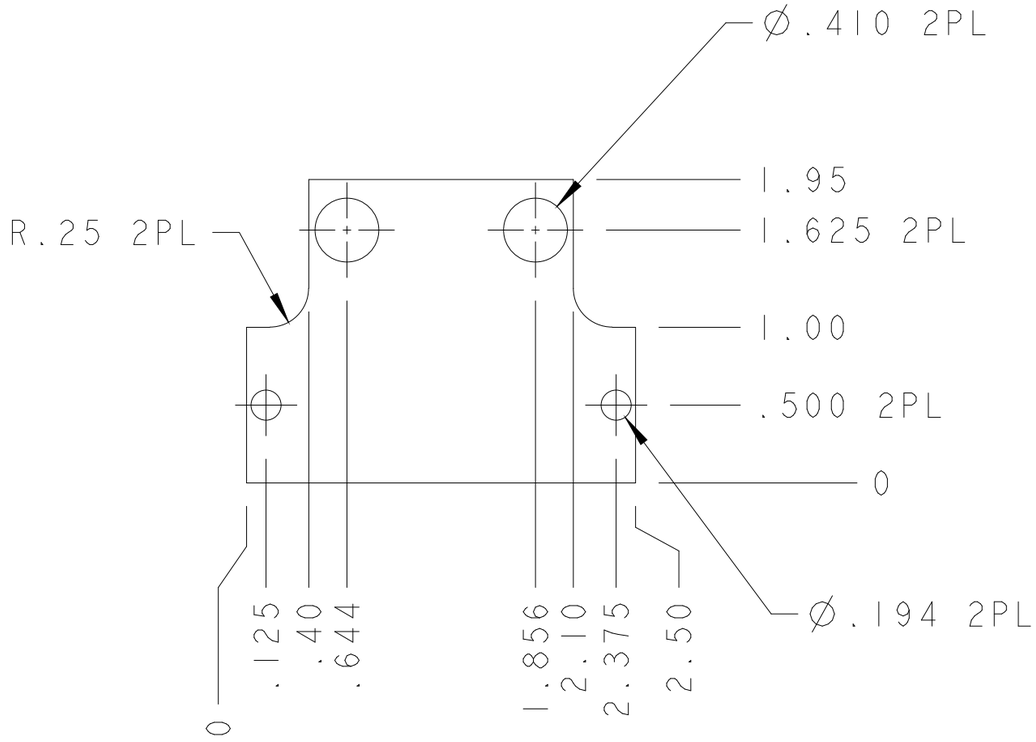
SNS -FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
X-SHIM, QUAD

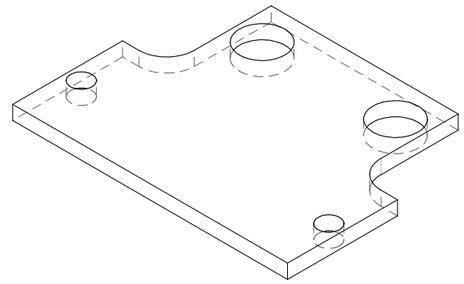
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4562	B

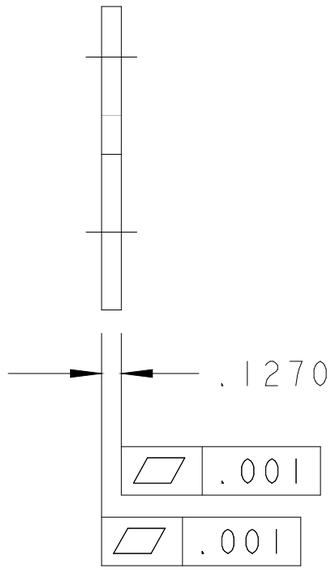
Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B456 Model File: 25B456

DWG. NO. 25B4572 | SIZE B | REV. | SH. 1







REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		9/26/01	.1270 ±.0005 WAS ±.00005. ADDED .25R 2PL.
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	14-May-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D. OSHATZ	DATE	5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

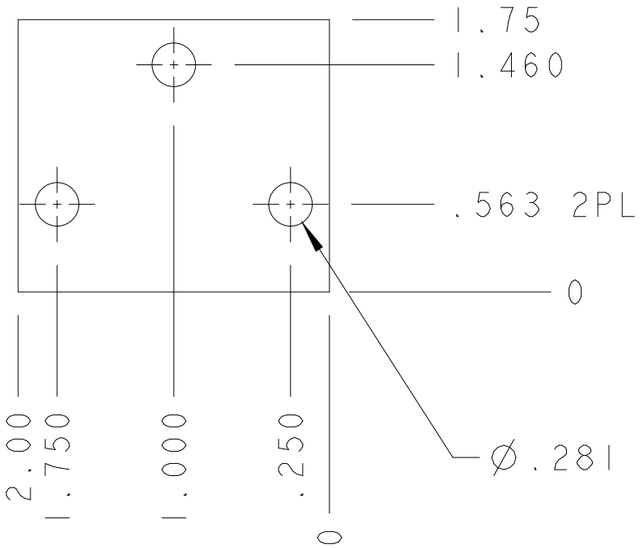
SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
Y-SHIM, QUAD

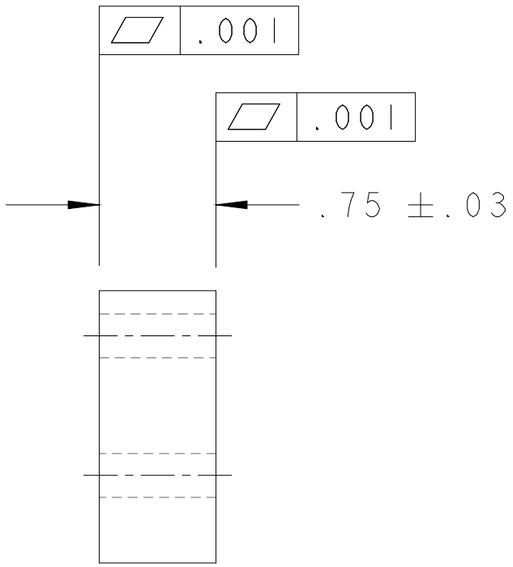
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4572	B

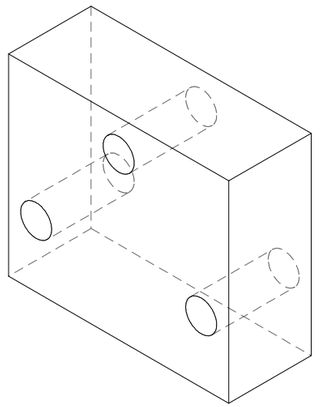
Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B457 Model File: 25B457

DWG. NO. 25B4582 | SIZE B | REV. | SH. 1







REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		9/26/01	.75 ±.03 WAS .7500 ±.0005
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES

X.X ± 0.1	FRAC. ± 1/64
X.XX ± 0.01	Angles ± 1.0°
X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

SER NO.	-	
ACCT NO.	NO. REQD	DATE ISSD -
DEL TO		DATE REQD -
SURFACE TREATMT	-	
IDENT METHOD	TAG	
PROJECT NUMBER	na	
PROJECT NAME	N/A	
DWG BY	PAL	DATE 14-May-01
CHK BY	D.OSHATZ	DATE 5-14-01
APR BY	D. OSHATZ	DATE 5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

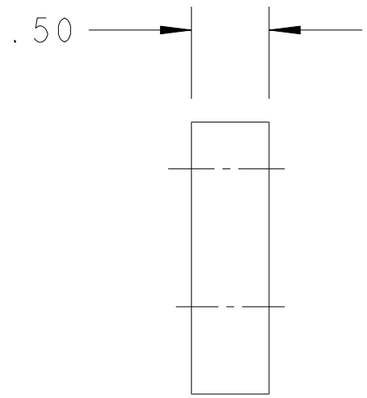
SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
RAIL, X-SHIM

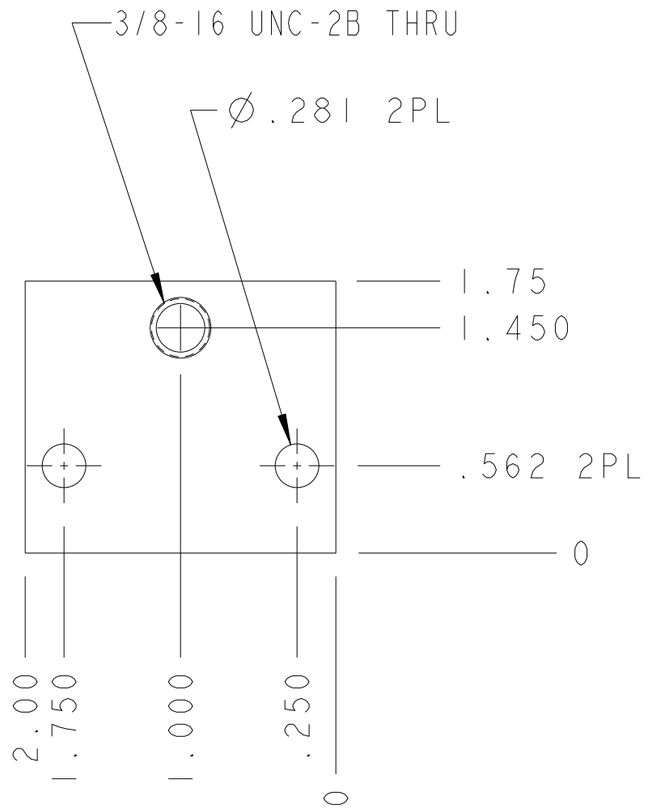
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4582	B

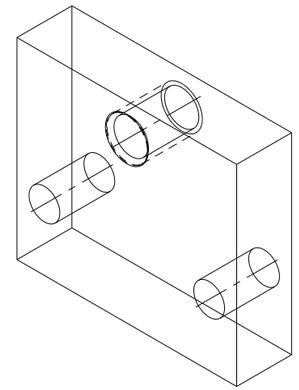
Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B458 Model File: 25B458

DWG. NO.	SIZE	REV.	SH.
25B4592	A	1	







-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	14-May-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D. OSHATZ	DATE	5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
RAIL, JACKING, TYPE A

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4592	A

Rev. 1/29/2000 J. R. Osborn

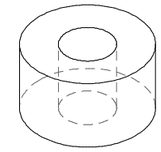
Dwg. File: 25B459 Model File: 25B459

DWG. NO. 25B4602 | SIZE F | REV. | SH. 1

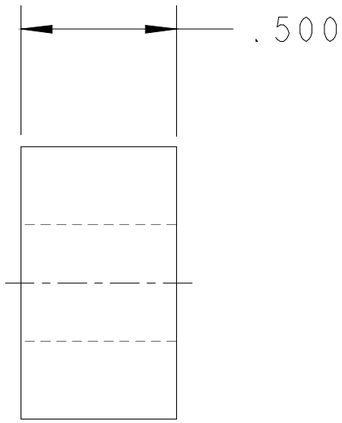
NOTES (UNLESS OTHERWISE SPECIFIED):

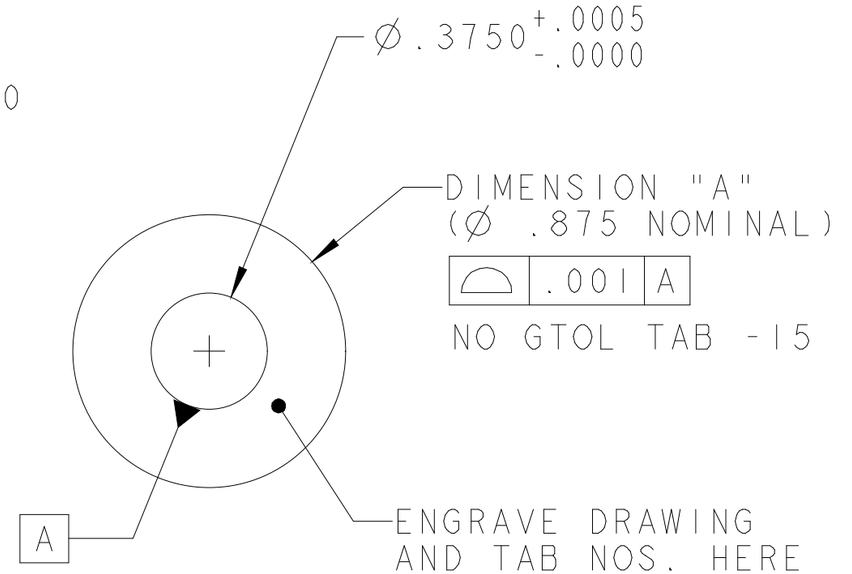
1) DIMENSIONS IN INCHES.
2) SIGNED LETTER "X" IN LOCATION COLUMN OF TABLE REFERS TO MEBT COORDINATE SYSTEM.

TAB	DIM "A"	LOCATION	WHERE USED
-15	1.25	----	FAB BLANK
-14	1.0274 ±.0005	X+	REBUNCHER CAVITY #1
-13	.976 ±.0005	X-	REBUNCHER CAVITY #1
-12	∅1.0128 ± .0005	X+	REBUNCHER CAVITY #2
-11	∅.9828 ± .0005	X-	REBUNCHER CAVITY#2
-10	∅.9854 ± .0005	X+	REBUNCHER CAVITY #3
-09	∅.9798 ± .0005	X-	REBUNCHER CAVITY #3
-08	∅.8706 ±.0005	X+	TARGET
-07	∅.8836 ±.0005	X-	TARGET
-06	∅1.0264 ± .0005	X+	REBUNCHER CAVITY #4
-05	∅.9532 ±.0005	X-	REBUNCHER CAVITY #4
-04	∅.8872 ±.0005	X+	ANTI-CHOPPER (BOX #2)
-03	∅.8802 ±.0005	X-	ANTI-CHOPPER (BOX #2)
-02	∅.8854 ±.0005	X+	CHOPPER (BOX #1)
-01	∅.8714 ±.0005	X-	CHOPPER (BOX #1)



SCALE 1/1





REV	DWG	CHK	ZONE	DATE	CHANGES
F	PAL	DPO		01/17/02	ADDED TABS -09 THRU -12 DIMS "A"
E	PAL	DPO		11/20/01	ADDED TABS -13, -14 DIMS "A"
D	PAL	DPO		10/15/01	TAB -08 ∅.8706 WAS ∅.0706 - CORRECTION
C	PAL	DPO		10/03/01	EXTENDED TAB BLOCK. DEFINED VERSIONS -07, -08, -15. DWG SIZE "B" WAS "A".
B	PAL	DPO		08/31/01	ADDED VERSIONS -05, -06
A	PAL	DPO		08/07/01	INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	-
DEL TO		DATE ISSD	-
SURFACE TREATMT	-	DATE REQD	-
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	15-Oct-01
CHK BY		DATE	
APR BY	D.Oshatz	DATE	

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
Z-SHIM

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 2/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4602	F

Dwg. File: 25B460 Model File: 25B460

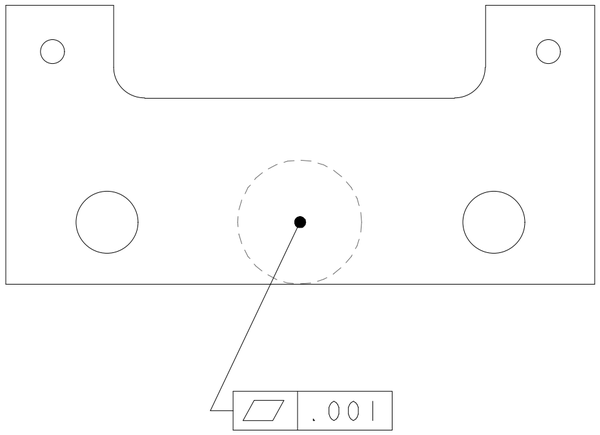
Rev. 1/29/2000 J. R. Osborn

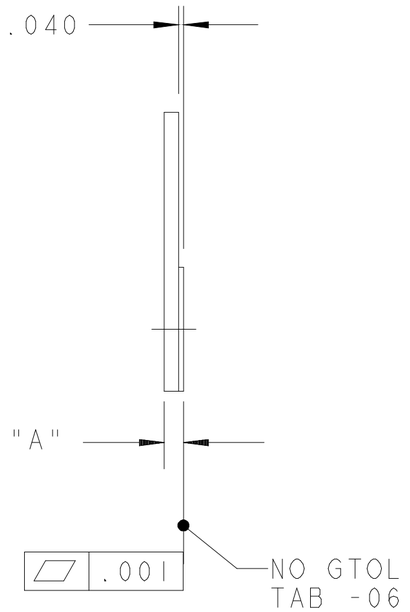
NOTES (UNLESS OTHERWISE SPECIFIED):

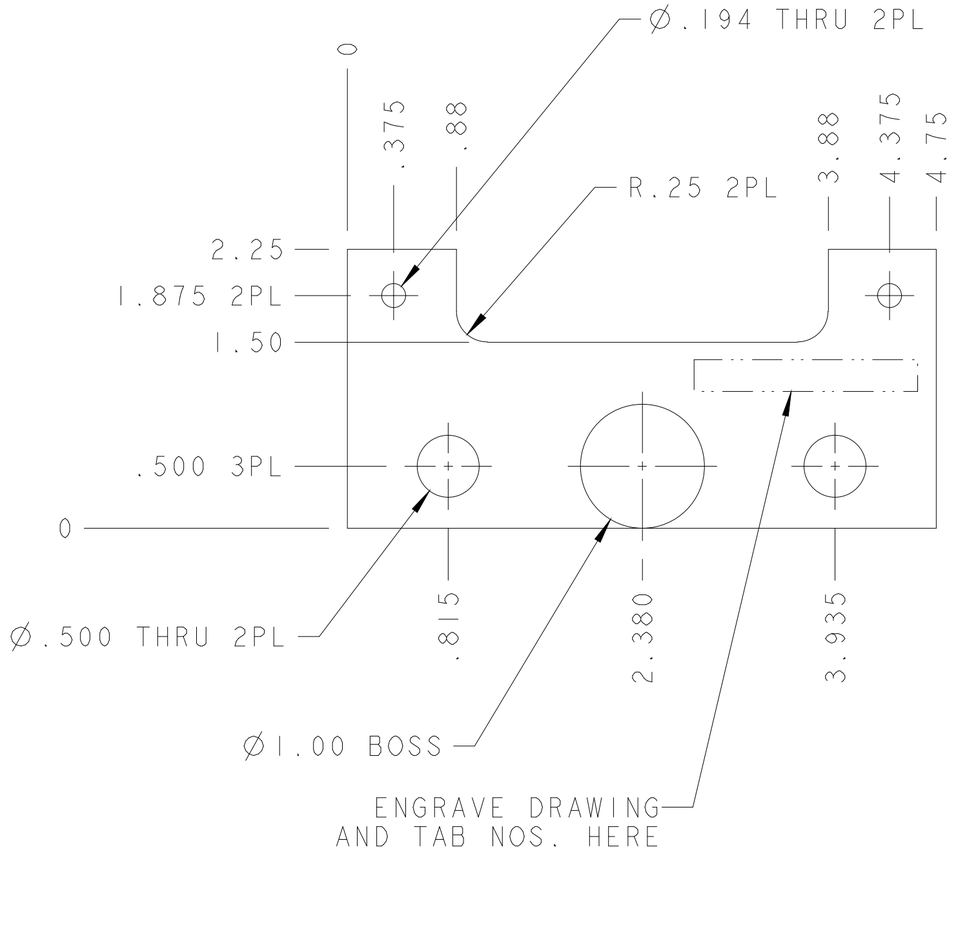
1) DIMENSIONS IN INCHES.

2) SIGNED LETTER "X" IN LOCATION COLUMN OF TAB BLOCK REFERS TO MEBT COORDINATE SYSTEM.

TAB	DIM "A"	LOCATION	WHERE USED
-01	.1482 ± .0005	X-	REBUNCHER CAVITY #1
-02	.1608 ± .0005	X-	REBUNCHER CAVITY #2
-03	.1479 ± .0005	X-	REBUNCHER CAVITY #3
-04	.1652 ±.0005	X-	REBUNCHER CAVITY #4
-05	.2000 ±.0005	----	TEST STAND
-06	.20	----	FAB BLANK







REV	DWG	CHK	ZONE	DATE	CHANGES
D	PAL	DPO		01/17/02	ADDED TABS -02, -03 DIMS "A"
C	PAL	DPO		11/20/01	ADDED TAB -01 DIM "A"
B	PAL	DPO		10/03/01	REDESIGNED AND REDRAWN IN PRO-E. CREATED TABULATION BLOCK. DEFINED VERSIONS -04,-05,-06.
A	PAL	DPO		8/30/01	INITIAL RELEASE IN MEIO.

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 | FRAC. ± 1/64 | X.XX ± 0.01 | Angles ± 0.1° | X.XXX ± 0.005 | FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

PLATE	SST, 304 PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	-
DEL TO		DATE ISSD	-
SURFACE TREATMT	DEGREASE	DATE REQD	-
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	02-Oct-01
CHK BY	-	DATE	
APR BY	D. OSHATZ	DATE	

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

FES - SNS MEBT
MECHANICAL SUBSYSTEMS
Y-SHIM, SIMPLEX, REBUNCHER

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4753	D

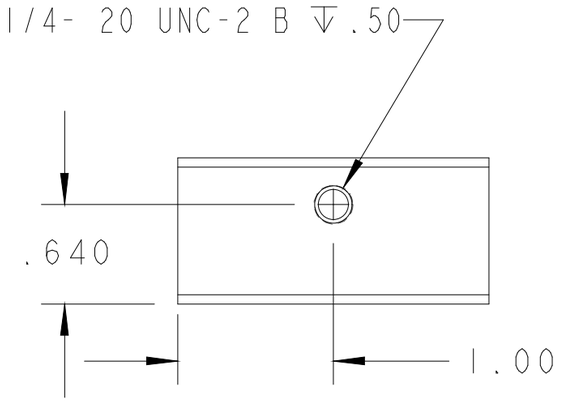
Dwg. File: 25B475 Model File: 25B475

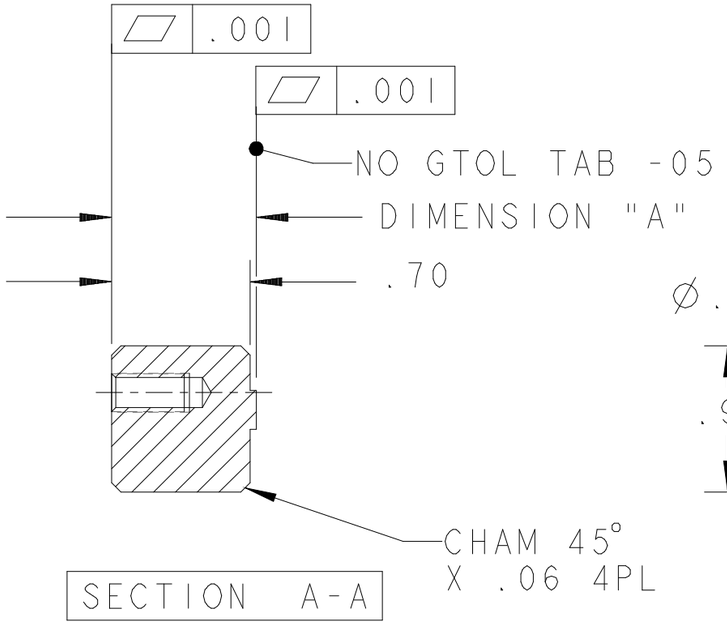
Rev. 1/28/2009 J. C. Ostrel

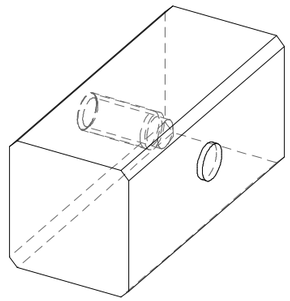
DWG. NO. 25B4753 SIZE D REV. SH. 1

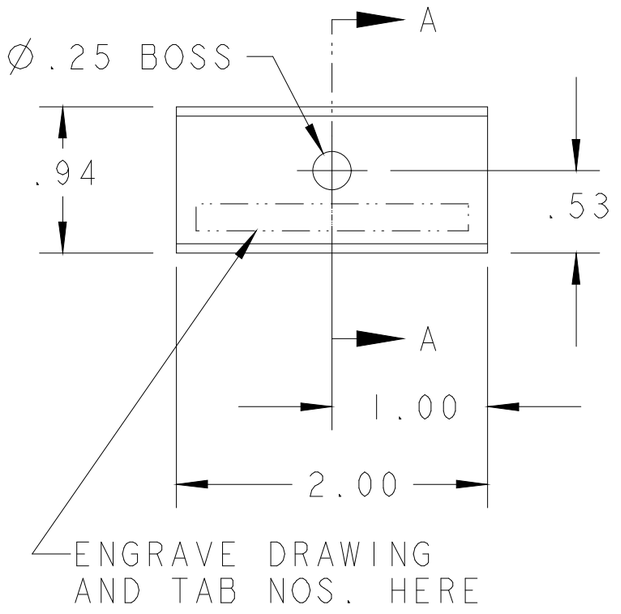
DWG. NO. 25B4622 | SIZE D | REV. | SH. 1

NOTES (UNLESS OTHERWISE SPECIFIED):
1) DIMENSIONS IN INCHES.
2) SIGNED LETTER "X" IN LOCATION COLUMN OF TAB BLOCK REFERS TO MEBT COORDINATE SYSTEM.









TAB	DIM "A"	LOCATION	WHERE USED
-05	1.00	----	FAB BLANK
-04	.7903 ±.0005	X-	REBUNCHER CAVITY #4
-03	.9315 ± .0005	X-	REBUNCHER CAVITY #3
-02	.9366 ± .0005	X-	REBUNCHER CAVITY #2
-01	.9297 ±.0005	X-	REBUNCHER CAVITY #1

REV	DWG	CHK	ZONE	DATE	CHANGES
D	PAL	DPO		01/17/02	ADDED TABS -02, -03 DIMS "A"
C	PAL	DPO		11/20/01	ADDED TAB -01 DIM "A"
B	PAL	DPO		10/03/01	CREATED TABULATION BLOCK. DEFINED VERSIONS -04, -05.
A	PAL	DPO		8/30/01	INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 | FRAC. ± 1/64 | X.XX ± 0.01 | Angles ± 1.0° | X.XXX ± 0.005 | FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	-
DEL TO		DATE ISSD	-
SURFACE TREATMT	-	DATE REQD	-
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	07-May-01
CHK BY	-	DATE	
APR BY	D. Oshatz	DATE	

DESCRIPTION	MATERIAL	MAT. LOCATION
-	304 SS PRODEC	-

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
X-SHIM, REBUNCHER

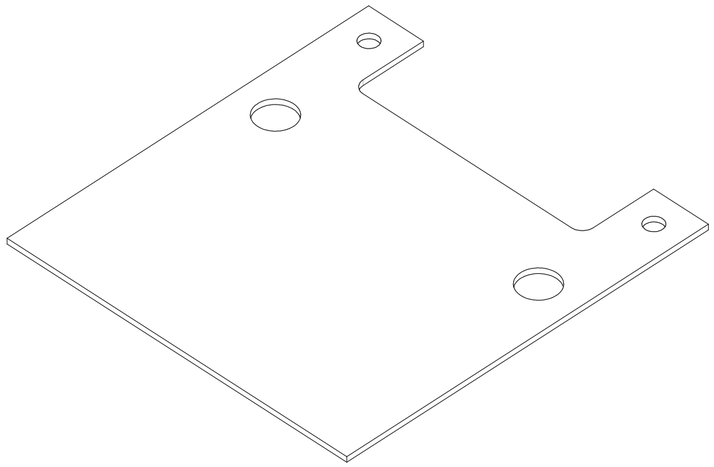
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4622	D

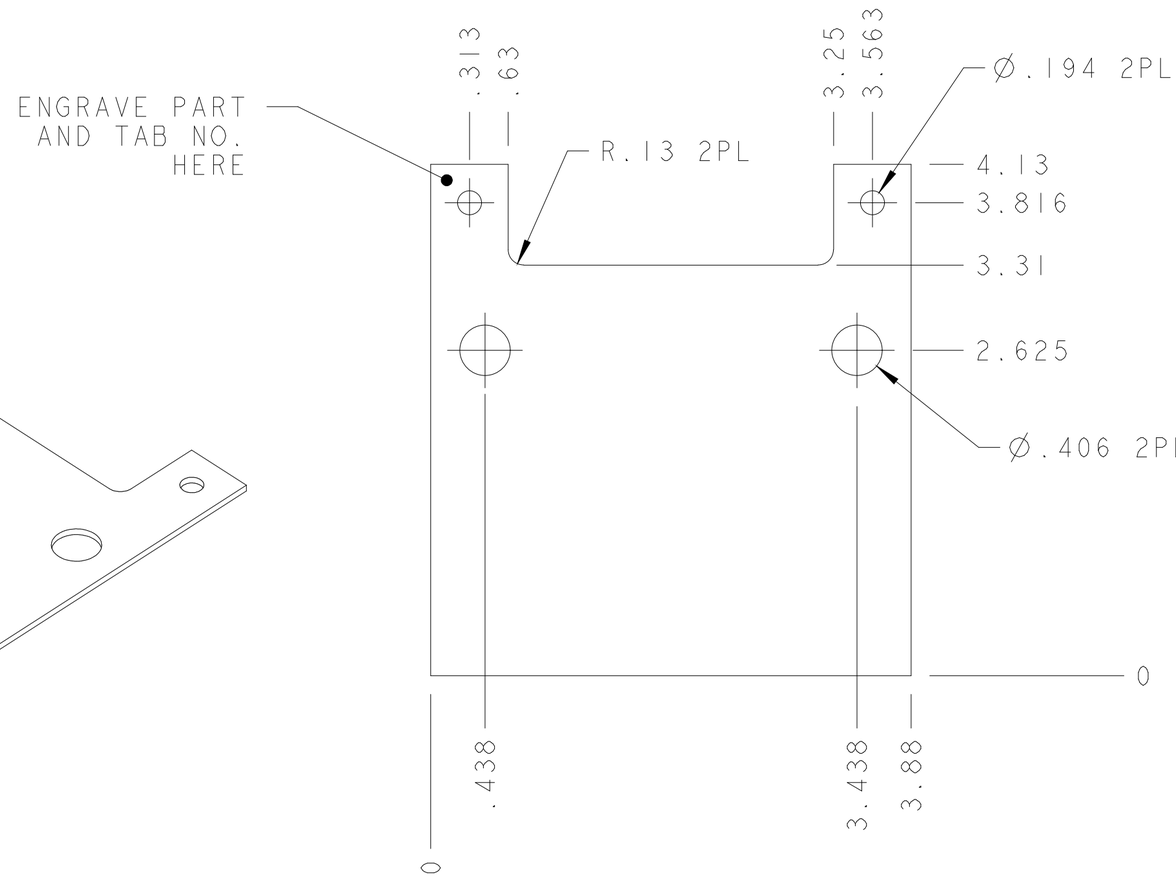
Rev. 1/29/2008 J. R. Osborn
Dwg. File: 25B462 Model File: 25B462

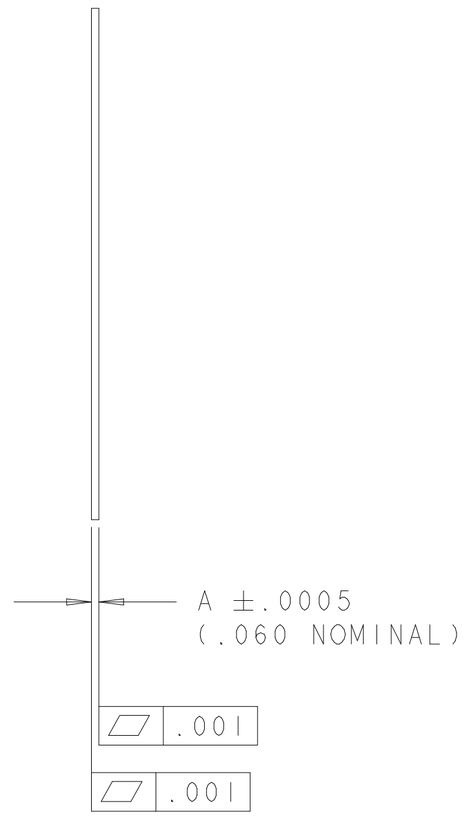
NOTES (UNLESS OTHERWISE SPECIFIED):

1) DIMENSIONS IN INCHES
2) LETTER "X" IN LOCATION COLUMN OF TABLE REFERS TO MEBT COORDINATE SYSTEM.

TAB	DIM "A"	LOCATION	WHERE USED
-04	.0679	X-	ANTI-CHOPPER (BOX# 2)
-03	.0770	X+	ANTI-CHOPPER (BOX# 2)
-02	.0694	X-	CHOPPER (BOX #1)
-01	.0735	X+	CHOPPER (BOX #1)







REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		08/07/01	RELEASE FOR FAB
A	PAL	DPO		06/01	PRELIMINARY DISTRIBUTION

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 | FRAC. ± 1/64 | X.XX ± 0.01 | Angles ± 0.5° | X.XXX ± 0.005 | FINISH 125
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

SER NO.	-		
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT			
IDENT METHOD	TAG		
PROJECT NUMBER	25B463		
PROJECT NAME			
DWG BY	PAL	DATE	02-May-01
CHK BY	DPO	DATE	08/07/01
APR BY	D.Oshatz	DATE	08/07/01

DESCRIPTION	MATERIAL	MAT. LOCATION
	304 SS PRODEC	-

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
Y-SHIM, CHOPPER

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
		FE3313	25B4633	B

Dwg. File: 25B463 Model File: 25B463

Rev. 1/31/2000 J. R. Qbarat

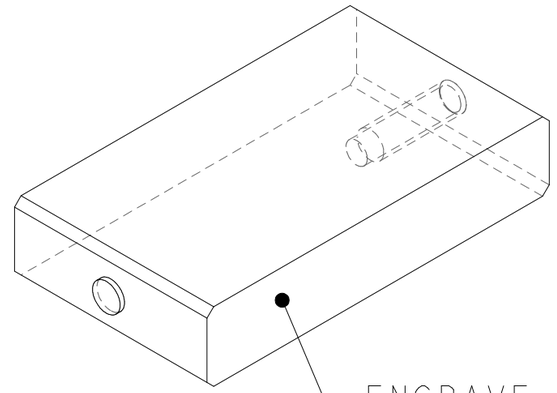
DWG. NO. 25B4633 SIZE B REV. 1 SH.

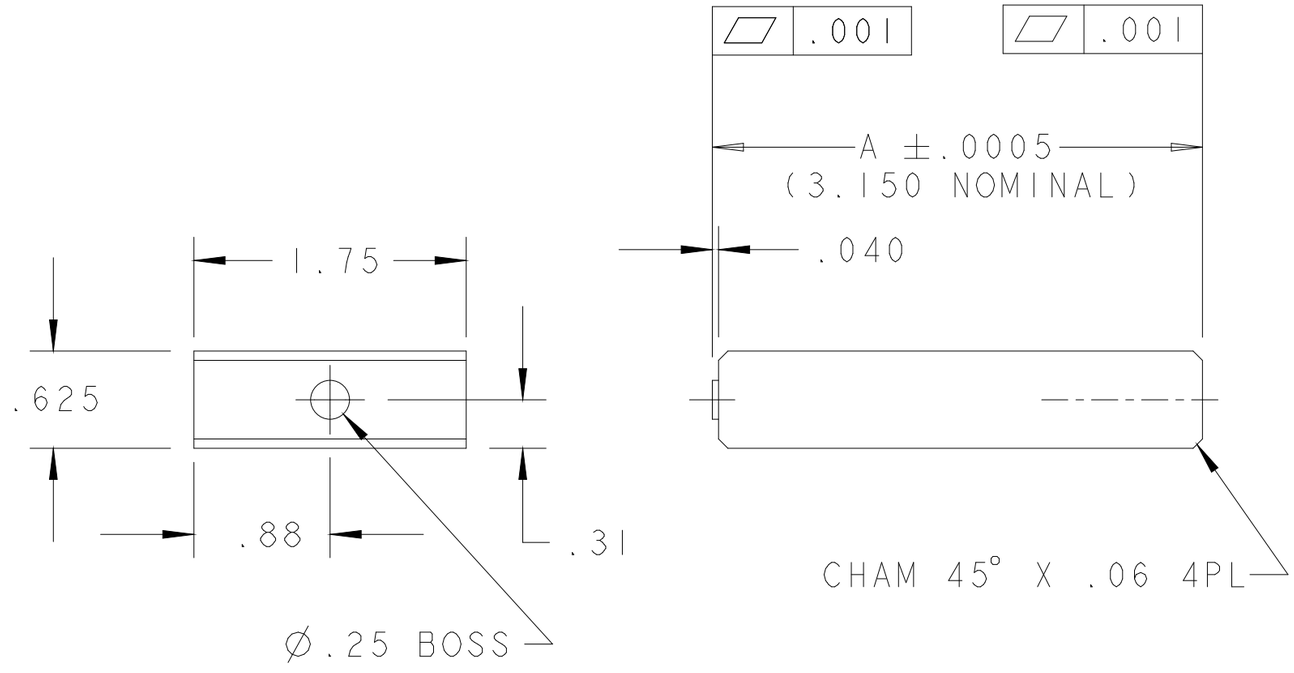
DWG. NO. 25B4642 | SIZE A | REV. | SH. 1

NOTES (UNLESS OTHERWISE SPECIFIED):

1) DIMENSIONS IN INCHES.

-02	3.1480	ANTI-CHOPPER (BOX #2)
-01	3.1508	CHOPPER (BOX #1)
TAB	DIM "A"	WHERE USED





A	PAL	DPO		08/07/01	INITIAL RELEASE
REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	02-May-01
CHK BY	DPO	DATE	08/07/01
APR BY	D. OSHATZ	DATE	08/07/01

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

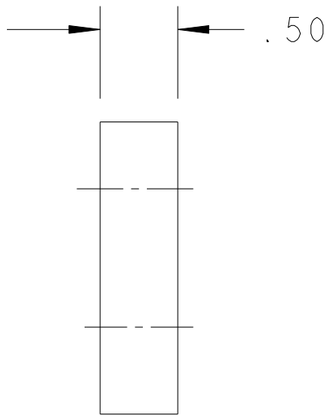
SNS -FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
X-SHIM, CHOPPER

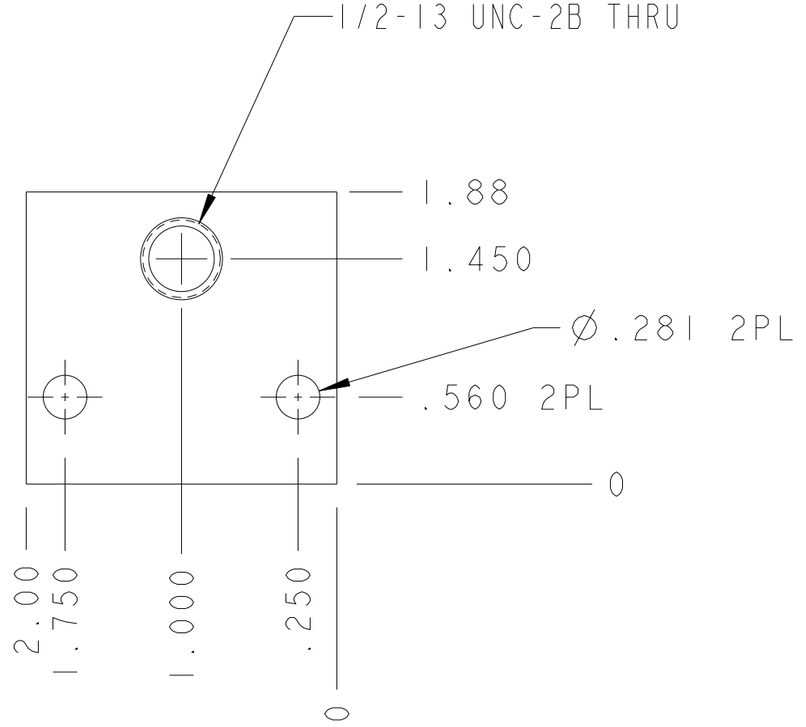
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4642	A

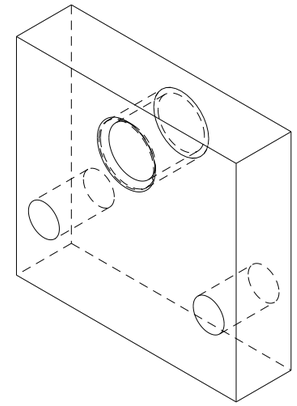
Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B464 Model File: 25B464

DWG. NO.	SIZE	REV.	SH.
25B4652	A	1	







-	304 SS PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	08-May-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D. OSHATZ	DATE	5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
RAIL, JACKING, TYPE B

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4652	A

Rev. 1/29/2000 J. R. Osborn

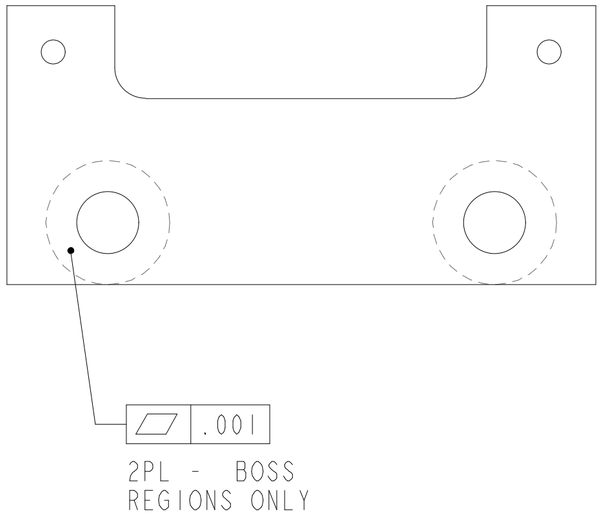
Dwg. File: 25B465 Model File: 25B465

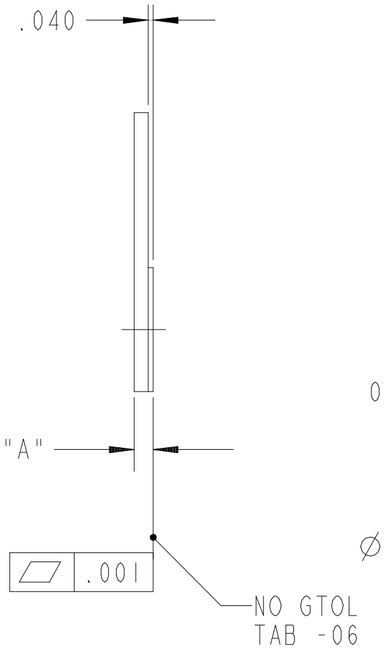
NOTES (UNLESS OTHERWISE SPECIFIED):

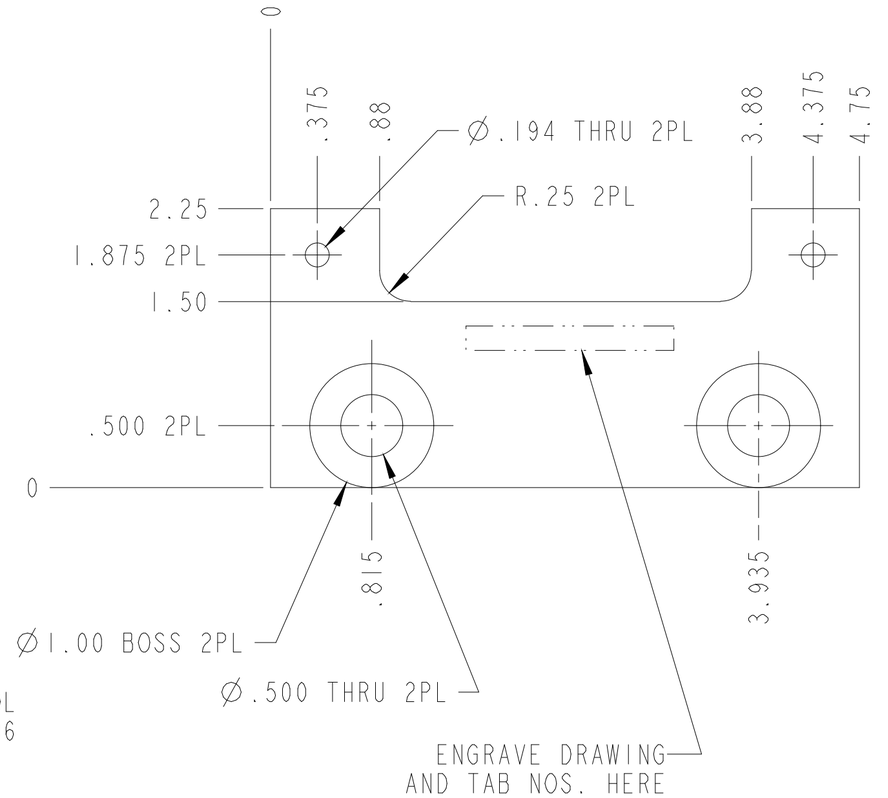
1) DIMENSIONS IN INCHES

2) SIGNED LETTER "X" IN LOCATION COLUMN OF TAB BLOCK REFERS TO MEBT COORDINATE SYSTEM.

TAB	DIM "A"	LOCATION	WHERE USED
-01	.1482 ± .0005	X+	REBUNCHER CAVITY #1
-02	.1608 ± .0005	X+	REBUNCHER CAVITY #2
-03	.1479 ± .0005	X+	REBUNCHER CAVITY #3
-04	.1652 ±.0005	X+	REBUNCHER CAVITY #4
-05	.2000 ±.0005	----	TEST STAND
-06	.20	----	FAB BLANK







REV	DWG	CHK	ZONE	DATE	CHANGES
D	PAL	DPO		01/17/02	ADDED TABS -02, -03 DIMS "A"
C	PAL	DPO		11/20/01	ADDED TAB -01 DIM "A"
B	PAL	DPO		10/03/01	REDESIGNED AND REDRAWN IN PRO-E. CREATED TABULATION BLOCK. DEFINED VERSIONS -04, -05, -06.
A	PAL	DPO		8-30-01	INITIAL RELEASE IN MEIO

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES: X.X ± 0.1 | FRAC. ± 1/64 | X.XX ± 0.01 | Angles ± 0.1° | X.XXX ± 0.005 | FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

PLATE	SST, 304 PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	-
DEL TO		DATE ISSD	-
		DATE REQD	-
SURFACE TREATMT	DEGREASE		
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	20-Sep-01
CHK BY	-	DATE	
APR BY	D. OSHATZ	DATE	

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

FES - SNS MEBT
MECHANICAL SUBSYSTEMS
Y-SHIM, DUPLEX, REBUNCHER

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4793	D

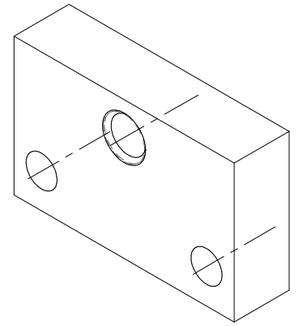
Dwg. File: 25B479 Model File: 25B479

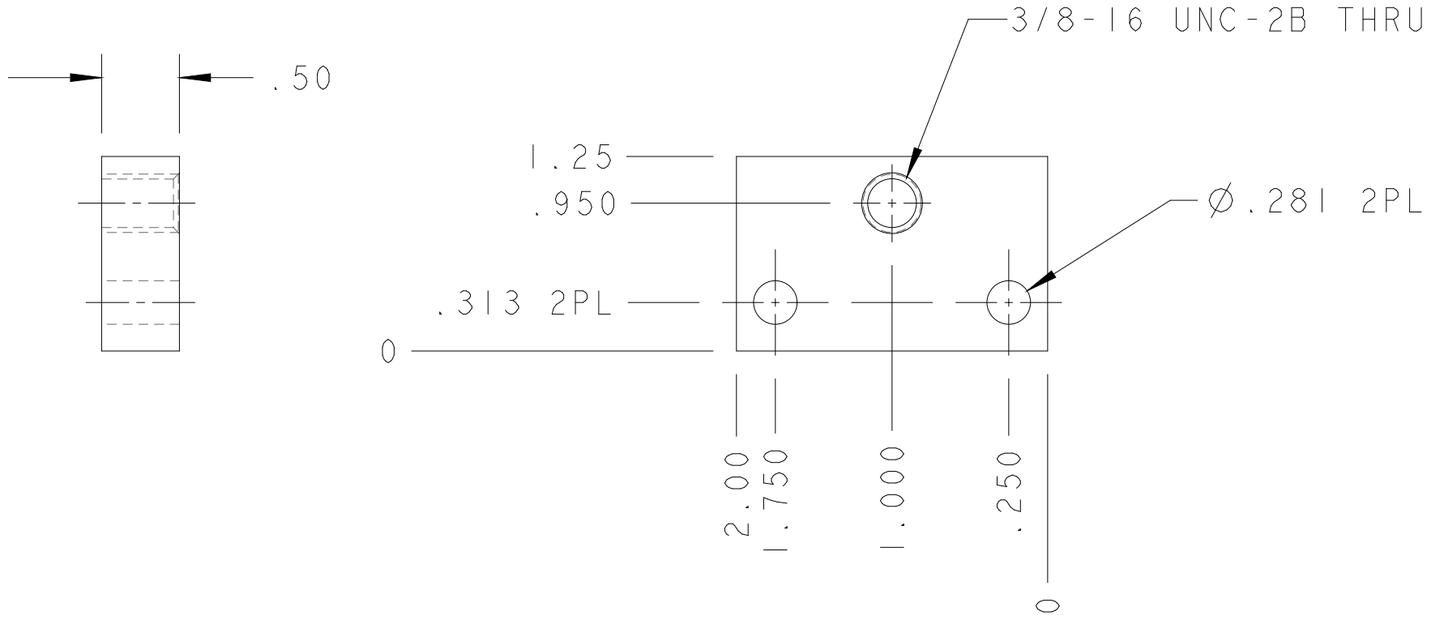
DWG. NO. 25B4793 SIZE D REV. SH. 1

Rev. 1/28/2009 T. Oshatz

DWG. NO.	SIZE	REV.	SH.
25B7102	A		1

NOTES (UNLESS OTHERWISE SPECIFIED):
1) DIMENSIONS IN INCHES.





	-	304 SS PRODEC	-
	DESCRIPTION	MATERIAL	MAT. LOCATION

REV	DWG	CHK	ZONE	DATE	CHANGES
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

SER NO.	-		
ACCT NO.		NO. REQD	
DATE ISSD	-		
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	25B710		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	01-Oct-01
CHK BY	DPO	DATE	10-02-01
APR BY	D. OSHATZ	DATE	10-02-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

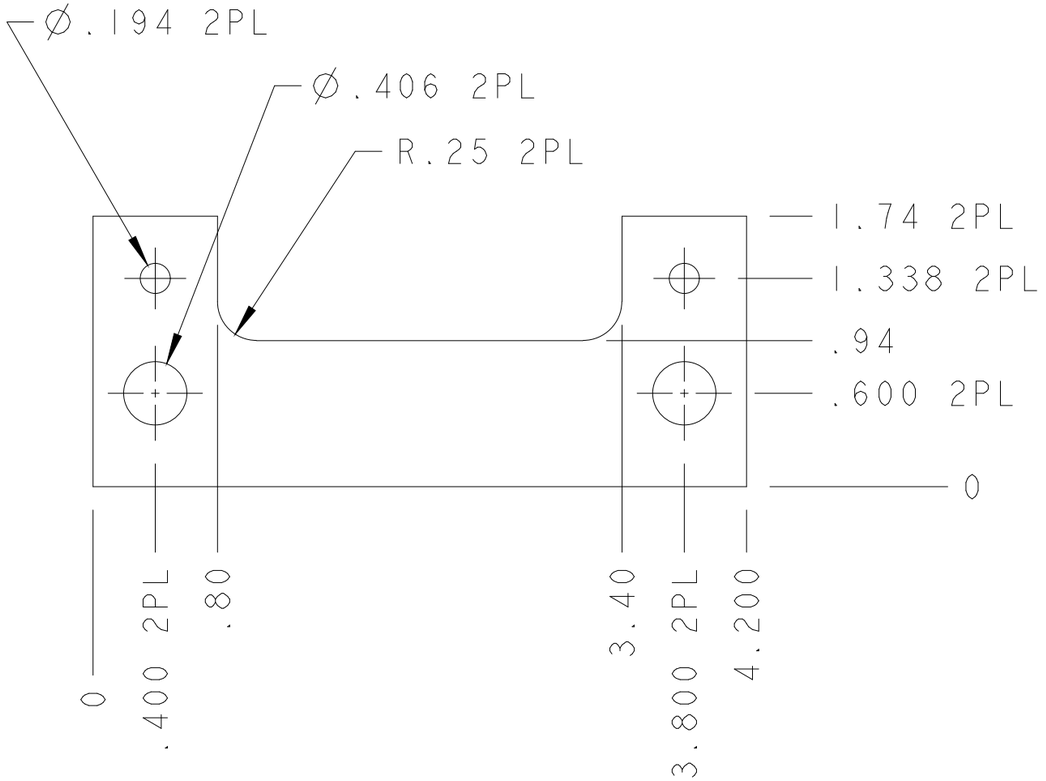
SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
RAIL, JACKING, TYPE C

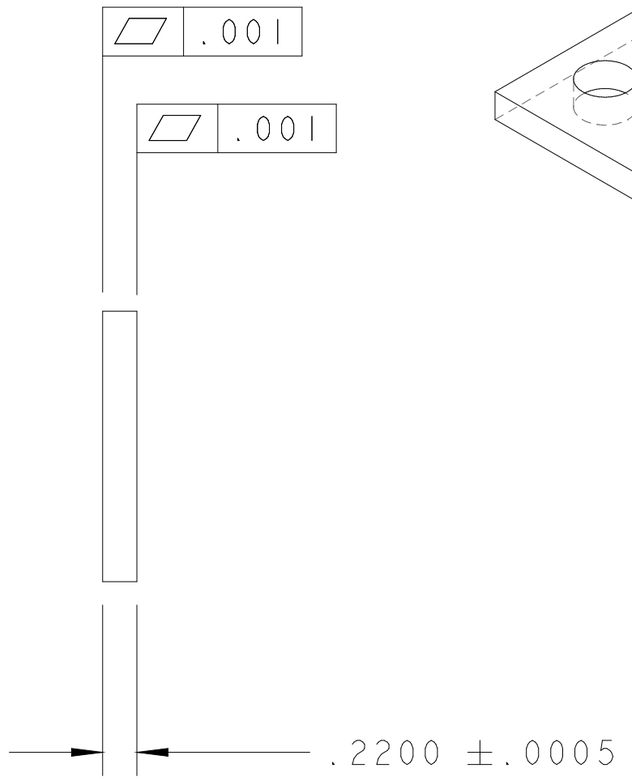
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B7102	A

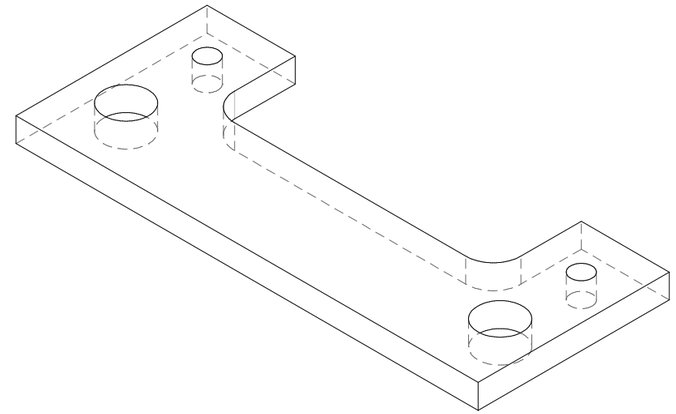
Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B710 Model File: 25B710

DWG. NO.	SIZE	REV.	SH.
25B4662	B	1	







B	PAL	DPO		9/26/01	R.25 WAS R.13, 2PL
A					INITIAL RELEASE
REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

-	304 SS - PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	14-May-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D.Oshatz	DATE	5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

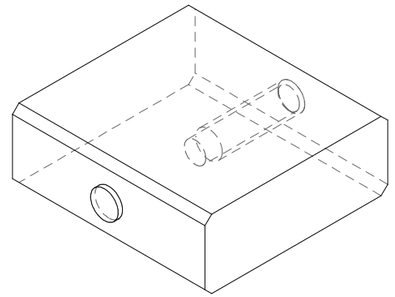
SNS - FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
Y-SHIM, TARGET

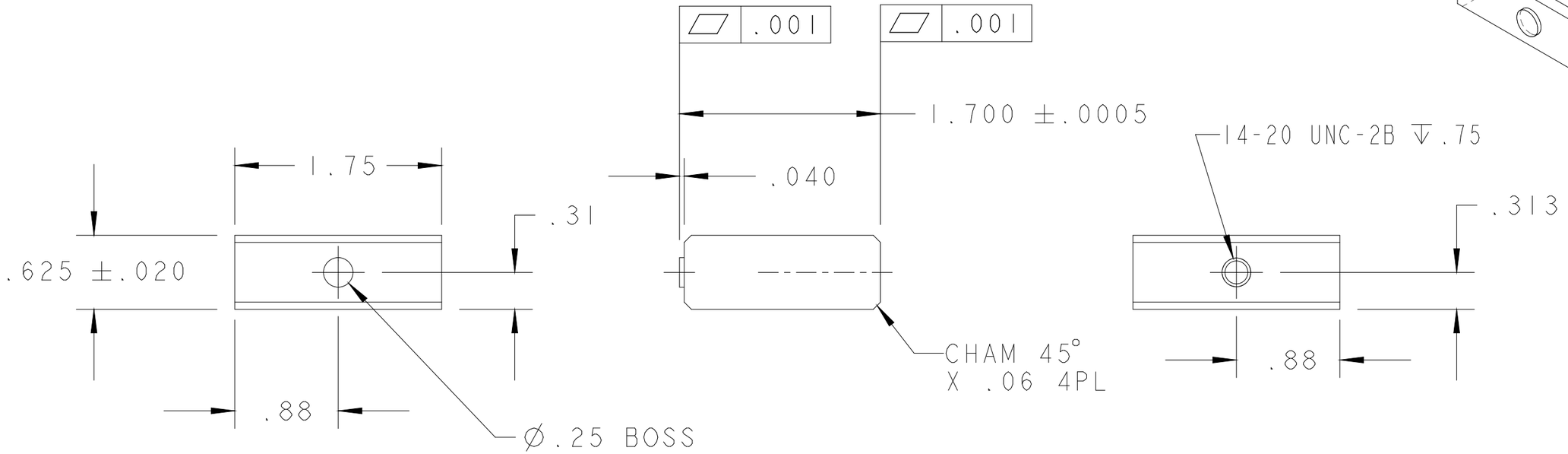
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4662	B

Rev. 1/29/2000 J. R. Osborn

Dwg. File: 25B466 Model File: 25B466

DWG. NO. 25B4672 | SIZE B | REV. | SH. 1





	-	304 SS PRODEC	-
	DESCRIPTION	MATERIAL	MAT. LOCATION

REV	DWG	CHK	ZONE	DATE	CHANGES
B	PAL	DPO		9/26/01	.625 ±.020 WAS BLOCK TOL
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

PROJECTION:

TOLERANCES		
	X.X ± 0.1	FRAC. ± 1/64
	X.XX ± 0.01	Angles ± 1.0°
	X.XXX ± 0.005	FINISH 125

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

SHOP ORDERS

		SER NO.	-
ACCT NO.	NO. REQD	DATE ISSD	-
DEL TO		DATE REQD	-
SURFACE TREATMT	-		
IDENT METHOD	TAG		
PROJECT NUMBER	na		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	02-May-01
CHK BY	D.OSHATZ	DATE	5-14-01
APR BY	D. OSHATZ	DATE	5-14-01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

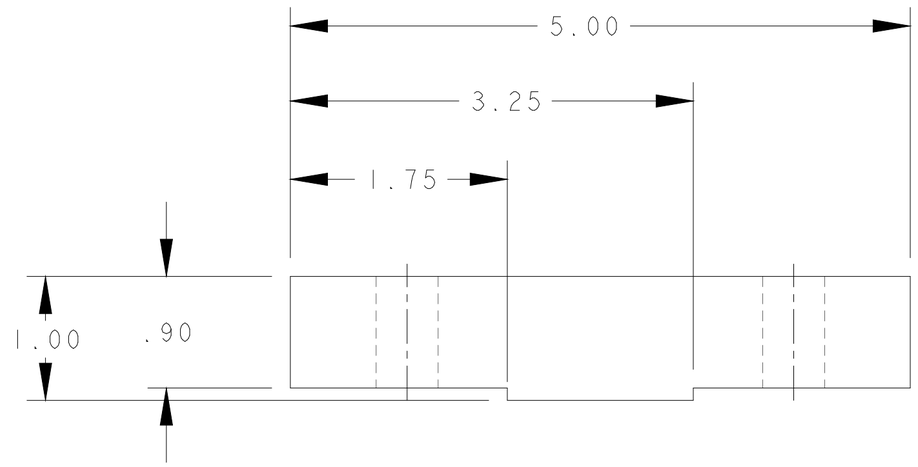
SNS -FES MEBT
MECHANICAL SUBSYSTEMS - RAFT SYSTEMS
X-SHIM, TARGET

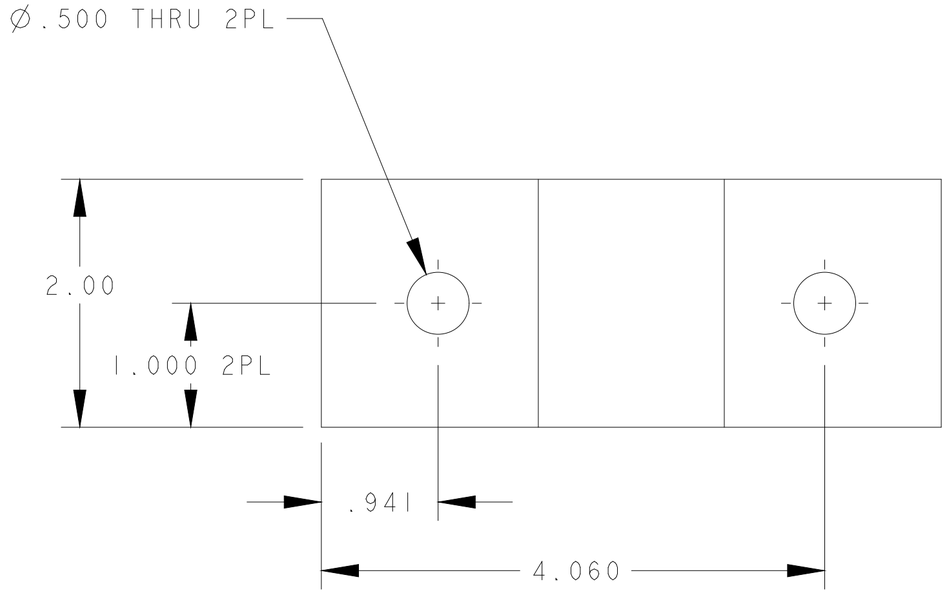
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B4672	B

Rev. 1/29/2008 J. R. Osborn

Dwg. File: 25B467 Model File: 25B467

NOTES (UNLESS OTHERWISE SPECIFIED)
1) DIMENSIONS IN INCHES





REV	DWG	CHK	ZONE	DATE	CHANGES
B	DPO			09/10/01	DRAWING CONVERTED TO PRO/E, CHANGED DIM SCHEME
A				08/30/01	INITIAL RELEASE (MEIO)

UNLESS OTHERWISE SPECIFIED
PROJECTION:
TOLERANCES: X.X ± 0.1 | FRAC. ± 1/64 | X.XX ± 0.03 | Angles ± 1.0° | X.XXX ± 0.010 | FINISH 125
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW TREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5M & B46.1

1 INCH PLATE	SST, 304 PRODEC	-
DESCRIPTION	MATERIAL	MAT. LOCATION

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	-
DEL TO		DATE ISSD	-
SURFACE TREATMT	DEGREASE	DATE REQD	-
IDENT METHOD	TAG		
PROJECT NUMBER	N/A		
PROJECT NAME	N/A		
DWG BY	PAL	DATE	10-Sep-01
CHK BY	-	DATE	
APR BY	D. OSHATZ	DATE	08/30/01

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

SNS - FES MEBT
MECHANICAL SUBSYSTEMS
T-BAR, REBUNCHER

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1/1	DO NOT SCALE PRINTS
	PART	-	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	-	FE3313	25B7023	B

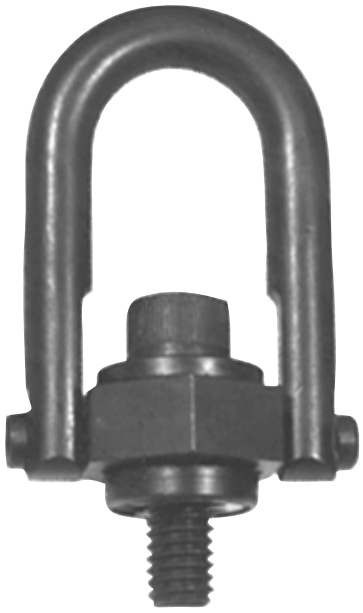
Dwg. file: 25B702 Model file: 25B702
Rev. 1/31/2000 J. E. Osborn

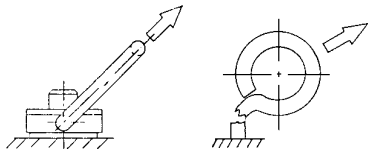
DWG. NO. 25B7023 SIZE B REV. SH. 1

(Rev. 8-00)

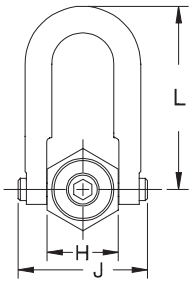
SWIVEL HOIST RINGS

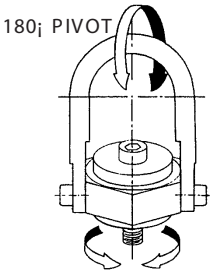
BODY, RING: 4140 STEEL, HEAT TREATED RC 43-48
BOLT: ALLOY STEEL, HEAT TREATED RC 39-43
BLACK OXIDE FINISH OR CADMIUM PLATED

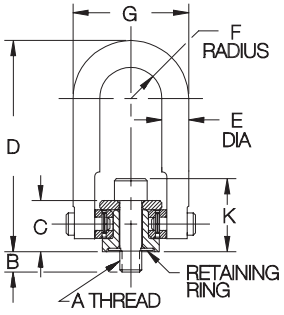




Swivel Hoist Rings (left) are designed to withstand much greater side loads than eye bolts (right).







Pivots 180¡ and rotates 360¡ simultaneously to allow lifting from any direction. Choice of bolt lengths available: Use the shortest only for steel plates, the other lengths for weaker materials and for through-hole mounting with a washer and nut. See safety precautions on page 27. Swivel Hoist Rings are also available in 300-series stainless steelÉ please contact factory (Load rating = 50% of steel).

NOW AVAILABLE
IN LARGER SIZES
& STAINLESS STEEL!

BLACK OXIDE FINISH (USA)

PART NO.	LOAD RATING (LBS)*	A	B	C	D	E DIA	F	G	H	J	K	L	INSTALLATION TORQUE (FT-LB)	REPLACEMENT BOLT (WITH RETAINING RING)
CL-800-SHR-1	800	5/16-18	.29	.72	2.71	3/8	7/16	1-5/8	1	1.82	1.03	2.35	7	CL-800-SHRB-1
CL-800-SHR-2			.54											CL-800-SHRB-2
CL-1000-SHR-1	1000	3/8-16	.54	.72	2.71	3/8	7/16	1-5/8	1	1.82	1.09	2.35	12	CL-1000-SHRB-1
CL-2500-SHR-1	2500	1/2-13	.77	1.23	4.77	3/4	7/8	3-1/4	2	3.52	1.73	4.24	28	CL-2500-SHRB-1
CL-2500-SHR-2			1.02											CL-2500-SHRB-2
CL-2500-SHR-3			1.27											CL-2500-SHRB-3
CL-4000-SHR-1	4000	5/8-11	.77	1.23	4.77	3/4	7/8	3-1/4	2	3.52	1.86	4.24	60	CL-4000-SHRB-1
CL-4000-SHR-2			1.02											CL-4000-SHRB-2
CL-4000-SHR-3			1.27											CL-4000-SHRB-3
CL-5000-SHR-1	5000	3/4-10	1.02	1.23	4.77	3/4	7/8	3-1/4	2	3.52	1.98	4.24	100	CL-5000-SHRB-1
CL-5000-SHR-2			1.52											CL-5000-SHRB-2
CL-7000-SHR-1	7000	3/4-10	1.03	1.72	6.55	1-1/16	1-13/32	4-15/16	3	5.06	2.47	5.80	100	CL-7000-SHRB-1
CL-7000-SHR-2			1.53											CL-7000-SHRB-2
CL-8000-SHR-1	8000	7/8-9	1.03	1.72	6.55	1-1/16	1-13/32	4-15/16	3	5.06	2.60	5.80	160	CL-8000-SHRB-1
CL-8000-SHR-2			1.53											CL-8000-SHRB-2
CL-10000-SHR-1	10000	1-8	1.28	1.72	6.55	1-1/16	1-13/32	4-15/16	3	5.06	2.72	5.80	230	CL-10000-SHRB-1
CL-10000-SHR-2			1.53											CL-10000-SHRB-2
CL-10000-SHR-3			2.28											CL-10000-SHRB-3
CL-15000-SHR-1	15000	1-1/4Ð7	1.89	2.11	8.73	1-1/4	1-3/4	6	3.76	6.50	3.36	7.76	470	CL-15000-SHRB-1
CL-24000-SHR-1	24000	1-1/2Ð6	2.70	2.81	12.47	1-3/4	2-1/4	8	4.87	8.55	4.36	11.12	800	CL-24000-SHRB-1
CL-30000-SHR-1	30000	2Ð4-1/2	2.96								5.36			CL-30000-SHRB-1

* Safety factor = 5:1. Larger sizes available as specialsÉ please contact factory.

CarrLane® MANUFACTURING CO
4200 Carr Lane Ct., P.O. Box 191970
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Phone: 314-647-6200, FAX: 314-647-5736
Web Site: www.carrlane.com

(Rev. 9-00)

CONSTRUCTION BALLS

52100 STEEL BALL, HEAT TREATED RC 54-56, 1018 STEEL SHANK
OR ALL 1144 STEEL, HEAT TREATED RC 54-56

CL-7-SCB
3/4"

CL-6-SCB
1/2"

CL-5-SCB
1/2"

CL-4-SCB
1/2"

CL-3-SCB
1/2"

CL-2-SCB
1/2"

CL-1-SCB
1/2"

CL-00-SCB
3/8"

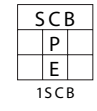
CL-0-SCB
1/4"

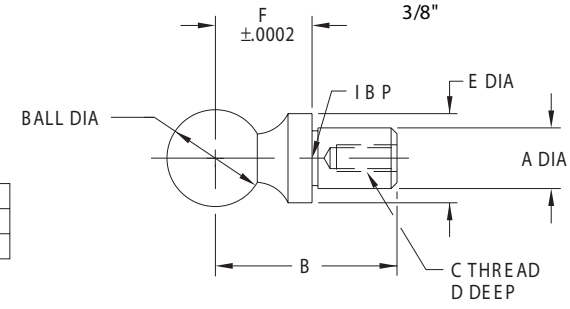
CLM-1-SCB
12mm

CLM-00-SCB
12mm

CLM-0-SCB
6mm

NEW SIZES INCLUDING METRIC!





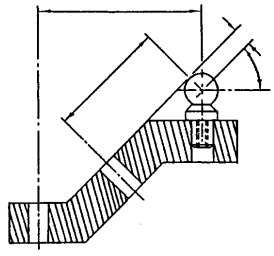
SHOULDER TYPE (USA)

PART NO.	BALL DIA NOMINAL	BALL DIA ACTUAL	A DIA NOMINAL	A DIA ACTUAL	B	C	D	E DIA	F
CL-0-SCB	1/4	.2502/.2498	1/8	.1250/.1246	.56	Ñ	Ñ	.25	.2000
CL-00-SCB	3/8	.3752/.3748	3/16	.1875/.1871	.75	Ñ	Ñ	.37	.3000
CL-1-SCB	1/2	.5000/.4997	1/4	.2500/.2497	.63	#6-32	1/4	.46	.3125
CL-2-SCB					.94		5/16		.5000
CL-3-SCB					1.50	Ñ	Ñ		
CL-4-SCB			5/16	.3125/.3122	.94	#6-32	5/16	.46	.5000
CL-5-SCB					1.50	Ñ	Ñ		
CL-6-SCB			3/8	.3750/.3747	1.50	Ñ	Ñ	.56	.5000
CL-7-SCB	3/4	.7502/.7498	3/8	.3750/.3746	1.25	Ñ	Ñ	.75	.5000

SHOULDER TYPE (METRIC)

CLM-0-SCB	6mm	.2364/.2360	3mm	.1181/.1177	.47	Ñ	Ñ	.24	.2362 (6mm)
CLM-00-SCB	12mm	.4726/.4722	6mm	.2362/.2358	.87	Ñ	Ñ	.47	.4724 (12mm)
CLM-1-SCB					.98	M3.5	.24		

Precision tooling ball used as a reference point for critical inspection, layout, and machining operations. Concentricity between ball and shank is .0002 TIR. The shoulder type has a precision height-reference shoulder to locate the ball in three dimensions. The adjustable type can be set at any height, then locked with a setscrew. Note: Catalog photos are actual size.



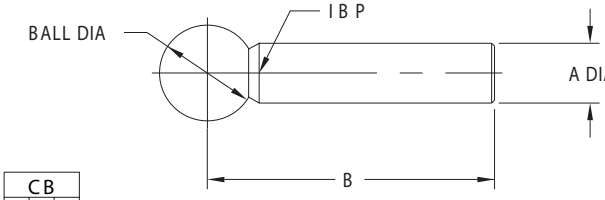
CL-5-CB
1/2"

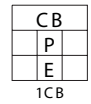
CL-3-CB
1/2"

CL-1-CB
1/2"

CL-00-CB
3/8"

CL-0-CB
1/4"





ADJUSTABLE TYPE (USA)

PART NO.	BALL DIA NOMINAL	BALL DIA ACTUAL	A DIA NOMINAL	A DIA ACTUAL	B
CL-0-CB	1/4	.2502/.2498	1/8	.1250/.1246	.56
CL-00-CB	3/8	.3752/.3748	3/16	.1875/.1871	.75
CL-1-CB	1/2	.5000/.4997	1/4	.2500/.2497	1.50
CL-3-CB			5/16	.3125/.3122	
CL-5-CB			3/8	.3750/.3747	

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For metric spiral-groove pull-out dowel pins, see page 2931.

Pull-Out Dowel Pins

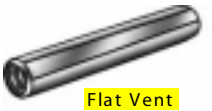
Easy in, easy out. These reusable, internally threaded pins have a tapped hole in one end so they can be pulled out with a removal screw or a threaded "puller." Case hardened to Rockwell C hardness of 60. They have a plain finish.

Fractional size pins are ground to a diameter .0002" larger than the diameters listed below. Metric pins are case hardened and ground to an oversized tolerance. Dia. tolerances: for M6 to M10 is +.006 to +.015 mm; M12 to M16 is +.007 to +.018 mm; M20 is +.008 to +.021 mm.

Standard—Have a smooth finish along their entire length and are used for through-hole applications. Spiral Groove—Grooves cut from end to end relieve trapped air for easy insertion and removal in blind-hole applications. They also help reduce hole scoring. Flat Vent—A ground chamfer along one side relieves trapped air, allowing for easy insertion and removal in blind-hole applications.

Standard

Spiral Groove


Flat Vent

Fractional

Length	Standard Alloy Steel	Each	Spiral Groove Alloy Steel	Each	Flat Vent Alloy Steel	Each	Flat Vent 18-8 Stainless Steel	Each
1/4 Dia.—Thread Size: #8-32								
3/4	97175A311	$0.85	97352A110	$1.74	97360A110	$1.53	97365A110	$2.98
1	97175A315	.92	97352A120	1.85	97360A120	1.60	97365A120	3.01
1 1/4			97352A130	2.04	97360A130	1.69	97365A130	3.07
1 1/2	97175A318	.99	97352A140	2.08	97360A140	1.74	97365A140	3.14
1 3/4			97352A150	2.28	97360A150	1.83	97365A150	3.22
2	97175A321	1.16	97352A160	2.34	97360A160	2.41	97365A160	3.28
2 1/2	97175A325	1.23	97352A170	2.36	97360A170	2.80	97365A170	3.45
5/16 Dia.—Thread Size: #10-32								
3/4	97175A329	.87	97352A180	2.01	97360A180	1.97	97365A180	3.11
1	97175A332	.94	97352A190	2.20	97360A190	2.12	97365A190	3.20
1 1/4			97352A200	2.30	97360A200	2.30	97365A200	3.32
1 1/2	97175A336	1.13	97352A210	2.42	97360A210	2.35	97365A210	3.43
2	97175A390	1.30	97352A220	2.56	97360A222	2.62	97365A222	3.64
2 1/4			97352A222	2.62				
2 1/2	97175A341	1.45	97352A240	2.69	97360A240	2.99	97365A240	3.87
3/8 Dia.—Thread Size: #10-32								
3/4	97175A344	1.09						
1	97175A348	1.11	97352A250	2.45	97360A250	2.41	97365A250	3.59
1 1/4			97352A260	2.55	97360A260	2.42	97365A260	3.75
1 1/2	97175A352	1.33	97352A270	2.70	97360A270	2.56	97365A270	3.90
1 3/4			97352A280	2.81				
2	97175A355	1.47	97352A290	2.92	97360A290	2.83	97365A290	4.16
2 1/4			97352A300	3.10	97360A300	2.97	97365A300	4.31
2 1/2	97175A358	1.67	97352A310	3.38	97360A310	3.32	97365A310	4.47
3	97175A364	2.08	97352A320	3.64	97360A320	3.89	97365A320	4.77
7/16 Dia.—Thread Size: 1/2-20								
1	97175A366	1.21						
1 1/2	97175A369	1.57						
2	97175A374	1.71						
1/2 Dia.—Thread Size: 1/2-20								
1	97175A377	1.33	97352A330	3.21	97360A330	2.47	97365A330	4.75
1 1/4			97352A340	3.43	97360A340	2.60	97365A340	4.81
1 1/2	97175A379	1.45	97352A350	3.65	97360A350	2.70	97365A350	5.03
1 3/4			97352A360	3.87	97360A360	2.78	97365A360	5.26
2	97175A383	1.62	97352A370	4.10	97360A370	2.86	97365A370	5.48
2 1/4			97352A380	4.16				
2 1/2	97175A391	1.83	97352A390	4.33	97360A390	3.73	97365A390	5.95
3	97175A395	2.05	97352A400	4.67	97360A400	4.18	97365A400	6.40
3 1/2			97352A410	5.16	97360A410	4.25	97365A410	6.65
4			97352A412	5.64				
5/8 Dia.—Thread Size: 1/2-20								
1 1/2			97352A430	4.12	97360A430	3.70	97365A430	7.50
2			97352A440	4.28	97360A440	3.89	97365A440	8.20
2 1/4			97352A480	4.47	97360A480	4.02	97365A480	8.85
2 1/2			97352A460	4.66	97360A490	4.25	97365A490	9.17
3			97352A470	4.99	97360A470	4.47	97365A470	9.60
4			97352A474	5.34				
3/4 Dia.—Thread Size: 5/16-18								
1 1/2	97175A426	2.15						
2	97175A431	2.37	97352A490	5.57	97360A500	4.54	97365A500	10.04
2 1/2	97175A435	2.61	97352A500	6.37				
3	97175A439	2.85	97352A510	7.10	97360A510	5.05	97365A510	11.80
4			97352A570	8.25	97360A570	5.57	97365A570	13.60
1 Dia.—Thread Size: 5/16-18								
2	97175A443	4.27	97352A530	9.73	97360A530	6.79	97365A530	15.47
2 1/2	97175A446	4.76						
3	97175A449	5.60	97352A550	12.61	97360A550	8.37	97365A550	19.02
4			97352A580	16.44	97360A580	9.88	97365A580	22.57

Thread size: 3/8-16.

Metric—DIN 7979-m6

Lg., mm	Standard Case-Hardened Steel	Each
M6 Dia. Thread Size: M4 Thread Pitch: 0.7		
16	97355A292	$0.90
18	97355A296	.96
20	97355A300	1.02
24	97355A302	.95
28	97355A303	1.03
30	97355A306	1.17
32	97355A310	1.07
36	97355A314	1.24
40	97355A318	1.12
45	97355A322	1.30
50	97355A326	1.39
M8 Dia. Thread Size: M5 Thread Pitch: 0.8		
20	97355A401	$1.03
24	97355A405	1.21
25	97355A410	1.21
28	97355A414	1.24
30	97355A418	1.27
32	97355A404	1.20
36	97355A422	1.39
40	97355A406	1.24
50	97355A426	1.58
60	97355A430	1.53
M10 Dia. Thread Size: M6 Thread Pitch: 1		
24	97355A492	$1.33
28	97355A496	1.36
30	97355A500	1.48
32	97355A504	1.38
36	97355A505	1.42
40	97355A506	1.46
50	97355A507	1.63
55	97355A511	1.95
60	97355A515	2.10
M12 Dia. Thread Size: M6 Thread Pitch: 1		
24	97355A531	$1.48
30	97355A535	1.64
36	97355A539	1.70
45	97355A543	1.88
50	97355A547	1.98
60	97355A551	1.93
M16 Dia. Thread Size: M8 Thread Pitch: 1.25		
32	97355A563	$2.13
36	97355A567	2.19
40	97355A571	2.29
45	97355A575	2.35
50	97355A579	2.41
55	97355A583	2.47
60	97355A587	2.60
70	97355A591	2.69
M20 Dia. Thread Size: M10 Thread Pitch: 1.5		
40	97355A601	$2.69
50	97355A605	3.03
60	97355A609	3.12
80	97355A613	3.58

Pull-Out Dowel Pin Puller

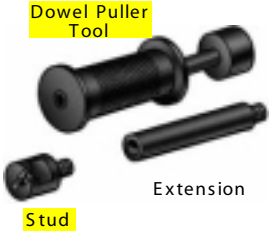
Also known as a slide hammer puller, tool removes internally threaded pull-out dowel pins. A complete dowel pin puller tool consists of a dowel pin puller and a stud (both sold separately at right). Choose the stud according to the size of the dowel pin you need to remove.

To assemble, screw the stud into the dowel pin puller. Use a socket head cap screw (sold separately; see 91251A on page 2812 and 91290A on page 2820) to join tool with dowel pin. Just a few taps of the dowel pin puller tool removes the dowel pin. Overall length of puller is 12 1/4". It has a reach of 6 1/2" when used without extension.

Optional extension allows easy access to hard-to-reach areas. It is 5 1/2" long and can be stacked for an even longer reach.

		Each
Dowel Pin Puller	92330A300	$65.55
Optional Extension	92330A220	13.64

Stud for Dowel Diameter	Fits Socket Head Cap Screw Sizes	Each
M6–M12, 1/4"–5/8"	M4–M6, #8-1/4"	92330A411 $23.17
M13–M20, 3/4"–1 1/2"	M8–M10, 5/16"–3/8"	92330A511 23.17


Dowel Puller Tool

Extension

Stud

(Rev. 8-98)

SWIVEL SCREW CLAMPS

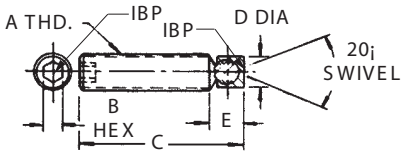
BODY: 12L14 OR 1144 STEEL, HEAT TREATED, ZINC PLATED YELLOW CHROMATE (OR 300-SERIES STAINLESS STEEL)
FOOT: 12L14 STEEL, ZINC PLATED YELLOW CHROMATE (OR 300-SERIES STAINLESS STEEL, OR DELRIN®)

Swivel-screw assemblies that combine the bodies on page 32 with the feet on page 33. To order with a Delrin® foot, add ÒNÓ to the part number (types A and B only). Example: CL-1-SSCN

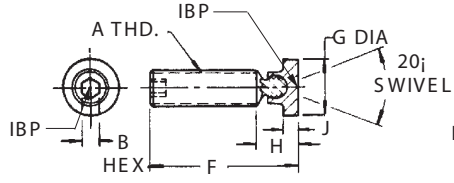
SSC
P
E

1SSC

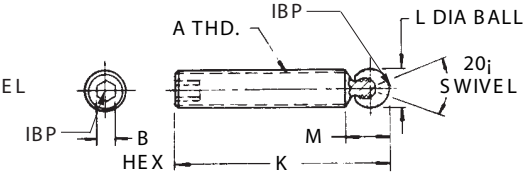
Type A: Small Foot



Type B: Large Foot



Type D: Ball Foot



USA

TYPE A STEEL PART NO.	TYPE A STAINLESS PART NO.	TYPE B STEEL PART NO.	TYPE B STAINLESS PART NO.	TYPE D STEEL PART NO.	A	B	C	D DIA	E	F	G DIA	H	J	K	L DIA	M
CL-1-SSC		CL-20-SSC		CL-47-SSC	1/4-20	1/8	1/2	3/16	9/32	19/32	3/8	23/64	1/8	17/32	1/4	5/16
CL-2-SSC	CL-2-SSC-S	CL-21-SSC	CL-21-SSC-S	CL-48-SSC			3/4			27/32				25/32		
CL-3-SSC	CL-3-SSC-S	CL-22-SSC	CL-22-SSC-S	CL-49-SSC			1			1-3/32				1-1/32		
CL-4-SSC	CL-4-SSC-S	CL-23-SSC	CL-23-SSC-S	CL-50-SSC			1-1/2			1-19/32				1-17/32		
CL-5-SSC		CL-24-SSC		CL-51-SSC	5/16-18	5/32	3/4	1/4	11/32	27/32	1/2	27/64	5/32	25/32	5/16	23/64
CL-6-SSC	CL-6-SSC-S	CL-25-SSC	CL-25-SSC-S	CL-52-SSC			1			1-3/32				1-1/32		
CL-7-SSC	CL-7-SSC-S	CL-26-SSC	CL-26-SSC-S	CL-53-SSC			1-1/2			1-19/32				1-17/32		
CL-8-SSC	CL-8-SSC-S	CL-27-SSC	CL-27-SSC-S	CL-54-SSC			2			2-3/32				2-1/32		
CL-9-SSC		CL-28-SSC		CL-55-SSC	3/8-16	3/16	3/4	19/64	3/8	7/8	9/16	5/8	3/16	25/32	3/8	7/16
CL-10-SSC		CL-29-SSC		CL-56-SSC			1			1-1/8				1-1/32		
CL-11-SSC	CL-11-SSC-S	CL-30-SSC	CL-30-SSC-S	CL-57-SSC			1-1/2			1-5/8				1-17/32		
CL-12-SSC	CL-12-SSC-S	CL-31-SSC	CL-31-SSC-S	CL-58-SSC			2			2-1/8				2-1/32		
CL-39-SSC	CL-39-SSC-S	CL-43-SSC	CL-43-SSC-S	CL-59-SSC			3			3-1/8				3-1/32		
CL-14-SSC		CL-33-SSC		CL-61-SSC	1/2-13	1/4	1-1/2	13/32	15/32	1-9/16	3/4	17/32	3/16	1-19/32	1/2	9/16
CL-15-SSC	CL-15-SSC-S	CL-34-SSC	CL-34-SSC-S	CL-62-SSC			2			2-1/16				2-3/32		
CL-16-SSC	CL-16-SSC-S	CL-35-SSC	CL-35-SSC-S	CL-63-SSC			3			3-1/16				3-3/32		
CL-40-SSC	CL-40-SSC-S	CL-44-SSC	CL-44-SSC-S	CL-64-SSC			4			4-1/16				4-3/32		
CL-18-SSC		CL-37-SSC		CL-66-SSC	5/8-11	5/16	2	1/2	5/8	2-3/64	15/16	21/32	7/32	2-7/32	5/8	11/16
CL-19-SSC		CL-38-SSC		CL-67-SSC			3			3-3/64				3-7/32		
CL-41-SSC		CL-45-SSC		CL-68-SSC			4			4-3/64				4-7/32		
CL-42-SSC		CL-46-SSC		CL-69-SSC			5			5-3/64				5-7/32		

METRIC

CLM-1-SSC		CLM-20A-SSC		CLM-47-SSC	M6	3mm	.59	3/16	9/32	.69	3/8	23/64	1/8	.64	1/4	5/16
CLM-2-SSC		CLM-21A-SSC		CLM-48-SSC			.79			.89				.84		
CLM-3-SSC		CLM-22-SSC		CLM-49-SSC			.98			1.08				1.03		
CLM-4-SSC		CLM-23-SSC		CLM-50-SSC			1.57			1.67				1.62		
CLM-5-SSC		CLM-24-SSC		CLM-51-SSC	M8	4mm	.79	1/4	11/32	.88	1/2	27/64	5/32	.85	5/16	23/64
CLM-6-SSC		CLM-25-SSC		CLM-52-SSC			.98			1.08				1.05		
CLM-7-SSC		CLM-26-SSC		CLM-53-SSC			1.57			1.67				1.64		
CLM-8-SSC		CLM-27-SSC		CLM-54-SSC			1.97			2.06				2.03		
CLM-9-SSC		CLM-28-SSC		CLM-55-SSC	M10	5mm	.79	19/64	3/8	.91	9/16	5/8	3/16	.82	3/8	7/16
CLM-10-SSC		CLM-29-SSC		CLM-56-SSC			.98			1.11				1.02		
CLM-11-SSC		CLM-30-SSC		CLM-57-SSC			1.57			1.70				1.61		
CLM-12-SSC		CLM-31-SSC		CLM-58-SSC			1.97			2.10				2.01		
CLM-13-SSC		CLM-32-SSC		CLM-59-SSC			2.95			3.08				2.99		
CLM-14-SSC		CLM-33-SSC		CLM-61-SSC	M12	6mm	1.57	13/32	15/32	1.64	3/4	17/32	3/16	1.69	1/2	9/16
CLM-15-SSC		CLM-34-SSC		CLM-62-SSC			1.97			2.03				2.08		
CLM-16-SSC		CLM-35-SSC		CLM-63-SSC			2.95			3.01				3.06		
CLM-17-SSC		CLM-36-SSC		CLM-64-SSC			3.94			4.00				4.05		
CLM-18-SSC		CLM-37-SSC		CLM-66-SSC	M16	8mm	1.97	1/2	5/8	2.01	15/16	21/32	7/32	2.06	5/8	11/16
CLM-19-SSC		CLM-38-SSC		CLM-67-SSC			2.95			2.99				3.04		
CLM-20-SSC		CLM-39-SSC		CLM-68-SSC			3.94			3.98				4.03		
CLM-21-SSC		CLM-40-SSC		CLM-69-SSC			4.92			4.97				5.02		

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