



Model 808
UNIVERSAL
VOLTAGE REGULATOR
Manufactured in the USA by
FLIGHT SYSTEMS
www.flightsystems.com

INSTALLATION and ADJUSTMENT INSTRUCTIONS

Description

The Model 808 Universal Regulator is designed for OEM applications as well as an economical replacement for many hard to get or obsolete regulators found on older generator sets. Installation is easy on all 240/120 volt single phase systems and 208/120, 240/120, 318/220 three phase wye and 240 volt three-phase delta systems, 50 or 60 Hz, by connecting four wires. The 808 regulator works with brushless exciters or conventional fields. Field excitation of up to 7A continuous is provided by means of a full-wave phase-controlled SCR bridge. Adjustments are provided for Voltage, Stability and Under-frequency. Remote voltage adjustment is possible. The generator output voltage is automatically reduced during under-speed operation. Power and under-frequency LED indicators are included. A soft start feature helps prevent a sudden load on the engine at startup. The Model 808 is self-starting on a residual voltage as low as 5 volts and does not normally require field flash.

Specifications

Input Power and Sensing: 200 – 280VAC (TB1-1, TB1-2)
Output Voltage: 170VDC max. @ 240VAC input (TB1-3, TB1-4)
Output current: 7A continuous, 12A for start-up and surges
Voltage Regulation: +/- 1% (with 4% engine governing)
Start-up Residual Voltage: 5VAC, min.
External Voltage Adjustment: +/- 6% with 1K Ohm, 2W potentiometer
Unit Power Dissipation: 8 Watts max.
Under-frequency Knee Factory setting: 58 Hz (see Fig. 2, Pg. 4)
Soft Start Time: 2 seconds (See Fig. 3, Pg. 4)
Adjustments: VOLT (200-280VAC), STAB, U/F
Indicators: POWER (green LED), U/F (red LED)
Connections: Screw-terminal barrier strip (See Fig. 4, Pg. 5)
Protection: Internal 8A fuse with cover, EMI filtering and voltage spike suppression
Case: Black ABS plastic, encapsulated with automotive grade urethane
Size: 3.5" [89] W x 5.75" [146] L x 2.30" [58] H (See Fig 4, Pg. 5).

Application

The Model 808 may be used with almost any generator with a power/sensing voltage that is between 200 and 280 volts, 50 or 60 Hz, and a field current requirement of up to 7 Amps (internally fused at 8A). The field or exciter field resistance must be between 8 ohms and 250 ohms and be isolated from all other circuits. The maximum allowable field voltage depends on the field resistance. See Fig. 1 (Pg. 4). The regulator is powered and the AC voltage is sensed between terminals 1 and 2. The maximum available field voltage at terminals 3 and 4 depends on the voltage at terminals 1 and 2 and is 170 VDC for 240 VAC input. The VOLT adjustment pot is used to precisely set the desired output voltage. Remote voltage adjustment is possible.

Installation

1. If applicable, remove the old regulator and carefully mark the wires. Verify that the field circuit is isolated from all other circuits and that the field resistance is between 8 and 250 ohms. If the field resistance is less than 8 ohms, add an appropriately rated series resistor.
2. Mount (fix) the unit to a flat surface in a suitable location using the four #8 (0.177 [4.5mm]) clear holes provided. These holes may be enlarged to #10 (0.205 [5.2mm]) if necessary. Make sure the location chosen provides adequate ventilation for cooling and access to the adjustments. See Fig. 4 (Pg. 5).
3. Refer to the wiring diagrams below and determine which one is appropriate for your generator. Insulated ring or spade type terminals of appropriate size on wires are required to insure safe and secure connections.
4. Observing polarity, connect the positive field terminal of the generator to F+ (3) and the negative field terminal to F- (4). NOTE: Connecting the field backwards may require re-flashing of the field due to reversal/loss of residual magnetism.
5. Connect terminals 1 and 2 on TB1 (marked AC) to the proper points as shown in the wiring diagrams below. NOTE: Complete re-connection diagrams for all 6, 10 and 12 lead generators are available in pdf format on our website www.flightsystems.com under ***Troubleshooting***.
6. Refer to the illustration for TB2 connections and install or remove the jumper (supplied) as is appropriate for your generator. Note: The jumper must be installed for 60 Hz systems but should be removed for 50 Hz operation.
7. If desired, an external remote voltage adjustment potentiometer (1K) may be added by connecting it in place of the link that is now connected on TB1 between the EXT VOLT terminals (5 and 6). See Fig. 4 (Pg. 5) and adjustment instructions below.

CAUTION: Even though the heat sink is electrically isolated, use caution. Do not come in contact with any part of the regulator, as dangerous voltages are present when the generator is running and some parts are hot and may cause burns.

Adjustment

Verify the wiring before proceeding with adjustment. Make sure that the frequency jumper on TB2 is in the correct position for your system frequency. Turn the STAB pot full CCW. Start the generator and bring it up to rated operating speed (use the Hz function on your DVM). Make sure that the U/F LED indicator is not on. If it is, turn the U/F pot CCW until the LED just goes off. Adjust the VOLTS pot until the desired output voltage is obtained. The object of the STABILITY adjustment is to obtain the best dynamic response to changes to load without instability. Under no-load conditions, turn the STAB pot slowly CW until the output voltage starts to fluctuate, then CCW until it becomes stable. Repeat if necessary. To adjust the U/F (ramp) more precisely, reduce the speed of the generator to 58 Hz (48 Hz for 50Hz systems) and hold it there during adjustment. Turn the U/F pot CW until the U/F LED indicator just starts to come on and then back it off so that the LED just goes off. At rated speed, this LED should not be on.

Optional Remote Voltage Adjustment

The output voltage of the generator can be remotely adjusted by adding a 1K potentiometer in place of the jumper connected between the EXT VOLT terminals (5 and 6) on TB1. Before connecting the remote potentiometer, follow all of the steps above for installation and adjustment. The potentiometer should be wired

so that its resistance decreases with clockwise rotation. See Fig. 4 (Pg. 5). Perform output voltage adjustment as follows:

1. Set the remote potentiometer at its mid point.
2. Start the generator and set the VOLTS pot on the regulator for the desired output voltage (230, 240, etc.). The remote potentiometer will now have an adjustment range of approximately +/- 6%.

Field Flash

In order for the regulator to start up automatically and build voltage, the residual voltage of the generator should be 5 VAC or higher. If a generator has not been used for a long period of time, has been apart or has had its field inadvertently reversed, it may have lost some or all of its residual magnetism. In this case, it may require field flashing. To flash the field, the generator must be stopped and the field leads disconnected. Momentarily connect the field leads to a 12 volt battery for 3-5 seconds, observing polarity (positive to F+, negative to F-). Repeat a few times. CAUTION: Do not come in contact with the field circuit because a high-voltage “kickback” will occur each time the circuit is interrupted.

Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Generator voltage does not build up	Residual voltage below 5 VAC	Flash generator field
	Incorrect wiring	Re-check wiring
	AC wire(s) at TB1 1&2 not connected	Re-check AC wires at TB1 1&2
	Field wire(s) not connected	Re-check field wires
	Open field or exciter circuit	Check field continuity
	Field polarity reversed	Re-check field polarity
	Generator speed too low	Run generator at correct speed
Generator output voltage low	VOLT pot adjusted too low	Re-adjust VOLT pot
	U/F pot improperly adjusted	Re-adjust U/F pot
	External voltage adjust jumper missing on TB1	Install external voltage adjust jumper on TB1
Generator output voltage high	VOLT pot adjusted too high	Re-adjust VOLT pot
	Defective regulator	Replace regulator
U/F LED is on at rated speed	U/F pot improperly adjusted	Re-adjust U/F pot
	Running at 50 Hz with 60 Hz selected	Remove 50/60 Hz jumper on TB2
U/F LED never comes on with U/F adjustment	Running at 60 Hz with 50 Hz selected	Install 50/60 Hz jumper on TB2
Generator output voltage unstable	STAB pot set too far CW.	Re-adjust STAB pot slightly CCW.
Fuse Blows	Incorrect wiring	Re-check wiring
	Field resistance too low	Re-check field resistance
	Required field current above 7 amps.	Select a higher capacity regulator

Warranty

The Model 808 Universal Regulator is warranted against defects in materials and workmanship for a period of two years from the date of shipment. This warranty does not cover damage caused by operation outside of ratings, misapplication or abuse. Flight Systems is not responsible for consequential damage to property or other equipment, loss of use, spoilage of product, labor or travel costs, or injury to personnel as a result of its use. Warranty service is limited to repair or replacement of product that we determine is defective, otherwise our standard repair rates will apply.

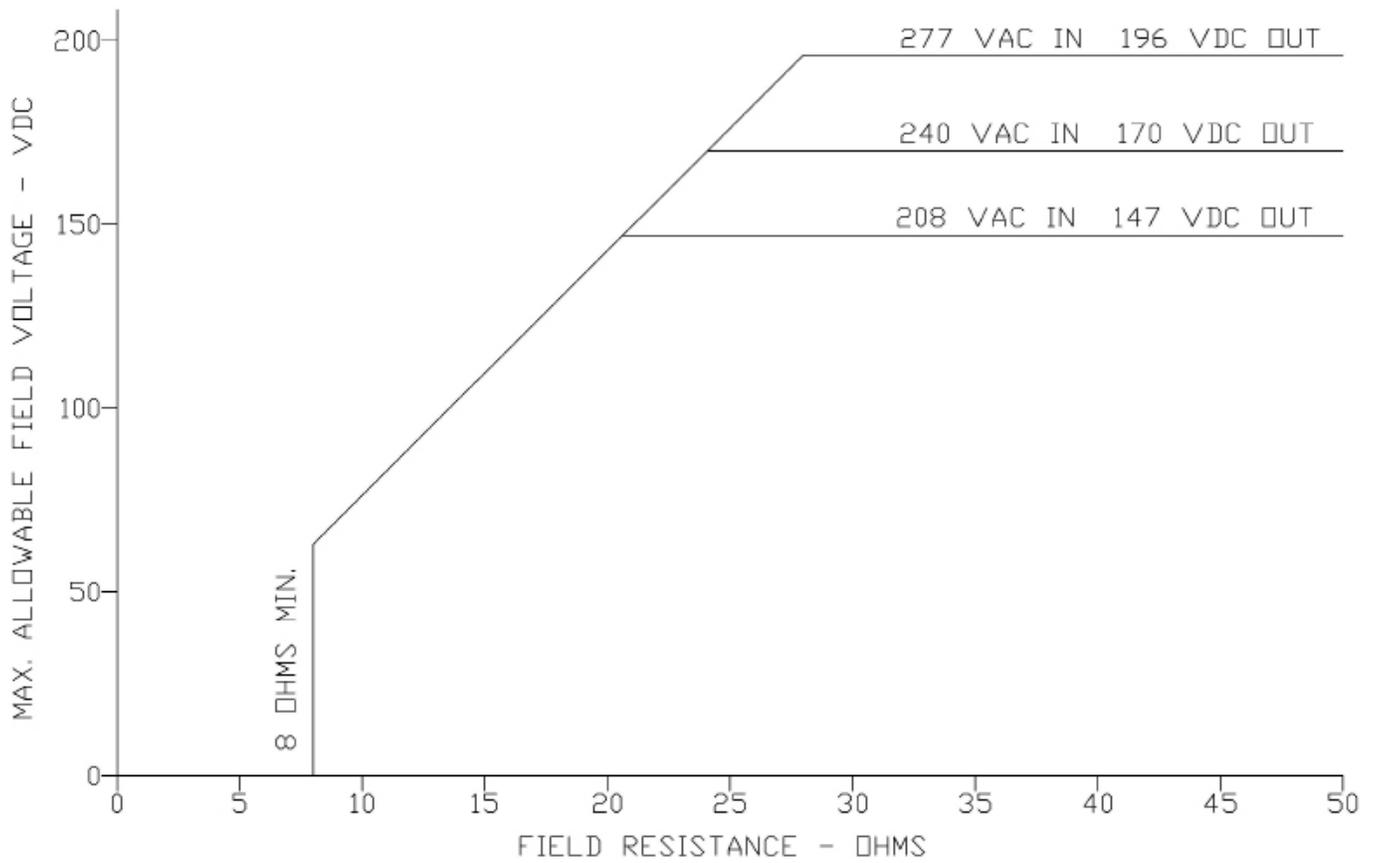


FIG. 1 MAX. ALLOWABLE FIELD VOLTAGE VS. FIELD RESISTANCE

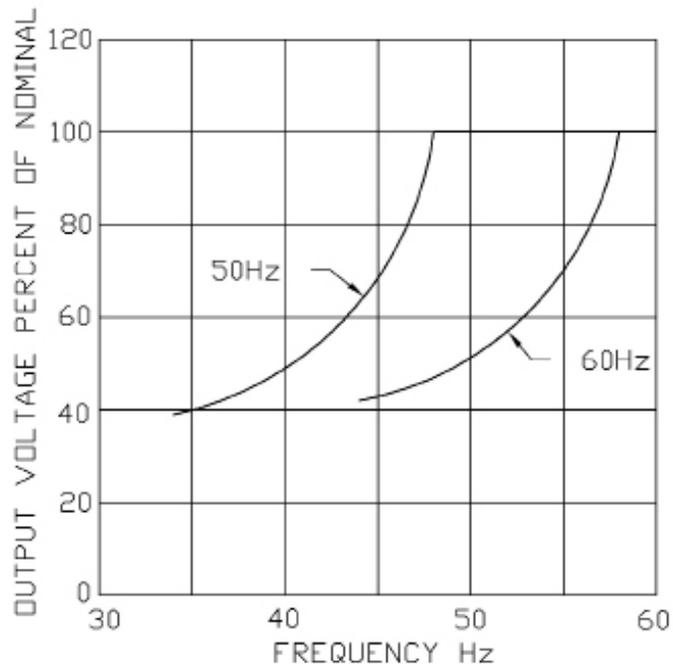


FIG. 2 OUTPUT VOLTAGE % OF NOMINAL VS. FREQUENCY

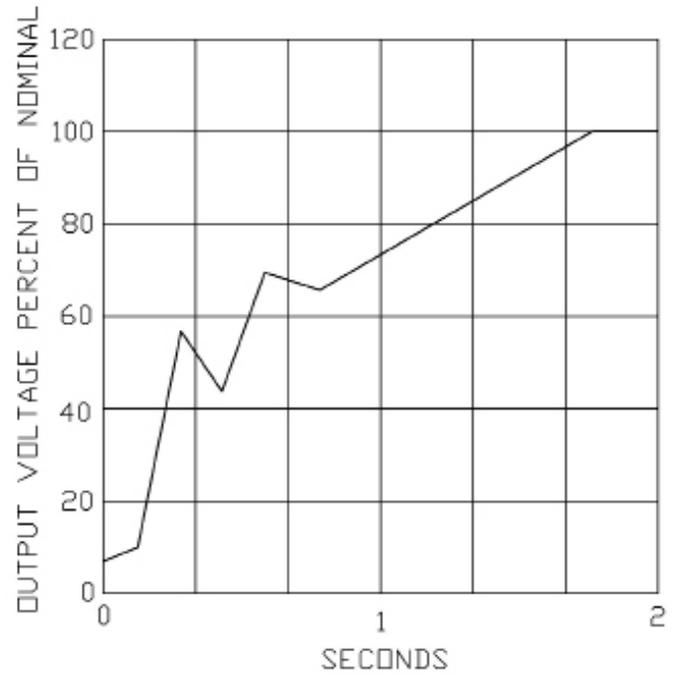
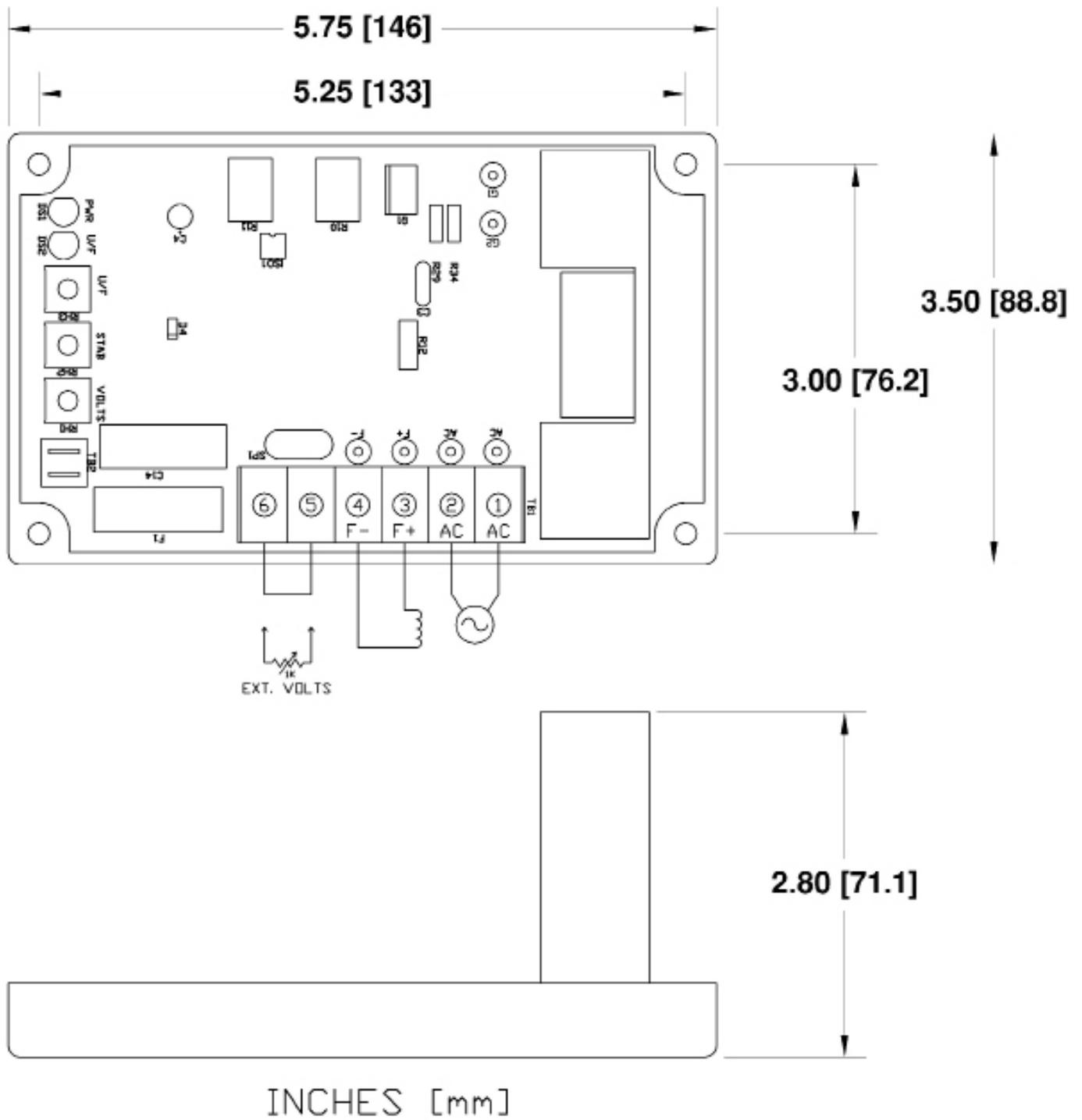
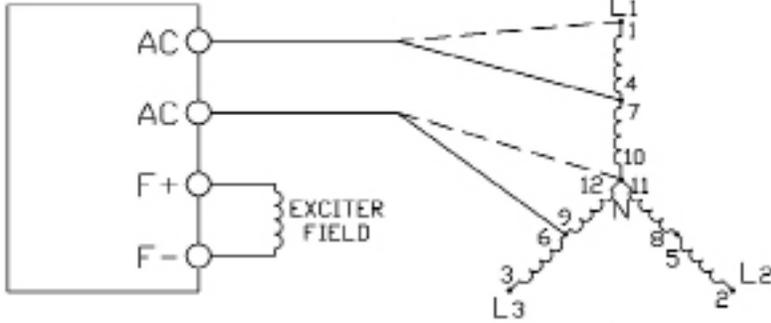


FIG. 3 SOFT START CURVE

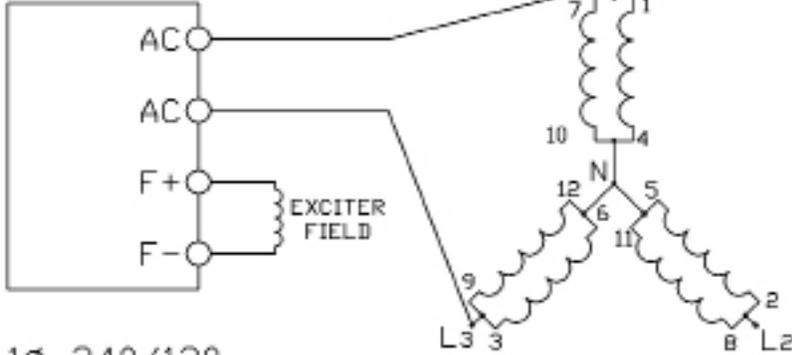


WIRING DIAGRAMS FOR THE MODEL 808

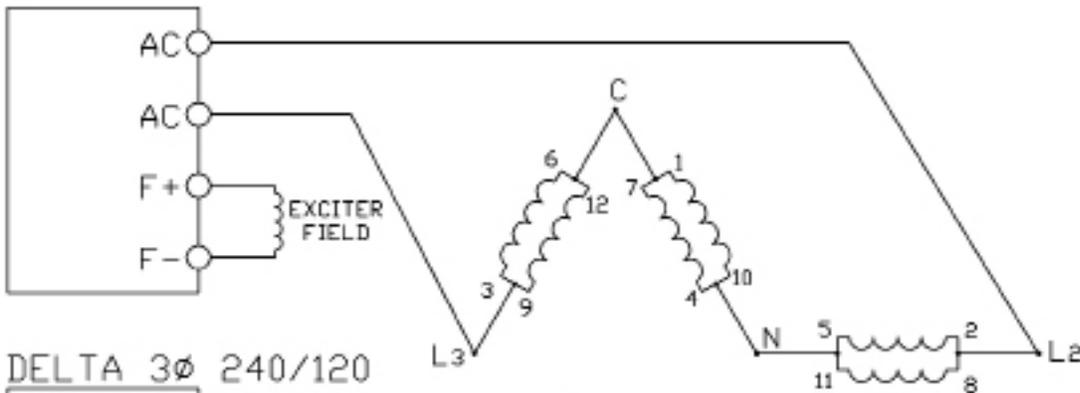
3 ϕ 480/277



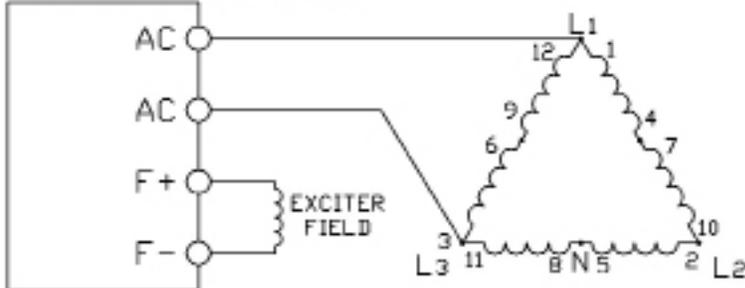
3 ϕ 208/120



1 ϕ 240/120



DELTA 3 ϕ 240/120



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