NEUTRON™ DC22

22 DC SHADE POWER DISTRIBUTION UNIT

INSTRUCTION MANUAL

#NEU-DC-22

Neutron™ is not a PoE DEVICE and is NOT POWERED BY PoE

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All brand names, product names and trademarks are the property of their respective owners. Certain trademarks, registered trademarks, and trade names may be used to refer to either the entities claiming the marks and names or their products.

Specifications are subject to change without notice

FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the

following two conditions: (1) This device may not cause harmful interference, and (2)

this device must accept any interference received, including interference that may

cause undesired operation.

Thank you for your purchase of Neutron™.

This manual is designed to provide all the necessary information for installation and deployment, however if you have any additional questions or need any additional information, please reach out to our Customer Support Teams.

TOLLFREE +1 (844) 771-8725 – 24/7/365

Throughout this manual you will find QR codes that when scanned will take you to a video for that section that may contain additional information. Scan the code or click on the QR code to bring up your default browser and take you to the video.

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Contents

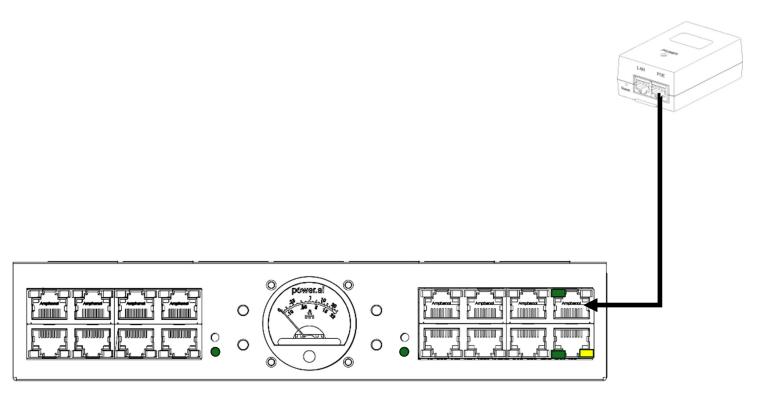Neutron™ is not a PoE DEVICE and is NOT POWERED BY PoE

QUICK START BASIC USE:

Neutron can be used as a standard shade low voltage power supply.

Simply connect the included passive DC injector to the BUS IN port on the front chassis.

This will automatically take the Neutron out of Hibernation/delivery mode.

You will see the LEDs on the BUS IN, the system status and ESM turn green, and no further action is needed to start shading.

You can now connect your low voltage motors to the front and rear ports and use the supply like any other shade power supply.

Optionally you can use the 4 devices ports as a 485 data hub for user controls and connect any IP gateway or hubs to the BUS OUT of the DATA (LAN) port on the passive DC injector.

Neutron can be used as a standard shade low voltage power supply.
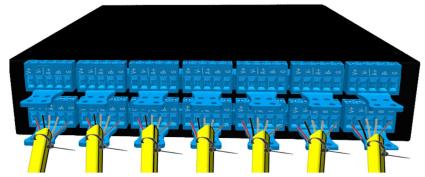
INTRODUCTION: COMPATIBLE MOTORS & CAPACITY

COMM	MOTOR MODEL NUMBER		Connector	Watts	Torque	Voltage	Neutron DC-22
BTX®							~ Per PDU
RF	BTX® DC RF 2Nm		2P	22	2	24V	22
RF	BTX® DC RF 4Nm		2P	40	4	24V	12
PoE	BTX® PoE 2.0		RJ45	22	2	44~57 AF	~N/A ~
PoE	BTX® PoE 4.0		RJ45	40	4	44~57 AF	~N/A ~
CRESTRON®							
485	CSM-QMT50-	DCCN	4P	50	6	22.1-26.1	10
485	CSM-QMTDC-	163-1-CN	4P	42.5	0.75	22.1-26.1	11
485	CSM-QMTDC-	163-1-EX	4P	42.5	0.75	22.1-26.1	11
485	CSM-QMTDC-	250-4-CN	4P	42.5	4	22.1-26.1	11
485	CSM-QMTDC-	250-4-EX	4P	42.5	4	22.1-26.1	11
485	CSM-QMTDC-	256-2-CN	4P	36	2	22.1-26.1	13
485	CSM-QMTDC-	DRP-3-CN	4P	42.5	1.62	22.1-26.1	11
485	CSM-QMTDC-	DRP-3-EX	4P	42.5	1.62	22.1-26.1	11
LUTRON®							
485	QSSC-EDU-	R20	4P	17	0.33	21.6 - 38.5	22
485	QSSC-EDU-	5	4P	28	0.56	21.6 - 38.5	17
485	QSSC-EDU-	10	4P	52	1.12	21.6 - 38.5	9
485	QSSC-EDU-	64	4P	52	1.12	21.6 - 38.5	9
485	QSSC-EDU-	R100	4P	37	2.82	21.6 - 39.6	13
485	QSSC-EDU-	R150	4P	45	3.73	21.6 - 38.5	11
485	QSSC-EDU-	R200	4P	24	6.77	21.6 - 38.5	20
485	QSSC-EDU-	R225	4P	30	2.82	21.6 - 38.5	16
485	QSSC-EDU-	30-SB	4P	37	2.82	21.6 - 38.5	13
485	QSSC-EDU-	R300	4P	53	6.77	21.6 - 38.5	9
485	QSSC-EDU-	R300-XT	4P	52	7.9	21.6 - 38.5	9
485	QSSC-EDU-	45	4P	30	5.08	21.6 - 38.5	16
485	QSSC-EDU-	60	4P	40	6.77	21.6 - 38.5	12
485	QSSC-EDU-	D105	4P	41	11.85	21.6 - 38.5	12
485	QSSC-EDU-	D145	4P	40	16.36	21.6 - 38.5	12
485	QSSC-EDU-	D175	4P	45	19.74	21.6 - 38.5	11

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INTRODUCTION: COMPATIBLE MOTORS & CAPACITY

| COMM	MOTOR MODEL NUMBER	Connector	Watts	Torque	Voltage	Neutron DC-22
POWERSHADES®						~ Per PDU
RF	PS30CEQ_2.0NM_2W_2022	2P	18	2	12V	~N/A ~
PoE	PS35PoE_2.0NM_BR17_2022	RJ45	5	2	44~57 AF	~N/A ~
PoE	PS45PoE_6.0NM_BR20_2023	RJ45	5	6	44~57 AF	~N/A ~
Q-MOTION®						
485	Q-Motion® QIS Motor QIS-24	RJ45	32	2.5	24V	~N/A ~
SHADE INNOVATIONS™						
PoE	Coming Soon	RJ45	15	0.7	44~57 AT	~N/A ~
PoE	Coming Soon	RJ45	15	1.1	44~57 AT	~N/A ~
PoE	Coming Soon	RJ45	15	2	44~57 AT	~N/A ~
Zigbee	Coming Soon	2P	15	0.7	12V	~N/A ~
Zigbee	Coming Soon	2P	18	1.1	12V	~N/A ~
Zigbee	Coming Soon	2P	20	2	12V	~N/A ~
SOMFY®						
485	Sonesse® 30 #1241144	5P	16	2	21.6-28.5	26
485	Sonesse® ULTRA 504 #1134022	5P	36	4	21.6-28.5	13
485	30 (Obsolete) #1000658	5P	20	2	21.6-28.5	11
PoE	Sonesse® 30 #1241147	J45	18	1.5	48-57 AT	~N/A ~
PoE	Sonesse® 40 2 #1241426	J45	25	2	48-57 AT	~N/A ~
PoE	Sonesse® 40 4 #1241427	J45	51	4	48-57 BT	~N/A ~
PoE	Sonesse® 40 6 #1241428	J45	62	6	48-57 BT	~N/A ~
Zigbee	Sonesse® 30 #1241970	2P	18	2	21.6-28.5	24
RTS	Sonesse® 30 #1241142	2P	15	2	21.6-28.5	26
RTS	Sonesse® 30 #1241144	2P	16	2	21.6-28.5	19
RTS	Sonesse® ULTRA 504 #1134023	2P	36	4	21.6-28.5	9
DCT	Sonesse® 30 #1241146	6P	20	2	21.6-28.5	8

INTRODUCTION: MOTOR CONNECTORS
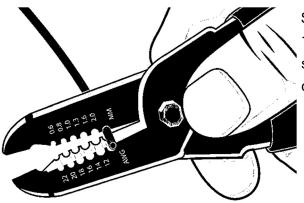
Each of the 14 connectors are 5.08 pitch 5 positions that can support up to 12AWG wire

Connect the 24V **Positive** (+) from the shade motors to the left terminals marked with (V+)
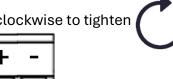

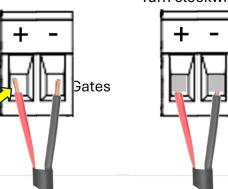Connect the **Negative** Ground (-) from the shade motors to the right terminals marked (V-)

Strip approx. ¼ of dielectric from each wire up to 12AWG and insert into each polarity gate and use a small flathead screwdriver to turn the top screws to close the connector gates down on the stranded wire
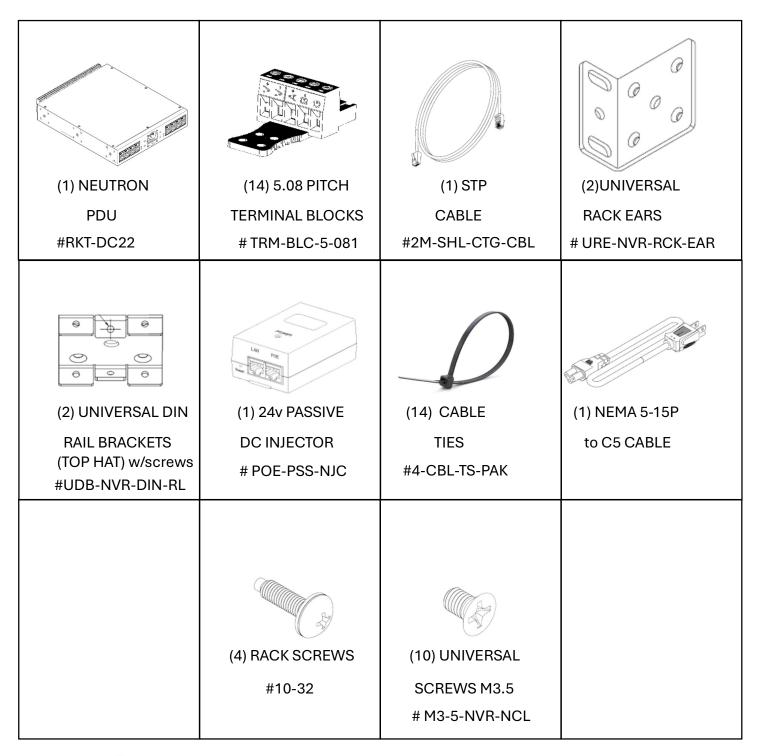
Turn clockwise to tighten

Gates

For best results ensure the gates are only closed onto the wire and not the dielectric

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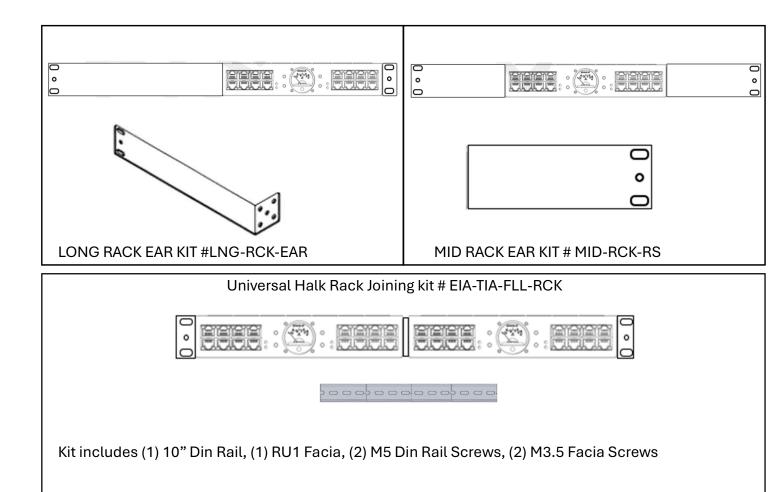
PARTS INCLUDED IN THE BOX: (Replacement parts also sold on website)

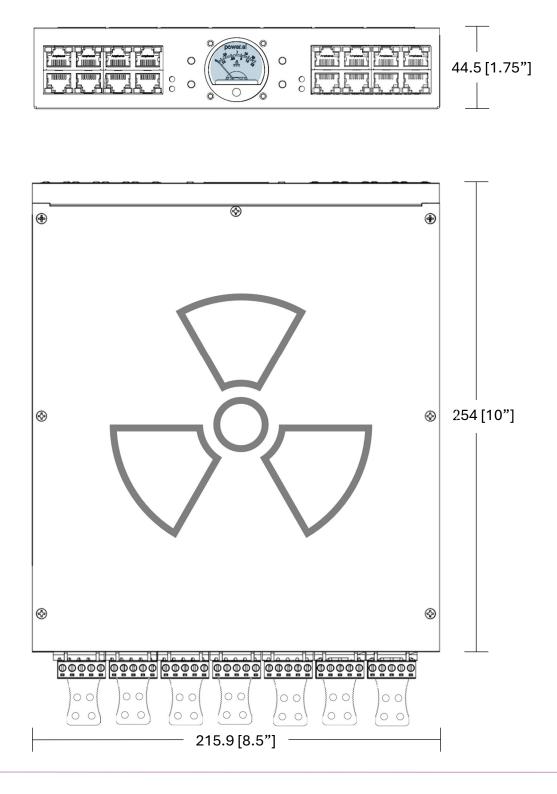|			
(1) NEUTRON PDU #RKT-DC22	(14) 5.08 PITCH TERMINAL BLOCKS # TRM-BLC-5-081	(1) STP CABLE #2M-SHL-CTG-CBL	(2)UNIVERSAL RACK EARS # URE-NVR-RCK-EAR
(2) UNIVERSAL DIN RAIL BRACKETS (TOP HAT) w/screws #UDB-NVR-DIN-RL	(1) 24v PASSIVE DC INJECTOR # POE-PSS-NJC	(14) CABLE TIES #4-CBL-TS-PAK	(1) NEMA 5-15P to C5 CABLE
	(4) RACK SCREWS #10-32	(10) UNIVERSAL SCREWS M3.5 # M3-5-NVR-NCL	

This manual is NOT included in the box as part of our SAVe sustainability efforts. We have 3 QR CODE locations on the enclosure for digital downloads of this manual.
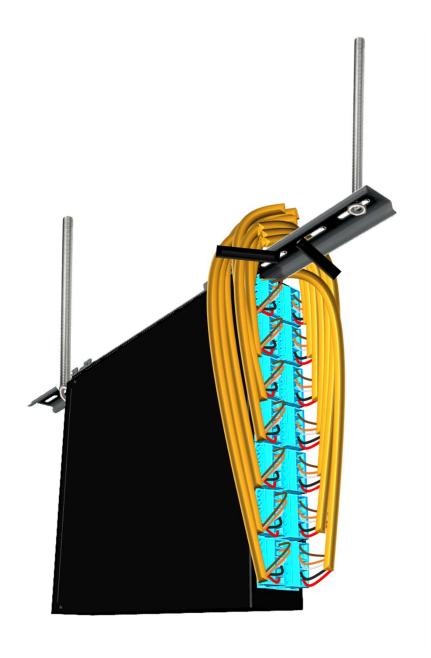
POPULAR OPTINAL PARTS SOLD SEPARATELY:

LONG RACK EAR KIT #LNG-RCK-EAR

MID RACK EAR KIT # MID-RCK-RS

Universal Halk Rack Joining kit # EIA-TIA-FLL-RCK

Kit includes (1) 10" Din Rail, (1) RU1 Facia, (2) M5 Din Rail Screws, (2) M3.5 Facia Screws

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INSTALLATION - DIMENSIONS:

44.5 [1.75"]

254 [10"]

215.9 [8.5"]

NEUTRON MOUNTING

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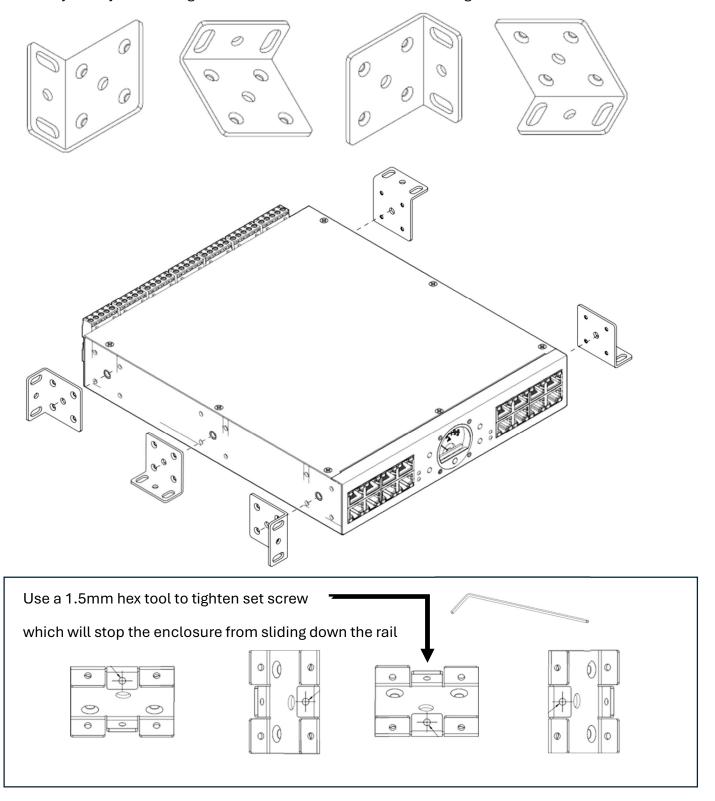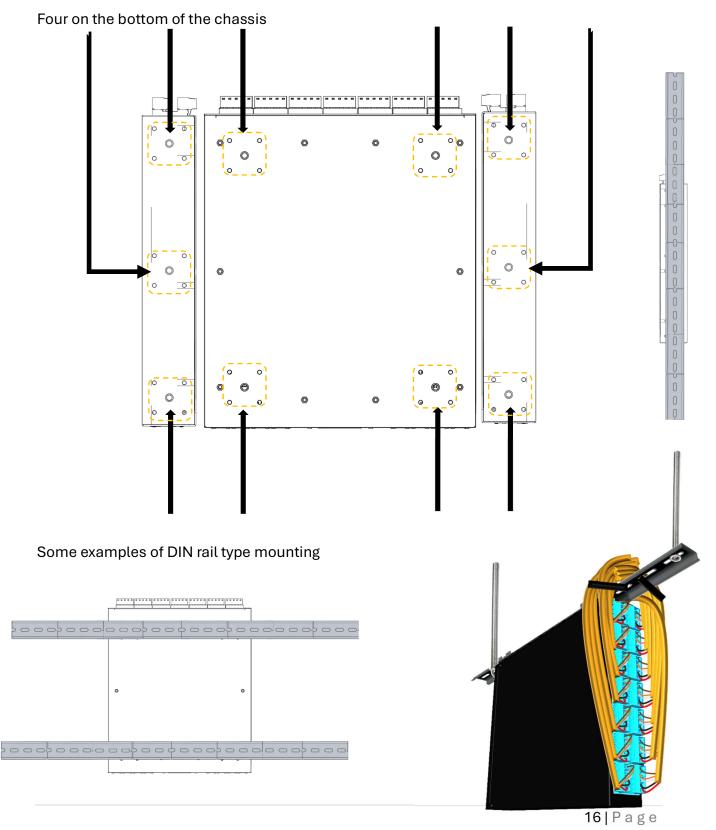
INSTALLATION – SYMMETRICAL RACK & DIN MOUNTING:

Using the included symmetrical rack ears and din rail brackets the unit can be mounted in a variety of ways. Including on wall or in wall box with screws through rack ears or on din rails
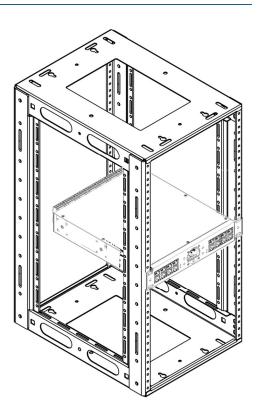

Use a 1.5mm hex tool to tighten set screw

which will stop the enclosure from sliding down the rail

NEUTRON 10 MOUNTING POINTS

Neutron is Plenum rated and has 10 Rack mount and Din rail bracket mounting points

Four on the bottom of the chassis

Some examples of DIN rail type mounting

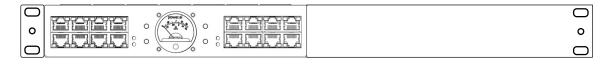Neutron™ is not a PoE DEVICE and is NOT POWERED BY PoE

RACK MOUNTING EXAMPLES

1RU Half rack enclosures – 1 Neutron

1RU Full rack – (1 Neutron with optional Long Rack Ears* must use front & back due to weight)
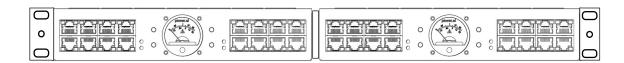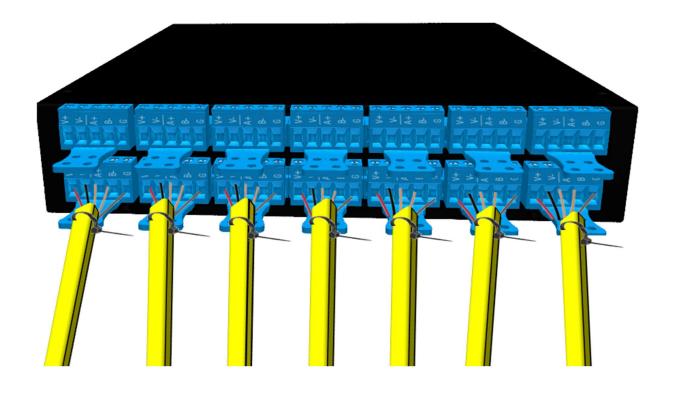
1RU Full rack – (1 Neutron with optional Mid Rack Ears* must use front & back due to weight)

1RU Full rack – (2 Neutrons with optional 1RU Rack Joiner Kit)
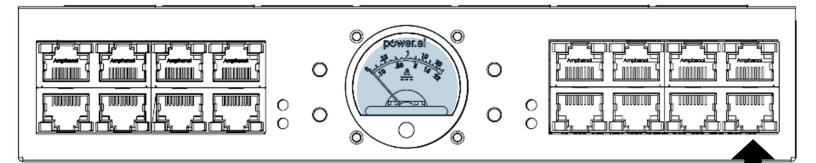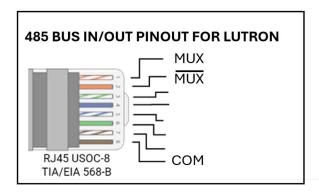
NEUTRON CONNECTIONS

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INSTALLATION - CONNECTIONS: FRONT PANEL

DC MOTOR PORTS PIN OUT

Data A+   RS-485 (0-5Vdc)
Data B−
n/c
Power +   24Vdc **OUTPUT**
Power +
n/c
Ground −
Ground −

RJ45 USOC-8
TIA/EIA 568-B

BUS IN (DC HARVESTING) PIN OUT

Data A+   RS-485 (0-5Vdc)
Data B−
n/c
Power +   24-48Vdc **INPUT**
Power +
n/c
Ground −
Ground −

RJ45 USOC-8
TIA/EIA 568-B

Ethernet

FUTURE USE

(8) ±2Nm DC MOTOR PORTS (RJ45)   (4) 485 DEVICE PORTS (RJ45)

power.ai

GPI/O

Single DC motor port (**1Nm** max per port)

Do not connect 485 devices to motor ports.

Only a single DC or AC powered motor should be connected to each front motor port.

485 DEVICE PORTS PIN OUT

Data A+   RS-485
Data B−   (0-5Vdc)
n/c
Power +
Power +
n/c   24Vdc **OUTPUT**
Ground −
Ground −

RJ45 USOC-8
TIA/EIA 568-B

⚠ AC motors can be connected to the front motor ports however care should be taken to use the correct cable with only 3 pins A+, B-, & G No connection on pin 4 should be made as Neutron provides power on that pin to power DC motors. Failure to use the proper cable may damage the AC motor. #3-CND-CBL-ACM compatible with 9012111

BUS OUT / RS232 PORT PIN OUT

Data A+   RS-485 (0-5Vdc)
Data B−
RS232- TX (0-5Vdc)
n/c
n/c
RS232- RX
Ground −
Ground −
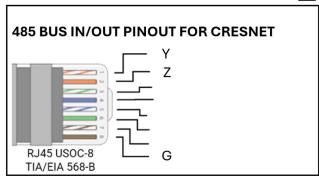
RJ45 USOC-8
TIA/EIA 568-B
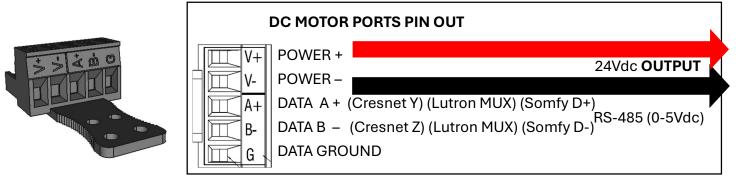
LUTRON and CRESNET CONNECTIONS:

485 BUS IN/OUT PINOUT FOR LUTRON

MUX
$\overline{\text{MUX}}$

COM

RJ45 USOC-8
TIA/EIA 568-B

485 BUS IN/OUT PINOUT FOR CRESNET

Y
Z

G

RJ45 USOC-8
TIA/EIA 568-B

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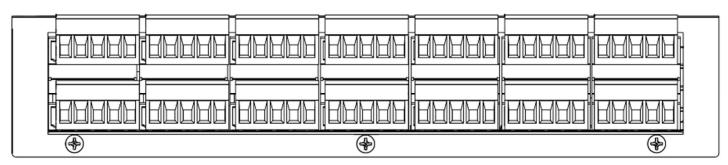
INSTALLATION - CONNECTIONS: REAR PANEL

DC MOTOR PORTS PIN OUT

V+	POWER +	
V-	POWER –	24Vdc **OUTPUT**
A+	DATA A + (Cresnet Y) (Lutron MUX) (Somfy D+)	
B-	DATA B – (Cresnet Z) (Lutron MUX) (Somfy D-)	RS-485 (0-5Vdc)
G	DATA GROUND	
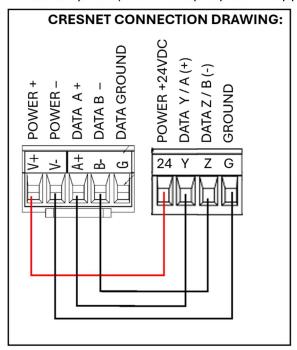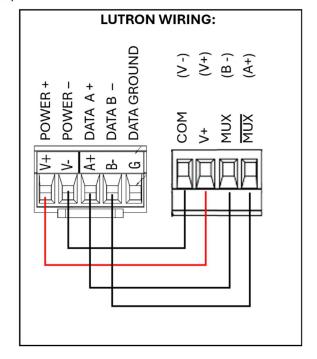
14 - 5.08 pitch terminal blocks are included (The cable strain relief can be removed)

(14) ±7Nm MOTOR PORTS (5.08 – FIVE POSITION TERMINAL BLOCKS, 12-24 AWG wire)
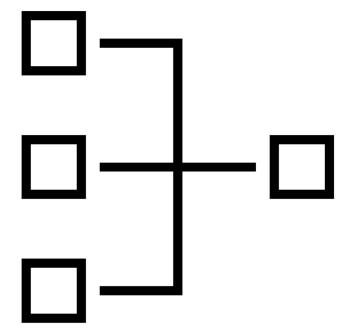
DC motor ports (**7Nm max** per port is supported)

CRESNET CONNECTION DRAWING:

POWER + POWER – DATA A + DATA B – DATA GROUND POWER +24VDC DATA Y / A (+) DATA Z / B (-) GROUND

V+ V- A+ B- G 24 Y Z G

LUTRON WIRING:

POWER + POWER – DATA A + DATA B – DATA GROUND COM (V -) (V+) (B -) (A+) V+ MUX MUX

V+ V- A+ B- G
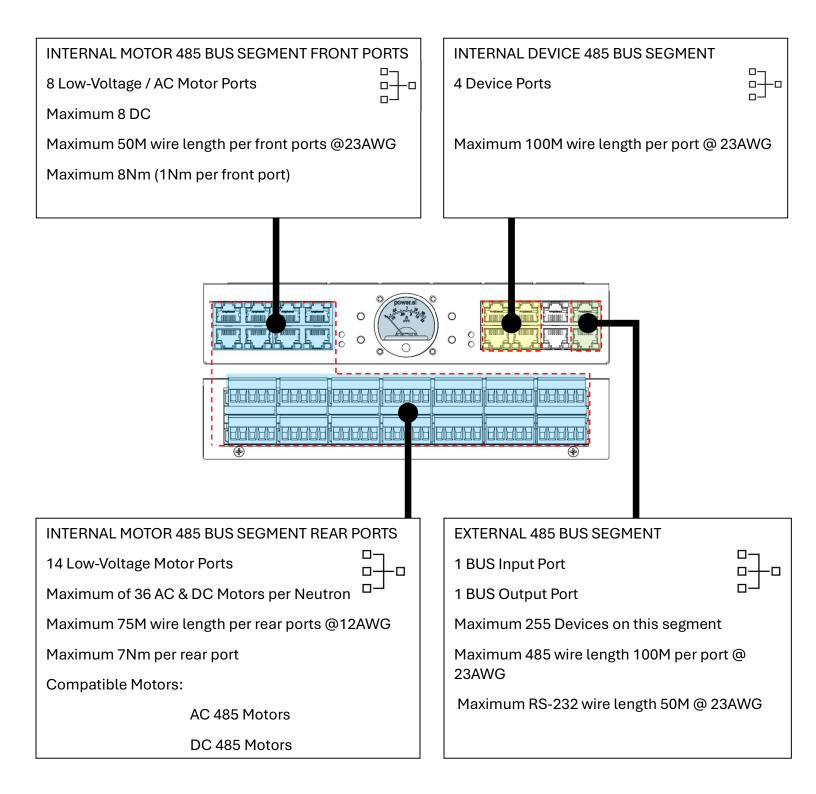
NEUTRON 485 SEGMENTS

Neutron™ is not a PoE DEVICE and is NOT POWERED BY PoE
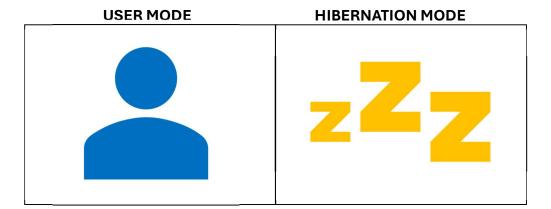
THREE 485 BUS SEGMENTS

Neutron has three 485 BUS segments:

INTERNAL MOTOR 485 BUS SEGMENT FRONT PORTS

8 Low-Voltage / AC Motor Ports

Maximum 8 DC

Maximum 50M wire length per front ports @23AWG

Maximum 8Nm (1Nm per front port)

INTERNAL DEVICE 485 BUS SEGMENT

4 Device Ports

Maximum 100M wire length per port @ 23AWG

INTERNAL MOTOR 485 BUS SEGMENT REAR PORTS

14 Low-Voltage Motor Ports

Maximum of 36 AC & DC Motors per Neutron

Maximum 75M wire length per rear ports @12AWG

Maximum 7Nm per rear port

Compatible Motors:

AC 485 Motors

DC 485 Motors

EXTERNAL 485 BUS SEGMENT

1 BUS Input Port

1 BUS Output Port

Maximum 255 Devices on this segment

Maximum 485 wire length 100M per port @ 23AWG

Maximum RS-232 wire length 50M @ 23AWG

NEUTRON OPERATIONAL MODES

USER MODE	HIBERNATION MODE

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NEUTRON OPERATIONAL MODES – HIBERNATION (1of 2):

Neutron has 2 operational modes (**HIBERNATION**, USER)

MODE 1 of 2; HIBERNATION zZz **MODE**

This is the shipping/delivery mode that the unit is set at from the factory.

In this mode no power can be provided on any Motor or Device port.

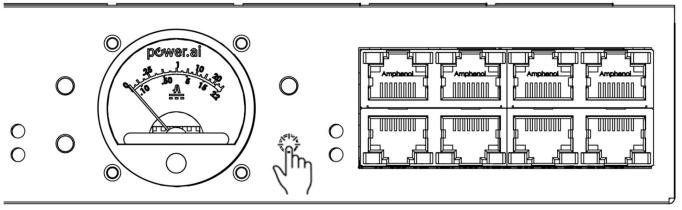In this deep-sleep mode the priority of processing is for ESM Balancing, and ultra-low energy support systems which are running in the background. The unit has countermeasures against unintended user intervention whether biological or artificial means such as during stressful movements or packaging ingress or crushing.

You can test (or demonstrate operational readiness) with a press of the reset Key. The unit is still in Hibernation mode, but will briefly turn on the ESM, and both BUS OUT LED's for UN38.3 international inspection or other EMEA nonproliferation inspection purposes.

Neutron has two methods to switch out of Hibernation Mode.

#1 Connect a 24-48VDC power source to the BUS INPUT which will switch to USER 👤 MODE

(The unit ships with a passive DC injector, connect the output to the BUS IN)

or

#2 Hold the RESET Key for approximately 6 seconds until the ESM LED starts flashing & has now switched to USER 👤 MODE

NEUTRON OPERATIONAL MODES – USER (2 of 2):

Neutron has 2 operational modes (HIBERNATION, **USER**)
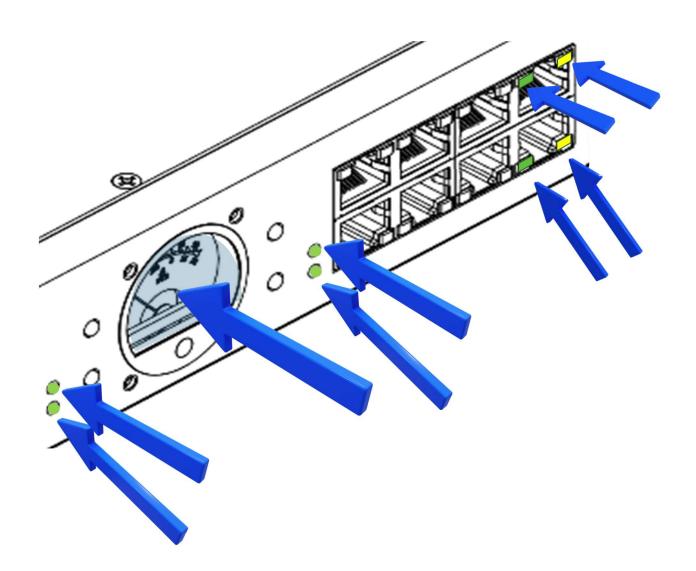
MODE 2 of 2; USER 👤 MODE

This is the normal run-time mode that Neutron will be in for 99% of its operational life.

Three of the four user keys are locked by default in this mode to avoid unintentional motor movements. Check the user key section for details on how to unlock the keys for use.

Depending on the Neutron set-up this mode can help save energy by eliminating all or some of the energy used by shade motors.

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NEUTRON INDICATORS (9)

NEUTRON LEDS/INDICATORS – SYSTEM STATUS:

MOTOR PORT TOTAL
OUTPUT (0-22 Amps)

DC
POWER

485
ACTIVITY

SYSTEM
STATUS

ESM
STATUS

RS232
READY/ACT

485
END of LINE
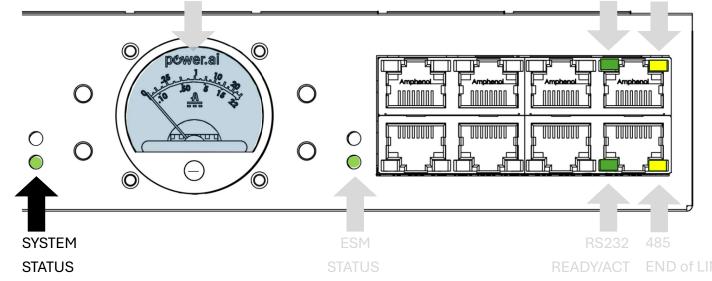
			LED COLOR		
SYSTEM STATUS LED:	○	●	●	●	●
	NONE	**GREEN**	**YELLOW**	**AMBER**	**RED**
This LED indicates overall system Status and Keylock status	UNIT IN HYBER. MODE	UNIT IN USER MODE (KEYS LOCKED)	N/A	KEYS UNLOCKED	N/A
					SYSTEM ERROR*
This LED also FLASHES during AI BUS activity (please wait for flashing to stop before proceeding)		❋			
This LED also winks slowly if RS232 is enabled		😉		🙂	

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NEUTRON LEDS/INDICATORS – ECO/ESM/DC POWER STATUS:

MOTOR PORT TOTAL
OUTPUT (0-22 Amps)

DC
POWER

485
ACTIVITY

SYSTEM
STATUS

ESM
STATUS

RS232
READY/ACT
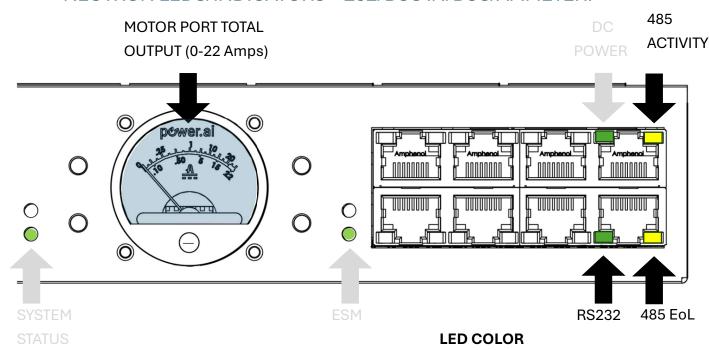
485
END of LINE

LED COLOR

	NONE	GREEN	YELLOW	AMBER	RED
ESM STATUS: This LED indicates the status of the Energy Storage Module or ESM	○ Unit is in Hiber. Mode	🟢 ESM Power Good	🟡 N/A	🟠 ESM Charge pending	🔴 N/A
This LED also winks slowly when the ESM is harvesting power from BUS IN		😉			
DC POWER STATUS: This LED indicates the status of any DC for the Reaktor to use for power & harvesting for the ESM	○ NO DC POWER DETECTED	🟢 DC POWER IS PRESENT	🟡 N/A	🟠 N/A	🔴 ESM LOW N/A

NEUTRON LEDS/INDICATORS – 232/BUS IN/BUS/AMMETER:

MOTOR PORT TOTAL
OUTPUT (0-22 Amps)

DC
POWER

485
ACTIVITY

SYSTEM
STATUS

ESM

RS232   485 EoL
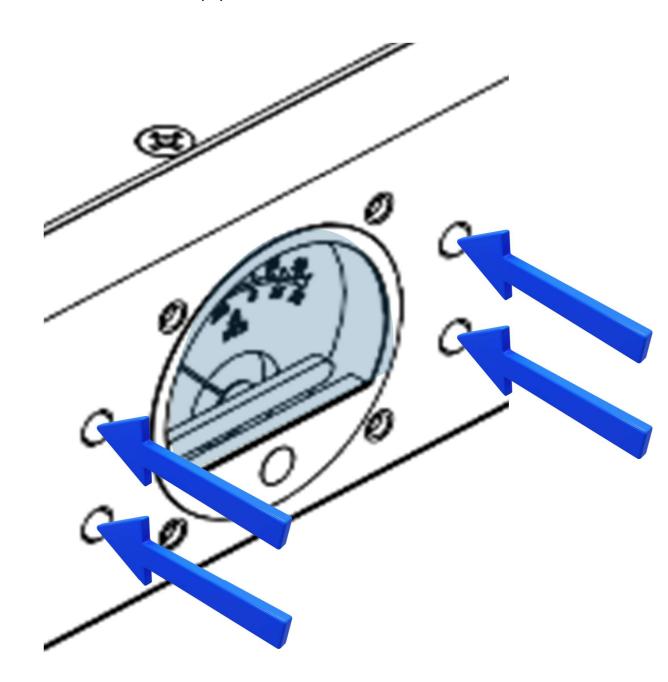
	LED COLOR				
	NONE	**GREEN**	**YELLOW**	**AMBER**	**RED**
RS-232 STATUS: This LED indicates if a connection To the RS232 port is detected And flashes on with data activity	RS232 Connection Detected	Flashes On with RS232 Data Activity	N/A	N/A	N/A
485 BUS STATUS (BUS IN): This LED Flashes on with 485 BUS Activity	NO DATA	On when Power present	Flashes on with Data Act.	N/A	N/A
485 BUS STATUS (BUS OUT): This LED indicates upstream 485 Node(s) detected or 485 End of Line	Upstream Node(s) Detected	ON when NO RS232 is connected	485 End of Line	N/A	N/A

MOTOR PORT AMMETER:

This analog gauge indicates the total amount of current flowing through the motor ports in amps. This meter is very precise and can show quiescent current loads as low as 2mA.

The blue backlighting comes on when the ESM provides enough current to move the motor on the motor connectors.

NEUTRON USER KEYS (4)

NEUTRON KEYS UP/DOWN/RESET (3):

Neutron has 4 user keys. The UP, & DOWN KEYS are LOCKED by default to avoid unintentional presses. The RESET key is never locked.   FUTURE USE
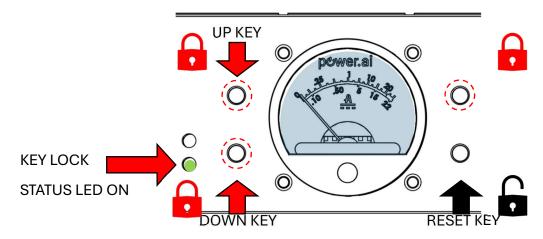
The black and white hand icon represents a KEY press & release
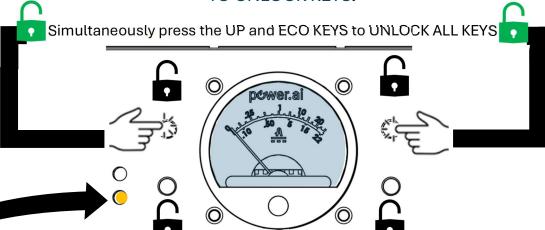
The solid orange hand icon represents a KEY press & hold, then release

UP KEY

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KEY LOCK

STATUS LED ON

DOWN KEY   RESET KEY

TO UNLOCK KEYS:

Simultaneously press the UP and ECO KEYS to UNLOCK ALL KEYS

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The Status LED will illuminate with a GREEN color when the keys are locked

The Status LED will illuminate with an AMBER color when the keys are unlocked.

Once keys are unlocked, they remain unlocked until 50 minutes after the last key activity.

Neutron™ is not a PoE DEVICE and is NOT POWERED BY PoE

NEUTRON KEY ACTIONS (HIBERNATE zZz MODE): 3 KEYS LOCKED

PRESS UP KEY; has no result

KEY LOCKED!

HOLD UP KEY; has no result

KEY LOCKED!

PRESS KEY; has no result

KEY LOCKED!
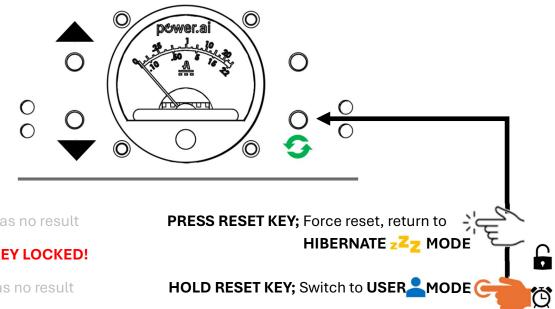
HOLD KEY; has no result

KEY LOCKED!

All LED's and BACKLIGHTING ARE OFF
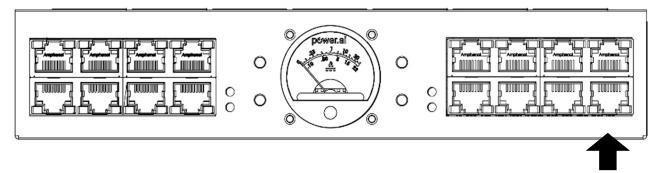
power.ai

KEYS ARE LOCKED:
(Default)

PRESS DOWN KEY; has no result

KEY LOCKED!

HOLD DOWN KEY; has no result

KEY LOCKED!

PRESS RESET KEY; Force reset, return to **HIBERNATE zZz MODE**

HOLD RESET KEY; Switch to **USER 👤 MODE**

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NEUTRON KEY ACTIONS (USER 👤 MODE): 3 KEYS LOCKED 🔒

PRESS UP KEY; has no result

KEY LOCKED!

HOLD UP KEY; has no result

KEY LOCKED!

PRESS UP KEY >>>>>>>>>>>>>>>>>>>>>>> **&** >>>>

HOLD UP KEY >>>>>>>>>>>>>>>>>>>>>>> **&** >>>>

PRESS KEY; has no result

KEY LOCKED!

HOLD KEY; has no result

KEY LOCKED!

PRESS KEY: Unlocks all KEYS
(for 50 minutes after last Key press)

HOLD KEY: Unlocks all KEYS

GREEN STATUS LED

🔒 **KEYS ARE LOCKED:**
(Default)

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PRESS DOWN KEY; has no result

KEY LOCKED!

HOLD DOWN KEY; has no result

KEY LOCKED!

PRESS RESET KEY; Force reset, return to
USER 👤 MODE

HOLD RESET KEY; if power is connected,
Forces reset, return to
USER 👤 MODE
If power is not connected
switches to **HIBERNATE 💤 MODE**

NOTE: The Ammeter Blue Backlighting will turn on once any movement command is sent on or to the internal local 485 segment (Motor Ports) and turn back off after 5 minutes of inactivity on the internal local 485 segment.

MOTOR LIMIT TOOLS / 3rd PARTY CONTROL SYSTEMS:

When using motor limit setting tools, we recommend using the BUS OUT

TROUBLESHOOTING   **CALL US FOR HELP TOLLFREE +1 (844) 771-8725**

ISSUE	POTENTIAL CAUSE:	REMEDY ACTION:
Neutron unit has no power	Passive DC not connected	Check AC input on passive DC, check cable from output to BUS IN on UNIT
Shades have no power		A movement command must be sent on the bus to a connected motor for Neutron to provide power to the motor
Shades start to move but then stop moving	ESM LED IS AMBER or RED	Check ESM LED, if the LED is not green, then the ESM needs time to harvest energy from the BUS IN, this can take a few hours
Shades start to move but then stop moving	ESM LED is GREEN	Ensure you are not overloading the motor port (Front motor ports 1Nm maximum per port, Rear motor ports 7Nm maximum per port) If you have more than the port can provide move a motor off this port to another port that is not used in the same group, or you may need additional Neutrons for this project
1 or more of the shades in my group is not moving with the group	485 BUS Collision	Check wiring of the motors not moving
The Neutron keeps going back to Hibernate mode	Passive PoE not providing power	Neutron has a special feature to protect itself in the event of long power disruptions. Neutron will shut down if input power is lost; **and** after 3 hours and 45 minutes; **and** the system (bus activity) has been idle for more than 30 minutes Or the input power is lost; **and** the system (bus activity) has been idle for more than 30 minutes and ESM is very low. To remedy, re-apply power to the passive PoE and or if you need to move shades, hold the reset KEY for approx. 6 seconds which will switch Neutron back to USER MODE

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