

Assembly and installation of all electrical parts and equipment must be performed by a qualified licensed electrician according to local, state and federal electrical codes. NEMA, UL, and other safety certifications are voided by use of non-compliant parts. For the safety of all personnel, the effective control of equipment and the protection of electrical system and components, a qualified electrician is required. The following is intended as an overview to assembly for the qualified licensed electrician.

Starter Installation and Startup

Pass and Seymour TurnLock™ male plugs and female connectors with their corresponding male and female gendered weather resistant boots are designed for use with 12 AWG SEOOW wire rated for outdoor use in wet conditions. These cord sets provide “quick release” weather resistant electrical connections to enable safe, efficient installation, operation and maintenance of the electrical system. All electrical installation connections must be made by a licensed qualified electrician to ensure the safe and effective use of the design and features provided by the manufacturer. **Before handling and working on starters and motors, always disconnect TurnLock™ Plug/Connectors to isolate motor and starter. Starters may be set to automatically restart a motor after a thermal (overload) reset (cooling) or power re-energization.**

General Instructions:

Start/Stop/Reset: Starter may be set up to operate in either of two ways-“AUTO” or “HAND”. The factory default is HAND. It is recommended that this setting be **CHANGED TO -> “AUTO”** for unattended field installations. If “HAND” is selected, an intermittent power failure to the entire installation will require that each and every starter be manually restarted by pushing each START button. By setting all units to the **“AUTO” mode**, all units will automatically reset or “re-latch” and restart the starter after power is restored (e.g. after a “LINE side” power interruption).

CHANGE TO “AUTO” for automatic restart after a temporary site power failure/reset.

Settings: Mode Settingand AMP setting

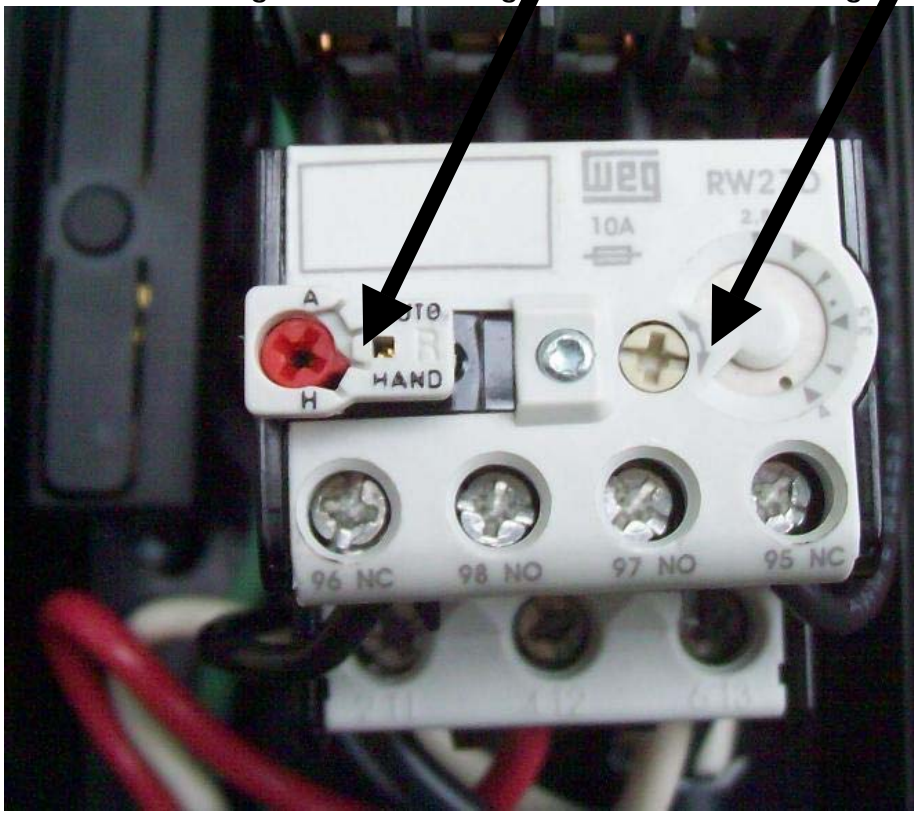


Figure 1

Factory default is "HAND"

Amp range shown in this example:

Change to **"AUTO"** (for typical remote installations)

from.... 2.8 to 4.0

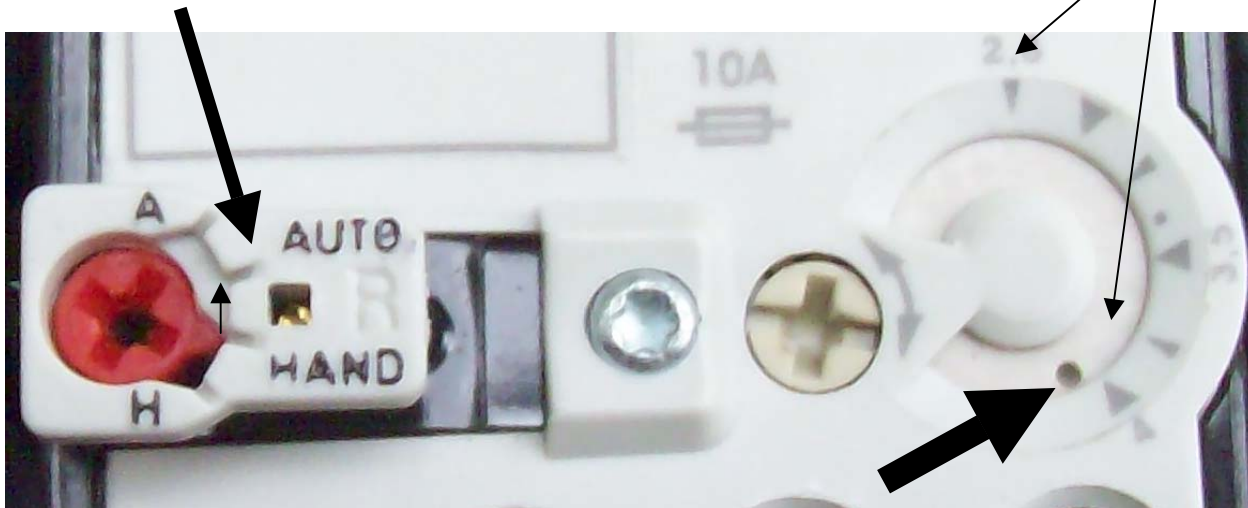


Figure 2 Small screw driver is used to select/change mode and/or to adjust precise amp setting required by motor. Use motor nameplate Full Load Amps (FLA) times the nameplate Service Factor (SF) for maximum amp setting.

Obtain the nameplate ratings for each motor being controlled and protected. Recommended maximum setting is based on the nameplate Full Load Amps (FLA) multiplied by the nameplate Service Factor (SF) for maximum amp setting.

e.g. M600 series motor with 480v 3P power that runs at ~3.2 amps has name plate data as follows:
 3 HP - FLA 3.9 amps - SF 1.25
 calculate maximum heater amp setting by multiplying $3.9 \times 1.25 = 4.875$
 ...round up to 4.9 amps
 and thus, **in this case, use a setting of 4.9-5.0 amps as the maximum.**

- 1 **ALWAYS** -> **BUMP START** the VBT™ for rotation direction verification after all electrical adjustments, modifications or restarts. **Damage to motor will occur if motor runs in the reverse direction! Look for arrow on motor fan cover to verify direction. (Right to left when facing unit, CW viewing thru top fan cover, CCW when viewing prop rotation from the bottom. Proper prop rotation forces water down when turning correctly)**
- 2 **Monitor running amps:** Upon startup use an ammeter to determine the nominal running amps. Compare this running amp reading with the FLA and starter setting. In the example above, if the running amp reading is above 2.6-3.2 amps consider raising the motor up slightly to reduce running amps. In general, to extend motor life, a running amp range of 80% or less of FLA is required.

LOG (record) the start-up running amp reading for later comparison. Any significant change (increase) will indicate either a restriction to the air inlet, an air-plate blockage, possible prop fowling or a potential voltage drop.

3 Mounting Starter: CAUTION ...DO NOT USE starters as a "portable device"!

Starters must be firmly mounted in a vertical position. All relays inside magnetic starters may accidentally activate (energize) if physically bumped, dropped, or jarred. This situation is prevented by securely mounting the starter to a stationary, secure wall, post or rack.

Upon final installation, inspect starter for any signs of physical damage. Inspect gasket between cover and base to be certain the seal is maintained when the cover is properly installed.

The default color code sequence typically used is: X-L1-black, Y-L2-Red, Z-L3-white (if applicable). This sequence is intended **ONLY AS A GUIDE**. By consistently coordinating all component wiring sequences with the site power source, proper motor direction will result. **PROPER MOTOR ROTATION DIRECTION IS CRITICAL!** Motors run in the wrong direction can result in any or all of the following: electrical hazard, equipment damage, complete mechanical and electrical failure and/or reduced service life.

ALWAYS have the ELECTRICIAN "bump-test" FOR PROPER MOTOR DIRECTION PRIOR TO OPERATION!!

Warranty is voided by if equipment is operated in reverse direction.

All three configurations (**BASIC, KIT and PLUG n Play**) include a set of extension cord ends with gender specific compatible outdoor weather resistant electrical connections.

NOTE: Interchanging incompatible parts, substituting and/or using different /other manufacturer's parts and components is not recommended. Doing so can easily compromise safety, control and equipment protection and is undertaken entirely at the installer/end-user's own risk!

X-Black-Line 1, Y-Red-Line 2, Z-White-Line 3

Connect wires inside starter to heater terminals as follows:

Wiring configuration (e.g. three (3) phase 480volt)

- "G" on plug "Green" wire Ground lug terminal in starter
- " X" on plug "Black" wire "Line 1" terminal on heater
- "Y" on plug "Red" wire "Line 2" terminal on heater
- "Z" on plug "White" wire "Line 3" terminal on heater



Figure 3

Plug n Play Starter: Whips (load-side) & (line-side) assembly

Repeat load side whip assembly procedure described above connecting wire ends to line-side of starter terminals with same sequence (e.g. X-Black-Line 1, Y-Red-Line 2, Z-White-Line 3).



Figure 4

Load Side Line Side

GENDER DEPENDENT CONNECTIONS:

Male plug with Male Boot



Figure 5 Mated pairs with mated boots

Female connector with Female Boot



Figure 6



Figure 7

COMPLETED STARTERS



Figure 8 "LOAD" side Female connector with female boot

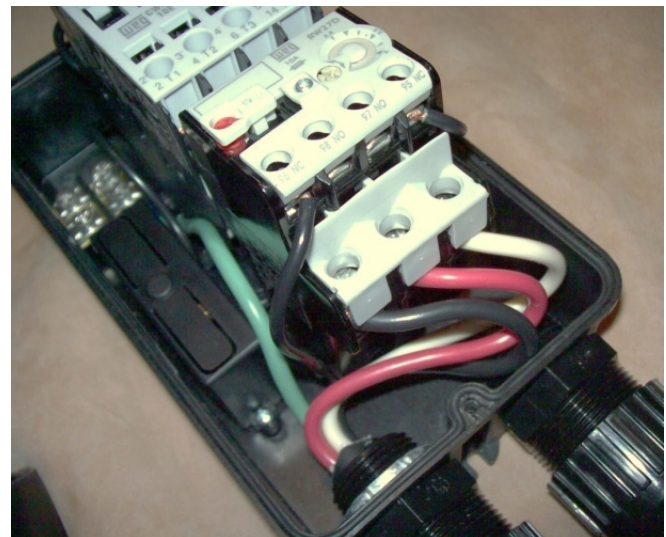


Figure 9 Note: Black-Red-White sequence for L1-L2-L3 respectively

Starters shown in Figures 8-9 have "Load-whip" installed. Starters are now ready for the site power supply connection using standard electrical hardware or a Plug n Play "Line-whip".