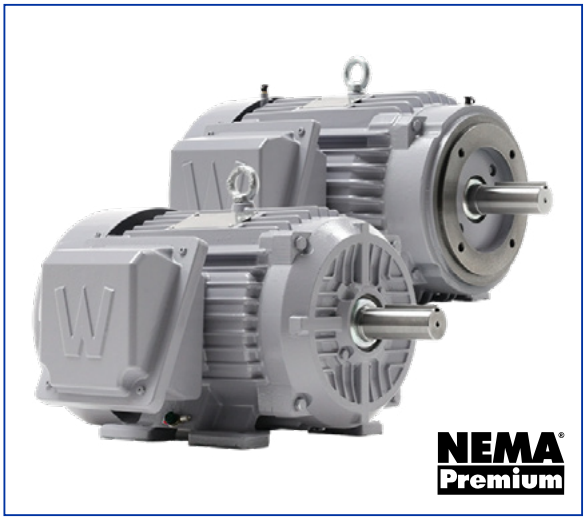
(800) 808-2131
worldwideelectric.com

Severe Duty Motors

This Manual Covers for the following WorldWide Electric Motors



SD

Installation, Operation, and Maintenance

Product Manual

Document No: IOM-Severe Duty-Motors-Manual-09-2026

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This manual includes procedures for the safe and proper transportation, storage, installation, connection, operation and maintenance of WorldWide Electric motors. For your protection, please read these instructions carefully before attempting to install, operate or service the motor. Please retain this manual in your files for future reference.

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Recieving Instructions

- Inspect the shipping container for damage before accepting the motor from the carrier. Immediately report in writing any observed damage to the carrier.
- Check the motor nameplate data (HP, RPM, voltage, frame size, space heater, enclosure, etc.) before start-up.
- If a shaft locking device/transit clamps for frames (284T-586/7) are installed on the motor for transport, remove these and retain for future use. Reinstall again when transporting motor.
- Turn shaft by hand to be certain it rotates freely and listen for any sounds of mechanical resistance like the fan rubbing on the fan cover. Check for debris or loose parts in the fan cover.

Warning

Safety precautions must be observed before installing, using, servicing and handling any WorldWide Electric motor.During the installation and operation of our motor in an industrial application, there is a danger of live electric parts and wires as well as hot surfaces and rotating parts. Therefore, please carefully read, fully understand, and heed all instructions, warnings, cautions and safety notices. Failure to do so could lead to personal injury, death and /or property damage.

Please review the following safety precautions:

- High voltage, rotating machinery and hot surfaces can cause serious or fatal injury if the motor is improperly installed. Only properly trained, qualified personnel should perform installation, operation and maintenance on equipment. Responsible personnel should be familiar with NEMA MG-2, National Electrical Code, CSA C22-100 (C.E.C), IEC 364 (prEN5011-1) and all state and local utility regulations and safety standards.
- When preparing to service the motor, all power sources to the motor and accessory devices must be de-energized and disconnected and made inoperative. Allow all rotating parts to come to a stop before servicing. Keep extremities, hair, clothing, foreign objects, etc. away from machinery. Replace Junction Box cover after connection.
- Before the motor is re-energized, make sure that all safety guards are in place and that the shaft key is removed before running the motor without a connected load.
- When working near machinery with high noise levels, proper protection must be used to reduce harmful effect to hearing.
- Automatic reset/thermostat protection should not be used where an unexpected automatic restart would be hazardous to personnel. Serious personal injury or death could occur.
- The frame of the machine must be grounded properly to protect against fatal injury to personnel. Lugs included in J-Box.
- To protect against fatal injury to personnel, refer to NEC, CSA and local utility regulations and any applicable local codes.
- Provide proper safety guards for personnel against possible failure of motor-mounted brake, particularly on applications involving overhauling loads.
- The repair of Explosion Proof and VHS motors must be made by a UL certified/authorized EASA service center that is certified by UL, CSA or other appropriate agency. Failure to comply will violate hazardous

Warning (Continued...)

duty certification in accordance with NFPA70 NEC article 500 hazardous location of electric motors.

- To find a UL shop visit the EASA website at www.easa.com

Storage

- For motors that will not be placed in service within six months up to 24 months of shipment date.
- Locate the motor indoors in a dry area (even temperature above -20°C), without sunlight, well-vented, and free of dust or corrosive gas. Store motor off the floor on rubber mats, if possible. The motor should not be stored near heat or cold source (i.e. boiler/freezer). Motor should be stored in upright position.
- Measure and record the resistance of the winding insulation every 30 days of storage.
- The storage area should have less than 60% humidity and be free of shock or vibration. Vibration not to exceed 2 mils max.
- Treat unpainted flanges, shafts and fittings with a rust inhibitor. If motor is supplied with space heaters, apply appropriate power to the space heater (½ voltage).
- The shaft should be rotated 15 revolutions stopping at a different position every month to maintain proper distribution of grease in the bearing cavity.

Removal From Storage

- Remove all packing material.
- Measure and record the winding insulation resistance at the time of removal from storage. The insulation resistance must not be less than 50% from the initial reading recorded when the motor was placed into storage. A decrease in resistance indicates moisture in the windings and necessitates electrical or mechanical drying before the motor can be placed into service.
- If stored longer that 24 months:
  - Shaft has been rotated every month - completely remove old grease and add new grease.
  - Shaft has not been rotated every month - replace bearings

Handling

- Use correct material handling equipment to avoid injury. Use caution when removing the motor from its packaging. Sharp corners may exist on motor shaft, motor key, sheet metal and other surfaces.
- Before lifting the motor ensure all eyebolts are properly tightened and the shoulders are in contact with the base.
- Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc.

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Location

- ODP motors are intended for use indoors where atmosphere is relatively clean, dry, corrosive free & well-vented.
- Totally enclosed motors may be installed where dirt, moisture, chemicals and/or dust are present in an outdoor location.
- Explosion proof motors are intended for use in hazardous areas, NEC, article 500 classified by Underwriters Laboratories, National Electrical Code, Canadian Standards Association, and IEC79 (EN50014 & EN50018).
- Mill and chemical duty TEFC motors are designed for installation in high corrosion or excessive moisture, salty atmosphere and extremely hostile content in the environment.
- Standard TEFC motors are suitable for use in ambient temperatures between -20°C to -40°C with low temperature grease to + 40°C and at elevations at or below 1000 meters (3300 ft ASL). For temperatures higher or lower, please contact WorldWide Electric.

Mounting

- Make certain that the underside of the motor feet and/or the flange is clean and free of dirt. It is imperative that the motor be level. Remove any masking materials or any rust inhibitive coating from the mounting surface and shaft.
- All ball bearing motors, frame up to and including NEMA 326T, can be mounted in all positions shown in NEMA MG1-4.03, provided that the surface is stable and solid and the drain holes are located properly. Roller bearings are standard on crusher duty 404T-586/7 frames.
- When using a direct coupling, align motor shaft to driven shaft as accurately as possible. Although a flexible coupling is designed to transmit power with some angular and parallel misalignment, this will have an effect on the life of the bearings.
- The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and the shaft load. Failure to do so will cause vibration, misalignment and/or bearing damage. The mounting bolts must be carefully tightened to prevent changes in alignment and possible damage to the motor or equipment. These values are for medium carbon steel bolts (identified by 3 radial lines 120° on the bolt head-ANSI grade 5). For low carbon steel bolts (ANSI grade 2), use 50% of this torque (see TABLE #1).
- Remove drain plugs from the end shield or frame on totally enclosed motors. It is critical that the motor be mounted with these at the lowest point of the frame. If the motor is to be mounted with the feet in any position except down, these must be relocated to the appropriate position. Contact WorldWide Electric for advice.
- The use of pulleys, sheaves, sprockets or gears on motor shafts is defined in NEMA MG1-14.07. The application of v-belt sheave dimension on AC motors is shown in MG1-14.41.
- The pitch diameter must not be less than indicated in TABLE #2 and the maximum sheave width must not exceed:
  - A. (N-W) for narrow type (3V, 5V 8V) sheaves
  - B. 2X (N-W)- ¼" for conventional type (A, B, C, D, E) sheaves

Mounting

  - C. N-W is the usable shaft length (IEC designation is dim. E)

- For sheaves ratios greater than 5:1 and center distances less than the diameter of the large sheaves, refer the application to the WorldWide Electric office.
- Mount the pulley or half coupling to the motor shaft using non-impact method. Do not hammer on the motor shaft as this will cause brinelling of the bearing, leading to premature failure of the motor.
- The motor is balanced using a half key; therefore the motor pulley or half coupling should also be balanced with a half key. After mounting the coupling or the belt and pulleys, a guard must be placed over all of the moving parts to protect against accidental contact or injury.

- Do not over tighten the belts as this will lead to an excessive overhung load on the motor bearings, causing a significant reduction in bearing life and premature failure.
- Make certain that there is adequate space around the motor for ventilation. If using a belt pulley, the ventilation opening at the rim of the pulley is essential for the motor's cooling. All ventilation openings must not be obstructed, and any wall or divider should be mounted a minimum of 30 inches (762mm) away from the motor.

Table #1 - Tightening Torque For The Securing Bolts

Bolt Size		Recommended Torque	
Inches	Metric	FT.LB	N-M
1/4	M6	7-11	9-15
5/16	M8	14-21	19-28
3/8	M10	25-37	34-50
1/2	M12	60-90	81-122
5/8	M16	120-180	163-244
3/4	M20	210-320	285-433

Power Supply

The wiring of the motor and controls as well as the grounding and overload protection should be performed in accordance with National Electrical Code, CSA C22-100 (C.E.C.) and all local and utility regulations and safety standards. Installation should be done only by properly qualified personnel.

Nameplate voltage and frequency should agree with the power supply. Motor will operate satisfactorily with supply voltage within 10% of the nameplate value or frequency within 5% combined variation not to exceed 10%. 230 volt motors can be used on 208 volt network systems, but with slightly modified performance characteristics as shown on the nameplate.

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Electrical Connection

Connect the motor as shown on the connection diagram on the motor nameplate. Be sure to identify the proper wiring diagram for the supply voltage of motor you are installing. If you have difficulty determining the proper wiring diagram for your motor, please contact WorldWide Electric for assistance. If this motor is installed as part of a motor control drive system, connect and protect the motor according to the control manufacturer's diagram. The wiring, fusing and grounding must comply with the National Electrical Code or IEC and local codes.

NOTE: WIRE NUTS ARE NOT AN APPROVED TERMINATION METHOD

Startup

- Disconnect the load when starting the motor, making sure the key is removed from the shaft. Check direction of rotation. If rotation must be changed allow the motor to stop completely. Interchange any two incoming power leads of a three-phase motor to change the direction of the rotation. See wiring diagram.
- Note: If improper rotation direction is detrimental to the load, check the rotation or 'bump' the motor prior to coupling the load to the motor shaft. When the motor is coupled to the load and started, it should start quickly and run smoothly. If not, stop the motor immediately and determine the cause. Possible causes are: low voltage at the motor, motor connections are not correct or the load is too heavy. Check the motor current after a few minutes of operation and compare the measured current with the nameplate rating.
- The motor's service factor is a multiplier applied to its rated horsepower to determine permissible loading under the specified operating conditions.
- Example: A 10 HP motor with a 1.15 service factor permits a load of 11.5 HP (10 HP × 1.15).
- Do not calculate allowable operating current by multiplying nameplate full-load amperes by the service factor. Use the service-factor current specified on the motor nameplate or consult WorldWide Electric. Continuous operation above rated horsepower may reduce motor life.
- When using AC motors with frequency inverters, be certain that the motor's maximum speed rating is not exceeded.
- Pay special attention to the temperature reading on the motor, the outside temperature or skin temperature of the motor, as well as monitoring, and measure the inside temperature of the motor. Note: the bearing temperature should not exceed 60°C. Surface temperature may exceed 90°C (194°F)"
  WARNING: Do not touch the exterior of an operating motor. The motor may be hot enough to be painful or cause injury.

Testing

- If the motor has been in storage for a long period of time or has been subjected to adverse moisture or extremely dusty/dirty conditions, it is best to check the insulation resistance of the stator windings with a megohmmeter. Depending on the length and conditions of storage it may be necessary to regrease or change out oxide bearings. If resistance is lower than 1 megohm, the windings should be dried in one of the following manners:
  - Bake in oven at temperature below 194°F until the insulation resistance becomes constant for a minimum of 30 minutes. Constantly monitor the conditions.
  - With the rotor locked, apply low voltage (approximately 10% nameplate voltage) and gradually increase current through windings until temperature measured with thermometer reaches 87°C (188°F). Do not exceed this temperature. Maintain this temperature until the insulation resistance remains constant 30 minutes.

Maintenance

- When the motor is in operation, examine the motor at regular intervals (about 500 hours). Make sure the ventilation openings are clear and unobstructed.
- Check the condition of shaft seals and replace if necessary.
- Check the condition of connections and mounting and assembly bolts.
- Check the bearing condition by listening for any unusual noise, vibration measurement, bearing temperature, inspection of spent grease or SPM bearing monitoring.

Lubrication (Open Bearings)

The motor should be running when greased and drain plug removed. Safety notice: Over-greasing bearings greatly increases bearing friction and can cause premature bearing and/or motor failure. See (TABLE #3) for lubrication intervals and (TABLE #4) for lubrication schedule in hours. The L10 life of the bearings subjected to routine maintenance is as follows: (a) belt drive applications 50,000 hours (b) direct coupled applications 100,000 hours. Do not mix greases unless compatibility has been checked and verified.

Vibration Levels

Note: acceptable vibration levels at no load condition.

- NEMA MG1-7
- 2-6 Pole: 0.15 in/s peak
- 8 Pole: 0.12 in/s peak

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Table #2 - Lubrication Levels

Type of Service	Typical Examples	HP Range	Relubrication Interval	
			Horizontal	Vertical
Easy	Valves, door openers, portable floor sanders, motors operating infrequently (one hour per day)	1 - 7.5	10 Years	9 Years
		10 - 40	7 Years	3 Years
		50 - 150	4 Years	1.5 Years
		200 - 350	3 Years	9 Months
		400 - 500	1 Year	--
Standard	Machine tools, air conditioning apparatus, conveyors, one or two shifts, garage compressors, refrigeration machinery, laundry machinery, oil well pumps, water pumps, wood working machinery	1 - 7.5	7 Years	3 Years
		10 - 40	4 Years	1 Year
		50 - 150	1.5 Years	6 Months
		200 - 350	1 Years	3 Months
		400 - 500	6 Months	--
Severe	Motors for fans, M-G sets (that run 24 hours per day, 365 days per year), coal and mining machinery, motors subject to severe vibration, steel mill machinery	1 - 7.5	4 Years	1.5 Years
		10 - 40	1.5 Years	6 Months
		50 - 150	9 Months	3 Months
		200 - 350	6 Months	1.5 Months
		400 - 500	3 Months	--
Very Severe	Dirty, vibrating applications where end of shaft is hot (pumps and fans), high ambient temperatures	1 - 7.5	9 Months	6 Months
		10 - 40	4 Months	3 Months
		50 - 150	4 Months	2 Months
		200 - 350	3 Months	1 Month
		400 - 500	2 Months	--

Table #3 - Lubrication Schedule (In Hours)*

HP	3600 RPM				1800 RPM				1200 RPM			
	DE Bearing	Grease Amount (g)*	ODE Bearing	Grease Amount (g)*	DE Bearing	Grease Amount (g)*	ODE Bearing	Grease Amount (g)*	DE Bearing	Grease Amount (g)*	ODE Bearing	Grease Amount (g)*
10	--	--	--	--		--	--	--	2160	30	2160	30
15	1440	30	1440	30	2160	30	2160	30	2160	30	2160	30
20	1440	30	1440	30	2160	30	2160	30	2160	30	2160	30
25	1440	30	1440	30	2160	30	2160	30	2160	45	2160	30
30	1440	30	1440	30	2160	30	2160	30	2160	45	2160	30
40	1440	30	1440	30	2160	45	2160	30	2160	45	2160	45
50	1440	30	1440	30	2160	45	2160	30	2160	45	2160	45
60	1440	45	1440	45	2160	45	2160	45	1440	45	1440	45
75	1440	45	1440	45	2160	45	2160	45	2160	45	2160	45
100	1440	45	1440	45	2160	45	2160	45	2160	45	2160	45
125	1440	45	1440	45	2160	45	2160	45	2160	45	2160	45
150	1440	45	1440	45	2160	45	2160	45	2160	45	2160	45
200	1440	45	1440	45	2160	45	2160	45	--	--	--	--

* Only Exxon POLYREX EM Polyurea Grease should be used For 1200 RPM & 900 RPM motor lubrication schedule contact WorldWide Electric at 1-800-808-2131 Ext. 3

Replaceable Parts

- In maintaining your WorldWide Electric motor, use genuine factory replacement parts as recommend by WorldWide Electric Corp. Failure to do so might cause damage or failure to the motor.
- When ordering renewal parts please specify complete nameplate information such as: Model, HP, type, frame, voltage, serial number, RPM and enclosure. Call us at 1-800-808-2131 between the hours of 8:00 AM - 6:00 PM Eastern Time to order.

Warranty Policy

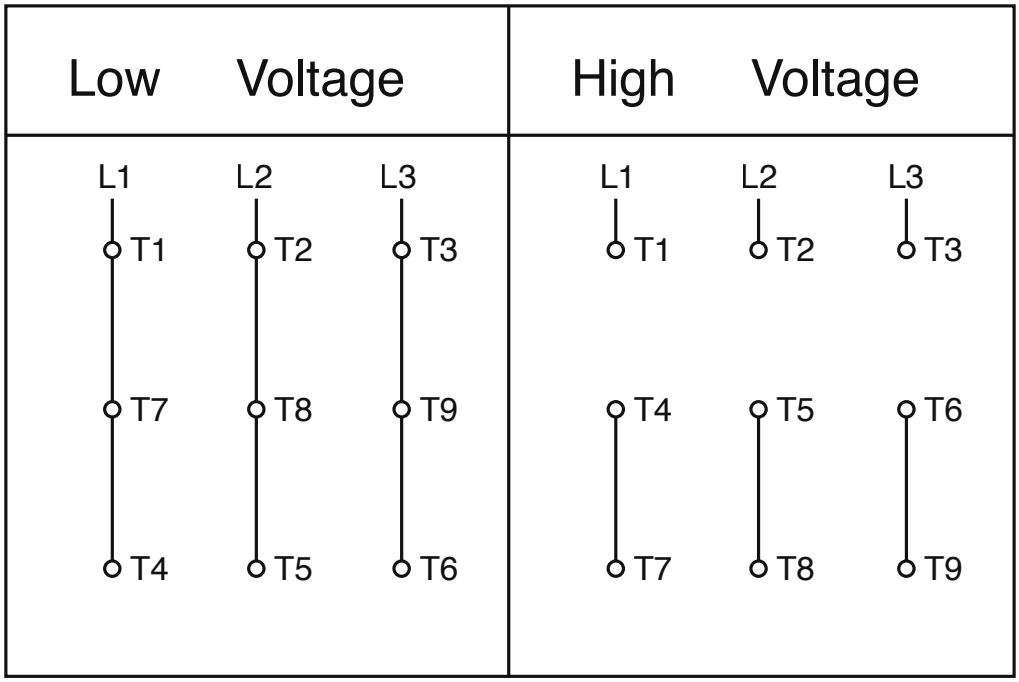
- All WorldWide Electric motors are warranted against defect in workmanship and materials and carry full warranties.
- WorldWide Electric shall, at its sole option and expense, repair or replace, F.O.B. Warehouse, any such motor or part which is defective within the warranty period. Repair or replacement constitutes complete fulfillment on WorldWide Electric part. The nature and length of the warranty will depend upon the motor and is set forth below:
- WARNING: Before you install, operate, or perform maintenance, observe all safety warnings so as to protect any personnel from possible injuries from high voltage, hot surfaces, improper handling and rotating parts. Never disable or by-pass any safety devices.

Premium Efficient Stainless Steel Motors (SSPE Series)		Three (3) years from date of sale (invoice)
Open Drip Proof Motors (ODP Series)		Two (2) years from date of sale (invoice)
Premium Efficiency Motors (PEWWE Models)		
1-200 HP	3600 and 1800 RPM	Three (3) years from date of sale (invoice)
1-150 HP	1200 RPM	Three (3) years from date of sale (invoice)
3-300 HP	900 RPM	Two (2) years from date of sale (invoice)
200 HP	1200 RPM	Two (2) years from date of sale (invoice)
250-500 HP	3600, 1800, 1200 RPM	Two (2) years from date of sale (invoice)
Explosion Proof Motors (IXPEWWE Series)		Two (2) years from date of sale (invoice)
Oil Well Pump Motors (OW Series)		Two (2) years from date of sale (invoice)
Close Coupled Pump Motors (OCCP Series)		Two (2) years from date of sale (invoice)
Premium Efficiency Severe Duty Motors (SD Series)		Three (3) years from date of sale (invoice)
Louis Allis IEEE 45 Severe & Marine-Duty Motors		Two (3) years from date of sale (invoice)
Louis Allis IEEE 841 PetroChem & Severe-Duty Motors		Five (5) years from date of sale (invoice)

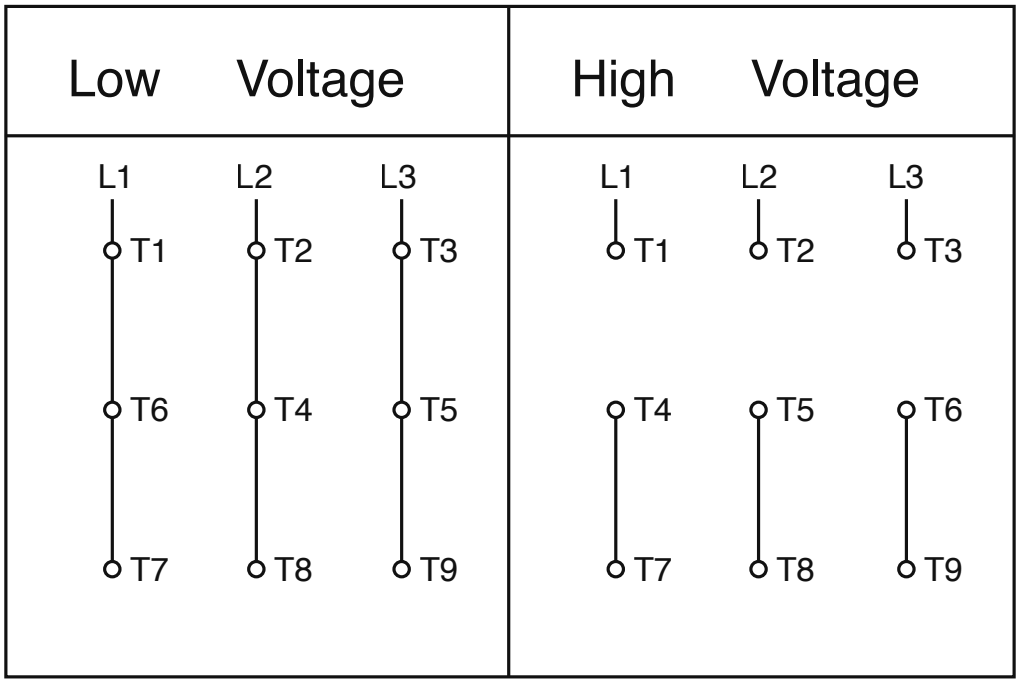
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Wiring Terminal Samples

9 Leads | Dual Voltage & Voltage Ratio 1 to 2 | WYE Connected



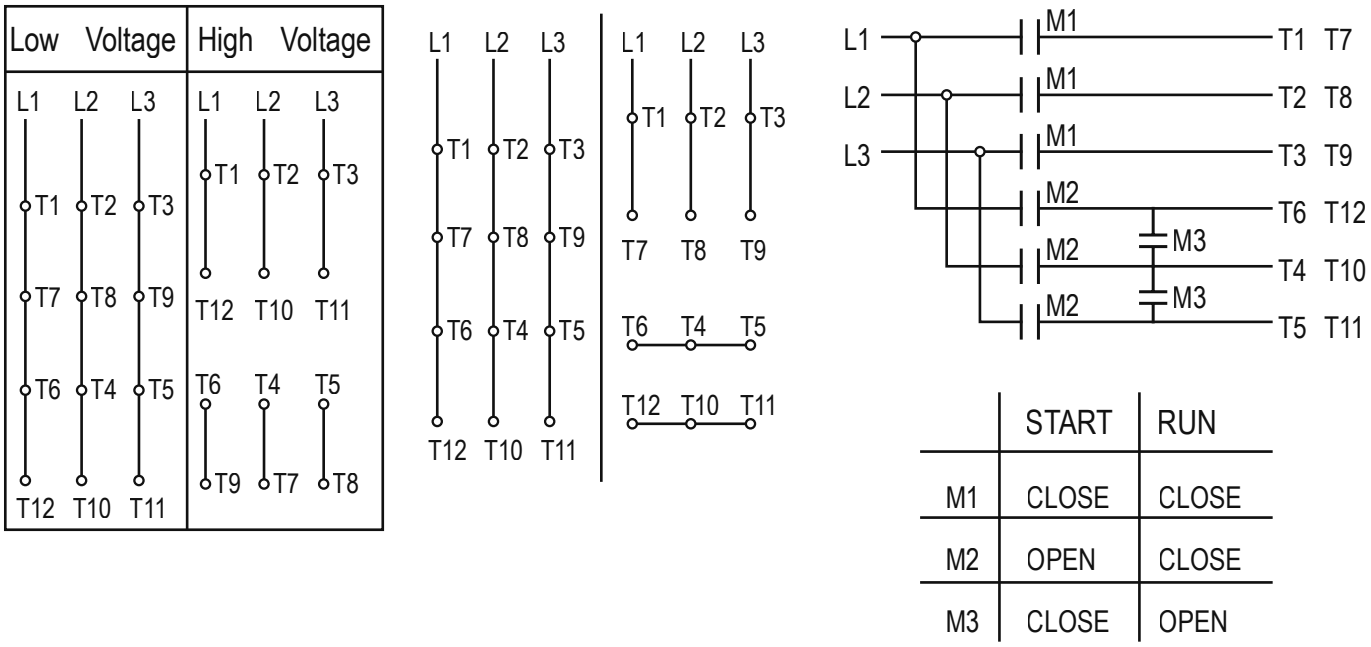
9 Leads | Dual Voltage & Voltage Ratio 1 to 2 | Delta Connected



Wiring Terminal Samples (Continued...)

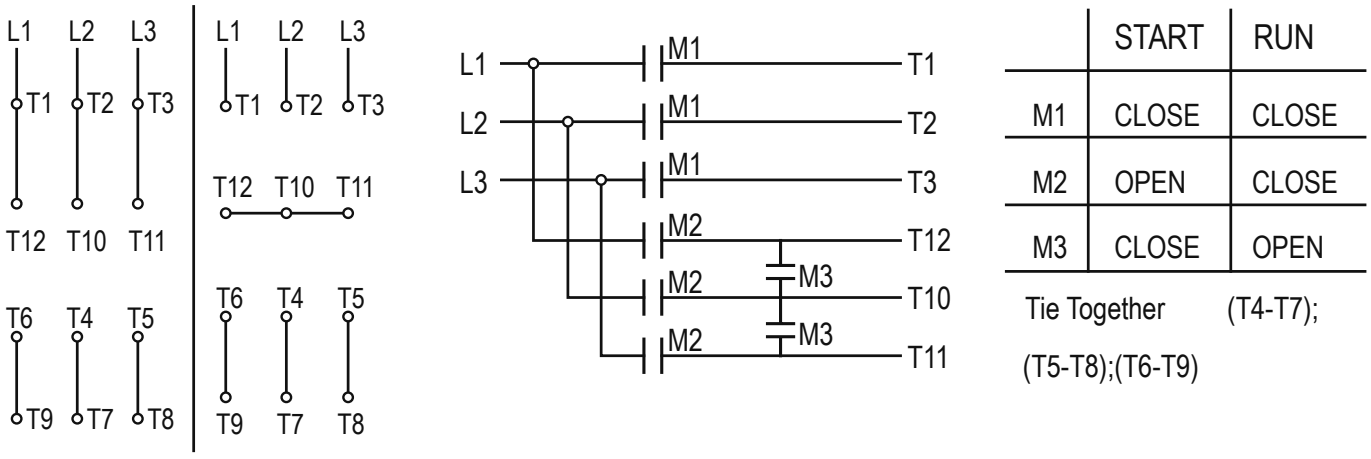
12 Leads | Dual Voltage

C-1 Across the Line Start & Run C-2-1 Wye Start & Delta Run (Low Voltage Only)



	START	RUN
M1	CLOSE	CLOSE
M2	OPEN	CLOSE
M3	CLOSE	OPEN

C-2-2 Wye Start & Delta Run (High Voltage Only)



	START	RUN
M1	CLOSE	CLOSE
M2	OPEN	CLOSE
M3	CLOSE	OPEN

Tie Together (T4-T7); (T5-T8);(T6-T9)

***Important:** For Part Winding Start, M2 contactor should be closed within two (2) seconds after M1 contactor is closed.

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