Instructions-Installation



3A6316A

e710 DC Motor

Electric drive for supercritical gas extraction. For professional use only.



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

See page 3 for model part numbers and approvals information.



PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

Related Manuals	. 2
Models Basic Models Advanced Models	. 3 . 3 . 4
Warnings	. 5
Installation Check the Oil Level Before Using the	. 9
Equipment	. 9
Power Requirements	. 9
Grounding	. 10 . 11
Intrinsically Safe Installation Requirements	
for Advanced Motors	. 11
Operation Startup Shutdown	. 12 . 12 . 12

Pressure Relief Procedure Advanced Motor Operation Basic Motor Operation	12 13 14
Maintenance Preventive Maintenance Schedule Change the Oil Check the Oil Level	16 16 16 16
Error Code Troubleshooting	17
Accessories	18
Appendix A - System Control Drawing 24N637	19
Mounting Hole Pattern	24
Technical Specifications	25

Related Manuals

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

Models

Basic Models



- ANSI/ISA 60079-0: 2009
- ANSI/ISA 60079-1: 2009
- FM 3615:2006

Specific Conditions of Use:

- 1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
- 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.

- CAN/CSA-E60079-1:2011
- CAN/CSA C22.2 No. 1010.1:2004

Advanced Models



Figure 2 Advanced Motor Identification Label

List of Standards

- IEC 60079-0: 2011 (Ed. 6)
- IEC 60079-1: 2014 (Ed. 7)
- IEC 60079-11: 2011 (Ed. 6)
- EN 60079-0: 2012
- EN 60079-1: 2014 (Ed. 7)
- EN 60079-11: 2012
- FM 3600:2011
- FM 3610:2010
- FM 3615:2006
- FM 3810:2005
- CSA C22.2 No. 0.4:2004 (R2009)

Specific Conditions of Use:

- 1. Consult the manufacturer if dimensional information on the flameproof joint is necessary.
- 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.

- CSA C22.2 No. 0.5:82 (R2008)
- CSA C22.2 No. 30:M86 (R2007)
- CSA C22.2 No. 157-92 (R2006)
- CAN/CSA-E60079-0:2011
- CAN/CSA-E60079-1:2011
- CAN/CSA C22.2 No. 1010.1:2004
- CAN/CSA-E60079-11:2011
- ANSI/ISA 60079-0:2009
- ANSI/ISA 60079-1:2009
- ANSI/ISA 60079-11:2011

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.

$\boldsymbol{\wedge}$	FIRE AND EXPLOSION HAZARD
	Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. 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 To prevent the risk of electrostatic sparking, the equipment's non-metallic parts should be cleaned only with a damp cloth. The aluminum housing may spark upon impact or contact with moving parts, which may cause fire or explosion. Take precautions to avoid such impact or contact. All flameproof joints are critical to the integrity of the motor as approved for hazardous locations and are not repairable if damaged. Damaged parts must be replaced only with genuine Graco parts with no substitutions.
	 ELECTRIC SHOCK HAZARD This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock. Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment. Connect only to grounded power source. All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

$\mathbf{\wedge}$	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 24N637. See Intrinsically Safe Installation Requirements for Advanced Motors, page 11. 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 11.
	 Do not operate the motor with any cover removed.
	 Do not substitute system components, as this may impair intrinsic safety.
Δ	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.
$\mathbf{\wedge}$	MOVING PARTS HAZARD
	Moving parts can pinch, cut, or amputate fingers and other body parts.
	Keep clear of moving parts.
MPa/bar/PSI	 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.

\wedge	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.							
	 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. 							
MPa/bar/PSI								
\wedge	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. 						
\wedge	EQUIPMENT MISUSE HAZARD						
	Misuse can cause death or serious injury.						
MPa/PS	 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 Data in all equipment manuals. Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. 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. Boute bases and cables away from treffic areas, sharp edges, moving parts, and bet 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.						

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 11.

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 3 Sightglass and Oil Fill Cap

Power Requirements

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

1	able	1	Power	Supply	S	pecifications
					_	

Model*	Voltage	Phase	Hz	kVA
EM007x	200–240 Vac	1	50/60	2.9

* The last digit of the Model No. varies. See the **Models** tables on pages 3–4.

Hazardous Location 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.

All cables must be rated at 70°C.

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.

Connect the Power Supply

1. Ensure that the fused safety switch (B) is shut off and locked out.



Figure 4 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.
- Bring the power 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 5 Connect the Power Wires

Notes for Fig. 5				
	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. 5.
- Connect a ground wire as shown in Fig. 6. 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.



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 24N637, page 19, for installation requirements and entity parameters. Follow all installation instructions in your system manual.

NOTE: For multiple advanced motors (EM0072) using a single advance control module, all motors must be bonded to the same high integrity equipotential system.

Operation

Startup

- 1. Unlock the fused safety switch (B) and turn it on. See Connect the Power Supply, page 10.
- 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 7 Power Indicator

Shutdown

Follow the Pressure Relief Procedure, page 12.

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



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 Power Supply, page 10.
- 2. Shut off and lock out the fused safety switch (B).
- 3. Relieve all fluid pressure as explained in your separate e710 DC pump manual.

Advanced Motor Operation

The Advanced e710 DC motors require installation of the 24P822 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 8 Control Module Accessory

Basic Motor Operation

The basic motor has three operating modes:

- Pressure Mode
- · Pressure Mode with Integrated Runaway



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 9 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.

- Turn the Control Knob (N) fully counterclockwise 1. to 0.
- 2. Pull the Mode Select switch (M) out to set. In

the Runaway **7** 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.

Pull the Control Knob (N) out to set. Turn the 3. 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 10 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 25.

- 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.

 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 11 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 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.
- Reinstall the oil drain plug (25). Torque to 25–30 ft-lb (34–40 N•m).
- 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 12 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 13 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.				
3	Over voltage — Motor supply voltage is too high, or the inlet pressure has driven the motor and caused it to generate excess voltage/power. The motor will self-clear the alarm and restart pumping after the voltage has dropped to an appropriate level for motor operation.				
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.				
7	Low supply voltage detected at startup.				
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.				

Accessories

Motor Part No.	Description	Kits	Kit Description
Model EM0071	e710 DC Advanced Motors	24P822	Control Module, for Advanced Motors; see manual 3A2527.
Models EM0071	e710 DC Advanced Motors	16P911	CAN Cable, 3 ft (1 m)
		16P912	CAN Cable, 25 ft (8 m)
		24P979	Pneumatic Control for Back Pressure Regulator; see manual 332142.
		24R050	Pressure Transducer Kit
		16U729	Start/Stop Switch. Allows pump to be shut off while maintaining power to the control module.
All motors in this	Connection kits, to mount an e710 DC Motor to an existing pump lower. Kits include tie	288203	For 3000 and 4000 cc 4–Ball Lowers
manual		288204	For Dura-Flo 1800 and 2400 Lowers
	rods, tie rod nuts, adapter, and coupler.	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

Appendix A - System Control Drawing 24N637

NOTES FOR FIG. 16 AND 17:

- The non-intrinsically safe terminals (power rail) must not be connected to any device which uses or generates more than Um = 250 Vrms or dc unless it has been determined that the voltage has been adequately isolated.
- 2. For multiple advanced motors (EM0071) using a single advance control module, all motors must be bonded to the same high integrity equipotential system.
- 3. Do not remove any cover until power has been removed.
- Installation should 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).
- 5. Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
- 6. Reserved for future use.
- Between one and eight motors may be connected in series. The motors are connected with a CAN cable (16P911 or 16P912). The side of the cable with the red marking is connected to Port 1 of one motor and the unmarked side of the cable is connected to Port 2 of the next motor.
- 8. The first motor in the series (the one with no CAN cable on Port 2) is installed with the power jumper 24N910 connected to Port 2 and Port 3.

- 9. The "last" motor in the series is connected to either an IS apparatus in the hazardous location or an associated IS apparatus in the non-hazardous location. The side of the CAN cable with the red marking is connected to Port 1 of the last motor and the unmarked side of the cable is connected to the IS or associated IS apparatus.
- 10. The output entity parameters given for Pins 1 and 4 in each of Ports 1 and 2 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 lo, and the power output from Pin 1 and Pin 4 added together will not exceed the listed Po.



WARNING: Substitution of components may impair intrinsic safety.

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

Table 2 . Calculation Procedures

Zones					
Uo ≤ Ui					
lo ≤ li					
Po ≤ Pi					
Co ≥ Ci + Ccable					
Lo ≥ Li + Lcable					
Lo / Ro ≥ Li / Ri					



Figure 14 System Control Drawing 24N637, Sheet 1



Figure 15 System Control Drawing 24N637, Sheet 2

Table 3 . Port 3: Power Barrier Output Parameters

Power Barrier Output Parameters							
Port 3: Male M12 5 Pin "A" Key	Pin		Voc	lsc	Pt	La	Ca
		Units	Vmax	mA	mW	μH	μF
	1	CAN Data Low	Not Connected				
	2	Power	17.9	646	2891	681	7.7
	3	IS Ground Return	—	—	—	—	—
	4	CAN Data High	Not Connected				
	5	Shield	_	—	_		—

CAN Data High/Low Input Loads							
Port 2: Male M12	Din		Vmax	Imax	Pi	Li	Ci
5 Pin "B" Key	Pin	Units	Vmax	mA	mW	μH	μF
3	1	CAN Data Low	See Table 5 for Data based on the Number of Motors				
	2	VIN Power	17.9	725	2900	128	0
	3	Signal Ground	—	—	—	—	—
4	4	CAN Data High	See Table 5 for Data based on the Number of Motors				of Motors
Port 1: Male M12 5 Pin "A" Key	5	Shield	—	—	—	—	—
		CAN Data High/	Low Output	Barriers			
Port 2: Male M12	Pin		Voc	lsc	Pt	La	Са
		Units	Vmax	mA	mW	μH	μF
3	1	CAN Data Low	See Table	e 5 for Data	based on t	he Number	of Motors
	2	VIN Power	17.9	646	2891	681	7.7
	3	Signal Ground	—	—	—	—	—
4							
5 Pin "A" Key	4	CAN Data High	See Table	e 5 for Data	based on t	he Number	of Motors
	5	Shield	—	—	—	—	—

Table 4 . Ports 1 and 2: CAN Data/Power In and Out Entity Parameters

CAN Data High/Low Input Loads						
Number of		Vmax	Imax	Pi	Li	Ci
Motors	Units	Vmax	mA	mW	μH	μF
1		6	700	900	67	0.2
2		6	700	900	67	0.4
3		6	700	900	67	0.6
4		6	700	900	67	0.8
5		6	700	900	67	1.0
6		6	700	900	67	1.2
7		6	700	900	67	1.4
8		6	700	900	67	1.6
		CAN Data H	ligh/Low Outpu	t Barriers		
Number of		Voc	lsc	Pt	La	Ca
Motors	Units	Vmax	mA	mW	mH	μF
1		4.94	102	79	27.3	1000
2		4.94	179	158	8.88	1000
3		4.94	246	237	4.70	1000
4		4.94	305	316	3.06	1000
5		4.94	358	395	2.22	1000
6		4.94	407	474	1.72	1000
7		4.94	452	553	1.39	1000
8		4.94	494	632	1.17	1000

Table 5 . Ports 1 and 2, Pins 1 and 4: CAN Data High and Low (applies to all CAN data pins shorted together or to any individual pin; see Note 10 on page 26)

Mounting Hole Pattern



Α	В	С	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

e710 DC Motors	U.S.	Metric			
Input voltage/Power:					
Models EM007x	200–240 VAC, single phase, 50/60 Hz, 2.9 kVA				
Maximum potential fluid pressure:					
Models EM007x	436000/v (volume of lower in cc) = psi	3000/v (volume of lower in cc) = bar			
Maximum continuous cycle rate	20 cpm				
Maximum force:					
Models EM007x	2800 lbf	12455 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 synthetic gear oil				
Weight	99 lb	45 kg			

Graco High Pressure Equipment Company Standard Warranty

Graco High Pressure Equipment Company warrants all equipment referenced in this document which is manufactured by Graco High Pressure Equipment Company 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 High Pressure Equipment Company, Graco High Pressure Equipment Company will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco High Pressure Equipment Company to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco High Pressure Equipment Company's written recommendations.

This warranty does not cover, and Graco High Pressure Equipment Company shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco High Pressure Equipment Company component parts. Nor shall Graco High Pressure Equipment Company be liable for malfunction, damage or wear caused by the incompatibility of Graco High Pressure Equipment Company equipment with structures, accessories, equipment or materials not supplied by Graco High Pressure Equipment Company, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco High Pressure Equipment Company.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco High Pressure Equipment Company distributor for verification of the claimed defect. If the claimed defect is verified, Graco High Pressure Equipment Company 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.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco High Pressure Equipment Company's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco High Pressure Equipment Company (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco High Pressure Equipment Company will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco High Pressure Equipment Company be liable for indirect, incidental, special or consequential damages resulting from Graco High Pressure Equipment Company supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco High Pressure Equipment Company, or otherwise.

FOR GRACO CANADA CUSTOMERS

The Parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés, à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

Graco High Pressure Equipment Company Information

For the latest information about Graco High Pressure Equipment Company products, visit www.highpressure.com.

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

Toll Free: 1-800-289-7447 Fax: 814-838-6075

All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice. Original Instructions. This manual contains English, MM 3A6316

Graco Headquarters: Minneapolis

International Offices: Belgium, China, Japan, Korea

GRACO HIGH PRESSURE EQUIPMENT CO. • 2955 West 17th Street • ERIE, PA 16305 • USA Copyright 2018, Graco Inc. All Graco manufacturing locations are registered to ISO 9001.

www.etensifier.com Revision A, December 2018