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Delta UPS - Amplon Family

Transformer Cabinet
5/ 6/ 8/ 10 kVA

User Manual

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Smarter. Greener. Together.

SAVE THIS MANUAL

This manual contains important instructions and warnings that you should follow during the installation, operation, storage and maintenance of this product. Failure to heed these instructions and warnings will void the warranty.

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Chapter 1 : Introduction & Safety Instructions

Thank you for purchasing the TFM-RT series Transformer Cabinet, hereafter referred to as 'TFM-RT'. The TFM-RT is a step down transformer and includes three models, TFM-RT-5/6K (two models) and TFM-RT-8/10K (one model).

Please read this user manual thoroughly before installing your TFM-RT as it provides important information that should be followed during installation and maintenance, which allows you to correctly set up your system for the maximum safety and performance.

If you experience a problem with the TFM-RT, please refer to **Chapter 6: Obtaining Service** or contact Delta service personnel for assistance.

- The TFM-RT is **ONLY** intended to be installed in an indoor temperature controlled environment that is free of conductive contaminants. It is not intended for use in a computer room as defined in the Standard for the Protection of Electronic Computer/ Data Processing Equipment ANSI/ NFPA75.
- The maximum ambient operating temperature for the TFM-RT is 40°C ("0 ~40°C" for Ambient Operation).
 1. The external vents and openings on the unit are provided for ventilation. To ensure reliable operation of the unit and to protect the unit from overheating, these vents and openings must not be blocked or covered. Do not insert any object into any of the vents or openings that may hinder the ventilation.
 2. Install the unit in a well ventilated area, away from excess moisture, heat, dust, flammable gas or explosives.
 3. Leave adequate space (at least 15cm) around all sides of the unit for proper ventilation.
 4. Do not mount the unit with its front or rear panel facing down at any angle.
 5. Before usage, you must allow the unit to adjust to room temperature (20°C ~25°C or 68°F~77°F) for at least one hour to avoid moisture condensing inside the unit.
- The TFM-RT contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user serviceable parts. Repairs must be performed by **QUALIFIED SERVICE PERSONNEL ONLY**.

- The TFM-RT-5/6K comes with an attached #10 AWG input power cord. Do not use extension cords or surge strips. If you want to use adapter plugs, please choose type B plugs suitable for power rating (i.e. 208 Vac/ 24 A). Besides, the adapter plugs must be certified by UL.
- The TFM-RT-8/10K comes with a #6 AWG input power cable in the box. The copper terminals for the input and output cables are included. Connect one end of the input power cable to the input terminal block on the TFM-RT-8/10K. Connect the other end of the input power cable to the power supply. Do not use extension cords, adapter plugs, or surge strips.
- For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible. For permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment.
- To reduce the risk of electrical shock with the installation of the unit and the connected equipment, the user must ensure that the TFM-RT is properly grounded due to a possible risk of AC current leakage.
- **ONLY Qualified Service Personnel** can perform Installation and Servicing of the TFM-RT. Delta accepts no liabilities and is not limited to: injury to the Service Personnel, or damages to the TFM-RT, the power supply, or the connected equipment caused by the incorrect installation or servicing of the power supply system.
- When using the TFM-RT, the load **MUST** be limited as follows:

TFM-RT-5/6K	TFM-RT-8/10K
5kVA/ 5K Watts	10kVA/ 10K Watts



WARNING:

Do not use the mounting brackets to lift the TFM-RT. The mounting brackets are only for securing the unit to the rack.

- The equipment has been tested and found to comply with the limits for a Class B computing device and the Class B limits for radio noise emissions from digital apparatus. These limits are designed to provide reasonable protection against such interference in a residential installation. This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, this equipment may cause interference to radio and television reception. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by

one or more of the following measures:

1. Re-orient the receiving antenna.
 2. Relocate the computer with respect to the receiver.
 3. Move the computer away from the receiver.
 4. Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.
 5. Shielded communications interface cables must be used with this product.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
 - Life support policy

As a general policy, Delta does not recommend the use of any of our products in life support applications where failure or malfunction of the product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. We do not recommend the use of any of our products in direct patient care. We will not knowingly sell our products for use in such applications unless it receives in writing assurances satisfactory to us that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) our liability is adequately protected under the circumstances.

Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as "critical" by the United States FDA.

- All wiring and equipment should be installed in accordance with NFPA 70 (National Electrical Code) and ANSI C2 (National Electrical Safety Code). It is the responsibility of the Authority Having Jurisdiction over the final installation to determine if the final configurations meet the necessary criteria for installation and use.
- Standard Compliance

UL1778

Chapter 2 : Package Inspection

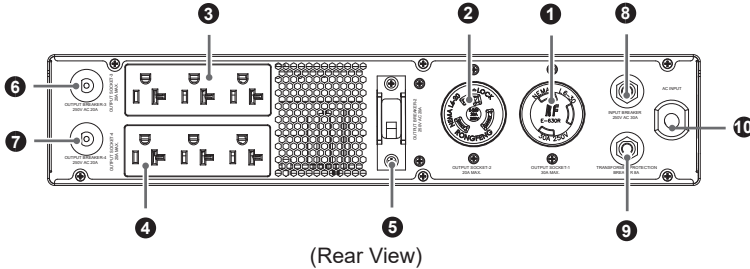
Once you receive the product it should be visually inspected for damage that may have occurred in shipping. Immediately notify the carrier and place of purchase if any damage is found. Warranty claims for damage caused by the carrier will not be honored by the manufacturer. The packing materials that the product was shipped in were carefully designed to minimize any shipping damage. In the unlikely case that the product needs to be returned to the manufacturer, use the original packing material. Since the manufacturer is not responsible for shipping damage incurred when the product is returned, the original packing material is inexpensive insurance. **PLEASE SAVE THE PACKING MATERIALS.**

The TFM-RT package contains the following items:

No.	Item	Q'ty	TFM-RT-5/6K	TFM-RT-8/10K
①	Transformer	1 PC	✓	✓
②	User Manual	1 PC	✓	✓
③	Bracket Ear	1 Set	✓	✓
④	Rail Kit	1 Set	✓	✓
⑤	Copper Terminal	10 PCS	x	✓
⑥	Input Cable	1 PC	x	✓
⑦	Tower Stand Extender	4 PCS	✓	x
⑧	Tower Stand Extender	6 PCS	x	✓

Chapter 3 : Rear Panels

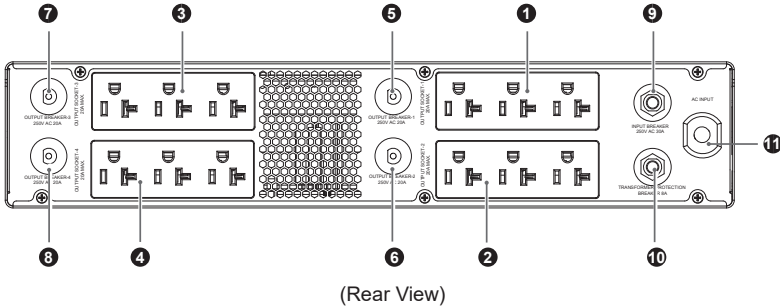
- TFM-RT-5/6K (TFM502R4RT2N035) Rear Panel



No.	Description
1	Load 1: 208V output receptacle (L6-30R x 1).
2	Load 2: 208V output receptacle (L6-20R x 1).
3	Load 3: 120V output receptacles (5-15/ 20R x 3).
4	Load 4: 120V output receptacles (5-15/ 20R x 3).
5	The Load 2 circuit breaker will trip when the load exceeds the power rating.
6	The Load 3 circuit breaker will trip when the load exceeds the power rating.
7	The Load 4 circuit breaker will trip when the load exceeds the power rating.
8	The input circuit breaker will trip when the load exceeds the TFM-RT's power rating.
9	The TFM-RT's circuit breaker will trip when the TFM-RT becomes overheated.

No.	Description
10	The input power cord is for connecting to the UPS.

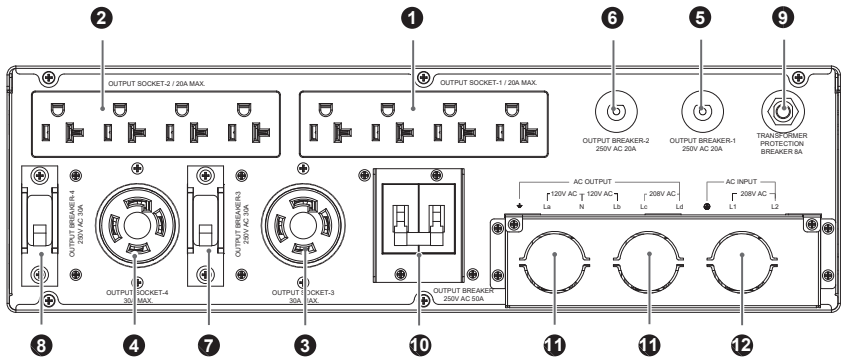
• TFM-RT-5/6K (TFM502R5RT2N035) Rear Panel



No.	Description
1	Load 1: 120V output receptacles (5-15/ 20R x 3).
2	Load 2: 120V output receptacles (5-15/ 20R x 3).
3	Load 3: 120V output receptacles (5-15/ 20R x 3).
4	Load 4: 120V output receptacles (5-15/ 20R x 3).
5	The Load 1 circuit breaker will trip when the load exceeds the power rating.
6	The Load 2 circuit breaker will trip when the load exceeds the power rating.
7	The Load 3 circuit breaker will trip when the load exceeds the power rating.
8	The Load 4 circuit breaker will trip when the load exceeds the power rating.

No.	Description
9	The input circuit breaker will trip when the load exceeds the TFM-RT's power rating.
10	The TFM-RT's circuit breaker will trip when that the TFM-RT becomes overheated.
11	The input power cord is for connecting to the UPS.

• TFM-RT-8/10K (TFM103R4RT2N035) Rear Panel



(Rear View)

No.	Description
1	Load 1: 120V output receptacles (5-15/ 20R x 4).
2	Load 2: 120V output receptacles (5-15/ 20R x 4).
3	Load 3: 208V output receptacles (L14-30R x 1).
4	Load 4: 208V output receptacles (L14-30R x 1).
5	The Load 1 circuit breaker will trip when the load exceeds the power rating.
6	The Load 2 circuit breaker will trip when the load exceeds the power rating.

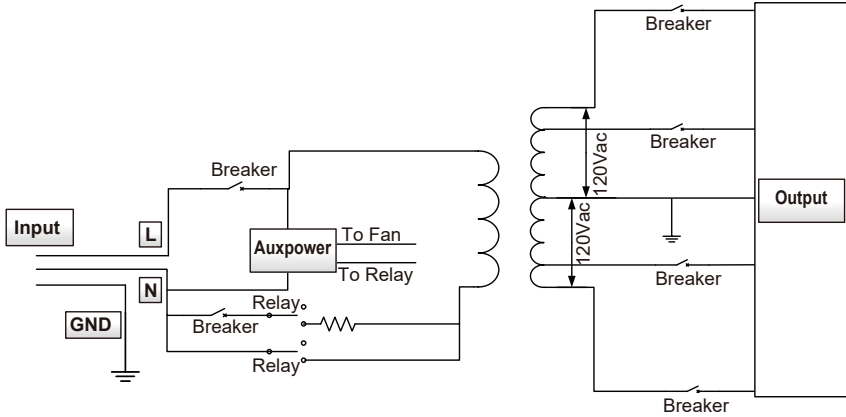
No.	Description
7	The Load 3 circuit breaker will trip when the load exceeds the power rating.
8	The Load 4 circuit breaker will trip when the load exceeds the power rating.
9	The TFM-RT's circuit breaker will trip when that the TFM-RT becomes overheated.
10	The output circuit breaker will trip when the output terminal block exceeds the power rating.
11	The output terminal block is for optional hardwiring the load. The available output voltage is 120V/ 208V.
12	The input terminal block (208V) is for connecting to the output terminal block of the UPS.

**NOTE:**

1. This Transformer cabinet not intend for mains connection. Connection to a Delta online type UPS is required.
2. TFM-RT-5/6K must be connected to the UPS through the optional Delta Maintenance Bypass Box (model MBB-RT-5K-S). If you want to purchase the Delta Maintenance Bypass Box (MBB), please contact your local dealer or customer service.

Chapter 4 : Installation

Please refer to the block diagram and related information below for correct installation.



4.1 Installation Placement

The TFM-RT is **ONLY** intended to be installed in an indoor temperature controlled environment that is free of conductive contaminants. DO NOT operate the unit in: extremely dusty and/ or unclean areas, locations near heating devices, water or excessive humidity, or where the unit is exposed to direct sunlight. Select a location, which will provide good air circulation for the unit at all times. Route power cords so they cannot be walked on or damaged. The TFM-RT is not intended for use in a computer room as defined in the Standard for the Protection of Electronic Computer/ Data Processing Equipment ANSI/ NFPA 75.

- Operating Temperature (Maximum): 0 ~ 40°C (32 ~ 104°F)
- Operating Elevation: 0 ~ 2000m (0 ~ 6562ft)
- Operating and Storage Relative Humidity: 95% (non-condensing)
- Storage Temperature: -15 ~ 50°C (5 ~ 122°F)
- Storage Elevation: 0 ~ 15000m (0 ~ 49213ft)

4.2 Installation

Be sure to read this user manual thoroughly before installing the TFM-RT. Place the unit in the final desired location and complete the rest of the installation procedures. Please refer to **4.3 Rack-mount Configuration** to install the unit into a rack. The TFM-RT are extremely heavy. Use the appropriate number of personnel when installing the TFM-RT.

**WARNING:**

Do not use the mounting brackets to lift the TFM-RT. The mounting brackets are only for securing the unit to the rack.

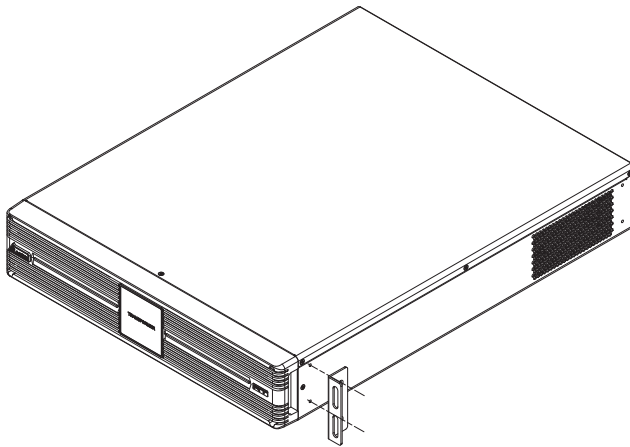
4.3 Rack-mount Configuration

Use the included rack-mount brackets and screws to mount the TFM-RT in a rack by following the steps below. The TFM-RT is extremely heavy. Use the appropriate number of personnel when installing the TFM-RT.

**WARNING:**

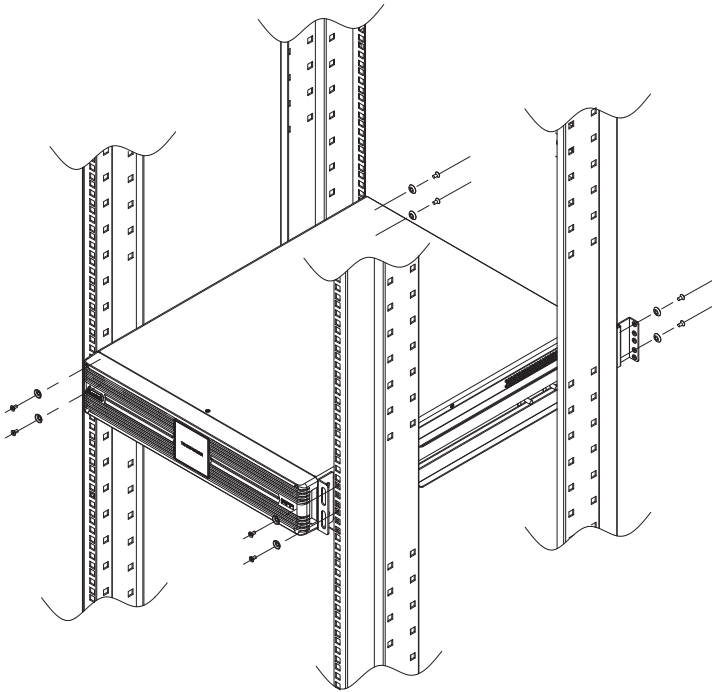
Do not use the mounting brackets to lift the TFM-RT. The mounting brackets are only for securing the unit to the rack.

1. Attach the rack-mount brackets to the mounting holes on the side panel of the TFM-RT as shown below.



2. Follow steps 1 through 4 to install the TFM-RT into the provided rail kit. See the figure below.

- 1 Adjust the length of the rail according to the rack.
- 2 Securely tighten the wing nuts.
- 3 Secure the rail to the rack with the enclosed screws.
- 4 Slide the TFM-RT onto the rail and secure to the rack with the enclosed screws.



4.4 Tower Configuration

The tower configuration allows the user to install the TFM-RT in the up-right position.



WARNING:

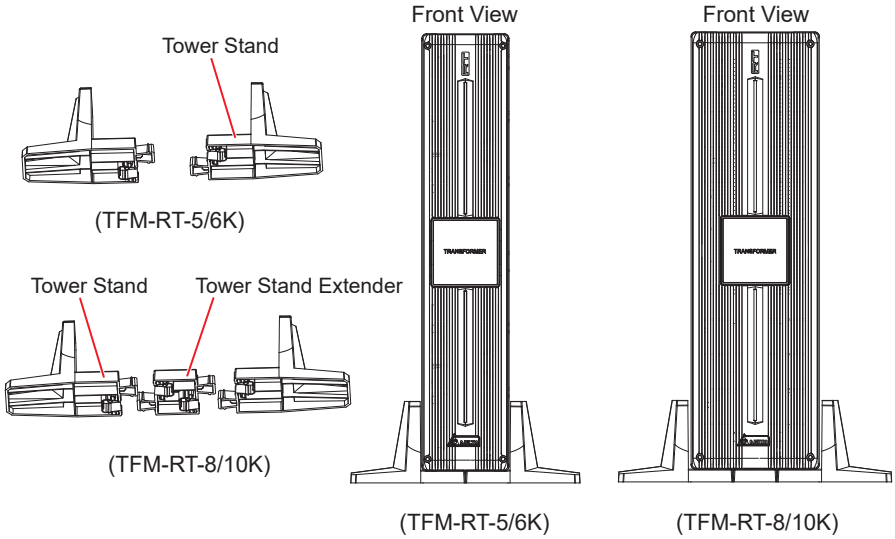
1. Use two or more people when installing the TFM-RT.
 2. The TFM-RT is extremely heavy. Use the appropriate number of personnel when installing the TFM-RT.
-
1. Connect the provided tower stand extenders with the tower stands provided in the UPS's carton (please take the UPS and the TFM-RT's size into consideration).
 2. Once the location of the TFM-RT has been determined, place the tower stands (not provided) in the desired location.



WARNING:

The TFM-RT must be installed in the proper up-right position. Once the TFM-RT is placed in the tower stands (not provided), the vent holes on the side panels must be facing upwards to provide proper ventilation.

3. Slide the TFM-RT into the tower stands (not provided). Make sure that the TFM-RT is stable.
4. The name plate panel can be rotated to read in the up-right position. Remove the front panel from the TFM-RT. On the backside of the front panel, push the name plate panel outwards and the panel will pop out. Rotate the name plate panel counter clockwise so that it reads in the upright position. Re-install the front panel on the TFM-RT.



4.5 Connection Warnings

1. When connecting the TFM-RT-8/10K to the UPS, it is highly recommended that you install the protective devices. Please refer to the below table and figure.

TFM-RT	Suggested Protective Device	Suggested Supplier
TFM-RT-8/10K	D curve-80A circuit breaker	DELIXI



2. The protective devices must use approved components that meet safety certifications.

4.6 Input/ Output Connections



WARNING:

Only Qualified Service Personnel can perform Installation and Servicing of the TFM-RT.

1. TFM-RT-8/10K Input/ Output cable selection:

Temperature Rating	TFM-RT-8/10K	Tightening Torque (For AC Wiring)
90°C	#6 AWG (Cu)	22 lb-in

In accordance with National Electrical Code (NEC), install a suitable conduit and bushing.



NOTE: Use copper wire only.

2. Before connecting to the input/ output terminals, read this user manual thoroughly.



NOTE: The TFM-RT's input voltage setting must be the same as the power supply's output voltage setting.

- TFM-RT-5/6K:

Plug the attached #10 AWG input power cord on the TFM-RT-5/6K into the power supply.

- TFM-RT-8/10K:

1. Remove the terminal block cover plate from the rear panel of the TFM-RT-8/10K (a Phillips screwdriver is required). Refer to the figure below for the input/ output connections. The copper terminals for the input and output cables are included.
 - a) Connect the black wire labeled L1 on the input power cable to the TFM-RT-8/10K AC input terminal block labeled L1 and secure.
 - b) Connect the white wire labeled L2 on the input power cable to the TFM-RT-8/10K AC input terminal block labeled L2 and secure.
 - c) Connect the green wire labeled G on the input power cable to the TFM-RT-8/10K AC input terminal block's ground terminal and secure.
2. Connect the other end of the #6 AWG input power cable to the output terminal block on the power supply and secure.
 - a) Connect the black wire labeled L on the input power cable to the power supply's output terminal block labeled L and secure.
 - b) Connect the white wire labeled N on the input power cable to the power

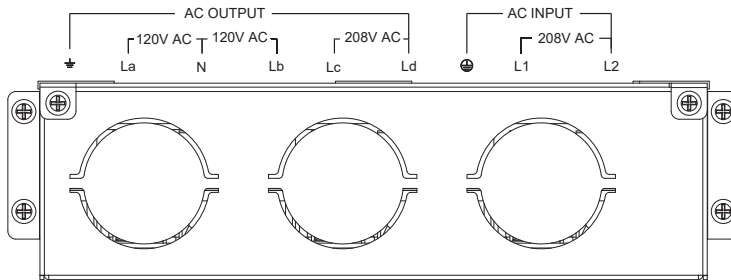
supply's output terminal block labeled N and secure.

- c) Connect the green wire labeled G on the input power cable to the power supply's output terminal block's ground terminal and secure.
3. Re-install the terminal block cover plate on the TFM-RT-8/10K.
4. Plug the equipment into the output receptacles on the rear panel of the TFM-RT-8/10K. The TFM-RT-8/10K has a terminal block for hardwiring the output. Refer to the figure below for the input/ output connections. The pins for the output cable are included.



NOTE: The two 120V outputs are individual 5kVA outputs and they cannot be paralleled.

- Input/ Output terminal block for the TFM-RT-8/10K:



- 1) 120V outputs
La-N: 50A max
Lb-N: 50A max
- 2) 208V output
Ld: 48.1A max
- 3) 240V output
Lb: 41.7A max



NOTE: Each cable entry knock out most connects three cables(including grounding cable).

Chapter 5 : Operation

5.1 Start up the Step Down Transformer (TFM-RT)

The input of the TFM-RT must be connected to the output of the power supply. The equipment must be plugged into the output receptacles on the TFM-RT.

1. Turn on all of the Load breakers on the rear panel of the TFM-RT.
2. Turn on the connected equipment one at a time.

5.2 Turn off the Step Down Transformer (TFM-RT)

1. Turn off all of the connected equipment.
2. Turn off all of the Load breakers on the rear panel of the TFM-RT.

Chapter 6 : Obtaining Service

- If the step down transformer (TFM-RT) requires service,
 1. Verify there are no tripped circuit breakers. A tripped circuit breaker is the most common issue.
 2. Contact Delta service personnel.

Appendix 1 : Specifications

Model		TFM-RT-5/6K	TFM-RT-8/10K
Topology		Isolation, Step Down Transformer, Sine Wave	
Input	Voltage	208 Vac	
	Frequency	60 Hz	
	Current (Max)	24 Amps	49.2 Amps
	Protection	Resettable Circuit Breaker	
	Connection	Attached #10 AWG power cord	Terminal Block Hardwire only
Output	Voltage	120 Vac or 208 & 120 Vac	208 & 120 Vac
	Voltage Regulation	< 3%	
	Frequency	60 Hz	
	Power (Max)	5kVA/5K Watts	10kVA/10K Watts
	Harmonic Distortion	≤ 3% (full linear load)	
	Efficiency	≥ 95% (full linear load)	≥ 95% (full linear load)
	Waveform Type	True Sine Wave	
	Protection	Resettable Circuit Breaker	
Environmental	Operating Temperature	0 ~ 40°C (32 ~ 104°F)	

Model		TFM-RT-5/6K	TFM-RT-8/10K
Environmental	Operating/Storage Humidity	0 ~ 95% (non-condensing)	
	Operating Elevation	0 ~ 3000 m (0 ~ 10000 ft); 0 ~ 1000 m (0 ~ 3300 ft) (without derating)	
	Audible Noise	55 dBA	60 dBA
Physical	Dimensions (W × D × H)	17.3 × 22.2 × 3.5 inch 440.2 × 565 × 88.2 mm	17.3 × 28.6 × 5.12 inch 440.2 × 726 × 130 mm
	Weight	85.98 lbs/ 39 Kg	125.66 lbs/ 57 Kg
Regulatory Compliance	Safety and Approvals	UL/ CUL	
	EMC Verification	FCC certified	



NOTE :

1. Refer to the rating label for the safety rating.
2. All specifications are subject to change without prior notice.

Appendix 2 : Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship within the warranty period. If the product has any failure problem within the warranty period, Seller will repair or replace the product at its sole discretion according to the failure situation.

This warranty does not apply to normal wear or to damage resulting from improper installation, operation, usage, maintenance or irresistible force (i.e. war, fire, natural disaster, etc.), and this warranty also expressly excludes all incidental and consequential damages.

Maintenance service for a fee is provided for any damage out of the warranty period. If any maintenance is required, please directly contact the supplier or Seller.



WARNING:

The individual user should take care to determine prior to use whether the environment and the load characteristic are suitable, adequate or safe for the installation and the usage of this product. The User Manual must be carefully followed. Seller makes no representation or warranty as to the suitability or fitness of this product for any specific application.

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