SAE International	SURFACE VEHICLE RECOMMENDED PRACTICE	SAE J577 JUN2011
		Issued 1940-01 Reaffirmed 2011-06 Superseding J577 JUL2005

Vibration Test Machine and Operation Procedure

RATIONALE

J577 has been reaffirmed to comply with the SAE 5-Year Review policy.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

1. Scope

This SAE Recommended Practice provides procedures, and information to conduct vibration (impact) tests on lighting devices and their components as well as other safety equipment used on vehicles.

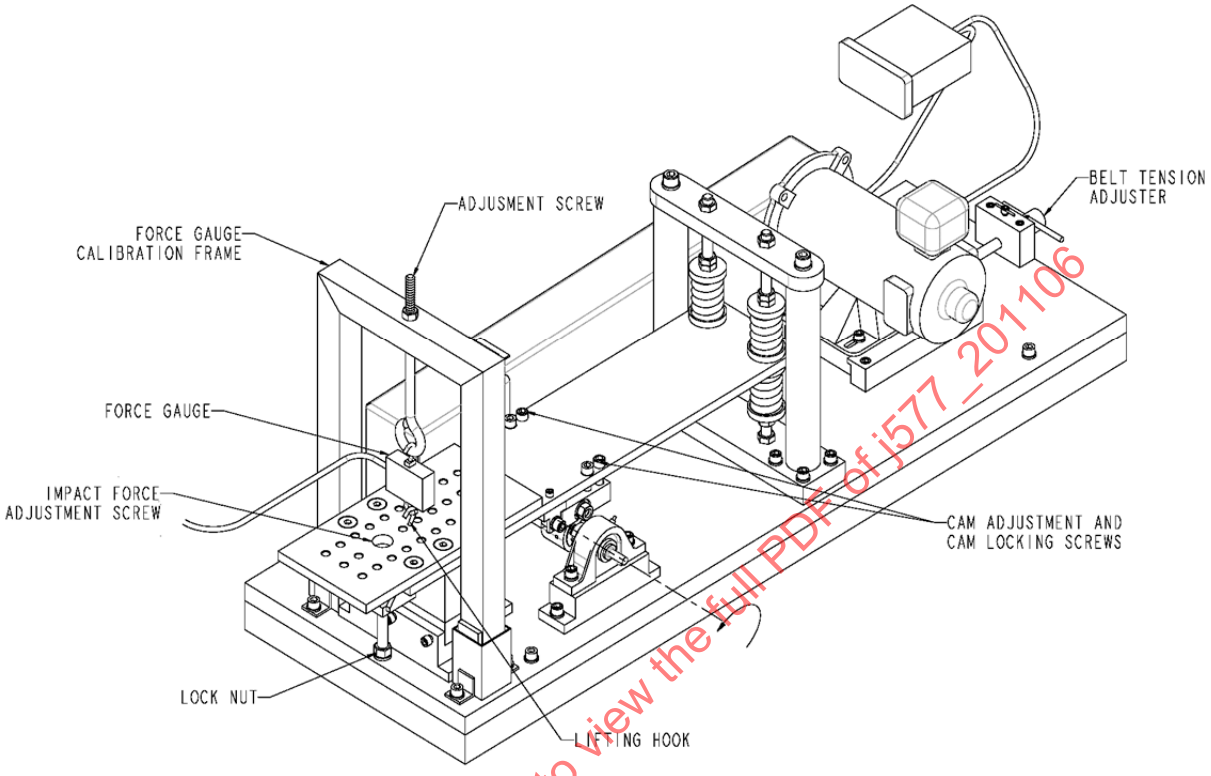


FIGURE 1—VIBRATION TEST MACHINE

2. References

2.1 Related Publications

2.1.1 SAE PUBLICATIONS

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J575—Tests for Motor Vehicle Lighting Devices and Components
SAE J2139—Tests for Lighting Devices, Reflective Devices and Components Used on Vehicles 2032 mm or more in Overall Width
SAE 861957—Headlight Vibration Testing for Heavy Duty Trucks
SAE 840501—Automotive Component Vibration: A Practical Approach to Accelerated Vibration Durability Testing
SAE 790747—Vibration Test for Motor Vehicle Lighting Devices and Components

2.1.2 FMVSS PUBLICATIONS

Available from the National Highway Traffic Safety Administration, 400 Seventh SW, Washington, DC 20024-0002.

FMVSS-108—Lamps Reflective Devices, And Associated Equipment (Available as 49 CFR 571.108)

2.1.3 OTHER PUBLICATIONS

U.S. Department of Agriculture General Technical Report FPL 22—An Assessment of the Common Carrier Shipping Environment

3. Definitions

3.1 Anvil

The member located at the front of the machine on the lower base plate, that is struck by the hammer when the top plate is falling.

3.2 Cam Follower

A mechanism that contains a roller(s) that comes in contact with the cam(s) surface and thereby reduces the friction and wear on the cam by rotating rather than rubbing.

3.3 Hammer

The member located at the front of the machine on the upper plate, that strikes the anvil when the top plate is falling.

3.4 Vibration Test Fixture

A fixture specifically designed to support the device under test in its designed operating position during the vibration test.

4. Lighting Identification Code

Not applicable.

5. Tests

5.1 Calibration Equipment and Instrumentation

Equipment listed is a guide for standardization only. Equivalent instrumentation equipment is available, however test results should be checked for accuracy

5.1.1 FORCE GAGE

5.1.1.1 Force/Torque Indicator with 50 x 0.02 kgf Capacity, 500 x 0.2 N, accuracy ± 0.2% of full scale ± 1 digit.

5.1.1.2 Force Sensor with 50 x 0.02 kgf Capacity, accuracy ± 0.15% of full scale ± 1 digit.

5.1.2 GO-NO-GO GAGES

5.1.2.1 Gages specified in Figures 2, 3, and 4 below should be used to set the machine up and for recalibration.

5.2 Vibration Test

This test evaluates the ability of a device to resist damage from vibration-induced (impact-induced) stresses.

5.3 Vibration Test Procedures

5.3.1 A sample of the device, mounted in the specified vibration test fixture shall be bolted to the anvil end of the table on the vibration test machine and vibrated at 12.5 ± .17 Hz (750 ± 10 cpm) through a vertical distance of 3.2 mm ± .25 mm. The table shall be spring mounted at one end and fitted with a steel hammer on the underside of the other end. The hammer shall contact the steel anvil once during each cycle at the completion of the fall. The impact force shall be 290 N ± 20 N.

6. Vibration Machine Requirements

6.1 The vibration system shall consist of a vibration machine and the mounting base.

6.2 The machine shall meet the specifications as outlined in drawing number 251942, which may be purchased from SAE Headquarters.

NOTE—Deviation from the specifications as listed could compromise the performance of the vibration test.

6.3 The mounting base for the machine shall meet the specifications as outlined in drawing number 230050, which may be purchased from SAE Headquarters.

7. Machine Set-Up and Calibration

The vibration isolator system on the mounting base should be pressurized to a minimum of 275.6 kPa.

7.1 Calibration and Instrumentation Sequence

a. Vee block rollers
b. Rear spring set-up
c. Verify top plate is parallel to machine base plate.
d. Adjust hammer and anvil gap
e. Adjust top plate spring tension
f. Program cycles per minute into the controller

7.2 Vee Block Roller Adjustment

7.2.1 Remove the fixture mounting plate mounted on top of the top plate to access the two mounting screws holding the vee block in place.

7.2.2 Place a 0.25 mm gage or shim stock between each roller and the vee block as shown in Figure 5. Position the vee block so that it makes contact with the shim stock on both rollers.

7.2.3 Tighten the two mounting bolts for the vee block and replace the fixture plate.

7.2.4 Remove the gages or shim stock(s).

7.3 Rear Spring Set-Up

7.3.1 The lifting cams should be rotated to their lowest point (not engaged). Rotate the cams counterclockwise, when viewed from the pulley side, until they touch the cam followers. The hammer and anvil must be touching.

7.3.2 Measure the height of the top plate from the machine's bottom plate using the "GO-NO-GO" gage shown in Figure 2. The measurement should be made at the front (both sides) to make sure it is at the proper height, then measure the rear of the top plate (both sides) to make sure they are at the same height. If the rear of the top plate is higher or lower than the front, adjust the rear springs until the gage fits both front and rear.

7.3.3 Use the "GO-NO-GO" gage per Figure 3 to gage the correct spring compression to obtain the force required. The gage should "go" over the spring keeper and interfere with the "NO-GO" portion of the gage. The spring force is determined by the spring rate to determine the amount of compression plus the wall thickness of the two spring keepers.

7.3.4 Recheck the height of the top plate using the "GO-NO-GO" gage from Figure 2 to make sure it is the same as the front (both sides).

7.3.5 Place a piece of manila folder between the hammer and anvil and run the machine for 60 seconds. Check the imprint on the manila paper to make sure the hammer and anvil are making contact over the entire surface. If they are not making even contact from side to side and front to back it is recommended that the hammer and anvil and holder assembly be surface ground. After grinding repeat the manila paper imprint test. Caution should be taken not to grind too much off the hammer and anvil so that the top plate is no longer level. It is recommended that no shims be used under the hammer or the anvil as this can cause dampening of the machine. Replace a worn anvil.

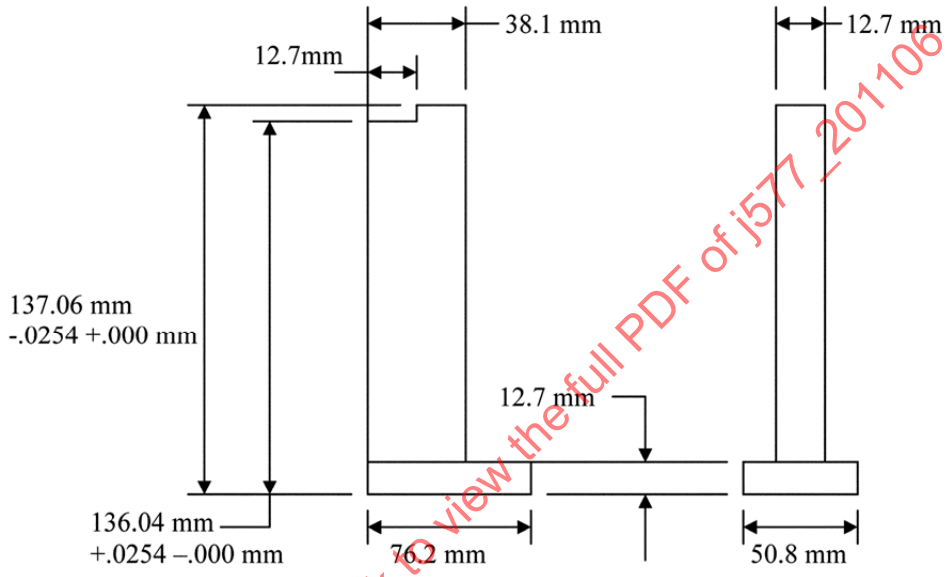


FIGURE 2—TOP PLATE GAGE

7.4 Calibration Procedure

7.4.1 CAM SET-UP

7.4.1.1 Care should be taken to assemble the cams on the machine correctly. When viewing the cams from the pulley side of the machine, the cams should rotate clockwise.

7.4.1.2 Manually rotate the cams to Top-Dead-Center (TDC). This will provide the largest gap between the hammer and anvil.

7.4.1.3 Check the gap using the "GO-NO-GO" gage in Figure 4. Adjust the cantilevered cam followers until the "GO" portion of the gage fits between the hammer and anvil.

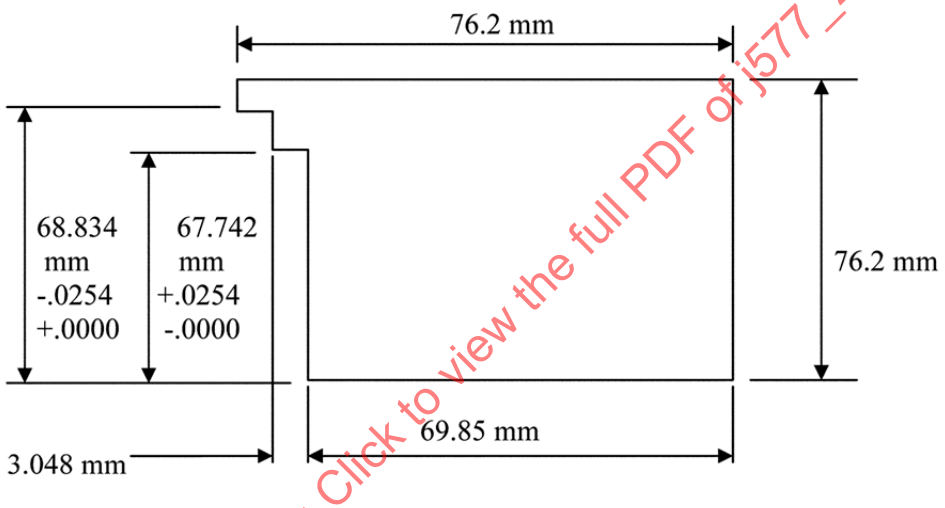
7.4.2 SPRING FORCE CALIBRATION

7.4.2.1 Rotate the cam from TDC backwards until the highest point on the cam stops at the cam follower. This is the lowest point on the cam and the hammer should be touching the anvil.

7.4.2.2 Place the calibration frame in the receptacles as shown on the drawings referenced in 6.2. Install the lifting hook in the accelerometer-mounting hole in the fixture mounting plate directly over the center of the anvil.

7.4.2.3 Attach the force gage specified in 5.1.1 to the calibration frame and attach it to the hook installed in the accelerometer-mounting hole on the fixture plate. Tighten the screw on top of the calibration frame until the gap between the hammer and anvil fits the "GO-NO-GO" gage in Figure 4.

7.4.2.4 Adjust the socket head capscrew for the front compression spring through the hole in the fixture plate until the calibration gage has a reading between 290 N ±20 N.



Recommended width of the gage is 25.4 mm.

FIGURE 3—REAR SPRING GAGE

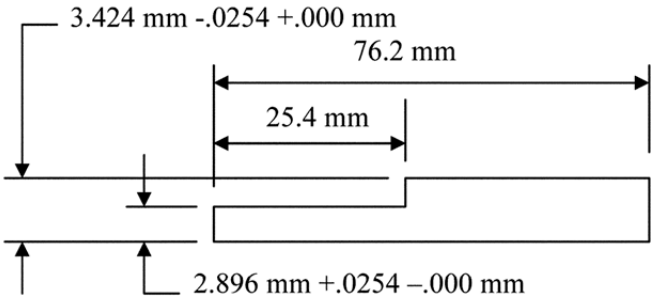
7.4.3 MACHINE CYCLE CALIBRATION

7.4.3.1 Set the controller at 750 cycles per minute.

8. Test Fixture Design

8.1 The combined weight of the fixture plate, the DUT, and the fixture shall be a minimum of 13.5 kg and a maximum of 27.0 kg.

8.2 The center of gravity of the fixture and the DUT should be centered as near as practicable over the anvil.



Recommended width of the gage is 25.4 mm.

FIGURE 4—GAP GAGE

9. Guidelines

9.1 Preventive Maintenance and Re-calibration

9.1.1 Calibration of the machine should be checked after 150 hours of tests or per the companies re-calibration schedule, which ever is less . Repair or replacement of worn machine components requires recalibration.

9.1.2 The machine should be inspected before and after each test to see if there is any wear appearing on the components and that all of the springs are functioning properly.

9.1.3 The machine should be lubricated on a quarterly basis or per the companies preventive maintenance schedule, which ever is less.

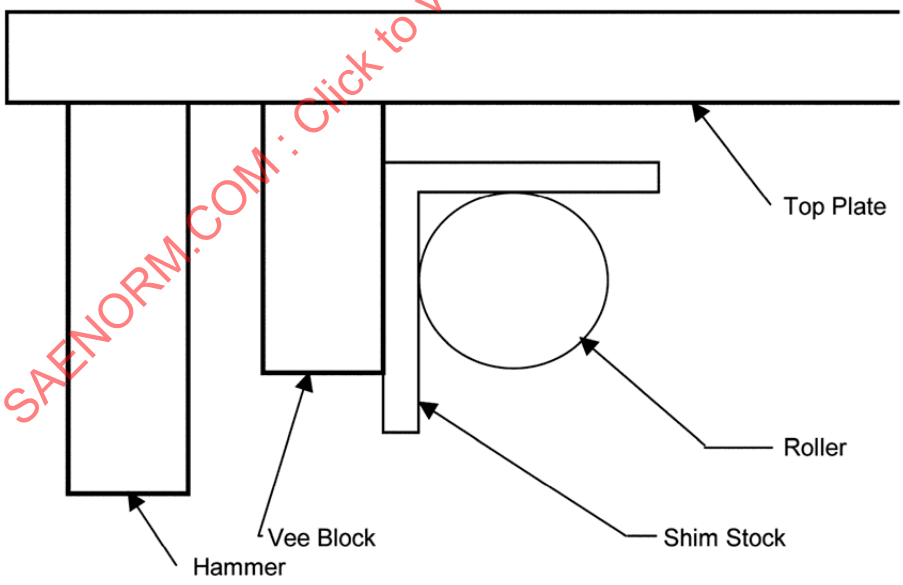


FIGURE 5—VEE BLOCK AND ROLLER SPACING ADJUSTMENT

J577 VIBRATION MACHINE SET-UP FLOW CHART

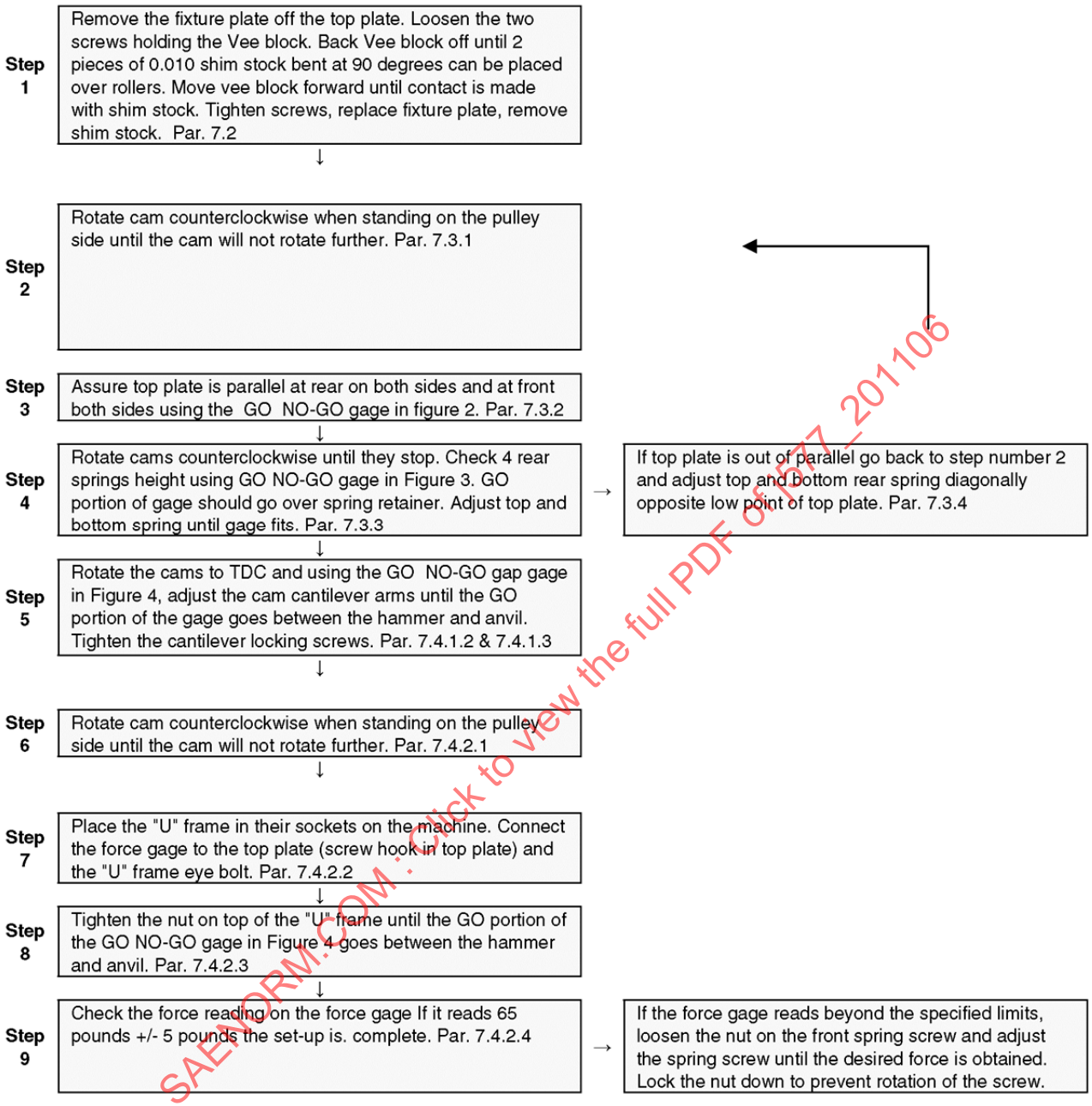
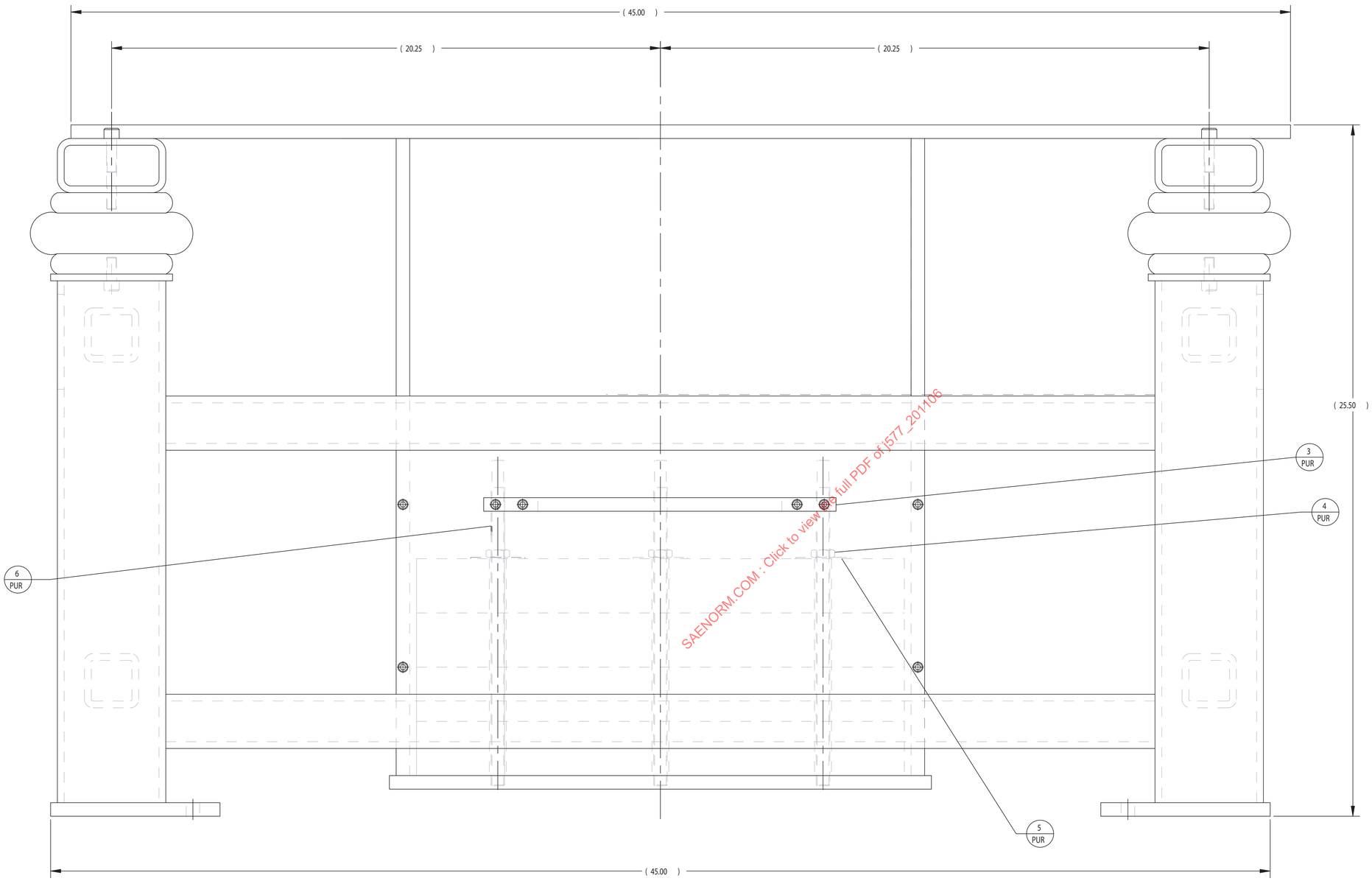


TABLE 1—MOUNTING BASE BILL OF MATERIAL

ITEM	ASY SHT	DTL SHT	QTY	MATERIAL	FINISH SIZE OR NAME
1	2		1	PUR	CARR LANE, SWING BOLT #CL-2-SB
2	2		4	PUR	FIRESTONE, AIRMOUNTS STYLE #16
3	2		1	PUR	McMASTER-CARR, DRAWER & DOOR
					PULLS #187A64
4	2		3	PUR	McMASTER-CARR, HEX THIN (JAM)
					NUT #91847A520
5	2		3	PUR	McMASTER-CARR, LARGE O.D. FLAT
					WASHER #91090A118
6	2		3	PUR & ALT	McMASTER-CARR, THREADED ROD
					#98847A033
7	3	5	1	WELDMENT	BASE WELDMENT ASEMBLY
8	3	6	1	WELDMENT	MOUNTING PLATE SUB-ASSEMBLY
9	3	7	2	STEEL TUBE	MOUNTING PLATE CROSSMEMBER
10	3	8	1	1018	WEIGHT RACK COVER
11	3	9	4	1018	WEIGHT
					23050-01



BASE ASSEMBLY

B NOTES:

1) IT IS RECOMMENDED THAT THE FIRESTONE VIBRATION ISOLATORS BE INTERCONNECTED WITH EACH OTHER USING 1/4" TUBING.

2) THE SYSTEM SHOULD INCLUDE AN AIR INLET VALVE TO PRESSURIZE THE SYSTEM.

3) THE SYSTEM SHOULD BE PRESSURIZED TO 40 PSI.

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01
B MDN	ADDED NOTES		(230050) 07/08/02

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: 1/2	UNITS: IN
DATE:	07-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

TITLE: MOUNTING BASE, J577 VIB. MACHINE

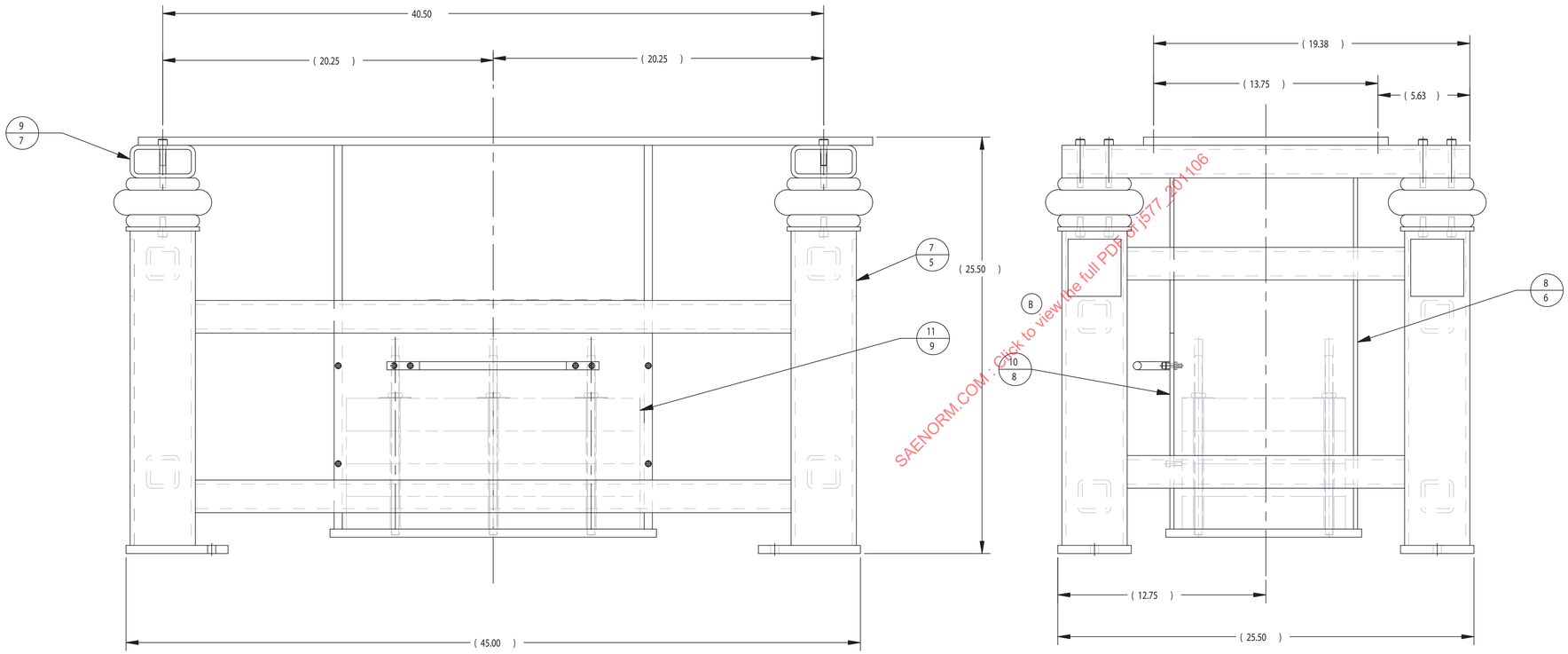
GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-02	B	1 of 1

SYSTEM/REV. Pro/E 2000i

3D DATA: no

FIGURE 6—MOUNTING BASE ASSEMBLY



BASE ASSEMBLY

FIGURE 7—MOUNTING BASE ASSEMBLY

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01
B MDN	CORRECTED PICTORIALLY		(230050) 07/09/02

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: 1/4	UNITS: IN
DATE:	07-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

TITLE

MOUNTING BASE,
J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-03	B	1 of 1

SYSTEM/REV. Pro/E 2000i

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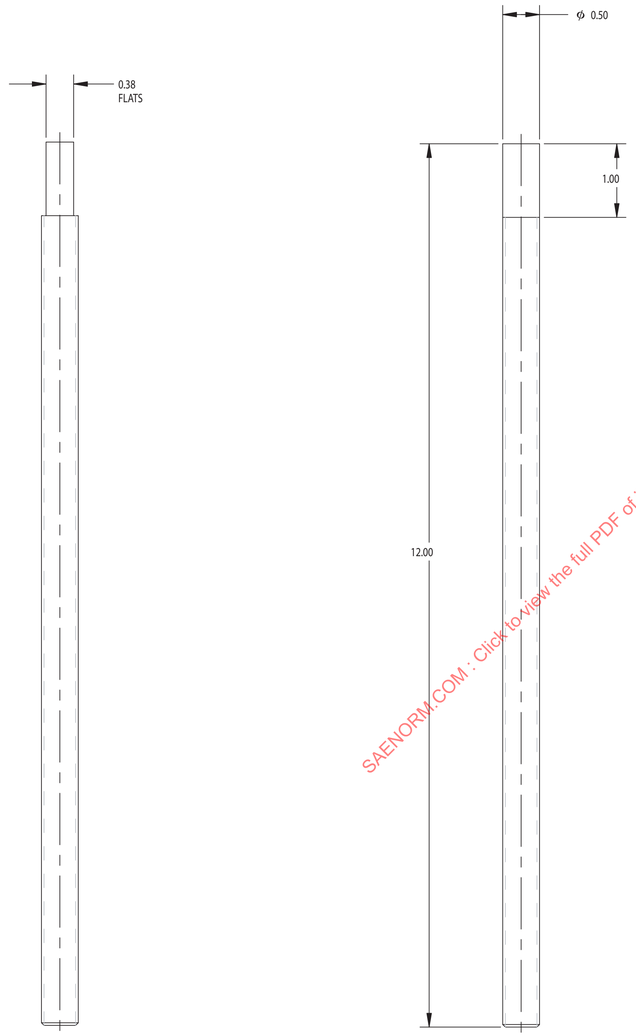

6/2 THREADED ROD
(3) REQ'D ~PUR
CARR LANE, THREADED ROD #98847A033

FIGURE 8—ROD WEIGHT CLAMP

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: FULL	UNITS: IN
DATE:	07-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

TITLE: MOUNTING BASE, J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

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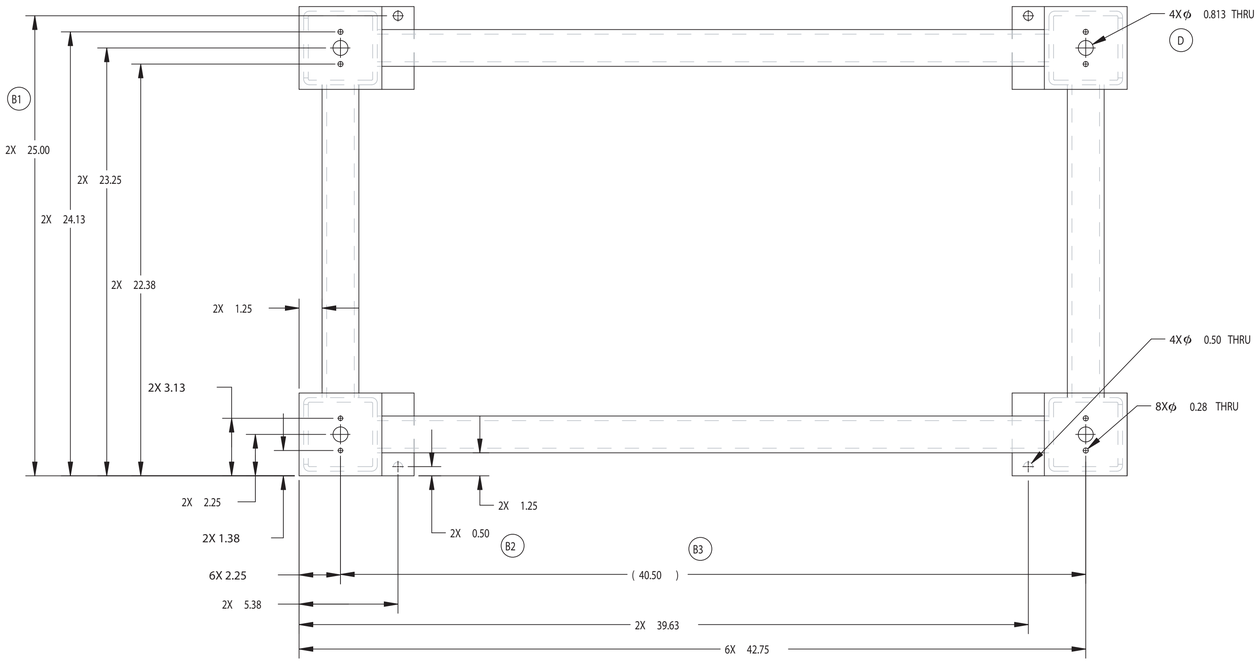
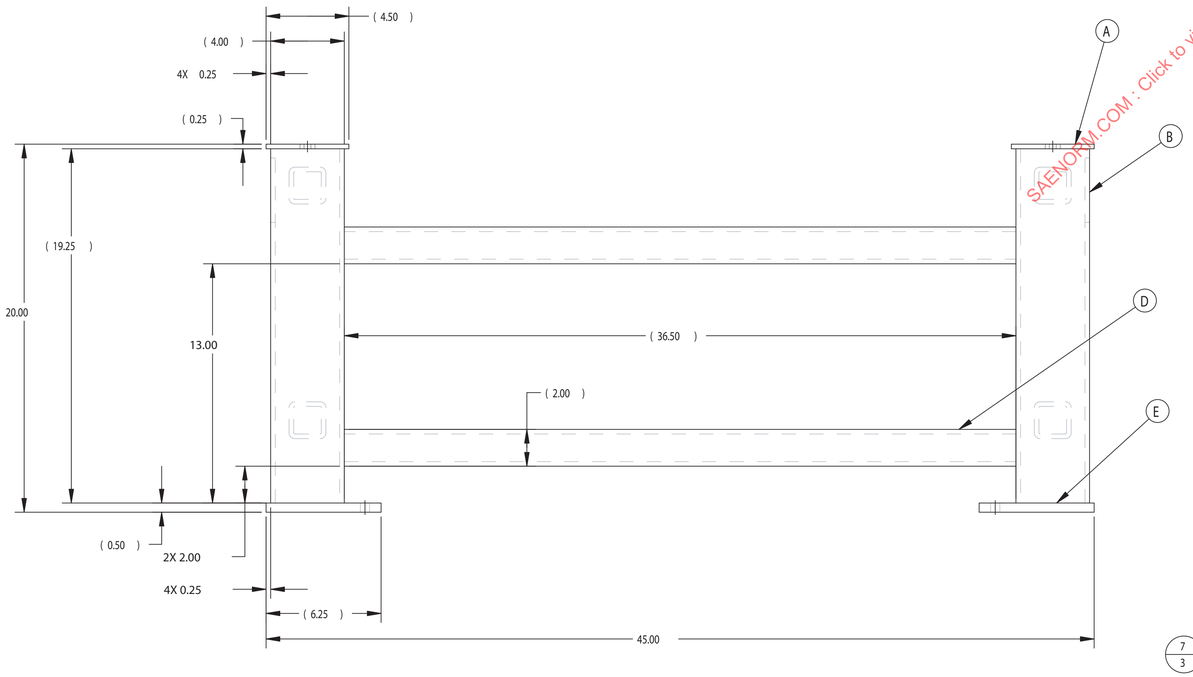
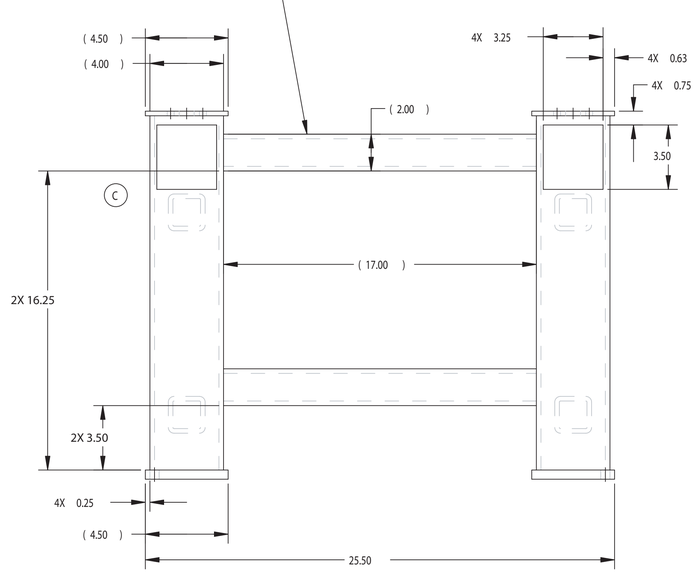
SYSTEM/REV: Pro/E 2000i

3D DATA: NO







7/3 BASE WELDMENT
(1) REQ'D ~ STRESS RELIEVE

BILL OF MATERIAL
FINISHED SIZES GIVEN

- A — (4) REQ'D ~ 1018 ~ 0.25 X 4.50 X 4.50 LONG
- B — (4) REQ'D ~ 1018 ~ 4" SQ. TUBING X 0.25 WALL X 19.25 LONG
- C — (4) REQ'D ~ 1018 ~ 2" SQ. TUBING X 0.125 WALL X 17.00 LONG
- D — (4) REQ'D ~1018 ~ 2" SQ. TUBING X 0.125 WALL X 37.50 LONG
- E — (4) REQ'D ~ 1018 ~ 0.50 X 4.50 X 6.25 LONG

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01
B1 B2 B3 MDN	25.00 WAS 23.25 0.50 WAS 2.25 ADDED (40.50) DIMENSION		230050 02/11/02
C CDB	REMOVED TAPPED HOLE		230050 2/27/02
D MDN	ADDED 4X ϕ 0.813 THRU		(230050) 07/09/02

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: 1/4	UNITS: IN
DATE:	06-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

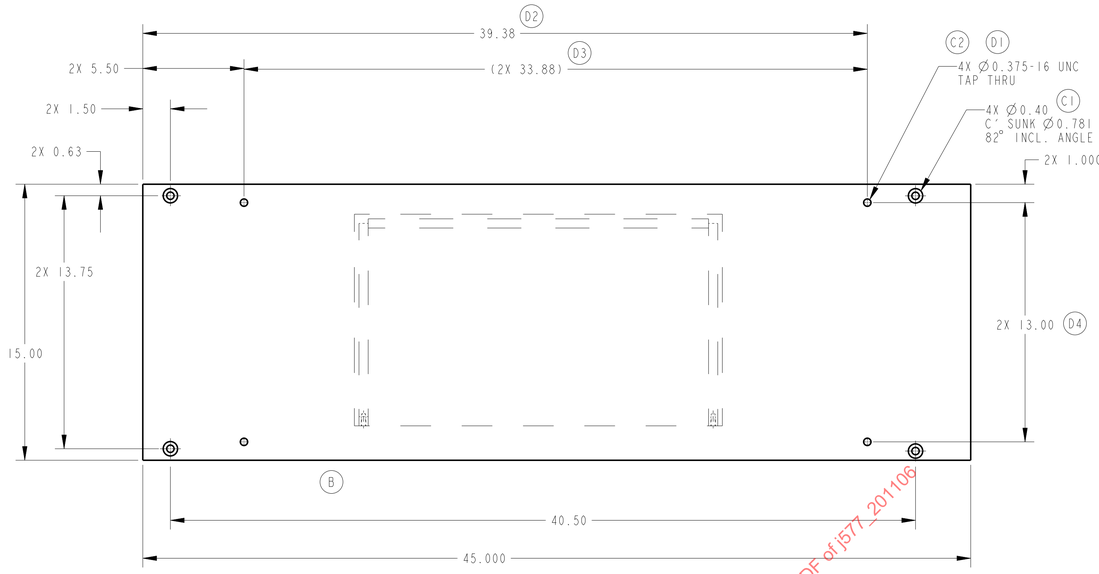
TITLE: MOUNTING BASE, J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-05	D	1 of 1

SYSTEM/REV. Pro/E 2000i | 3D DATA: NO

FIGURE 9—BASE WELDMENT

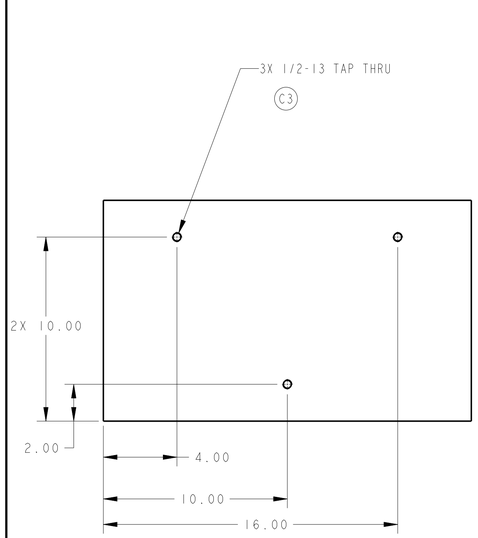


A (1) REQ'D ~ 1018 ~ 0.50 X 15.00 X 45.00 LONG

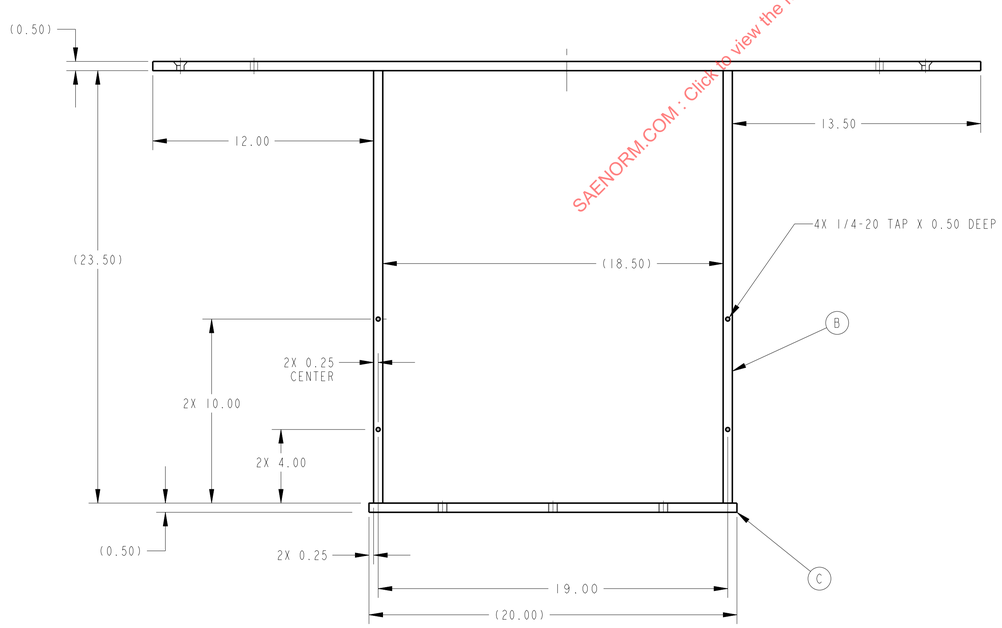
B (2) REQ'D ~ 1018 ~ 0.50 X 11.00 X 23.50 LONG

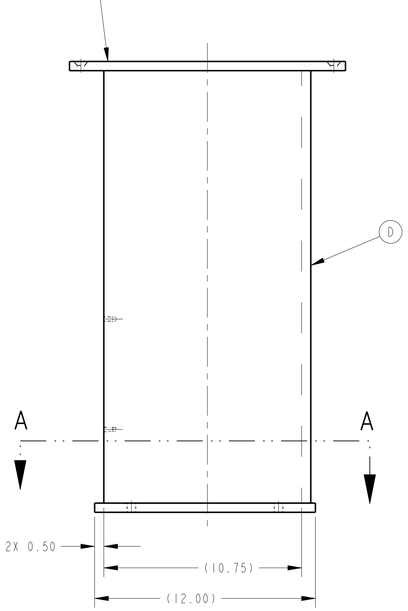
C (1) REQ'D ~ 1018 ~ 0.50 X 12.00 X 20.00 LONG

D (1) REQ'D ~ 1018 ~ 0.50 X 18.50 X 23.50 LONG



SECTION A-A





8/3 *MOUNTING PLATE SUB-ASSEMBLY*
(1) REQ'D ~ WELDMENT ~ STRESS RELIEVE

FIGURE 10—MOUNTING PLATE ASSEMBLY

REV.	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01
B CDB	MOVED TAPPED HOLE		230050 2/27/02
C1 C2 C3 MDN	ADDED C'BORE 4X WAS 8X MODIFIED TAP HOLE		(230050) 07/09/02
D1 D2 D3 D4 RF	Ø0.375-16 UNC WAS Ø0.40 39.38 WAS 39.50 (2X 33.88) WAS (2X 34.00) ADDED DIMENSIONS		 01-10-07

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY: M. NOE	SCALE: 1/4	UNITS: IN
DATE: 06-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO. N/A	CHECKED BY:	

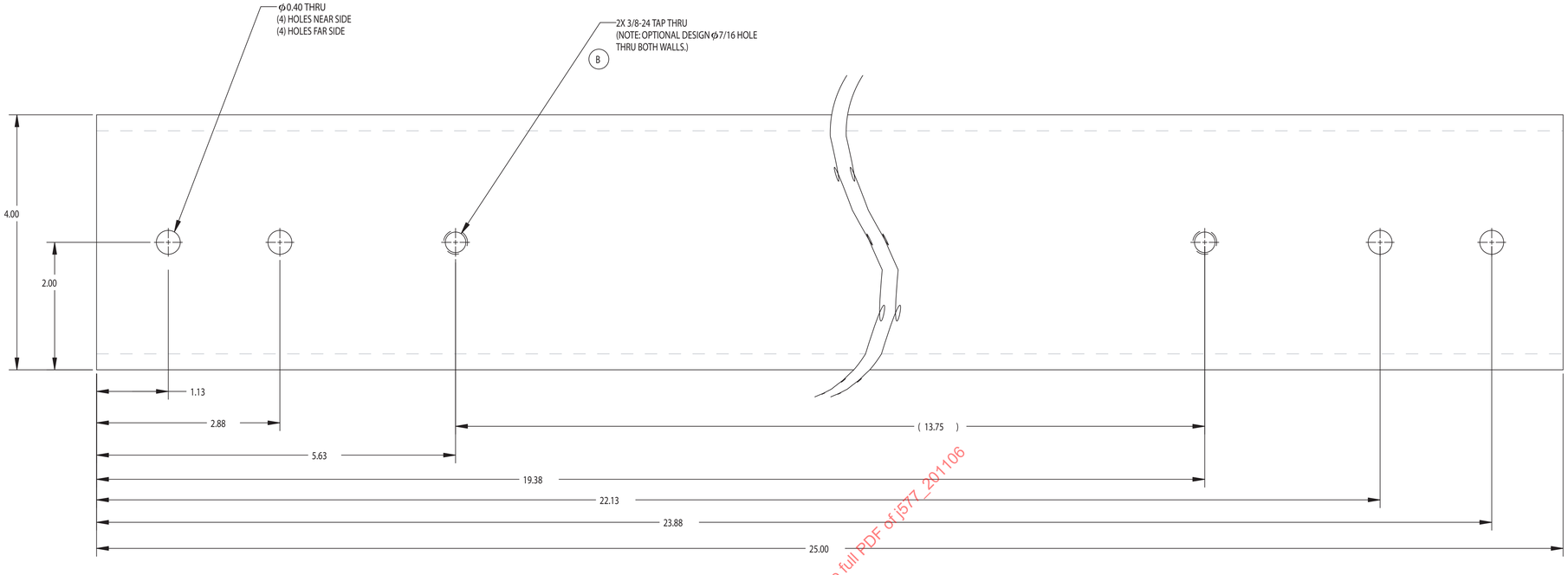
MAT'L DESCRIPTION: N/A

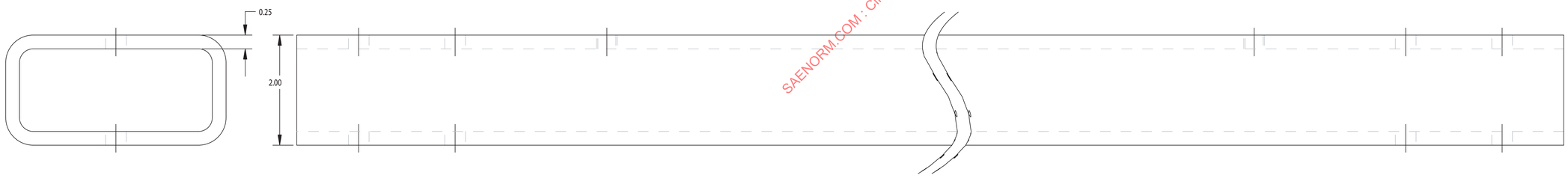
TITLE: MOUNTING BASE, J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-06	D	1 of 1

SYSTEM/REV.: Pro/E WF2.0 | 3D DATA: no





9/3 MOUNTING PLATE CROSSMEMBER
(2) REQ'D ~ STEEL TUBE

FIGURE 11—MOUNTING BASE CROSSMEMBER

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01
B MDN	ADDED OPTIONAL DESIGN NOTE		(230050) 07/10/02

GCC DENOTES GROTE CONTROL CHARACTERISTIC

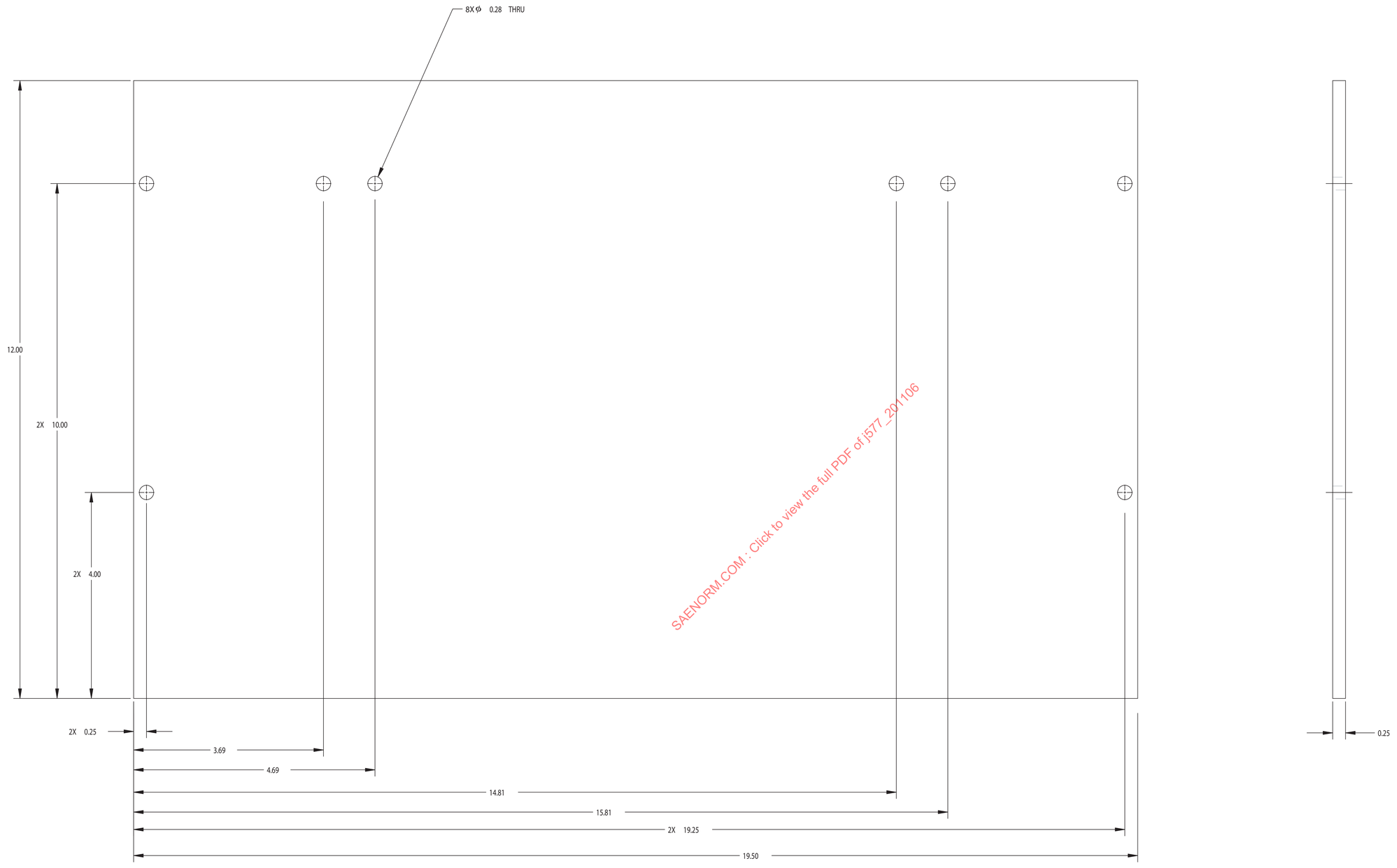
THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: FULL	UNITS: IN
DATE:	06-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		
TITLE	MOUNTING BASE, J577 VIB. MACHINE		

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-07	B	1 of 1

SYSTEM/REV. Pro/E 2000i | 3D DATA: no



10/3 WEIGHT RACK COVER
(1) REQ'D ~ 1018

FIGURE 12—WEIGHT RACK COVER

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: FULL	UNITS: IN
DATE:	07-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

TITLE

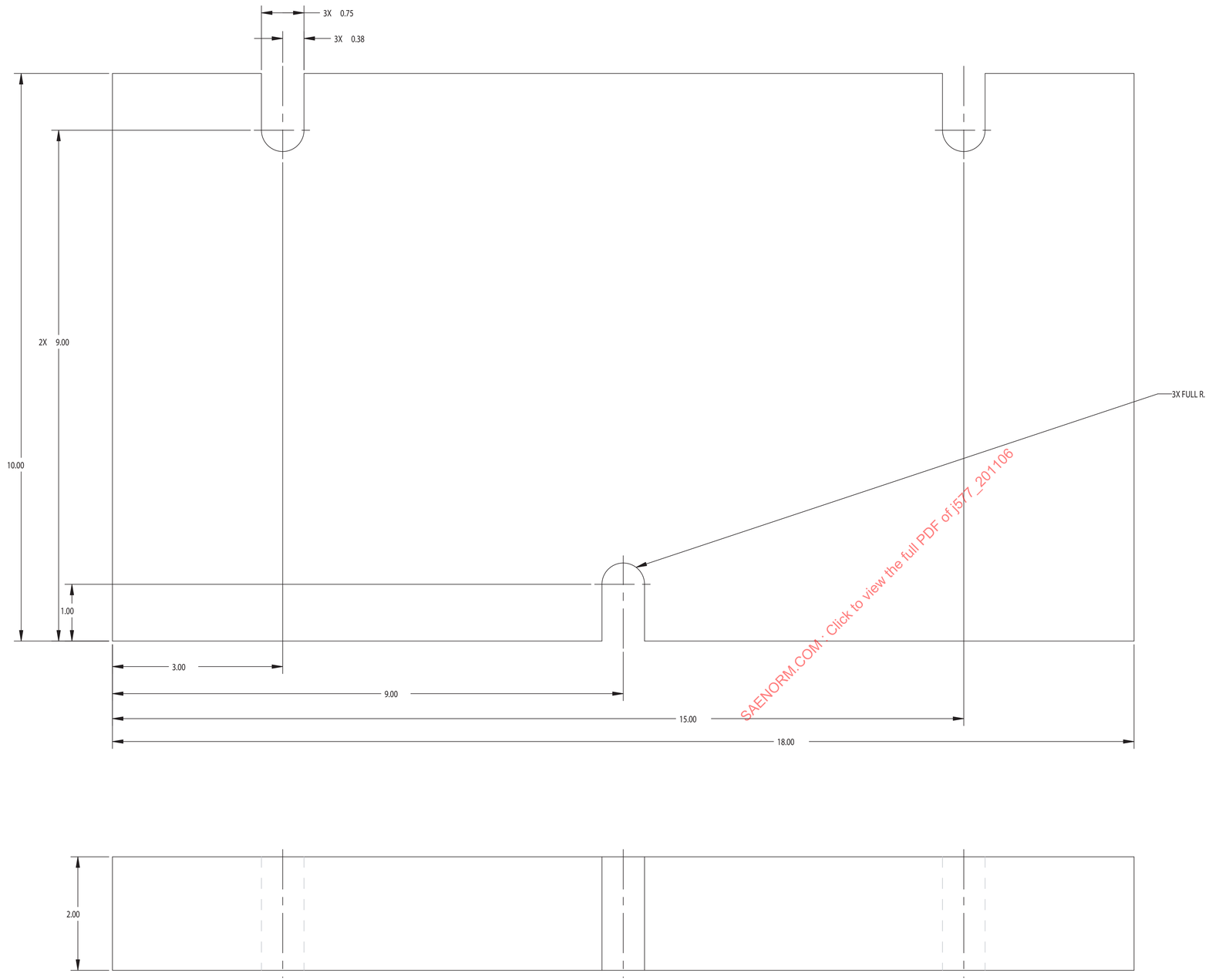
MOUNTING BASE, J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-08	A	1 of 1

SYSTEM/REV. Pro/E 2000i

3D DATA: no



11/3 WEIGHT
(4) REQ'D ~ 1018

FIGURE 13—WEIGHT

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
A MDN	RELEASED		(230050) 11/13/01

GCC
DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	M. NOE	SCALE: FULL	UNITS: IN
DATE:	08-Nov-01	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

TITLE
MOUNTING BASE,
J577 VIB. MACHINE

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	230050-09	A	1 of 1

SYSTEM/REV. Pro/E 2000i
3D DATA: NO

TABLE 2—J577 MACHINE BILL OF MATERIAL

BILL OF MATERIALS		
QTY	Part No.	Description
1	251942-01	Main Assembly
1	251942-02	Weldment Detail #2
1	251942-03	Weldment Detail #3
1	251942-04	Weldment Detail # 4
1	251942-05	Weldment Detail #5
4	251924-06	Weldment Detail #6
2	251942-07	Weldment Detail #8
1	251942-08	1.000 X 15.000 X 45.000 CRS
2	251942-09	1.670 DIA X 10.250 LG CRS
1	251942-12	1.250 SQ X 6.000 LG. # 4140 STL.
1	251942-13	1.250 X 1.500 X 6.000 LG. CRS
1	251942-14	0.750 X 1.000 X 4.125 LG. CRS
2	251942-15	FAFNIR PILLOW BLOCK #G1012KRRB, RAK 3/4
1	251942-16	0.500 X 6.000 X 26.625 LG. CRS
1	251942-17	0.750 X 2.000 X 11.000 CRS
1	251942-18	1.250 DIA X 13.375 LG. D2 58/62Rc STL.
1	251942-21	1.250 SQ. X 2.500 LG. #4140 STL.
1	251942-22	1.250 SQ. X 4.500 LG. CRS
2	251942-23	1.625 X 1.750 X 6.500 LG. CRS
1	251942-24	1.250 X 2.750 X 6.000 LG. D2 STL.
1	251942-25	1.000 X 2.875 X 11.875 LG. CRS
4	251942-26	Century Spring #11996
1	251942-27	Electric Motor, Baldor # CDP3320
1	251942-28	Bushed Gearbelt Pulley, Browning # 18LG075
1	251942-29	Bushed Gearbelt Pulley, Browning # 40LH075
1	251942-30	Timing Belt, Gates # 600L075
2	251942-31	Cam Follower, Roller Bearing Co. of America # S40L
2	251942-32	Cam follower # S32LW & Lube Fitting #36235 Roller Bearing Co. of America
4	251942-33	1.810 DIA X 0.344 LG. Tool STL
4	251942-34	1.810 DIA X 0.564 LG. Tool STL
1	251942-35	0.500 DIA X 2.250 X 4.000 LG CRS
2	251942-37	0.250 SQ. X 1.360 LG. Key
2	251942-38	E-Ring, McMaster Carr #98407A156
2	251942-40	1/8" Grease Zerk, McMaster Carr # 1095K11
2	251942-41	2.000 DIA X 1.500 LG Hardened D2 STL
1	251942-42	0.500 X 6.000 X12.000 LG. CRS
2	251942-43	2.000 SQ. X 14 GA. Tubing X 3.000 LG
2	251942-44	1.500 SQ X 0.125 Wall Tubing X 18.000 LG.
1	251942-45	1.500 SQ X 0.125 Wall Tubing X 11.250 LG.
1	251942-46	12GA. X 17.605 X 40.908 LG. CRS

TABLE 2—J577 MACHINE BILL OF MATERIAL (CONTINUED)

BILL OF MATERIALS		
QTY	**Part No.**	**Description**
1	251942-47	Inline Force/Torque Indicator Mark -10, Model BGI, Series SSM100
2	251942-49	0.125 SQ. X 2.000 LG. Key
1	251942-50	Red Oak Quarter Sawn 1.625 X 15.000 X 45.000 LG.
3	251942-52	Hook, Purchased W/ P/N 251942-47
2	251942-53	0.125 X 1.000 X 1.000 Angle X 1.250 LG.
1	251942-54	2.250 X 2.188 X 7.500 LG. CRS
1	251942-56	1.250 X 4.500 X 6.000 LG. CRS
2	251942-61	1.250 SQ. X 8.000 LG. CRS
1	251942-62	Sub-Assembly
1	251942-63	1.000 X 2.000 X 3.000 LG. CRS
1	251942-65	Sub-Assembly
1	251942-66	Hinge, McMaster Carr # 16175A15
1	251942-67	0.750 X 1.000 X 4.125 LG. CRS
4	251942-68	0.125 X 1.000 X 1.000 Angle X 1.000 LG.
2	251942-69	1.250 DIA X 0.437 LG. Hardened Tool STL
1	251942-70	Sub-Assembly
1	251942-71	0.250 X 1.750 X 2.125 LG. CRS
1	251942-72	Honda ATV Valve Spring #14751-KCY-670
1	251942-73	Bushing, Browning # H 3/4
1	251942-74	Bushing, Browning # G 5/8
1	251942-75	Dart Tachometer #MDIOP
1	251942-76	Dart Pulse Generator # PU2E
2	251942-77	0.125 X 1.000 X 1.500 Angle X 1.000 LG.
2	251942-78	0.250 X 1.380 X 3.000 LG, CRS
1	251942-79	0.500 X 2.375 X 2.000 Angle X 1.500 LG.
1	251942-80	1.000 DIA X 1.500 LG. ROD
1	251942-81	0.250 DIA X 4.000 LG. ROD
1	251942-82	1/4-20UNC SHCS X 1.250 LG
1	251942-83	0.093 DIA X 1.250 LG. ROD

PREPARED BY THE SAE HEAVY DUTY LIGHTING STANDARDS COMMITTEE

REAFFIRMED BY THE SAE TEST METHODS AND EQUIPMENT COMMITTEE

BILL OF MATERIAL

QTY.	PART NO.	DESCRIPTION
1	251942-01	MAIN ASSEMBLY
1	251942-02	WELDMENT DETAIL #2
1	251942-03	WELDMENT DETAIL #3
1	251942-04	WELDMENT DETAIL #4
1	251942-05	WELDMENT DETAIL #5
4	251942-06	WELDMENT DETAIL #6
2	251942-07	WELDMENT DETAIL #8
1	251942-08	1.000 X 15.000 X 45.000 CRS
2	251942-09	ϕ 1.670 X 10.250 LG. CRS
1	251942-12	1.250 SQ. X 6.000 LG. #4140 STL.
1	251942-13	1.250 X 1.500 X 6.000 LG. CRS
1	251942-14	0.750 X 1.000 X 4.125 LG. CRS
2	251942-15	FAFNIR PILLOW BLOCK #G1012KRRB, RAK 3/4
1	251942-16	0.500 X 6.000 X 26.625 LG. CRS
1	251942-17	0.750 X 2.000 X 11.000 CRS
1	251942-18	ϕ 1.250 X 13.375 LG. D2 58/62Rc STL.
1	251942-21	1.250 SQ. X 2.500 LG. #4140 STL.
1	251942-22	1.250 SQ. X 4.500 LG. CRS
2	251942-23	1.625 X 1.750 X 6.500 LG. CRS
1	251942-24	1.250 X 2.750 X 6.000 LG. D2 STL.
1	251942-25	1.000 X 2.875 X 11.875 LG. CRS
4	251942-26	CENTURY SPRING #11996
1	251942-27	ELECTRIC MOTOR, BALDOR #CDP3320
1	251942-28	BUSHED GEARBELT PULLEY, BROWNING #18LG075
1	2519472-29	BUSHED GEARBELT PULLEY, BROWNING #40LH075
1	251942-30	TIMING BELT, GATES #600L075
2	251942-31	CAM FOLLOWER, ROLLER BEARING CO. OF AMERICA #540L
2	251942-32	CAM FOLLOWER #S32LW & LUB FITTING #36235 ROLLER BEARING CO. OF AMERICA
4	251942-33	ϕ 1.810 X 0.344 LG. TOOL STL.
4	251942-34	ϕ 1.810 X 0.564 LG. TOOL STL.
1	251942-35	0.500 X 2.250 X 4.000 LG. CRS
2	251942-37	0.250 SQ. X 1.360 LG. KEY
2	251942-38	E-RING, MCMASTER CARR #98407A156
2	251942-40	1/8" GREASE ZERK, MCMASTER CARR #1095K11
2	251942-41	ϕ 2.000 X 1.500 LG HARDENED D2 STL.
1	251942-42	0.500 X 6.000 X 12.000 LG. CRS
2	251942-43	2.000 SQ. X 14GA. TUBING X 3.000 LG.
2	251942-44	1.500 SQ. X 0.125 WALL TUBING X 18.000 LG.
1	251942-45	1.500 SQ. X 0.125 WALL TUBING X 11.250 LG.
1	251942-46	12GA. X 17.605 X 40.908 LG. CRS
1	251942-47	INLINE FORCE/TORQUE INDICATOR MARK-10, MODEL BGI, SERIES SSM100
2	251942-49	0.125 SQ. X 2.000 LG. KEY
1	251942-50	RED OAK QUARTER SAWN 1.625 X 15.000 X 45.000 LG.
3	251942-52	HOOK, PURCHASED W/ P/N 251942-47
2	251942-53	0.125 X 1.000 X 1.000 ANGLE X 1.250 LG.
1	251942-54	2.250 X 2.188 X 7.500 LG. CRS
1	251942-56	1.250 X 4.500 X 6.000 LG. CRS
2	251942-61	1.250 SQ. X 8.000 LG. CRS
1	251942-62	SUB-ASSEMBLY
1	251942-63	1.000 X 2.000 X 3.000 LG. CRS
1	251942-65	SUB-ASSEMBLY
1	251942-66	HINGE, MCMASTER CARR #16175A15
1	251942-67	0.750 X 1.000 X 4.125 LG. CRS
4	251942-68	0.125 X 1.000 X 1.000 ANGLE X 1.000 LG.
2	251942-69	ϕ 1.250 X 0.437 LG. HARDENED TOOL STL.
1	251942-70	SUB-ASSEMBLY
1	251942-71	0.250 X 1.750 X 2.125 LG. CRS
1	251942-72	HONDA ATV VALVE SPRING #14751-KCY-670
1	251942-73	BUSHING, BROWNING #H 3/4
1	251942-74	BUSHING, BROWNING #G 5/8
1	251942-75	DART TACHOMETER #MD10P
1	251942-76	DART PULSE GENERATOR #PU2E
2	251942-77	0.1250 X 1.000 X 1.500 ANGLE X 1.000 LG.
2	251942-78	0.250 X 1.380 X 3.000 LG. CRS
1	251942-79	0.500 X 2.375 X 2.000 ANGLE X 1.500 LG.
1	251942-80	ϕ 1.000 X 1.500 LG. ROD
1	251942-81	ϕ 0.250 X 4.000 LG. ROD
1	251942-82	1/4-20UNC SHCS X 1.250 LG.
1	251942-83	ϕ 0.093 X 1.250 LG. ROD

FASTENERS

NOTE: ALL FASTENERS TO BE GRADE 5 OR BETTER

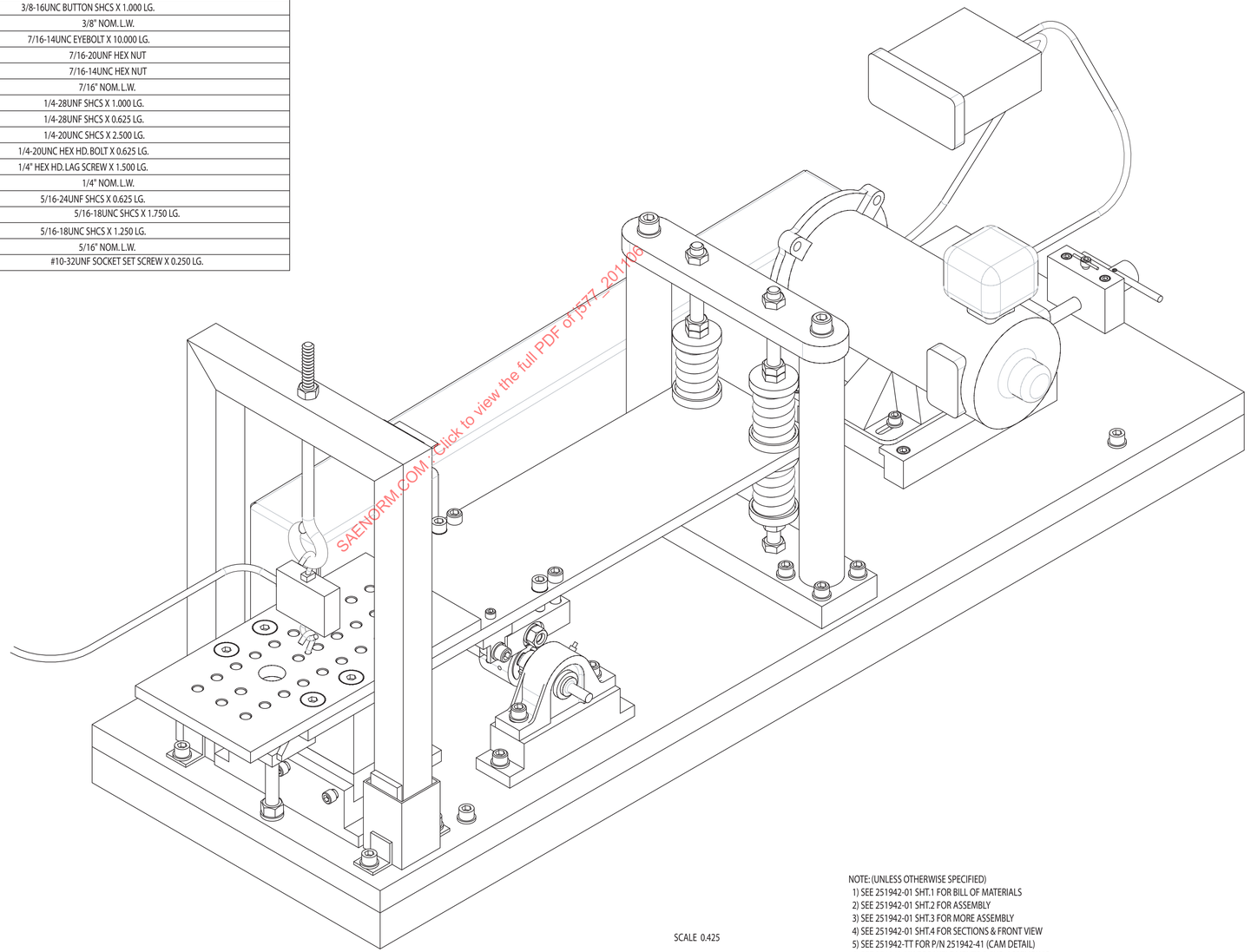
QTY.	PART NO.	DESCRIPTION
2		1/2-13UNC SHCS X 2.000 LG.
1		1/2-13UNC SHCS X 5.500 LG.
2		1/2-13UNC FLAT HD. SHCS X 1.250 LG.
6		1/2-13UNC FLAT HD. SHCS X 1.000 LG.
2		1/2-13UNC ALL-THD. X 12.500 LG.
1		1/2-13UNC ALL-THD. X 9.250 LG.
2		1/2-20UNF HEX NUT
1		1/2-13UNC HEX NUT
12		1/2-13UNC HEX JAM NUT
5		1/2" NOM. L.W.
8		3/8-16UNC SHCS X 2.000 LG.
12		3/8-16UNC SHCS X 1.500 LG.
2		3/8-16UNC SHCS X 1.250 LG.
2		3/8-16UNC SHCS X 1.875 LG.
6		3/8-16UNC SHCS X 1.000 LG.
4		3/8-16UNC SHCS X "A" LG.
2		3/8-16UNC BUTTON SHCS X 1.000 LG.
30		3/8" NOM. L.W.
1		7/16-14UNC EYEBOLT X 10.000 LG.
2		7/16-20UNF HEX NUT
1		7/16-14UNC HEX NUT
2		7/16" NOM. L.W.
2		1/4-28UNF SHCS X 1.000 LG.
4		1/4-28UNF SHCS X 0.625 LG.
2		1/4-20UNC SHCS X 2.500 LG.
4		1/4-20UNC HEX HD. BOLT X 0.625 LG.
4		1/4" HEX HD. LAG SCREW X 1.500 LG.
8		1/4" NOM. L.W.
3		5/16-24UNF SHCS X 0.625 LG.
4		5/16-18UNC SHCS X 1.750 LG.
4		5/16-18UNC SHCS X 1.250 LG.
4		5/16" NOM. L.W.
9		#10-32UNF SOCKET SET SCREW X 0.250 LG.

F1

E1

E2

F2



SCALE 0.425

NOTE: (UNLESS OTHERWISE SPECIFIED)
1) SEE 251942-01 SHT.1 FOR BILL OF MATERIALS
2) SEE 251942-01 SHT.2 FOR ASSEMBLY
3) SEE 251942-01 SHT.3 FOR MORE ASSEMBLY
4) SEE 251942-01 SHT.4 FOR SECTIONS & FRONT VIEW
5) SEE 251942-TT FOR P/N 251942-41 (CAM DETAIL)
6) SEE 251942-UU FOR WELDMENTS & SUB-ASSEMBLY'S
7) SEE 251942-VV FOR WELDMENTS, SUB-ASSEMBLY'S, & PARTS
8) SEE 251942-WW FOR PARTS
9) SEE 251942-XX FOR PARTS
10) SEE 251942-YY FOR PARTS
11) SEE 251942-ZZ FOR PARTS

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
B GDS	REDRAWN & UPDATED ON PRO/E		251942 07/10/03
C GDS	P/N 251942-18 - 58/62Rc STL. WAS 62/94Rc STL.		251942 11/14/03
D CDB	P/N 251942-37 - 0.250 x 0.360 WAS 0.190 x 0.380		251942 12/11/03
E1 E2 CDB	DELETED P/N 251942-48 P/N 251942-49 QTY 2 WAS 1		251942 12/22/03
F1 F2 GDS	P/N 251942-32 - ADDED LUB FITTING P/N 251942-71 - 1.750 X 2.125 WAS 2.000 X 2.375		251942 05/27/04

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY: G.SMITH	SCALE: 1/2	UNITS: IN	
DATE: 10-July-03	DO NOT SCALE DRAWING		
MATERIAL NO. N/A	CHECKED BY:		
MAT'L DESCRIPTION N/A			

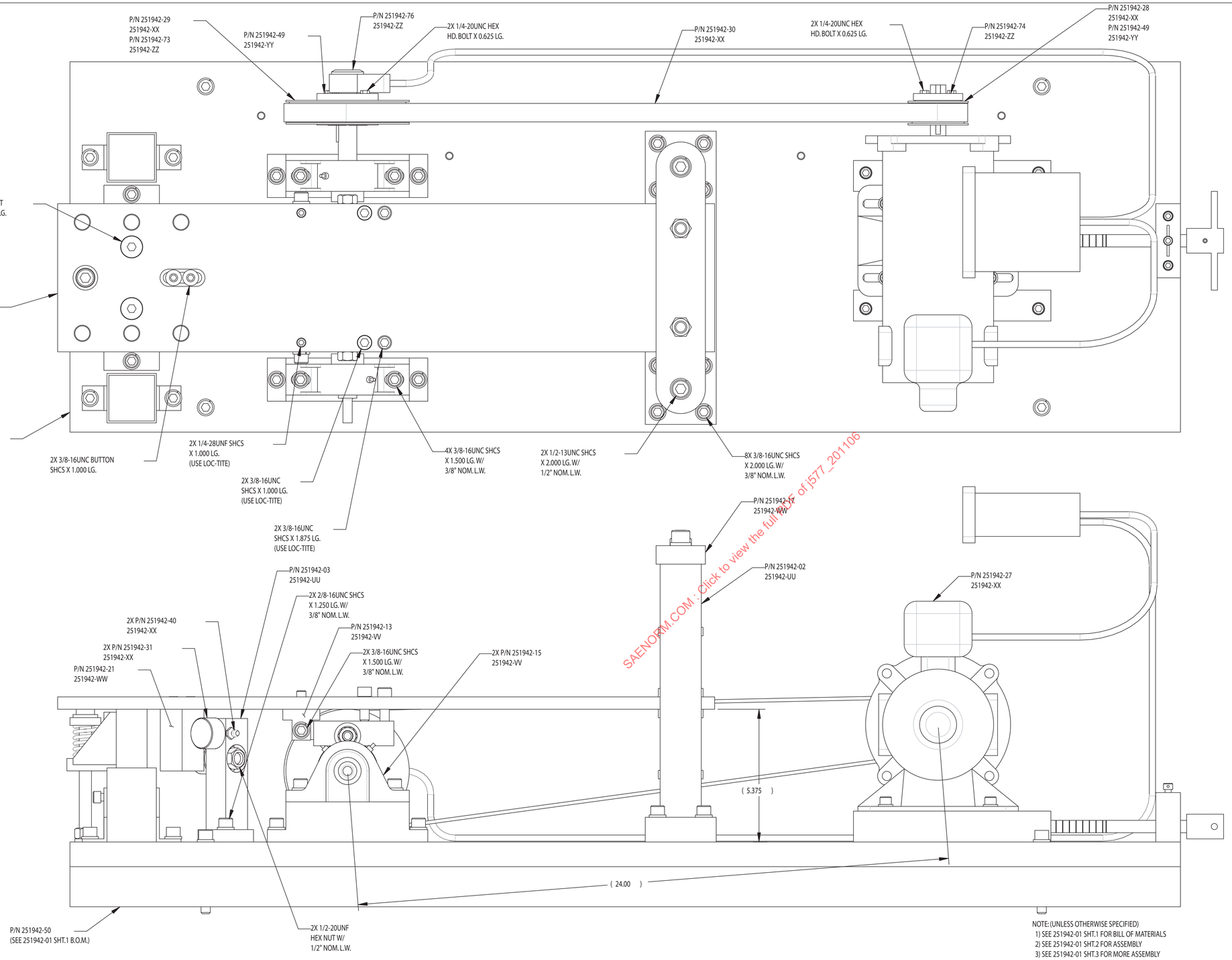
TITLE: VIBRATION TEST STAND PER SAE J577 (BILL OF MATERIALS)

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	251942-01	F	1 of 4

SYSTEM/REV. Pro/E 2001 | 3D DATA: YES

FIGURE 14—VIBRATION TEST MACHINE ASSEMBLY



REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
B GDS	REDRAWN & UPDATED ON PRO/E		251942 07/10/03
C GDS	P/N 251942-18 - 58/62Rc STL. WAS 62/94Rc STL.		251942 11/14/03
D CDB	P/N 251942-37 - 0.250 x 0.360 WAS 0.190 x 0.380		251942 12/11/03
E CDB	SEE SHEET 1		251942 12/22/03
F GDS	SEE SHEET 1		251942 05/27/04

NOTE: (UNLESS OTHERWISE SPECIFIED)
1) SEE 251942-01 SHT.1 FOR BILL OF MATERIALS
2) SEE 251942-01 SHT.2 FOR ASSEMBLY
3) SEE 251942-01 SHT.3 FOR MORE ASSEMBLY
4) SEE 251942-01 SHT.4 FOR SECTIONS & FRONT VIEW
5) SEE 251942-TT FOR P/N 251942-41 (CAM DETAIL)
6) SEE 251942-UU FOR WELDMENTS & SUB-ASSEMBLY'S
7) SEE 251942-VV FOR WELDMENTS, SUB-ASSEMBLY'S, & PARTS
8) SEE 251942-WW FOR PARTS
9) SEE 251942-XX FOR PARTS
10) SEE 251942-YY FOR PARTS
11) SEE 251942-ZZ FOR PARTS

GCC — DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	G.SMITH	SCALE: 1/2	UNITS: IN
DATE:	11-July-03	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

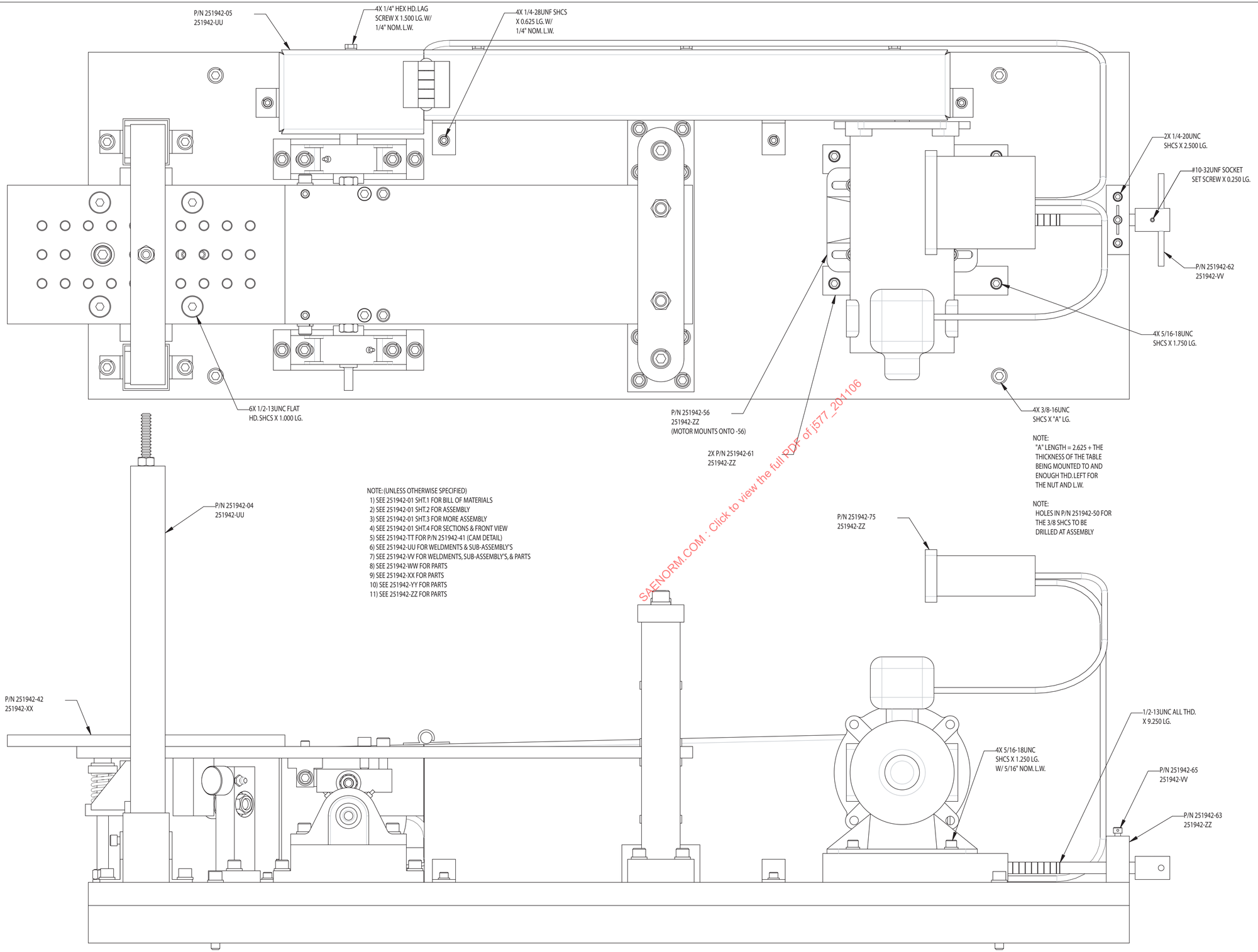
TITLE: VIBRATION TEST STAND PER SAE J577 (ASSEMBLY)

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	251942-01	F	2 of 4

SYSTEM/REV: Pro/E 2001 — 3D DATA: YES

FIGURE 15—VIBRATION MACHINE TOP AND SIDE VIEWS



REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
B GDS	REDRAWN & UPDATED ON PRO/E		251942 07/10/03
C GDS	P/N 251942-18 - 58/62Rc STL. WAS 62/94Rc STL.		251942 11/14/03
D CDB	P/N 251942-37 - 0.250 x 0.360 WAS 0.190 x 0.380		251942 12/11/03
E CDB	SEE SHEET 1		251943 12/22/03
F GDS	SEE SHEET 1		251942 05/27/04

GCC DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	G.SMITH	SCALE: 1/2	UNITS: IN
DATE:	11-July-03	DO NOT SCALE DRAWING	
MATERIAL NO.	N/A	CHECKED BY:	
MAT'L DESCRIPTION	N/A		

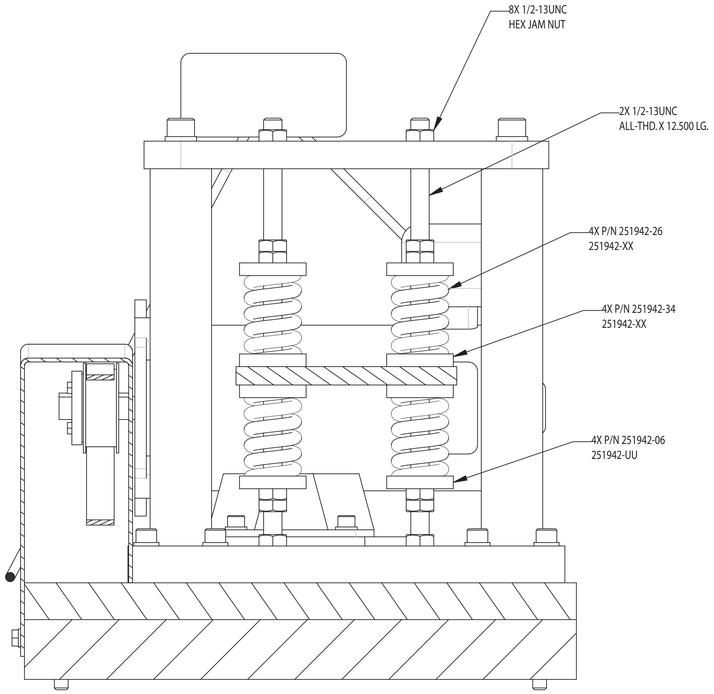
TITLE: VIBRATION TEST STAND PER SAE J577 (MORE ASSEMBLY)

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

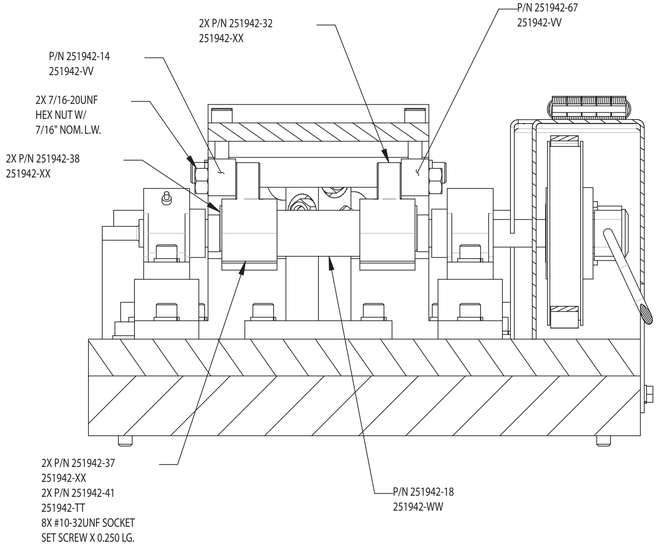
SIZE	PART/DWG NO.	REV.	SHT #
D	251942-01	F	3 of 4

SYSTEM/REV. Pro/E 2001 | 3D DATA: YES

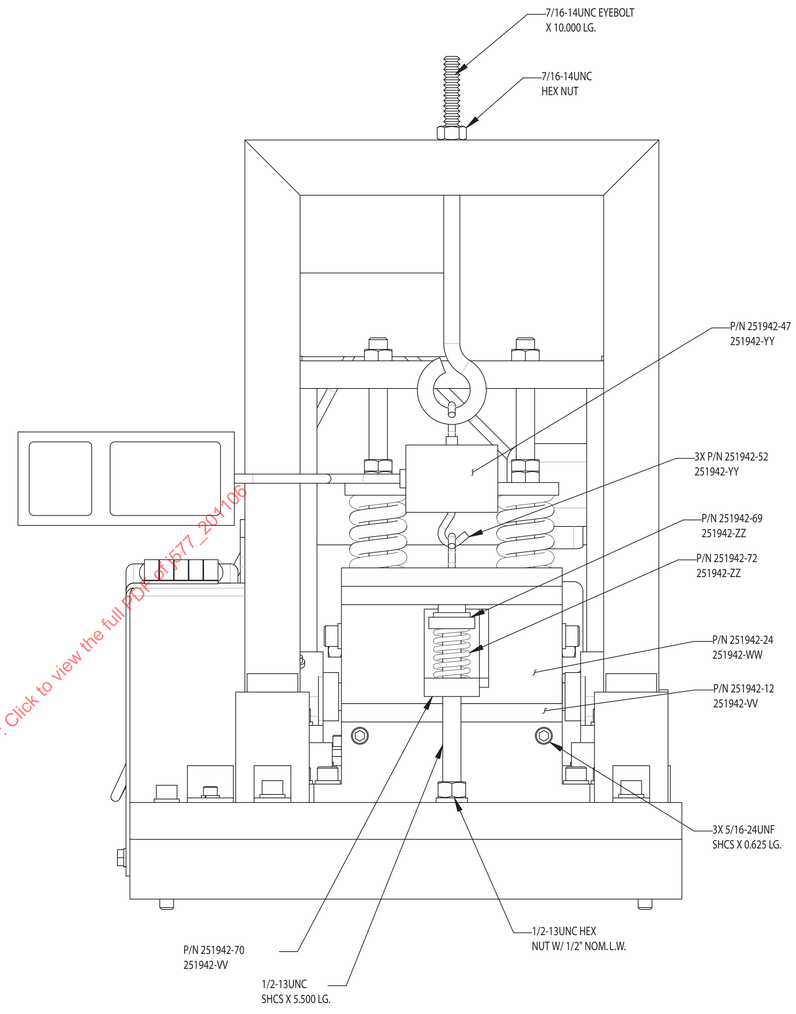
FIGURE 16—VIBRATION MACHINE WITH CALIBRATION FRAME



SECTION A-A



SECTION B-B



NOTE: (UNLESS OTHERWISE SPECIFIED)
1) SEE 251942-01 SHT.1 FOR BILL OF MATERIALS
2) SEE 251942-01 SHT.2 FOR ASSEMBLY
3) SEE 251942-01 SHT.3 FOR MORE ASSEMBLY
4) SEE 251942-01 SHT.4 FOR SECTIONS & FRONT VIEW
5) SEE 251942-TT FOR P/N 251942-41 (CAM DETAIL)
6) SEE 251942-UU FOR WELDMENTS & SUB-ASSEMBLY'S
7) SEE 251942-VV FOR WELDMENTS, SUB-ASSEMBLY'S, & PARTS
8) SEE 251942-WW FOR PARTS
9) SEE 251942-XX FOR PARTS
10) SEE 251942-YY FOR PARTS
11) SEE 251942-ZZ FOR PARTS

REV	DESCRIPTION	ENG APP'L	ECN/ECO NO AND DATE
B GDS	REDRAWN & UPDATED ON PRO/E		251942 07/10/03
C GDS	P/N 251942-18 - 58/62Rc STL. WAS 62/94Rc STL.		251942 11/14/03
D CDB	P/N 251942-37 - 0.250 x 0.360 WAS 0.190 x 0.380		251942 12/11/03
E CDB	SEE SHEET 1		251943 12/22/03
F GDS	SEE SHEET 1		251942 05/27/04

GCC
DENOTES GROTE CONTROL CHARACTERISTIC

THIRD ANGLE PROJECTION

DR. BY:	G.SMITH	SCALE: 0.500	UNITS: IN
DATE:	11-July-03	DO NOT SCALE DRAWING	
MATERIAL NO.		CHECKED BY:	
MATL DESCRIPTION			

TITLE: VIBRATION TEST STAND PER SAE J577 (SECTIONS & FRONT VIEW)

GROTE INDUSTRIES, LLC.
MADISON, INDIANA U.S.A.

SIZE	PART/DWG NO.	REV.	SHT #
D	251942-01	F	4 of 4

SYSTEM/REV. Pro/E 2001
3D DATA: YES

FIGURE 17—VIBRATION MACHINE CROSS SECTIONS