Laboratorio de Resistencia de Materiales

Laboratorios y Talleres de Mecánica.
Universidad Distrital Sede Tecnologica.

MANUAL

PENDULO DE IMPACTO

Marca SATEC

Modelo SI-1A

5A-10700

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SI-Series Impact Testing Machine

User's Guide

SI-Series Manual ©December 1997

SATEC Systems, Inc.

CONGRATULATIONS

Welcome to the SATEC family of materials testing.

SATEC designs, manufactures, and delivers high-quality materials testing hardware and software equipment for a variety of industrial, commercial, and institutional customers. Tracing its roots to the century-old Baldwin line of universal testers, SATEC focuses on responding to its customers through its international force of highly trained sales, service, and technical personnel.

Our current line of machines and accessories range from simple, manually-controlled units, to fully-automated, computer-controlled systems, complete with the latest innovations. When your testing needs require unique systems, we integrate special designs into our standard product schedule. We also carry an extensive line of grips and fixtures to meet a wide variety of testing needs. Call for our catalog.

Whatever your testing needs, SATEC delivers.

SATEC Systems, Inc.

National Headquarters in Grove City, Pennsylvania, USA

PLEASE READ THIS INSTRUCTION MANUAL IN ITS ENTIRETY BEFORE OPERATING YOUR MACHINE.

Keep all body parts clear of the testing space while the machine is in use. Make certain the machine has completed cycling, before inserting or removing a specimen. Turn all power off before attempting to disassemble, inspect, or clean the system.

Eye protection should be worn when operating this machine.

About Your Documentation

This manual describes the construction and operation of the SATEC SI-Series Impact Testing Machine.

Please read the instruction manual carefully and study the illustrations and drawings that are provided in the reference drawing section.

A thorough understanding of the machine and close attention to maintenance will pay big dividends in trouble-free operation.

Throughout your documentation are NOTE and CAUTION flags which alert your attention to important information.

NOTE:
Notes provide further clarification on particular issues.

CAUTION!
Cautions provide warnings for situations that could cause personal injury or damage to the machine frame.

Support Services

For information about other products, options, retrofits, or replacement parts, contact your SATEC Sales Engineer or the SATEC Sales Headquarters at (412) 458-9610.

For information about service or calibration contact the SATEC Service Department at 1-800-726-TEST.

For information about software support contact the SATEC Software Hotline at 1-800-245-8117.

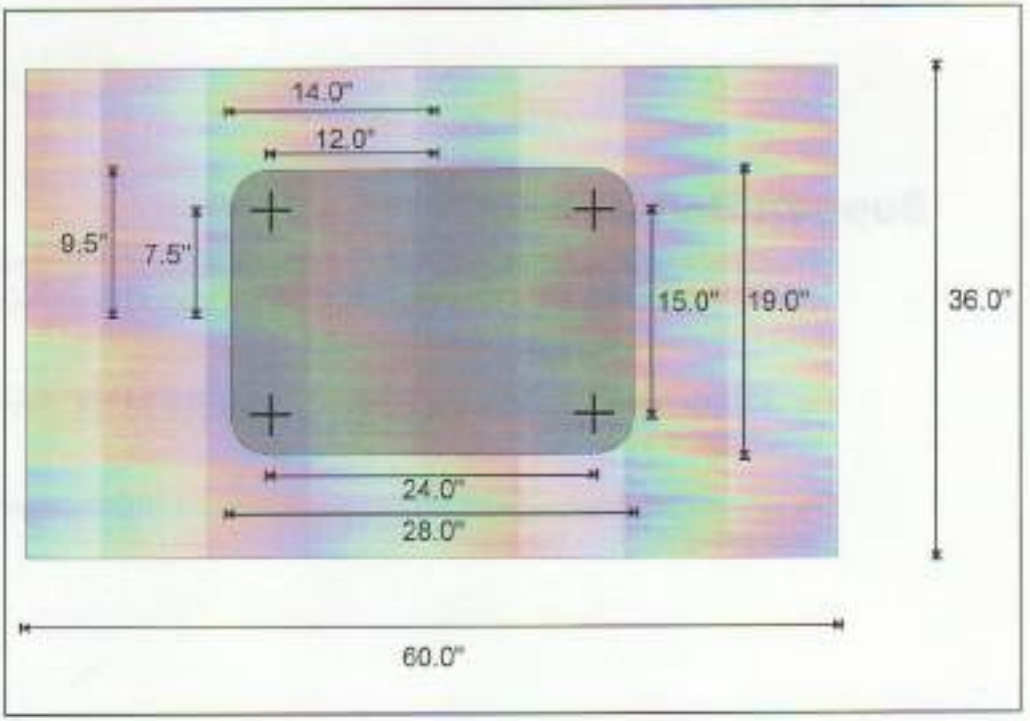
INSTALLATION

Uncrating

- Visually check for damage to machine that may have occurred during shipment. If you find damage, describe it on the bill of lading and make a claim on the carrier at once. Photos of damaged boxes and equipment are always helpful in substantiating claims.
- Remove the crating and packing material from the machine and its components.
- Verify that all items have been received.

Foundation

The foundation for an impact machine is of critical importance for accurate test results. Energy loss through absorption by the foundation must be kept to a minimum. Our recommendation is a pad of a minimum 22 cubic feet of concrete with dimensions of 36 inches wide by 60 inches long and 18 inches thick.



Foundation diagram above shows the dimensions for the recommended foundation and locations for the hold down bolts.

Tie down bolts must be securely embedded in the concrete and protrude above the surface of the foundation 6 inches. These bolts are not provided. Use four 5/8 inch diameter J-bolts at least 15 inches long for the hold down bolts.

Leveling the machine requires three 1/4 inch thick steel plates, for placement under the leveling screws in the machine base during installation.

Where our recommended foundation is not possible, bolt the machine to a foundation with a mass not less than 40 times the mass of the pendulum which is approximately 68 pounds.

Positioning

- Place a sling or chain through the eyebolt on top of the machine frame for positioning.

CAUTION!
Never lift the machine using the pendulum.

- Arrange the three 1/4 inch plates on the foundation so that the three leveling screws will rest on the plates.
- Place the machine on the foundation.

Leveling

1. The accuracy of the machine also depends upon the precision of the leveling.

   Level it to within 0.003 inch/foot in both directions.

   - Use the base for the line parallel to the plane of the pendulum swing.
   - Use the Charpy Specimen Supports for the line perpendicular to the plane of the swing.

2. After the leveling screws are adjusted, snug the foundation bolts, but do not tighten them completely.
3. Fill the space between the bottom of the base of the impact machine and the top of the concrete pad with a non-shrinking grout. Make sure that the grout flows under the machine to hold the bearing plates in place under the leveling screws. The grout should completely seal around the crevice between machine base and pad. The following brands or their equivalents may be used:

Company	Brand
A.C. Horn Company	Horn Non-Corrosive Grout
Anti Hydro Company	Axpandcrete R.M.
Master Builders	Embeco 636 or Master Flow 713
L & M Construction Chemicals	Crystex Grout
Sonneborn Building Products	Sonogrout

4. When the grout has set, loosen the leveling screws, then tighten the foundation bolts so that the machine is held rigidly in place.
5. Check the level after the bolts are tightened to make sure that it falls within the 0.003 inch/foot tolerance.

Low Latch Stop Plug

When using the machine in the high latch position, the low latch stop plug prevents the pendulum front catching in the low latch position.

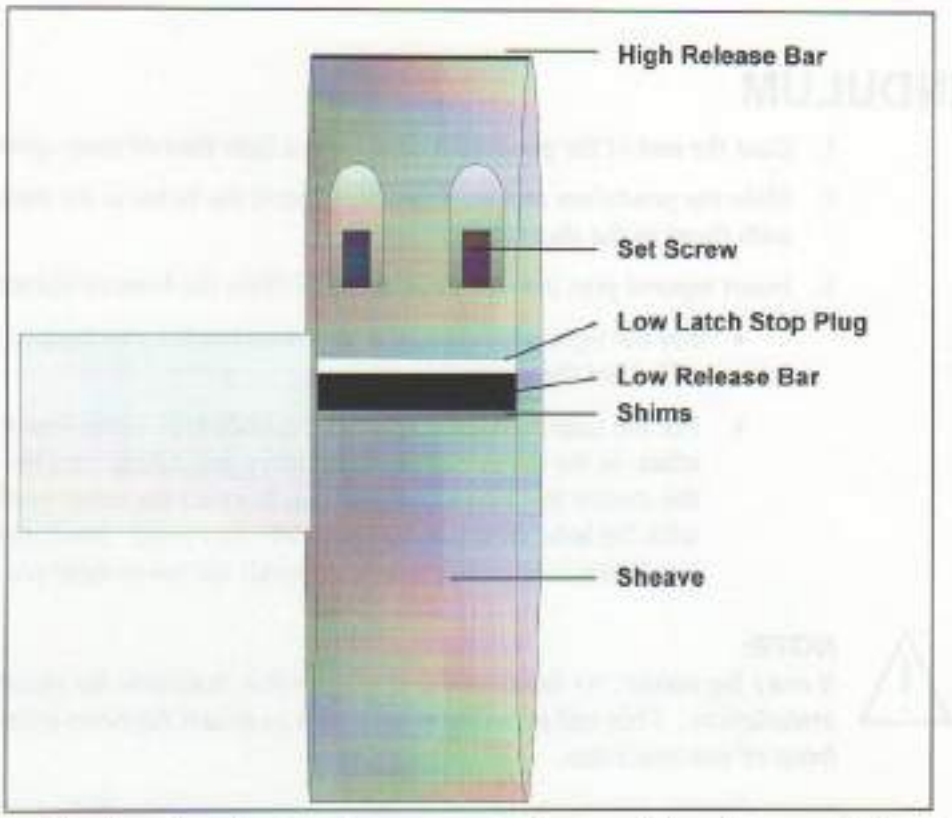
CAUTION!
An aluminum stop plug installs against the low-latch release bar to eliminate the possibility of accidentally stopping the hammer and bending the shaft during its fall from the high-latch position.

1. Slide the sheave so that the notch is horizontal.
2. Loosen the set screws above the notch.
3. Insert the aluminum plug, being careful not to disturb the release bar or remove the shims.

CAUTION!
If the shims fall out, replace them in their original positions. The shims establish the correct height for the hammer's arc. Be sure the release bar and shims are blended smoothly with the edge of the drum.

4. Tighten the set screws, and be sure the release bar and shims are blended smoothly with the edge of the drum.

See the drawing on the next page.

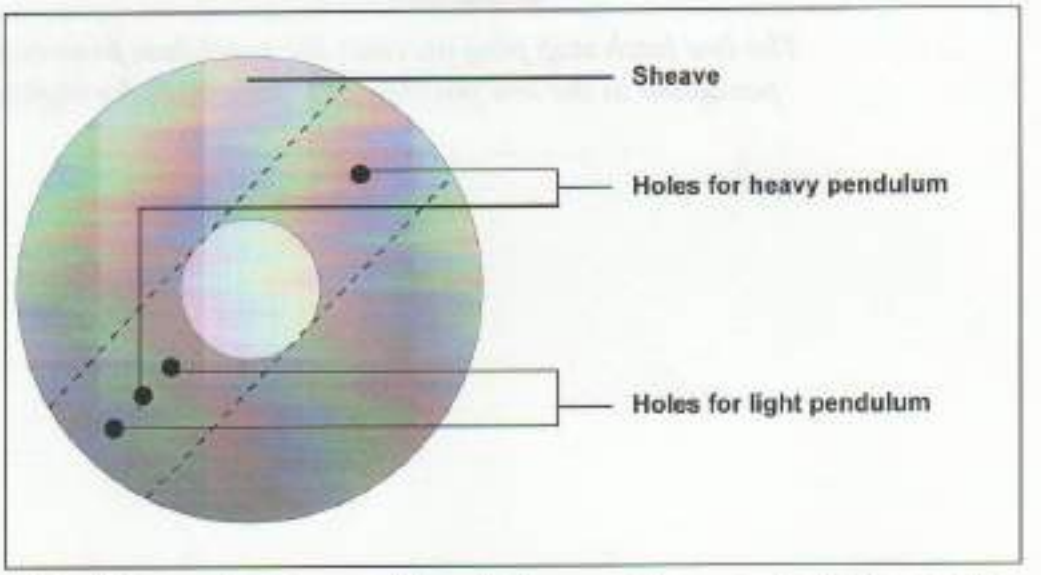


The low latch stop plug prevents the pendulum from catching the pendulum in the low position as it falls from the high position.

PENDULUM

1. Coat the end of the pendulum shaft with a light film of moly-grease.
2. Slide the pendulum arm into the sheave until the holes in the tube are lined up with those in the sheave.
3. Insert tapered pins into the lined up holes from the front of the machine.
    - For the light pendulum, use the two outside holes located in the bottom of half of the sheave.
    - For the heavy pendulum, use the middle hole in the lower half, and the other, in the upper half. For the heavy pendulum, turn the opening in the sheave to a horizontal position to insert the lower pin lining it up with the hole, then tap the pin firmly into place. Next, raise the pendulum to shoulder height to install the lower taper pin.

NOTE:
It may be easier, to remove the dial from the machine for pendulum installation. This will provide more room to insert tapered pins from the front of the machine.



The holes on the sheave will only line up with one set of holes on the pendulum.

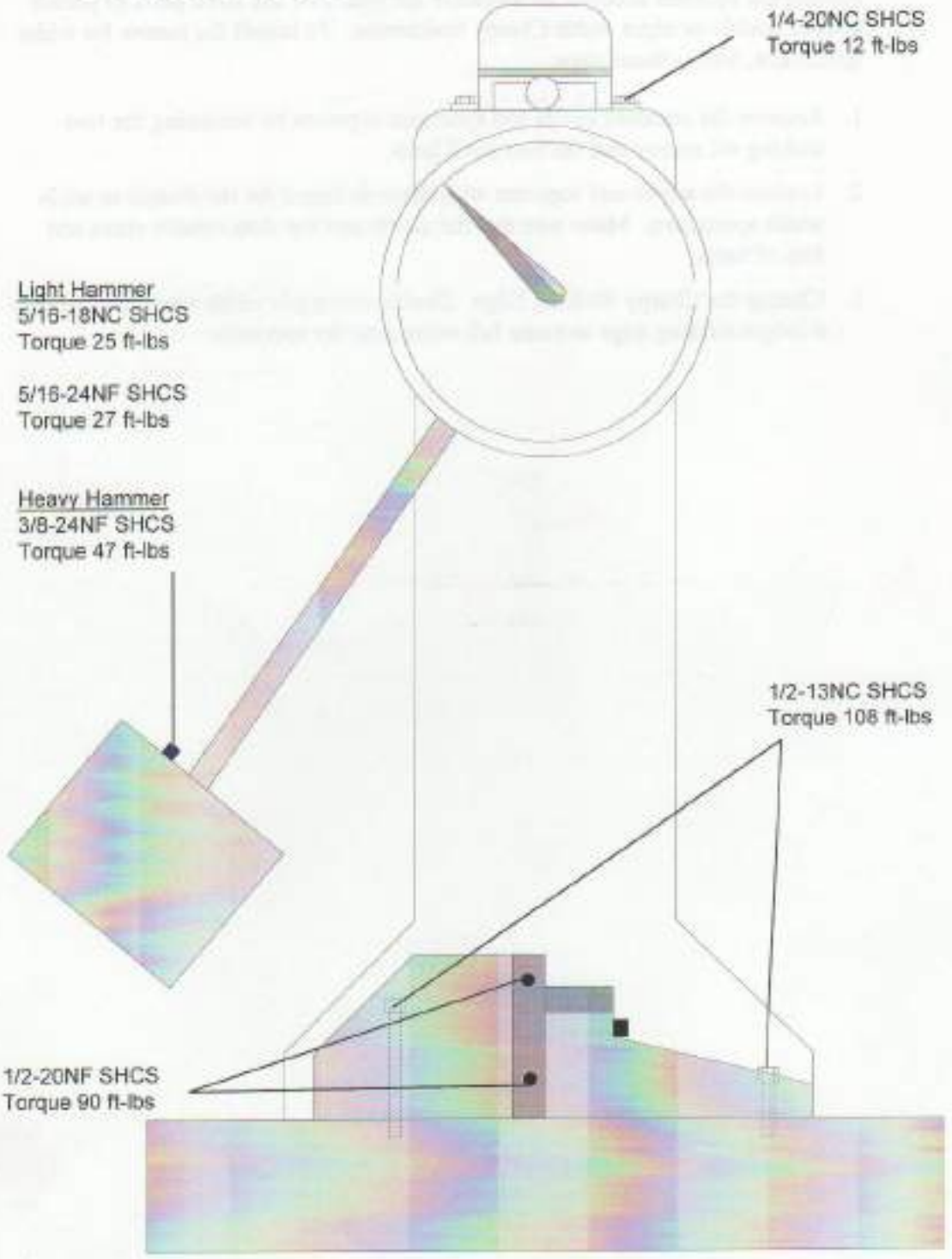
After you install the pendulum, place a standard Charpy specimen on the specimen supports and make sure that the striking edge hangs within 0.100-inch of the specimen. This gives you a double check on the level of the machine.

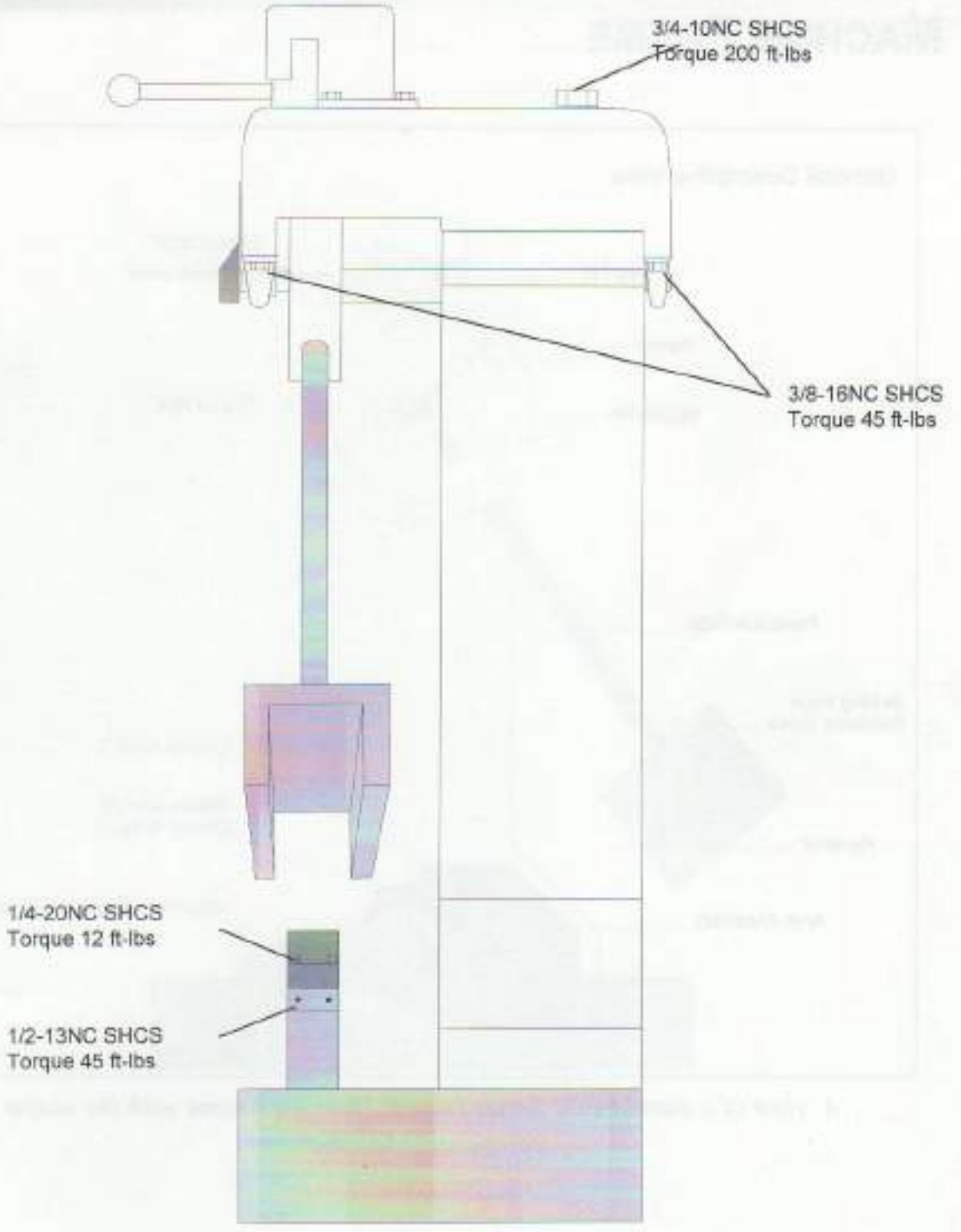
Optional Inserts For Wide Specimens

Among the optional accessories available for your SI-1 are anvil parts to permit tests of double or triple width Charpy Specimens. To install the inserts for wider specimens, follow these steps:

1. Remove the standard anvils and specimen supports by loosening the two locking set screws and the two anvil bolts.
2. Replace the anvils and supports with those designed for the double or triple width specimens. Make sure that the anvils and the slots remain clean and free of burrs.
3. Change the Charpy Striking Edge. Double and triple width specimens require a longer striking edge to make full contact on the specimen.

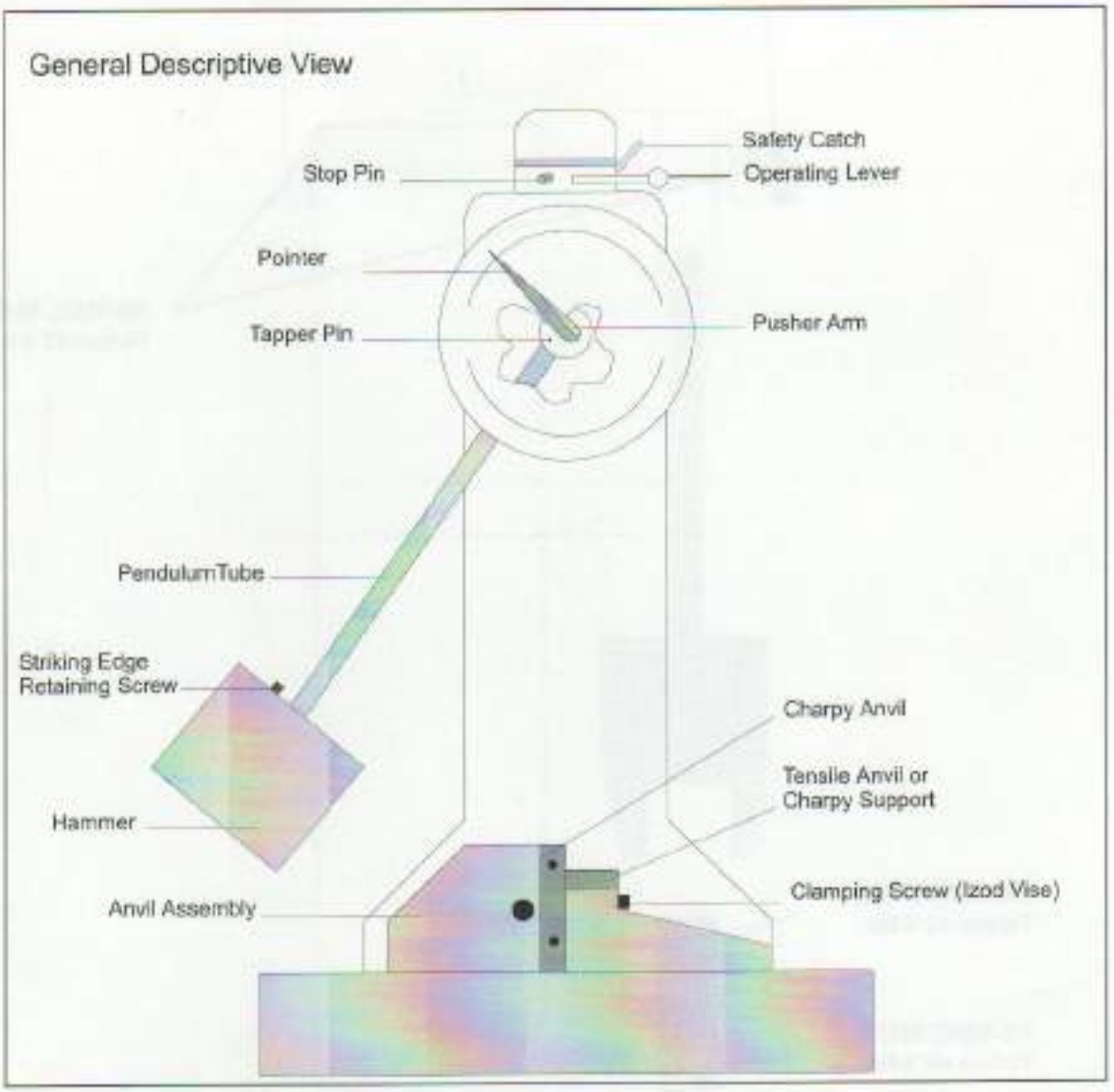
Torque Values





NOTE:
All torque values are based on the use of a slight amount of Molykote under the head of the bolt.

MACHINE FRAME



A view of a standard SI Series Impact Machine Frame with the major components labeled.

Models

Designed to conform to the requirements of ASTM E-23 and capable of performing Watertown Arsenal specifications (A.M.M.R.C.), the SI series performs notched bar impact tests and may be equipped with options for tension impact testing.

The basic machine has five models and six operating capacities.

SI-1A	
	Both Charpy and Izod
	Light Hammer, *Low* 25 ft-lbs or *High* 60 ft-lbs
	Dial in 0.25 ft-lbs Increments
SI-1B	
	Both Charpy and Izod
	Light Hammer, *Low* 25 ft-lbs or *High* 60 ft-lbs
	Bolt-on Weights for Hammer, *Low* 50 ft-lbs or *High* 120 lbs
SI-1C3	
	Both Charpy and Izod
	Heavy Hammer, *Low* 125 ft-lbs or *High* 300 ft-lbs
SI-1D3	
	Both Charpy and Izod
	Light Hammer, *Low* 25 ft-lbs or *High* 60 ft-lbs
	Bolt-on Weights for Hammer, *Low* 50 ft-lbs or *High* 120 lbs
	Heavy Hammer, *Low* 125 ft-lbs or *High* 300 ft-lbs
SI-1K3	
	Charpy Only
	Heavy Hammer, *Low* 125 ft-lbs or *High* 300 ft-lbs

Frame Description

The SI-Series is a pendulum-type impact testing machine capable of performing

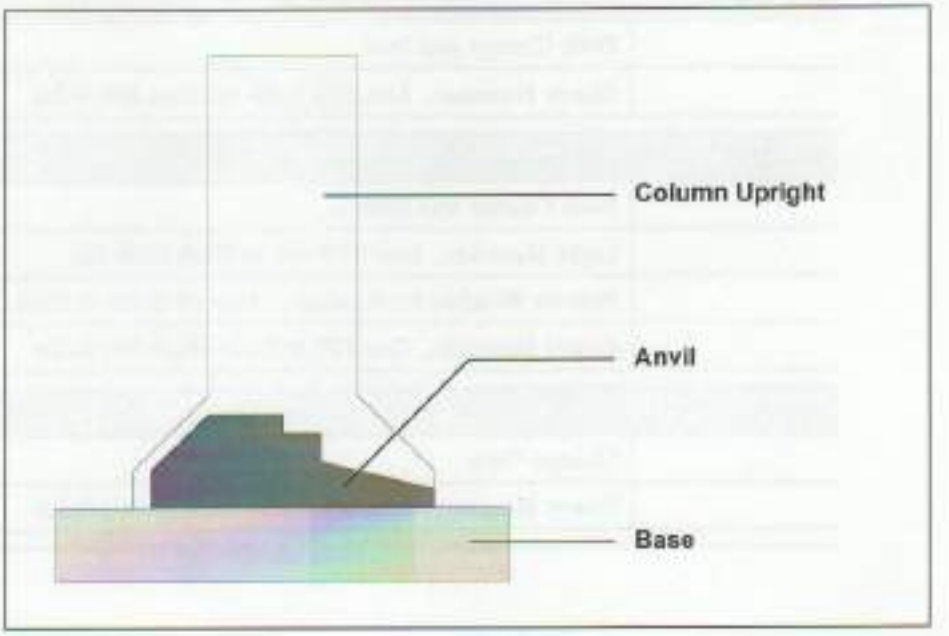
- Charpy,
- Izod,
- and Tension Impact Testing.

The SI-Series calculates the energy required to break a specimen by measuring the difference between the angle of rise when the pendulum swings freely and the angle of rise after it breaks a specimen.

The SI-Series is a simple machine composed of four major components which are:

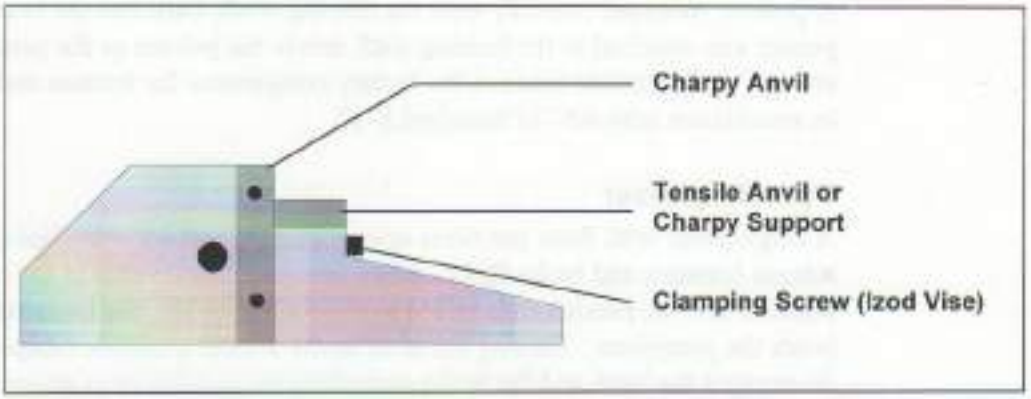
- the Base,
- the Anvil,
- the Head Assembly,
- and the Pendulum.

Base



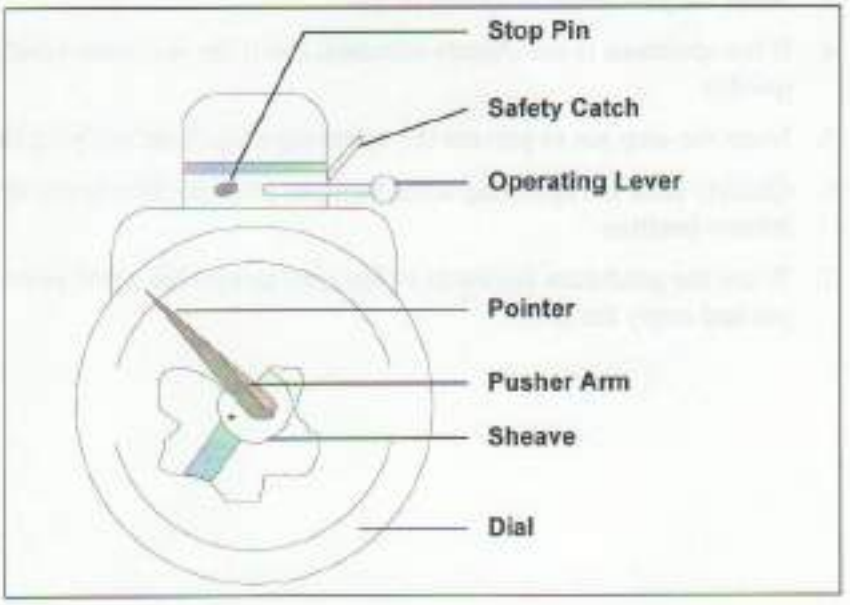
The base provides a firm anchor for the machine. Constructed from solid steel the base provides four holes for hold-down bolts and has three leveling screws to ensure accuracy and stability.

Anvil



The anvil provides the machine with a testing area. Specimen supports or a clamping vise hold the specimen either Charpy or Izod positions. Shrouds which fasten to the Charpy Specimen Supports prevent fractured specimens from jamming the pendulum in a Charpy Test. For tension impact tests, an adapter attaches to accommodate the ASTM Standard Type V Specimen along with an alternate set of anvils to replace the Charpy Specimen Supports.

Head Assembly



Shaft & Sheave

Machined from one piece of metal, the shaft and sheave rotate on precision ball bearing to impart a perfect glide path for the pendulum.

Dial

Energy values display on a large circular scale, color-coded for different ranges. A pointer, mounted coaxialy with the bearing shaft, indicates the energy value. A pusher arm attached to the bearing shaft drives the pointer as the pendulum swings. Adjustments made at the factory compensate for friction and wind losses, in accordance with ASTM Standard E-23.

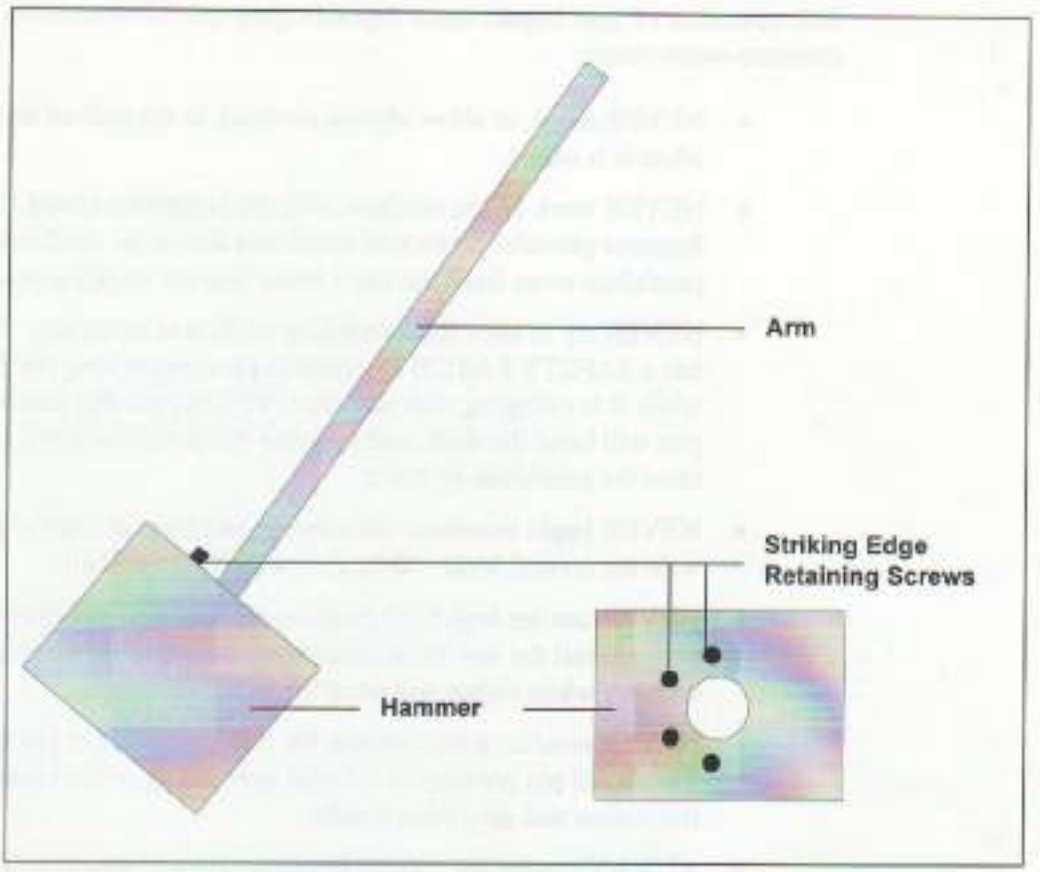
Operating Lever

A single lever with three positions operates the pendulum -- latched (right), release (center), and brake (left). When the operating lever is in the latched position and the pendulum is raised to the correct height, the latch automatically holds the pendulum. Turning the lever to the release position, completely disengages the latch and the brake permitting the pendulum to swing through its test arc. In the brake position, the latch remains disengaged while the brake is applied. A safety catch prevents accidental latching of the pendulum in the low latch position while it is swinging, and a removable stop pin prevents accidental application of the brake after the pendulum is released.

Using the Operating Lever

1. Place the safety catch in the up position.
2. Place the lever in the latch position.
3. Raise the pendulum to testing height.
4. If the specimen is not already installed, insert the specimen carefully and quickly.
5. Insert the stop pin to prevent the operating lever from applying the break.
6. Quickly slide the operating lever from the latch position to the stop pin in the release position.
7. When the pendulum begins to swing back toward the anvil, remove the stop pin and apply the break.

Pendulum



All SI-Series machines except for the SI-1K3 arrive with interchangeable striking edges for Izod and Charpy testing. Four retaining screws visible from the top of the hammer fasten the striking edge to the pendulum assembly.

Precautions

Safe operation of your impact tester depends upon careful observation of a few common-sense rules:

- NEVER stand, or allow anyone to stand, in the path of the pendulum when it is raised.
- NEVER work on the machine with the pendulum raised. SATEC Systems provides a block of wood that should be used to hold the pendulum away from the anvil while you are working on the vice.
- NEVER try to latch the pendulum while it is swinging. The machine has a SAFETY LATCH designed to prevent latching the pendulum while it is swinging, and you must NOT bypass this device. If you do, you will bend the shaft, and you may break the latch pin. ALWAYS raise the pendulum by hand.
- NEVER begin to release the hammer and then attempt to push it back with the control lever. This, also, will bend the shaft.
- NEVER use the high latch position without first installing the stop plug against the low latch release bar. Accidently catching the hammer while swing will bend the shaft and sheave.
- NEVER conduct a test without the brake stop dowel pin in position. The dowel pin prevents accidental application of the brake which raise test values and give false results.
- ALWAYS move the control lever quickly and crisply to the RELEASE position. Dragging the control lever will add friction to your test and give inaccurate test results.

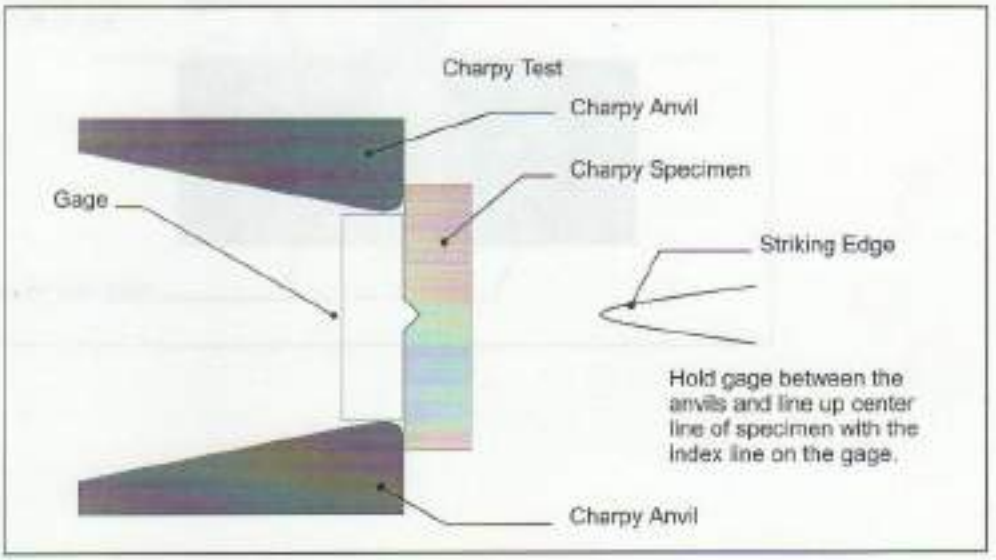
TESTING

Preparations For A Test

Test Specimens

Charpy Test

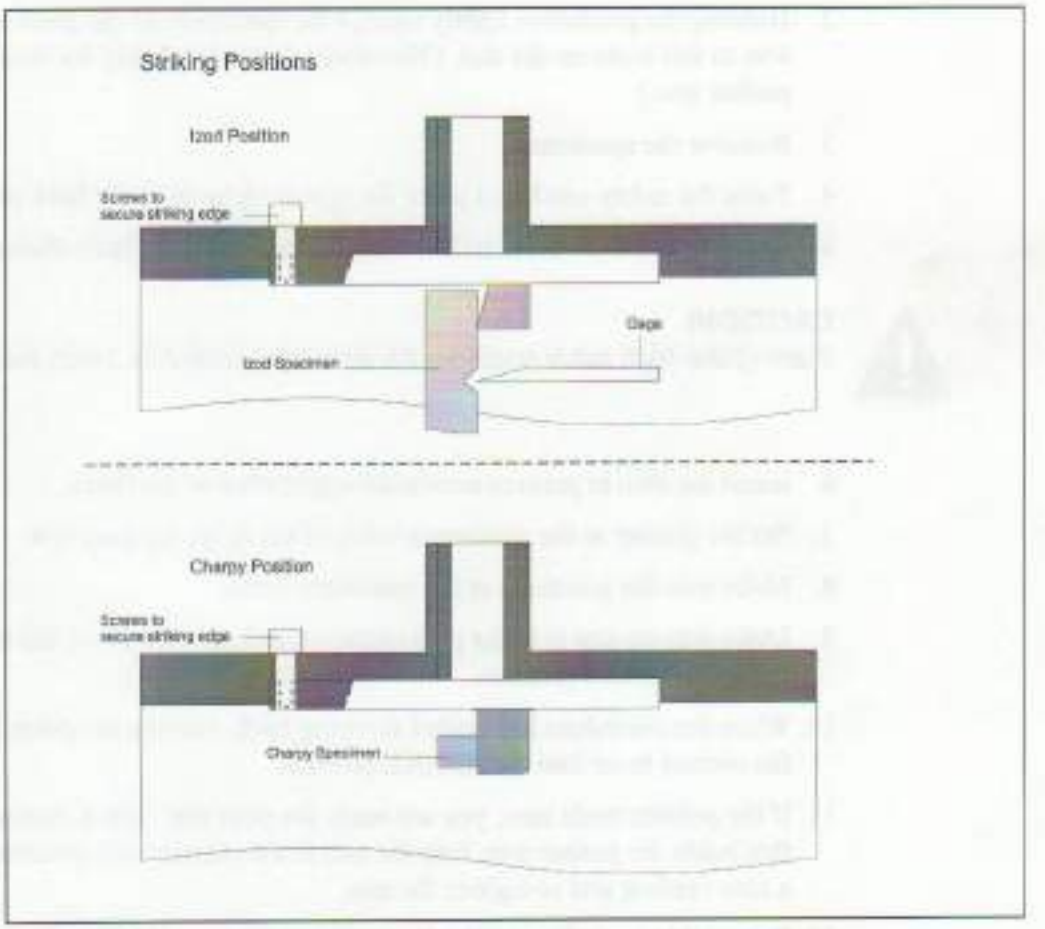
You must place the Charpy specimen, described in ASTM E23, across the anvils with the notch away from the striking edge. The centerline of the notch must coincide with the centerline of the anvils. SATEC Systems offers a gauge to help you line up the specimen. We also sell an optional pair of handling tongs that automatically line up Charpy specimens when you place them in the anvils, and simplify handling low temperature specimens.



Striking Edges

ASTM E23 requires that the axis of the Charpy striking edge be perpendicular to the specimen, and that the Izod striking edge be parallel to the face of the specimen. You can verify the position of your striking edges by coating a standard specimen with Prussian Blue, moving the pendulum by hand so that the striking edge contacts the specimen, and checking the marks on the specimen and the striking edge.

After you have aligned the proper striking edge for your test, bolt it rigidly in place with the four Allen screws provided for the purpose.



Shrouds

A set of shrouds, which prevent the fractured sample from inhibiting the swing of the pendulum, should be fastened to the Charpy specimen supports before you use your SI-1 for a Charpy test. These shrouds must be removed to conduct other impact tests.

The shrouds should be positioned to give maximum clearance around the specimen and to give no more than 0.0625-inch clearance inside the U-shaped

hammer. After you establish the proper clearance, make sure the shrouds are tightly fastened in place.

Setting the Pointer

Before you start a test, and after you change pendulums, you should check the zero of the pointer. Factory verification adjusts the machine for friction and wind loss, so the pointer should read zero foot-pounds after a free swing; that is, a swing without a specimen in place. To check the zero, proceed as follows:

Checking the Zero

1. Bring pendulum against a standard specimen.
2. Holding the pendulum tightly against the specimen set the pointer and pusher arm to full scale on the dial. (This may require loosening the screw on the pusher arm.)
3. Remove the specimen.
4. Raise the safety catch and place the operating lever in the latch position.
5. Lift the pendulum counterclockwise by hand until the latch clicks.

CAUTION!
If using the high latch position, be sure stop plug has been installed.

6. Insert the stop to prevent accidental application of the brake..
7. Set the pointer at the maximum value of the range for your test.
8. Make sure the pointer is at the maximum value.
9. Make sure no one is in the path of the pendulum, then move the control lever to the RELEASE position.
10. When the pendulum has started to swing back, remove the dowel pin and push the control lever into the BRAKE position.
11. If the pointer reads zero, you are ready for your test. If not, loosen the screw that holds the pusher arm, turn the arm in the amount and direction to produce a zero reading and re-tighten the arm.
12. Repeat this procedure until a free swing reads zero. (Allowable tolerance is 0.75 of one percent of the energy range.)

Conducting A Test

1. Block the pendulum away from the anvil and position your specimen as described above.

CAUTION!
If a temperature test requires you to raise the pendulum before you place the specimen, be extremely careful when you place the specimen.

2. Raise the safety catch and place the operating lever in the latch position.
3. Lift the pendulum counterclockwise by hand until the latch clicks.

CAUTION!
If using the high latch position, be sure stop plug has been installed.

4. Insert the stop to prevent accidental application of the brake..
5. Set the pointer at the maximum value of the range for your test.
6. Make sure the pointer is at the maximum value.
7. Make sure no one is in the path of the pendulum, then move the control lever to the RELEASE position.
8. When the pendulum has started to swing back, remove the dowel pin and push the control lever into the BRAKE position.
9. Read the pointer indication for the amount of energy used to break the sample.

CALIBRATION AND VERIFICATION

Properly handled and with no more than normal maintenance, your SI-1 Digital Impact Systems will give years of trouble-free service.

SATEC Systems maintains a staff of field service engineers to provide field verifications. Each person carries force measuring devices with accuracy traceable to the National Institute for Standards Technology (NIST).

NOTE:
Service of your SATEC machine should be performed by a qualified service engineer only.

For repair, calibration or verification service, call your SATEC Systems sales representative or contact the Service Manager at SATEC Systems, Inc.

SATEC Systems, Inc.
900 Liberty Street
Grove City, PA 16127
(412) 458-9610
FAX: (412) 458-9614

DI-300
Digital Impact Display

User's Guide

Optional DI-300 for SI machines Manual © Rev. December 1996

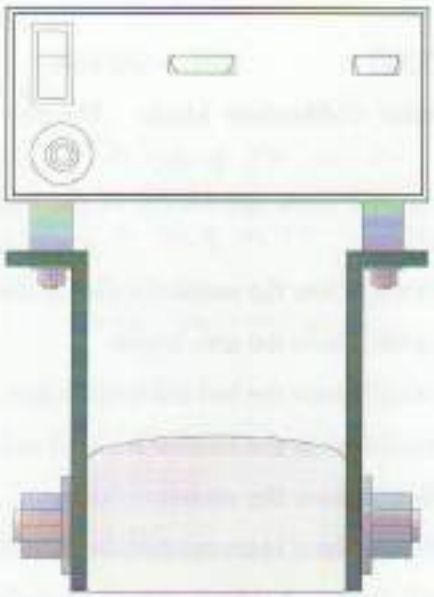
SATEC Systems, Inc.

INTRODUCTION

The Model DI-300 system provides a readout of the energy expelled during an impact test. The system is trilingual and can display results in English (ft-lbs), Metric (m-kg), or SI (Joules) units. The DI-300 is battery backed to ensure that information in memory is not lost when the system power is OFF. The life of the battery is approximately 4 years and at that time will require replacement. When the battery is replaced it will be necessary for all information to be reentered into the DI-300. It provides capabilities of compensation for such factors as wind and friction resistance to the pendulum, ultimately resulting in precise and accurate test data. The digital display provides a resolution of .1 foot-pound (.1 Joule, and .01 m-kg). Accuracy of the system is +/-.1 foot-pound. The DI-300 Digital Impact Readout System has been designed to meet or exceed accuracy and test methods as required by ASTM E-23.

Installing DI-300

Prior to installation of the Digital Readout System, the striker must be centered on the anvil of the machine.



1. First, bolt the mounting bracket onto the machine's head with studs, washers and nuts.
2. Now attach the digital display unit to the mounting brackets by matching up the threaded bolts extending from the systems underside with the holes in the brackets.
3. Secure the display unit by inserting washers and nuts onto each of the bolts.
4. Connect the cable extending from the encoder to the 9-pin connector on the rear panel of the DI-300 labeled 'POSITION'.
5. If you are adding a PC or Printer to the DI-300, connect it to the 24-pin connector, also on the rear panel, labeled 'REMOTE'.
6. The power cord from the rear panel of the DI-300 is to be plugged into a 120 volt, 1 phase, 60 cycle power supply.
7. Now turn the system ON using the two-position ON/OFF toggle switch on the rear panel of the DI-300.

Marker Pulse Adjustment

1. Turn on power.
2. Wait for indicator to boot up.
3. Press the MODE button. Hammer Weight should be displayed.
4. Press the COMPENSATE & TEST buttons simultaneously. The display should now read:

   MODE = EXIT SEL = GO ON

5. Press SELECT button to enter Calibration Mode. Display should show Hammer Weight again.
6. Press SELECT, the display should show the Model of the machine. If not, return to step 3.
7. Press SELECT, the display should show the serial number of the machine.
8. Press SELECT, the display should show the arm length.
9. Press SELECT, the display should show the last calibration date.
10. Press SELECT, the display should show the 100 Swing Test value.
11. Press SELECT, the display should show the encoder counts.
12. Press SELECT, the display should show Hammer Height & MARKER Pulse.
13. Swing the hammer back and forth. A block should illuminate when the hammer passes through the marker pulse.
14. If the block does not illuminate, the encoder shaft must be adjusted.
15. Wait until the hammer stops and go to the back of the machine
16. Turn the shaft 90°.
17. Keep the shaft turning until the block illuminates when the hammer swings back and forth.
18. When the encoder passes the pulse it will show a number on the display. This reading is in feet.
19. Install a specimen into the machine.
20. Put the striker against the specimen.
21. Turn the fine adjustment screw until the block illuminates on the display.
22. With the striker against the specimen and the block illuminated, tighten the set screw on the zero adjust coupling. The indicator light must remain on during this procedure.
23. Remove the specimen.

24. Press the SELECT, the display should read the Hammer Weight.
25. Press the MODE button to Exit the Calibration Mode. The Hammer Weight should again be on the display.

Front Panel

The DI-300 Digital Impact Readout System is equipped with four pushbuttons through which you can enter data, scroll through displays, and enable/disable operating features.

Any time that the digital readout system does not respond to the action button you have pushed, the hammer is in most cases resting on the marker pulse and is locking the display. Therefore, swing the hammer slightly and press the action button again to see if the display acknowledges.

MODE Button

- Sets the display to one of the four possible modes.
- Press this button to scroll through the modes.

SELECT Button

- In modes 1-3 press this button to accept the entry shown on the display and scroll down to the next line.
- In modes 1-3, press the SELECT button simultaneously with the UP/COMPENSATE button to move the cursor to the right.
- In modes 1-3, press the SELECT button simultaneously with the DOWN/TEST button to move the cursor to the left.
- In mode 4, press the SELECT button to print a report of your test results.

UP/COMPENSATE Button

- In mode 1, pressing this button scrolls forward through the available characters for the space where the cursor is located: A-Z, a-z, 0-9, decimal point (.), blank space.
- In modes 2-3, pressing this button scroll forward through the possible entries.
- In mode 4, pressing this button clears the energy display, and enters a resistance compensation swing mode where the light in the upper right most character of the display with a solid flashing block. Pressing this button a second time will disarm the compensation swing.

DOWN/TEST Button

- In mode 1, pressing this button scrolls backward through the available characters for the space where the cursor is located: A-Z, a-z, 0-9, decimal point (.), blank space.
- In modes 2-3, pressing this button scroll backward through the possible entries.
- In mode 4, pressing this button will clear the energy display, and enter a test specimen swing where the light in the lower right most character of the display with a solid flashing block. Pressing this button a second time will disarm the test swing.
- In mode 5, press this button by itself to change the date the system was last calibrated to the current date.

Rear Panel

The following list provides a brief description of the function of the 4 components located on the rear panel of the DI-300.

ON/OFF POWER
Turns indicator ON or OFF.

REMOTE Connector
This 25-Pin connector allows for any IBM or compatible PC, or serial interface commercial printer to be connected to the DI-300.

POSITION Connector
This 9-Pin connector is where you must plug in the cable which extends from the position encoder. The cable ALWAYS needs to be connected when you wish to use the DI-300 System.

Modes

The DI-300 provides 5 different display modes. Four of the display modes can be scrolled through by pressing the MODE pushbutton to change to the next display. The fifth display is referred to as SPECIAL CALIBRATION mode and requires a combination of pushbuttons to be pressed in order to access. The only necessary time for to enter the SPECIAL CALIBRATION mode is when the battery is replaced and the setup information contained in that mode must be reentered. All modes consist of a defined number of line items. The following pages will outline each mode and its corresponding line items.

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbuttons for each of the DI-300 modes.*

MODE #1: Customer Information

Mode #1 contains 5 line items. These items are entered into the DI-300 before shipment of the Impact from SATEC's plant. Therefore, you should not have to enter this information until you are required to replace the battery. If you print a hardcopy report of the test results this information will appear as a header on the top of the form.

LINE 1 - Name
Your company name appears here (long names may require an abbreviation).

LINE 2 - Address
Your company address, usually street address, appears here.

LINE 3 - State, Zip
State and Zip code for your company appears here.

LINE 4 - Time
The current time appears here in military format (HH:MM:SS). This will automatically update unless the battery requires replacement.

LINE 5 - Date mm/dd/yy
The current date appears here in the format MM/DD/YY.

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbutons for each of the DI-300 modes.*

MODE #2: Calibration

Mode #2 contains two line items.

LINE 1 - Hammer ##
Each hammer is listed with its number and accompanying weight. The weights cannot be changed.

LINE 2 - Calibrated
Shows the date the hammer was last calibrated and a value derived from the Eleven Swings Windage Test for Friction. To determine if the calibration of windage friction complies, take the value displayed and enter it into the equation from ASTM E23.:

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbuttons for each of the DI-300 modes.*

Eleven Swings Windage & Friction Test

1. Enter Mode 2.
2. Press SELECT button to begin Eleven Swings Windage & Friction Test.
3. Latch hammer in position.
4. Press compensation button.
5. Release hammer.
6. After eleven swings the display will show the reading for the test in ft/lbs. This reading divided by eleven should less than 0.4% of the capacity checked.

MODE #3: Setup

Mode #3 contains six line items.

LINE 1 - Language
There are three possible languages for values to be displayed in: ft-lbs, joules, or m-kg. You MUST operate the test in the units you wish. You cannot switch languages after the test in completed.

LINE 2 - Auto Report
Can be either Enabled or Disabled. If Enabled, a report will be given for every energy calculation. When used in conjunction with 'Series of Tests' a report will output after X number of tests have been completed.

LINE 3 - Auto Inc Test #
Determines the starting number the test number will increment from and will record up to 9999, if not reset. Therefore, if you wish to count the number of tests you perform in one day, you will want to reset this number to 0001 before beginning the first test of each day.

LINE 4 - Auto Inc
Can be either Enabled or Disabled. If Enabled, it will automatically register an increase of one for each test completed, and increase the test number by 1.

LINE 5 - Series of tests
Makes it possible to have an Auto Report print out after X number (the number you enter, 01 - 99) of tests have been completed.

LINE 6 - Remote
A report can be in two available formats on two different remote devices: PRINTER or COMPUTER. Either remote format will be presented in an ASCII Delimited notation.

Printer

This report (1200 baud, 8 bit, and no parity) contains the following information:

test lab's name
test lab's address
test lab's state & zip
time date
(of first test of series)

TEST NUMBER	ENERGY	TEST NUMBER	ENERGY
1	155.3	51	155.3
2	155.3	52	155.3
3	155.3	53	155.3
4	155.3	54	155.3
5	155.3	...	155.3
6	155.3	97	155.3
7	155.3	98	155.3
8	155.3	99	155.3
...			

Computer

This report (1200 baud, 8 bit, and no parity) contains the following information:

(HEADER TEXT) TEST #, ENERGY UNITS<Cr><Lf>
(NUMERIC VALUE) test #, energy, units<Cr><Lf>

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbuttons for each of the DI-300 modes.*

MODE #4: Tests

Mode #4 contains two line items:

LINE 1 - Test Number
Display of the number of tests that have been performed, from 0000-9999. If Auto Inc is Enabled, this number will automatically increment after each test.

LINE 2 - Energy
Either the compensation energy or the specimen energy. Compensation energy will be presented with a 'c' before the word energy whereas specimen energy will display a 's'.

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbuttons for each of the DI-300 modes.*

MODE #5: Secret Calibration

To Get into the Secret Calibration Mode:

- Press MODE until the entering Mode 2 with the hammer weight displayed.
- Press the UP/COMPENSATE button simultaneously with the DOWN/TEST button.
- The display will now read:

  MODE = EXIT SEL = GO ON

  Press SELECT to enter the Secret Calibration Mode or MODE to exit without entering the Secret Calibration Mode.

Mode #5 contains seven line items:

LINE 1 - Hammer ##
The appropriate numeric selection should be made from the following chart for entry into this answer field.

	SELECT	HAMMER	ENGLISH
SI-1	#1	66.666 lbs	300 ft/lbs
Impact	#2	53.333 lbs	240 ft/lbs
Models	#3	26.666 lbs	120 ft/lbs
	#4	13.333 lbs	60 ft/lbs
BLI	#5	8.000 lbs	16 ft/lbs
Impact	#6	4.000 lbs	8 ft/lbs
Models	#7	2.000 lbs	4 ft/lbs
	#8	1.000 lbs	2 ft/lbs
	#9	0.500 lbs	1 ft/lbs

LINE 2 - Model
The represents the Model of Impact Hammer that you have.

LINE 3 - Arm Length
Length of arm on your Model of Impact Hammer.

LINE 4 - Calibrated
The date that your Impact was last calibrated should be here. At the time of calibration this display will need to be updated.

LINE 5 - 100 Swings Time

This entry counts the time that it takes for the hammer to swing 100 times to and fro. Refer to ASTM E-23 for further information on the exact details on how this is to be used.

Running a 100 Swings Test:

1. Latch hammer for test.
2. Release hammer and press the UP/COMPENSATE button simulaneously with the DOWN/TEST button while the hammer descends with less than 15° of arc.

LINE 6 - Encoder Counts
Measured via the position encoder mounted on the shaft and sheave assembly. (Normally 8000).

LINE 7 - Hammer Height
Measured via the position encoder mounted on the shaft and sheave assembly.

Refer to the **'Front Panel'** *section for changing the information on screen with the pushbuttons for each of the DI-300 modes.*

Operation

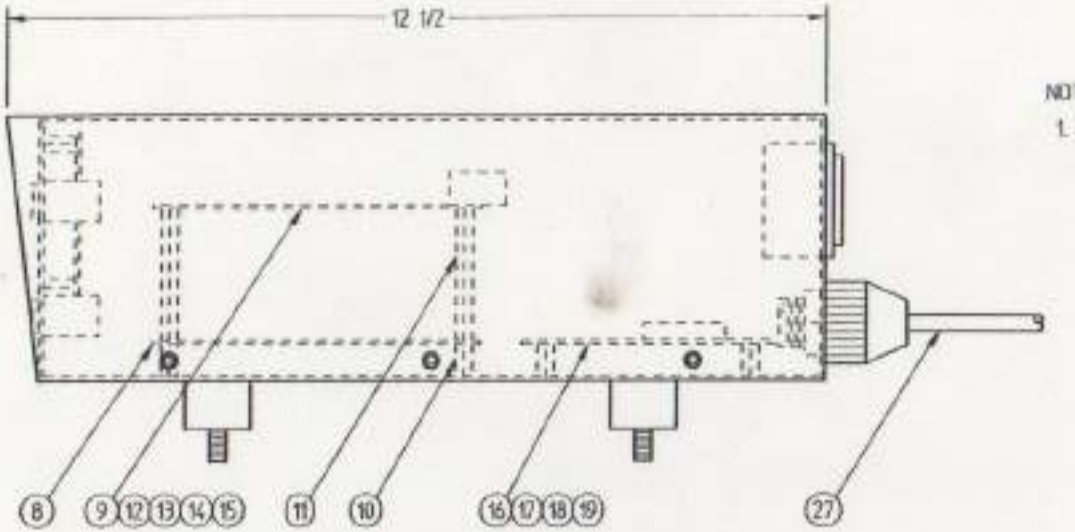
1. Once you have your DI-300 Digital Impact Readout System installed on your impact machine you will want to plug it into 120 Volt, Single Phase, 60 Hz power supply.
2. Now locate the two position toggle switch on the rear panel labeled "Power" and position it to ON.
3. Your Impact will now display the Mode #1 readout.
4. Press MODE pushbutton 3 times to get to Mode #4.
5. Latch hammer to test height, press COMPENSATE button. Verify that a blinking block is in the upper right block of the display. Do NOT install a specimen.
6. Release the hammer. After the hammer has swung 1 full swing a 'C' will appear on the display.
7. The compensation value, once calculated by following the procedure just described, will then be deducted from every following test swing. Always verify to make certain that the 'C' appears on the display so that you know that the compensation value has been calculated.
8. Latch hammer in test height again and install the specimen.
9. Press MODE to let the prepare prompt the DI-300 for the test.
10. Once complete, the display will read 'S' Energy. This represents specimen energy.

Error Codes

- ERROR: If the display shows "POSITION IS COUNTING BACKWARDS", then the computer has read the initial hammer position as a negative value (with respect to the marker pulse), thus the encoder is wired reverse OR the marker pulse was set incorrectly.

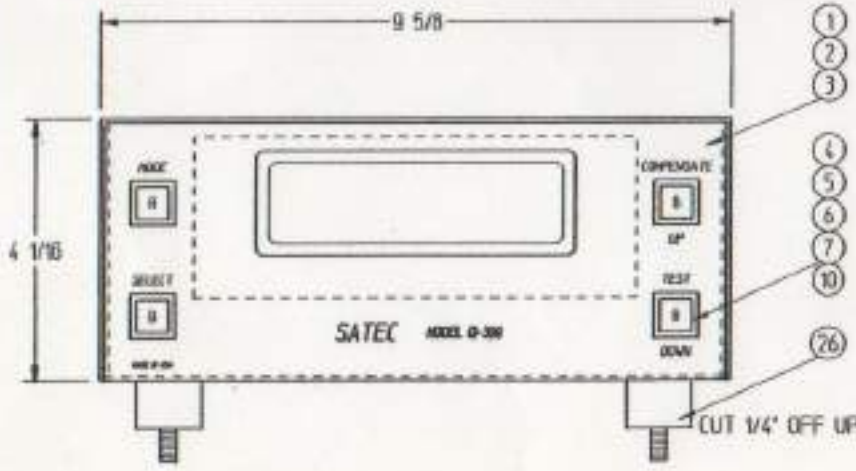
  SOLUTION: Check connector - white wire should go to connector 1-A; green wire should go to connector 1-B. If this is correct, check connections of connector 1 to connect J7. Connector 1-A goes to J7-7 and connector 1-B goes to J7-6.

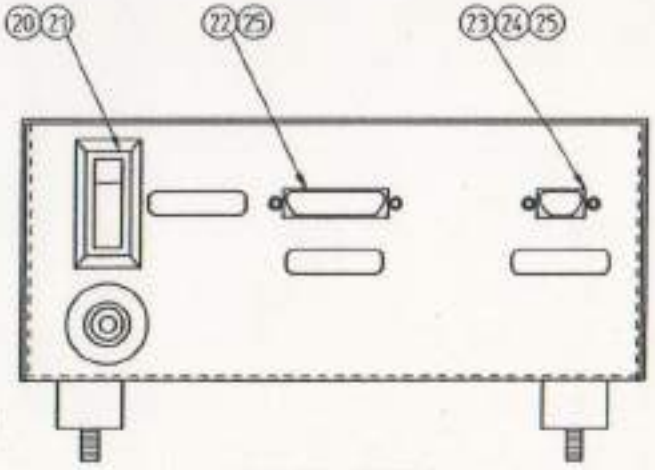
- ERROR: If the display shows "CHECK THE MARKER PULSE ADJUSTMENT", then the computer has read the final hammer position as greater than the initial hammer position, thus the marker pulse is not aligned properly. To align the marker pulse, place a sample in position and bring the striker in contact with it. The leading edge of the marker pulse should occur at this point. If not, then rotate the encoder until it does. Encoder is rotated by loosening the set screw on the coupling and then turning the zero adjusting screw. After correctly aligning the encoder, tighten the set screw. THIS MARKER PULSE MUST BE CHECKED USING MODE #5 - Line 7.



NOTE:

1. DRILL CHASSIS USING COVER AS TEMPLATE.

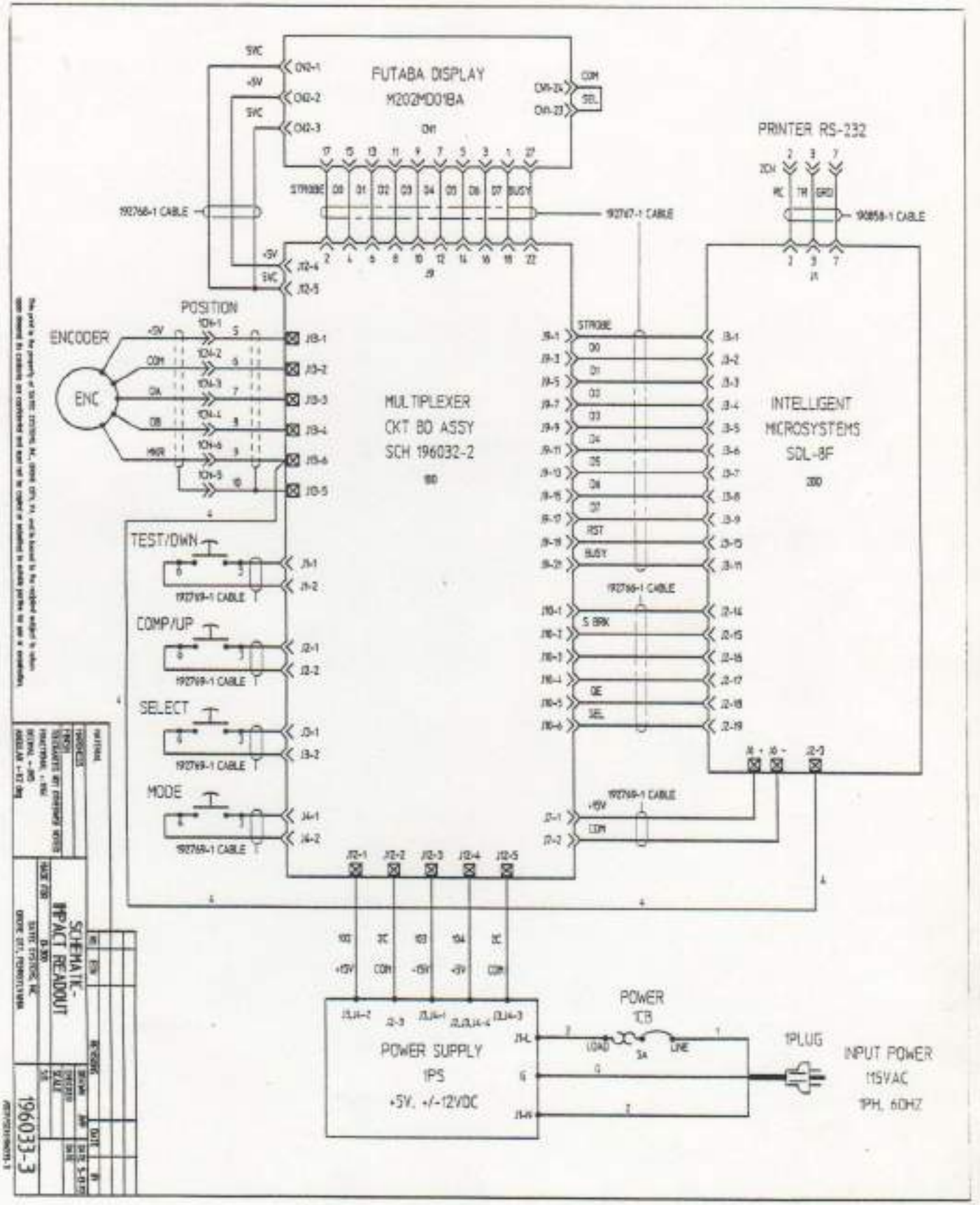


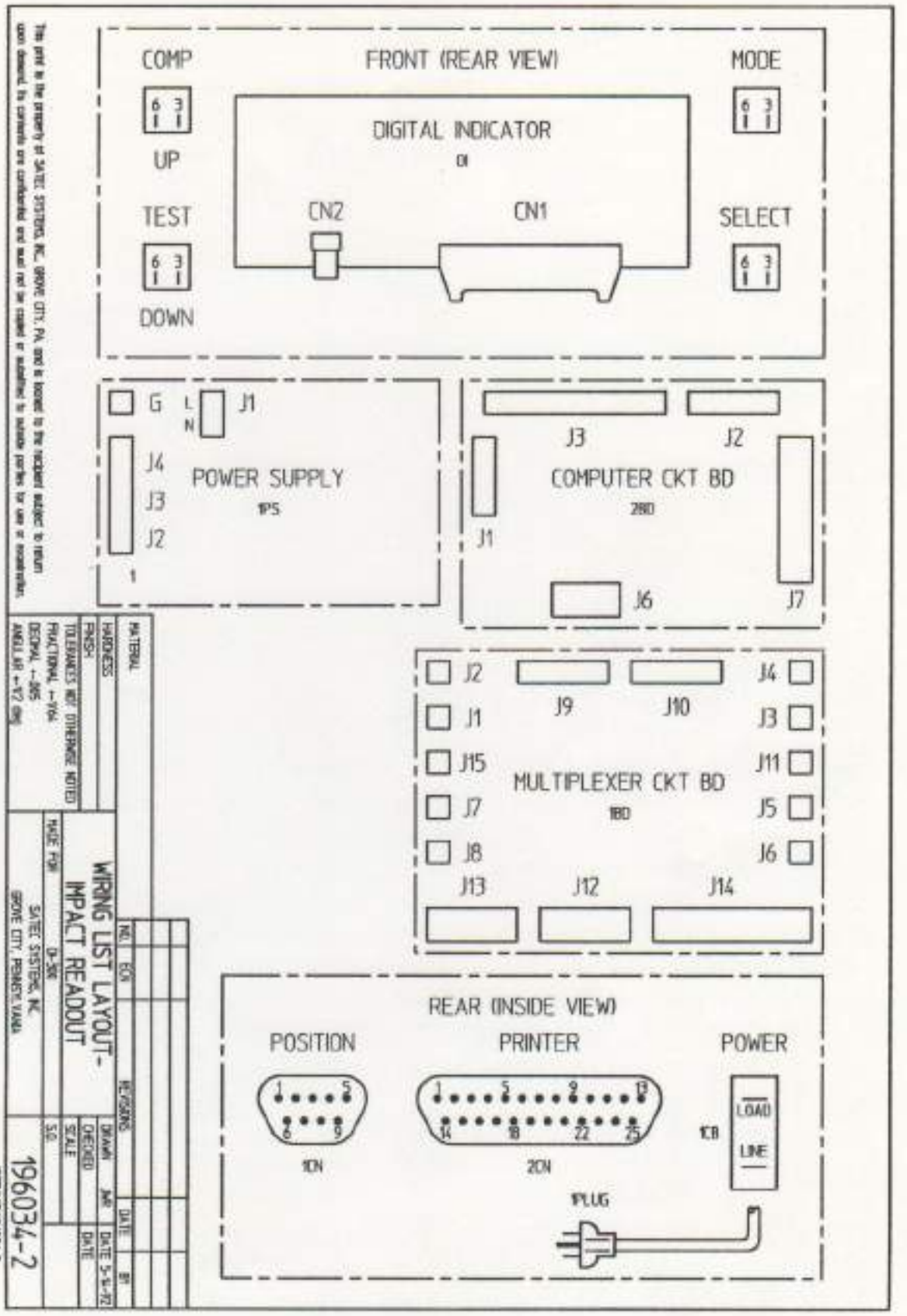


SCHEMATIC - 196033-3

ASSEMBLY	MACHINE	RESOLUTION
196030-3	ST	0.00 FT-IB
196030-3A	BLI	0.000 FT-LB

MATERIAL				
FINISH	DI-300 IMPACT READOUT ASSEMBLY		DRAWN	DATE 5-14-92
			CHECKED	DATE
	MADE FOR SATEC SYSTEMS INC. GROVE CITY, PENNSYLVANIA		SCALE	
			SIZE	196030-3


FUTABA DISPLAY
M202MD01BA
PRINTER RS-232
ENCODER
POSITION
ENC
MULTIPLEXER
CKT BD ASSY
SCH 196032-2
INTELLIGENT
MICROSYSTEMS
SDL-8F
TEST/DWN
COMP/UP
SELECT
MODE
POWER
SUPPLY
IPS
+5V, +/-12VDC
POWER
TCB
PLUG
INPUT POWER
115VAC
1PH, 60HZ
SCHEMATIC-
IMPACT READOUT
196033-3


COMP
UP
TEST
DOWN
FRONT (REAR VIEW)
DIGITAL INDICATOR
CN2
CN1
MODE
SELECT
G
L
N
J1
J4
J3
J2
POWER SUPPLY
PS
J3
J2
J1
COMPUTER CKT BD
CB
J6
J7
J2
J1
J15
J7
J8
J9
J10
J4
J3
J11
J5
J6
J13
J12
J14
MULTIPLEXER CKT BD
MB
REAR (INSIDE VIEW)
POSITION
PRINTER
POWER
1CN
2CN
PCB
LOAD
LINE
PLUG
MATERIAL
HARDNESS
FINISH
TOLERANCES NOT OTHERWISE NOTED
FRACTIONAL ±1/64
DECIMAL ±.005
ANGULAR ±1/2 deg
NEXT ASSY
WIRING LIST LAYOUT-
IMPACT READOUT
MADE FOR
D-306
SATEC SYSTEMS, INC.
GROVE CITY, PENNSYLVANIA
REVISIONS
DRAWN
CHECKED
SCALE
S.C.
DATE
196034-2

Number:	196035		**Date:**
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		

From		To		Wire or Cable				
REAR PANEL CONNECTIONS								
1PLUG	L1	1CB	LINE	1		1	18	BLK
	L2	1PS	J1-N	2		'	'	WHT
	G	'	G	G		'	'	GRN
1CB	LOAD	1PS	J1-L	3		1	18	BLK
1CN	1	1BD	J13-1	5	3	6	24	BLK
(POSIT)	2	'	J13-2	6			'	WHT
	3	'	J13-3	7			'	GRN
	4	'	J13-4	8			'	RED
	6	'	J13-6	9			'	BLK
	5	'	J13-5	10			'	BRAID 5,6,7
2CN (PRINTR)	--	2BD	J1	--	190858-1	1	22	--
POWER SUPPLY & CKT BD INTERCONNECT								
1PS	J4-4	1BD	J12-4	104		1	16	BLUE
	J4-3	1BD	J12-5	2C		1	16	WHT
	J4-2	1BD	J12-1	102		1	16	BLU
	J4-1	1BD	J12-3	103		1	16	ORG
	J2-3	1BD	J12-2	2C		1	16	WHT
1BD	J13-6	2BD	J2-5	4		1	18	--

Number:	196035 Date:
Title:	WIRE LIST-IMPACT RDOUT (DI300)
Drawn:	JWR
Rev.:	1

From		To		Wire or Cable			
(MULTPX	J10	2BD	J2	--	192766-1	1	22 --
BOARD)	J9	2BD	J3	--	192767-1	1	22 --
	J7	2BD	J6	--	192769-1	1	22 --

Number:	196035		Date:
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		

From		To		Wire or Cable			
FRONT PANEL INTERCONNECT							
TEST/DWN	--	1BD	J1	--	192769-1	1	22 --
COMP/UP	--	1BD	J2	--	192769-1	1	22 --
SELECT	--	1BD	J3	--	192769-1	1	22 --
MODE	--	1BD	J4	--	192769-1	1	22 --
DISPLAY	CN1	1BD	J9	--	192767-1	1	22 --
	CN2	1BD	J12	--	192768-1	1	22 --

Number:	196035	**Date:**	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

From		To		Wire or Cable					Misc
REAR PANEL CONNECTIONS									
1PLUG	L1	1CB	LINE	1		1	18	BLK	CORD
	L2	1PS	J1-N	2		'	'	WHT	SET
	G	'	G	G		'	'	GRN	'
1CB	LOAD	1PS	J1-L	3		1	18	BLK	
1CN	1	1BD	J13-1	5	3	6	24	BLK	
(POSIT)	2	'	J13-2	6			'	WHT	
	3	'	J13-3	7			'	GRN	
	4	'	J13-4	8			'	RED	
	6	'	J13-6	9			'	BLK	
	5	'	J13-5	10			'	BRAID	
								5,6,7	,8,9
2CN	--	2BD	J1	--	190858-1	1	22	--	CABLE
(PRINTR)									ASSY
POWER SUPPLY & CKT BD INTERCONNECT									
1PS	J4-4	1BD	J12-4	104		1	16	BLUE	SHORT AS POSS'BL TWISTED
	J4-3	1BD	J12-5	2C		1	16	WHT	'
	J4-2	1BD	J12-1	102		1	16	BLU	'
	J4-1	1BD	J12-3	103		1	16	ORG	'
	J2-3	1BD	J12-2	2C		1	16	WHT	'
1BD	J13-6	2BD	J2-5	4		1	18	--	BK OF IPR SH'LDED CABLE SHIELD ON

Number:	196035	**Date:**	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

From		To		Wire or Cable				Misc
								J13-5
(MULTPX	J10	2BD	J2	--	192766-1	1	22	-- ASSY
BOARD)	J9	2BD	J3	--	192767-1	1	22	-- ASSY
	J7	2BD	J6	--	192769-1	1	22	-- ASSY

Number:	196035	**Date:**	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

From		To		Wire or Cable				Misc
FRONT PANEL INTERCONNECT								
TEST/DWN	--	1BD	J1	--	192769-1	1	22	-- ASSY
COMP/UP	--	1BD	J2	--	192769-1	1	22	-- ASSY
SELECT	--	1BD	J3	--	192769-1	1	22	-- ASSY
MODE	--	1BD	J4	--	192769-1	1	22	-- ASSY
DISPLAY	CN1	1BD	J9	--	192767-1	1	22	-- ASSY
	CN2	1BD	J12	--	192768-1	1	22	-- ASSY

Number:	196035	**Date:**	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

From		To		Wire or Cable					Misc
REAR PANEL CONNECTIONS									
1PLUG	L1	1CB	LINE	1		1	18	BLK	CORD
	L2	1PS	J1-N	2		'	'	WHT	SET
	G	'	G	G		'	'	GRN	'
1CB	LOAD	1PS	J1-L	3		1	18	BLK	
1CN	1	1BD	J13-1	5	3	6	24	BLK	
(POSIT)	2	'	J13-2	6			'	WHT	
	3	'	J13-3	7			'	GRN	
	4	'	J13-4	8			'	RED	
	6	'	J13-6	9			'	BLK	
	5	'	J13-5	10			'	BRAID	
								5,6,7	,8,9
2CN	--	2BD	J1	--	190858-1	1	22	--	CABLE
(PRINTR)									ASSY
POWER SUPPLY & CKT BD INTERCONNECT									
1PS	J4-4	1BD	J12-4	104		1	16	BLUE	SHORT AS POSS'BL TWISTED
	J4-3	1BD	J12-5	2C		1	16	WHT	'
	J4-2	1BD	J12-1	102		1	16	BLU	'
	J4-1	1BD	J12-3	103		1	16	ORG	'
	J2-3	1BD	J12-2	2C		1	16	WHT	'
1BD	J13-6	2BD	J2-5	4		1	18	--	BK OF IPR SH'LDED CABLE SHIELD ON

Number:	196035	Date:	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

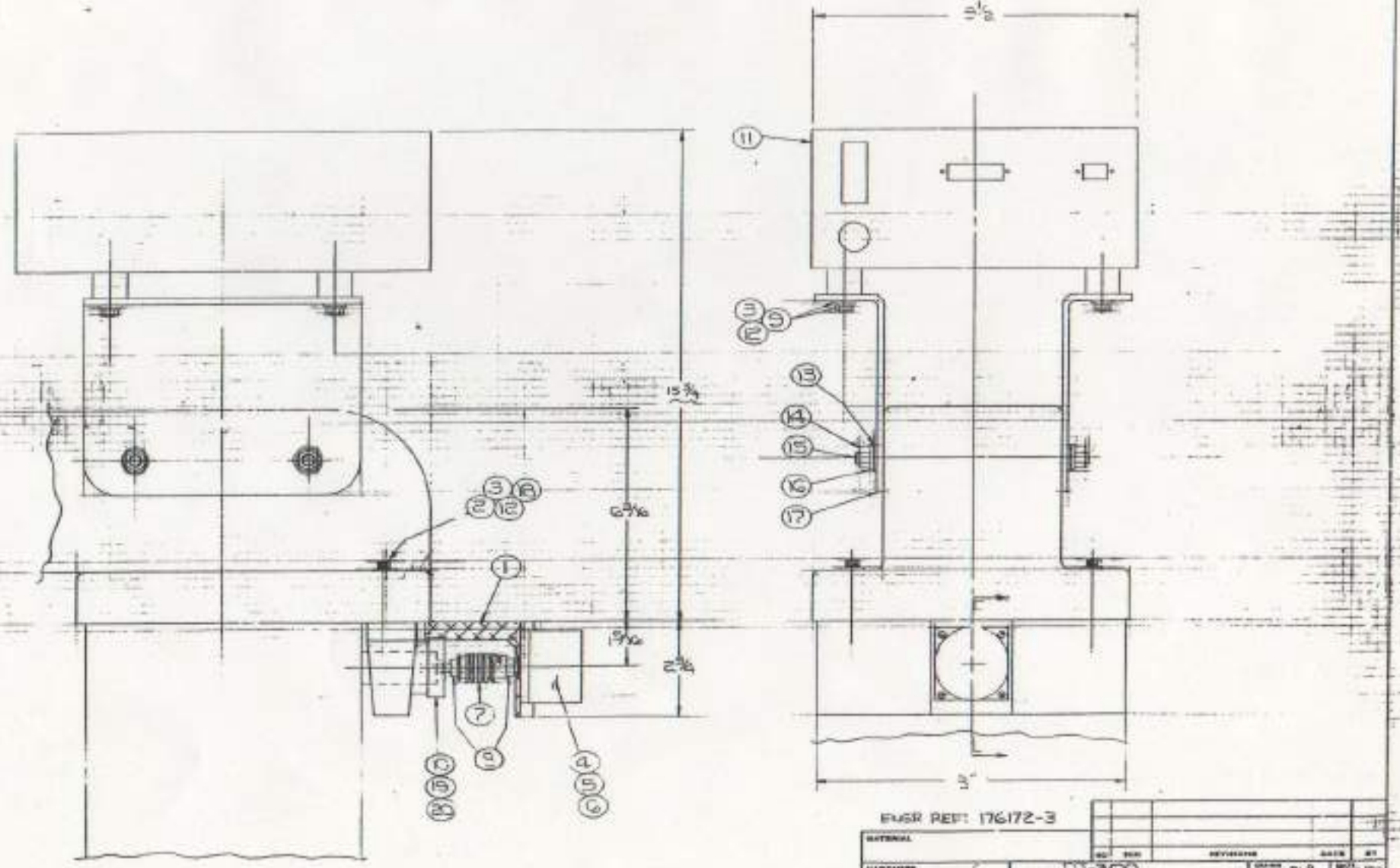
From		To		Wire or Cable				Misc
								J13-5
(MULTPX	J10	2BD	J2	--	192766-1	1	22	-- ASSY
BOARD)	J9	2BD	J3	--	192767-1	1	22	-- ASSY
	J7	2BD	J6	--	192769-1	1	22	-- ASSY

These files can be found on the network at:
R:\WIRELIST\FILES\

Number:	196035	**Date:**	12/3/93
Title:	WIRE LIST-IMPACT RDOUT (DI300)		
Drawn:	JWR		
Rev.:	1		Updated to Excel via VB 9/8/97

From		To		Wire or Cable				Misc
FRONT PANEL INTERCONNECT								
TEST/DWN	--	1BD	J1	--	192769-1	1	22	-- ASSY
COMP/UP	--	1BD	J2	--	192769-1	1	22	-- ASSY
SELECT	--	1BD	J3	--	192769-1	1	22	-- ASSY
MODE	--	1BD	J4	--	192769-1	1	22	-- ASSY
DISPLAY	CN1	1BD	J9	--	192767-1	1	22	-- ASSY
	CN2	1BD	J12	--	192768-1	1	22	-- ASSY

WHEN THIS ASSEMBLY IS INSTALLED IN THE FIELD, MAKE SURE PRINTS OF HEAD & SHAFT MODIFICATIONS (176145-2 & 176150-2) ARE SENT WITH JOB.

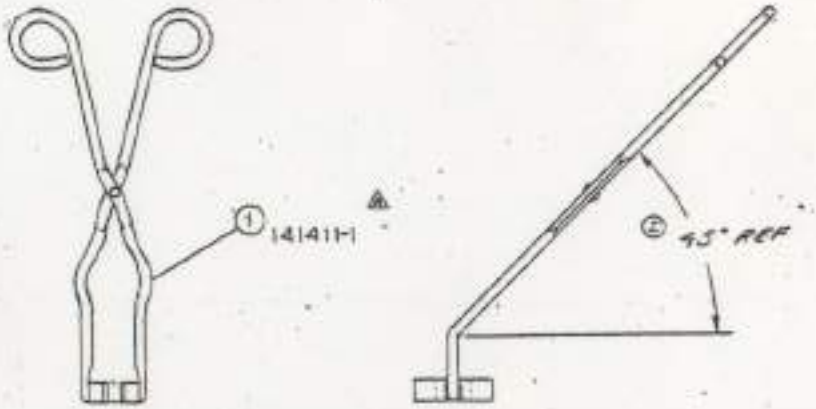


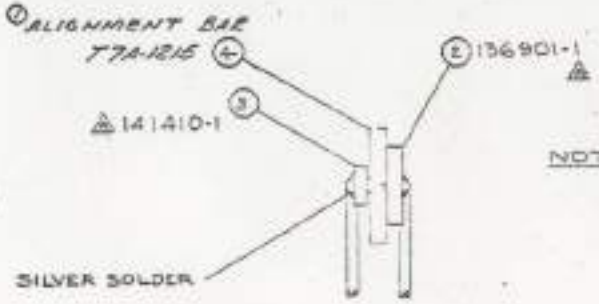
ENGR REF: 176172-3

MATERIAL			
HARDNESS	DI-3000	DRAWN R.L.R.	
FINISH	DWG. IMPACT READOUT ASSEM.		
FRACTIONAL ±1/64	MADE FOR DI IMPACT		
	SATEC SYSTEMS, INC. GROVE CITY, PENNSYLVANIA		196043-3

145197-2

WORK TO DIMENSIONS





NOTE:
CLAMP (4) BETWEEN (2) & (3) TO INSURE PARALLELISM BEFORE SILVER SOLDERING (2) & (3) TO TONES (1).

2	22456	3	REV'D.	[illegible]	[illegible]	11-4-66
1	11320	2	JE	[illegible]	[illegible]	7/19/66
PTS.	D. N. NO.	LAST DWG NO.	BY	CHKD.	APPD.	DATE

DRAWING NO. WAS 5155T-H

DATE	D. N. NO.
8-27-65	23590

A	ADDED DWG NOT TO MAGNETIC BOM 2317	6-2-66 DMF

NO.	SGN	REVISIONS	DATE	BY

MATERIAL		DRAWN GHA	DATE 10-11-65
HARDNESS	LOW TEMPERATURE IMPACT TONES	CHECKED	DATE
FINISH		SCALE	
TOLERANCES NOT OTHERWISE NOTED: FRACTIONAL ±1/64 DECIMAL ±.005 ANGULAR ±1/2°	MADE FOR SATEC SYSTEMS, INC. GROVE CITY, PENNSYLVANIA	P.C.	145197-2

MODEL	ASSEMBLY NO.	SER. NO.	ITEM NO.	NO. REQD.
51-1		12589-9		

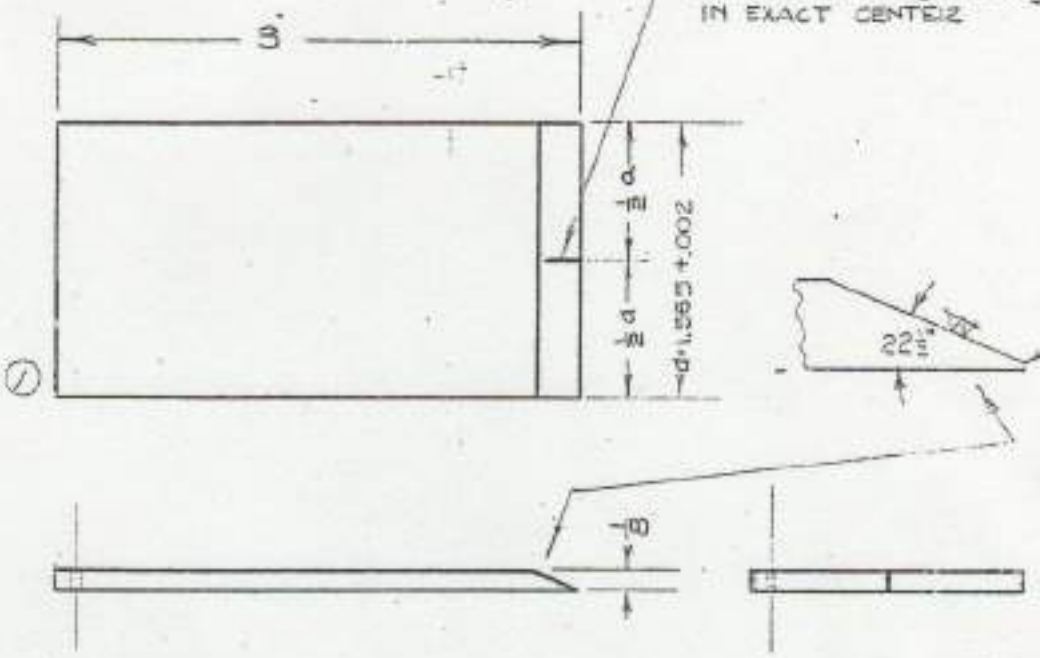
REVISION AND DATE	DATE 5-12-45	SONNTAG SCIENTIFIC CORPORATION	1-41320-1
100-98	SCALE FULL DR. RUH	GREENWICH, CONNECTICUT	
162-1	CH'KD. TR.	MATERIAL PER PART: OIL HARDENING GROUND STOCK $\frac{1}{8} \times 3$	ASSEMBLY 1-50192-L

8600-5391

HARDEN TO APPROX
ROCKWELL 48-50 C
PER SPEC #731011

BREAK SHARP EDGES

SCRIBE LINE $\frac{3}{8}$ LONG $\frac{1}{32}$ WIDE
IN EXACT CENTER



SPECIMEN GAUGE

1 REQ'D

REV.	C. N. NO.	LAST CODE NO.	BY	CH'KD.	APPD.	DATE
1	10317	2	WSK	WSK	WSK	5-12-45

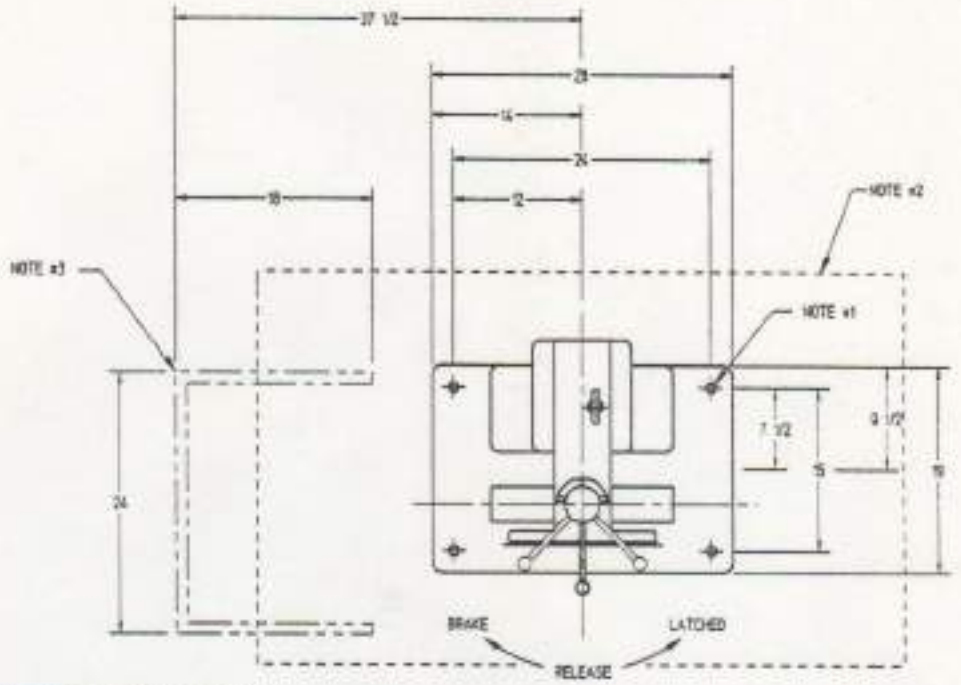
DRAWING NO. WAS	C. N. NO.
6600-S	19669
DATE 10-22-41	

FINISH: HAUGHTO #2 BLACK

SUPERSEDING 1-5848-S

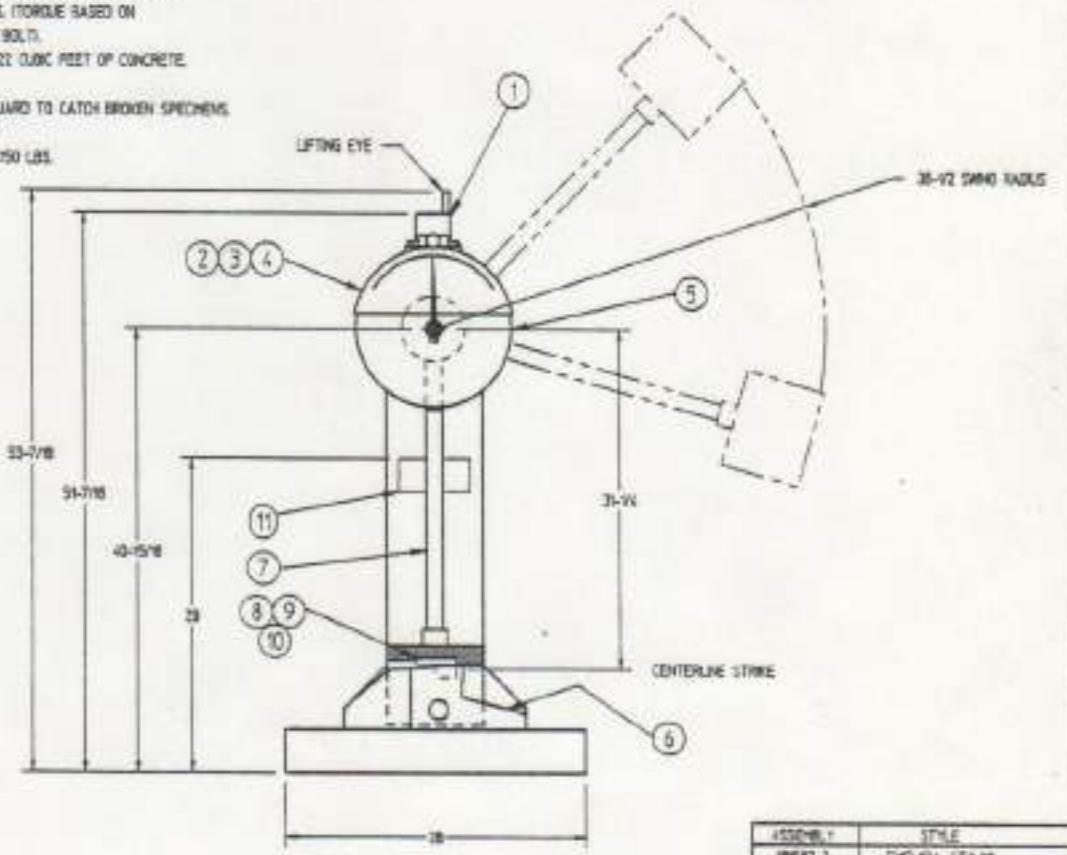
This print is the property of SATEC SYSTEMS, INC., Grove City, Pa. and is loaned subject to return upon demand. Its contents are confidential and must not be copied or submitted to outside parties for use or examination.

V	ORDINARY MACHINE FINISH	CLEAN UP FOR APPEARANCE NO ALLOWANCE ON PATTERNS	1-41320-1
W	GOOD MACHINE FINISH	FRACTIONAL DIMENSIONS ARE ± 1/64" ANGLES ±1° UNLESS OTHERWISE NOTED	
VVV	VERY GOOD MACHINE FINISH		



NOTES:

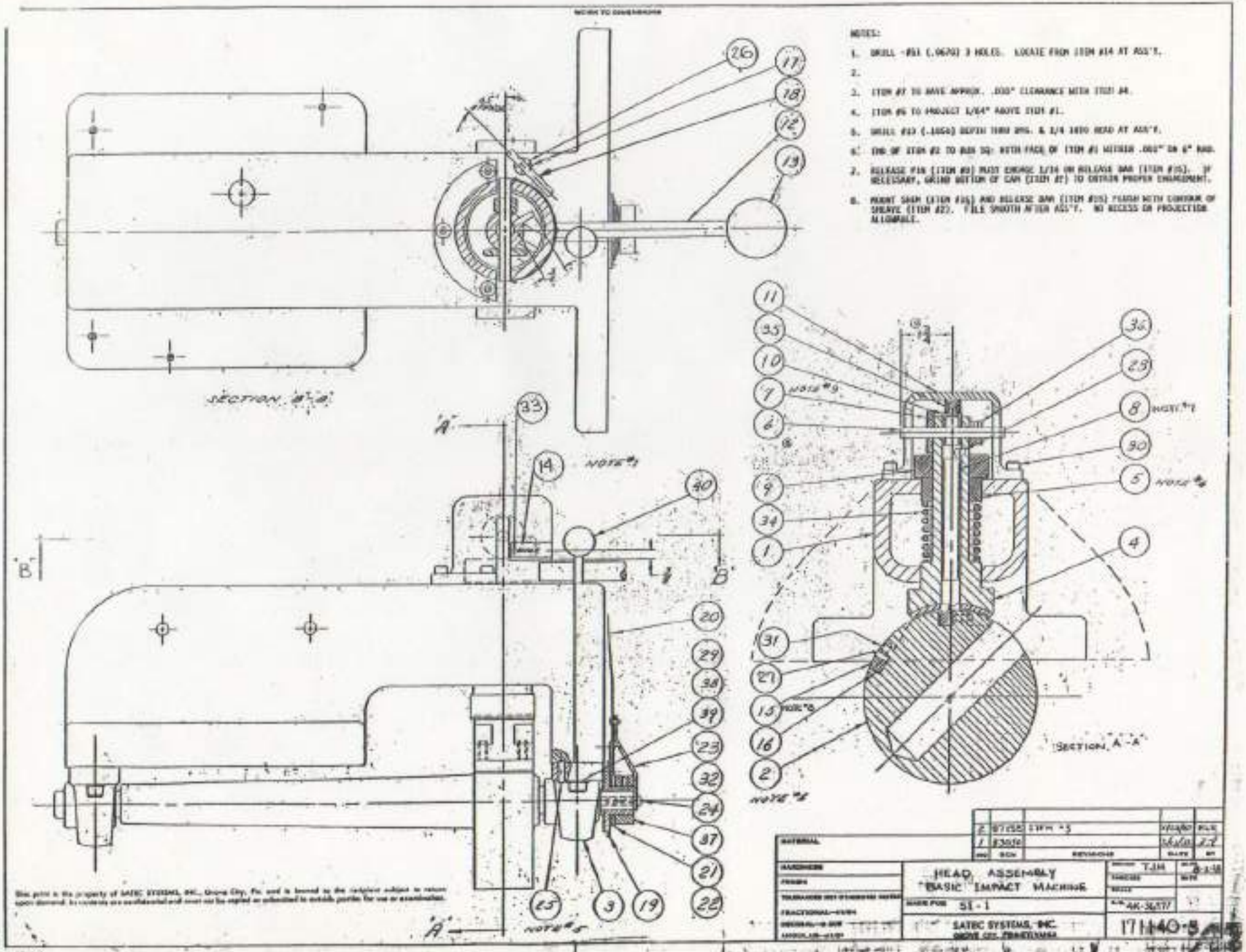
1. LOCATION FOR 5/8"DIA. TIE DOWN BOLTS (4 TOTAL) TO BE SUPPLIED BY CUSTOMER. BOLTS TO HAVE 5/8-11NC THREAD. TORQUE TO 211 FT/LBS. (TORQUE BASED ON 100,000 PSI TENSILE STRESS IN BOLT).
2. FOUNDATION TO BE MINIMUM OF 22 CUBIC FEET OF CONCRETE (i.e. 36" X 69" X 18"THICK)
3. OPTIONAL U-SHAPED WOODEN GUARD TO CATCH BROKEN SPECIMENS TO BE SUPPLIED BY CUSTOMER.
4. APPROXIMATE MACHINE WEIGHT 1750 LBS.

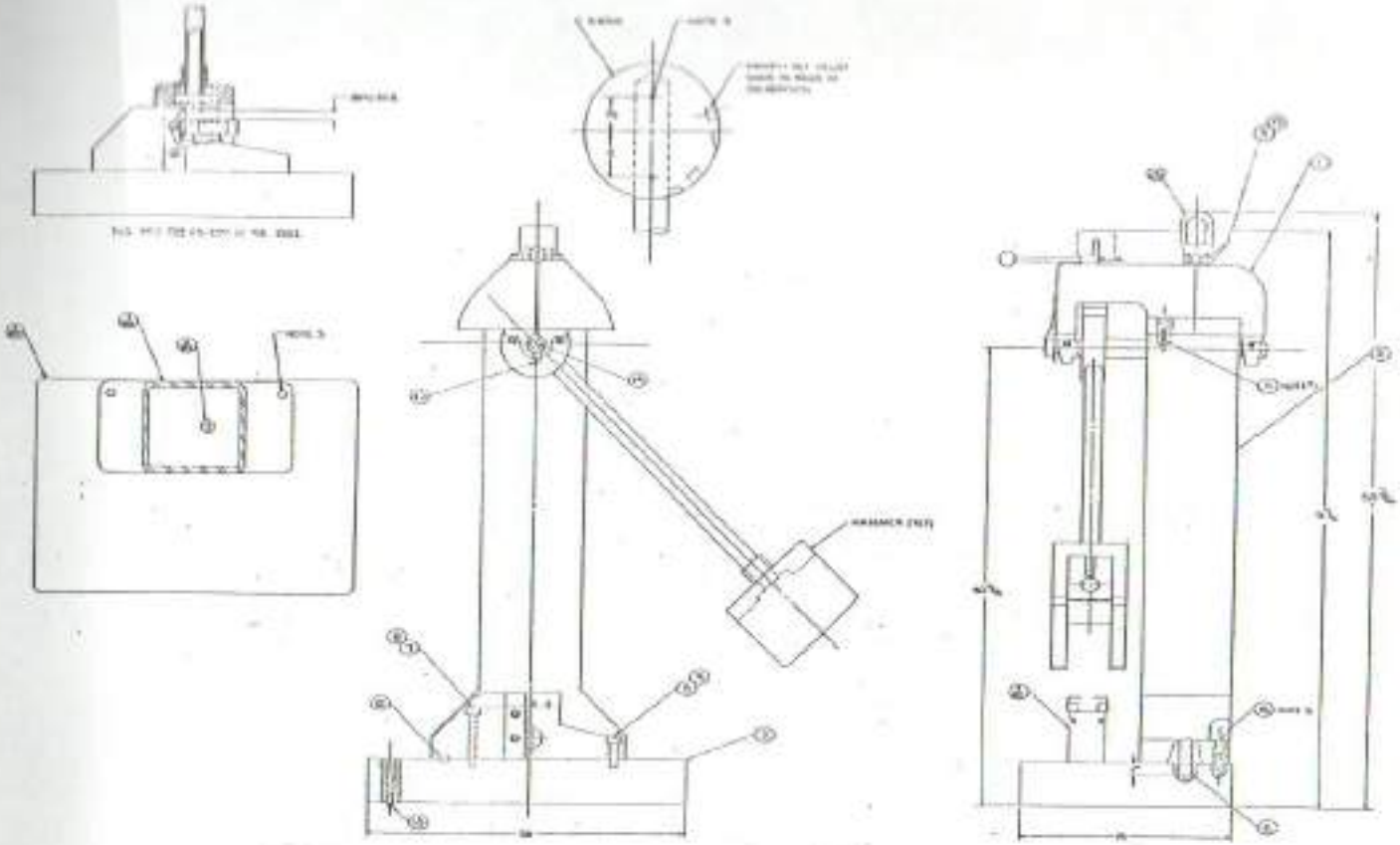


ASSEMBLY	STYLE
18582-3	ENGLISH FT/LBS
18582-3A	METRIC JOULES
18582-3E	ENGLISH FT-LBS CHARPY ONLY

GENERAL ASSEMBLY SI-1A IMPACT

18582-3


NOTES:
1. DRILL #51 (.0670) 3 HOLES. LOCATE FROM ITEM #14 AT ASS'Y.
2.
3. ITEM #7 TO HAVE APPROX. .030" CLEARANCE WITH ITEM #4.
4. ITEM #6 TO PROJECT 1/64" ABOVE ITEM #1.
5. DRILL #13 (.1850) DEPTH THRU DRG. & 1/4 DEEP HEAD AT ASS'Y.
6. END OF ITEM #2 TO BUS SQ. WITH FACE OF ITEM #1 WITHIN .002" ON 6" RAD.
7. RELEASE PIN (ITEM #9) MUST ENGAGE 1/16 ON RELEASE BAR (ITEM #35). IF NECESSARY, GRIND BOTTOM OF CAM (ITEM #7) TO OBTAIN PROPER ENGAGEMENT.
8. MOUNT SHIM (ITEM #36) AND RELEASE BAR (ITEM #35) FLUSH WITH CONTOUR OF SHEAVE (ITEM #2). FILE SMOOTH AFTER ASS'Y. NO RECESS OR PROJECTION ALLOWABLE.
SECTION "B-B"
SECTION "A-A"
HEAD ASSEMBLY
BASIC IMPACT MACHINE
SATEC SYSTEMS, INC.
171140-5



NOTES:

1. AT ASSEMBLY USE HEAD ITEM # 1 AS TEMPLATE AND DRILL & REAM .250/.250Ø DIA. THRU HEAD AND 1/2" DEEP INTO UPRIGHT ITEM # 2. INSERT DOWEL PIN ITEM # 11.
2. INSERT HAMMER INTO SHEAVE WITH TEFLON STRIPPING EDGE INSTALLED. ADJUST HAMMER TO OBTAIN .064/.066 DIMENSION. LOCATE, THEN DRILL 2 HOLES - .196/.200 DIA., THRU AND REAM FOR #4 TAPER PIN & PIN HAMMER IN PLACE.
3. ALIGN HAMMER WITH ANVIL & DRILL & REAM 2 ---.5000/.5003 HOLES THRU UPRIGHTS & 1" DEEP INTO BASE AND INSERT DOWEL PINS.

MATERIAL	2	State		
	1	Plate		
	NO.	DWG.	REVISIONS	DATE
HARDNESS				
FINISH				
TOLERANCES UNLESS NOTED				
FRACTIONAL ±1/64				
DECIMAL ±.005				
ANGULAR ±1/2°				

MACHINE ASSEMBLY
ST-1 IMPACT

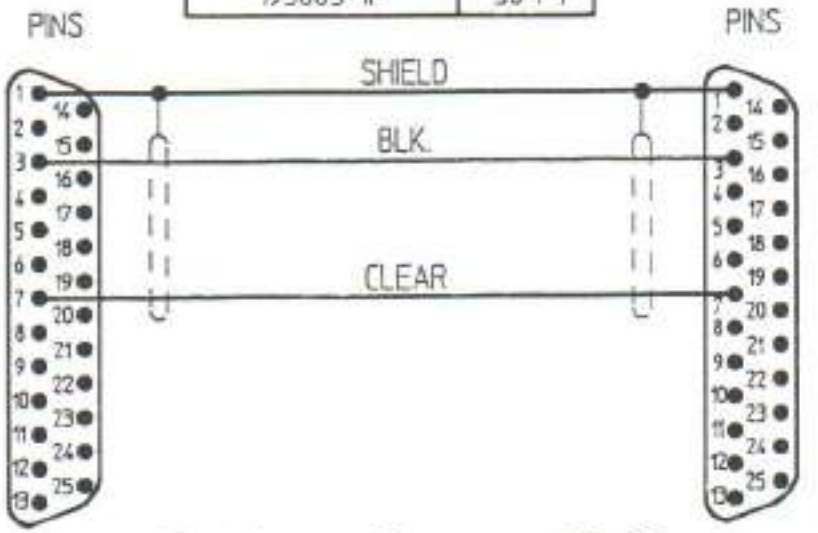
MADE FOR

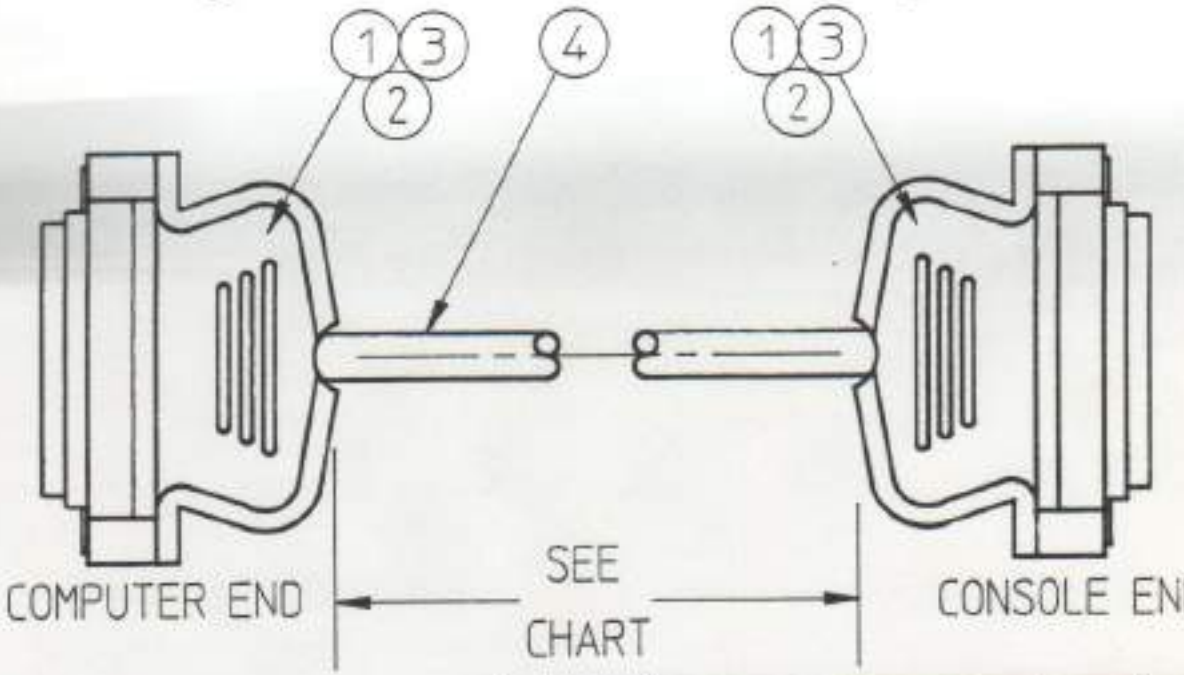
SATEC SYSTEMS, INC.
GROVE CITY, PENNSYLVANIA

SCALE 1/2" = 1"

DWG. NO. 1A61693

ASSEMBLY NO.	LENGTH
193685-1A	5 FT
193685-1B	10 FT
193685-1C	15 FT
193685-1D	20 FT
193685-1E	25 FT
193685-1F	30 FT





NO.	ECN	REVISIONS	DATE	BY

MATERIAL

HARDNESS

FINISH

TOLERANCES NOT OTHERWISE NOTED
FRACTIONAL ±1/64
DECIMAL ±.005
ANGULAR ±1/2 deg

RS-232C SERIAL INTERFACE CABLE ASSEMBLY

MADE FOR MKIII+ (CONSOLE SIDE TO LX-810 PRINTER)

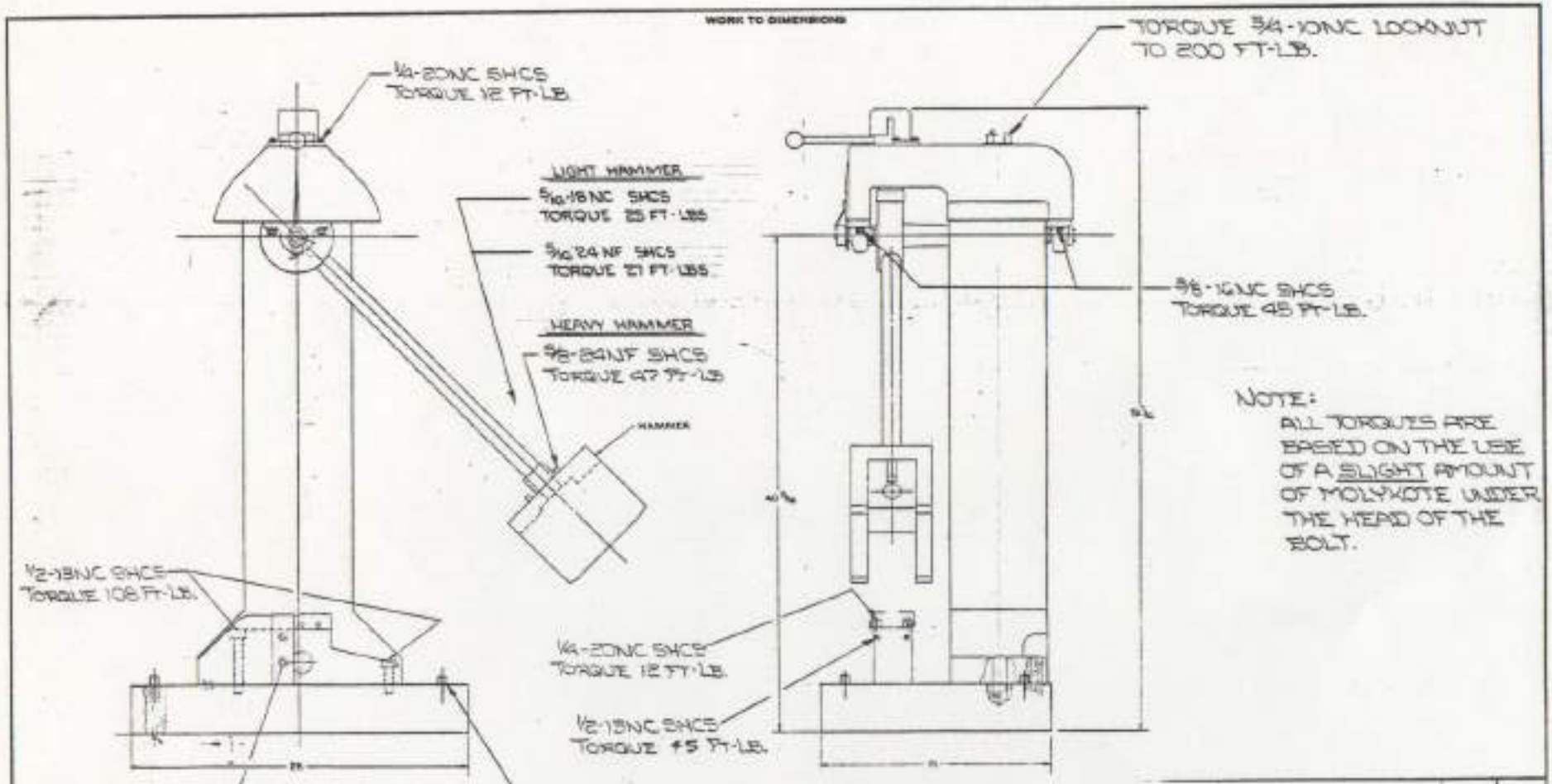
SATEC SYSTEMS, INC.
GROVE CITY, PENNSYLVANIA

DRAWN	SPE	DATE 3-13-91
CHECKED		DATE
SCALE		
S.O.		

193685-1

/DMP/ASSY/193685-1

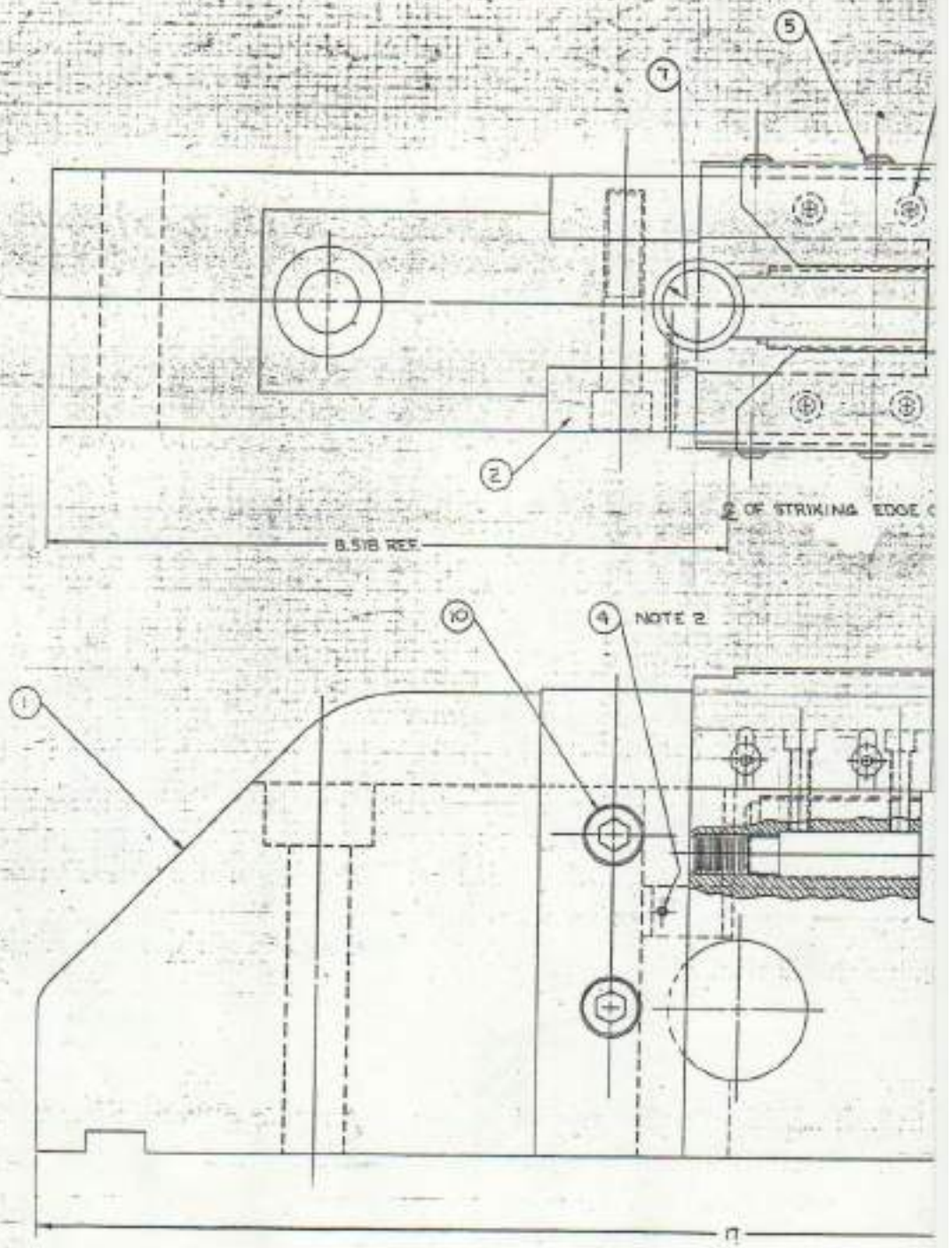
WORK TO DIMENSIONS



MATERIAL	1 Move 45 FT-LB Was 108 FT-LB	7/8/87	PJ
HARDNESS	NO. ECN REVISIONS	DATE	BY
FINISH	TORQUE VALUE DRAWING	DRAWN [illegible]	DATE 6-2-87
		CHECKED	DATE
		SCALE	
	SI IMPACT	S.S.	
	SATEC SYSTEMS, INC. GROVE CITY, PENNSYLVANIA	176166-2	

Warranty

Any of our products which, under normal operating conditions, proves defective in material or workmanship within one year from the date of shipment by SATEC, will be repaired or replaced free of charge provided such defects are brought to our attention for verification, and the defective product/part is returned, transportation charges prepaid with notice of defect, and provided the customer establishes that the product has been properly installed, maintained, and operated within the limits of rated and normal usage. Replacement product will be shipped F.O.B. our plant. The terms of this warranty do not extend to any product or part thereof which, under normal usage, has inherently shorter useful life than one year. The replacement warranty detailed here is the Buyers' exclusive remedy, and will satisfy all obligations of SATEC. SATEC is not responsible for any incidental or consequential loss or damage which might result from a failure of any SATEC product. THE WARRANTIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE OR USE.

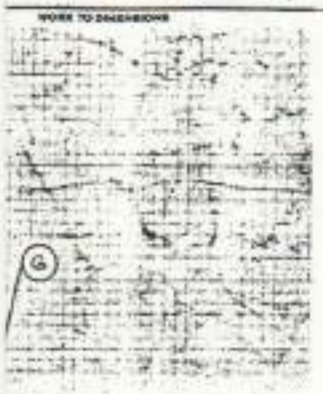


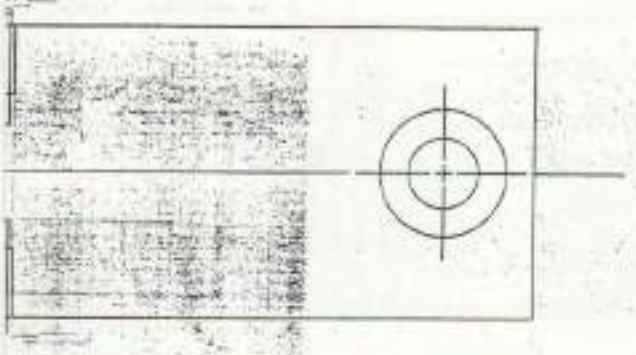
NOTES.

1. MOUNT SHROUD ITEMS 8 & 9 TO PROVIDE LESS THAN 1/16" CLEARANCE BETWEEN PENDULUM AND TOP OF SHROUD AT CLOSEST POINT.

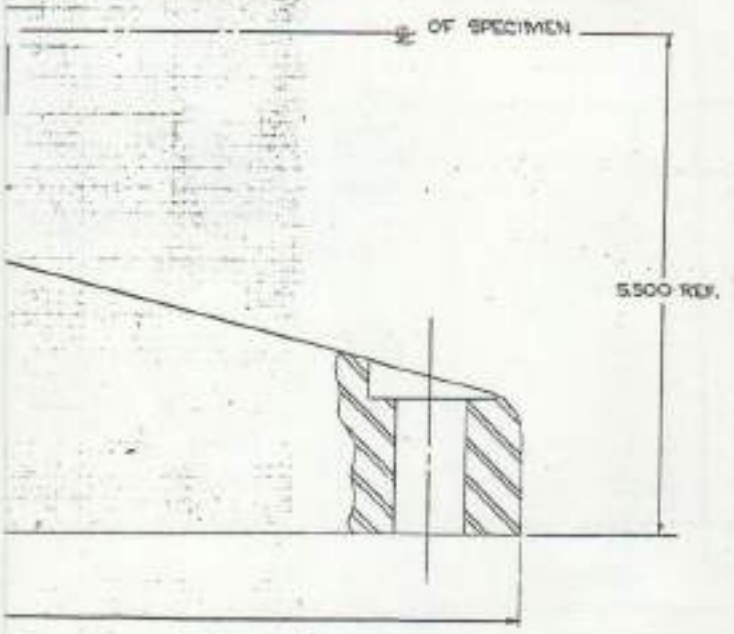
2. DRILL 1/8" DIA DRILL THRU ANVIL ITEM 1 AND BUSHING ITEM 7 AFTER ASSEMBLY AND INSERT PIN ITEM 4

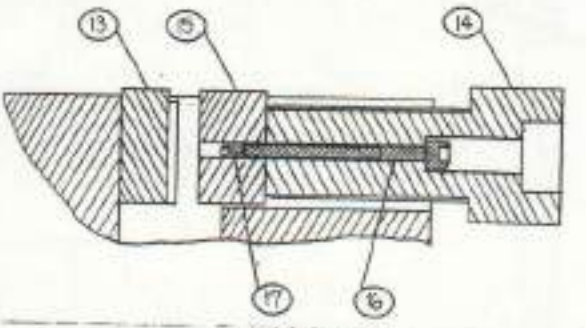
WORK TO DIMENSIONS



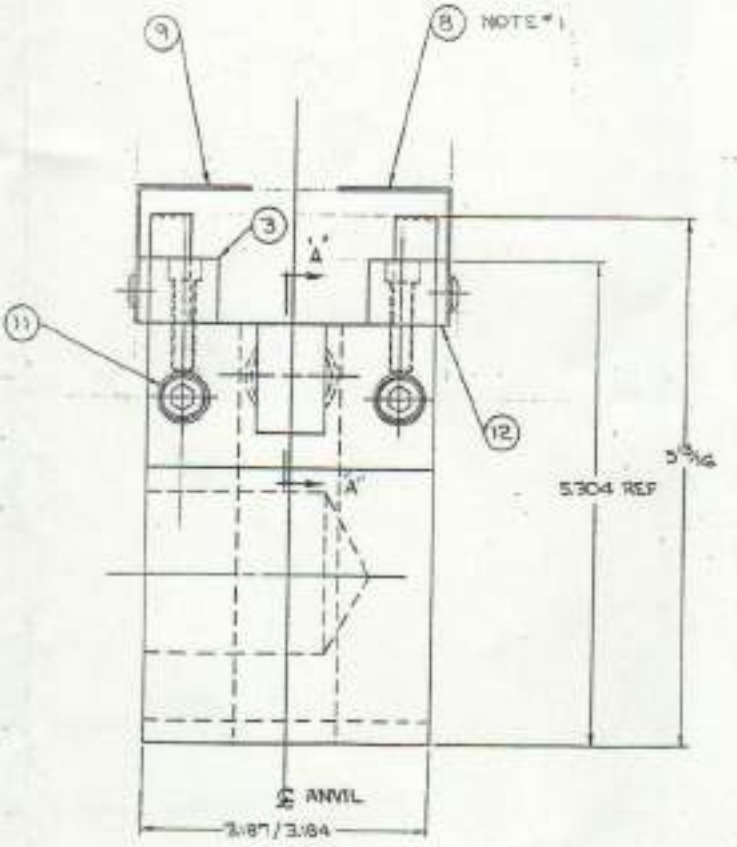


IR. PEND. HAMMER. REF.





SECTION "A"-"A"
PARTS REQ'D FOR 1200 ASS'Y ONLY.



ASSY NO.	DESCRIPTION	REF
171207-4	CHARPY @ 120D	
171207-4A	CHARPY ONLY	W/O ITEMS 8-17

MATERIAL				
	NO.	ECN	REVISIONS	DATE
HARDNESS	ANVIL ASSEMBLY			
FINISH	CHARPY @ 120D			
MADE FOR				
	SATEC SYSTEMS, INC. GROVE CITY, PENNSYLVANIA			171207-4