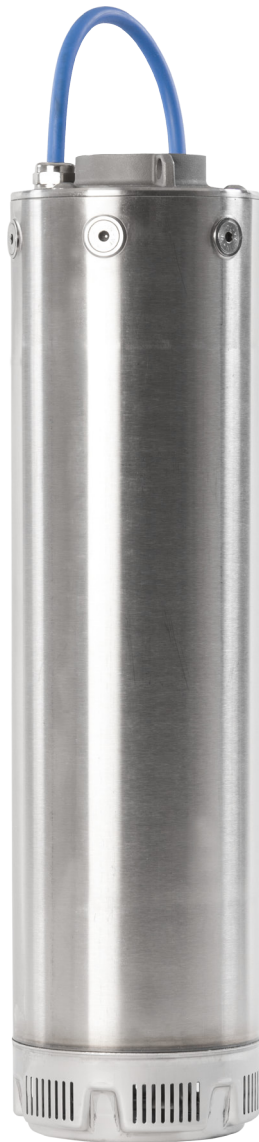


Diesel Exhaust Fluid Pump Motor Assembly









DEF-PMA Replacement Instructions



Important Safety Messages

This equipment is designed to be installed in association with Diesel Exhaust Fluid (DEF). DEF is a non-flammable, non-combustible liquid that is made up of 32.5% urea and 67.5% distilled or deionized water. DEF is used in diesel burning vehicles that are equipped with Selective Catalytic Reduction (SCR) for emission control. Installing or working on this equipment means working in an environment in which DEF is present, as well as where highly flammable liquids may be present. **Working in such a hazardous environment presents a risk of severe injury or death if these instructions and standard industry practices are not followed. Do not underestimate the risk of working in this environment. Read and follow all instructions thoroughly before installing or working on this, or any other related equipment.**

As you read this guide, please be aware of the following symbols and their meanings:

- Warning**  This symbol identifies a warning. A warning sign will appear in the text of this document when a potentially hazardous situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of severe bodily harm or even death.
- Caution**  This is a caution symbol. A caution sign will appear in the text of this document when a potentially hazardous environmental situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous environmental situation may involve the leakage of fuel from equipment that could severely harm the environment
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- Warning**  Follow all applicable codes governing the installation and servicing of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on during installation or servicing. Do not smoke while working on or near this equipment, and use only non-sparking tools.
- Warning**  Before entering a containment sump, check for the presence of hydrocarbon vapors. If these vapors are inhaled they could cause dizziness or unconsciousness, and, if ignited, hydrocarbon vapors could explode causing serious injury or death. Electronic and electrical petroleum monitoring equipment is often housed in containment sumps designed to trap hazardous liquid spills and prevent contamination of the environment, and, as a consequence, containment sumps can trap dangerous amounts of hydrocarbon vapors. If these vapor levels reach unsafe amounts, ventilate the sump with fresh air. While working in the sump, periodically check the atmosphere in the sump, if vapors reach unsafe levels, exit the sump and ventilate it before continuing work. Always have a second person standing by for assistance when working in, or around, a containment sump.
- Warning**  Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow National Fire Protection Association codes 30A and 70 as applicable to DEF dispensing systems. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.
- Warning**  Always secure the work area from moving vehicles. The equipment in this manual is usually mounted underground, so reduced visibility puts service personnel working on this equipment in danger from moving vehicles entering the work area. To help eliminate these unsafe conditions, secure the area by using a service truck to block access to the work environment, or by using any other reasonable means available to ensure the safety of service personnel.
- Warning**  The piping and storage tank must be installed using standard industry practices, including but not limited to the following:
- Recommended Practices for Installation of Underground Storage Systems, The Petroleum Equipment Institute, PEI / RP100 (latest edition)
 - Recommended Practices for Installation of Aboveground Storage Systems, The Petroleum Equipment Institute, PEI / RP200 (latest edition)
 - Recommended Practices for the Storage and Dispensing of Diesel Exhaust Fluid (DEF), The Petroleum Equipment Institute, PEI / RP1100 (latest edition)
- Caution**  Do not modify the DEF Pump Motor Assembly (DEF-PMA). Modifying or altering the DEF-PMA in any way defeats the rigorous quality control tests performed during assembly and could result in dangerous safety issues

Overview

Diesel Exhaust Fluid (DEF) is a non-flammable, non-combustible liquid with a specific gravity of 1.09 at 68° F and is made per ISO 22241-1 specifications with 32.5% urea and distilled or deionized water. DEF is used in diesel burning vehicles that are equipped with Selective Catalytic Reduction (SCR) for emission control. DEF freezes at 12° F (-11° C) and can be impaired by prolonged storage above 77° F (25° C). DEF systems require compatible materials to prevent product contamination/degradation and unintended release.

All models of this DEF-PMA equipment are intended for use with DEF only. All models are suitable for vertical installation where the pump motor is suspended off the bottom of the storage tank by the discharge piping. All models are rated for continuous operation with motor cooling provided by product flow and protected from dry running. All models require a Bypass Relief Valve with a cracking pressure of 30-40 psi (2.1 - 2.8 bar) and capable of 4 gpm (15 lpm) minimum flow at the discharge. All models require a Non-Return Check Valve with a maximum cracking pressure of 3 psi (0.2 bar) between the product piping and the Bypass Relief Valve. Three Phase models require overload protection in the motor starter, whereas Single Phase models have thermal overload protection built into the motor.

Procedure

1. Disconnect power to the DEF Pump Assembly at the electrical supply box.
2. Tag and lock out electrical circuit breakers so they are not turned on accidentally.
3. Carefully disconnect the product discharge piping and supply power wiring so the DEF Pump Assembly can be extracted from the storage tank.

Note: Wiring for single phase units may include a run/start Capacitor. Make sure the Capacitor is safely discharged before disconnecting supply wiring.

4. Carefully extract the DEF Pump Assembly from the storage tank and carefully lay on flat, open surface for Pump Motor replacement.

Note: Never lift or suspend the DEF Pump Assembly by the Power Cable.

5. As applicable, unfasten the Power Cable from DEF Pump Assembly to allow Pump Motor Assembly removal.
6. Remove existing DEF Pump Motor Assembly from product piping.
7. Verify that DEF Pump Assembly properly incorporates a Non-Return Check Valve and Bypass Relief Valve as specified above in Overview section (Reference Figure 1).

Note: A Bypass Relief Valve must be installed to provide flow for cooling the unit. Running the DEF-PMA without product to properly cool the unit can cause irreparable damage.

8. Unpack DEF-PMA and verify specifications match the installation.

Note: Measure and compare the Pump Motor lengths. Verify that the length of the DEF Assembly will not touch the bottom of the tank. The DEF-PMA will typically be suspended about 3" (76 mm) off the bottom of the storage tank.

Model Number	Discharge Outlet	Outside Diameter	Inlet-to-Outlet Length
DEF-PMA150A	2" NPT female	5.1" (130mm)	18.7" (474mm)
DEF-PMA150B	2" BSPT female	5.1" (130mm)	19.8" (504mm)
DEF-PMA150C	2" BSPT female	5.1" (130mm)	19.8" (504mm)
DEF-PMA150D	2" NPT female	5.1" (130mm)	18.7" (474mm)

9. Apply DEF compatible thread sealant to product piping and thread on DEF-PMA.

Note: Do NOT use PTFE Thread Seal Pipe Tape. Use only DEF-compatible materials to prevent product contamination and/or unintended release.

Note: Prevent Power Cable damage while threading on DEF-PMA. Do not over-tighten product piping into DEF-PMA or the discharge port which may be damaged.

10. Fasten Power Cable to the DEF Pump Assembly product piping to prevent it from being damaged during install or extraction. (Reference Figure 1)

Note: Do not fasten power cable too tightly. Provide enough freedom to prevent stretching or cutting of power cable.

11. Verify proper capacitor for DEF-PMA (3 phase models do not use a run/start capacitor).

Model Number	Electrical Specifications	Capacitor	Voltage Rating
DEF-PMA150A	Single Phase, 60 Hz, 208-240 VAC	25 μ F	370 V (Minimum)
DEF-PMA150B	Single Phase, 50 Hz, 200-250 VAC	30 μ F	440 V (Minimum)
DEF-PMA150C	Three Phase, 50 Hz, 380-415 VAC	None	None
DEF-PMA150D	Three Phase, 60 Hz, 208-230 VAC	None	None

Note: Capacitor recommended to include bleed down resistor and to be housed at the DEF Pump Assembly turbine sump within a liquid tight junction box.

12. Carefully lower the DEF Pump Assembly back into the storage tank making sure not to damage any components of the assembly, including but not limited to the Power Cable or the DEF-PMA housing.

13. Secure DEF Pump Assembly in place and reconnect product discharge.

14. Attach DEF-PMA Power Cable to supply power wiring as applicable. (Reference Figures 2-5)

Note: All wiring must be done in accordance with National Electrical Code (NEC) and any other local, state, or federal regulations that apply.

Note: Verify that the DEF pump controllers are wired and set correctly. Running the DEF-PMA without proper overload protection can cause irreparable damage.

Model Number	Electrical Specifications	Rated Current	Locked Rotor Current
DEF-PMA150A	Single Phase, 60 Hz, 208-240 VAC	7.9 Amps	35 Amps
DEF-PMA150B	Single Phase, 50 Hz, 200-250 VAC	6.9 Amps	32 Amps
DEF-PMA150C	Three Phase, 50 Hz, 380-415 VAC	2.6 Amps	19 Amps
DEF-PMA150D	Three Phase, 60 Hz, 208-230 VAC	5.0 Amps	38 Amps

Model Number	Lead-to-Lead Resistance (including Power Cable)		
	Blue - Black	Brown - Black	Brown - Blue
DEF-PMA150A	1.7 - 2.5 Ohms	4.6 - 5.4 Ohms	6.3 - 7.1 Ohms
DEF-PMA150B	2.5 - 3.3 Ohms	5.6 - 6.4 Ohms	8.1 - 8.9 Ohms
DEF-PMA150C	14.2 - 15.0 Ohms	14.2 - 15.0 Ohms	14.2 - 15.0 Ohms
DEF-PMA150D	2.9 - 3.7 Ohms	2.9 - 3.7 Ohms	2.9 - 3.7 Ohms

15. Connect power to the DEF Pump Assembly at the electrical supply box.

16. Energize DEF Pump Assembly and check installation for leaks. If leaks are present, disconnect/lockout power and fix before proceeding.

Note: Do not start DEF-PMA unless it has been completely submerged in fluid. Running the DEF-PMA without product to properly cool the unit can cause irreparable damage.

17. Test proper operation by dispensing product into a calibration can. If pressure decreases to below 24 psi (1.65 bar) with one nozzle operating, the DEF-PMA is likely running in reverse rotation.

Note: For Three Phase models, disconnect/lockout power and change the position of two motor leads to verify rotation before proceeding.

Note: For Single Phase models, disconnect/lockout power and change the position of two motor leads across the capacitor to verify rotation.

18. If operation isn't corrected, or any other problems or concerns occur, call FFS Technical Support for assistance (800-984-6266).

Note: If the DEF-PMA does not turn off when the DEF dispenser switch is turned off, or the DEF-PMA turns on without the DEF dispenser switch turned on, this may indicate an electrical problem in the dispenser or other wiring. Immediately consult a qualified electrician.

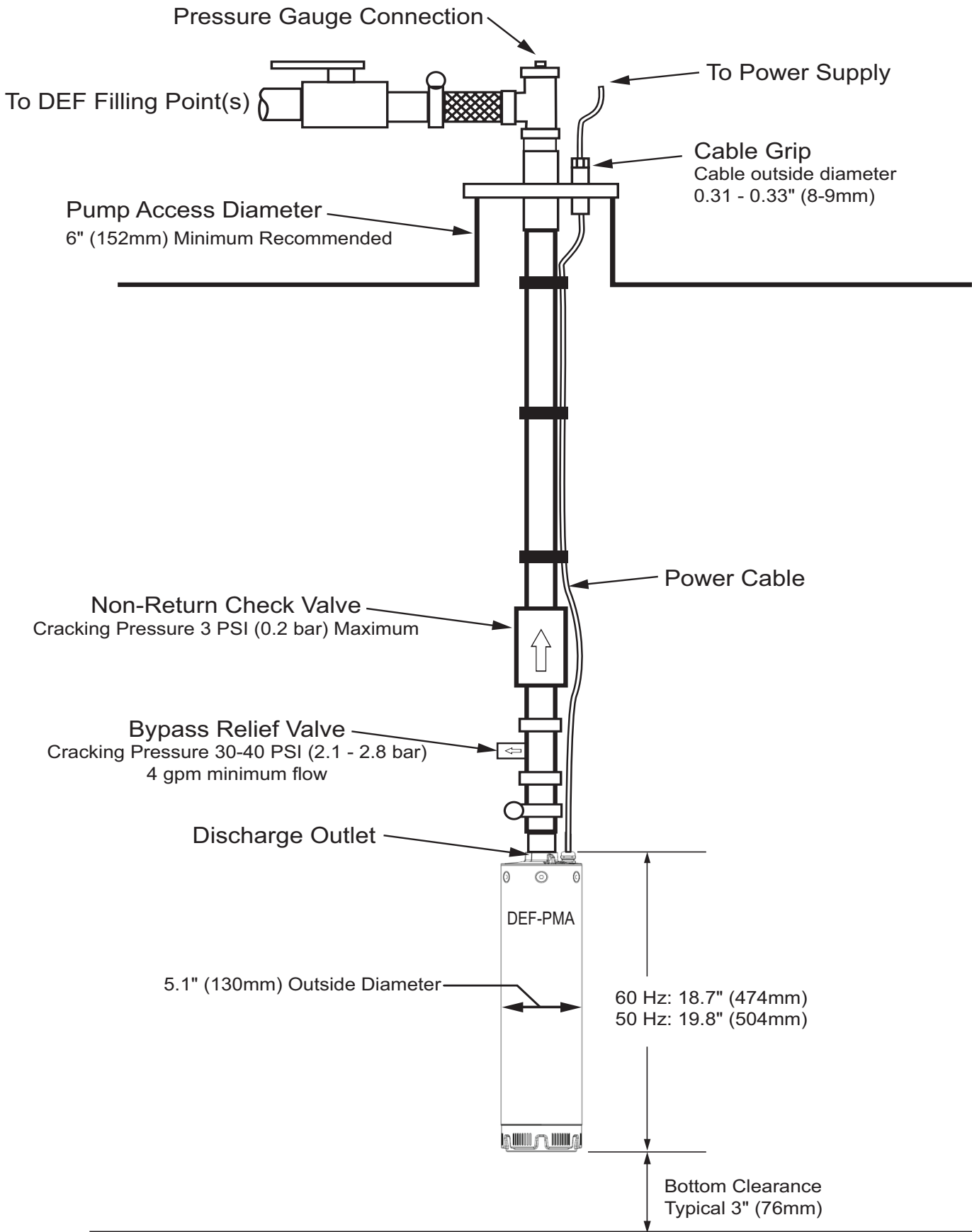


Figure 1: Typical DEF-PMA Installation

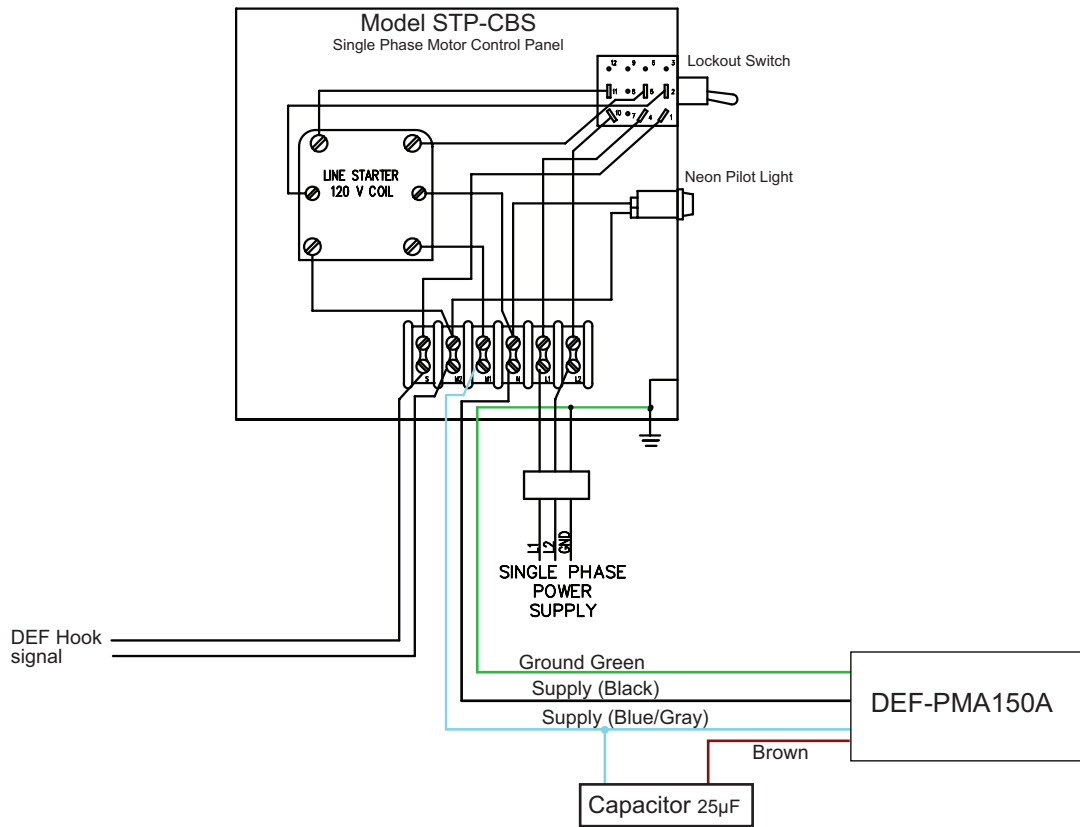


Figure 2: DEF-PMA150A Single-Phase Wiring

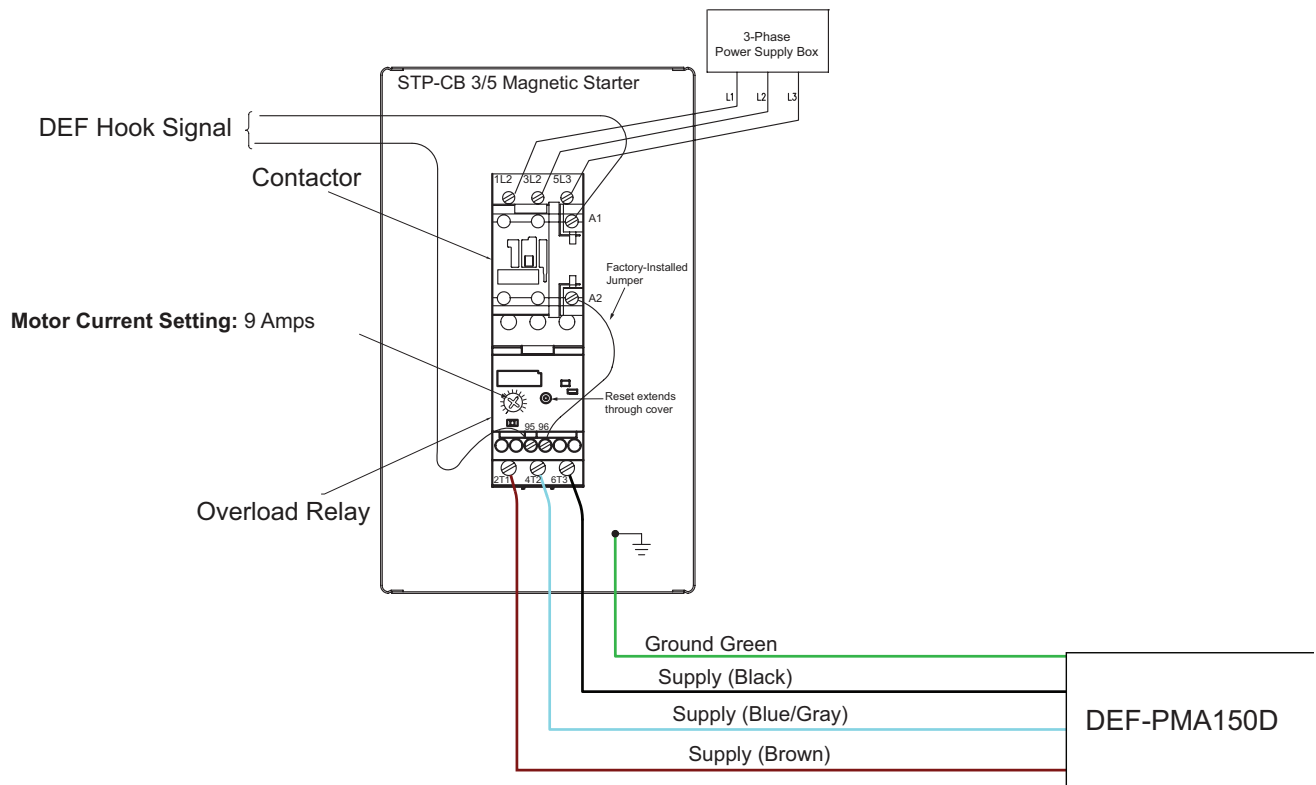


Figure 3: DEF-PMA150D 3-Phase Wiring

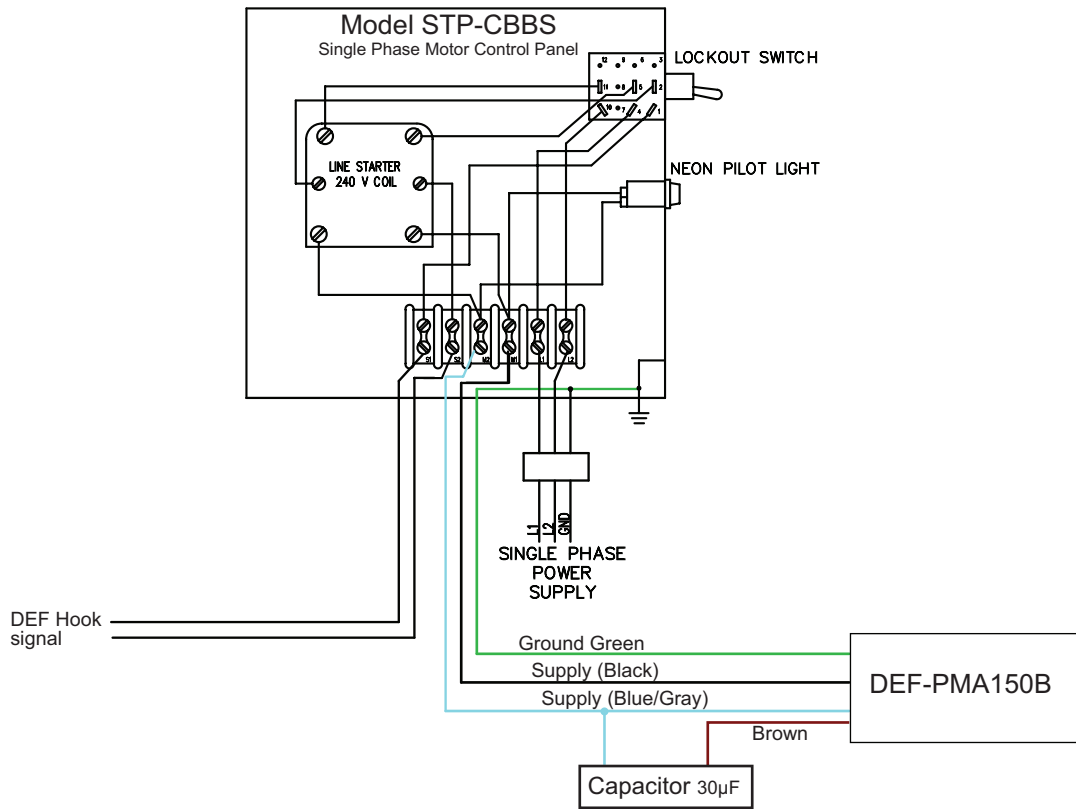


Figure 4: DEF-PMA150B Single-Phase wiring

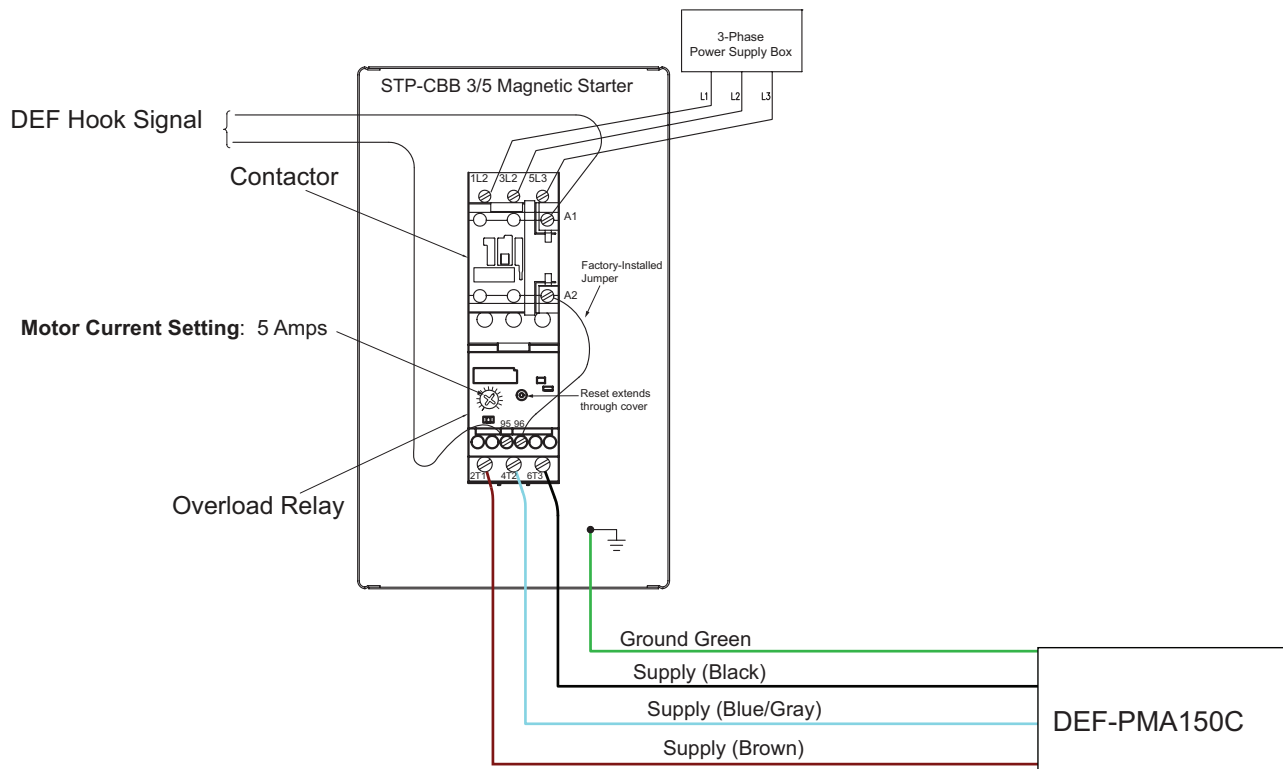


Figure 5: DEF-PMA150C Three-Phase Wiring



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