mi

modern industries INC



"MANUFACTURERS
OF
RAILROAD EQUIPMENT"

100 OUTER LOOP
P. O. BOX 14287
LOUISVILLE, KY. 40214
PH. 502/361-1113

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Subject: MATERIAL AND INSTALLATION PACKAGES FOR
HIGHWAY CROSSING WARNING DEVICES

As the above subject indicates we are in the Railroad Signal Business; we manufacture and install systems throughout the country. We have been manufacturing and installing these highway crossing warning systems since 1964. We have many satisfied customers and sure would like to add you to the list.

Our specialty is "Highway Crossing Warning Devices" which are mainly funded by State and Federal Governments. Our engineering staff will field survey and design the signal system to meet your individual operation requirements and provide maximum safety at the lowest possible cost.

Our construction crews are equipped with a special designed tractor-trailer and all equipment necessary to install your signal system in an efficient and workable manner. We deliver and handle all materials with our forces, which eliminates all labor and storage expense for you.

Our material and installation meet or exceed A.A.R., A.A.S.H.T.O. and State and Federal D.O.T. Standards.

In addition, we carry in stock for immediate delivery and emergencies, various items of maintenance materials such as bond wires, lens, insulation, gate arms, flashing lights, masts, bases, track rectifiers, signs, bulbs, reflectors, etc.

We feel we can be of service to you, either by installing your signal systems or by furnishing the material only. We look forward to hearing from you in the very near future.

Very truly yours,

MODERN INDUSTRIES, INC.

Garry K. Caudill
Manager - Signal Division

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# PRODUCT INDEX


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| | B | WALKOUT CANTILEVER SIGNALS |
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|---|---|---|
| 4 | | HOUSINGS |
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| | B | INSTRUMENT HOUSES |
| | C | TELEPHONE BOXES |
| | D | CASE MOUNTED BOXES |
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| | F | CASE ACCESSORIES |
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| 5 | A | FOUNDATIONS |
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| | A | TRANSFORMERS |
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| SECTION NUMBER | SUB-SECTION NUMBER | PRODUCT |
|---|---|---|
| 9 | A | WIRED HOUSINGS AND SIGNAL INSTALLATIONS |
| 10 | A | HOT BOX DETECTOR ACCESSORIES |
| 11 | A | WHEEL DETECTORS |
| 12 | A | ROD AND SWITCH HARDWARE |


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# PRODUCT AND SERVICES LIST

## HOUSING

1. A complete line of Instrument Cases ranging from 17" wide models to 9'8" four door cases. Cases are arranged for external foundation mounting and a wide variety of pole and wall mounted cases are available.

2. A complete line of Instrument Houses from 4' X 6' to 10' X 40' models are available. Interior arrangements are made to suit your needs. Adjustable wood or metal shelves, wood or plastic wire way, wall mounting arrangements, plug-in relay swing and stationary racks, and accessories such as battery racks and special ventilating fans are all available.

3. A wide variety of communication type housing such as Hot Dipped Galvanized Steel Telephone Boxes, Terminal Boxes and pole mounted Line Junction Boxes.

## MASTS, LADDERS AND BASES

1. A complete line of Aluminum Masts drilled for mounting standard Flashing Light Signals and Flashing Light Signal Sidelights.

2. A complete line of Aluminum Masts drilled for mounting Side, Front or Top of Mast Mounting Colorlight, Searchlight or Position Light Signals.

3. Galvanized Steel Ladders, Platforms, Hand Rails and Braces are available to your specifications.

4. A complete line of Cast Aluminum Split and Junction Box Bases, Split Bases for 2 inch, 3 inch, 4 inch and 5 inch masts are available. 4 inch and 5 inch single and double Junction Box Bases with maximum number of AAR Terminals are in stock.

5. Special Bridge Signal Masts, Ladders, Bases and Structures.

6. Conduit, fittings, clamps, front and side of mast mounting brackets for above.

## FOUNDATIONS

1. A complete line of Galvanized Steel Instrument Case Piers, Flashing Light Signal and Gate Foundations, Wayside Signal Foundations and special foundations such as Talk Back Speaker Foundations are all available.

## COLORLIGHT SIGNALS

1. A complete line of Cast Aluminum 8-3/8" Doublet Lens Signals with S-11 Type Lamps can be arranged for Top, Side or Front of Mast mounting.

2. Two and Three Position Colorlight Dwarf Signals with 6-3/8" doublet lens can be arranged for either Ground or Suspended mounting.

3. A variety of single unit Marker Lights of both reflector and doublet lens design are available.

## HIGHWAY CROSSING PROTECTION

1. A complete line of Standard AAR Flashing Light Signals, Cantilever Type Signals and Automatic Crossing Gates are available.

2. Adjustable Wooden Gate Arms from 14' to 40', with reflective stripes, are in stock for immediate delivery.

## SIGNS

A complete line of extruded and sheet aluminum reflective signs. Most standard signs are stocked for immediate shipment. Special signs will be manufactured to your specifications.

## ACCESSORIES

1. Bootleg Kits

2. Standard and special lenses of all types.

3. Cast Aluminum Push Button Boxes for manual control.

4. Meters and test equipment.

5. Protective devices and shields for track mounted equipment.

## SERVICES

1. Complete engineering and fabrication of steel and aluminum structures or parts.

2. Complete engineering, design and factory wiring of Railway Signal Systems.

3. Repair of all signal apparatus.

4. Field service engineering.

5. Stampings and custom machining of obsolete parts.

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MODERN INDUSTRIES, INC.

TERMS AND CONDITIONS OF SALE

ALL ORDERS SHALL BE MADE OUT TO THE COMPANY AND SHALL BE SUBJECT TO ACCEPTANCE BY US.

1. CONSTRUCTION AND LEGAL EFFECT. Our sale to you will be soley upon the terms and conditions set forth herein. They supersede and reject any conflicting terms and conditions of yours, any statement in yours to the contrary notwithstanding. Exceptions to any of our terms and conditions must be contained in a written or typed (not printed) statement received from you. We shall not be deemed to have waived any of our terms and conditions or to have assented to any modification or alteration of such terms and conditions unless such waiver or assent is in writing and signed by an authorized officer of seller.

   No representation of any kind has been made by us except as set forth herein; this agreement conclusively supersedes all prior writings and negotiations with respect thereto and we will furnish only the quantities and items specifically listed on the face hereof; we assume no responsibility for furnishing other equipment or material shown in any plans and/or specifications for a project to which the goods ordered herein pertain. Any action for breach of contract must be commenced within one year after the cause of action has occurred. Our published or quoted prices, discounts, terms and conditions are subject to change without notice.

2. PRICES. Unless otherwise noted on the face hereof, prices are net F.O.B. our factory and firm for thirty (30) days. Service time of a factory-trained service representative is not included and may be charged extra. The amount of any applicable present or future tax or other government charge upon the production, sale, shipment or use of goods and services ordered or sold will be added to billing unless you provide us with an appropriate exemption certificate.

3. WARRANTY. Modern Industries, Inc. warrants its signals and track equipment against defects in material and workmanship for a period of one year from date of shipment. All electronic equipment is warranted for a period of one (1) year from date of installation. Sellers entire warranty obligation is limited to repairing or replacing any equipment which is returned within the warranty period and which the seller finds to be so defective.

   The integrity of custom-designed equipment, systems or other engineering services performed by Modern cannot be finally checked until all devices and circuits are connected to form a complete system or an effective portion thereof. Such a system or portion thereof must be given a complete circuit and operational test by the user before being accepted and placed in regular operation. Once accepted, Modern's warranty will be limited to parts that have been fully paid for.

   Modern warrants the equipment of other manufacturers which it supplies and which has been fully paid for only to the extent of the regular warranty of those manufacturers.

   Return of equipment to Seller is at Buyer's risk and expense. Equipment returned to Seller must be clearly identified and instructions must be furnished for reshipment to Buyer of the repaired or replaced equipment. Equipment will be returned to the Modern plant of original manufacture.

All export taxes, fees and duties occuring from warranty shipments beyond the continental United States will be Buyer's responsibility.

Adjustments will not be allowed for products or components which have been subject to abuse, alteration, improper handling or installation, or which have not been operated in accordance with Seller's instructions or repaired in accordance with Seller's approved parts list and procedure manual. Alteration or removal of any serial number or identification mark voids the warranty.

4. CANCELLATION AND RESTOCKING OF ORDERS. This policy defines the terms and conditions under which Modern Industries, Inc. will accept purchase order cancellation and/or the return of Modern's equipment for restocking.

   CANCELLATION OF ORDERS - Purchase order cancellations received prior to shipment of the ordered equipment from the designated Modern factory may, at Modern's discretion, be accepted at no cost to the Buyer provided that:

   A. The cancelled equipment is standard Modern stock.
   B. The equipment is in a standard configuration and has not been altered or specially modified to Buyer's requirements.
   C. The cancellation magnitude is such that Modern does not incur undue hardship and coincident costs in returning the cancelled equipment to stock.

   Should the above conditions not prevail, a cancellation charge will be established on a percentage of completion basis.

   RESTOCKING - A restocking charge of 15 percent of the total selling price will be charged by Seller on equipment returned to Modern for credit and/or exchange under the following conditions:

   A. The cancelled equipment is standard Modern stock and is returned with the prior approval of Modern.
   B. Modern reserves the right to refuse acceptance of returned equipment which is not in an "as new" condition or which has been altered or modified to meet Buyer's special requirements.
   C. Modern reserves the right to refuse the return of equipment which may cause excessively high inventories.
   D. Material returned to Modern for restocking will be at the Buyer's expense and risk.

5. OUT OF WARRANTY - Modern Industries, Inc. establishes this policy to cover repair or replacement of equipment sold by Modern which has had the one-year warranty period expire. Modern will repair or replace such equipment at Customers' expense pursuant to the following terms and conditions:

   A. The customer shall return the equipment to the designated Modern factory at the customer's expense and risk, including repaired, replacement and reshipment to Buyer.

   B. When the equipment is repaired and returned the customer will be invoiced for repair of the equipment based on total cost of labor and materials used for repair, tests, inspection, return transportation charges, etc.

C. The warranty established in Modern's warranty policy for its equipment applies to new equipment only. No warranty, expressed or implied, applies to equipment repaired and returned under this policy.

D. If it is determined by Modern that the repair cost per item will exceed 50 per cent of the then selling price of a new replacement, the customer will be so notified. Modern will await customer's advice to repair or replace the defective item before proceeding with any repairs.

E. All export taxes, fees and duties occurring from out-of-warranty shipments beyond the continental United States will be the customer's responsibility.

6. CREDIT AND PAYMENT. Unless otherwise noted on the face hereof, terms are net thirty (30) days. We may decline to deliver except for cash, or stop goods in transit, whenever for any reason doubt as to your financial responsibility develops. Pro-rata payments shall become due with partial shipments. Where you are responsible for any delay in shipment, the date of completion of goods may be treated by us as the date of shipment for purposes of payment, completed goods shall be held at your cost and risk, and we shall have the right to bill you for reasonable storage and insurance expenses.

7. DELIVERY. Delivery, shipment and installation dates are estimated dates only, and unless otherwise specified, are figured from the date of receipt by Modern of complete technical data and approved drawings such as may be necessary. In estimating such dates, no allowance has been made, nor shall we be liable directly or indirectly for , delays of carriers or delays from labor difficulities, shortages, strikes or stoppages of any sort, fires, accidents, failure or delay in obtaining materials or manufacturing facilities, acts of government affecting us directly or indirectly, bad weather or any causes beyond our control or causes designated Acts of God or force majeure by any court of law, and the estimated delivery date shall be extended accordingly. We will not be liable for any damages or penalties whatsoever, whether direct, indirect, special or consequential, resulting from our failure to perform or delay in performing unless otherwise agreed in writing by an authorized officer of Modern.

THE FOREGOING OBLIGATIONS EXPRESSLY UNDERTAKEN BY THE SELLER ARE IN LIEU OF ALL OTHER OBLIGATIONS AND LIABILITIES, AND ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OR OTHERWISE, EXPRESS OR IMPLIED IN FACT OR BY LAW, AND STATE OUR ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM OF DAMAGES IN CONNECTION WITH THE SALE OR FURNISHING OF GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATION, SELLER SHALL IN NO EVENT BE LIABLE FOR CONSEQUENTIAL DAMAGES EITHER DIRECT OR INDIRECT.

IF THE PLANS AND SPECIFICATIONS FOR SIGNAL EQUIPMENT OR SERVICES COVERED BY THIS AGREEMENT ARE SUBMITTED TO THE BUYER FOR APPROVAL, COMMUNICATION BY THE BUYER, OR ITS AGENT TO THE SELLER OF SUCH APPROVAL SHALL CONSTITUTE AN AGREEMENT BY BUYER TO INDEMNIFY AND HOLD SELLER HARMLESS FROM ALL CLAIMS ARISING OUT OF THE DESIGN, ENGINEERING, CHOICE OF MATERIAL AND SUPPLIES, OR PLANNING OF THE SIGNAL SYSTEM, INCLUDING BUT NOT LIMITED TO PROFESSIONAL NEGLIGENCE AND FAILURE TO ADHERE TO GENERALLY ACCEPTED ENGINEERING STANDARDS.

8. SHIPPING. Unless you specify otherwise in writing, (a) goods will be boxed or crated as we may deem proper for protection against normal handling, and extra charge will be made for preservation, waterproofing and similar added protection of goods, (b) routing and manner of shipment will be at our discretion, and may

be insured at your expense, value to be stated at order price. On all shipments F.O.B. our plant, delivery of goods to the initial carrier will constitute delivery to you and all goods will be shipped at your risk. A claim for loss or damage in transit must be entered with the carrier and prosecuted by you.

9. PATENT INFRINGEMENT. We will not be liable for any claim of infringement unless due to infringement by goods manufactured by us in the form in which we supply such goods to you and without regard to their use by you. If you notify us promptly of any such claim of infringement and, if we so request, authorize us to defend or settle any suit or controversy involving such claim, we will indemnify you against the reasonable expenses of any such suit and will satisfy any judgment or settlement in which we acquiesce, but only to an amount not exceeding the price paid to us for the allegedly infringing goods. If an injunction is issued against the further use of allegedly infringing goods, we shall have the option of procuring for you the right to use the goods, or replacing them with non-infringing goods or of removing them and refunding the purchase price. The foregoing expresses our entire and exclusive warranty and liability as to patents, and we will not be liable for any and all claims, demands, liabilities, damages, costs and expenses resulting from or connected with any claim of patent infringement arising out of the manufacture by us of goods in accordance with a design or specifications which you furnish us.

10. INSPECTION. Inspection of goods in our plant by you or your representative will be permitted insofar as this does not unduly interfere with our production workflow, provided that complete details of the inspection you desire are submitted to us in writing in advance.

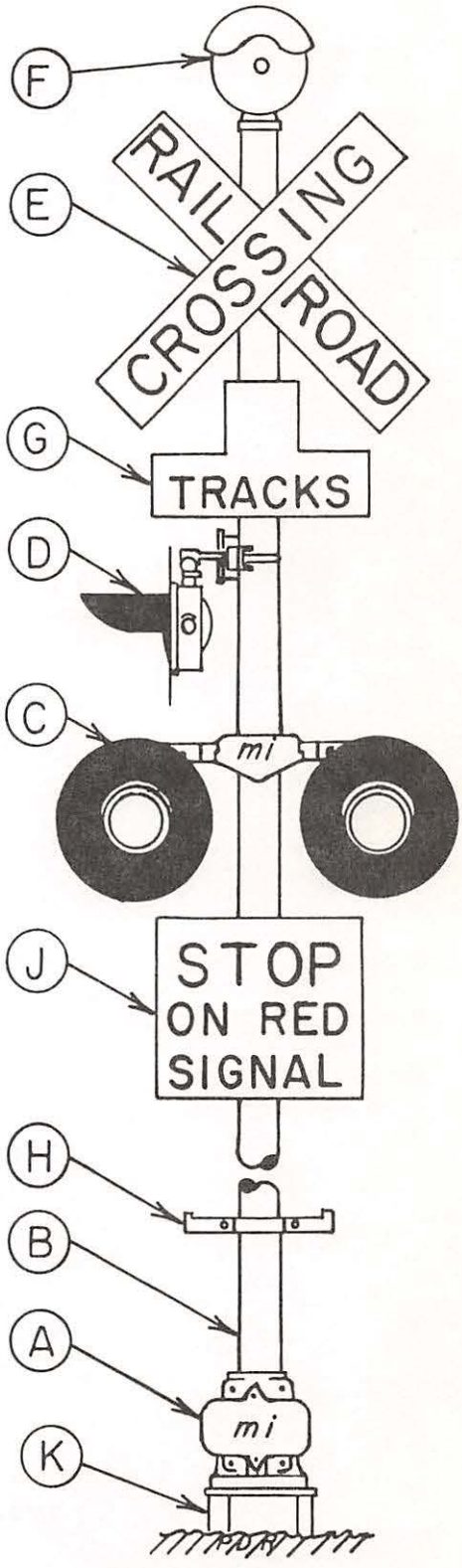
11. RECORDS, AUDITS AND PROPRIETARY DATA. Unless otherwise specifically agreed to in writing signed by an authorized officer of Modern Industries, Inc., neither you nor any representative of yours, nor any other person, shall have any right to examine or audit our cost accounts, books or records of any kind or on any matter, or be entitled to, or have control over, any engineering or production prints, drawings, or technical data which we, in our sole discretion, may consider in whole or in part proprietary to ourselves.

# FLASHING LIGHT SIGNAL ASSEMBLIES

## MODEL 52000-04
## 4" MAST
## ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | BASE | SPLIT ___ JCT. BOX ____<br>9 1/2" x 9 1/2" B.S. ____<br>11 11/16" x 11 11/16" B.S. ____ | ___ |
| B | MAST | LENGTH _____, NO. OF LGT. HOLES ____<br>DIRECTION OF EXTRA LIGHTS ____°R,____°L | ___ |
| C | MAIN LIGHTS | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION - FRONT: ____°H,____°V<br>- BACK: ____°H,____°V | ___ |
| D | SIDE LIGHTS | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION - RIGHT: ____°H,____°V<br>- LEFT: ____°H,____°V | ___ |
| E | X-ING SIGN | REFLECTIVE SHEETING<br>ENG. GRADE ____, HIGH INTENSITY ____ | ___ |
| F | BELL OR PINNACLE | BELL ___: ____VOLT: AC___, DC___<br>PINNACLE ____ | ___ |
| G | NO. TRACK SIGN | NO. OF TRACK ____<br>ENG. GRADE ____, HIGH INTENSITY ____ | ___ |
| H | POLE STEP | ALUMINUM ____, STEEL ____ | ___ |
| J | "STOP ON RED" SIGN | REFLECTIVE SHEETING<br>ENG. GRADE ____, HIGH INTENSITY ____ | ___ |
| K | FOUNDATION | 48" GALVANIZED STEEL | ___ |

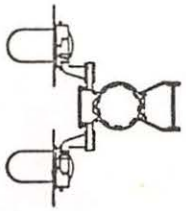



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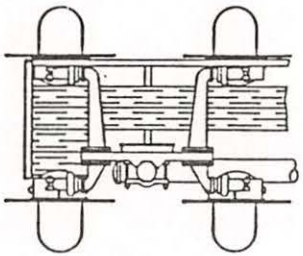
WHEN SIDE LIGHTS ARE TO BE INSTALLED IN THE FIELD, CLAMPS WILL BE PROVIDED.

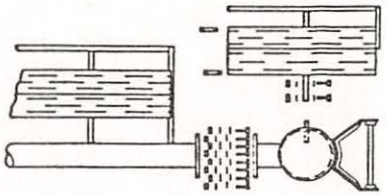


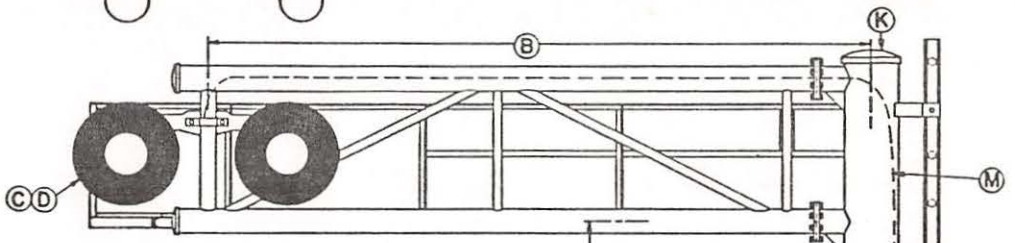
Ⓖ SIDE LIGHTS 45° RIGHT

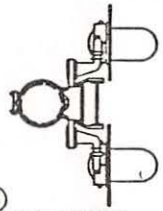


Ⓖ SIDE LIGHTS 90° LEFT

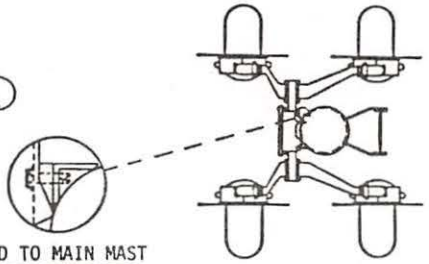






Ⓖ SIDE LIGHTS 90° RIGHT

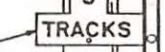


LIGHTS MOUNTED TO MAIN MAST BY PREPOSITIONED BRACKETS WELDED TO MAST, WHEN LOCATION OF SIGNAL IS GIVEN.

Ⓕ MAIN MAST LIGHTS




Ⓗ




Ⓙ

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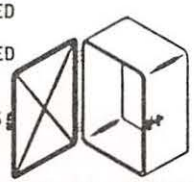



Ⓝ

18'-0"

NOTE: 1. 10" DIA. MAST WILL BE SUPPLIED WITH 12' TO 24' ARM.
2. 12" DIA. MAST WILL BE SUPPLIED WITH 25' TO 29'.

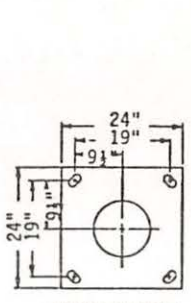
NOTE: ALL LIGHT ASSEMBLY MOUNTING HARDWARE, TERMINAL NUTS, WASHERS ETC., PACKAGED IN LIGHT CARTONS.



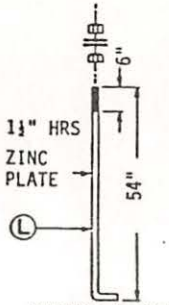
NOTE: TERMINAL BOW SUPPLIED, W-2, DOUBLE ROW 6, TERMINAL STRIPS; (OPTIONAL)

NOTE: WHEN EXT. JCT BOX IS NOT USED, DOUBLE ROW 6 TERM. BLOCK IS MOUNTED INSIDE PIPE.

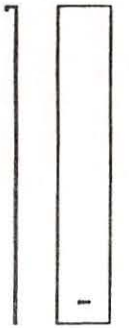
Ⓐ




BASE PLATE DETAIL




ANCHOR BOLT DETAIL



LADDER GUARD
INCLUDES LOCK BRACKET

## FEATURES:

* ALL ALUM. CONSTRUCTION UTILIZING EXTRUDED 6061-T6 ALUM. ALLOY.
* ARM AMD MAST FABRICATED AT FACTORY AND TEST FITTED FOR EASE OF FIELD INSTALLATION.
* CROSSARM JUNCTION BOX FACES WALKWAY FOR SAFE-EASY ACCESS.
* HIGH-STRENGTH A-325 STEEL BOLTS; 8 EACH FLANGE.
* HEAVY DUTY WALKWAY GRATING.
* HANDRAIL 31" HIGH, WITH INTER-MEDIATE HANDRAIL SET AT 18".
* 17'-6" ROAD CLEARANCE.
* ALL SIGN MOUNTING BRACKETS WELDED TO MAST FOR EASE OF ASSEMBLY IN THE FEILD.
* DRILLED AND TAPPED BRACKETS WELDED TO MAIN MAST TO ELIMINATE U-BOLTS FOR FLASHING LIGHT ASSEMBLY MOUNTING.
* MEETS OR EXCEEDS A.A.R. AND A.A.S.H.O. SPECIFICATION.
* WITHSTANDS WIND LOADS OF 100 M.P.H. WITH 30% GUST.
* SUPPORTS 500 LBS. LIVE LOAD AT END OF ARM.

# SINGLE MAST CANTILEVER

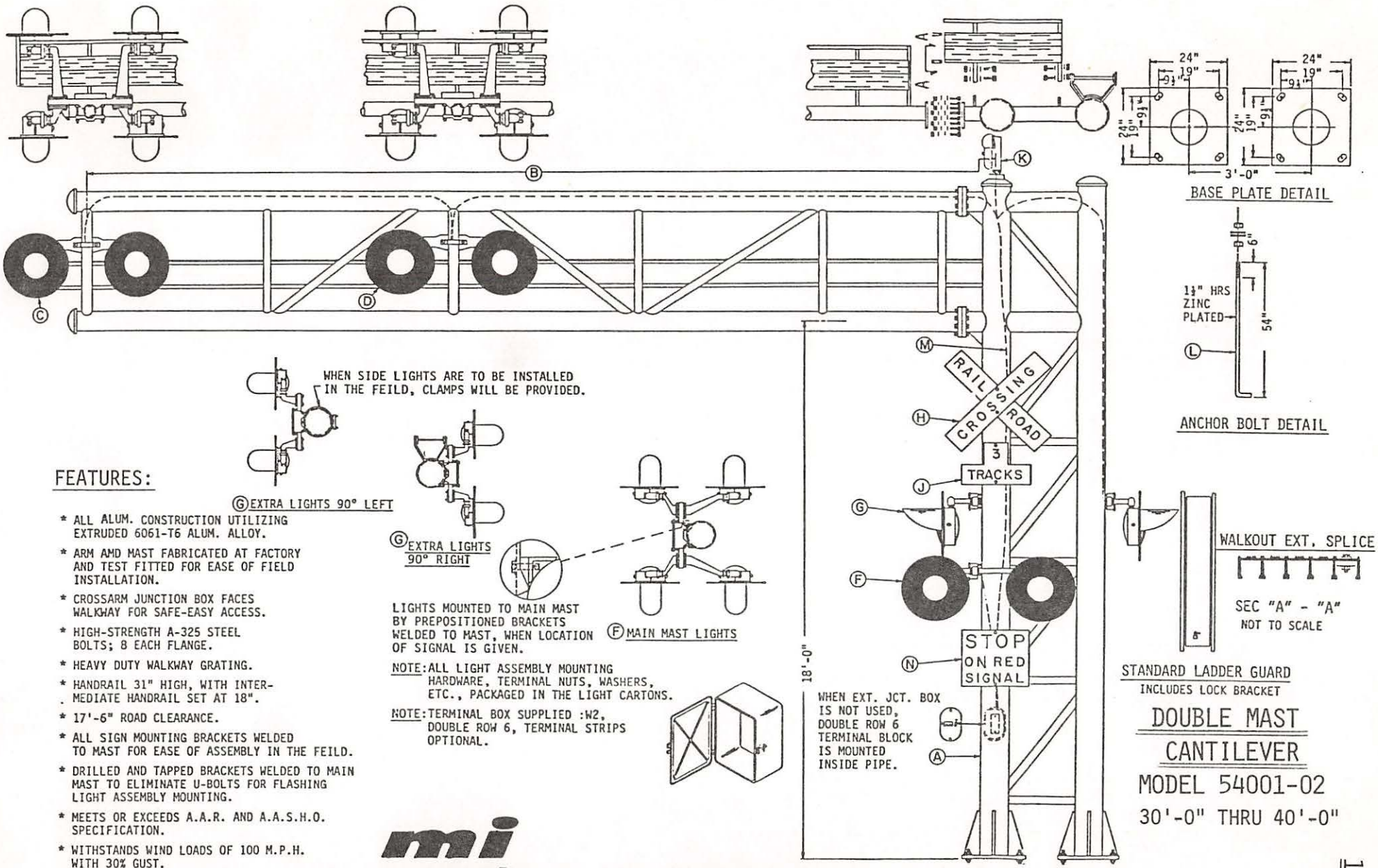
## MODEL 54001-01

12'-0" THRU 29'-0"

1-B-1


**mi modern industries** INCORPORATED

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## FEATURES:

- * ALL ALUM. CONSTRUCTION UTILIZING EXTRUDED 6061-T6 ALUM. ALLOY.
- * ARM AMD MAST FABRICATED AT FACTORY AND TEST FITTED FOR EASE OF FIELD INSTALLATION.
- * CROSSARM JUNCTION BOX FACES WALKWAY FOR SAFE-EASY ACCESS.
- * HIGH-STRENGTH A-325 STEEL BOLTS; 8 EACH FLANGE.
- * HEAVY DUTY WALKWAY GRATING.
- * HANDRAIL 31" HIGH, WITH INTER-. MEDIATE HANDRAIL SET AT 18".
- * 17'-6" ROAD CLEARANCE.
- * ALL SIGN MOUNTING BRACKETS WELDED TO MAST FOR EASE OF ASSEMBLY IN THE FEILD.
- * DRILLED AND TAPPED BRACKETS WELDED TO MAIN MAST TO ELIMINATE U-BOLTS FOR FLASHING LIGHT ASSEMBLY MOUNTING.
- * MEETS OR EXCEEDS A.A.R. AND A.A.S.H.O. SPECIFICATION.
- * WITHSTANDS WIND LOADS OF 100 M.P.H. WITH 30% GUST.
- * SUPPORTS 500 LBS. LIVE LOAD AT END OF ARM.

NOTE: ALL LIGHT ASSEMBLY MOUNTING HARDWARE, TERMINAL NUTS, WASHERS, ETC., PACKAGED IN THE LIGHT CARTONS.

NOTE: TERMINAL BOX SUPPLIED :W2, DOUBLE ROW 6, TERMINAL STRIPS OPTIONAL.

# DOUBLE MAST CANTILEVER

## MODEL 54001-02

30'-0" THRU 40'-0"


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1-B-2

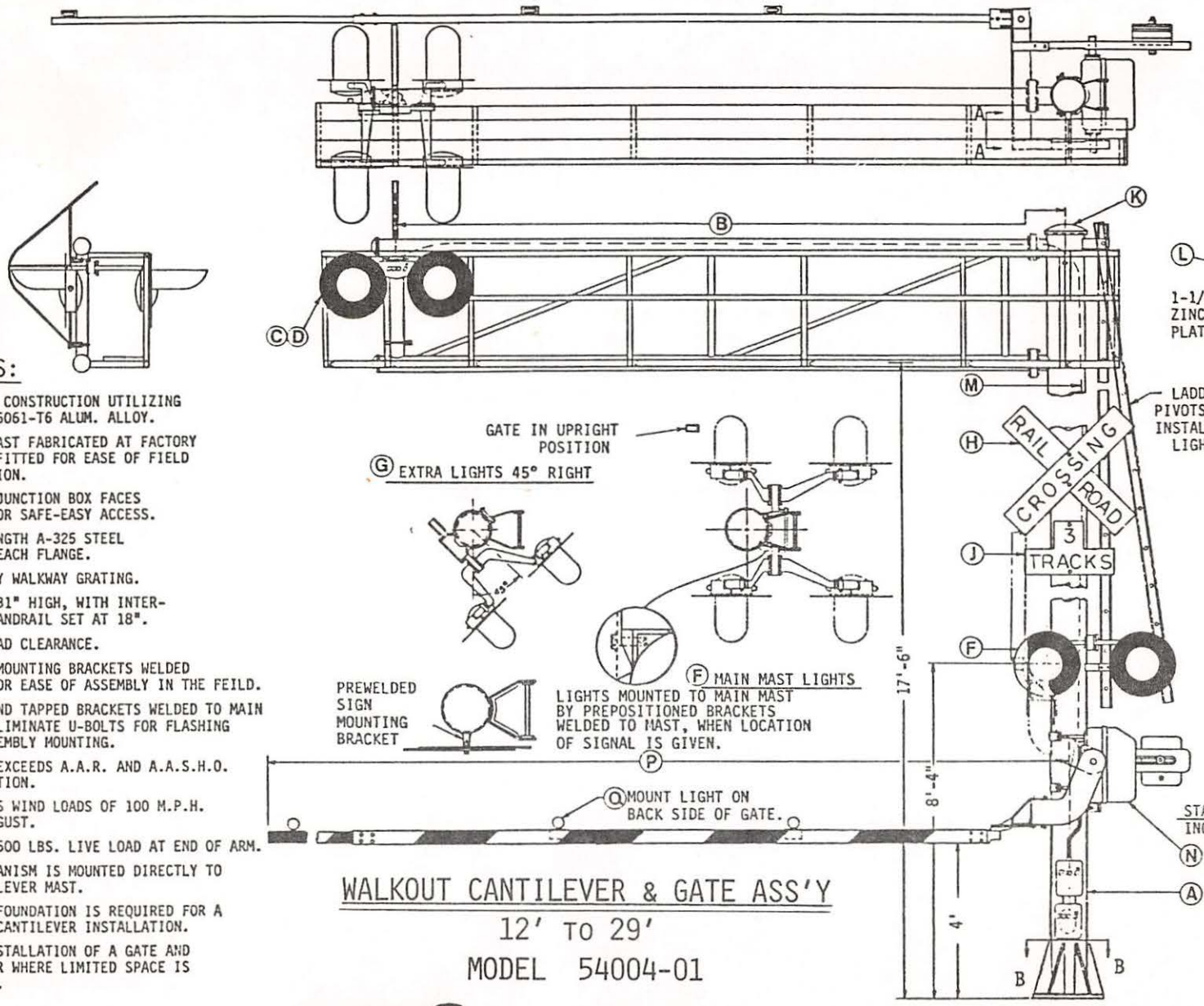
# STATIONARY WALKOUT CANTILEVER

# ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | MAST | INTERNAL JUNCTION BOX ____<br>EXTERNAL JUNCTION BOX ____<br>DIRECTION OF SIDE LIGHTS ____°R, ____°L | ____ |
| B | ARM LENGTH | _____ FT.<br>NUMBER OF LIGHTS ON ARM ____ | ____ |
| C | ARM LIGHTS<br>TIP | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____VOLT, ____WATT<br>LENS DEFLECTION: ____°H, ____°V | ____ |
| D | ARM LIGHTS<br>MIDDLE | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____VOLT, ____WATT<br>LENS DEFLECTION: ____°H, ____°V | ____ |
| F | MAST LIGHTS<br>MAIN | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____VOLT, ____WATT<br>LENS DEFLECTION - FRONT: ____°H, ____°V<br>- BACK: ____°H, ____°V | ____ |
| G | MAST LIGHTS<br>SIDE | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____VOLT, ____WATT<br>LENS DEFLECTION - RIGHT: ____°H, ____°V<br>- LEFT: ____°H, ____°V | ____ |
| H | R.R. X-ING<br>SIGN | LOCATION: ARM ____, MAST ____<br>REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ____ |
| J | "NO. TRACKS"<br>SIGN | NUMBER OF TRACKS ____<br>REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ____ |
| K | BELL OR<br>PINNACLE | BELL ____: ____VOLT; AC ____, DC____ ,<br>PINNACLE ____ ; BELL ADAPTER ____IN. | ____ |
| L | ANCHOR<br>BOLTS | 1½" x 54" WITH HARDWARE<br>( SET OF 4 ) | ____ |
| M | WIRING<br>HARNESS | 3 WIRE CIRCUIT ____<br>4 WIRE CIRCUIT ____<br>WIRE SIZE ____<br>WIRE TYPE ____<br>PLEASE PROVIDE WIRING SKETCH. | ____ |
| N | "STOP ON RED"<br>SIGN | REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ____ |

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## FEATURES:

* ALL ALUM. CONSTRUCTION UTILIZING EXTRUDED 6061-T6 ALUM. ALLOY.
* ARM AMD MAST FABRICATED AT FACTORY AND TEST FITTED FOR EASE OF FIELD INSTALLATION.
* CROSSARM JUNCTION BOX FACES WALKWAY FOR SAFE-EASY ACCESS.
* HIGH-STRENGTH A-325 STEEL BOLTS; 8 EACH FLANGE.
* HEAVY DUTY WALKWAY GRATING.
* HANDRAIL 31" HIGH, WITH INTER-MEDIATE HANDRAIL SET AT 18".
* 17'-6" ROAD CLEARANCE.
* ALL SIGN MOUNTING BRACKETS WELDED TO MAST FOR EASE OF ASSEMBLY IN THE FEILD.
* DRILLED AND TAPPED BRACKETS WELDED TO MAIN MAST TO ELIMINATE U-BOLTS FOR FLASHING LIGHT ASSEMBLY MOUNTING.
* MEETS OR EXCEEDS A.A.R. AND A.A.S.H.O. SPECIFICATION.
* WITHSTANDS WIND LOADS OF 100 M.P.H. WITH 30% GUST.
* SUPPORTS 500 LBS. LIVE LOAD AT END OF ARM.
* GATE MECHANISM IS MOUNTED DIRECTLY TO THE CANTILEVER MAST.
* ONLY ONE FOUNDATION IS REQUIRED FOR A GATE AND CANTILEVER INSTALLATION.
* ALLOWS INSTALLATION OF A GATE AND CANTILEVER WHERE LIMITED SPACE IS A PROBLEM.

# WALKOUT CANTILEVER & GATE ASS'Y

12' TO 29'

MODEL 54004-01

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# WALKOUT CANTILEVER & GATE ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | MAST | DIRECTION OF SIDE LIGHTS ____°R, ____°L<br>(IF REQUIRED) | ___ |
| B | ARM LENGTH | ____ FT.<br>NUMBER OF LIGHTS ON ARM ____ | ___ |
| C | ARM LIGHTS TIP | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION: ____°H, ____°V | ___ |
| D | ARM LIGHTS MIDDLE | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION: ____°H, ____°V | ___ |
| F | MAST LIGHTS MAIN | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION: FRONT - ____°H, ____°V<br>BACK - ____°H, ____°V | ___ |
| G | MAST LIGHTS SIDE | 1 WAY ____ 2 WAY ____<br>8" ____ 12" ____<br>LAMP: ____ VOLT, ____ WATT<br>LENS DEFLECTION: FRONT - ____°H, ____°V<br>BACK - ____°H, ____°V | ___ |
| H | R.R. X-ING SIGN | LOCATION: ARM ____, MAST ____<br>REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ___ |
| J | "NO. TRACKS" SIGN | NUMBER OF TRACKS ____<br>REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ___ |
| K | BELL OR PINNACLE | BELL ____: ____ VOLT; AC____, DC ____<br>PINNACLE ____; BELL ADAPTER ____ IN. | ___ |
| L | ANCHOR BOLTS | 1½" x 54" WITH HARDWARE<br>( SET OF 4) | ___ |
| M | WIRING HARNESS | 3 WIRE CIRCUIT ____<br>4 WIRE CIRCUIT ____<br>WIRE SIZE _____<br>WIRE TYPE _____<br>PLEASE PROVIDED WIRING SKETCH. | ___ |
| N | GATE MECH. | W. C. H. MODEL 3593<br><br>SAFETRAN MODEL "S"<br>CONTROL: 2 WIRE ____, 3 WIRE ____ | ___ |
| P | GATE ARM | LENGTH: ____ FT. FIBERGLASS<br>REFLECTIVE SHEETING: ENG. GRADE ____<br>HI INTENSITY ____ | ___ |
| Q | GATE LIGHTS | TYPE: 4" DOUBLE FACE ____<br>7" DOUBLE FACE ____<br>PLEASE PROVIDED WIRING SKETCH. | ___ |

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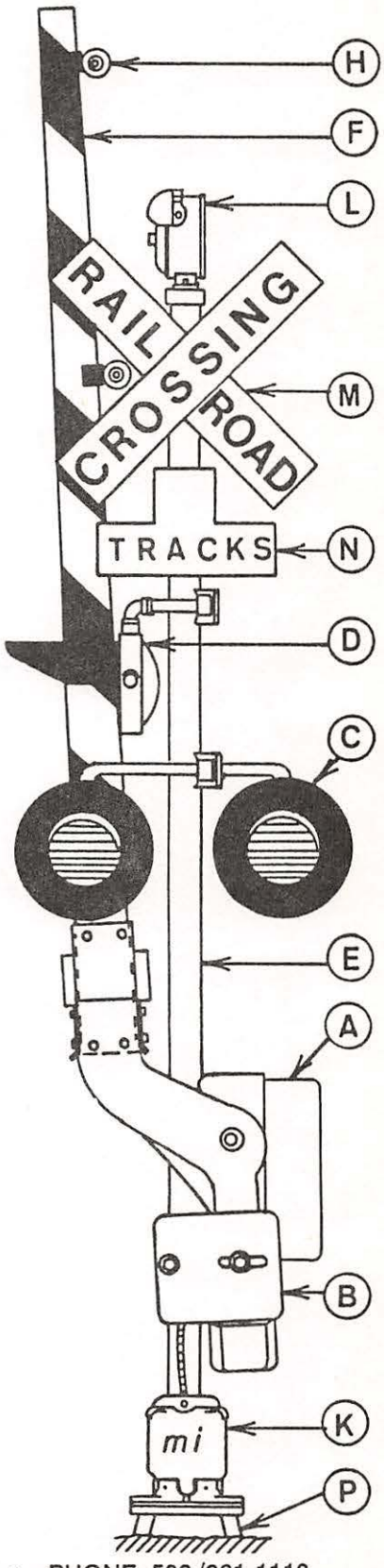
# FLASHING LIGHT SIGNAL AND GATE ASSEMBLIES



## MODEL 50001-01
## 5" MAST
## ALUMINUM CONSTRUCTION

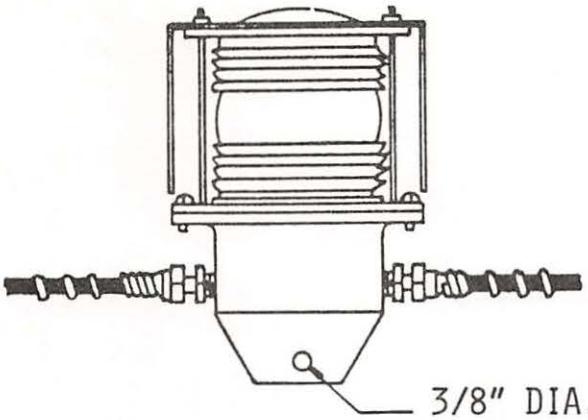
TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | GATE MECH. | G.R.S. MODEL "D" ____<br>W.C.H. MODEL 3593 ____<br>U.S.&S. MODEL 75 ____<br>SAFETRAN MODEL "S" ____<br>CONTROL: 2 WIRE ___, 3 WIRE ___ | ___ |
| B | COUNTERWEIGHT ASSEMBLY | ARM TYPE: FIBERGLASS ____<br>WOOD ____<br>ARM LENGTH: ____ FT. | ___ |
| C | MAIN LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| D | SIDE LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| E | MAST | LENGTH: ____FT.<br>NO. OF LIGHT HOLES: ____<br>DIR. OF SIDE LIGHTS ___°R, ___°L | ___ |
| F | GATE ARM | LENGTH: ____FT.<br>TYPE: WOOD ___, F.G. ___, AL.___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| H | GATE LIGHTS | TYPE: FRESNEL ___,4" DOUBLE FACE ___<br>7" DOUBLE FACE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| K | BASE | SGL. JCT. BOX ___, DBL. JCT. BOX ___ | ___ |
| L | BELL OR PINNACLE | BELL ___: ___VOLT: AC___, DC___<br>PINNACLE ___ | ___ |
| M | R.R. X-ING SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| N | "NO. TRACK" SIGN | NUMBER OF TRACKS: ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| P | FOUNDATION | GALVANIZED STEEL 48" x 48" x 60" | ___ |

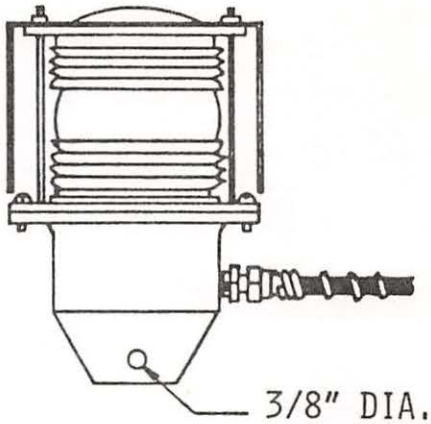



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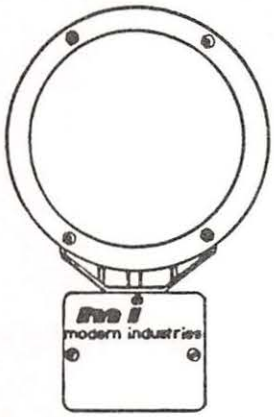
# LAMPS
# GATE ARMS




50101-04




50101-02




7" DOUBLE FACE

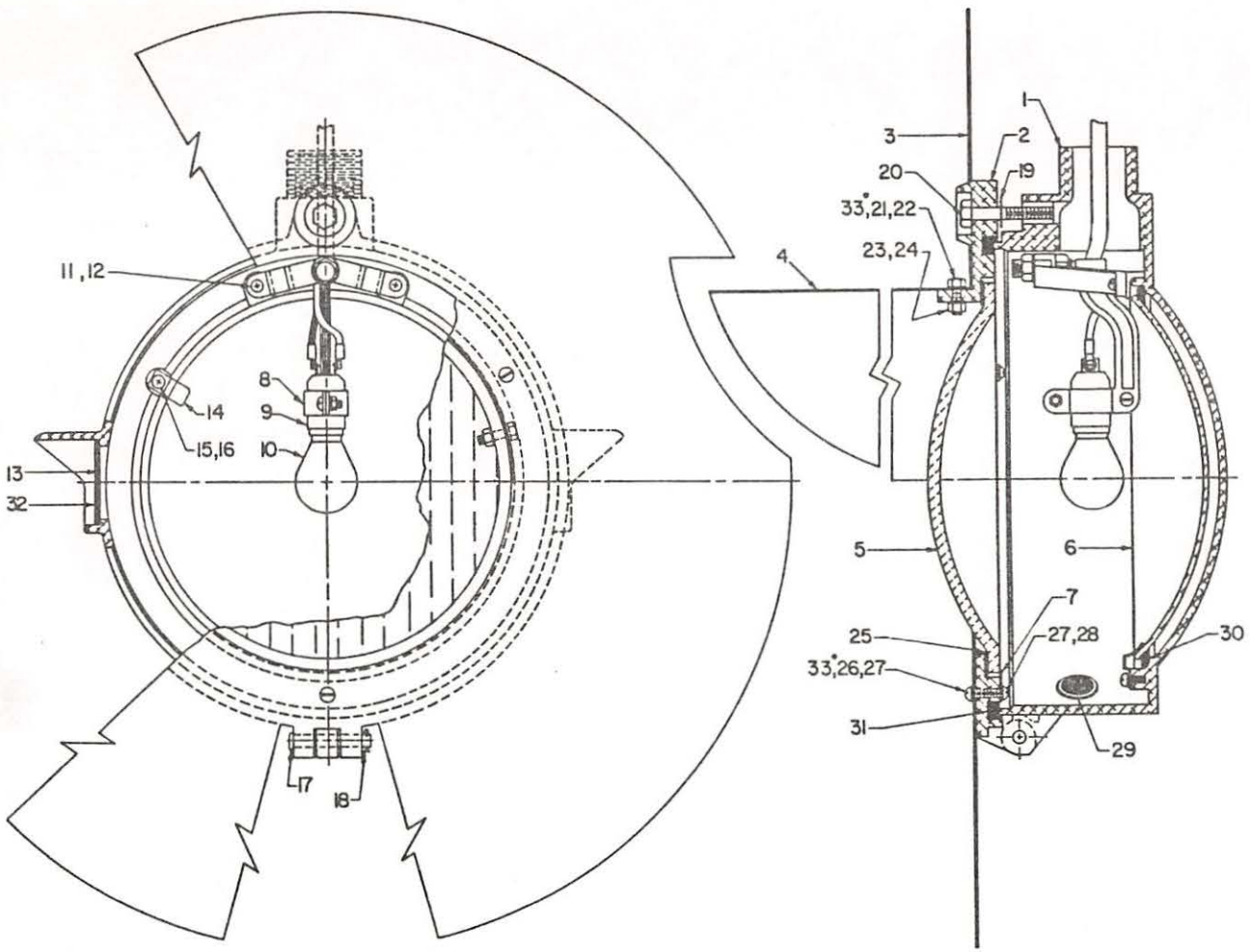



4" DOUBLE FACE

ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 50101-02 | LAMP, RIGID TYPE, COMPLETE WITH TWO CONNECTORS, BAYONET SOCKET AND SHIELD. |
| 50101-04 | LAMP, RIGID TYPE, COMPLETE WITH ONE CONNECTOR, BAYONET SOCKET AND SHIELD. |
| 50301-01 | 4" LAMP, DOUBLE FACE, COMPLETE WITH ONE CONNECTOR AND BULB. |
| 50301-02 | 4" LAMP, DOUBLE FACE, COMPLETE WITH TWO CONNECTORS AND BULB. |
| 50301-03 | 7" LAMP, DOUBLE FACE, COMPLETE WITH ONE CONNECTOR AND BULB. |
| 50301-04 | 7" LAMP, DOUBLE FACE, COMPLETE WITH TWO CONNECTORS AND BULB. |
| 50-11309 | RED FRESNEL REPLACEMENT LENS |
| 01500079 | 4" LENS KIT COMPLETE WITH GASKET AND SCREWS (1 LENS) |

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| PARTS LIST | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | PART NO. | DWG. NO. |
| 1 | BODY | 51-51001 | LC510025 |
| 2 | LENS RING | 51-51002 | LC510026 |
| 3 | BACKGROUND 20" | 51-01005 | LC510004 |
| 4 | HOOD | 51-01003 | LC510003 |
| 5 | ROUNDEL | CHART "B" | |
| 6 | REFLECTOR | 51-01001 | |
| 7 | ROUNDEL RETAINER CLIP | 51-01007 | LA510005 |
| 8 | LAMP SOCKET & STAND ASS'Y | 51-01026 | |
| 9 | LAMP SOCKET | 01510002 | |
| 10 | PRECISION SIGNAL LAMP | CHART "A" | |
| 11 | 10-32 x 5/8" LG. TYPE "F" PHILLIPS HEAD | 01024013 | |
| 12 | #10 STAR-WASHER | 01023131 | |
| 13 | SIDE LIGHT LENS | 51-01014 | LA510017 |
| 14 | REFLECTOR HOLDING CLIP | 51-01009 | LA510007 |
| 15 | 8-32 x 5/16"LG. TYPE "F" PHILLIPS HEAD | 01023601 | |
| 16 | #8 STAR-WASHER | 01023121 | |
| 17 | 1/4" x 1-3/4" LG. ALUM. CLEVIS PIN | 01025489 | |
| 18 | 3/32" x 5/8" LG. COTTER PIN | 01025415 | |
| 19 | TRUARC RETAINING RING | 01025583 | |
| 20 | 5/16"-18 x 1-3/4" H.H. CAP SCREW | 01020330 | |
| 21 | 1/4"-20 x 5/8" H.H. CAP SCREW | 01020020 | |
| 22 | 1/4" STAR-WASHER | 01023152 | |
| 23 | 1/4" LOCK NUT | 01023151 | |
| 24 | 1/4"-20 HEX NUT | 01022890 | |
| 25 | 1/16" x 1/2" SPONGE | 01510017 | |
| 26 | 1/4"-20 x 1/4" ROUND HEAD MACHINE SCREW | 01023541 | |
| 27 | 1/4" STAR-WASHER | 01023152 | |
| 28 | 1/4"-20 x 5/16" ROUND HEAD MACHINE SCREW | 01023631 | |
| 29 | VENTILATOR | 01510001 | |
| 30 | 1/4" ROUND SPONGE | 01010008 | |
| 31 | 1/4" x 3/8" SPONGE | 01510018 | |
| 32 | TRUARC RETAINING RING | 01025582 | |
| 33* | MTG. HARDWARE FOR HOOD & BACKGROUND | 51-01046 | |

* COMPLETE SET OF HARDWARE INCLUDES ITEMS 21 THRU 24 AND ITEM 26 & 27.

ORDER NUMBER - 5 1 2 0 8 - A* B*

| "A" LAMP SPECIFICATION | | |
|---|---|---|
| NO. | PART NO. | DESCRIPTION |
| 0 | 01030031 | 10V-18W LAMP |
| 1 | 01510020 | 10V-16W QUARTZ LAMP |
| 2 | 01030037 | 10V-25W LAMP |
| 3 | NONE | NO LAMP, #10 WIRE |
| 4 | NONE | NO LAMP, STD. WIRE |

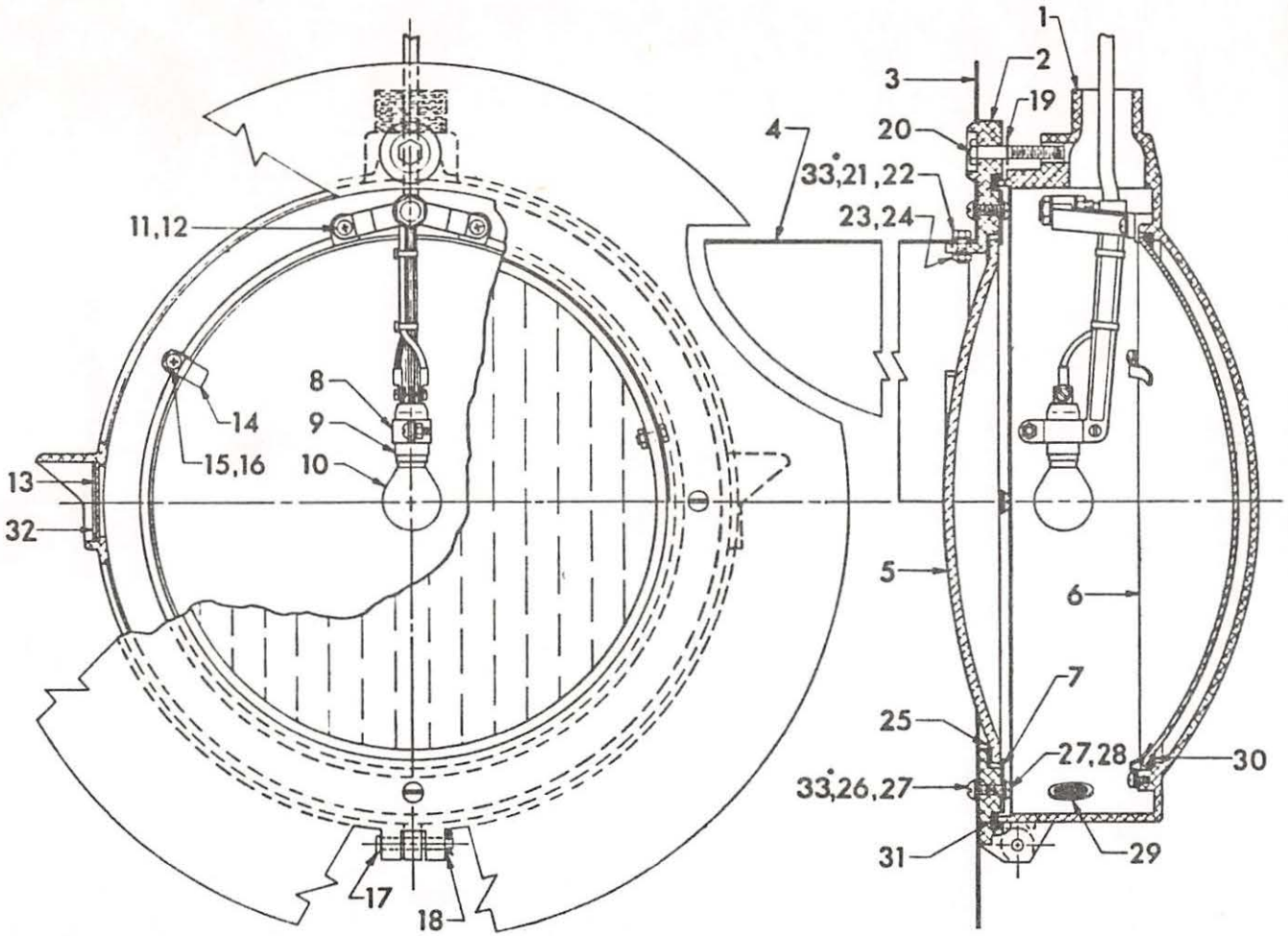
| "B" LENS SPECIFICATION | | |
|---|---|---|
| NO. | PART NO. | DESCRIPTION |
| 1 | 51-01034 | 30°-15° LENS |
| 2 | 51-01035 | 20°-32° LENS |
| 3 | 51-01036 | 20°-10° LENS |
| 4 | 51-01037 | 70° LENS |

* REPLACE LETTER WITH NUMBER FROM CHART.

REDRAWN 11-3-83

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | | |
|---|---|---|
| 8" FLASHING LIGHT UNIT | | |
| DWN: R.L.C | PART NO. | 51208-01 |
| APP: P.A.H. | | |
| SCALE: NONE | DWG. NO. | LC510053 |
| DATE: 8-28-81 | | |

1-D-1




| PARTS LIST | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | PART NO. | DWG. NO. |
| 1 | BODY | 51-51003 | LC510027 |
| 2 | LENS RING | 51-51006 | LC510028 |
| 3A | BACKGROUND 20" | 51-01006 | LC510002 |
| 3B | BACKGROUND 24" | 51-01015 | LC510068 |
| 4 | HOOD | 51-01004 | LC510001 |
| 5 | ROUNDEL | CHART "B" | |
| 6 | REFLECTOR | 51-01002 | |
| 7 | ROUNDEL RETAINER CLIP | 51-01007 | LA510005 |
| 8 | LAMP SOCKET & STAND ASS'Y | 51-01027 | |
| 9 | LAMP SOCKET | 01510002 | |
| 10 | PRECISION SIGNAL LAMP | CHART "A" | |
| 11 | 10-32 x 5/8" LG. TYPE "F" PHILLIPS HEAD | 01024013 | |
| 12 | #10 STAR-WASHER | 01023131 | |
| 13 | SIDE LIGHT LENS | 51-01014 | LA510017 |
| 14 | REFLECTOR HOLDING CLIP | 51-01009 | LA510007 |
| 15 | 8-32 x 5/16 LG. TYPE "F" PHILLIPS HEAD | 01023601 | |
| 16 | #8 STAR-WASHER | 01023121 | |
| 17 | 1/4" x 1-3/8" LG. ALUM. CLEVIS PIN | 01025491 | |
| 18 | 3/32" x 5/8" LG. COTTER PIN | 01025415 | |
| 19 | TRUARC RETAINING RING | 01025583 | |
| 20 | 5/16"-18 x 1-3/4" H.H. CAP SCREW | 01020330 | |
| 21 | 1/4"-20 x 5/8" H.H. CAP SCREW | 01020020 | |
| 22 | 1/4" STAR-WASHER | 01023152 | |
| 23 | 1/4" LOCK NUT | 01023151 | |
| 24 | 1/4"-20 HEX NUT | 01022890 | |
| 25 | 1/16" x 7/16" SPONGE | 01510015 | |
| 26 | 1/4"-20 x 1/4" ROUND HEAD MACHINE SCREW | 01023541 | |
| 27 | 1/4" STAR-WASHER | 01023152 | |
| 28 | 1/4"-20 x 5/16" ROUND HEAD MACHINE SCREW | 01023631 | |
| 29 | VENTILATOR | 01510001 | |
| 30 | 1/4" ROUND SPONGE | 01010008 | |
| 31 | 1/4" x 5/16" SPONGE | 01510016 | |
| 32 | TRUARC RETAINING RING | 01025582 | |
| 33* | MTG. HARDWARE FOR HOOD & BACKGROUND | 51-01046 | |

* COMPLETE SET OF HARDWARE INCLUDES ITEMS 21 THRU 24 AND ITEM 26 & 27.

ORDER NUMBER - 5 1 2 1 2 - A* B*

| "A" LAMP SPECIFICATION | | |
|---|---|---|
| NO. | PART NO. | DESCRIPTION |
| 0 | 01030031 | 10V-18W LAMP |
| 1 | 01510020 | 10V-16W QUARTZ LAMP |
| 2 | 01030037 | 10V-25W LAMP |
| 3 | NONE | NO LAMP, #10 WIRE |
| 4 | NONE | NO LAMP, STD. WIRE |

| "B" LENS SPECIFICATION | | |
|---|---|---|
| NO. | PART NO. | DESCRIPTION |
| 1 | 51-01019 | 30°-15° LENS |
| 2 | 51-01020 | 20°-32° LENS |
| 3 | 51-01018 | 20°-10° LENS |
| 4 | 51-01021 | 70° LENS |

* REPLACE LETTER WITH NUMBER FROM CHART.

REDRAWN 11-3-83

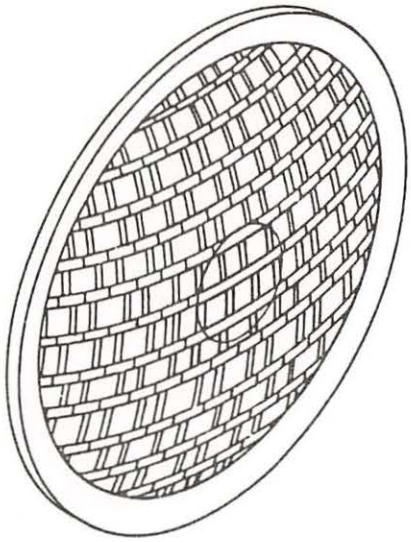
MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

12" FLASHING LIGHT UNIT

| | |
|---|---|
| DWN: R.L.C. | PART NO. 51212-01 |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510048 |
| DATE: 4-20-79 | |

1-D-2

# FLASHING LIGHT ROUNDELS



## RED LEXAN ROUNDELS

ORDER BY PART NUMBER AND DESCRIPTION

| DEFLECTION | | DIAMETER IN INCHES | PART NUMBER |
|---|---|---|---|
| HORIZONTAL | VERTICAL | | |
| 20° | 10° | 8-3/8" | 01510004 |
| 20° | 32° DOWN | 8-3/8" | 01510008 |
| 30° | 15° DOWN | 8-3/8" | 01510024 |
| 70° | 0 | 8-3/8" | 01510010 |
| 20° | 10° | 12" | 51-01018 |
| 20° | 32° DOWN | 12" | 51-01020 |
| 30° | 15° DOWN | 12" | 51-01019 |
| 70° | 0 | 12" | 51-01021 |

ALL MODERN INDUSTRIES FLASHING LIGHT ROUNDELS ARE DESIGNED WITH EXACT SPECIFICATIONS, THUS PROVIDING A FULL-FACE HIGH INTENSITY WARNING LIGHT. THESE ROUNDELS MEET OR EXCEED AAR SPECIFICATIONS. THEY ARE PRODUCED FROM LEXAN, WHICH PROVIDES MAXIMUM IMPACT RESISTANCE.

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ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

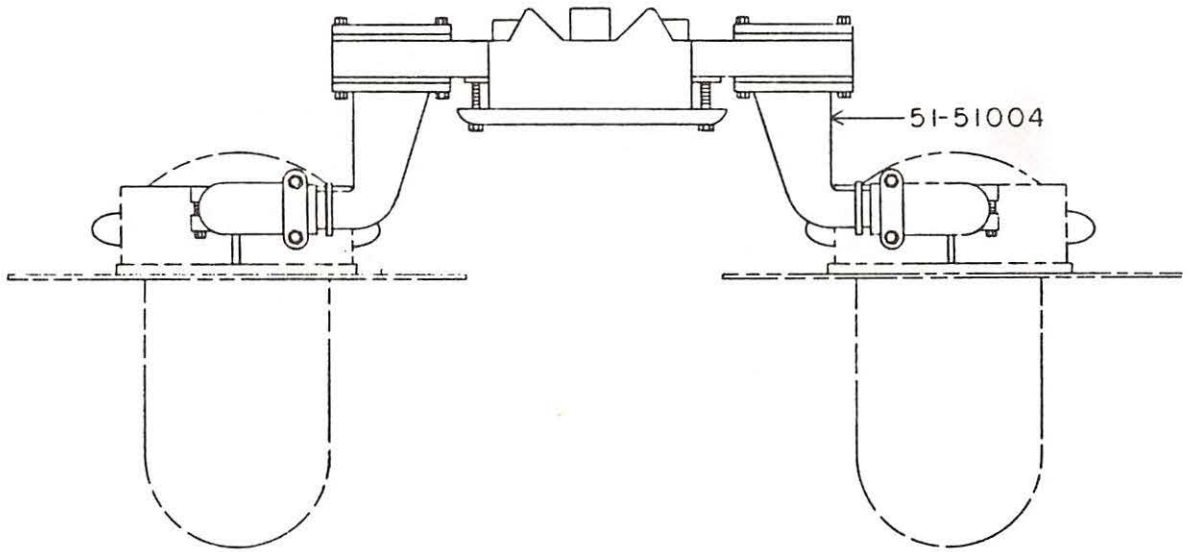
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| 2 | 20°-32° LENS |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 01 | 4" | 1W STD. FLASHER OR ROT. CANT. ARM |
| 04 | 5" | 1W GATE, EXTRA 90° RIGHT |
| 08 | 8" | 1W ROT. CANT., EXTRA 90° LEFT |
| 12 | 10" | 1W W.O. CANT., EXTRA 90° LEFT |
| 16 | 12" | 1W W.O. CANT., EXTRA 90° LEFT |
| 20 | BKT. | 1W W.O. CANT., EXTRA 90° LEFT |




1-E-1

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY.

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510081 |
| DATE: 11-3-83 | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

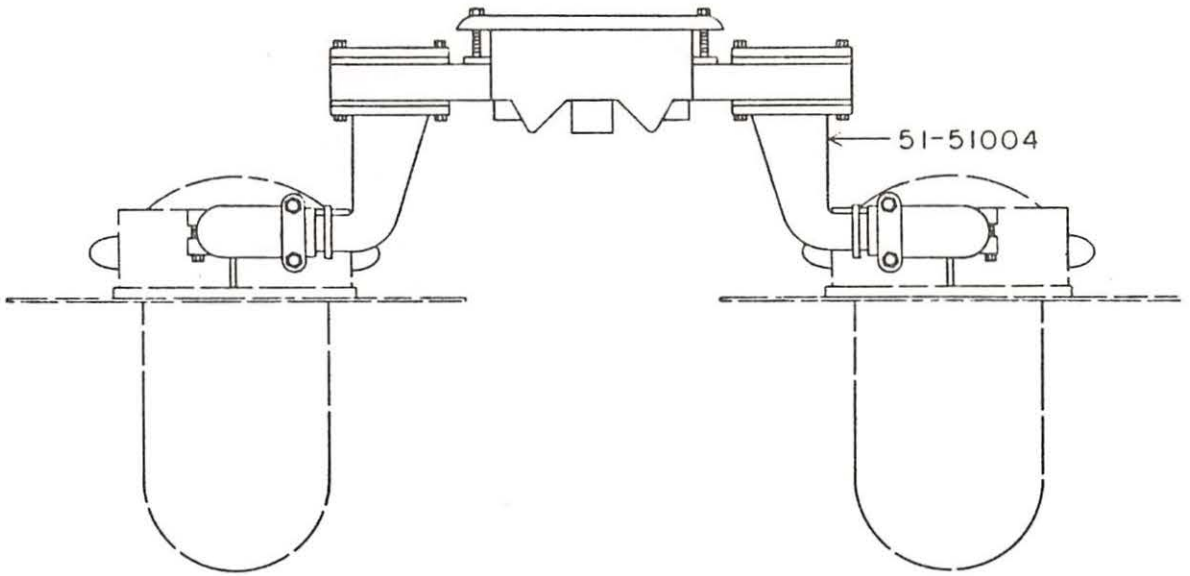
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A R-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A R-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| 2 | 20°-32° LENS |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 02 | 4" | 1W W.O. CANTILEVER ARM |
| 30 | 5" | 1W GATE, EXTRA 90° LEFT |
| | | |
| | | |
| | | |
| | | |

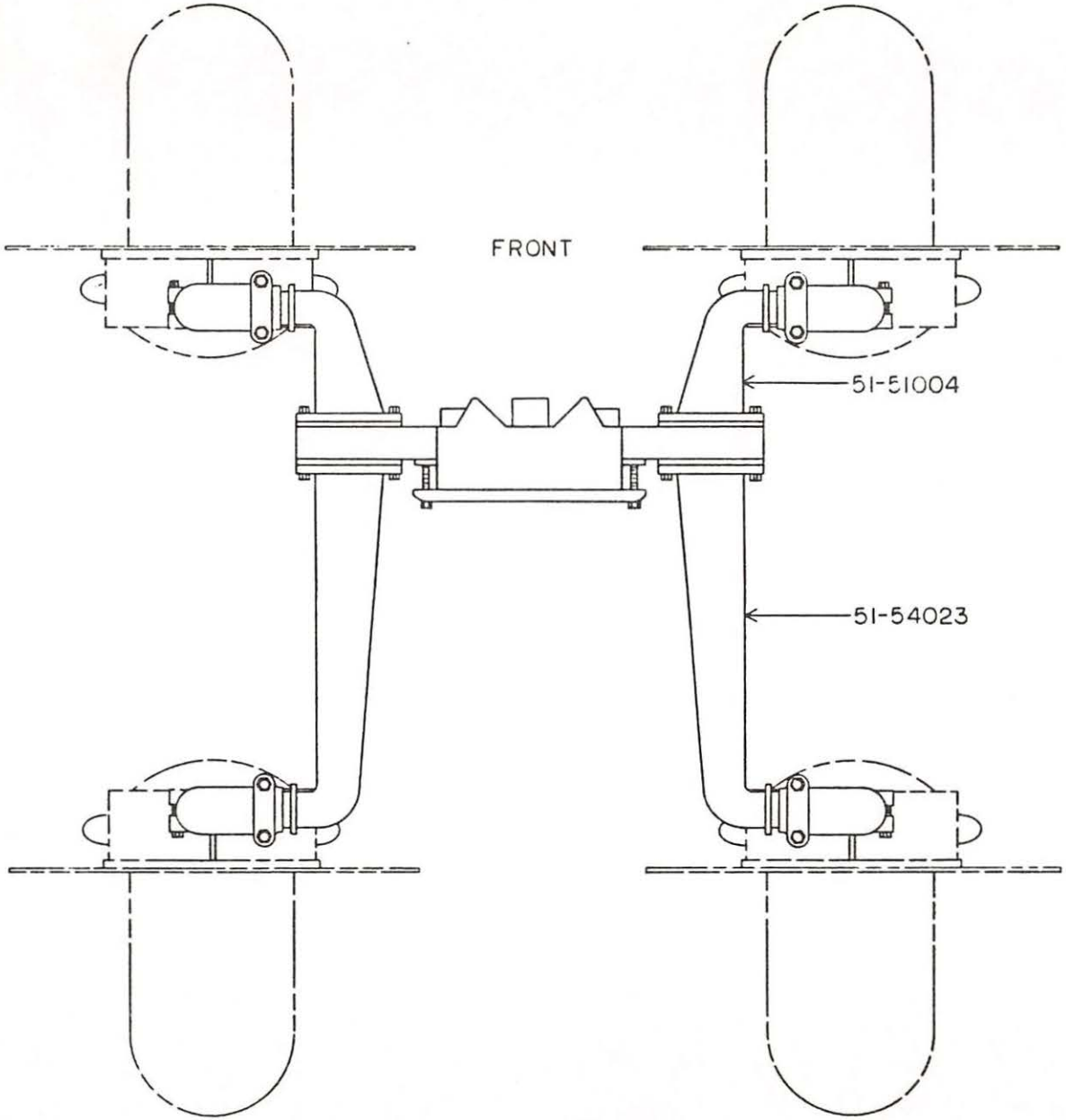



1-E-2

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510082 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" LAMP SPECIFICATION | |
|---|---|
| NO. | DESCRIPTION |
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" LENS SPECIFICATION | |
|---|---|
| NO. | DESCRIPTION |
| 1 | 30°-15° LENS |
| 2 | 20°-32° LENS |

| "C" MOUNTING SPECIFICATION | | |
|---|---|---|
| NO. | MTG. | USE |
| 03E | 4" | 2W WALKOUT CANTILEVER ARM |
| | | |
| | | |
| | | |
| | | |
| | | |

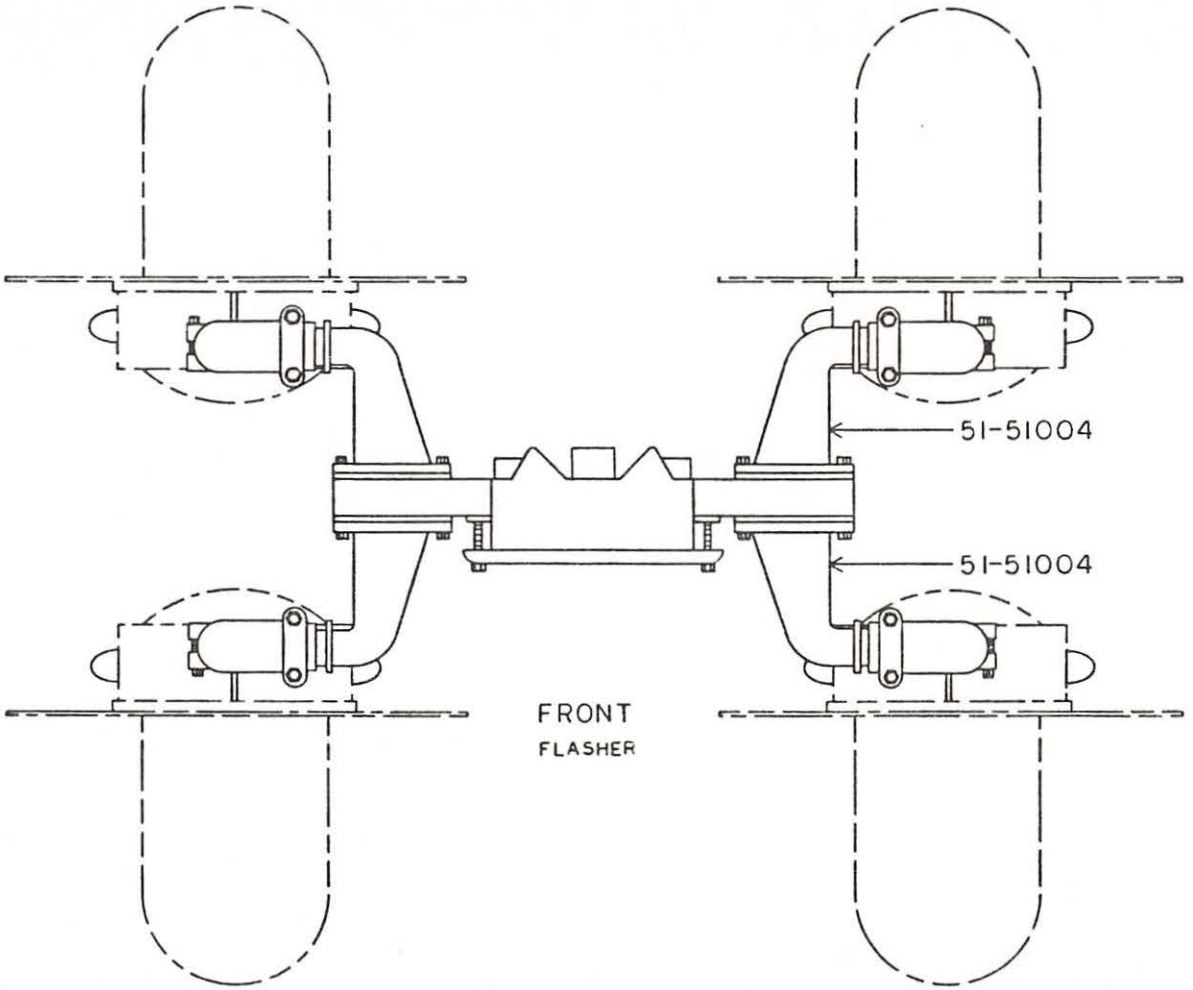
1-E-3

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | | | |
|---|---|---|---|
| DWN: | R.L.C. | PART NO. | SEE CHARTS |
| APP: | P.A.H. | | |
| SCALE: | NONE | DWG. NO. | LC510083 |
| DATE: | 11-3-83 | | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| 2 | 20°-32° LENS |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| 6 | 20°-32° LENS(FRONT), 70° LENS(BACK) |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 03 | 4" | 2W STANDARD FLASHER |
| 06 | 5" | 2W GATE, EXTRA |
| 10 | 8" | 2W ROT. CANTILEVER, EXTRA |
| | | |
| | | |
| | | |

1-E-4

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510084 |
| DATE: 11-3-83 | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

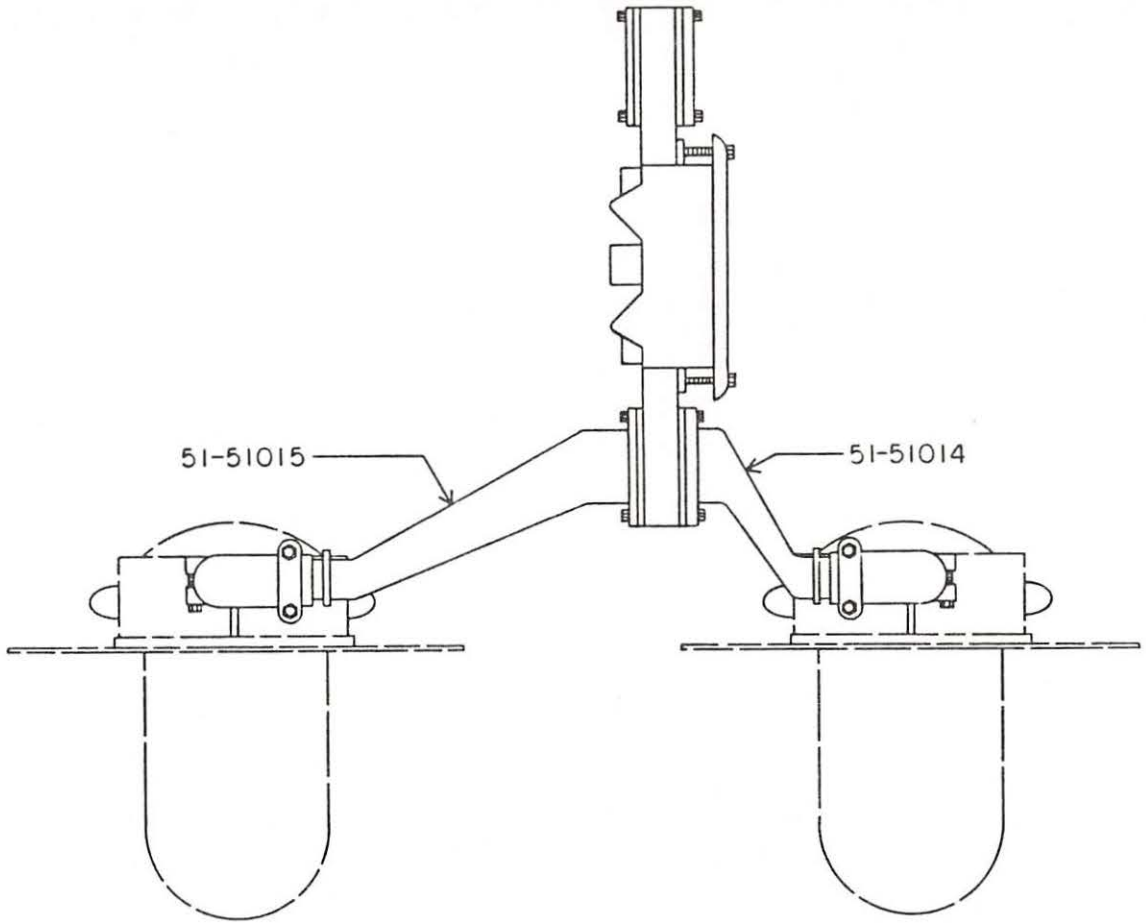
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

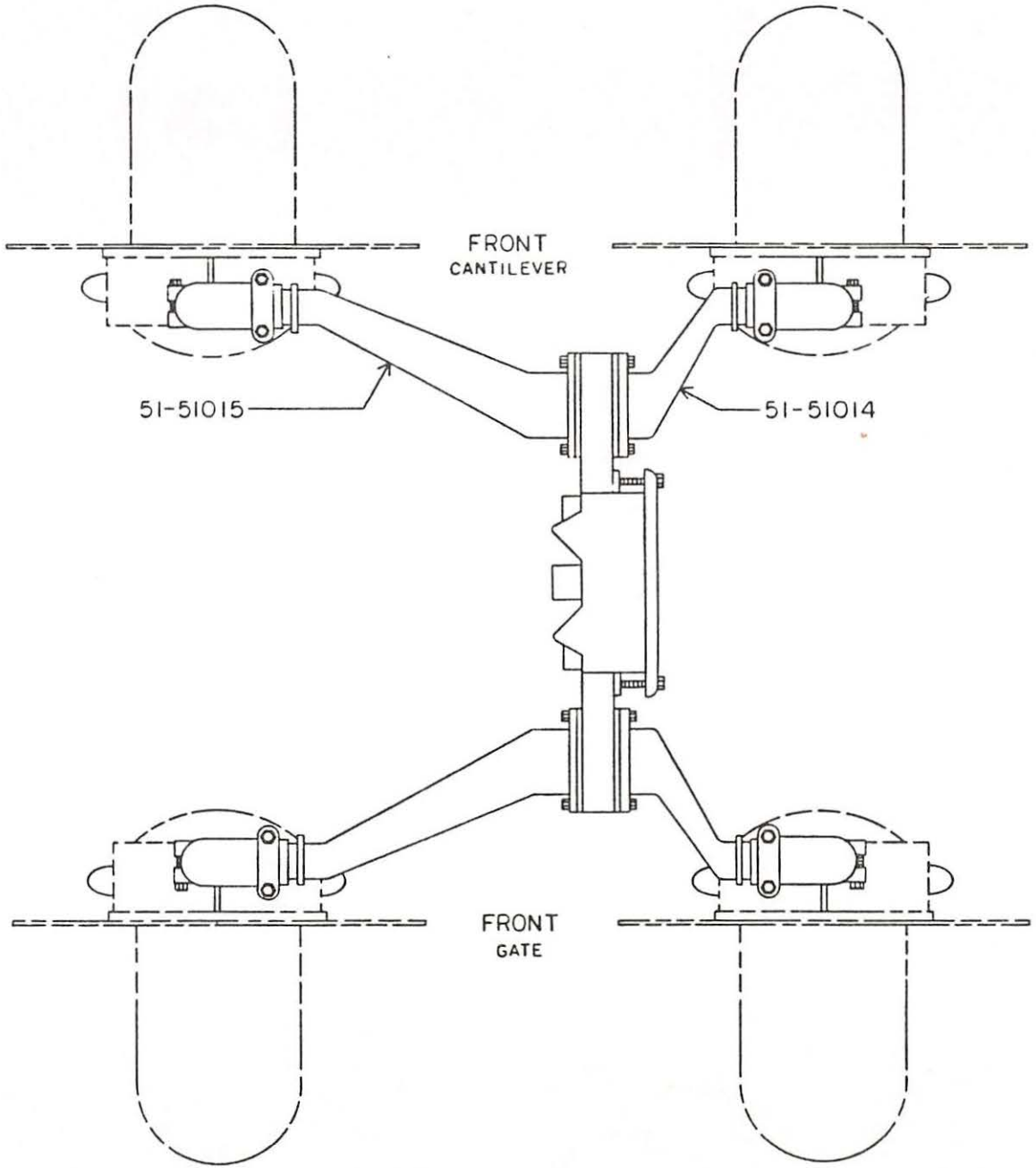
| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 05 | 5" | IW GATE |
| | | |
| | | |
| | | |
| | | |
| | | |




1-E-5

REV. 12-1-83

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510085 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" LAMP SPECIFICATION | |
|---|---|
| NO. | DESCRIPTION |
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" LENS SPECIFICATION | |
|---|---|
| NO. | DESCRIPTION |
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" MOUNTING SPECIFICATION | | |
|---|---|---|
| NO. | MTG. | USE |
| 07 | 5" | 2W GATE, MAIN LIGHTS |
| 11 | 8" | 2W ROT. CANTILEVER, MAIN LIGHTS |
| 15 | 10" | 2W W.O. CANTILEVER, MAIN LIGHTS |
| 19 | 12" | 2W W.O. CANTILEVER, MAIN LIGHTS |
| 23 | BKT. | 2W W.O. CANTILEVER, MAIN LIGHTS |
| | | |

1-E-6

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY.

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510086 |
| DATE: 11-3-83 | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

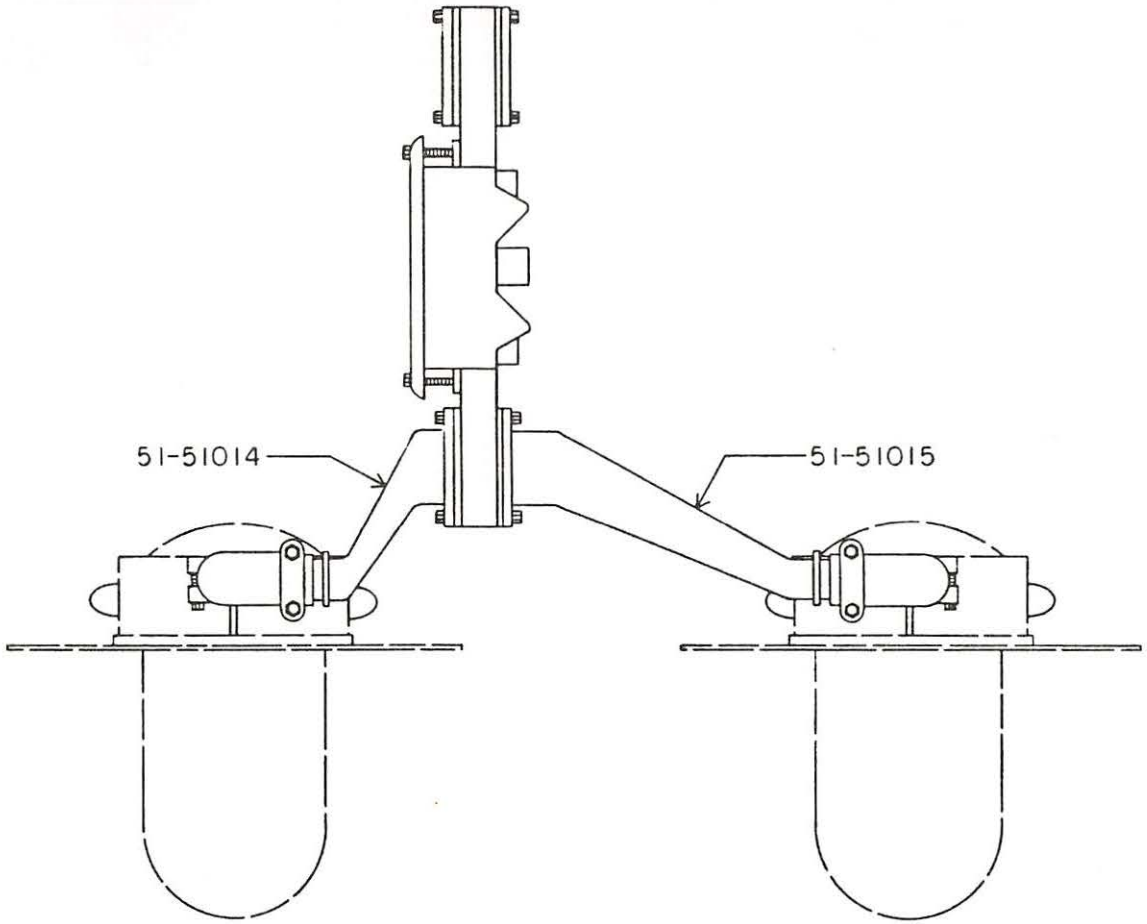
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

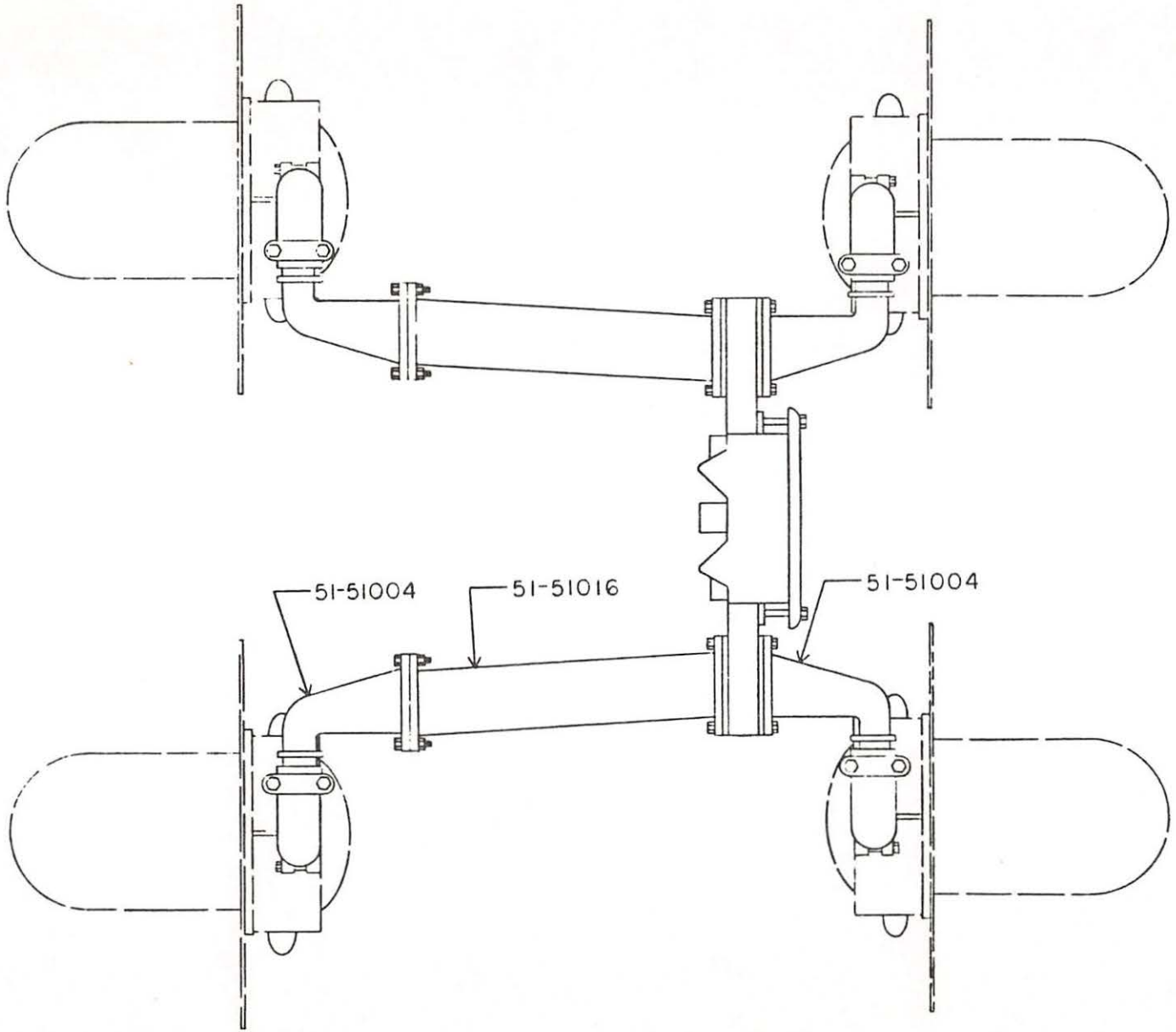
| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 09 | 8" | 1W ROT. CANTILEVER MAST |
| 13 | 10" | 1W W.O. CANTILEVER MAST |
| 17 | 12" | 1W W.O. CANTILEVER MAST |
| 21 | BKT. | 1W W.O. CANTILEVER MAST |
| | | |
| | | |




REV. 12-1-83

1-E-7

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY. | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510087 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 14 | 10" | 2W W.O. CANTILEVER, EXTRA |
| 18 | 12" | 2W W.O. CANTILEVER, EXTRA |
| 28 | BKT. | 2W W.O. CANTILEVER, EXTRA |
| | | |
| | | |
| | | |

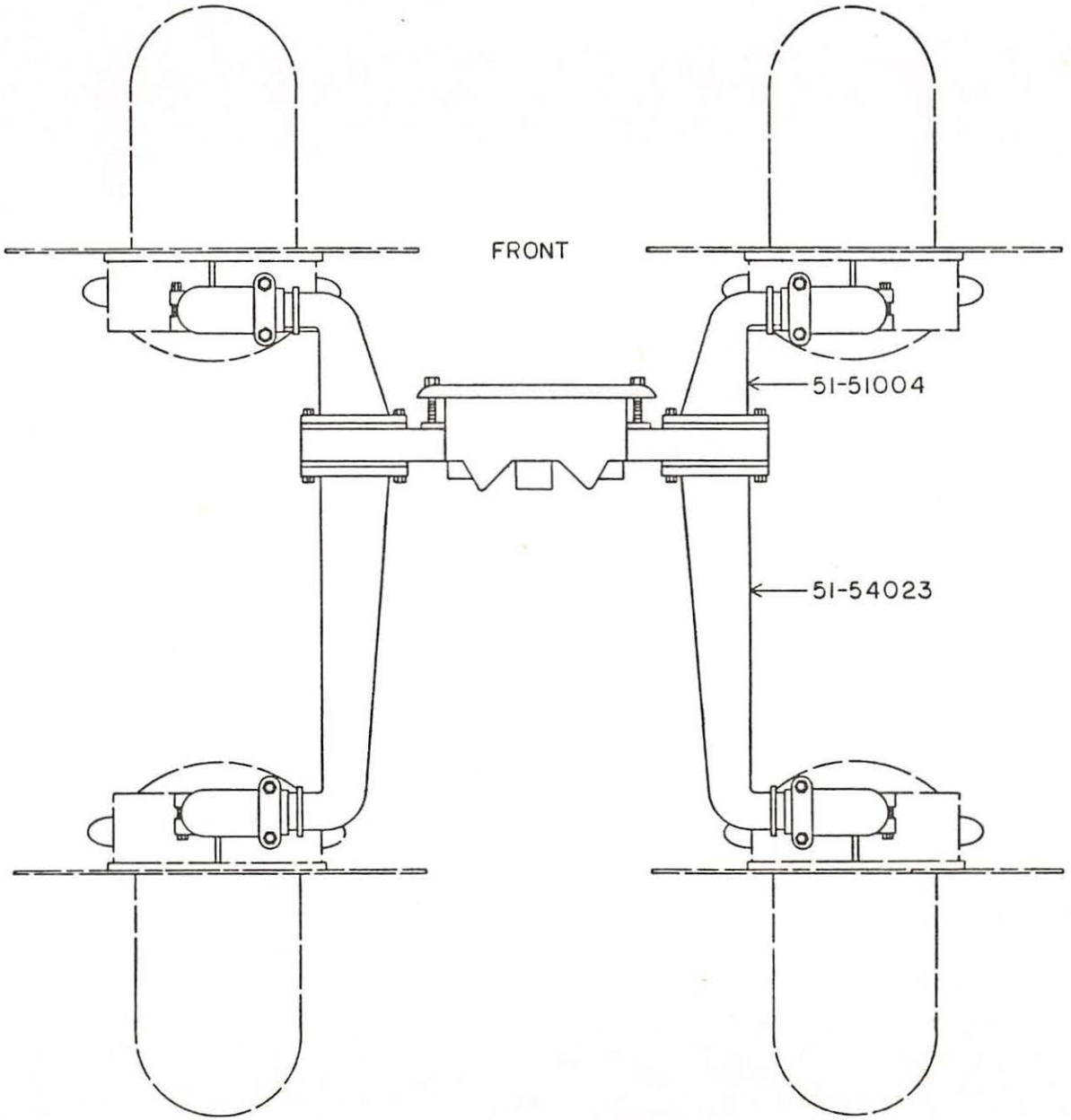
1-E-8

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510088 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

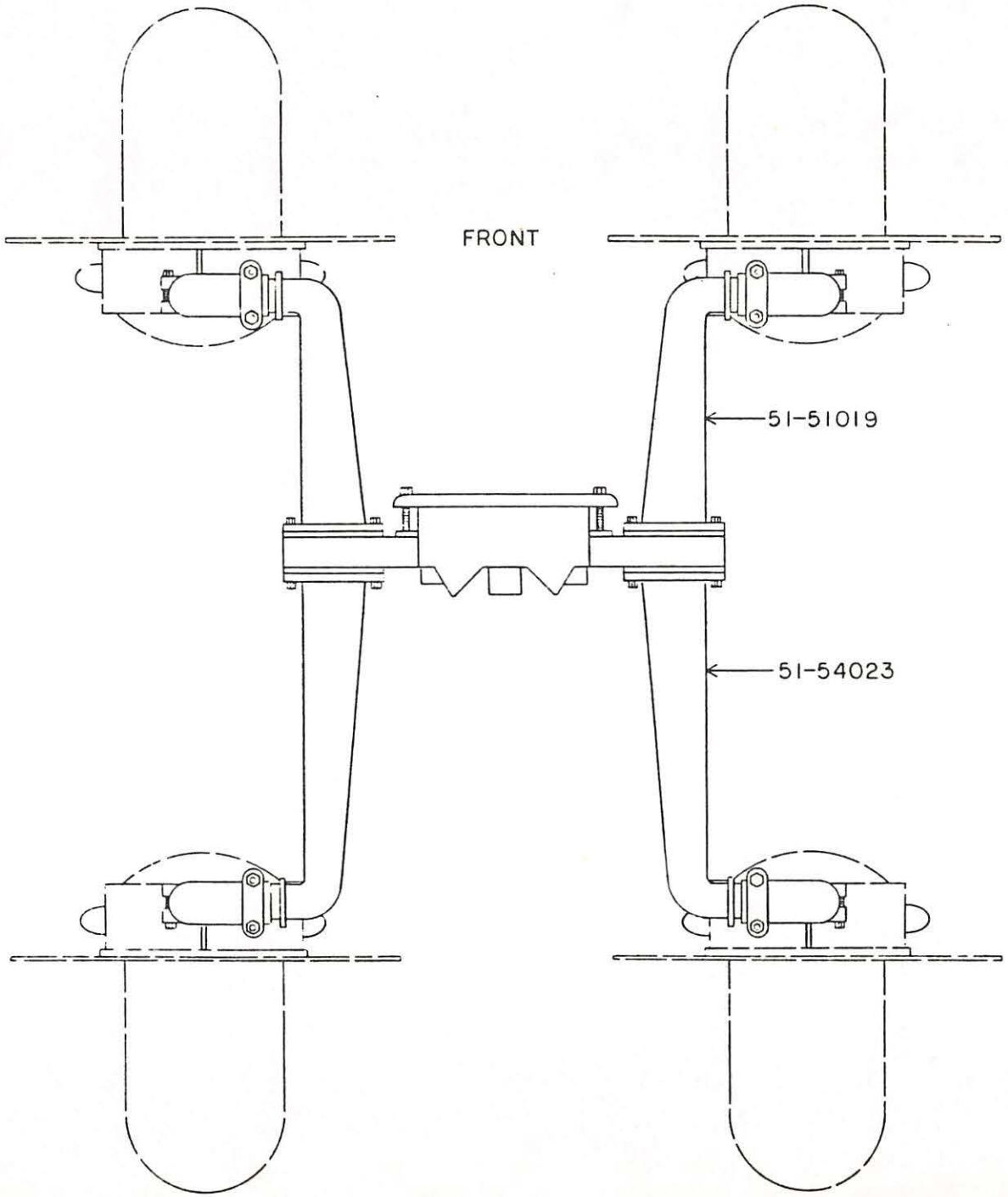
| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 24 | 8" | 2W SAFETRAN ROT. CANTILEVER MAIN |
| | | |
| | | |
| | | |
| | | |
| | | |

1-E-9

REV. 12-1-83

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510089 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 25 | 5" | 2W GATE OR FLASHER, S.P. |
| | | |
| | | |
| | | |
| | | |
| | | |

REV. 12-1-83

1-E-10

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | | | |
|---|---|---|---|
| DWN: | R.L.C. | PART NO. | SEE CHARTS |
| APP: | P.A.H. | | |
| SCALE: | NONE | DWG. NO. | LC510090 |
| DATE: | 11-3-83 | | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

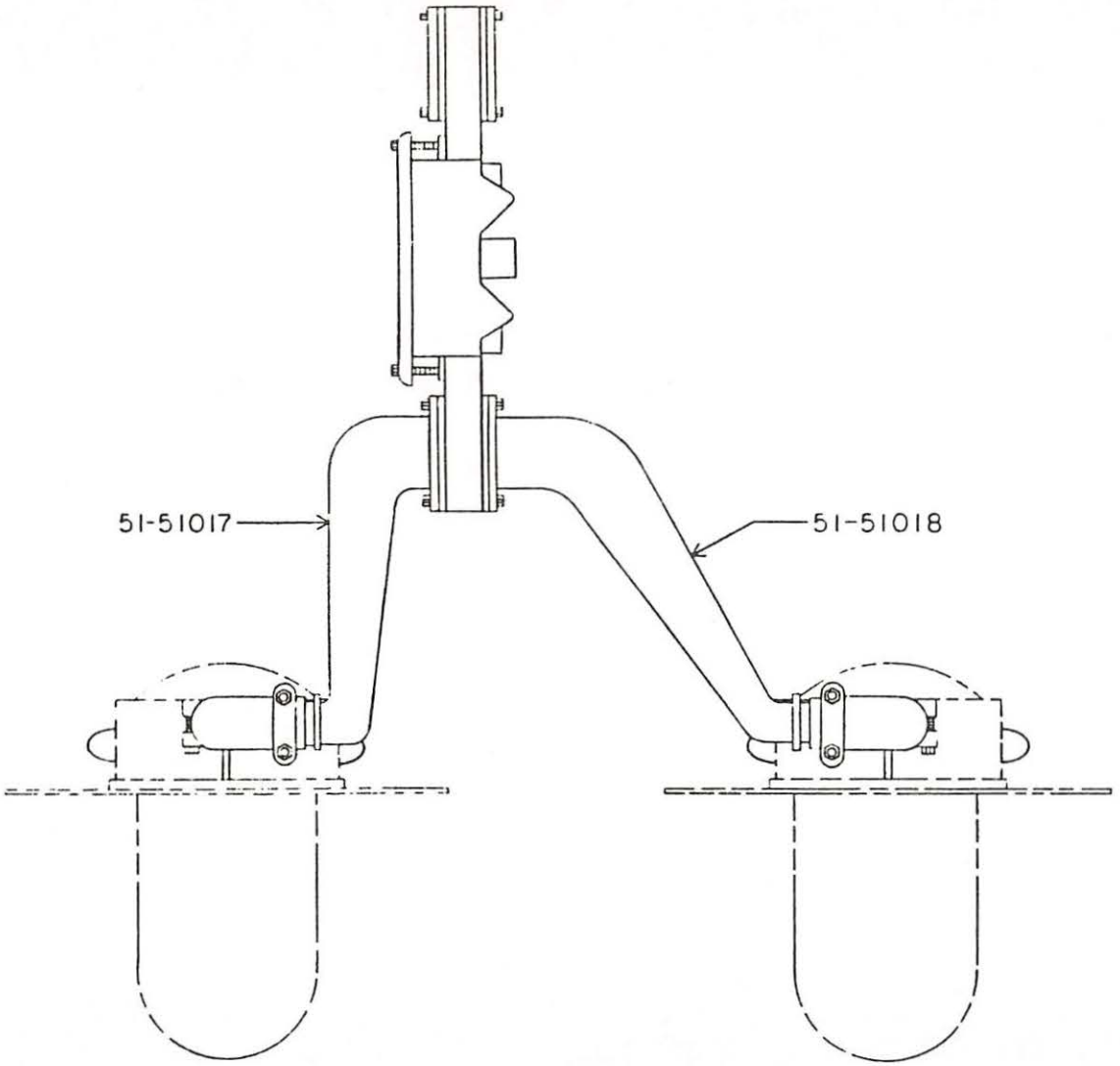
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A R-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A R-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 26 | BKT. | 1W W.O. CANTILEVER, EXTRA 45° RIGHT |
| 33 | 10" | 1W W.O. CANTILEVER, EXTRA 45° RIGHT |
| 34 | 12" | 1W W.O. CANTILEVER, EXTRA 45° RIGHT |
| | | |
| | | |
| | | |




1-E-11

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | | | |
|---|---|---|---|
| DWN: | R.L.C. | PART NO. | SEE CHARTS |
| APP: | P.A.H. | | |
| SCALE: | NONE | DWG. NO. | LC510091 |
| DATE: | 11-3-83 | | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

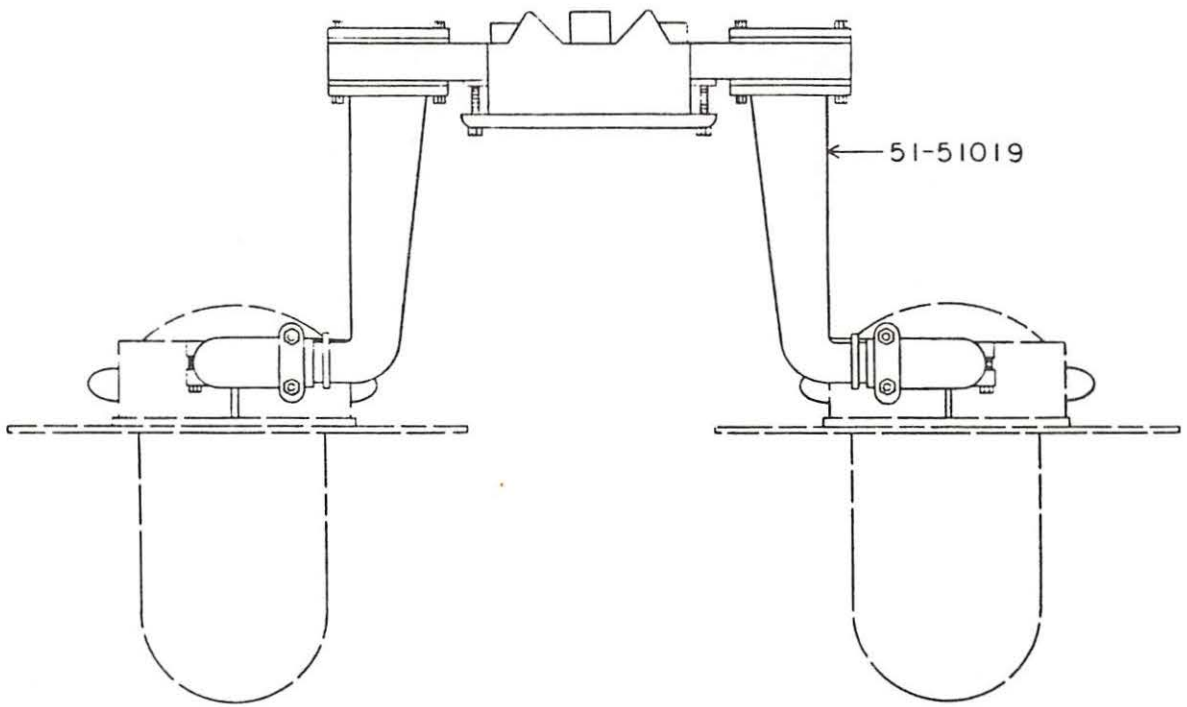
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 27 | 5" | 1W GATE OR FLASHER, S.P. |
| | | |
| | | |
| | | |
| | | |
| | | |



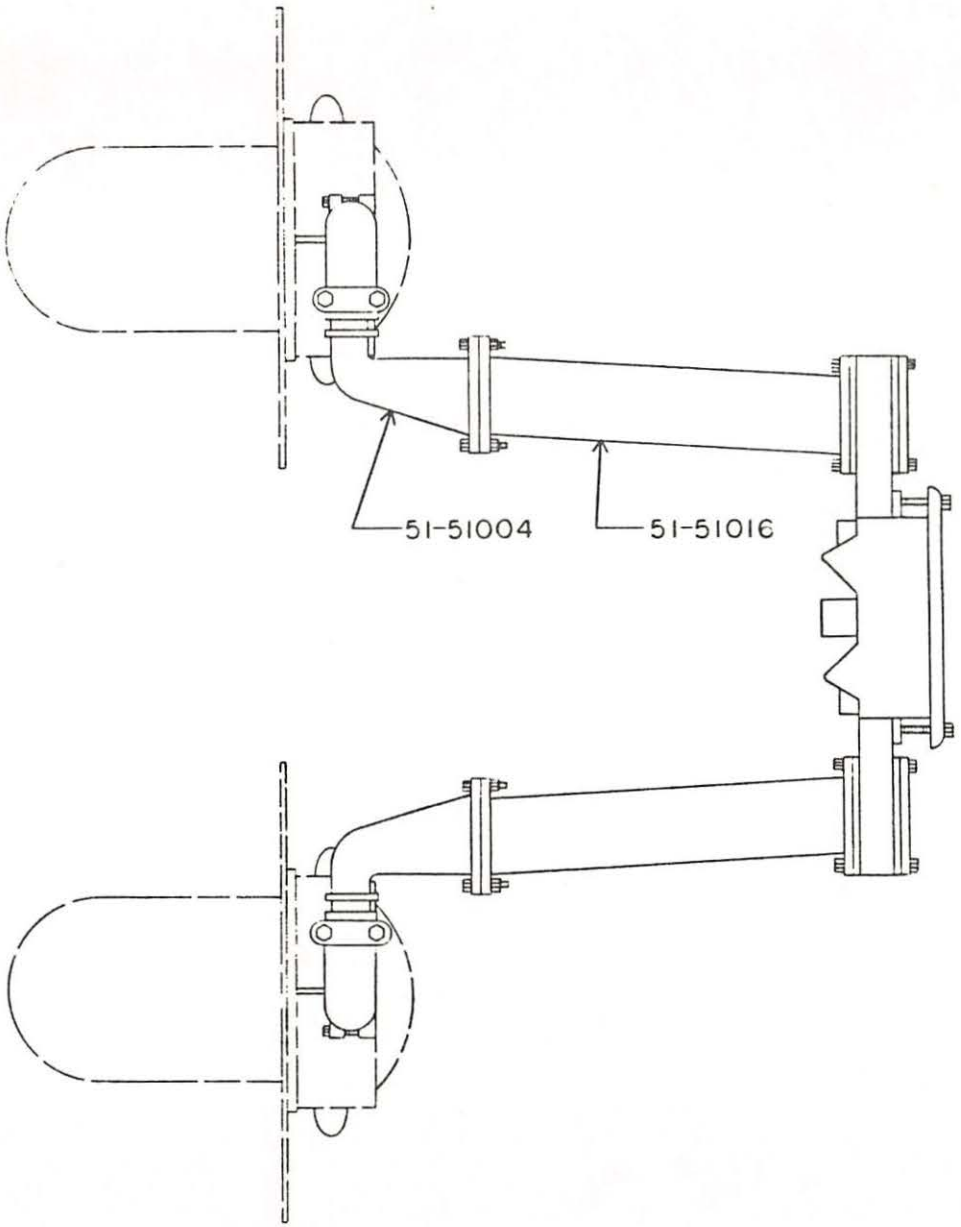

1-E-12

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY.

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: R.L.C. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510092 |
| DATE: 11-3-83 | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 29 | BKT. | 1W W.O. CANTILEVER, EXTRA 90° RIGHT |
| 31 | 10" | 1W W.O. CANTILEVER, EXTRA 90° RIGHT |
| 32 | 12" | 1W W.O. CANTILEVER, EXTRA 90° RIGHT |
| | | |
| | | |
| | | |

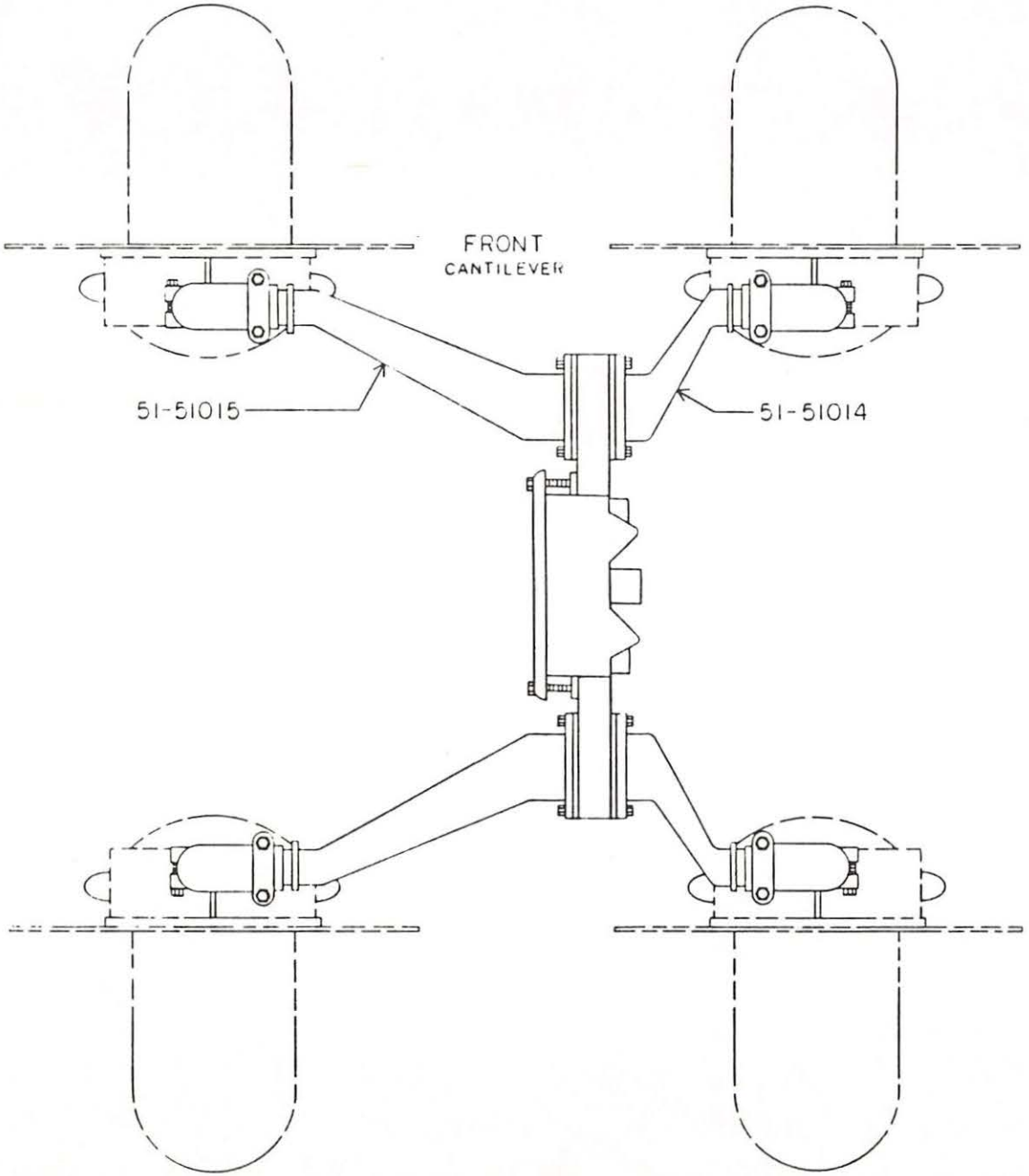
1-E-13

REV. 12-1-83

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | | | |
|---|---|---|---|
| DWN: | R.L.C. | PART NO. | SEE CHARTS |
| APP: | P.A.H. | | |
| SCALE: | NONE | DWG. NO. | LC510093 |
| DATE: | 11-3-83 | | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

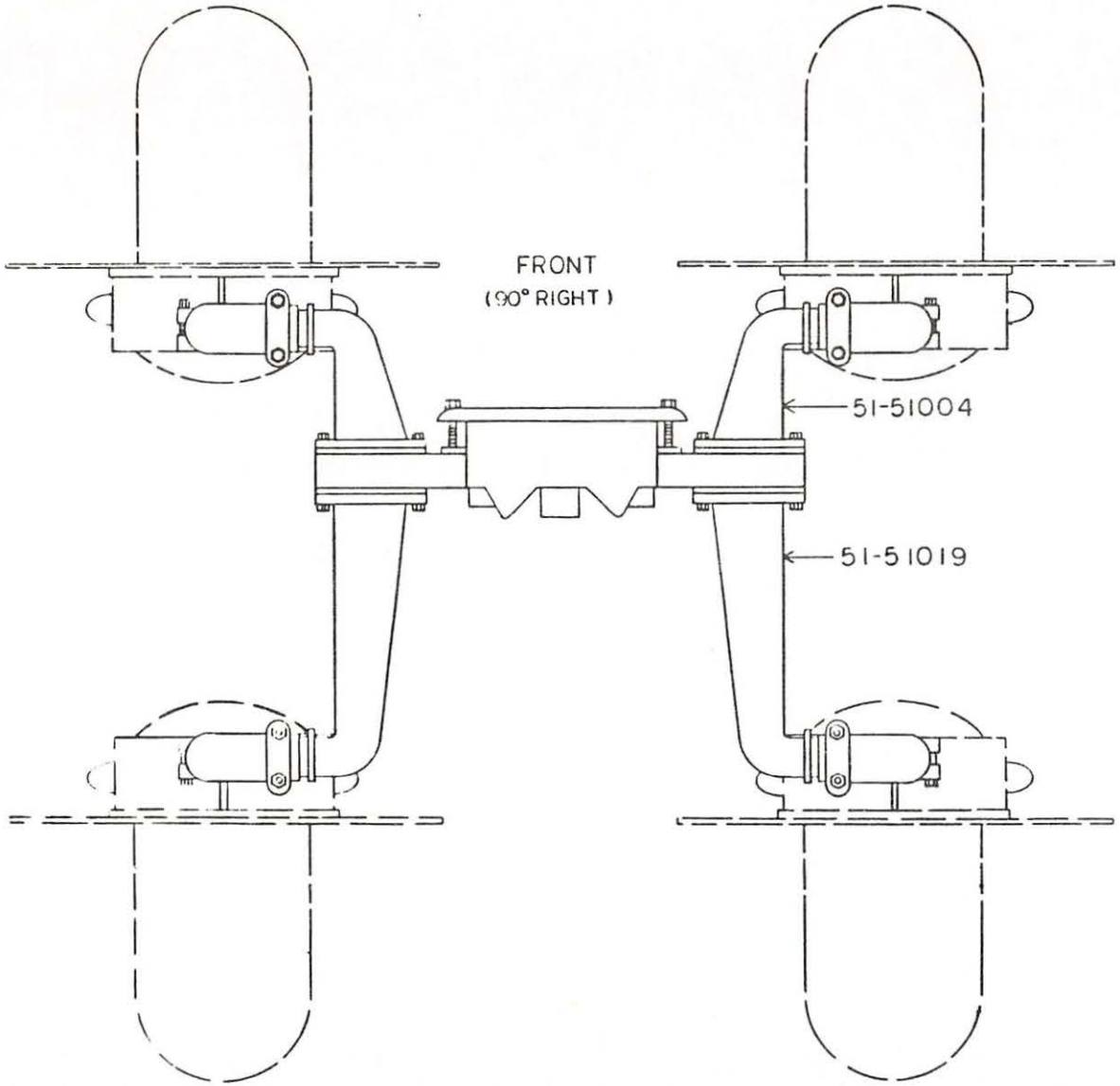
| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 35 | BKT | 2W GATE-CANTILEVER, MAIN |
| | | |
| | | |
| | | |
| | | |
| | | |

1-E-14 (A)

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

FLASHING LIGHT SIGNAL ASSEMBLY

| | | | |
|---|---|---|---|
| DWN: | K R H | PART NO. | SEE CHARTS |
| APP: | P.A.H. | | |
| SCALE: | NONE | DWG. NO. | LC510097 |
| DATE: | 11-3-83 | | |




ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |
| 5 | 30°-15° LENS(FRONT), 70° LENS(BACK) |
| | |
| 7 | 20°-10° LENS(FRONT), 70° LENS(BACK) |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 36 | 10" | 2W GATE CANTILEVER, EXTRA |
| 37 | 12" | 2W GATE CANTILEVER, EXTRA |
| 38 | BKT | 2W GATE CANTILEVER, EXTRA |
| | | |
| | | |
| | | |

1-E-15

A

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: K.R.H. | PART NO. SEE CHARTS |
| APP: P.A.H. | |
| SCALE: NONE | DWG. NO. LC510099 |
| DATE: 16 NOV 83 | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

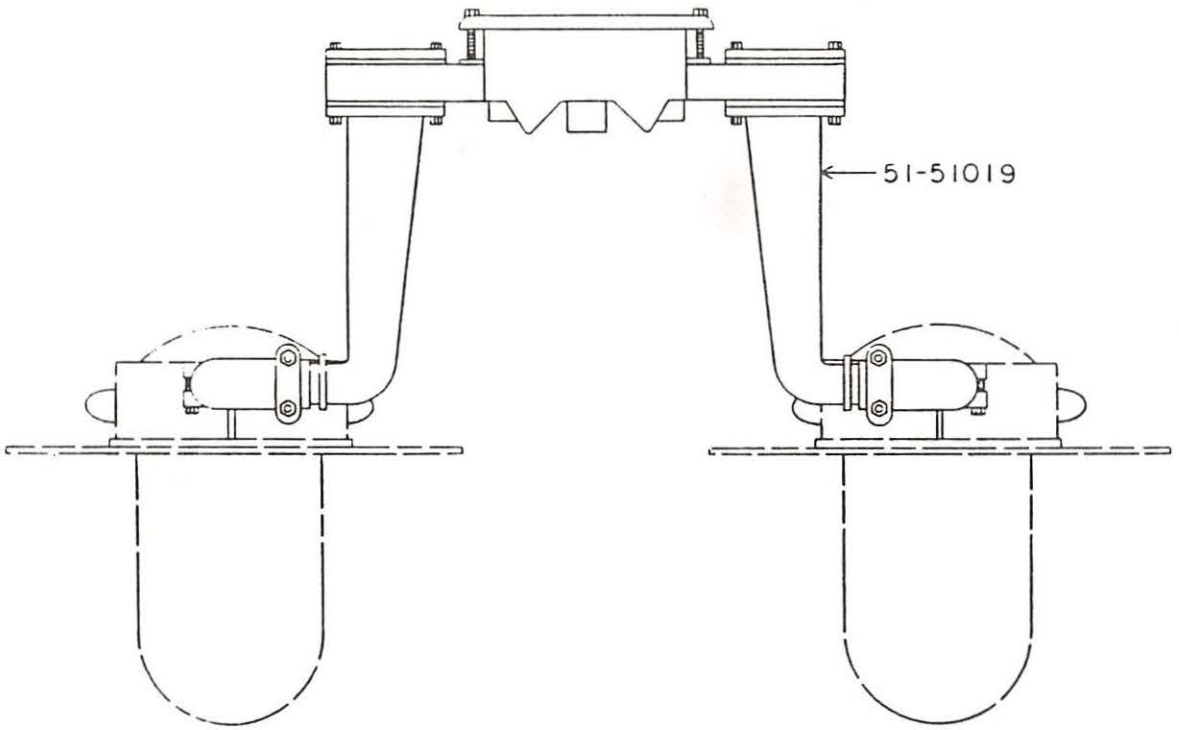
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 39 | 10" | 1 W GATE CANTILEVER, EXTRA 90° L |
| 40 | 12" | 1 W GATE CANTILEVER, EXTRA 90° L |
| 41 | BKT. | 1 W GATE CANTILEVER, EXTRA 90° L |
| | | |
| | | |
| | | |




1-E-16

A

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY.

FLASHING LIGHT SIGNAL ASSEMBLY

| | |
|---|---|
| DWN: RABUZZI | PART NO. SEE CHARTS |
| APP: | |
| SCALE: NONE | DWG. NO. LC510101 |
| DATE: 11-30-83 | |

ORDER LIGHT ASSEMBLIES BY PART NO. AND DESCRIPTION FROM THE FOLLOWING CHARTS.

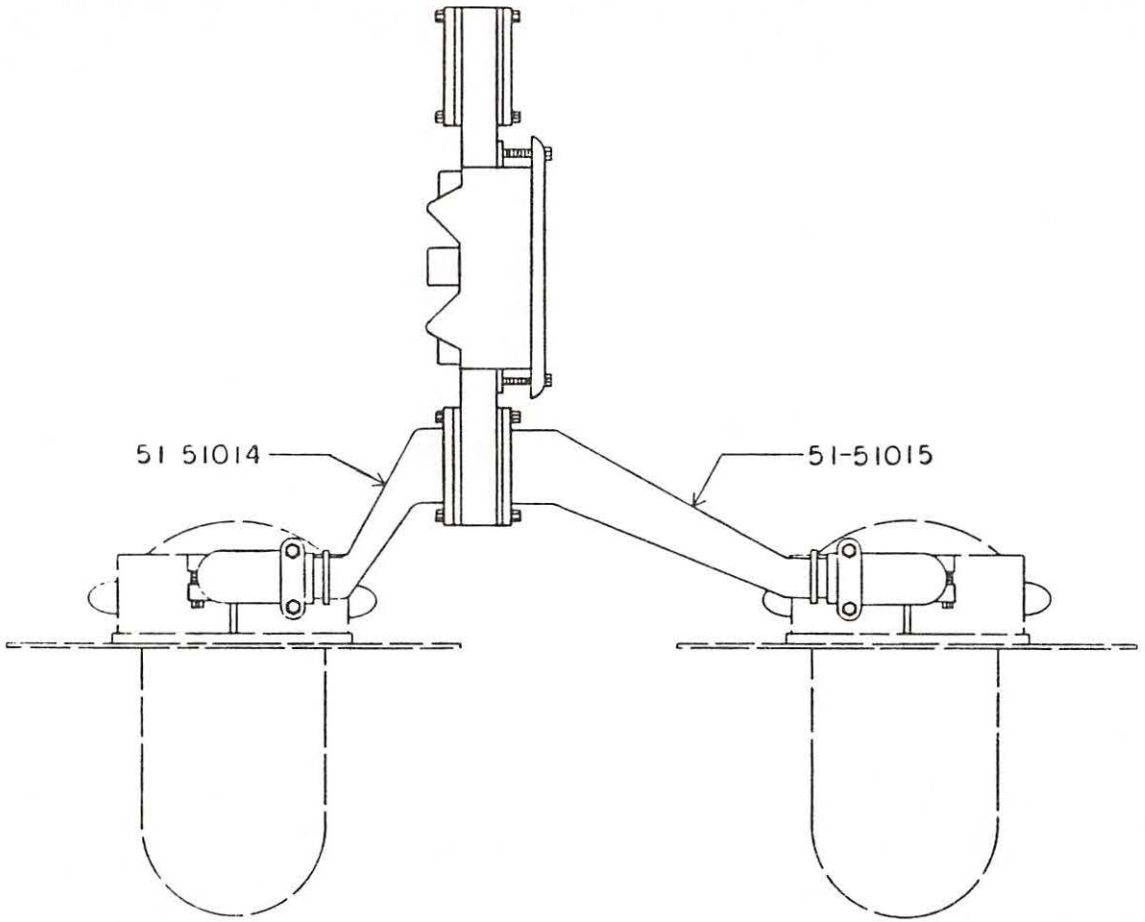
| PART NO. | DESCRIPTION |
|---|---|
| 5 1 0 1 0-C* | CROSSARM ASSEMBLY LESS LIGHTS |
| 5 1 5 A B-C* | CROSSARM ASS'Y WITH 8" LIGHTS |
| 5 1 6 A B-C* | CROSSARM ASS'Y WITH 12" LIGHTS |

* REPLACE LETTERS WITH NO.'S FROM THE FOLLOWING CHARTS TO SPECIFY LAMP, LENS, AND MOUNTING.

| "A" NO. | LAMP SPECIFICATION DESCRIPTION |
|---|---|
| 0 | 10V-18W LAMP |
| 1 | 10V-16W QUARTZ LAMP |
| 2 | 10V-25W LAMP |
| 3 | NO LAMP, #10 WIRE |
| 4 | NO LAMP, STD. WIRE |

| "B" NO. | LENS SPECIFICATION DESCRIPTION |
|---|---|
| 1 | 30°-15° LENS |
| | |
| 3 | 20°-10° LENS |
| 4 | 70° LENS |

| "C" NO. | MTG. | MOUNTING SPECIFICATION USE |
|---|---|---|
| 42 | BKT | I W GATE CANTILEVER, MAIN |
| | | |
| | | |
| | | |
| | | |
| | | |

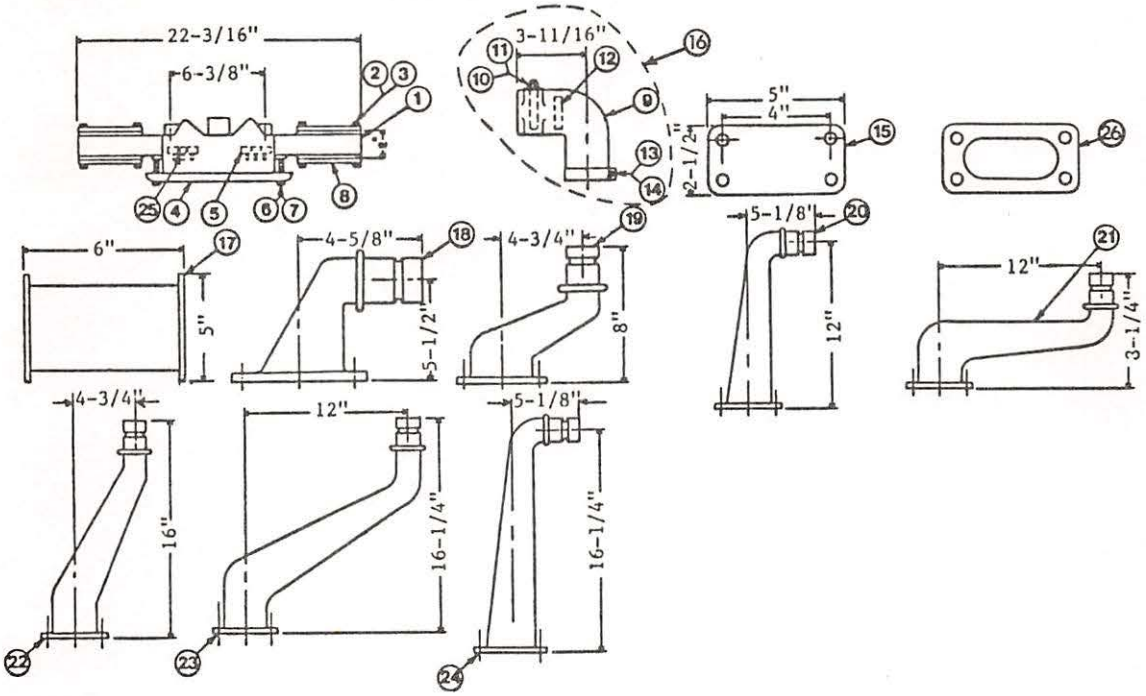



1-E-17

A

| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| FLASHING LIGHT SIGNAL ASSEMBLY | |
| DWN: RABUZZI | PART NO. SEE CHARTS |
| APP: | |
| SCALE: NONE | DWG. NO. LC 510102 |
| DATE: 11-30-83 | |

# CROSSARMS
# REPLACEMENT PARTS




| REF. | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | CROSSARM JUNCTION BOX (CASTING ONLY) | 51-51010 |
| 2 | 3/8" LOCK WASHER, ZINC | 01023171 |
| 3 | 3/8" - 16 x 1" HEX. HD. CAP SCREW, ZINC | 01020550 |
| 4 | CROSSARM JUNCTION BOX COVER | 51-51012 |
| 5 | DOUBLE ROW TERMINAL BLOCK | 73106-02 |
| 6 | 3/8" FLAT WASHER, ZINC | 01023170 |
| 7 | 3/8" x 1-1/2" HEX. HD. CAP SCREW, ZINC | 01020570 |
| 8 | SEE NUMBER 15, THIS SHEET | |
| 9 | CROSSARM ELBOW | 51-51005 |
| 10 | 5/16" - 18 U-BOLT, ZINC | 51-01038 |
| 11 | 5/16" - 18 HEX. NUT, ZINC | 01022900 |
| 12 | ELBOW GASKET | 51-01039 |
| 13 | 3/8" - 16 x 2" HEX. HD. CAP SCREW, ZINC | 01020590 |
| 14 | SEE NUMBER 2, THIS SHEET | |
| 15 | COVER PLATE FOR 1-WAY CROSSARM | 51-01042 |
| 16 | ELBOW ASSEMBLY, COMPLETE | 51-01040 |
| 17 | EXTENSION, CROSSARM 6" | 51-51009 |
| 18 | ARM, EXTENSION 5-1/2" | 51-51004 |
| 19 | ARM, EXTENSION 8" , w/ 5" OFFSET | 51-51014 |
| 20 | ARM, EXTENSION 12" | 51-51019 |
| 21 | ARM, EXTENSION 8" , w/12" OFFSET | 51-51017 |
| 22 | ARM, EXTENSION 16", w/ 5" OFFSET | 51-51015 |
| 23 | ARM, EXTENSION 16", w/12" OFFSET | 51-51018 |
| 24 | ARM, EXTENSION 16" | 51-54023 |
| 25 | 10 - 32 x 7/8" FILLISTER HD. MACHINE SCREW | 01024231 |
| 26 | ARM, EXTENSION GASKET | 51-01041 |

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# MOUNTING ARRANGEMENTS FOR FLASHING LIGHT SIGNAL ASSEMBLIES

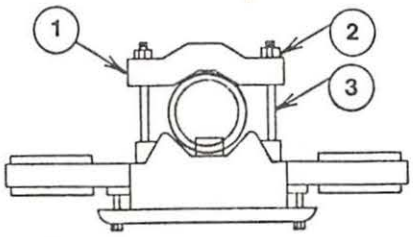



FIGURE #1

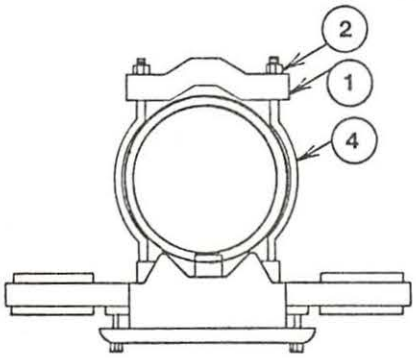



FIGURE #2

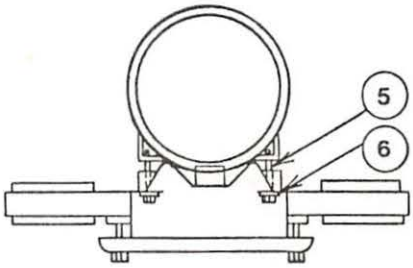



FIGURE #3

FIGURE #1 - TYPICAL MOUNTING ARRANGEMENT FOR 4" OR 5" MASTS USED ON FLASHERS AND GATES.

FIGURE #2 - TYPICAL MOUNTING ARRANGEMENT FOR 8" MAST USED ON ROTATABLE CANTILEVER, AND FOR 10" OR 12" MASTS USED ON WALKOUT CANTILEVER WHEN LIGHT HOLE MUST BE FIELD DRILLED.

FIGURE #3 - TYPICAL BRACKET MOUNTING ARRANGEMENT FOR 10" OR 12" MASTS USED ON WALKOUT CANTILEVER WHEN LIGHT HOLE IS FACTORY DRILLED.

| REF. | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | PIPE CLAMP | C-51008 |
| 2 | 5/8" - 11 HEX. NUT, ZINC | 01022950 |
| 3 | 4" MAST: 5/8" - 11 x 6" HEX. HD. CAP SCREW, ZINC | 01021710 |
| | 5" MAST: 5/8" - 11 x 7-1/2" H.H. CAP SCREW, ZINC | 01021740 |
| 4 | 8" MAST: MOUNTING BOLT, ZINC | 51-01043 |
| | 10" MAST: MOUNTING BOLT, ZINC | 54-00514 |
| | 12" MAST: MOUNTING BOLT, ZINC | 54-00515 |
| 5 | 1/2" - 13 x 2-1/2" HEX. HD. CAP SCREW, ZINC | 01021110 |
| 6 | 1/2" FLAT WASHER, ZINC | 01023190 |

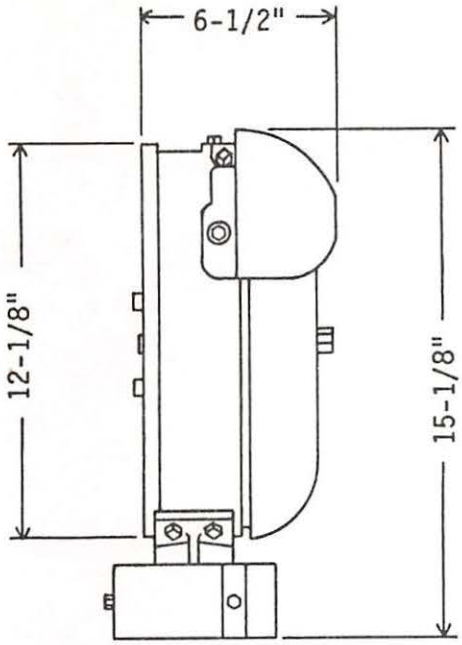
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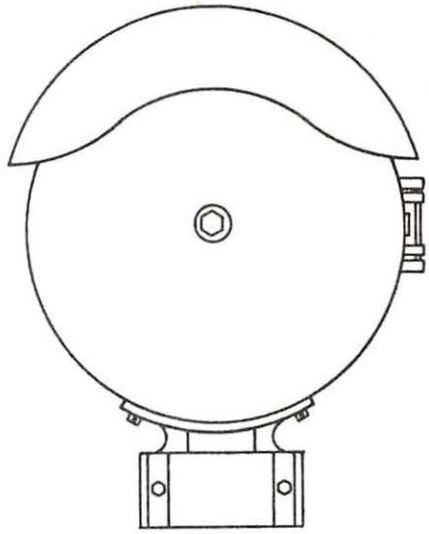
# HIGHWAY CROSSING BELL



## MODEL 21000

## SIZE 12"



FEATURES OF THE 12" HIGHWAY CROSSING BELL

MEETS ALL AAR REQUIREMENTS

RUGGED DESIGN FOR LONG LIFE

CAST ALUMINUM HOUSING FOR LIGHT WEIGHT

AVAILABLE FOR DC, AC, OR AC/DC OPERATION

LOW WORKING CURRENT; 225 MA

12" STEEL GONG

160-200 STROKES PER MINUTE

MOUNTING AVAILABLE FOR TOP OF 4", 5", 6", 10", AND 12" MASTS

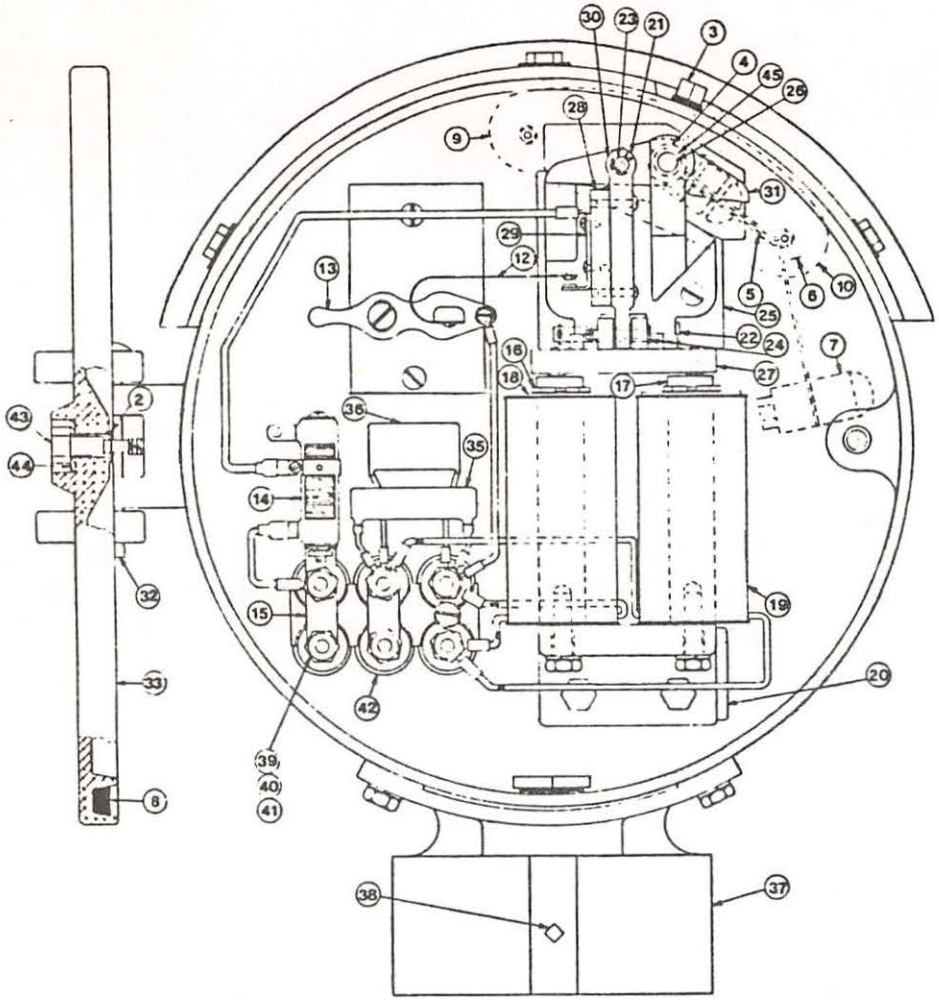
TO ORDER: PLEASE FILL IN THE ORDER NUMBER BELOW BY THE ORDERING INFORMATION THAT FOLLOWS.

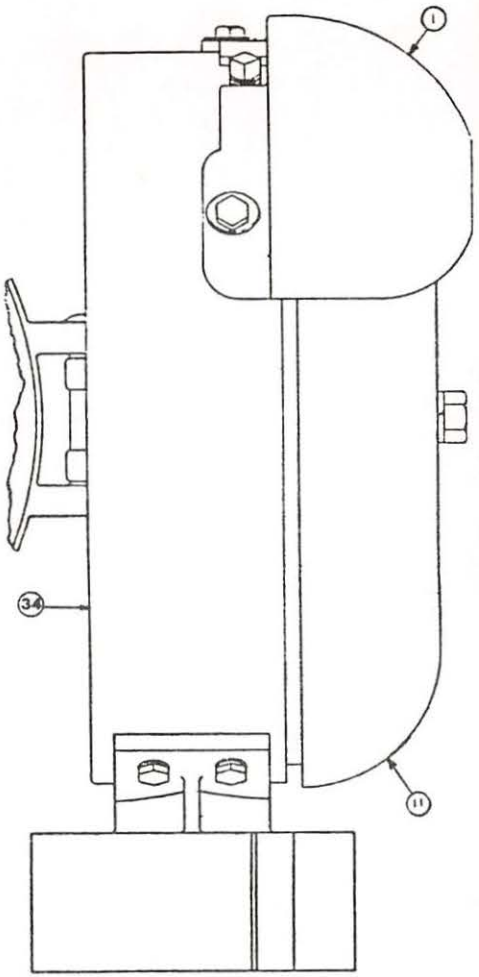
ORDER NUMBER: 2100__ - 0 __

ORDERING INFORMATION

| MTG. | 6 TO 16V DC | 115V AC | 8 TO 16V DC/AC |
|---|---|---|---|
| 4" | 21001-01 | 21002-01 | 21003-01 |
| 5" | 21001-02 | 21002-02 | 21003-02 |
| 6" | 21001-03 | 21002-03 | 21003-03 |
| 10" | 21001-04 | 21002-04 | 21003-04 |
| 12" | 21001-05 | 21002-05 | 21003-05 |

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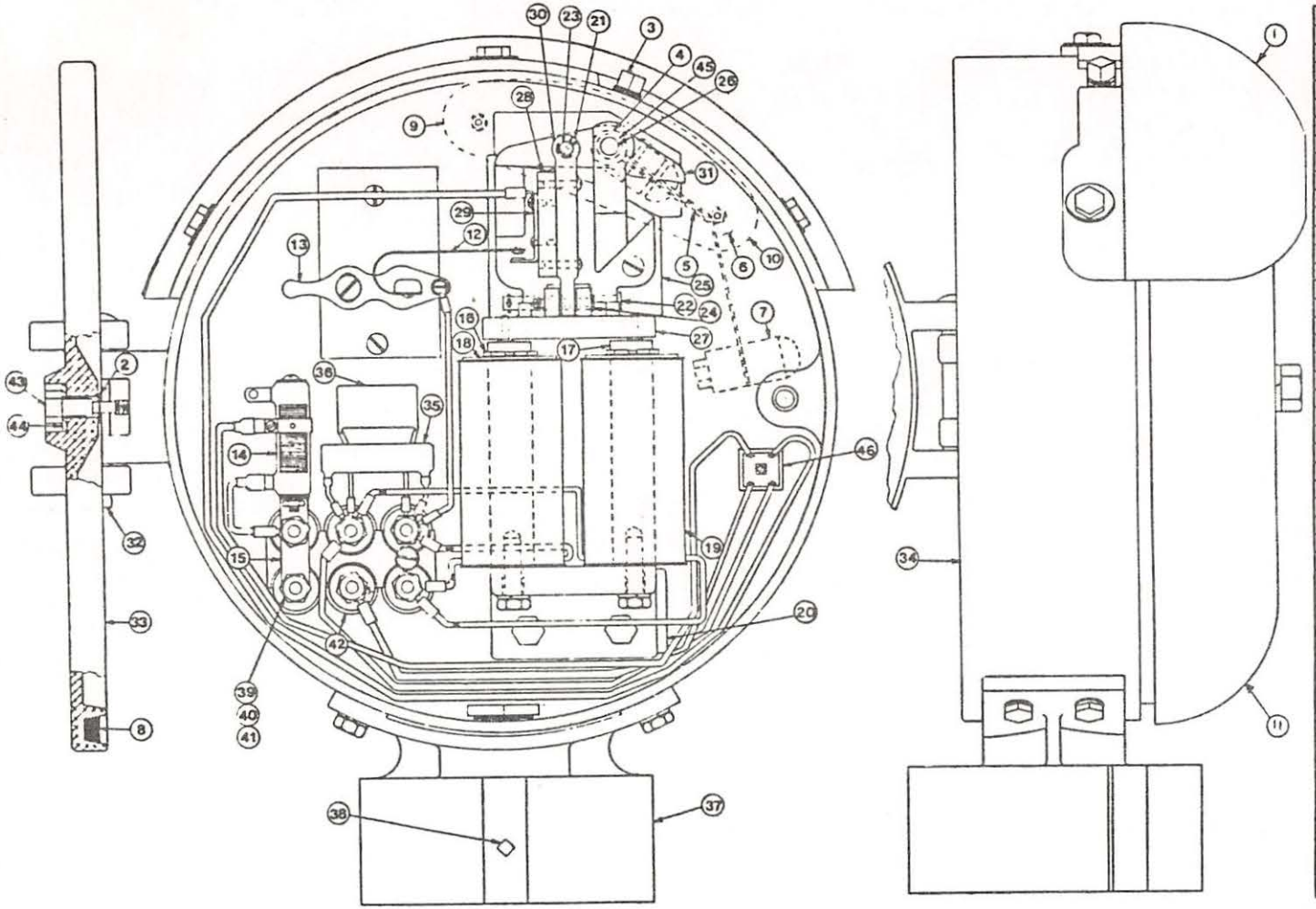
| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | BELL HOOD | C-21003 |
| 2 | 1/4" TRUARC RETAINING RING | 01025587 |
| 3 | 1/4" GALV. PIPE PLUG | 01032903 |
| 4 | 1/4" x 3/16" FELT | 01210002 |
| 5 | HAMMER REFORCEMENT SPRING | 21-01004 |
| 6 | DUST GUARD GASKET | 21-01006 |
| 7 | CLAPPER | 21-01018 |
| 8 | DOOR GASKET | 21-01022 |
| 9 | RIGHT DUST GUARD | 21-01026 |
| 10 | LEFT DUST GUARD | 21-01027 |
| 11 | BELL GONG | 21-01029 |
| 12 | CONTACT FINGER ASSEMBLY | 21-01020 |
| 13 | CONTACT FINGER SUPPORT | 21-21013 |
| 14 | ADJUSTABLE RESISTOR SUB-ASSEMBLY | 21-02005 |
| 15 | 1" STANDARD FLAT CONNECTOR | 73-10763 |
| 16 | TRUARC RETAINING RING | 01025588 |
| 17 | MAGNET CORE | 21-01003 |
| 18 | MAGNET CORE RETAINING WASHER | 21-01007 |
| 19 | MAGNET COIL ASSEMBLY | 21-01031 |
| 20 | MAGNET BRACKET | 21-21012 |
| 21 | 1/16" x 1/2" COTTER PIN | 01025405 |
| 22 | 1/4" x 2" CLEVIS PIN | 01025490 |
| 23 | 1/4" x 1-1/4" CLEVIS PIN | 01025492 |
| 24 | 3/16" x 1-1/4" CLEVIS PIN | 01025493 |
| 25 | MOVEMENT BASE ASSEMBLY | 21-02001 |
| 26 | OSCILLATOR STUD | 21-01017 |
| 27 | ARMATURE | 21-21010 |
| 28 | LINK INSULATOR | 21-01015 |
| 29 | MOVING CONTACT ASSEMBLY | 21-01030 |
| 30 | OPERATING LINK | 21-21011 |
| 31 | OSCILLATOR | 21-21009 |
| 32 | 5/16" x 3-1/2" AL. RIVIT | 01025449 |
| 33 | BELL DOOR | 21-21001 |
| 34 | BELL HOUSING | 21-21002 |
| 35 | FIXED RESISTOR | 21-02009 |
| 36 | CAPACITOR | 21-02010 |
| 37 | A - 4" MOUNTING SOCKET | 21-21004 |
| | B - 5" MOUNTING SOCKET | 21-21005 |
| | C - 6" MOUNTING SOCKET | 21-21006 |
| 38 | 5/16" - 18 x 3/4" SQ. HD. SET SCREW, S.S. | 01020281 |
| 39 | ACORN NUT | 73-10706 |
| 40 | CLAMP NUT | 73-10707 |
| 41 | AAR WASHER | 73-10708 |
| 42 | TERMINAL BLOCK DOUBLE ROW L/ HDW | 73106-00 |
| 43 | 5/16" - 18 x 1-1/8" HEX. LOCK BOLT | 01250001 |
| 44 | 5/16" FLAT WASHER | 01023160 |
| 45 | TRUARC RETAINING RING | 01025585 |

## REPLACEMENT PARTS

MODEL: 21001

12" HIGHWAY CROSSING BELL: TO 16V DC

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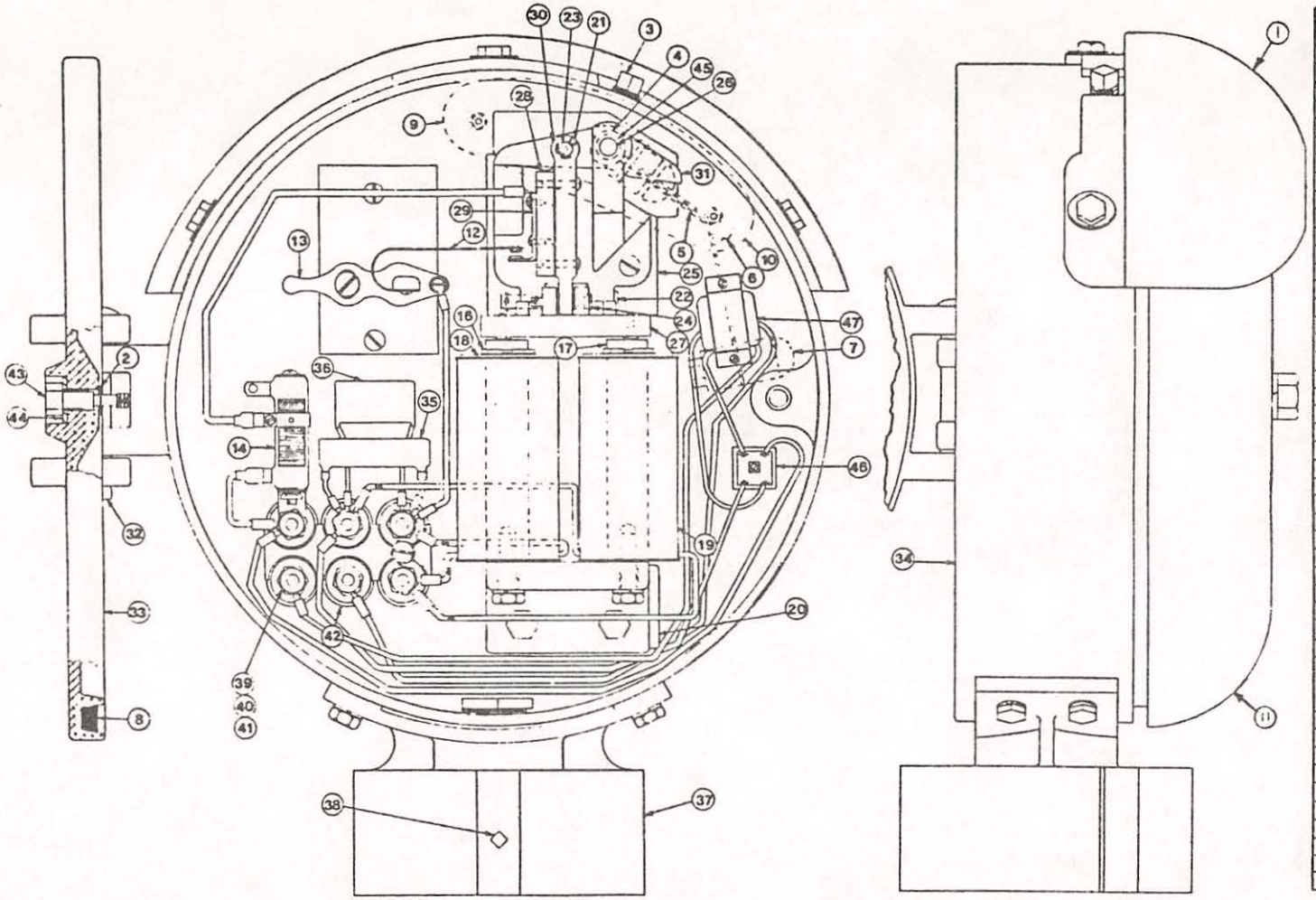
| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | BELL HOOD | C-21003 |
| 2 | 1/4" TRUARC RETAINING RING | 01025587 |
| 3 | 1/4" GALV. PIPE PLUG | 01032903 |
| 4 | 1/4" x 3/16" FELT | 01210002 |
| 5 | HAMMER REFORCEMENT SPRING | 21-01004 |
| 6 | DUST GUARD GASKET | 21-01006 |
| 7 | CLAPPER | 21-01018 |
| 8 | DOOR GASKET | 21-01022 |
| 9 | RIGHT DUST GUARD | 21-01026 |
| 10 | LEFT DUST GUARD | 21-01027 |
| 11 | BELL GONG | 21-01029 |
| 12 | CONTACT FINGER ASSEMBLY | 21-01020 |
| 13 | CONTACT FINGER SUPPORT | 21-21013 |
| 14 | ADJUSTABLE RESISTOR SUB-ASSEMBLY | 21-02005 |
| 15 | 1" STANDARD FLAT CONNECTOR | 73-10763 |
| 16 | TRUARC RETAINING RING 5160-75 | 01025588 |
| 17 | MAGNET CORE | 21-01003 |
| 18 | MAGNET CORE RETAINING WASHER | 21-01007 |
| 19 | MAGNET COIL ASSEMBLY | 21-01031 |
| 20 | MAGNET BRACKET | 21-21012 |
| 21 | 1/16" x 1/2" COTTER PIN | 01025405 |
| 22 | 1/4" x 2" CLEVIS PIN | 01025490 |
| 23 | 1/4" x 1-1/4" CLEVIS PIN | 01025492 |
| 24 | 3/16" x 1-1/4" CLEVIS PIN | 01025493 |
| 25 | MOVEMENT BASE ASSEMBLY | 21-02001 |
| 26 | OSCILLATOR STUD | 21-01017 |
| 27 | ARMATURE | 21-21010 |
| 28 | LINK INSULATOR | 21-01015 |
| 29 | MOVING CONTACT ASSEMBLY | 21-01030 |
| 30 | OPERATING LINK | 21-21011 |
| 31 | OSCILLATOR | 21-21009 |
| 32 | 5/16" x 3-1/2" AL. RIVIT | 01025449 |
| 33 | BELL DOOR | 21-21001 |
| 34 | BELL HOUSING | 21-21002 |
| 35 | FIXED RESISTOR | 21-02009 |
| 36 | CAPACITOR | 21-02010 |
| 37 | A - 4" MOUNTING SOCKET | 21-21004 |
| | B - 5" MOUNTING SOCKET | 21-21005 |
| | C - 6" MOUNTING SOCKET | 21-21006 |
| 38 | 5/16" - 18 x 3/4" SQ. HD. SET SCREW, S.S. | 01020281 |
| 39 | ACORN NUT | 73-10706 |
| 40 | CLAMP NUT | 73-10707 |
| 41 | AAR WASHER | 73-10708 |
| 42 | TERMINAL BLOCK DOUBLE ROW L/ HDW | 73106-00 |
| 43 | 5/16" - 18 x 1-1/8" HEX. LOCK BOLT | 01250001 |
| 44 | 5/16" FLAT WASHER | 01023160 |
| 45 | TRUARC RETAINING RING | 01025585 |
| 46 | BRIDGE RECTIFIER | 01030204 |
| | | |

## REPLACEMENTS PARTS

MODEL: 21002

12" HIGHWAY CROSSING BELL: 115V AC

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| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | BELL HOOD | C-21003 |
| 2 | 1/4" TRUARC RETAINING RING | 01025587 |
| 3 | 1/4" GALV. PIPE PLUG | 01032903 |
| 4 | 1/4" x 3/16" FELT | 01210002 |
| 5 | HAMMER REFORCEMENT SPRING | 21-01004 |
| 6 | DUST GUARD GASKET | 21-01006 |
| 7 | CLAPPER | 21-01018 |
| 8 | DOOR GASKET | 21-01022 |
| 9 | RIGHT DUST GUARD | 21-01026 |
| 10 | LEFT DUST GUARD | 21-01027 |
| 11 | BELL GONG | 21-01029 |
| 12 | CONTACT FINGER ASSEMBLY | 21-01020 |
| 13 | CONTACT FINGER SUPPORT | 21-21013 |
| 14 | ADJUSTABLE RESISTOR SUB-ASSEMBLY | 21-02005 |
| 15 | 1" STANDARD FLAT CONNECTOR | 73-10763 |
| 16 | TRUARC RETAINING RING 5160-75 | 01025588 |
| 17 | MAGNET CORE | 21-01003 |
| 18 | MAGNET CORE RETAINING WASHER | 21-01007 |
| 19 | MAGNET COIL ASSEMBLY | 21-01031 |
| 20 | MAGNET BRACKET | 21-21012 |
| 21 | 1/16" x 1/2" COTTER PIN | 01025405 |
| 22 | 1/4" x 2" CLEVIS PIN | 01025490 |
| 23 | 1/4" x 1-1/4" CLEVIS PIN | 01025492 |
| 24 | 3/16" x 1-1/4" CLEVIS PIN | 01025493 |
| 25 | MOVEMENT BASE ASSEMBLY | 21-02001 |
| 26 | OSCILLATOR STUD | 21-01017 |
| 27 | ARMATURE | 21-21010 |
| 28 | LINK INSULATOR | 21-01015 |
| 29 | MOVING CONTACT ASSEMBLY | 21-01030 |
| 30 | OPERATING LINK | 21-21011 |
| 31 | OSCILLATOR | 21-21009 |
| 32 | 5/16" x 3-1/2" AL. RIVIT | 01025449 |
| 33 | BELL DOOR | 21-21001 |
| 34 | BELL HOUSING | 21-21002 |
| 35 | FIXED RESISTOR | 21-02009 |
| 36 | CAPACITOR | 21-02010 |
| 37 | A - 4" MOUNTING SOCKET | 21-21004 |
| | B - 5" MOUNTING SOCKET | 21-21005 |
| | C - 6" MOUNTING SOCKET | 21-21006 |
| 38 | 5/16" - 18 x 3/4" SQ. HD. SET SCREW, S.S. | 01020281 |
| 39 | ACORN NUT | 73-10706 |
| 40 | CLAMP NUT | 73-10707 |
| 41 | AAR WASHER | 73-10708 |
| 42 | TERMINAL BLOCK DOUBLE ROW L/ HDW | 73106-00 |
| 43 | 5/16" - 18 x 1-1/8" HEX. LOCK BOLT | 01250001 |
| 44 | 5/16" FLAT WASHER | 01023160 |
| 45 | TRUARC RETAINING RING | 01025585 |
| 46 | BRIDGE RECTIFIER | 01030204 |
| 47 | TRANSFORMER 12.6V - 1AMP. | 01030203 |

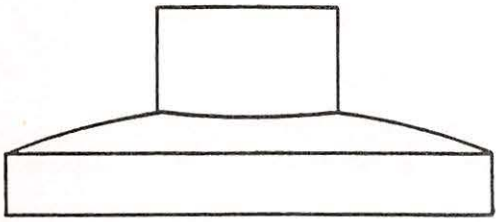
## REPLACEMENT PARTS

MODEL: 21003

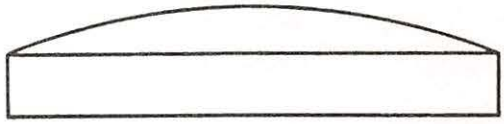
12" HIGHWAY CROSSING BELL: 8 TO 16V AC/DC

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# BELL ADAPTERS & PINNACLES



BELL ADAPTER



PINNACLE

ORDER BY PART NUMBER AND DESCRIPTION

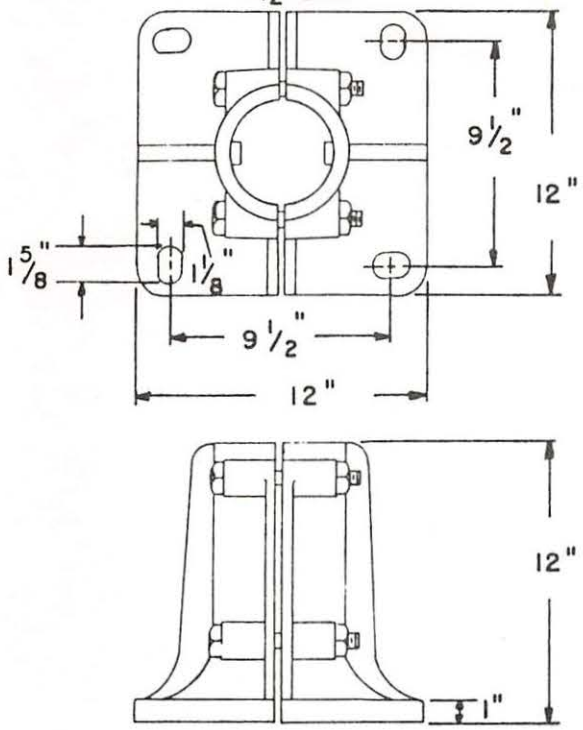
| PART NO. | DESCRIPTION |
|---|---|
| 54-00520 | 12" TO 5" BELL ADAPTER WITH SET SCREW |
| 54-00513 | 10" TO 5" BELL ADAPTER WITH SET SCREW |
| 54-00154 | 12" TO 4" BELL ADAPTER WITH SET SCREW |
| 54-00153 | 10" TO 4" BELL ADAPTER WITH SET SCREW |
| C-54001 | 12" PINNACLE |
| 54-54001 | 12" PINNACLE WITH SET SCREW |
| C-54002 | 10" PINNACLE |
| 54-54002 | 10" PINNACLE WITH SET SCREW |
| C-54004 | 8" PINNACLE |
| 54-54004 | 8" PINNACLE WITH SET SCREW |
| C-54007 | 6" PINNACLE |
| 54-54007 | 6" PINNACLE WITH SET SCREW |
| C-11305 | 5" PINNACLE |
| 54-11305 | 5" PINNACLE WITH SET SCREW |
| C-11304 | 4" PINNACLE |
| 54-11304 | 4" PINNACLE WITH SET SCREW |

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# SPLIT BASES

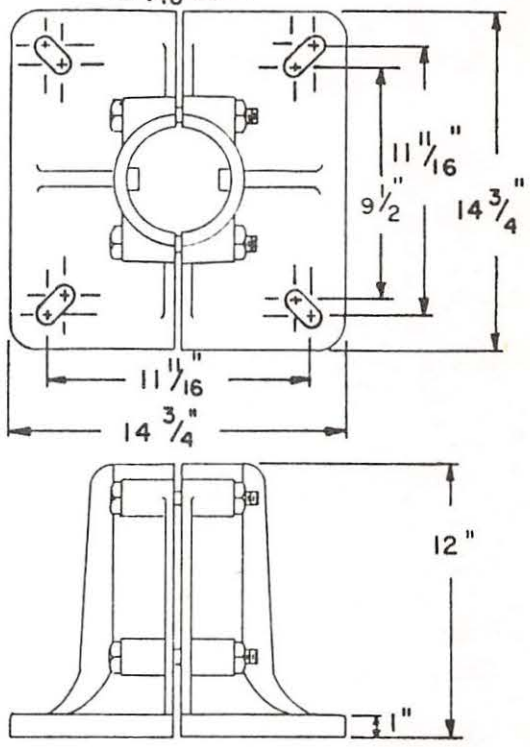
ALUMINUM

SPLIT TYPE 4" PIPE
9½" B.S.

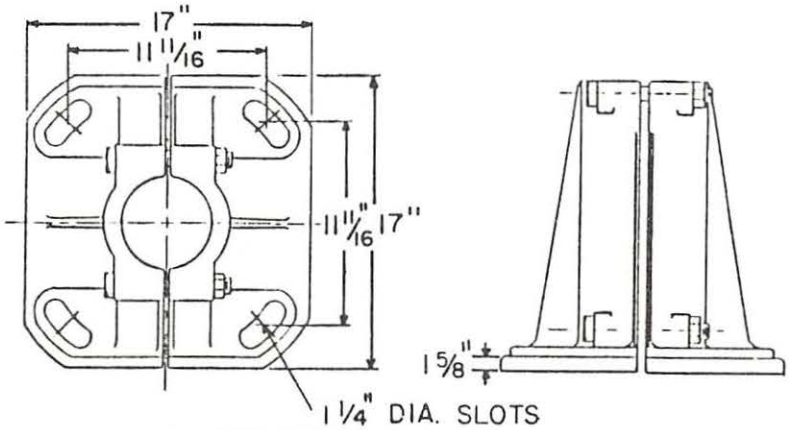



ASSEMBLY
20905-01
4" MAST

SPLIT TYPE 4" PIPE
11 11/16" B.S.




ASSEMBLY
20901-01
4" MAST



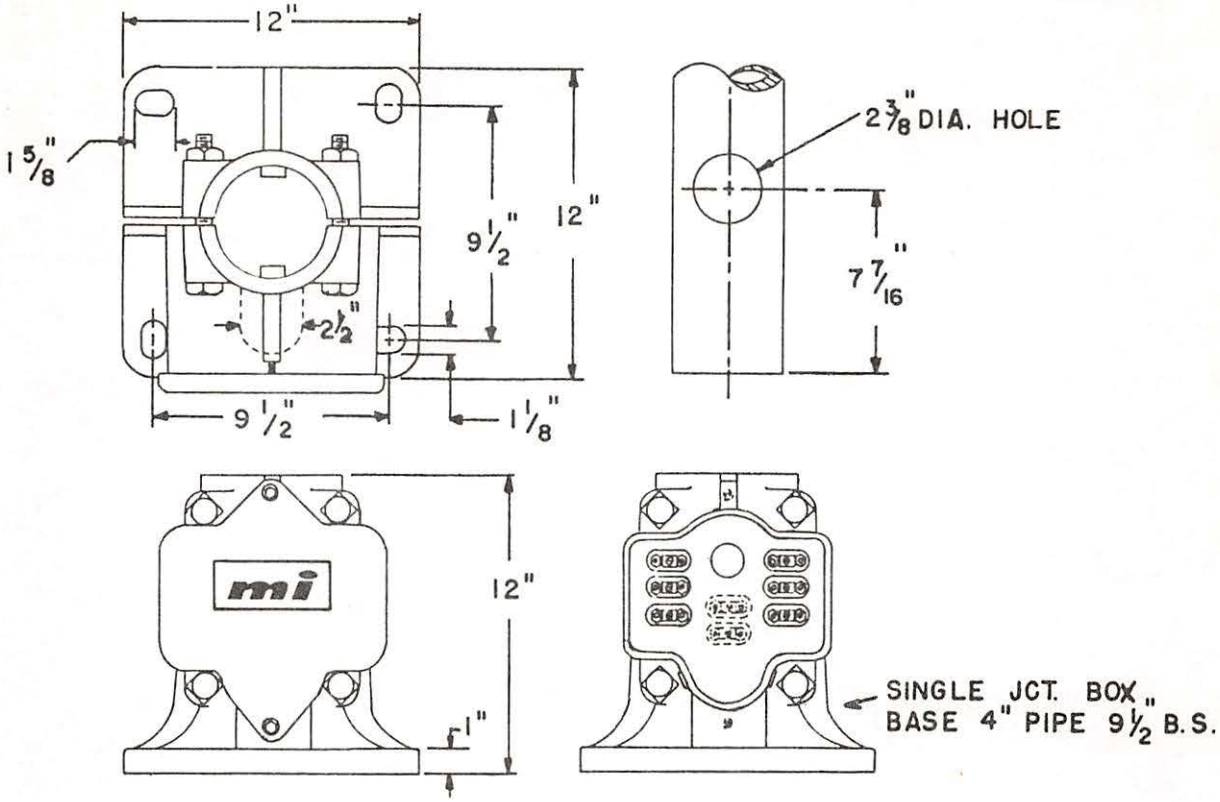

ASSEMBLY 20501-01
5" MAST

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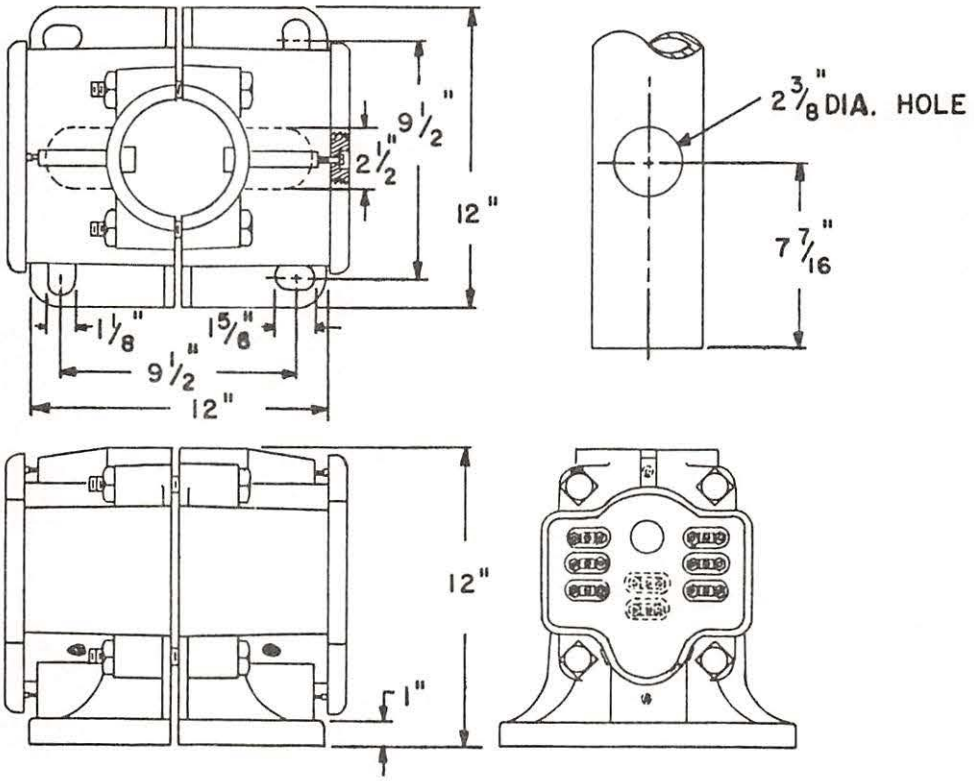
# JCT. BOX BASES



ALUMINUM - 4" MAST - 9-1/2" x 9-1/2" B.S.




ASSEMBLY 20906-01




DOUBLE JCT. BOX BASE 4" PIPE
9 1/2" B. S

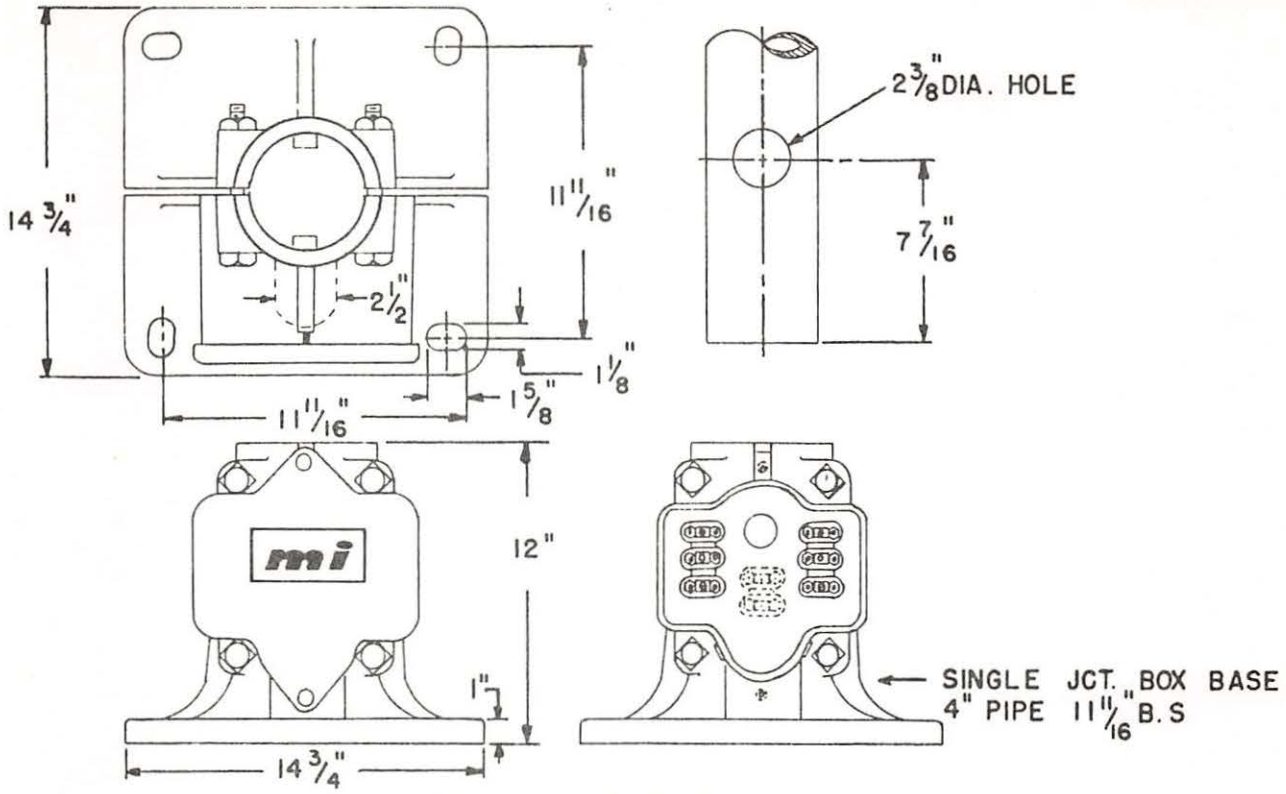
ASSEMBLY 20906-04

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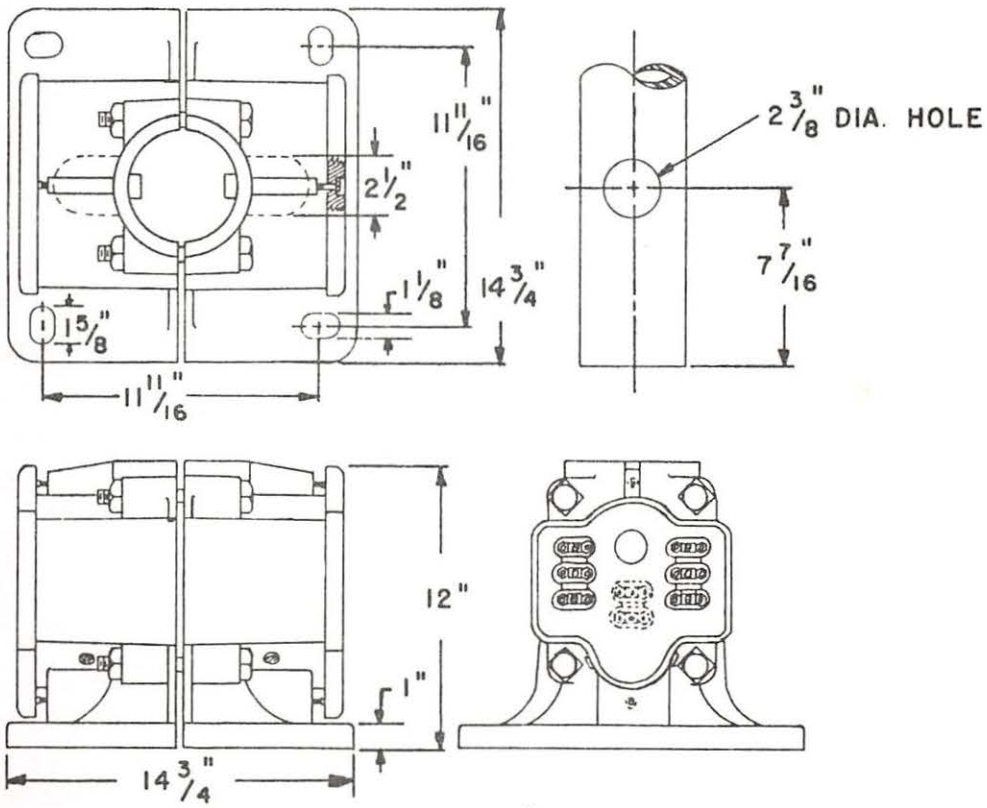
# JCT. BOX BASES



ALUMINUM - 4" MAST - 11-11/16" x 11-11/16" B.S.




ASSEMBLY 20902-01

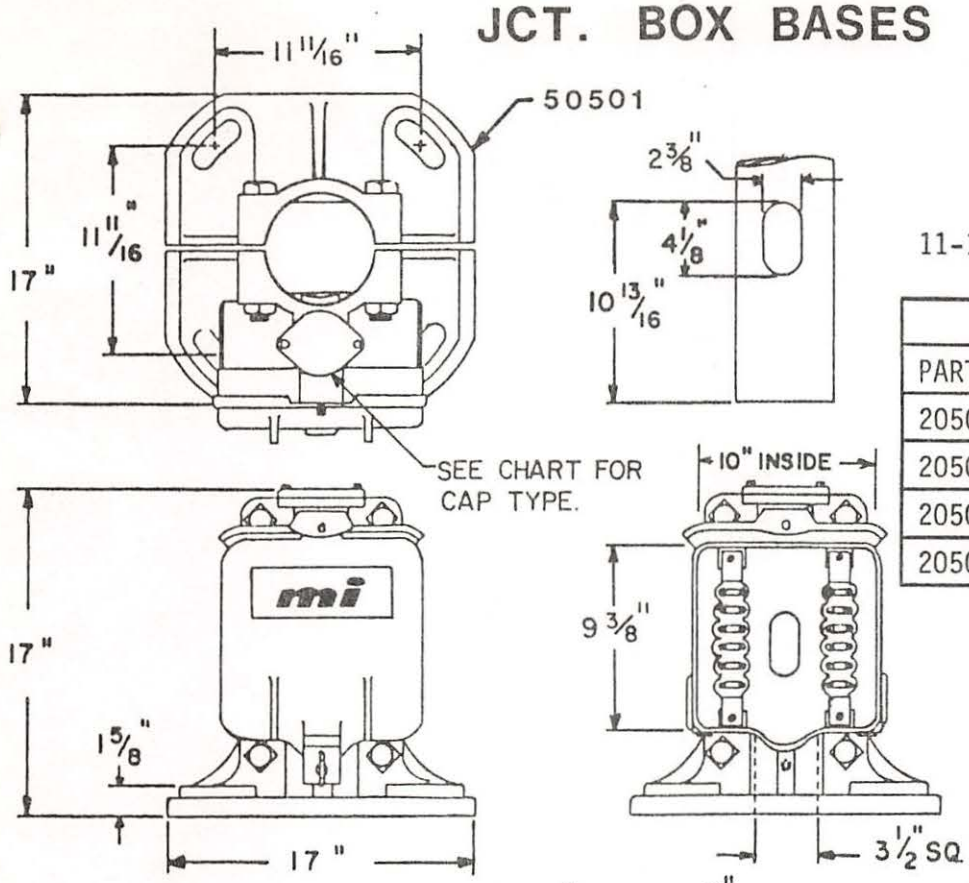



DOUBLE JCT. BOX BASE 4" PIPE
11 11/16" B.S.

ASSEMBLY 20902-03

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# JCT. BOX BASES




ALUMINUM

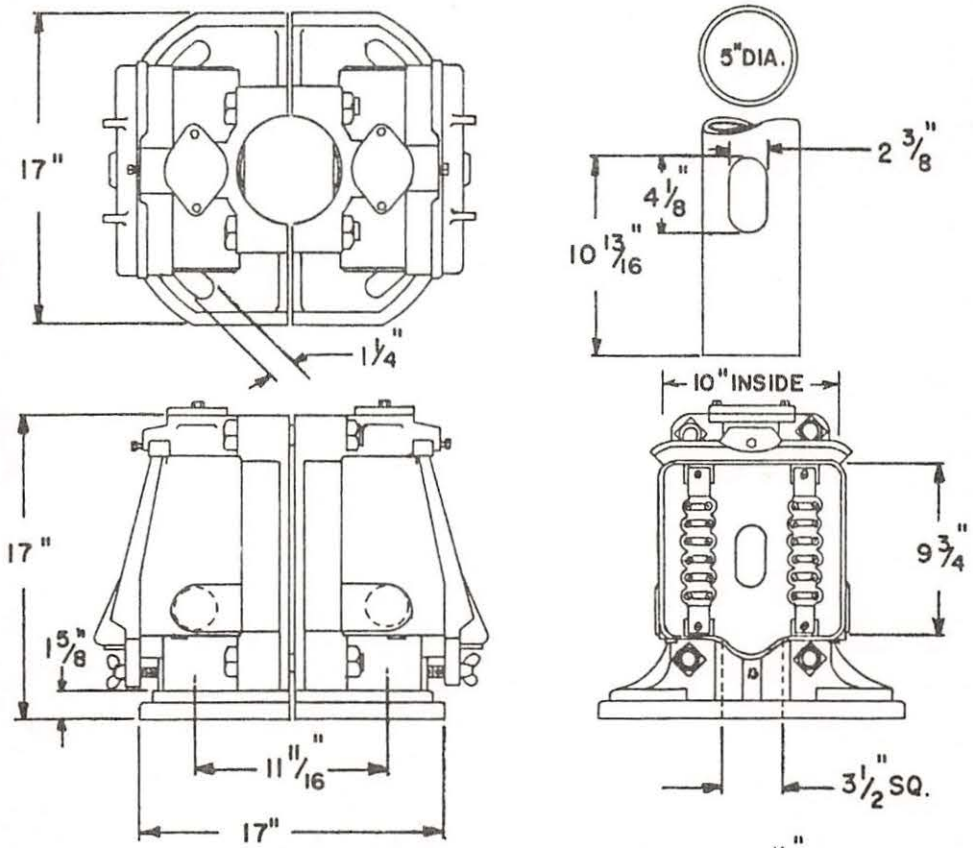
5" MAST

11-11/16" x 11-11/16" B.S.

| CAP CHART | |
|---|---|
| PART NO. | DESCRIPTION |
| 20502-01 | BLANK |
| 20502-06 | 1-1/2" FLEX FITTING |
| 20502-09 | 2" NPT HOLE |
| 20502-10 | 1-1/2" NPT HOLE |

SINGLE JCT. BOX BASE 5" PIPE 11 11/16" B.S

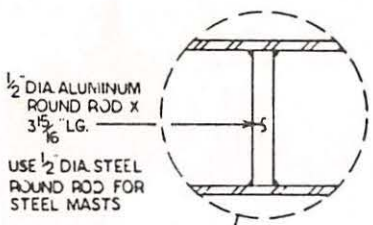
ASSEMBLY 20502-__

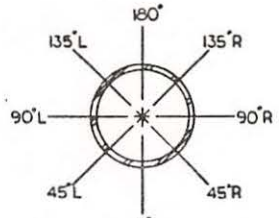



DOUBLE JCT. BOX BASE 5" PIPE 11 11/16" B.S.

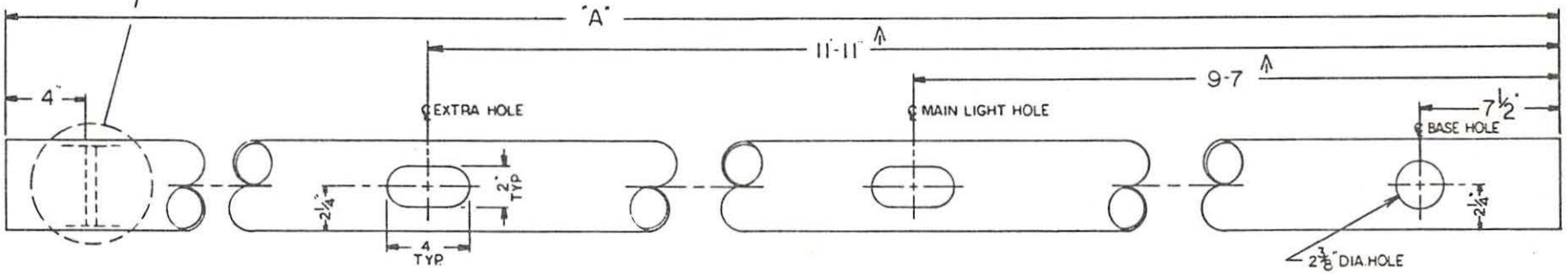
ASSEMBLY 20502-04

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TOP VIEW




TABLE

| PART NO | DIAMETER OF PIPE | PIPE MATERIAL | "A" | LOCATION OF BASE HOLE | LOCATION OF MAIN LIGHT HOLE | LOCATION OF EXTRA HOLE | CUSTOMER |
|---|---|---|---|---|---|---|---|
| 51101-01 | 4" | SCH-40AL | 14-0 | 0° | 0° | NONE | STD |
| 51103-00 | 4" | SCH40AL | 16-0 | 0° | 0° | NONE | STD |
| 51103-01 | 4" | " | 16-0 | 0° | 0° | 90° RIGHT | " |
| 51103-02 | 4" | " | 16-0 | 0° | 0° | 90° LEFT | " |
| 51103-03 | 4" | " | 16-0 | 0° | 0° | 45° RIGHT | " |
| 51103-04 | 4" | " | 16-0 | 0° | 0° | 45° LEFT | " |
| 51103-05 | 4" | " | 16-0 | 0° | 0° | 135° RIGHT | " |
| 51103-06 | 4" | " | 16-0 | 0° | 0° | 135° LEFT | " |

1-H-1

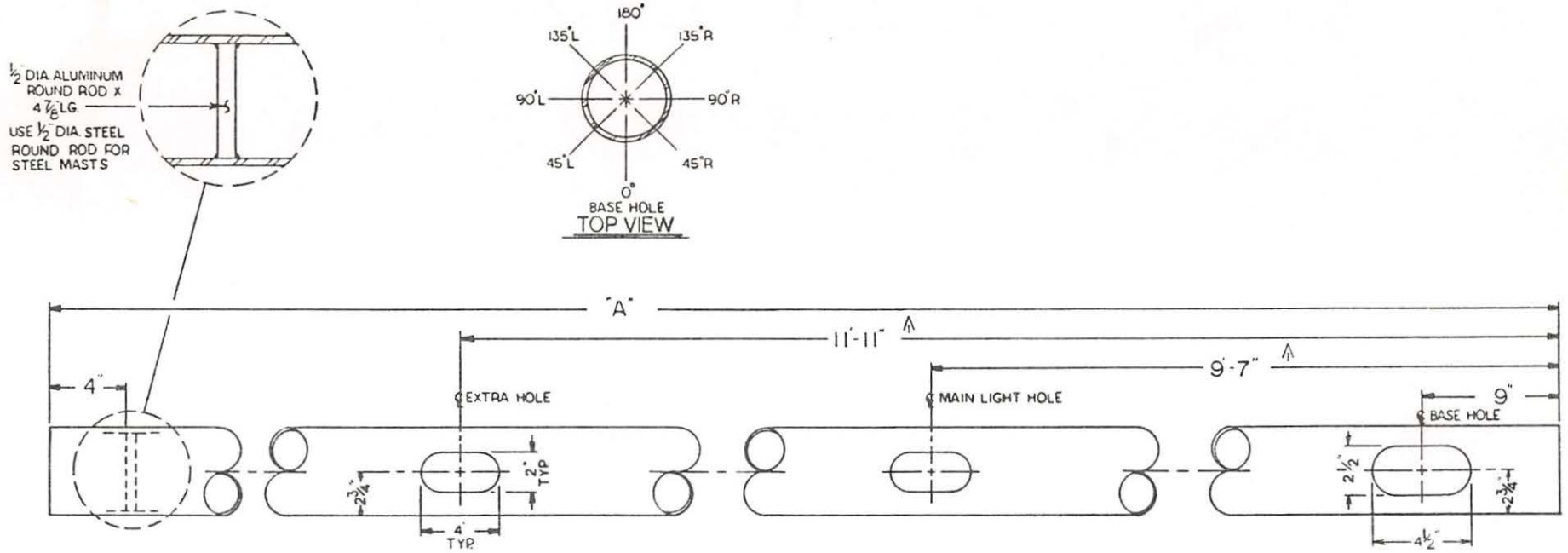
⚠ REVISED 5-24-83 CHANGED DWG NO
⚠ REVISED 3-15-83 CHANGED DIMENSIONS

MODERN INDUSTRIES INCORPORATED
LOUISVILLE, KY

4"Ø SIGNAL MASTS

| | |
|---|---|
| DWN: J. BARNES | PART NO. |
| APP: | |
| SCALE: 3"=1'-0" | DWG NO. LC510069TAB |
| DATE: 12-10-82 | |

BRUNING 4071 49973 1




| TABLE | | | | | | | |
|---|---|---|---|---|---|---|---|
| PART NO. | DIAMETER OF PIPE | PIPE MATERIAL | "A" | LOCATION OF BASE HOLE | LOCATION OF MAIN LIGHT HOLE | LOCATION OF EXTRA HOLE | CUSTOMER |
| 51105-01 | 5" | SCH.40 AL. | 14-0" | 0° | 90° RIGHT | NONE | STD. |
| 51106-01 | 5" | " | 6-6 | 0° | NONE | NONE | STD. |
| 51113-01 | 5" | " | 16-0" | 0° | 90° RIGHT | 90° RIGHT | STD. |
| 51113-02 | 5" | " | 16-0" | 0° | 90° RIGHT | NONE | STD. |
| 51113-03 | 5" | " | 16-0 | 0° | 90° LEFT | NONE | |
| 51113-04 | 5" | " | 16-0" | 0° | NONE | NONE | |
| 51117-01 | 5" | SCH.40 AL. | 16-0" | 0° AND 180° | 90° RIGHT | NONE | |
| 51118-01 | 5" | " | 17-0 | 0 AND 180° | 90° RIGHT | NONE | |
| 51119-01 | 5" | SCH.80 AL. | 16-0 | 0° | 0° | NONE | |
| 51120-01 | 5" | SCH.40 ST. | 13-0 | 0° | 90° RIGHT | NONE | |

1-H-2

⚠ REVISED 5-24-83 CHANGED DWG NO
⚠ REVISED 3-15-83 CHANGED DIMENSIONS

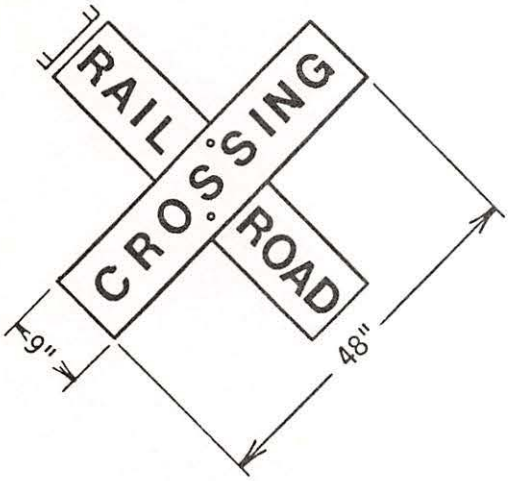
| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
|---|---|
| 5" Ø SIGNAL MASTS | |
| DWN: J. BARNES | PART NO. |
| APP: | |
| SCALE: 3"=1'-0" | DWG NO. LC510070 TAB |
| DATE: 12-10-82 | |

BRUNING 40-21 49973-1

# HIGHWAY CROSSING WARNING DEVICES

E.G. - ENGINEERING GRADE H.I. - HIGH INTENSITY

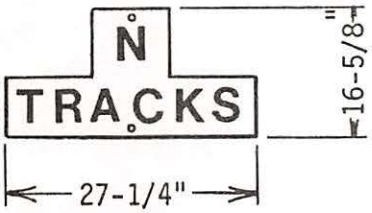
ORDER BY PART NUMBER AND DESCRIPTION




## R. R. CROSSING SIGN

| MOUNTING | E.G. | H.I. |
|---|---|---|
| 4" FLASHER | 60008-04 | 60007-04 |
| 5" GATE | 60008-05 | 60007-05 |
| 8" ROT. CANT. | 60008-08 | 60007-08 |
| SIGN (ONLY) [1] | 60-60008 | 60-60007 |

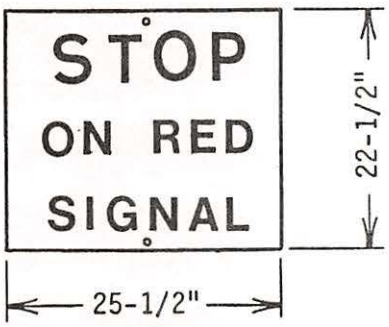
1. FOR CANTILEVERS WITH BRACKETS WELDED TO MAST.




## TRACK SIGN

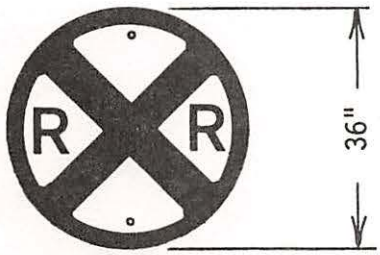
| MOUNTING | E.G. | H.I. |
|---|---|---|
| 4" FLASHER | 60031-04-N [2] | 60032-04-N [2] |
| 5" GATE | 60031-05-N [2] | 60032-05-N [2] |
| 8" ROT. CANT. | 60031-08-N [2] | 60032-08-N [2] |
| SIGN (ONLY) [1] | 60-60031-N [2] | 60-60032-N [2] |

2. REPLACE LETTER "N" WITH NUMBER OF TRACKS.




## " STOP ON RED " SIGN

| MOUNTING | E.G. | H.I. |
|---|---|---|
| 4" FLASHER | 60040-04 | |
| 5" GATE | 60040-05 | |
| 8" ROT. CANT. | 60040-08 | |
| SIGN (ONLY) [1] | 60-60040 | |



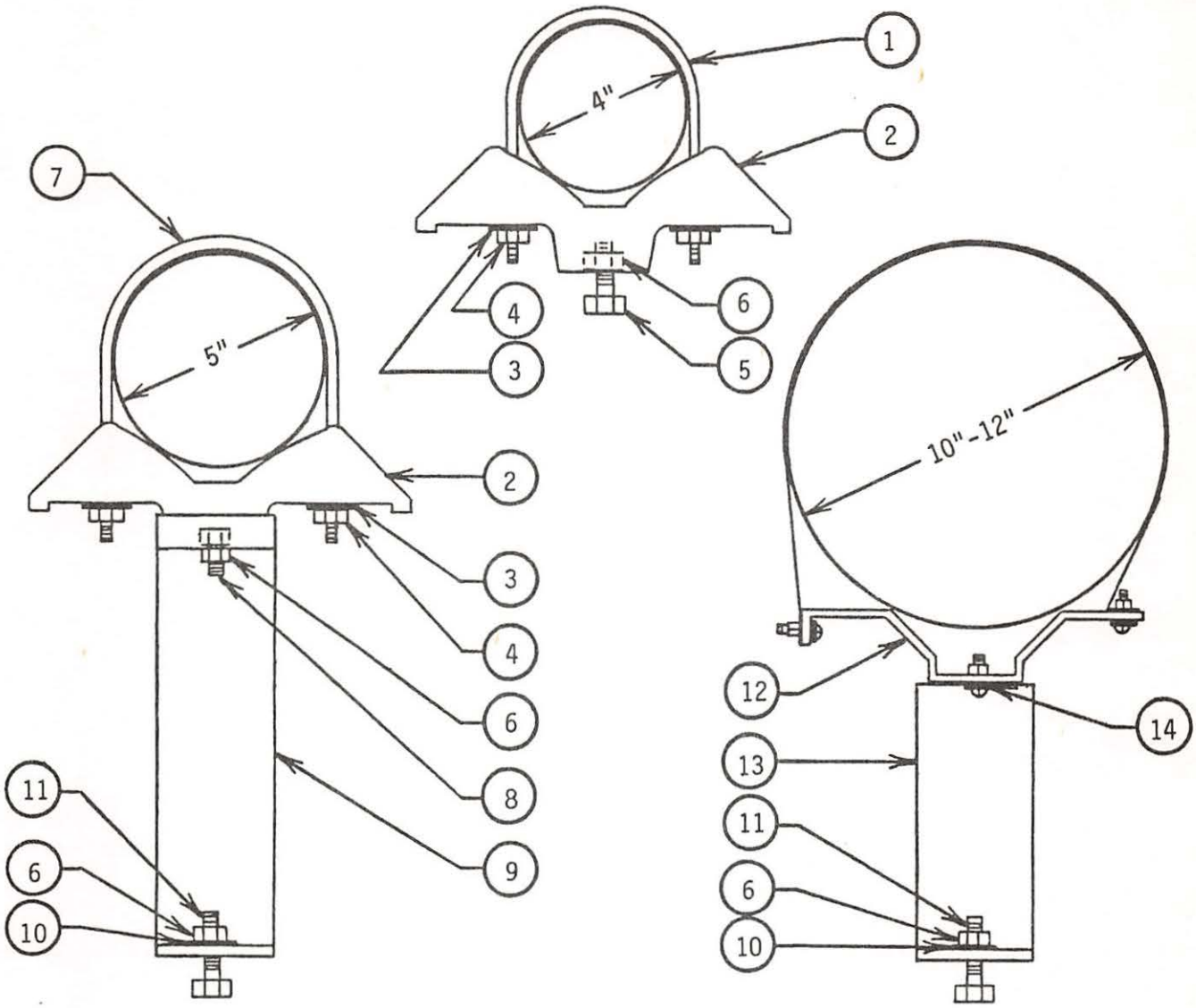

## ADVANCE WARNING SIGN (E.G.)

| | |
|---|---|
| SIGN (ONLY) | 60-60045 |
| SIGN (WITH MOUNTING [3]) | 60045-01 |
| POST (GALV. RIB-BACK 3#,12") | 60001-02 |

3. MOUNTING INCLUDES HARDWARE FOR WOOD POST.

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# REPLACEMENT PARTS
# HIGHWAY CROSSING SIGNS




ORDER BY PART NUMBER AND DESCRIPTION

| ITEM NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 60-14004 | 4" U-BOLT |
| 2 | C-11330 | AAR SIGN CLAMP |
| 3 | 01023190 | 1/2" FLAT WASHER |
| 4 | 01022930 | 1/2" - 13 HEX. NUT, ZINC |
| 5 | 01021640 | 5/8" x 3-1/4" HEX. HD. CAP SCREW |
| 6 | 01022950 | 5/8" - 11 HEX. NUT, ZINC |
| 7 | 60-14005 | 5" U-BOLT |
| 8 | 01021590 | 5/8" x 2" HEX. HD. CAP SCREW |
| 9 | 60-11331 | SIGN EXTENSION FOR GATE MAST |
| 10 | 01023210 | 5/8" FLAT WASHER |
| 11 | 01021620 | 5/8" x 2-3/4" HEX. HD. CAP SCREW |
| 12 | 60-11333 | #6726 - 10 SIGN BRACKET-COMPLETE |
| 13 | 60-11332 | SIGN EXTENSION FOR CANTILEVER MAST |
| 14 | 01023170 | 3/8" FLAT WASHER |

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# STATIONARY WALKOUT CANTILEVER

# ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | MAST | INTERNAL JUNCTION BOX ___<br>EXTERNAL JUNCTION BOX ___<br>DIRECTION OF SIDE LIGHTS ___°R, ___°L | ___ |
| B | ARM LENGTH | _____ FT.<br>NUMBER OF LIGHTS ON ARM ___ | ___ |
| C | ARM LIGHTS<br>TIP | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| D | ARM LIGHTS<br>MIDDLE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| F | MAST LIGHTS<br>MAIN | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT: ___°H, ___°V<br>- BACK: ___°H, ___°V | ___ |
| G | MAST LIGHTS<br>SIDE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - RIGHT: ___°H, ___°V<br>- LEFT: ___°H, ___°V | ___ |
| H | R.R. X-ING<br>SIGN | LOCATION: ARM ___, MAST ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| J | "NO. TRACKS"<br>SIGN | NUMBER OF TRACKS ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| K | BELL OR<br>PINNACLE | BELL ___: ___VOLT; AC ___, DC___ ;<br>PINNACLE ___ ; BELL ADAPTER ___IN. | ___ |
| L | ANCHOR<br>BOLTS | 1½" x 54" WITH HARDWARE<br>( SET OF 4 ) | ___ |
| M | WIRING<br>HARNESS | 3 WIRE CIRCUIT ___<br>4 WIRE CIRCUIT ___<br>WIRE SIZE ___<br>WIRE TYPE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| N | "STOP ON RED"<br>SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |

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# STATIONARY WALKOUT CANTILEVER

# ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | MAST | INTERNAL JUNCTION BOX ___<br>EXTERNAL JUNCTION BOX ___<br>DIRECTION OF SIDE LIGHTS ___°R, ___°L | ___ |
| B | ARM LENGTH | ____ FT.<br>NUMBER OF LIGHTS ON ARM ___ | ___ |
| C | ARM LIGHTS<br>TIP | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| D | ARM LIGHTS<br>MIDDLE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| F | MAST LIGHTS<br>MAIN | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT: ___°H, ___°V<br>- BACK: ___°H, ___°V | ___ |
| G | MAST LIGHTS<br>SIDE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - RIGHT: ___°H, ___°V<br>- LEFT: ___°H, ___°V | ___ |
| H | R.R. X-ING<br>SIGN | LOCATION: ARM ___, MAST ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| J | "NO. TRACKS"<br>SIGN | NUMBER OF TRACKS ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| K | BELL OR<br>PINNACLE | BELL ___: ___VOLT, AC ___, DC___ ;<br>PINNACLE ___ ; BELL ADAPTER ___IN. | ___ |
| L | ANCHOR<br>BOLTS | 1½" x 54" WITH HARDWARE<br>( SET OF 4 ) | ___ |
| M | WIRING<br>HARNESS | 3 WIRE CIRCUIT ___<br>4 WIRE CIRCUIT ___<br>WIRE SIZE ___<br>WIRE TYPE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| N | "STOP ON RED"<br>SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |

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# STATIONARY WALKOUT CANTILEVER

# ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | MAST | INTERNAL JUNCTION BOX ___<br>EXTERNAL JUNCTION BOX ___<br>DIRECTION OF SIDE LIGHTS ___°R, ___°L | ___ |
| B | ARM LENGTH | ____ FT.<br>NUMBER OF LIGHTS ON ARM ___ | ___ |
| C | ARM LIGHTS<br>TIP | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| D | ARM LIGHTS<br>MIDDLE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION: ___°H, ___°V | ___ |
| F | MAST LIGHTS<br>MAIN | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT: ___°H, ___°V<br>- BACK: ___°H, ___°V | ___ |
| G | MAST LIGHTS<br>SIDE | 1 WAY ___ 2 WAY ___<br>8" ___ 12" ___<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - RIGHT: ___°H, ___°V<br>- LEFT: ___°H, ___°V | ___ |
| H | R.R. X-ING<br>SIGN | LOCATION: ARM ___, MAST ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| J | "NO. TRACKS"<br>SIGN | NUMBER OF TRACKS ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |
| K | BELL OR<br>PINNACLE | BELL ___: ___VOLT, AC ___, DC___ ,<br>PINNACLE ___ ; BELL ADAPTER ___IN. | ___ |
| L | ANCHOR<br>BOLTS | 1½" x 54" WITH HARDWARE<br>( SET OF 4 ) | ___ |
| M | WIRING<br>HARNESS | 3 WIRE CIRCUIT ___<br>4 WIRE CIRCUIT ___<br>WIRE SIZE ___<br>WIRE TYPE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| N | "STOP ON RED"<br>SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI INTENSITY ___ | ___ |

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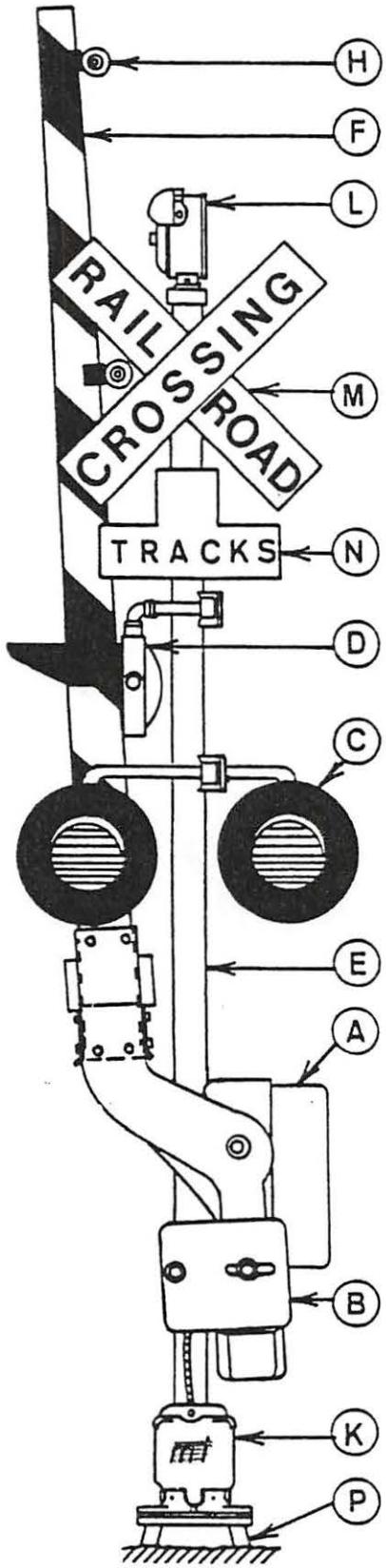
# FLASHING LIGHT SIGNAL AND GATE ASSEMBLIES



## MODEL 50001-01
## 5" MAST
## ALUMINUM CONSTRUCTION

TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBNIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
| A | GATE MECH. | G.R.S. MODEL "D" ____<br>W.C.H. MODEL 3593 ____<br>U.S.&S. MODEL 75 ____<br>SAFETRAN MODEL "S" ____<br>CONTROL: 2 WIRE ___, 3 WIRE ___ | ___ |
| B | COUNTERWEIGHT ASSEMBLY | ARM TYPE: FIBERGLASS ____<br>WOOD ____<br>ARM LENGTH: ____ FT. | ___ |
| C | MAIN LIGHTS | 1 WAY ___ 2 WAY ___<br>8" _____ 12" _____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| D | SIDE LIGHTS | 1 WAY ___ 2 WAY ___<br>8" _____ 12" _____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| E | MAST | LENGTH: ____FT.<br>NO. OF LIGHT HOLES: ____<br>DIR. OF SIDE LIGHTS ___°R, ___°L | ___ |
| F | GATE ARM | LENGTH: ____FT.<br>TYPE: WOOD ___, F.G. ___, AL.___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| H | GATE LIGHTS | TYPE: FRESNEL ___,4" DOUBLE FACE ___<br>7" DOUBLE FACE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| K | BASE | SGL. JCT. BOX ___, DBL. JCT. BOX ___ | ___ |
| L | BELL OR PINNACLE | BELL ___: ___VOLT: AC___, DC___<br>PINNACLE ___ | ___ |
| M | R.R. X-ING SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| N | "NO. TRACK" SIGN | NUMBER OF TRACKS: ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| P | FOUNDATION | GALVANIZED STEEL 48" x 48" x 60" | ___ |




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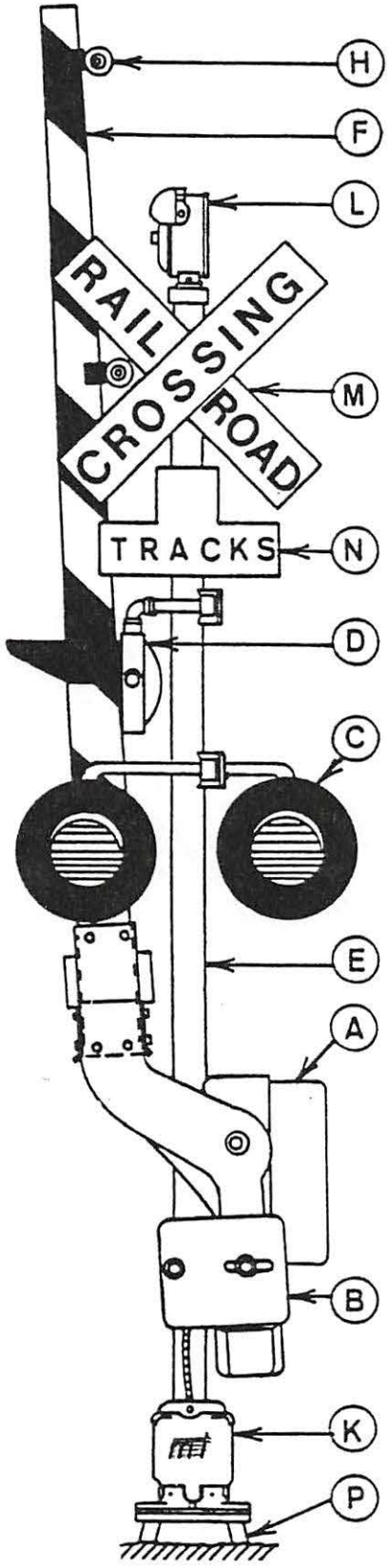
# FLASHING LIGHT SIGNAL AND GATE ASSEMBLIES



## MODEL 50001-01
## 5" MAST
## ALUMINUM CONSTRUCTION

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| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
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| B | COUNTERWEIGHT ASSEMBLY | ARM TYPE: FIBERGLASS ____<br>WOOD ____<br>ARM LENGTH: ____ FT. | ___ |
| C | MAIN LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| D | SIDE LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| E | MAST | LENGTH: ____FT.<br>NO. OF LIGHT HOLES: ____<br>DIR. OF SIDE LIGHTS ___°R, ___°L | ___ |
| F | GATE ARM | LENGTH: ____FT.<br>TYPE: WOOD ___, F.G. ___, AL.___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| H | GATE LIGHTS | TYPE: FRESNEL ___,4" DOUBLE FACE ___<br>7" DOUBLE FACE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| K | BASE | SGL. JCT. BOX ___, DBL. JCT. BOX ___ | ___ |
| L | BELL OR PINNACLE | BELL ___: ___VOLT: AC___, DC___<br>PINNACLE ___ | ___ |
| M | R.R. X-ING SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| N | "NO. TRACK" SIGN | NUMBER OF TRACKS: ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| P | FOUNDATION | GALVANIZED STEEL 48" x 48" x 60" | ___ |




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# FLASHING LIGHT SIGNAL AND GATE ASSEMBLIES



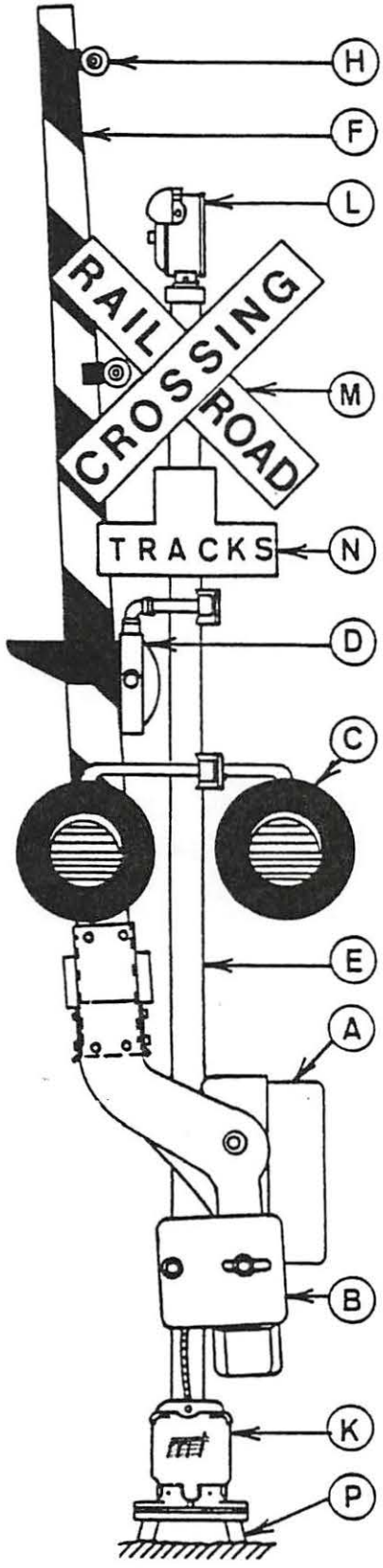
## MODEL 50001-01

## 5" MAST

## ALUMINUM CONSTRUCTION

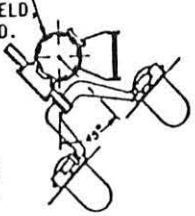
TO ORDER: COMPLETE A COPY OF THIS PAGE AND SUBMIT IT WITH YOUR ORDER.

| ITEM | DESCRIPTION | SPECIFICATION | QTY. |
|---|---|---|---|
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| B | COUNTERWEIGHT ASSEMBLY | ARM TYPE: FIBERGLASS ____<br>WOOD ____<br>ARM LENGTH: ____ FT. | ___ |
| C | MAIN LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| D | SIDE LIGHTS | 1 WAY ___ 2 WAY ___<br>8" ____ 12" ____<br>LAMP: ___VOLT, ___WATT<br>LENS DEFLECTION - FRONT:___°H,___°V<br>- BACK: ___°H,___°V | ___ |
| E | MAST | LENGTH: ____FT.<br>NO. OF LIGHT HOLES: ____<br>DIR. OF SIDE LIGHTS ___°R, ___°L | ___ |
| F | GATE ARM | LENGTH: ____FT.<br>TYPE: WOOD ___, F.G. ___, AL.___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| H | GATE LIGHTS | TYPE: FRESNEL ___,4" DOUBLE FACE ___<br>7" DOUBLE FACE ___<br>PLEASE PROVIDE WIRING SKETCH. | ___ |
| K | BASE | SGL. JCT. BOX ___, DBL. JCT. BOX ___ | ___ |
| L | BELL OR PINNACLE | BELL ___: ___VOLT: AC___, DC___<br>PINNACLE ___ | ___ |
| M | R.R. X-ING SIGN | REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| N | "NO. TRACK" SIGN | NUMBER OF TRACKS: ___<br>REFLECTIVE SHEETING: ENG. GRADE ___<br>HI-INTENSITY ___ | ___ |
| P | FOUNDATION | GALVANIZED STEEL 48" x 48" x 60" | ___ |

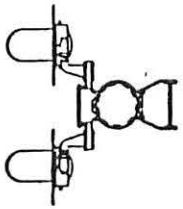



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WHEN SIDE LIGHTS ARE TO BE INSTALLED IN THE FIELD, CLAMPS WILL BE PROVIDED.



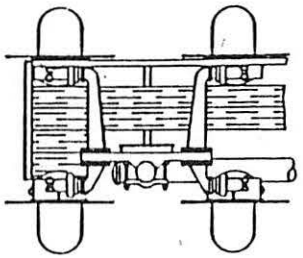
Ⓖ SIDE LIGHTS 45° RIGHT

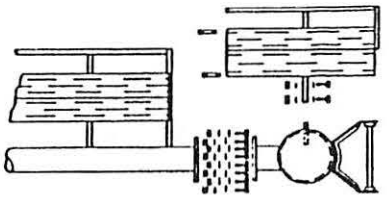


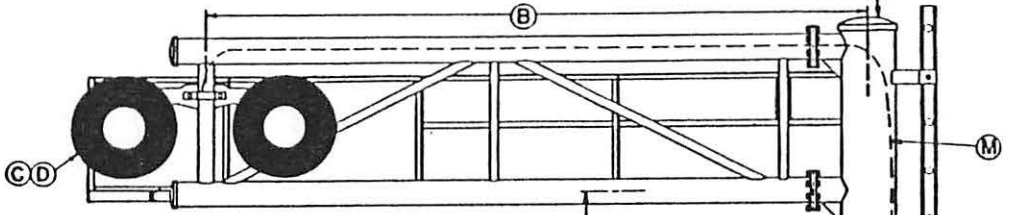
Ⓖ SIDE LIGHTS 90° LEFT

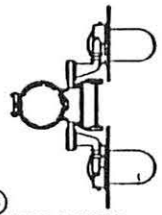
## FEATURES:

* ALL ALUM. CONSTRUCTION UTILIZING EXTRUDED 6061-T6 ALUM. ALLOY.
* ARM AMD MAST FABRICATED AT FACTORY AND TEST FITTED FOR EASE OF FIELD INSTALLATION.
* CROSSARM JUNCTION BOX FACES WALKWAY FOR SAFE-EASY ACCESS.
* HIGH-STRENGTH A-325 STEEL BOLTS; 8 EACH FLANGE.
* HEAVY DUTY WALKWAY GRATING.
* HANDRAIL 31" HIGH, WITH INTER-MEDIATE HANDRAIL SET AT 18".
* 17'-6" ROAD CLEARANCE.
* ALL SIGN MOUNTING BRACKETS WELDED TO MAST FOR EASE OF ASSEMBLY IN THE FEILD.
* DRILLED AND TAPPED BRACKETS WELDED TO MAIN MAST TO ELIMINATE U-BOLTS FOR FLASHING LIGHT ASSEMBLY MOUNTING.
* MEETS OR EXCEEDS A.A.R. AND A.A.S.H.O. SPECIFICATION.
* WITHSTANDS WIND LOADS OF 100 M.P.H. WITH 30% GUST.
* SUPPORTS 500 LBS. LIVE LOAD AT END OF ARM.

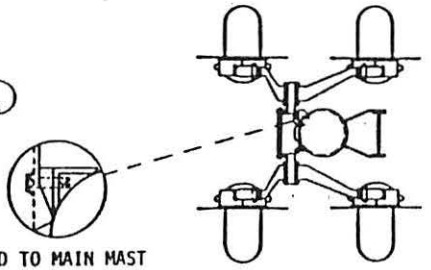






Ⓖ SIDE LIGHTS 90° RIGHT

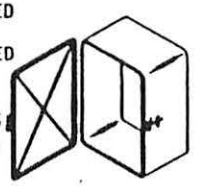


Ⓕ MAIN MAST LIGHTS

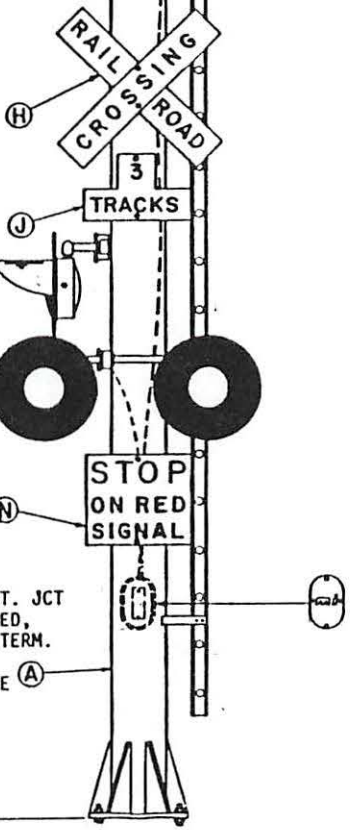
LIGHTS MOUNTED TO MAIN MAST BY PREPOSITIONED BRACKETS WELDED TO MAST, WHEN LOCATION OF SIGNAL IS GIVEN.

NOTE: 1. 10" DIA. MAST WILL BE SUPPLIED WITH 12' TO 24' ARM.
2. 12" DIA. MAST WILL BE SUPPLIED WITH 25' TO 29'.

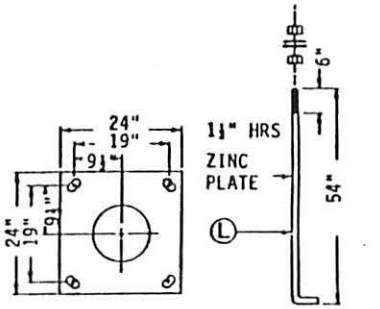
NOTE: ALL LIGHT ASSEMBLY MOUNTING HARDWARE, TERMINAL NUTS, WASHERS ETC., PACKAGED IN LIGHT CARTONS.



NOTE: TERMINAL BOW SUPPLIED, W-2, DOUBLE ROW 6, TERMINAL STRIPS; (OPTIONAL)

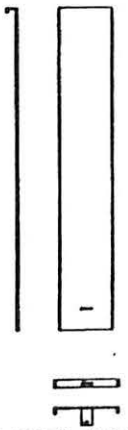



NOTE: WHEN EXT. JCT BOX IS NOT USED, DOUBLE ROW 6 TERM. BLOCK IS MOUNTED INSIDE PIPE.




BASE PLATE DETAIL

ANCHOR BOLT DETAIL



LADDER GUARD
INCLUDES LOCK BRACKET

# SINGLE MAST CANTILEVER

## MODEL 54001-01

12'-0" THRU 29'-0"

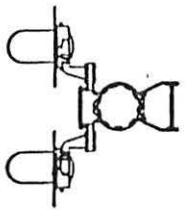
1-B-1


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WHEN SIDE LIGHTS ARE TO BE INSTALLED IN THE FIELD, CLAMPS WILL BE PROVIDED.



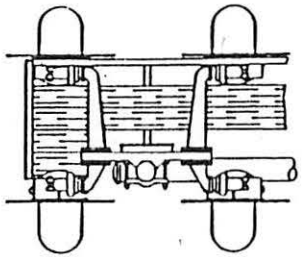
Ⓖ SIDE LIGHTS 45° RIGHT

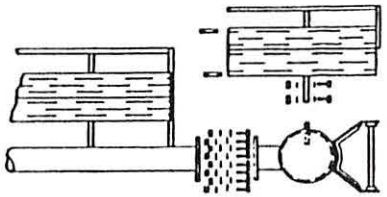


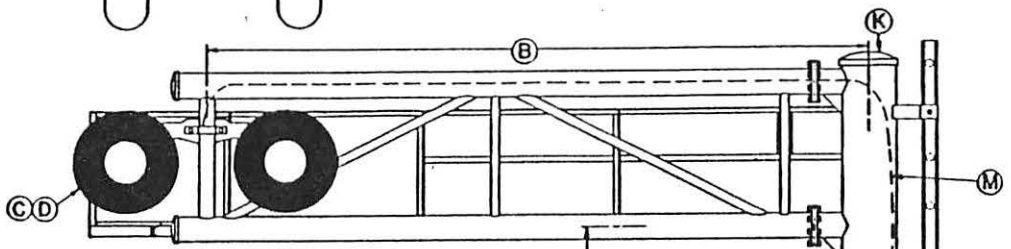
Ⓖ SIDE LIGHTS 90° LEFT

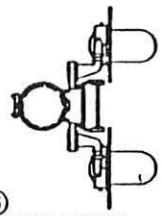
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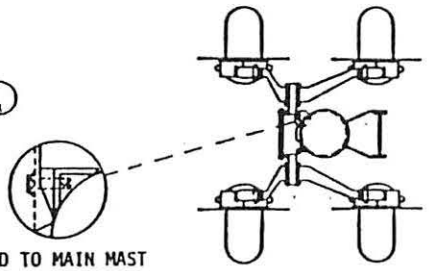






Ⓖ SIDE LIGHTS 90° RIGHT

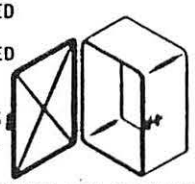


LIGHTS MOUNTED TO MAIN MAST BY PREPOSITIONED BRACKETS WELDED TO MAST, WHEN LOCATION OF SIGNAL IS GIVEN.

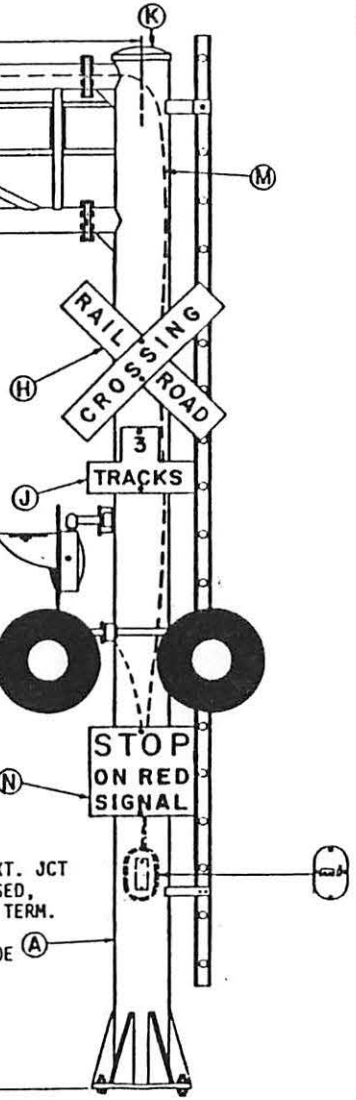
Ⓕ MAIN MAST LIGHTS

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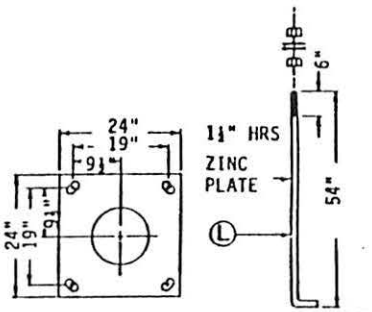
NOTE: ALL LIGHT ASSEMBLY MOUNTING HARDWARE, TERMINAL NUTS, WASHERS ETC., PACKAGED IN LIGHT CARTONS.



NOTE: TERMINAL BOW SUPPLIED, W-2, DOUBLE ROW 6, TERMINAL STRIPS; (OPTIONAL)




NOTE: WHEN EXT. JCT BOX IS NOT USED, DOUBLE ROW 6 TERM. BLOCK IS MOUNTED INSIDE PIPE.




BASE PLATE DETAIL

ANCHOR BOLT DETAIL



LADDER GUARD
INCLUDES LOCK BRACKET

# SINGLE MAST CANTILEVER

## MODEL 54001-01

12'-0" THRU 29'-0"

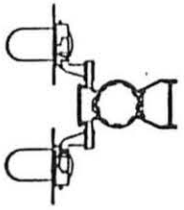
1-B-1


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WHEN SIDE LIGHTS ARE TO BE INSTALLED IN THE FIELD, CLAMPS WILL BE PROVIDED.



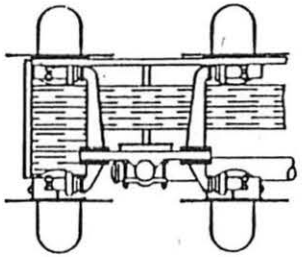
Ⓖ SIDE LIGHTS 45° RIGHT

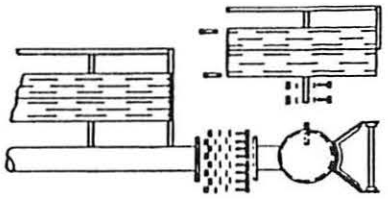


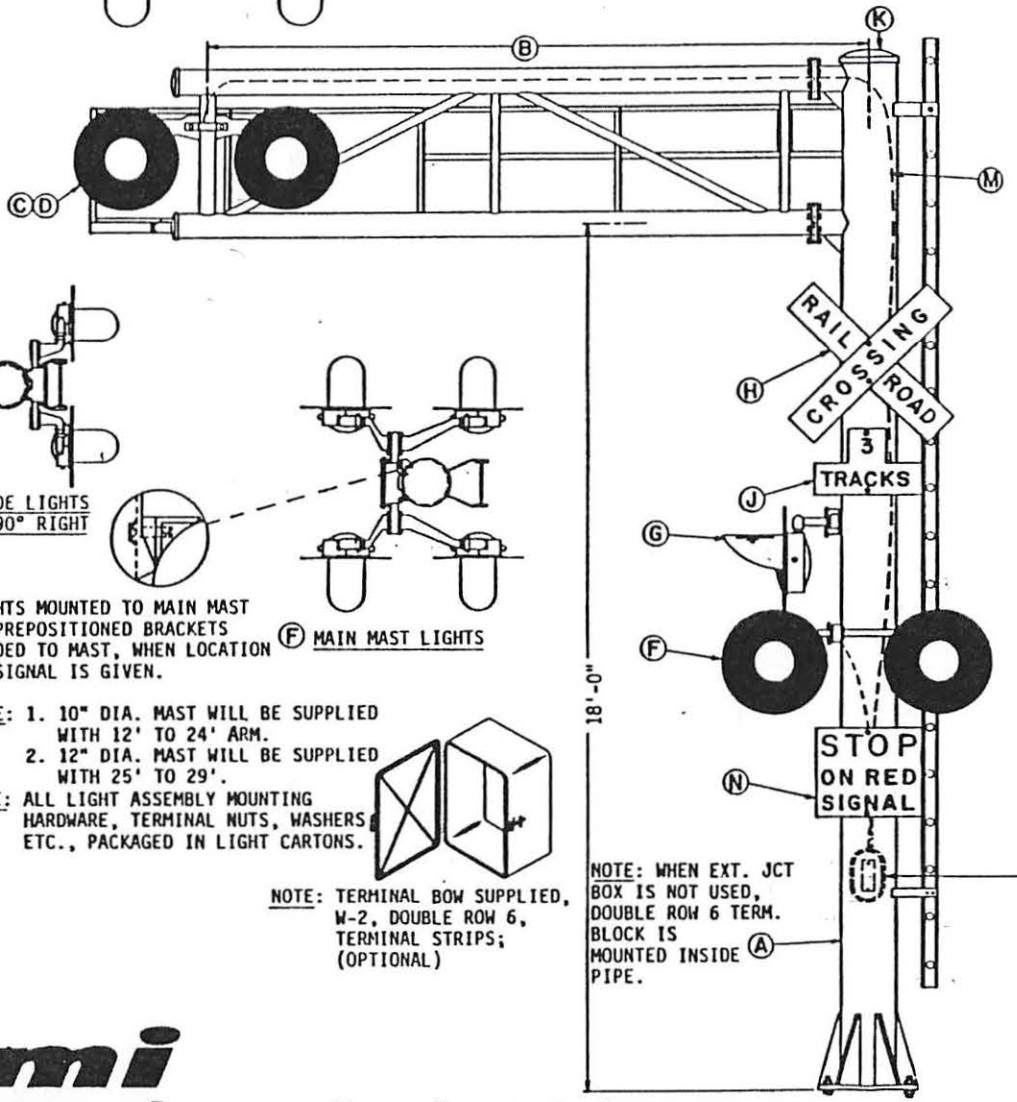
Ⓖ SIDE LIGHTS 90° LEFT

## FEATURES:

* ALL ALUM. CONSTRUCTION UTILIZING EXTRUDED 6061-T6 ALUM. ALLOY.
* ARM AMD MAST FABRICATED AT FACTORY AND TEST FITTED FOR EASE OF FIELD INSTALLATION.
* CROSSARM JUNCTION BOX FACES WALKWAY FOR SAFE-EASY ACCESS.
* HIGH-STRENGTH A-325 STEEL BOLTS; 8 EACH FLANGE.
* HEAVY DUTY WALKWAY GRATING.
* HANDRAIL 31" HIGH, WITH INTER-MEDIATE HANDRAIL SET AT 18".
* 17'-6" ROAD CLEARANCE.
* ALL SIGN MOUNTING BRACKETS WELDED TO MAST FOR EASE OF ASSEMBLY IN THE FEILD.
* DRILLED AND TAPPED BRACKETS WELDED TO MAIN MAST TO ELIMINATE U-BOLTS FOR FLASHING LIGHT ASSEMBLY MOUNTING.
* MEETS OR EXCEEDS A.A.R. AND A.A.S.H.O. SPECIFICATION.
* WITHSTANDS WIND LOADS OF 100 M.P.H. WITH 30% GUST.
* SUPPORTS 500 LBS. LIVE LOAD AT END OF ARM.










Ⓖ SIDE LIGHTS 90° RIGHT



LIGHTS MOUNTED TO MAIN MAST BY PREPOSITIONED BRACKETS WELDED TO MAST, WHEN LOCATION OF SIGNAL IS GIVEN.

Ⓕ MAIN MAST LIGHTS

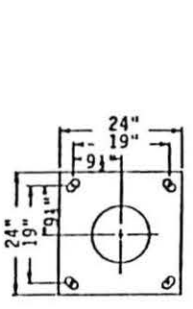
NOTE: 1. 10" DIA. MAST WILL BE SUPPLIED WITH 12' TO 24' ARM.
2. 12" DIA. MAST WILL BE SUPPLIED WITH 25' TO 29'.

NOTE: ALL LIGHT ASSEMBLY MOUNTING HARDWARE, TERMINAL NUTS, WASHERS ETC., PACKAGED IN LIGHT CARTONS.



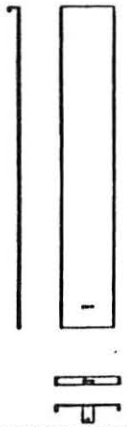
NOTE: TERMINAL BOW SUPPLIED, W-2, DOUBLE ROW 6, TERMINAL STRIPS; (OPTIONAL)

NOTE: WHEN EXT. JCT BOX IS NOT USED, DOUBLE ROW 6 TERM. BLOCK IS MOUNTED INSIDE PIPE.




BASE PLATE DETAIL

ANCHOR BOLT DETAIL



LADDER GUARD
INCLUDES LOCK BRACKET

# SINGLE MAST CANTILEVER

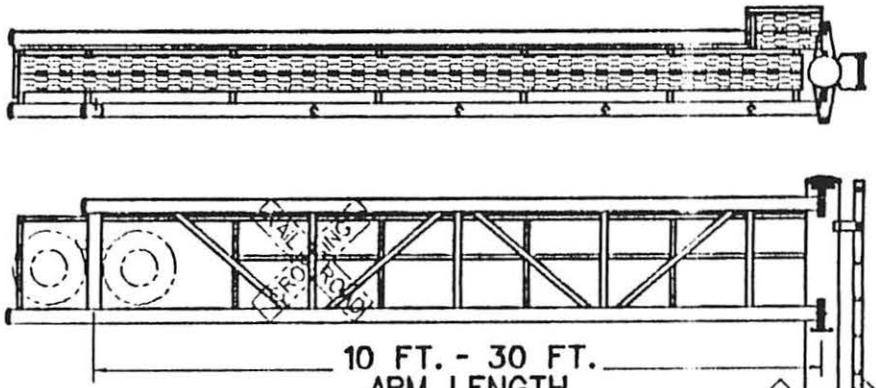
## MODEL 54001-01

12'-0" THRU 29'-0"

1-B-1

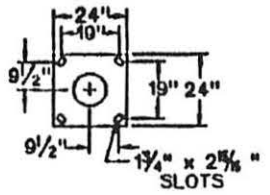

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| REV. | DATE | DESCRIPTION |
|---|---|---|
| 06 | 5 MAY 93 | SHEETS 4 OF 5 AND 5 OF 5 REMOVED, NOW A-3727 DIMENSIONS ADDED |




FEATURES :

- ALUMINUM CONSTRUCTION 6061-T6
- 3/4" THK. x 12" WD. SLOTTED 6061-T6 ALUMINUM WALKWAY GRATING
- HANDRAIL 31" HIGH WITH INTERMEDIATE HANDRAIL AT 18"
- 17'-6" ROAD CLEARANCE
- SIGN MOUNTING BRACKETS WELDED TO THE STRUCTURE
- FLASHING LIGHTS AND SIGNS SHOWN IN PHANTOM SUPPLIED BY CUSTOMER
- REMOVABLE LADDER GUARD
- STRUCTURE MEETS AAR AND AASHTO REQUIREMENTS
- 10" DIA. MAST WILL BE SUPPLIED WITH 10'-0" TO 22'-0" ARM
- 12" DIA. MAST WILL BE SUPPLIED WITH 24'-0" TO 30'-0" ARM




TOLERANCES:
UNLESS OTHERWISE SPECIFIED
PLATE/PIPE +/- 1/16"
MACHINING +/- .005"
ANGLES +/- 1 DEG.

FABRICATED METALS CORPORATION
MANUFACTURERS OF INDUSTRIAL METAL PRODUCTS

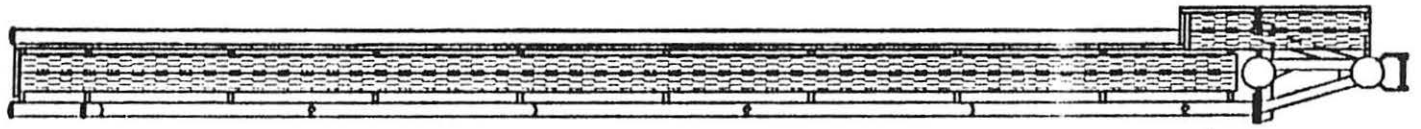
DESCRIPTION:
SINGLE MAST CANTILEVER

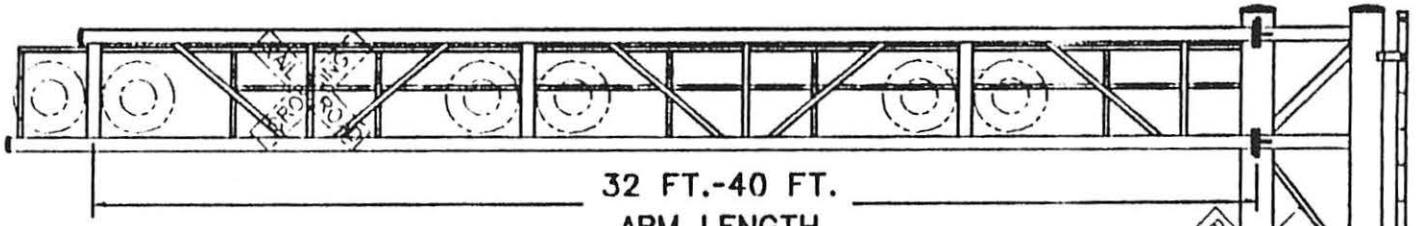
DRAWN BY: K.W. MARTIN
APPROVED:
SCALE: 3/16"=1'-0"
ECN: 05 MAY 93
DATE: 20 APR 93

PART NO.
SHEET 1 OF 3

DWG. NO.
A-3668-06

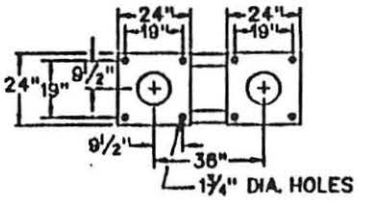
| REV. | DATE | DESCRIPTION |
|---|---|---|
| 06 | 5 MAY 93 | SHEETS 4 OF 5 AND 5 OF 5 REMOVED. NOW A-3727 DIMENSIONS ADDED |






FEATURES :

- ALUMINUM CONSTRUCTION 6061-T6
- 3/4" THK. x 12" WD. SLOTTED 6061-T6 ALUMINUM WALKWAY GRATING
- HANDRAIL 31" HIGH WITH INTERMEDIATE HANDRAIL AT 18"
- 17'-6" ROAD CLEARANCE
- SIGN MOUNTING BRACKETS WELDED TO THE STRUCTURE
- FLASHING LIGHTS AND SIGNS SHOWN IN PHANTOM SUPPLIED BY CUSTOMER
- REMOVABLE LADDER GUARD
- STRUCTURE MEETS AAR AND AASHTO REQUIREMENTS
- 10" DIA. MAST WILL BE SUPPLIED WITH 32'-0" TO 34'-0" ARM
- 12" DIA. MAST WILL BE SUPPLIED WITH 36'-0" TO 40'-0" ARM




TOLERANCES:
UNLESS OTHERWISE SPECIFIED
PLATE/PIPE +/- 1/16"
MACHINING +/- .005"
ANGLES +/- 1 DEG.

FABRICATED METALS CORPORATION
MANUFACTURERS OF INDUSTRIAL METAL PRODUCTS

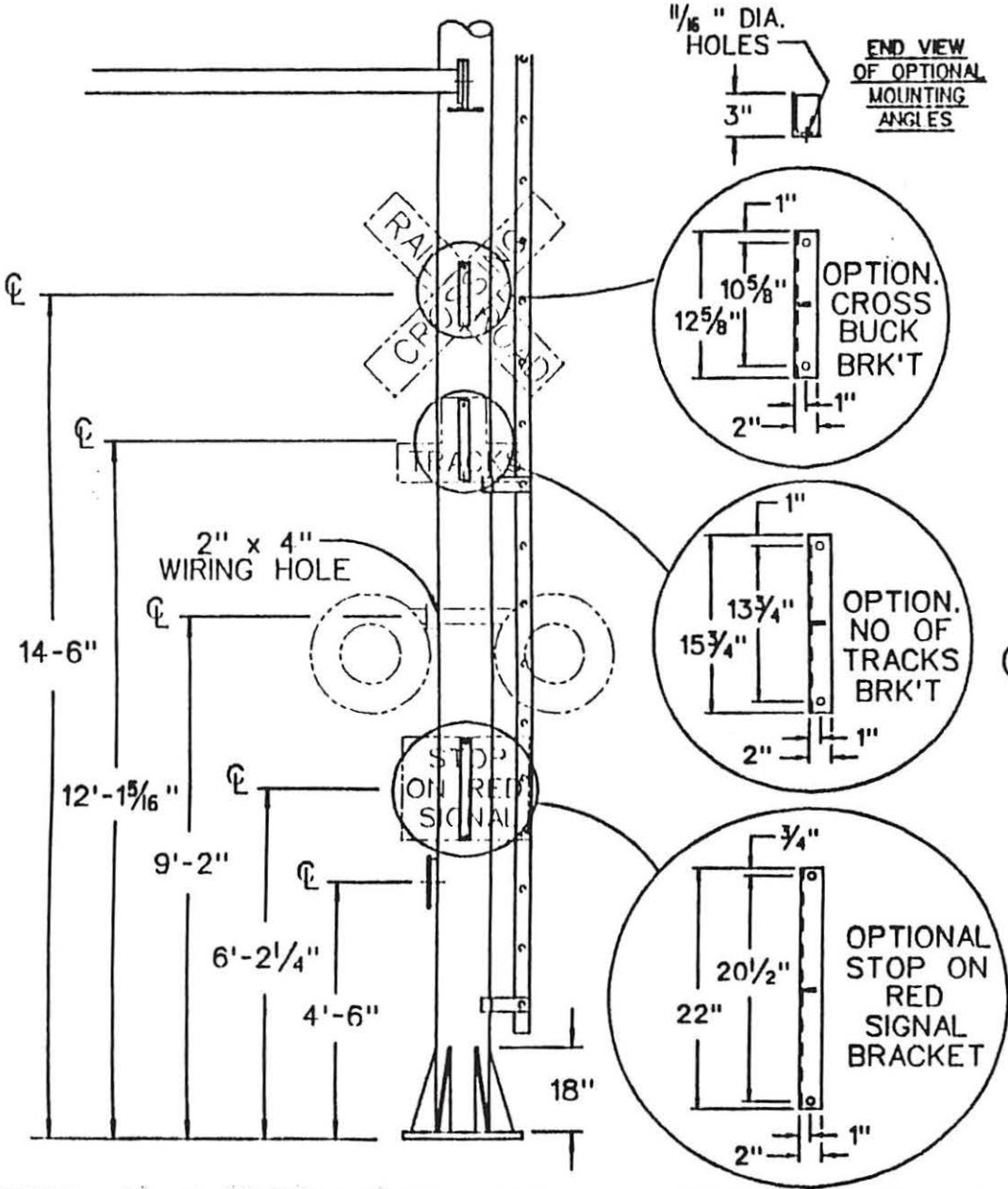
DESCRIPTION:
DOUBLE MAST CANTILEVER

DRAWN BY: K.W. MARTIN
APPROVED:
SCALE: 3/16"=1'-0"
ECN: 05 MAY 93
DATE: 20 APR 93

PART NO.
SHEET 2 OF 3

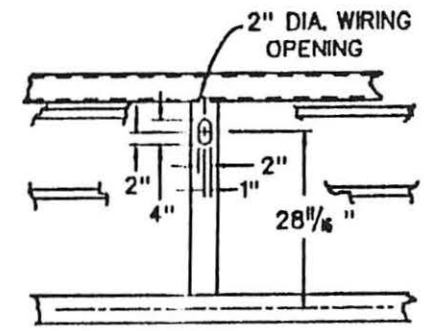
DWG. NO.
A-3668-06

4in

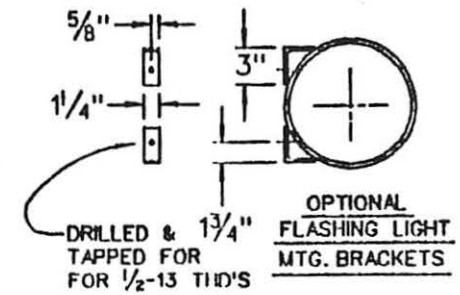




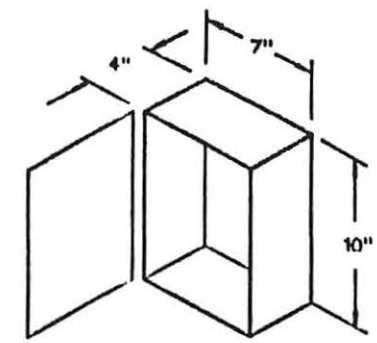




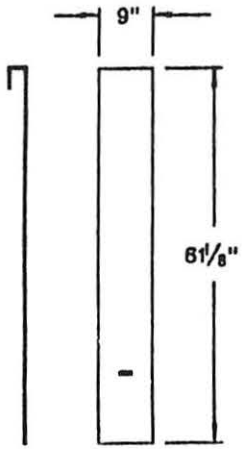

FLASHING LIGHT MTG. HOLE AS VIEWED FROM WALKWAY SIDE OF ARM



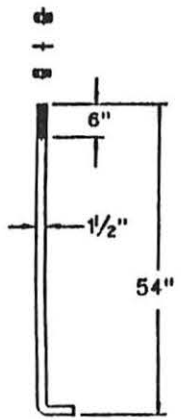

OPTIONAL FLASHING LIGHT MTG. BRACKETS




OPTIONAL EXTERNAL JUNCTION BOX




LADDER GUARD DETAIL




OPTIONAL ANCHOR BOLT DETAIL

| REV. | DATE | DESCRIPTION |
|---|---|---|
| 06 | 5 MAY 93 | SHEETS 4 OF 5 AND 5 OF 5 REMOVED, NOW A-3727 DIMENSIONS ADDED |

TOLERANCES:
UNLESS OTHERWISE SPECIFIED
PLATE/PIPE +/- 1/16"
MACHINING +/- .005"
ANGLES +/- 1 DEG.

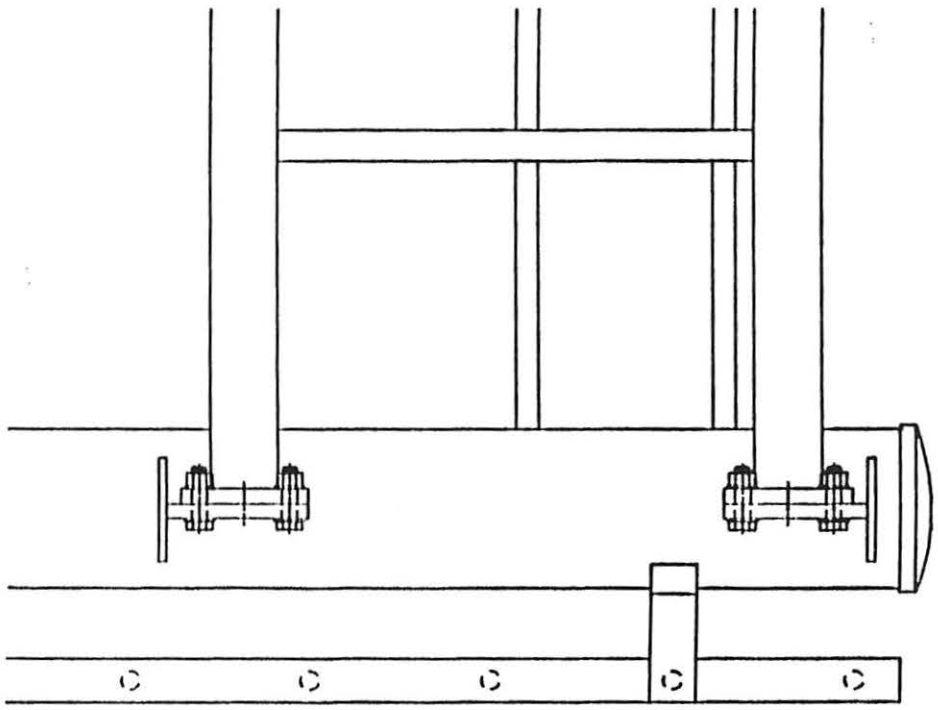
FABRICATED METALS CORPORATION
MANUFACTURERS OF INDUSTRIAL METAL PRODUCTS

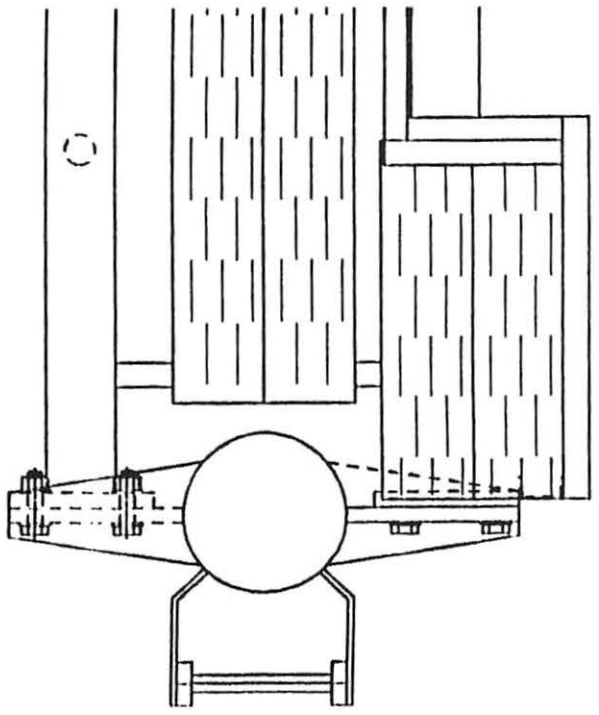
DESCRIPTION:
MISC. AND OPTIONAL PARTS

DRAWN BY: K.W. MARTIN
APPROVED:
SCALE: NONE
ECN: 05 MAY 93
DATE: 20 APR 93

PART NO.
SHEET 3 OF 3

DWG. NO.
A-3668-06





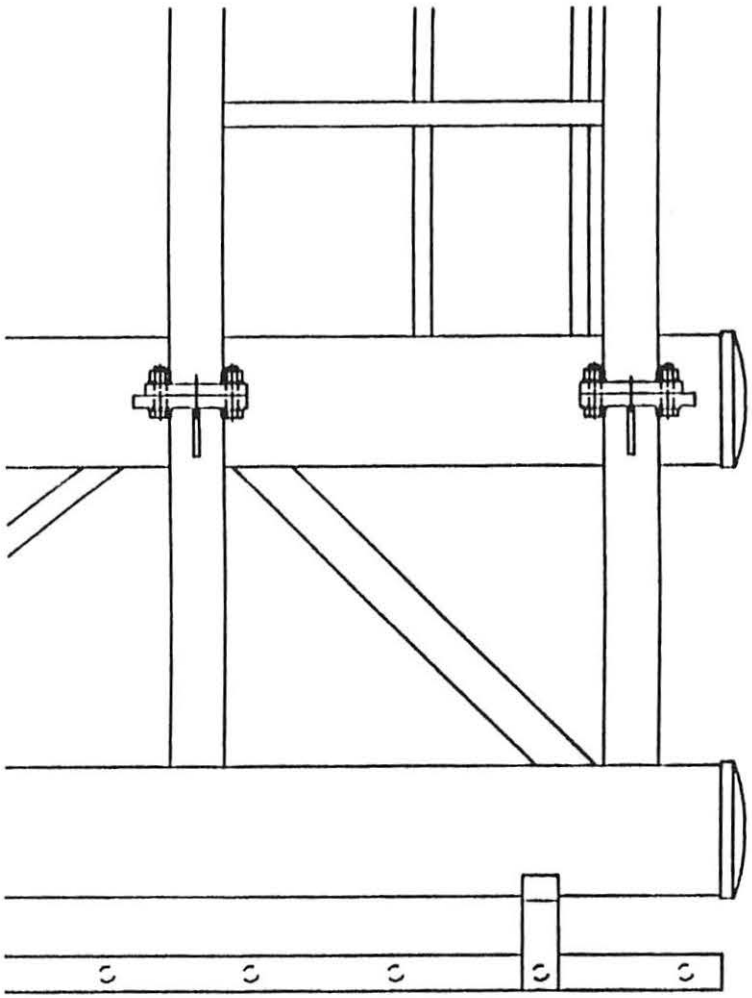
| REV. | DATE | DESCRIPTION |
|---|---|---|
| | 5 MAY 93 | INITIAL RELEASE WAS PART OF A-3668-05 |

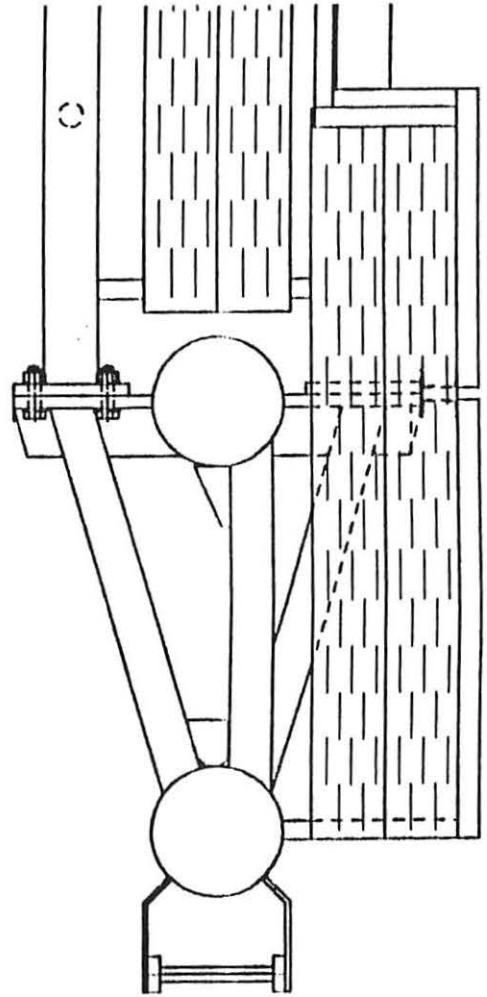
TOLERANCES:
UNLESS OTHERWISE SPECIFIED
PLATE/PIPE +/- 1/16"
MACHINING +/- .005"
ANGLES +/- 1 DEG.

FABRICATED METALS CORPORATION
MANUFACTURERS OF INDUSTRIAL METAL PRODUCTS

DESCRIPTION:
# BOLTING ARRANGEMENT SINGLE MAST CANTILEVER

| | |
|---|---|
| DRAWN BY: K.W. MARTIN | PART NO. |
| APPROVED: | SHEET 1 OF 2 |
| SCALE: NONE | DWG. NO. |
| ECN: 05 MAY 93 | A-3727 |
| DATE: 20 APR 93 | |





| DESCRIPTION | DATE | REV |
|---|---|---|
| INITIAL RELEASE WAS PART OF A-3668-05 | 5 MAY 93 | |

TOLERANCES:
UNLESS OTHERWISE SPECIFIED
PLATE/PIPE +/- 1/16"
MACHINING +/- .005"
ANGLES +/- 1 DEG.

FABRICATED METALS CORPORATION
MANUFACTURERS OF INDUSTRIAL METAL PRODUCTS

DESCRIPTION:
BOLTING ARRANGEMENT
DOUBLE MAST CANTILEVER

DRAWN BY: K.W. MARTIN
APPROVED:
SCALE: NONE
ECN: 05 MAY 93
DATE: 20 APR 93

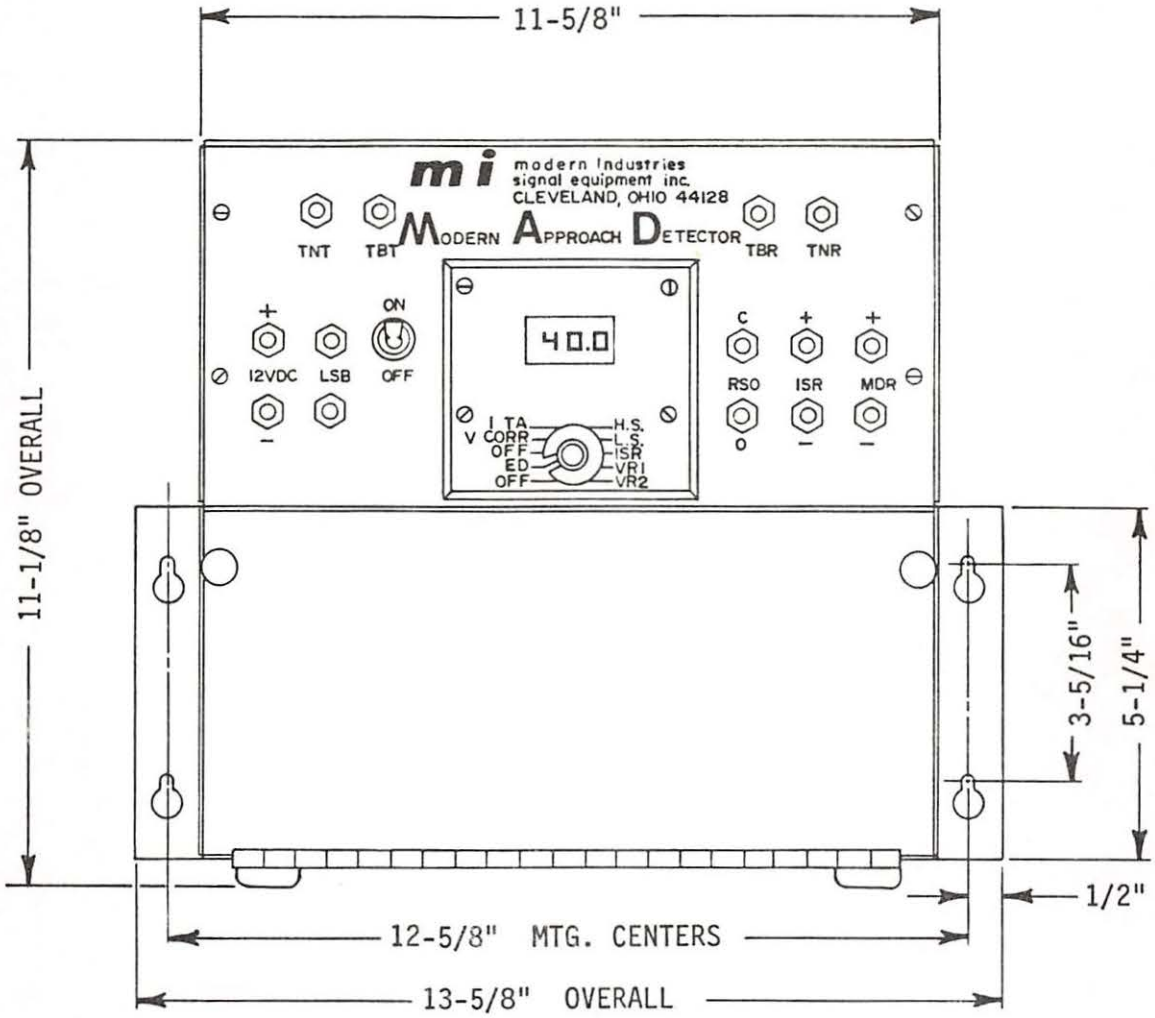
PART NO.
SHEET 2 OF 2

DWG. NO.
A-3727

# MODERN APPROACH DETECTOR

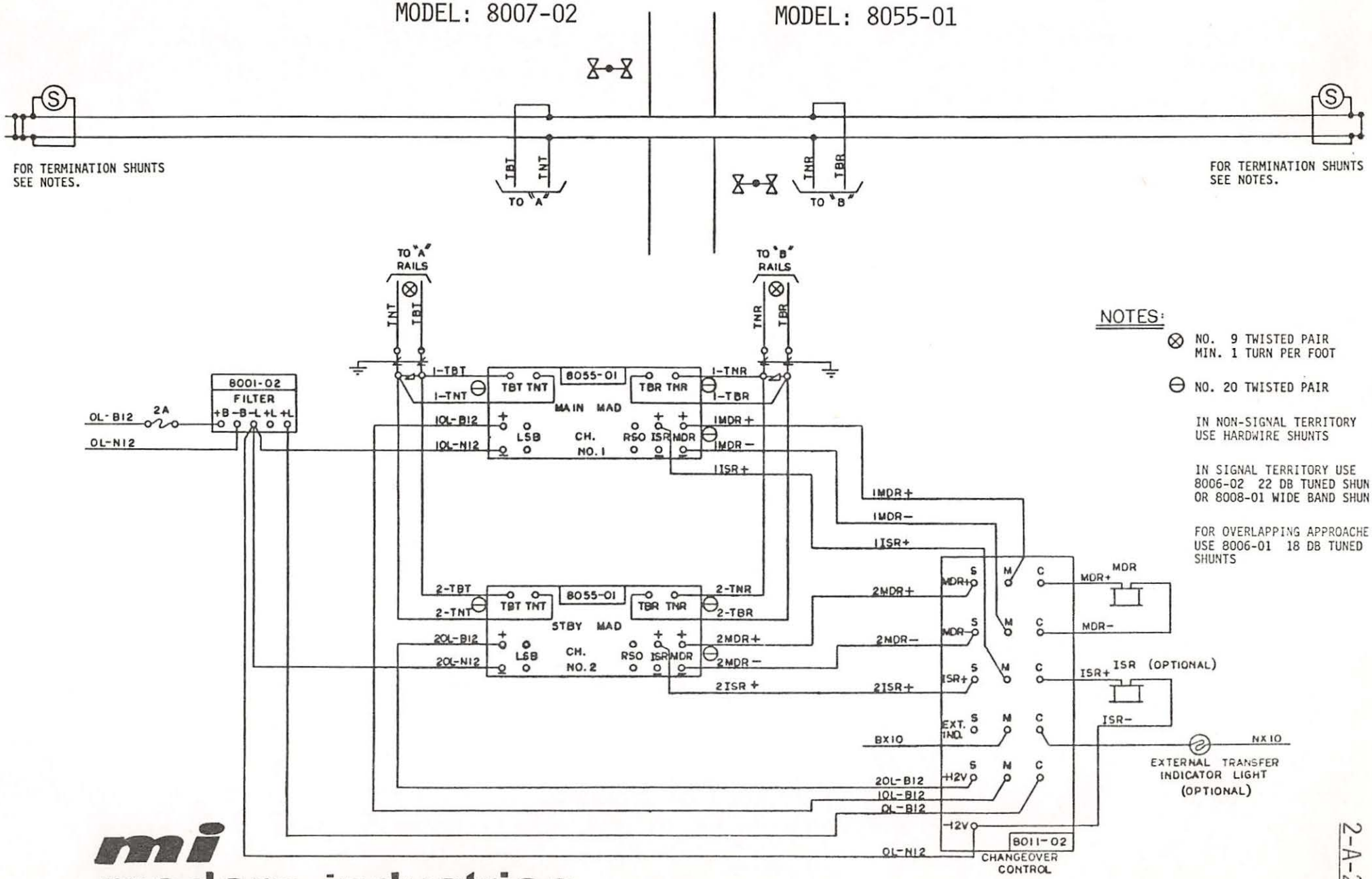
# M.A.D.

## MODEL 8007-02 MODEL 8055-01




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# MODERN APPROACH DETECTOR




NOTES:

⊗ NO. 9 TWISTED PAIR MIN. 1 TURN PER FOOT

⊖ NO. 20 TWISTED PAIR

IN NON-SIGNAL TERRITORY USE HARDWIRE SHUNTS

IN SIGNAL TERRITORY USE 8006-02 22 DB TUNED SHUN OR 8008-01 WIDE BAND SHUN

FOR OVERLAPPING APPROACHE USE 8006-01 18 DB TUNED SHUNTS


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# SPECIFICATIONS M.A.D. 8007-02 MODERN APPROACH DETECTOR

| | |
|---|---|
| INPUT VOLTAGE | 10.5 to 14 VDC |
| INPUT CURRENT | 800 TO 850 MA at 12 VDC |
| AUTOMATIC BALLAST COMPENSATION DYNAMIC | .5 to 20 OHMS "ZT" |
| OUTPUT IMPEDANCE | 2 OHMS |
| INPUT IMPEDANCE | 25 OHMS |
| MODE OF OPERATION | PULSE MODULATED |
| SELF-CHECK RATE | CONSTANT at Fo |
| RELAY DRIVE - MR | 9.25 VDC across 500 OHMS |
| RELAY DRIVE - ISLAND (optional) | 9.25 VDC across 500 OHMS |
| RECEIVER SENSITIVITY | -55 DB |
| TRANSMITTER OUTPUT CURRENT-SELF ADJUSTING (in auto mode) | 100 to 900 MA |
| SHUNTING SENSITIVITY | 5 to 10 FT. "IS" RING-BY |
| LOSS OF SHUNT & DELAYED PICK-UP | 10 SECONDS MIN. |
| FREQUENCY STABILITY | .003% per °C |
| OPERATING TEMP. RANGE | -40°C (-40°F) to +71°C (+160°F) |
| HIGH AND LOW SIGNAL DETECTION POINTS | AS SPECIFIED |
| OPERATIONAL CHANNELS | 24 |
| OVERALL SIZE | 10-1/2"H x 12-5/8"W x 8-3/16"D |
| WEIGHT | 14 LBS. |

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# SPECIFICATIONS M.A.D. 8055-01 MODERN APPROACH DETECTOR

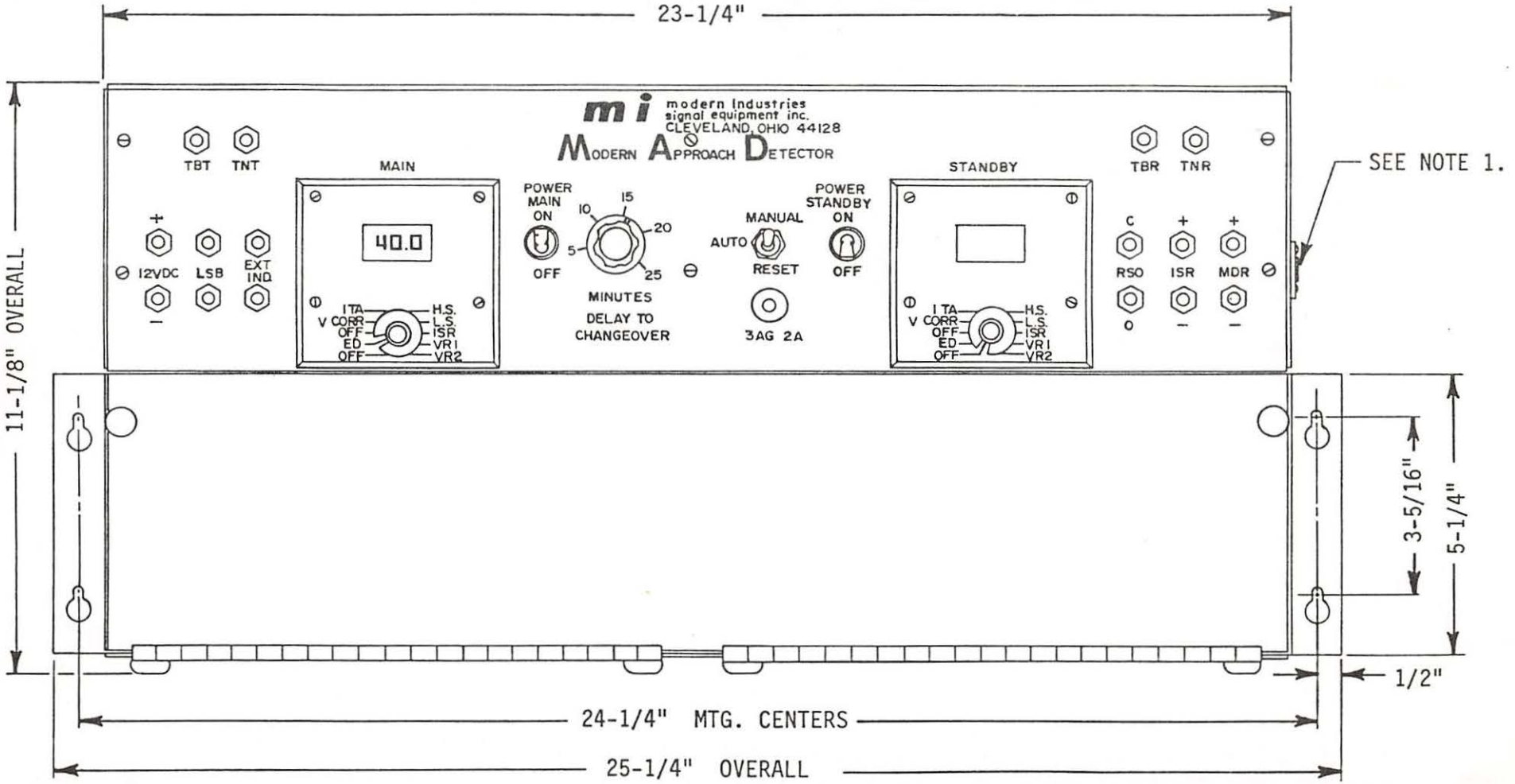
| | |
|---|---|
| INPUT VOLTAGE | 10.0 to 14 VDC |
| INPUT CURRENT | 800 TO 850 MA at 12 VDC |
| AUTOMATIC BALLAST COMPENSATION DYNAMIC | .5 to 20 OHMS "ZT" |
| OUTPUT IMPEDANCE | 2 OHMS |
| INPUT IMPEDANCE | 25 OHMS |
| MODE OF OPERATION | PULSE MODULATED |
| SELF-CHECK RATE | CONSTANT at Fo |
| RELAY DRIVE - MR | 12 VDC ± 2V across 500 OHMS |
| RELAY DRIVE - ISLAND (optional) | 12 VDC ± 2V across 500 OHMS |
| RECEIVER SENSITIVITY | -55 DB |
| TRANSMITTER OUTPUT CURRENT-SELF ADJUSTING (in auto mode) | 100 to 650 MA |
| SHUNTING SENSITIVITY | 5 to 10 FT. "IS" RING-BY |
| LOSS OF SHUNT & DELAYED PICK-UP | 10 SECONDS MIN. |
| FREQUENCY STABILITY | .003% per °C |
| OPERATING TEMP. RANGE | -40°C (-40°F) to +71°C (+160°F) |
| HIGH AND LOW SIGNAL DETECTION POINTS | AS SPECIFIED |
| OPERATIONAL CHANNELS | 24 |
| OVERALL SIZE | 10-1/2"H x 12-5/8"W x 8-3/16"D |
| WEIGHT | 14 LBS. |

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# MODERN APPROACH DETECTOR

# M. A. D.

## MODEL 8007-22 MODEL 8055-21

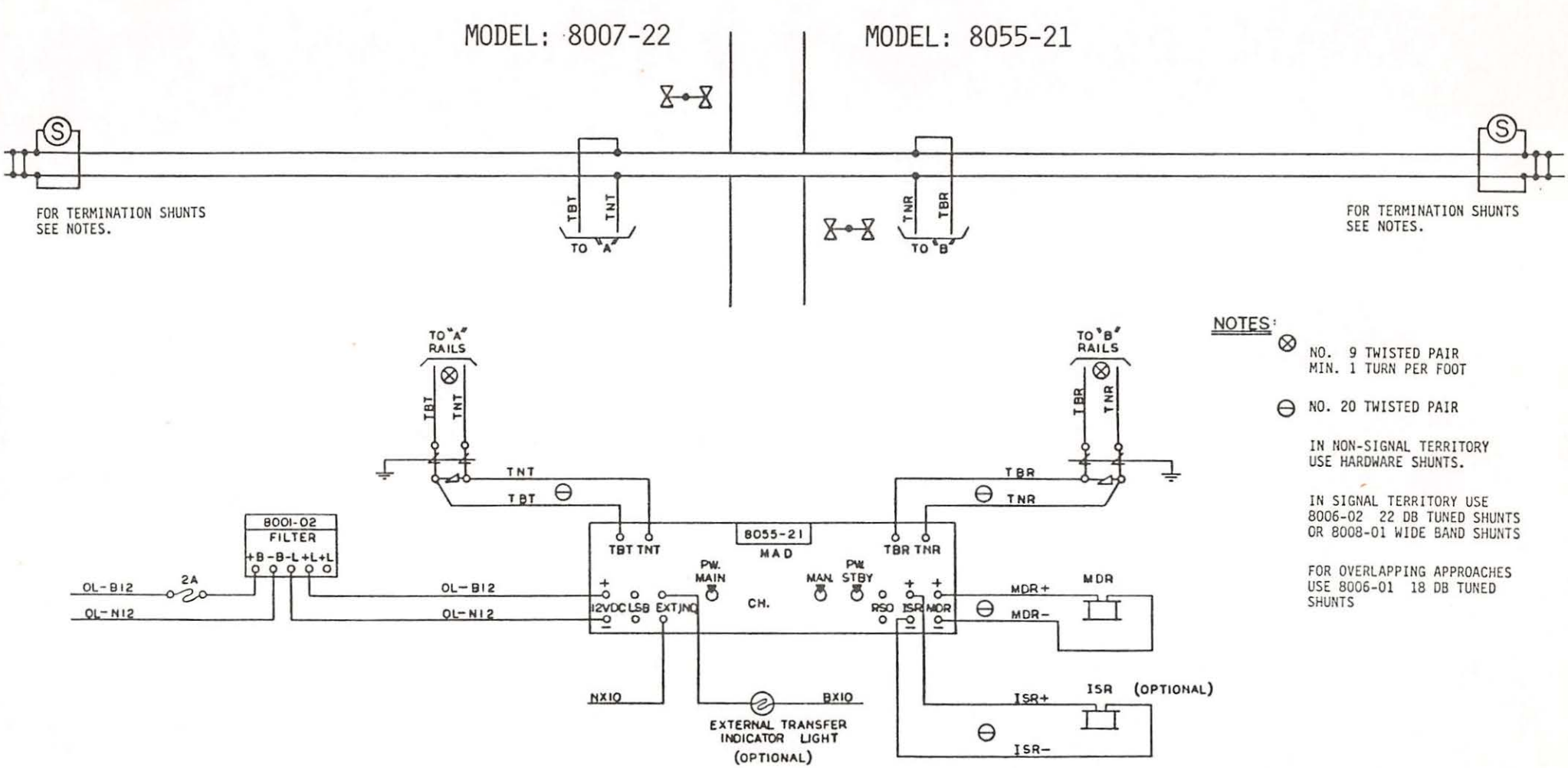



NOTE : 1. 2" MIN. CLEARANCE NECESSARY FOR INSTALLATION OR REMOVAL OF MASTER-SLAVE CONNECTOR.

2-A-5


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# MODERN APPROACH DETECTOR




NOTES:

⊗ NO. 9 TWISTED PAIR MIN. 1 TURN PER FOOT

⊖ NO. 20 TWISTED PAIR

IN NON-SIGNAL TERRITORY USE HARDWARE SHUNTS.

IN SIGNAL TERRITORY USE 8006-02 22 DB TUNED SHUNTS OR 8008-01 WIDE BAND SHUNTS

FOR OVERLAPPING APPROACHES USE 8006-01 18 DB TUNED SHUNTS


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## DISTANCE vs FREQUENCY vs BALLAST RESISTANCE IN OHMS PER 1000 FEET

| CHANNEL | FREQ. | .5 OHM | 1 OHM | 2 OHM | 4 OHM | 6 OHM | 8 OHM | 10 OHM | 20 OHM |
|---|---|---|---|---|---|---|---|---|---|
| C | 203.5 Hz | 1251 | 1769 | 2501 | 3537 | 4332 | 5003 | 5593 | 7910 |
| B | 241.8 | 1147 | 1623 | 2295 | 3245 | 3974 | 4589 | 5131 | 7256 |
| A | 280.3 | 1065 | 1506 | 2129 | 3011 | 3688 | 4259 | 4761 | 6734 |
| 1 | 313.0 | 1008 | 1426 | 2017 | 2852 | 3493 | 4034 | 4510 | 6378 |
| 2 | 349.0 | 955 | 1351 | 1910 | 2701 | 3308 | 3820 | 4271 | 6040 |
| 3 | 389.0 | 905 | 1279 | 1809 | 2558 | 3134 | 3618 | 4045 | 5721 |
| 4 | 433.7 | 857 | 1212 | 1713 | 2423 | 2968 | 3427 | 3831 | 5418 |
| 5 | 483.5 | 811 | 1147 | 1623 | 2295 | 2811 | 3246 | 3629 | 5132 |
| 6 | 539.0 | 768 | 1087 | 1537 | 2174 | 2662 | 3074 | 3437 | 4860 |
| 7 | 600.9 | 728 | 1029 | 1456 | 2059 | 2521 | 2911 | 3255 | 4603 |
| 8 | 669.9 | 689 | 975 | 1379 | 1950 | 2388 | 2757 | 3083 | 4360 |
| 9 | 746.8 | 653 | 923 | 1306 | 1846 | 2262 | 2611 | 2920 | 4129 |
| 10 | 832.5 | 618 | 874 | 1237 | 1749 | 2142 | 2473 | 2765 | 3911 |
| 11 | 928.1 | 586 | 828 | 1171 | 1656 | 2029 | 2342 | 2619 | 3704 |
| 12 | 1034.0 | 555 | 785 | 1110 | 1569 | 1922 | 2219 | 2481 | 3509 |
| 13 | 1151.0 | 526 | 744 | 1052 | 1487 | 1822 | 2104 | 2352 | 3326 |
| 14 | 1281.0 | 498 | 705 | 997 | 1410 | 1727 | 1994 | 2229 | 3153 |
| 15 | 1425.0 | 473 | 668 | 945 | 1337 | 1637 | 1890 | 2114 | 2989 |
| 16 | 1588.0 | 448 | 634 | 896 | 1268 | 1552 | 1792 | 2004 | 2834 |
| 17 | 1764.0 | 425 | 601 | 850 | 1201 | 1472 | 1699 | 1900 | 2687 |
| 18 | 1963.0 | 403 | 569 | 805 | 1139 | 1395 | 1611 | 1801 | 2547 |
| 19 | 2185.0 | 382 | 540 | 763 | 1080 | 1322 | 1527 | 1707 | 2414 |
| 20 | 2432.0 | 362 | 512 | 724 | 1023 | 1253 | 1447 | 1618 | 2288 |
| 21 | 2706.0 | 343 | 485 | 686 | 970 | 1188 | 1372 | 1534 | 2169 |

$$D = \sqrt{\frac{2^{R}B/ft.}{\pi FL/ft.}}$$

D = DISTANCE IN FEET
F = FREQUENCY

$R_{B/ft.}$ = BALLAST RESISTANCE IN OHMS PER FOOT
L/ft. = INDUCTANCE PER FOOT (TABLE VALUE = 1 uh PER FOOT)

ABOVE TABLE INDICATES THE MAXIMUM DISTANCE vs FREQUENCY vs BALLAST CONDITIONS OVER WHICH THE MAD WILL DETECT MOTION (ASSUMING LINEAR CONDITIONS). THESE DISTANCES REPRESENT THE CHARACTERISTIC IMPEDANCE POINT OF THE TRACK, BUT THEY ARE INFLUENCED CONSIDERABLY BY ANY OR EACH OF THE FOLLOWING:

1: RAIL SIZE
2: RAIL TYPE (RIBBON OR BONDED)
3: TYPE OF BOND USED
4: ADJACENT CROSSINGS, SWITCHES, INSULATED JOINTS
5: TYPE OF BEGINNING-OF-APPROACH SHUNT (TUNED, BROADBAND OR HARDWIRE)



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# CHANGEOVER CONTROL UNIT
# MODEL 8011-02

The Model 8011-02 Changeover Control Unit contains all of the logic and switching necessary to connect two (2) single M.A.D.s in redundant operation. One M.A.D. is designated as the main unit which is continuously monitored by an internal optically coupled timer. Should the main unit fail for any reason and drop its MDR relay for more than a previously selected time of from 2 to 25 minutes, changeover to the standby M.A.D. is automatic.

An indication that this changeover has occurred may be obtained from an external indicator light, location of which is at the discretion of the user. When changeover has occurred, the change is permanent until the main unit has been checked and control returned to it by a manual reset.

Clearly marked switches on the main control panel will allow either manual or automatic operation of the changeover function.

DIMENSIONS: WIDTH: 6-5/8"
HEIGHT: 9-3/8"
DEPTH: 8-1/2"

SPECIFICATIONS:

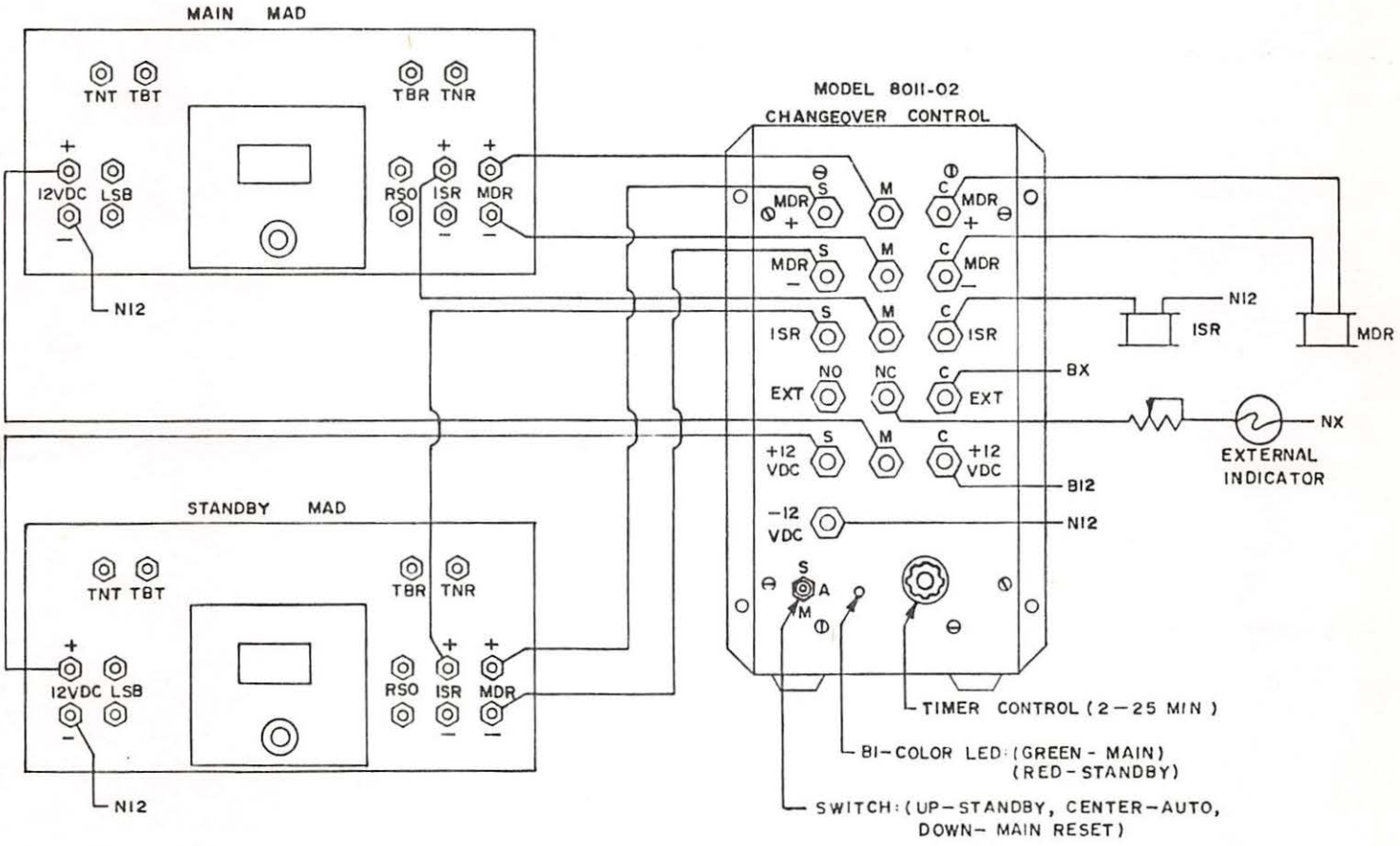
Operational Temp Range: -40°C (-40°F) to +71°C (+160°F)
Battery in: 8.5VDC min. to 15VDC max., 12VDC nom.
Input Current (Controller only): MAIN mode .05 amp (12VDC in)
STANDBY mode .25 amp (12VDC in)
Timer Repeatability: ±4%
Timer Accuracy (referred to front panel scale): ±15%
Internal Contact Rating: 1.25 amp @24VDC
MDR input voltage: Min. 8VDC, Max. 25VDC
Indicator: Bi-color LED: Green = MAIN; Red = STANDBY
Controls: 1.) Potentiometer with indicator knob and scale varies time from 2 min. to 25 min. ±15%.
2.) Three position switch provides auto-timeout function (center), switch-to-STANDBY (upper), and switch-to or hold-on MAIN.
Fuse: 1 amp internal, type 3AG

NOTE: SEE PAGE 2-A-9 FOR TYPICAL INSTALLATION.

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# CHANGEOVER CONTROL UNIT
# MODEL 8011-02

## TYPICAL WIRING DIAGRAM




NOTES:
1. ONLY CONNECTIONS NECESSARY FOR CHANGEOVER CONTROL UNIT ARE SHOWN. FOR TRACK CONNECTIONS AND OTHER INFORMATION SEE "MAD" MANUAL.
2. WITH "EXT." CONNECTED AS SHOWN, EXTERNAL INDICATOR WILL BE LIT WHEN MAIN UNIT IS POWERED AND OUT WHEN STANDBY UNIT IS POWERED. OPERATION MAY BE REVERSED BY USING "NO" INSTEAD OF "NC".
3. SEE SPECIFICATIONS FOR CONTACT RATINGS.

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MODERN APPROACH DETECTOR

ACCESSORIES

2-A-11

ORDER BY PART NUMBER AND DESCRIPTION

| DESCRIPTION | PART NO. |
|---|---|
| BATTERY LINE FILTER | 8001-01 |
| BATTERY LINE FILTER -HEAVY DUTY | 8001-02 |
| TUNED SHUNT | 8006-01-* |
| TUNED SHUNT - DEEP NOTCH | 8006-02-* |
| BROAD BAND SHUNT OR COUPLER | 8008-01 |
| TUNED JOINT COUPLER - ONE FREQ. REPAIRABLE | 8009-02-* |
| TUNED JOINT COUPLER - TWO FREQ. REPAIRABLE | 8009-03-* |
| TRACK BATTERY REACTOR | 8010-01 |
| DC CODE FILTER | 8012-01 |
| TUNED JOINT COUPLER _____ Hz. | 8028-01-* |
| TUNED JOINT COUPLER _____ Hz. | 8028-02-* |
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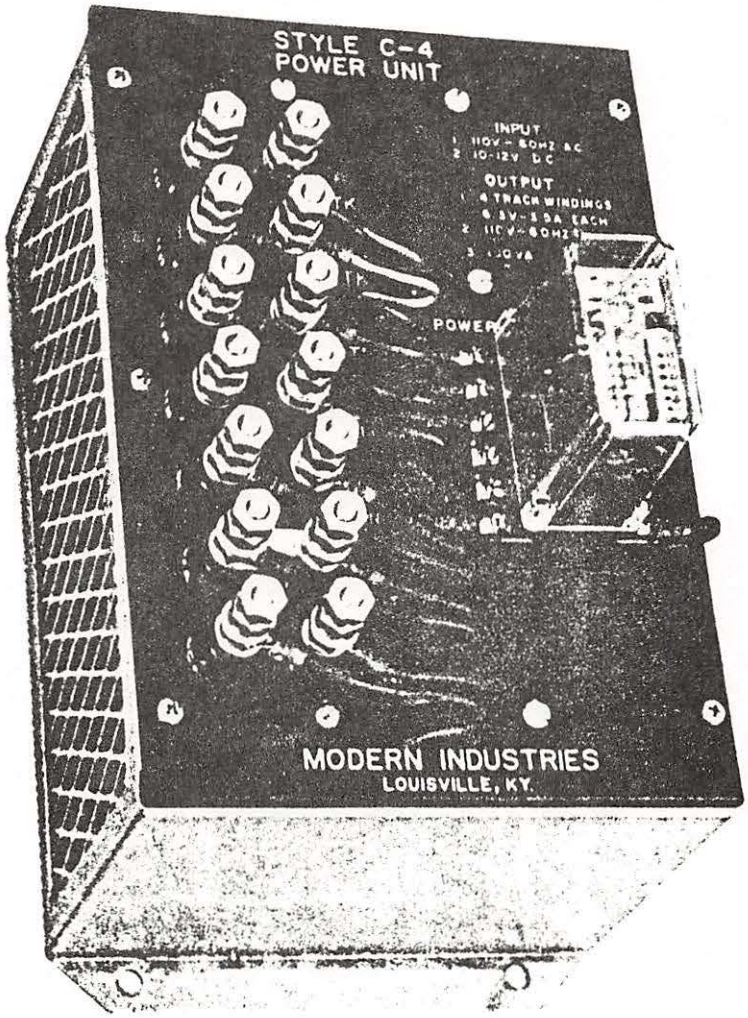
* PLEASE SPECIFY FREQUENCY REQUIRED

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# 8025-02 POWER UNIT

## STYLE C-4

**FOR PROVIDING NORMAL AND STANDBY POWER FOR UP TO FOUR RECTIFIED AC TRACK CIRCUITS.**




**POWER UNIT CONSISTS OF TRACK TRANSFORMER, SOLID STATE INVERTER AND POWER TRANSFER RELAY WIRED TO STANDARD AAR TERMINAL STRIP AND MOUNTED IN VENTED HOUSING.**

## SPECIFICATIONS

**TRANSFORMER — SINGLE PRIMARY — 115VAC 60-HZ FOUR SECONDARIES EACH 6.3 VOLTS · 3.5 AMPS**

**INVERTER CAPACITY — 100VA**

**POWER TRANSFER RELAY — PLUG-IN, COIL · 115V · 60HZ, CONTACTS 115VAC · 10 AMPS**

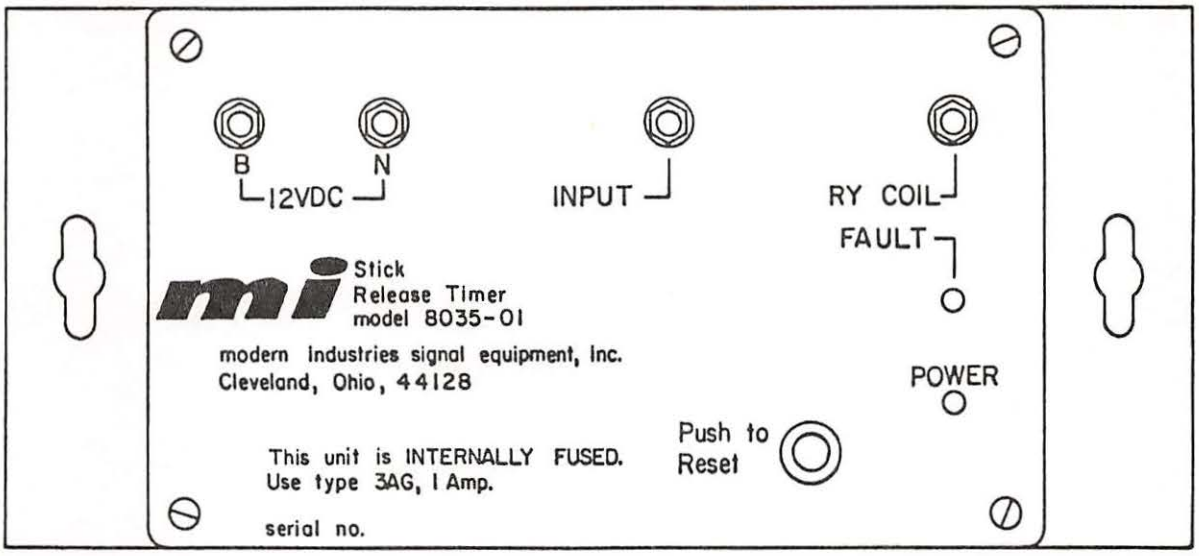
**INPUT NORMAL 110VAC**
**INPUT STANDBY 12VDC**

**DIMENSIONS — 11 3/8" HIGH X 8 1/2" WIDE X 8 1/2" HIGH**

**WEIGHT — 20 LBS.**

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# SINGLE STICK RELEASE TIMER
# MODEL 8035-01



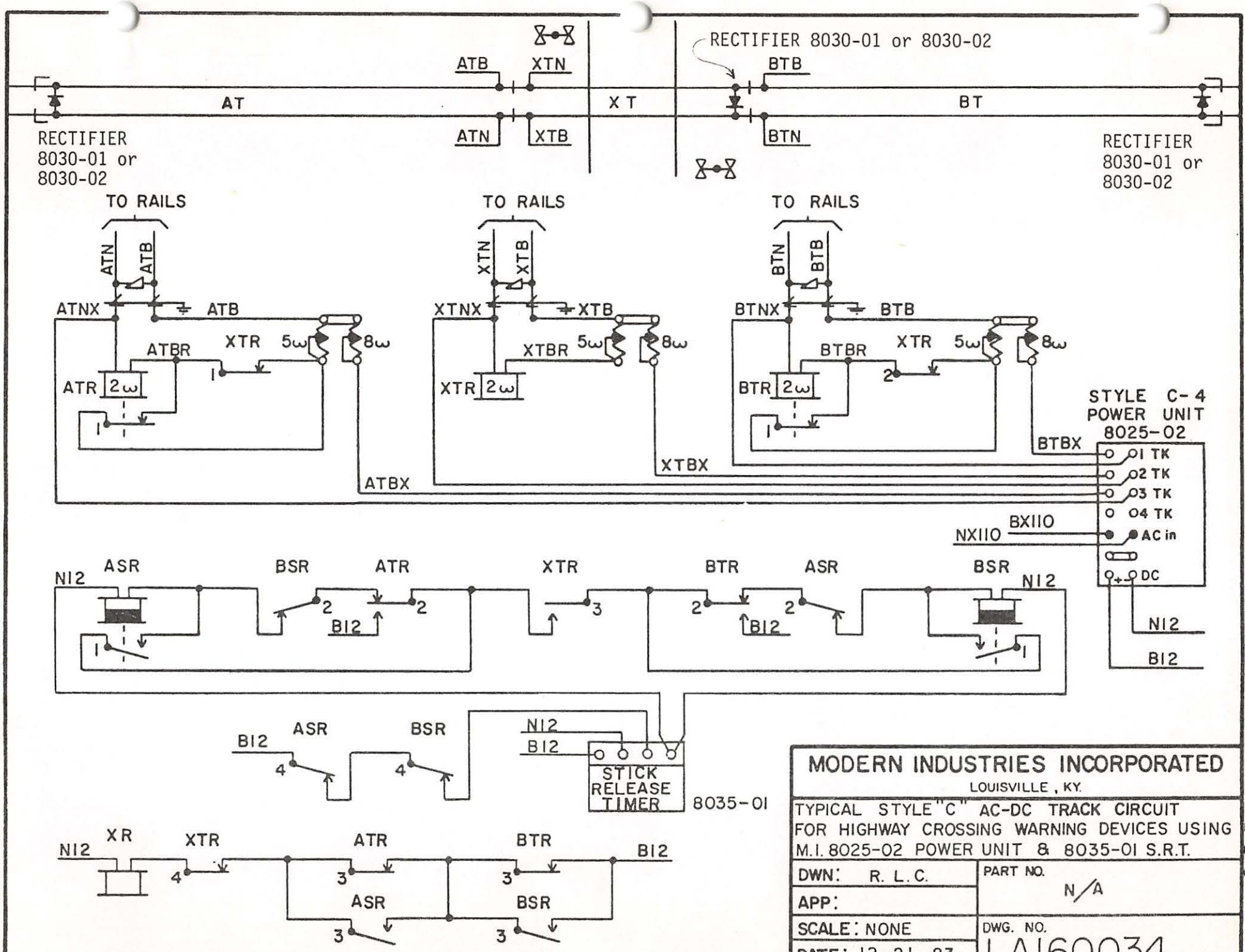

THE SINGLE STICK RELEASE TIMER IS DESIGNED FOR USE WITH STYLE"C" HIGHWAY CROSSING WARNING CIRCUITS. THE TIMER WILL RELEASE THE DIRECTIONAL STICK RELAYS AFTER A PRESET TIME INTERVAL OF 5, 10, OR 15 MINUTES. IN THE EVENT OF A TRACK CIRCUIT FAILURE DURING A RECEDING TRAIN MOVE, APPROACH CUT-OUT WILL BE LIMITED TO THE PRESET TIME. A FAULT MEMORY INDICATOR IS PROVIDED TO SHOW AN APPROACH CIRCUIT HAS FAILED, SHOULD THE FAILURE BE INTERMITTENT. THE TIME INTERVAL IS SET BY AN INTERNAL SWITCH AND CAN BE ADJUSTED IN 5 MINUTE STEPS.

DIMENSIONS: WIDTH : 8-1/4"
HEIGHT : 3-3/4"
DEPTH : 3-3/4"

* SEE PAGE 2-B-3 FOR TYPICAL INSTALLATION.

SPECIFICATIONS: TIMER: DIGITAL PROGRAMMABLE; 5, 10, OR 15 MINUTE INTERVALS, SWITCH SELECTABLE
TEMP. RANGE: -40°C (-40°F) TO +71°C (160°F)
TEMP. STABILITY: ±2% OVER TEMPERATURE RANGE
POWER SUPPLY: 9 TO 16 VDC; 12 VDC NOMINAL
CURRENT DRAW: 36 MA @ 12 VDC; INDICATOR AND INPUT CURRENT
FUSE: 1 AMP., TYPE 3AG, INTERNAL

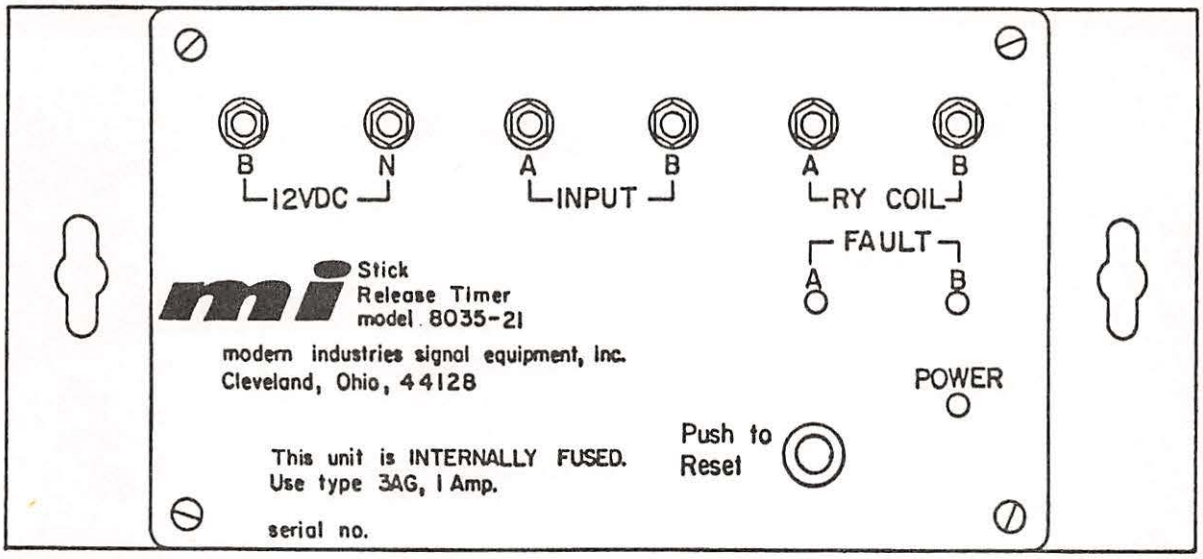
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| MODERN INDUSTRIES INCORPORATED<br>LOUISVILLE, KY. | |
|---|---|
| TYPICAL STYLE "C" AC-DC TRACK CIRCUIT FOR HIGHWAY CROSSING WARNING DEVICES USING M.I. 8025-02 POWER UNIT & 8035-01 S.R.T. | |
| DWN: R. L. C. | PART NO. N/A |
| APP: | |
| SCALE: NONE | DWG. NO. LA160034 |
| DATE: 12-21-83 | |

2-B-3

# DUAL STICK RELEASE TIMER
# MODEL 8035-21



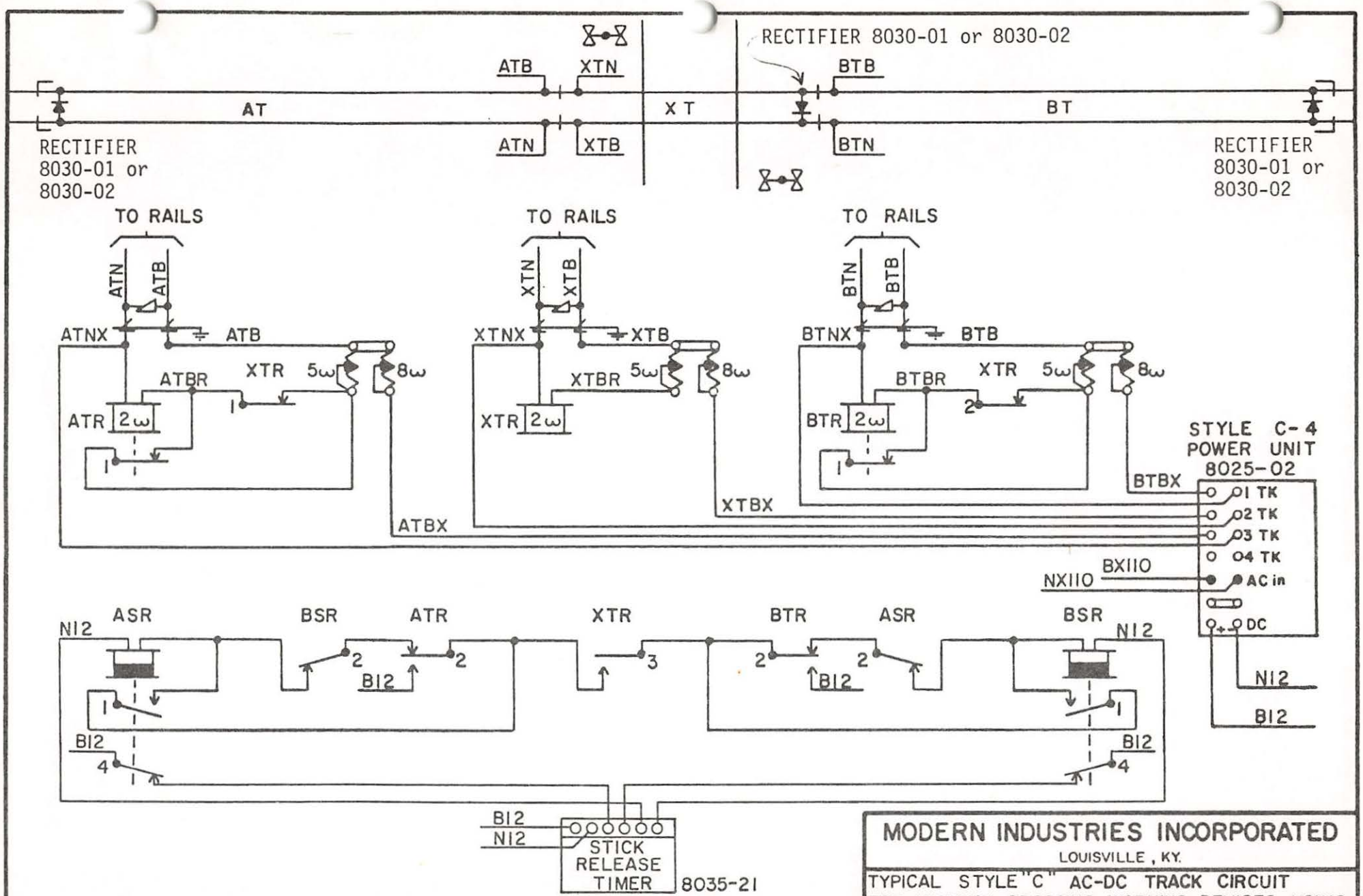

THE DUAL STICK RELEASE TIMER IS DESIGNED FOR USE WITH STYLE"C" HIGHWAY CROSSING WARNING CIRCUITS. THE TIMER WILL RELEASE EITHER DIRECTIONAL STICK RELAY AFTER A PRESET TIME INTERVAL OF 1 TO 15 MINUTES. IN THE EVENT OF A TRACK CIRCUIT FAILURE DURING A RECEDING TRAIN MOVE, APPROACH CUT-OUT WILL BE LIMITED TO THE PRESET TIME. FAULT MEMORY INDICATORS ARE PROVIDED TO SHOW WHICH APPROACH CIRCUIT FAILED, SHOULD THE FAILURE BE INTERMITTENT.
THE TIME INTERVAL IS SET BY AN INTERNAL SWITCH AND CAN BE ADJUSTED IN ONE MINUTE INTERVALS.

DIMENSIONS: WIDTH : 8-1/4"
HEIGHT : 3-3/4"
DEPTH : 3-3/4"

* SEE PAGE 2-B-5 FOR TYPICAL INSTALLATION.

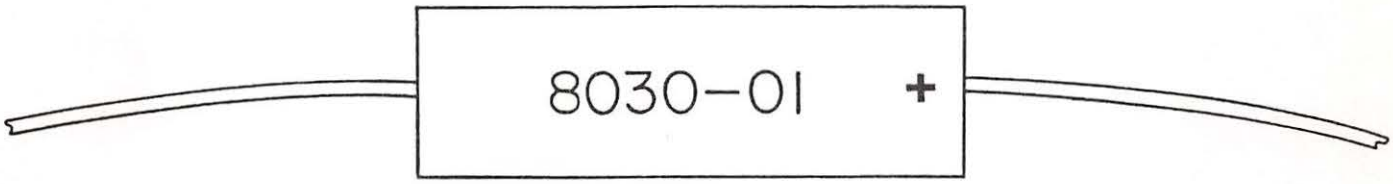
SPECIFICATIONS: TIMER: DIGITAL PROGRAMMABLE; 1 THRU 15 MINUTES, 1 MINUTE INTERVALS, SWITCH SELECTABLE
TEMP. RANGE: -40°C (-40°F) TO +71°C (160°F)
TEMP. STABILITY: ±2% OVER TEMPERATURE RANGE
POWER SUPPLY: 9 TO 16 VDC; 12 VDC NOMINAL
CURRENT DRAW: 50 MA @ 12 VDC; INDICATORS AND INPUT CURRENT
FUSE: 1 AMP., TYPE 3AG, INTERNAL

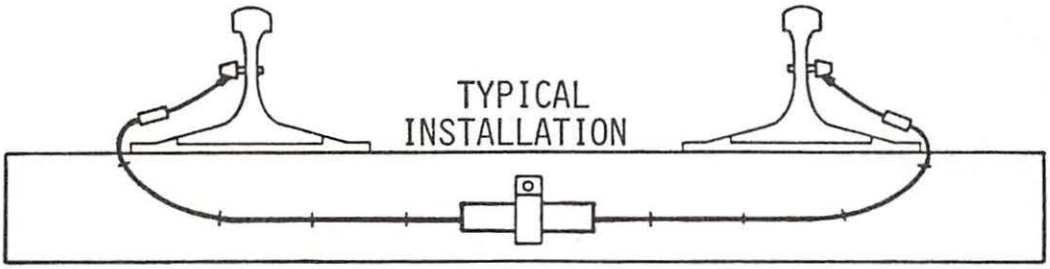
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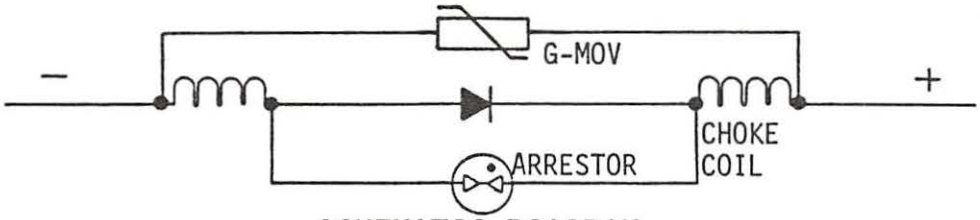



| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY. | |
|---|---|
| TYPICAL STYLE "C" AC-DC TRACK CIRCUIT FOR HIGHWAY CROSSING WARNING DEVICES USING M.I. 8025-02 POWER UNIT & 8035-21 S.R.T. | |
| DWN: R. L. C. | PART NO. N/A |
| APP: | |
| SCALE: NONE | DWG. NO. LA160033 |
| DATE: 12-21-83 | |

# TRACK RECTIFIER
# MODEL 8030-01
# FOR AC-DC TRACK CIRCUITS



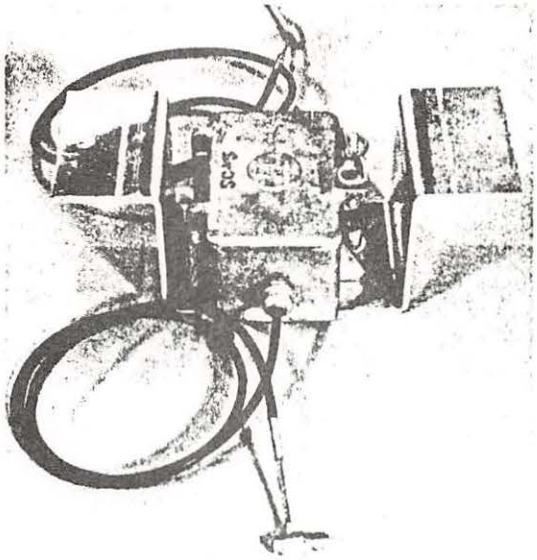




SCHEMATIC DIAGRAM

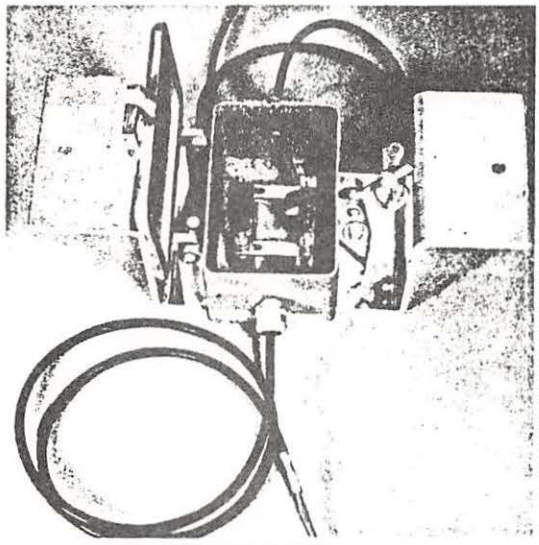
THE MODEL 8030-01 TRACK RECTIFIER IS A HEAVY DUTY UNIT DESIGNED FOR USE IN AREAS WHERE LIGHTNING SURGES CAUSE FREQUENT RECTIFIER FAILURE. THE RECTIFIER IS RATED FOR 35 AMPS FORWARD CURRENT AND 600 PEAK INVERSE VOLTS. TWO CHOKE COILS, A GAS ARRESTOR, AND A G-MOV ARE PROVIDED FOR LIGHTNING PROTECTION. THE UNIT IS ENCASED IN A PVC PIPE FILLED WITH POLYETHYLENE. IT IS WATERPROOF AND VANDAL RESISTANT. THE RECTIFIER MAY BE DIRECT BURIED OR MOUNTED TO A TIE AS SHOWN ABOVE.

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# STYLE SC - 5 RECTIFIER FOR AC - DC TRACK CIRCUIT



CLOSED VIEW



OPEN VIEW

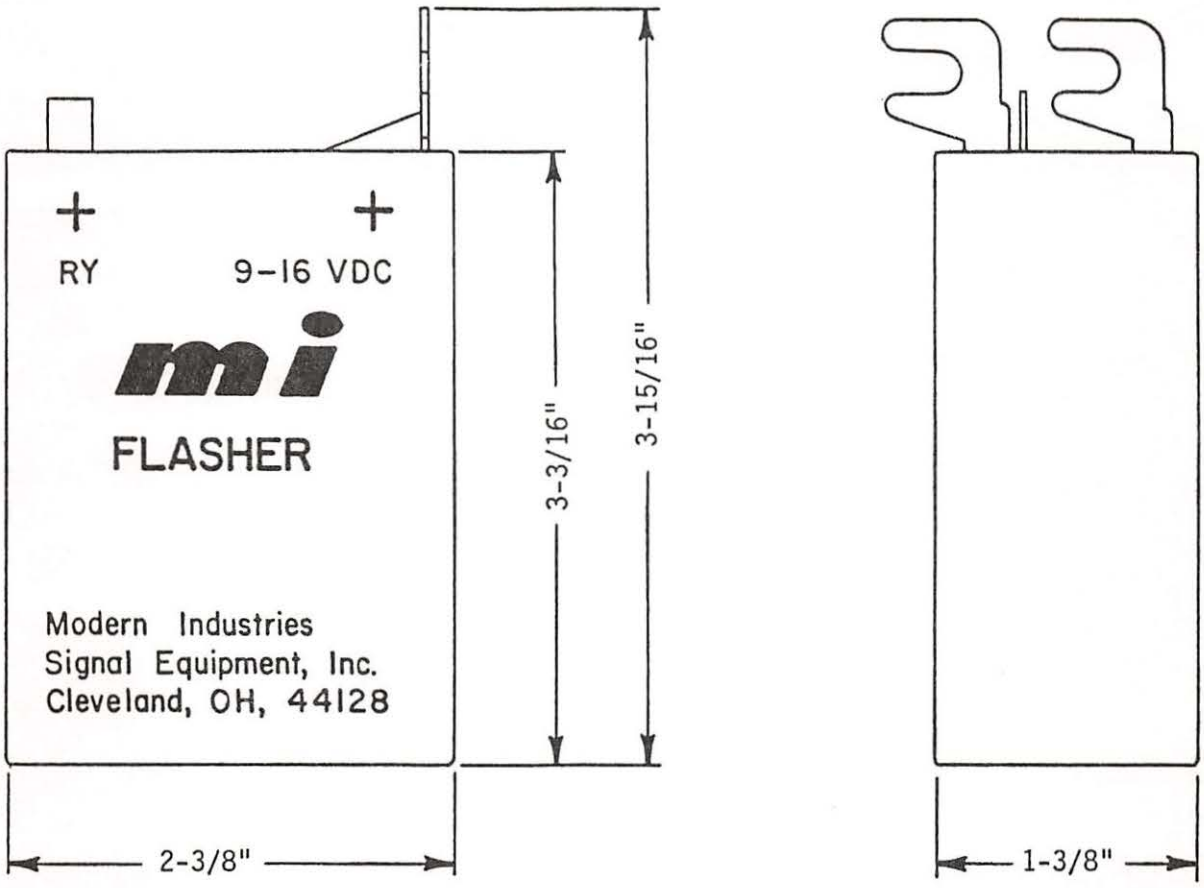
CAST ALUMINUM HOUSING MOUNTED ON "1/4" ALUMINUM PLATE. HINGED WATER TIGHT COVER PROVIDES EASY ACCESS FOR FIELD COMPONENT REPLACEMENT. TRACK CONNECTIONS ARE PROVIDED AND CONNECTED TO TERMINALS IN THE HOUSING THROUGH WATER TIGHT CONNECTORS.

| MODEL NUMBER | LIGHTNING PROTECTION | RECTIFIER TYPE | PART NUMBER |
|---|---|---|---|
| SC-5 | EQUALIZER | SILICON DIODE | 16100-01 |
| SC-5-1 | EQUALIZER | SELENIUM STACK | 16100-02 |
| SC-5-2 | EQUALIZER & TRANSIENT SUPPRESSOR | SILICON DIODE | 16100-03 |

THE RECTIFIER IS NORMALLY PROVIDED WITH SINGLE DRIVE PIN TRACK CONNECTIONS. IF DOUBLE DRIVE PIN CONNECTIONS ARE REQUIRED OR CADWELD TYPE PREFERRED PLEASE STATE ON ORDER.

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# RELAY FLASHER MODULE
# MODEL 8027-01 , MODEL 8027-02




THE FLASHER IS DESIGNED TO OPERATE IN CONJUNCTION WITH A TYPE K4 OR TYPE B1 FLASHER RELAY AND HAS MATCHING MOUNTING TERMINALS. FLASHER HAS BUILT IN SURGE SUPPRESSION AND IS POTTED IN POLYURETHANE.

## SPECIFICATION

FLASHING RATE: MODEL 8027-01 , 40 TO 45 FLASHES PER MINUTE (42*NOMINAL)
MODEL 8027-02 , 56 TO 64 FLASHES PER MINUTE (60*NOMINAL)

OPERATING VOLTAGE: 9 TO 16 VOLTS D.C.

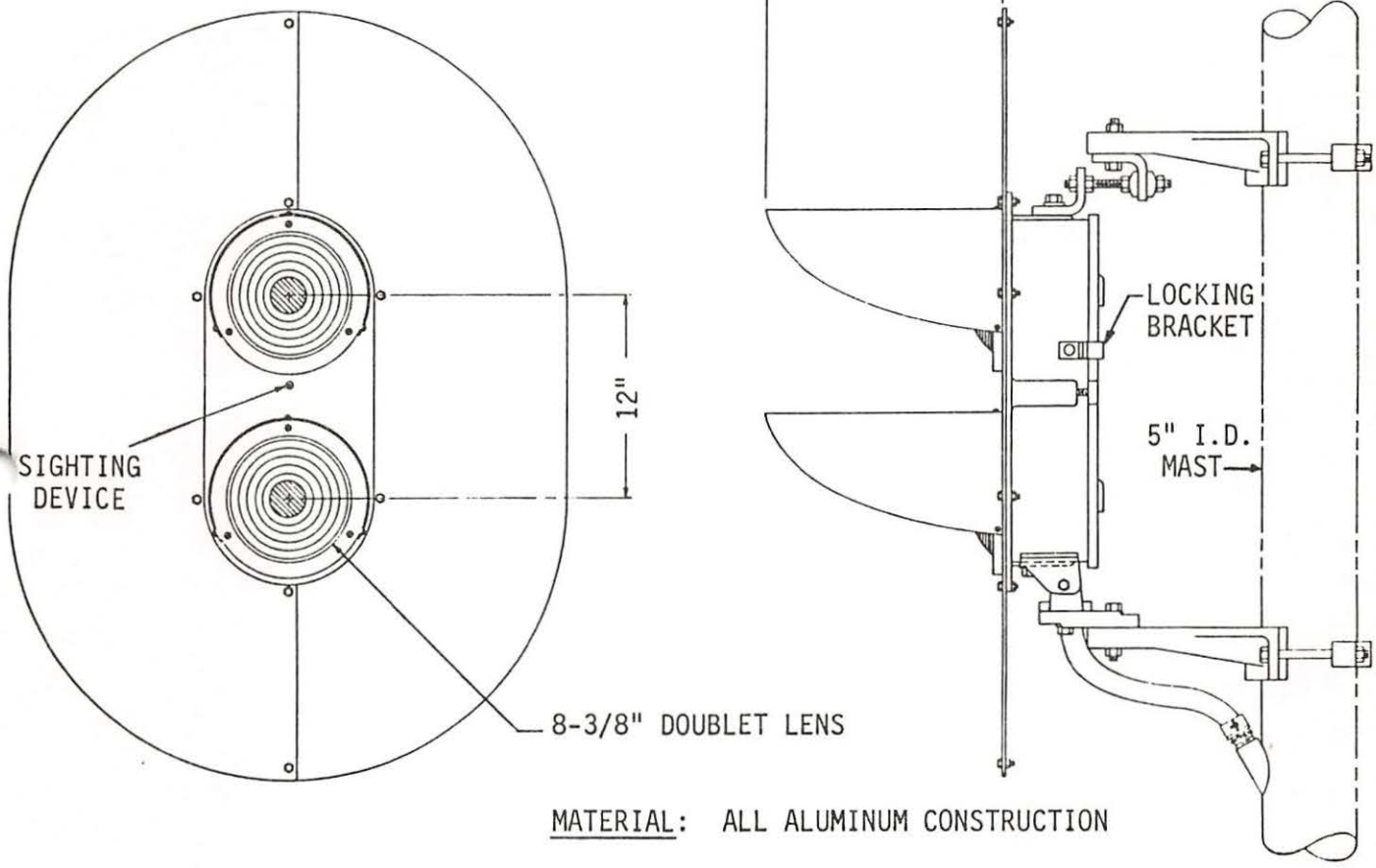
OPERATING TEMPERATURE: -40°C (-40°F) TO +71°C (+160°F)

* FLASHING RATE DETERMINED AT +12 VDC @+25°C

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# COLOR LIGHT
# 2-POSITION
# MODEL 45212

3-A-1




MATERIAL: ALL ALUMINUM CONSTRUCTION

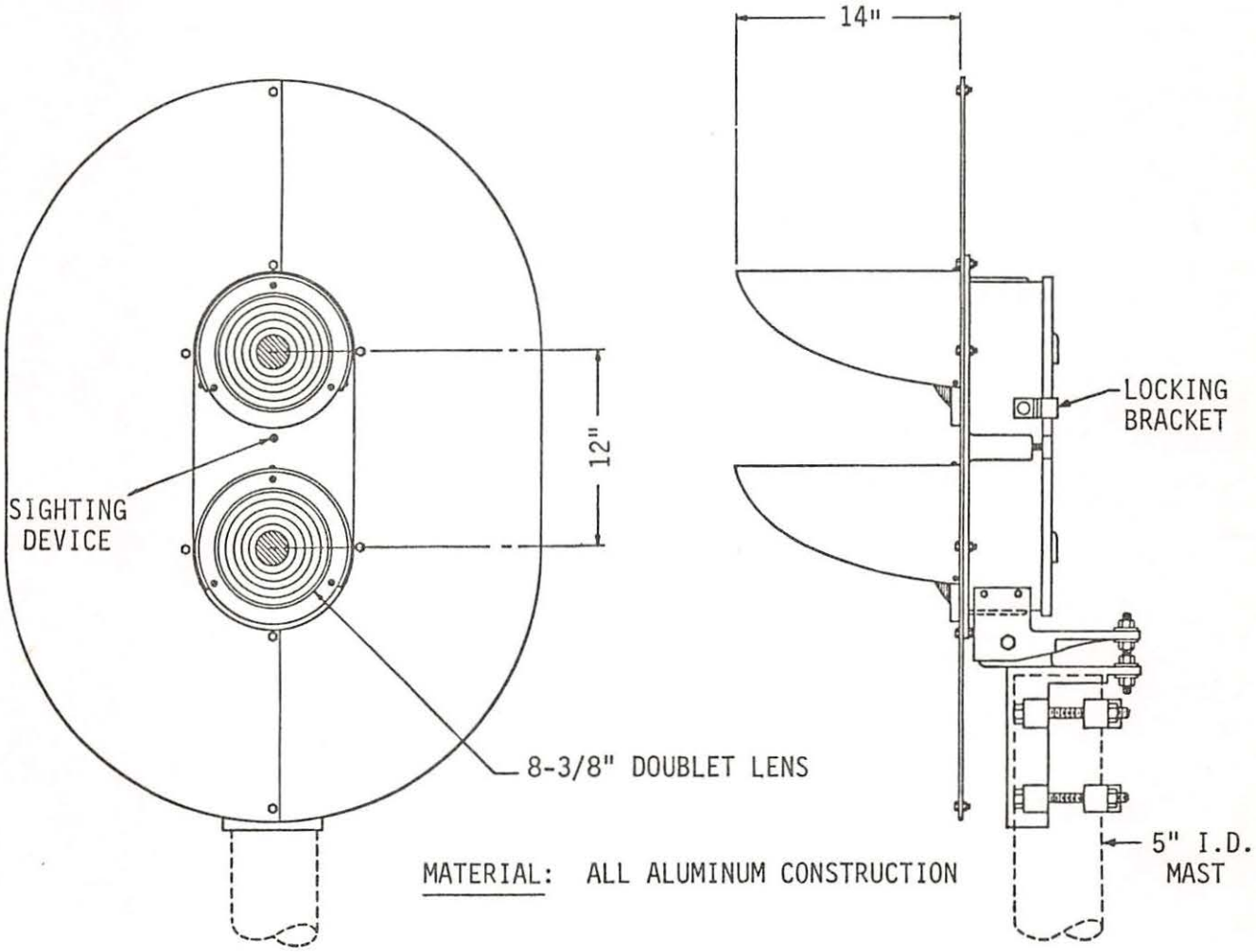
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | BACKGROUND : | 24" x 36" _____ ; 33-7/8" x 45-7/8" _____. |
| 2. | RESISTOR(S) : | YES _____, QTY. _____ ; NO _____. |
| 3. | LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 5. | ASPECT : | TOP _____ ; BOTTOM _____. |


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# COLOR LIGHT
# 2-POSITION
# MODEL 45222

3-A-2




MATERIAL: ALL ALUMINUM CONSTRUCTION

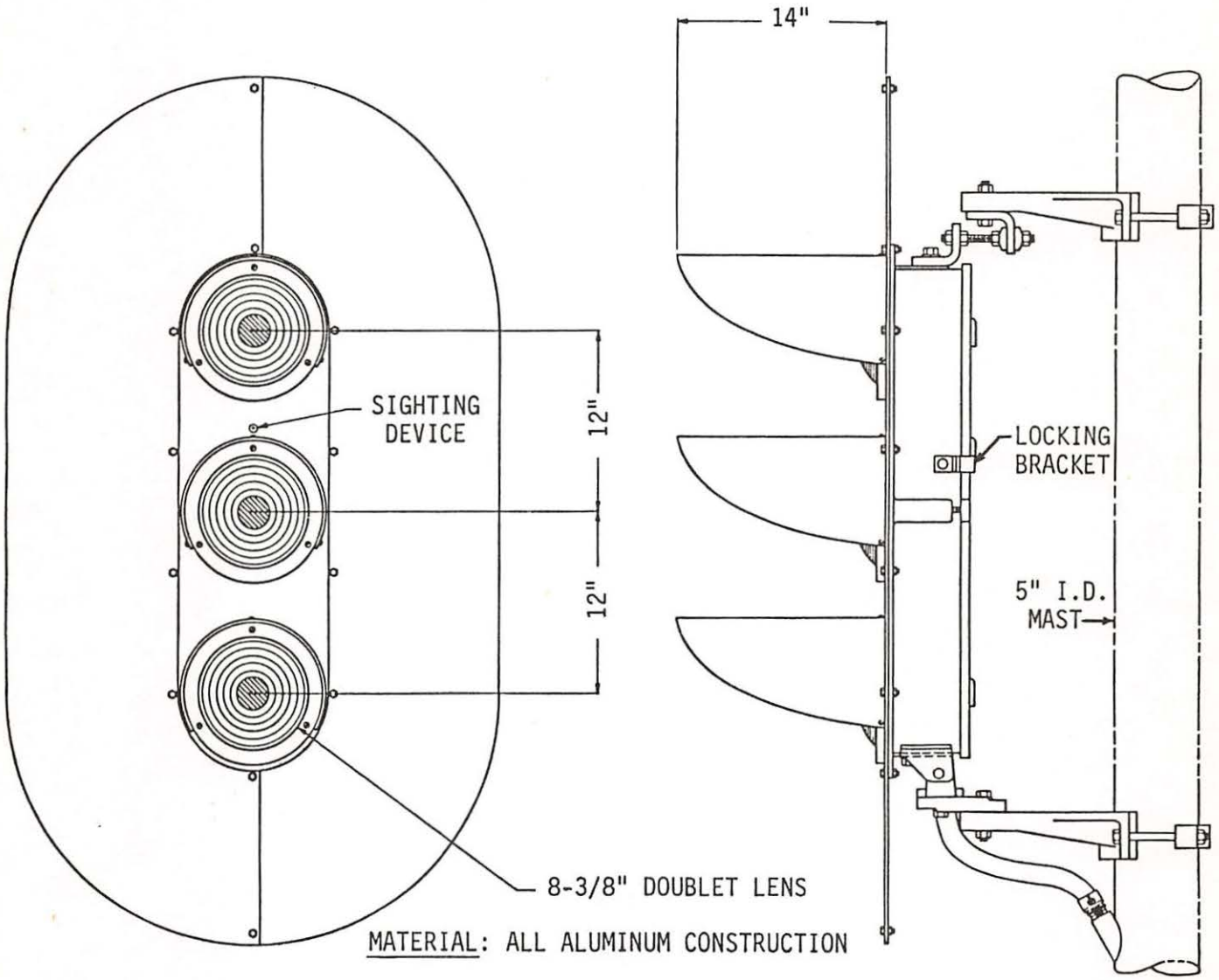
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | BACKGROUND : | 24" x 36" _____ ; 33-7/8" x 45-7/8" _____. |
| 2. | RESISTOR(S) : | YES _____, QTY. _____ ; NO _____. |
| 3. | LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 5. | ASPECT : | TOP _____ ; BOTTOM _____. |


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# COLOR LIGHT
# 3-POSITION
# MODEL 45213

3-A-3




MATERIAL: ALL ALUMINUM CONSTRUCTION

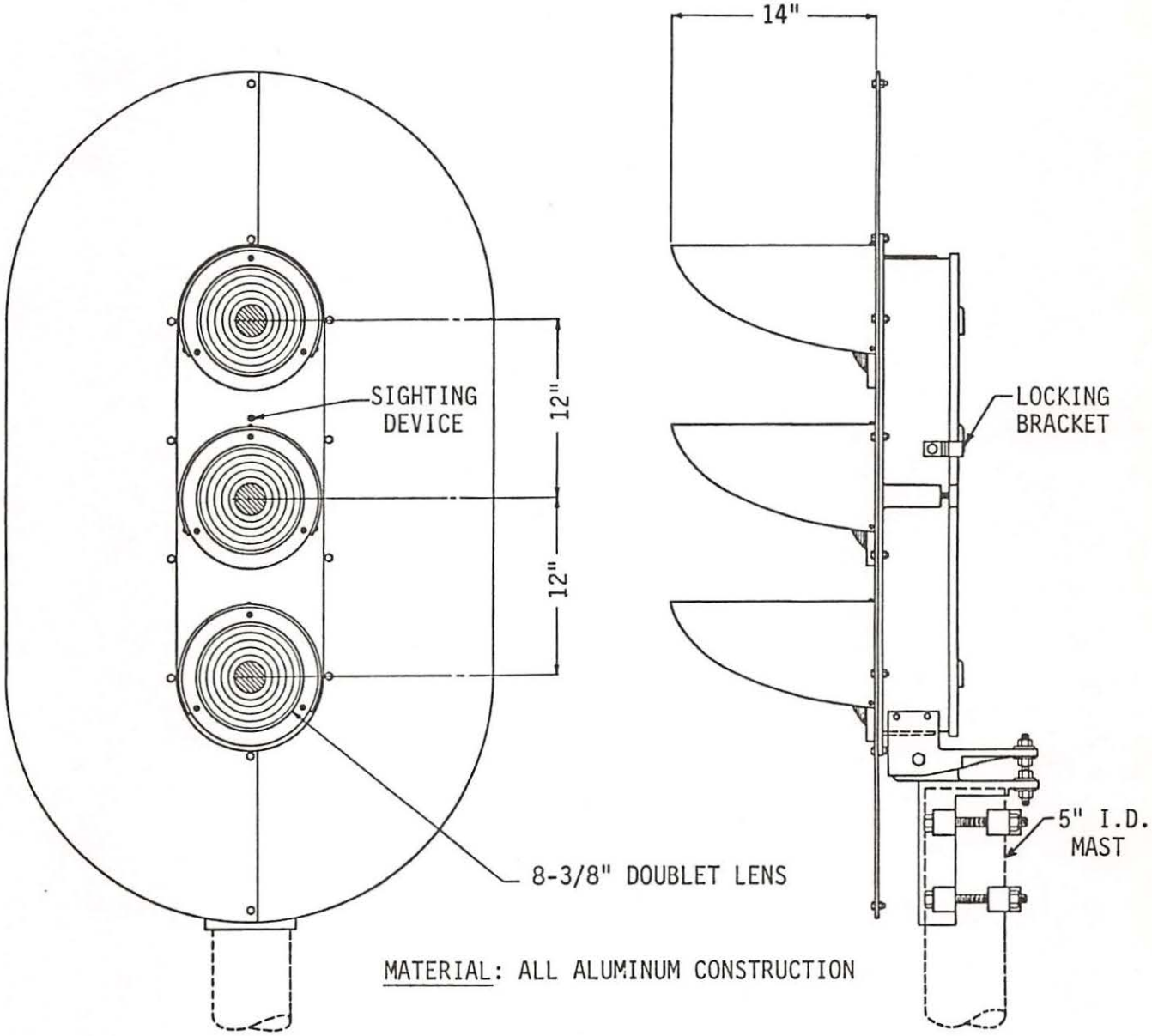
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | BACKGROUND : | 24" x 48" _____ ; 33-7/8" x 57-7/8" _____. |
| 2. | RESISTOR(S) : | YES _____, QTY. _____ ; NO _____. |
| 3. | LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 5. | ASPECT : | TOP _____ ; MIDDLE _____ ; BOTTOM _____. |


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# COLOR LIGHT
# 3-POSITION
# MODEL 45223

3-A-4




MATERIAL: ALL ALUMINUM CONSTRUCTION

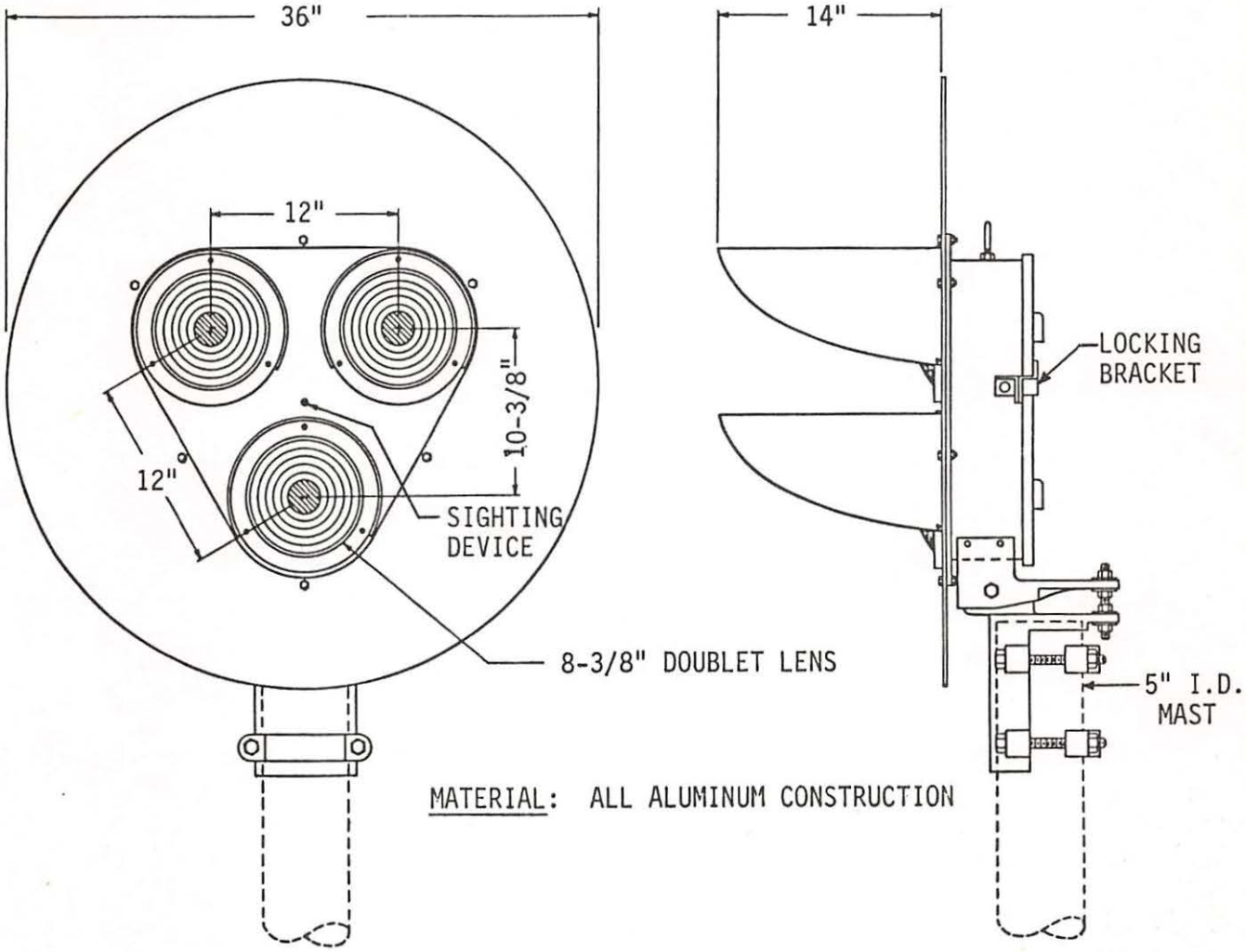
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | BACKGROUND : | 24" x 48" _____ ; 33-7/8" x 57-7/8" _____. |
| 2. | RESISTOR(S) : | YES _____, QTY. _____ ; NO _____. |
| 3. | LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 5. | ASPECT : | TOP _____ ; MIDDLE _____ ; BOTTOM _____. |


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# COLOR LIGHT
# TRIANGULAR
# MODEL 45403

3-A-5




MATERIAL: ALL ALUMINUM CONSTRUCTION

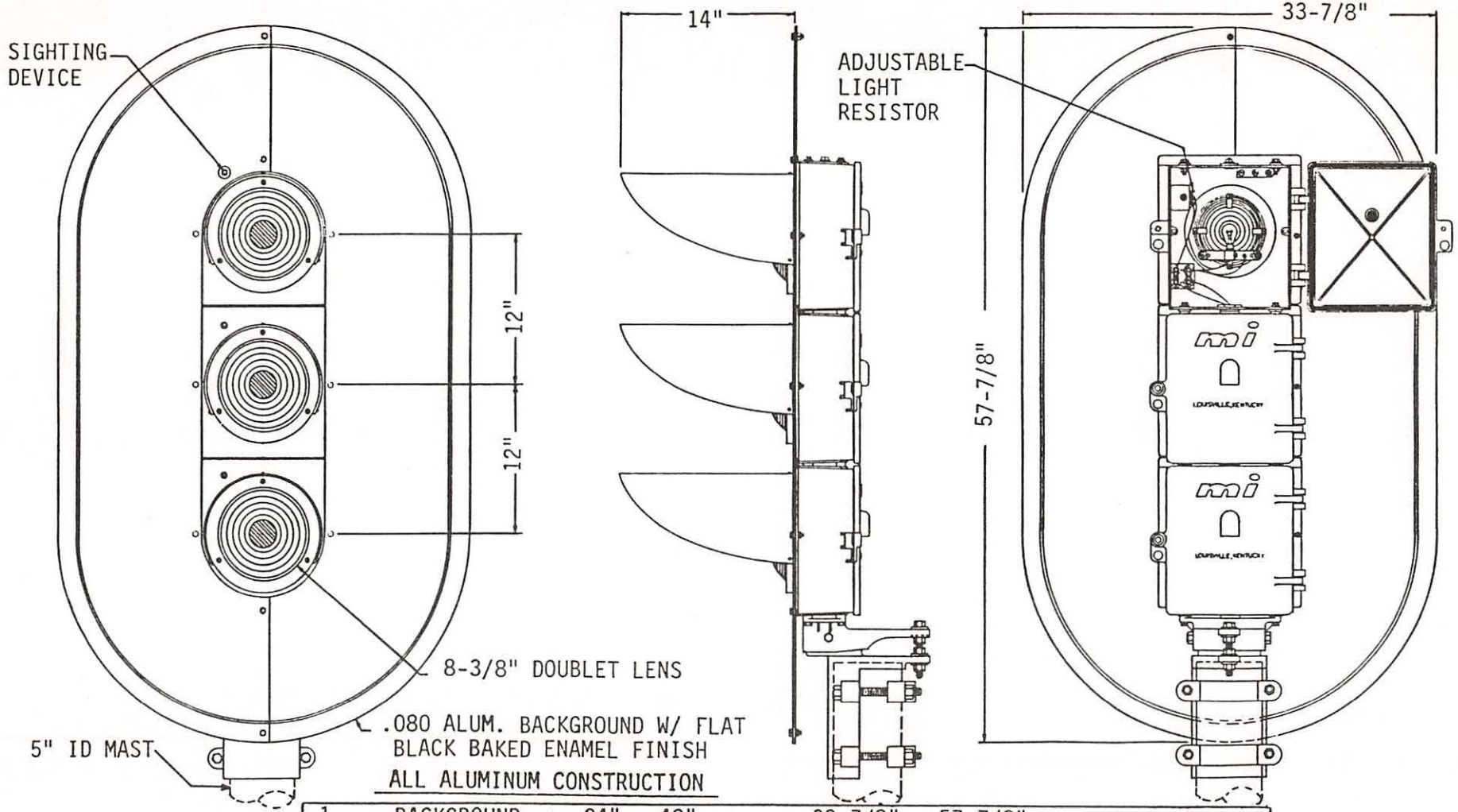
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | RESISTOR(S) : | YES _____, QTY. _____ ; NO _____. |
| 2. | LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 3. | LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 4. | ASPECT : | TOP-LEFT _____ ; TOP-RIGHT _____ ; BOTTOM _____. |


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# MODULAR COLOR LIGHT
# MODEL 45500



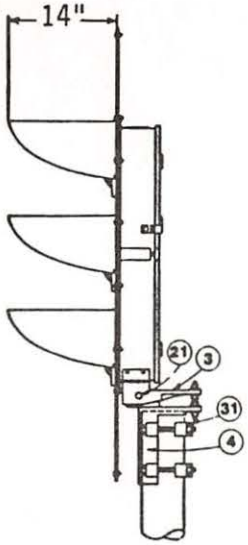

| | | |
|---|---|---|
| 1. | BACKGROUND : | 24" x 48"_____ ; 33-7/8" x 57-7/8" _____ . |
| 2. | RESISTORS : | YES_____, QTY._____; NO_____. |
| 3. | LENS SPEC. : | 0° PLAIN_____; 40° BULLS-EYE_____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. : | _____VOLTS , _____WATTS. |
| 5. | ASPECT : | TOP_____; MIDDLE _____; BOTTOM _____. |

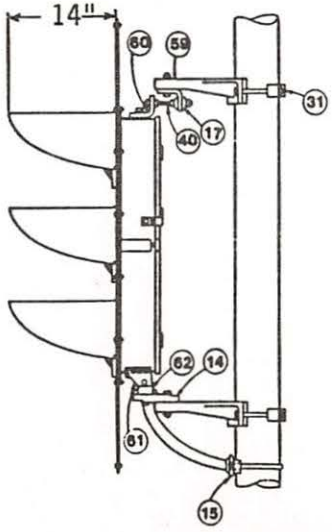

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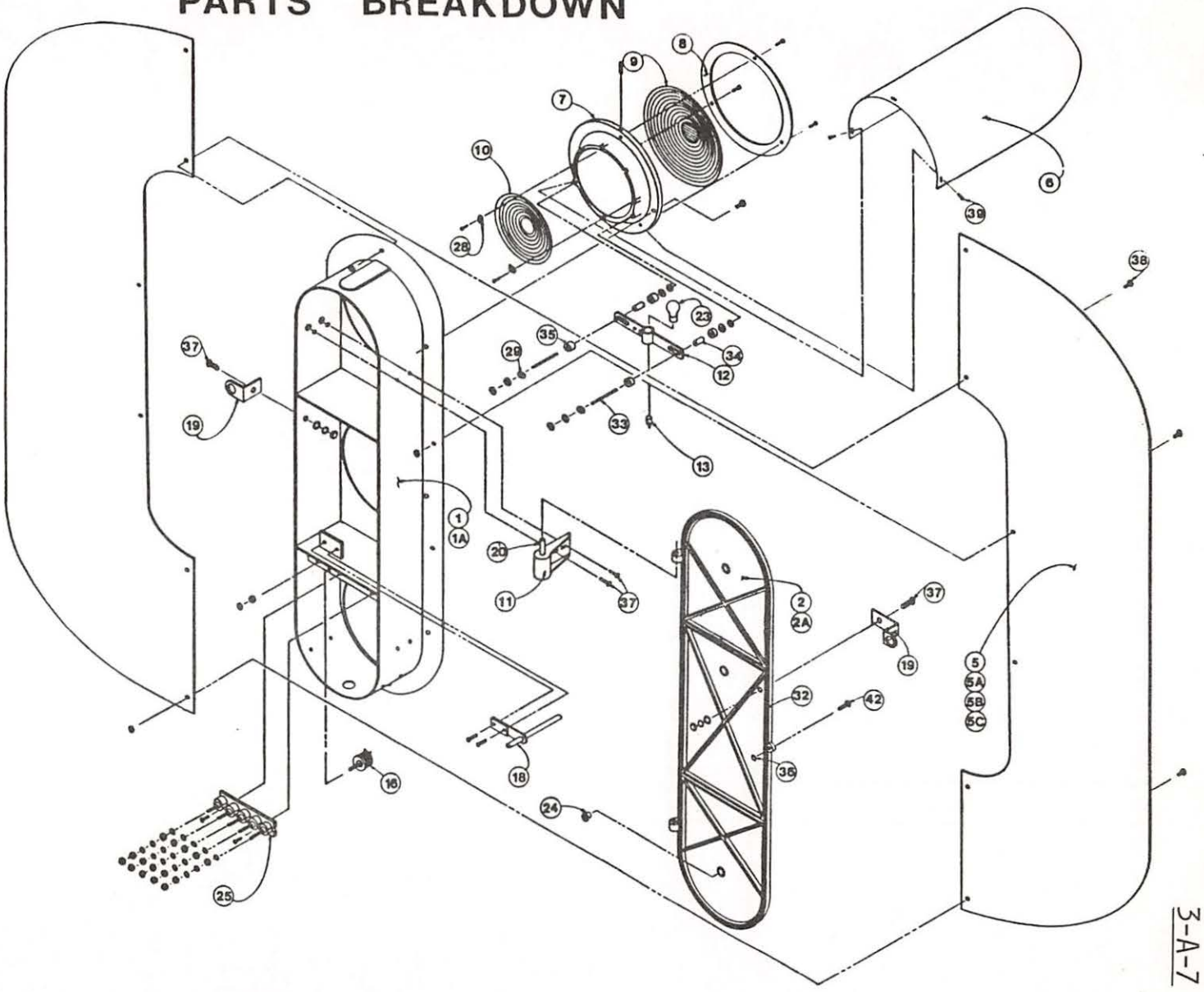
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# COLOR LIGHTS SERIES 45200

## PARTS BREAKDOWN




3-A-7


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# REPLACEMENT PARTS
# SERIES 45200 COLOR LIGHTS

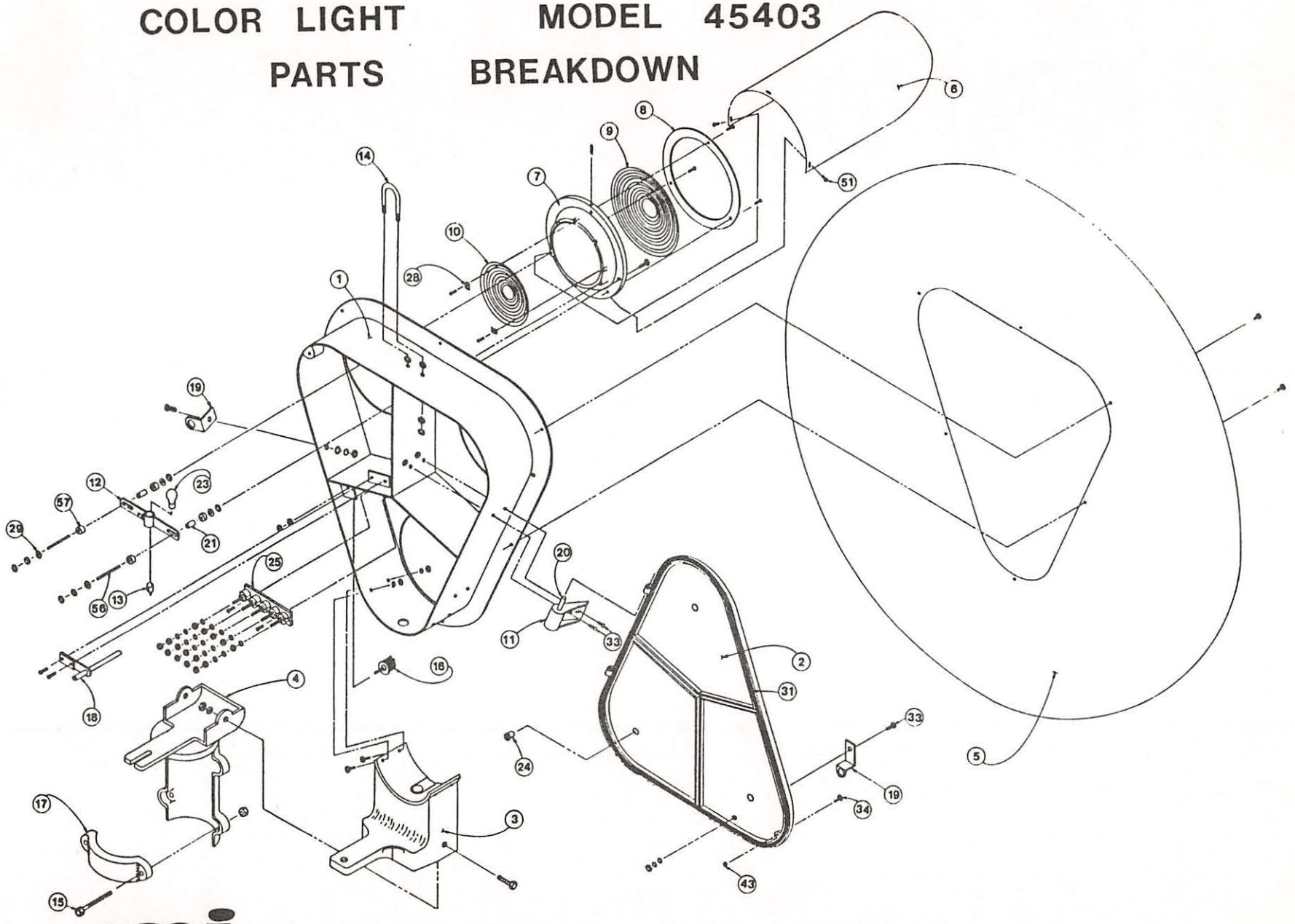
| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | BODY, 3- POSITION COLOR LIGHT, MACH. | 45-45001 |
| 1A | BODY, 2- POSITION COLOR LIGHT, MACH. | 45-45003 |
| 2 | DOOR, 3- POSITION COLOR LIGHT, MACH. | 45-45002 |
| 2A | DOOR, 2- POSITION COLOR LIGHT, MACH. | 45-45004 |
| 3 | BRACKET, TOP OF POLE, MACHINED | 45-45007 |
| 4 | TOP OF POLE MOUNTING BRACKET, MACH. | 45-09865 |
| 5 | BACKGROUND, 3- POS. 33-7/8"x57-7/8" | 45-10036 |
| 5A | BACKGROUND, 3- POS. 24"x48" | 45-10035 |
| 5B | BACKGROUND, 2- POS. 33-7/8"x45-7/8" | 45-10034 |
| 5C | BACKGROUND, 2- POS. 24"x36" | 45-10033 |
| 6 | HOOD FOR 8-3/8" COLOR LIGHT | 45-10001 |
| 7 | LENS HOLDER, MACHINED | 45-05643 |
| 8 | LENS RETAINING RING, MACHINED | 45-05644 |
| 9 | 8-3/8" PLASTIC OUTER DBLT | 01450004 |
| 10 | LENS, RED 5-1/2" INTER DBLT | 01450007 |
| 11 | HINGE, MACHINED | 45-05645 |
| 12 | BULB HOLDER, MACHINED | 45-09665 |
| 13 | SOCKET - WIRED 787-64 | 45-10027 |
| 14 | OFFSET, MACHINED | 45-06651 |
| 15 | CONDUIT CLAMP, MACHINED | 45-06640 |
| 16 | RESISTOR (OPTION) | 01450048 |
| 17 | TAPER WASHER, MACHINED | 45-06654 |
| 18 | PEEP SIGHT ASM. 8-3/8" COLOR LIGHT | 45-10040 |
| 19 | LOCKING BRACKET FOR COLOR LIGHT | 45-10058 |
| 20 | STAINLESS-STEEL PIN 3/8"x3" | 45-10026 |
| 21 | 1/2" x 1-1/2" HH C/S, ZINC PLATED | 01021070 |
| 22 | 1/2" x 6-1/2" ALL THREAD STEEL ROD | 01025356 |
| 23 | BULB, 10V-18W | 01030031 |
| 24 | SCREEN VENT | 01510001 |
| 25 | SINGLE ROW TERMINAL BLOCK | 73108-01 |
| 26 | 5/16" STAINLESS-STEEL INSERT | 01025584 |
| 27 | GROMMET, 3/8" ID, RUBBER | 01450033 |
| 28 | REFLECTOR CLIP WITH PAD | 51-01009 |
| 29 | AAR WASHER | 73-10708 |
| 30 | 1/4" - 20 HEX NUT, ZINC PLATED | 01022890 |
| 31 | HALF POLE CLAMP | C-09965 |
| 32 | 1/2" DIA. RUBBER CORD | 01010007 |

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 33 | ADJUSTING ROD 1/4" x 2" S/S | 45-10009 |
| 34 | BUSH, 1/4" ID x 3/8" OD x 1/2"LT | 45-10029 |
| 35 | INS. SPAC. 7/8" DIA. x 1/4" TK | 45-10018 |
| 36 | 5115-31 TRUARC RETAINING RING | 01025583 |
| 37 | 1/4" - 20 x 1" CARRIAGE BOLT | 01020051 |
| 38 | 1/4" - 20 x 1" HH C/S, ZINC | 01020050 |
| 39 | 10-32 x 1/2" RD HD M/S, S/S | 01023902 |
| 40 | 1/2" - 13 x 7" HH C/S, ZINC | 01021230 |
| 41 | 5/16" - 18 x 1-1/4" HH C/S | 01020310 |
| 42 | 5/16" x 1-3/4" HH C/S | 01020330 |
| 43 | 5/16" - 18 HEX NUT, ZINC | 01022900 |
| 44 | 5/16" LOCK WASHER, ZINC PLATED | 01023162 |
| 45 | 1/4" - 20 x 1/2" CARRIAGE BOLT | 01020011 |
| 46 | 5/8" x 1-1/4" HH C/S, ZINC | 01021560 |
| 47 | #10-32 HEX NUT, ZINC PLATED | 01022872 |
| 48 | 1/4" - 20 HEX JAM NUT, ZINC | 01022897 |
| 49 | 1/2" - 13 HEX NUT, ZINC PLATED | 01022930 |
| 50 | 5/8" - 11 HEX NUT, ZINC PLATED | 01022950 |
| 51 | #8 INTERNAL STAR LOCK WASHER | 01023121 |
| 52 | 1/4" FLAT WASHER, ZINC PLATED | 01023150 |
| 53 | 1/4" LOCK WASHER, ZINC PLARED | 01023151 |
| 54 | 1/4" INTERNAL STAR WASHER, ZINC | 01023152 |
| 55 | 1/2" FLAT WASHER, ZINC PLATED | 01023190 |
| 56 | 1/2" LOCK WASHER, ZINC PLATED | 01023192 |
| 57 | #8-32 x 1/2" RD H M/S, ZINC | 01023892 |
| 58 | 5/16" - 18 x 1" FLAT HD M/S | 01024370 |
| 59 | POLE MOUNTING BRACKET, MACH. | 45-05649 |
| 60 | ADJUSTABLE BRACKET, MACHINED | 45-06650 |
| 61 | HOUSING BRACKET, MACHINED | 45-05647 |
| 62 | SWIVEL BRACKET, MACHINED | 45-05648 |



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# COLOR LIGHT MODEL 45403
# PARTS BREAKDOWN





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# REPLACEMENT PARTS
# MODEL 45403 COLOR LIGHT

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | BODY, TRIANGULAR COLOR LIGHT, MACH. | 45-45005 |
| 2 | DOOR, TRIANGULAR COLOR LIGHT, MACH. | 45-45006 |
| 3 | BRACKET, TOP OF POLE MOUNTING | 45-45007 |
| 4 | TOP OF POLE MOUNTING BRK'T., MACH. | 45-09865 |
| 5 | BACKGROUND, TRIANGULAR COLOR LIGHT | 45-10037 |
| 6 | HOOD FOR 8-3/8" COLOR LIGHT | 45-10001 |
| 7 | LENS HOLDER, MACHINED | 45-05643 |
| 8 | LENS RETAINING RING, MACHINED | 45-05644 |
| 9 | 8-3/8" PLASTIC OUTER DBLT | 01450004 |
| 10 | LENS, RED 5-1/2" INTER DBLT | 01450007 |
| 11 | HINGE, MACHINED | 45-05645 |
| 12 | BULB HOLDER, MACHINED | 45-09665 |
| 13 | SOCKET - WIRED | 45-10027 |
| 14 | 5/16" U-BOLT | 51-01038 |
| 15 | 1/2" - 13 x 7" HH C/S, ZINC | 01021230 |
| 16 | RESISTOR (OPTION) | 01450048 |
| 17 | HALF POLE CLAMP | C-09965 |
| 18 | PEEP SIGHT ASM - 8-3/8" COLOR LIGHT | 45-10040 |
| 19 | LOCKING BRACKET FOR COLOR LIGHT | 45-10058 |
| 20 | STAINLESS STEEL PIN 3/8" x 3" | 45-10026 |
| 21 | BUSH,1/4" ID x 3/8" OD x 1/2" T | 45-10029 |
| 22 | 1/2" x 6-1/2" ALL THREAD STEEL ROD | 01025356 |
| 23 | BULB, 10V-18W | 01030031 |
| 24 | SCREEN VENT | 01510001 |
| 25 | SINGLE ROW TERMINAL BLOCK | 73108-01 |
| 26 | 5/16" STAINLESS-STEEL INSERT | 01025584 |
| 27 | GROMMET | 01450033 |
| 28 | REFLECTOR CLIP WITH PAD | 51-01009 |
| 29 | AAR WASHER | 73-10708 |
| 30 | 1/4" - 20 HEX NUT,ZINC PLATED | 01022890 |

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| 31 | 1/2" DIA. RUBBER CORD | 01010007 |
| 32 | 1/4" x 3/4" HH C/S ZINC PLATED | 01020030 |
| 33 | 1/4" - 20 x 1" CARRIAGE BOLT | 01020051 |
| 34 | 5/16" - 18 x 1-1/4" HH C/S, ZINC | 01020310 |
| 35 | 1/2" x 1-1/2" HH C/S, ZINC | 01021070 |
| 36 | 3/8" - 16 x 1" CARRIAGE BOLT | 01020552 |
| 37 | 3/8" - 16 x 1-1/4" HH C/S, ZINC | 01020560 |
| 38 | 5/8" x 1-1/4" HH C/S, ZINC | 01022890 |
| 39 | 1/4" - 20 JAM NUT STAINLESS-STL | 01022899 |
| 40 | 5/16" - 18 HEX NUT, ZINC PLATED | 01022900 |
| 41 | 3/8" - 16 HEX NUT, ZINC PLATED | 01022910 |
| 42 | 1/2" - 13 HEX NUT, ZINC PLATED | 01022930 |
| 43 | #8 INTERNAL STAR LOCK WASHER | 01023121 |
| 44 | 1/4" FLAT WASHER, ZINC PLATED | 01023150 |
| 45 | 1/4" LOCK WASHER, ZINC PLATED | 01023151 |
| 46 | 5/16" FLAT WASHER, ZINC PLATED | 01023160 |
| 47 | 5/16" LOCK WASHER, ZINC PLATED | 01023162 |
| 48 | 3/8" LOCK WASHER, ZINC PLATED | 01023171 |
| 49 | 1/2" FLAT WASHER, ZINC PLATED | 01023190 |
| 50 | 8 - 32 x 1/2" RD. H. M/S S/S | 01023891 |
| 51 | 10 - 32 x 1/2" RD. H. M/S S/S | 01023903 |
| 52 | 10 - 32 x 3/4" RD. H. M/S S/S | 01024121 |
| 53 | 10 - 32 x 3/4" RD. H. M/S S/S | 01024122 |
| 54 | 5/16" - 18 x 1 FLAT HD. S/M/S | 01024370 |
| 55 | TRUARC RETAINING RING | 01025583 |
| 56 | ADJUSTING ROD 1/4" x 2" S/S | 45-10009 |
| 57 | INS. SPC. 7/8" DIA. x 1/4"TK TX | 45-10018 |



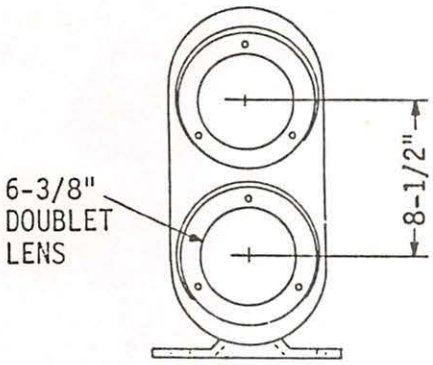
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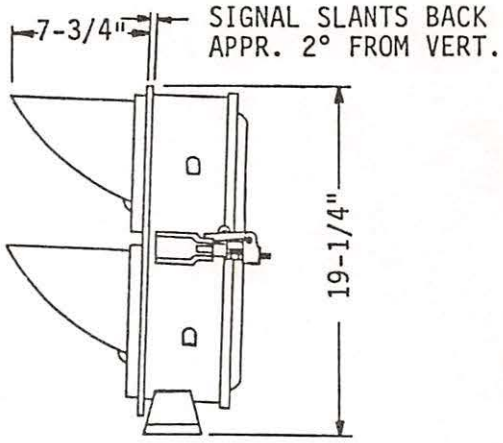
# DWARF COLOR LIGHTS



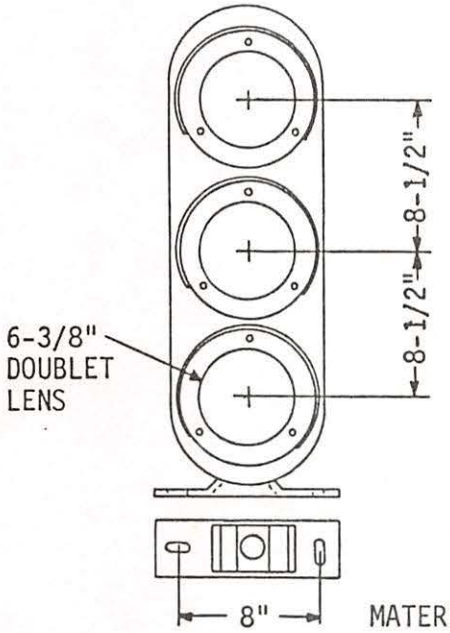
6-3/8" LENS

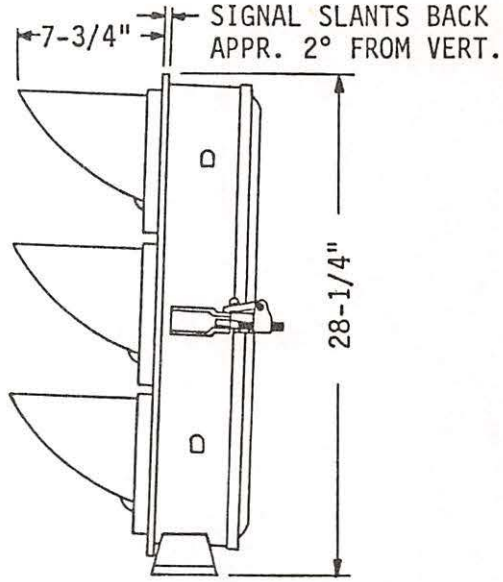
## 45102-01




## 45103-01




MATERIAL- (BOTH MODELS): ALL ALUMINUM CONSTRUCTION

WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | |
|---|---|---|
| 1. | MODEL | : 45102-01 (2-POSITION) _____ ; 45103-01 (3-POSITION) _____. |
| 2. | RESISTOR(S) | : YES _____ , QTY. _____ ; NO _____. |
| 3. | LENS SPEC. | : 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. | : _____ VOLTS , _____ WATTS. |
| 5. | ASPECT | : TOP _____ ; MIDDLE _____ ; BOTTOM _____. |

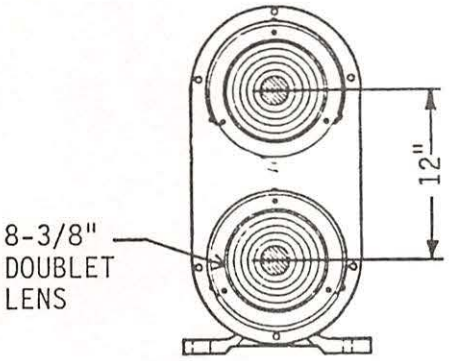
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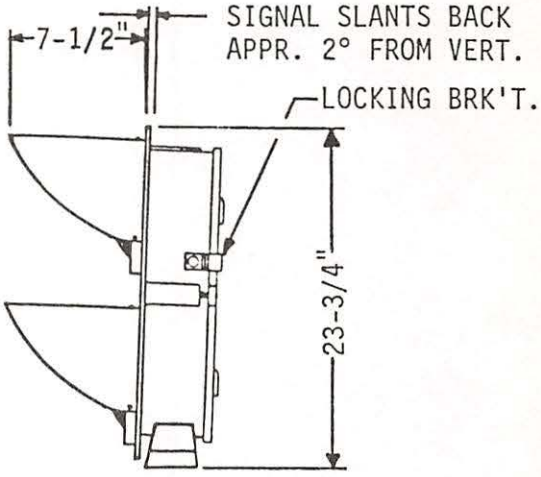
# DWARF COLOR LIGHTS



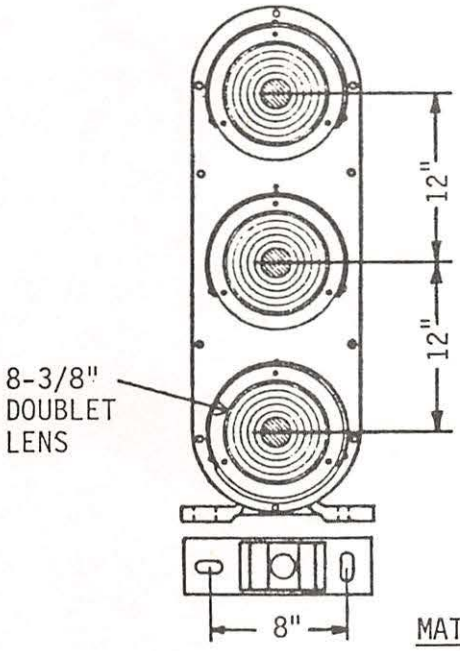
8-3/8" LENS

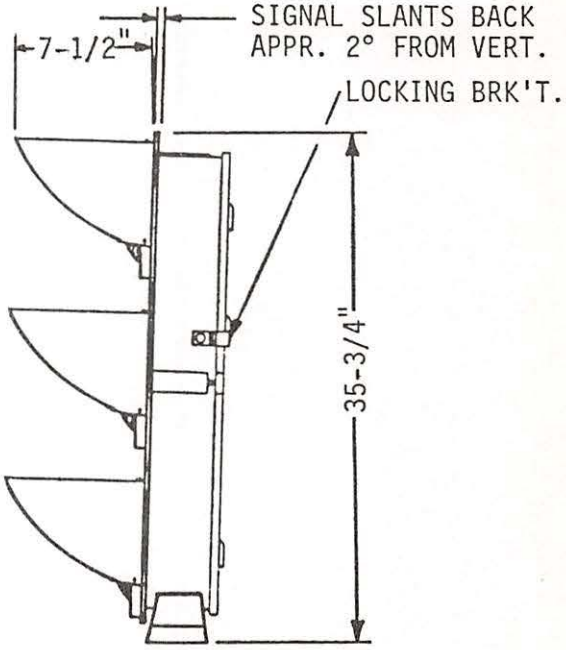
## 45202-01




## 45203-01



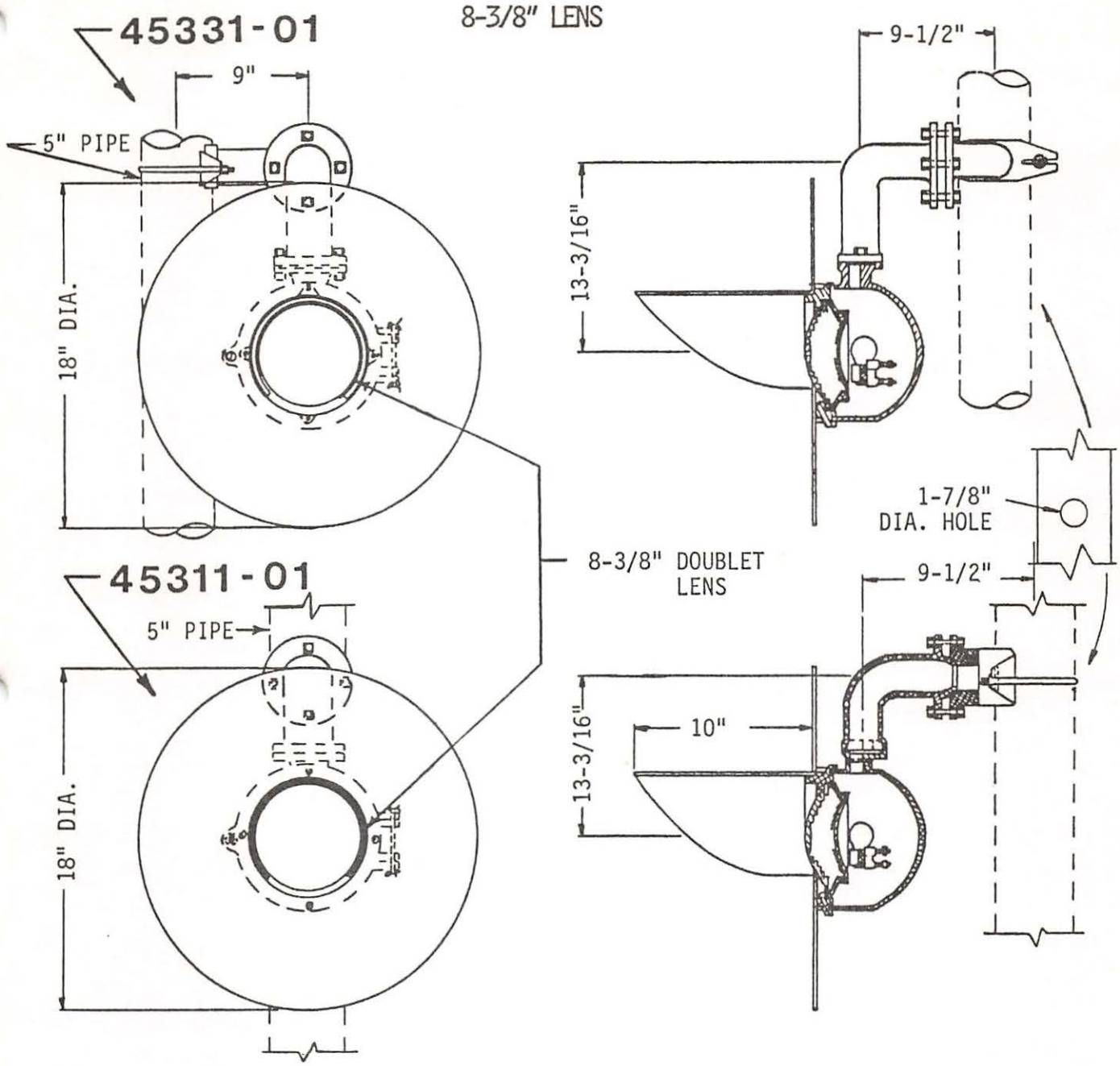

MATERIAL (BOTH MODELS): ALL ALUMINUM CONSTRUCTION

WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | MODEL | : | 45202-01 (2-POSITION) _____ ; 45203-01 (3-POSITION) _____. |
| 2. | RESISTOR(S) | : | YES _____, QTY. _____ ; NO _____. |
| 3. | LENS SPEC. | : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 4. | LAMP SPEC. | : | _____ VOLTS , _____ WATTS. |
| 5. | ASPECT | : | TOP _____ ; MIDDLE _____ ; BOTTOM _____. |

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# MARKER LIGHT SIGNALS

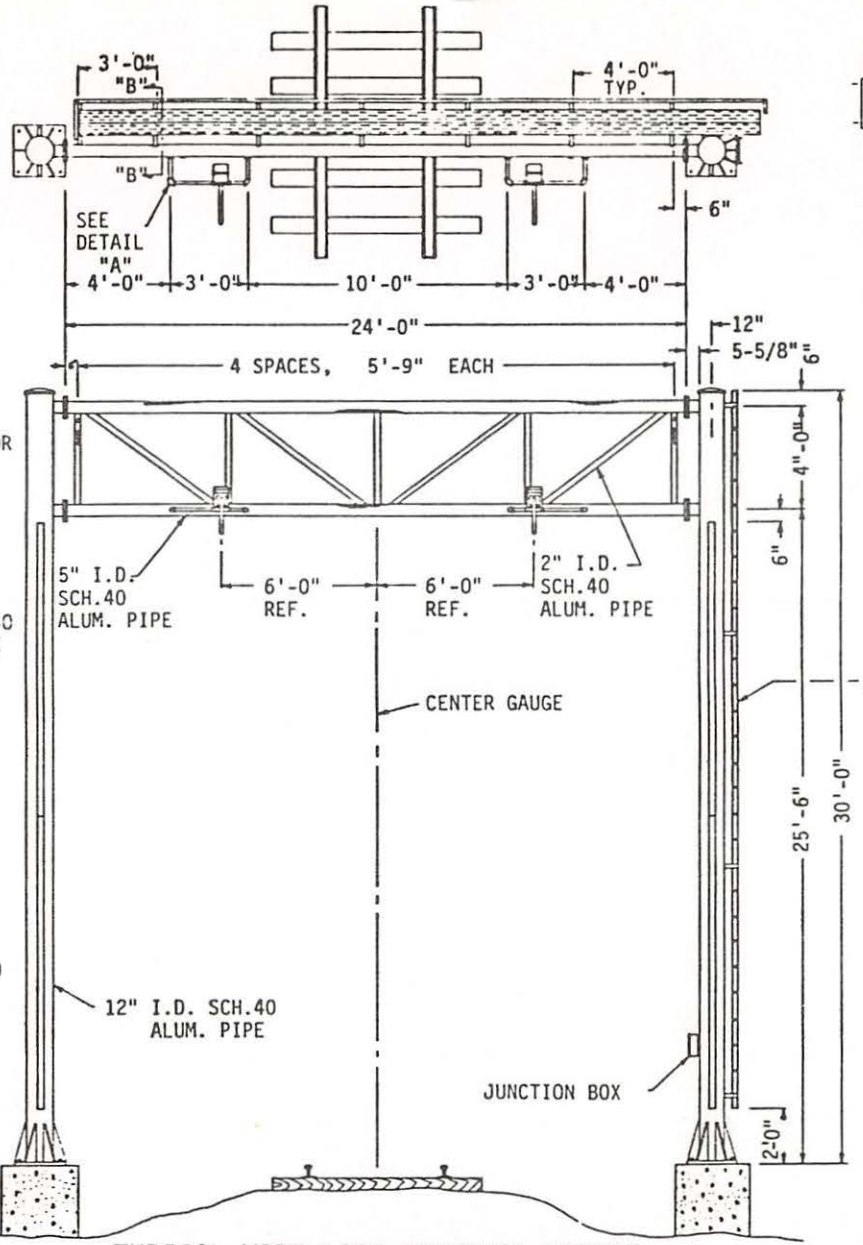



MATERIAL : ALL ALUMINUM CONSTRUCTION

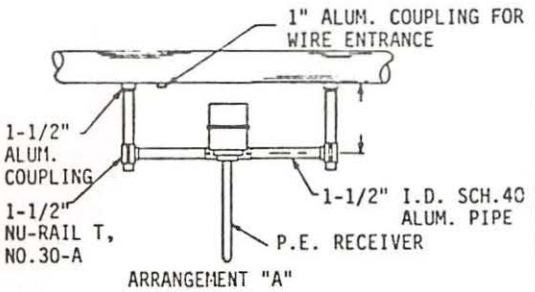
WHEN ORDERING, PLEASE SPECIFY THE FOLLOWING.

| | |
|---|---|
| 1. MODEL : | 45331-01 (SIDE MTG.) _____ ; 45311-01 (FRONT MTG.) _____. |
| 2. LENS SPEC. : | 0° PLAIN _____ ; 40° BULLS-EYE _____ ; 30° SPREAD _____. |
| 3. LAMP SPEC. : | _____ VOLTS , _____ WATTS. |
| 4. ASPECT : | _____. |

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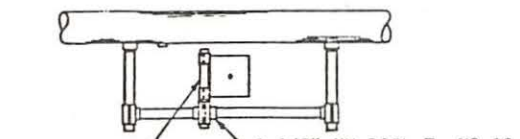



TYPICAL WIDE LOAD DETECTOR BRIDGE
FOR SINGLE TRACK



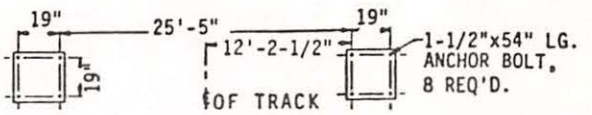

ARRANGEMENT "A"

DETAIL "A"

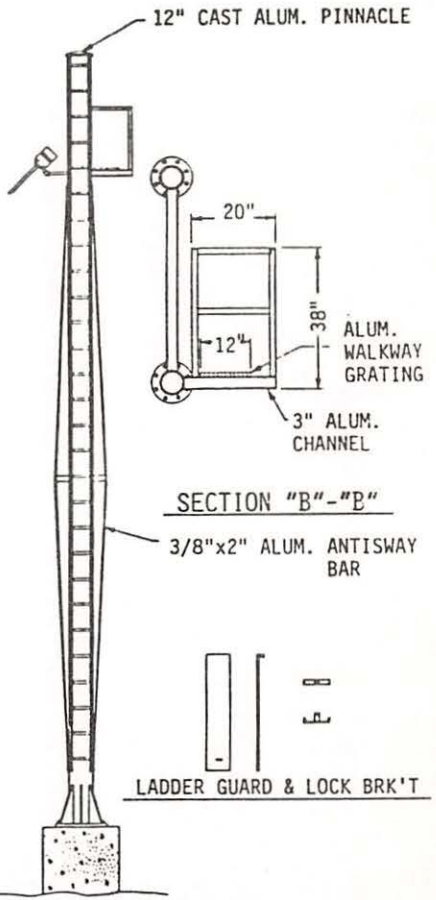



ARRANGEMENT "B"

NOTE: 1. P.E. RECEIVER CAN BE MOUNTED IN EITHER POSITION SHOWN BY ABOVE DETAILS.
2. ALL MOUNTING HARDWARE WILL BE SUPPLIED FOR BOTH ARRANGEMENTS.




FOUNDATION BOLT PLAN




SECTION "B"-"B"



LADDER GUARD & LOCK BRK'T

NOTES: 1. BRIDGE PARTS ARE NUMBERED FOR EASE OF ASSEMBLY.
2. P.E. RECEIVER NOT SUPPLIED.

3-C-1

* CUSTOM DESIGNS TO MEET YOUR SPECIFIC REQUIREMENTS; AVAILABLE UPON REQUEST.

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# INSTRUMENT CASES

## GENERAL INFORMATION

Modern Industries Instrument Cases are manufactured in accordance with AAR specifications and are stocked in the sizes shown on AAR Drawing #1601B. Other sizes are available as shown. Special sizes and/or arrangements will be manufactured to meet your requirements.

Case construction can be of aluminum, steel, or Corten® steel. Aluminum instrument cases are constructed of .100 aluminum sheeting. Steel and Corten® steel cases are constructed of 12 and 14 gauge steel.

All doors are manufactured with a 3-point latching device and both front and rear doors have two (2) sets of screened louvers for ventilation. Provided with the louvers are winter close-off plates and dust filters. Doors are also equipped with lubricated hinge fittings and doors are completely removable when open. Hooks are provided to hold doors open at 120 degree position. All doors are manufactured with hammer fold edges for a much better seal against rain and dust. Door handles are designed to accept padlocks.

All cases are provided with lifting eyes and a 15 degree slant in the bottom of door sill to prevent water from standing. Cases are also equipped with a full length, exterior grade, 3/4" plywood backboard. Wood or steel shelves are available and are adjustable in increments of 2-3/16". Two (2) aerial cable openings are provided on each side of case, complete with cover plates. One (1) aerial cable casting is furnished. Maximum number of 4-3/4" underground cable knockouts are provided. The bottom of the case has an angle iron base for maximum strength and support.

Steel cases are painted with a primer and finished with aluminum paint on the exterior, and gray paint on the interior, or as specified. Aluminum and Corten® steel cases are finished the same as the steel on the interior, but are unfinished on the exterior. The outermost surface of the Corten® steel oxidizes, providing a natural protective finish for the exterior of the case. The steel and Corten® steel cases are black mastic undercoated.

Interior of case can be lined with 1/2" Celotex®, 1" Thermax®, and 2" Thermax® if desired. Shelves can be furnished for shelf type relays as well as relay bars for "B" or "PN" plug type relays. Cases can also be furnished with rubber matting and/or battery trays.

Cases are arranged for external mountings, and smaller cases are available for pipe post, concrete post, or wood post mountings.

Factory wired cases are available. Complete engineering and design services can be provided.

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# INSTRUMENT CASES

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Cases are arranged for external mountings, and smaller cases are available for pipe post, concrete post, or wood post mountings.

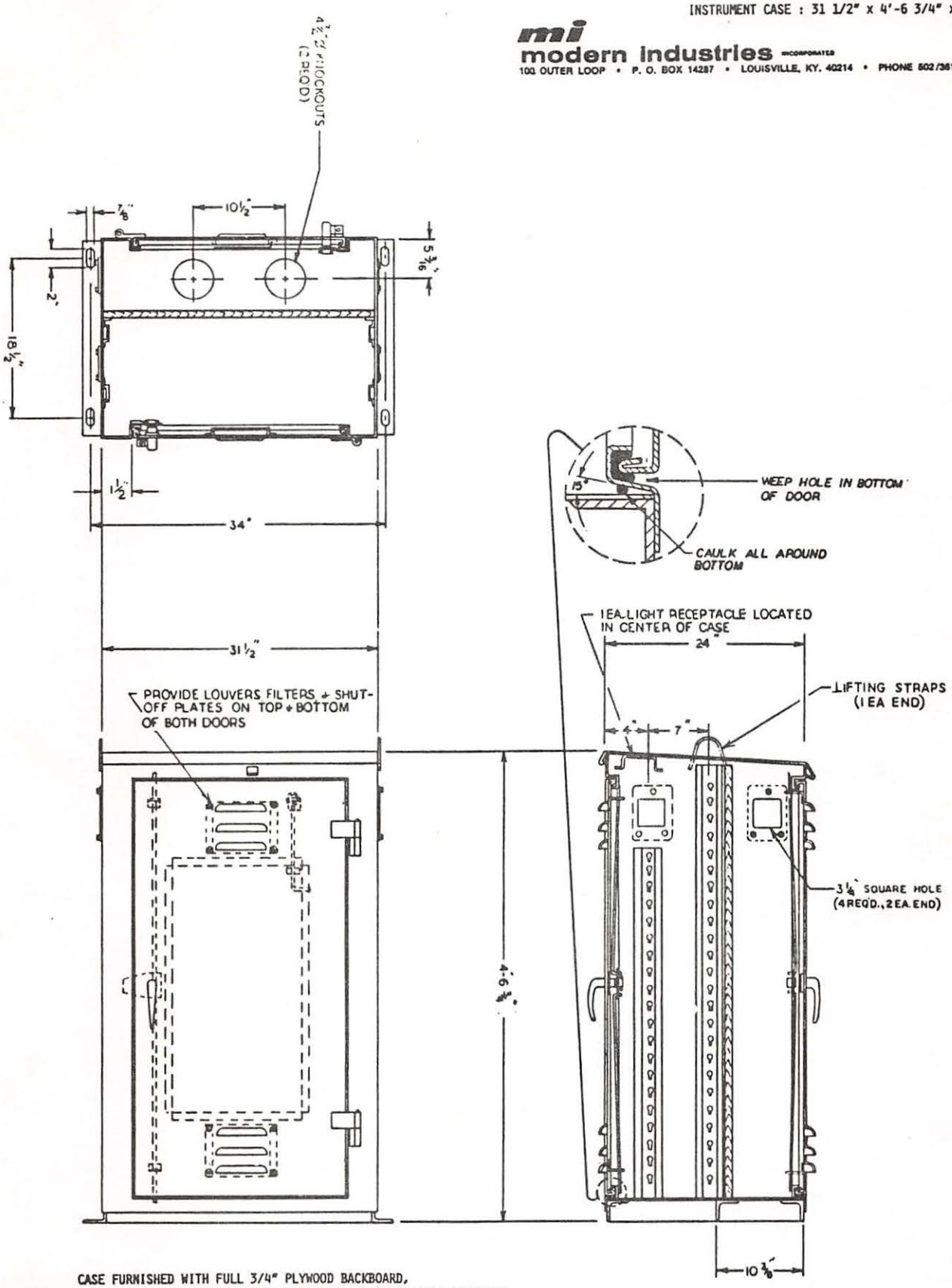
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MANUFACTURERS OF RAILROAD EQUIPMENT

INSTRUMENT CASE : 31 1/2" x 4'-6 3/4" x 24"

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CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

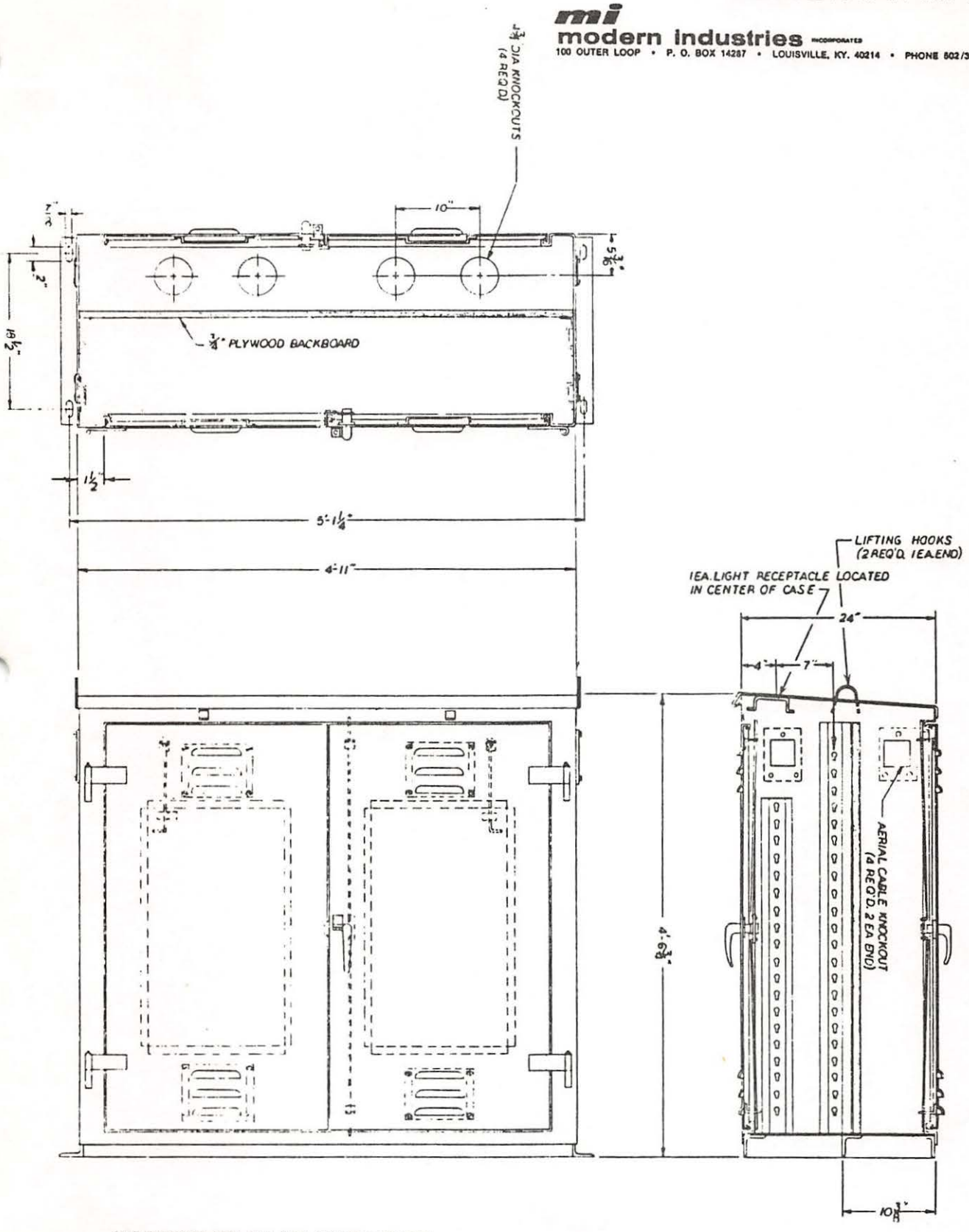
FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300650 |
| 12 GA. STEEL | 301650 |
| 14 GA. CORTEN | 302650 |
| .100" ALUMINUM | 303650 |

MANUFACTURERS OF RAILROAD EQUIPMENT

INSTRUMENT CASE : 4'-11" x 4'-6 3/4" x 24"

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CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

59

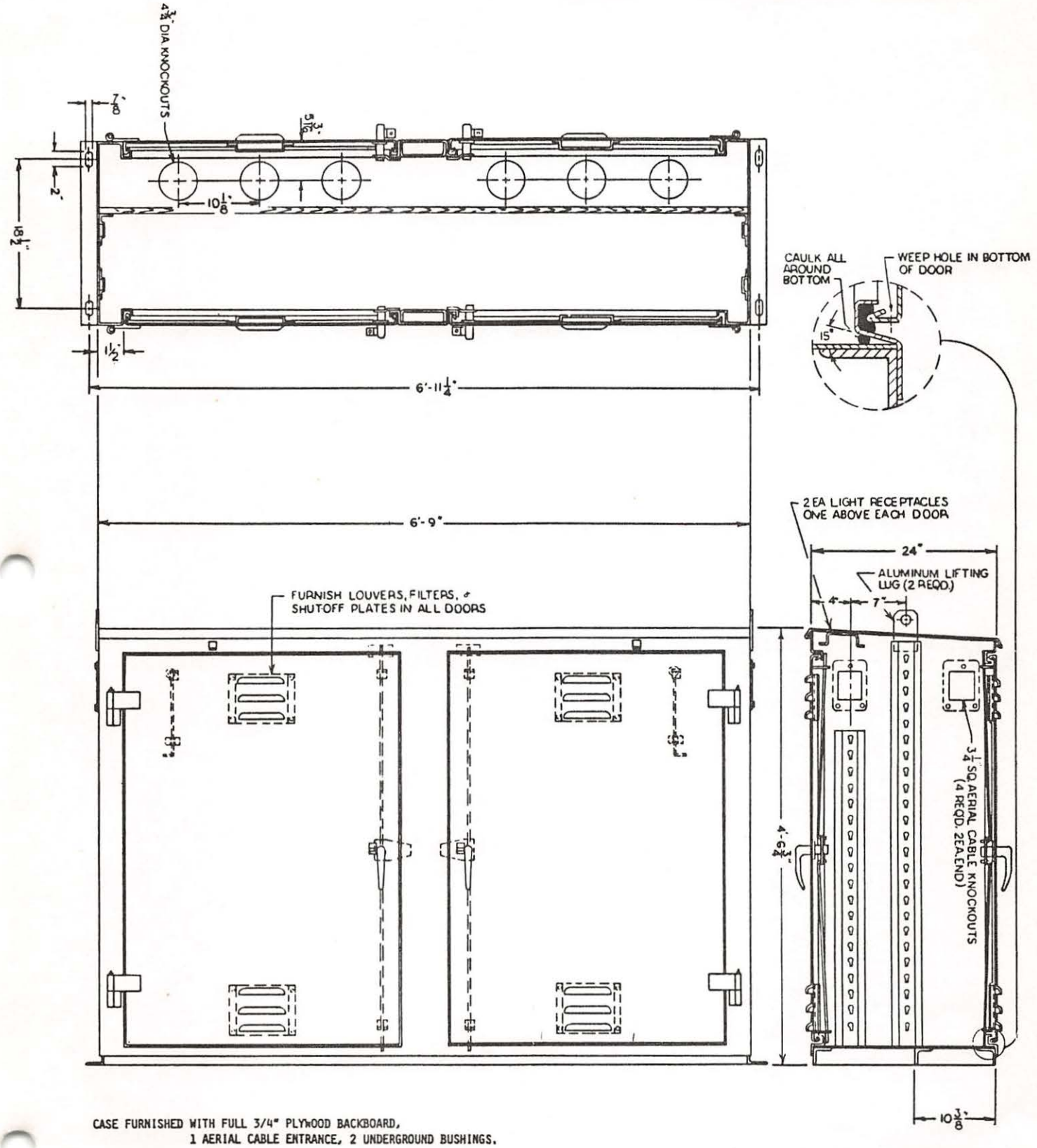
FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300651 |
| 12 GA. STEEL | 301651 |
| 14 GA. CORTEN | 302651 |
| .100" ALUMINUM | 303651 |

MANUFACTURERS OF RAILROAD EQUIPMENT

INSTRUMENT CASE : 6'-9" x 4'-6 3/4" x 24"

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100 OUTER LOOP • P. O. BOX 14287 • LOUISVILLE, KY. 40214 • PHONE 502/361-1113




CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

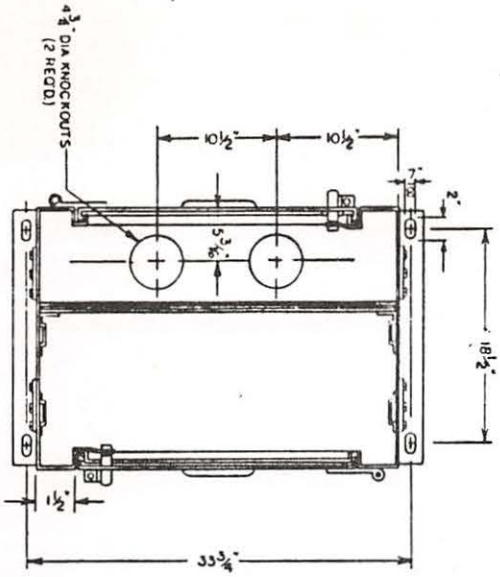
FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300652 |
| 12 GA. STEEL | 301652 |
| 14 GA. CORTEN | 302652 |
| .100" ALUMINUM | 303652 |

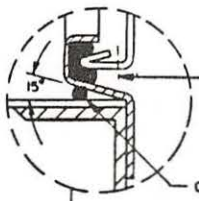
MANUFACTURERS OF RAILROAD EQUIPMENT

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INSTRUMENT CASE : 31 1/2" x 6'-3 3/8" x 24"




NOTE:
15° SLANT FOR WATER DRAINAGE ONLY.







CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

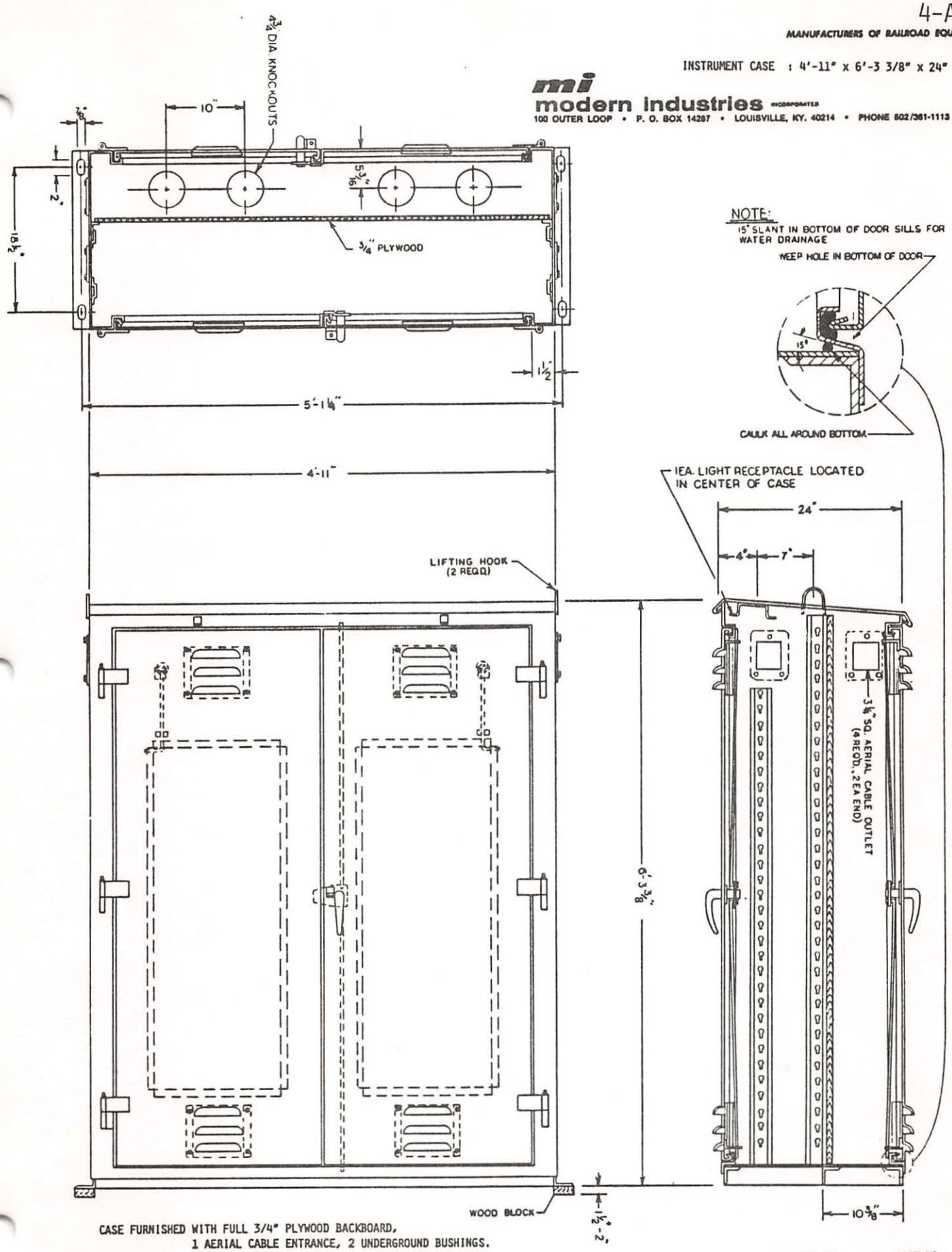
FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300653 |
| 12 GA. STEEL | 301653 |
| 14 GA. CORTEN | 302653 |
| .100" ALUMINUM | 303653 |

MANUFACTURERS OF RAILROAD EQUIPMENT

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INSTRUMENT CASE : 4'-11" x 6'-3 3/8" x 24"




CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

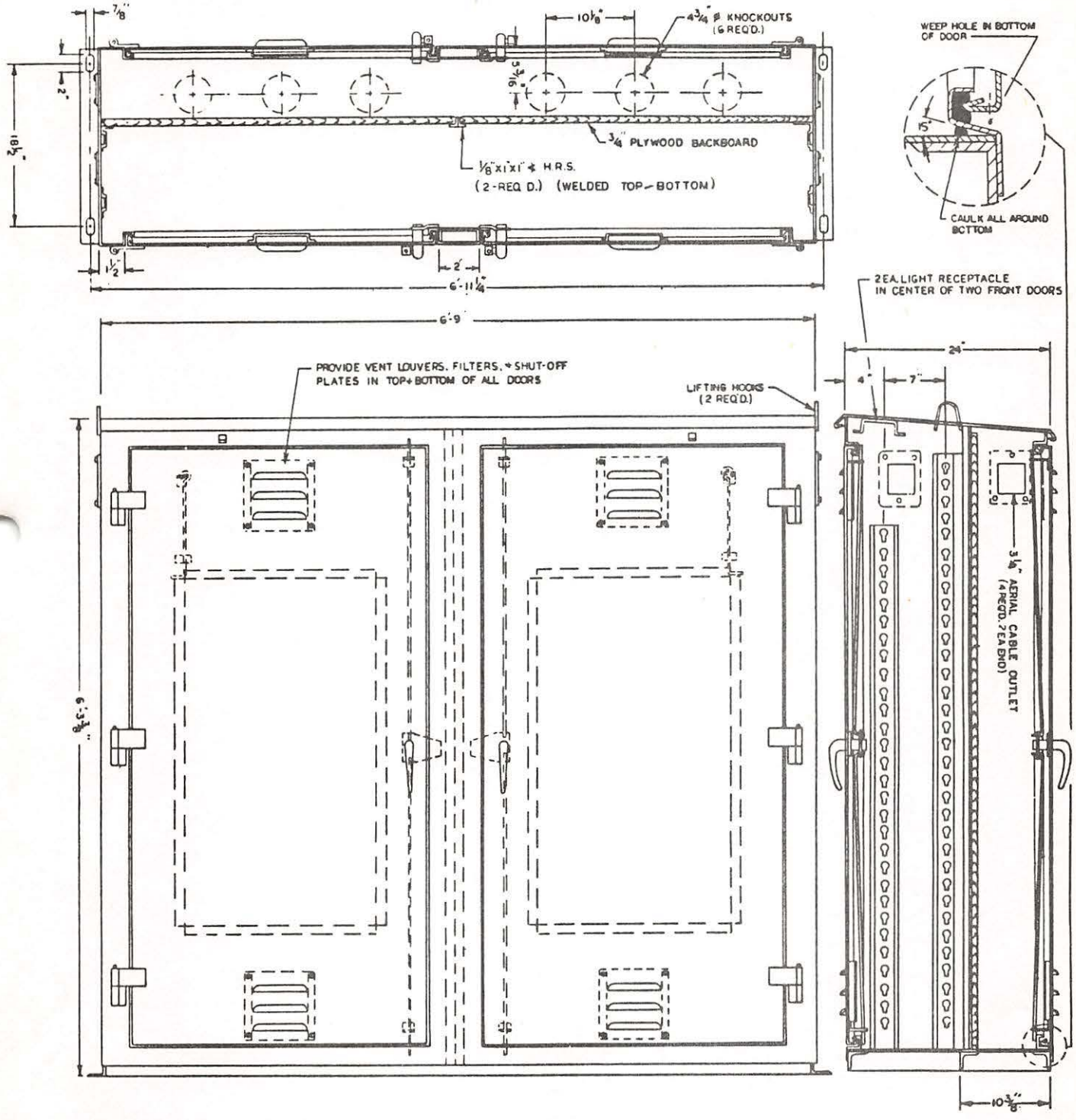
| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300654 |
| 12 GA. STEEL | 301654 |
| 14 GA. CORTEN | 302654 |
| .100" ALUMINUM | 303654 |

MANUFACTURERS OF RAILROAD EQUIPMENT

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INSTRUMENT CASE : 6'-9" x 6'-3 3/8" x 24"

NOTE:
15° SLANT IN BOTTOM OF DOOR ONLY FOR WATER DRAINAGE



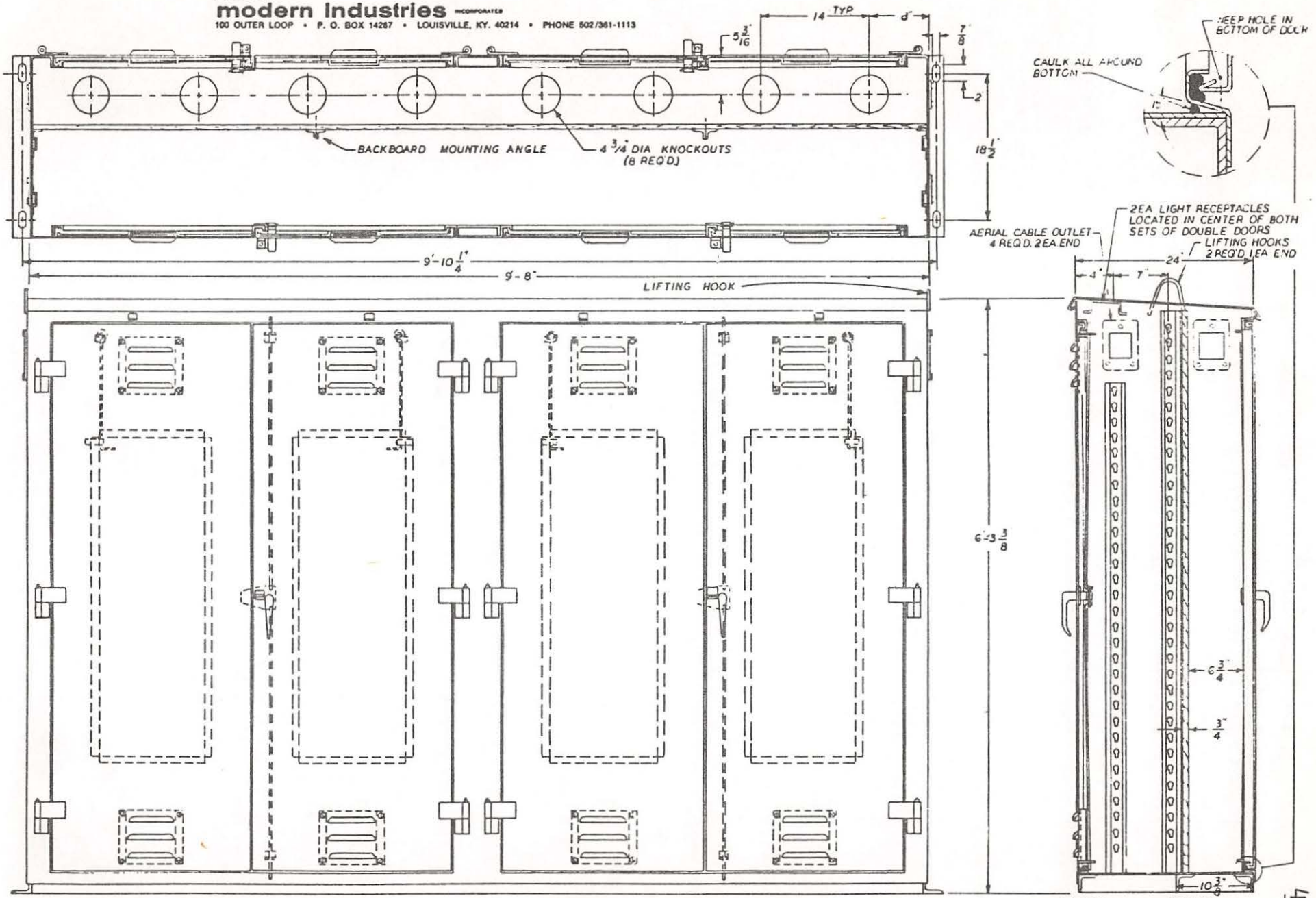

CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300655 |
| 12 GA. STEEL | 301655 |
| 14 GA. CORTEN | 302655 |
| .100" ALUMINUM | 303655 |

INSTRUMENT CASE : 9'-8" x 6'-3 3/8" x 24"

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CASE FURNISHED WITH FULL LENGTH 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND CABLE BUSHINGS.

FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

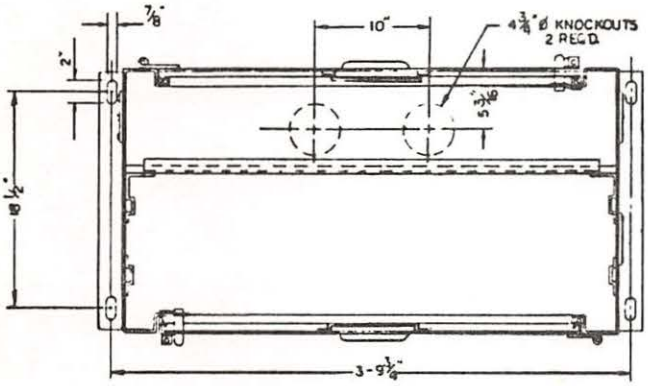
| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300656 |
| 12 GA. STEEL | 301656 |
| 14 GA. CORTEN | 302656 |
| .100" ALUMINUM | 303656 |

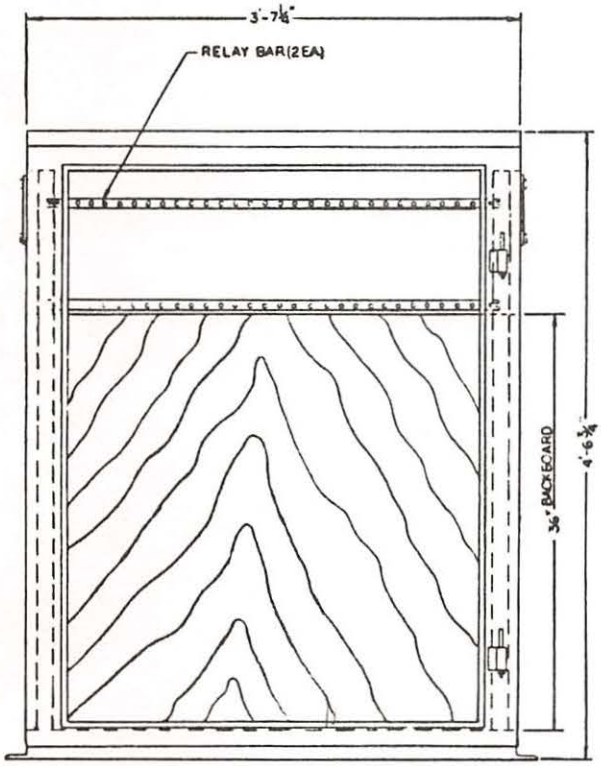
4-A-8

MANUFACTURERS OF RAILROAD EQUIPMENT

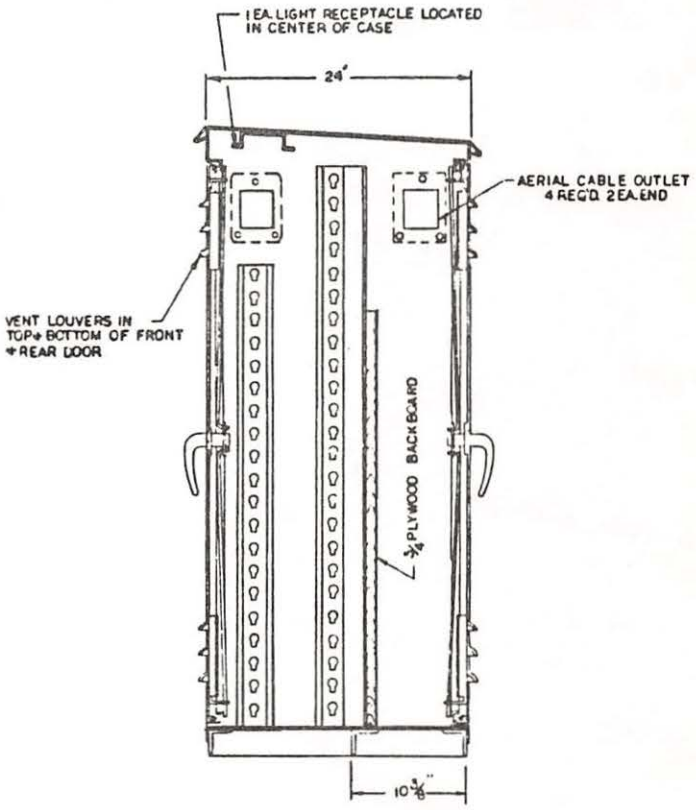
INSTRUMENT CASE : 3'-7 1/4" x 4'-6 3/4" x 24"

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FRONT VIEW WITH DOOR REMOVED




CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

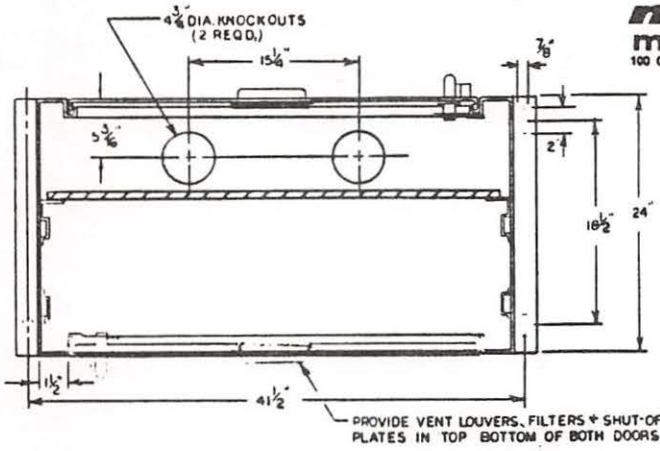
FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

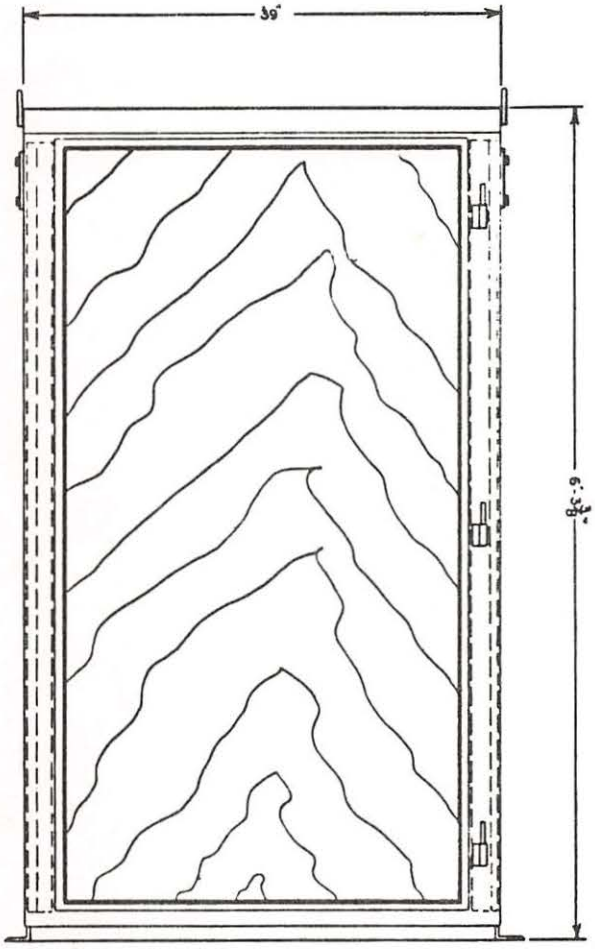
| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300657 |
| 12 GA. STEEL | 301657 |
| 14 GA. CORTEN | 302657 |
| .100" ALUMINUM | 303657 |

MANUFACTURERS OF RAILROAD EQUIPMENT

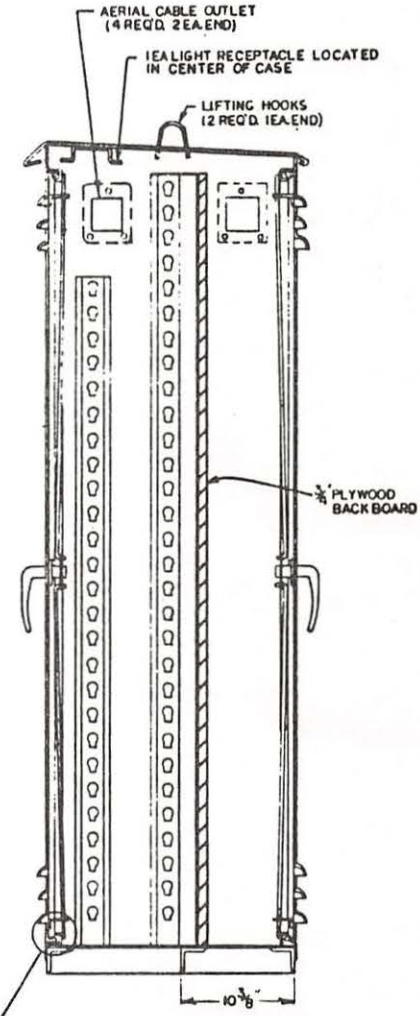
INSTRUMENT CASE : 39" x 6'-3 3/8" x 24"

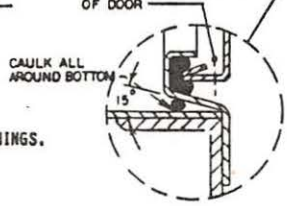
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FRONT VIEW W/DOORS REMOVED




CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300658 |
| 12 GA. STEEL | 301658 |
| 14 GA. CORTEN | 302658 |
| .100" ALUMINUM | 303658 |

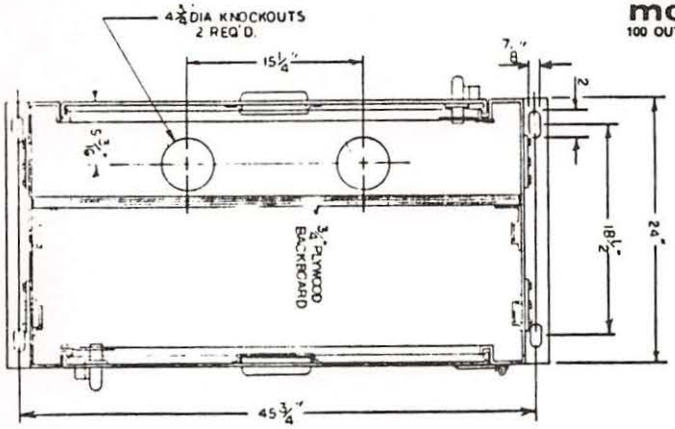
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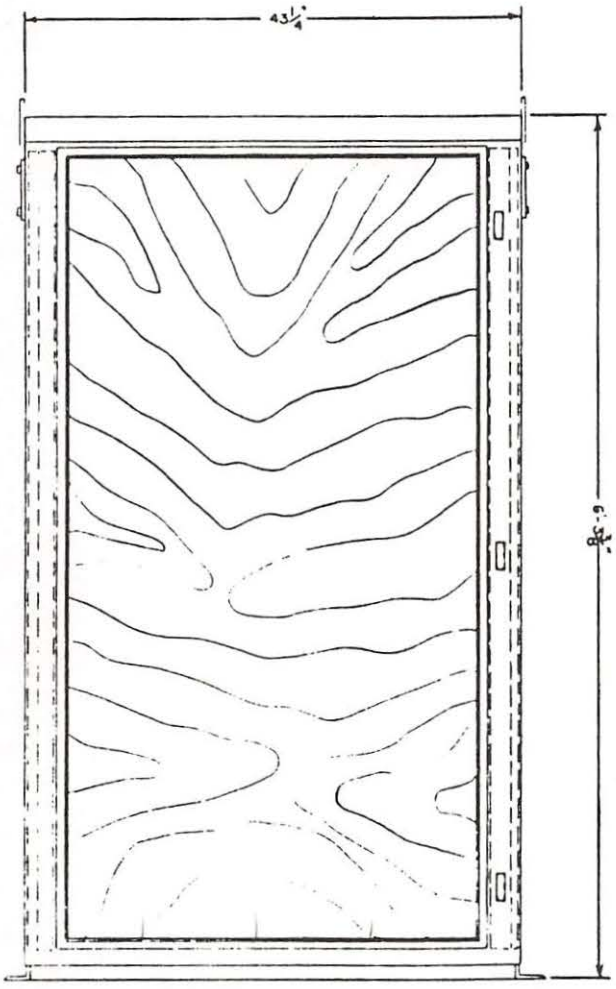
3

MANUFACTURERS OF RAILROAD EQUIPMENT

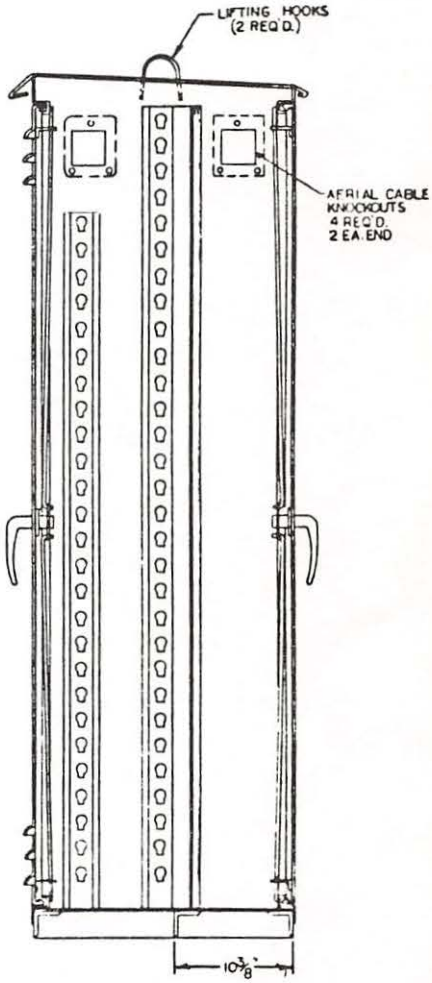
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INSTRUMENT CASE : 43 1/4" x 6'-3 3/8" x 24"




FRONT VIEW WITH DOOR REMOVED




CASE FURNISHED WITH FULL 3/4" PLYWOOD BACKBOARD,
1 AERIAL CABLE ENTRANCE, 2 UNDERGROUND BUSHINGS.

FINISH:
INTERIOR - GRAY ENAMEL
EXTERIOR - 14 GA. STEEL - ALUMINUM ENAMEL
12 GA. STEEL - ALUMINUM ENAMEL
14 GA. CORTEN - NONE
.100" ALUMINUM - NONE

| MATERIAL | PART NO. |
|---|---|
| 14 GA. STEEL | 300659 |
| 12 GA. STEEL | 301659 |
| 14 GA. CORTEN | 302659 |
| .100" ALUMINUM | 303659 |

# INSTRUMENT HOUSE

## GENERAL INFORMATION

Modern Industries Instrument Houses can be constructed of aluminum, steel, or Corten® steel, all welded construction, and are available in sizes from 5' X 5' to 10' X 40', all with a 7'-6" inside clearance. Special sizes and/or arrangements will be manufactured to meet your requirements.

All doors are manufactured with a 3-point latching device. All exterior doors have two (2) sets of screened louvers for ventilation. Provided with the louvers are winter close-off plates and dust filters. Doors are also equipped with lubricated hinge fittings and doors are completely removable when open. Hooks are provided to hold doors open at 90 and/or 180 degree position(s). All doors are manufactured with hammer fold edges for a much better seal against rain and dust. Door handles are designed to accept padlocks.

The walls are constructed of interlocking panels in two (2) foot sections with all seams sealed. Inside walls have vertical angles with punched key holes for mounting shelf brackets, mounting boards, wire chase, and/or tag boards.

Also provided with the instrument house are overhead lighting fixtures. Either incandescent or fluorescent are available. A switch and duplex outlet are located by the entrance door.

Houses can be furnished with plywood or metal shelves, with plywood or plastic wire ways, swing, and/or stationary racks for plug-in relays. If additional ventilation is required, special fans and ventilators can be provided. Heating and air conditioning systems are also available, as well as battery trays, rubber floor matting, and built-in telephone booths.

Aerial cable openings are provided on each side of house, complete with cover plates and two (2) aerial cable castings. Any number of 4-3/4" diameter underground cable knockouts can be provided.

Each house is furnished with one (1), two (2), three (3), or four (4), chimney vent(s). The number furnished is dependent upon the size of the house. Vents are equipped with insect proof vent caps. Removal of the vent caps allows a chain to be fastened to a lifting bar for hoisting the instrument house.

Aluminum instrument houses are constructed of .100 aluminum sheeting. Steel and Corten® steel houses are constructed of 12 and 14 gauge steel.

Steel houses are primed inside and out and finished with aluminum paint on the exterior, and gray paint on the interior. Aluminum and Corten® steel houses are finished inside, but are unfinished on the exterior. The outermost surface of the Corten® steel oxidizes, providing a natural abrasion resistance finish on the exterior of the house. Special paint can be provided to meet your specifications.

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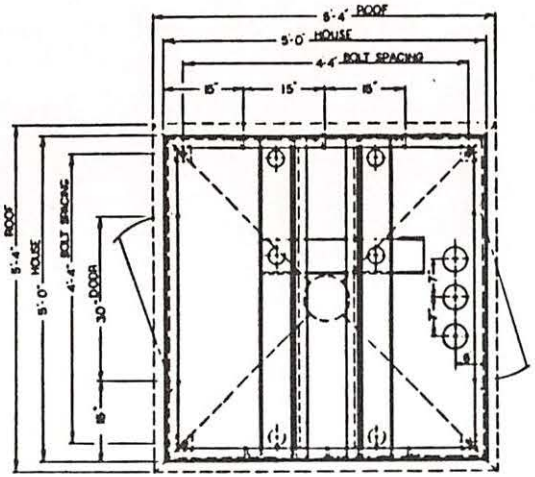
The interior of the house can be lined with 1/2" Celotex ® , or 1" or 2" high efficiency Thermax ® insulation.

Houses can be furnished prewired complete with relays, control and indication systems, communication equipment, and local control panels per your specifications and engineering.

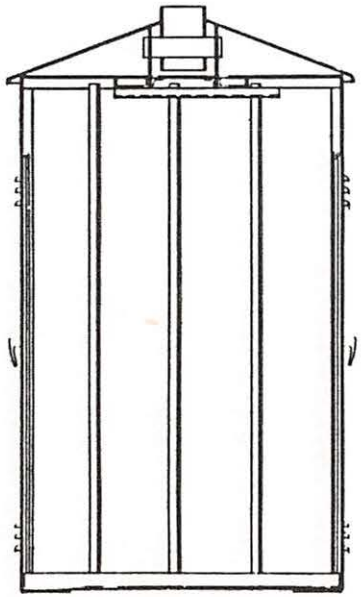
When ordering, please specify size of house wanted, construction, insulation, equipment or accessory items desired, location of doors, and if at all possible, please furnish drawing of house.

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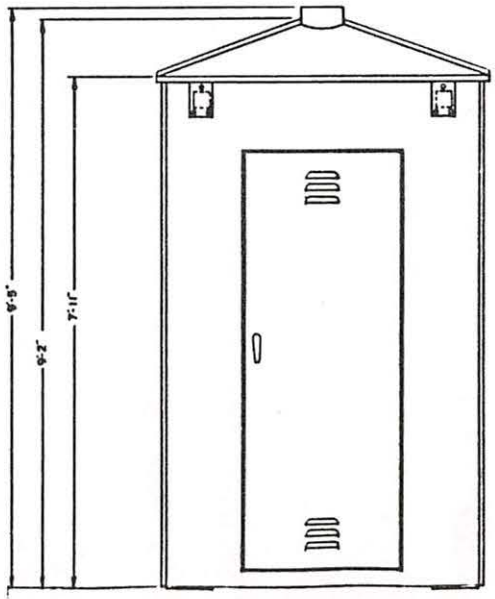
# TYPICAL
# 5′ x 5′
# INSTRUMENT HOUSE




TOP VIEW



FRONT VIEW




RIGHT END VIEW

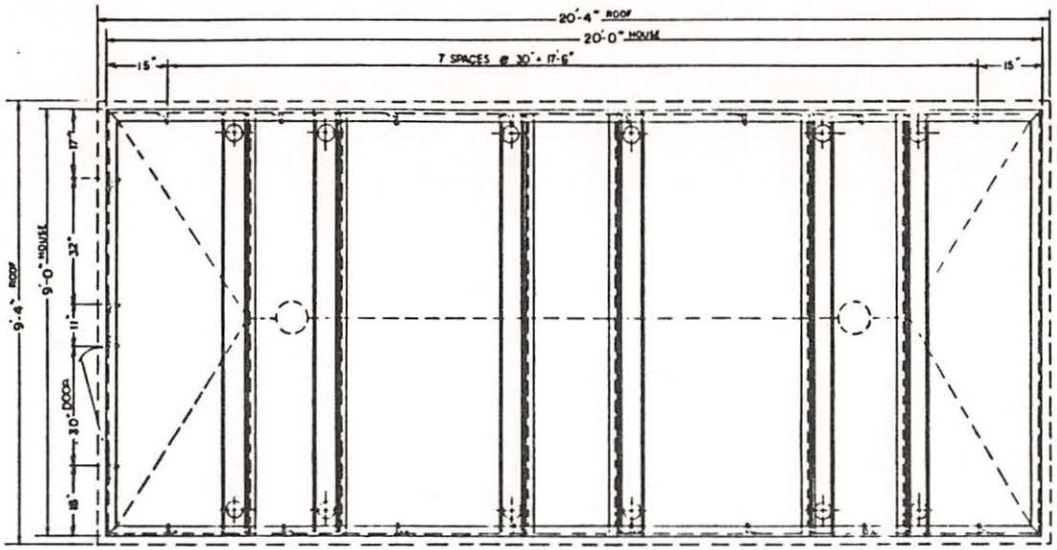

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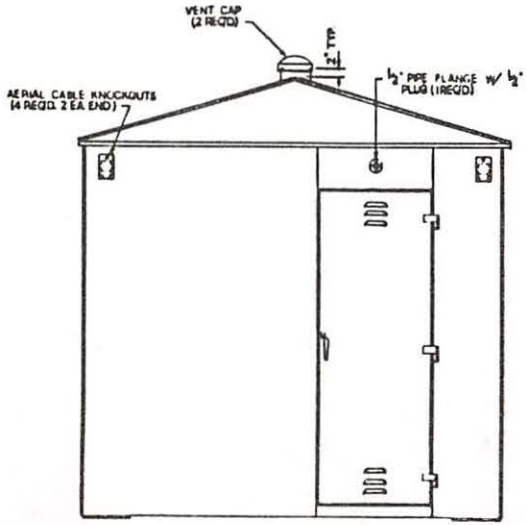
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TYPICAL

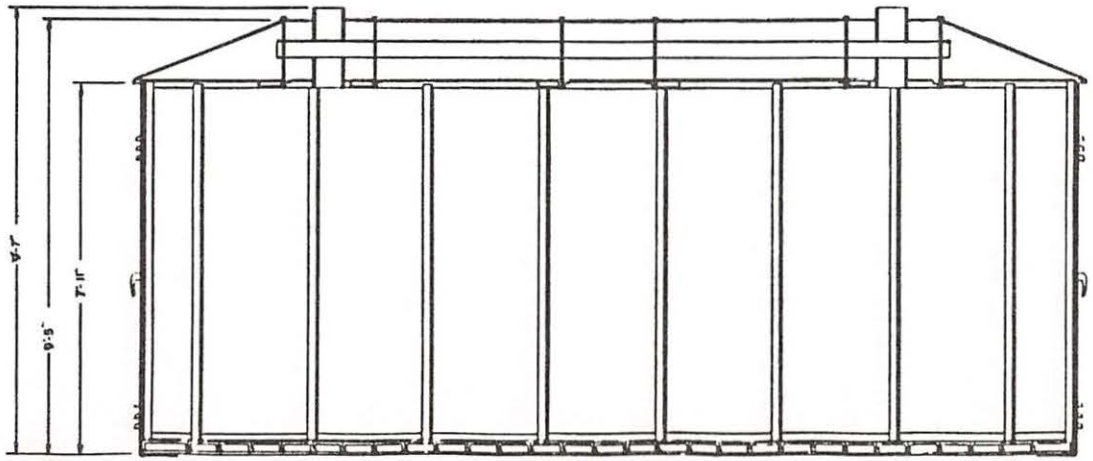
9′ x 20′

INSTRUMENT HOUSE



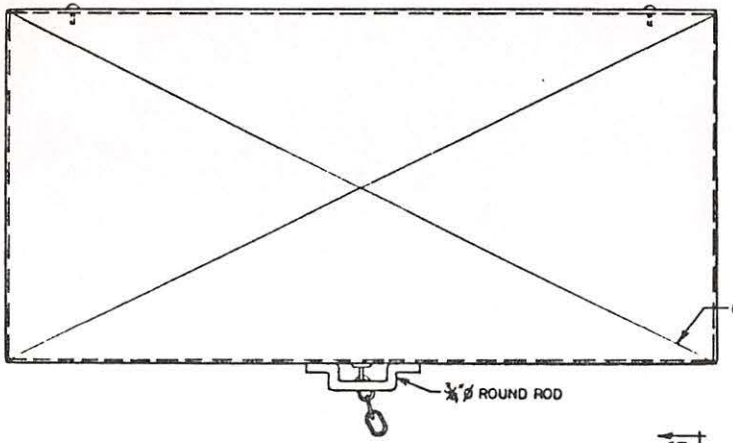

LEFT END VIEW

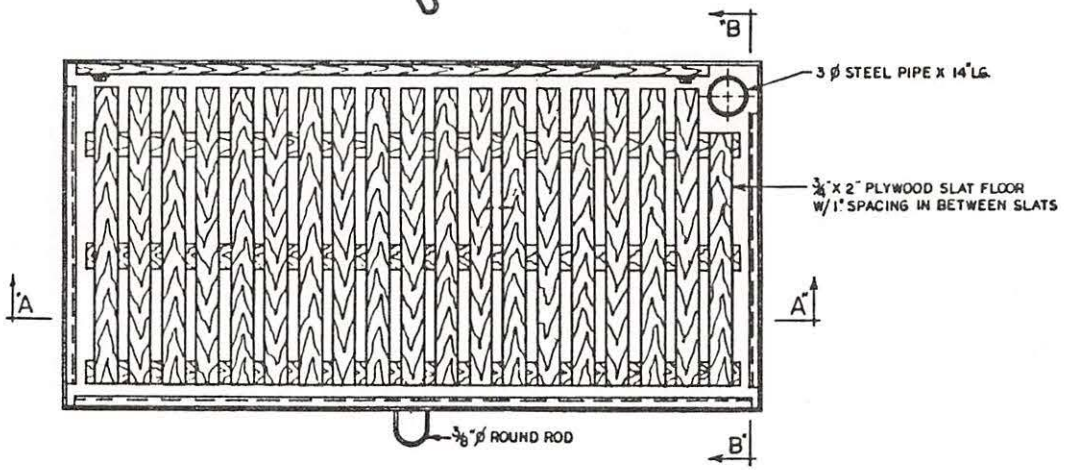



FRONT VIEW

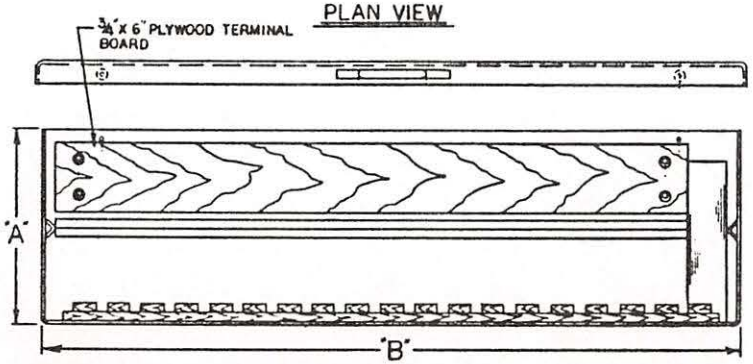

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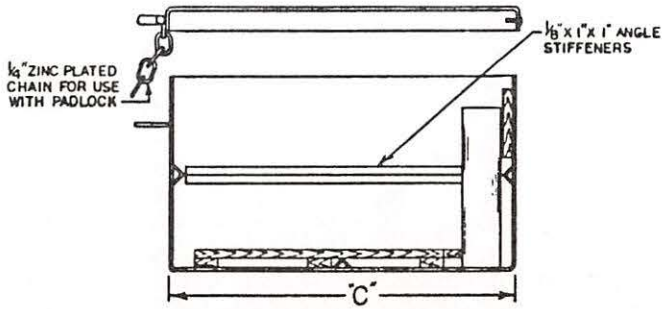



PLAN VIEW




SECTION "A-A"




SECTION "B-B"

| DIM. | "A" | "B" | "C" |
|---|---|---|---|
| BOX NO.1 | 24" | 45" | 23-1/2" |
| BOX NO.2 | 17" | 62" | 30-1/2" |
| BOX NO.3 | 24" | 36" | 36" |
| BOX NO.4 | 28" | 36" | 36" 600 |

ANY SIZE AVAILABLE UPON REQUEST.

SPECS:
1. CONSTRUCTION: 12 GA. STEEL
2. FINISH: HOT DIPPED GALV.
3. INTERIOR: PAINTED W/ACID RESISTANT PAINT

OPTIONS:
1. FROST COVER
2. EXTRA TERMINAL BOARD
3. 1/2" INSULATION
4. VENTS

| | |
|---|---|
| MODERN INDUSTRIES INCORPORATED LOUISVILLE, KY | |
| BATTERY BOX (SALES DWG.) | |
| DWN: J. BARNES | PART NO. |
| APP: | |
| SCALE: 1½" = 1'-0" | DWG NO. LC300193 |
| DATE: 11-23-83 | |

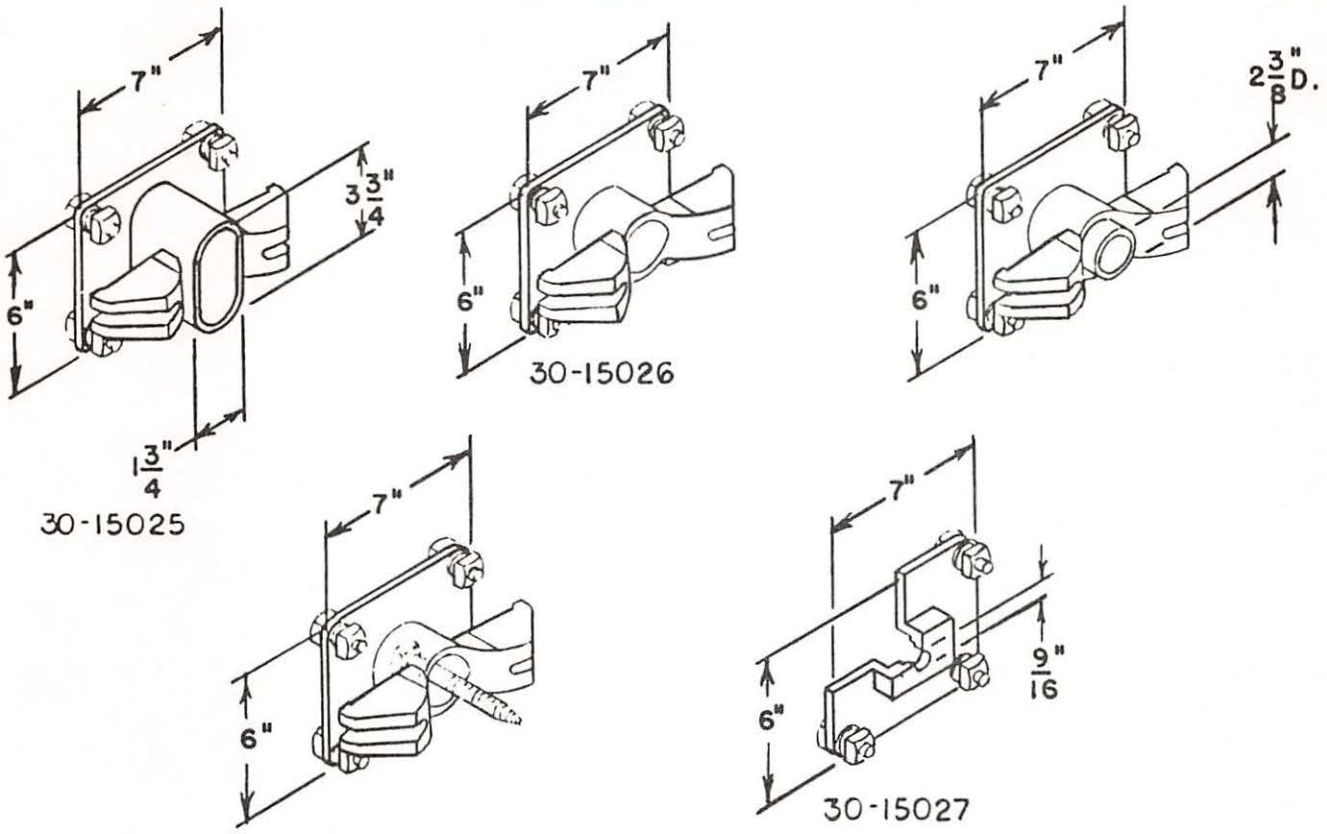
4-E-1

22

21'-10"
W

BRUNING 40.21 49973 1

# INSTRUMENT CASES
# MOUNTING BRACKETS



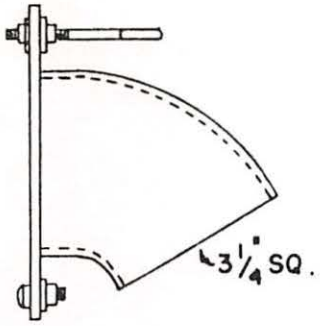

(ORDER BY PART NUMBER & DESCRIPTION)

| PART NO. | DESCRIPTION |
|---|---|
| 30-15025 | CASE TO 4"-10" PIPE, WITH 2"X4" OVAL ENTRANCE HOLE |
| 30-15026 | CASE TO 4"-10" PIPE WITH NO ENTRANCE HOLE |
| | CASE TO 4"-10" PIPE; 2 1/2" RD. ENTRANCE HOLE |
| | CASE TO WOOD POLE, NO ENTRANCE HOLE |
| 30-15027 | CASE TO WALL OR CONC. POLE, NO ENT. HOLE. |
| | |
| | |
| | |
| | |
| | |

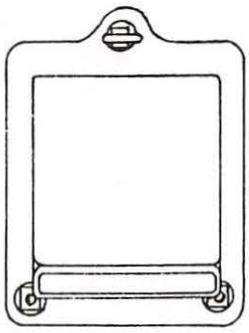
WHEN ORDERING PIPE MOUNTING BRACKET, SPECIFY PIPE SIZE SO PROPER SIZE "U" BOLT WILL BE FURNISHED.

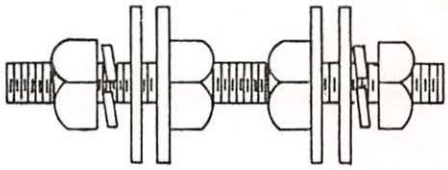
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# INSTRUMENT CASES
# ACCESSORIES

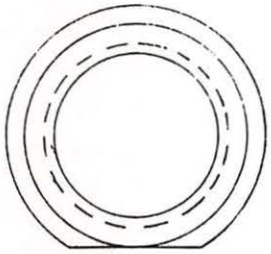



31-11320



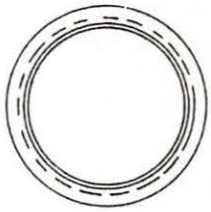


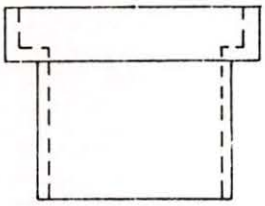
30-11302



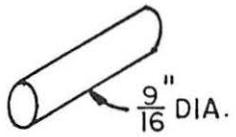


01310032

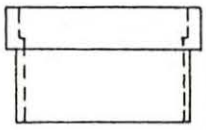




C-11324




01010020



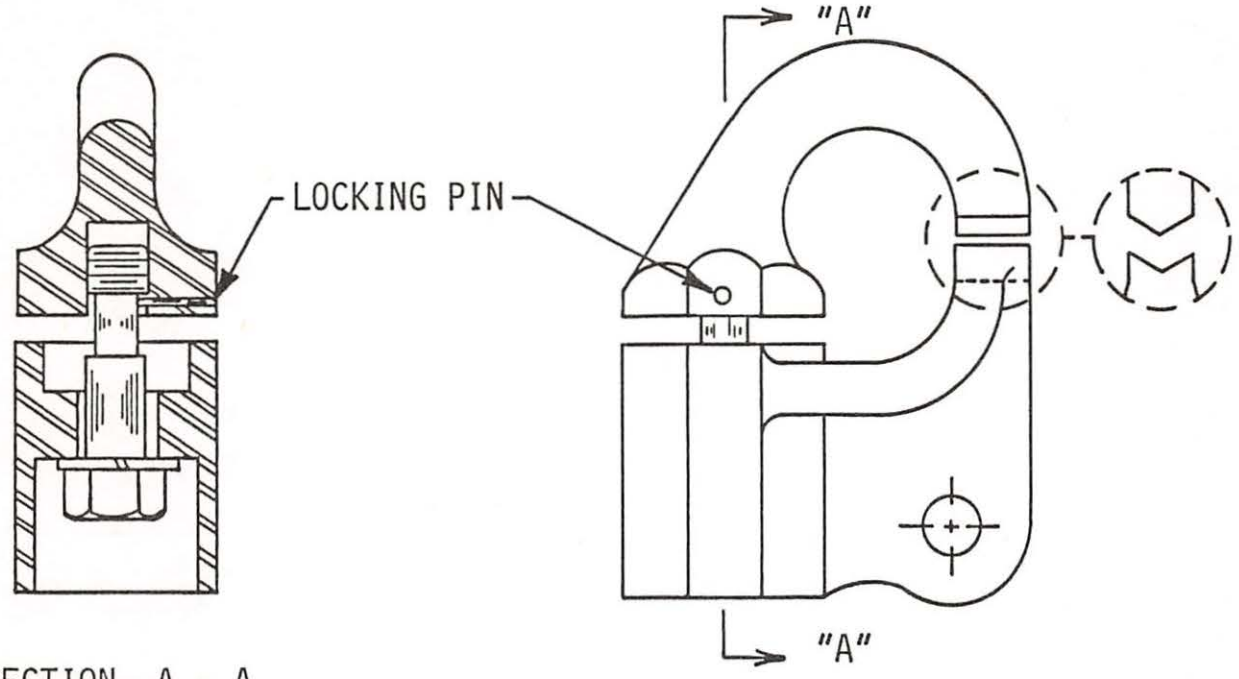
C-11325

ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 31-11320 | AERIAL CABLE INLET COMPLETE WITH EYEBOLT |
| 30-11302 | GROUND TERMINAL |
| C-11324 | UNDERGROUND BUSHING 4" DIA. |
| 01310032 | SERVICE LIGHT |
| 01010020 | DOOR GASKET |
| C-11325 | UNDERGROUND BUSHING 3" DIA. |
| 01310033 | ALUMINUM PAINT (ONE CAN) NOT SHOWN |
| | |
| | |
| | |

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# PADLOCKS




SECTION A - A

NOTE: LOCK IS SHOWN IN OPEN POSITION

| LOCK PART NO. | ILLUSTRATION | HEAD TYPE |
|---|---|---|
| 25000-01 |  | HEX HEAD |
| 25000-02 |  | TRIANGULAR HD. |
| 25000-03 |  | SLOTTED HEAD |
| 25000-05 |  | SPECIAL HEAD |

MATERIALS: LOCK - BRONZE
SCREW - NICKEL PLATED BRONZE

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# ANGLE IRON FOUNDATIONS

## GENERAL INFORMATION

MODERN INDUSTRIES CARRIES IN STOCK A COMPLETE LINE OF HOT-DIPPED GALVANIZED ANGLE IRON FOUNDATIONS. THESE LOW COST, STURDY FOUNDATIONS ARE AVAILABLE FOR EVERY SIGNAL AND COMMUNICATION REQUIREMENT, FROM TALK-BACK SPEAKERS TO CANTILEVER SIGNALS.

## SALIENT FEATURES

1. STURDY CONSTRUCTION, FABRICATED WITH 1/4" THICK HOT-ROLLED STEEL ANGLE, 1/4" AND 3/8" THICK PLATE, TOP GRADE WELDING.

2. LONG LIFE, HOT-DIPPED GALVANIZED FOR PROTECTION AGAINST THE ELEMENTS.

3. LIGHT WEIGHT.

4. LOW COST, IN ADDITION TO THE LOW PURCHASE PRICE (APPROXIMATELY ONE-HALF THE COST OF CAST IRON PIERS) YOU CAN REALIZE A SAVINGS ON FREIGHT AND ON INSTALLATION LABOR. (NO ASSEMBLY)

5. EASY TO HANDLE.

ALL FOUNDATIONS COME COMPLETE WITH NECESSARY HARDWARE FOR MOUNTING SIGNALS, SPEAKERS, ETC.

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3. LIGHT WEIGHT.

4. LOW COST, IN ADDITION TO THE LOW PURCHASE PRICE (APPROXIMATELY ONE-HALF THE COST OF CAST IRON PIERS) YOU CAN REALIZE A SAVINGS ON FREIGHT AND ON INSTALLATION LABOR. (NO ASSEMBLY)

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# FOUNDATIONS

## ANGLE IRON

| MODERN NO. | DESCRIPTION |
|---|---|
| 17100-1 | INSTRUMENT CASE PIER, 18-1/2" B.S. |
| 17-00003 | SPACER FOR PIER, 34" B.S. |
| 17-00010 | SPACER FOR PIER, 5'-1-1/4" B.S. |
| 17-00014 | SPACER FOR PIER, 6'-11-1/4" B.S. |
| 17-00017 | SPACER FOR PIER, 9'-10-1/4" B.S. |
| 17104-1 | SINGLE PLATFORM ASS'Y. COMPLETE |
| 17106-1 | DOUBLE PLATFORM ASS'Y. COMPLETE |
| 17108-1 | BASE EXTENSION COMPLETE |
| 17110-1 | FOUNDATION FOR I.C. WITH 15"x 20" B.S. |
| 17119-1 | LIGHT LOADING, 9-1/2"x 9-1/2" B.S. 24" HT. |
| 17119-2 | LIGHT LOADING, 9-1/2"x 9-1/2" B.S. 36" HT. |
| 17119-3 | LIGHT LOADING, 9-1/2"x 9-1/2" B.S. 48" HT. |
| 17122-1 | FLASHING LIGHT SIGNAL FOUNDATION, 36" HT. |
| 17122-2 | FLASHING LIGHT SIGNAL FOUNDATION, 48" HT. |
| 17122-3 | FLASHING LIGHT SIGNLE FOUNDATION, 60" HT. |
| 17130-1 | YARD SPEAKER RADIAL 8" B.S. 24" |
| 17130-2 | YARD SPEAKER RADIAL 8" B.S. 36" |
| 17130-3 | YARD SPEAKER RADIAL 8" B.S. 48" |
| 17140-1 | DWARF SIGNAL FOUNDATION |
| 17150-1 | INSTRUMENT HOUSE FOUNDATION |
| 17180-1 | FOUNDATION FOR 3 ARM SEARCHLIGHT |
| 17190-1 | FOUNDATION FOR 1&2 ARM SEARCHLIGHT |
| 17200-1 | FOUNDATION FOR AUTO. CROSSING GATE |

## GENERAL INFORMATION

ALL FOUNDATION AND ACCESSORIES ARE FURNISHED COMPLETE WITH MOUNTING BOLTS.

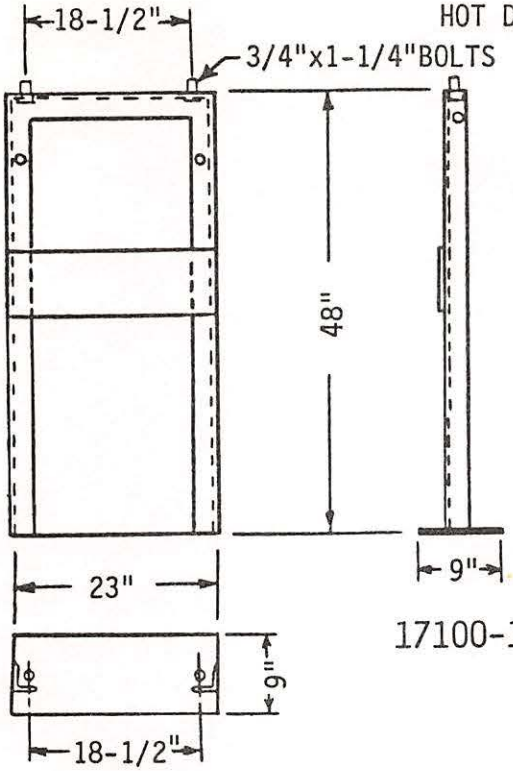
ITEMS NO. 17104-1 & 17106-1 ARE FURNISHED LESS STEP

ALL FOUNDATIONS ARE GALVANIZED.

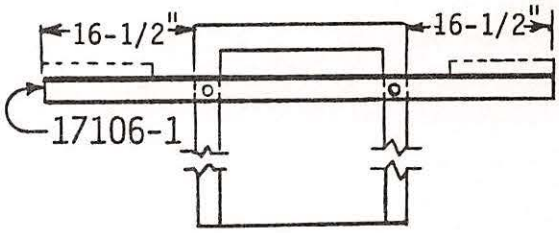
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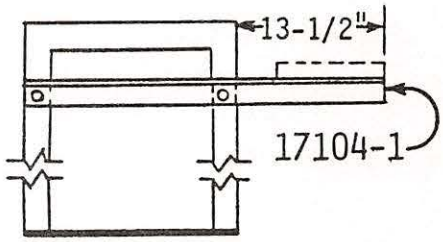
# FOUNDATION - ANGLE IRON

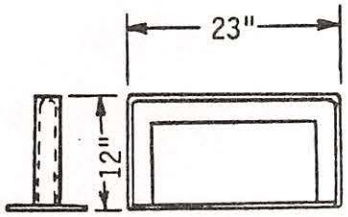
HOT DIPPED GALVANIZED



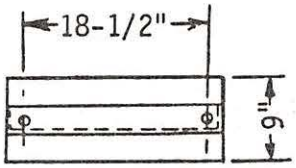

17100-1

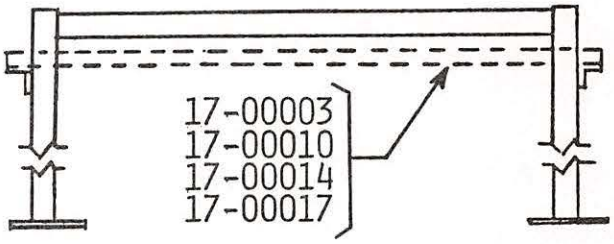



17108-1



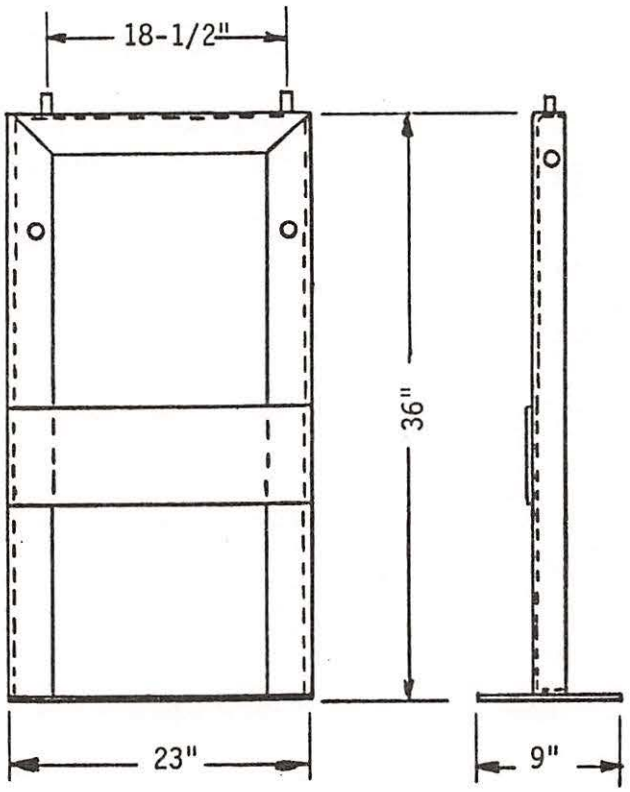

ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 17100-1 | INSTRUMENT CASE PIER 18-1/2" B.S. WITH TWO BOLTS |
| 17-00003 | SPACER FOR 34" B.S. COMPLETE WITH BOLTS (2-REQ'D) |
| 17-00010 | SPACER FOR 5'-1-1/4" B.S. COMPLETE WITH BOLTS (2-REQ'D) |
| 17-00014 | SPACER FOR 6'-11-1/4" B.S. COMPLETE WITH BOLTS (2-REQ'D) |
| 17-00017 | SPACER FOR 9'-10-1/4" B.S. COMPLETE WITH BOLTS (2-REQ'D) |
| 17104-1 | SINGLE PLATFORM ASSEMBLY COMPLETE (LESS STEP) |
| 17106-1 | DOUBLE PLATFORM ASSEMBLY COMPLETE (LESS STEP) |
| 17108-1 | BASE EXTENSION COMPLETE |

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# FOUNDATION - ANGLE IRON

HOT DIPPED GALVANIZED



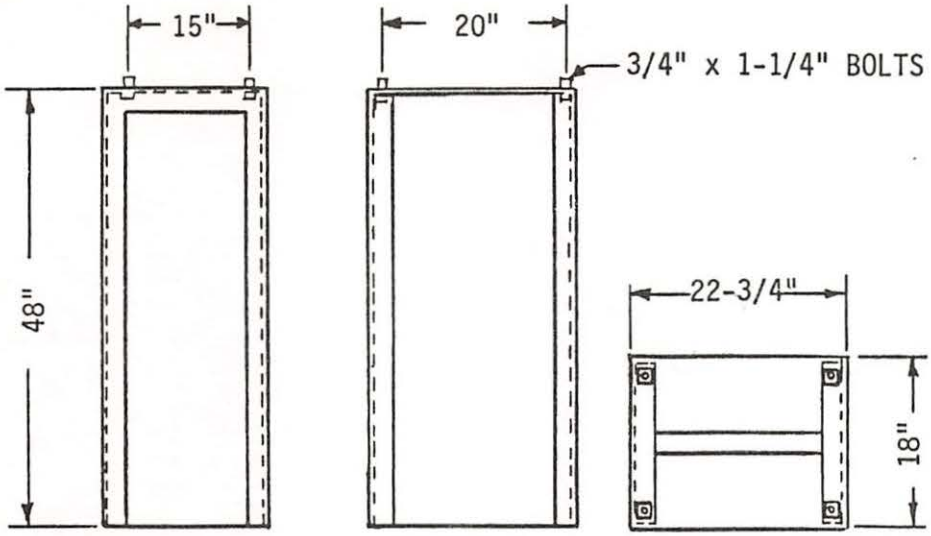

ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 17100-9 | INSTRUMENT CASE , 18-1/2" B.C. |

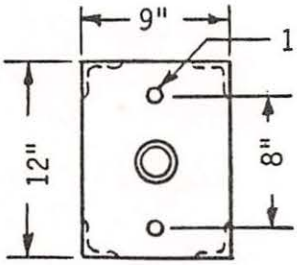
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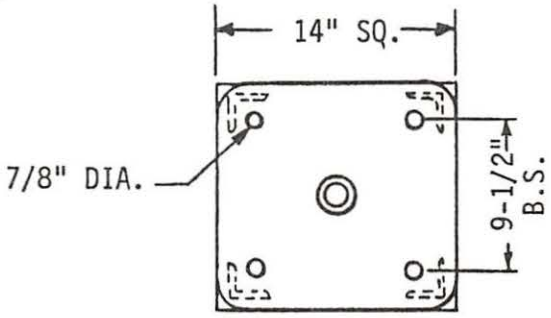
# FOUNDATION - ANGLE IRON

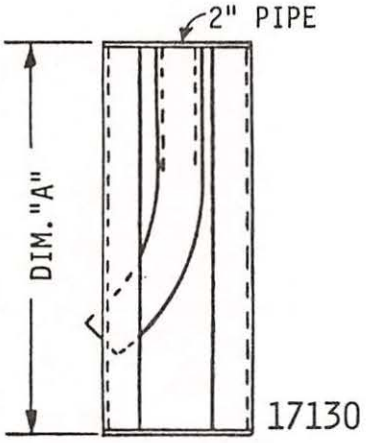
HOT DIPPED GALVANIZED



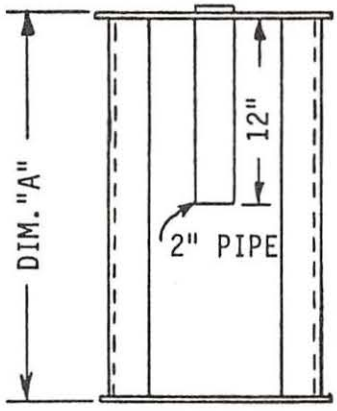

17110-1



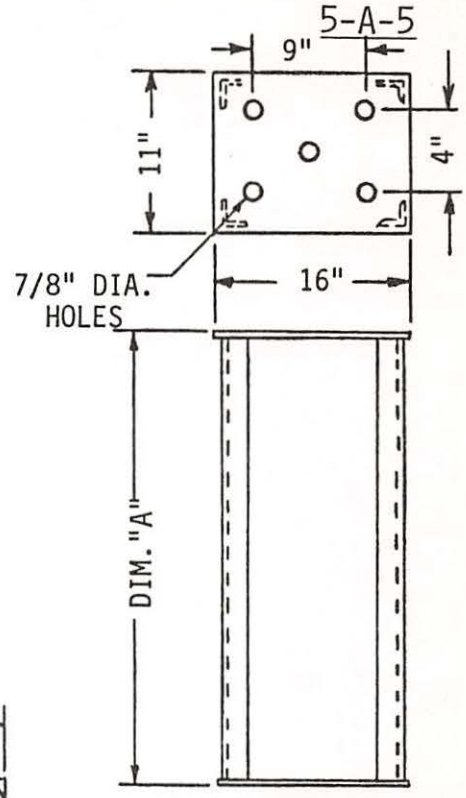




17130




17119

5-A-5




17150-1
17150-3

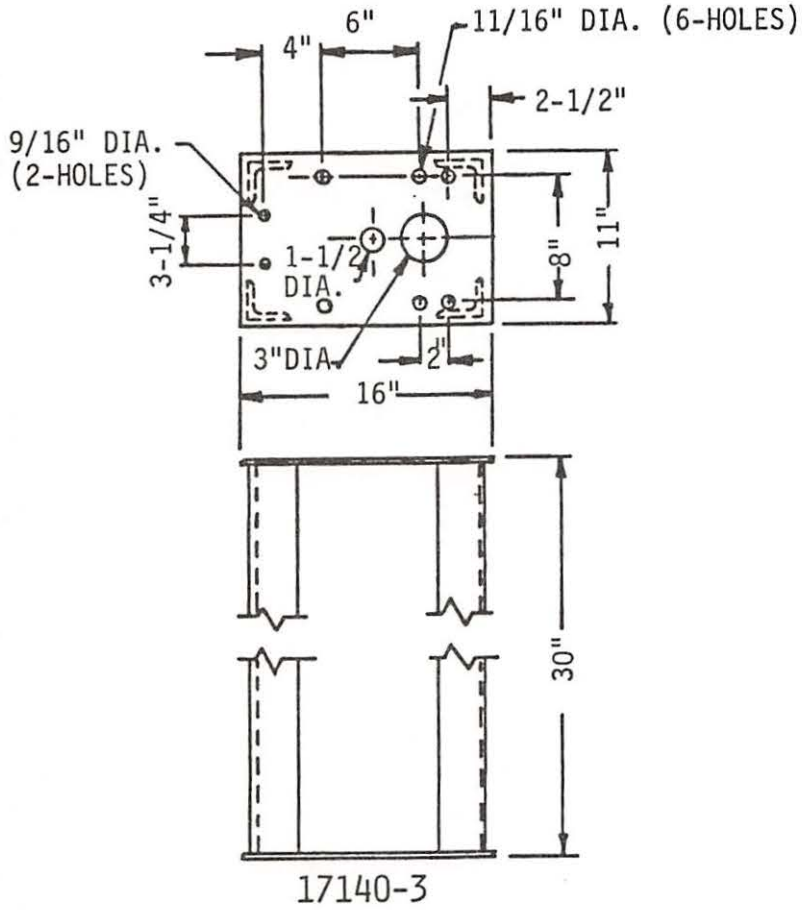
ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 17110-1 | INSTRUMENT CASE 15" x 20" B.S. |
| 17119-1 | LIGHT LOADING 9-1/2" B.S.,DIM."A" 24-1/2"(FOR 3" PIPE OR UNDER) |
| 17119-2 | LIGHT LOADING 9-1/2" B.S.,DIM."A" 36-1/2"(FOR 3" PIPE OR UNDER) |
| 17119-3 | LIGHT LOADING 9-1/2" B.S.,DIM."A" 48-1/2"(FOR 3" PIPE OR UNDER) |
| 17130-1 | YARD SPEAKER DIM."A" 24-1/2" |
| 17130-2 | YARD SPEAKER DIM."A" 36-1/2" |
| 17130-3 | YARD SPEAKER DIM."A" 48-1/2" |
| 17150-1 | INSTRUMENT HOUSE DIM."A" 36-1/2" |
| 17150-3 | INSTRUMENT HOUSE DIM."A" 48" |


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# FOUNDATION - ANGLE IRON

HOT DIPPED GALVANIZED




17140-3

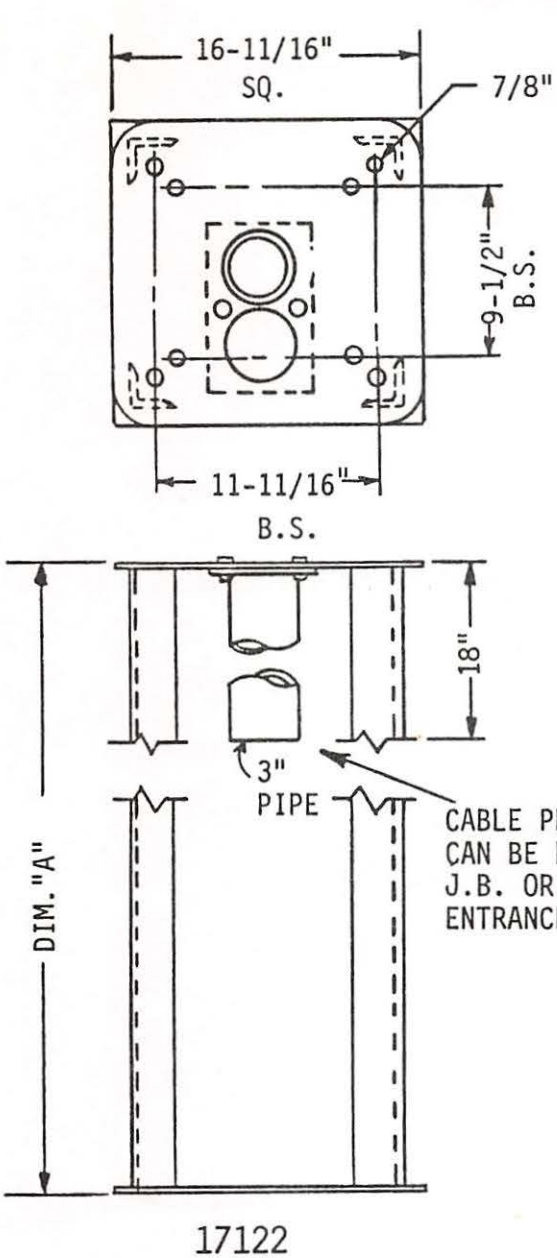
ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 17140-3 | DWARF SIGNAL FOUNDATION 11" x 16" x 30" |

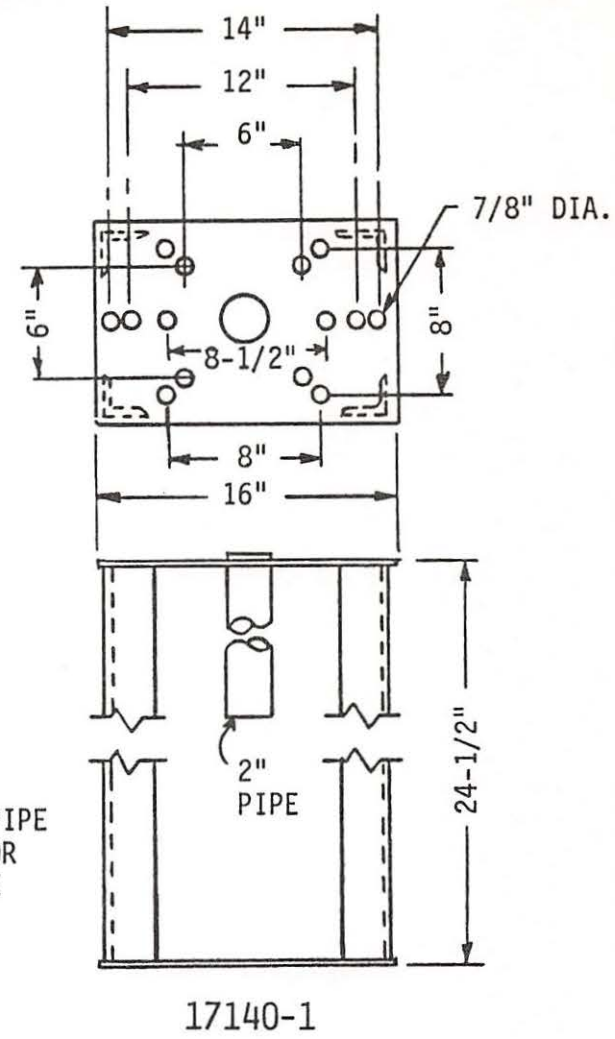
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# FOUNDATION - ANGLE IRON

HOT DIPPED GALVANIZED




17122




17140-1

ORDER BY PART NUMBER AND DESCRIPTION

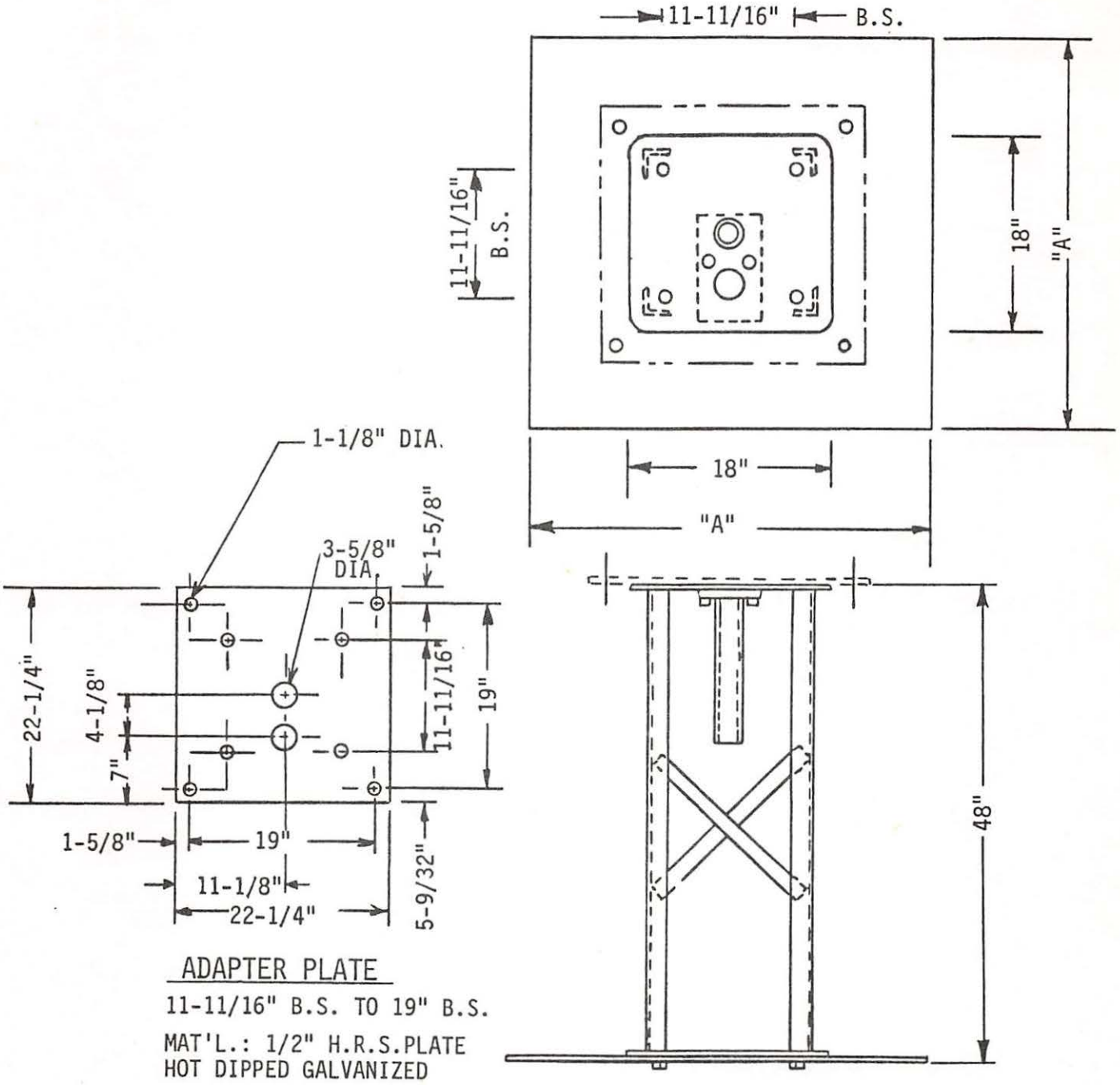
| PART NO. | DESCRIPTION |
|---|---|
| 17122-1 | FLASHING LIGHT SIGNAL FOUNDATION, DIM."A" 36-1/2" |
| 17122-2 | FLASHING LIGHT SIGNAL FOUNDATION, DIM."A" 48-1/2" |
| 17122-3 | FLASHING LIGHT SIGNAL FOUNDATION, DIM."A" 60-1/2" |
| 17140-1 | DWARF SIGNAL FOUNDATION - SPECIFY BOLT SPACING |

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# FOUNDATION - ANGLE IRON



HOT DIPPED GALVANIZED




## ADAPTER PLATE

11-11/16" B.S. TO 19" B.S.

MAT'L.: 1/2" H.R.S.PLATE
HOT DIPPED GALVANIZED

## ORDER BY PART NUMBER AND DESCRIPTION

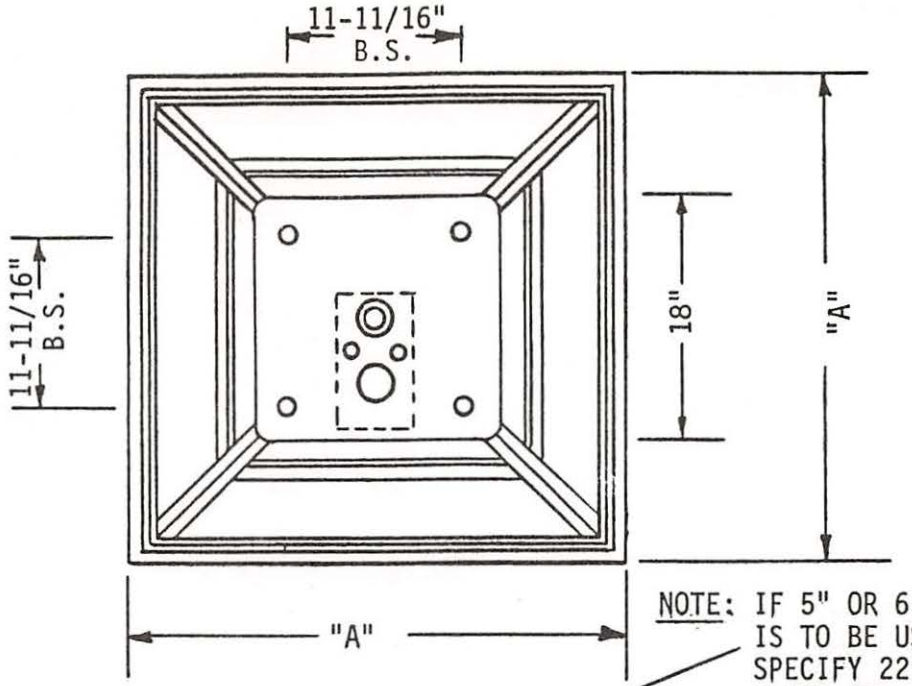
| PART NO. | DESCRIPTION | "A" |
|---|---|---|
| 17200-1 | AUTOMATIC CROSSING GATE | 36" |
| 17200-2 | AUTOMATIC CROSSING GATE WITH PLATE | 36" |
| 17200-5 | AUTOMATIC CROSSING GATE WITH 48" BASE | 48" |

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# FOUNDATION - ANGLE IRON



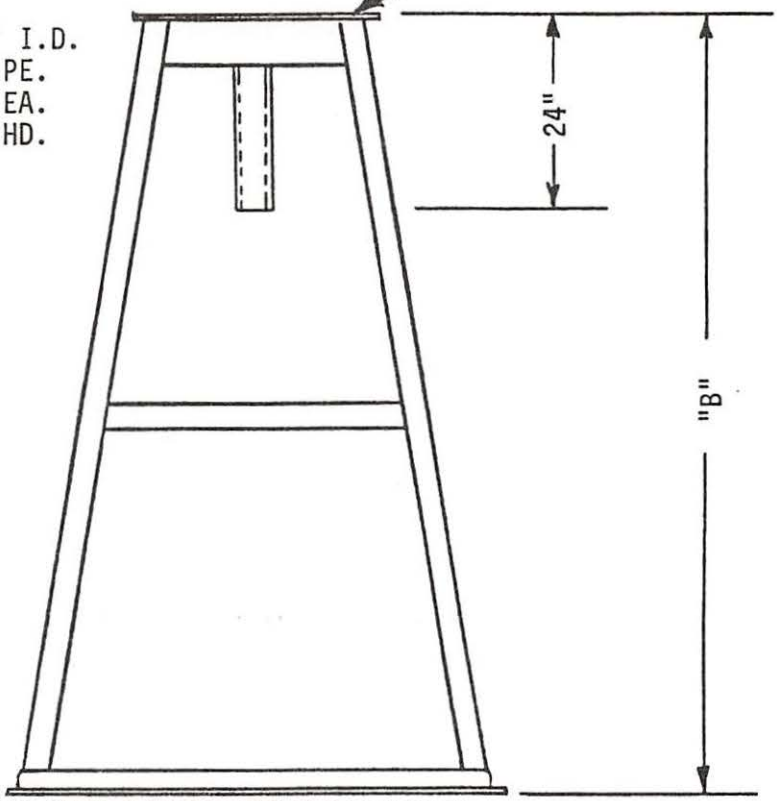
HOT DIPPED GALVANIZED




NOTE: IF 5" OR 6" ONE PIECE BASE IS TO BE USED ON SIGNAL, SPECIFY 22" x 22" TOP PLATE ON FOUNDATION.

NOTES:

1. FURNISHED WITH 3" I.D. CABLE ENTRANCE PIPE.
2. FURNISHED WITH 4 EA. 1" x 4-1/2" HEX. HD. BOLTS, NUTS, AND WASHERS.



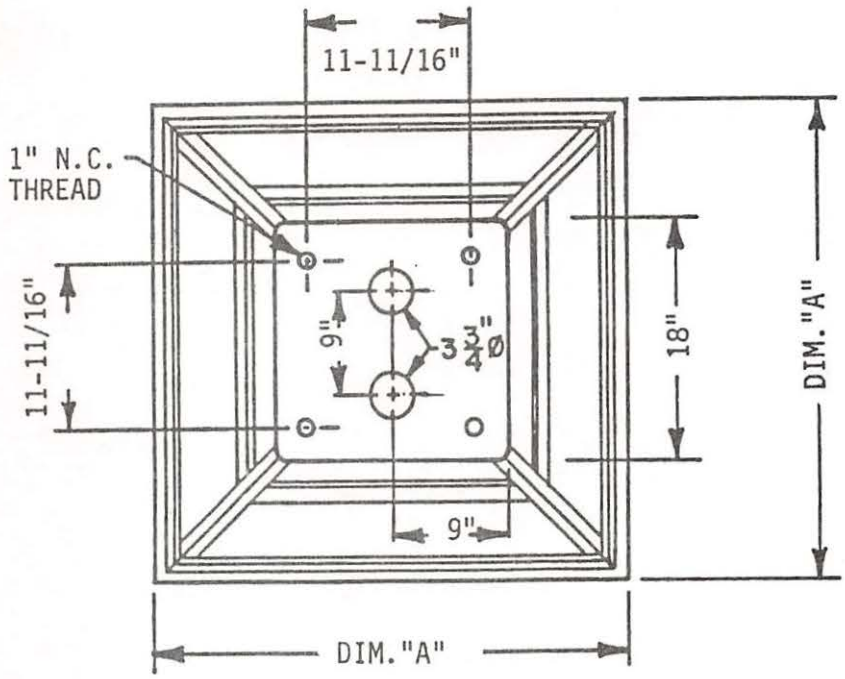

ORDER BY PART NUMBER AND DESCRIPTION

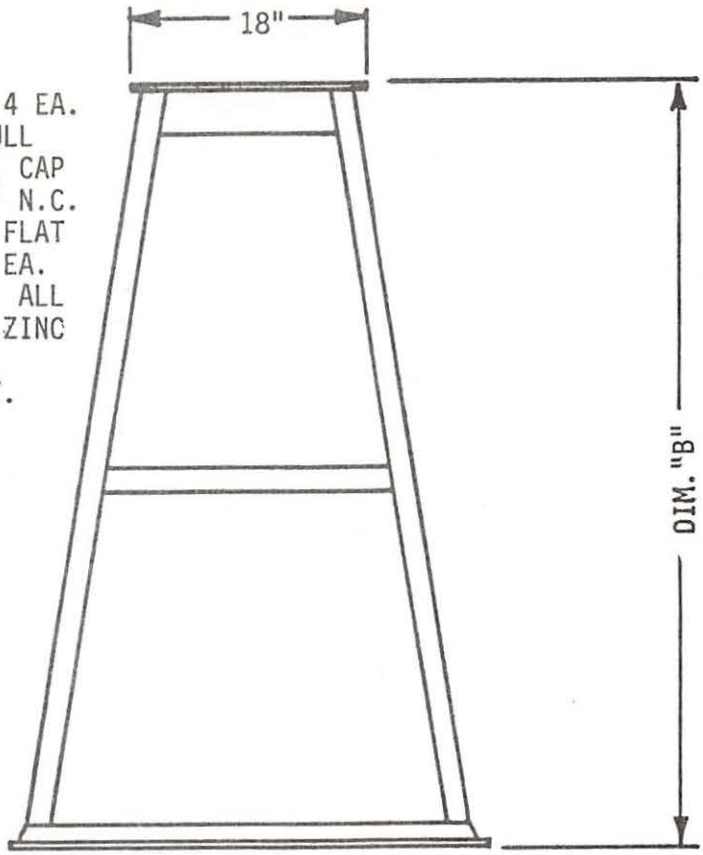
| PART NO. | DIM. "A" | DIM. "B" | DESCRIPTION |
|---|---|---|---|
| 17180-1 | 48" | 60" | 3 UNIT SIGNAL OR CANTILEVER SIGNAL |
| 17190-1 | 32" | 72" | 1 and 2 UNIT SIGNAL |
| 17190-2 | 32" | 42" | 1 AND 2 UNIT SIGNAL |
| 17190-3 | 32" | 48" | 1 and 2 UNIT SIGNAL |
| 17190-4 | 32" | 60" | 1 AND 2 UNIT SIGNAL |

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# FOUNDATION - ANGLE IRON

HOT DIPPED GALVANIZED




NOTES:

1. FURNISHED WITH 4 EA. 1" N.C. x 6" FULL THREAD HEX. HD. CAP SCREW, 8 EA. 1" N.C. NUTS, 8 EA. 1" FLAT WASHERS, AND 4 EA. 1" LOCKWASHERS. ALL HARDWARE TO BE ZINC PLATED.
2. HOT DIPPED GALV. AFTER WELDING.

ORDER BY PART NUMBER AND DESCRIPTION

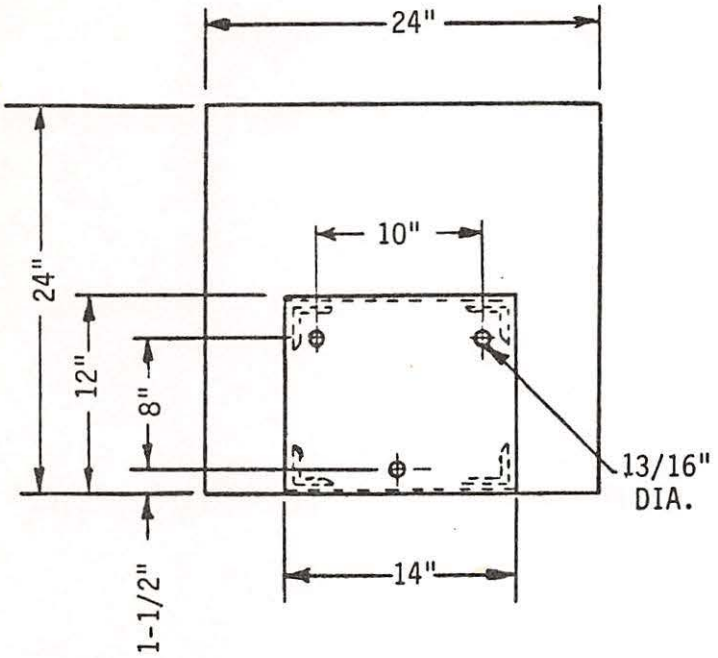
| PART NO. | DIM."A" | DIM."B" | DESCRIPTION |
|---|---|---|---|
| 17190-6 | 32" | 48" | 1 UNIT SIGNAL MAST, FLASHING LIGHTS&GATES |

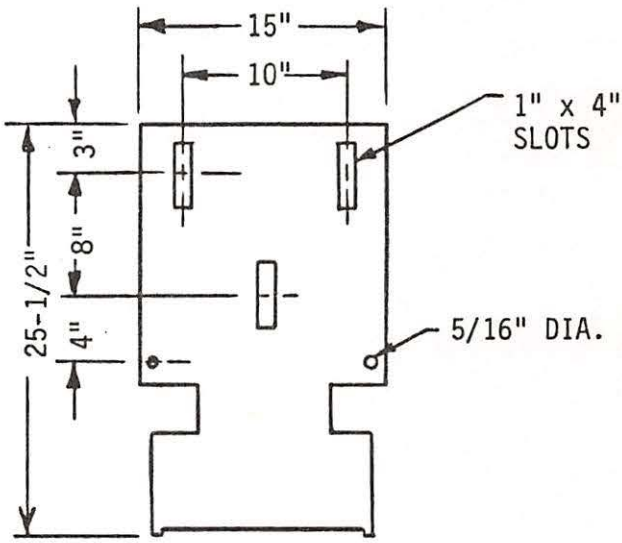
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# FOUNDATION - ANGLE IRON

5-A-11

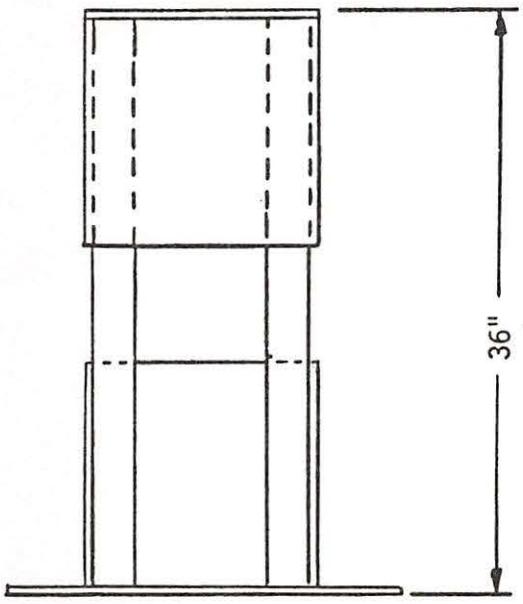
HOT DIPPED GALVANIZED




TOP VIEW
SCANNER CANTILEVER ARM

MAT'L. : 1/2" STEEL BOILER PLATE




NOTES:

1. FURNISH 3 EA. 3/4" x 6" FULL THREAD BOLTS, 6 EA. 3/4" LOCK WASHERS, 9 EA. 3/4" NUTS & 6 EA. 2" SQ. x 1/8" THICK w/ 7/8" DIA. HOLE FLAT WASHERS.
2. ALL HARDWARE TO BE ZINC PLATED.

ORDER BY PART NUMBER AND DESCRIPTION

| PART NO. | DESCRIPTION |
|---|---|
| 17107-1 | HOT BOX DETECTOR FOUNDATION |


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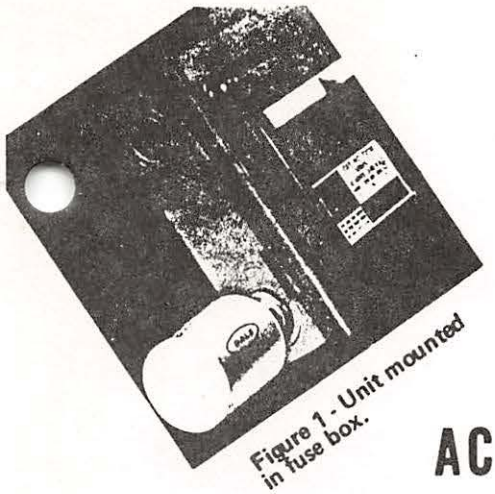


Figure 1 - Unit mounted in fuse box.

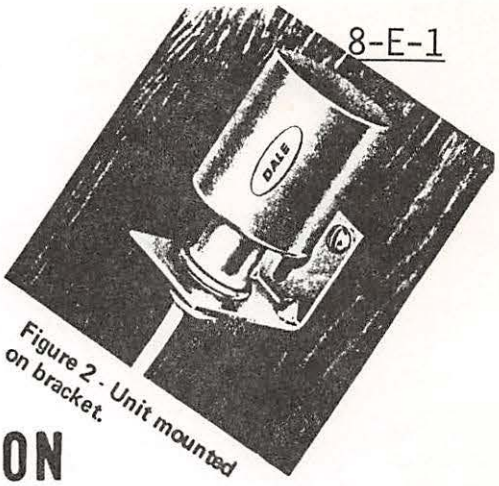


Figure 2 - Unit mounted on bracket.

# AC ARRESTER INSTALLATION

## MODEL SPA-100, SPA- 200 and SPA-400 Secondary Power Arrester

Dale arresters are designed to provide protection for electric appliances and equipment operating from nominal voltages of 120 volts (SPA-100), 277 volts (SPA-200) & 480 volts (SPA-400) line to ground.

While the arrester is specifically designed for installation on a fuse box, (Figure 1); the arrester may be installed on the sides of buildings, or on utility poles by using an angle bracket, (Figure 2). The arrester can be installed in either indoor or outdoor applications. The preferred mounting for outdoor installations, as shown in Figure 2, is with the can up and the nipple and wires down.

### FUSE BOX MOUNTING (External)

To mount the arrester on a fuse box, insert the wire leads and threaded nipple through a 7/8 inch knockout in the box. Thread the conduit locknut on the nipple from the inside of the box. Tighten for a secure mounting. Connect the wire leads to the service cables making permanent, tight electrical connections (see the wiring diagrams, Figure 3). For best protection, make the leads as short as possible. Connect the ground lead (green) first then connect the line lead (black).

### FUSE BOX MOUNTING (Internal)

For flush-mounted fuse boxes, and in other instances where mounting the arrester outside the fuse box is impractical, the unit may be installed inside the fuse box. The arrester can either be mounted using a bracket which is in turn, bolted to the side or back of the fuse box or by fastening to the side or back of the fuse box, with a piece of perforated metal strapping. **IMPORTANT: BE SURE TO FOLLOW GROUNDING INSTRUCTIONS BELOW.**

### BRACKET MOUNTING

Mount the arrester as close to the service entrance as possible (requires the permission of your electric utility). Attach angle bracket to the pole or the side of the building using self-tapping screws or nails. Place the threaded nipple through the 7/8 inch hole in the bracket with the wires pointing down (Figure 2), and thread on the conduit locknut. Tighten the nut sufficiently to make a secure mounting. Connect the arrester lead as in fuse box mounting, green lead first, to the neutral and black lead to the line.

### GROUNDING INSTRUCTIONS

**IMPORTANT:** Failure to follow the grounding instructions will prevent the arrester from properly protecting your circuits.

On installations of all types, check the circuit ground, or the neutral wire to make sure that it is well and properly grounded. A No. 8 or larger wire should be connected from the fuse box or mounting bracket to an 8' ground rod or equal.

### WARNING

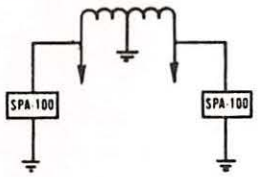
Only a qualified person should install the Dale secondary Power Arresters. Unqualified persons attempting installation may come into contact with dangerous voltages, or may incorrectly install the unit making it ineffective.

If you want to install the arrester outside, be sure to obtain permission from the local electric utility.

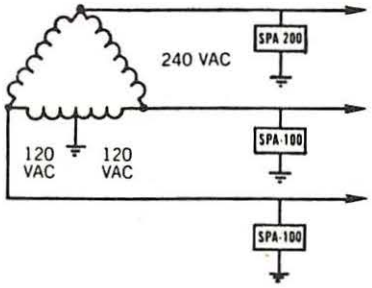
## WIRING DIAGRAMS

Shown below are approved methods of installing Dale SPA Arresters in 8 of the most frequently used types of secondary power connection. For installation information on any service connection not covered here, contact Surge Arrester Department, Dale Electronics, Inc.

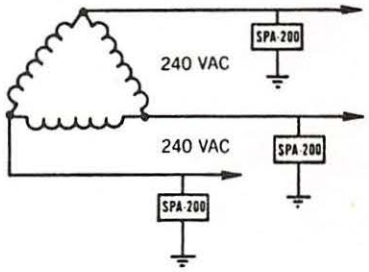
1. 120/240 VAC single phase



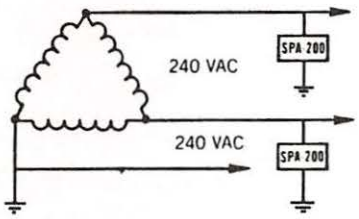

2. 240 VAC 3 phase delta



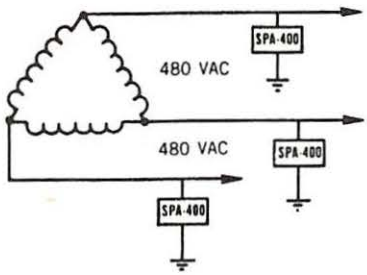

3. 240 VAC 3 phase delta



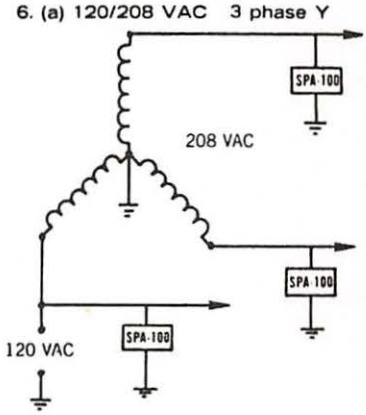

4. 240 VAC 3 phase delta



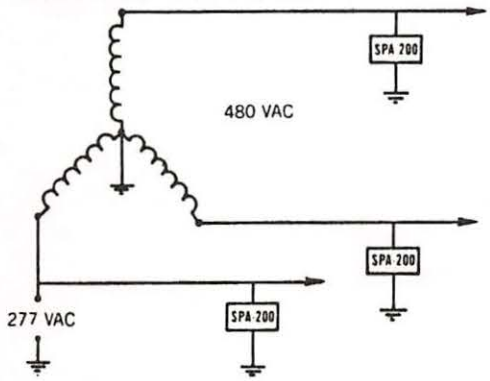

5. 480 VAC 3 phase delta



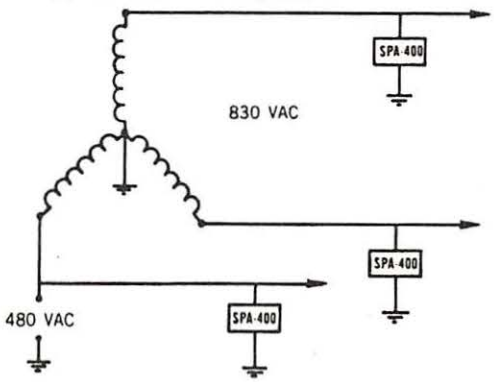

6. (a) 120/208 VAC 3 phase Y




7. (b) 277/480 VAC 3 phase Y




8. (b) 480/830 VAC 3 phase Y




## ARRESTER WARRANTY

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL OR IMPLIED. Dale Electronics, Inc., warrants that the Lightning Arrester delivered hereunder will be free from defects in material and workmanship. If within three (3) years from the date of purchase the lightning arrester delivered hereunder is defective because of either material or workmanship, the company shall furnish a replacement only. THE LIABILITY OF THE COMPANY ARISING OUT OF THE DELIVERY OF SAID ARRESTER OR ITS USE IS LIMITED TO SAID REPLACEMENT, AND SHALL CONSTITUTE THE SOLE REMEDY OF THE PURCHASER. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR CONSEQUENTIAL DAMAGES OR INSTALLATION CHARGES. THE COMPANY AUTHORIZES NO ONE TO ASSUME OR REPRESENT ANY OTHER WARRANTY OR LIABILITY IN CONNECTION WITH THIS PRODUCT OTHER THAN AS STATED HEREIN.

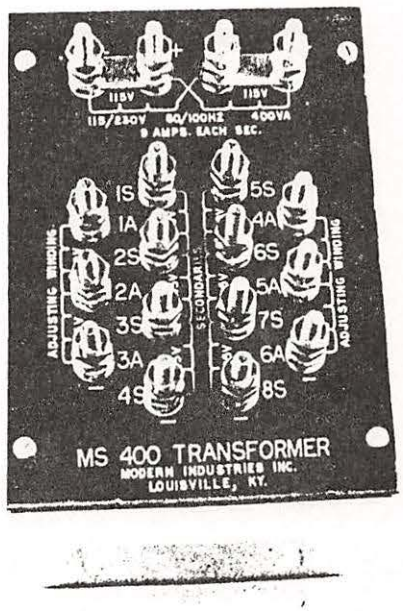
**DALE ELECTRONICS, INC.**

# STYLE MS TRANSFORMERS




MS-525 OR MS-750

SINGLE
SECONDARY




MS-400

DUAL
SECONDARY

**ALL STYLE MS TRANSFORMERS HAVE DUAL PRIMARIES 115/230 VOLTS, 60-100HZ AND ARE AVAILABLE WITH SINGLE OR MULTIPLE SECONDARIES.**

**STANDARD SINGLE SECONDARY TAPS — 4-8-1-1-1.**

**STANDARD MULTIPLE SECONDARY TAPS — TWO MAIN SECONDARIES WITH ADJUSTING WINDINGS, ADJUSTABLE IN 0.5 VOLT STEPS FROM 0.5 VOLTS TO 22.5 VOLTS.**

**WINDING AND TAP ARRANGEMENT SHOWN ON TOP PLATE.**

**CONTACT OUR ENGINEERING DEPARTMENT WITH ANY SPECIAL REQUIREMENTS AND WE WILL MANUFACTURE TRANSFORMERS PER YOUR SPECIFICATIONS.**

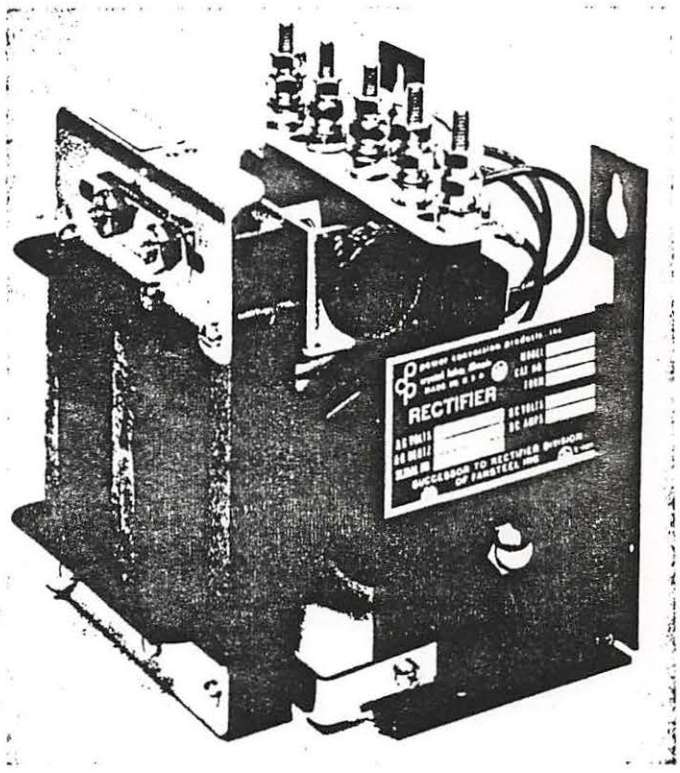
| MODEL NUMBER | PRIMARY VOLTS | SECONDARY VOLTS | AMPS | DIMENSIONS H | W | D | WEIGHT POUNDS | PART NUMBER |
|---|---|---|---|---|---|---|---|---|
| MS-400 | 115/230 | 22.5 (.5 to 22.5) | 9 | 7½" | 5¼" | 8¼" | 23½ | 16400-01 |
| | | 22.5 (.5 to 22.5) | 9 | | | | | |
| MS-525 | 115/230 | 15 (4-8-1-1-1) | 35 | 9¼" | 6½" | 9½" | 26½ | 16525-01 |
| MS-750 | 115/230 | 15 (4-8-1-1-1) | 50 | 9¼" | 6½" | 9½" | 33 | 16750-01 |

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# MODEL "DT" SIGNAL RECTIFIER

## GENERAL

The Model "DT" Series Signal Rectifier has been the standard of the Railroad Industry since the 1930's. Hundreds of thousands have been placed in service and many of the original rectifiers are still operational. Ruggedly built, the "DT" incorporates a unique mechanical output adjustment designed specifically for and with the cooperation of RR signal personnel. All units meet AAR Signal Section Specification No. 229-488.




## OPERATION

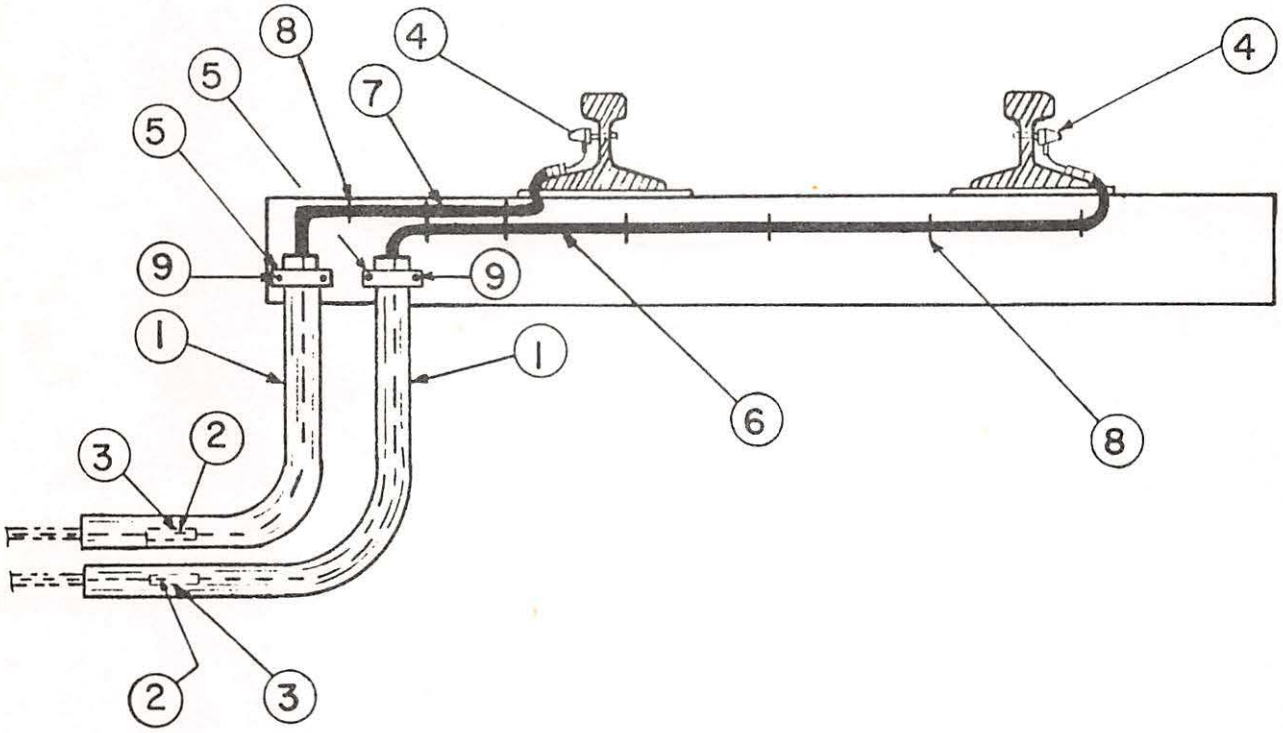
The "DT" constant current rectifier utilizes a full wave selenium rectifier with adjustable reactive transformer for track, signal, and interlocking batteries. Each unit is compactly assembled for shelf or wall mounting. The continuously adjustable transformer eliminates the necessity for either primary or secondary taps. Output is controlled from zero to 100% of rated current with a simple micrometer screw adjustment. Selenium rectifiers are used due to their inherent surge withstand-capabilities. All units are capable of operating continuously at rated output at 160°F ambient temperature.

## ORDERING INFORMATION

| Catalog Number | AC Input Volts (60-100Hz) | DC Output Volts Max. | DC Output Amps Max. | For Charging Lead Cells | For Charging Ni-Cad Ni-Fe Cells | Overall Dimensions (") H | W | D |
|---|---|---|---|---|---|---|---|---|
| DT2739 | 110/220 | 13.5 | 2.7 | 4-6 | 6-9 | 6 | 5-3/4 | 6-7/8 |
| DT1062 | 110/220 | 13.5 | 1.7 | 4-6 | 6-9 | 6 | 5-3/4 | 6-7/8 |
| DT1078 | 110/220 | 3.0 | 4.4 | 1 | 2 | 6 | 5-3/4 | 6-7/8 |
| DT2399 | 110/220 | 3.0 | 2.2 | 1 | 2 | 6 | 5-3/4 | 6-7/8 |
| DT-13.5-5 | 110/220 | 13.5 | 5.0 | 4-6 | 6-9 | 6 | 5-3/4 | 6-7/8 |
| DT-20-3.5 | 110/220 | 20.0 | 3.5 | 7-9 | 10-13 | 6 | 5-3/4 | 6-7/8 |

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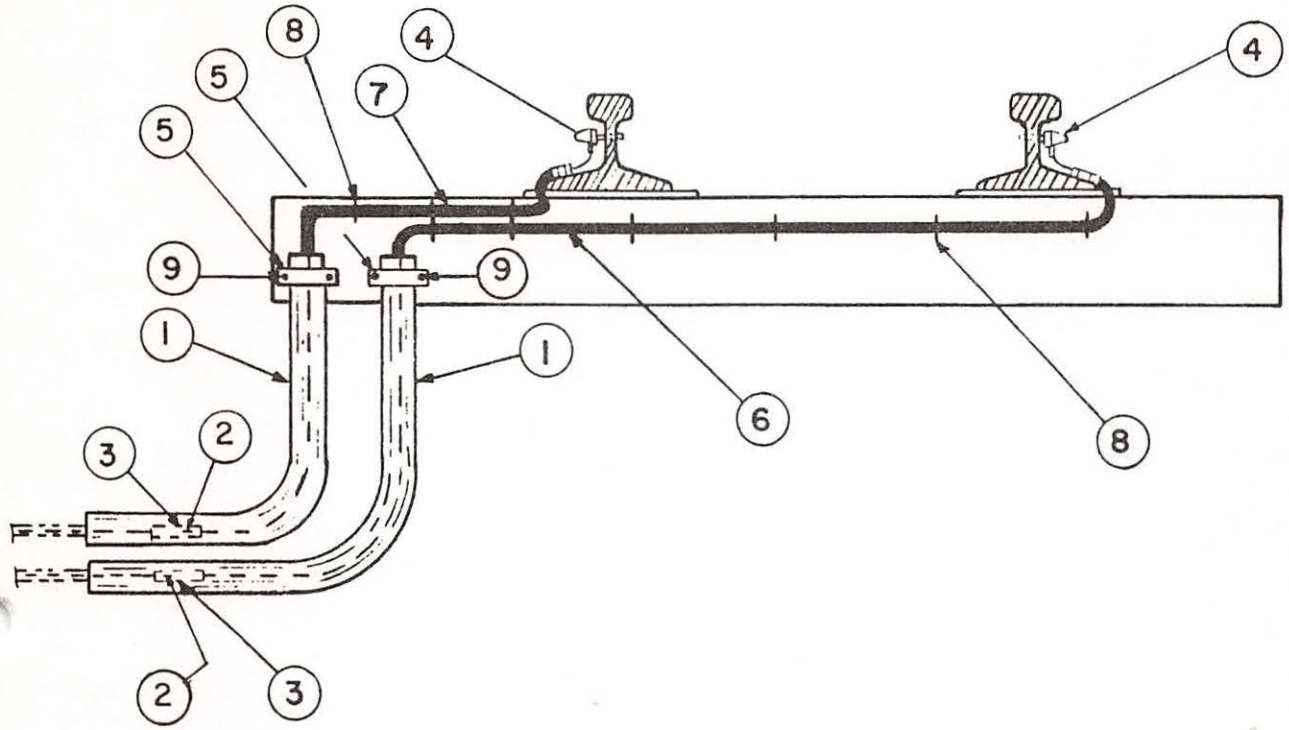
# TRACK KIT (COMPLETE)
# NO. 6 TRACK WIRE
# PART NO. 10006-02




| REF. | QTY. | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 2 | 01030065 | $\frac{3}{4}$" I.D. x 4" LONG HI FLEX PIPE |
| 2 | 2 | 01030010 | REDUCING NICROPRESS $\frac{3}{16}$ TO #6 TRACK WIRE |
| 3 | 2 | 01030066 | HEAT SHRINK TUBING, 3" LONG |
| 4 | 2 | 01030039 | S-8PT RAIL CONNECTOR |
| 5 | 2 | 01030063 | $\frac{3}{4}$" PIPE STRAP GALVANIZE |
| 6 | 12 FT. | 01031175 | INSULATED BOND STRAND $\frac{3}{16}$" |
| 7 | 6FT. | 01031175 | INSULATED BOND STRAND $\frac{3}{16}$" |
| 8 | 10 | 01030064 | $1\frac{3}{4}$" x $\frac{3}{8}$" x .144 STAPLE COPPERWELD |
| 9 | 4 | 01010033 | #10 GALVANIZED NAILS |

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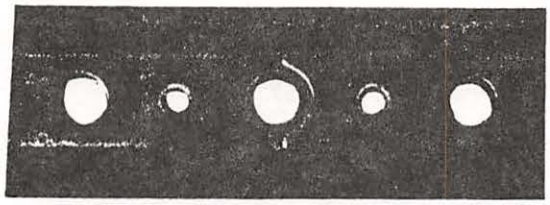
# TRACK KIT (COMPLETE)
# NO. 9 TRACK WIRE
# PART NO. 10009-02



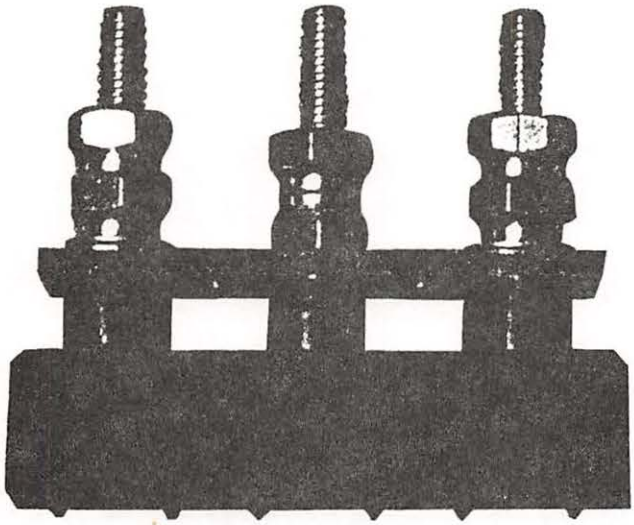

| REF. | QTY. | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 2 | 01030065 | $\frac{3}{4}$" I.D. x 4" LONG HI FLEX PIPE |
| 2 | 2 | 01030011 | REDUCING NICROPRESS $\frac{3}{16}$ TO #9 TRACK WIRE |
| 3 | 2 | 01030066 | HEAT SHRINK TUBING, 3" LONG |
| 4 | 2 | 01030039 | S-8PT RAIL CONNECTOR |
| 5 | 2 | 01030063 | $\frac{3}{4}$" PIPE STRAP GALVANIZE |
| 6 | 12 FT. | 01031175 | INSULATED BOND STRAND $\frac{3}{16}$" |
| 7 | 6FT. | 01031175 | INSULATED BOND STRAND $\frac{3}{16}$" |
| 8 | 10 | 01030064 | $1\frac{3}{4}$" x $\frac{3}{8}$" x .144 STAPLE COPPERWELD |
| 9 | 4 | 01010033 | #10 GALVANIZED NAILS |

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# TEST SWITCH



TEST LINK



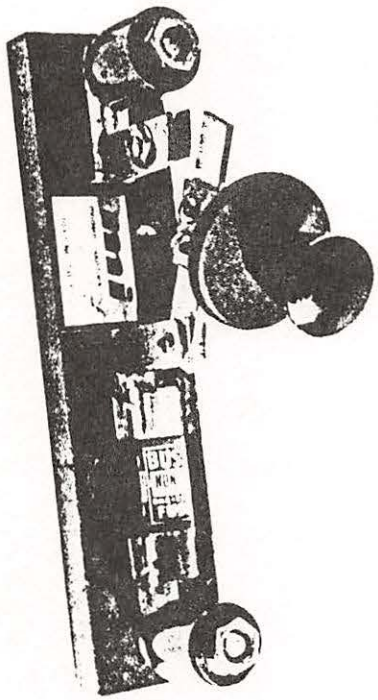
TEST SWITCH ASSEMBLY

SWITCH CONSISTS OF 3 HOLE TEST LINK MADE TO MOUNT ON STANDARD 3 POST TERMINAL STRIP CIRCUIT BETWEEN OUTER TERMINAL POSTS CAN BE OPENED BY BACKING OFF CENTER POST NUTS.

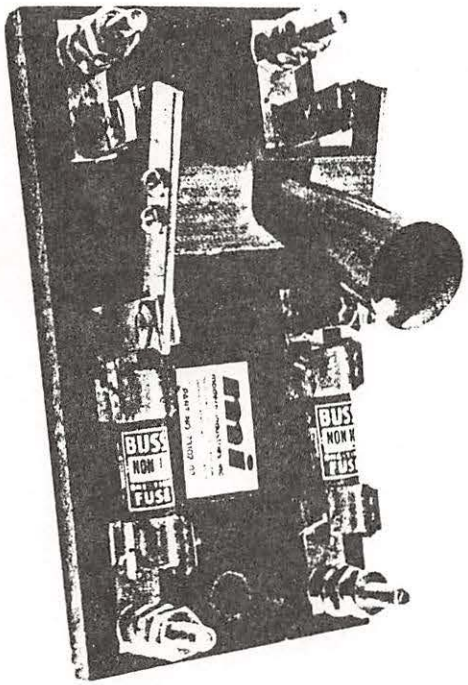
| DESCRIPTION | PART NUMBER |
|---|---|
| TEST SWITCH ASSEMBLY | 73105-01 |
| TEST LINK ONLY | 73105-02 |

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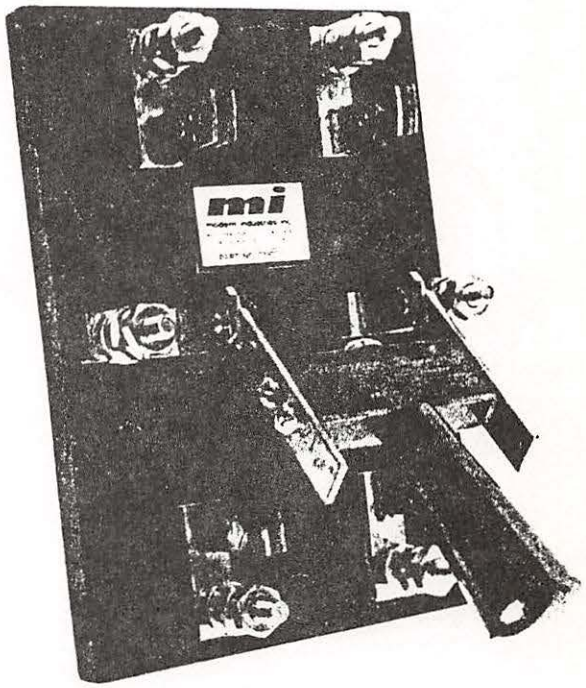
# KNIFE SWITCHES



SINGLE POLE
SINGLE THROW
FUSED




DOUBLE POLE
SINGLE THROW
FUSED




DOUBLE POLE
DOUBLE THROW
NON-FUSED

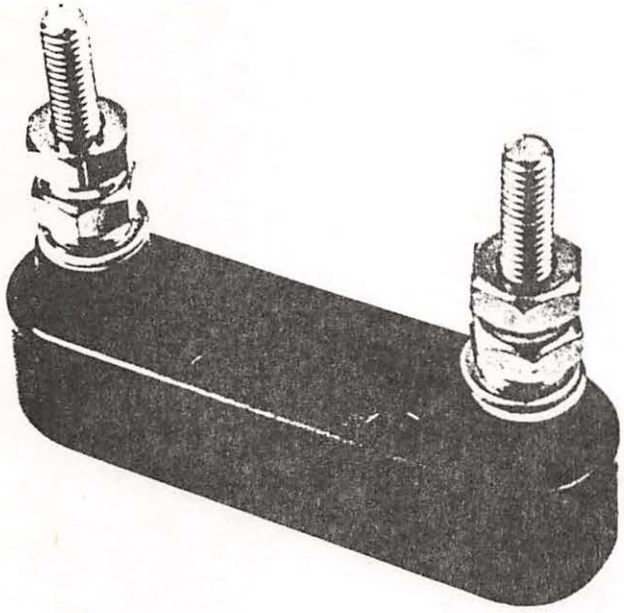
**RATED: 30 AMPS, 250 WATTS**

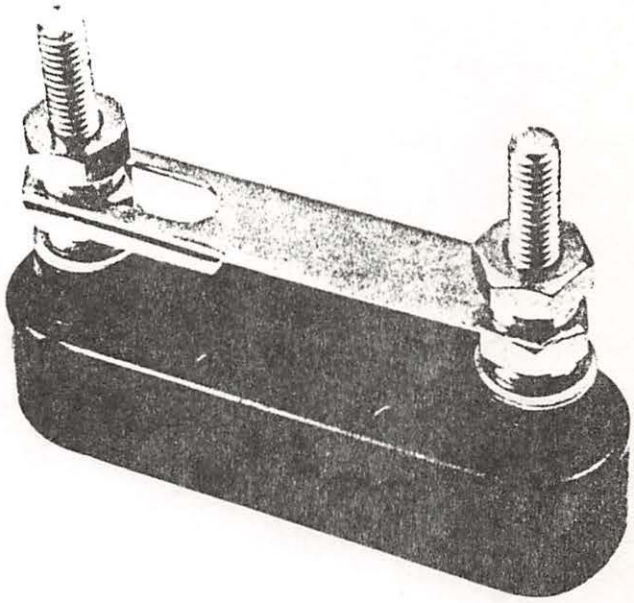
| | DIMENSIONS | | | |
|---|---|---|---|---|
| DESCRIPTION | H | W | D | PART NUMBER |
| SP-ST FUSED | 7" | 1 9/16" | 4" | 73101-01 |
| SP-ST FUSED W/FUSE | 7" | 1 9/16" | 4" | 73101-02 |
| DP-ST FUSED | 7" | 3 3/8" | 4 1/2" | 73102-01 |
| DP-ST FUSED W/FUSE | 7" | 3 3/8" | 4 1/2" | 73102-02 |
| DP-DT NON-FUSED | 7 3/4" | 5" | 2" | 73103-01 |

**IF INSULATING NUTS ARE REQUIRED PLEASE STATE ON ORDER.**

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# MOLDED TERMINAL BLOCK — TWO POST



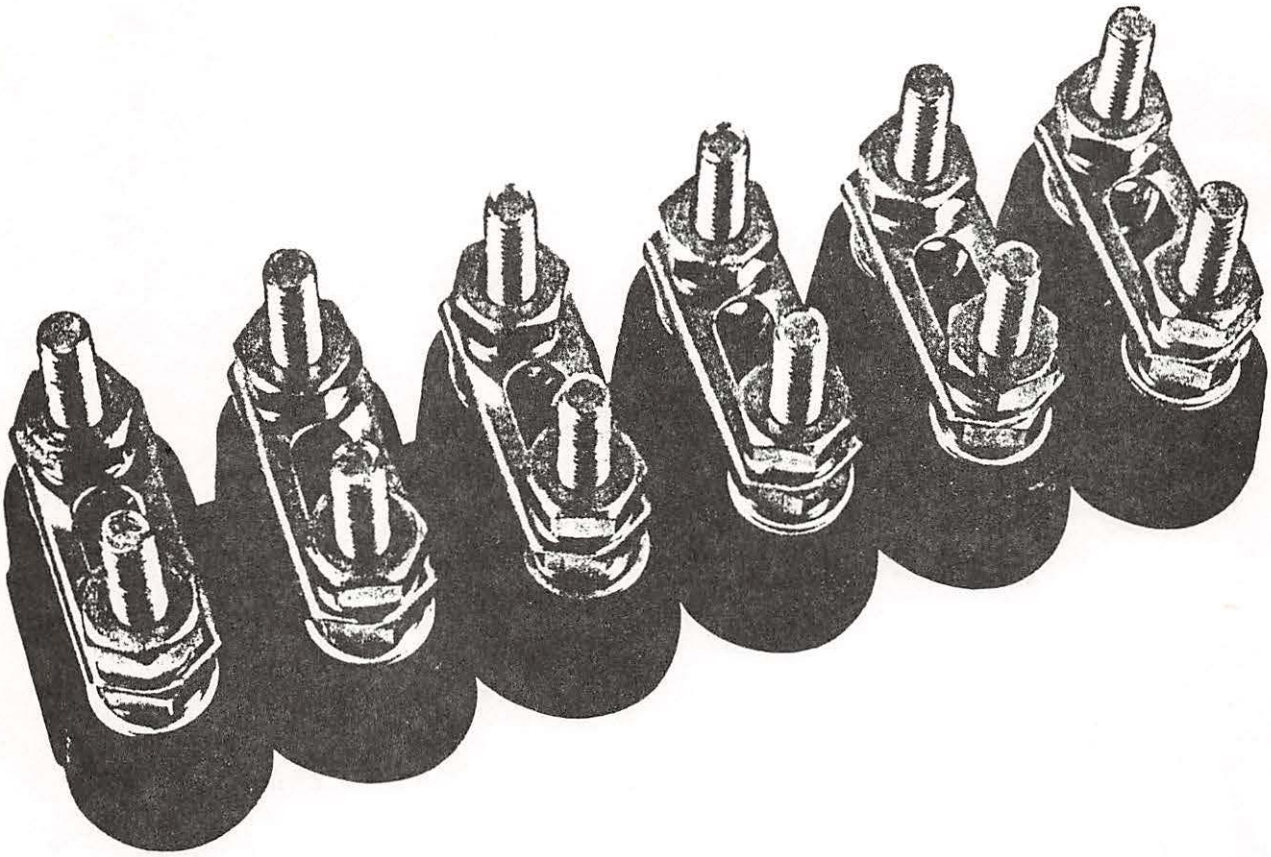


**Terminal block with binding post molded in on 2 3/8" centers. Furnished with 4 AAR 10706 binding nut and 4 AAR 10708 washers unless otherwise specified.**

| DESCRIPTION | PART NUMBER |
|---|---|
| TERMINAL BLOCK WITHOUT CONNECTOR — | 73107-01 |
| TERMINAL BLOCK WITH AAR 10762 CONNECTOR — | 73107-02 |
| TERMINAL BLOCK WITH AAR 10764 CONNECTOR — | 73107-03 |

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# DOUBLE ROW 6 — TERMINAL STRIP



**Terminal strip has 12 binding posts molded on 1 inch centers in each direction. 24 binding nuts, 24 washers and 6 AAR 10761 straps (when required) are packaged separately.**

**Strip has 6 mounting holes and can be separated by sawing when less than 6 terminals are required.**

| DESCRIPTION | PART NUMBER |
|---|---|
| DOUBLE ROW 6 WITH NUTS & WASHERS — | 73106-01 |
| DOUBLE ROW 6 WITH NUTS, WASHERS & 10761 STRAP — | 73106-02 |
| DOUBLE ROW 6 WITH NUTS, WASHERS & 10763 STRAP — | 73106-03 |

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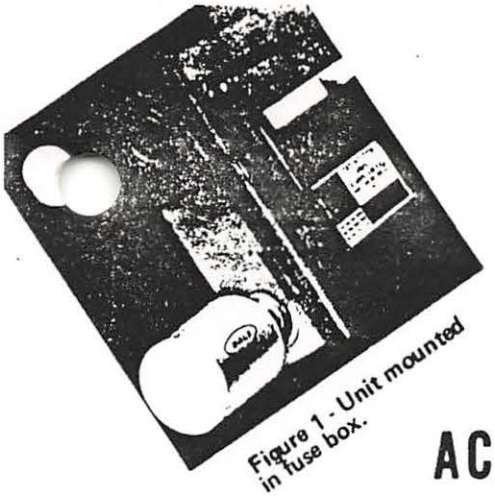


Figure 1 - Unit mounted in fuse box.

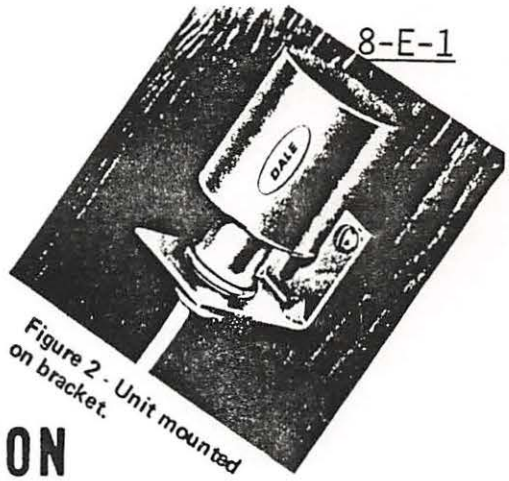


Figure 2 - Unit mounted on bracket.

# AC ARRESTER INSTALLATION

## MODEL SPA-100, SPA- 200 and SPA-400 Secondary Power Arrester

Dale arresters are designed to provide protection for electric appliances and equipment operating from nominal voltages of 120 volts (SPA-100), 277 volts (SPA-200) & 480 volts (SPA-400) line to ground.

While the arrester is specifically designed for installation on a fuse box, (Figure 1); the arrester may be installed on the sides of buildings, or on utility poles by using an angle bracket, (Figure 2). The arrester can be installed in either indoor or outdoor applications. The preferred mounting for outdoor installations, as shown in Figure 2, is with the can up and the nipple and wires down.

### FUSE BOX MOUNTING (External)

To mount the arrester on a fuse box, insert the wire leads and threaded nipple through a 7/8 inch knockout in the box. Thread the conduit locknut on the nipple from the inside of the box. Tighten for a secure mounting. Connect the wire leads to the service cables making permanent, tight electrical connections (see the wiring diagrams, Figure 3). For best protection, make the leads as short as possible. Connect the ground lead (green) first then connect the line lead (black).

### FUSE BOX MOUNTING (Internal)

For flush-mounted fuse boxes, and in other instances where mounting the arrester outside the fuse box is impractical, the unit may be installed inside the fuse box. The arrester can either be mounted using a bracket which is in turn, bolted to the side or back of the fuse box or by fastening to the side or back of the fuse box, with a piece of perforated metal strapping. **IMPORTANT: BE SURE TO FOLLOW GROUNDING INSTRUCTIONS BELOW.**

### BRACKET MOUNTING

Mount the arrester as close to the service entrance as possible (requires the permission of your electric utility). Attach angle bracket to the pole or the side of the building using self-tapping screws or nails. Place the threaded nipple through the 7/8 inch hole in the bracket with the wires pointing down (Figure 2), and thread on the conduit locknut. Tighten the nut sufficiently to make a secure mounting. Connect the arrester lead as in fuse box mounting, green lead first, to the neutral and black lead to the line.

### GROUNDING INSTRUCTIONS

**IMPORTANT:** Failure to follow the grounding instructions will prevent the arrester from properly protecting your circuits.

On installations of all types, check the circuit ground, or the neutral wire to make sure that it is well and properly grounded. A No. 8 or larger wire should be connected from the fuse box or mounting bracket to an 8' ground rod or equal.

### WARNING

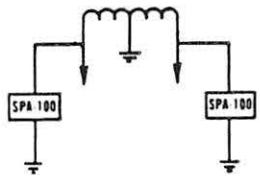
Only a qualified person should install the Dale secondary Power Arresters. Unqualified persons attempting installation may come into contact with dangerous voltages, or may incorrectly install the unit making it ineffective.

If you want to install the arrester outside, be sure to obtain permission from the local electric utility.

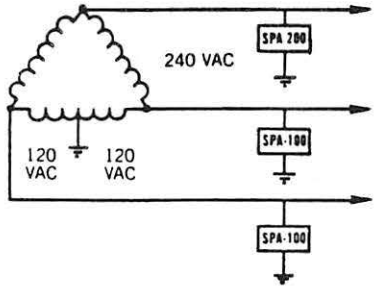
## WIRING DIAGRAMS

Shown below are approved methods of installing Dale SPA Arresters in 8 of the most frequently used types of secondary power connection. For installation information on any service connection not covered here, contact Surge Arrester Department, Dale Electronics, Inc.

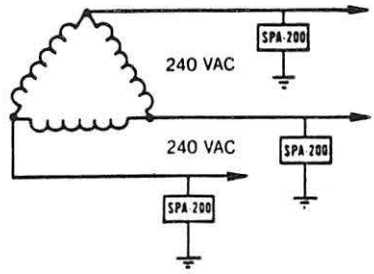
1. 120/240 VAC single phase



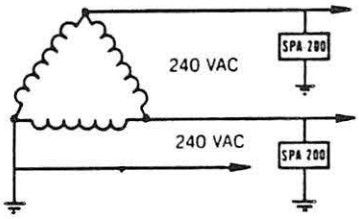

2. 240 VAC 3 phase delta



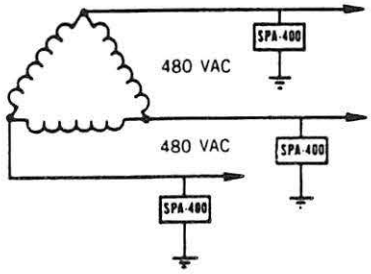

3. 240 VAC 3 phase delta



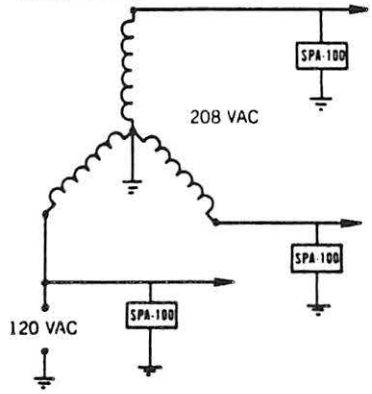

4. 240 VAC 3 phase delta



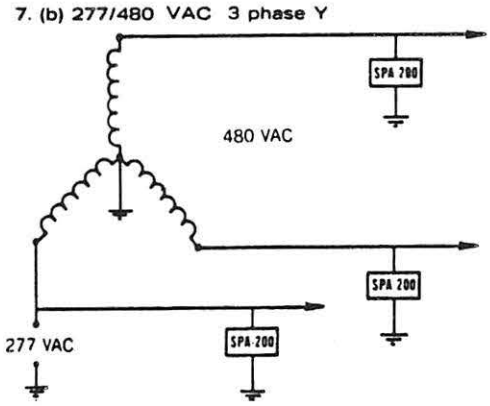

5. 480 VAC 3 phase delta



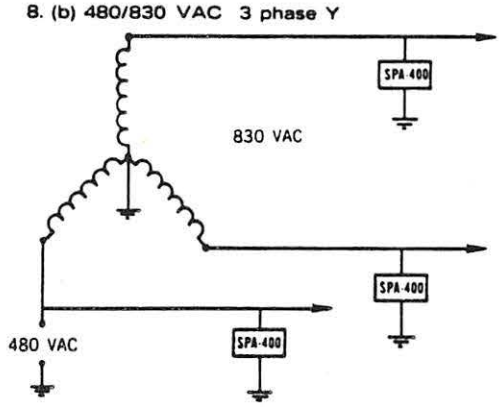

6. (a) 120/208 VAC 3 phase Y




7. (b) 277/480 VAC 3 phase Y




8. (b) 480/830 VAC 3 phase Y




## ARRESTER WARRANTY

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL OR IMPLIED. Dale Electronics, Inc., warrants that the Lightning Arrester delivered hereunder will be free from defects in material and workmanship. If within three (3) years from the date of purchase the lightning arrester delivered hereunder is defective because of either material or workmanship, the company shall furnish a replacement only. THE LIABILITY OF THE COMPANY ARISING OUT OF THE DELIVERY OF SAID ARRESTER OR ITS USE IS LIMITED TO SAID REPLACEMENT, AND SHALL CONSTITUTE THE SOLE REMEDY OF THE PURCHASER. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR CONSEQUENTIAL DAMAGES OR INSTALLATION CHARGES. THE COMPANY AUTHORIZES NO ONE TO ASSUME OR REPRESENT ANY OTHER WARRANTY OR LIABILITY IN CONNECTION WITH THIS PRODUCT OTHER THAN AS STATED HEREIN.

**DALE ELECTRONICS, INC.**

# HOT BOX DETECTOR PARTS LIST

| PART NUMBER | DESCRIPTION | DRAWING NO. |
|---|---|---|
| 15110-01 | SCANNER PROTECTOR FOR 132# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LB150041 |
| 15110-02 | SCANNER PROTECTOR FOR 90# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LB150041 |
| 15110-03 | SCANNER PROTECTOR FOR 100# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LB150041 |
| 15110-04 | SCANNER PROTECTOR FOR 115# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LB150041 |
| 15130-02 | PEDESTAL (FOUNDATION) FOR SERVO HOT BOX DETECTOR COMPLETE WITH SCANNER PLATE, WASHER PLATES, AND HARDWARE | LC150043 |
| 15130-03 | FOUNDATION FOR SERVO MODEL 8808 AND MODEL 8909 HOT BOX DETECTORS | LB150064 |
| 15138-01 | SCANNER PLATE, 1/2" X 39" X 24", USED WITH 15130-02 FOUNDATION | LA150046 |
| 15133-01 | WASHER PLATE, 1/4" X 3" X 24", USED WITH 15130-02 FOUNDATION | LA150048 |
| 15140-01 | 63" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150021 |
| 15140-02 | 35" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150006 |
| 15140-04 | 51" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 8808 DETECTOR | LC150027 |
| 15140-05 | 35" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 8808 DETECTOR | LC150026 |
| 15140-06 | 51" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 8808 DETECTOR | LC150027 |
| 15140-07 | 35" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 8808 DETECTOR | LC150026 |
| 15140-08 | 35" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150006 |
| 15140-09 | 63" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150021 |
| 15140-10 | 35" TRANSDUCER GUARD FOR 100# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150006 |

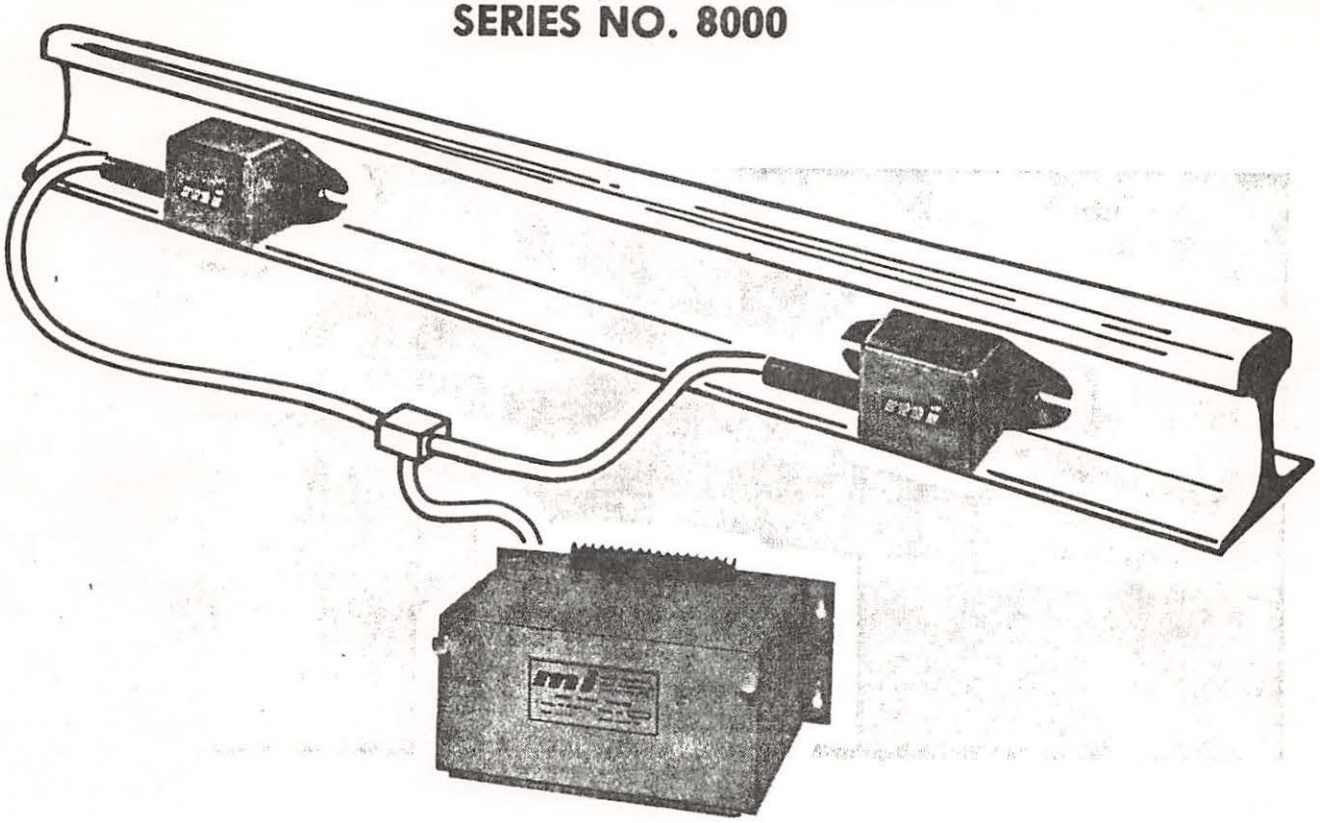
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## HOT BOX DETECTOR PARTS LIST
(CONTINUED)

| PART NUMBER | DESCRIPTION | DRAWING NO. |
|---|---|---|
| 15140-11 | 63" TRANSDUCER GUARD FOR 100# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150021 |
| 15140-12 | 45" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150047 |
| 15140-13 | 45" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 7707 DETECTOR | LC150047 |
| 15140-14 | 59" TRANSDUCER GUARD FOR 132# RAIL USED WITH SERVO MODEL 8909 DETECTOR | LC150063 |
| 15140-15 | 59" TRANSDUCER GUARD FOR 115# RAIL USED WITH SERVO MODEL 8909 DETECTOR | LC150063 |
| 15140-16 | 59" TRANSDUCER GUARD FOR 100# RAIL USED WITH SERVO MODEL 8909 DETECTOR | LC150063 |
| 15150-01 | EQUIPMENT RACK FOR HOT BOX LOCATOR USED WITH SERVO MODEL 7707 DETECTOR | LC150045 |
| 15166-01 | SCANNER GUARD FOR SERVO MODEL 8808 HOT BOX DETECTOR | LC150042 |
| 15190-01 | FIBER BASE PLATE FOR SCANNER FOR SERVO MODEL 7707 DETECTOR | LB150044 |
| 15191-01 | RIGHT SCANNER BRACKET FOR SERVO MODEL 7707 DETECTOR | LC150004 |
| 15191-02 | LEFT SCANNER BRACKET FOR SERVO MODEL 7707 DETECTOR | LC150005 |
| 72-02008 | ANTENNA MOUNTING BRACKET | LB720112 |

# RAILROAD WHEEL FLANGE DETECTORS
# SERIES NO. 8000





Detect passage of railroad wheels at any speed from ¼ to 150 MPH. Any desired number of detector heads - up to six may be powered from one control unit. Multiple installation for classification yards may be rack mounted providing up to 30 individual or 15 directional wheel counters in one 6" x 19" panel space. Each wheel counter/amplifier provides individual 3 amp relay contact outputs.

Pick up heads may be located over 2,000 feet from amplifiers. Thus presence, wheel-count and speed may be determined at one central location in class yards without complicated interfaces or repeaters.

Repeatability ± 1/16". Two heads located a known distance apart may be used as a very accurate speed detector on test track sections with much more reliability than treadle switches or other electro-magnetic or electro mechanical devices.

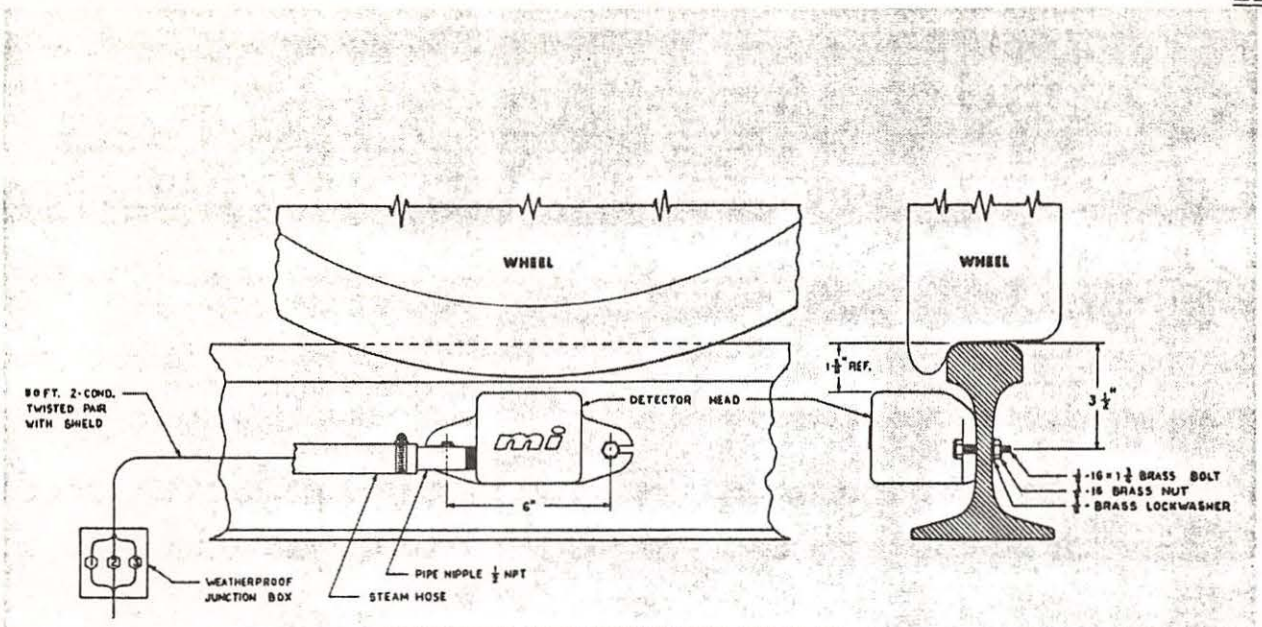
Individual wheel count or adjustable longer time delays for presence indication, make the NO. 8000 detectors especially attractive for use on:

(1) Weigh in motion scales.
(2) Automatic greasing or oiler locations.
(3) Equipment turn-on at inspection points for -
    a. dragging equipment detector
    b. car clearance detectors
    c. hot box detector locations
    d. T.V. camera locations
(4) Count in - Count out at interlocking plants for signal control.

All amplifiers are solid state differential, practically immune to false counts from transients or overload surges. Sensitivity may be adjusted as required to compensate for installation variations in pick up head mountings. Pick up heads are housed in very rugged, thick walled bronze castings held by two 3/8" brass bolts, (shearable), through the web of rail. Slotted mounting feet allow horizontal adjustment for pin-point accuracy of installation as needed for speed determination.

For class yard grease or oiler installations the NO. 80003-01 contains a solid state LED two digit readout, presetable to any number of wheel counts up to 99, to supply a controlled amount of grease or oil to any preselected wheel count. The 80003-01 is directional to supply lubrication when wheels are passing in one direction only.

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DETECTOR HEAD MOUNTING DETAILS

# MULTIPLE WHEEL COUNTER SPECIFICATIONS:

Built in surge protection.

12 volt DC operation at 500 Ma-Max. or 110V-60HZ at 15 Va Max.

Plug in circuit cards - 2 amplifiers per card.

Wheel detection ¼ mph to 150 mph.

Rack, panel, or shelf mtg.

Cabinet for signal case installation - Size 13½" long x 9¼" deep x 6" high.

Differential amplifiers for low noise and stability.

Adjustable sensitivity.

Adjustable timing for presence detection up to 60 secs.

Dry 3A relay contact output NO, NC, or SPDT.

Operating temp. range - 55 to +150°F.

Detector Heads - flange mtg. for bolting to web of rail.

Shielded twisted pair for long noisy runs.

Twisted unshielded for short runs.

Heads supplied with 50 feet shielded pair.

Detector heads housed in thick bronze casting shielded to ignore relative motion of tie plates, track spikes or any other objects which do not pass directly over the head.

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MANUFACTURERS OF RAILROAD EQUIPMENT

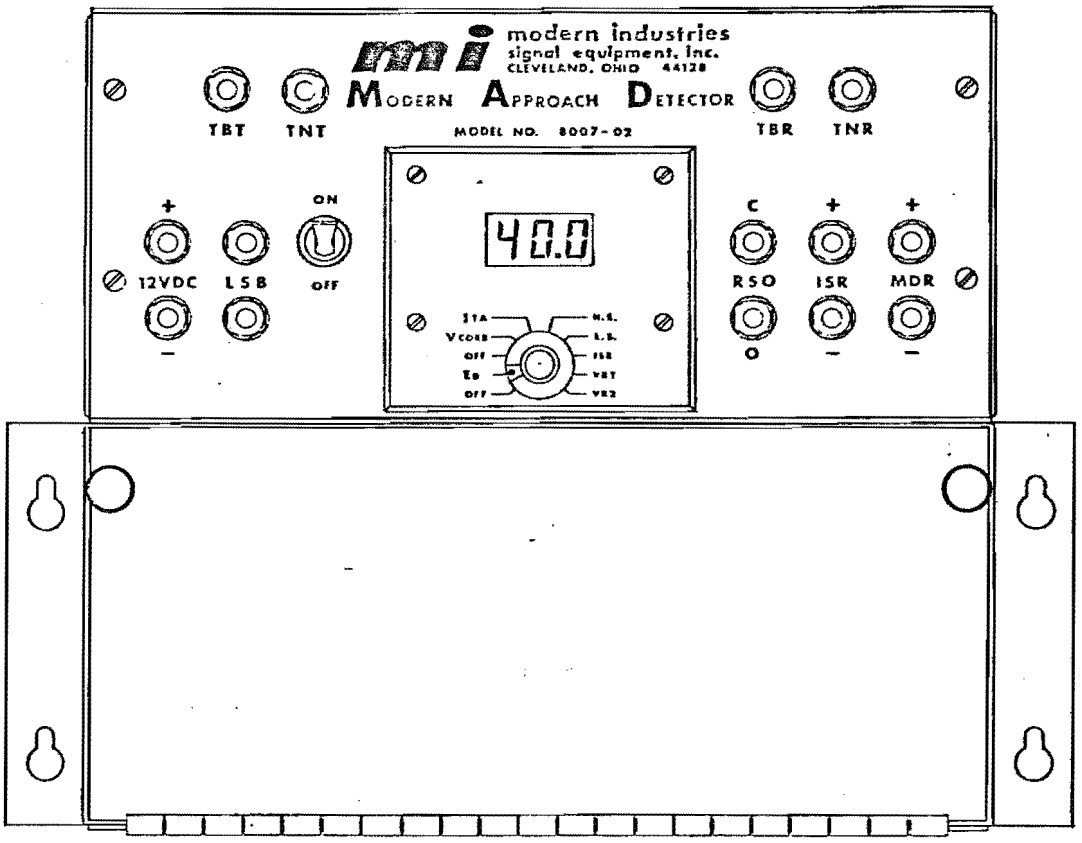
modern industries signal equipment, inc.
20710 MILES PARKWAY • P.O. BOX 28500 • CLEVELAND, OHIO 44128 • PHONE:216/663-3444

FAXED
MAR 6 2006

# MODERN APPROACH DETECTOR

## MODEL 8007-02 M A D

## INSTRUCTION MANUAL




THIS MANUAL COVERS ALL UNITS STARTING WITH SERIAL NO. 1053.

(IN ADDITION TO NOS. 1025, 1028, & 1039)

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# SPECIFICATIONS - MAD - 8007 MODERN APPROACH DETECTOR

| | |
|---|---|
| Input Voltage | 10.5 to 14 VDC |
| Input Current | 800 to 850 MA |
| Automatic Ballast Compensation Dynamic Range | .5 to 20 Ohms ZT |
| Output Impedance | 2 Ohms |
| Input Impedance | 25 Ohms |
| Mode of Operation | Pulse Modulated |
| Self-Check Rate | Constant at Fo |
| Relay Drive - MDR | 9.25 volts across 500 Ohms |
| Relay Drive - Island (optional) | 9.25 " " " " |
| Receiver Sensitivity | -55 DB |
| Transmitter Output Current-Self Adjusting | 100 to 900 MA |
| Shunting Sensitivity | 5 to 10 feet IS ring-by |
| Loss of Shunt & Delayed Pick up-Min. | 10 Seconds |
| Frequency Stability | .003% per $^{o}C$ |
| Operating Temp Range | -40 to +85$^{o}C$ |
| High and Low Signal Detection Points | As specified |
| Operational Channels | 24 |

# I N T R O D U C T I O N

The Modern Approach Detector, MAD, 8007, uses frequencies in the audio spectrum to activate grade crossing protection devices, in advance of, and during the presence of railroad trains at grade crossings. It is completely solid state, and contained in one aluminum housing suitable for either shelf or wall mounting, in railroad signal cases. Printed circuit boards perform the hereinafter described functions.

The MAD contains one transmitter and one receiver each connected to the tracks from a signal-case via individually twisted pairs of #9 wire or larger, so that transmitted and received signals appear normally on opposite sides of the crossing.

Note: For single ended approaches one MAD does not span the crossing but tie points of the second unit should be placed far enough apart (100 ft.) to simulate a second island to prevent premature pickup and drop out during a receeding move when a long car may span too short a distance between tie points.

The section of track between the transmitter and receiver is designated as a crossing island. Sections of rail outside of the island are known as approaches, which lengths are defined by, "beginning of approach shunts", or termination shunts, either tuned, broadband or hardwire. The termination shunts effectively determine where an approaching train will first be detected by the MAD, and when trains are not present, function to contain the audio signal within the desired confines of the approaches.

Lengths of approaches and proper placement of termination shunts is determined by the maximum expected train speed, and minimum required warning time. The length of an island is determined mostly by the width of the grade crossing, but must never be shorter than the longest cars expected, so that lockout is firm when the island is occupied.

The MAD is pulse modulated at a rate of approximately 8 pulses per second. The transmitted pulses and the received pulses are compared in such a manner that any other erroneous signals which might appear in the receiver will result in activation of crossing warning devices. Self check is continuous at frequency of operation.

When an approaching train crosses a termination shunt, a voltage which is proportional to the distance to the shunt (ED) will begin to drop, at a rate determined by the train speed. The MAD sensitivity may be adjusted to give a constant warning time for trains traveling at the same speeds. When the E.D. (distance vs voltage) drop exceeds a predetermined rate, the MDR (motion detection relay) is released. If the train ceases its forward motion before reaching the island (IS) crossing, a delayed pickup of a minimum of 10 seconds is initiated before deactivation of crossing warning devices.

The E.D. drop rate for any approaching train, even at a steady rate of speed, is never constant. Through out an approach, ballast conditions, distance to the crossing, and the signal frequency being used, each influence the linearity of the E.D. drop. Sensitivity to motion is greater for the faster drop, which always occurs closer to the island crossing. To prevent excessive gate-down time, sensitivity may be adjusted to allow a very slow train to approach much closer before detection. A minimum gate-down time may thus be realized that is always as much, but never less than required for minimum warning time.

As the train shunt clears the tie points of the MAD and begins to recede from the crossing, the ED and island voltages will reappear, and the MDR will recover.

In addition to the basic motion detection functions, the MAD has other features that are designed to provide operation under a variety of application conditions. One of the most difficult things to determine before placing any motion detector in service, is the actual lumped impedance into which the unit will be looking electrically. Also no matter what the basic impedance may be, it will be altered somewhat, especially frequency-wise, by addition of any other selective audio equipment.

The MAD will supply this information at the time of installation, and monitor changing conditions as they occur. Other features are:

1. Automatic ballast compensation (ABC)
2. Loss of shunt (LOS)
3. Low signal/low gain sensing (LS)
4. High signal/broken rail sensing (HS)
5. Delayed pick up (DPU)
6. Delayed drop out (DDO) for reverse switch overide (RSO)
7. Built in LCD meter to monitor all important voltages and currents.

   NOTE: In event of failure of the LCD meter, provisions are also made for use of an external 20,000 ohm per volt meter, to monitor the ED and Vcorr voltages. See layout on inside of hinge down front panel, for location of external metering points.

## (1) MANUAL ADJUSTMENT VS AUTOMATIC BALLAST COMPENSATION

The MAD has provisions for two modes of operation. Either (A) manual, or (B) automatic. Either mode may be used at the option of the user. However the functions of each should be understood, and some direct comparisons follow:

(A). In manual operation - the E.D. level is always proportional to ballast and track conditions. When the track is bad, the E.D. will be low, but higher for better conditions. The operational window between Lo 30 volt and Hi 51 volt signal is fixed. Excursions of E.D. in excess of ±10 volts will thus result in crossing warning devices being actuated.

(B). In automatic operation - track conditions are monitored, and compensated for on a 15 minute correction cycle. Both Lo and Hi signal points exist as before, but slow changes or drift, do not influence the E.D. level which remains constant between closer preset limits, at approximately 40 volts. The operational window is effectively more than tripled to over 60 volts in width.

(A). Man. - Track power and receiver gain must each usually be adjusted for seasonal changes.

(B). Auto. - Both track power and receiver gain are automatically optimum for existing track conditions.

(A). Man. - Installation requires an initial adjustment of both transmitter power and receiver gain in prescribed amounts.

(B). Auto. - Most installations will require no adjustments. If extremely adverse conditions either high or low exist, a simple, one time adjustment may be made.

(2) LOSS OF SHUNT PROTECTION

When a train enters an approach there are conditions, such as rusty rail, which normally might cause a momentary loss of shunt. It goes without saying that a shunt must be realized before it can be lost. Each time a shunt is made, and then lost, a ten second D.P.U. is initiated. This will allow short sections of shunt metal to be used on exceptionally bad rail with no pumping of gates. When an island is occupied, the D.P.U. is cancelled for receding moves.

(3) LOW SIGNAL/LOW GAIN DETECTION

The E.D. voltage developed by the MAD will adjust itself internally and be maintained constant under most track conditions. However should ballast resistance variations with weather conditions drop the E.D. to a selected predetermined level, without detecting motion, a low signal detector will drop the MDR, activating the crossing warning devices. This low signal point can be adjusted to meet specific installation requirements, but as received from the factory will be set at 30 volts.

In either automatic or manual modes, MDR drop out is permanent, whenever the E.D. drops below the selected low signal point without first having seen motion. When a number of switches exist in an approach, it may be desirable to disable the low signal detector while car switching is taking place. Terminals are available for remote control of this function.

(4) HIGH SIGNAL/BROKEN RAIL DETECTION

The high signal/broken rail detector circuit, will release the MDR when the E.D. voltage exceeds a predetermined level for conditions of a broken rail or high resistance bond, within the limits of the approach circuit. A lock out option is available. The low signal, and high signal detector circuits, are important to detect undesirable faults in the track circuit. It is imperative that no readjustment of the E.D. be

attempted until the approach circuits have been thoroughly inspected, after a (HS) condition is indicated. If a track fault is located, and corrected, the MAD should require little or no adjustment. If no specific track fault is located, the detection, could have been the result of a change in track conditions which exceeded the limits of the "operational window" determined by the LS-HS set points, or an intermittent battery power supply, which also lights the HS indicator.

(5) DELAYED PICK UP 1) DPU 2) LOS

The DPU feature serves these two functions: If a loss of shunt were to occur during the time motion is being detected, the E.D. will rise to a higher level, but crossing warning devices will remain activated for a minimum of 10 seconds.

Each time motion is again detected, another complete 10 seconds is initiated, before the MDR can recover. Note that the time period is initiated after internal MAD recovery, and not from the time that motion was first detected.

This feature allows the MAD to maintain continuous protection during very intermittent shunting, which might occur, and continue intermittently during any approach move. If the receding move creates intermittent shunting, the crossing protection may again also be activated, for ten seconds, and other arrangements must be made to preclude this, such as a DC circuit with time delay to drop out. The D.P.U., is cancelled by island occupancy to allow rapid recovery of MDR, when the island is cleared.

(6) DELAYED DROP OUT & REVERSE SWITCH OVERRIDE (RSO)

This feature requires an additional PC BD, which is only supplied on separate order. A delayed drop out is used for a reverse switch override. When a switch occurs in an approach, and it is not desired to operate crossing protection during an entering but receding move, - the RSO circuit will initiate a non-repeat (one time), disabling of crossing protection for approximately 10 seconds. This is accomplished

by hardwiring to a single-pole-double-throw set of contacts in the remote switch, or a repeater relay operated when the remote switch is off normal.

When the remote switch is off normal, a hardwire, or double broadband shunt, must be placed across the main line between the remote switch and the crossing, to preclude detection of each new truck, as it drops onto the main line. After the 10 second RSO period has expired,the MAD will again be responsive to further approaching moves, on the main line. The RSO control circuit, should be wired through a back contact on the crossing MDR or XR, to give priority to any previously detected approaching move. See page 26 for RSO hookup.

## (7) MONO DIRECTIONAL MOTION DETECTION

Under normal conditions a sudden shunt on the track which reduces the (ED) level below the (LS) low signal point does not initiate the low signal bypass (LSBP). However when single ended approaches are used each unit involved will receive sudden shunts as the train traverses the insulated joints separating the two MADs. A strap or wire loop in the center of PC BD #2 must be opened to allow (LSBP) to be initiated for sudden shunts and thereby prevent a gates-down condition until the ED has risen to the 30 volt low signal point during a receding move.

## SECTION II. SELECTION OF FREQUENCIES AND STARTING SHUNTS

Several important steps should be taken to insure frequency compatability.

1. Consult the speed tables on page 12. Determine the length of approach, and desired warning time, for the fastest trains. Add five miles an hour to fastest train speed expected, read to the right for desired warning time, and plan to install shunts at distance indicated. If the distance indicated is in the clear, not overlapping approaches to the other protected crossings, and the track is not coded, broadband shunts may be used.

The majority of protected crossings occur in bunches through towns and cities, and it is recommended that the noise level on the tracks be kept as low as possible. Installing broadband shunts for the outer-most approach starts, will help isolate a particular area.

2. Figures, graphs and charts included in this manual must of necessity be based on the assumption that ballast and rail conditions are linear throughout an approach. Other grade crossings, switches, interlockings, etc., occuring in the approach, likely as not, will be seen as lumps of impedance, and must be dealt with. No matter what condition the track is in - to detect movement of an approaching train at any distance, some signal must be present at the point of detection.

The "distance versus frequency and ballast resistance" chart on page 13 represents the theoretical maximum distance that train motion may be detected - again assuming linear conditions. Do not select a frequency which is capable of use for much greater distances than needed. Likewise too high a frequency may not go far enough. As an added guide to frequency selection, consult the graph on page 14 which represents the figures on page 13, in graphic form.

3. Assuming a frequency has been selected for a given distance, placement and type of shunts are next important. Various shunts attenuate the track signal

to different degrees. A tuned shunt can reduce a signal from 18 to 22 DB, a broadband by approximately 30 DB, and a hardwire, depending on conductor size, between 30 and 35 DB.

Normally a tuned shunt may be placed at the calculated distance required for detection. A broadbandpass shunt should be moved outward another 50 to 100 feet. A hardwire shunt up to 200 feet further. Remember a signal must be present at the point of detection and the broadband and hardwire shunts have a very large effect.

4. Compatibility with other frequencies. The MAD contains very selective filters in both transmitter and receiver. However tuned shunts, which are used to define beginnings of approaches, are quite broad by comparison. Other tuned shunts appearing in approaches, may act as lumps of lower impedance and could shorten approach warning times.

Five rules of thumb will help in determining compatibility of multiple adjacent crossing frequencies:

A. An adjacent channel shunt should never appear in an approach. Skip two channels for the next crossing.

B. A shunt one channel or more removed may be placed in an adjacent island when concurrent starts are possible and the crossings are the right distance apart.

C. Where beginnings of two approaches fall at the same distance from two crossings = adjacent channels may be used, and the two shunts placed at the same point. Of course more separation may be used at any time.

D. Avoid all third harmonic relationships between any adjacent crossing or overlaps of approaches. For instance; Channel 1 is 313 Hz, the third harmonic of which is 939 Hz. Channel 11 is 928.1 Hz and some interference may be encountered if they are used on adjacent crossings and approaches are overlapped.

E. Whenever a tuned shunt for one crossing appears in a approach to another, where possible, extend the approach distances by placing the opposing shunts in the other crossing islands. A few hundred feet of extension on any long approach will not increase the warning time appreciably, but will help maintain approach linearity. Insulated joints appearing in approaches should be bypassed with appropriate couplers either broadband or hi-pass as discussed later in this manual.

## SPEED TABLE FOR CROSSING SIGNAL STARTS

| SECONDS | | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MILES PER HOUR | FEET PER SECOND | DISTANCE TRAVELED IN FEET | | | | | | | | | | |
| 1 | 1.46 | 14.6 | 22.0 | 29.3 | 36.6 | 44.0 | 51.3 | 58.6 | 66.0 | 73.3 | 80.6 | 88.0 |
| 2 | 2.93 | 29.3 | 44.0 | 58.6 | 73.3 | 88.0 | 102.6 | 117.3 | 132.0 | 146.6 | 161.3 | 176.0 |
| 3 | 4.4 | 44 | 66 | 88 | 110 | 132 | 154 | 176 | 198 | 220 | 242 | 264 |
| 4 | 5.86 | 58.6 | 88 | 117.3 | 146.6 | 176 | 205.3 | 234.6 | 264 | 293.3 | 322.6 | 352 |
| 5 | 7.3 | 73 | 110 | 147 | 183 | 220 | 257 | 293 | 330 | 367 | 403 | 440 |
| 10 | 14.6 | 146 | 220 | 293 | 366 | 440 | 513 | 587 | 660 | 733 | 807 | 880 |
| 15 | 22.0 | 220 | 330 | 440 | 550 | 660 | 770 | 880 | 990 | 1,100 | 1,210 | 1,320 |
| 20 | 29.3 | 293 | 440 | 587 | 733 | 880 | 1,027 | 1,173 | 1,320 | 1,467 | 1,613 | 1,760 |
| 25 | 36.7 | 367 | 550 | 733 | 917 | 1,100 | 1,283 | 1,467 | 1,650 | 1,833 | 2,017 | 2,200 |
| 30 | 44.0 | 440 | 660 | 880 | 1,100 | 1,320 | 1,540 | 1,760 | 1,980 | 2,200 | 2,420 | 2,640 |
| 35 | 51.3 | 513 | 770 | 1,027 | 1,283 | 1,540 | 1,797 | 2,053 | 2,310 | 2,567 | 2,823 | 3,080 |
| 40 | 58.7 | 587 | 880 | 1,174 | 1,467 | 1,760 | 2,053 | 2,347 | 2,640 | 2,933 | 3,227 | 3,520 |
| 45 | 66.0 | 660 | 990 | 1,320 | 1,650 | 1,980 | 2,310 | 2,640 | 2,970 | 3,300 | 3,630 | 3,960 |
| 50 | 73.3 | 733 | 1,100 | 1,467 | 1,833 | 2,200 | 2,567 | 2,933 | 3,300 | 3,667 | 4,033 | 4,400 |
| 55 | 80.7 | 807 | 1,210 | 1,613 | 2,017 | 2,420 | 2,823 | 3,227 | 3,630 | 4,033 | 4,437 | 4,840 |
| 60 | 88.0 | 880 | 1,320 | 1,760 | 2,200 | 2,640 | 3,080 | 3,520 | 3,960 | 4,400 | 4,840 | 5,280 |
| 65 | 95.3 | 953 | 1,430 | 1,907 | 2,383 | 2,860 | 3,337 | 3,813 | 4,290 | 4,767 | 5,243 | 5,720 |
| 70 | 102.7 | 1,027 | 1,540 | 2,053 | 2,567 | 3,080 | 3,593 | 4,107 | 4,620 | 5,133 | 5,647 | 6,160 |
| 75 | 110.0 | 1,100 | 1,650 | 2,200 | 2,750 | 3,300 | 3,850 | 4,400 | 4,950 | 5,500 | 6,050 | 6,600 |
| 80 | 117.3 | 1,173 | 1,760 | 2,347 | 2,933 | 3,520 | 4,107 | 4,693 | 5,280 | 5,867 | 6,453 | 7,040 |
| 85 | 124.7 | 1,247 | 1,870 | 2,493 | 3,117 | 3,740 | 4,363 | 4,987 | 5,610 | 6,233 | 6,858 | 7,480 |
| 90 | 132.0 | 1,320 | 1,980 | 2,640 | 3,300 | 3,960 | 4,620 | 5,280 | 5,940 | 6,600 | 7,260 | 7,920 |
| 95 | 139.3 | 1,393 | 2,090 | 2,787 | 3,483 | 4,180 | 4,877 | 5,573 | 6,270 | 6,967 | 7,663 | 8,360 |
| 100 | 146.7 | 1,467 | 2,200 | 2,933 | 3,667 | 4,400 | 5,133 | 5,867 | 6,600 | 7,333 | 8,067 | 8,800 |
| 105 | 154.0 | 1,540 | 2,310 | 3,080 | 3,850 | 4,620 | 5,390 | 6,160 | 6,930 | 7,700 | 8,470 | 9,240 |
| 110 | 161.3 | 1,613 | 2,420 | 3,227 | 4,033 | 4,840 | 5,647 | 6,453 | 7,260 | 8,067 | 8,873 | 9,680 |
| 115 | 168.6 | 1,686 | 2,530 | 3,373 | 4,217 | 5,060 | 5,903 | 6,747 | 7,590 | 8,434 | 9,277 | 10,120 |
| 120 | 176.0 | 1,760 | 2,640 | 3,520 | 4,400 | 5,280 | 6,160 | 7,040 | 7,920 | 8,800 | 9,680 | 10,560 |

NOTE: WHERE LENGTH OF TRACK CIRCUIT IS KNOWN, TIME IN SECONDS CAN BE DETERMINED BY DIVIDING ITS LENGTH IN FEET BY "FEET PER SECOND" AT TRAIN SPEED SELECTED.

## DISTANCE vs FREQUENCY vs BALLAST RESISTANCE IN OHMS PER 1000 FEET

| CHANNEL | FREQ. | .5 OHM | 1 OHM | 2 OHM | 4 OHM | 6 OHM | 8 OHM | 10 OHM | 20 OHM |
|---|---|---|---|---|---|---|---|---|---|
| C | 203.5 Hz | 1251 | 1769 | 2501 | 3537 | 4332 | 5003 | 5593 | 7910 |
| B | 241.8 | 1147 | 1623 | 2295 | 3245 | 3974 | 4589 | 5131 | 7256 |
| A | 280.8 | 1065 | 1506 | 2129 | 3011 | 3688 | 4259 | 4761 | 6734 |
| 1 | 313.0 | 1008 | 1426 | 2017 | 2852 | 3493 | 4034 | 4510 | 6378 |
| 2 | 349.0 | 955 | 1351 | 1910 | 2701 | 3308 | 3820 | 4271 | 6040 |
| 3 | 389.0 | 905 | 1279 | 1809 | 2558 | 3134 | 3618 | 4045 | 5721 |
| 4 | 433.7 | 857 | 1212 | 1713 | 2423 | 2968 | 3427 | 3831 | 5418 |
| 5 | 483.5 | 811 | 1147 | 1623 | 2295 | 2811 | 3246 | 3629 | 5132 |
| 6 | 539.0 | 768 | 1087 | 1537 | 2174 | 2662 | 3074 | 3437 | 4860 |
| 7 | 600.9 | 728 | 1029 | 1456 | 2059 | 2521 | 2911 | 3255 | 4603 |
| 8 | 669.9 | 689 | 975 | 1379 | 1950 | 2388 | 2757 | 3083 | 4360 |
| 9 | 746.8 | 653 | 923 | 1306 | 1846 | 2262 | 2611 | 2920 | 4129 |
| 10 | 832.5 | 618 | 874 | 1237 | 1749 | 2142 | 2473 | 2765 | 3911 |
| 11 | 928.1 | 586 | 828 | 1171 | 1656 | 2029 | 2342 | 2619 | 3704 |
| 12 | 1034.0 | 555 | 785 | 1110 | 1569 | 1922 | 2219 | 2481 | 3509 |
| 13 | 1151.0 | 526 | 744 | 1052 | 1487 | 1822 | 2104 | 2352 | 3326 |
| 14 | 1281.0 | 498 | 705 | 997 | 1410 | 1727 | 1994 | 2229 | 3153 |
| 15 | 1425.0 | 473 | 668 | 945 | 1337 | 1637 | 1890 | 2114 | 2989 |
| 16 | 1585.0 | 448 | 634 | 896 | 1268 | 1552 | 1792 | 2004 | 2834 |
| 17 | 1764.0 | 425 | 601 | 850 | 1201 | 1472 | 1699 | 1900 | 2687 |
| 18 | 1963.0 | 403 | 569 | 805 | 1139 | 1395 | 1611 | 1801 | 2547 |
| 19 | 2185.0 | 382 | 540 | 763 | 1080 | 1322 | 1527 | 1707 | 2414 |
| 20 | 2432.0 | 362 | 512 | 724 | 1023 | 1253 | 1447 | 1618 | 2288 |
| 21 | 2706.0 | 343 | 485 | 686 | 970 | 1188 | 1372 | 1534 | 2169 |

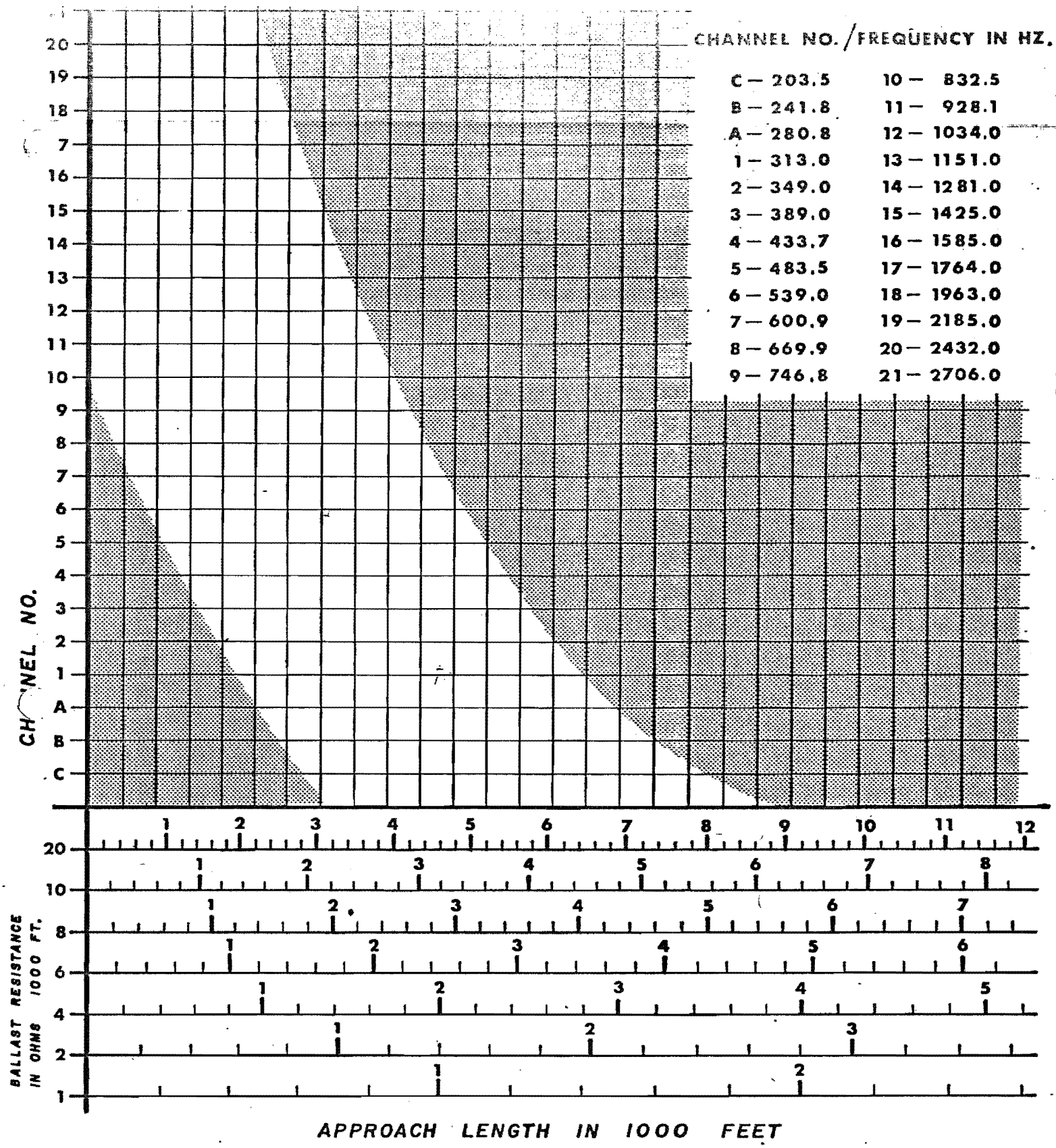
$$D = \sqrt{\frac{2R_{B/ft.}}{\pi F L/ft.}}$$

D = DISTANCE IN FEET
F = FREQUENCY

$R_{B/ft.}$ = BALLAST RESISTANCE IN OHMS PER FOOT
L/ft. = INDUCTANCE PER FOOT (TABLE VALUE = 1 uh PER FOOT)

ABOVE TABLE INDICATES THE MAXIMUM DISTANCE vs FREQUENCY vs BALLAST CONDITIONS OVER WHICH THE MAD WILL DETECT MOTION (ASSUMING LINEAR CONDITIONS). THESE DISTANCES REPRESENT THE CHARACTERISTIC IMPEDANCE POINT OF THE TRACK, BUT THEY ARE INFLUENCED CONSIDERABLY BY ANY OR EACH OF THE FOLLOWING:

1: RAIL SIZE
2: RAIL TYPE (RIBBON OR BONDED)
3: TYPE OF BOND USED
4: ADJACENT CROSSINGS, SWITCHES, INSOLATED JOINTS
5: TYPE OF BEGINNING-OF-APPROACH SHUNT (TUNED, BROADBAND OR HARDWIRE)




FREQUENCY VS APPROACH LENGTH WITH VARIOUS BALLAST CONDITIONS

To make proper frequency selection, locate approach length on the appropriate ballast resistance scale, and run a vertical line up through the channel no. chart.

All channel no. horizontal lines which intersect the previously drawn vertical line WITHIN THE UNSHADED AREA indicate those frequencies which may be used.

All frequency/distance intersections occuring in the upper shaded area should be avoided, since, under certain conditions, they may result in short approach warning times.

## SECTION III. INSTALLATION GUIDE LINES - MAD

A. MAD meter and connection panel layout.

1. Wiring to the track from the signal case for the MAD, should be made with #9 or larger insulated twisted pair wires. Isolate the transmitter and receiver lines as much as possible. Do not stagger the actual track connections. Be sure the island is long enough, so that a long car could not span these island connections. Track lines should connect to lightning arrestors, as close as possible to where the lines enter the signal case.

2. When track leads are brought into a case, lightning arrestors should be very close to the point of entry. This is standard with most railroads but care should be taken not to cable audio carrying wires with any other lines either before, or after, the lightning arrestors.

3. Connections from lightning arrestors to transmitter output and receiver input, of the MAD should be made as directly as possible using #20 or #22 twisted pair conductors at least 3 feet long. These small twisted pairs, are very necessary to protect internal components from lightning, or other high voltage transients. Several feet of these small tight twisted pairs serve as a delay line allowing much slower lightning arrestors to fire, before internal damage can be done. Under no conditions should track lead arrestors be used which contain inductive or capacitive elements, such as the SP-15, or SP-16.

4. Any batteries or coding devices connected to the track whenever audio is present, must have a track battery reactor, or code filter, in series with at least one leg of the two lines connecting to the rails. All relay lines connected to the MAD should be twisted pairs, kept as short and directly routed as possible.

5. Where insulated joints appear in approaches, in non-code, or slow code areas, broadband couplers should be installed around each joint. The broadband couplers must be placed as close as possible, preferably buried just below the ballast, to the joints. Do not run long leads, or signal case mount the couplers. When long leads are used, the result is a change of track impedance which could have the effect of shortening approach warning times.

6. When installation is made on jointed rail - all joints inside the desired approach warning distance, and for several hundred feet beyond, must be bonded. Short railhead welded bonds, either single, or double, are best. Long web of rail bonds, even double, will very definitely shorten approach warning time. To the MAD, 2000 feet of track using long web of rail plug bonds will appear as the equivalent of approximately 3000 feet of ribbon rail. If web of rail bonds are in use, much lower frequencies must be used to achieve the necessary approach distances as indicated on graph (page No. 14).

7. When insulated joints appear outside of, but close to beginning of approach shunts, it may be necessary to broadband couple these joints to prevent undesired operation of crossing warning devices, as a train appears suddenly - but still outside of the approach shunts.

8. In bi-directional operation it is not always possible or desirable to have both approaches equal in length. In many cases single direction detection is also a necessity or a practice. The first dependable detection of motion distance is at the characteristic impedance point on the rails with reference

to frequency, power and ambient track conditions as shown on graph on page No. 14 . These figures apply to either single or double ended approaches, the only pre-requisite being a signal level sufficient to reach to the beginning of approaches. If however larger changes of ballast resistance occur in one approach, and track power is not increased, that approach length could be shortened. The MAD, in automatic, will largely compensate for or eliminate this possibility, again assuming linear track conditions throughout the approach.

9. If variations in approach lengths of greater than 2 to 1 exist, it is advisable to install an insulated joint on one side of the crossing and operate the MAD in single direction detection only. This applies mostly to long distance higher speed approach distances. For very short approaches of only a few hundred feet - an altogether different set of circumstances exist. Here distance tables and graphs will not apply but the MAD may be adjusted for almost any track length or ballast condition. This will be covered in more detail in the technical section of this manual.

## IV. INSTALLATION PROCEDURE AND PRECAUTIONS

If possible determine a time of average track conditions for installation, and perform all of the following steps.

Do not turn on the battery power switch until all of the following steps have been taken.

1. Install all track connections and check for proper rail phasing. TNR to TNT and TBR to TBT by resistance check.

2. Install beginning of approach shunts.

3. Couple around insulated joints in approaches.

4. Connect an MDR, 500 to 1000 ohm relay to terminals as marked.

5. As before stated - a firm island is achieved without the use of an island relay, but if used the same - 500 or 1000 ohm coil values should be used.

6. Check for Battery voltage 11 to 14 volts.

7. Be sure all connections are tight.

8. Do not connect MDR or IS relay contacts until some familiarity with relay action is achieved.

9. Do not apply power before reading Section V.

## V. SET UP PROCEDURE

Determining Track Impedance Before Final Adjustment

A. The MAD as received from the factory is adjusted to provide 200 MA of track current into a 3.0 ohm load. If an installation is made properly the effective lumped track impedance may be determined quite accurately. Follow steps below in sequence making no adjustment until called for. Recheck Section III of this instruction manual. then ----

Step 1. With manual-auto switch on PCBD #4 in automatic turn on battery power.

Step 2. Wait for, or assist with the speed Up or Down switch, the ED to settle at 40 volt ± .1 volt and wait several minutes.

Step 3. Put internal meter switch on $I_TA$ to read total track current direct, in MA. If a reading of 218 MA were obtained, with ED at 40 V, consulting the chart on page 20, would indicate an effective track impedance of 2.7 ohms.

Switching the meter to Vcorr position, a 3.36V level would be seen. Note and retain these figures for final set up purposes and future reference.

| EXAMPLE ONLY | | ACTUAL | |
|---|---|---|---|
| $I_TA$ | = 218 MA | $I_TA$ | _____ |
| ED | = 40 V | ED | _____ |
| Vcorr | = 3.36 V | Vcorr | _____ |
| $Z_T \Omega$ | = 2.7 $\Omega$ | $Z_T \Omega$ | _____ |

V. SET UP PROCEDURE (CONT'D)

B. MAD Dynamic Range Charts

Ved = Distance vs. Voltage
$Z_T$ = Lumped Track Impedance
Vcorr = Auto. Correction Voltage
$I_TA$ = Track Current in MA.

| IN AUTOMATIC MODE | | | | | | | IN MANUAL XMTR MODE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ← LCD → | | | ← $F_SVM$ → | | | | ← LCD → | | | ← $F_SVM$ → | |
| $Z_T$ | Vcorr | $I_T$ | Ved | $Db_T$ | $Db_R$ | | $Z_T$ | Vcorr | $I_T$ | Ved | $Db_T$ | $Db_R$ |
| 10.0 | 3.19 | 176 | 40 ±.5 | -10.6 | -11.2 | | 10.0 | 3.33 | 242 | 46.1 | -8.4 | -9.0 |
| 8.0 | 3.20 | 178 | | -10.8 | -11.5 | | 8.0 | 3.33 | 234 | 45.9 | -8.8 | -9.5 |
| 6.0 | 3.23 | 163 | | -12.0 | -12.8 | | 6.0 | 3.33 | 222 | 45.4 | -10.0 | -10.5 |
| 5.0 | 3.26 | 170 | | -12.2 | -13.0 | | 5.0 | 3.33 | 220 | 45.0 | -10.0 | -11.2 |
| 4.0 | 3.28 | 183 | | -12.4 | -13.4 | | 4.0 | 3.33 | 218 | 43.5 | -11.1 | -12.0 |
| 3.5 | 3.31 | 192 | | -12.4 | -13.4 | | 3.5 | 3.33 | 218 | 42.7 | -11.7 | -12.7 |
| 3.0 | 3.33 | 200 | | -12.6 | -14 | ← CAL. PT. → | 3.0 | 3.33 | 200 | 40.0 | -12.6 | -14 |
| 2.7 | 3.36 | 218 | | -12.6 | -14 | | 2.7 | 3.33 | 208 | 39.4 | -13 | -14.3 |
| 2.4 | 3.41 | 233 | | -12.7 | -14.3 | | 2.4 | 3.33 | 211 | 38.0 | -13.5 | -15 |
| 2.1 | 3.46 | 256 | | -12.8 | -14.5 | | 2.1 | 3.33 | 210 | 36.3 | -14.2 | -15.8 |
| 1.8 | 3.53 | 284 | | -12.8 | -14.7 | | 1.8 | 3.33 | 214 | 34.3 | -14.7 | -17.0 |
| 1.5 | 3.65 | 337 | | -12.7 | -15.0 | | 1.5 | 3.33 | 219 | 31.8 | -16.0 | -18.0 |
| 1.2 | 3.77 | 427 | | -12.4 | -15.4 | | 1.2 | 3.33 | 222 | 28.0 | -17.2 | -20.0 |
| 1.0 | 3.90 | 543 | | -11.9 | -15.5 | | 1.0 | 3.33 | 226 | 23.6 | -17.6 | -22.0 |
| .75 | 4.08 | 836 | | -10.0 | -16.6 | | .75 | 3.33 | 232 | 15.7 | -20.4 | -25.6 |
| .51 | 5.88 | 924 | 27.2 | -12.2 | -22.0 | | .51 | 3.33 | 246 | 6.6 | -23.3 | -33.2 |
| .3 | 3.4 | 290 | 11.9 | -31.0 | -32.5 | | | | | | | |
| .2 | 3.4 | 290 | 8.1 | -30.5 | -31.7 | | | | | | | |
| .13 | 3.4 | 290 | 6.0 | -33.4 | -34.8 | | | | | | | |
| .1 | 3.4 | 290 | 3.3 | -37.0 | -38.5 | | | | | | | |
| .05 | 3.4 | 290 | 3.3 | -37.6 | -40 | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | 10 | 11 | 12 |

Readings in columns 5 & 6 and 11 & 12 above, when obtained from a ($F_SVM$) frequency selective voltmeter, will show $D_b$ losses in track leads and crossing islands.

All ($I_T$) track current readings (in column 3) represent maximum Vcorr corrected power levels which maintain Ved at indicated levels when the MAD is in automatic mode of operation.

V. C. Factory Adjustments of Field Adjustable Controls.

The MAD contains a number of potentiometers of the set-and-forget type not available or to be used for field adjustments. These are sealed and set at the factory.

Only 4 potentiometers are available for field adjustment. These are:

(1) Transmitter Power

(2) Master Gain

(3) Sensitivity

(4) Island Gain

Each of these controls are optimized at the factory for the following conditions:

(1) Transmitter provides 200 MA of track current into 3.0 ohm track.

(2) Master gain is adjusted so that a 3.3 Vcorr is developed when the ED level is at + 40 V.

(3) Sensitivity is set at near maximum to where a .1V drop in ED per second will indicate motion.

(4) Island amplifier is adjusted for .06 ohm shunting but may be modified in the field for shorter ring-by with a hardwire shunt 6 to 10 feet beyond tie points.

If these adjustments are made when estimated average track conditions exist - the automatic ballast compensation control voltage will be in the middle of its range, thereby affording maximum correction in both directions as seasonal change occur.

Shunting to establish ringby distances for bi-directional installations, may be made in either approach. For single ended approaches, shunting should be done in the longest approach.

C - (5) - Factory adjustment recap

NOTE: As received from the factory adjustments have been made as follows:

a - Low signal (LS) point is set to 30 volts.
b - High signal (HS) point is set at 51 volts.
c - Island (IS) is adjusted for .06 ohm shunting.
d - Track power (X-mtr) is adjusted for 200 MA into 3 ohm load.
e - Distance voltage (ED) is adjusted for 40 volts with 3.33 volts (Vcorr).
f - Low signal by-pass (LSBP) is disabled for sudden shunts which lower the ED below the (LS) point. (See pg. 18 - paragraph #7).
g - ED clamp is disabled (See pg. 25, LED - 401, paragraph 1,2 & 3).
h - Sensitivity to motion adjusted to high medium. (See paragraph 9 following).

D - Final field adjustment

1. Put man-auto SW on PCBD #4, down to manual position.

2. Meter switch to ED position.

3. Adjust (P2) track power on PCBD #1 to obtain an ED level of 40± .5 volts.

4. Put man-auto SW up to automatic and use the UP-DN SW on PCBD #4 to speed ED setting at 40 volts.

5. To adjust island ring-by

a - Put man-auto SW in man position.
b - Place a temporary jumper across LSB terminals (on front panel).
c - Place a hardwire shunt 5 to 10 feet outside of island tie points either transmitter or receiver side.
d - Adjust P-4 on PCBD #3 until the MDR and IS (if used) relays just recover.
e - Remove the LSB jumper and return the man-auto SW to auto position.
f - Island is now adjusted.

6. Sensitivity to motion may now be checked in either man or auto operation.

a - Rotate P-9 on PCBD #4 slowly counter-clockwise.
b - Flashing of LED #202 on PCBD #2 will be noted as the point of maximum sensitivity is reached, and the MDR drops.
c - The usable maximum sensitivity will usually be 1½ to 2 turns clockwise past the point where LED #202 stops flashing and comes on steady, with a recovery of the MDR.
d - Remember that a mimimum ten second time delay is initiated after each detection of motion and internal recovery, before the MDR will pick. Make this adjustment slowly (NOTE 1).

7. Adjustment is now complete. Steps 1 thru 4 may be repeated at any time if large seasonal changes take place. Steps 5 & 6 usually require no readjustment.

D - CONT'D

8. Recording V-CORR and $I_{TA}$ changes on a regular basis will indicate any slowly deteriorating or improving ballast conditions.

9. If the high signal LED and ED clamp LED's are lit, extinguish with appropriate push buttons.

NOTE: 1: Further clockwise rotation of P-9 up to 6 or 7 turns will reduce sensitivity until the MAD becomes very speed determining allowing shorts gate-down times for slower approaching trains.

## VI. A. LED LOCATIONS AND FUNCTIONS

The MAD incorporates 7 light emitting diodes which provide visual clues to operation and are aids for adjustment.

LED -201 (Upper LED on PCBD #2) Flashing indicates:

1. Transmitter and receiver are operating and that the MAD receiver is responding only to its own transmitter.
2. Flashing will stop when the island is occupied or a foreign signal causes the phase of the transmitted and received signals to shift beyond preset very narrow limits. Whenever flashing ceases the MDR will drop out.

LED -202 (Lower LED on PCBD #2) Motion detection indicator.

1. Turns off-on motion, and/or a high signal condition.
2. Coming on after being off indicates internal recovery from detection of motion and initiation of a ten second DPU to MDR pick up.
3. Slight flashing will be noted if the MAD starts to detect or recover from motion. On solid indicates a stable, waiting for motion, condition.

LED -301 (Upper LED on PCBD #3) is low signal amplifier monitor.

1. On or flashing when ED is above the selected low signal point.
2. Off when ED is below the low signal point.

LED -302 (2nd LED Down on PCBD #3) is island amplifier monitor.

1. Normally on at all times except when the island is occupied.

LED -303 (3rd LED down on PCBD #3) Hi-signal amplifier monitor.

1. When on indicates the Hi Signal amplifier is functioning.
2. When off indicates a high signal level exists.
3. Will normally restore to on when high signal condition disappears.

VI. A. (CONT'D)

LED - 304 (Bottom LED on PCBD #3) Hi signal indicator with latch.

1. Comes on in a latched condition whenever a high signal condition has existed. Manual reset is required by PB Sw. #301.

Note: When the HS latch jumper strap on PCBD #3 is connected, and a HS is detected, the MDR will be released permanently until manually reset by PB-SW #301.

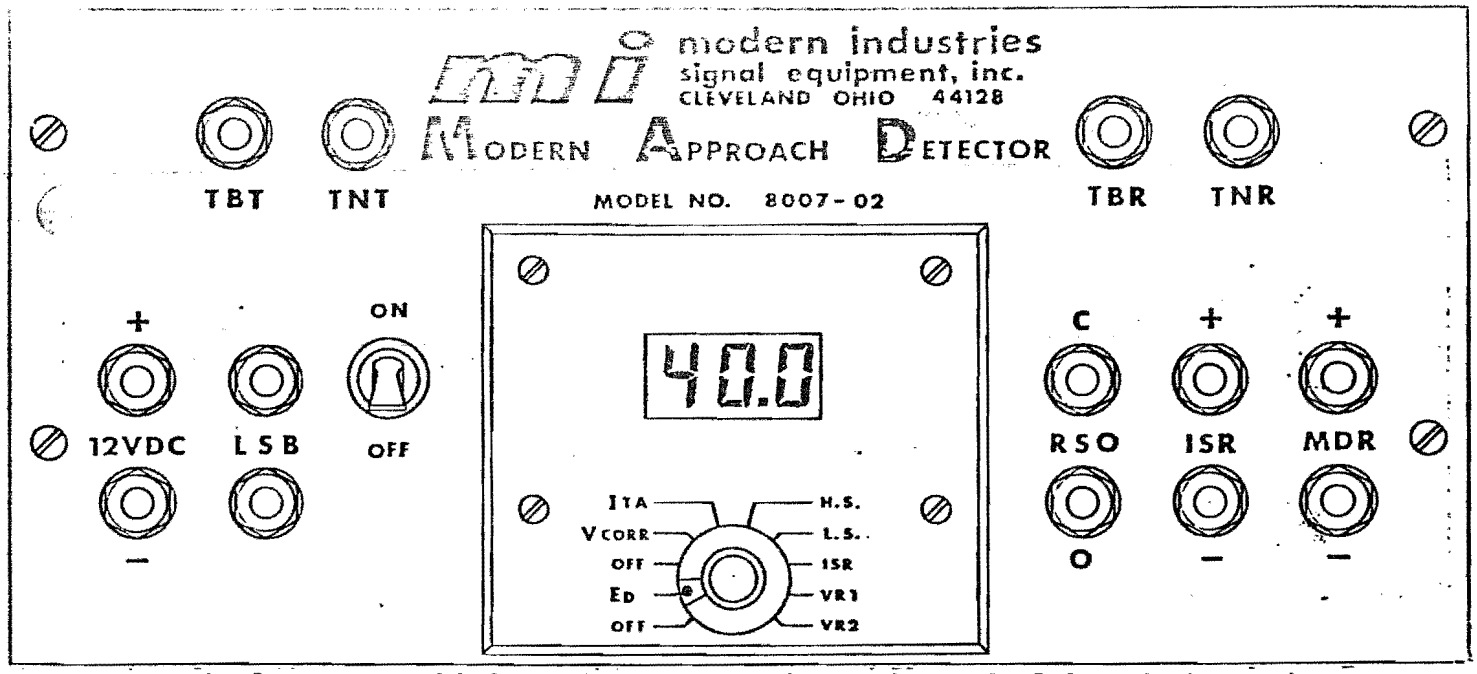
LED - 401 (On PCBD #4) is the ED Clamp.

1. Comes on when a receding move is detected.

Note: If a train in an approach stopped forward motion and the ED was still above the 30 volt low signal (LS) level, the MAD will slowly correct itself upwards towards 40 V ED. If this train were to back out of the approach without proceeding through the crossing, the ED might possibily rise to the (HS) high signal level.

2. As shipped from the factory the ED clamp is inactive by virtue of a small loop jumper found on the wiring side of PCBD #4. If the crossing approach is a switching area and a repeated (HS) high signal indications occur this small jumper should be removed. The (HS) indication will now be disabled for several minutes as the MAD adjusts itself downward towards 40V ED.

3. A sudden break in a rail will however still initiate a high signal condition before the ED clamp turns on.




AAR terminals are provided on the MAD metering and terminal board shown above.

TBT and TNT are transmitter connections to one side of a crossing and TBR and TNR are receiver connections to the other side to create an island of at least 100 feet in length. Phase to proper rails.

12 VDC + and - should be connected through a twisted pair - as close to the battery as possible, observing polarity.

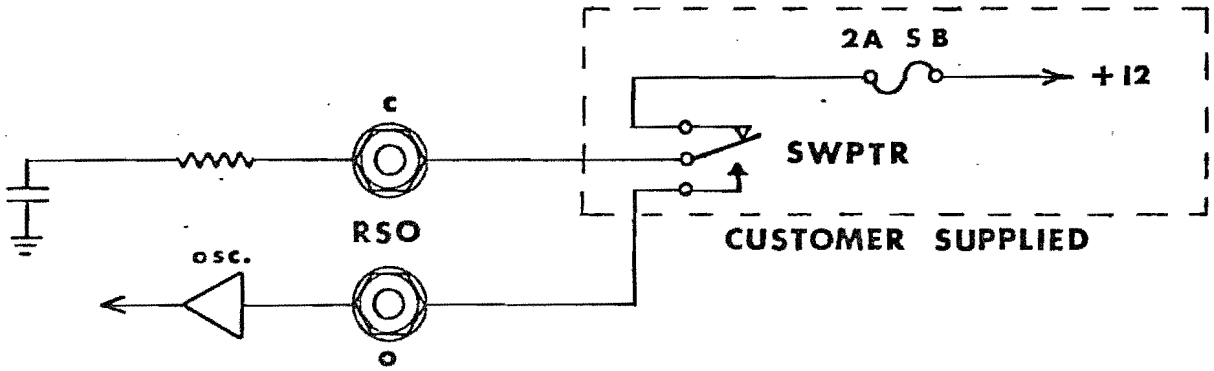
Terminals LSB may be permanently strapped, or shunted by a repeater relay, to disable the low signal detector (LSD) when necessary.

Terminals RSO are for connection to a reverse switch repeater. Diagram shown below.

ISR terminals will connect to an island relay, if needed, for additional logic only. The (IS) island circuit is internally connected and island lockout is firm even without an external relay. However, when a relay is not used - it is advisable to maintain a 500 or 1000 ohm resistor (furnished) across these terminals.

MDR terminals are for the motion detection relay, which will drop on motion, or internal failure of the MAD. The MDR terminals provide an isolated output D.C. voltage and should be connected to nothing else but the MDR relay coil. Both the MDR and IS relay may have either 500 or 1000 ohms coil resistance, and connections to relay coils should be through twisted pairs, not cabled with other conductors.

Functions of the LCD meter and rotary switch are described in other parts of this manual but when not in use the switch should be on one of the 2 (off) positions.



VII. A. TECHNICAL SECTION - FIELD ADJUSTMENTS ONLY*** - POTENTIOMETER LOCATIONS

| | | |
|---|---|---|
| P1- On PCBD #1, Frequency adj. | | Factory sealed. |
| ***P2- On PCBD #1, Trans. Pwr. adj. | Field adj. | |
| P3- On PCBD #3, Low Signal adj. | | Factory sealed. |
| ***P4- On PCBD #3, Island adj. | Field adj. | |
| P5- On PCBD #3, High Signal adj. | | Factory sealed. |
| P6- On PCBD #4, ED level - adj. | | Factory sealed. |
| ***P7- On PCBD #4, Master gain adj. | Field adj. | |
| P8- On PCBD #4, Man. -Vcorr adj. | | Factory sealed. |
| ***P9- On PCBD #4. Sensitivity adj. | Field adj. | |
| P10- On PCBD #4, Tolerance adj. | | Factory sealed. |
| P11- On PCBD #4, Zero Signal Vcoorr adj. | | Factory sealed |

B.

P1 - On PCBD #1 is a factory adjusted potentiometer used to adjust the frequency of each MAD. Once adjusted it is sealed and unless seal is broken should not be readjusted without an accurate frequency counter for comparison.

P2 - On PCBD #1 is transmitter power adjustment. At the factory with the MAD in manual mode - Vcorr at 3.3 volt P2 is adjusted to give 200 MA into a 3 ohm load.

P3 - On PCBD #3 is the low signal level adjustment. The low signal point is set at 27 volts which approximates 60% of an approach distance when the ED is at 40 volts. The low signal point may be checked in two ways.

The upper LED on PCBD #3 monitors the low signal point - on or a pulsing, above 27 volts - off below.

To Determine the L.S. (Low Signal Point)

1. MAD auto-man. sw. in auto.
   Reduce ED to below 15 V w/DN switch.
2. Wait for MDR Recovery - LSBP is now functioning.

3. As ED climbs to 30 V observe LS-LED coming ON.
   LSBP failure would result in permanent drop out of MDR when ED is below 30 volts.

4. Strapping LSB terminals will eliminate LS protection and is not recommended.

P4 - On PCBD #3 - Island adjust, should be adjusted for IS relay pickup, with a hardwire shunt 3 or 4 feet outside of tie points.

P5 - On PCBD #3 - High signal adjust is factory set and sealed for MDR drop- out at approximately 49 volts ED. This point may be checked by:

1. With ED at 40 V - extinguish the clamp LED on PCBD #4 with lower PB #403. With the MAD in automatic mode.

2. Raise the ED slowly in short steps without reinitiating the clamp LED, observing MDR drop-out at set point. Do not attempt a fast adjustment as the DPU (Delayed Pick up of 10 seconds) is initiated each time the HS point is reached. Movement detector LED may also be observed turning off.

   Note: If the peculiarities of a particular track cause a rise in ED as a train nears an approach shunt and the ED rises above the HS point before detecting motion - the MDR will drop and a ten second DPU will be initiated. If the train crossed the beginning of approach shunt before the DPU expires the approach time has effectively increased in spite of a bad track condition.

P6 - On PCBD #4 is the ED level adjust which with the MAD in automatic, selects the voltage level the ED will always return to (40 V $\pm$ 1 V) as track conditions vary slowly above the low signal (LS) and below the (HS) points. P6 is sealed - do not field adjust.

VII. B. (CONT'D)

P7 - On PCBD #4 is the master gain control of the MAD. After adjustment of P2 described above, with the MAD in manual mode - P7 was factory adjusted for a 40 $\pm$ .1 volt ED level. Even if a track lumped impedance was exactly 3 ohms, field readings will almost always be different due to losses in lengths of track leads, lengths of islands, etc.

P8 - On PCBD #4 is the manual Vcoor adjustment factory set and sealed for 3.3 Vcorr, which may be checked at any time by placing the MAD in manual. Variations in excess of $\pm$ .1 volt will indicate low battery supply or defective voltage regulators.

P9 - On PCBD #4 sensitivity control may be adjusted in the field. Counter-clockwise increases sensitivity. Do not turn past the point where the motion LED indicator on bottom of PCBD #2 starts to flash. Several clockwise turns will decrease sensitivity until the MAD becomes speed determining. After each sensitivity adjustment track shunting tests should be performed, or trains observed.

P11 - On PCBD #4 is a factory adjusted potentiometer which sets the Vcorr level for the time during which the ED is below the low signal point and/or the island is occupied.

# TERMS AND CONDITIONS OF SALE

Terms:

½%, 10 days, net 30, F.O.B. Cleveland, Ohio

Claims:

Claims for errors, shortages, or concealed damages, etc., will not be entertained by Seller unless detailed written information as to any damages or shortage is furnished to us in writing within fifteen (15) days after receipt of such goods.

Warranty:

## COVENANT OF WARRANTY

The electrical and electronic equipment manufactured by Modern Industries Signal Equipment, Inc. (hereinafter called MISE), is warranted by MISE for a period of 180 days from date of delivery by MISE or for a period of 120 days from the date the product is placed in service, whichever period expires first, to be free from defects in material and workmanship, provided, however, that the product has been connected, installed and adjusted in accordance with instructions furnished by MISE. If, within the period set forth above, the purchaser gives MISE written notice of the alleged defects in products sold by MISE to the purchaser, and if such products are found not to be in conformity with the foregoing warranty, MISE will promptly repair the defective part or, at its option, supply a replacement therefor. Return of products or parts to the MISE factory must be made with transportation charges prepaid. MISE will forward said repaired or replacement equipment to the purchaser, f.o.b. MISE factory.

THERE IS NO FURTHER REPRESENTATION OR WARRANTY (EXCEPT AS TO TITLE) EXPRESS OR IMPLIED IN FACT OR IN LAW, RELATING TO THE DESIGN, MANUFACTURE, QUALITY, FITNESS, SALE, USE OR OTHERWISE (INCLUDING, WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY) WITH REGARD TO ANY PRODUCTS SOLD BY MISE. ALL SUCH WARRANTIES BEING HEREBY NEGATED. EXCLUDED AND WAIVED BY PURCHASER.

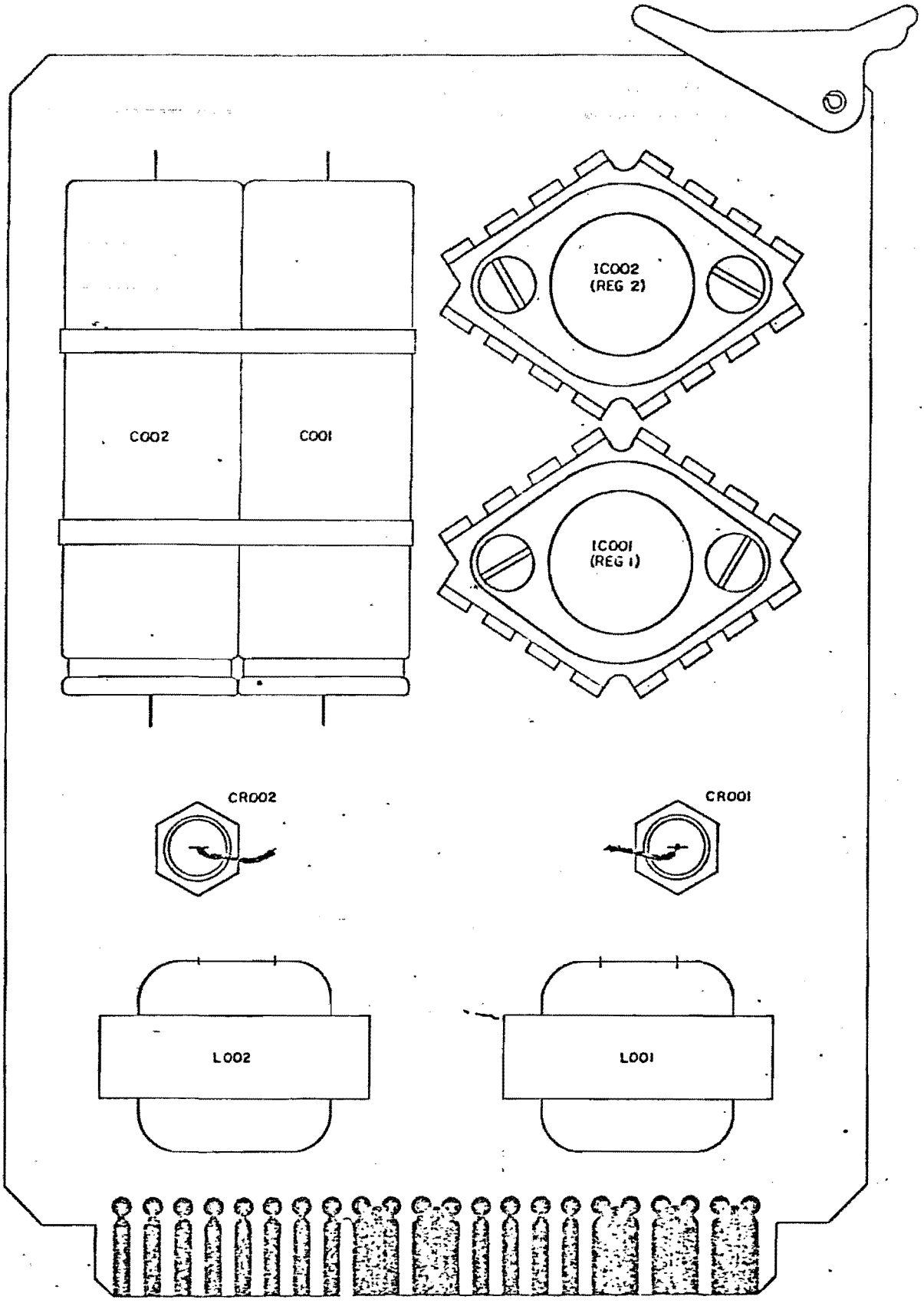
MISE's obligation on any warranty is limited to the repair or replacement of defective products as hereinabove provided, and such repair or replacement shall be the sole and exclusive remedy for any breach of warranty. Without limiting the foregoing, MISE shall not be liable for any incidental or consequential damages incurred by the purchaser.

Conditions of Sale:

(1) The prices quoted herein may be changed by us without notice in order to reflect our prices at time of shipment and any increase in transportation, labor or other costs.
(2) Upon request, services of an MISE field engineer are available on 10 days advance notice and are chargeable at $75.00 per day plus travel expenses.
(3) We reserve the right to correct any obvious errors in specifications or prices.
(4) All orders and contracts are subject to final acceptance at the Seller's home office.
(5) Taxes which are imposed by any present or future law of federal, state or municipal authority on the sale and/or use of the articles purchased as a result of this quotation shall be paid by the Buyer in addition to price quoted.
(6) All sales are final and are not subject to return or cancellation without express written consent of Seller.

(7) Any deliveries named are subject to change for reasons and circumstances beyond Seller's control.

(8) The terms set forth herein constitute the sole terms and conditions of the contract between Buyer and Seller. No other term, condition, or understanding, whether oral or written shall be binding upon us, unless hereafter made in writing and signed by our authorized representative.




MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

TITLE BRD #0 (REGULATOR BRD.) FOR MODEL 8007-02 (M.A.D.)

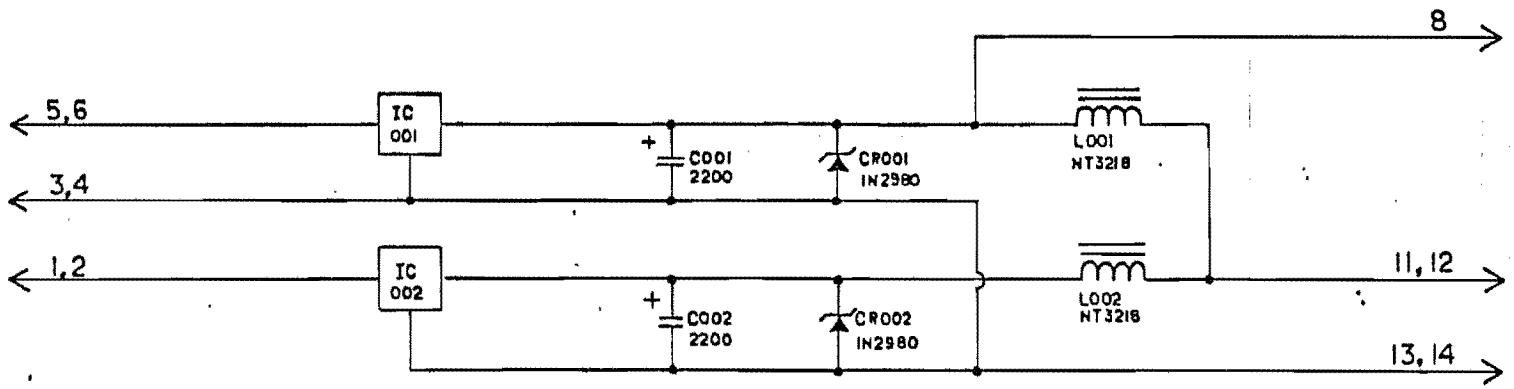
DATE 11/9/79 ARTWORK NO. 1015-2

DRAWN LJO CIRCUIT MOD. NO.

CHKD. BOARD NO.

CB-1073-A

| DATE | SYM | REVISION RECORD | DR | CK |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

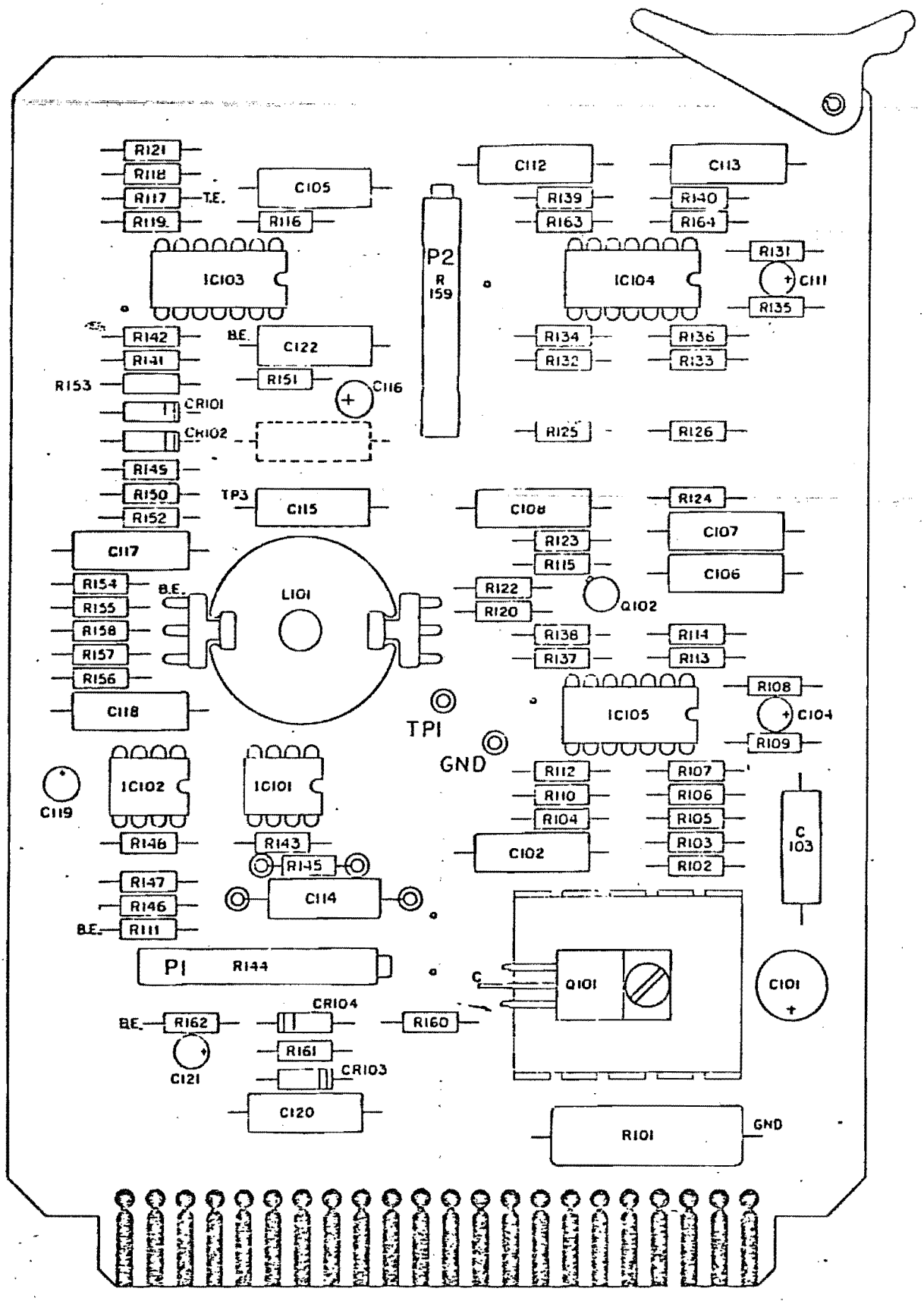



Unless noted otherwise:
All resistor in ohms; capacitors in microfarads; resistors are 1/4 W 5%

IC001,002 LM340K-8.0

Last used: IC002, CR002, L002, C002

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | | |
| DECIMAL * | FILTER BOARD | SCALE | DRAWN BY DJH |
| FRACTIONAL * | | | APPROVED BY |
| ANGULAR * | TITLE SCHEMATIC, BOARD NO. 0, MODEL 6007-02 (MAD) | | |
| | DATE 11/21/79 | DRAWING NUMBER CB-1096 | |




B.E. — BOTTOM END
T.E. — TOP END
GND — GROUND
C — COLLECTOR

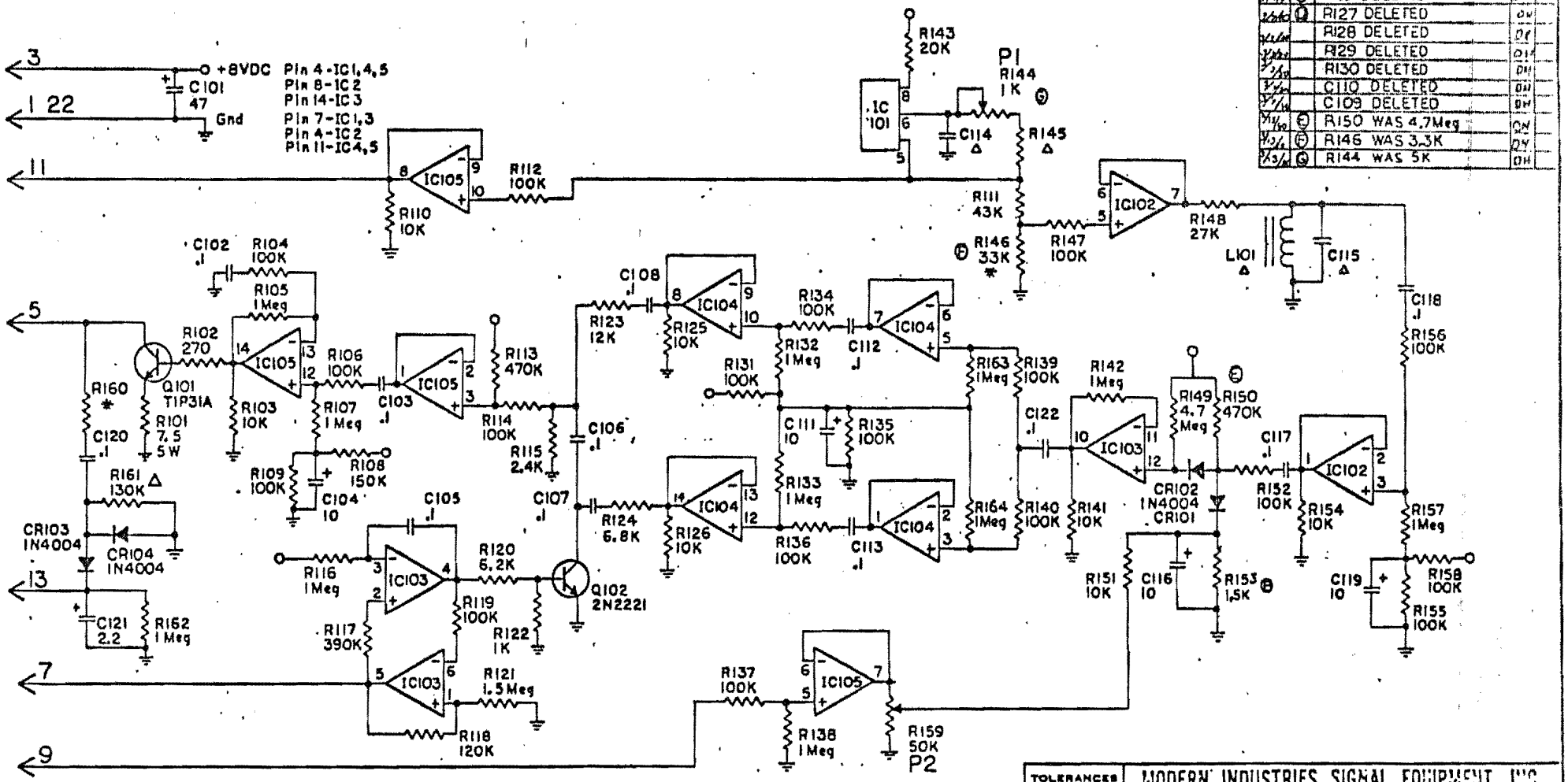
MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

TITLE BRD. #1 (TRANSMITTER BRD.) FOR MODEL 8007-01 (M.A.D.)

DATE 10-30-79
DRAWN LJO
CHKD

ARTWORK NO. 1006-2
CIRCUIT MOD. NO.
BOARD NO.

CB-1071-A




| DATE | SYM | REVISION RECORD | BY |
|---|---|---|---|
| 12/17 | A | ADDED R165 THERM. | DH |
| 1/4/79 | B | R153 WAS 2K | DH |
| 1/4/79 | C | R165 DELETED | DH |
| 2/26/79 | D | R127 DELETED | DH |
| 4/4/79 | | R128 DELETED | DH |
| 4/23/79 | | R129 DELETED | DH |
| 5/1/79 | | R130 DELETED | DH |
| 5/1/79 | | C110 DELETED | DH |
| 5/1/79 | | C109 DELETED | DH |
| 5/10/79 | E | R150 WAS 4.7Meg | DH |
| 5/31/79 | F | R146 WAS 3.3K | DH |
| 5/31/79 | G | R144 WAS 5K | DH |

Unless noted otherwise:
All resistors in ohms; capacitors in microfarads; resistors are 1/4 W, 5%.

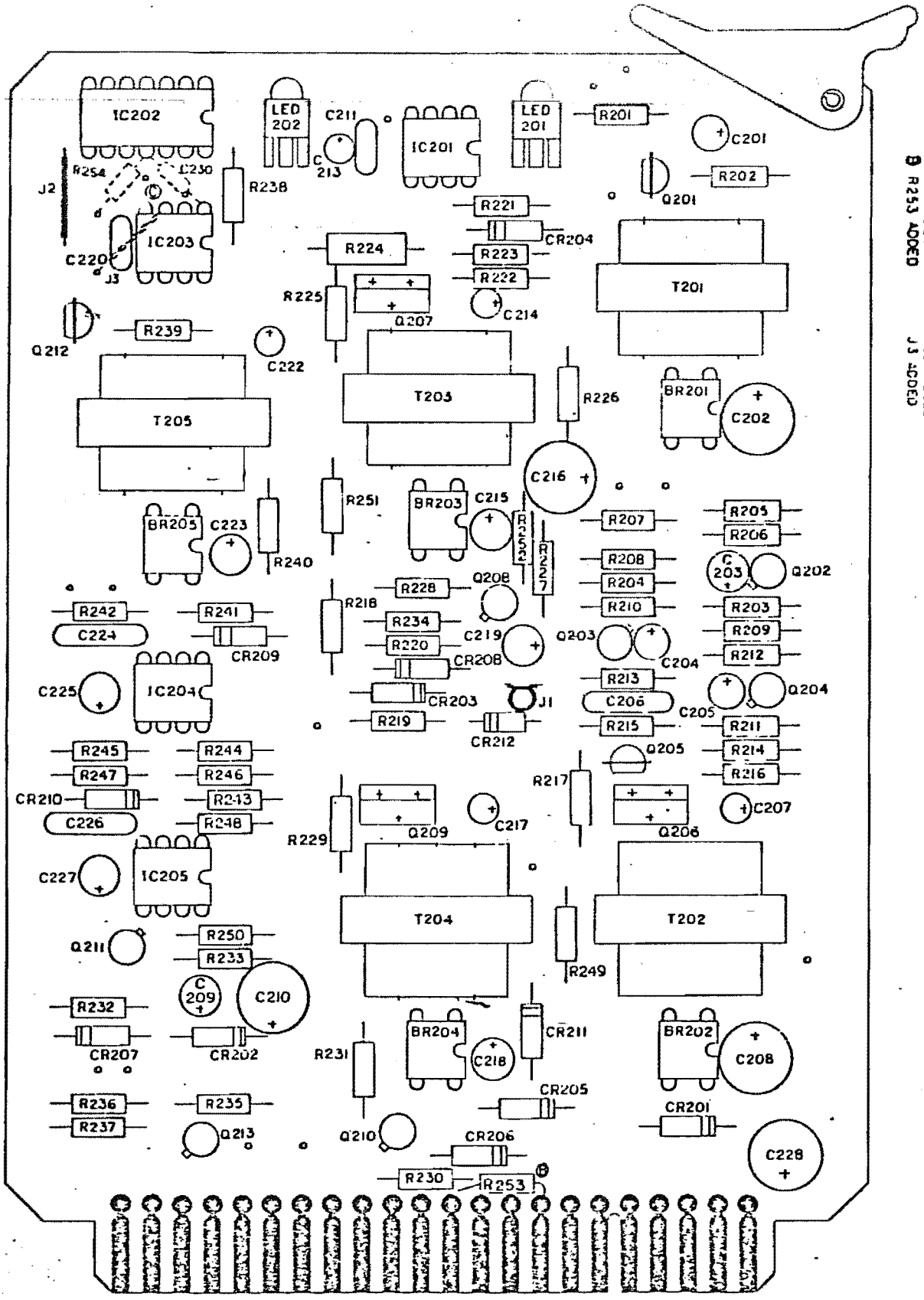
Δ frequency dependent

* may vary

| | |
|---|---|
| IC 101 | NE567 |
| IC 102 | LM258 |
| IC 103 | MC3301 |
| IC 104, 105 | LM224 |

Last used: IC105, Q102, CR105, L101, R164, C122.

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | | |
| DECIMAL * | TRANSMITTER BRD | SCALE N/A | DRAWN BY LJO |
| FRACTIONAL * | TITLE SCHEMATIC, BRD No.1, MODEL 8007-01 (M.A.D.) | | APPROVED BY |
| ANGULAR *. | DATE 9/10/79 | DRAWING NUMBER CB-1042 | |



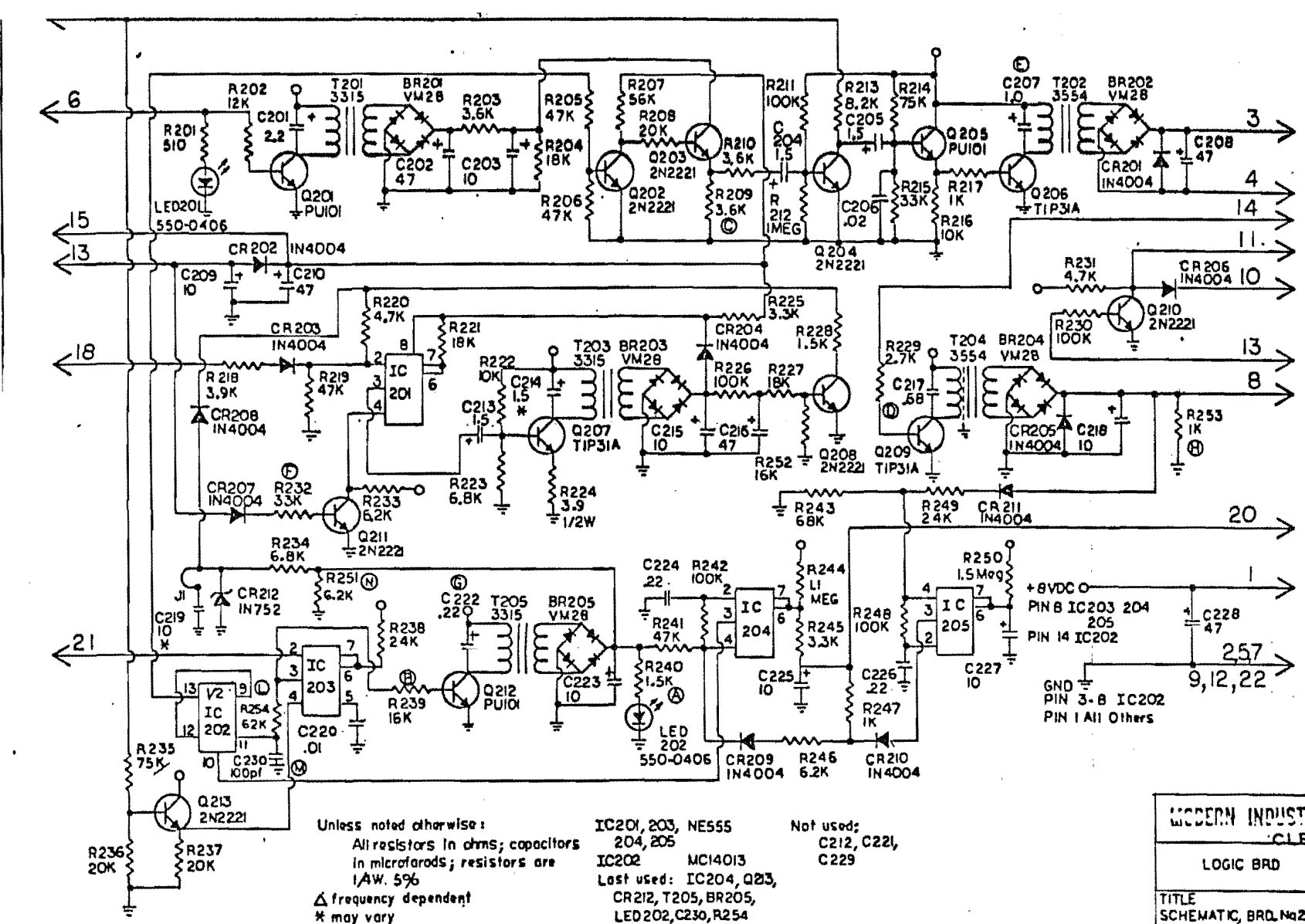

V3.80 ⊕ C212 OUT · 3460 Ω 0230 ADDED
C221 OUT
B R253 ADDED
R254 ADDED
J3 ADDED

MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

TITLE BRD #2 (LOGIC BRD) FOR
MODEL 8007-02 (M.A.D)

DATE 10-25-79 ARTWORK NO. 1011-2
DRAWN LJO CIRCUIT MOD. NO.
CHKD. BOARD NO.

CB-1070-A




| | | |
|---|---|---|
| | R240 WAS 2.2K | A |
| | R239 WAS 22K | B |
| | R209 WAS 8.2K | C |
| | C217 WAS 1.5Mfd | D |
| | C207 WAS 2.2Mfd | E |
| | R232 WAS 200K | F |
| | C222 WAS 1.5Mfd | G |
| | ADDED R253 1K | H |
| | C229 DELETED | I |
| | C221 DELETED | J |
| | C212 DELETED | K |
| | ADDED R254 62K | L |
| | ADDED C230 100 PF | M |
| | R251 WAS 10K | N |
| | C211 DELETED | O |

Unless noted otherwise:
All resistors in ohms; capacitors in microfarads; resistors are 1/4W. 5%
△ frequency dependent
* may vary

IC201, 203, NE555
204, 205
IC202 MC14013
Last used: IC204, Q213, CR212, T205, BR205, LED202, C230, R254

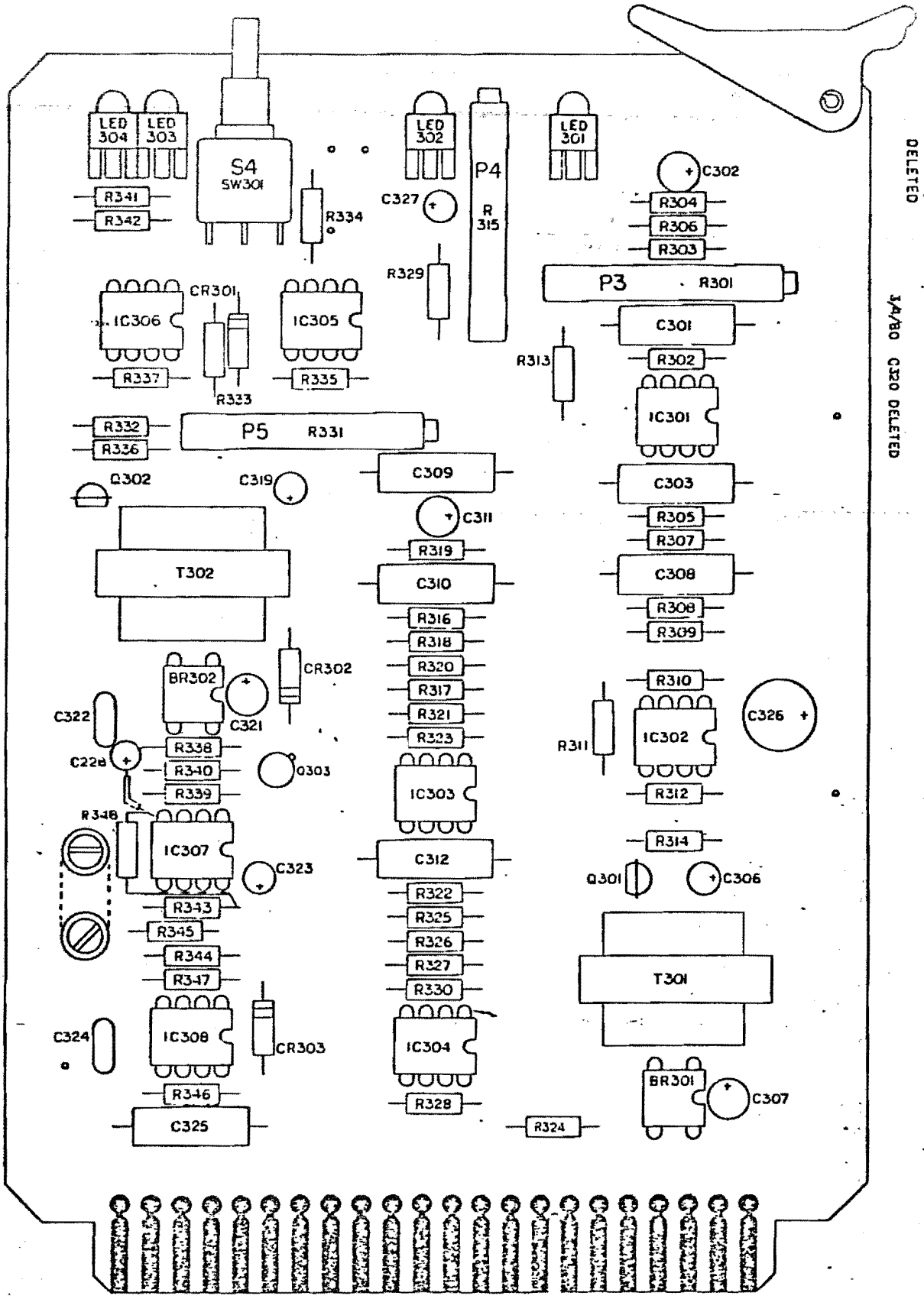
Not used:
C212, C221, C229

MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO

| | | |
|---|---|---|
| LOGIC BRD | SCALE N/A | DRAWN BY DJH |
| | | APP. BY |

TITLE
SCHEMATIC, BRD. No2, MODEL 8007-01 (MAD)

| | |
|---|---|
| DATE 1/4/80 | CB-1043 |




MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

TITLE BRD. #3 (AMPLIFIER BRD.) FOR MODEL 8007-1 (M.A.D.)

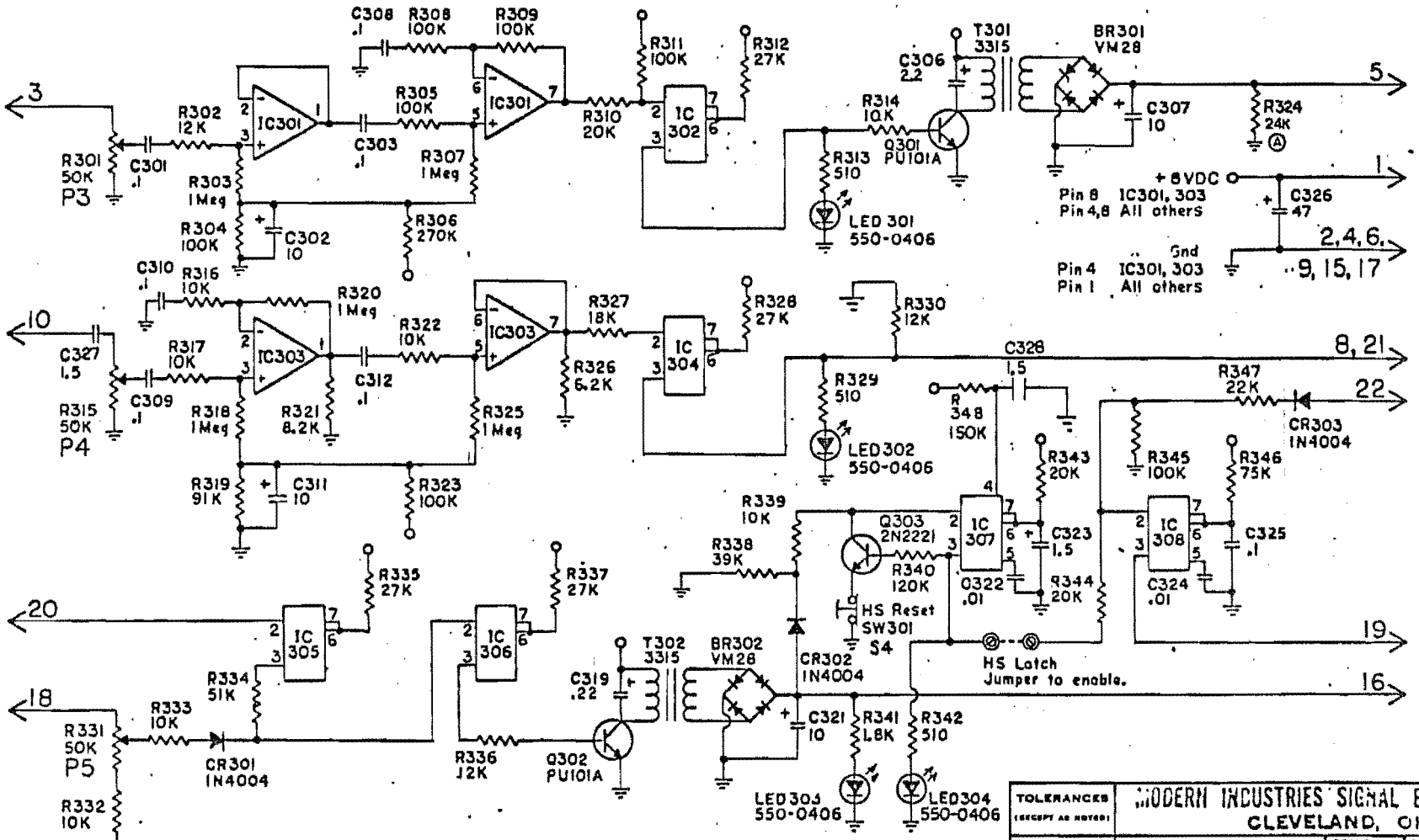
DATE 10-15-79 ARTWORK NO. 1012-2

DRAWN LJO CIRCUIT MOD. NO.

CHKD. BOARD NO.

CB-1069-A

| DATE | SYM | REVISION RECORD | DR | CK |
|---|---|---|---|---|
| 1/11/79 | A | R324 WAS 15K | DJ | |
| 4/5/79 | B | C304, 305, 313, 314, 315, 316, | DJ | |
| | C | 317, 318 DELETED | DJ | |
| 5/16/79 | D | C320 DELETED | DJ | |




Unless noted otherwise:
All Resistors in ohms; capacitors in microforads; resistors are 1/4 W, 5%.

Δ frequency dependent

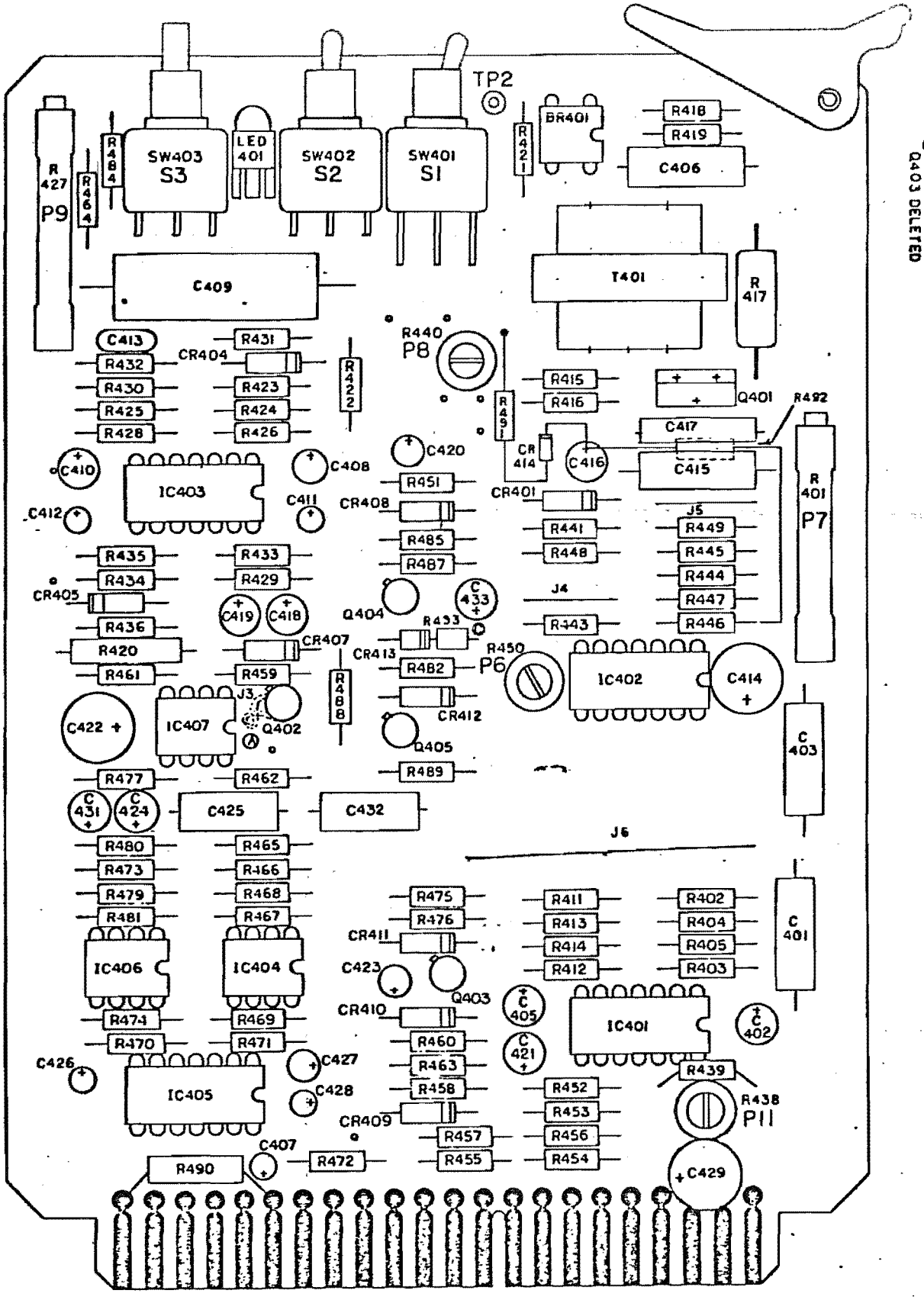
% may vary

IC 301, 303 LM258
IC 302, 304, 305, NE555
306, 307, 308

Last used: IC308, Q303, CR303, LED304, T302, SW301, R348, C328, BR302.

Not used: C304, 305, 313, 314, 315, 316, 317, 318, 320

| | | |
|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | |
| DECIMAL * | AMPLIFIER BRD | SCALE N/A |
| FRACTIONAL * | TITLE SCHEMATIC, BRD No. 3, MODEL 8007-01 (M. A. D.) | |
| ANGULAR * | DATE 9/10/79 | DRAWING NUMBER CB-1044 |
| | DRAWN BY LJO | APPROVED BY |




4/10/80 Ⓐ J3 ADDED
Ⓑ JUMPER AT Q403 DELETED
1/7/80 Ⓒ R493 ADDED

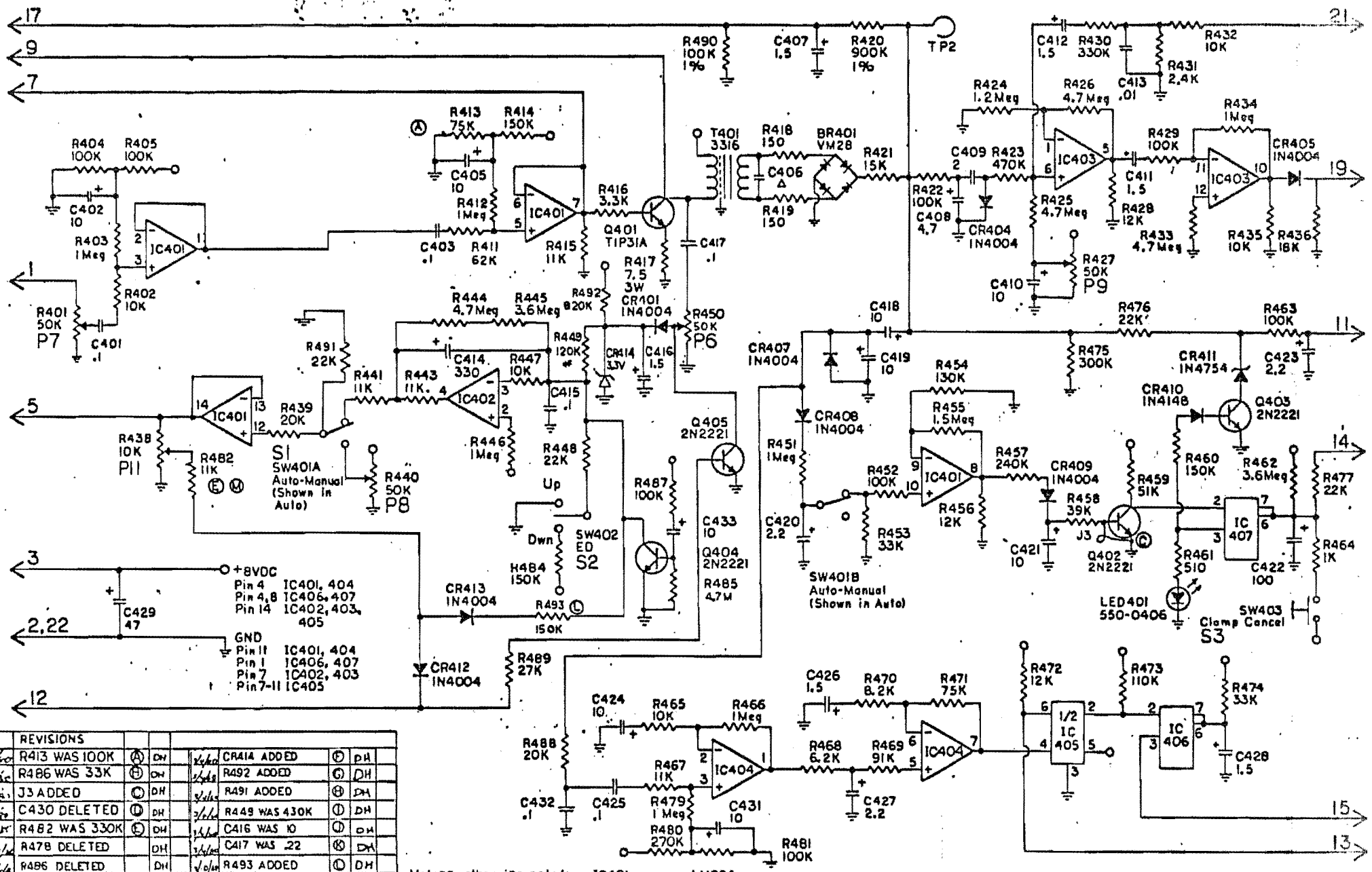
MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

TITLE BRD 4 (RECEIVER BRD) FOR MODEL 8007-02 (M.A.D.)

DATE 10-31-79 ARTWORK NO. 1010-2

DRAWN LJO CIRCUIT MOD. NO.

CHKD. BOARD NO.




| | REVISIONS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3/20 | R413 WAS 100K | Ⓐ | DH | 3/6/80 | CR414 ADDED | Ⓕ | DH |
| 3/26 | R486 WAS 33K | Ⓑ | DH | 3/6/80 | R492 ADDED | Ⓖ | DH |
| 3/31 | J3 ADDED | Ⓒ | DH | 3/6/80 | R491 ADDED | Ⓗ | DH |
| 3/31 | C430 DELETED | Ⓓ | DH | 3/6/80 | R449 WAS 430K | Ⓘ | DH |
| 3/31 | R482 WAS 330K | Ⓔ | DH | 3/6/80 | C416 WAS 10 | Ⓙ | DH |
| 4/4 | R478 DELETED | | DH | 3/6/80 | C417 WAS .22 | Ⓚ | DH |
| 4/4 | R486 DELETED | | DH | 4/8/80 | R493 ADDED | Ⓛ | DH |
| 4/4 | R422 DELETED | | DH | 4/10/80 | R482 WAS 100K | Ⓜ | DH |
| 4/4 | C404 DELETED | | DH | 4/10/80 | R442 DELETED | Ⓝ | DH |
| 4/4 | R437 DELETED | | DH | | | | |
| 4/4 | R406 DELETED | | DH | | | | |
| 4/4 | R483 DELETED | | DH | | | | |
| 4/4 | CR402 DELETED | | DH | | | | |
| 4/4 | CR403 DELETED | | DH | | | | |
| 4/4 | R407 DELETED | | DH | | | | |
| 4/4 | R408 DELETED | | DH | | | | |
| 4/4 | R409 DELETED | | DH | | | | |
| 4/4 | R410 DELETED | | DH | | | | |
| 4/4 | CR406 DELETED | | DH | | | | |

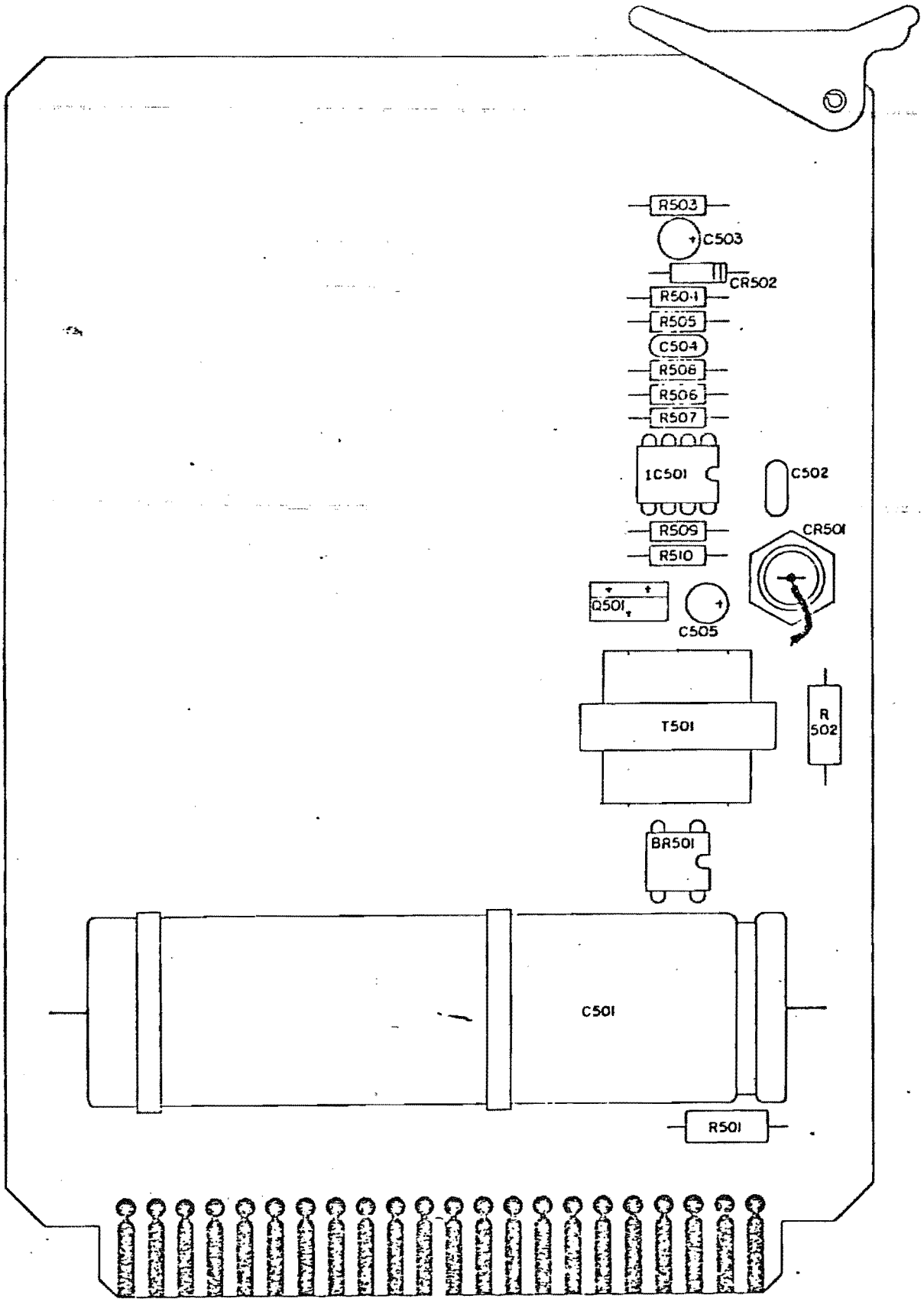
Unless otherwise noted:
- All resisters in ohms;
- Capacitors in microfarads;
- Resistors are 1/4W, 5%
- Δ frequency dependent.
- * may vary

| | | |
|---|---|---|
| IC401. | | LM224 |
| IC402, 403 | | MC3301 |
| IC405 | | MC14013 |
| IC406, 407. | | NE555 |
| IC404 | | LM258 |

Last used: IC407, Q405, CR414 T401, BR401, C433, LED401, SW403, R492

MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO

| | |
|---|---|
| RECEIVER BRD. | DWN. MO |
| SCHEMATIC, BRD No. 4, MODEL 8007-02 (M. A. D.) | |
| 9/10/79 | CB-10 |




MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO, 44128

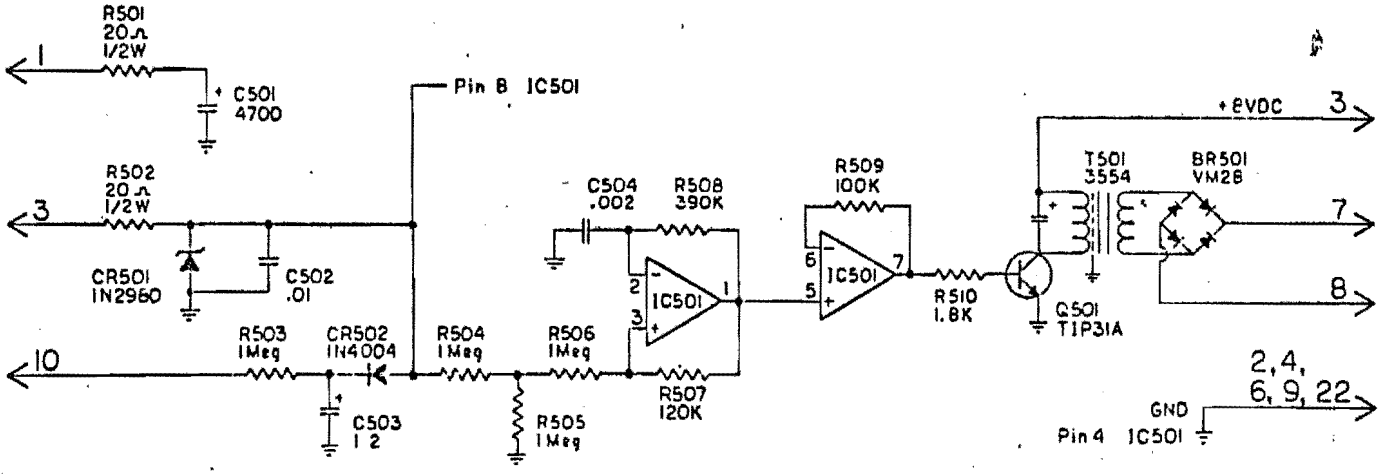
TITLE BRD #5 (OPTION BRD.) FOR MODEL 8007-02 (M.A.D.)

DATE 11/2/79 ARTWORK NO. 1014-1

DRAWN LJO CIRCUIT MOD. NO.

CHKD. BOARD NO.

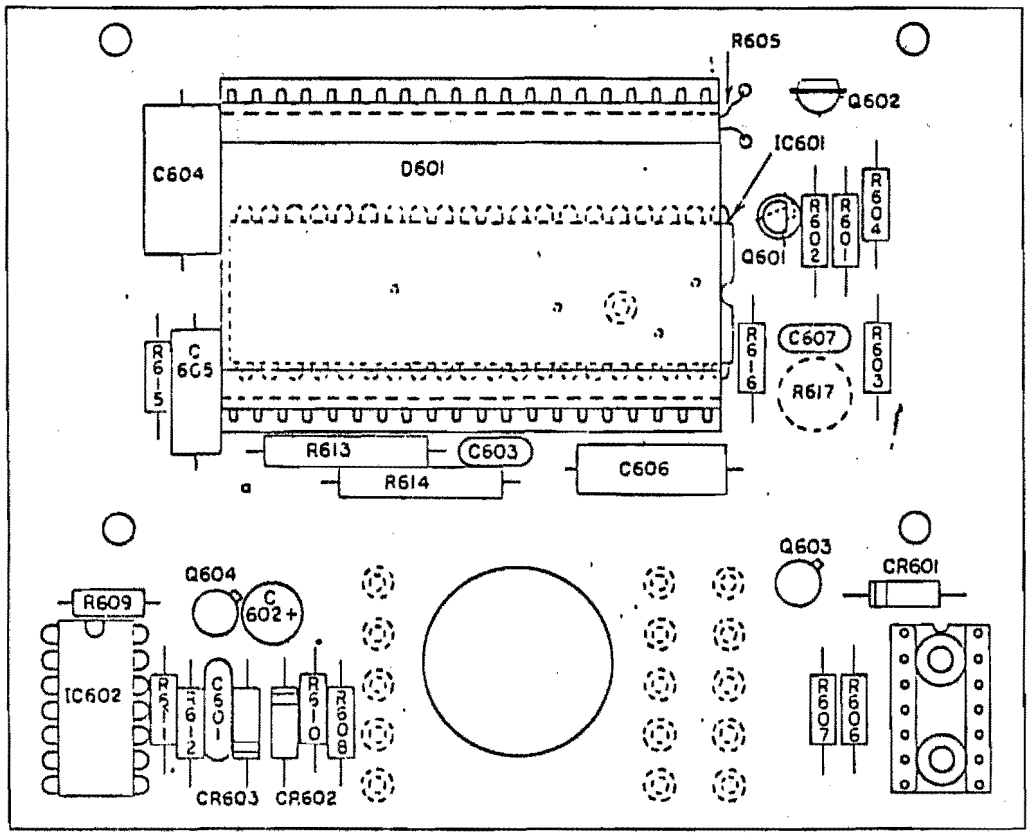
CB-1074-A




Unless otherwise noted:
All resistors in ohms; capacitors in microfarads; resistors are 1/4W, 5%.

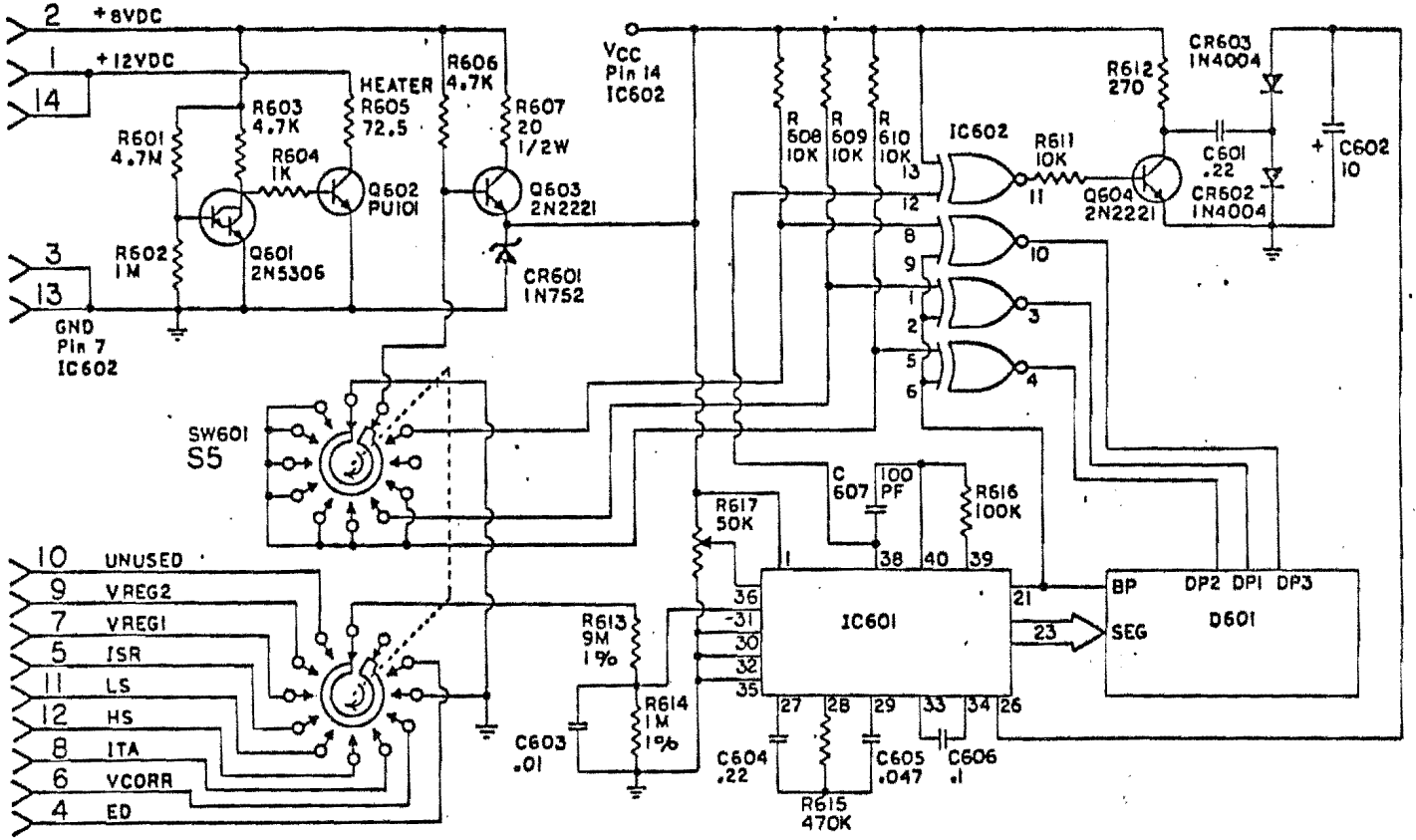
IC501 LM258
Last used: IC501, Q501, CR502, T501, BR501, R510, C504

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | | |
| DECIMAL ± | OPTION BRD (R50) | SCALE | DRAWN BY JSC / APPROVED BY |
| FRACTIONAL ± | TITLE SCHEMATIC, BRD No 5, MODEL 8007-01 (M.A.D.) | | |
| ANGULAR ± | DATE 3/26/79 | DRAWING NUMBER CB-1046 | |




| MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | | |
|---|---|---|
| ARTWORK NO. 1013-2 | SCALE 2X | LJO |
| PARTS LAYOUT, BRD NO. 6, METER BOARD MODEL 8007-02 (MAD) | | |
| 10/15/79 | CB-1067-A | |

| DATE | BY | REVISION RECORD | | |
|---|---|---|---|---|
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Unless otherwise noted:
All resistors in ohms; capacitors in microfarads; resistors are 1/4 W, 5 %.

IC601 ICL7106CPL
IC602 MC14077
Last used IC602, Q604, CR603, SW601, R617, C606, D601

| | | |
|---|---|---|
| TOLERANCES (UNLESS AS NOTED) | MODERN INDUSTRIES SIGNAL EQUIPMENT, INC. CLEVELAND, OHIO | |
| DECIMAL ± | METER BRD. | SCALE / DRAWN BY / APPROVED BY |
| FRACTIONAL ± | TITLE: SCHEMATIC, BRD. No. 6, MODEL 8007-02 (M.A.D.) | |
| ANGULAR ± | DATE: 11/16/79 | DRAWING NUMBER: CB-1076 |

# MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.

## MODERN APPROACH DETECTOR (MAD), TEST INSTALLATION DATA

INST. DATE _____ S/N _____ FREQ. _____ HZ.

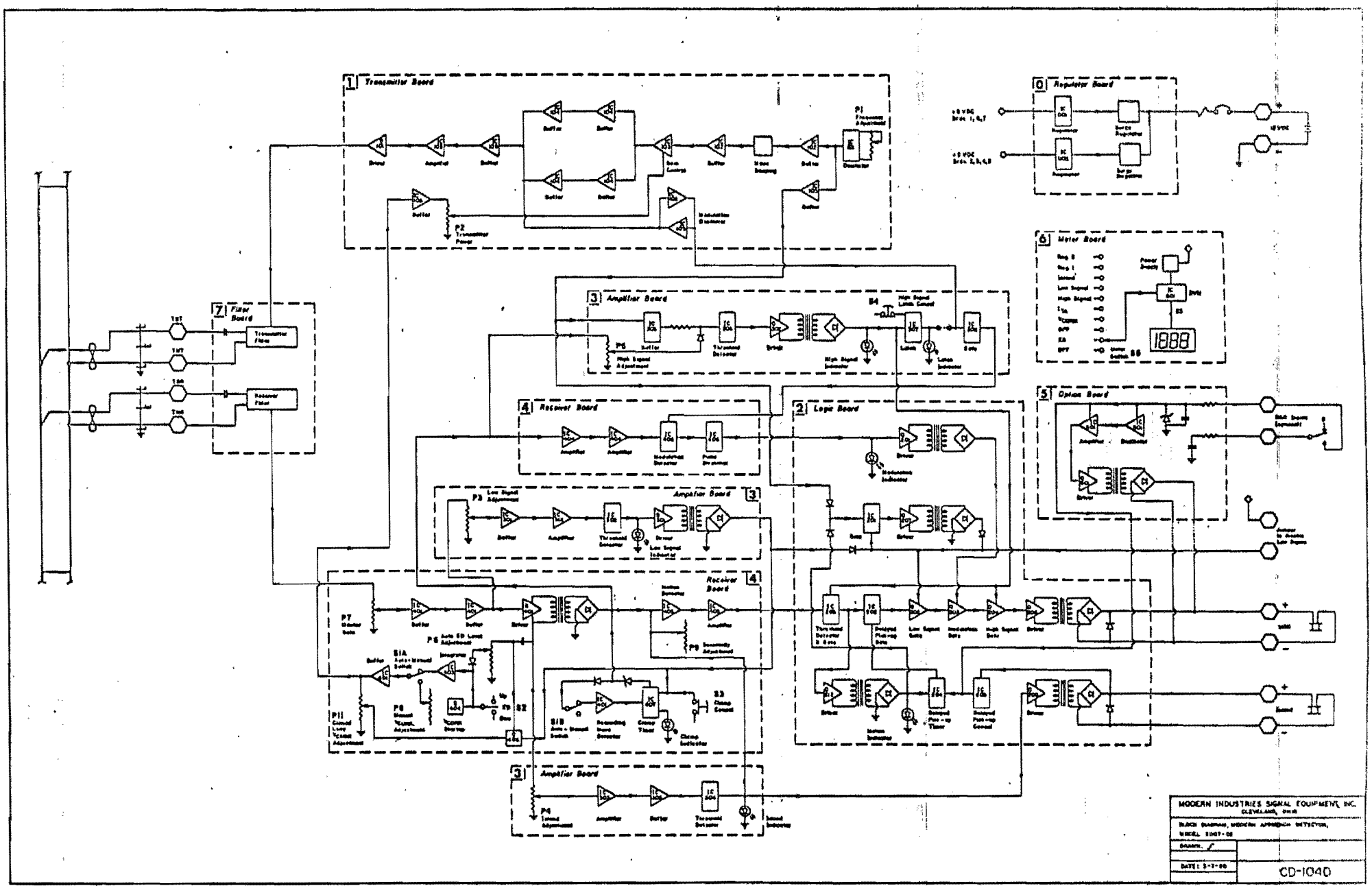
RAILROAD _____ CITY _____ STATE _____

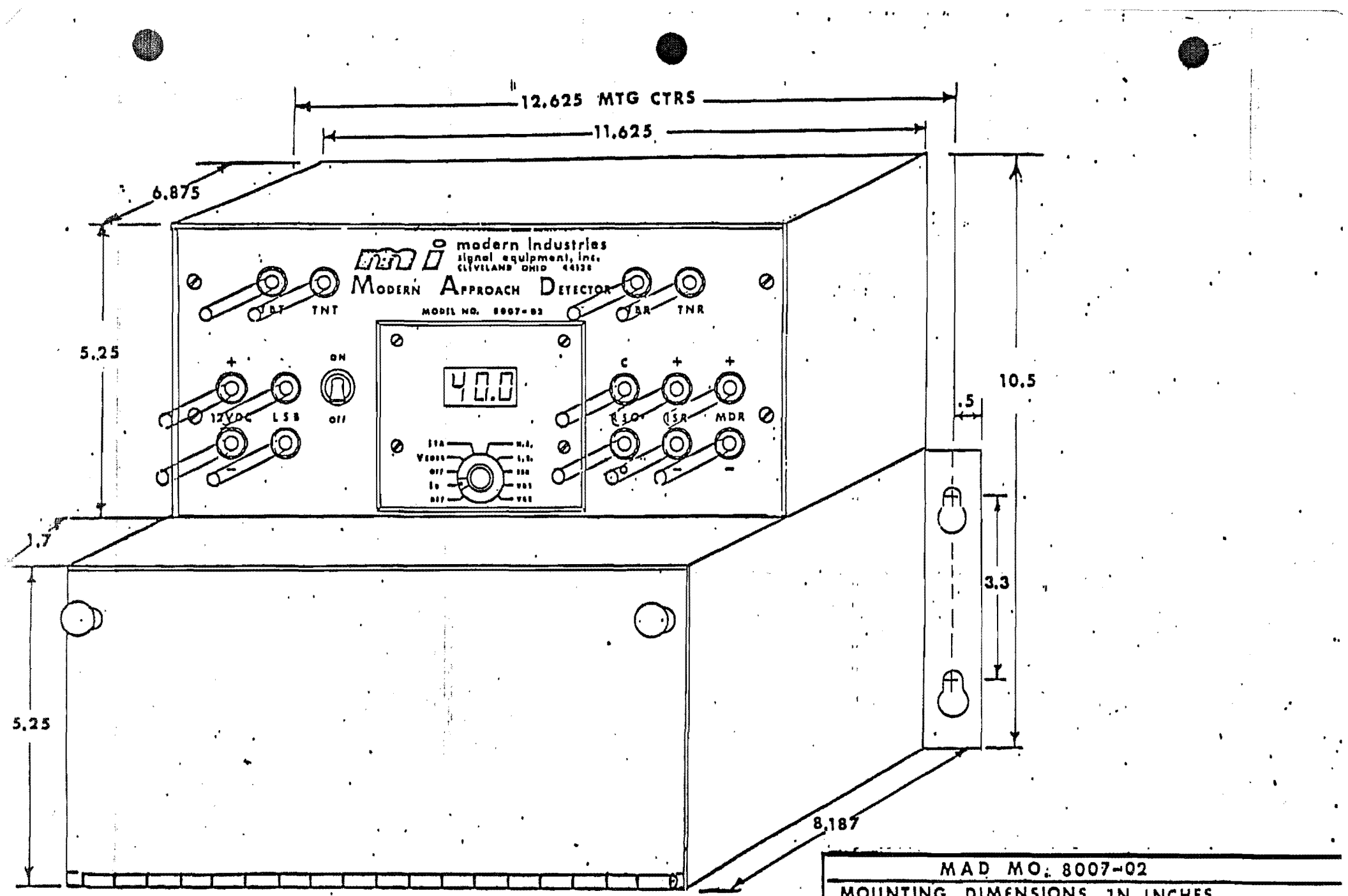
XING LOCATION _____

RR SUPV. _____ MI ENGR. _____

MAD METER READINGS

| DATE | TIME | TEMP. | WEATHER | INITIAL | BATTERY "B" | ED | VCORR | ITA | HS | LS | ISR | VR 1 | VR 2 | PERFORMANCE COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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1 Transmitter Board
0 Regulator Board
6 Meter Board
7 Fiber Board
3 Amplifier Board
4 Receiver Board
2 Logic Board
5 Option Board
3 Amplifier Board
4 Receiver Board
3 Amplifier Board
MODERN INDUSTRIES SIGNAL EQUIPMENT, INC.
CLEVELAND, OHIO
CD-1040




WEIGHT - 14 LBS

MAD MO. 8007-02

MOUNTING DIMENSIONS. IN INCHES

MODERN INDUSTRIES, SIGNAL EQUIPMENT INC.

CLEVELAND, OHIO

| Drawn WLH | Date 10-20-79 | DWG-1025 |
|---|---|---|

**modern industries** signal equipment, inc.
20710 MILES PARKWAY • P.O. BOX 28500 • CLEVELAND, OHIO 44128 • PHONE:216/663-3444

# MAD DISCREPANCY REPORT

No. _____

Your Name _____ Date: _____

Your Company _____

System Location _____

Function Failure _____ Serial No. _____

Failed Item PCBD or Part No. if known _____ Quantity _____

Date and Time of Failure _____

Parts Returned ☐ Repaired in Field ☐

---

How found Visual ☐ Operator Report ☐ During Original Installation ☐

Alarm ☐ Customer Report ☐ Normal Maintenance ☐

Problem reported By _____

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Possible Cause of Trouble (if known): Workmanship ☐ Defective Part ☐

Maintenance/Installation ☐
Other _____
_____
_____

Secondary Cause ☐
i.e. Lightning etc.
Failure of other products
or devices

Description of Trouble or Symptom: (Use back of Sheet if Necessary)

Fill in as much applicable information above as possible. This sheet should be kept and shipped with each MAD and/or, PCBD returned to the factory for repair. If a field engineer corrects the problems, a copy of this should be mailed to the factory.

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Corrective Action: Factory

Failure Analysis Required ☐ Results

APPROVALS

| Department | Signature | Date | Department | Signature | Date |
|---|---|---|---|---|---|
| Q.C./MFG. | | | FIELD SERV. | | |
| PROD. ENG. | | | | | |

(To be returned to originator when completed)