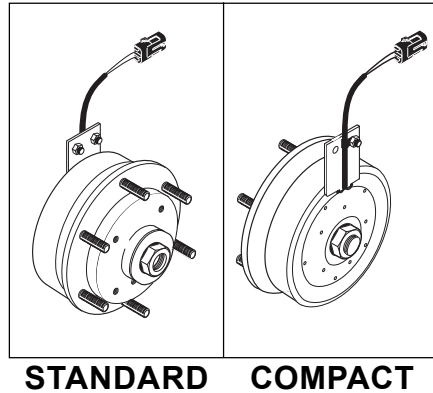


EC450™

ELECTROMAGNETIC FAN CLUTCH (STANDARD AND COMPACT STYLES)

INSTALLATION AND PRODUCT INFORMATION



INTRODUCTION	2
General Information	2
PRE-INSTALLATION	3
Fan Clutch Operation	3
Vehicle Preparation	4
INSTALLATION	5
Standard Style EC450™ Fan Clutch	5
Compact Style EC450™ Fan Clutch	6
Control System Installation	7
Temperature Switch	7
Optional Air Conditioning Pressure Switch	8
Optional Manual Override Switch	8
Wiring Harness	9
Warning Sticker	10
Operation Check	11
TROUBLESHOOTING	12
Temperature Switch	12
A/C Pressure Switch	13
PARTS LIST	14
TORQUE SPECIFICATIONS	15



INTRODUCTION

General Information

This manual describes the correct Fan Clutch Installation procedures. Following the instructions carefully will provide the safest and most trouble-free operation.

Horton uses the following special notices to give warning of possible safety related problems which could cause serious injury and provide information to help prevent damage to equipment.

DANGER

Danger is used to indicate the presence of a hazard which will cause severe personal injury, death, or substantial property damage if the warning is ignored.

WARNING

Warning is used to indicate the presence of a hazard which can cause severe personal injury, death, or substantial property damage if the warning is ignored.

CAUTION

Caution is used to indicate the presence of a hazard which will or can cause minor personal injury or property damage if the warning is ignored.

NOTE

Note is used to notify people of installation, operation, or maintenance information which is important but not hazard related.

PRE-INSTALLATION

You must follow your company safety practices, which should adhere to or be better than Federal or State approved shop safety practices and procedures. Be sure you have all the parts listed in the REQUIRED PARTS section (Page 14) and that you understand all the procedures and instructions before beginning work on this unit.

Fan Clutch Operation

The EC450™ Fan Clutch is activated by DC voltage from the vehicle's electrical system. Multiple control functions can be used to turn the Fan Clutch on and off, as dictated by your equipment and operating conditions. All control functions operate the same way: switches close to complete the electrical circuit to engage the fan clutch.

The following are the most commonly used control devices:

- An increase of the engine coolant temperature above a preset limit causes a normally open (N.O.) thermal switch in the engine cooling system to close (close-on-rise) at the preset temperature, causing the Fan Clutch to engage.
- An increase of the air conditioner's refrigerant pressure above a preset limit causes a normally open (N.O.) refrigerant pressure switch to close, causing the Fan Clutch to engage.
- A manual switch allows you to engage the Fan Clutch at any time.

Closure of any of these switches completes the DC circuit to the Fan Clutch. When the circuit is completed, DC current flows through the Fan Clutch coil, causing the Fan Clutch to engage and the fan to turn. As long as any switch is closed, the Fan Clutch will be engaged.

When all switches are open, or power is interrupted for any reason, the magnetic field collapses, releasing the fan hub from the drive pulley. As the field collapses, polarity across the protective diode in the Fan Clutch wiring harness reverses, making a low-resistance circuit to ground. This protects other electronic components on the vehicle.

Vehicle Preparation

NOTE

If the vehicle is equipped with air conditioning, always have the A/C refrigerant charge checked immediately after installing a Horton EC450™ Fan Clutch. If the refrigerant pressure is too high, the fan may run all the time. If the refrigerant pressure is too low, the low pressure cut-off switch on the vehicle will disengage the A/C compressor.

NOTE

Use care to protect the radiator from damage during the replacement of the fan clutch.

1. Remove the fan assembly and place the fan aside while installing the Fan Clutch.
2. Remove the fan drive currently on your vehicle.

NOTE

If the fan drive you are removing is on a threaded shaft, loosen the hex nut in the same direction as the engine rotation.

INSTALLATION

Standard Style EC450™ Fan Clutch

NOTE

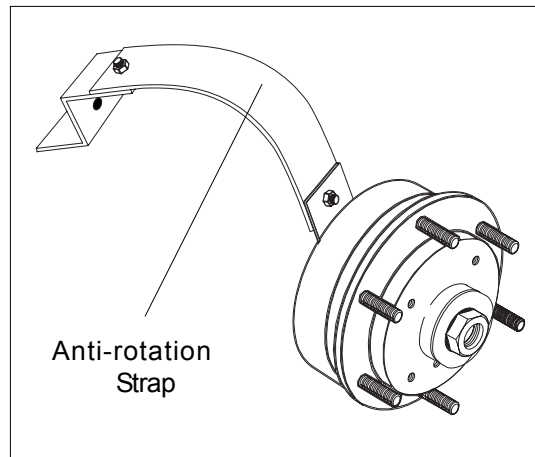
Do not loosen the P-clamp attaching the wiring harness to the metal tab on the Fan Clutch. If loosened, the P-clamp must be re-tightened to prevent the wiring harness from slipping through the P-clamp, causing tension on the Fan Clutch wiring.

1. Install the Horton EC450™ Fan Clutch on the engine. Set the torque according to the specifications on Page 15.
2. Secure the Anti-rotation Strap to a suitable fixed location on the engine, such as a retaining bolt or mounting boss. Do not attach to engine wiring harness tie-downs, etc. Be sure to allow enough slack in the strap to avoid undue stress on the metal tab of the clutch.

NOTE

Make sure the Anti-rotation Strap and Bracket do not come in contact with any engine components.

3. Install the fan onto the Horton EC450™ Fan Clutch. Be sure the fan is installed for the correct rotation. Alternately and evenly tighten the Hex head nuts provided in the kit (See Page 15 for Torque Specifications).



Compact Style EC450™ Fan Clutch

1. Install the fan onto the Horton EC450™ Fan Clutch. Be sure the fan is installed for the correct rotation. Alternately and evenly tighten the Hex head nuts provided in the kit (See Page 15 for Torque Specifications).

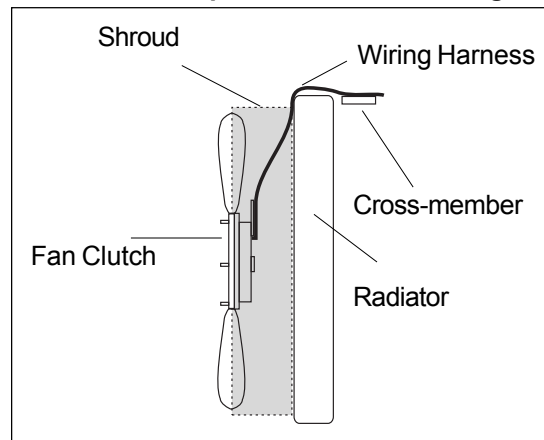
NOTE

Do not loosen the P-clamp attaching the wiring harness to the metal tab on the Fan Clutch. If loosened, the P-clamp must be re-tightened to prevent the wiring harness from slipping through the P-clamp, causing tension on the Fan Clutch wiring.

2. Install the Fan Clutch on the engine.
3. Feed the Wiring Harness between the radiator and shroud (See Figure). Trimming of the shroud may be required for proper fit.
4. Secure the P-clamp at the end of the Wiring Harness to the radiator cross-member or a similar suitable location.
5. Be sure the P-clamp is tightly fastened.

CAUTION

The Wiring Harness on compact models also functions as an anti-rotation device for the Fan Clutch. It is essential that the P-clamp be tightly secured to an immobile location. However, the Wiring Harness must be allowed enough slack to prevent strain from breaking the tab on the Fan Clutch. Be sure the Wiring Harness cannot be pulled into the turning fan.



Control System Installation

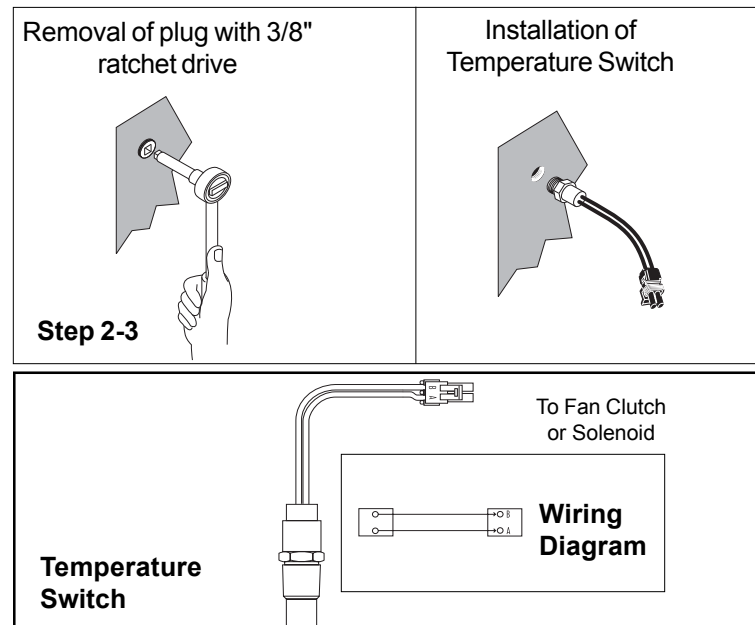
Temperature Switch

1. Drain coolant from the radiator into a clean container. The coolant can be returned to the radiator after the Temperature Switch is installed.
2. Locate a port in the engine in which to install the Temperature Switch. The port should be as close to the engine thermostat as possible.
3. Use a 3/8" ratchet drive and extension to remove the 1/2" engine plug.

NOTE

Be careful not to over-torque the Temperature Switch.

3. Install and tighten the Temperature Switch in the location where the 1/2" threaded plug was removed. Tighten the temperature switch to 25 Ft.Lbs. [33.8 N•m].
4. Replace the coolant.

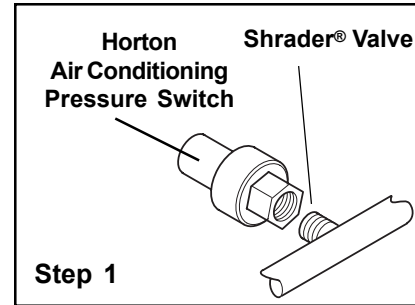


Optional Air Conditioning Pressure Switch

NOTE

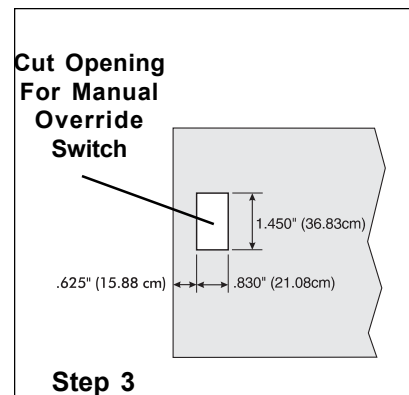
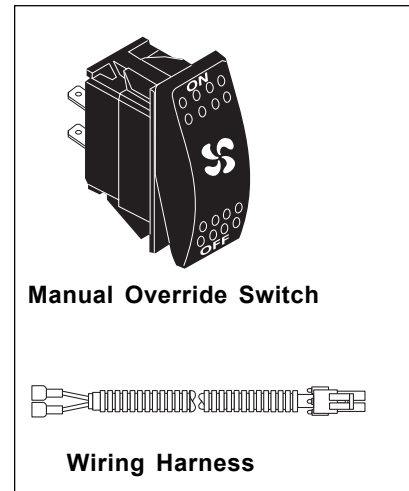
The high pressure line may be equipped with a Shrader® valve to prevent refrigerant loss. If a Shrader® valve is not available, you must use a T-fitting (Horton part number 994160) to share the Shrader® valve being used by the vehicle's high pressure A/C cutoff switch.

1. Install the A/C Pressure Switch onto the male port on the air conditioning line next to the air conditioning compressor.



Optional Manual Override Switch (Kit #994187)

1. Pull the Manual Override Wiring Harness leads from the engine compartment through one of the bulk head panel's existing grommets. Leave enough length to reach the Switch on dash panel.
2. Install the Manual Override Switch in the dash within easy reach of the driver's seat.
3. Cut an opening in the dash for the Manual Override Switch. Feed the Wiring Harness leads through the Switch opening. Attach Wiring Harness leads to the Switch. Snap the Switch in place.



Wiring Harness

Refer to the Wiring Harness illustration and schematic to locate connectors in the Wiring Harness installation.

1. Feed the power supply end of the Wiring Harness from the engine compartment, through the bulkhead, into the cab of the vehicle.
2. Plug the spade receptical into the back of the ignition switch.

NOTE

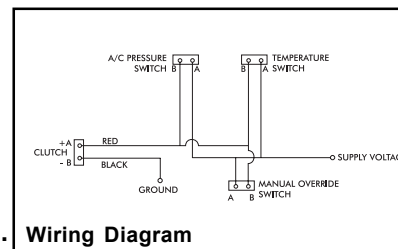
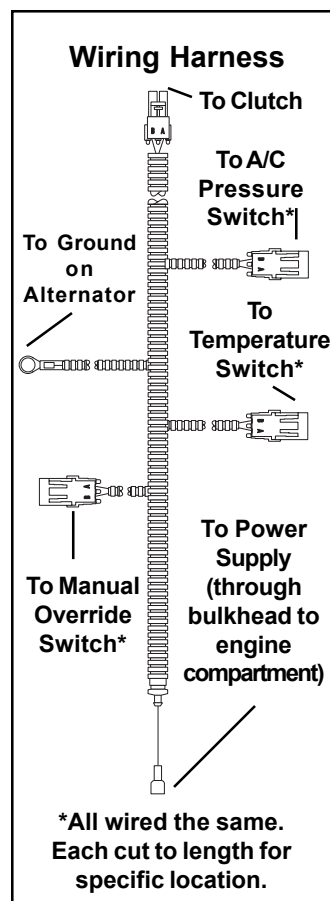
Check to make sure that current is present at the spade terminal on the Ignition Switch when the key is turned to the on position.

CAUTION

If a 12 volt circuit is not available at the Ignition Switch, a 12 volt fused circuit must be located. This circuit must be energized only when the truck's Ignition Switch is in the "ON" position. Use caution when selecting a 12 volt power source. Since the EC450 draws 4 amps of current when engaged, be sure the circuit will handle this amount of draw along with other devices in the circuit (such as headlamps, blower motors, etc.).

CAUTION

The EC450 Fan Clutch contains a protective diode which prevents damage to the vehicle's electrical system when the clutch is disengaged. We strongly recommend the use of the Horton Wiring Harness. However, if you use a non-Horton Wiring Harness, be sure to observe the correct polarity of the clutch to prevent damage to the diode (See Wiring Diagram).



3. Remove the protective cap from the wire connector for the appropriate Temperature Switch location. Plug the connector into the Temperature Switch connector.
4. If the vehicle is equipped with air conditioning, plug in one of the connectors of the Wiring Harness to the A/C switch.
5. If the optional Manual Override Switch is used, plug in one of the open connectors of the Wiring Harness.
6. Plug the harness into the Fan Clutch.
7. Using the wire ties provided, secure the rest of the Wiring Harness away from heat and moving parts.

Warning Sticker

1. Install the Fan Clutch warning sticker in a visible area on the fan shroud.



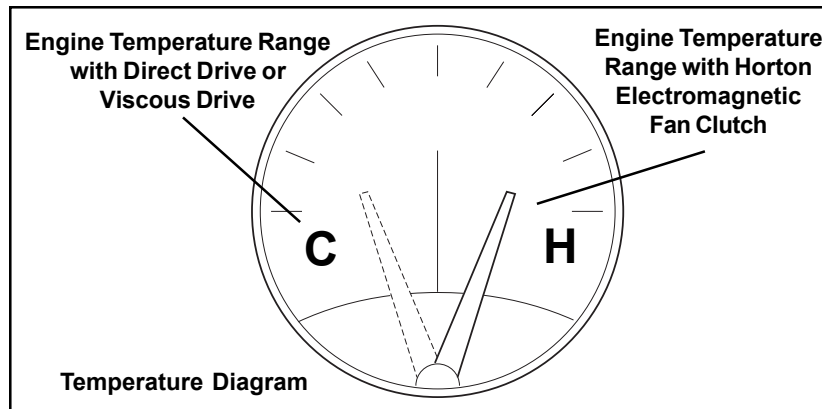
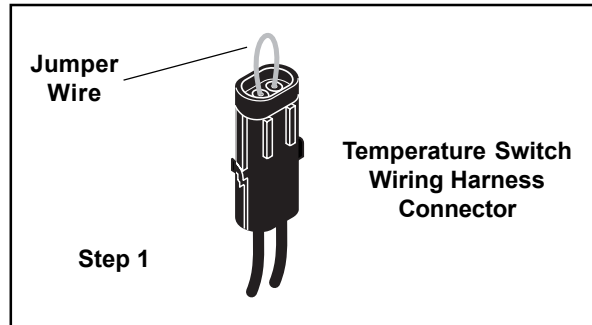
Operation Check

After the unit is completely installed, test the Fan Clutch as follows:

1. Start the engine and cycle the Fan Clutch on and off 10 to 15 times using the Manual Override Switch, or installing a jumper wire across the Temperature Switch Wiring Harness connector. This will seat the clutch faces, insuring maximum life from your Horton Fan Clutch.
2. If an A/C Pressure Switch is used, turn the air conditioning on maximum with the blower fan on high. The fan should engage after a short period of time due to the air conditioner pressure switch closing.

NOTE

Normal operating temperature will increase when using an on/off Fan Clutch. This type of clutch does not cool the engine until necessary. This allows the engine to operate at optimal operating temperature. The temperature diagram shows the change in normal operating temperature range once the Horton EC450 Fan Clutch is installed.



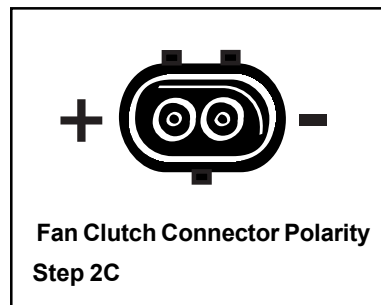
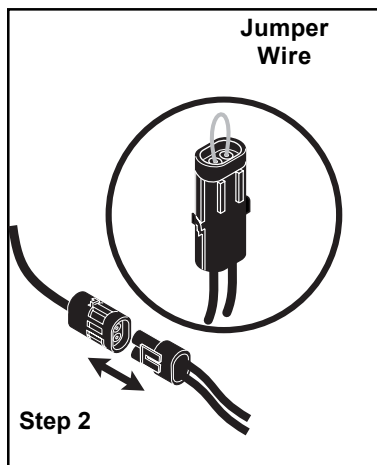
TROUBLESHOOTING

⚠ WARNING

Stay clear of the fan. Fan clutch can engage without warning.
Temperature Switch

Check the Temperature Switch if the Fan Clutch fails to operate after the engine temperature exceeds the Temperature Switch rating.

1. Check all wiring terminals.



2. Unplug the Temperature Switch and use a jumper wire to complete the circuit.
 - A. If the Fan Clutch engages, the Temperature Switch may be defective and should be replaced.

NOTE

Be sure engine temperature is above the Temperature Switch rating when testing the Temperature Switch. Vehicle gauges may not be accurate. The use of an engine thermometer in the inlet of the radiator to sense coolant temperature is recommended.

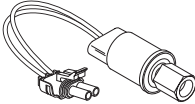
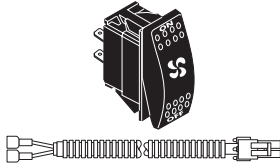
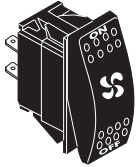
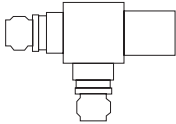
- B. If the Fan Clutch does not engage, the problem is in the Fan Clutch, the Wiring Harness, or loss of power or ground.
- C. To check Fan Clutch operation, unplug the Wiring Harness from the Fan Clutch and apply power supply voltage to the Fan Clutch (See Step 2C Polarity Diagram). If the Fan Clutch engages, the problem is in the Wiring Harness, or lack of power or ground to the Wiring Harness circuit.

A/C Pressure Switch

If the air conditioning begins to blow warm air in the cab, there may be a loss of refrigerant, or the Fan Clutch may not be engaging, drawing air over the condenser to drop the refrigerant pressure. If the refrigerant pressure becomes high, the high pressure cut-off switch on the vehicle will disengage the A/C compressor. To check the A/C pressure switch, unplug the A/C pressure switch and use a jumper wire to complete the circuit.

- A. If the Fan Clutch engages, the A/C pressure switch may be defective or the refrigerant charge may be too low. Have the refrigerant charge checked. If nothing is wrong with the refrigerant charge, replace the A/C pressure switch assembly.
- B. If the Fan Clutch does not engage, the problem is in the Fan Clutch, the wiring harness, or loss of power or ground.
- C. To check the Fan Clutch operation, unplug the wiring harness from the Fan Clutch and apply 12 volts to Terminal A and ground Terminal B. If the Fan Clutch engages, the problem is in the wiring harness, or there is a lack of power or ground to the Fan Clutch.

PARTS LIST (Required and Optional)

PART	DESCRIPTION	QTY	REPLACEMENT PART NO.
	Wiring Harness (12 Volt)*	1	996125
	Wiring Harness (24 volt)*	1	996129
	Temperature Switch*#	1	993670 (195°F) 993671 (200°F) 993672 (205°F) 993673 (210°F)
	A/C Pressure Switch	1	996033 Pressure Range: 300-210 (R12) Thread: 7/16-20 UNF 993922 Pressure Range: 325-235 (R134a) Thread: M10X1.25-6H
	Manual Override Switch with Wiring Harness	1	994187
	Manual Override Switch	1	9944179
	A/C Pressure Switch T-fitting	1	994160

* Required Parts.

See the Horton Medium Duty Fan Clutch Catalog (L-22470) for information on selecting the proper Temperature Switches.

TORQUE SPECIFICATIONS

Mounting Horton EC450™ Fan Clutch to Engine Fan Hub Drive

Cap Screw Size	Recommended Torque
8 mm	25-30 ft.-lb. [34-41 N·m]
10 mm	50-60 ft.-lb. [68-81 N·m]
3/8 inch	40-45 ft.-lb. [54-61 N·m]

Mounting Fan to Horton EC450 Fan Clutch

Stud Size	Recommended Torque
10 mm	30-35 ft.-lb. [41-47 N·m]
5/16 inch	18-20 ft.-lb. [24-27 N·m]
3/8 inch	30-35 ft.-lb. [41-47 N·m]

**For Technical Assistance
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