CLEANCUT® PUMP INSTRUCTIONS

52585-001 SERVICE AND INSTALLATION INSTRUCTIONS

Beckett®

CleanCut PF20322

CleanCut PF20323

CleanCut Two-Stage PF20422

⚠ WARNING

Professional Service Required

Incorrect installation, adjustment, or misuse of this product could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.

The pump must be installed, adjusted and put into operation only by a qualified individual or service agency that is:

- Licensed or certified to install and provide technical service to oil heating systems.
- Experienced with all applicable codes, standards and ordinances.
- Responsible for the correct installation and commission of this equipment.
- Skilled in the adjustment of oil burners using combustion test instruments.

The installation must strictly comply with all applicable codes, authorities having jurisdiction and the latest revision of the National Fire Protection Association Standard for the installation of Oil-burning Equipment, NFPA 31 (or CSA-B139 and CSA-B140 in Canada).

— Regulation by these authorities may require requirements and instructions to those provided in this installation manual.

These instructions cover only the replacement of a failed pump or the upgrade of an existing pump.

For instructions on how to install a new appliance, fuel tank, or burner see the applicable installation manuals.

⚠ WARNING

Oil Leak & Fire Hazard

Not adhering to the following may result in the failure of the valve seals and cause the pump to leak oil.

- Never exceed 3 psig on the Pump Inlet or Return Ports. (see NFPA 31-25, 8.6.3).
- Use with approved fuels ONLY. Approved fuels are listed on Figure 7, page 4 of these instructions. For additional fuels information, please refer to form # 664860 or visit **www.beckettcorp.com/fuels**
- Never place any fuel line restriction that may increase the pressure at the Pump Return Port.
- If a vacuum safety valve is used on the inlet line it must be equipped with an accumulator and pressure relief to the tank. Dangerous thermal expansion of oil trapped by an inlet line check valve can create extreme pressures that damage fuel unit seals, line fittings, inlet filters, gauges and other components.
- Do not use Teflon tape or compression fittings.

Disassembly

1. Disconnect the power to the burner and the oil supply system. Note the burner air settings.
2. Make sure the coil voltage on the pump matches the replacement part.
3. Unplug the cord set from the solenoid coil.
4. Remove all fuel lines: Supply line, output to the nozzle, and return line if used.
5. Remove the mounting screws. Most are 3/8” hex head.
6. Remove the existing pump and properly dispose (See Figure 1).
7. Inspect the plastic coupling shaft that drives the pump (See Figure 2). Replace if the “D” Shaped holes are rounded or the internal splines are worn.

Figure 1 - Loosen Screws / Fuel Line and Remove Plug

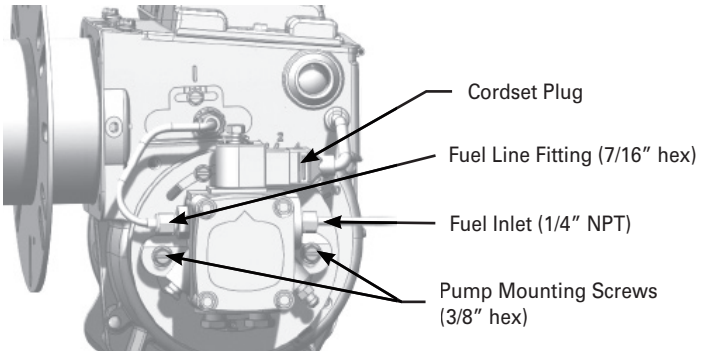
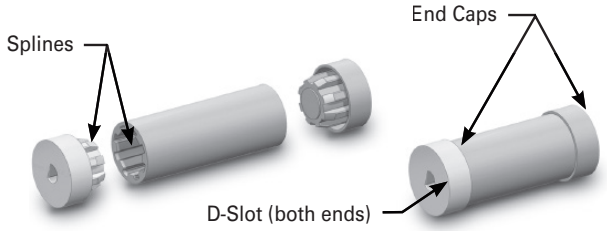


Figure 2 - Shaft Coupling



***Note:** The [X]s in the part numbers are placeholders for the complete pump model number.*

Beckett CleanCut Pumps		
Pump Kit Part No.	**Coil Voltage**	**Description**
PF20322 (A2EA-6527)	110/120VAC - 50/60 HZ	CleanCut
PF20323 (071N1121)	110/120VAC - 50/60 HZ	CleanCut
PF20332 (A2EA-6527)	220VAC - 50/60 HZ	CleanCut
PF20333 (071N1123)	220VAC - 50/60 HZ	CleanCut
PF20372 (A2EA-6527)	12VDC / 24VAC	CleanCut
PF20363 (07N1122)	12VDC	CleanCut
PF20353 (071N1125)	24VAC	CleanCut
PF20342 (A2EA-6527)	24VDC	CleanCut
PF20343 (071N1124)	24VDC	CleanCut
PF20422 (B2EA-6550)	120VAC 50/60HZ	2-Stage CleanCut

Note: The PF204[XX] CleanCut Pump with a double gear set is referred to as a " Two Stage" on the pump label. This pump is used to provide extra lift or long oil supply run lengths. This should not be confused with a "High Fire/Low Fire pump" which can also be described as a "2-Stage".

Maximum Allowable Vacuum Inches hg		
	PF203[XX]	**PF204[XX]**
Single Pipe System	6″	12″
Two Pipe System	12″	17″

Oil Supply Vacuum Test: To verify the operating vacuum is appropriate for the fuel pump.

- With no power and oil to the burner remove fittings to the pump.
- Install a vacuum gauge in an unused inlet port on the pump, or install a tee with a gauge in the inlet line and reconnect the oil supply line. A Beckett p/n T15 'Oil Watcher' is an excellent tool to perform this test
- Power the burner and check the gauge, letting the gauge stabilize.
- The table above shows the maximum allowable vacuum for the pump.

Note: Vacuum levels above the maximum limits can cause poor combustion performance.

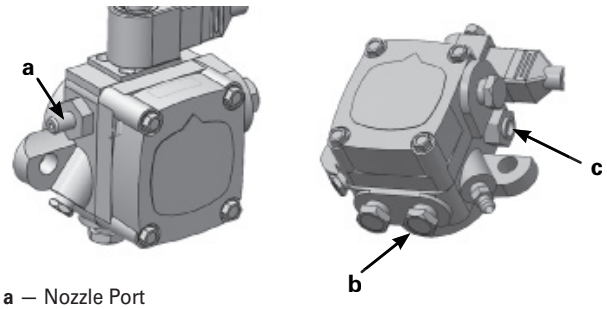
Replacement Parts		
Beckett Part No.	**Description**	**Where Used**
21807U	Cordset - 13″ Non-Delay	All CleanCut® Pumps
21887U	Cordset - 13″ w/ PD Timer	All CC Pumps - 4 Sec time Delay
3713824U	Solenoid Coil 120VAC	PF20322
3713798U	Solenoid Coil 240VAC	PF20332
3713823U	Solenoid Coil 12VDC / 24VAC	PF20372
071N0805U	Solenoid Coil 120VAC	PF20323
071N0806U	Solenoid Coil 240VAC	PF20333
071N0807U	Solenoid Coil 12VC	PF20363
21877U	Valve Stem	All PFx03x2 Pumps
S160-14	Cleancut® Strainer Kit	All 1-stage CleanCut Pumps
S190-8-10	Strainer cover gasket (10)	PF203x2 Pumps
S197-5-10	Strainer cover O-Ring (10)	PF203x3 Pumps

Couplings	
Beckett Part No.	**Burner Models**
2454	AF / AFG, NX, CF375
2801	RF175, AF / AFG, CF375 (With Outside Air Boot)
2433	SM / SF
2140501U	ADC
2154101U	SDC

Configure Pump Before Installation:

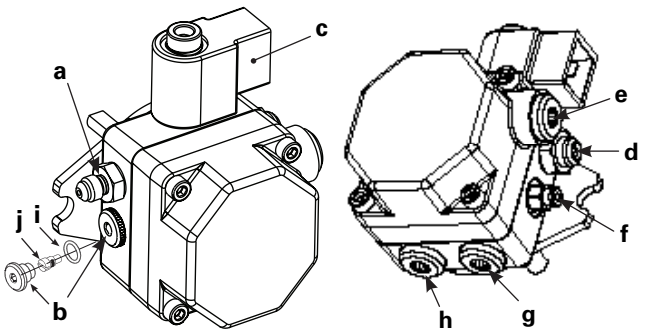
1. 1-Pipe Operation: Remove the 1/4" NPT plug from the desired inlet port with either 5/8" hex or 1/4" Allen wrench and discard. Connect inlet piping to the 1/4" NPT fitting using appropriate pipe sealant. DO NOT USE TEFLON TAPE OR COMPRESSION FITTINGS.
2. 2-Pipe Operation: The return port is only used for 2–pipe operation. For 2-pipe operation a bypass plug will need to be installed.
   a). CleanCut (Figure 3) — *PF203[X]2, PF20422*: Remove the return port 5/8" hex plug and discard. The port is located in the bottom of the pump. Install bypass plug set screw (1/16" – 27 NPT) with a 5/32" allen wrench in the return port and tighten. Connect return piping to the return port (1/4" NPT) using appropriate pipe sealant. Make sure no valves are placed in the return line. The return line can now be attached. DO NOT USE TEFLON TAPE or COMPRESSION FITTINGS.
   b). CleanCut (Figure 4) Page 3 — *PF203[X]3*: Remove the bypass plug access port (Item b) with a 5/32" allen wrench, located below the nozzle port. Do Not discard. Install bypass plug, which has the slotted screw head and tighten. Reinstall the access port making sure the O-ring is retained at the base of the plug and tighten. Remove the return port (Item g) located at the bottom of the pump with a 1/4" Allen wrench and discard. Connect return piping to the return port (1/4" NPT) using appropriate pipe sealant. Make sure no valves are placed in the return line. The return line can now be attached. DO NOT USE TEFLON TAPE or COMPRESSION FITTINGS.

Figure 3 — PF203x2, PF20422



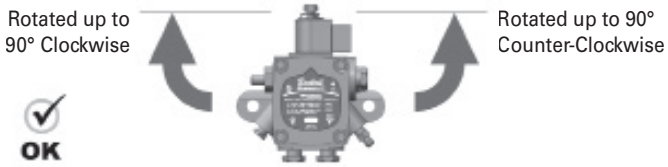
a — Nozzle Port
b — Return Port, remove plug for bypass plug installation and install return turn fuel line fitting here.
c — Pressure Adjustment (Slotted Screw)

Figure 4 — *PF203x3*



a — Nozzle Port 3/16″ Flare Fitting
b — By-pass Port Plug: 5/32″ Allen wrench
c — Solenoid.
d — Pressure Regulation 5/32″ Allen wrench
e — Inlet Port 1/4″ NPT, 1/4″ Allen wrench
f — Bleeder Valve 3/8″ hex
g — Return Port 1/4″ NPT, 1/4″ Allen wrench
h — Inlet Port 1/4″ NPT, 1/4″ Allen wrench
i — O-Ring
j — Bypass plug with screwdriver slot

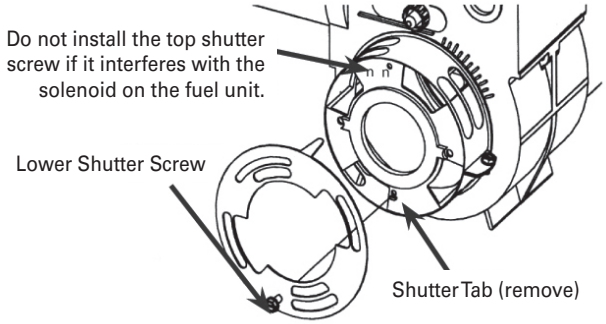
Figure 5 - Approved Pump Orientation



The Beckett CleanCut pump can be oriented in any position up to 90° from the horizontal ground plane (as shown above).

It must not be oriented upside down, or with the shaft pointing up or down.

Figure 6



Reassembly:

Fuel lines are assumed to be flare fittings or NPT pipe fittings. If in good condition, reconnect fuel lines using the existing fittings and pipes. Use pipe sealant on appropriate fittings. Use of pipe thread sealant compatible with both fuel oil and biodiesel fuel is required.

1. Install the coupling to the motor shaft. Apply a light coat of grease to the pump end of the coupling.
2. Align with the mounting holes and mount the pump using the bolts removed from the burner. See Figure 5 for appropriate pump mounting orientation, in reference to the horizontal plane.
3. To install a CleanCut pump on a housing that has two top shutter mounting holes, make sure the screw is installed in the hole on the left that is closest to the front of the burner (air tube side).
4. When upgrading to a CleanCut, on a housing that has only one air shutter locking screw, please see installation tips section and Figure 6 for guidance of removal of the lower tab, and use the bottom screw for locking the shutter.
5. Optional Cord Set Installation:
   a). Route the new cord set through the in the housing where the previous cord was located.
   b). Attach the violet and white wires of the cord set to the terminal location previously used on the control.
   c). Re-attach the control to the 4x4 junction box taking care not to pinch the wires in the 4x4.
   d). Close the igniter taking care not to pinch any wires.
   e). Connect the new cordset to the pump.

Installation Tips

1. If upgrading to a CleanCut pump and the shutter screw interferes with the solenoid on the pump, see Figure 6 and follow these steps:
   a). Remove existing pump and solenoid valves, if applicable, and appropriately dispose of them.
   b). Note the air setting of the shutter, then remove the air shutter, set the shutter aside to be reinstalled later.
   c). Remove the shutter tab by using a pair of side cutter pliers and file sharp edges flush with burner surface. This will permit the shutter to be locked securely.
   d). Install the air shutter using the screw located below the pump. Adjust the shutter to the original air setting and tighten screw securely. Check combustion performance with test instruments. See appliance manual or burner manual for guidance.
2. On older burners, do not install the top shutter screw, it will interfere with the solenoid on the fuel unit.
3. To install a CleanCut pump on a housing that has two top shutter mounting screw holes, make sure the screw is installed in the hole on the left that is closest to the front of the burner (air tube side).
4. Other Mounting Installations: The CleanCut Pump with a standard cord set or a PD Timer can be installed on the Carlin EZ-1, Wayne 'M', Wayne 'E', Wayne 'HS', Ducane 'DM', Aero, and other 3450 RPM burners.
5. Ducane 'DR': 5/16" diameter hole will have to be drilled into the housing through the wire cavity.
6. Weil-McLain 'QB': The valve coil blocks the air shutter screw. Allow enough slack in the cordset in order to pivot the valve coil away from the housing.

Bleeding The Pump

1. Open all fuel valves and check for line leaks. Tighten fittings and/or re-flare as needed to stop leaks. DO NOT use compression fittings.
2. One-pipe system requires a manual bleeding process. Two-pipe systems "bleed" automatically – but the bleeding process can be accelerated with a manual process.
3. Note: All fuel lines must be air tight with no leaks or burner performance will be impacted. Leaks can cause loss of prime, poor combustion, and rumbles / pulsations may occur.
4. For accelerated bleeding oil systems:
   a). Place a hose on the bleed port, and position a catch-can underneath.
   b). Open the 3/8" hex head on the port and turn counter clock-wise (CCW) 1/2 to 1 full turn, to allow oil flow into the catch-can.
   c). Apply power to the burner. The oil will begin flowing into the catch-can when the burner starts.
   d). Allow the oil to flow for 15 seconds in the can until there is no foam or air bubbles are present. If signs of air remain, make sure all air is purged from the oil filter cartridge.
   e). Tighten the 3/8" hex bleed port clock-wise (CW). Re-check the system for leaks.

Adjusting The Pump Pressure

1. Install a pressure gauge, dead heading the nozzle port.
2. Set the pump pressure to the required settings, which are located in the appliance manufactures instructions. If unavailable, consult the Beckett Spec Guide at www.beckettcorp.com. The new pump is factory set at 100 psi, unless noted otherwise.
3. Turn the adjustment screw CW with a slotted screw driver or 5/32" allen wrench to increase the pump pressure. See Figure 3 (Item c) page 2 and Figure 4 (Item e) page 3.
4. Cycle the burner and confirm the following:
   a). The pump output pressure is maintained at a level where it was set to in step 1 above, when the pump's coil is energized.
   b). The pump pressure decreases when the burner control removes power from the pump's valve coil. With the nozzle port dead-headed, the pressure will only drop to approximately 20% of the operating pressure.
   c). Remove power from the burner.
   d). Remove the Pressure Gauge. Connect the copper line to the nozzle port of the pump and tighten with a 7/16" hex wrench.
5. Turn power on to the burner and check all fuel line and fittings for leaks.
6. Check burner combustion performance with proper test equipment. See burner operating manual for testing guidelines.

Approved and Compatible Fuels

Burners and pumps sold by the RW Beckett Corporation are UL listed to UL296 (Burners) and UL343 (Pumps) respectively. The fuels approved for use under these listings conform to ASTM D396 for #1 and #2 heating oils, ASTM D396 for B6-B20, and fuels meeting CAN/CGSB-3.2 for Type 0, Type 1, and Type 2 in Canada. Sometimes it is desirable or necessary to use an alternative fuel that is not certified, but essentially meets one of these standards. The list in Figure 7 should be used as a guide when considering which fuels will function properly with Beckett liquid fuel burners. If the fuel you are considering is not listed in Figure 7, do NOT attempt to use it.

Figure 7 - Fuels for Burners and Pumps

Fuel Grade	Fuel Standard
Heating Oil #1	ASTM D396 (S15, S500, and S5000)*
Heating Oil #2	ASTM D396 (S15, S500, and S5000)*
Heating Oil B6-B20	ASTM D396 (S15, S500, and S5000)*
Heating Oil Types 0,1,2	CAN/CGSB-3.2
B5 (5%) Biodiesel Blends	Included in ASTM D396 #1 & #2
Diesel Fuel #1	ASTM D975 (S15 & S500)*
Diesel Fuel #2	ASTM D975 (S15 & S500)*
Diesel Fuel B6-B20	ASTM D7467-20a
Kerosene 1K (K-1)	ASTM D3699 Grade 1
Kerosene 2K (K-2)	ASTM D3699 Grade 2
Kerosene	CAN/CGSB-3.3
Gas turbine Oil #1	ASTM D2880 Grade 1
Gas turbine Oil #2	ASTM D2880 Grade 2
B21 - B100 Biodiesel Blends	Blends of ASTM D396 & D6751
Renewable Diesel (RD, HVO)	Meets ASTM D975
Jet A, Jet A-1	ASTM D1655
JP-5 (Military Jet Fuel)	MIL-DTL-5624, F44
JP-8 (Military Jet Fuel)	MIL-DTL-83133, F34

Note:
* Denotes Sulfur limit in fuel - Example: S15 = 15ppm Sulfur.

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