



E-Flo® DC 2-Ball Piston Pumps

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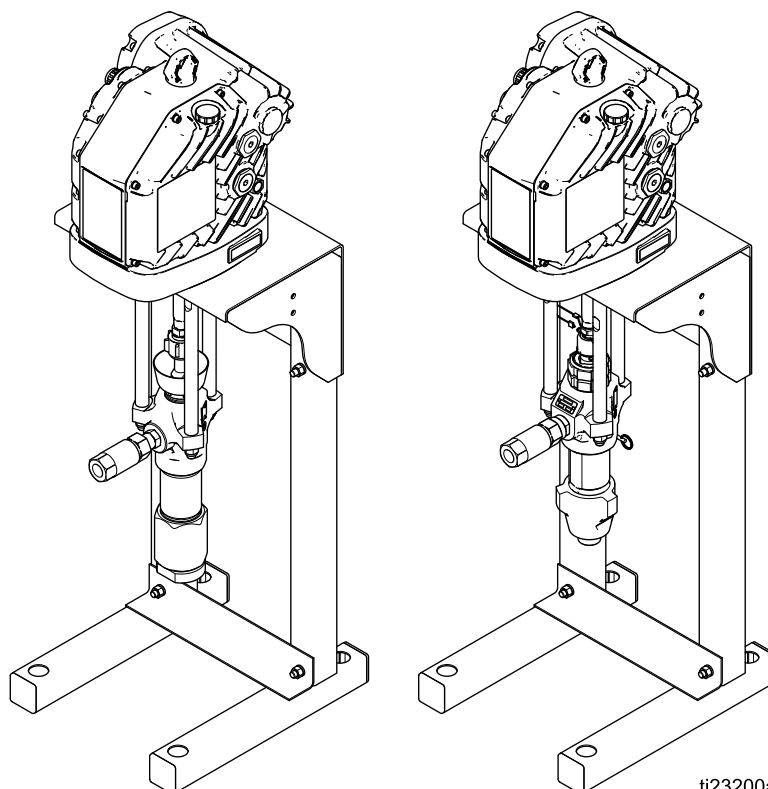
Electric drive piston pumps for low to medium volume paint circulation applications.
For professional use only.



Important Safety Instructions

Read all warnings and instructions in this manual and in the E-Flo DC Motor and E-Flo DC Three Phase manuals before using the equipment. Save these instructions.

*See Technical Specifications for
Maximum Working Pressure.
See page 3 for model part numbers and
approvals information.*



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Models

The part number for your equipment is printed on the equipment identification label. The part number includes digits from each of the following categories, depending on the configuration of your equipment. See [Pump Matrix, page 25](#) for a complete list of pump part numbers.

E-Flo DC Pump (ES)	Lower Pump Size (7, 8, 9, or 0)	Motor, Controls, Approvals (3–8 or C, D, G, H)	Pump Type and Fittings (4, 5, or 6)	Mounting Type (0, 1, or 2)
ES	7: 145 cc	3: 2 hp, Basic, Single Phase ATEX • FM • IECEX	4: Carbon Steel with three Xtreme packings and two leather packings	0: None
	8: 180 cc	4: 2 hp, Advanced, Single Phase ATEX • FM • IECEX	5: Stainless Steel with four leather packings and one PTFE packing	1: Stand
	9: 220 cc	7: 2 hp, Basic, Single Phase ATEX • IECEX • TIIS • KCS	6: Stainless Steel with leather packings and PTFE packings	2: Wall Bracket
	0: 290 cc	8: 2 hp, Advanced, Single Phase ATEX • IECEX • TIIS • KCS C: 2 hp, Basic, Three Phase ATEX • FM • IECEX D: 2 hp, Advanced, Three Phase ATEX • FM • IECEX G: 2 hp, Basic, Three Phase ATEX • IECEX • TIIS • KCS H: 2 hp, Advanced, Three Phase ATEX • IECEX • TIIS • KCS		

Approvals

Single phase and three phase pumps with basic motors: ESx3xx models ESx7xx models	ESxCxx models ESxGxx models	 	 II 2 G Ex db h IIA T3 Gb X
Single phase pumps with advanced motors: ESx4xx models ESx8xx models		 	 II 2 (1) G Ex db h [ia Ga] IIA T3 Gb X
Three phase pumps with advanced motors: ESxDxx models ESxHxx models		 	 II 2 (1) G Ex db h [ia op is Ga] IIA T3 Gb X

NOTE: See the E-Flo DC Motor manuals for motor approvals information.



Related Manuals

Manual No.	Description
3A2526	E-Flo DC Motor, Instructions-Parts
3A2527	E-Flo DC Control Module Kit, Instructions-Parts
3A4409	E-Flo DC Motor, Three Phase Instructions-Parts
3A4801	E-Flo DC Motor, Repair-Parts
311762	Xtreme® Lowers, Instructions-Parts
311827	Dura-Flo® Lowers, Instructions-Parts
3A9013	273319 Dura-Flo® Lower, Instructions-Parts
332013	Display Control Module (DCM) and Advanced Display Control Module (ADCM)






Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

DANGER

 	<p>SEVERE ELECTRIC SHOCK HAZARD</p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> • Turn off and disconnect the power at the main switch before disconnecting any cables and before servicing equipment. • This equipment must be grounded. Connect only to a grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
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WARNING

    	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in the work area can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in a well-ventilated area. • Eliminate all ignition sources such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking). • Ground all equipment in the work area. See Grounding instructions. • Never spray or flush solvent at high pressure. • Keep the work area free of debris, including solvent, rags, and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Use only grounded hoses. • Hold the gun firmly to the side of a grounded pail when triggering into a pail. Do not use pail liners unless they are antistatic or conductive. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area. <p>Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Clean plastic parts only in well ventilated area. • Do not clean with a dry cloth. • Do not operate electrostatic guns in equipment work area.
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WARNING










SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**





- Engage the trigger lock when not dispensing.
- Do not point the dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.



WARNING

 	<p>EQUIPMENT MISUSE HAZARD Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Specifications in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Specifications in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from your distributor or retailer. • Do not leave the work area while equipment is energized or under pressure. • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
 	<p>MOVING PARTS HAZARD Moving parts can pinch, cut, or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.
	<p>TOXIC FLUID OR FUMES Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read Safety Data Sheets (SDSs) to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>BURN HAZARD Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> • Do not touch hot fluid or equipment.
	<p>PERSONAL PROTECTIVE EQUIPMENT Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Installation

				
<p>Installation of this equipment involves potentially hazardous procedures. Only trained and qualified personnel who have read and who understand the information in this manual should install this equipment.</p>				

Location

When selecting the location for the equipment, keep the following in mind:

- There must be sufficient space on all sides of the equipment for installation, operator access, maintenance, and air circulation.
- Ensure that the mounting surface and mounting hardware are strong enough to support the weight of the equipment, fluid, hoses, and stress caused during operation.
- There must be a start/stop control (C) within easy reach of the equipment. See [Typical Installation, page 10](#).

Mount the Pump

Stand Mount

See [Stand Mounting Hole Pattern, page 30](#)





1. Select a level surface for the stand to be mounted to.
2. Secure the stand to the floor with M19 (5/8 in.) bolts. Use bolts that engage at least 152 mm (6 in.) into the floor to prevent the pump from tipping.
3. Place the pump and accessories over the bracket's mounting holes and secure with bolts (5) and washers (4) supplied.
4. Use shims to level the pump as required.

Wall Mount

See [Wall Mounting Hole Pattern, page 31](#).

1. Select a solid position on a wall for the mounting bracket. The wall should be capable of supporting the pump and accessories that will be attached to the bracket, any additional weight of the fluid used in the pump, and any stress or strain that may be applied during pump operation.
2. Drill four 7/16 in. (11 mm) diameter holes for the mounting bolts, approximately 5 ft (1.5 m) above the floor, using the wall bracket as a template. Use any of the three mounting hole groupings
3. Bolt the bracket securely to the wall. Use bolts designed to hold in the wall's construction.
4. Place the pump and accessories over the bracket's mounting holes and secure with screws (5) and washers (4) supplied.

Power Requirements

				
<p>Improper wiring may cause electric shock or other serious injury if work is not performed properly.</p> <ul style="list-style-type: none"> • This equipment must be grounded. Connect only to a grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations. 				

The system requires a dedicated circuit protected with a circuit breaker. See the following table for power requirements.

Table 1 . Power Specifications

Model	Voltage	Phase	Hz	Power
ESx3xx ESx4xx ESx7xx ESx8xx	200–250 Vac	1	50/60	2.9 kVA
ESxCxx ESxDxx ESxGxx ESxHxx	380–480 Vac	3	50/60	3.0 kVA

Hazardous Area Cabling and Conduit Requirements

Explosion Proof

All electrical wiring in the hazardous area must be encased in Class I, Division I, Group D approved explosion-proof conduit. Follow all national, state, and local electric codes.

A conduit seal (D) is required within 18 in. (457 mm) of the motor for the US and Canada. See Figs. 3 and 4.

All cables must be rated at 70°C (158°F).

Flame Proof (ATEX)

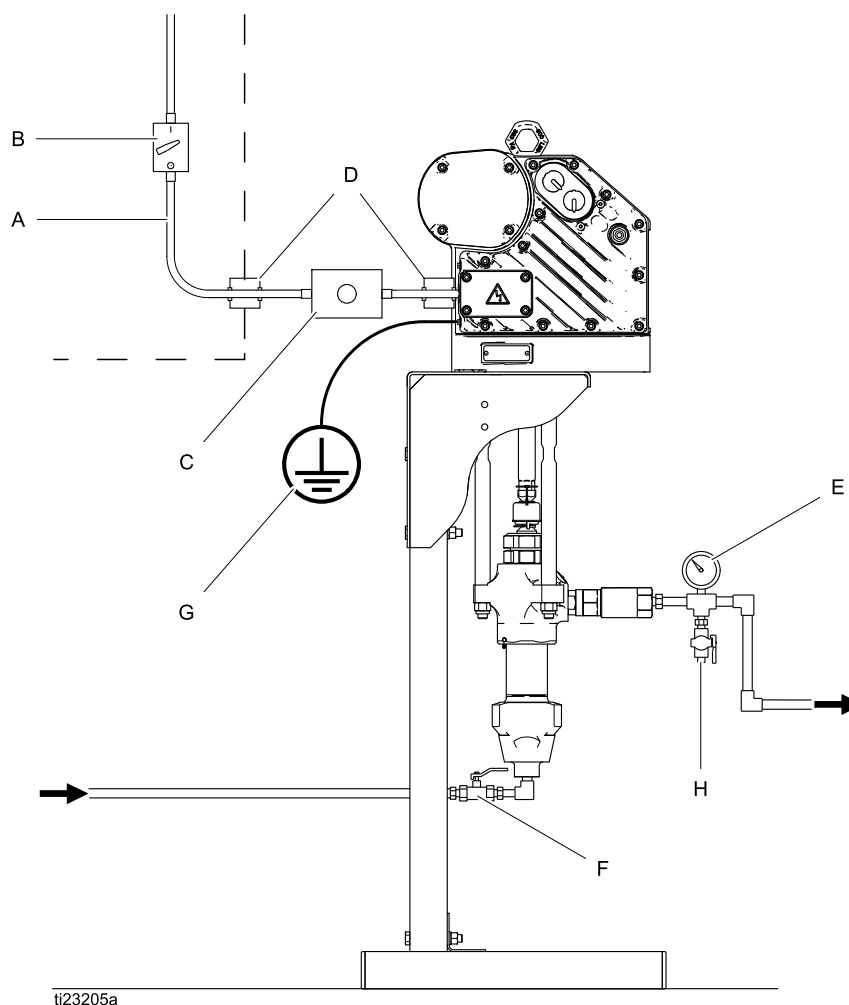
Use appropriate conduit, connectors, and cable glands rated for ATEX II 2 G. Follow all National, State, and Local electric codes.

All cable glands and cables must be rated at 70°C (158°F).

Typical Installation

NON-HAZARDOUS LOCATION

HAZARDOUS LOCATION



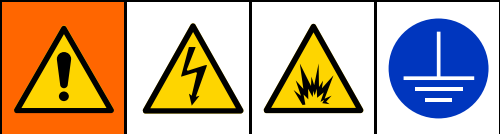
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Figure 1 Typical Installation

Key for Fig. 1	
A	Electrical Supply (must be sealed conduit approved for use in hazardous locations)
B	Disconnect, with lock
C	Start/Stop Control (must be approved for use in hazardous locations)
D	Explosion Proof Conduit Seal. Required within 18 in. (457 mm) of the motor for the US and Canada.

Key for Fig. 1	
E	Fluid Pressure Gauge
F	Fluid Shutoff Valve
G	Pump Ground Wire. Two ground terminals are provided if local code requires redundant grounding connections.
H	Fluid Drain Valve

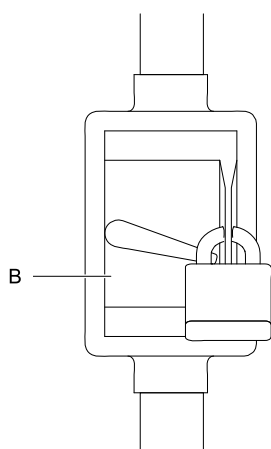
Connect the Supply Wiring



Improper wiring may cause electric shock or other serious injury if work is not performed properly.

- This equipment must be grounded. Connect only to a grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

1. Ensure that the disconnect (B, Fig 2) is shut off and locked out.

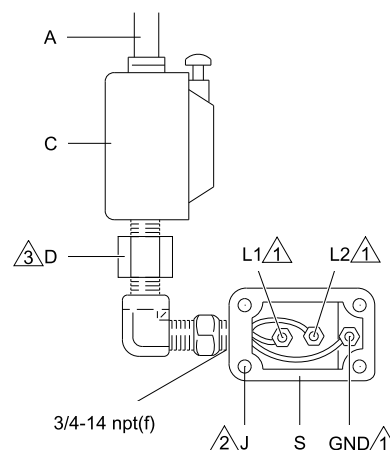


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Figure 2 Locked Out Disconnect

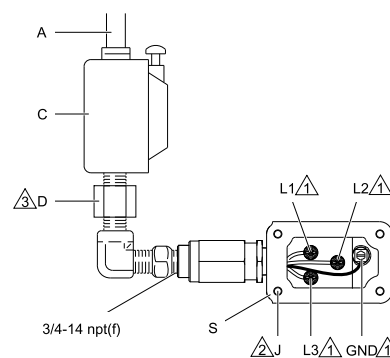
2. See Figs. 3 and 4. Install a start/stop control (C) in the electrical supply line (A), within easy reach of the equipment. The start/stop control must be approved for use in hazardous locations.

3. Open the electrical compartment (S) on the motor.
4. Bring the supply wires into the electrical compartment through the 3/4–14 npt(f) inlet port. Connect the wires to the terminals, as shown in Figs. 3 and 4. Torque the terminal nuts to 15 in-lb (1.7 N•m) maximum. **Do not over-torque.**



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Figure 3 Connect the Power Wires, Single Phase







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Figure 4 Connect the Power Wires, Three Phase

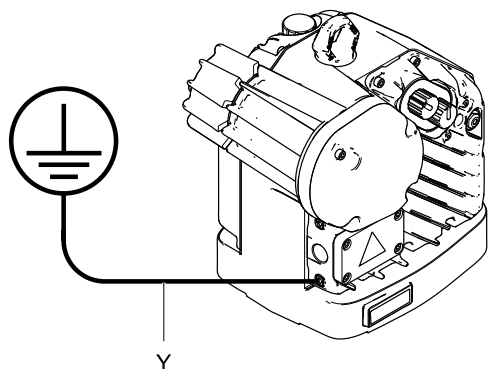
Notes for Figs. 3 and 4	
1	Tighten all terminal nuts to 15 in-lb (1.7 N•m) maximum. Do not over-torque.
2	Tighten cover screws to 15 ft-lb (20.3 N•m).
3	A conduit seal (D) is required within 18 in. (457 mm) of the motor for the US and Canada.

5. Close the electrical compartment. Torque the cover screws to 15 ft-lb (20.3 N•m).

Grounding

				
<p>This equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.</p>				

1. Connect the supply ground wire in the electrical compartment as shown in [Connect the Supply Wiring, page 11](#).
2. Connect a ground wire as shown in Fig. 5. Loosen the ground screw and attach a ground wire (Y, Graco part 222011, not supplied). Tighten the ground screw securely. Connect the other end of the ground wire to a true earth ground.



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Figure 5 Ground Wire

NOTE: Advanced models require installation of a control module. All pumps connected to a common control module must be grounded to the same ground point. Different ground points (unequal potential) may cause current to flow through component cables, causing incorrect signals.

Pump	Control Module
ESx4xx	24P822
ESx8xx	24X599
ESxDxx	17V232
ESxHxx	17V233

3. **Fluid hoses:** Use only electrically conductive hoses with a maximum of 500 ft. (150 m) combined hose length to ensure grounding continuity. Check the electrical resistance of hoses. If total resistance to ground exceeds 25 megohms, replace hose immediately
4. **Fluid supply container:** Follow your local code.
5. **Solvent pails used when flushing:** Follow your local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts grounding continuity.

6. **To maintain grounding continuity when flushing or relieving pressure:** Hold metal part of the spray gun or valve firmly to the side of a grounded metal pail, then trigger the gun or open the valve.

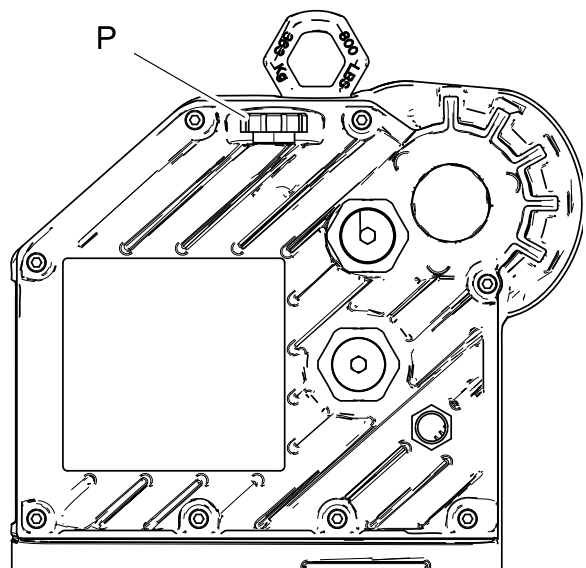
Fluid Line Accessories

Install the following accessories as shown in Fig. 1, using adapters as necessary. All fluid lines and accessories must be rated to the maximum working pressure of the pump. See [Technical Specifications, page 35](#).

- **Fluid drain valve (H):** required in your system, to relieve fluid pressure in the hose and circulation system.
- **Fluid pressure gauge (E):** for more precise adjustment of the fluid pressure.
- **Fluid shutoff valve (F):** shuts off fluid flow.

Check the Oil Level Before Using the Equipment

The motor is pre-filled with oil. Before using the equipment, replace the shipping plug with the vented fill cap (P) that is included with the motor.



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Figure 6 Sightglass and Oil Fill Cap

Flush Before Using the Equipment

The pump fluid section was tested with lightweight oil, which is left in the fluid passages to protect parts. To avoid contaminating your fluid with oil, flush the equipment with a compatible solvent before using the equipment.

Control Module Accessory

The Control Module Accessory is required with Advanced E-Flo DC motors to provide the interface for users to enter selections and view information related to setup and operation. See the Control Module Accessory Kit manual for installation and operation information.

Operation

Startup

To operate the pump, follow the Startup instructions for the Basic or Advanced motor in the Motor manual. The Advanced E-Flo DC motors require installation of a Control Module Accessory Kit (see table) to provide the interface for users to enter selections and view information related to setup and operation. See the Control Module Accessory Kit manual 3A2527 for installation and operation information.

Pump	Control Module
ESx4xx	24P822
ESx8xx	24X599
ESxDxx	17V232
ESxHxx	17V233

Run the pump at a slow speed until the fluid lines are primed and all air is forced out of the system.

NOTICE

Do not use Xtreme pump lowers for waterborne paints, because the pumps are carbon steel and waterborne paints will cause them to rust.

Shutdown

Follow the [Pressure Relief Procedure, page 14](#). Stop the pump at the bottom of its stroke to prevent fluid from drying on the exposed displacement rod and damaging the throat packings.

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid, and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Disengage the start/stop control (C). See Fig. 1.
2. Shut off and lock out the disconnect (B).
3. Open the fluid drain valve (H), having a waste container ready to catch drainage. Leave open until you are ready to pressurize system again.

Maintenance

See the motor manual for required motor maintenance procedures.

Preventive Maintenance Schedule

The operating conditions of your particular system determine how often maintenance is required. Establish a preventive maintenance schedule by recording when and what kind of maintenance is needed, and then determine a regular schedule for checking your system.

Change the Oil

NOTE: Change the oil after a break-in period of 200,000–300,000 cycles. After the break-in period, change the oil once a year.

1. See Fig. 7. Place a minimum 2 quart (1.9 liter) container under the oil drain port. Remove the oil drain plug (25). Allow all oil to drain from the motor.
2. Reinstall the oil drain plug (25). Torque to 25–30 ft-lb (34–40 N•m).
3. See Fig. 8. Open the fill cap (P) and add Graco Part No. 16W645 ISO 220 silicone-free synthetic gear oil. Check the oil level in the sight glass (K). Fill until the oil level is near the halfway point of the sight glass. The oil capacity is approximately 1.5 quarts (1.4 liters). **Do not overfill.**
4. Reinstall the fill cap.

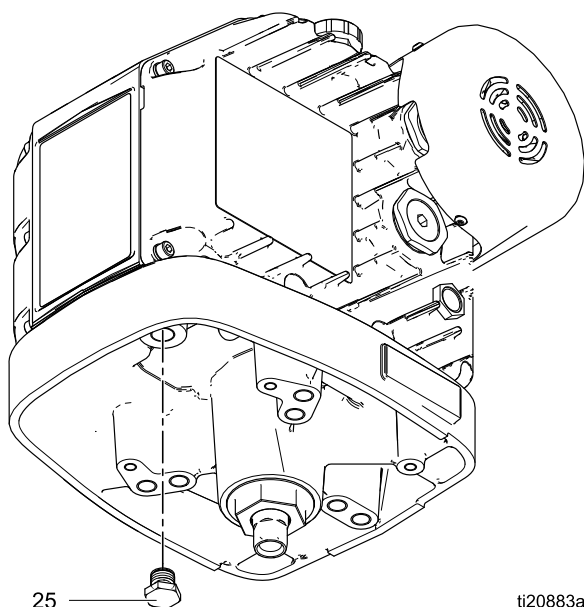
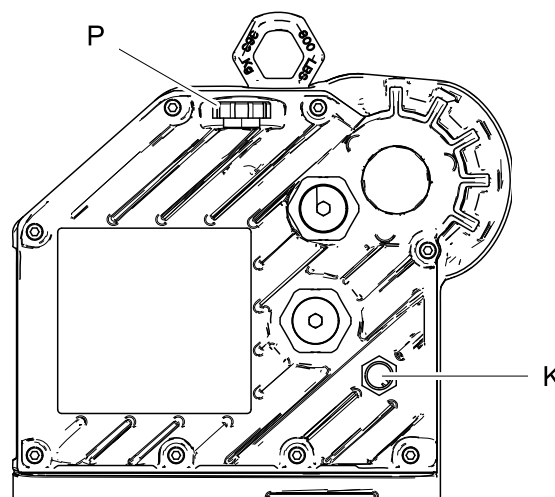


Figure 7 Oil Drain Plug

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Check the Oil Level

See Fig. 8. Check the oil level in the sight glass (K). The oil level should be near the halfway point of the sight glass when the unit is not running. If low, open the fill cap (P) and add Graco Part No. 16W645 ISO 220 silicone-free synthetic gear oil as required. The oil capacity is approximately 1.5 quarts (1.4 liters). **Do not overfill.**



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Figure 8 Sightglass and Oil Fill Cap

Wet Cups

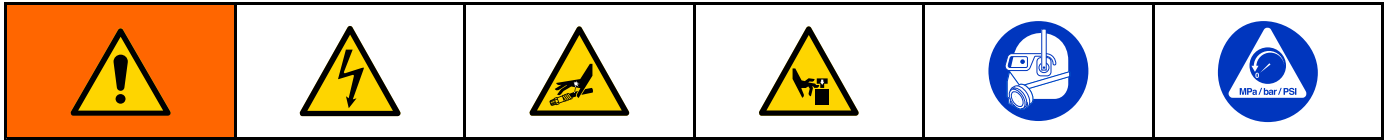
Check the wet cup daily. Keep the wet cup 1/3 filled with Graco Throat Seal Liquid (TSL™) or compatible solvent.

Flushing

To avoid fire and explosion, always ground equipment and waste containers. To avoid static sparking and injury from splashing, always flush at the lowest possible pressure.				

- Flush before changing fluids, before fluid can dry in the equipment, at the end of the day, before storing, and before repairing equipment.
- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.
- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

Troubleshooting



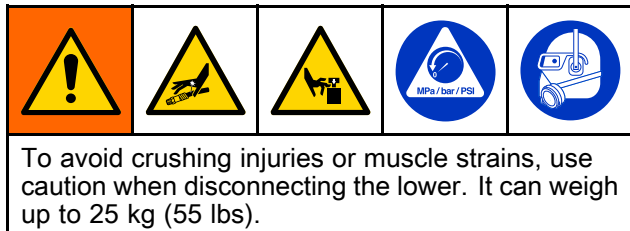
- Follow the [Pressure Relief Procedure, page 14](#) before checking or servicing the equipment.
- Check all possible problems and causes before disassembly.
- The LED on the motor blinks if an error is detected. See **Error Code Troubleshooting** in the motor manual for more information.

Problem	Cause	Solution
Pump output low on both strokes.	Inadequate power.	See Power Requirements, page 8 .
	Exhausted fluid supply.	Refill and reprime pump.
	Clogged fluid outlet line, valves, etc.	Clear.
	Worn piston packing.	Replace. See lower manual.
Pump output low on only one stroke.	Held open or worn ball check valves.	Check and repair. See lower manual.
	Worn piston packing.	Replace. See lower manual.
No output.	Improperly installed ball check valves.	Check and repair. See lower manual.
Pump operates erratically.	Exhausted fluid supply.	Refill and reprime pump.
	Held open or worn ball check valves.	Check and repair. See lower manual.
	Worn piston packing.	Replace. See lower manual.
Pump will not operate.	Inadequate power.	See Power Requirements, page 8 .
	Exhausted fluid supply.	Refill and reprime pump.
	Clogged fluid outlet line, valves, etc.	Clear.
	Fluid dried on piston rod.	Disassemble and clean pump. See lower manual. In future, stop pump at bottom of stroke.

Repair

Dura-Flo Lowers

Disassembly



1. Stop the pump at the bottom of its stroke.
2. Relieve the pressure. Follow the .
3. Disconnect the hoses from the lower and plug the ends to prevent fluid contamination.

4. Loosen the coupling nut (11) and remove the collars (10). See Fig. 9.
5. Remove the coupling nut from the piston rod (R).
6. Unscrew the locknuts (8) from the tie rods (6).
7. Separate the motor (3) and lower (7).

To repair the lower, see the Dura-Flo Lower instruction manual 311827. To repair the motor, see repair manual 3A4801.

Reassembly

1. If the coupling adapter (9) and tie rods (6) have not been disassembled from the motor (3), skip to step 2.

If the coupling adapter (9) and tie rods (6) have been disassembled from the motor (3), follow these steps:

- a. Screw the tie rods (6) into the motor (3) and torque to 50-60 ft-lb (68-81 N•m).
 - b. Screw the coupling adapter (9) into the motor shaft and torque to 90-100 ft-lb (122-135 N•m).
 - c. Reassemble the pump to the motor. Use the applicable instructions for your pump ([Dura-Flo, page 18](#) or [Xtreme, page 20](#)).
 - d. Continue to step 2.
2. Assemble the coupling nut (11) to the piston rod (R).
3. Orient the lower (7) to the motor (3). Position the lower (7) on the tie rods (6). Lubricate the threads of the tie rods (6).
4. Screw the tie rod locknuts (8) onto the tie rods (6). Tighten the locknuts (8) and torque to 50-60 ft-lb (68-81 N•m).
5. Insert the collars (10) into the coupling nut (11). Tighten the coupling nut (11) onto the coupling adapter (9) and torque to 90-100 ft-lb (122-135 N•m).
6. Flush and test the pump before reinstalling it in the system. Connect hoses and flush the pump. While it is pressurized, check for smooth operation and leaks. Adjust or repair as necessary before reinstalling in the system. Reconnect the pump ground wire before operating.

NOTE: When used with E-Flo DC motors, Dura-Flo lowers require a check valve (35) to be installed.

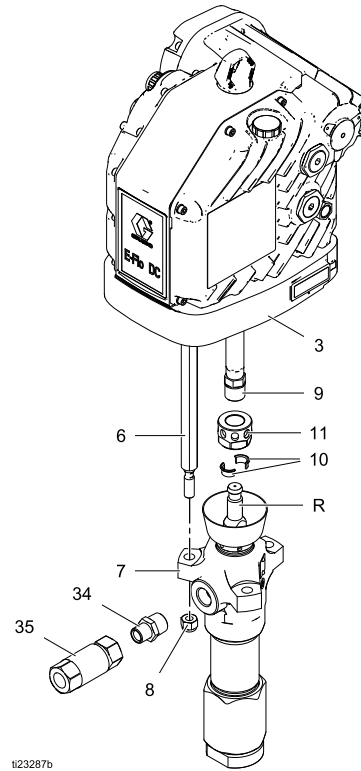


Figure 9 Dura-Flo Pump Assembly

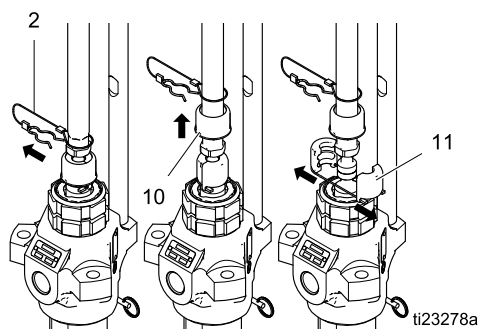
Xtreme Lowers

Disassembly

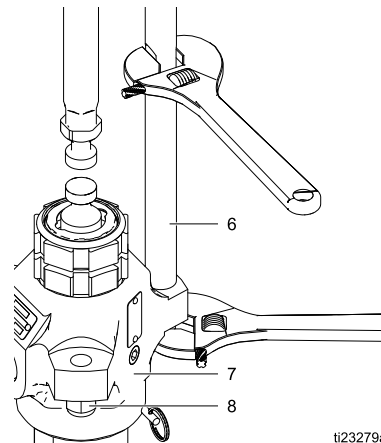


To avoid crushing injuries or muscle strains, use caution when disconnecting the lower. It can weigh up to 25 kg (55 lbs).

1. Stop the pump at the bottom of its stroke.
2. Relieve the pressure. Follow the [Pressure Relief Procedure](#), page 14.
3. Disconnect the hoses from the lower and plug the ends to prevent fluid contamination.
4. Remove clip (2) and slide coupling cover (10) up to remove the coupling (11).



5. Unscrew the nuts (8) and remove the lower (7). Use a wrench to hold the tie rod flats to keep the rods from turning.



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To repair the lower, see the Xtreme Lower instruction manual 311762. To repair the motor, see repair manual 3A4801.

Reassembly

1. If the coupling adapter (9) and tie rods (6) have not been disassembled from the motor (3), skip to step 2.

If the coupling adapter (9) and tie rods (6) have been disassembled from the motor (3), follow these steps:

- a. Screw the tie rods (6) into the motor (3) and torque to 50-60 ft-lb (68-81 N•m).
 - b. Screw the coupling adapter (9) into the motor shaft and torque to 90-100 ft-lb (122-135 N•m).
 - c. Reassemble the pump to the motor. Use the applicable instructions for your pump ([Dura-Flo, page 18](#) or [Xtreme, page 20](#)).
 - d. Continue to step 2.
2. Orient the lower (7) to the motor (3). Position the lower (7) on the tie rods (6). Lubricate the threads of the tie rods (6).
 3. Screw the tie rod locknuts (8) onto the tie rods (6). Tighten the locknuts (8) and torque to 50-60 ft-lb (68-81 N•m).
 4. Raise the motor shaft. Place the coupling cover (10) onto the coupling adapter (9) and lower the motor shaft. Place the coupling (11) onto the lower (7) and slide the coupling cover (10) over the coupling (11). Insert clip (2).
 5. Flush and test the pump before reinstalling it in the system. Connect hoses and flush the pump. While it is pressurized, check for smooth operation and leaks. Adjust or repair as necessary before reinstalling in the system. Reconnect the pump ground wire before operating.

NOTE: When used with E-Flo DC motors, Xtreme lowers require a check valve (33) to be installed.

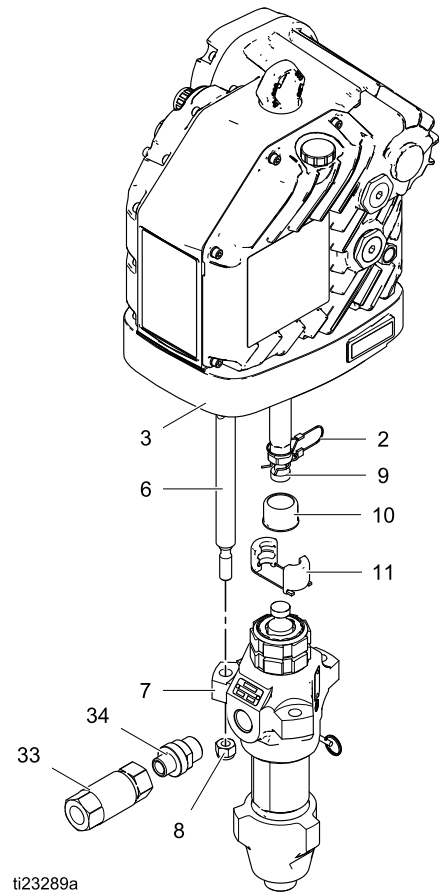
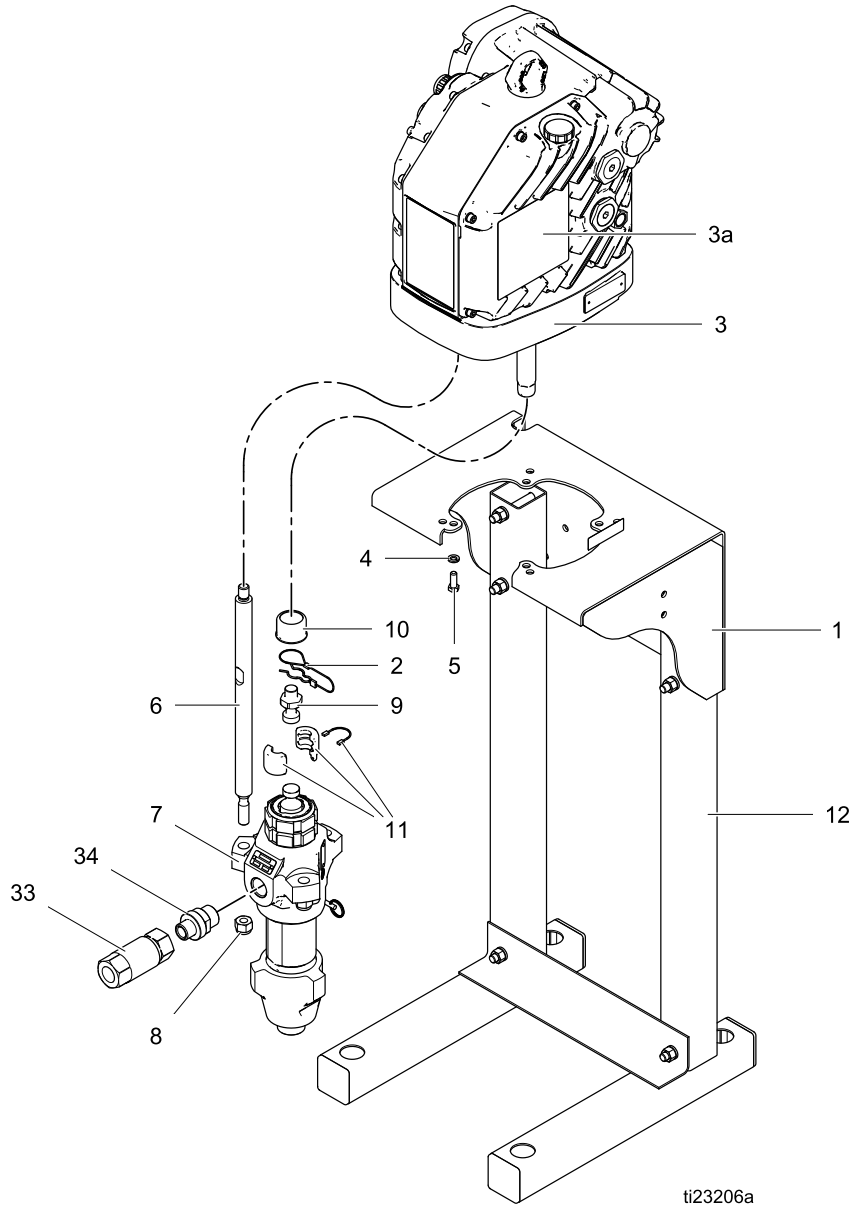


Figure 10 Xtreme Pump Assembly

Parts

Xtreme Pump Assembly

See [Models, page 3](#) for an explanation of the pump part number.



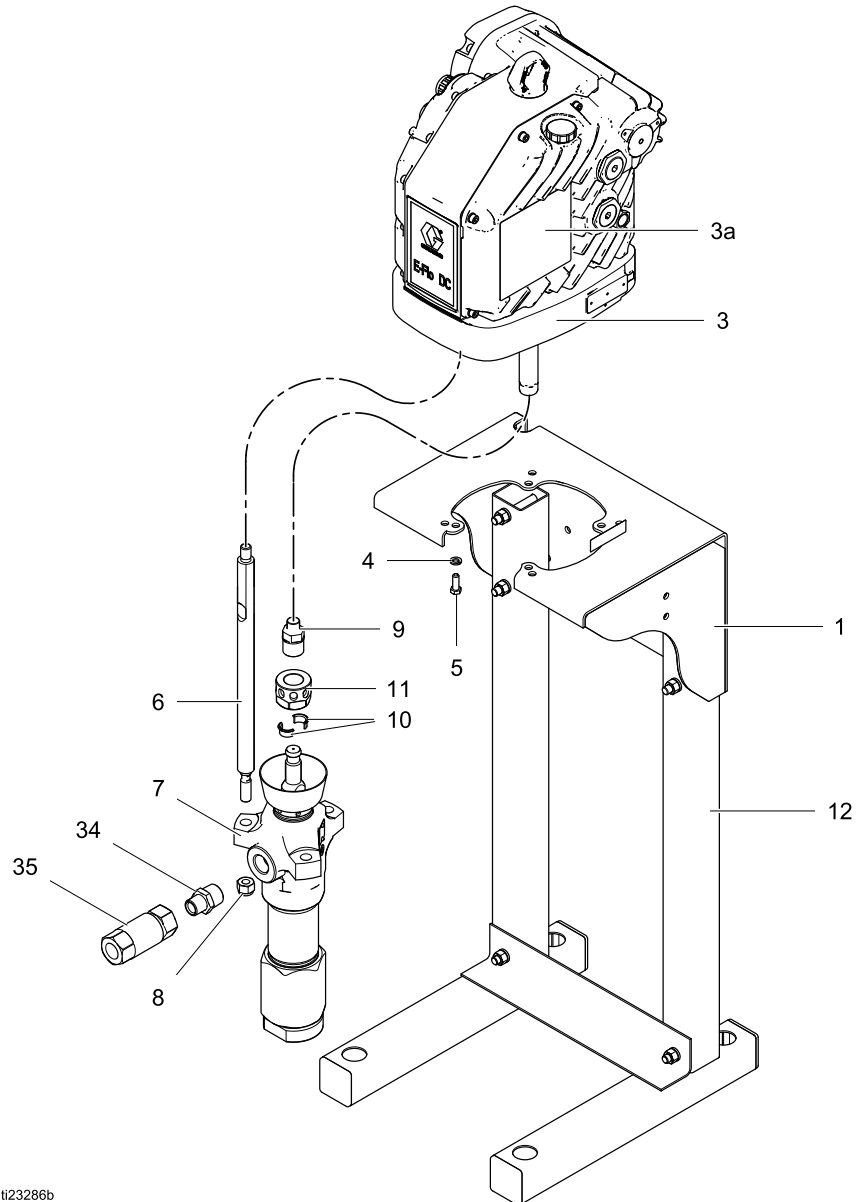
Parts

Ref	Part	Description	Qty
1	See Pump Matrix, page 25	KIT, mounting bracket, pump; includes items 4 and 5; see manual 311619	1
2	244820	CLIP, hairpin	1
3	See Pump Matrix, page 25	MOTOR, Basic; see motor manual; includes items 3a and 3b	1
3a [▲]	17J476	LABEL, warning	1
3b	16W645	OIL, gear, synthetic; ISO 220 silicone-free; 1 quart (0.95 liter); not shown	2
4	See Pump Matrix, page 25	WASHER	4
5	See Pump Matrix, page 25	BOLT	4
6	15F837	ROD, tie	3
7	See Pump Matrix, page 25	PUMP, displacement; see lower manual	1
8	107112	NUT, lock, hex	3
9	15H392	ADAPTER	1
10	197340	COVER, coupler	1
11	244819	Coupling Assembly	1
12	See Pump Matrix, page 25	STAND, floor	1
33	16T480	VALVE, check	1
34	See Pump Matrix, page 25	FITTING	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

Dura-Flo Pump Assembly

See [Models, page 3](#) for an explanation of the pump part number.



ti23286b

Parts

Ref	Part	Description	Qty
1	See Pump Matrix, page 25	KIT, mounting bracket, pump; includes items 4 and 5; see manual 311619	1
3	See Pump Matrix, page 25	MOTOR; Basic or Advanced; see motor manual; includes items 3a and 3b	1
3a▲	17J476	LABEL, warning	1
3b	16W645	OIL, gear, synthetic; ISO 220 silicone-free; 1 quart (0.95 liter); not shown	2
4	See Pump Matrix, page 25	WASHER	4
5	See Pump Matrix, page 25	BOLT	4
6	15H562	ROD, tie	3
7	See Pump Matrix, page 25	PUMP, displacement; see lower manual	1
8	101712	NUT, lock	3
9	15H370	ADAPTER	1
10	184129	COLLAR, coupling	2
11	186925	NUT, coupling	1
12	See Pump Matrix, page 25	STAND, floor	1
34	See Pump Matrix, page 25	FITTING	1
35	24S039	VALVE, check	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

Pump Matrix

Pump Part No.	Pump Series	Mounting Bracket (Ref 1)	Floor Stand (Ref 12)	Motor (Ref 3)	Washer (Ref 4)	Bolt (Ref 5)	Lower Pump (Ref 7)*	Fitting (Ref 34)
ES0340	A	— — — —	— — — —	EM0021	— — — —	— — — —	L29AC1	15C257
ES0341	A	255143	256193		100133	100101	L29AC1	15C257
ES0342	A	255143	— — — —		100133	100101	L29AC1	15C257
ES0350	A	— — — —	— — — —		— — — —	— — — —	247192	16C946
ES0351	A	255143	256193		100133	100101	247192	16C946
ES0352	A	255143	— — — —		100133	100101	247192	16C946
ES7360	A	— — — —	— — — —		— — — —	— — — —	247168	190724
ES7361	A	255143	256193		100133	100101	247168	190724
ES7362	A	255143	— — — —		100133	100101	247168	190724
ES8340	A	— — — —	— — — —		— — — —	— — — —	L18AC1	175013
ES8341	A	255143	256193		100133	100101	L18AC1	175013
ES8342	A	255143	— — — —		100133	100101	L18AC1	175013
ES8350	A	— — — —	— — — —		— — — —	— — — —	261657	190724
ES8351	A	255143	256193		100133	100101	261657	190724
ES8352	A	255143	— — — —		100133	100101	261657	190724
ES9340	A	— — — —	— — — —		— — — —	— — — —	L22AC1	15C257
ES9341	A	255143	256193		100133	100101	L22AC1	15C257
ES9342	A	255143	— — — —		100133	100101	L22AC1	15C257
ES9350	A	— — — —	— — — —		— — — —	— — — —	247190	16C946
ES9351	A	255143	256193		100133	100101	247190	16C946
ES9352	A	255143	— — — —		100133	100101	247190	16C946
ES0440	A	— — — —	— — — —	EM0022	— — — —	— — — —	L29AC1	15C257
ES0441	A	256143	256193		100133	100101	L29AC1	15C257
ES0442	A	256143	— — — —		100133	100101	L29AC1	15C257
ES0450	A	— — — —	— — — —		— — — —	— — — —	247192	16C946
ES0451	A	255143	256193		100133	100101	247192	16C946
ES0452	A	255143	— — — —		100133	100101	247192	16C946
ES7440	A	— — — —	— — — —		— — — —	— — — —	L14AC1	175013
ES7441	A	255143	256193		100133	100101	L14AC1	175013
ES7442	A	255143	— — — —		100133	100101	L14AC1	175013
ES7460	A	— — — —	— — — —		— — — —	— — — —	247168	190724
ES7461	A	255143	256193		100133	100101	247168	190724
ES7462	A	255143	— — — —		100133	100101	247168	190724
ES8440	A	— — — —	— — — —		— — — —	— — — —	L18AC1	175013
ES8441	A	255143	256193		100133	100101	L18AC1	175013
ES8442	A	255143	— — — —		100133	100101	L18AC1	175013
ES8450	A	— — — —	— — — —		— — — —	— — — —	261657	190724
ES8451	A	255143	256193		100133	100101	261657	190724
ES8452	A	255143	— — — —		100133	100101	261657	190724
ES9440	A	— — — —	— — — —		— — — —	— — — —	L22AC1	15C257
ES9441	A	255143	256193		100133	100101	L22AC1	15C257
ES9442	A	255143	— — — —		100133	100101	L22AC1	15C257
ES9450	A	— — — —	— — — —		— — — —	— — — —	247190	16C946
ES9451	A	255143	256193		100133	100101	247190	16C946
ES9452	A	255143	— — — —		100133	100101	247190	16C946

Parts

Pump Part No.	Pump Series	Mounting Bracket (Ref 1)	Floor Stand (Ref 12)	Motor (Ref 3)	Washer (Ref 4)	Bolt (Ref 5)	Lower Pump (Ref 7)*	Fitting (Ref 34)
ES0740	A	----	----	EM0023	----	----	L29AC1	15C257
ES0741	A	255143	256193		100133	100101	L29AC1	15C257
ES0742	A	255143	----		100133	100101	L29AC1	15C257
ES0750	A	----	----		----	----	247192	16C946
ES0751	A	255143	256193		100133	100101	247192	16C946
ES0752	A	255143	----		100133	100101	247192	16C946
ES7760	A	----	----		----	----	247168	190724
ES7761	A	255143	256193		100133	100101	247168	190724
ES7762	A	255143	----		100133	100101	247168	190724
ES8740	A	----	----		----	----	L18AC1	175013
ES8741	A	255143	256193		100133	100101	L18AC1	175013
ES8742	A	255143	----		100133	100101	L18AC1	175013
ES8750	A	----	----		----	----	261657	190724
ES8751	A	255143	256193		100133	100101	261657	190724
ES8752	A	255143	----		100133	100101	261657	190724
ES9740	A	----	----		----	----	L22AC1	15C257
ES9741	A	255143	256193		100133	100101	L22AC1	15C257
ES9742	A	255143	----		100133	100101	L22AC1	15C257
ES9750	A	----	----		----	----	247190	16C946
ES9751	A	255143	256193		100133	100101	247190	16C946
ES9752	A	255143	----		100133	100101	247190	16C946
ES0840	A	----	----	EM0024	----	----	L29AC1	15C257
ES0841	A	255143	256193		100133	100101	L29AC1	15C257
ES0842	A	255143	----		100133	100101	L29AC1	15C257
ES0850	A	----	----		----	----	247192	16C946
ES0851	A	255143	256193		100133	100101	247192	16C946
ES0852	A	255143	----		100133	100101	247192	16C946
ES7840	A	----	----		----	----	L14AC1	175013
ES7841	A	255143	256193		100133	100101	L14AC1	175013
ES7842	A	255143	----		100133	100101	L14AC1	175013
ES7860	A	----	----		----	----	247168	190724
ES7861	A	255143	256193		100133	100101	247168	190724
ES7862	A	255143	----		100133	100101	247168	190724
ES8840	A	----	----		----	----	L18AC1	175013
ES8841	A	255143	256193		100133	100101	L18AC1	175013
ES8842	A	255143	----		100133	100101	L18AC1	175013
ES8850	A	----	----		----	----	261657	190724
ES8851	A	255143	256193		100133	100101	261657	190724
ES8852	A	255143	----		100133	100101	261657	190724
ES9840	A	----	----		----	----	L22AC1	15C257
ES9841	A	255143	256193		100133	100101	L22AC1	15C257
ES9842	A	255143	----		100133	100101	L22AC1	15C257
ES9850	A	----	----	EM0022	----	----	247190	16C946
ES9851	A	255143	256193		100133	100101	247190	16C946
ES9852	A	255143	----		100133	100101	247190	16C946
ES9D70	A	----	----	EM0022	----	----	273319	16C946

* See [Related Manuals](#), page 4 .

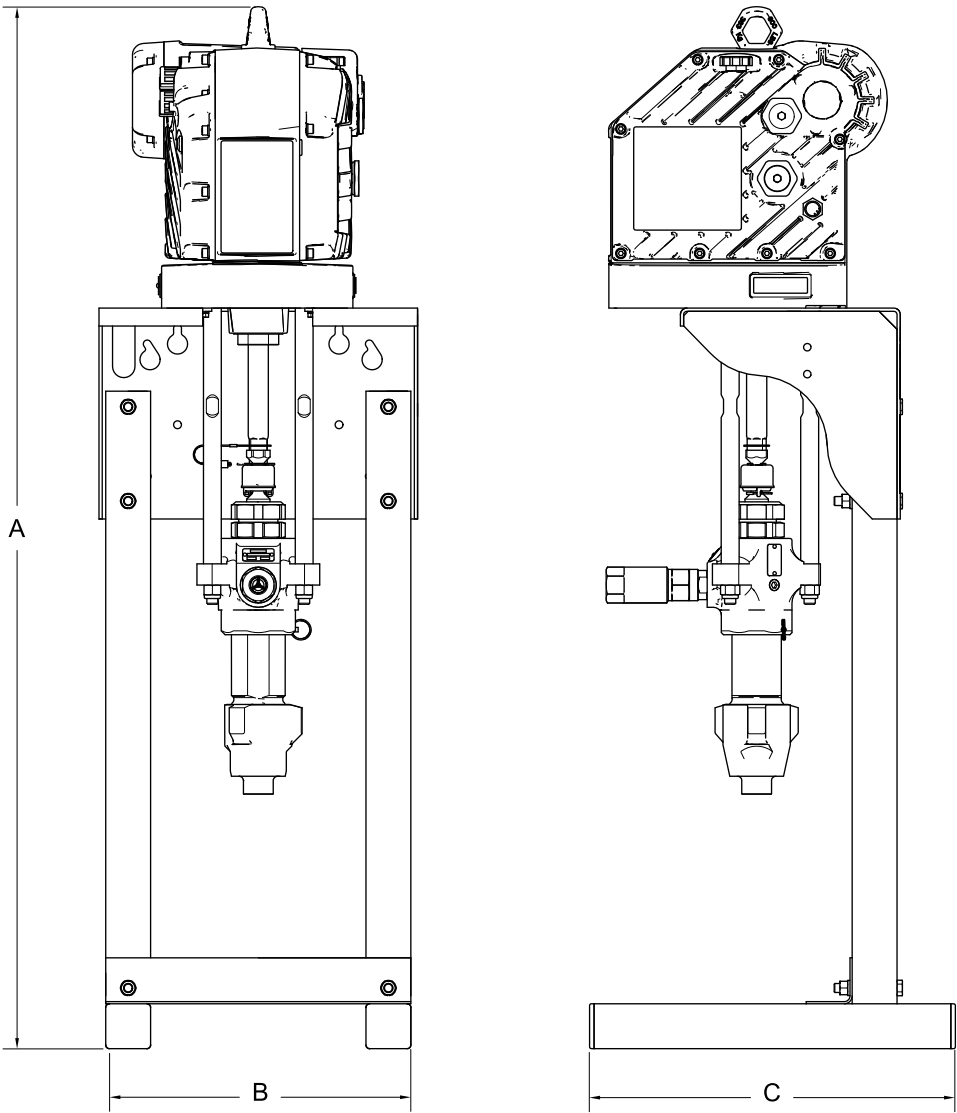
Pump Part No.	Pump Series	Mounting Bracket (Ref 1)	Floor Stand (Ref 12)	Motor (Ref 3)	Washer (Ref 4)	Bolt (Ref 5)	Lower Pump * (Ref 7)	Fitting (Ref 34)
ES0C40	A	— — — —	— — — —	EM1021	— — — —	— — — —	L29AC1	15C257
ES0C41	A	255143	256193		100133	100101	L29AC1	15C257
ES0C42	A	255143	— — — —		100133	100101	L29AC1	15C257
ES0C50	A	— — — —	— — — —		— — — —	— — — —	247192	16C946
ES0C51	A	255143	256193		100133	100101	247192	16C946
ES0C52	A	255143	— — — —		100133	100101	247192	16C946
ES7C60	A	— — — —	— — — —		— — — —	— — — —	247168	190724
ES7C61	A	255143	256193		100133	100101	247168	190724
ES7C62	A	255143	— — — —		100133	100101	247168	190724
ES8C40	A	— — — —	— — — —		— — — —	— — — —	L18AC1	175013
ES8C41	A	255143	256193		100133	100101	L18AC1	175013
ES8C42	A	255143	— — — —		100133	100101	L18AC1	175013
ES8C50	A	— — — —	— — — —		— — — —	— — — —	261657	190724
ES8C51	A	255143	256193		100133	100101	261657	190724
ES8C52	A	255143	— — — —		100133	100101	261657	190724
ES9C40	A	— — — —	— — — —		— — — —	— — — —	L22AC1	15C257
ES9C41	A	255143	256193		100133	100101	L22AC1	15C257
ES9C42	A	255143	— — — —		100133	100101	L22AC1	15C257
ES9C50	A	— — — —	— — — —		— — — —	— — — —	247190	16C946
ES9C51	A	255143	256193		100133	100101	247190	16C946
ES9C52	A	255143	— — — —		100133	100101	247190	16C946
ES0D40	A	— — — —	— — — —	EM1022	— — — —	— — — —	L29AC1	15C257
ES0D41	A	256143	256193		100133	100101	L29AC1	15C257
ES0D42	A	256143	— — — —		100133	100101	L29AC1	15C257
ES0D50	A	— — — —	— — — —		— — — —	— — — —	247192	16C946
ES0D51	A	255143	256193		100133	100101	247192	16C946
ES0D52	A	255143	— — — —		100133	100101	247192	16C946
ES7D40	A	— — — —	— — — —		— — — —	— — — —	L14AC1	175013
ES7D41	A	255143	256193		100133	100101	L14AC1	175013
ES7D42	A	255143	— — — —		100133	100101	L14AC1	175013
ES7D60	A	— — — —	— — — —		— — — —	— — — —	247168	190724
ES7D61	A	255143	256193		100133	100101	247168	190724
ES7D62	A	255143	— — — —		100133	100101	247168	190724
ES8D40	A	— — — —	— — — —		— — — —	— — — —	L18AC1	175013
ES8D41	A	255143	256193		100133	100101	L18AC1	175013
ES8D42	A	255143	— — — —		100133	100101	L18AC1	175013
ES8D50	A	— — — —	— — — —		— — — —	— — — —	261657	190724
ES8D51	A	255143	256193		100133	100101	261657	190724
ES8D52	A	255143	— — — —		100133	100101	261657	190724
ES9D40	A	— — — —	— — — —		— — — —	— — — —	L22AC1	15C257
ES9D41	A	255143	256193		100133	100101	L22AC1	15C257
ES9D42	A	255143	— — — —		100133	100101	L22AC1	15C257
ES9D50	A	— — — —	— — — —		— — — —	— — — —	247190	16C946
ES9D51	A	255143	256193		100133	100101	247190	16C946
ES9D52	A	255143	— — — —		100133	100101	247190	16C946

Parts

Pump Part No.	Pump Series	Mounting Bracket (Ref 1)	Floor Stand (Ref 12)	Motor (Ref 3)	Washer (Ref 4)	Bolt (Ref 5)	Lower Pump * (Ref 7)	Fitting (Ref 34)
ES0G40	A	----	----	EM1023	----	----	L29AC1	15C257
ES0G41	A	255143	256193		100133	100101	L29AC1	15C257
ES0G42	A	255143	----		100133	100101	L29AC1	15C257
ES0G50	A	----	----		----	----	247192	16C946
ES0G51	A	255143	256193		100133	100101	247192	16C946
ES0G52	A	255143	----		100133	100101	247192	16C946
ES7G60	A	----	----		----	----	247168	190724
ES7G61	A	255143	256193		100133	100101	247168	190724
ES7G62	A	255143	----		100133	100101	247168	190724
ES8G40	A	----	----		----	----	L18AC1	175013
ES8G41	A	255143	256193		100133	100101	L18AC1	175013
ES8G42	A	255143	----		100133	100101	L18AC1	175013
ES8G50	A	----	----		----	----	261657	190724
ES8G51	A	255143	256193		100133	100101	261657	190724
ES8G52	A	255143	----		100133	100101	261657	190724
ES9G40	A	----	----		----	----	L22AC1	15C257
ES9G41	A	255143	256193		100133	100101	L22AC1	15C257
ES9G42	A	255143	----		100133	100101	L22AC1	15C257
ES9G50	A	----	----		----	----	247190	16C946
ES9G51	A	255143	256193		100133	100101	247190	16C946
ES9G52	A	255143	----		100133	100101	247190	16C946
ES0H40	A	----	----	EM1024	----	----	L29AC1	15C257
ES0H41	A	255143	256193		100133	100101	L29AC1	15C257
ES0H42	A	255143	----		100133	100101	L29AC1	15C257
ES0H50	A	----	----		----	----	247192	16C946
ES0H51	A	255143	256193		100133	100101	247192	16C946
ES0H52	A	255143	----		100133	100101	247192	16C946
ES7H40	A	----	----		----	----	L14AC1	175013
ES7H41	A	255143	256193		100133	100101	L14AC1	175013
ES7H42	A	255143	----		100133	100101	L14AC1	175013
ES7H60	A	----	----		----	----	247168	190724
ES7H61	A	255143	256193		100133	100101	247168	190724
ES7H62	A	255143	----		100133	100101	247168	190724
ES8H40	A	----	----		----	----	L18AC1	175013
ES8H41	A	255143	256193		100133	100101	L18AC1	175013
ES8H42	A	255143	----		100133	100101	L18AC1	175013
ES8H50	A	----	----		----	----	261657	190724
ES8H51	A	255143	256193		100133	100101	261657	190724
ES8H52	A	255143	----		100133	100101	261657	190724
ES9H40	A	----	----		----	----	L22AC1	15C257
ES9H41	A	255143	256193		100133	100101	L22AC1	15C257
ES9H42	A	255143	----		100133	100101	L22AC1	15C257
ES9H50	A	----	----		----	----	247190	16C946
ES9H51	A	255143	256193		100133	100101	247190	16C946
ES9H52	A	255143	----		100133	100101	247190	16C946

* See [Related Manuals](#), page 4 .

Dimensions

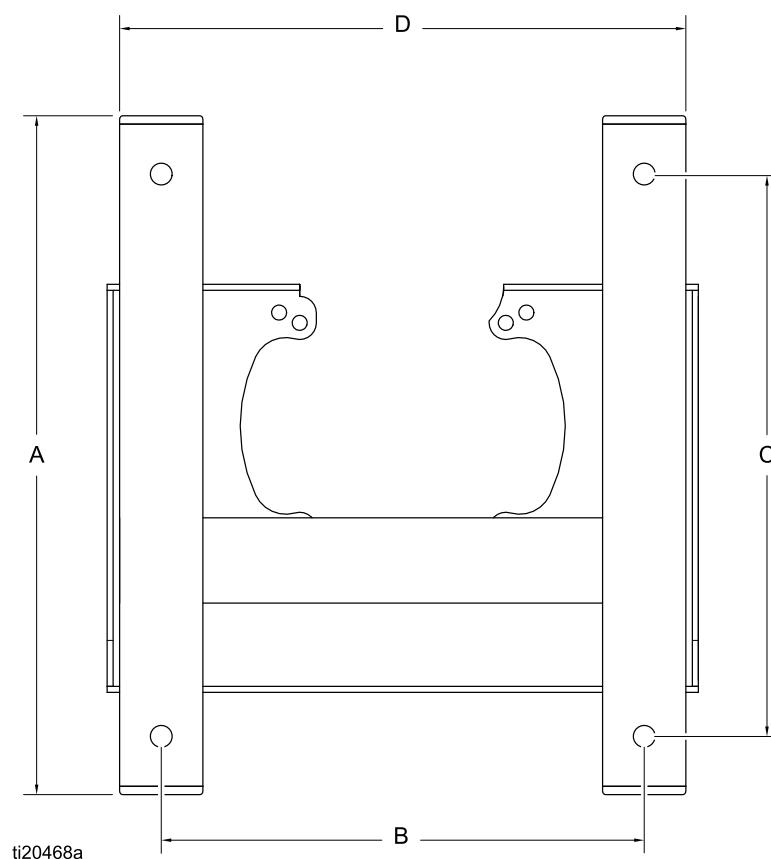


ti23207a

A	B	C
58.00 in. (1473 mm)	17.00 in. (432 mm)	19.88 in. (505 mm)

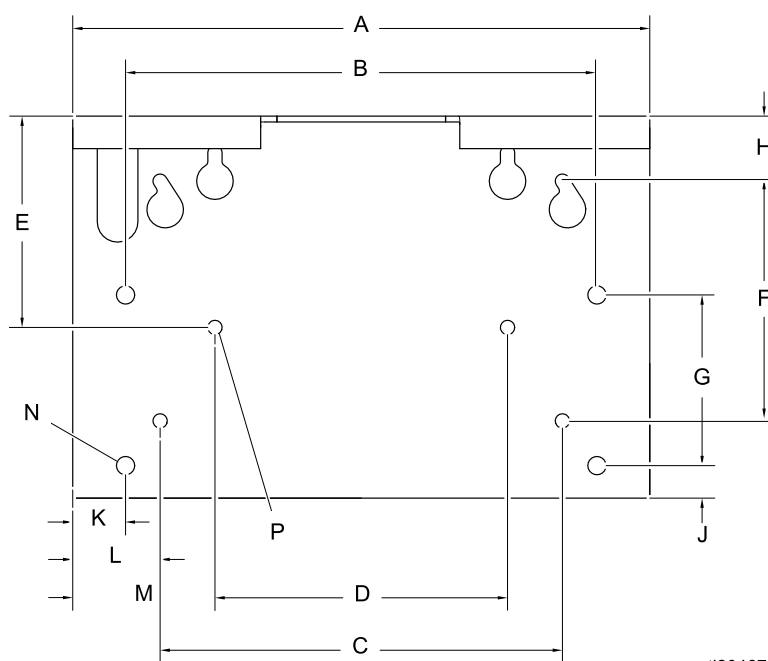
Mounting Hole Patterns

Stand Mount



Dimension	Measurement
A	19.88 in. (505 mm)
B	14.50 in. (368 mm)
C	16.88 in. (429 mm)
D	17.00 in. (432 mm)

Wall Mount



ti20467a

Dimension	Measurement
A	17.8 in. (451 mm)
B	14.5 in. (368 mm)
C	12.4 in. (314 mm)
D	9.0 in. (229 mm)
E	5.4 in. (137 mm)
F	7.4 in. (187 mm)
G	5.3 in. (133 mm)
H	2.0 in. (51 mm)
J	1.0 in. (25 mm)
K	1.6 in. (41 mm)
L	2.7 in. (69 mm)
M	4.4 in. (112 mm)
N	Four 0.562 in. (14 mm) diameter holes for mounting to stand
P	Four 0.438 in. (11 mm) diameter holes for mounting to wall

Performance Charts

To find the fluid pressure (psi/bar/MPa) at a specific fluid flow (gpm/lpm) and percentage of maximum force:

1. Locate the desired fluid flow in the scale at the bottom of the chart.
2. Follow the vertical line up to the intersection with the selected percentage of maximum force (see the **Key** below).
3. Follow left to the vertical scale to read the fluid outlet pressure.

Key to Performance Charts

NOTE: The charts show the motor operating at 100%, 70%, and 40% of maximum force. These values are approximately equivalent to an air motor operating at 100, 70, and 40 psi.

A	40% single phase
B	40% three phase
C	70% single phase
D	70% three phase
E	100% single phase
F	100% three phase

Table 2 . E-Flo DC with Dura-Flo 145 Lower

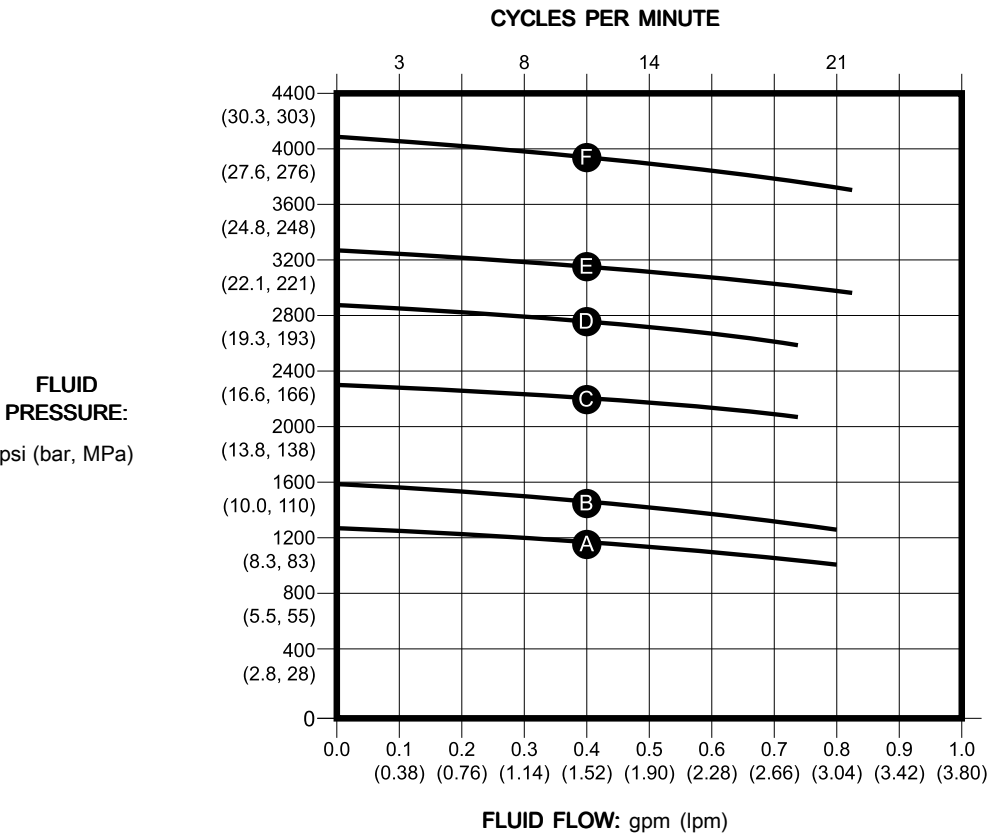


Table 3 . E-Flo DC with Dura-Flo/Xtreme 180 Lower

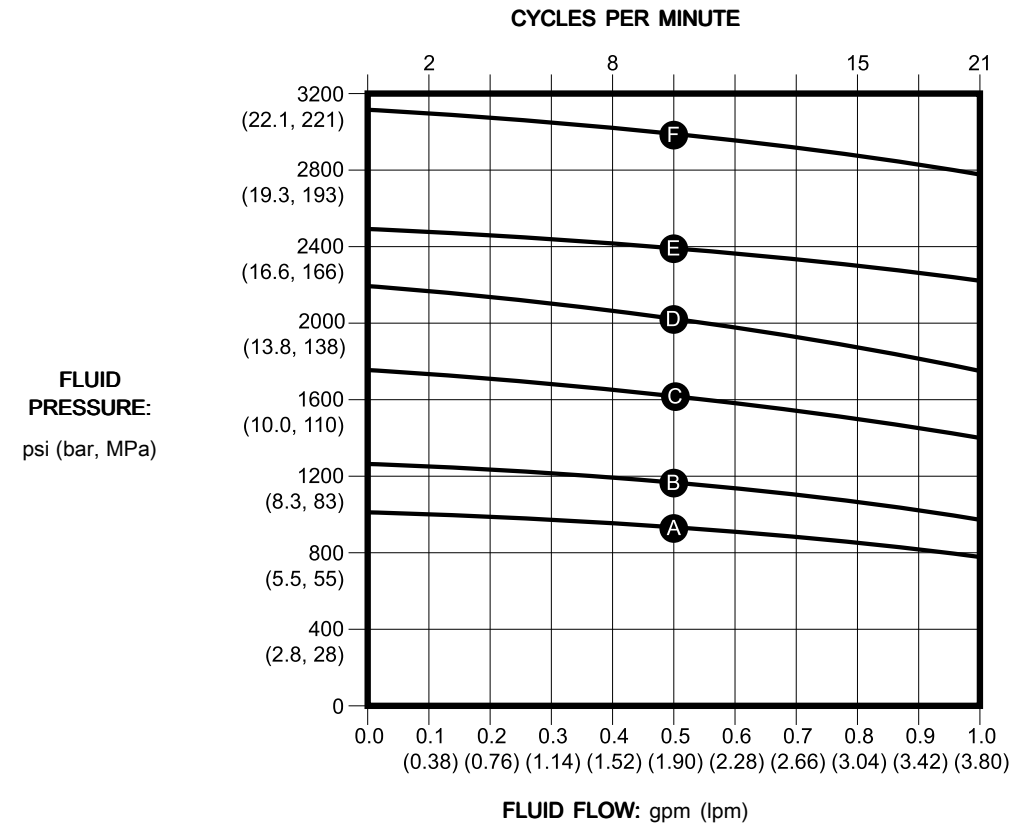


Table 4 . E-Flo DC with Dura-Flo/Xtreme 220 Lower

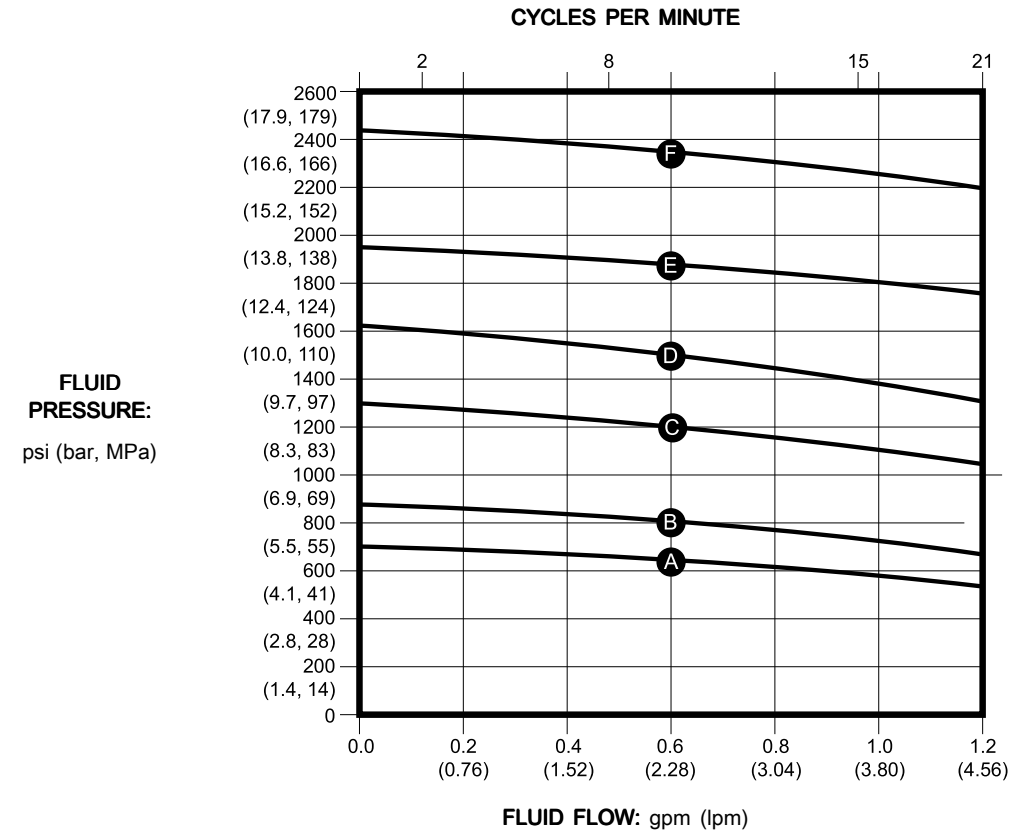
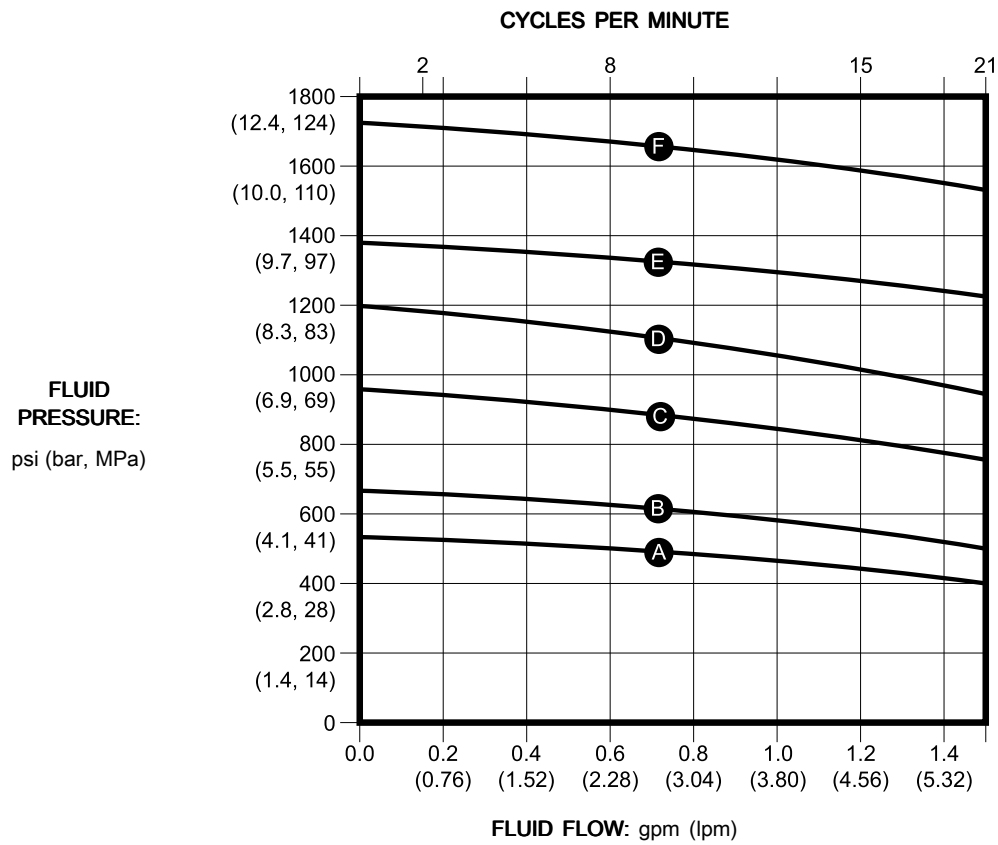


Table 5 . E-Flo DC with Dura-Flo/Xtreme 290 Lower



Technical Specifications

E-Flo DC Pumps	U.S.	Metric
Maximum Fluid Working Pressure, Single Phase		
Models ES0xxx	1520 psi	10.48 MPa, 104.8 bar
Models ES9xxx	2030 psi	14 MPa, 140 bar
Models ES8xxx	2430 psi	16.75 MPa, 167.5 bar
Models ES7xxx	3040 psi	20.96 MPa, 209.6 bar
Maximum Fluid Working Pressure, Three Phase		
Models ES0xxx	1900 psi	13.1 MPa, 131 bar
Models ES9xxx	2540 psi	17.5 MPa, 175 bar
Models ES8xxx	3040 psi	21 MPa, 210 bar
Models ES7xxx	3800 psi	26.2 MPa, 262 bar
Maximum Potential Fluid Pressure		
Models ESx3xx, ESx4xx, ESx7xx, and ESx8xx	436000/v (volume of lower in cc) = psi	3000/v (volume of lower in cc) = bar
Models ESxCxx, ESxDxx, ESxGxx, and ESxHxx	545000/v (volume of lower in cc) = psi	3750/v (volume of lower in cc) = bar
Maximum Continuous Cycle Rate	20 cpm	
Maximum Flow	Maximum flow is determined by the size of the pump lower. See Performance Charts , page 32.	
Power Requirements		
Models ESx3xx, ESx4xx, ESx7xx, and ESx8xx	200–250 VAC, single phase, 50/60 Hz, 2.9 kVA	
Models ESxCxx, ESxDxx, ESxGxx, and ESxHxx	380–480 VAC, three phase, 50/60 Hz, 3.0 kVA	
Power Inlet Port Size	3/4–14 npt(f)	
Ambient Temperature Range	32–104°F	0–40°C
Sound Data	Less than 70 dB(A)	
Oil Capacity	1.5 quarts	1.4 liters
Oil Specification	Graco Part No. 16W645 ISO 220 silicone-free synthetic gear oil	
Weight	Pump package (motor, 1000cc lower, stand, and tie rods): 220 lb	Pump package (motor, 1000cc lower, stand, and tie rods): 99.8 kg
Fluid Inlet Size	1–1/2 npt(f)	
Fluid Outlet Size	3/4 npt(f) [145cc-180cc] 1 npt(f) [220cc-290cc] (lower), 3/4 npt(f) (check valve)	
Wetted Parts	See lower manual.	

California Proposition 65

CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm — www.P65warnings.ca.gov.

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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For the latest information about Graco products, visit www.graco.com. For patent information, see www.graco.com/patents.

To place an order, contact your Graco Distributor or call to identify the nearest distributor.

Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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Original Instructions. This manual contains English, MM 333389

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