nrg100GMT10-M

Power :: 100A GMT Fuse Panel with nrgSMART™ Remote Monitoring

Installation Guide

nrgSMART describes the family of distributed network monitoring and management products, from BDFB's, high current and low current secondary panels, as well as Web interface software and data server solutions. nrgSMART allows you to collect performance data on distributed assets and tools to help you efficiently access business critical and actionable information.

Telect recognizes the industry need to manage distributed assets more efficiently, get better power performance out of deployed assets, as well as pursue realistic and achievable alternative energy goals. Through nrgSMART, access to data at the equipment level provides the foundation for managing performance of a distributed DC power distribution system.

- **Individual circuit monitoring:** measure power at the circuit level. This enables powerful trend analysis and insights into equipment performance and enables preventative maintenance processes.
  - **High accuracy, 100% passive monitoring, modular sensor modules**
- **Collect feed voltage, circuit current, and temperature**
- **Network Data Collection:** Intelligent interpretation of the collected data, based on equipment data signature (smart alarms), drives relevant business decisions.
  - **Hosted Data Services available through the nrgSMART-ADH service**
  - **SNMP Interface comes standard when used with the nrgCONTROL-BT**
- **Data Analytics:** When used in conjunction with the nrgCONTROL-BT and nrgSMART-ADH Service, the nrg100GMT10-M can be remotely monitored through the nrgSMART web portal and dashboard views. Remotely access the data that is important to you. Instantly see real-time results at any of your distributed sites.

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Overview

Telect's nrg100GMT10-M 100A dual-feed 10/10-position GMT fuse panel features -48V operating voltage to fit in legacy and "next-gen" network applications, with advanced circuit level monitoring features engineered into a standard 1 RU footprint. Each circuit supports up to 20A fuses in each position, providing ample capacity for distribution to a broad range of components.

The panel provides total front access to fuses and LED status. Below the status LED console is a pull-out designation card holder.

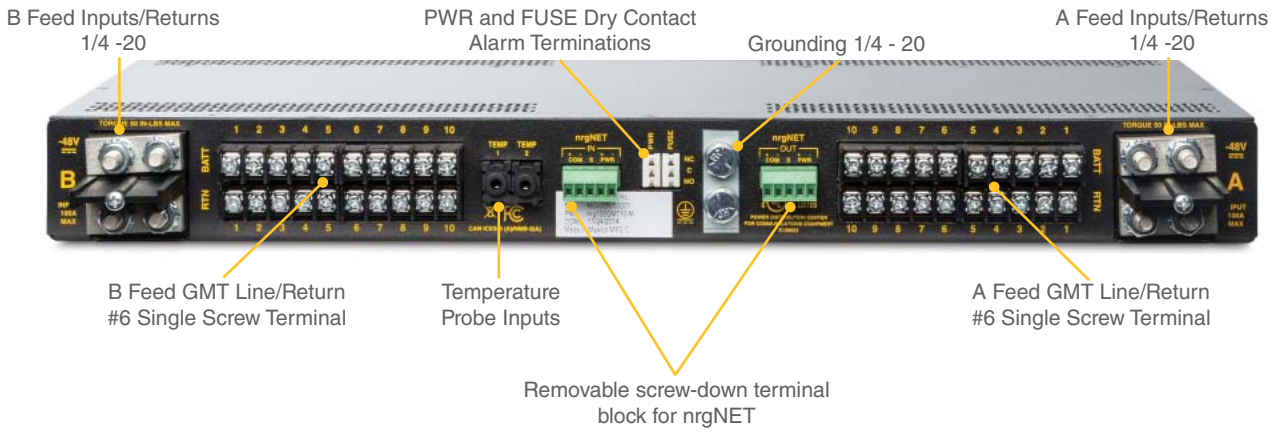
All terminals for inputs, outputs, ground, and alarms are on the rear of the panel. All terminals are covered by a single full-width transparent terminal cover:

- Inputs are studs for dual-hole lugs
- Ground terminals accept either single- or dual-hole lugs.
- Output screw-post terminals accept either ring or forked lugs, as well as bare wire.
- External power and fuse alarms are wire wrap pins.

The GMT fuse holders are mounted inverted so that the GMT indicator flag flips downward when tripped, making identification and detection easier, especially on taller racks. In addition, the GMT fuse holders/ sensors are generously spaced for easy grip of fuses and better heat dissipation.

Figure 1 – nrg100GMT10 Front View

Figure 2 – nrg100GMT10 Rear View



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Specifications

Inputs	
Voltage range, nominal voltage	-40V to -60V (Nominal -48Vdc)
Max input load rating	100A per side at max
Short circuit withstand rating	450A
Input Terminal Studs (with KEPS, nuts, and flat washers) for dual-hole compression lugs	• One pair of 1/4 – 20 studs on 5/8 in. centers per terminal [max. lug width of .52 in. (13.2mm)] • Torque nut (using 7/16 in. or 12 mm wrench) to 50 in.-lb (~5.6 N•m), max.
Outputs	
GMT output terminals for compression lugs	• 10, removable, #6-32 panhead screws (max. lug width of 0.26 in. [6.6 mm]). • Torque to 6.3 in.lb (~0.7N•m), max.
GMT output wire size	#22 AWG to #14 AWG, depending on output fuse rating
Grounding	
Earth GND terminal bolts (with washers) for dual-hole compression lug	• Two pair of 1/4 - 20 threaded holes on 5/8 in. centers. • Torque bolts (using 7/16 in. or 12 mm wrench) to 50 in.-lb (5.5 N•m), max.
Ground wire size	#6 AWG recommended
Communication	
nrgNET sensor and alarm card power	-48VDC nominal
nrgNET data communication	RS-485
nrgNET connector	Removable 5-pin connector with screw down terminals
nrgNET connector functions	nrgNET IN from the nrgCONTROL or nrgSMART panel, nrgNET OUT to next in line nrgSMART panel
Supported protocols	Proprietary nrgNET used to communicate between panels and controller
Voltage Sensor	
Sensor accuracy	0 to -19.99V: ±0.3V -20V to -60V: ±0.1V
Voltage measurement range	0 to -60VDC
Feed voltage detection	0 to -19.99V: Alarm -20V to -60V: Normal

NOTE:
- Voltage measurement may be slightly different than at input terminal blocks due to the voltage drop within the panel.
- Sensors are factory calibrated and do not require user adjustment.

GMT Sensor	
Max. GMT Output Fuse (ea.)	20A
Max. GMT Output Load (ea.) - continuous	14A
Minimum short circuit interrupt rating	450A
Measurement Range	0A to 30A
Current measurement accuracy	See table below
Response Time	1 sec
Sample Rate	1 sec minimum
Dry Contact Alarms	
Alarm wire size	#22 to #18 AWG
Alarm terminals	Wirewrap
Relay contact ratings	Dry Form-C contacts (1A @ 30 VDC, 0.5A @ 60 VDC, 0.3A @ 125 VAC)
Max. Alarm Power Rating	@24V: 72 mA (1.73W) @48V: 147 mA (7.06W)
Mechanical	
Dimensions	17" W x 1.73" H x 9" D (432 mm x 44 mm x 229 mm)
Weight	Installed: 9 lbs. (4 kg) Shipping: 11 lbs. (5 kg)
Color and finish	Pewter grey powder coat
Mounting	19" or 23"
Environmental	
Operating temperature	-5° to +55°C
Humidity	0 to 90%, non-condensing

Current Range	Specification	Relative Accuracy
< 7A	± 2% of measured value	± .1A
≥ 7A	±4% of measured value	± .1A
ex. 6A value results in .12A + .1A = ± .22A accuracy		

Warranty:
- Standard 1 year warranty on all parts.
- The warranty is extended through the addition of the annual maintenance and support contract (nrgSMART- APSC).

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nrg100GMT10-M

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Important Installation Guidelines:

- **Elevated Operating Ambient Temperature ::** If you install the rack in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, take care to install the equipment in an environment compatible with the maximum operating temperature
- **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 -** Give consideration 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. Use appropriate consideration for equipment nameplate ratings when addressing this concern.
- **Reliable Earthing ::** Maintain reliable earthing of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).
- **Disconnect Device ::** Incorporate a readily accessible disconnect device in the building installation wiring.

Inspection

Please read and understand all instructions before starting installation. If you have questions, contact Telect Technical Support at support@telect.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 Telect Quality at quality@telect.com or call 1.509.926.6000.

Telect is not liable for transit damaged. If the product is damaged, please report it to the carrier and contact Telect Quality.

NOTE: The nrg100GMT10-M is suitable for installation as part of a Common Bonding Network (CBN) for installation in Network Telecommunications Facilities an OSP.

Installation

ALERT

ALERT! It is recommended that this product is installed 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. This product must be installed and maintained only by qualified technicians.

Verify all connections meet requirements specified in local electric codes or operating company guidelines before supplying power. Unit shall be protected by a listed circuit breaker or branch-rated fuse rated maximum 125A.

Rack Mounting

- The nrg100GMT10-M panel can be mounted in 19-in. & 23-in. EIA and WECO racks.
- The nrg100GMT10-M panel can be flush-mounted, fully extended, or adjusted to any distance in between in ½ inch increments.

1. Rack mounting brackets are temporarily attached to the chassis for protection during shipping. Remove the brackets and attach to the chassis in the appropriate location using the four #10-32 flat head screws provided.

2. Locate an unused rack position, normally at the top of the rack. Mount the panel to the rack using four, #12-24 thread-cutting screws provided.

3. Tighten screws to 35 in.-lb (4.29 N•m).

4. Remove the transparent terminal cover.

WARNING

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

5. Make sure input power is off (open breaker, phony fuse, or open fuse holder at primary power distribution unit [PDU]) before connecting this panel's input cables to that PDU.

6. Use a proper crimping tool to attach a listed (approved), dual-hole, right-angle compression lug for 1/4-20 studs on 5/8-in. centers onto #6 AWG ground wire. (Min. #8 AWG)

7. If desired (highly recommended), lightly coat anti-oxidant on lug, grounding terminal, and surrounding contacting surface.

8. Connect the lug using the 1/4 -20 bolts, lock washers, and flat washers provided.

9. Tighten bolts to ~50 in.-lb (~5.6 N•m), max.

⚠ WARNING

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

10. Make sure GMT fuse positions do not contain fuses.

11. For input wiring — wiring used as inputs to the nrg100GMT10-M distribution panel:

- Crimp dual-hole compression lugs onto #8 to #1/0 AWG conductors (#1/0 AWG with a 60C insulation rating, minimum for a 100A feed). Insulate lug barrels with UL94 V-0 rated heat-shrink tubing.
- Clean terminals and lugs with a nonabrasive, nonmetallic cloth.
- If desired (highly recommended), lightly coat anti-oxidant on lugs, terminals, and contacting surfaces.
- Connect lugs to input BATT and RTN terminals on the panel.
- Torque KEPS nuts to ~50 in.-lb (~5.6 N•m), max.

ⓘ ALERT

ALERT! Only qualified service personnel should replace fuses. The installer must verify that a readily accessible protection device is incorporated in the building wiring feeding the fuse panel: 125A (max.) protection device for a 100A panel.

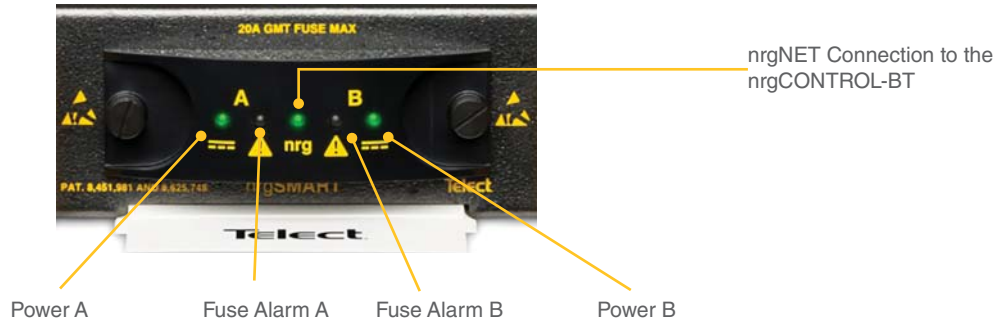


Figure 3 – nrg100GMT10-M Alarm Card

LED State	PWR A/B	FUSE Alarm A/B	nrgNET Connection
Green	Operating normally	Operating normally	Active communication to nrgCONTROL-BT
Blinking Green	PWR B, boot loader loading	N/A	Used for visual identification through controller command
Yellow	PWR A, boot loader mode	N/A	N/A
RED	PWR A or PWR B feed voltage alarm < -20VDC	A feed or B feed fuse alarm	Connected to nrgCONTROL, but no communication to this specific panel within last 3 seconds
RED Single Blink	N/A	N/A	Defective panel. Contact Telect for replacement.
RED Double Blink	N/A	N/A	Invalid communication to nrgCONTROL. Check that COM+ and COM- did not get swapped.
No Light	No power to feed	No alarm	No power present on nrgNET IN connector

Boot Loader Mode

The nrg100GMT10-M alarm card will receive remote firmware updates automatically from the nrgCONTROL-BT. The boot loader mode is indicated by a yellow PWR A LED. In this mode, the power and fuse LEDs are used for diagnostics and do not represent the power and fuse status. A blinking green PWR B LED in conjunction with the yellow PWR A LED indicates the firmware is actively being updated. The update process lasts approximately 7 seconds.

NOTE: The following steps require that the nrg100GMT10-M is connected to an nrgCONTROL-BT controller. The nrgCONTROL-BT provides power to the nrg100GMT10-M's alarm card, which is required for steps 12-14 and steps 20-22. Reference the nrgNET connectivity section for further details.

12. Make sure none of the fuse positions contain operable fuses.

13. Enable protection device (fuse or breaker) at primary PDU to turn on Feed A to Side A of panel and then check voltage and polarity at input connectors of panel. Also, check that
    - PWR A LED on front of panel turns on (green).
    - PWR B LED is red and both FUSE LEDs

14. With PWR A lit green— but with PWR B LED lit red — test power-fail relay and contacts at PWR alarm terminals on rear of panel:
    - Expect continuity (∞Ω) between Terminals C and NC.
    - Expect an open circuit (0Ω) between Terminals C and NO.

15. Also, test fuse alarm relay contacts at FUSE alarm terminals, then
    - Expect continuity (0Ω) between Terminals C and NC.
    - Expect an open circuit (∞Ω) between Terminals C and NO.

16. Repeat Steps 12 through 14 to power up Side B. PWR A and PWR B LEDs must both be green.

17. With PWR A and PWR B lit green, test power-fail relay and contacts at PWR alarm terminal:
    - Expect continuity (0Ω) between Terminals C and NC.
    - Expect an open circuit (∞Ω) between Terminals C and NO.

18. For GMT output wiring, proceed as follows:
    a. Working with one wire at a time, either
       - Crimp a single-hole ring or fork lug for a #6-32 screw-post terminal, as required by NEC, or
       - Strip 3/8 in. (10 mm) of insulation from a #22 to #14 copper wire for a bare-wire connection.
    b. Clean the panel terminals and lug (if applicable) with a nonabrasive, nonmetallic cleaning pad.
    c. If required, lightly coat anti-oxidant on lug/wire and output BATT and RTN terminals, and then connect to terminals.

NOTE: (NEC specifies only one load at each output terminal.) Tighten #6-32 screws using either a flat-tipped screwdriver or Phillips screwdriver (for cross-recessed screw heads) to no greater than 6 in.-lb (~0.7 N•m). Connect other end of output wire to load.

19. Use the provided designation card to record circuit assignments in accordance with operating company procedures and guidelines.

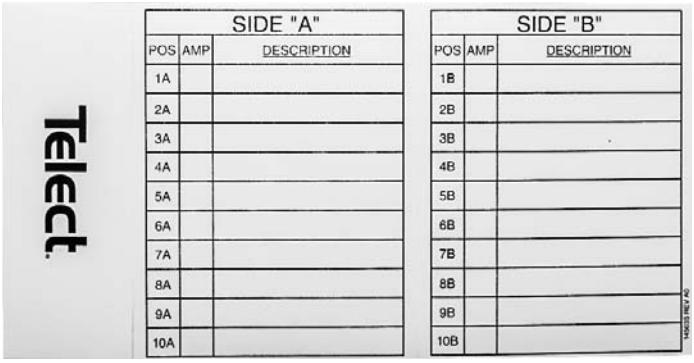


Figure 4 – Designation Card

⚠ ALERT

ALERT! GMT fuses have a small inherent electrical resistance resulting in a small inherent power loss. For this reason, the GMT fuse manufacturer recommends:
- The load for GMT fuses up to and including 7.5A not exceed 80% of the fuse rating
- The load for GMT fuse sizes between 10A and 20A not exceed 70% of the fuse rating. For example, the load for a 15A GMT fuse should not exceed 10.5A (15A x 0.70 = 10.5A).

20. Make sure load devices are off (disabled) and then install GMT fuses. Remember, GMT fuses need to be installed inverted so that failure indication flags are at the bottom.

21. Test power and polarity at input of each equipment load.

22. If possible, replace one of the operable GMT fuses with a blown fuse to verify that the applicable FUSE Alarm LED turns red. Also, check the FUSE alarm terminals on the rear of the panel:
    - Expect an open circuit (∞Ω) between Terminals C and NC.
    - Expect continuity (0Ω) between Terminals C and NO. Re-install operable GMT fuse before proceeding.
    - If desired, connect remote, external audio/visual panel alarm indicator wires (solid wires, #22 to #18 AWG) to wirewrap PWR and FUSE alarm pins on rear of panel, as shown in Figure 5.

23. Re-install terminal cover.

24. Lastly, enable equipment loads one at a time to verify the proper operation of loads.

25. The total load for all fuse outputs on each side must not exceed the panel's load rating: 100A.

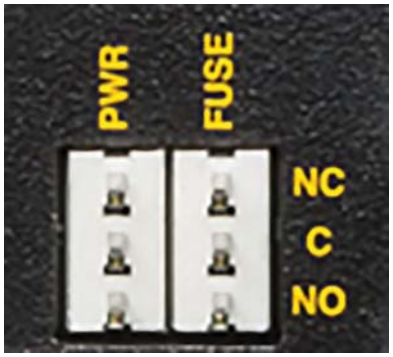


Figure 5 – Alarm Wire Wrap Contacts

Dry Contact Alarm States
- Alarm card is not installed
  - All contacts will be open
- Alarm card is installed, but no power present on nrgNET
  - All contacts will go to the alarm state (NC and C will be open, NO and C will be closed)
- Alarm card is installed and powered
  - All contacts operate as indicated (NC and C will be closed if no alarm present)

Accessories & Alarm Card

The following lists optional and replacement items for the panel.

⚠ WARNING

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

Input & GND Lugs
The following table describes the available input lugs for stranded copper conductors with straight dual-hole lugs for 1/4-in. studs on 5/8-in. centers.

Table 2 – Input Lugs

Source	#1/0 AWG	#2 AWG	#4 AWG	#6 AWG	#8 AWG
T & B			54206 (Die Code 29)	54205 (Die Code 24)	542040416 (Die Code 21)
Panduit		LCDN2-14A-Q (Die Code 33)		LCD6-10A-L (Die Code 24)	LCD8-10A-L (Die Code 21)
Burndy	YA25L2NT14E1 (Die Code12)		YA4CL2TC14 (Die Code 8)	YA6CL2TC14 (Die Code 7)	YA8CL2TC14 (Die Code 49)

The following table describes the available ground lugs for stranded copper conductors with 90° dual-hole lugs for #10 studs on 5/8" centers.

Table 3 – Ground Lugs

Source	#6 AWG	#8 AWG
T&B	256-30695-1356 (Die Code 24)	54204UB (Die Code 21)
Panduit	LCD6-10AF-L (Die Code 24)	LCD8-10AF-L (Die Code 21)
Burndy	YA6CL2TC1090 (Die Code 7)	YA8CL2TC1090 (Die Code 49)

Table 4 – Single-Hole Ring Lug

	#22-18 AWG	#22-16 AWG	#16-14 AWG	#12-10 AWG
AMP	51863	51863	320619	329697
Panduit	PN18-6R-M	-	PN14-6RN-M	-

(Insulated Barrels) with Part Numbers vs Output Wire Size (For #6 Panhead Screws)

GMT Fuses

For additional dummy fuses, order part number 132748. For GMT safety (splash/splatter) covers, order part number 116915 for GMT fuses up to 15A. Telect recommends using only UL-recognized supplementary protectors.

Table 5 – GMT Fuses

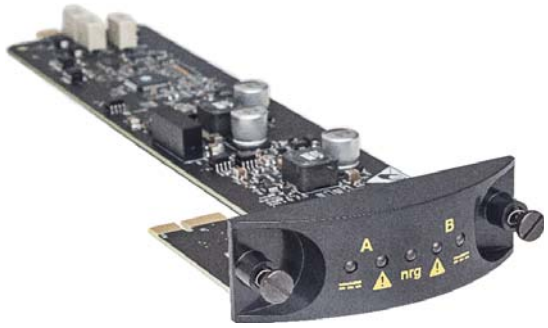
GMT Fuse	Part Numbers GMT Fuse
.18A Yellow (YEL)	130781
.25A Violet (VIO)	100151
.5A Red (RED)	004001
.75A Brown (BRN)	004008
1A Gray (GRY)	100991
1.18A White (WHT)	004006
1.5A White/Yellow (WHT/YEL)	004011
2A Orange (ORN)	004002
2.5A White/Orange (WHT/ORN)	130783
3A Blue (BLU)	004012
3.5A White/Blue (WHT/BLU)	130782
4A White/Brown (WHT/BRN)	004013
5A Green (GRN)	004014
7.5A Black/White (BLK/WHT)	004010
10A Red/White (RED/WHT)	004015
12A Yellow/Green (YEL/GRN)	102287
15A Red/Blue (RED/BLU)	102288
20A White/Green Without Safety Cover (WHT/GRN)	127240RC
20A White/Green With Safety Cover(WHT/GRN)	131340

Alarm Card

The nrg100GMT10-M's alarm card can be replaced if necessary by unscrewing the two screws on the alarm card front bezel. Gently remove the card by pulling straight out. The card can be removed with the nrgNET power still connected (Hot Swapping) to the panel. The replacement part number for the nrg100GMT10-M card is the nrg100GMT10-AUX.

⚠ WARNING

WARNING! Handle the Alarm Card with care. The alarm card is ESD sensitive. Take ESD mitigation precautions when handling the Alarm Cards.



Temperature Probes

Two temperature probe ports are available on the back of the nrg100GMT10-M. Each port is able to accept the optional nrgTEMP probes.

Figure 6 – Temperature Probe Inputs

Figure 7 – Optional nrgTEMP Temperature Probe

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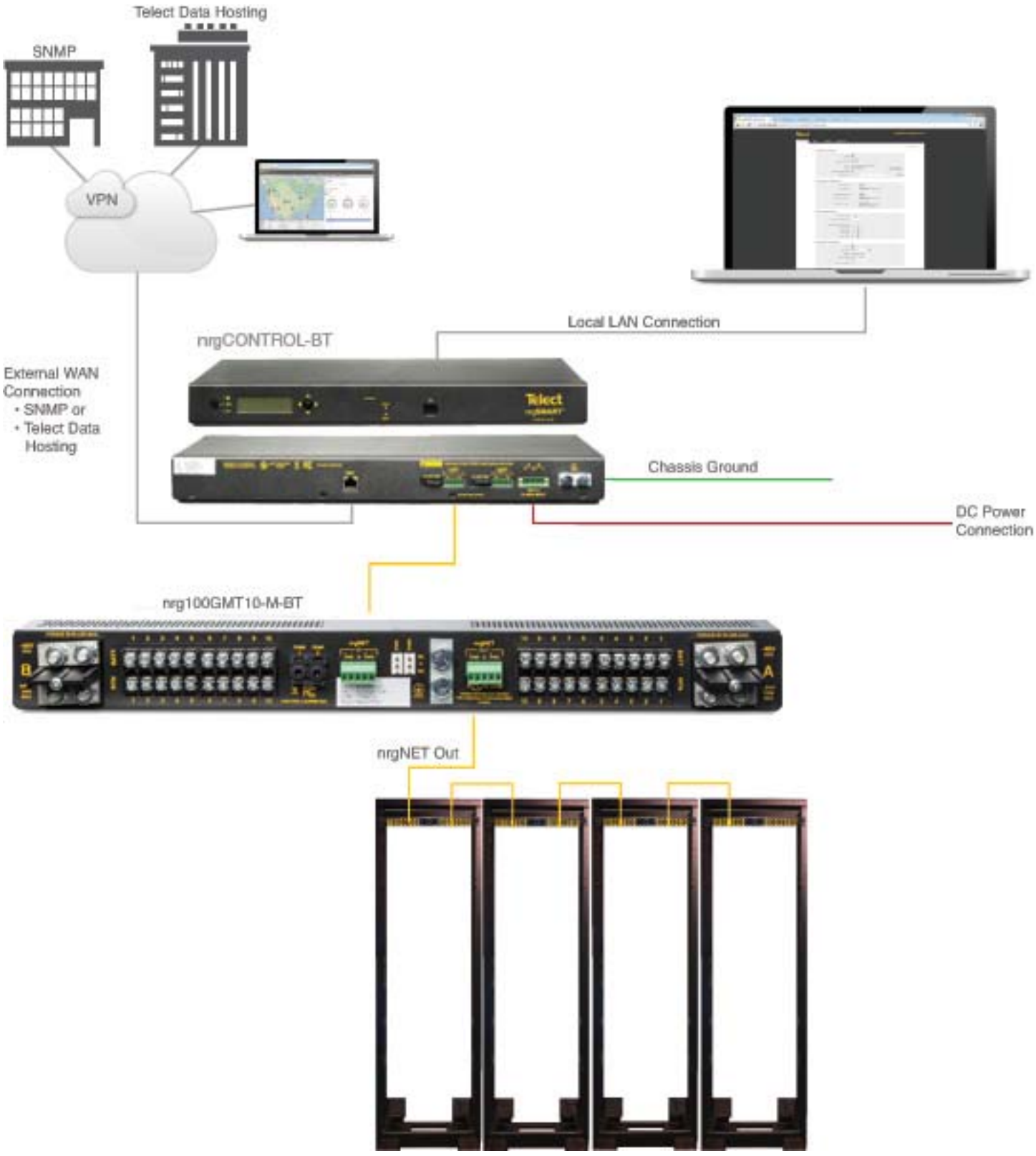
nrgNET Connectivity



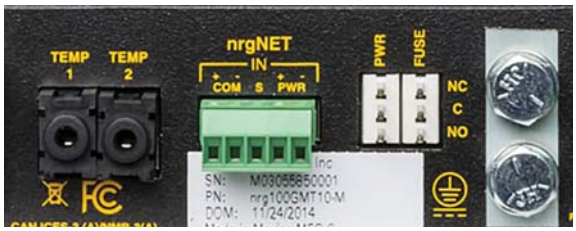
nrgNET Pin Outs

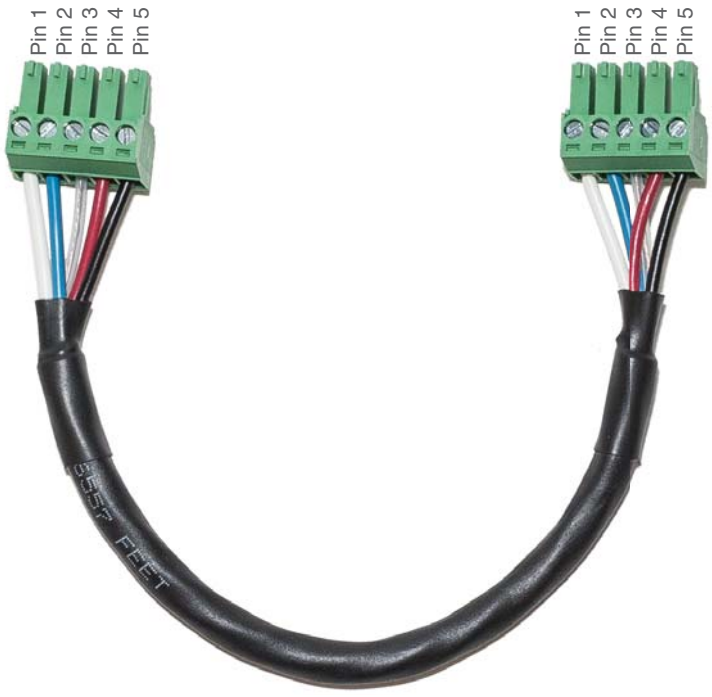
Table 6 – nrgNET Pinouts

Pin Number	Label	Wire
Pin 1	COM +	White (22AWG)
Pin 2	COM -	Blue (22AWG)
Pin 3	S	Drain Wire (24AWG)
Pin 4	PWR +	Red (18AWG)
Pin 5	PWR -	Black (18AWG)

nrgCONTROL-BT

nrg100GMT10-M





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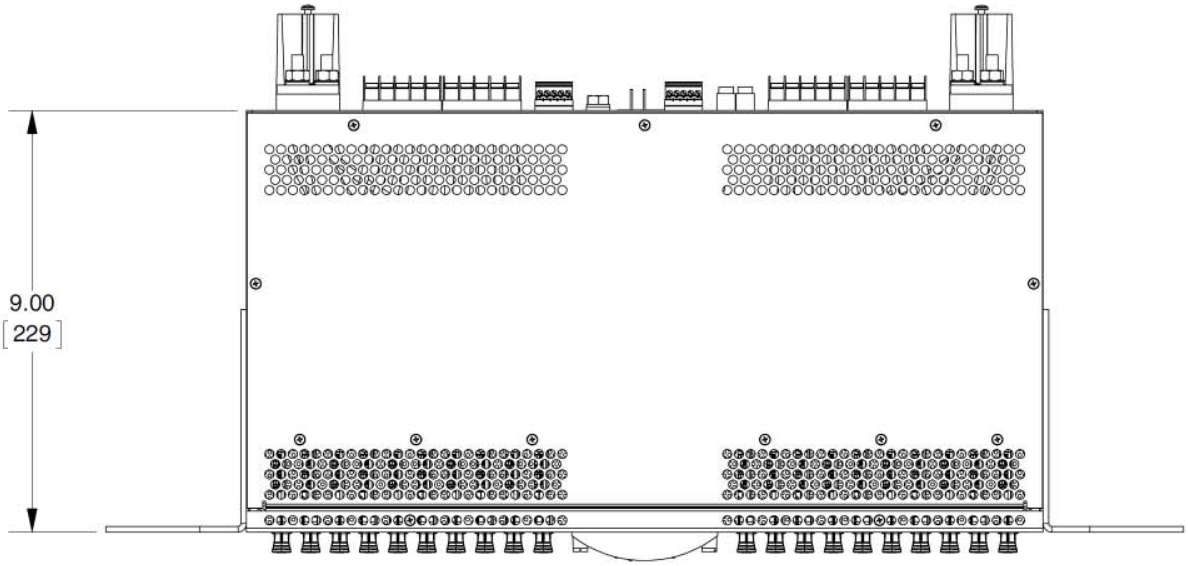
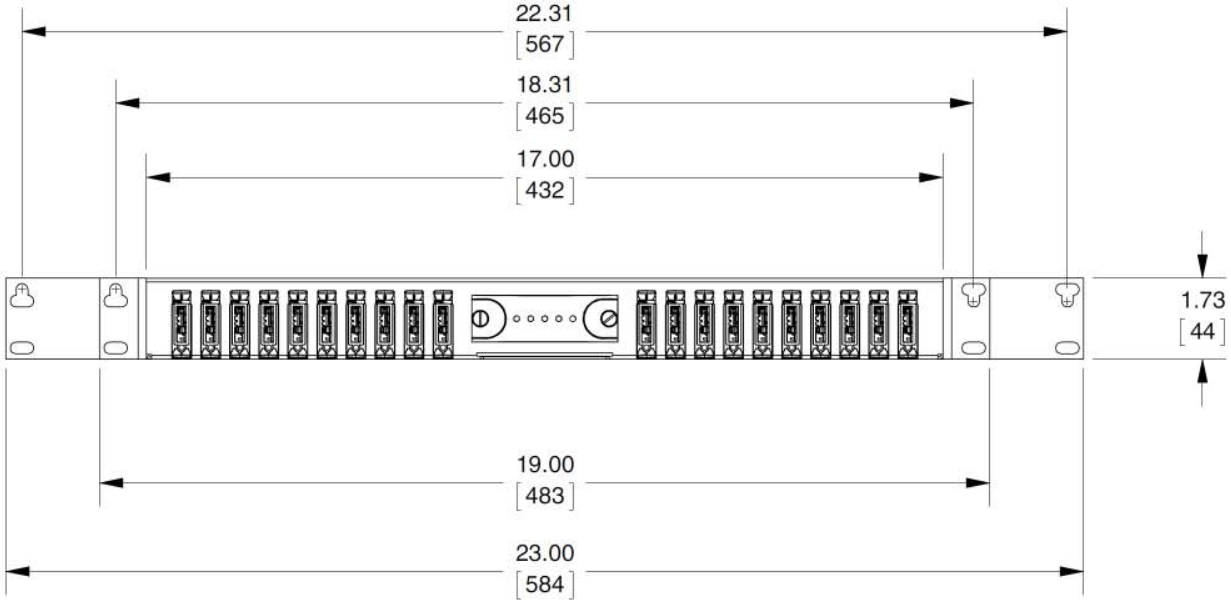
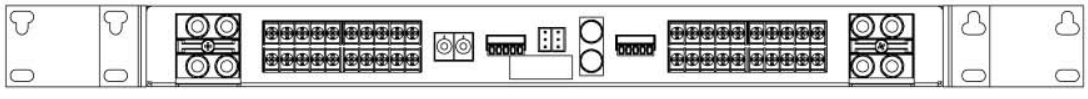


TOP VIEW (COVER NOT SHOWN)



FRONT VIEW



REAR VIEW (ROTATED, COVER NOT SHOWN)

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Related nrgSMART Products

Part Numbers	Description	Use
nrgCONTROL Parts		
nrgCONTROL-BT	nrgSMART: CONTROLLER, *Bluetooth®*	nrgSMART Controller with *Bluetooth®*
143142	TERM BLOCK: RCPT, 1x4, 300V, 15A, 5.08 mm, MTG SCRW, 30-12AWG, ROHS	Replacement Power connector

Part Number	Description	Use
nrg100GMT10-M		
nrg100GMT10-M	nrgSMART: PANEL, 100A DUAL 10/10 GMT, 1RU,-48V, WITH nrgGMT	Fully populated with sensors
nrg100GMT10	nrgSMART: PANEL,100A DUAL 10/10 GMT, 1RU,-48V, UN-POPULATED	Base Chassis and Alarm Card, no sensors
nrg100GMT10-AUX	nrgSMART: AUX,ALARM CARD FOR GMT,-48V	Replacement alarm card
nrgGMT	nrgSMART: MOD,GMT,CURRENT SENSOR,-48V	Replacement GMT sensor
GMT-BLANK	nrgSMART: MOD, GMT, BLANK FACE PLATE	Blank GMT face plate
GMT Accessories		
nrgTEMP	nrgSMART: ACC, TEMP SENSOR, 6FT	Temperature Probe
06102B01+B7	RK MTG BRKT LT 19" 1" TAB WITH UNIVERSAL MTG SLOTS, PWTR	19" left 1RU mounting bracket
06102B02+B7	RK MTG BRKT RT 19" 1" TAB WITH UNIVERSAL MTG SLOTS, PWTR	19" right 1RU mounting bracket
06102B03+B7	RK MTG BRKT LT 23" 3" TAB WITH UNIVERSAL MTG SLOTS, PWTR	23" left 1RU mounting bracket
06102B04+B7	RK MTG BRKT RT 23" 3" TAB WITH UNIVERSAL MTG SLOTS, PWTR	23" right 1RU mounting bracket
System Level Components		
nrgNET-500	nrgSMART: ACC, nrgNET CABLE, SPOOL, 500FT	500 foot spool of cable
nrgNET-10	nrgSMART: ACC, nrgNET CABLE, UN-TERMINATED, 10FT	10 foot length of cable, unterminated
141431	TERM BLOCK: RCPT, 1x5, 160V, 8A, 3.81mm, 30-16AWG, ROHS	nrgNET termination connector
Annual Contracts		
nrgPORTAL-ADH	nrgSMART: ACON, DATA HOSTING	Annual web portal data hosting service
nrgSMART- APSC	nrgSMART: ACON, ANNUAL PRODUCT SUPPORT CONTRACT	Annual product maintenance and support

FCC Class A Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device many not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modification
Any modifications made to this device that are not approved by Telect Inc. may void the authority granted to the user by the FCC to operate this equipment.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS! When handling any electronic component or assembly you must observe the following antistatic precautions to prevent damage. Always disconnect power from the server and wear a grounded wrist strap when working around the nrgCONTROL-BT. Always wear a grounded wrist strap when handling printed circuit boards. Treat all assemblies, components, and interface connections as static-sensitive.

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