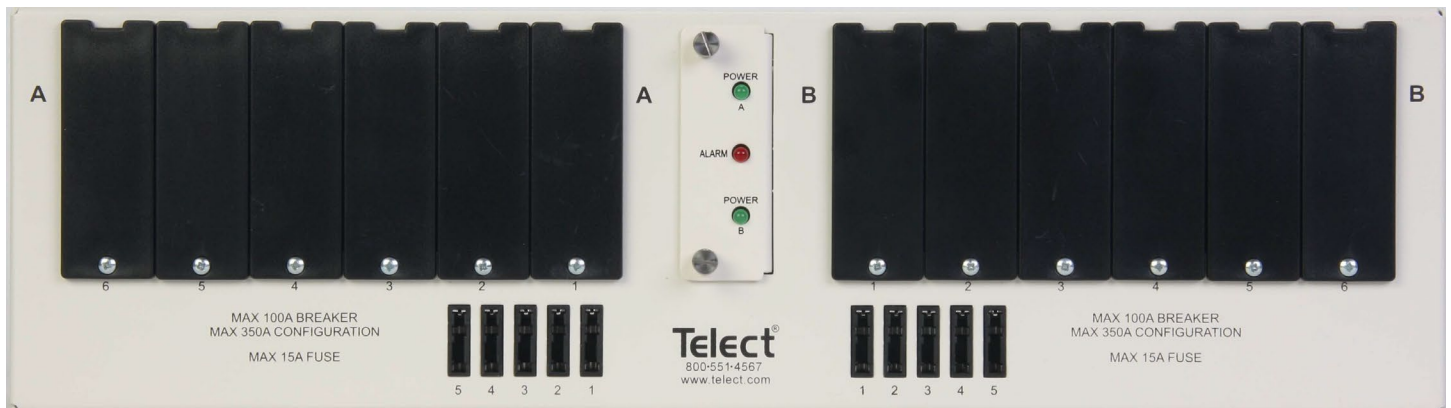


Dual-Feed 350A 6-Circuit Breaker/TFD Distribution Panel with 5 GMTs

Installation Guide



Installation Guide, Part Number 138661 A0

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About

Amphenol Network Solutions is a global innovative original equipment manufacturer that serves the data and communications markets. We design, manufacture, and distribute products for customers who need an end to end solution for network connectivity, fiber, power distribution and rack management. We collaborate with our customers to deliver product solutions that exceed expectations with innovative designs and world class quality. Amphenol Network Solutions is the industry thought leader on network cable management.



Telect, Inc. has been a market leader in secondary DC power distribution for over 36 years. Through our acquisition by Amphenol and our merger with All Systems Broadband, to become Amphenol Network Solutions, we have continued to deliver reliable, high-quality solutions to power, protect, and monitor today's network servers and equipment. We are proud to be an Amphenol company that will continue to be Powered by Telect.

Technical Support

Email: support@amphenol-ns.com
Phone: 509.926.6000

**Dual-Feed 350A 6-Circuit
Breaker/TFD Distribution
Panel with 5 GMTs**

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1.1 Overview

The Amphenol Network Solutions dual-feed 350A circuit breaker/TFD panel provides high-capacity protection for secondary power distribution, co-locations and data for communications equipment. In addition, the provided GMT fuses enhance power distribution for applications that require 15A or less. Each of the dual feeds contains six interrupter positions for either bullet-style REC switch (ON/OFF) circuit breakers or TFD holders. Each feed also includes five GMT fuses. Go to amphenol-ns.com to order circuit breakers, TFD holders and GMT fuses:

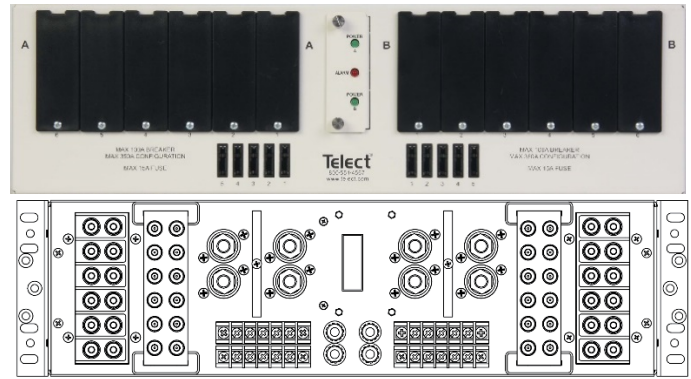


Fig. 1: 350CB06 Distribution Panel

- TLS fuses up to 70A rated, continuous current 80% of rated
- TPS fuses up to 125A rated, continuous current 80% of rated
- GMT fuses up to 15A rated, continuous current 70% of rated
- Circuit breakers up to 100A rated, continuous current 80% of rated

This panel ships with solid covers over the circuit breaker/TFD positions and with fuse-slot fillers in the GMT holders.

Sides A and B are electrically isolated except for the replaceable alarm card, which contains power and alarm LEDs. The panel features separate power status LEDs and a single-alarm LED for breaker trips or fuse failures. Power and alarm relay connections are controlled on-board and provide dry Form-C contacts.

All input, output and alarm terminals are on the rear, and all are covered by a single, full-size transparent terminal cover. Separate input terminal sub-covers maintain protection for the other terminals when you are only working with the load and/or alarm terminals. Two pairs of ground studs on the rear panel provide flexibility in grounding from either side of the rack. The input, output and ground studs support the following cable gauges:

- Input terminals support up to a 750-MCM cable
- Output terminals support up to a 2-AWG cable
- Ground studs support up to a 1-AWG cable

1.2 Important Installation Guidelines

- **Elevated Operating Ambient** – If installed in a closed or multi-rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (TMA) specified by the manufacturer.
- **Reduced Air Flow** – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading** – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading** – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing** – Reliable earthing of rack-mounted equipment should be maintained. Attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- **Disconnect Device** – A readily disconnect device shall be incorporated in the building installation wiring.

1.3 Specifications

Inputs:	Specifications:
Voltage range (nominal voltage)	± 20V to ± 30V (nominal ± 24 VDC) -40V to -60V (nominal -48 VDC)
Max. input load rating	350A @ +50°C 300A @ +55°C
Short circuit withstand rating	5000A
Nominal power loss at full load	Less than 40W per side @ 16,800W full load per side (350A x 48V)
Max. input interrupt device	440A
Input terminal studs (with nuts, flat washers & spring washers) for dual-hole compression lugs	³ / ₈ -16 studs on 1 in. centers [max. lug width of 1.625 in. (41.3 mm)]. Torque nuts (using ⁹ / ₁₆ in. or 15 mm wrench) to 140 in-lb. (15.5 N•m).
Input wire size	#1 AWG to 750 MCM
Breaker/Fuse Outputs:	Specifications:
Max. output single-pole, long-delay circuit breaker (ea.)	100A
Max. output TFD holder, schematic C	125A (TLS fuse) 70A (TPS fuse)
Max. continuous output load (ea.)	80% of rated
Min. short circuit interrupt rating	5000A
Max. total output load	300A per side
Output terminal studs (with KEPS nuts and washers) for dual-hole compression lugs	10-32 studs on ⁵ / ₈ in. centers [max. lug width of 0.6 in. (15.2 mm)]. Torque nuts (using ³ / ₈ in. or 10 mm wrench) to 20 in-lb. (2.27 N•m)
Output wire size	#6 AWG to #2 AWG
GMT Outputs:	Specifications:
Max. rated output GMT fuse (ea.)	15A
Max. continuous output load (ea.)	70% of rated
Max. total output load	50A per side
Output terminals for compression lugs	6-32 panhead screws [max. lug width of 0.32 in. (8.1 mm)]. Torque to 6.3 in-lb. (0.7 N•m).
Output wire size*	#22 AWG to #12 AWG

Grounding:		Specifications:
Earth GND terminal studs for dual-hole compression lugs		1/4-20 studs on 5/8 in. centers. Torque nuts (using 7/16 in. or 12 mm wrench) to 25 in-lb. (2.83 N•m).
Ground wire size		Up to #1 AWG
Alarms:		Specifications:
Alarm relay contacts		2A @ 30 VDC 0.6A @ 60 VDC
Max. alarm card power rating		@ 24V: 40 mA (.96W) @ 48V: 58 mA (2.78W)
Alarm wire size		#18 AWG to #22 AWG
Alarm terminals		Wire wrap
Dimensions:		Specifications:
Nominal, without brackets:		
	Width:	17.25 in. (438 mm)
	Height:	5 in. (127 mm)
	Depth:	8 in. (203 mm)
Weight:		Specifications:
Without packaging and accessories		19 lbs. (8.6 kg)
Shipping		22 lbs. (10 kg)
Environment:		Specifications:
Operating temperature		-10°C (14°F) to 55°C (131°F)
Humidity		90%, non-condensing

! ALERT

ALERT! Verify that all connections meet requirements specified in local electric codes or operating company guidelines before supplying power. Protect this equipment with a fuse or breaker sufficient to interrupt power levels specified on the preceding pages.

Install this product within a restricted access location where access is through the use of a tool, lock and key, or other means of security and is controlled by the authority responsible for the location. Only qualified technicians may install and maintain this product.

1.4 Inspection

Please read and understand all instructions before starting installation. If you have questions, contact Amphenol Network Solutions Technical Support at support@amphenol-ns.com or call 1.509.926.6000.

When you receive the equipment, carefully unpack it and compare it to the packaging list. Please report any defective or missing parts to Amphenol Network Solutions Quality at quality@amphenol-ns.com or call 1.509.926.6000.

Amphenol Network Solutions is not liable for transit damage. If the product is damaged, please report it to the carrier and contact Amphenol Network Solutions Quality.

1.5 Installation

Panel brackets provide flush, 2-in. extended, 4-in. extended EIA or WECO mounting in a 19-or 23-in. rack.

Procedure steps:

1. Use the six screws provided to fasten the brackets to the panel, as shown in the following two illustrations.

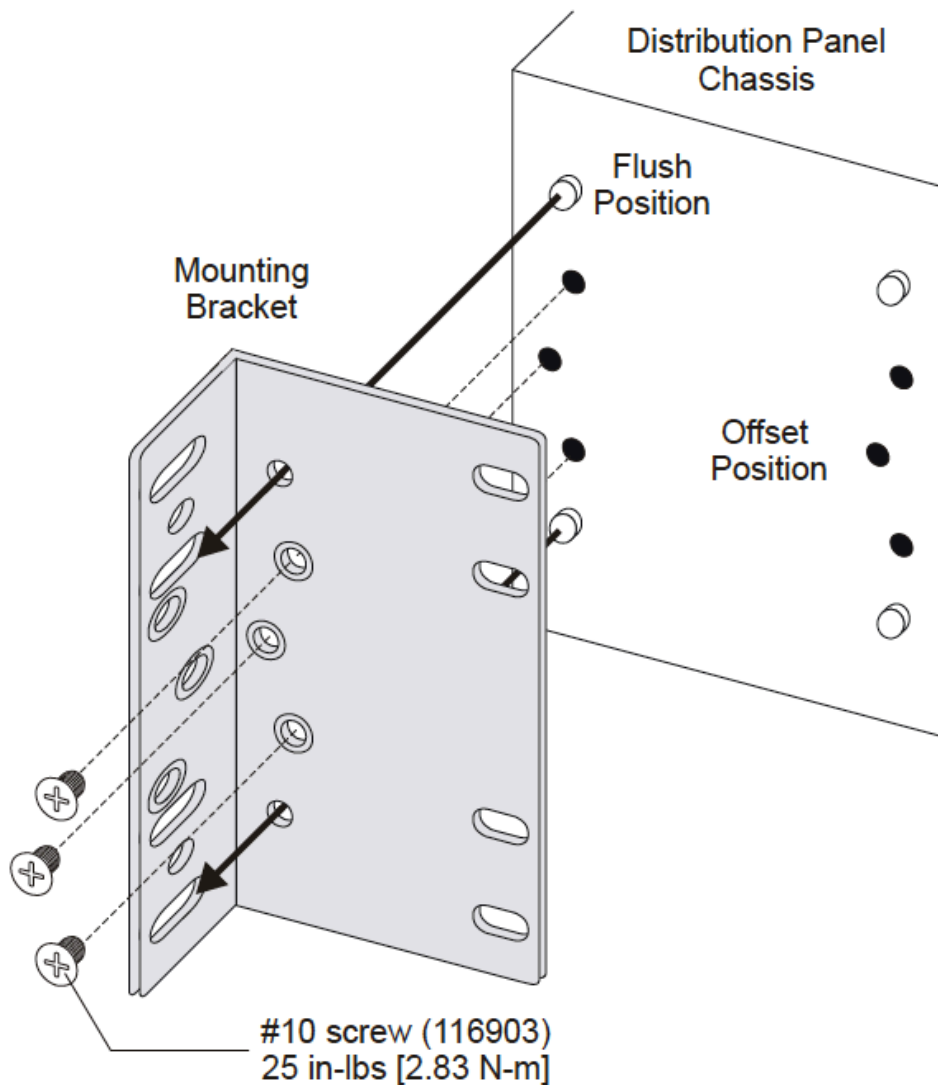


Fig. 2: Bracket Orientation

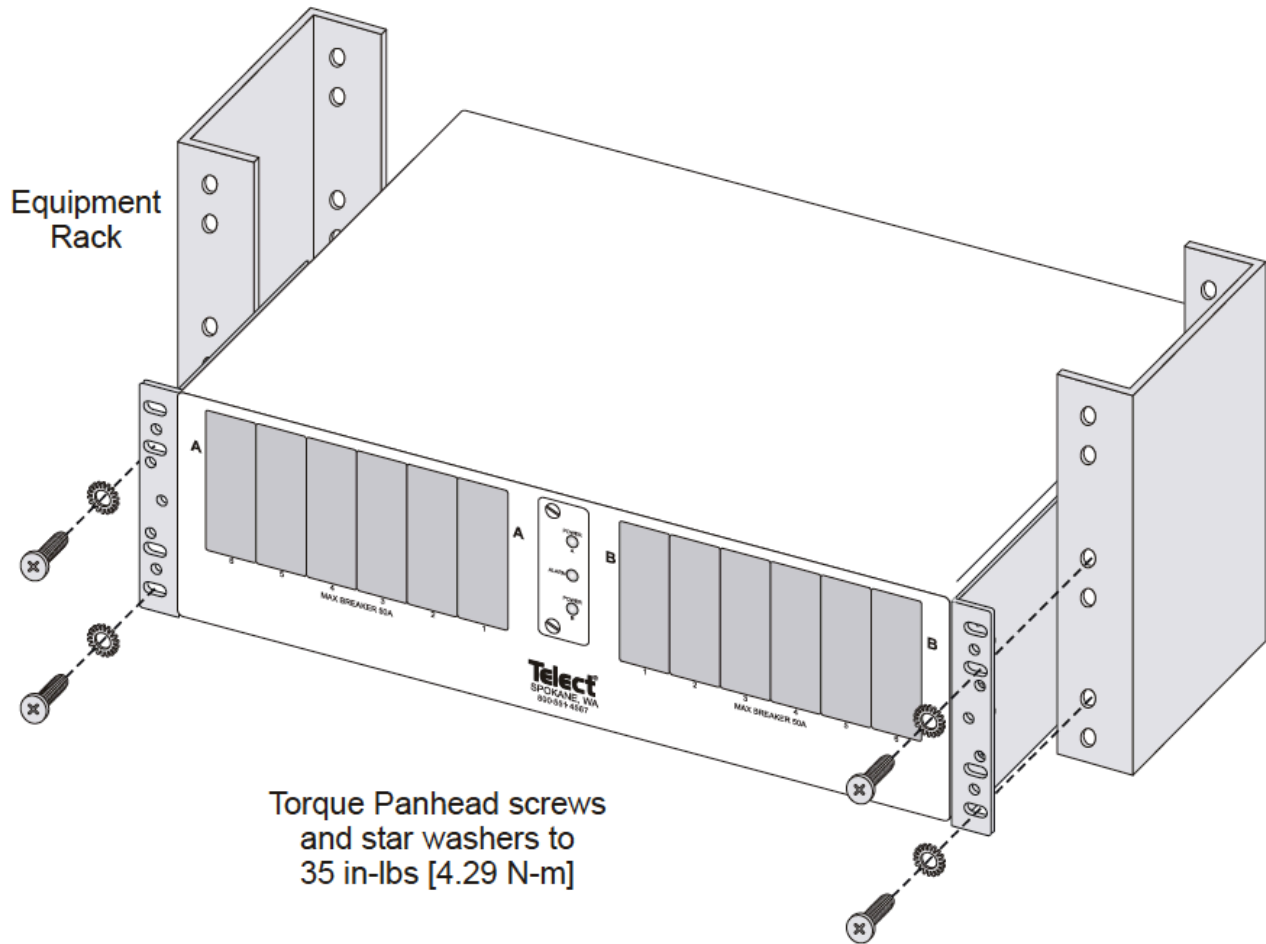


Fig. 3: Rack Mounting

2. Locate an unused rack position and mount the panel using at least two sets of fasteners (screws and star washers provided) per side, as shown in Figure 3. (Mount the panel as high as possible on the rack.)
3. Tighten the screws to 35 in-lb. (4.29 N•m).
If you intend on installing more than one panel per rack, you need to plan a rack arrangement that dissipates heat efficiently, as suggested on the following page.
4. Loosen (you need not remove) the two screws securing the transparent terminal cover to the rear of the panel.
5. Remove the cover.



WARNING

WARNING! Failure to properly ground this equipment can create hazardous conditions to installation personnel and to the equipment.

! ALERT

ALERT! Only use components and crimping tools approved by agencies or certifying bodies recognized in your country or region such as Underwriter’s Laboratories (UL), TUV, etc.

6. Use a listed (approved) crimping tool to attach a listed (approved), dual-hole compression lug onto suitable ground wire. (The size of the ground depends on the input interruption device.)
7. If required, lightly coat an antioxidant on the lug and grounding surface on the rear of the panel.
8. Connect using 1/4-20 hex nuts and flat washers provided, as shown in Figure 4.
9. Tighten the bolt to 25 in-lb. (2.83 N•m), max.

! WARNING

WARNING! Before connecting input power cables, make sure input power to panel is turned off.

10. Make sure the input power is off (open breaker, dummy fuse or open fuse holder at primary power distribution unit or battery) before connecting this panel’s input cables to the PDU or battery.
11. For input wiring — wiring used as inputs to this load center — crimp dual-hole compression lugs onto #1-AWG to 750-MCM copper wires. The choice of input wiring depends on the following criteria:
 - The input interrupt device rating affects the size of the input wiring.
 - Ambient operating temperature affects the type of input wire insulation. For further information consult the National Electrical Code (NEC).

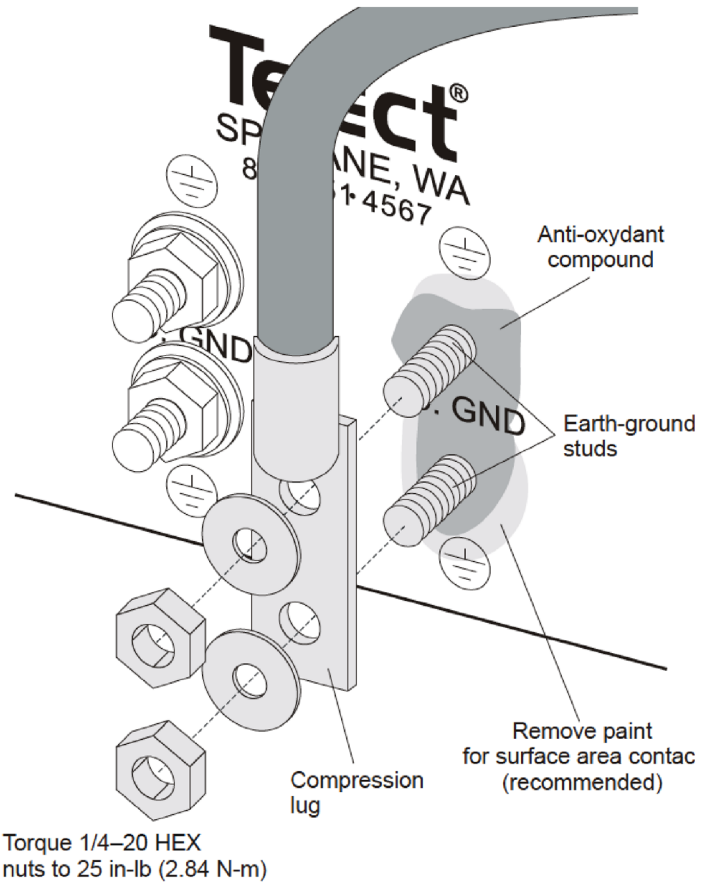


Fig. 4: Ground to Chassis

12. Insulate lug barrels with UL94 V-0-rated heat-shrink tubing.
13. Clean the terminals and lugs with a nonabrasive, nonmetallic pad.
14. If required, lightly coat an antioxidant on the lugs and input BATT and RETURN terminals.
15. Connect the lugs to input terminals on the back of the panel, as shown in Figure 5.
16. Tighten the lugs to 140 in-lb. (~15.5 N•m), max.
17. Make sure all interrupter positions are either empty, off or contain dummy fuses (phony, inoperative all-plastic slugs.)
18. Enable the fuse or breaker at the primary distribution unit or battery (440A max.) to turn on Feed A to Side A of the panel and then check the voltage and polarity at input connectors of panel.

Also check that:

- **POWER A** LED on the front of the panel turns on (green).
 - **POWER B** LED is off.
19. Repeat the previous step with Feed B and verify **POWER B** LED.
 20. With **POWER A** and **B** LEDs green (normal operation), test power-fail relay and contacts at **POWER FAIL** alarm terminals on the rear of the panel:
 - Expect continuity (0Ω) between Terminals **C** and **NC**.
 - Expect an open circuit ($\infty\Omega$) between Terminals **C** and **NO**.
 21. Test fuse alarm relay contacts at **ALARM** (CB/Fuse Alarm) terminals on the rear of the panel.
 - Expect continuity (0Ω) between Terminals **C** and **NC**.
 - Expect an open circuit ($\infty\Omega$) between Terminals **C** and **NO**.

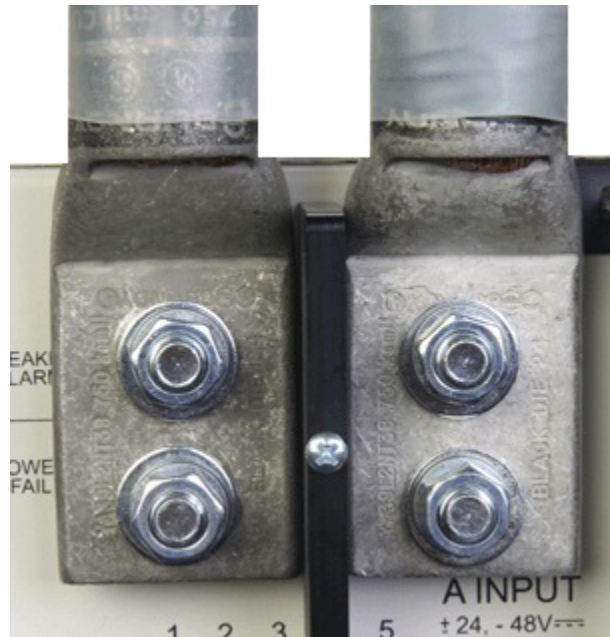


Fig. 5: Input Lug Connections

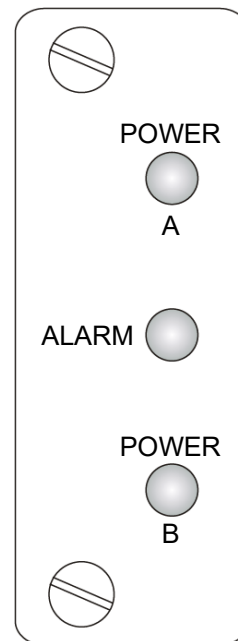


Fig. 6: Alarm Faceplate

22. Make sure none of the interrupter positions contains operable devices.
23. For circuit breaker, or TPS/TLS output wiring, crimp dual-hole lugs onto one end of the #6- to #2-AWG copper output wires, as required by NEC. (Work with one output wire at a time.)
24. Insulate lug barrels with UL 94V-0-rated heat-shrink tubing.
25. Clean panel terminals and lugs with a nonabrasive, nonmetallic pad.
26. If required, lightly coat antioxidant on the lugs and output **BATT** and **RETURN** terminals, and then connect the lugs to the terminals, as shown in Figure 7. (NEC specifies only one lug and load at each output terminal.)
27. Tighten nuts to 20 in-lb. (~2.3 N•m), max.
28. Connect the other end of the output wire to load.

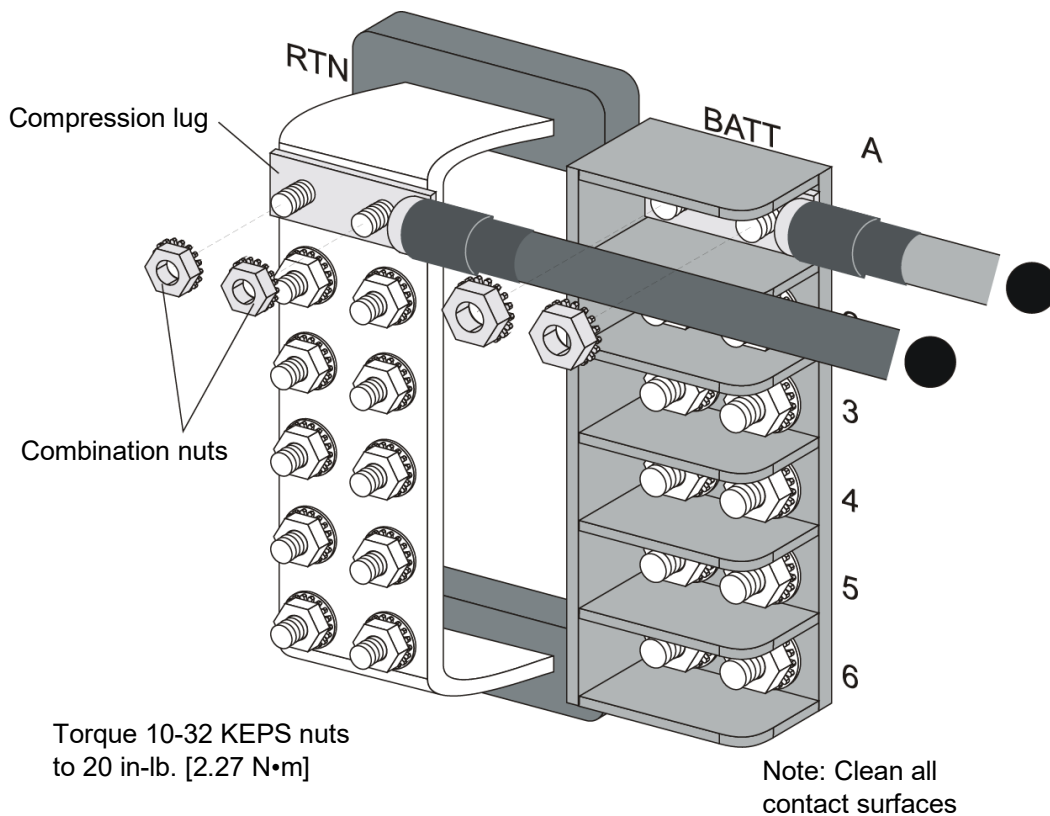


Fig. 7: CB/TFD Output Lug Connections

29. For GMT output wiring, use #22- to #12-AWG copper wire. (Work with one wire at a time.) At the panel end of the wire, crimp a single-hole ring or fork lug, as required by the NEC.
30. Clean the panel terminals and lug (if applicable) with a nonabrasive, nonmetallic pad.
31. If required, lightly coat antioxidant on the lug/wire and output **BATT** and **RETURN** terminals, and then connect to terminals, as shown in Figure 8. (NEC specifies only one load at each output terminal.)
32. Tighten the panhead screws to no more than 6.3 in-lb. (~0.7 N•m).
33. Connect the other end of the output wire to load.

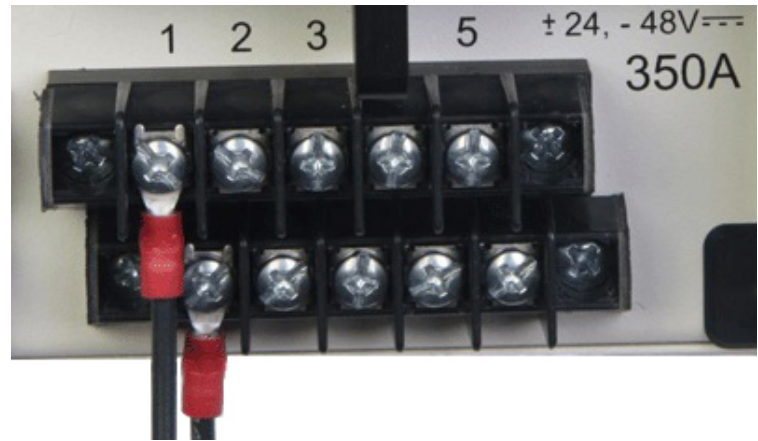


Fig. 8: GMT Output Lug Connections

⚠ ALERT

ALERT! GMT fuses have a small inherent electrical resistance resulting in a small inherent power loss. For this reason, GMT fuse manufacturer recommends that the load for GMT fuses up to and including 7.5A not exceed 80% of the fuse rating and that the load for GMT fuse sizes between 10A and 15A not exceed 70% of the fuse rating. For example, the load for a 15A GMT fuse should not exceed 10.5A (15A x .70 = 10.5A).

34. Make sure the circuit breakers or fuse holders are switched off, empty or contain dummy devices. Also make sure load devices and/or distribution units are disabled. (Normally, circuit breakers are OFF when the switch operator [handle] is down.) Then install circuit breakers or fuse holders and fuses for the dual-hole lug outputs, as shown in Figure 9.
35. Again, make sure the load devices are disabled and then install the GMT fuses, as shown.

If possible, avoid placing high-current circuit breakers side-by-side. Not doing so causes concentrated heat collection and subsequent power loss. Also, if not all circuit breaker positions are occupied, allow non-populated positions between breakers.

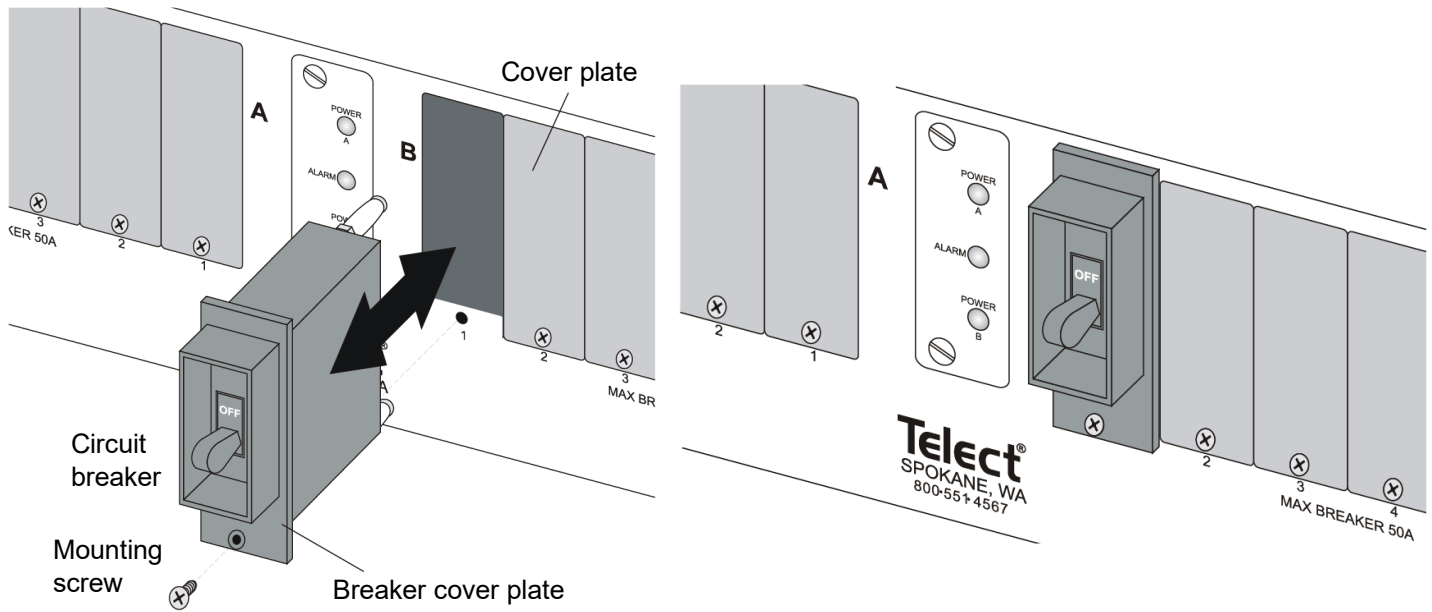


Fig. 9: Installing Circuit Breaker



Fig. 10: Installing GMT Fuses

Install the GMT fuses so that the failure indicator flags are at the top.

36. Do one of the following:

- Switch breakers to ON
- Install fuses

Then test power and polarity at input of each equipment load or distribution unit fed by a circuit breaker or fuse.

37. If possible, temporarily replace one of the operable GMT fuses with a blown fuse to check that the applicable **ALARM** LED lights up red. Also, check the **ALARM** terminal on the rear of the panel:

Dual-Feed 350A 6-Circuit Breaker/TFD Distribution Panel with 5 GMTs

- Expect an open circuit ($\infty\Omega$) between Terminals **C** and **NC**.
- Expect continuity (0Ω) between Terminals **C** and **NO**.
Re-install the operable GMT fuse before proceeding.

38. Record circuit assignments in accordance with operating company procedures and guidelines.

The manufacturer’s designation card, shown below, is a 10-in. (254 mm) by 2 1/4-in. (57 mm) card that folds in half to fit a card holder located to the right of the status LEDs.

SIDE A			FUZE TYPE			RACK/BAY #		
POS	AMP	DESCRIPTION	POS	AMP	DESCRIPTION	POS	AMP	DESCRIPTION

SIDE B			FUZE TYPE			RACK/BAY #		
POS	AMP	DESCRIPTION	POS	AMP	DESCRIPTION	POS	AMP	DESCRIPTION

Fig. 11: Designation Card

- 39. Re-install the terminal cover.
- 40. Lastly, enable equipment loads one at a time to verify the proper operation of loads.
- 41. This procedure is complete.

NOTE: For service or warranty, see our amphenol-ns.com website and click on the “Support” tab, email inquiries to getinfo@amphenol-ns.com or phone us at 1.509.926.6000.

1.6 Parts & Accessories

The following tables list optional and replacement items for the panel. For wire sizing and labeling, please refer to Wire Sizing & Label Convention Chart (Amphenol Network Solutions Part No. 117995) included with your panel.



WARNING

WARNING! Use only UL-listed or UL-recognized component secondary protection devices.

Table 1 – Accessories

Item	Description	Part Number
Alarm card	Standard ROHS 6/6	400223RC
Face plate	Circuit breaker face plate	090-0001-0002
Face plate blank	Replacement face plate blank	090-0001-0003
Circuit breakers	10 amp long delay	090-0052-0010
	20 amp long delay	090-0052-0020
	30 amp long delay	090-0052-0030
	40 amp long delay	090-0052-0040
	50 amp long delay	090-0052-0050
	60 amp long delay	090-0052-0060
	70 amp long delay	090-0052-0070
	80 amp long delay	090-0052-0080
	90 amp long delay	090-0052-0090
	100 amp long delay	090-0052-0100
Input terminal compression lugs	1/0 AWG or #1 Weld Wire	116108
	2/0 AWG or 1/0 Weld Wire	116109
	3/0 AWG or 2/0 Weld Wire	116110
Ground and output terminal compression lugs	2 AWG	114552
	4 AWG	06117-04
	6 AWG	06117-01
TFD fuse holder kit	For TPS/TLS fuses	090-0001-0033
GMT phony fuse	Dummy plastic slug	132748
GMT fuse safety cover	Solder splash protection	116915

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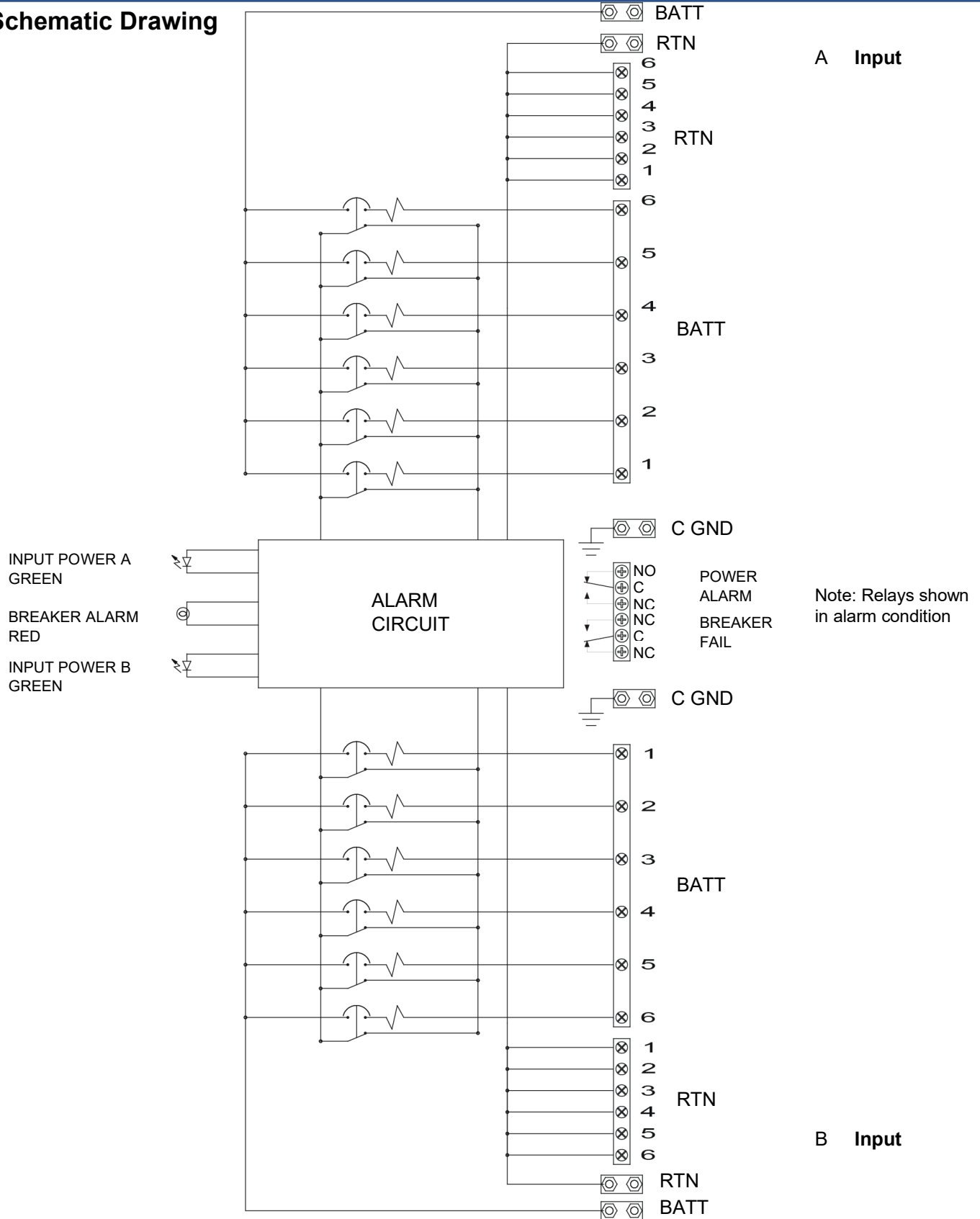
Table 2 – TPS/TLS Fuse

TPS Fuses		TLS Fuses	
Description	Part Number	Description	Part Number
5A	130481	80A	140640
10A	130485	90A	140641
15A	130487	100A	140642
20A	130489	110A	140643
25A	130476	125A	140644
30A	130478		
40A	130482		
50A	130484		
60A	130486		
70A	130488		

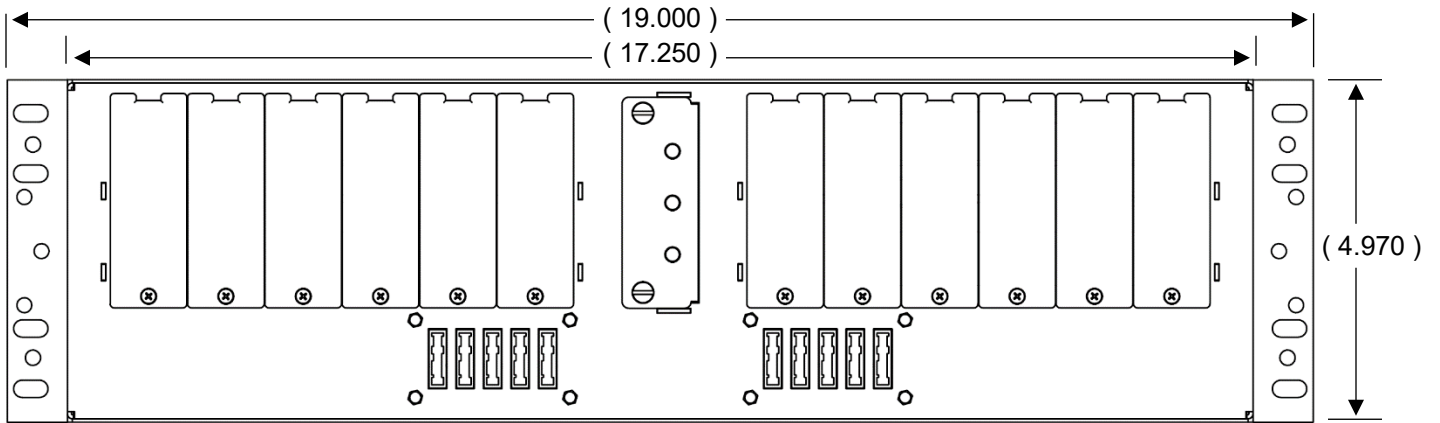
Table 3 – GMT Fuses

Item	Description	Part Number of Fuse	Part Number of Colored Designation Pin
GMT Fuses	.18A Yellow (YEL)	130781	102435-21
	.25A Violet (VIO)	100151	102435-2
	.5A Red (RED)	004001	102435-5
	.75A Brown (BRN)	004008	102435-7
	1A Gray (GRY)	100991	102435-8
	1.33A White (WHT)	004006	102435-9
	1.5A White/Yellow (WHT/YEL)	004011	102435-10
	2A Orange (ORN)	004002	102435-11
	2.5A White/Orange (WHT/ORN)	130783	102435-12
	3A Blue (BLU)	004012	102435-13
	3.5A White/Blue (WHT/BLU)	130782	102435-14
	4A White/Brown (WHT/BRN)	004013	102435-15
	5A Green (GRN)	004014	102435-16
	7.5A Black/White (BLK/WHT)	004010	102435-17
	10A Red/White (RED/WHT)	004015	102435-18
12A Yellow/Green (YEL/GRN)	102287	102435-19	
15A Red/Blue (RED/BLU)	102288	102435-20	

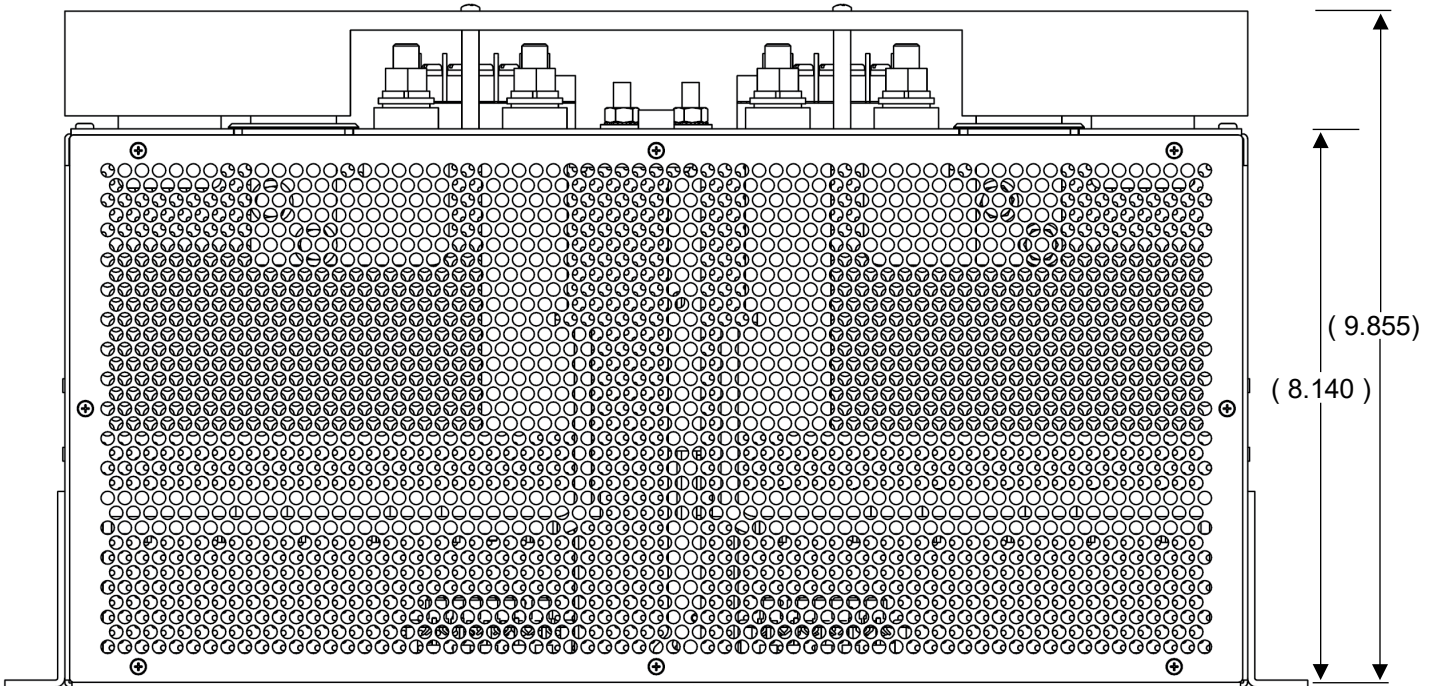
1.7 Schematic Drawing



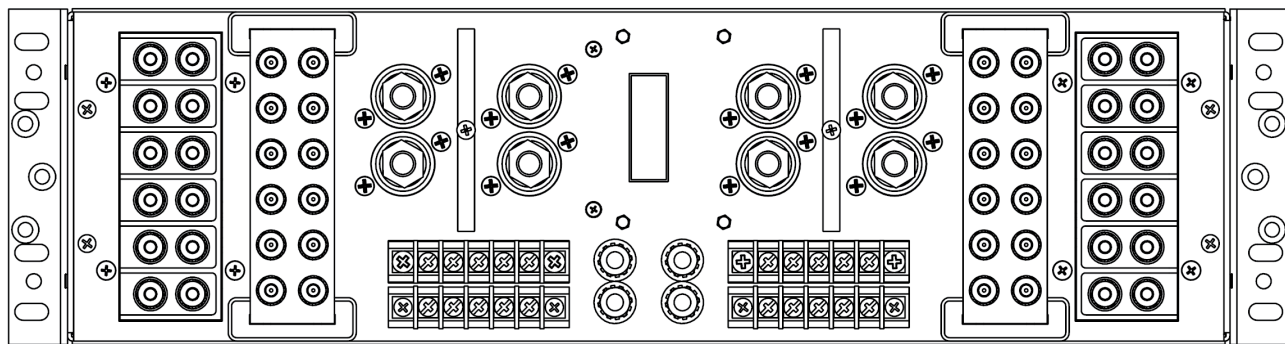
1.8 Drawings



Front View



Top View



Rear View

**Dual-Feed 350A 6-Circuit
Breaker/TFD Distribution
Panel with 5 GMTs**