

HMW 06020 Filtered Fuse Panel for GMT Fuses

-24 to -48VDC

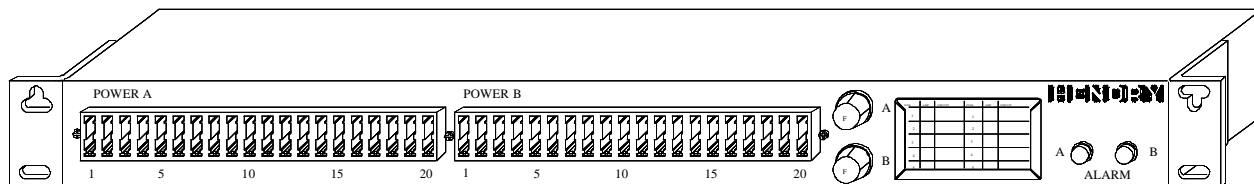


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1. GENERAL DESCRIPTION

1.01 FUSE PANEL

The HMW 06020 Series Fuse Panels are designed for use in standard 19" and 23" equipment racks, can be mounted in either 1.75" or 2" panel spaces, and provide current protection for 40 circuits using GMT type fuses. The panels are configured with two separate circuits that may be operated independently, at the same, or at different voltages over the range of -24 to -48 volts. The exclusive alarm feature of this panel allows it to provide a warning if a fuse blows.

1.02 AUXILIARY FAIL ALARMS

The panels are available configured with an Auxiliary Alarm circuit, HMW 06020-05. This circuit allows alarm signals from other alarm sources to be combined into a single alarm output. The Auxiliary Alarm circuit can be triggered with either a positive or negative alarm signal. Both positive and negative alarms may be applied to the circuit at the same time.

1.03 FUSE FAIL ALARM

The panel also contains a Fuse Fail Alarm circuit. This circuit operates when one or more of the panel's fuses fail. The circuit contains two form C relay outputs which can be used to operate external audible and visual alarm devices. A green LED located on the front panel changes to red when an output fuse has failed.

1.04 EXTERNAL NOISE FILTER

The panel contains a filter that protects internal circuitry by suppressing noise levels from external sources. Filter characteristics under load are: 60 Hz - 44 dB, 200 Hz - 58 dB, 1 KHz - 96 dB, 10 KHz - 102 dB, or better. (Tested at 20 ohm DC source impedance and 50 ohm noise signal source impedance.)

1.05 GMT FUSES

The 06020 Fuse Panel uses GMT fuses for individual circuit protection. The GMT fuse is available in sizes ranging from 0.20 A to 10 A. The panel is rated for 10 A fuses under normal operation. When the fuse fails due to an overload condition, a small colored flag on the fuse shows the position of the fuse that has failed.

1.06 INPUT and OUTPUT TERMINAL BLOCKS

Terminal blocks with screw type feed-through terminals are provided on the rear panel for both input and output wires. The input terminal block can accept wire sizes ranging from 14 to 6 awg. The output terminal block can accept wire sizes ranging from 22 to 14 awg.

1.07 FRONT PANEL CONFIGURATION

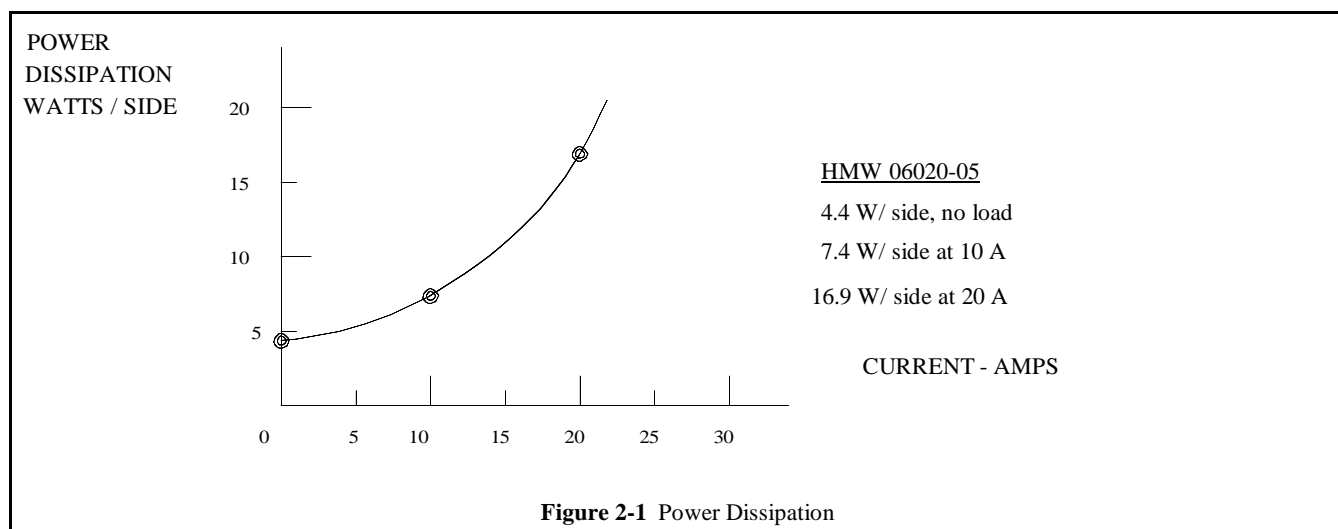
Fuse Positions:	40 GMT fuses in dual groups of 20
Card Holder:	40 position
Fuse Alarm LEDs:	Green is indicated for A or B if power is supplied to the panel and there are no failed fuses. (Green LED changes to red when a fuse has failed.)
Input Fuses:	20 A ceramic input fuse (Type ABC)

1.08 REAR PANEL CONFIGURATION

Input Terminal Block A:	Input for power source A
Input Terminal Block B:	Input for power source B
NEG VDC Output Block A:	Positions 1 to 20 upper right
NEG VDC Output Block B:	Positions 1 to 20 upper left
POS Gnd A Output Block:	Positions 1 to 20 lower right
POS Gnd B Output Block:	Positions 1 to 20 lower left
Alarm Panel:	.045" wirewrap terminals for fuse and auxiliary alarms (Also see Section 4.03)

2. TECHNICAL SPECIFICATIONS

Capacity	40 GMT fuses in dual groups of 20
Input Voltage	-24 to -48 VDC
Current Capacity	20 A "A" or "B" (40 A total)
Alarm Contact Relays	1 A at 120 VAC, 2 A at 30 VDC
Environmental Temp. Range	0 to 120°F
Power Dissipation	See Figure 2-1
Dimensions	Body: 17"W x 9.25"D x 1.75"H for 19" or 23" standard rack
Weight	12.1 Lbs.

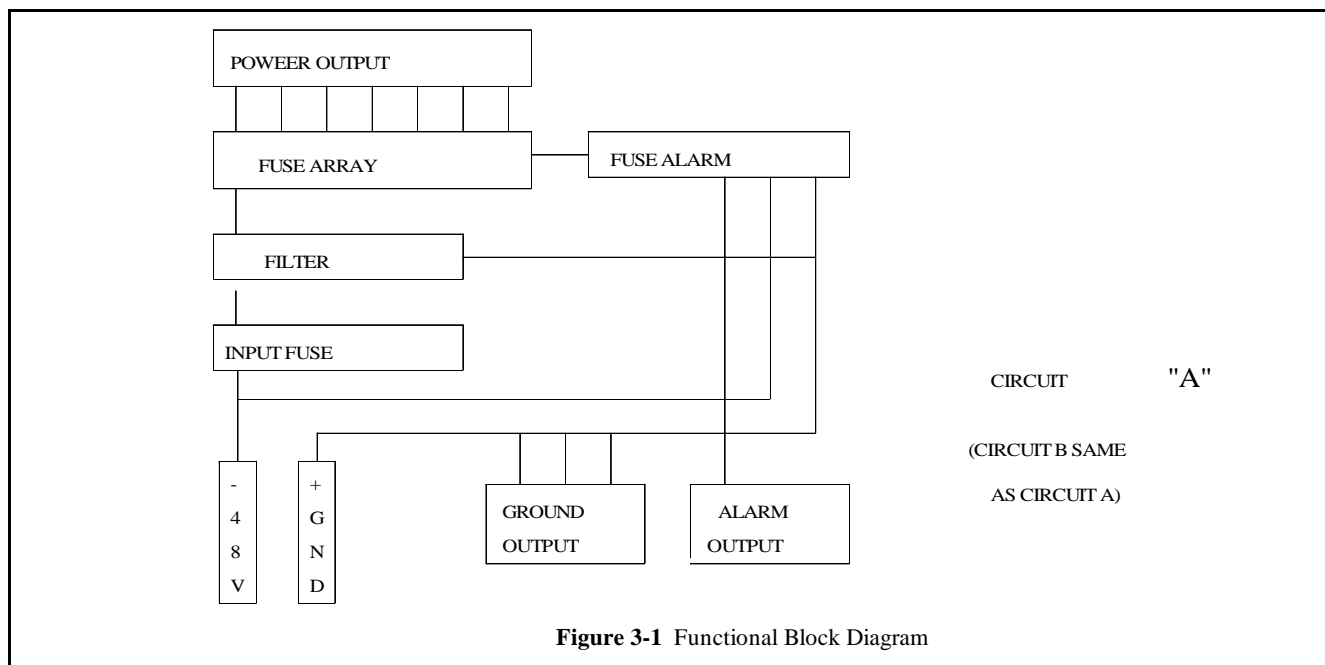


3. CIRCUIT DESCRIPTION

3.01 FUSE

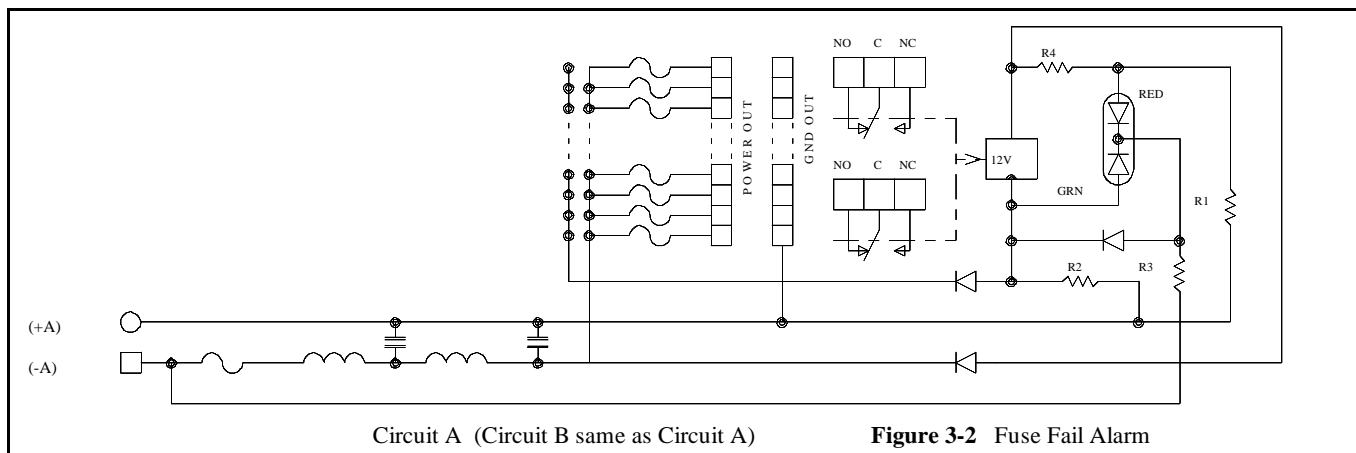
The panel contains two separate circuits, A and B. Current flows from the input terminal block, through the input fuse to the fuse bus. When a fuse is installed in a fuse holder the circuit is completed to the output connector. When a fuse blows, the input power bus is tied to the fail alarm bus and a "fail" signal is sent to the fail alarm circuit.

See Figure 3-1.



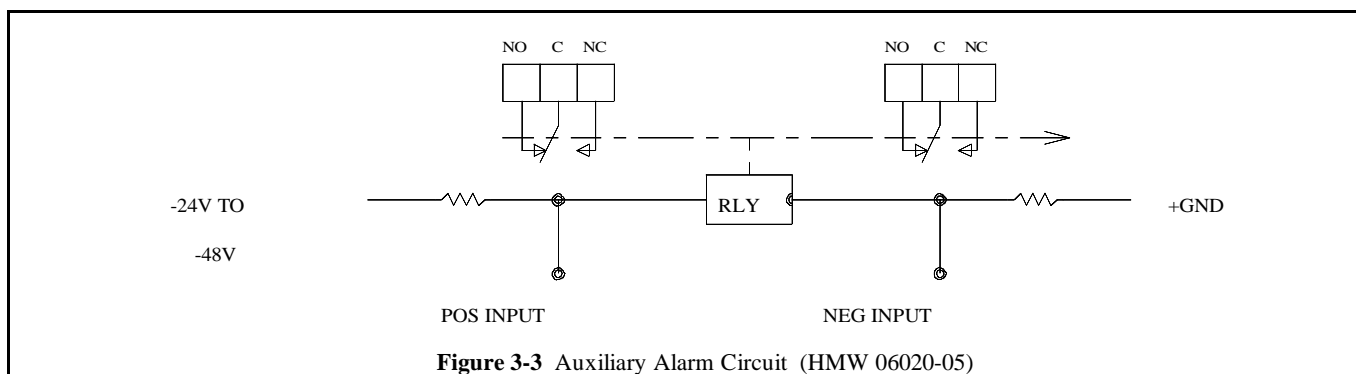
3.02 FUSE FAIL ALARMS

Separate and isolated Fuse Fail Alarm circuits are provided for both A and B circuits. Each contains highly reliable, passive components to provide an analog decision to illuminate the LED, either red or green. See Figure 3-2.



3.03 AUXILIARY ALARM CIRCUIT

A normal power-on condition energizes the relay. The application of either a positive or negative input triggers the relay to de-energize and give a fail indication at the output. Both positive and negative inputs may be applied to the circuit at the same time. See Figure 3-3.



3.04 FAIL RELAYS

The fail relays are kept in an energized condition under normal operation. When a fuse fail condition exists, the relay is de-energized and the normally open contacts close to operate external audible and visual alarms. Using this mode of operation, an alarm will be activated if the relay is disabled or unable to operate for any reason. Loss of power to the panel will also cause the relay to de-energize and cause a fail indication.

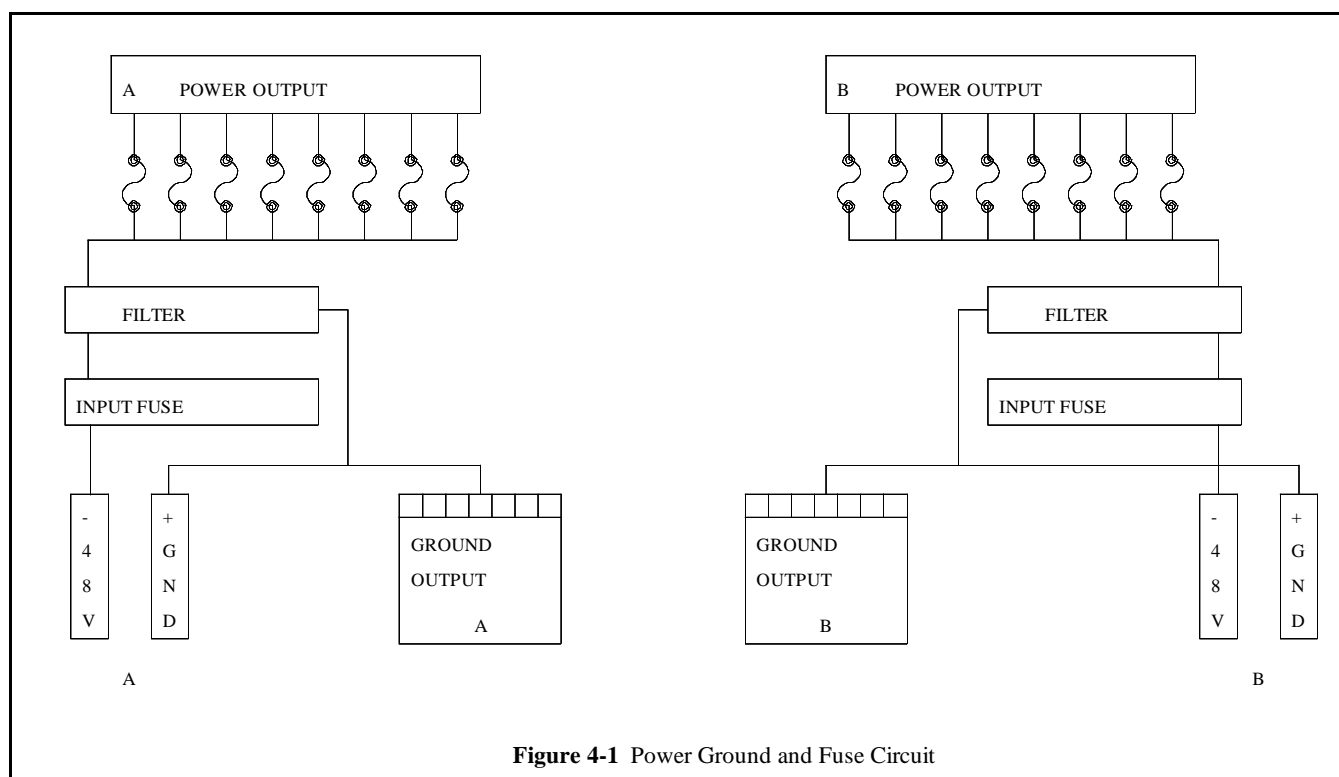
3.05 FUSE FAIL ALARM LED

The Fuse Fail Alarm LED on the front panel indicates the condition of the panel. Green is indicated if power is applied to the panel and there are no failed fuses. The green LED changes to red when a fuse fails. If an input fuse fails the LED turns orange.

4. APPLICATION INFORMATION

4.01 POWER DISTRIBUTION

The primary purpose of the Fuse Panel is to provide protected distribution of power. Protection is provided by the fuses placed in the GMT fuse holders used in the panel. The Hendry part number for these fuses is indicated in section 5.02. The power distribution circuit is shown in Figure 4-1.



4.02 HIGH RELIABILITY

The circuits used in this unit are designed for high reliability with a MTBF greater than 200,000 hours. However, the Fuse Panel is designed and constructed with removable components for troubleshooting and/or component replacement, if necessary.

4.03 BACK PANEL

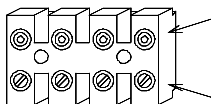
The back panel of the Fuse Panel consists of input and output terminal blocks, chassis ground and wirewrap pins for external alarm hookups. See Figure 4-3.

**CAUTION: LEAD
REVERSAL WILL
DAMAGE THE UNIT**

POWER INPUT TERMINAL BLOCKS for "A" and "B" CIRCUITS

Upper Terminals for Hendry Use Only

Do Not Remove Protective Plastic Caps
Do Not Loosen Screws Under Plastic Caps



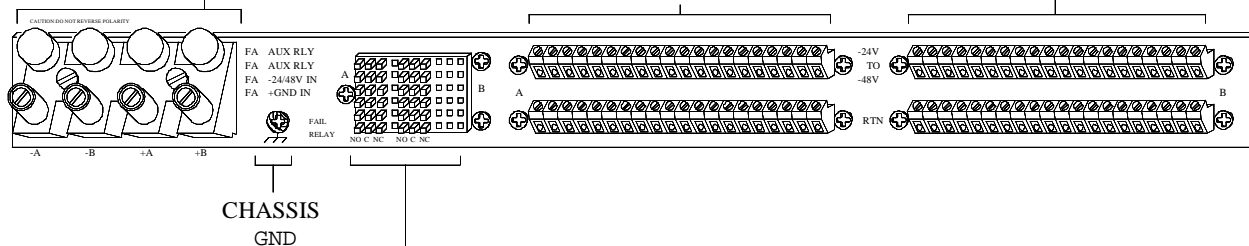
Lower Terminals for Customer Use

_ Terminals Accept 14 to 6 AWG
_ Torque Screws to 16 in-lbs

OUTPUT TERMINAL BLOCKS for "A" and "B" CIRCUITS

Terminals accept 22 to 12 AWG

_ 20 GMT fuses for each A and B circuit
_ Positive ground for both A and B circuits
_ Torque screws to 4.5 in-lbs



WIREWRAP PIN ARRANGEMENTS for EXTERNAL ALARM HOOKUPS

See paragraph 4.04 for detailed examples
of external wiring that may be used.

Figure 4-3 Back Panel (HMW 06020-05)

4.04 EXTERNAL ALARMS

External audible and visual alarms for both the fuse and auxiliary circuits may be operated from the Fuse Panel. Wirewrap pins are provided on the rear panel for access to the relay contacts. Examples of external wiring that may be used are indicated in Figures 4-4.1 through 4-4.4.

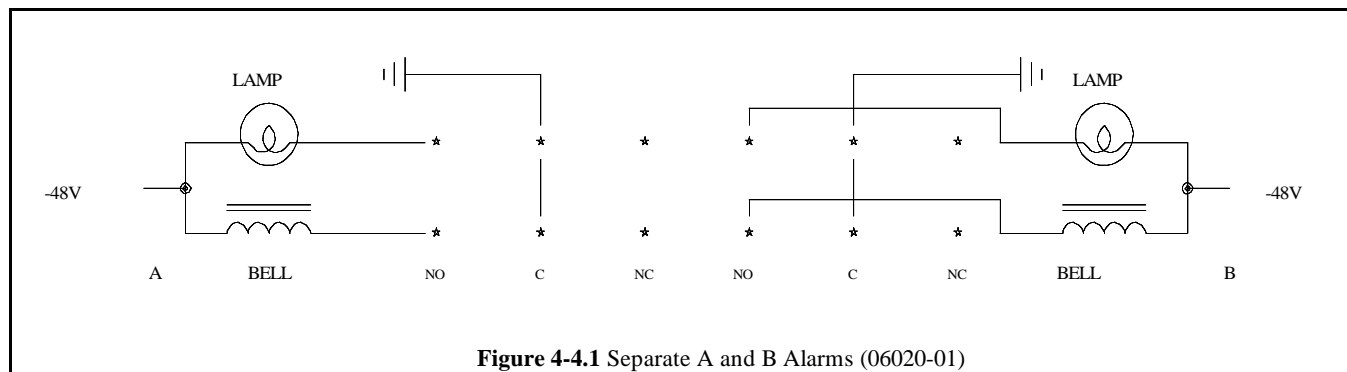


Figure 4-4.1 Separate A and B Alarms (06020-01)

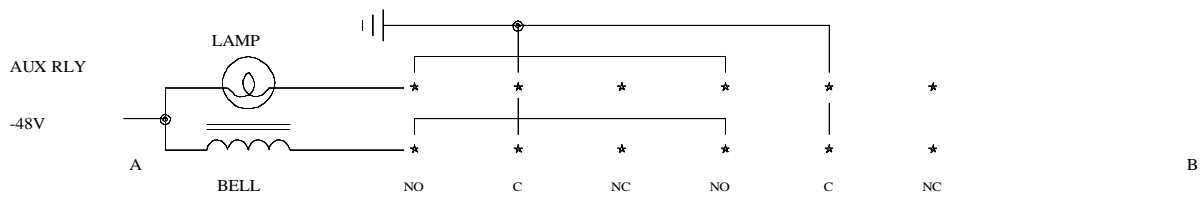


Figure 4-4.2 Common A and B Alarms (06020-01)

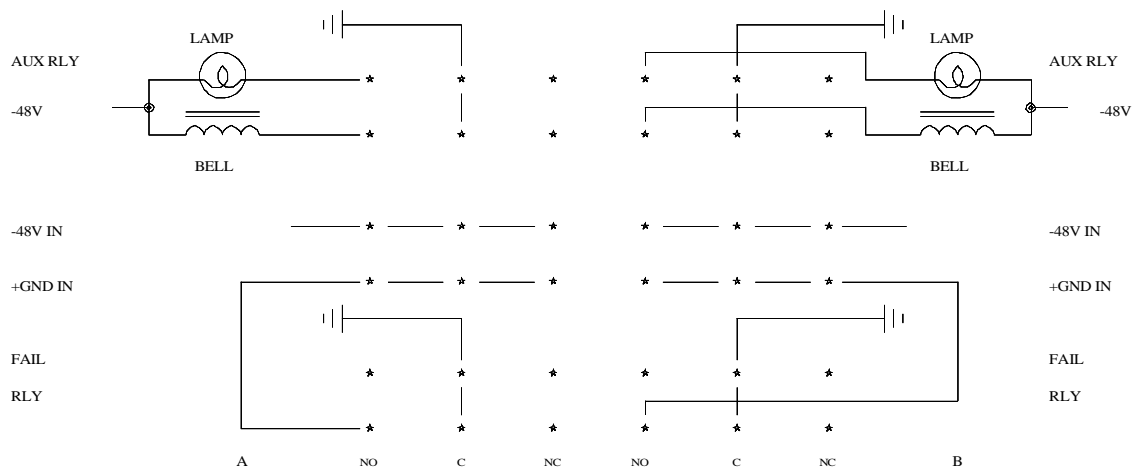


Figure 4-4.3 Separate A and B Auxiliary Alarms
A and B Fuse Alarms Triggering A and B Auxiliary Alarms (06020-05)

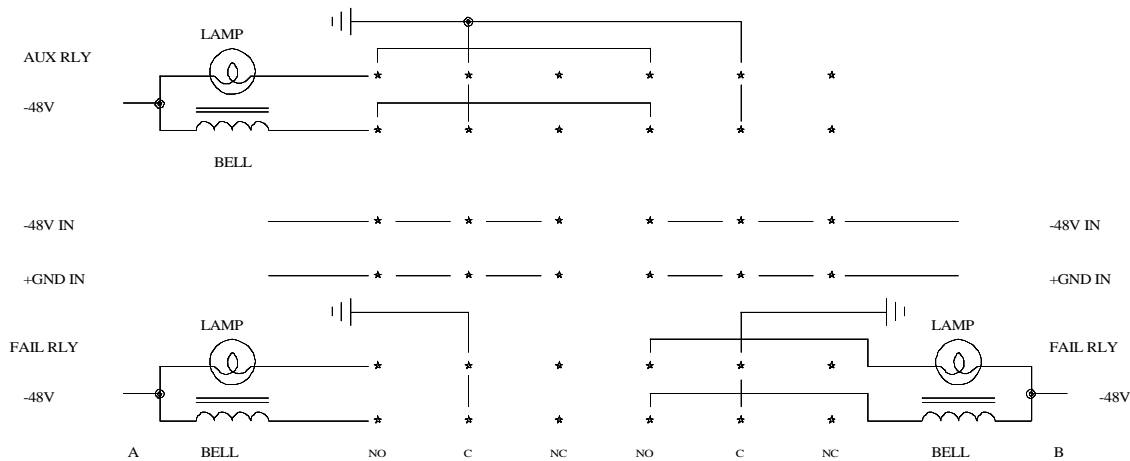


Figure 4-4.4 Common A and B Auxiliary Alarms
Separate A and B Fuse Alarms (06020-05)

4.05 TEMPERATURE

Care has been taken to facilitate the transfer of heat from the unit. Slots are provided in the top and bottom of the panel to facilitate air flow. This provides an efficient way to remove the heat without resorting to the use of less reliable fans or blowers.

The panel will become warm, however, because of the fuses which are actually temperature devices. Heat from the panel could radiate downward and upward to adjacent equipment even though air flow may not be blocked. Since most of the heat is generated at the front of the panel, this potential could be reduced if the fuses are separated by one or more blank fuse-holders, the panel is mounted forward in the rack (see Section 6.02), and one space is allowed between the panel and adjacent equipment.

At an ambient temperature of 70× F, the temperature at the front of the HMW 06020-01 panel using 10 A fuses under full load conditions are approximately 86× F at 20 A, and 105× F at 40 A. Temperatures at the rear of the panel under full load conditions are approximately 79× F at 20 A, and 93× F at 40 A.

4.06 GMT FUSES

GMT fuses are available at current ratings up to 10 A. Care should be taken, however, if more than one fuse at nearly 10 A is to be used in the same block of fuseholders. Temperatures of up to 173× F can be expected on the fuseholder if two 10 A fuses are placed in adjacent positions, and temperatures of up to 148× F can be expected if the same fuses are placed with one blank fuseholder between the two.

5. ORDERING INFORMATION

5.01 FUSE PANELS

Part #	Description
06020-01	NEG. 24 to 48 VDC, 40 fuses, 20 A and 20 B, Filtered
06020-05	NEG. 24 to 48 VDC, 40 fuses, 20 A and 20 B, Filtered w/ Auxiliary Alarm

5.02 FUSES

Part #	Description	Part #	Description
06100-0	Dummy Fuse	06100-1.5	1.50 A GMT fuse
06100-.20	0.20 A GMT fuse	06100-2	2.00 A GMT fuse
06100-.25	0.25 A GMT fuse	06100-2.5	2.50 A GMT fuse
06100-.33	0.33 A GMT fuse	06100-3	3.00 A GMT fuse
06100-.375	.375 A GMT fuse	06100-3.5	3.50 A GMT fuse
06100-.50	0.50 A GMT fuse	06100-4	4.00 A GMT fuse
06100-.65	0.65 A GMT fuse	06100-5	5.00 A GMT fuse
06100-.75	0.75 A GMT fuse	06100-7.5	7.50 A GMT fuse
06100-1	1.00 A GMT fuse	06100-10	10.0 A GMT fuse *
06100-1.3	1.30 A GMT fuse	* NOTE: See Sections 4.05 and 4.06.	

6. INSTALLATION



Electrical Hazard Caution

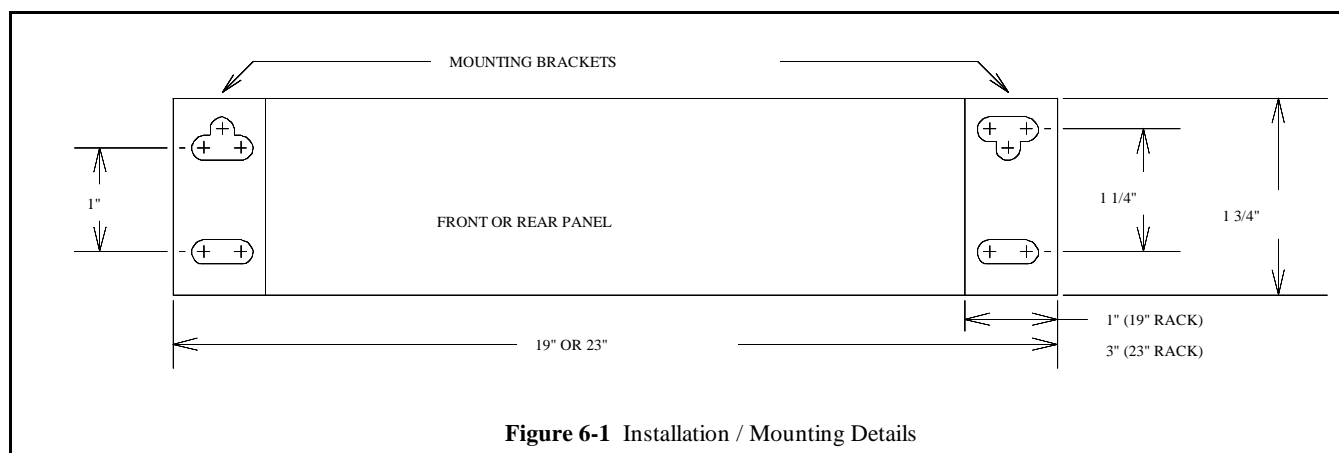
This unit employs electrical voltage and amperage levels which, per GR-1089, may be considered an electrical hazard. Care should be exercised to assure that only qualified personnel are allowed to install, operate, maintain or otherwise come in contact with this equipment when the panel is energized. Only insulated tools should be used on energized elements of the panel.

6.01 UNPACKING

Upon receiving the 06020 Fuse Panel, verify that the unit is not damaged. Notify the carrier promptly if any damage is noted. Remove the unit from the shipping container. Save the packaging material and shipping container for reshipment of the unit if necessary. Compare the part number indicated on the panel to the purchase documentation to be sure that the correct panel has been received.

6.02 MOUNTING BRACKETS


The unit is shipped with mounting brackets for a standard 19" or 23" equipment rack. The slotted mounting hole pattern in the brackets allows panel mounting in either 1-3/4" or 2" rack spaces, and compensates for horizontal frame distortion. The brackets are adjustable in eight 0.5" increments for repositioning of the panel forward from the front of the rack, and may also be reversed for mounting from the rear of the rack. See Figure 6-1 for mounting details.



6.03 WIRING

NOTE: The power input upper terminals are for Hendry use only. Do not remove the protective plastic caps, and do not loosen the screws under the caps. The power input lower terminals are for customer use. The terminals accept 14 to 6 awg wire sizes. The input wire leads should be stripped approximately 1/2 inch from the end, and the screws torqued to approximately 16 in-lbs. Do not reverse the input power leads as this will damage the unit. The output terminals accept 22 to 14 awg wire sizes. Output wire leads should be stripped approximately 1/4 inch from the end, and the screws torqued to approximately 4.5 in-lbs. Positive ground for both A and B must be common.

7. TEST

	<p>Electrical Hazard Caution</p> <p>This unit employs electrical voltage and amperage levels which, per GR-1089, may be considered an electrical hazard. Care should be exercised to assure that only qualified personnel are allowed to install, operate, maintain or otherwise come in contact with this equipment when the panel is energized. Only insulated tools should be used on energized elements of the panel.</p>
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7.01 QUALITY CONTROL

Each unit has been thoroughly tested at the factory, but the following tests are recommended to verify that no damage has occurred during shipping or handling. Test both A and B input circuits.

7.02 WIRING

Check the input and output connector screws with a torque screw driver. Test for 16 in-lbs on the input connector and 4.5 in-lbs on the output connectors.

7.03 RESISTANCE TESTING

Before connecting the input and output power leads (Re. Section 4.03), measure the resistance at the input to each circuit. Connect an ohm meter between the positive and negative input terminals. A resistance of at least 500 ohms should be read. (Some meters will indicate a resistance of several megohms since their input voltage is not high enough to break down the forward conductance of the diodes used in the circuit.) Any resistance higher than 500 ohms is acceptable.

7.04 POWER LEADS

If the input power leads are reversed, damage will occur to the unit. This fuse panel contains input line filters that have capacitors. If the input power leads are reversed, the filter capacitor will be damaged.

7.05 POWER APPLICATION

Connect the input power leads and apply power to the circuit. The green Fuse Fail Alarm LED will illuminate. The Fuse Fail relay should indicate an open circuit between the common, C, pin and the normally open, NO pin; and a closed circuit between the common pin and the normally closed, NC, pin.

7.06 FUSE ALARM

Place a blown fuse in one of the fuse positions. The green Fuse Fail Alarm LED will change to red and the Fuse Fail relay will operate.

8. OPERATION



Electrical Hazard Caution

This unit employs electrical voltage and amperage levels which, per GR-1089, may be considered an electrical hazard. Care should be exercised to assure that only qualified personnel are allowed to install, operate, maintain or otherwise come in contact with this equipment when the panel is energized. Only insulated tools should be used on energized elements of the panel.

8.01 OPERATIONAL CIRCUITS

All circuits are operational as soon as power is applied to the panel. The Fuse Fail Alarm LED on the front panel will illuminate green when power is ON.

8.02 FUSE INSTALLATION

Insert fuses in the panel as required. If a fuse blows, the Fuse Fail Alarm LED will change to red. To correct the problem, determine the cause of the fuse failure and replace the fuse.

9. MAINTENANCE



Electrical Hazard Caution

This unit employs electrical voltage and amperage levels which, per GR-1089, may be considered an electrical hazard. Care should be exercised to assure that only qualified personnel are allowed to install, operate, maintain or otherwise come in contact with this equipment when the panel is energized. Only insulated tools should be used on energized elements of the panel.

9.01 INSPECTION

Inspect the Fuse Panel periodically for damage to the fuses, broken wires originating from the alarm circuits, and excess dust and dirt.

9.02 CLEANING

Brush or wipe dust and dirt from the unit. Care should be taken not to damage the fuses.

9.03 ADJUSTMENTS

There are no field adjustments. If a circuit is not operating properly, contact the factory.

9.04 REPAIR

If the LEDs are not functioning properly, they may be removed from the front panel. (It is not necessary to turn off the power to remove the LEDs.) Contact the factory for a replacement. If tests indicate that the Fuse Fail Alarm circuits are not operating properly, contact the factory for a replacement circuit board.

10. WARRANTY

Hendry Telephone Products warrants each of its products to be free of defects in material and workmanship under normal use and service within five years after delivery to the original purchaser. Hendry's obligation under this warranty shall be limited to repair or replacement, without charge, of any product that is determined to be defective. Hendry shall not be liable for any consequential or indirect damage of any type or nature nor for any cost of reinstallation. No material is to be returned without approval from Hendry.