Instructions-Installation

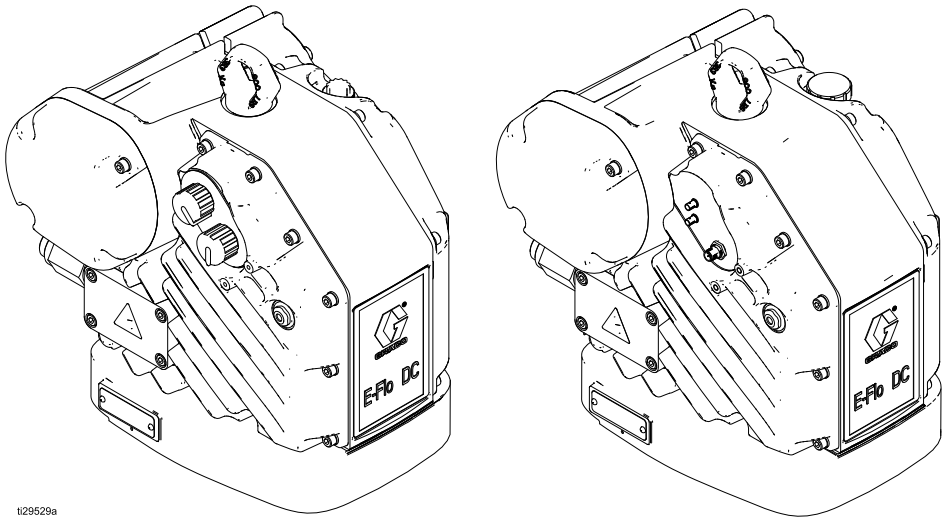
E-Flo® DC Motor, Three Phase

3A4409F
EN

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

Important Safety Instructions
Read all warnings and instructions in this manual before using the equipment. Save these instructions.

See page 3 for model part numbers and approvals information.



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Contents

Related Manuals

Manual No.	Description
3A4801	E-Flo DC Repair–Parts
3A2527	E-Flo DC Control Module Kit, Instructions-Parts

Models

Basic Models

Motor Part No.	Series	Horsepower	Maximum Force, lbf (N)
EM1011	A	1	1400 (6227)
EM1021	A	2	3500 (15570)

CE 2575 UKCA 0359 Ex II 2 G
Ex db IIA T4 Gb 0°C≤Ta≤40°C
FM12ATEX0067X
FM21UKEX0205X
IECEx FMG 12.0028X

FM C US APPROVED For Class I, Div. 1, Group D T4.
Class 1, Zone 1, AEx db IIA T4 Gb 0°C≤Ta≤40°C
Ex db IIA T4 Gb 0°C≤Ta≤40°C
FM17US0033X
FM17CA0018X

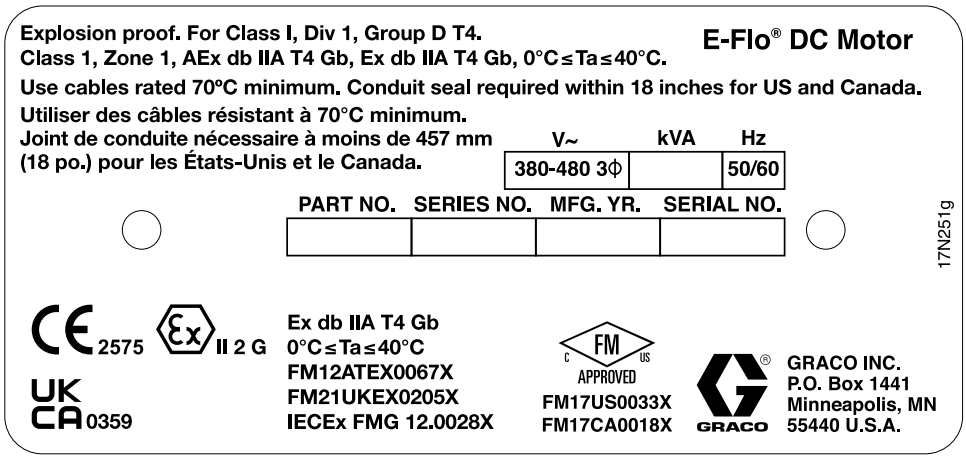


Figure 1 Basic Motor Identification Label

List of Standards

- FM 3600:2018
- FM 3615:2018
- FM 3810:2018
- ANSI/ISA 60079-0:2013
- ANSI/UL 60079-1:2015
- CSA-C22.2 No. 0.4:2017
- CSA-C22.2 No. 0.5:2016
- CSA-C22.2 No. 30:R2016
- CAN/CSA-C22.2 No. 60079-0:2015
- CAN/CSA-C22.2 No. 60079-1:2016
- CAN/CSA-C22.2 No. 61010-1:R2017
- EN IEC 60079–0:2018
- EN 60079-1:2014
- IEC 60079-0 (Ed. 7.0)
- IEC 60079-1 (Ed. 7.0)

Specific Conditions of Use:

1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
2. Consult the manufacturer for genuine replacement fasteners. M8 x 30 socket-head cap screws of Class 12.9 steel or better with a minimum yield strength of 1100 MPa (160,000 psi) are acceptable alternatives.

Basic Models with Region-Specific Approvals

Motor Part No.	Series	Horsepower	Maximum Force, lbf (N)
EM1013	A	1	1400 (6227)
EM1023	A	2	3500 (15570)

2575 0359

II 2 G
Ex db IIA T4 Gb 0°C≤Ta≤40°C
FM12ATEX0067X
FM21UKEX0205X
IECEx FMG 12.0028X

KTL 20-KA4BO-0503X

All Models

Model EM1013

Model EM1023

Figure 2 Basic Motor with Region-Specific Approvals Identification Label

List of Standards

- EN IEC 60079–0:2018
- EN 60079-1:2014
- IEC 60079-0 (Ed. 7.0)
- IEC 60079-1 (Ed. 7.0)

Specific Conditions of Use:

1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
2. Consult the manufacturer for genuine replacement fasteners. M8 x 30 socket-head cap screws of Class 12.9 steel or better with a minimum yield strength of 1100 MPa (160,000 psi) are acceptable alternatives.

Advanced Models

Motor Part No.	Series	Horsepower	Maximum Force, lbf (N)
EM1012	A	1	1400 (6227)
EM1015	A	1	1400 (6227)
EM1022	A	2	3500 (15570)
EM1025	A	2	3500 (15570)

CE 2575 UKCA 0359

Ex II 2 (1) G
Ex db [ia op is IIA T4 Ga] IIA T4 Gb
0°C≤Ta≤40°C
FM12ATEX0067X
FM21UKEX0205X
IECEx FMG 12.0028X

FM C US APPROVED For Class I, Div. 1, Group D T4.
Class 1, Zone 1, AEx db [ia op is IIA Ga] IIA T4 Gb
0°C≤Ta≤40°C
Ex db [ia op is IIA T4 Ga] IIA T4 Gb
0°C≤Ta≤40°C
FM17US0033X
FM17CA0018X

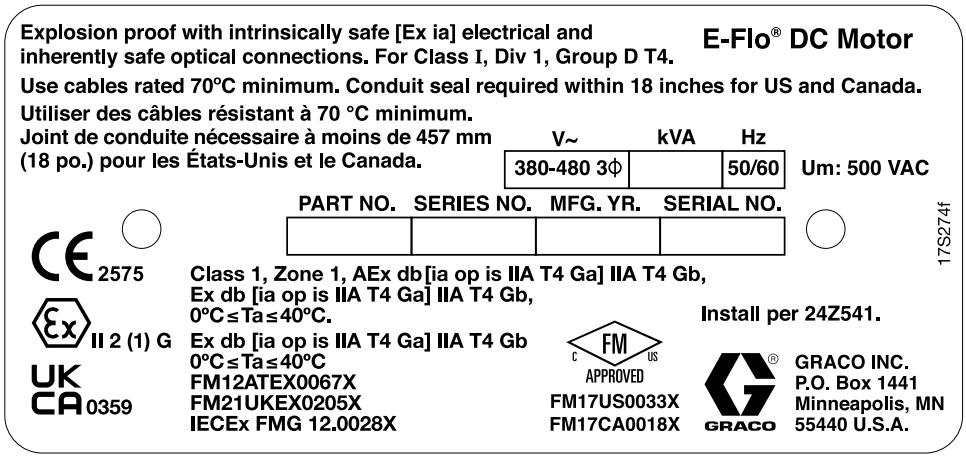


Figure 3 Advanced Motor Identification Label

List of Standards

- FM 3600:2018
- FM 3610:2018
- FM 3615:2018
- FM 3810:2018
- ANSI/ISA 60079-0:2013
- ANSI/ISA 60079-11:2014
- ANSI/UL 60079-1:2015
- ANSI/UL 60079-28:2017
- CSA-C22.2 No. 0.4:2017
- CSA-C22.2 No. 0.5:2016
- CSA-C22.2 No. 30:R2016
- CSA-C22.2 No. 60079-28:2016
- CAN/CSA-C22.2 No. 60079-0:2015
- CAN/CSA-C22.2 No. 60079-1:2016
- CAN/CSA-C22.2 No. 60079-11:2014
- CAN/CSA-C22.2 No. 61010-1:R2017
- EN IEC 60079–0:2018
- EN 60079-1:2014
- EN 60079-11:2012
- EN 60079-28:2015
- IEC 60079-0 (Ed. 7.0)
- IEC 60079-1 (Ed. 7.0)
- IEC 60079-11 (Ed. 6.0)
- IEC 60079-28 (Ed. 2.0): 2015

Specific Conditions of Use:

1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
2. Consult the manufacturer for genuine replacement fasteners. M8 x 30 socket-head cap screws of Class 12.9 steel or better with a minimum yield strength of 1100 MPa (160,000 psi) are acceptable alternatives.

Advanced Models with Region-Specific Approvals

Motor Part No.	Series	Horsepower	Maximum Force, lbf (N)
EM1014	A	1	1400 (6227)
EM1016	A	1	1400 (6227)
EM1024	A	2	3500 (15570)
EM1026	A	2	3500 (15570)

CE 2575 UKCA 0359

Ex II 2 (1) G
Ex db [ia op is IIA T4 Ga] IIA T4 Gb
0°C≤Ta≤40°C
FM12ATEX0067X
FM21UKEX0205X
IECEx FMG 12.0028X

KCs KTL 20-KA4BO-0502X

All Models

労(2020.11)検
検·第TC22660X号
Graco Inc.

労(2020.11)検
検·第TC22662X号
Graco Inc.

(ITRI)2022 07-00023X

Model EM1014 Model EM1024

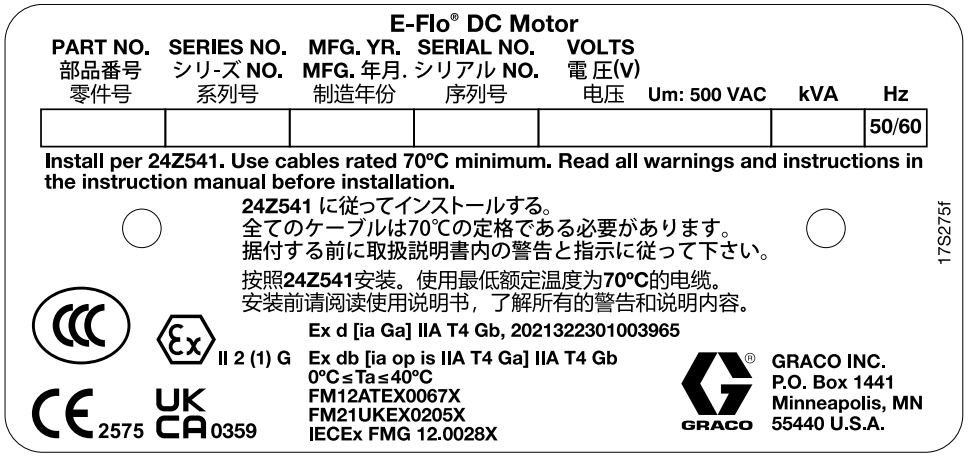


Figure 4 Advanced Motor with Region-Specific Approvals Identification Label

List of Standards

- EN IEC 60079–0:2018
- EN 60079-1:2014
- EN 60079-11:2012
- EN 60079-28:2015
- IEC 60079-0 (Ed. 7.0)
- IEC 60079-1 (Ed. 7.0)
- IEC 60079-11 (Ed. 6.0)
- IEC 60079-28 (Ed. 2.0): 2015

Specific Conditions of Use:

1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
2. Consult the manufacturer for genuine replacement fasteners. M8 x 30 socket-head cap screws of Class 12.9 steel or better with a minimum yield strength of 1100 MPa (160,000 psi) are acceptable alternatives.

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 or on warning labels, 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

SEVERE ELECTRIC SHOCK HAZARD

This equipment is powered by more than 240V. Contact with this voltage will cause death or serious injury.

- 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.

WARNING

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:

- Use equipment only in 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.
- Keep 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 gun firmly to side of grounded pail when triggering into 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.

SPECIAL CONDITIONS FOR SAFE USE

- Consult the manufacturer if dimensional information on the flameproof joints is necessary.
- Consult the manufacturer for genuine replacement terminal compartment/wiring entry and enclosure fasteners. M8x30 socket headed cap screws of Class 12.9 steel or better with a minimum yield strength of 1100 MPa (160,000 psi) are acceptable alternatives.

WARNING



INTRINSIC SAFETY

Intrinsically safe equipment that is installed improperly or connected to non-intrinsically safe equipment will create a hazardous condition and can cause fire, explosion, or electric shock. Follow local regulations and the following safety requirements.

- Be sure your installation complies with national, state, and local codes for the installation of electrical apparatus in a Class I, Group D, Division 1 Hazardous Location, including all of the local safety fire codes, NFPA 33, NEC 500 and 516, and OSHA 1910.107.
- Equipment that comes in contact with the equipment's intrinsically safe terminals must meet the entity parameter requirements specified in Control Drawing 24Z541. See Intrinsically Safe Installation Requirements for Advanced Motors, page 12. This includes safety barriers, DC voltage meters, ohmmeters, cables, and connections. Remove the unit from the hazardous area when troubleshooting.
- Do not install any equipment approved only for a non-hazardous location in a hazardous area, as defined in Article 500 of the National Electrical Code (USA) or your local electrical code. See the ID label for the intrinsic safety rating for your equipment.
- Ground the motor. Use a 12 gauge minimum ground wire, connected to a true earth ground. See Grounding, page 12.
- Do not operate the motor with any cover removed.
- Do not substitute system components, as this may impair intrinsic safety.

BURN HAZARD

Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.


MOVING PARTS HAZARD

Moving parts can pinch, cut, or amputate fingers and other body parts.

- 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.





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 trigger lock when not dispensing.
- Do not point 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

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- 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 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.

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- 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.

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:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Installation

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.

NOTE: To install an advanced motor, also see Intrinsically Safe Installation Requirements for Advanced Motors, page 12.

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.

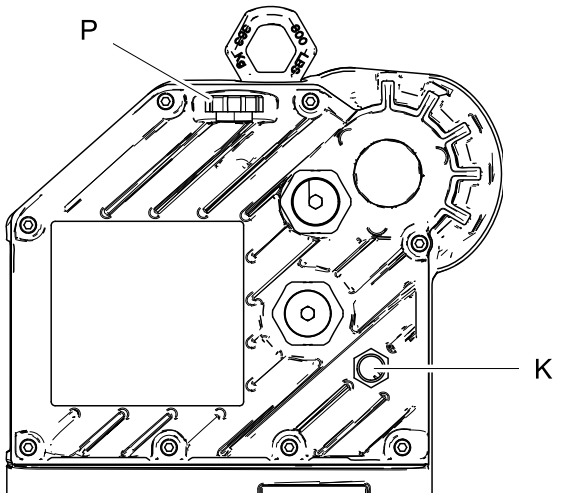


Figure 5 Sightglass and Oil Fill Cap

Power Requirements

See Table 1 for power requirements. The system requires a dedicated circuit protected with a circuit breaker.

Table 1 . Power Specifications

Model*	Voltage	Phase	Hz	kVA
EM101x	380–480 Vac	3	50/60	1.5
EM102x	380–480 Vac	3	50/60	3.0

* The last digit of the Model No. varies. See the **Models** tables on pages 3–6.

Hazardous Location Cabling and Conduit Requirements

Explosion Proof

All electrical wiring in the hazardous location 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.

All cables must be rated at 70°C.

Flame Proof (ATEX and UKEX)

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

All cable glands and cables must be rated at 70°C.

Connect the Supply Wiring

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

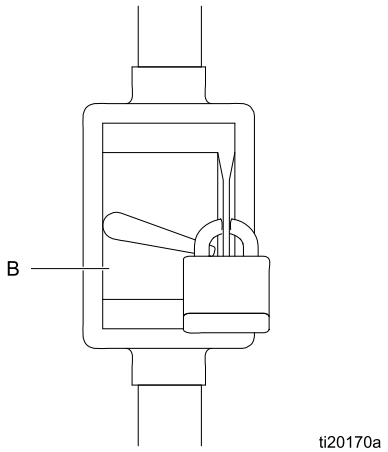


Figure 6 Example of a Locked Out Disconnect

2. 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. Torque the terminal nuts to 15 in-lb (2 N•m) maximum. **Do not over-torque.**
5. Close the electrical compartment. Torque the cover screws (J) to 15 ft-lb (20 N•m).

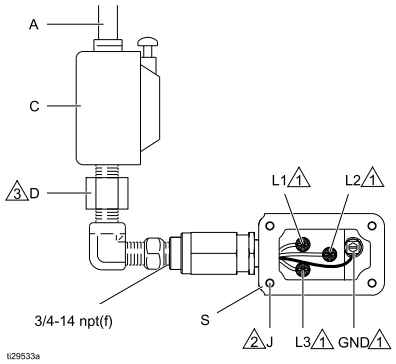


Figure 7 Connect the Supply Wires

Notes for Fig. 7	
1	Tighten all terminal nuts to 15 in-lb (2 N•m) maximum. **Do not over-torque.**
2	Tighten cover screws to 15 ft-lb (20 N•m).
3	A conduit seal (D) is required within 18 in. (457 mm) of the motor for the US and Canada.

Grounding

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.

1. Connect the supply ground wire in the electrical compartment as shown in Fig. 7.
2. Connect a ground wire as shown in Fig. 8. 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.

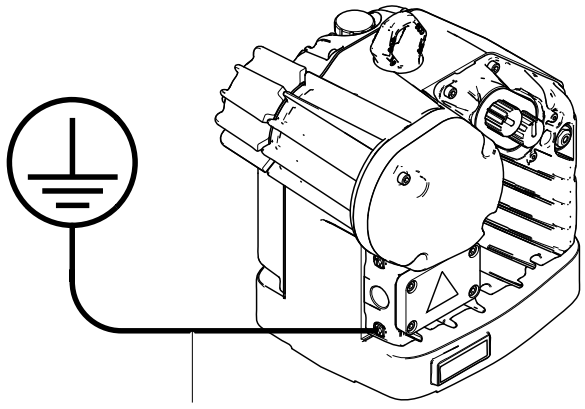


Figure 8 Ground Wire

Intrinsically Safe Installation Requirements for Advanced Motors

Do not substitute or modify system components as this may impair intrinsic safety. For component installation, maintenance, or operation instructions, read the component system manuals. Only install equipment in a hazardous location if the equipment is approved for a hazardous location. See the identification label for the intrinsic safety rating for your model.

See Appendix A - System Control Drawing 24Z541, page 19, for installation requirements and entity parameters. Follow all installation instructions in your system component manuals.

Operation

Startup

1. Unlock the fused safety switch (B) and turn it on. See Connect the Supply Wiring, page 11.
2. Press the start pushbutton (C).
3. Check that the power indicator (L) is lit (steady on).
4. See Advanced Motor Operation, page 13 or Basic Motor Operation, page 14 for further instructions.

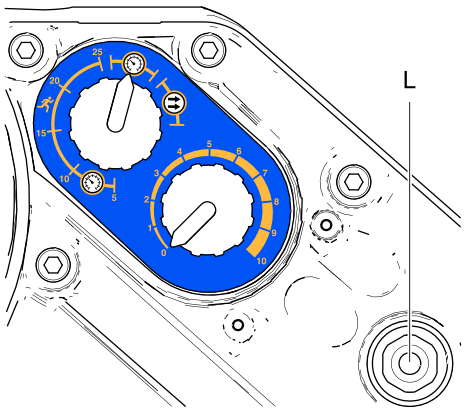


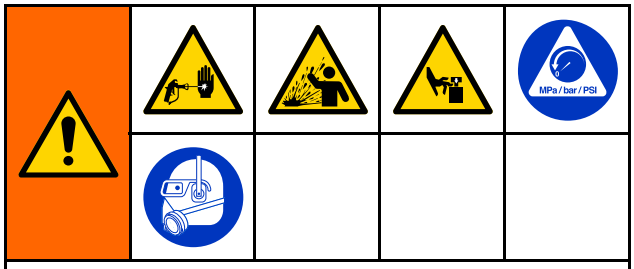
Figure 9 Power Indicator

Shutdown

Follow the Pressure Relief Procedure, page 13.

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 Connect the Supply Wiring, page 11.
2. Shut off and lock out the fused safety switch (B).
3. Relieve all fluid pressure as explained in your separate pump manual.

Advanced Motor Operation

The Advanced E-Flo DC motors require installation of the 17V232 or 17V233 Control Module Accessory Kit 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.

NOTICE

To prevent damage to the softkey buttons, do not press the buttons with sharp objects such as pens, plastic cards, or fingernails.

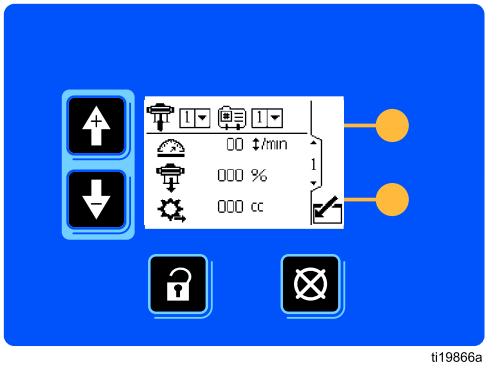


Figure 10 Control Module Accessory

Basic Motor Operation

The basic motor has three operating modes:

- Pressure Mode
- Pressure Mode with Integrated Runaway Protection
- Flow Mode

NOTE: Before changing from one mode to another, turn the Control Knob (N) fully counterclockwise to 0.

Pressure Mode

When in pressure mode, the motor will adjust the speed to maintain a constant fluid pressure.

1. Turn the Control Knob (N) fully counterclockwise to 0.
2. Pull the Mode Select switch (M) out to set. Turn the switch to Pressure. Push the switch in to lock.
3. Pull the Control Knob (N) out to set. Turn the knob clockwise to increase the pressure, or counterclockwise to decrease the pressure. Push the knob in to lock.

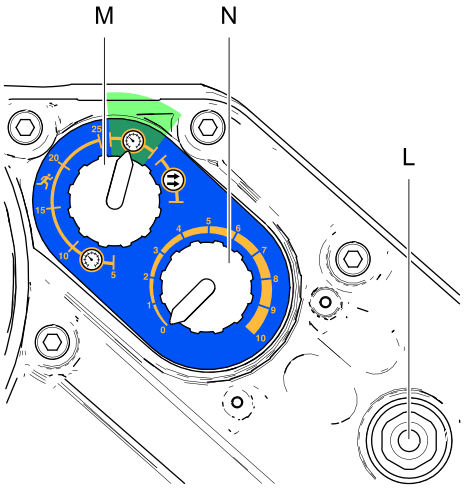


Figure 11 Pressure Mode

Pressure Mode with Integrated Runaway Protection

In pressure mode with integrated runaway protection, the motor will adjust the speed to maintain a constant fluid pressure, but will shut down if it exceeds a user-set speed.

1. Turn the Control Knob (N) fully counterclockwise to 0.
2. Pull the Mode Select switch (M) out to set. In the Runaway range, turn the switch to the desired shutdown speed in cycles per minute (5, 10, 15, 20, or 25). Push the switch in to lock.
3. Pull the Control Knob (N) out to set. Turn the knob clockwise to increase the pressure, or counterclockwise to decrease the pressure. Push the knob in to lock.

NOTE: The motor will shut down if the selected speed is exceeded for 5 cycles. To reset, turn the Control Knob (N) fully counterclockwise to 0, then turn to the desired pressure.

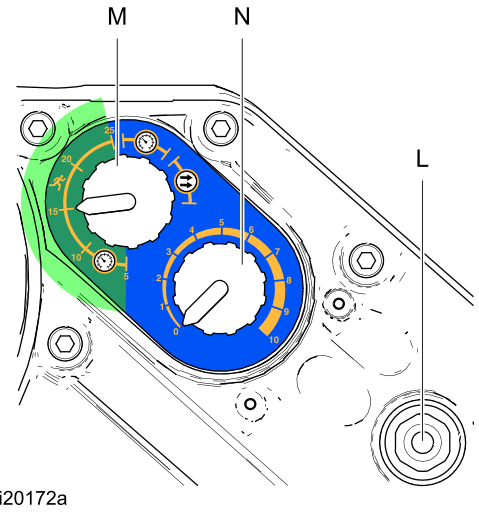


Figure 12 Pressure Mode with Integrated Runaway Protection

Flow Mode

When in flow mode, the motor will maintain a constant speed regardless of the fluid pressure, up to the pump's maximum working pressure. See Technical Specifications, page 23.

1. Turn the Control Knob (N) fully counterclockwise to 0.
2. Pull the Mode Select switch (M) out to set. Turn the switch to Flow  . Push the switch in to lock.
3. The amount of flow is determined by the cycle rate set with the Control Knob (N). The knob's scale (0–10) corresponds to a cycle adjustment range of 0-30 cycles per minute. Turn the Control Knob (N) clockwise to increase the cycle rate (flow), or counterclockwise to decrease the cycle rate (flow).

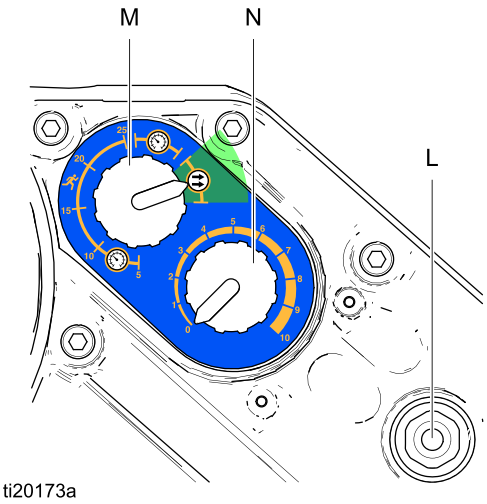


Figure 13 Flow Mode

Maintenance

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. Order two Part No. 16W645 ISO 220 silicone-free synthetic gear oil.

1. Place a minimum two-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. 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.

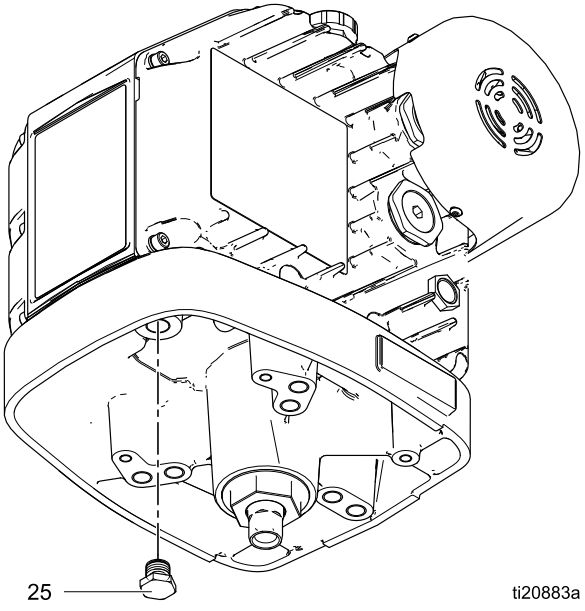


Figure 14 Oil Drain Plug

Check the Oil Level

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. **Do not overfill.**

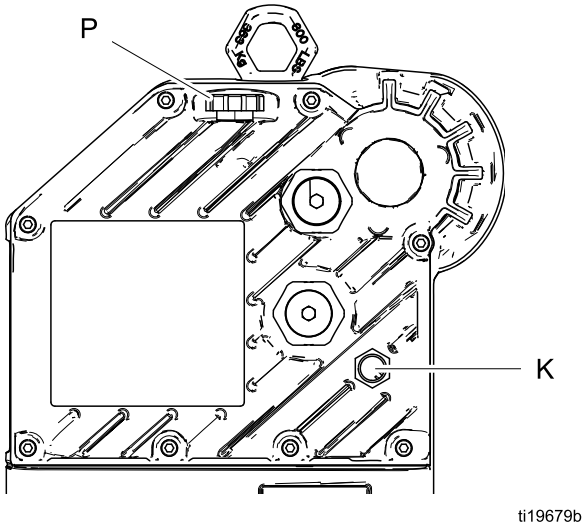


Figure 15 Sightglass and Oil Fill Cap

Error Code Troubleshooting

NOTE: The blink code is displayed using the power indicator on the motor. The blink code given below indicates the sequence. For example, blink code 2–6 indicates 2 blinks, then 6 blinks. The sequence then repeats.

Blink Code	Description
1	Flow exceeds maximum target; also indicates pump runaway condition exists.
2	Brown out; voltage supplied to motor is too low.
4	An internal control board hardware failure is detected.
5	Over temperature.
6	The Mode Select knob is set between Pressure  and Flow  . Set knob to the desired mode.
2–4	Temporary circuit board communication error.
2–6	AC power is lost.
3–5	Internal thermistor disconnected.
3–4	Software versions do not match.
3–6	Circuit board communication failure.
4–5	Internal software error.
5–6	Calibration of the encoder and stroke range is in progress.

Accessories

Motor Part No.	Description	Kits	Kit Description
Models EM10X2 and EM10X5	E-Flo DC Advanced Motors	17V232	Control Module, for Advanced Motors; see manual 3A2527.
Models EM10X4 and EM10X6	E-Flo DC Advanced Motors	17V233	Control Module, for Advanced Motors; see manual 3A2527.
Models EM10X2, EM10X4, EM10X5, and EM10X6	E-Flo DC Advanced Motors	16P911	CAN Cable, 3 ft (1 m)
		16P912	CAN Cable, 25 ft (8 m)
All motors in this manual	Connection kits, to mount an E-Flo DC Motor to an existing pump lower. Kits include tie rods, tie rod nuts, adapter, and coupler.	288203	For 3000 and 4000 cc 4–Ball Lowers
		288204	For Dura-Flo 1800 and 2400 Lowers
		288205	For Dura-Flo 600, 750, 900, and 1200 Lowers
		288206	For Dura-Flo 1000 Lowers
		288207	For Xtreme 145, 180, 220, 250, and 290 Lowers
		288209	For 750, 1000, 1500, and 2000 cc 4–Ball Lowers with Enclosed or Open Wet Cup
		288860	For Xtreme 85 and 115 Lowers
		17K525	For 750, 1000, 1500, and 2000 cc Sealed 4–Ball Lowers
All motors in this manual	Mounting kits	255143	Wall Mounting Kit
		253692	Floor Stand

Appendix A - System Control Drawing 24Z541

NOTES FOR FIG. 16 AND 17:

1. The non-intrinsically safe terminals (power rail) must not be connected to any device which uses or generates more than Um = 500 Vrms or DC unless it has been determined that the voltage has been adequately isolated.
2. Do not remove any cover until power has been removed.
3. Installation in the U.S.A. must be in accordance with ANSI/ISA RP12.06.01, installation of intrinsically safe systems for hazardous (classified) locations, and the National Electrical Code (ANSI/NFPA 70).
4. Installation in Canada must be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
5. For ATEX and UKEX, install according to EN 60079–14 and applicable local and national codes.
6. For IECEx, install according to IEC 60079–14 and applicable local and national codes.
7. For installation, maintenance, or operation instructions, see the instruction manual.

   WARNING: Substitution of components may impair intrinsic safety.

   ADVERTISSEMENT: La substitution de composants peut compromettre la securite intrinseque.

8. △8 Graco CAN cable part numbers 16P911, 16P912.
9. The output entity parameters given for pins 1 and 4 in port 3 are the total current and power available to both pins added together. The current on pin 1 and pin 4 added together will not exceed the listed Io, and the power output from pin 1 and pin 4 added together will not exceed the listed Po.
10. The intrinsically safe electrical outputs provided by the associated apparatus are not isolated from earth.
11. The control drawing of the intrinsically safe apparatus must specify that the intrinsically safe apparatus provides internal isolation between CAN power and CAN Hi/CAN Lo circuits and connections.
12. The specified Co and Lo values already include consideration of the effects of capacitance and inductance in combination.

Table 2 . Calculation Procedures

Divisions	Zones
Voc ≤ Vmax	Uo ≤ Ui
Isc ≤ Imax	Io ≤ Ii
Po ≤ PI	Po ≤ Pi
Ca ≥ Ci + Ccable	Co ≥ Ci + Ccable
La ≥ Li + Lcable	Lo ≥ Li + Lcable
La / Ra ≥ Li / Ri	Lo / Ro ≥ Li / Ri

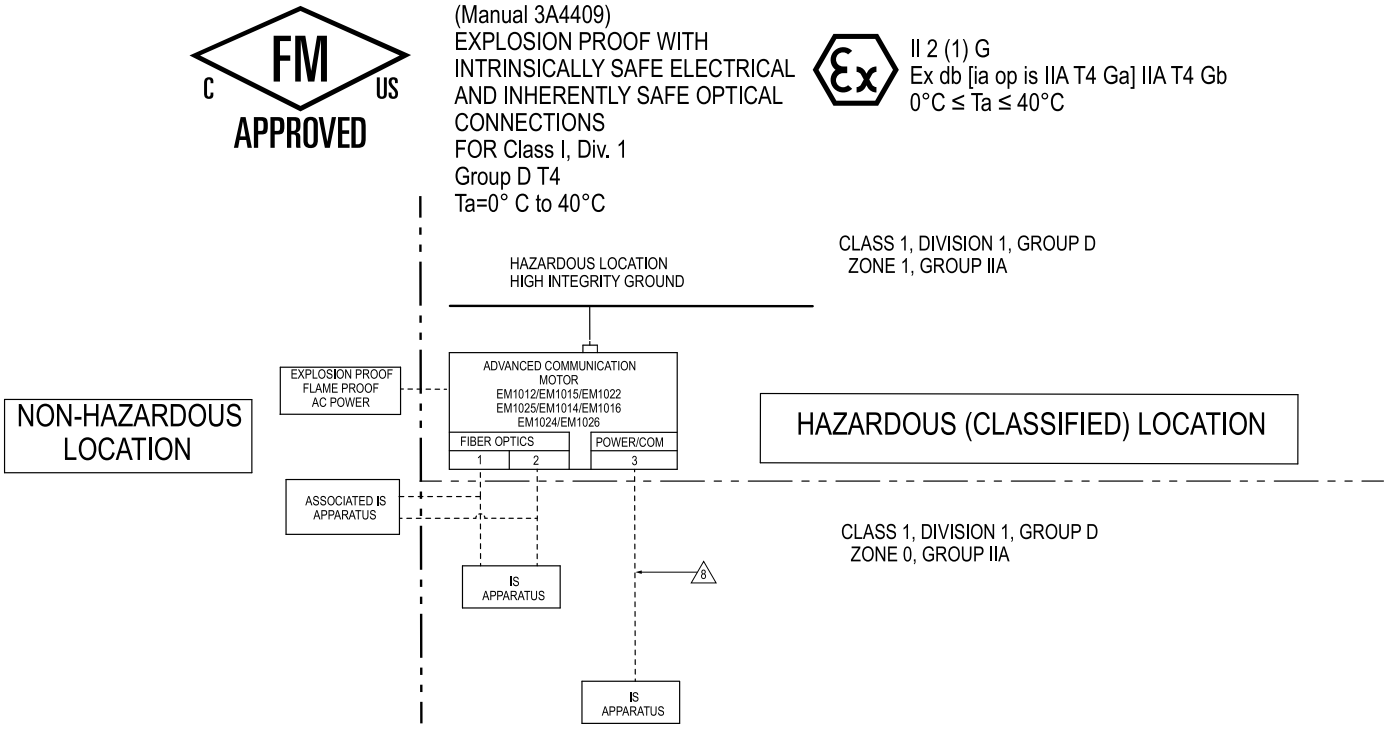


Figure 16 System Control Drawing 24Z541, Sheet 1

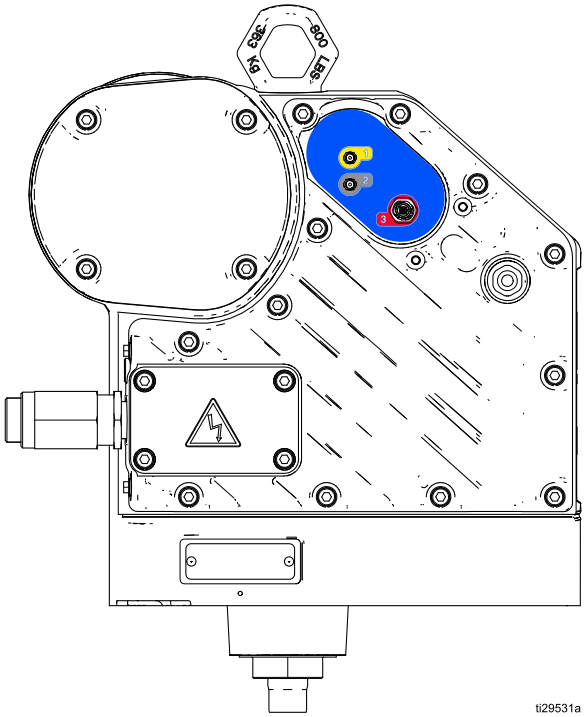
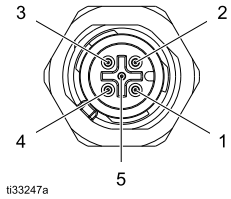


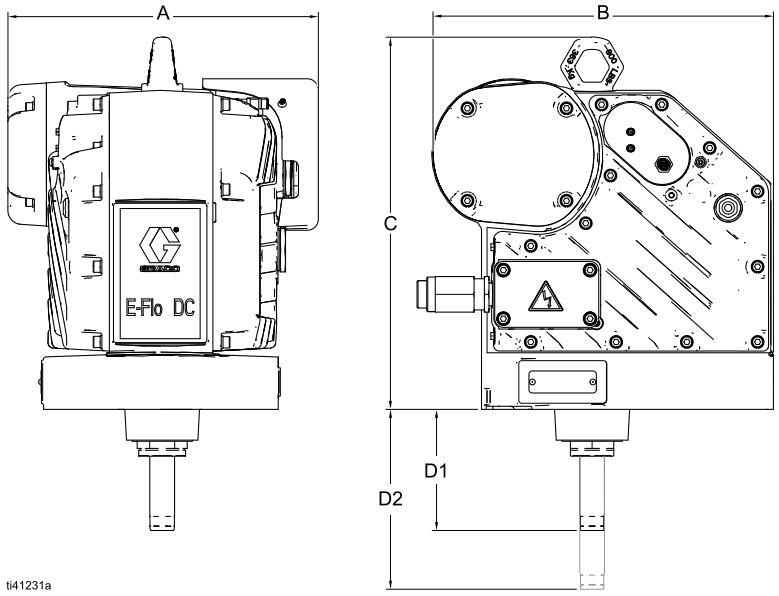
Figure 17 System Control Drawing 24Z541, Sheet 2

Table 3 . Port 3: Power Barrier Output Parameters

Port 3: Male M12 5 Pin “A” Key	CAN Data High/Low — Output Barriers							
	Pin		Uo	Io	Po	Lo	Co	Lo/Ro
			Voc	Isc	Pt	La	Ca	La/Ra
		Units	V	mA	mW	µH	µF	µH/Ohm
	1	CAN Data Low	4.94	63.3	79	709	999	3639
	2	Power	17.85	460	2893	116	2.5	98
	3	IS Ground Return	—	—	—	—	—	—
	4	CAN Data High	4.94	63.3	79	709	999	3639
	5	Shield	—	—	—	—	—	—

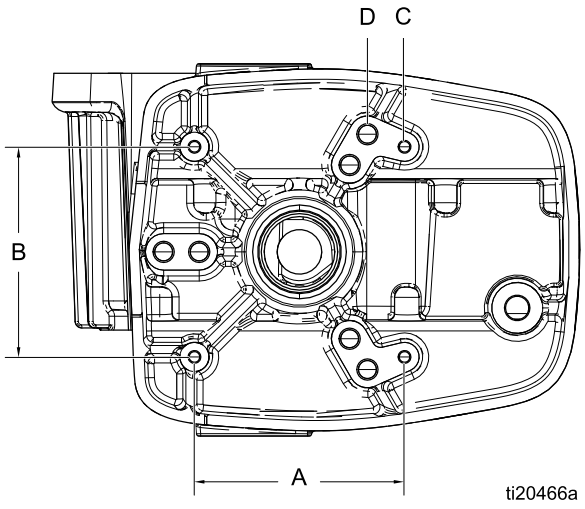
Dimensions and Mounting Holes

E-Flo DC Motor Dimensions



A	B	C	D1	D2
14.07 in. (35.74 cm)	15.54 in. (39.47 cm)	16.79 in. (42.65 cm)	5.44 in. (13.82 cm)	8.18 in. (20.78 cm)

Mounting Hole Pattern



A	B	C	D
6.186 in. (157 mm)	6.186 in. (157 mm)	Four 3/8–16 Mounting Holes	Six 5/8–11 Tie Rod Holes: • 8 in. (203 mm) x 120° bolt circle OR • 5.9 in. (150 mm) x 120° bolt circle

Technical Specifications

E-Flo DC Motors	U.S.	Metric
Input voltage/Power:		
Models EM101x	380–480 VAC three phase, 50/60 Hz, 1.5 kVA	
Models EM102x	380–480 VAC three phase, 50/60 Hz, 3.0 kVA	
Maximum potential fluid pressure:		
Models EM101x	218000/v (volume of lower in cc) = psi	14500/v (volume of lower in cc) = bar
Models EM102x	500000/v (volume of lower in cc) = psi	34500/v (volume of lower in cc) = bar
Maximum continuous cycle rate	20 cpm	
Maximum force:		
Models EM101x	1400 lbf	6227 N
Models EM102x	3500 lbf	15570 N
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 high-pressure synthetic gear oil	
Weight	99 lb	45 kg

California Proposition 65

CALIFORNIA RESIDENTS

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

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Original Instructions. This manual contains English, MM 3A4409
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Revision F, October 2022