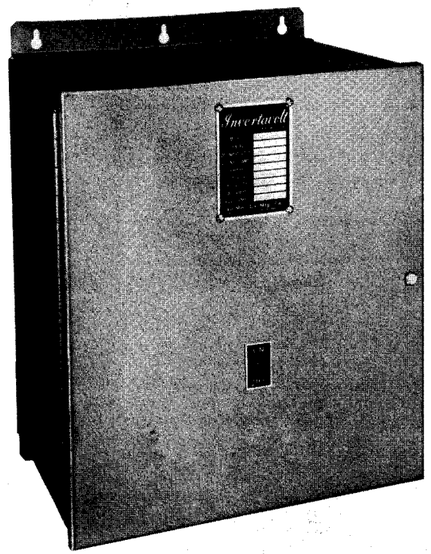
MODEL NO. A51E-4K-120V-A6
SERIAL NO. C1880-4
S.O. NO. D46890
SCHEMATIC NO. E51-620
PARTS LIST NO'S. 18/8A
OTHER DWG. NO'S.

MODEL A-51

DC TO AC POWER SOURCE WITH REGULATED SINE WAVE OUTPUT



MODEL A-51-100-48V IN #3 CASE

GENERAL DESCRIPTION

The La Marche MODEL A-51 is a completely solid state SCR inverter which provides a regulated, sine wave output for such applications as:

- Boiler Controls
- Telephone and Micro-wave Communications
- Burglar Alarms
- Supervisory Control Equipment
- Data Processing and Telemetering Equipment
- Nuclear and Missile Installations
- P.A. Systems
- Fire Alarms

SPECIALLY DESIGNED CIRCUITS PROVIDE INVERTER PROTECTION

UNDER VOLTAGE PROTECTION:
Provides protection for the inverter so that the inverter is automatically turned off before a malfunction due to low voltage.

OVER-VOLTAGE PROTECTION:
Special circuitry is provided to automatically turn OFF the inverter if the DC voltage exceeds maximum rated input voltage.

AC-DC SHORT PROTECTION:
Isolated output terminals are provided to protect against ground faults.

CURRENT LIMIT:
Ferroresonant transformer limits the load current under over-load conditions.

REVERSE POLARITY PROTECTION:
Special circuitry is provided in the event that the input cables are connected in reverse polarity

ELECTRICAL SPECIFICATIONS

AC OUTPUT VOLTAGE	120 Volts Nominal
LINE REGULATION	±1% for ±15% DC Change
LOAD REGULATION	±2% No Load to Full Load
FREQUENCY	60 Cycle Nominal (50 Hz Optional)
FREQUENCY STABILITY	±.025% for Load, Input, and Temperature Variations
WAVE SHAPE	Sine Wave
DISTORTION	Approximately 5%*
OVERALL EFFICIENCY	Approximately 70% (For units above 500 VA)
OPERATING TEMPERATURE	0° to 50°C (32°F to 122°F)

*Measured at full load nominal DC input

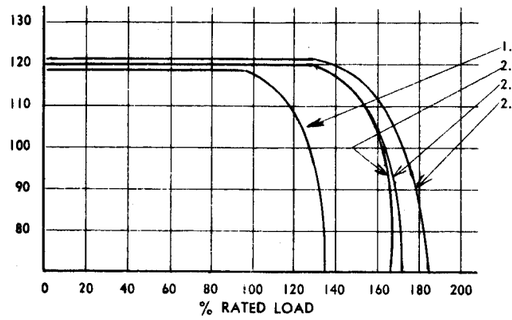


FIG. 1

OUTPUT VOLTAGE VERSUS LOAD CURRENT
P.F.—1 WITH LEAD ACID BATTERY

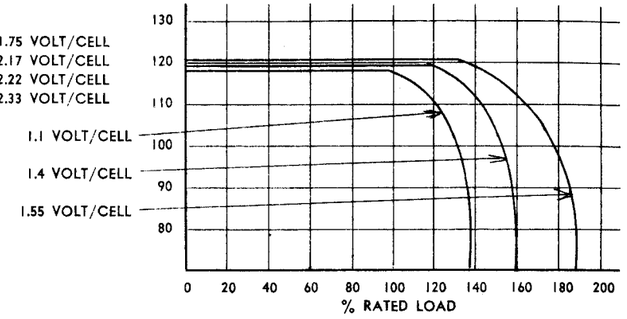


FIG. 2

OUTPUT VOLTAGE VERSUS LOAD CURRENT
P.F.—1 WITH NICKEL CADMIUM BATTERY

The above specifications are for unity power factor loads. Although regulation is not affected by power factor, the nominal voltage does change. A lagging power factor will cause the nominal voltage to drop while a leading power factor causes the nominal voltage to rise. The voltage variation with power factor is shown in Figure 3.

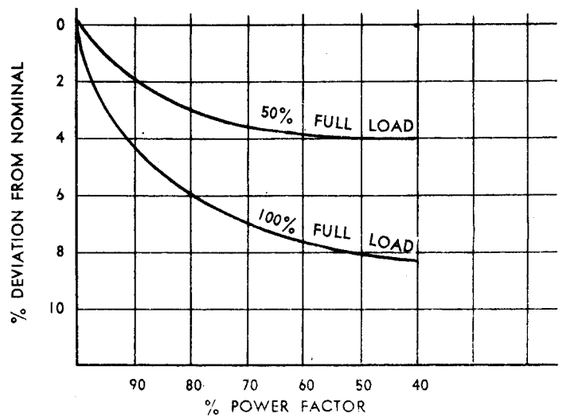
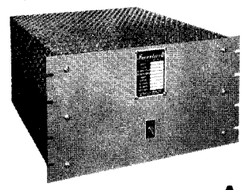


FIG. 3

TABLE NO. 1

MODEL NO.	D.C. INPUT volts	D.C. CURRENT FULL LOAD amps	D.C. CURRENT NO LOAD amps	CONTINUOUS LOAD RATING V.A.	A.C. CURRENT CONTINUOUS amps	CASE NO.*
A51-100-24V•	24V	10.0	5.0	100	.83	3
A51-100-48 V	48V	7.0	3.0	100	.83	3
A51-100-120V	120V	2.0	1.2	100	.83	3
A51-250-24V	24V	15.0	5.0	250	2.1	6
A51-250-48V	48V	9.0	3.0	250	2.1	6
A51-250-120V	120V	3.5	1.6	250	2.1	6
A51-500-24V	24V	32.0	8.0	500	4.2	6
A51-500-48V	48V	15.0	5.0	500	4.2	6
A51-500-120V	120V	7.0	3.0	500	4.2	6
A51-1K-24V	24V	54.0	11.0	1K	8.3	†19
A51-1K-48V	48V	28.0	8.0	1K	8.3	†19
A51-1K-120V	120V	10.0	3.0	1K	8.3	†19
A51-1.5K-24V	24V	85.0	18.0	1.5K	12.5	16
A51-1.5K-48V	48V	37.0	9.0	1.5K	12.5	16
A51-1.5K-120V	120V	15.0	5.0	1.5K	12.5	16
A51-2K-48V	48V	50.0	10.0	2K	16.6	16
A51-2K-120V	120V	20.0	6.0	2K	16.6	16
A51-3K-48V	48V	77.0	18.0	3K	25.0	16
A51-3K-120V	120V	30.0	8.0	3K	25.0	16
A51-4K-48V•	48V	110.0	20.0	4K	33.3	51
A51-4K-120V•	120V	44.0	10.0	4K	33.3	51
A51-5K-48V	48V	128.0	20.0	5K	42.0	51
A51-5K-120V	120V	54.0	12.0	5K	42.0	51
A51-6K-48V	48V	178.0	42.0	6K	50.0	50
A51-6K-120V	120V	70.0	20.0	6K	50.0	50
A51-8K-48V•	48V	210.0	41.0	8K	66.7	50
A51-8K-120V•	120V	85.0	20.0	8K	66.7	50
A51-10K-48V•	48V	252.0	39.0	10K	83.3	50
A51-10K-120V	120V	99.0	20.0	10K	83.3	50
A51-12.5K-120V•	120V	130.0	26.0	12.5K	104.1	52
A51-15K-120V•	120V	156.0	30.0	15K	125.0	52
A51-20K-120V•	120V	208.0	42.0	20K	166.6	57



Note description for wall mounting

A-51 IN RACK MOUNT CASE

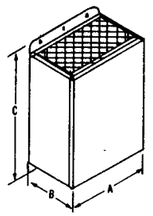
MECHANICAL SPECIFICATIONS

FINISH: Base material pretreated with zinc phosphate. Grey primer covering all base metal. Hammertone Grey baked enamel finish coat.

MOUNTING: Mounting flanges are supplied as part of the cabinet back plate on wall mounted units.

Case specifications are subject to change and where space requirements are critical it is best to check the plant for latest dimensions. Unit will be supplied in wall mount case unless otherwise specified.

CASE DIMENSIONS



CASE NO.	WIDTH	DEPTH	HEIGHT	MOUNTING
3	15⅜	11	23 1/16	Wall
6	25	11 9/16	27½	Wall/Floor
8	27¼	15	30½	Wall/Floor
19	27	17½	44½	Floor
16	27	26½	44½	Floor
50	48	28	72	Floor
51	34	28	72	Floor
52•	56	28	78	Floor
57•	60	38	80	Floor

•Denotes change or addition

*Due to design changes case dimensions can change

†#8 case optional

SAMPLE SPECIFICATIONS FOR MODEL A-51

The inverter to be furnished shall be La Marche Mfg. Co. Model A-51 or approved equal. A transistorized oscillator shall maintain the frequency at ±1% of 60 cycles with variations in load, input voltage, and temperature. The inverter shall employ a ferroresoant, sine wave filter and shall maintain the output voltage within ±3% from no load to full load (P.F.=1) with DC input variations of ±15%. The output waveshape shall be sine wave with less than 5% distortion. The overall efficiency of the inverter shall be better than 65%. The inverter shall be capable of operating at a rated output continuously at an ambient temperature of 50°C (120°F).

The inverter shall be convection cooled in a ventilated steel enclosure and painted a gray color. This inverter shall have:

1. Automatic current limiting.
2. Automatic regulation with load variations.
3. Automatic compensation for DC input changes.
4. Low voltage, overload, and short circuit protection.
5. Automatic regulation of frequency.
6. Fused DC input.
7. ON-OFF switch to operate solenoid, disconnecting the inverter from the battery.
8. Reverse polarity protection.
9. Quartz oscillator.

WHEN ORDERING PLEASE SPECIFY

1. La Marche model number.
2. Number and type of battery cells.
3. Ampere hour capacity of batteries.
4. AC loads.
5. Application.
6. Type and capacity of charging equipment.
7. Type of mounting, wall or rack mount.
8. Optional accessories.

OPTIONAL ACCESSORIES

1. AC and DC Circuit Breakers
2. Ground Detection
3. Low DC Voltage Relay
4. High DC Voltage Relay
5. DC Voltmeter and Ammeter
6. AC Voltmeter and Ammeter
7. Frequency Meter
8. Export Packing
9. Special Paint
10. Transfer Switch
11. Relay Rack Mounting
12. Automatic Load Demand Panel
13. Line Synchronization
14. Inverter/Line Phase Angle Meter
15. 50 Hz.
16. 120/240 Output

INSTALLATION AND OPERATING INSTRUCTIONS FOR INVERT-A-VOLT MODEL A-51

INSTALLATION

The La Marche Model A-51 Inverter is designed to supply 120 volt AC, 60 cycle, sine wave from a DC battery system. Since this unit is convection cooled, it is necessary to mount the inverter in a vertical position so that the expanded metal case openings are at the top and bottom with the nameplate right side up. A minimum of two (2) inches should be clear above and below the case. The unit should not be mounted in any space less than 10 times the volume of the case.

The Invert-a-volt can be damaged by high temperatures and should be mounted in an area that does not exceed an ambient temperature of 140°F.

Check the nameplate of the Invert-a-volt to make sure the correct type and number of battery cells is provided for the DC input to the inverter. Connecting wires from the inverter to the battery must be as short as possible and permanently fastened. When connecting the input cables to the battery make certain the positive lead to the inverter is connected to the positive terminal of the battery and a negative lead of the inverter to the negative terminal of the battery. The output terminals should then be connected to the AC load. *For correct AC and DC cable size consult table number 2.* Make certain the AC load demand does not exceed the continuous rating of the inverter. *Consult table number 1 for continuous ratings.*

OPERATION

The inverter is equipped with an on-off switch on the front of the case. Turning this switch on puts the inverter into operation.

PRELIMINARY TESTS

The inverter DC terminal voltage reading should be the same as the battery voltage and should agree with the nominal nameplate voltage. The inverter is designed to operate on a battery within a voltage range of 1.75 to 2.45 volts per cell (lead acid battery) or 1 to 1.55 volts per cell (nickel cadmium battery).

The AC output load wires should be disconnected or all AC loads turned off. Turn the inverter on and measure the AC output voltage.

Reconnect the load wires or turn on the AC loads. Turn on the inverter to power the load. The voltage drop should be checked between the inverter and the battery when the inverter is operating. A very slight voltage drop will indicate a good installation.

SAFETY PROTECTION

The low voltage protection feature protects the inverter in the event the DC input voltage is low. The DC contactor will not operate to power the inverter unless the voltage is correct. This also protects the batteries from excessive discharge.

Should the continuous rating of the Invert-a-volt be exceeded due to an overload or short circuit, the unit will go into a current limit mode of operation.

Excessively high DC input voltages may damage the inverter, therefore, a high voltage protection circuit is employed to protect the inverter and shut the unit off. If the DC input is shorted to the AC output of the inverter, the unit will not be damaged.

CHARGING EQUIPMENT

A generator or charger should be used to maintain the inverter batteries. The charging equipment should be sized so that it will keep the battery charged and carry the average DC load to the inverter.

The maximum "on charge" voltage of the charging equipment should be adjusted so that voltage does not exceed 2.45 volts per cell on lead acid batteries or 1.5 volts per cell on nickel cadmium batteries. If the on charge voltage exceeds the above values, the inverter high voltage protective circuitry will automatically turn the inverter off.

BATTERY SIZE

The battery size is an important consideration in successful inverter operation. The amp hour capacity of the battery must be large enough so that the voltage will not drop below 1.75 volts per cell when the inverter is operating at its full load capacity. If the inverter is to operate on the battery continuously without charging equipment, the battery size must be large enough to carry the inverter load for the length of time required. Other DC loads on the battery must also be considered in sizing the battery. The number of battery cells must agree with the nameplate rating of the inverter, otherwise the inverter will not operate correctly.

TABLE NO. 2

The table below gives wire sizes based on an assumed wire distance of not over 25 feet from the invert-a-volt to the batteries. At distances exceeding 25 feet, the DC wire size should be chosen to keep the voltage difference between the inverter terminals and the battery at less than ½ volt when the inverter is fully loaded.

	WIRE SIZE	
	DC INPUT	AC OUTPUT
A51-100-24	14	18
A51-100-48	14	18
A51-100-120	18	18
A51-250-24	10	18
A51-250-48	14	18
A51-250-120	16	18
A51-500-24	8	16
A51-500-48	10	16
A51-500-120	14	16
A51-1K-24	6	14
A51-1K-48	8	14
A51-1K-120V	12	14
A51-1.5K-24V	4	12
A51-1.5K-48V	8	12
A51-1.5K-120V	10	12
A51-2K-48	6	10
A51-2K-120	8	10
A51-3K-48	4	8
A51-3K-120	8	8
A51-4K-48•	2	6
A51-4K-120•	6	6
A51-5K-48	2	6
A51-5K-120	6	6
A51-6K-48	1	6
A51-6K-120	4	6
A51-8K-48•	1/0	4
A51-8K-120•	4	4
A51-10K-48•	2/0	4
A51-10K-120	2	4
A51-12.5K-120•	1	2
A51-15K-120•	1	2
A51-20K-120•	1/0	1

ADJUSTMENT INSTRUCTIONS FOR MODEL A-51

The inverter is factory tested and adjusted so that no field adjustments are necessary upon installation. Should field adjustments become necessary, apply the following:

Two potentiometers are provided for adjusting the inverter.

P2 Under voltage cut-out

P3 Over voltage cut-out

UNDER VOLTAGE CUT-OUT POTENTIOMETER P2

Should the d-c input voltage drop below the voltage setting of this potentiometer, the inverter will automatically turn off. The inverter will automatically turn on again, after a time delay, when the input voltage is restored to normal. The factory low d-c voltage cut-out point is set at 1.75 volts per cell for lead acid batteries and 1.1 volts per cell for nickel cadmium batteries. If the inverter does not start, due to misadjustment of low potentiometer setting, proceed as follows:

1. Check input voltage for normal (2.17 LA, 1.4 NC) input voltage.
2. Turn potentiometer P2, fully counterclockwise.
3. Turn switch on, start inverter.
4. Lower d-c input (apply load or reduce cells) until the low voltage setting is reached (1.75 volts per cell, lead acid, 1.1 volts per cell, nickel cadmium).
5. Raise the cut-out voltage setting by turning potentiometer P2 in the clockwise direction. When the cut-out voltage is reached, the inverter will turn off.
6. When the voltage returns to normal, the inverter will automatically turn on after a two second time delay.
7. The adjusting screw should be resealed to prevent further movement.

OVER VOLTAGE CUT-OUT POTENTIOMETER P3

The over voltage cut-out potentiometer is located on the over and under voltage protection printed circuit card AC3. This potentiometer is located to the right of the under voltage potentiometer (see schematic).

The over voltage cut-out will turn the inverter off should the d-c input voltage exceed the high voltage setting. Potentiometer P3 is factory set at 2.5 volts per cell for lead acid batteries and 1.65 volts per cell for nickel cadmium batteries.

Adjusting instructions are as follows:

1. Check input voltage for normal output.
2. Turn adjusting screw on potentiometer P3 on PC card AC3, clockwise. This will raise the voltage cut-out point.
3. Turn switch on, start inverter.
4. Raise the d-c input voltage. Adjust the charger voltage to 2.5 volts per cell (lead acid), 1.65 volts per cell (nickel cadmium).
5. Turn the potentiometer adjusting screw counterclockwise to lower the cut-out voltage until the inverter shuts off.
6. The inverter will automatically turn on when the voltage is returned to normal after a two second time delay.
7. Reseal the adjusting screw to prevent further movement.

TROUBLESHOOTING GUIDE FOR A-51 INVERTERS

INSTALLATION

If the unit is newly installed and does not function, recheck installation and operating instructions.

Check the nameplate data — input voltage, input and output connections, fuses, etc. Check to see that terminals 1 and 2 on the terminal board are jumpered.

Check reverse polarity fuse (F3). If fuse blows, check input cables for reverse polarity.

OPERATING FAILURE (See Procedure)

I. D-C input fuse blows.

A. Check power stage.

B. Check surge and DV/DT protection.

C. Check oscillator printed circuit card.

D. Check over and under voltage protection printed circuit card.

E. Check Resonating Capacitors C3.

II Fuses good — no output volts.

A. Contactor does not pull in.

B. Contactor pulls in but output voltage is zero or low.

PROCEDURE

I. A. Power Stage

1. Remove small 4 amp fuse F2. Removing this fuse de-energizes the pilot start relay which controls the main contactor. The oscillator is also de-energized so that the gates to the silicon controlled rectifiers (SCR) are not energized.

2. Manually close the contacts DK-1 of relay DK. This connects the battery to the mainpower stage. If the SCR's are shorted, the relay contacts will draw a big arc. If the contacts remain closed, the main d-c fuse F1 will blow.

   On small low voltage units, the contactor may be totally enclosed. In this case, the relay contacts can be closed by energizing the relay. To energize the relay, turn on the on-off switch and short out terminals 3 and 5 on the over and under voltage card AC3.

   If the main fuse blows, one of the feedback diodes SD1 and SD2 or the SCR's may be shorted. Check the SCR's as follows: Disconnect the leads to the cathodes of the SCR's. Disconnect the gates at terminals 2 and 7 of the surge and DV/DT card AC5. Check the continuity of the SCR's with an ohmmeter. Clip the ohmmeter leads to the anode (heatsink) and cathode, check continuity, reverse leads or polarity and check continuity again. The meter should read open circuit in both polarity directions.

3. Check feed back diodes SD1 and SD2. Disconnect the wire to the cathode end (pigtail) of the diode so that one end of the diode is free. Check continuity with ohmmeter from pigtail end of diode to the heatsink. Ohmmeter should read continuity in one direction and high resistance in the other.

4. The commutating capacitors can be checked for a shorted or open condition with an ohmmeter. Disconnect the wires from the capacitor terminals, and momentary short the terminals to insure that the capacitor is discharged. Connect the ohmmeter leads to the capacitor terminals. The meter should indicate a low initial resistance and gradually increase to a high resistance.

5. Check surge protector SP1, SP2 mounted near the SCR's. Isolate SP1, SP2. Ohmmeter reading should be open for both polarities. The inverter can also be operated without the suppressors.

I. B. Check surge and DV/DT protection card. If the SCR's in test I. A. are not shorted, the DV/DT circuit may be shorted.

1. Reconnect all wires disconnected in test I. A.

2. Remove wires from terminals 4 and 5 of the surge and DV/DT card AC5. This completely disconnects the snubber circuits.

3. Try to start the unit by turning the DC switch to the "ON" position. The inverter may be operated with these terminals disconnected.

4. If fuse still blows, check the diodes in the card AC5.

I. C. Check oscillator printed circuit card AC2. Replace fuse F2. Turn on-off switch off.

1. Put a piece of paper (insulator) between the contacts of relay DK so that when the relay is energized, the contacts will be insulated and not make contact. If the relay is a totally enclosed type, remove the heavy wire from one side of the relay contact to open the main circuit.

2. Turn on the on-off switch DCS. The unit should be energized except for the power stage.

3. Check the control voltage at terminals 1 and 2 on the over and under protection card AC3. This voltage should measure approximately 26 volts with a d-c input float voltage of 2.17 volts per cell (lead acid), 1.4 volts per cell (nickel cadmium).

4. Check the output of the oscillator at the output terminals of the oscillator transformer OT. The a-c output voltage at terminals 4 and 5, and 5 and 6 should be approximately 4 volts. If no voltage is measured at these points, turn the on-off switch off and remove the wires from terminals 4 and 6 of the oscillator transformer OT. Turn the inverter on and measure the voltage again as above. If no voltage is measured, the oscillator card should be replaced. Note, turn the on-off switch off before reconnecting the oscillator leads.

I. D. Check over and under voltage protection printed circuit card. The main fuse may blow due to a defective timing circuit in the over and under voltage card AC3. The timing sequence is as follows: When the on-off switch (DCS) is turned on, the oscillator panel AC2 is energized immediately. Card AC3 is also energized and its timing circuit begins timing. After a two second delay, a pilot relay is energized and its contacts close connecting terminals 3 and 5. These terminals in turn apply voltage to DK. DK operates to energize the power stage. The time delay allows the oscillator time to start so that the gates of the SCR's are properly energized when the power circuit is connected.

1. The time delay can be manually checked by disconnecting the wire from terminal 5 of AC3. Turn the on-off switch on. This will energize the oscillator and the gates to the SCR's should be properly firing. Connect a jumper wire — one end to the disconnected wire from terminal 5, the other end of the jumper wire to touch firmly to terminal 5. The contactor should energize immediately and the inverter should operate.

2. If the inverter starts and runs when manually started (per I. D. 1.), turn the on-off switch off and reconnect the wire to terminal 5.

3. Turn the on-off switch on. If the contactor pulls in immediately with no time delay and the fuse blows, the timing circuit is defective. Replace the over and under voltage protection card AC3.

I. E. Check Resonating Capacitor C3 as in step I. A. 4.

II. Fuses good — no output volts.

A. Contactor does not pull in.

1. Check input voltage and jumper between terminals 1 and 2 on Main Terminal Board.

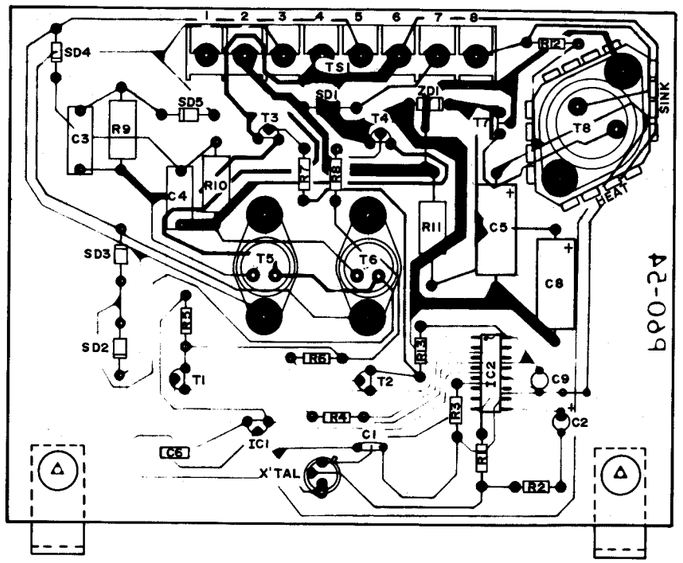
2. The over or under voltage setting may be outside of the limits of the input voltage. See adjustment instructions.

3. If the input voltage is proper for the unit and the main contactor does not pull in, the contactor can be energized by jumpering terminals 3 and 5 on the over and under voltage card AC3. Note, the on-off switch must be turned on before terminals 3 and 5 are jumpered. See I. D. If the inverter starts and runs, check the pilot relay on the card or replace the card AC3.

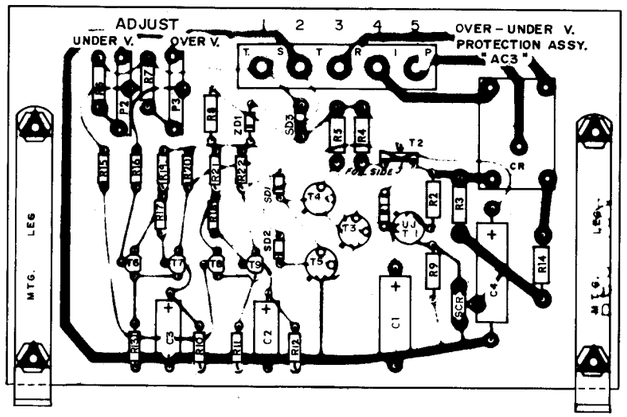
B. Contactor pulls in but output is 0 or low.

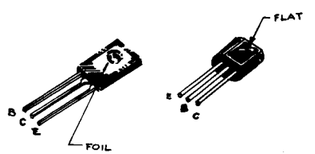
1. If the inverter starts and runs but the output voltage is low, capacitors C3 may be open or leaky. Voltage across capacitors should be approx. 660 volts A.C. Check as per 1. A. 4.

2. Check for broken wires. Voltage checks can be made from terminals 4 and 5 of the power transformer PT, through the a-c output terminals.

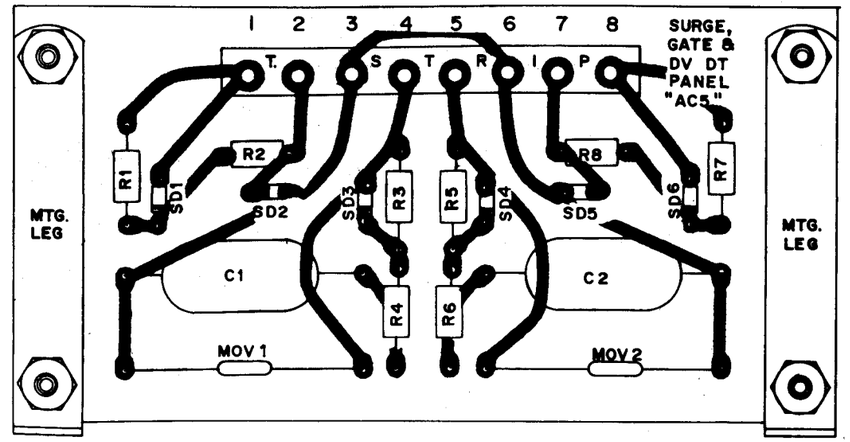


PLACEMENT PARTS FOR A51 QUARTZ CRYSTAL OSCILLATOR PANEL

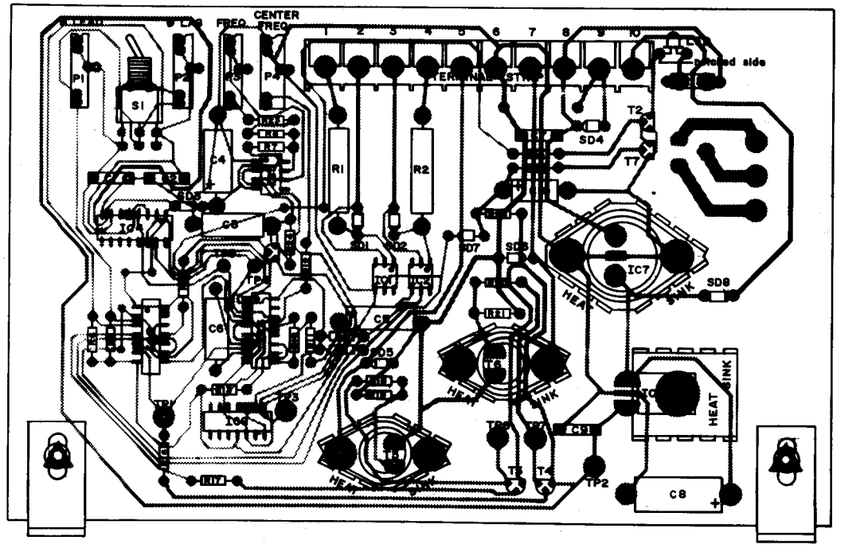




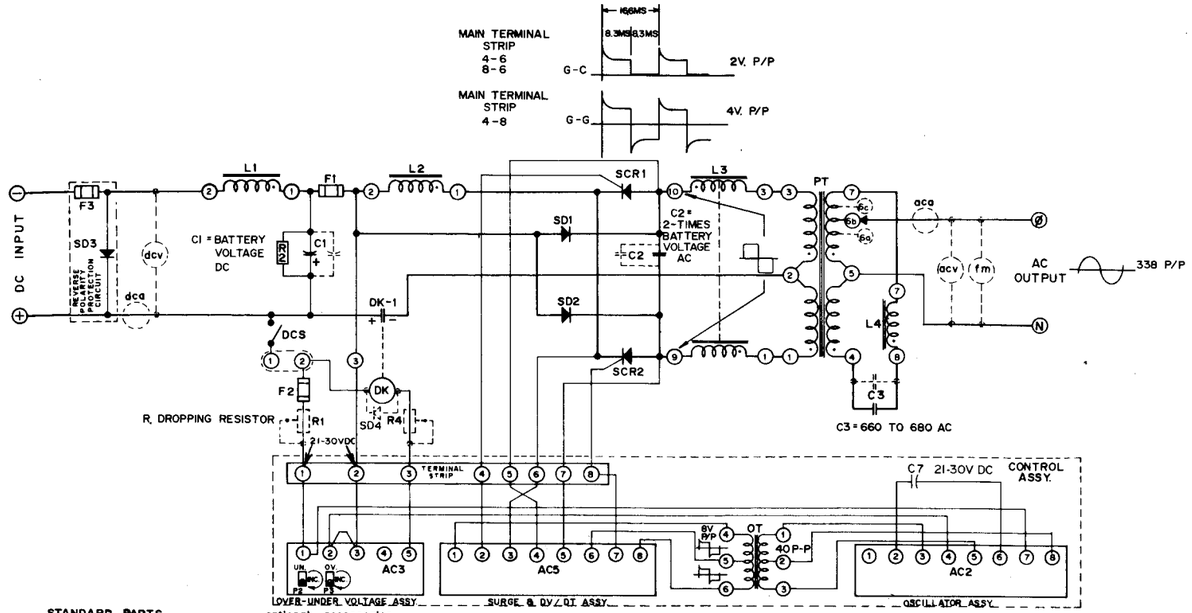
PICTORIAL ASSEMBLY OF OVER-UNDER VOLTAGE PROTECTION ASSEMBLY



SURGE, GATE & DV/DT PANEL ASSEMBLY



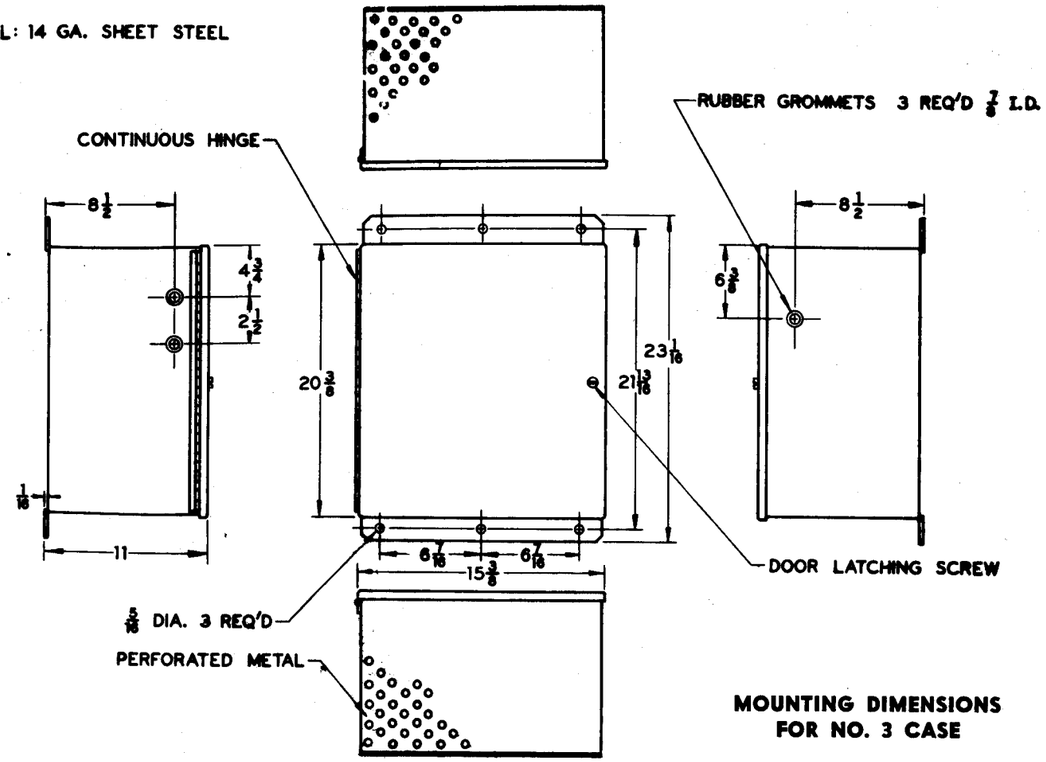
PARTS PLACEMENT ASSEMBLY MODEL A51 OPTIONAL LINE SYNC. / OSCILLATOR ASSY.



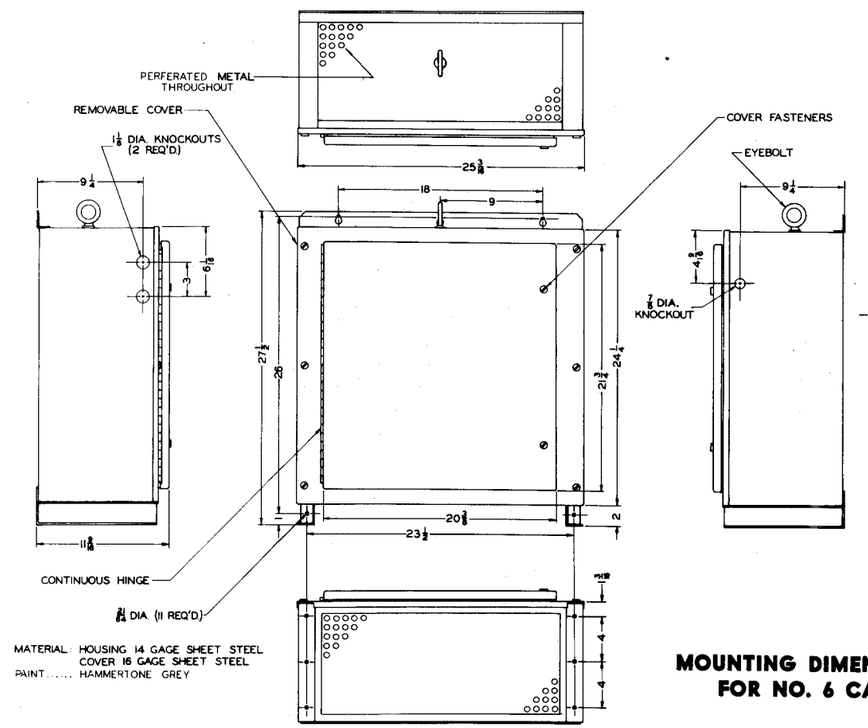
NOMENCLATURE	STANDARD PARTS		optional accessories	
F	FUSE		dca	dc ammeter
L	CHOKE		dcv	dc voltmeter
C	CAPACITOR		fm	frequency meter
R	RESISTOR		aca	ac ammeter
SD	SILICON DIODE		acv	ac voltmeter
DK	DC CONTACTOR			
SCR	SILICON CONTROLLED RECT.			
PT	POWER TRANSFORMER			
DCS	DC SWITCH			
OT	OSCILLATOR TRANSFORMER			

SCHEMATIC WIRING DIAGRAM OF MODEL A51E DC TO AC INVERTER

MATERIAL: 14 GA. SHEET STEEL

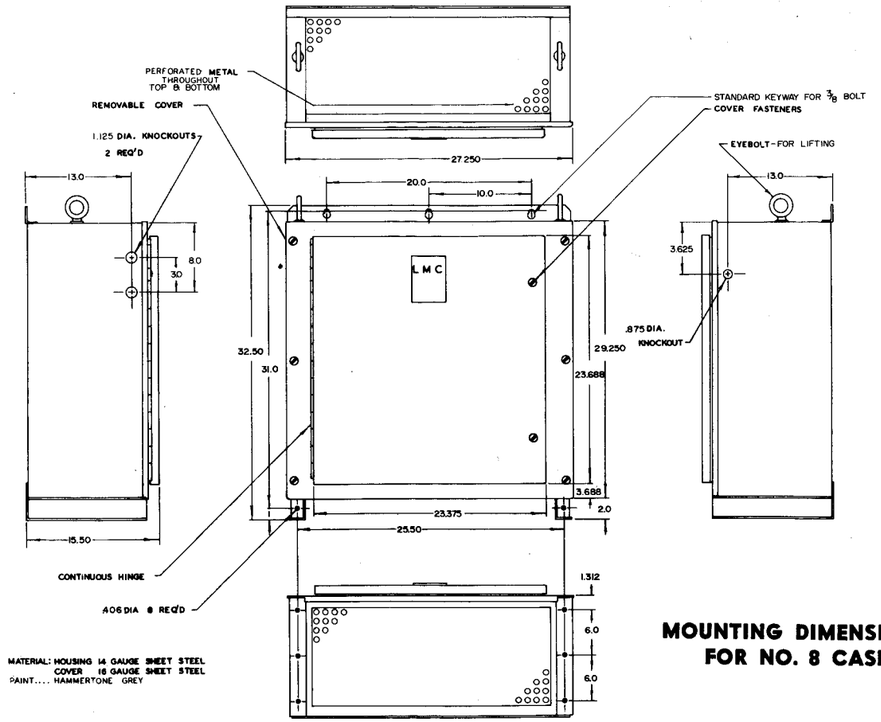


MOUNTING DIMENSIONS FOR NO. 3 CASE

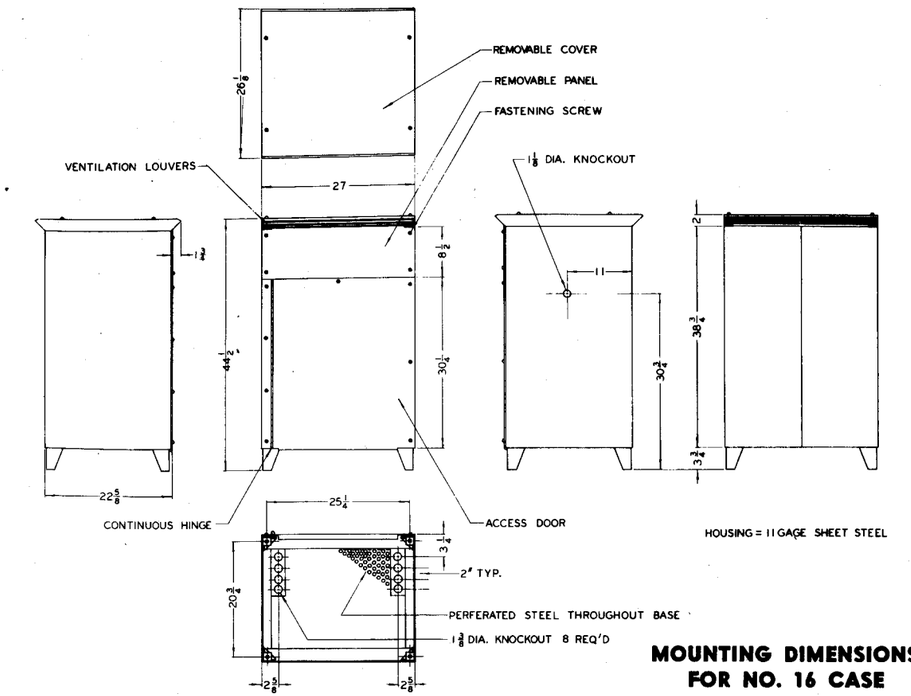


MATERIAL: HOUSING 14 GAGE SHEET STEEL
COVER 16 GAGE SHEET STEEL
PAINT..... HAMMERTONE GREY

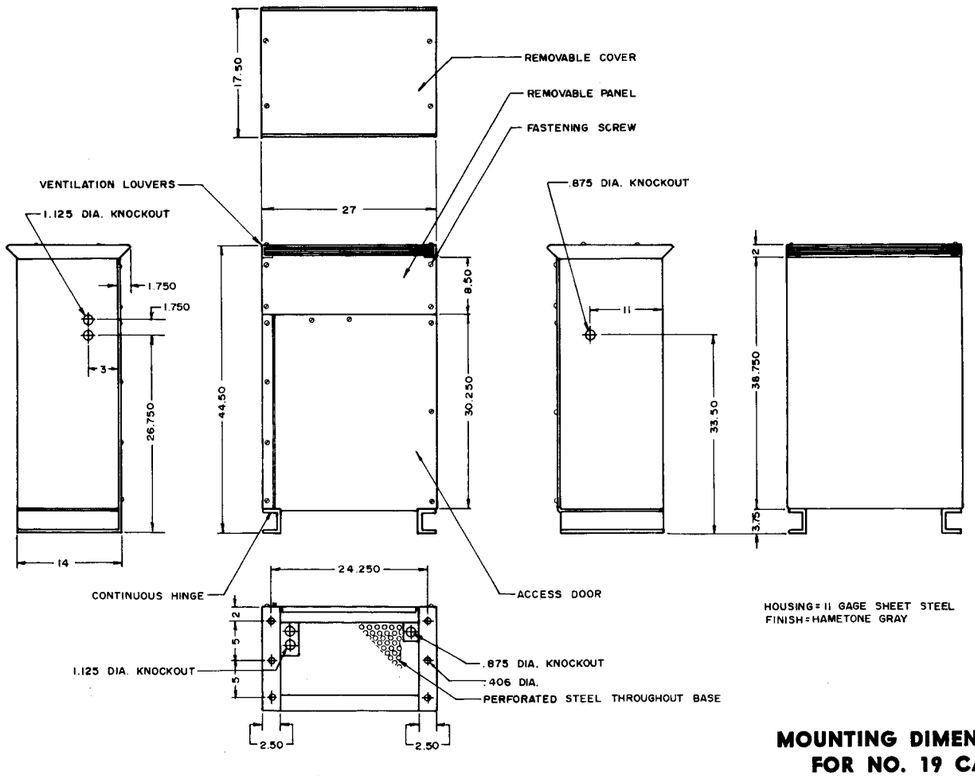
MOUNTING DIMENSIONS FOR NO. 6 CASE



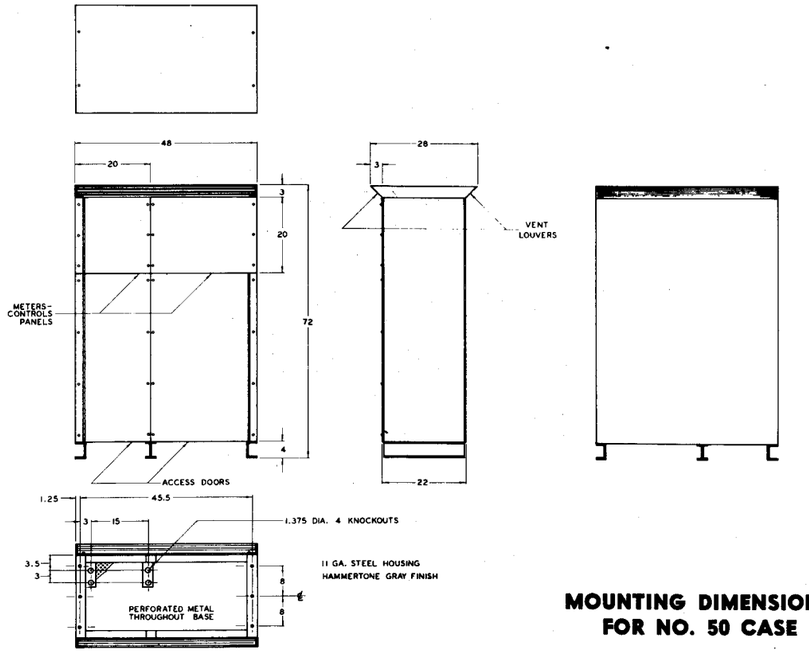
MOUNTING DIMENSIONS FOR NO. 8 CASE



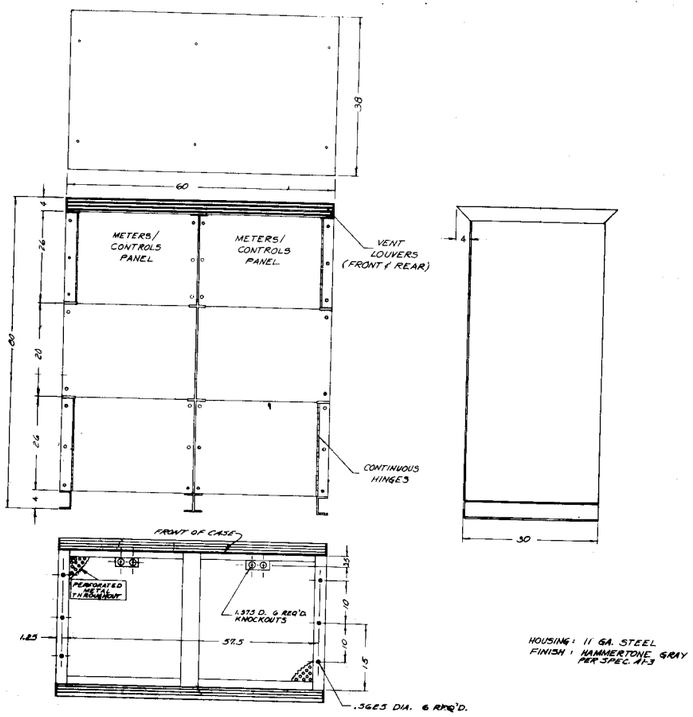
MOUNTING DIMENSIONS FOR NO. 16 CASE



MOUNTING DIMENSIONS FOR NO. 19 CASE

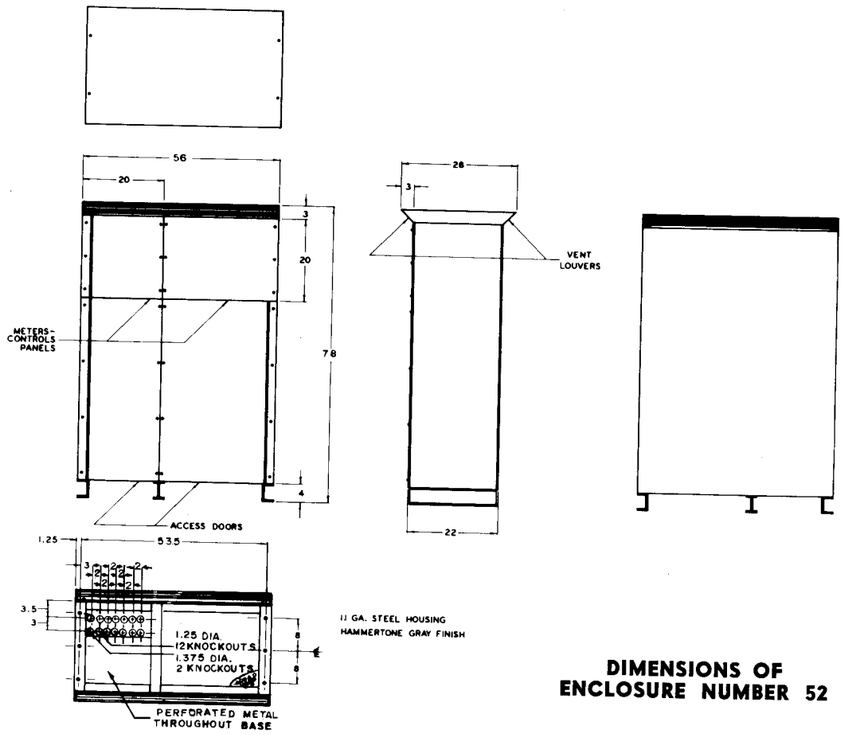


MOUNTING DIMENSIONS FOR NO. 50 CASE



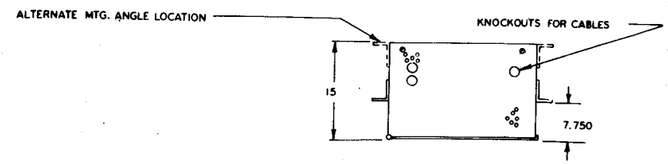
HOUSING: 11 GA. STEEL
FINISH: HAMMERTONE GRAY PER SPEC. A1-3

MOUNTING DIMENSIONS OF #57 CASE

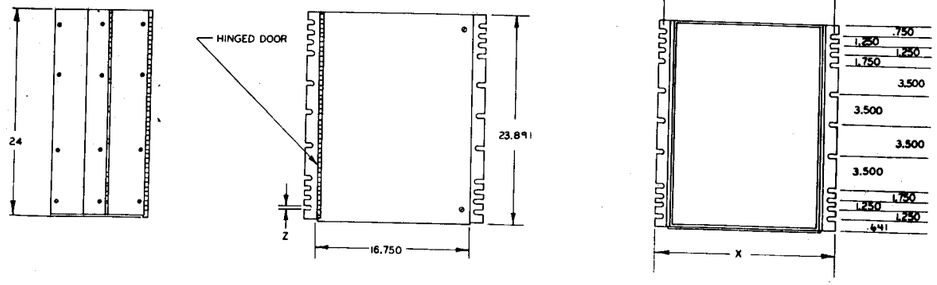


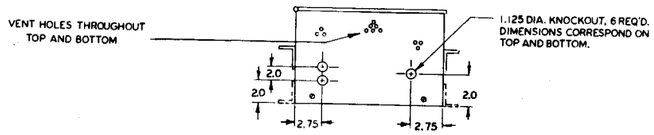
11 GA. STEEL HOUSING
HAMMERTONE GRAY FINISH

DIMENSIONS OF ENCLOSURE NUMBER 52



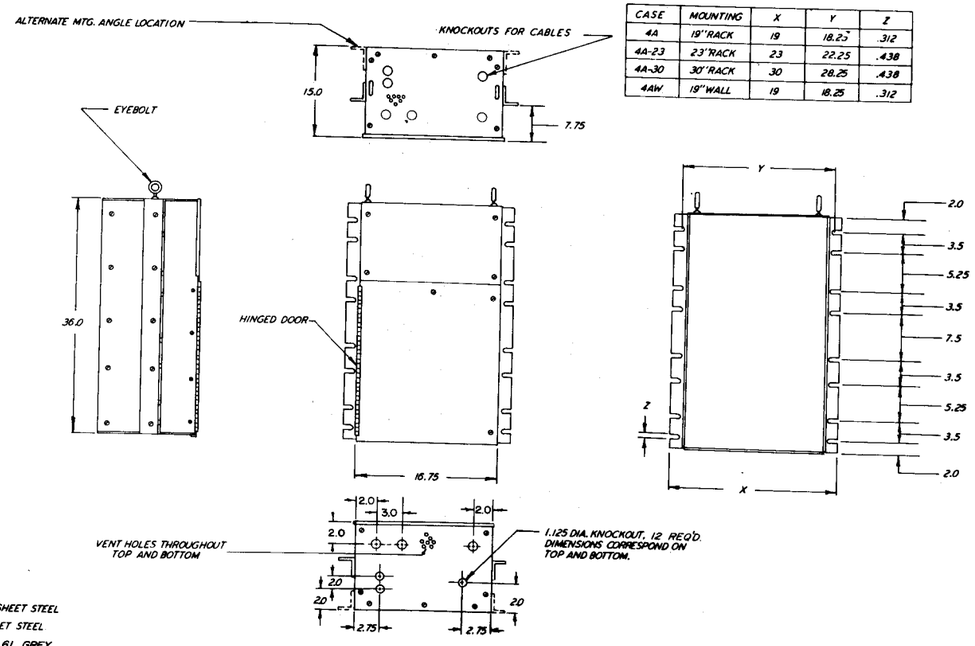
CASE	MOUNTING	X	Y	Z
4	19" RACK	19	18.250	.312
4-23	23" RACK	23	22.250	.438
4-30	30" RACK	30	28.250	.438
4W	19" WALL	19	18.250	.312





MATERIAL:
HOUSING – 14 GAUGE SHEET STEEL
COVER – 16 GAUGE SHEET STEEL
FINISH – ASA 61 GRAY

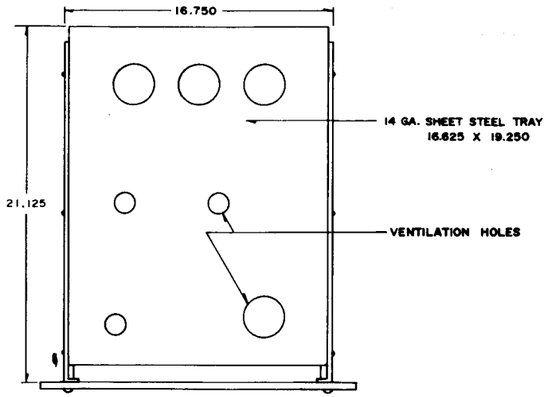
MOUNTING DIMENSIONS OF #4 CASE



CASE	MOUNTING	X	Y	Z
4A	19" RACK	19	18.25	.312
4A-23	23" RACK	23	22.25	.438
4A-30	30" RACK	30	28.25	.438
4AW	19" WALL	19	18.25	.312

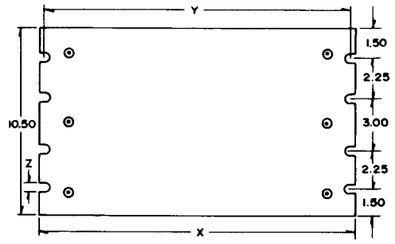
MATERIAL:
HOUSING – 14 GAUGE SHEET STEEL
COVER – 16 GAUGE SHEET STEEL
FINISH – ANSI NO. 61 GREY SULLIVAN PAINT NO. 23GY-4735 PER LA MARCHE ENG. SPEC. A1-3.

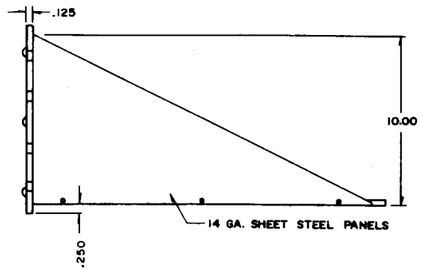
MOUNTING DIMENSIONS OF #4A CASE



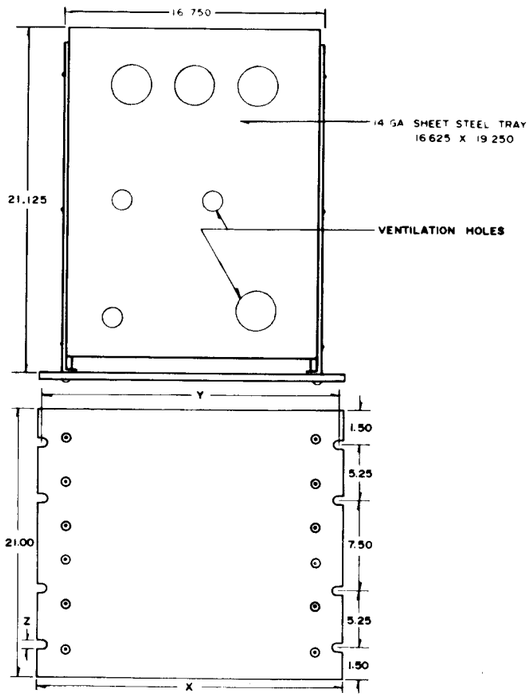
CASE	MOUNTING	X	Y	Z
5	19" RACK	19.000	18.250	.312
5-23	23" RACK	23.000	21.750	.438
5-30	30" RACK	30.000	28.750	.438

ALL DIMENSIONS ARE IN INCHES.
FINISH: SULLIVAN GREY PAINT NO. 5401



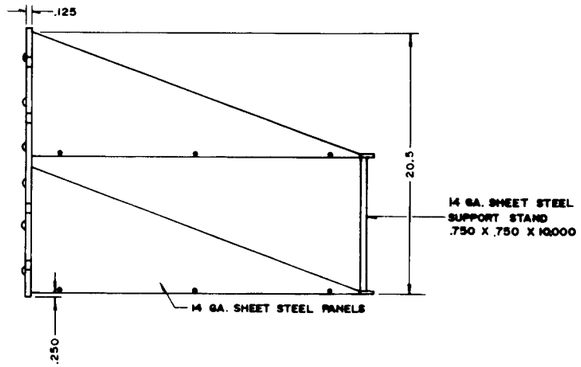


MOUNTING DIMENSIONS OF #5 CASE

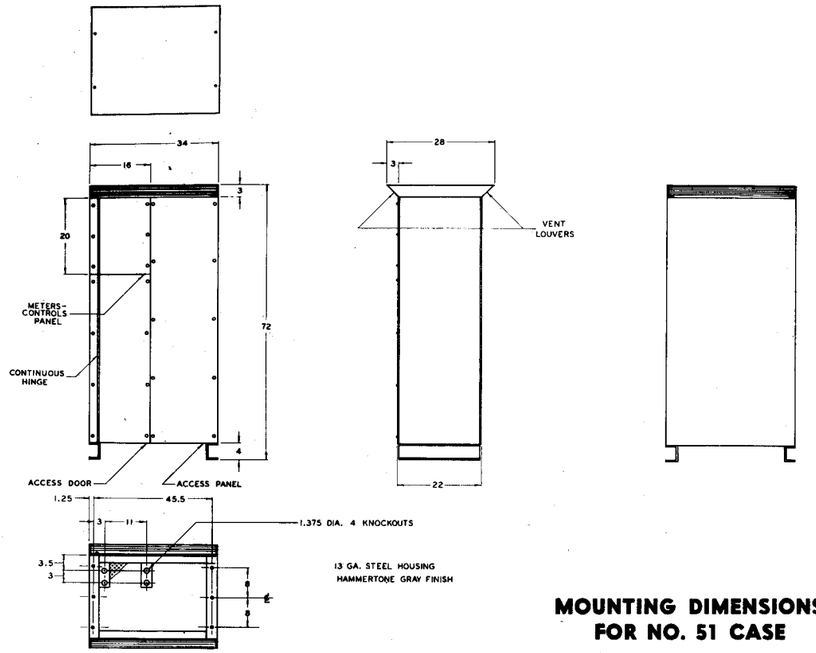


CASE	MOUNTING	X	Y	Z
5A	19" RACK	19.000	18.250	312
5A-23	23" RACK	23.000	21.750	438
5A-30	30" RACK	30.000	28.750	438

ALL DIMENSIONS ARE IN INCHES
FINISH: SULLIVAN GREY PAINT NO. 5401



MOUNTING DIMENSIONS OF #5A CASE



MOUNTING DIMENSIONS FOR NO. 51 CASE

LA MARCHE
Manufacturing Company

MANUFACTURER'S WARRANTY

All La Marche Mfg. Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is guaranteed to be free from any defect in workmanship and material that may develop within a period of one year from date of purchase.

Any part or parts of the equipment that prove defective within a one year period shall be replaced without charge when subjected to examination at our factory, providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse or misapplication. All such adjustments are made F.O.B. Des Plaines, Illinois.

Contact your local sales representative for minor parts replacement or equipment adjustments.

Should a piece of equipment require major compo nent replacement or repair, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts, replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the dealer from whom the equipment was purchased will obtain authorization from the factory. If, upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and repairs at the equipment location, field service rates will apply. A purchase order to cover such service must be issued.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche Sales Office should be contacted to provide this service.

All sales are final. Only standard La Marche units will be considered for return. A 10% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Mfg. Co. have any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Mfg. Co. renders this warranty null and void.

La Marche Mfg. Co. reserves the privilege of making revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Mfg. Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty supersedes and is in lieu of all other warranties, expressed or implied, and no person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the Manufacturer.