

INSTALLATION & SERVICING MANUAL

2HP SUBMERSIBLE GRINDER PUMPS

F&Q PUMPS

FG SERIES

MODELS:

- F(H)G2-21C – 200/230Volt, 1-Phase, Internal Capacitor Kit
- F(H)G2-21 – 200/230Volt, 1-Phase, External Capacitor Kit
- F(H)G2-23 – 200 / 230 / 460 Volt, 3-Phase

FC SERIES – Slicer Cutter Version

MODELS:

- F(H)C2-21C – 200/230Volt, 1-Phase, Internal Capacitor Kit
- F(H)C2-21 – 200/230Volt, 1-Phase, External Capacitor Kit
- F(H)C2-23 – 200 / 230 / 460 Volt, 3-Phase



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General Safety Information

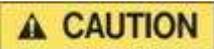
Please read this before installing or operating pump, this information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols:

NOTE: Indicates special instructions which are important but not related to hazards.

IMPORTANT: Indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

1. Most accidents can be avoided by using **COMMON SENSE**.

 **Do not wear loose clothing that may become entangled in the impeller or other moving parts. Always wear appropriate safety gear, such as safety glasses, when working on the pump or piping.**

 **Pumps build up heat and pressure during operation. Allow time for pumps to cool before handling or servicing.**

2. Only qualified personnel should install, operate, and repair pump.

 **Keep clear of suction and discharge openings. Do not insert fingers in pump with power connected.**

 **Do not pump Hazardous materials (flammable,**

caustic, etc.) unless the pump is specifically designed and designated to handle them.

3. Make sure lifting handles are securely fastened each time before lifting.

4. Do not lift pump by the power cord.

5. Do not exceed manufacturer's recommendation for maximum performance, as this could cause the motor to overheat.

6. Secure the pump in its operating position so it cannot tip over, fall, or slide.

7. Keep hands and feet away from impeller when power is connected.

 **Submersible pumps are not approved for use in swimming pools, recreational water installations, decorative fountains, or any installation where human contact with the pumped fluid is common.**

8. Operation against a closed discharge valve will cause premature bearing and seal failure on any pump.

 **To reduce risk of electrical shock, pump must be properly grounded in accordance with the United States National Electric Code (NEC), or the Canadian Electrical Code (CEC) and all applicable state, and local codes and ordinances.**

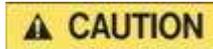
 **To reduce risk of electrical shock, always disconnect the pump from the**

power source before handling or servicing.

9. Any wiring of pumps should be performed by a qualified electrician.

 **Never operate a pump with a power cord that has frayed or brittle insulation.**

10. Cable should be protected at all times to avoid punctures, cuts, bruises, and abrasions – inspect frequently.

 **Never handle connected power cords with wet hands. Never operate a 120 volt pump with a plug-in type power cord without a ground fault circuit interrupter**

11. Do not remove cord and strain relief. Do not connect conduit to pump.

 **To reduce risk of electrical shock, all wiring and junction connections should be made per the United States National Electric Code (NEC), or the Canadian Electrical Code (CEC) and applicable state or province and local codes. Requirements may vary depending on usage and location. See wiring diagrams in manual.**

F&Q Pumps, Inc is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

Pump Specifications

- DISCHARGE ----- 1.1/4" NPT, Vertical
- LIQUID TEMPERATURE --- 120 degrees F (Continuous) 140 degrees F (Intermittent)
- MOTOR HOUSING----- Cast Iron, ASTM A-48, Class 30
- CORD CAP ----- Cast Iron, ASTM A-48, Class 30
- VOLUTE ----- Cast Iron, ASTM A-48, Class 30
- SEAL PLATE ----- Cast Iron, ASTM A-48, Class 30
- IMPELLER ----- Ductile Iron, 12 vane, Vortex with Pump-out Vanes, Dynamically Balanced
- SHREDDING RING ---- Hardened 440C Stainless Steel 56-60 Rockwell C
- GRINDER RING ----- Hardened 440C Stainless Steel 56-60 Rockwell C
- SLICER-IMPELLER ----- Hardened 440C Stainless Steel 56-60 Rockwell C
- PLATE-SLICER ----- Hardened 440C Stainless Steel 56-60 Rockwell C
- SHAFT ----- 420 Stainless Steel
- SHAFT SEAL--- Mechanical
 - Main (Motor): Carbide – Rotating Face Silicon – Stationary Face
 - Secondary(Pump): Silicon – Rotating Face Silicon – Stationary Face
 - Buna-N - Elastomer
- BEARING (UPPER) ---- Single Row, Ball, Oil Lubricated
- BEARING (LOWER)---- Single Row, Ball, Oil Lubricated
- SLEEVE BEARING ----- Bronze with Oil Groove
- HARDWARE----- 300 Series Stainless Steel
- O-RINGS ----- Buna-N
- CORD ENTRY ----- 30Ft Cord
 - Triple Sealed Design
 - Compression Grommet – Outer Jacket Seal
 - Epoxy Potted – Inner Conductor Seal
 - Butt Connector – Inner Wire Strand, Wicking Blockage
- MOTOR (THREE PHASE) --- 2 HP, 3450 RPM, 60 Hz
 - Tri-voltage, 200/230/460 volts.
 - On-Winding temperature sensor, requires sensor circuitry in control panel
 - Oil Filled, Class F
- MOTOR (SINGLE PHASE) --- 2 HP, 3450 RPM, 60 Hz
 - Dual-voltage, 200/230 volts
 - Overload Protec on in the Motor
 - Oil Filled, Class F
 - Capacitor Start/Capacitor Run
- OPTIONAL EQUIPMENT --- Seal Materials, Additional Cable Lengths, Leg Kits

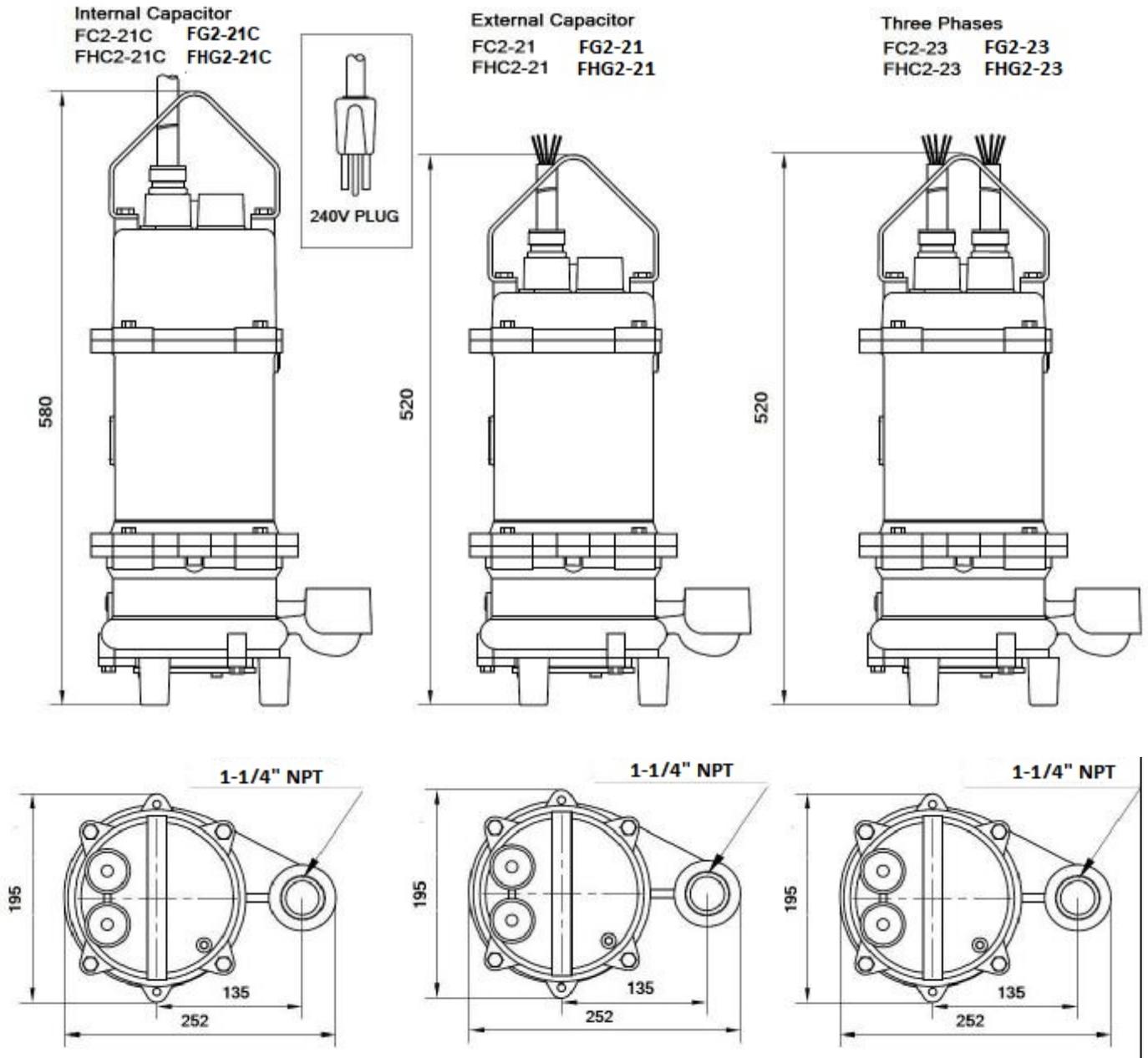
F(H)G Series Performance:

Model	HP	Volt. Phase	FLA amps	Gal/Min @ Total Head in Feet						Shut off	Weight (lbs.)
				20	40	60	80	100	120		
FG2-21	2	208~230/1	14.5	44	42	40	30	10		104	75
FG2-21C	2	208~230/1	14.5	44	42	40	30	10		104	75
FHG2-21	2	208~230/1	14.5	23	21	20	18	16	8	128	75
FHG2-21	2	208~230/1	14.5	23	21	20	18	16	8	128	75
FG2-23	2	230/460/3	8.8/4.4	44	42	40	30	10		104	75
FHG2-23	2	230/460/3	8.8/4.4	23	21	20	18	16	8	128	75

F(H)C Series Performance:

Model	HP	Volt. Phase	FLA amps	Gal/Min @ Total Head in Feet						Shut off	Weight (lbs.)
				20	40	60	80	100	120		
FC2-21	2	208~230/1	14.5	40	38	35	32	15		108	75
FC2-21C	2	208~230/1	14.5	40	38	35	32	15		108	75
FHC2-21	2	208~230/1	14.5	24	23	22	21	20	15	132	75
FHC2-21C	2	208~230/1	14.5	24	23	22	21	20	15	132	75
FC2-23	2	230/460/3	8.8/4.4	40	38	35	32	15		108	75
FHC2-23	2	230/460/3	8.8/4.4	24	23	22	21	20	15	132	75

Dimensions



IMPORTANT:

- PUMP MAY BE OPERATED "DRY" FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR AND/OR SEALS
- THIS PUMP IS APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION II HAZARDOUS LOCATIONS.
- THIS PUMP IS NOT APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CALSS I DIVISION I HAZARDOUS LOCATIONS.
- INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USED IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE

Installation

USAGE:

The 2 HP grinder pumps are for pumping domestic sewage. One pump can handle the sewage from a maximum of 2 homes.

These pumps are not to be used for pumping commercial or industrial sewage from factories, schools, motels, apartments, etc.

This pump is intended to grind and pump all normal sewage for home use. It will handle reasonable quantities of disposable diapers, sanitary napkins, paper towels, rubber material, wood, cigarette butts, string, plastic and other material not normally found in sewage.

CAUTION!

Pump is not to be disassembled in the field except at certified service stations or at the factory. Warranty is void if pump is taken apart for any reason other than to replace grinder impeller and grinder ring, which is covered in these instructions.

PACKAGING

Each pump is packaged with 30 feet of power cord in a carton that is marked with the Model Number. Longer cords are available - consult catalog.

INSPECTING PUMP

Before making any piping or electrical connections, check pump for any shipping damage. Turn grinder impeller to be sure it is free. DO NOT TURN IMPELLER WITH FINGERS AS EDGES ARE SHARP. Use alien wrench in the impeller screw to turn the impeller.

CAUTION!

No persons should be in the basin when pump is lowered into position! DO NOT lift pump in a manner where failure could result in loss of life.

After pump is installed in basin, NEVER WORK ON MOTOR OR GRINDER UNIT WITHOUT DISCONNECTING MOTOR LEAD WIRES FROM CONTROL PANEL. DO NOT RELY UPON OPENING THE CIRCUIT BREAKER ONLY!

ELECTRICAL:

MOTOR OVERLOAD PROTECTION Single phase motors are provided with an on-winding thermal overload switch. If motor overloads or overheats for any reason, the switch opens, stopping motor. As soon as the motor cools to normal temperature, the switch automatically closes and restarts motor.

MOISTURE DETECTION

All 2 HP, dual seal grinder pumps contain an electrode for detecting water within the unit. The electrode is housed within the seal chamber, isolated from the motor chamber by a mechanical seal. If the electrode detects water within the oil-filled housing, it will close the circuit to the red alarm light in the control panel, indicating the motor must be serviced before the upper seal fails.

MOTOR POWER CORDS (1-Phase)

Pump models with seal leak detector use a 5 conductor, #14 gauge cord. The three power conductors are BLACK, WHITE and RED.

The BLUE or ORANGE conductor connects to the seal leak probe and GREEN conductor connects to the ground screw inside the cord cap.

For single phase,

BLACK is "Common"

WHITE is "Run"

RED is "Start".

CORD SEAL

The lines from the motor chamber are sealed with a rubber sealing grommet that prevents oil from leaking into the cord cap compartment. If it is necessary to replace the power cord, the sealing grommet must not be loosened. This wire seal is removed only for complete motor repair that must be done at an authorized service center.

IMPORTANT!

Ground wires must be connected in the control box to grounding bar, which is connected to a good suitable ground. MOTOR IS NOT SAFE UNLESS PROPERLY GROUNDED.

REPLACING GRINDER IMPELLER AND SHREDDING RING

Note: This is the only disassembly operation permitted in the field.

All other repairs must be performed at an authorized service center or the factory.

STANDARD TOOLS REQUIRED:

- Standard socket wrench set.
- Standard set of open end wrenches.
- Hammer.
- Vise grip pliers.
- Allen head socket set.
- Screwdrivers.
- Wire brush.

CAUTION - Disconnect all power and control wires to motor at the control panel before starting the disassembly operations. Do not rely upon opening the circuit breaker only.

IMPORTANT

- Pump should be sanitized with bleach before starting work.
- Pump should be thoroughly cleaned of trash and deposits before starting disassembly operations.
- Wear protective gloves and clothing.
- Always use a rag on the impeller when turning to prevent cutting hands on the sharp edges of the shredding ring.

DISASSEMBLY OF SHREDDING RING AND GRINDER IMPELLER

1. Hold the grinder impeller by prying against the impeller cutting bar and remove the alien head cap screw from the end of the shaft.
2. Use a large screwdriver in the slot end of the shaft and tap (counterclockwise) on one of the large cutter vanes with a hammer. Tap in a counterclockwise direction (thread is right hand).
3. If the impeller removes easily, clean and replace if worn.
4. Make sure the pump impeller has not loosened when the grinder impeller was removed. This can be checked on reassembly of grinder impeller and shredding ring. The tips of the impeller cutter vanes should extend 1/8" below the bottom of the shredding ring. If the distance is greater, the pump impeller has loosened. If the distance is less, the shredding ring is not properly seated.
5. After the volute case has been removed, insert screwdriver in slot end of shaft and tap hammer against the outer vane of the ductile iron pump impeller (clockwise) to ensure it is threaded tight against shoulder on shaft.
6. Use large screwdriver to tap stainless steel cutter ring from cast iron volute.
7. Clean all threads with a wire brush and file smooth any nicked threads. Use NEVER-SEEZE or other graphite compound on threads before replacing grinder impeller.
8. Make sure alien head cap screw in bottom of pump shaft is tight. Make sure the impeller turns freely by hand after reassembly. Some drag will be present due to the shaft seals. There should not be any binding or tight spots when turning the grinder impeller.

TROUBLESHOOTING

The troubles listed below are potential problems involving the pump. Other troubles can occur from faulty control box operation. Consult control box instructions for troubleshooting list involving the control box.

PROBLEM

PROBABLE CAUSE

Pump will not run	Tripped breaker, blown fuse, poor electrical connection, interruption of power, improper power supply. Float switch defective or restricted. On single phase pumps, electronic start switch or capacitors blown. Overload in motor tripped. Solid material lodged in pump inlet.
Pump runs, but does not pump liquid from basin.	Pump impeller may be air locked. Start and stop pump several times to purge air. Check to ensure vent hole in volute is open and clean. Lower "OFF" float may be set too low, allowing air into pump. Pump inlet or valves in discharge pipe may be clogged. Discharge valve may be closed.
Pump hums but does not run.	Incorrect voltage Pump inlet plugged. Cutter jammed or loose on shaft, worn or damaged.
Pump delivers low volume of water.	Low voltage. On three phase pumps, motor running backwards. Discharge restricted. Check valve stuck closed or installed backwards. Pump motor damaged / worn. Pump may be air locked. Cutter loose or jammed on shaft, worn or damaged.
Pump is noisy.	Grinder impeller may be rubbing against grinder ring due to misalignment, bent shaft or object stuck in impeller. Grinder assembly may be partially clogged. Pump cavitation due to low discharge pressure.
Pump cycles frequently.	Check valve stuck closed or installed backwards. Ground water entering basin. Fixtures are leaking.
Pump will not turn off.	Float switch defective or movement restricted. H-O-A switch in panel is in "HAND" position. Pump may be air locked. Excessive inflow / pump not sized for the application.
Grease and solids accumulated in basin and will not pump out.	Pump "ON" switch may be set too high. Debris may have accumulated around lower float weight causing pump to turn off too soon. Clean debris away from weight and cord.
Red Sight illuminated at control box.	Moisture detection in double seal pumps indicating service is required. Lower seal has failed. Secondary seal still functioning.
Circuit breaker trips	Electrical short to ground. Check troubleshooting in control panel before pulling pump. Check all electrical cords for damage. Pull pump and take resistance readings of motor to determine if problem is in the pump or control box.

Limited Warranty

During the time periods and subject to the conditions hereinafter set forth, F&Q Pumps will repair or replace to the original user or consumer, any portion of your new F&Q Pumps product which proves defective due to defective materials or workmanship of F&Q Pumps. Contact your closest authorized F&Q Pumps representative or distributor for warranty service. At all times, F&Q Pumps shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts or components. Damage caused by acts of GOD or conditions beyond the control of F&Q Pumps is not covered by this warranty.

WARRANTY PERIOD:

12 months from date of installation / 18 months from date of manufacture, which-ever occurs first.

Start-up reports may be required to support warranty claims. Warranty effective only if F&Q Pumps supplied or authorized control panels are used. Single phase pumps must utilize F&Q Pumps supplied start components.

THIS WARRANTY WILL NOT APPLY:

- (1) To defects or malfunctions resulting from failure to properly install, operate or maintain the product in accordance with printed instructions provided.
- (2) To failures resulting from abuse, accident or negligence.
- (3) To normal maintenance services and the parts used in conjunction with such service.
- (4) To products which are not installed in accordance with applicable local codes, ordinances and good trade practices.
- (5) The product is used for purposes other than for what it was designed and manufactured.
- (6) If 3 phase motors are installed on a single phase power supply using a phase converter or if 3 phase power is supplied by only two transformers, making an open Delta system.

WARRANTY EXCLUSIONS:

F&Q Pumps specifically disclaims the implied warranties of merchantability and fitness for a particular purpose after the termination of the warranty period set forth herein. No warranties or representations at any time made by any representatives of F&Q Pumps shall vary or expand the provision hereof.

LIABILITY LIMITATION:

In no event shall F&Q Pumps be liable or responsible for consequential, incidental or special damages resulting from or related in any manner to any F&Q Pumps product or parts thereof. Personal injury and/or property damage may result from improper installation. F&Q Pumps disclaims all liability, including liability under this warranty, for improper installation. F&Q Pumps recommends following the instructions in the installation manual. When in doubt, consult a professional. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

LABOR, ETC, COSTS:

F&Q Pumps shall in no event be responsible or liable for the cost of field labor or other charges incurred by any customer in removing and/or reaffixing any F&Q Pumps' product, part or component thereof.

RETURNED OR REPLACED COMPONENTS:

Any item to be replaced under this Warranty must be returned to F&Q Pumps, or such other place as F&Q Pumps may designate, freight prepaid.

This warranty gives you specific legal rights and other rights which may vary from state to state.

In the absence of suitable proof of this purchase date, the effective date of this warranty will be based upon the date of manufacture. Example: 0118 = Month-Year = January, 2018