24V / 40A DRU-24V40ABN
Operating Guideline

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Field Application Engineer / Rev. 01.1

Contents

CliQ II DC-UPS Module

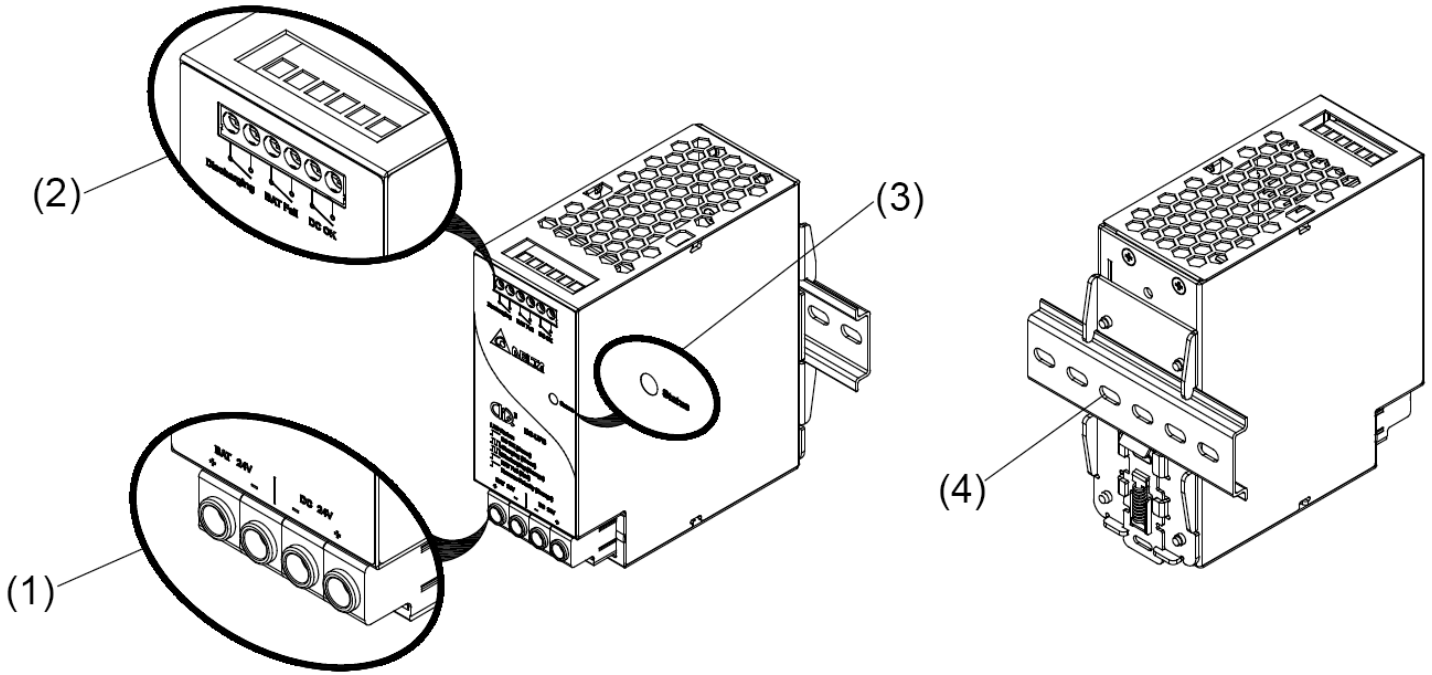
24V / 40A DRU-24V40ABN

Basic Information

Input	24-28Vdc 2A ± 1A charging mode **The typical charging voltage of a 24V battery type is 27.XX. As such, 28V input to charge the battery should be adequate to fully charge the battery.**
Output (Buffering Mode)	23-28Vdc 40.0A Max 960W Max (24V, 40A)
Battery Voltage	24Vdc, SLA (Sealed lead acid battery) 2x 12Vdc, SLA Sealed lead acid battery
Battery Capacity	7.5AH/ 12AH/ 15AH
Charging Time	< 3hr ± 1hr for battery 24V/15AH
Buffering Time	4.5min for battery 24V/15AH
Operating Temperature	-20° C to +60° C (full power, no power de-rating)
Overload/ Overcurrent Protection	42-52A, Latch Mode
Short Circuit Protection	Latch Mode
Deep Discharge Protection	23V ± 0.5V **The unit will stop operating when the battery voltage detected is < 23V ± 0.5V.**

Product Description

1. Input / Output terminal block connector (Rated 600V/60A)
2. Signal terminal block connector (Discharging, Battery Fail, DC OK)
3. LED display status (Red, Green, Orange)
4. Universal mounting rail system



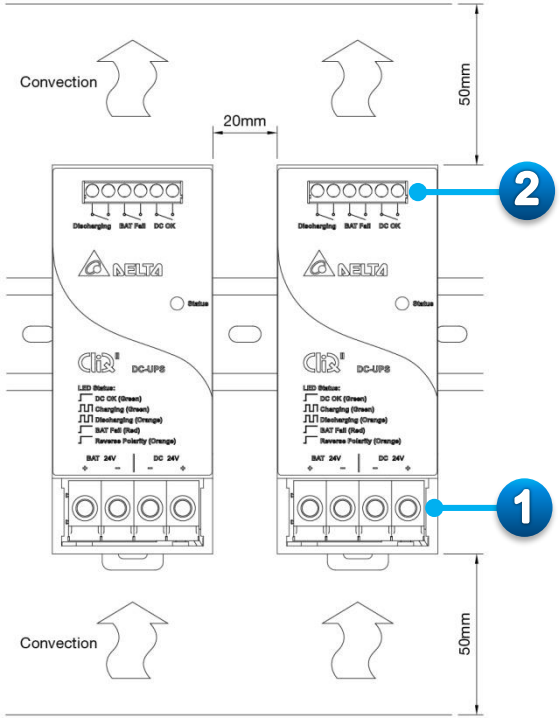
Installation Instruction

Installation

Vertical Mounting

To guarantee sufficient convection cooling

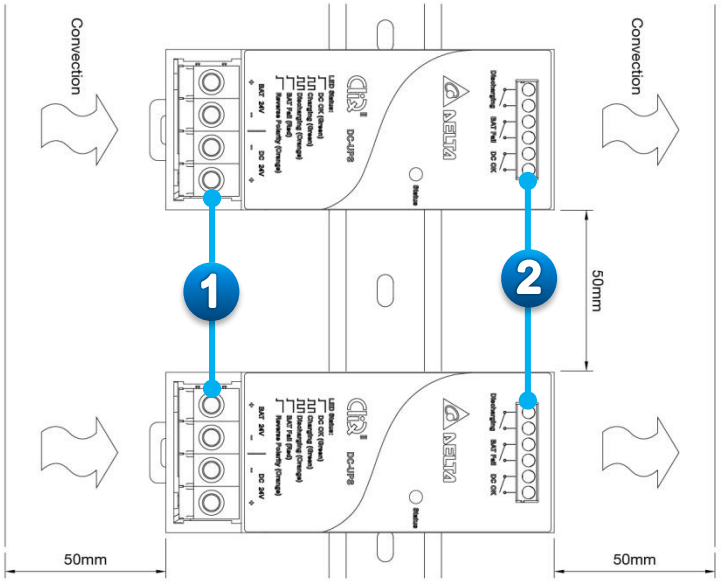
- Keep a distance of 50mm above and below
- A lateral distance of 20mm



Horizontal Mounting

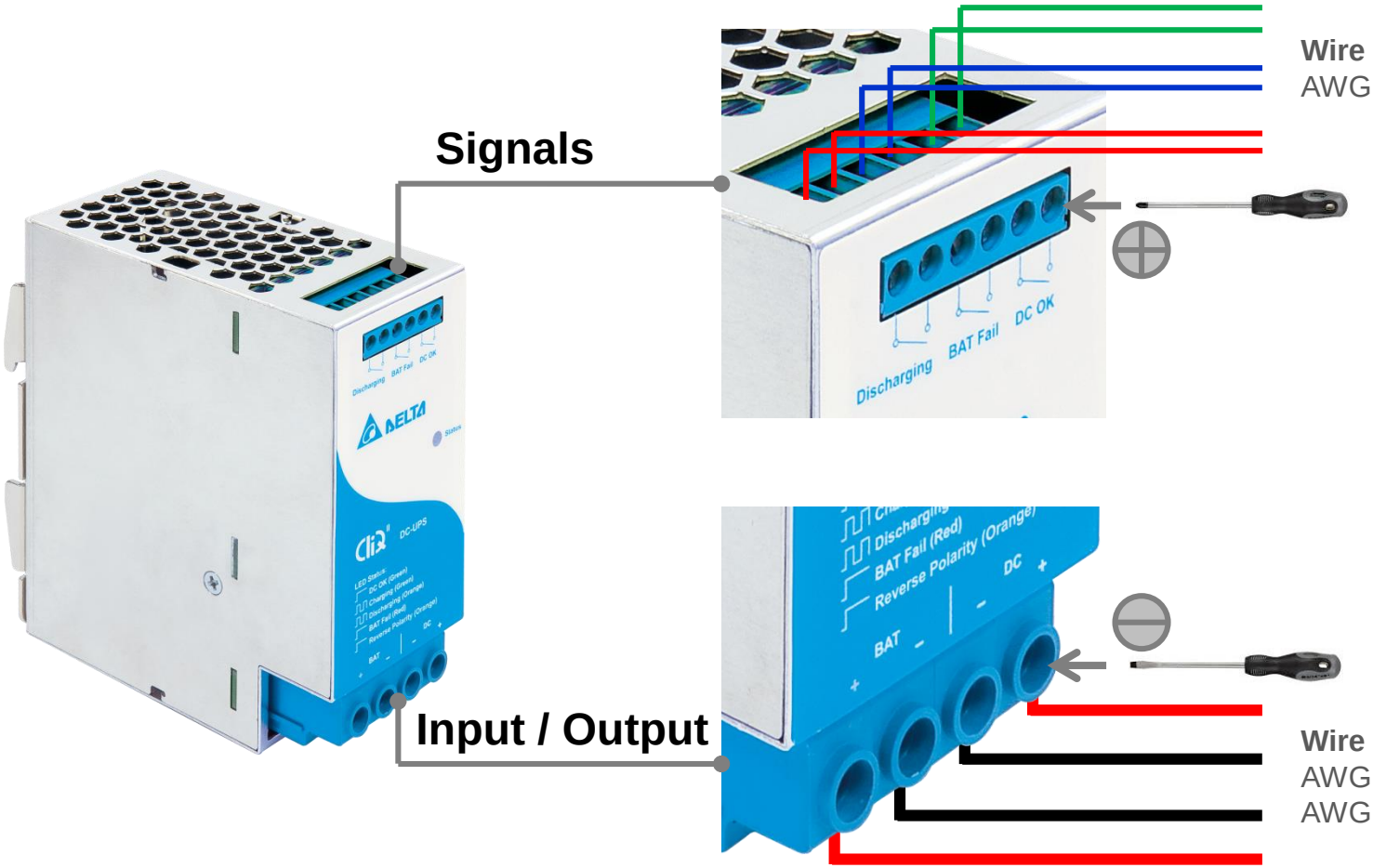
To guarantee sufficient convection cooling

- Keep a distance of 50mm to other units



Note:
1. Input / Output terminal
2. Signals terminal

Wiring Connection

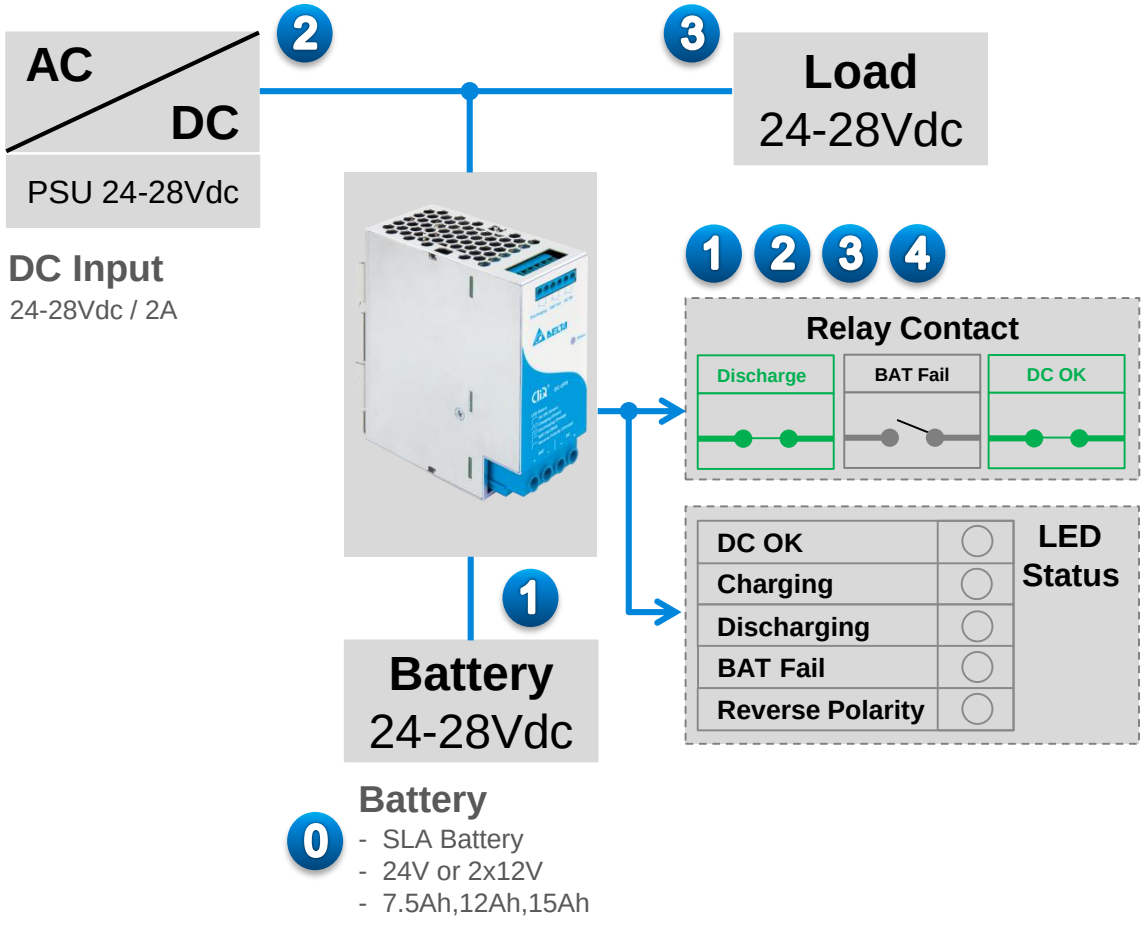


Wire Signals:
AWG 24-12

Wire Input / Output:
AWG 12-6 (load 0-20A)
AWG 8-6 (load 20-40A)

Operating Sequence

Wiring Instruction



Note:
Step 0-4, refer page 8-9

Operating Sequence

No.	Operation	Description	LED Status	Signals Status	Troubleshooting
0	Check the battery voltage	• Battery voltage should be in 23-28Vdc	-	-	• If battery voltage is less than 23Vdc, the DRU module will not operate in buffering mode.
		• Battery voltage 14Vdc min will enable BAT Fail status. **(DRU module will not charge the battery)**	-	-	• Change the battery if the voltage is less than 14Vdc.
1	Connect battery to DRU module	Connect the battery cable to “BAT” terminal of DRU module (+ to + and - to -).	OFF (correct connection)	DC OK: Open Discharge: Open BAT Fail: Open	-
			Orange On **(battery wrong polarity)**	DC OK: Open Discharge: Open BAT Fail: Open	Re-check battery polarity and make corrections.
2	• Connect PSU to DRU module • After checked the PSU cable connection, the main power must be turned OFF before move to step 3.	• Connect the PSU cable to “DC” terminal of DRU module (+ to + and - to -). • 24V battery has typical fully charged voltage at 27.XX. • Suggest to apply input at 28Vdc to charge battery.	Green flashing (battery charging)	DC OK: Closed Discharge: Open BAT Fail: Open	Use current probe to measure at battery cable BAT+, the charging current should be > 1A.
			Green On (battery fully charged)	DC OK: Closed Discharge: Open BAT Fail: Open	-
			Red On (No battery connection or battery spoil)	DC OK: Open Discharge: Open BAT Fail: Closed	Re-check battery voltage and change to good battery (≥21Vdc).
			Orange flashing (DRU input voltage is lower than battery voltage)	DC OK: Closed Discharge: Closed BAT Fail: Open	Re-check voltage from PSU and change to suggested voltage at 28Vdc.

Operating Sequence

No.	Operation	Description	LED Status	Signals Status	Troubleshooting
3	Connect load to DRU module (Normal mode)	Connect the load cable to “DC” terminal of DRU module. (+ to + and - to -).	Green flashing (battery charging)	DC OK: Closed Discharge: Open BAT Fail: Open	-
			Green On (battery fully charged)	DC OK: Closed Discharge: Open BAT Fail: Open	-
4	Buffering mode	Input collapse, DRU module operate in buffering mode. Battery will supply to load.	Orange flashing (battery discharging)	DC OK: Closed Discharge: Closed BAT Fail: Open	-
			OFF (DRU module does not operate in buffering mode)	DC OK: Open Discharge: Open BAT Fail: Open	• Re-check battery wiring and compare with “Typical Application Notes” in DRU module datasheet. Make corrections as needed. • Re-check battery voltage shall be more than 23Vdc (Deep discharge protection).

Relay Contact and LED Indicators

Relay Characteristics

Max Relay Contact Rating		24Vdc/Vac, 1.0A
DC BUS OK	Relay Contact	"DC OK" contact is closed when the DC input voltage is within 24-28V (±10%) range or the battery voltage is within 23-28V range
	LED Indicator	Green LED On
Charging	Relay Contact	"DC OK" contact is closed when the unit is in charging mode
	LED Indicator	Green LED Flashing
Battery Discharge*	Relay Contact	"Discharging" contact is closed when the unit is in buffering mode
	LED Indicator	Orange LED Flashing
Battery Fail	Relay Contact	"BAT Fail" contact is closed when the battery fails to function or battery voltage is less than 14V
	LED Indicator	Red LED On
Battery Reverse Polarity	Relay Contact	"DC OK" contact is opened when the battery is in reverse polarity
	LED Indicator	Orange LED On

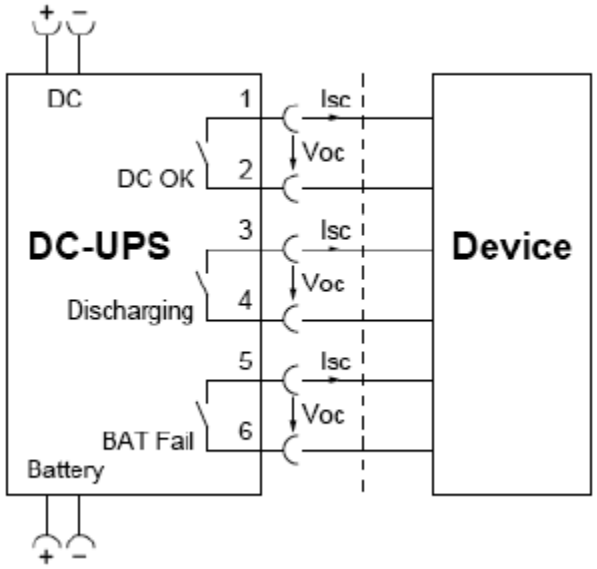
* With output current 3A to 40A.

*** With output current 3A to 40A: While Buffering mode.**

The module can operate from output current 0A to 40A. However, please note that the LED display status and relay contact operate properly at output current 3A and above. If load is lower than 3A, the module will malfunction.

Relay Contact and LED Indicators

Signal Wiring Diagram

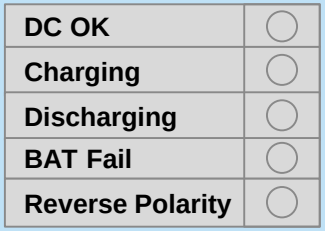
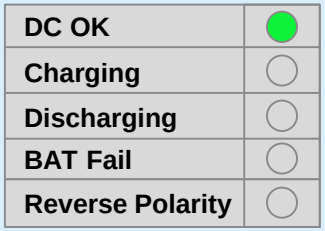
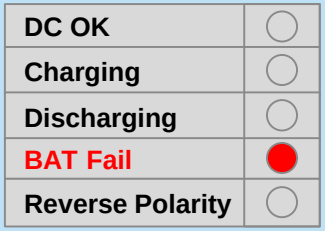
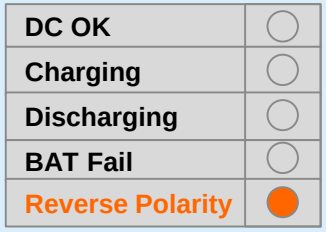


DC-UPS Status	Relay Output Connector			LED Display Status
	Discharging	BAT Fail	DC OK	
Battery Fully Charged	Open	Open	Close	Green LED On
Battery Charging	Open	Open	Close	Green LED Flashing
Battery Discharging* (Buffering Mode)	Close*	Open	Close	Orange LED Flashing
No Battery Connected	Open	Close	Open	Red LED On
Output Shutdown	Open	Open	Open	No Light

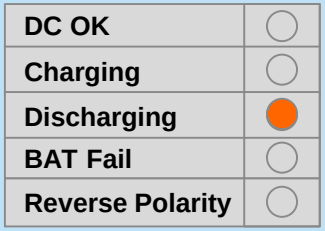
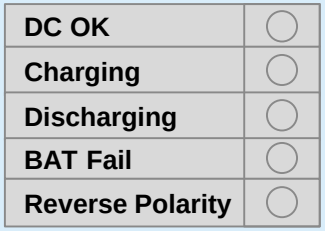
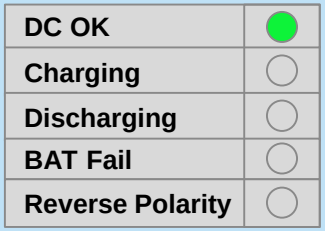
*** With output current 3A to 40A: While Buffering mode.**

The module can operate from output current 0A to 40A. However, please note that the LED display status and relay contact operate properly at output current 3A and above. If load is lower than 3A, the module will malfunction.

Troubleshooting

LED Display Status	Problem	Suggestion
	Normal mode (Charging) • LED display status is no light. • DRU module do not operate.	1) Check input voltage at **"DC"** terminal whether it is in 24-28Vdc voltage range or not. 2) If the input voltage at **"DC"** terminal is not in nominal range, please check wiring and PSU output. 3) Replace DRU module.
	Normal mode (Charging) • Green LED display status is light (not flash).	1) Check the input voltage whether it is equal to battery voltage or not. 2) Disconnect battery from DRU module then check battery voltage whether it is > 20Vdc min or not. 3) Replace with another good battery. 4) Replace DRU module.
	Normal mode (Charging) • Red LED display status is light.	1) Check battery voltage whether it is less than 14Vdc or not. (DRU module will not charge the battery), replace with good battery. 2) If the battery voltage ≥21Vdc, please check battery wiring. 3) Replace DRU module.
	Normal mode (Charging) • Orange LED display status is light.	Check battery polarity connection at **"BAT"** terminal of DRU module and make corrections.

Troubleshooting

LED Display Status	Problem	Suggestion
	Normal mode (Charging) • Discharging during input voltage available • LED display status is Orange flashing.	1) Check battery voltage at **"BAT"** terminal whether it is higher than input voltage from PSU or not. If the battery voltage at **"BAT"** terminal is higher than input voltage, the battery will be discharged until its voltage equal to input voltage then LED display will be Green. Suggest to adjust input voltage to 28Vdc. 2) Replace DRU module.
	Buffering mode (Discharging) • LED display status is no light. • DRU module does not take over the load when input collapse.	1) Check battery voltage at **"BAT"** terminal whether it is in 24-28V voltage range or not. (the battery voltage < 23V ± 0.5V, DRU module will not operate in buffering mode) 2) If the battery voltage at **"BAT"** terminal is not available, please check wiring. 3) Replace DRU module.
	Buffering mode (Discharging) • DRU module still operate in buffering mode (load did not shutdown). • Green LED display status is light (Orange LED is not flash).	Output load is < 3A. (the Orange LED will flash when the output load is > 3A)

Thank you.

To learn more about DeltaPSU, please visit www.DeltaPSU.com.

Document Revision Record

Date	Item	Content Revised	Page Affected	Rev
24 Jan 20	1	Initial release. By Tassanai	All	00
9 Jun 20	1	Update Operating sequence No.2 to add Orange ON and Red.	9	01
	2	Update Troubleshooting “Normal Mode (Charging)”	13	
		By Tassanai		
18 Jun 20	1	Update Operating sequence No.2 to add Orange flashing during input available.	8	01.1
	2	Remove Orange On from Operating sequence No.2	8	
	3	Update Troubleshooting to add Orange flashing and re-align its order	12-13	
		By Tassanai		