Instructions, Limited Release

QUANTM™ Pumps

3A8947A

EN

Electric-operated diaphragm (EODD) pumps with an integral electric drive for fluid transfer applications. Not for use with gasoline. Not approved for use in explosive atmospheres or hazardous (classified) locations. For professional use only.

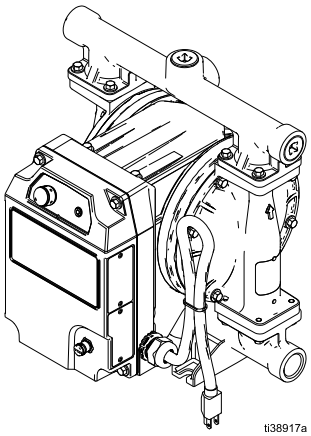
Industrial and Hygienic Models

See pages 6–10 for model information.

See pages 63–67 for maximum working pressure and electrical ratings.

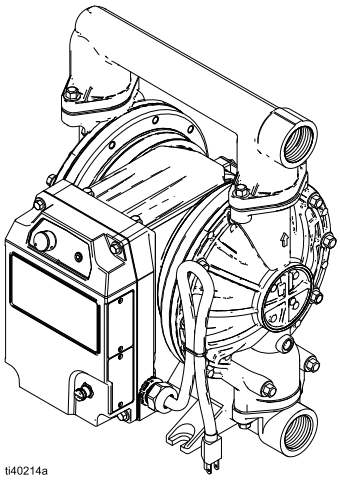
Important Safety Instructions

Read all warnings and instructions in this manual and related manuals before using the equipment. Save these instructions.



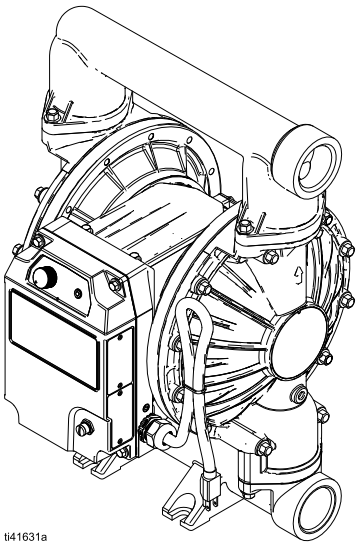
Q-C Model

Industrial model shown



Q-D Model

Industrial model shown



Q-E Model

Industrial model shown

Contents

Related Manuals

English Manual Number	Description	Reference
3A8948	QUANTM Electric Motor, Repair-Parts, Limited Release	Motor Manual
3A8949	QUANTM Pumps, Parts, Limited Release	Parts Manual

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.

⚠ 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 conductive grounded fluid lines.
- **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.

Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:

- Clean plastic parts only in well-ventilated area.
- Do not clean with a dry cloth.


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 cord before servicing equipment.
- Connect only to grounded electrical outlets.
- Only use 3-wire extension cords for 2-phase models. Only use 4-wire extension cords for 3-phase models.
- Ensure ground prongs are intact on power and extension cords.
- Do not expose to rain. Store indoors.
- Wait five minutes after disconnecting power cord before servicing.

⚠ 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.
- 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 fluid lines, cords, and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over-bend fluid lines, cords, or cables. Do not use fluid lines, cords, or cables to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

PLASTIC PARTS CLEANING SOLVENT HAZARD

Many cleaning solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.

- Use only compatible solvents to clean plastic structural or pressure-containing parts.
- See **Technical Specifications** in all equipment manuals for materials of construction. Consult the solvent manufacturer for information and recommendations about compatibility.

PRESSURIZED EQUIPMENT HAZARD

Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow the **Pressure Relief Procedure** when you stop spraying/dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check fluid lines and connections daily. Replace worn or damaged parts immediately.

⚠ WARNING

PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Do not use chlorine bleach.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

THERMAL EXPANSION HAZARD

Fluids subjected to heat in confined spaces, including fluid lines, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.

- Open a valve to relieve the fluid expansion during heating.
- Replace fluid lines proactively at regular intervals based on your operating conditions.

ENTANGLEMENT HAZARD

Rotating parts can cause serious injury.

- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Do not wear loose clothing, jewelry or long hair while operating equipment.
- Equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.

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.

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.

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.

Configuration Matrix

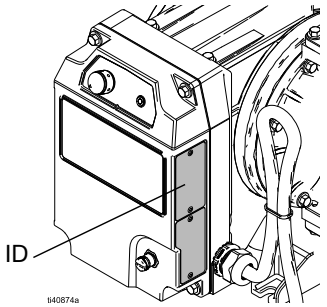
Record the model part number and configuration sequence found on your equipment identification plate (ID) to assist you when ordering replacement parts.

Model Part Number:

_____

Configuration Sequence:

_____



Sample Configuration Sequence: QTC-ACFC1ACACBNBNA10021											
Q	**T**	**C**	**AC**	**FC1**	**AC**	**AC**	**BN**	**BN**	**A1**	**00**	**21**
Brand	Application	Model	Wetted Section Material	Motor	Seat Material	Check Material	Diaphragm Material	Manifold Seal Material	Connection	Options	Material Certifications

NOTE: Some combinations are not possible. Check with your local distributor.

Brand		Application		Model		Wetted Section Material	
Q	QUANTM	**T**	Industrial	**C**	30 (1 in. port)	**AC**	Acetal
		H	Hygienic	**D**	60 (1-1/2 in. port)	**AL**	Aluminum
				E	120 (2 in. port)	**CI**	Cast Iron
						CP	Conductive Polypropylene
						FG	Food Grade, Stainless Steel, 125 micro finish (cast CF8M)
						HS	Hygienic, Stainless Steel, 32 micro finish
						HT	Hastelloy
						PH	Pharmaceutical, Stainless Steel, 20 micro finish
						PP	Polypropylene
						PV	PVDF
						SS	316 Stainless Steel
						3A	3-A Hygienic, Stainless Steel, 32 micro finish

Motor						
	Drive	**Coat**	**Input Voltage**	**Phase**	**Location**	**Cord/Cable Termination**
FC1	Aluminum Direct Drive	Black powder coat	200–240 V	3-Phase	Industrial, Ordinary Locations	Cord with plug
FC2	Aluminum Direct Drive	Black powder coat	200–240 V	Single-Phase	Industrial, Ordinary Locations	Cord with plug
FC5	Aluminum Direct Drive	Black powder coat	100–120 V	Single-Phase	Industrial, Ordinary Locations	Cord with plug
FF1	Aluminum Direct Drive	Fluorinated ethylene propylene (FEP) coat	200–240 V	3-Phase	Hygienic, Ordinary Locations	Cord with plug
FF2	Aluminum Direct Drive	FEP coat	200–240 V	Single-Phase	Hygienic, Ordinary Locations	Cord with plug
FF5	Aluminum Direct Drive	FEP coat	100–120 V	Single-Phase	Hygienic, Ordinary Locations	Cord with plug

Seat Material		Check Material		Diaphragm Material		Manifold Seal Material	
AC	Acetal	**AC**	Acetal, ball	**BN**	Buna-N	**--**	None
AL	Aluminum	**BN**	Buna-N, ball	**CO**	Polychloroprene Overmold	**BN**	Buna-N
BN*	Buna-N	**CR**	Polychloroprene, standard, ball	**CR**	Polychloroprene	**EP**	EPDM
FK*	Fluoroelastomer	**CW**	Polychloroprene, weighted, ball	**EO**	EPDM Overmold	**FK**	Fluoroelastomer
FL	Flapper, for hygienic models only	**EP**	EPDM, ball	**FK**	Fluoroelastomer	**PF**	PTFE Encapsulated Fluoroelastomer
GE	Geolast	**FK**	Fluoroelastomer, ball	**GE**	Geolast	**PT**	PTFE
PP	Polypropylene	**FL**	Flapper, Stainless Steel	**PO**	PTFE/EPDM Overmold		
PV	PVDF	**GE**	Geolast, ball	**PS**	PTFE/Santoprene, two-piece		
SA	17-4PH Stainless Steel with PTFE seals	**PT**	PTFE, ball	**PT**	PTFE/Neoprene, two-piece		
SB	316 Stainless Steel with Fluoroelastomer seals	**SD**	440C Stainless Steel, ball	**PU**	PTFE/polyurethane, two-piece		
SD	316 Stainless Steel with PTFE seals	**SP**	Santoprene, ball	**SP**	Santoprene		
SP	Santoprene	**SS**	316 Stainless Steel, ball	**TP**	TPE		
SS	316 Stainless Steel	**TP**	TPE, ball				
TP*	TPE						

* Models with BN, FK, or TP seats do not use manifold seals.

Connection		Options		Material Certifications	
A1	Aluminum, standard ports, NPT	**00**	Standard	**21**	EN 10204 type 2.1
A2	Aluminum, standard ports, BSP	**DP**	Drum Pump	**31**	EN 10204 type 3.1
A26	Aluminum, standard ports, BSP, no plugs	**FH**	Flapper, horizontal		
AC3	Acetal, standard ports, NPT	**OD**	Open Down Port		
AC4	Acetal, standard ports, BSP	**OR**	Outlet Reversed		
C1	Conductive Polypropylene, center flange	**RE**	Remote		
C2	Conductive Polypropylene, end flange	**SF**	Sanitary Flapper		
C3	Conductive Polypropylene, standard ports, NPT	**SM**	Split Manifold		
C4	Conductive Polypropylene, standard ports, BSP	**SS**	Stroke Sensor		
F1	PVDF, center flange				
F2	PVDF, end flange				
F3	PVDF, standard ports, NPT				
F4	PVDF, standard ports, BSP				
H1	Hastelloy, standard ports, NPT				
H2	Hastelloy, standard ports, BSP				
I1	Iron, standard ports, NPT				
I2	Iron, standard ports, BSP				
P1	Polypropylene, center flange				
P2	Polypropylene, end flange				
P3	Polypropylene, standard ports, NPT				
P4	Polypropylene, standard ports, BSP				
S1	Stainless Steel, standard ports, NPT				
S2	Stainless Steel, standard ports, BSP				
S3	Stainless Steel, standard ports, oil-certified, NPT				
S4	Stainless Steel, standard ports, spring check, NPT				
S13	Stainless Steel, standard ports, hygienic clamp				
S14	Stainless Steel, standard ports, DIN				
S51	Stainless Steel, center flange, horizontal outlet				
S52	Stainless Steel, center flange, vertical outlet				
SSA	Center-ported tri-clamp				
SSB	Center-ported DIN				

Approvals

Model Information*	Approvals
Motors	For motor approvals, see your related motor manual. See **Related Manuals**, page 2.
All pump models are approved to:	CE UKCA
QH models with diaphragm materials coded PO combined with PT or FL checks comply with:	EC 1935/2004
QH models with diaphragm materials coded EO, PT, or PS combined with EP, PT, or FL checks comply with:	EC 1935/2004 Class VI
Wetted contact section materials in QH models are FDA-compliant and meet the United States Code of Federal Regulations (CFR).	

* *See **Configuration Matrix**, starting on page 6, for detailed descriptions.*

Component Identification

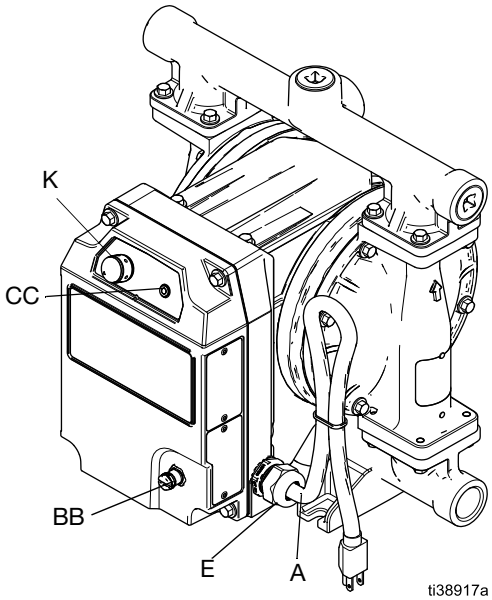


FIG. 1: Component Identification (QTC Industrial model shown)

Models include a cord with a plug and Input/Output (I/O) port.

Ref.	Component	Description
A	Power Cord/Cable	15 ft (4.6 m) cord with plug*
BB	I/O Port/Cable	M12, 5-pin connector**
	On/Off Control, Digital Input	
	Error Status, Digital Output	
	Speed Control, Analog Input	
CC	LED Indicator♦	Standard
E	External Ground Fastener, Ground Symbol	The equipment is marked per IEC 417, Symbol 5019:
K	Control Knob	Turn clockwise (right) to increase fluid output

** See **Required Power and Plugs**, page 17.*

*** See **I/O Pin Connection**, page 19.*

♦ *See **LED Indicator**, page 24.*

Typical Installation

General Information

A typical installations is shown in FIG. 2. The figure is only a guide for selecting and installing system components. Contact your local distributor for assistance in planning a system to suit your needs.

Always use Genuine Graco Parts and accessories. Be sure all accessories are adequately sized and pressure-rated to meet the requirements of the system.

Reference letters in the text, for example, (A), refer to the callouts in the figures.

Typical Installation

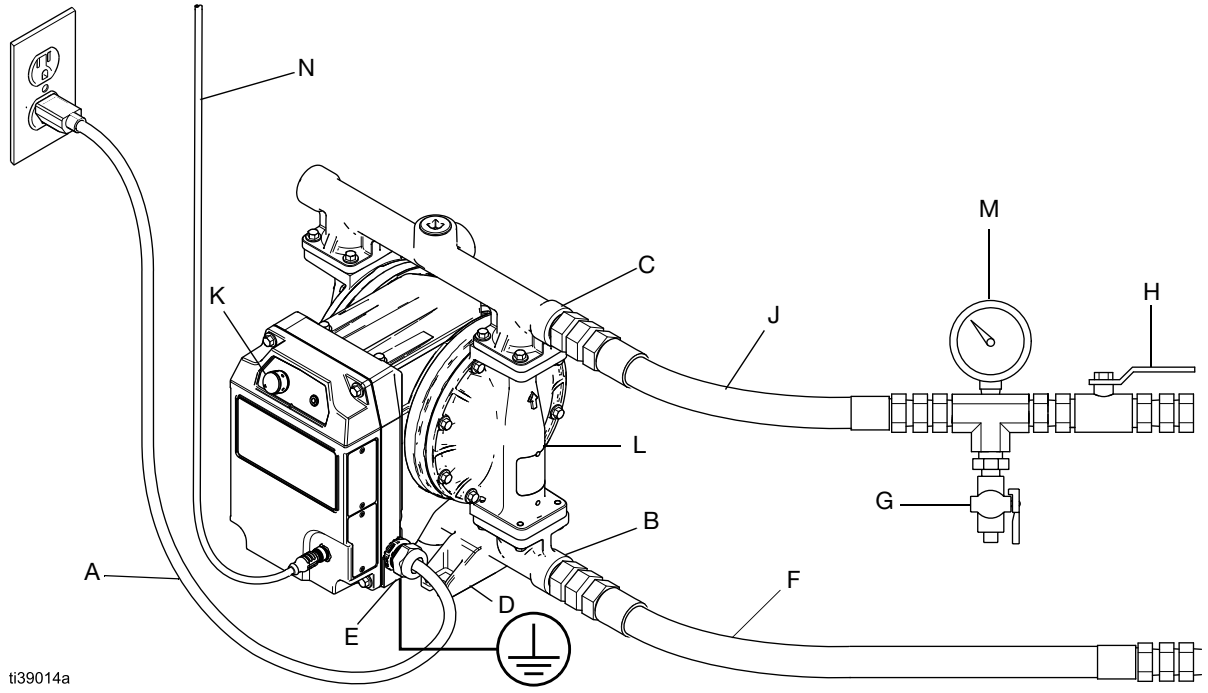


FIG. 2: Typical Installation (cord and plug connection) (QTC Industrial model shown)

Pump Components	
A‡	Power cord
B	Fluid inlet port
C	Fluid outlet port
D	Mounting feet
E	Ground fastener
K	Fluid output control knob
L▼	Diaphragm access ports (not shown)

‡ *Connect to a circuit with a main electrical disconnect. Install a branch circuit protective device in each ungrounded phase. Follow local codes and regulations.*

▼ *Install accessories. See **Install Monitoring Accessories**, page 14, or **Install Fluid Leak Line Accessories**, page 14.*

Accessories (Not Supplied)	
F*	Conductive, flexible fluid supply line
G*	Fluid drain valve
H	Fluid shutoff valve
J*	Conductive, flexible fluid outlet line
M	Fluid pressure gauge
N	I/O Cable

* *Required, not supplied.*

Installation

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.

To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

Mount the Pump

The pump may be very heavy (see **Technical Specifications**, starting on page 63, for specific weights). If the pump must be moved, follow the **Pressure Relief Procedure**, page 21. Use at least two straps and appropriate lifting equipment or have two people lift the pump. Do not use the outlet manifold alone to lift the pump.

1. Ensure that the mounting surface is level.
2. Ensure that the mounting surface and mounting hardware is strong enough to support the weight of the pump, fluid lines, accessories, and fluid, as well as the stress caused during operation.
3. For all mountings, be sure the pump is secured with fasteners through the mounting holes on the base. See FIG. 3. See **Dimensions**, starting on page 48.

   NOTE: For ease of operation and service, mount the pump so the control knob (K), LED indicator (CC), I/O port/cable (BB), and fluid inlet and outlet ports (B, C) are easily accessible.

NOTICE

To avoid pump damage, mount the pump to the mounting location using fasteners though each hole of the feet. See FIG. 3.

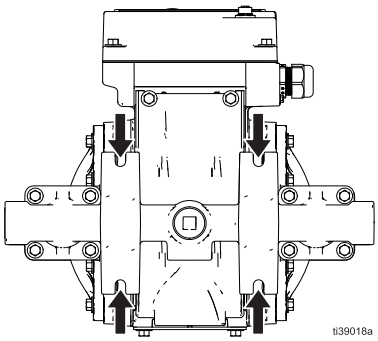


FIG. 3: Mounting Holes (Industrial model shown)

Connect Fluid Lines

Use conductive, flexible fluid lines for fluid supply (F) and fluid outlet (J) lines.

NOTE: For proper priming, ensure the fluid outlet port (C) is mounted higher than the fluid inlet port (B). See FIG. 2.

1. Install conductive, flexible fluid lines (F and J).
2. Install a fluid drain valve (G) near the fluid outlet. See FIG. 2.

A fluid drain valve (G) is required to relieve pressure in the fluid outlet line. The drain valve reduces the risk of serious injury, including splashing in the eyes or on the skin, when relieving pressure.

3. Install a fluid shutoff valve (H) in the fluid outlet line (J) downstream from the fluid drain valve (G).

NOTE: Install the equipment as close as possible to the material source. See **Technical Specifications**, starting on page 63, for maximum suction lift.

NOTICE

The pump can be damaged if flexible fluid lines are not used. If hard-plumbed fluid lines are used in the system, use a short length of conductive, flexible fluid line to connect to the pump.

Install Accessories

Install Monitoring Accessories

Install the following accessory to monitor equipment performance.

- **Leak Sensor:** Monitors for leaks in the pump due to diaphragm rupture. Automatically stops pump operation and triggers the LED Indicator if a leak is detected. Not provided with the equipment. Accessory kits are available (purchase separately). See your related motor manual. See **Related Manuals**, page 2.

NOTICE

To avoid pump damage, install a leak sensor to detect leaks in the equipment due to diaphragm rupture.

Install Fluid Line Accessories

Install the following accessories in the order shown in FIG. 2, using adapters as needed.

- **Fluid drain valve (G):** Required. Relieves fluid pressure in the system.
- **Fluid shutoff valve (H):** Shuts off fluid flow.
- **Fluid pressure gauge (M):** For more precise adjustment of the fluid pressure.
- **Fluid outlet line (J):** To dispense fluid.
- **Fluid supply line (F):** Enables the equipment to draw fluid from a container.

Install Fluid Leak Line Accessories

If a leak sensor is not installed in the pump and the diaphragm ruptures, the equipment will fill with fluid or fluid will drain into the work area. To avoid injury from leaking fluid, toxic fluid, toxic fumes, splashing fluid, or hot fluid, install fluid drain lines to route fluid leaks due to diaphragm rupture.

NOTICE

To avoid pump damage due to diaphragm rupture, install a leak sensor to detect leaks in the equipment and automatically stop pump operation. See **Install Monitoring Accessories**, page 14.

If a leak sensor is not installed in the pump, install the following accessory as shown in FIG. 4, using adapters as needed.

NOTE: To monitor for leaks in the pump due to diaphragm rupture, install a leak sensor. See **Install Monitoring Accessories**, page 14.

- **Fluid Leak line (L2):** Routes fluid to a drain location if fluid leaks due to diaphragm rupture.

1. Remove the plugs (if applicable) in the diaphragm access ports (L).
2. Install conductive, flexible fluid leak lines (L2) to the diaphragm access ports (L).

NOTICE

The pump can be damaged if flexible fluid lines are not used. If hard-plumbed fluid lines are used in the system, use a short length of conductive, flexible fluid line to connect to the pump.

3. Route the fluid leak lines (L2) to a grounded end container (L3) to catch leaking fluid. Follow local codes and regulations for grounding.

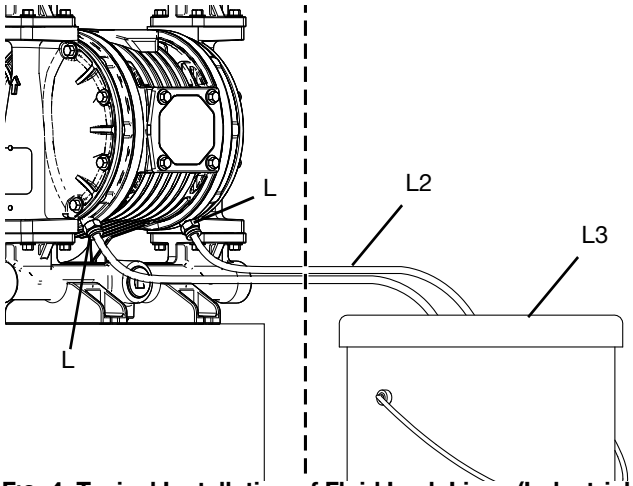
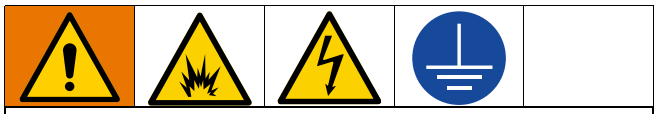


FIG. 4: Typical Installation of Fluid Leak Lines (Industrial model shown)

Grounding



The 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.

- Always ground the entire fluid system as described in this section.
- Follow local codes and regulations.

Before operating the equipment, ground the system as follows.

Ground the Pump

Connect a Static Ground

See FIG. 5.

1. Loosen the ground fastener (E).
2. Insert one end of a 12-gauge or thicker ground wire behind the ground fastener and securely tighten the ground fastener (E).
3. Connect the clamp end of the ground wire to a true earth ground.

NOTE: A ground wire and clamp (part number 238909) is available (purchase separately).

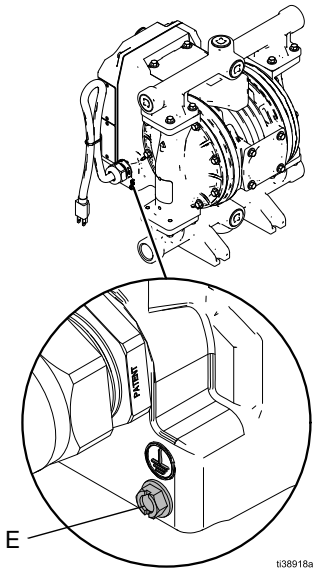


FIG. 5: Equipment Ground Fastener (Industrial model shown)

Connect the Electrical Ground

Ground through the provided power cord and plug. Connect the plug to a power outlet that is properly installed and grounded to a true earth ground.

Ground the Fluid Lines

Use only conductive fluid lines with a maximum of 500 ft (150 m) combined line length to ensure grounding continuity. Check electrical resistance of the fluid lines.

Ground the Fluid Supply Container

Follow local codes and regulations.

Ground the Pails for Solvents and Sanitizing Solution Used when Flushing

Follow local codes and regulations. 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.

Verify Ground Continuity

Check the pump ground continuity after the initial installation. Set a regular schedule for checking ground continuity to maintain proper grounding. Do not exceed 1 ohm resistance from earth ground to the pump.

Before First Use

Tighten Fasteners

Before using the equipment for the first time, check and torque all fasteners. Follow **Torque Fasteners**, page 43.

After the first day of operation, re-torque the fasteners.

NOTICE
To avoid pump damage, do not over-torque the fasteners on the equipment.

Tighten Connections

Check and tighten all fluid connections before operating the equipment. Replace worn or damaged parts as needed.

NOTICE
Firmly tighten all connections to avoid leaks and damage to equipment parts.

Flush the Equipment

Before using the equipment for the first time, flush the equipment. Follow **Flush the Equipment**, page 28.

For QH (Hygienic) Models: The equipment was tested using a food grade lubricant. If a food grade lubricant could contaminate the fluid being dispensed, flush the equipment thoroughly with a sanitizing solution before first use.

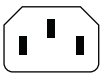
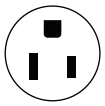
For QT (Industrial) Models: The equipment was tested with water. If water could contaminate the fluid being dispensed, flush the equipment with a compatible solvent before first use.

Electrical Connections and Wiring

Required Power and Plugs

To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

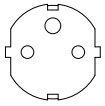
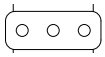
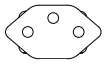
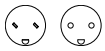
NOTE: For equipment provided with a cable and flying leads (no plug), install a main electrical disconnect per local codes and regulations.

Required Power and Plugs							
Motor Configuration Code*	Model	Power Requirements				Cord/Cable Termination	Plug
		Input Voltage	Phase‡	Hertz	Current		
F-1	Q-C, Q-D, Q-E	200–240 V	3	50/60 Hz	7.5 A	NEMA L15-20 Plug	
F-2	Q-C	200–240 V	1	50/60 Hz	10 A	IEC 60320-C14 Plug#	
	Q-D, Q-E	200–240 V	1	50/60 Hz	15 A	IEC 60320-C20 Plug#	
F-5	Q-C	100–120 V	1	50/60 Hz	12 A	NEMA 5-15 Plug	

** See **Configuration Matrix**, starting on page 6, for detailed descriptions.*

‡ *Connect to a circuit with a main electrical disconnect. Install a branch circuit protective device in each ungrounded phase. Follow local codes and regulations.*

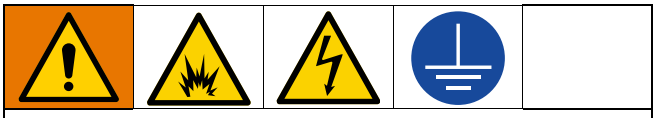
Adapter plugs are available from Graco. See the table on the next page for available adapter kits by region.

Adapter Kits for C14 and C20 Plugs by Region			
Region	**C14 Plug Adapter Kits***	**C20 Plug Adapters Kits‡**	**Plug**
Europe	242001	15G958	
Australia/China	242005	17A242	
Italy	242002	--	
	--	15G959	
Switzerland	242003	15G961	
Denmark	242003	--	

** A C14 plug retainer clip (195551) can be purchased separately from Graco.*

‡ A C20 plug retainer clip (121249) can be purchased separately from Graco.

I/O Pin Connection



To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

NOTE: All I/O connectors are capable of 30 VDC (volts of direct current) and are reverse-polarity protected.

For wiring, see **Equivalent Electrical Circuits for I/O Pin Connection**, page 20.

I/O Connector Pinout		
Pin	**Connector Type**	**Description**
Pin 1	Digital Input	Digital input has an internal 5 VDC pull-up for dry-contact or current-sinking circuits. Digital input is internally clamped for push-pull outputs. Pull the input low to stop the equipment from running. Release or drive the input high to re-enable the equipment.
Pin 2	Digital Output (Equipment Running)	Digital output is current-sinking with a current capacity up to 100 mA. Digital output is internally clamped for driving large inductive loads. The output is automatically pulled low when the equipment is running and automatically released when the equipment is not running.
Pin 3	GND/Common	Earth ground, common connection.
Pin 4	Analog Input, Positive	Analog inputs are 4–20 mA current-controlled. When the analog input is connected and driving current, the equipment disables the control knob (K) and uses the analog input to control the speed and pressure of the equipment. The control knob (K) can still be used to shut off the equipment by turning the knob to off (0). To re-enable the equipment at the speed and pressure commanded by the analog input, turn the control knob up (clockwise). To disable the analog input control and enable the control knob (K): 1. Shut down the equipment. See **Shut Down the Equipment**, page 23. Ensure the LED indicator is off (no light). 2. Disconnect power to the system. 3. Disconnect the analog input (Pin 4, Pin 5). 4. Connect the unit to a power source to turn on the equipment and enable the control knob (K) on the equipment.
Pin 5	Analog Input, Negative	

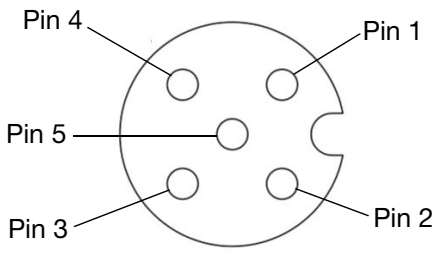
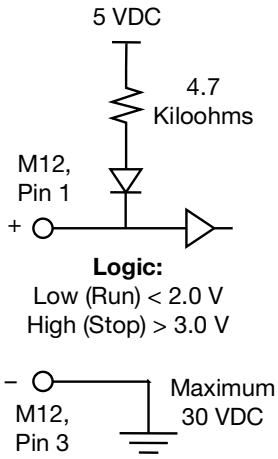
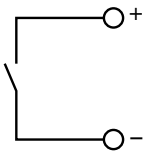
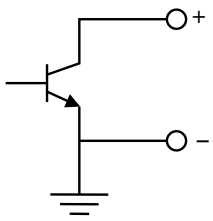
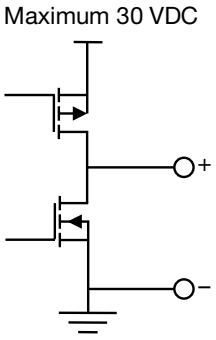
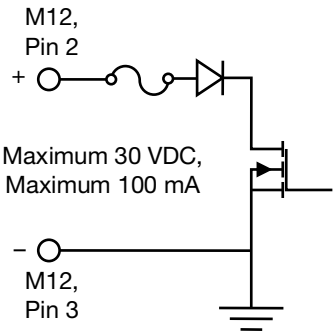
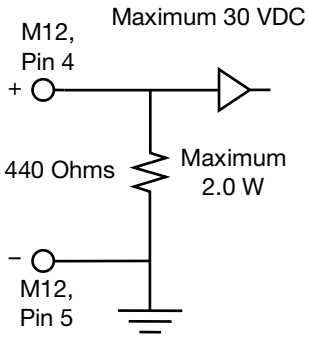


FIG. 6: M12, 5-pin Connector

Equivalent Electrical Circuits for I/O Pin Connection

Equivalent Electrical Circuits for I/O Pin Connection	
I/O Circuit	**Equivalent Circuit**
Digital Input	
	Compatible Drivers for Digital Input
	Switch or Relay 
	Open Collector (NPN) 
	Push-Pull Driver 

Equivalent Electrical Circuits for I/O Pin Connection	
I/O Circuit	**Equivalent Circuit**
Digital Output	
Analog Input	

Operation

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 splashing fluid and moving parts, Follow the **Pressure Relief Procedure** when you stop operating and before cleaning, checking, or servicing the equipment.

1. Turn the fluid output control knob (K) to off (0) and disconnect power to the system.
2. Close the fluid shutoff valve (H).
3. Open the fluid drain valve (G) to relieve fluid pressure. Prepare a container to catch the drainage.
4. Leave the fluid drain valve (G) open until the system is ready to be pressurized.

Before Each Use

Tighten Fasteners

Check and tighten all fasteners before operating the equipment. Re-torque as needed. Follow **Torque Fasteners**, page 43.

NOTICE

To avoid pump damage, do not over-torque the fasteners on the equipment.

Tighten Connections

Check and tighten all fluid connections before operating the equipment. Replace worn or damaged parts as needed.

NOTICE

Firmly tighten all connections to avoid leaks and damage to equipment parts.

Flush the Equipment

Flush the equipment before each use. Determine whether to disassemble and clean individual parts or simply flush the equipment with a compatible solvent or sanitizing solution.

To simply flush the equipment with a compatible solvent or sanitizing solution, follow **Start the Equipment**, page 22, and **Flush the Equipment**, page 28.

To disassemble and clean individual parts, see the applicable repair procedure. See **Repair**, starting on page 32.

Start the Equipment

Prepare the Equipment for Startup

1. Confirm that the equipment is properly grounded. See **Grounding**, page 15.
2. Check and tighten all fasteners and connections before operating the equipment. Replace worn or damaged parts as needed.
3. Insert the suction end of the fluid supply line (F) into the fluid to be dispensed.
4. Insert the outlet end of the fluid outlet line (J) into the end container.
5. Close the fluid drain valve (G).
6. Turn the control knob (K) to off (0).
7. Ensure all fluid shutoff valves (H) are open.
8. If the fluid outlet line (J) has a dispensing device, hold the dispensing valve open.

Start and Adjust the Equipment

1. Connect the equipment to a power source. See **Electrical Connections and Wiring**, starting on page 17. LED indicator will be solid red.
2. Turn control knob (K) to zero.
3. Increase the control knob (K) past zero to initiate the startup sequence. LED indicator will be solid yellow.
4. Once the LED indicator is green, slowly increase the control knob (K) until the equipment is operating at the set output level.
5. If flushing, run the equipment long enough to thoroughly clean the equipment and lines.

Tips for Using Auto-Prime

The auto-prime sensor monitors whether fluid is present while the pump is running over 30-50% of it's maximum speed. If fluid is not detected, the auto-priming sequence will start. The auto-priming sequence will run for 30 seconds, or until fluid is detected, before pumping resumes. Pumping will continue as for long as fluid is detected. If fluid is not detected, the auto-priming sequence will restart.

Though the auto-prime feature is enabled by default from the factory, it can be disabled on the control board.

To disable auto-prime:

1. Loosen the four cover screws and remove the control cover (2).
2. Locate the auto-prime dip switch directly below the leak sensor, and push the dip switch left to disable the auto-prime feature.

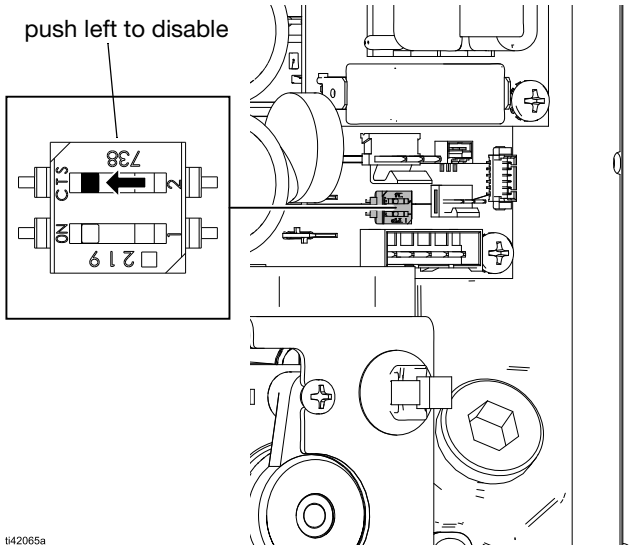


FIG. 7: Location of Auto-Prime Dip Switch

3. Replace the control cover (2) and tighten the four cover screws.

Tips to Reduce Cavitation

NOTICE

Frequent or excessive cavitation can cause serious damage, including pitting and early wear of wetted parts, and may result in reduced efficiency of the equipment. Cavitation damage and reduced efficiency both result in increased operating costs.

Cavitation is the formation and collapse of air pockets in the fluid. Cavitation depends on the vapor pressure of the fluid, the system suction pressure, and the velocity pressure. Viscous fluids are more difficult to pump and more prone to cavitation than non-viscous fluids.

To improve equipment efficiency and reduce the cavitation:

1. **Reduce vapor pressure:** Decrease the temperature of the fluid.
2. **Increase suction pressure:**
   a. Position the equipment lower than the fluid level in the supply.

b. Reduce the number of fittings on the suction lines to reduce friction length.

c. Increase the diameter of the suction lines.

d. Reduce the fluid inlet pressure. An inlet pressure supply of 3–5 psi (21–35 kPa, 0.2–0.3 bar) is adequate for most materials.

NOTICE

To avoid pump damage and inefficient operation, do not use a fluid inlet pressure greater than 25 percent of the outlet working pressure.

e. Increase the Net Positive Suction Head (NPSH). See **Performance Charts**, page 46.

3. **Reduce liquid velocity:** Slow the equipment cyclic rate.

Consider all the previously listed factors in system design. To maintain efficiency, operate the equipment at the lowest speed and pressure setting needed for the required flow.

Contact your local distributor for site-specific suggestions to improve equipment performance and reduce operating costs.

Shut Down the Equipment

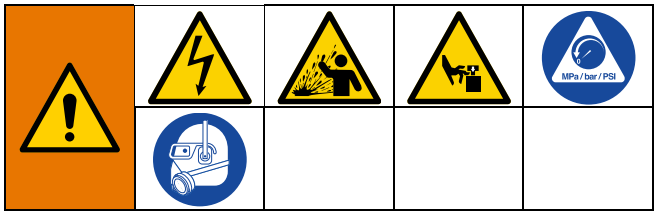
1. Follow **Pressure Relief Procedure**, page 21.
2. Follow **Flush the Equipment**, page 28.

LED Indicator

LED Indicator Overview

LED Indicator	Equipment Status	Notes
Red, solid	Control knob set at 0 (zero), system not operating.	Be aware that the equipment is energized. To initiate equipment operation, follow **Start the Equipment**, page 22.
	Powered on after a power cycle, control knob may be set above 0 (zero), system not operating.	
Red, flashing	Motor fault, motor error.	See **Troubleshoot LED Indicator Event Errors**, page 25.
Yellow, solid	Calibrating. Performing startup sequence.	No action. Allow equipment to finish startup sequence. Open the fluid drain valve (G) or fluid shutoff valve (H) to allow the equipment to cycle until the startup sequence is finished.
Yellow, flashing	Leak sensor alert.	See **Troubleshoot LED Indicator Event Errors**, page 25.
Green, solid	Normal operation.	No action.
Green, flashing	Normal operation, stalled against pressure.	Be aware that the equipment is energized. Special-case action. See **Troubleshoot LED Indicator Event Errors**, page 25.
No light (off)	System not powered.	See **Troubleshoot LED Indicator Event Errors**, page 25.

Troubleshoot LED Indicator Event Errors



If an event error occurs, the LED Indicator will blink a set number of times corresponding to the event code that needs acknowledged.

1. Follow the **Pressure Relief Procedure**, page 21, before checking or repairing the equipment.
2. Check all possible problems and causes before disassembling equipment.

Troubleshoot LED Indicator Event Errors

LED Indicator	Problem	Cause	Solution
Red, flashing, one flash	Motor or controller overheating.	Hot operating environment or hot operating conditions.	Turn the control knob (K) to the off (0) position. Keep the system connected to power and allow the equipment to cool before returning to operation.
			Inspect the fan. Repair or replace as needed. See your related motor manual. See **Related Manuals**, page 2.
	Motor temperature sensor disconnected.	Motor sensor not connected or motor not reading the temperature sensor.	Ensure the encoder cable is properly connected to the control board. See your related motor manual. See **Related Manuals**, page 2.
Red, flashing, two flashes	Motor current error.	Special-case cause.	Contact Technical Support.
Red, flashing, three flashes	Voltage error.	Input voltage is too high, too low, or too noisy.	Check line power voltage.
			Check control board connections. See your related motor manual. See **Related Manuals**, page 2.
Red, Flashing, four flashes	Motor sensor error.	Motor sensor disconnected.	Ensure the motor sensor cable is properly installed. See your related motor manual. See **Related Manuals**, page 2.
		Motor sensor not functioning.	Replace the motor sensor. See your related manuals. See your related motor manual. See **Related Manuals**, page 2.
Red, flashing, five flashes	Special-case problem.	Special-case cause.	Contact Technical Support.
Dim red, solid	Voltage detection error.	Power disconnected.	Check power connection.
		System powering down.	Allow equipment to finish shutdown.

Troubleshoot LED Indicator Event Errors			
LED Indicator	**Problem**	**Cause**	**Solution**
Yellow, flashing, continuous flash	*Leak sensor alert.	Leak detected in the equipment.	Check the diaphragm for rupture or incorrect installation. Repair or replace.
		The leak sensor disconnected.	Ensure the leak sensor is properly installed. See your related leak sensor manual.
Green, flashing, continuous flash	Equipment stalled against pressure.	A valve downstream in the fluid line is closed or clogged.	Open the valve.
			Follow the **Pressure Relief Procedure**, page 21, and clear the valve.
		Special-case cause.	Be aware that the equipment is energized. Special-case action. See your related motor manual. See **Related Manuals**, page 2.
			Contact Technical Support.
No light (off)	Voltage detection error.	System not powered.	Check power connection.
		Control failure.	Check the branch circuit for proper voltage.
			Replace the control board. See your related motor manual. See **Related Manuals**, page 2.

** A leak sensor is not provided with the equipment. Accessory kits are available (purchase separately). See your related motor manual. See **Related Manuals**, page 2.*

Maintenance

Establish a Preventive Maintenance Schedule

NOTICE

Regularly maintain the equipment to avoid pump damage due to spills, leaks, or diaphragm failure.

Establish a preventive maintenance schedule based on the equipment service history.

Inspect the Equipment

Regularly inspect the equipment for worn or damaged parts. Replace as needed.

Torque Fasteners

Regularly check and torque all fasteners. Follow **Torque Fasteners**, page 43.

NOTICE

To avoid pump damage, do not over-torque the fasteners on the equipment.

Tighten Connections

Check and tighten all fluid connections before operating the equipment. Replace worn or damaged parts as needed.

NOTICE

Firmly tighten all connections to avoid leaks and damage to equipment parts.

Lubricate the Equipment

The equipment is lubricated at the factory. Re-lubricate the equipment when replacing diaphragms.

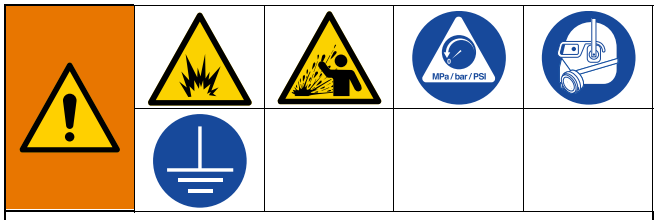
Lubricate the motor rotor when replacing diaphragms.

Graco recommends Lubriplate Synxtreme HD Series HD-2 grease, or equivalent NLGI grade 2 synthetic bearing grease containing calcium sulfanate complex as the thickener. See your related motor manual. See **Related Manuals**, page 2.

NOTICE

Do not over-lubricate the equipment. Lubricant exhaust could contaminate your fluid supply or other equipment. Excessive lubrication can also cause the equipment to malfunction.

Flush the Equipment



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

- Flush before fluid can dry or freeze in the equipment, at the end of the day, before storing, and before repairing equipment.
- Flush at the lowest pressure possible. Check connections for leaks and tighten as needed.
- Flush with a solvent that is compatible with the fluid being dispensed and the equipment wetted parts. Use a sanitary solution for hygienic applications.
- Flushing schedule varies based on particular uses.
- Always cycle the equipment during the entire flushing process.

1. Follow **Pressure Relief Procedure**, page 21.
2. Insert the suction end of the fluid supply line (F) into a compatible solvent or sanitizing solution.
3. Close the fluid drain valve (G).
4. Ensure the control knob (K) is turned to off (0).
5. If the fluid outlet line (J) has a dispensing device, place a metal part of the dispensing device to a grounded metal container and hold the dispensing valve open.
6. Ensure all fluid shutoff valves (H) are open.
7. Connect the equipment to a power source. See **Electrical Connections and Wiring**, starting on page 17.
8. Slowly increase the control knob (K) until the equipment is operating at the set output level.
9. Run the equipment for enough time to thoroughly clean the equipment and lines.
10. Turn the control knob (K) to off (0).
11. Follow **Pressure Relief Procedure**, page 21.

Store the Equipment

Always relieve the pressure and flush the equipment before storing the equipment for any length of time.

1. Follow **Pressure Relief Procedure**, page 21.
2. Follow **Flush the Equipment**, page 28.

NOTICE

Store the equipment at 32°F (0°C) or higher. Exposure to extreme low temperatures may result in damage to plastic parts.

Clean the Wetted Contact Section

Routinely clean the wetted contact section. Determine whether or not to disassemble equipment for cleaning.

- To clean the equipment without disassembling parts, follow **Clean In-Place (CIP)**, page 29.
- To clean the equipment by disassembling parts, follow **Clean Out-of-Place (COP)**, page 29.

For QH (Hygienic) Models: Clean the equipment in accordance with applicable sanitary standard codes and local regulations.

For QT (Industrial) Models: Clean the equipment in accordance with applicable codes and local regulations for your compatible solvent.

Clean In-Place (CIP)

NOTICE

To avoid equipment damage, only use cleaning fluids that are compatible with materials of the wetted contact section. To avoid damage to stainless steel parts, do not use chlorinated cleaning fluids. Do not exceed the maximum fluid temperature for the materials of the wetted contact section. See **Fluid Temperature Range**, page 63.

1. Follow **Pressure Relief Procedure**, page 21.
2. Flush the equipment with a compatible solvent or sanitizing solution. Follow **Flush the Equipment**, page 28.
3. Circulate the compatible solvent or sanitizing solution through the equipment. Slowly cycle the equipment as the compatible solvent or sanitizing solution is circulated.

   NOTE: Thoroughly circulate the compatible solvent or sanitizing solution through the equipment and the system prior to use.

NOTICE

To avoid equipment damage, do not exceed a fluid inlet pressure of 15 psi (103 kPa, 1 bar) when cycling the equipment.

4. Follow **Pressure Relief Procedure**, page 21.

Clean Out-of-Place (COP)

1. Follow **Pressure Relief Procedure**, page 21.
2. Flush the equipment with a compatible solvent or sanitizing solution. Follow **Flush the Equipment**, page 28.
3. Disassemble parts as needed. See **Repair**, starting on page 32.
4. Inspect parts for wear or damage. Replace as needed.
5. Using a brush or other COP methods, wash all wetted parts with a compatible solvent or sanitizing solution at the recommended temperature and concentration of the manufacturer.
6. Rinse the parts again with water and allow parts to completely dry.
7. Inspect the parts and re-clean any soiled parts.
8. **For QH (Hygienic) Models only:** Immerse all wetted parts in an approved sanitizer before assembly. Leave the parts in the sanitizer, and only remove the parts one by one as needed for assembly.
9. Reassemble the equipment as needed. See **Repair**, starting on page 32.
10. Flush the equipment with a compatible solvent or sanitizing solution. Follow **Flush the Equipment**, page 28.
11. Circulate the compatible solvent or sanitizing solution through the equipment. Slowly cycle the equipment as the compatible solvent or sanitizing solution is circulated.

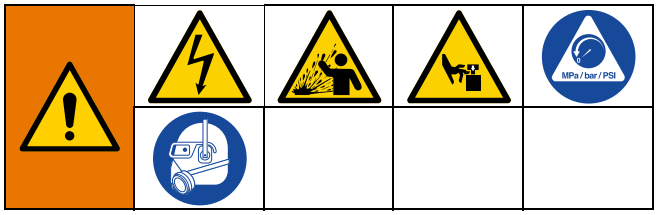
    NOTE: Thoroughly circulate the compatible solvent or sanitizing solution through the equipment and the system prior to use.

NOTICE

To avoid equipment damage, do not exceed a fluid inlet pressure of 15 psi (103 kPa, 1 bar) when cycling the equipment.

12. Follow **Pressure Relief Procedure**, page 21.

Troubleshooting



1. Follow the **Pressure Relief Procedure**, page 21, before checking or repairing the equipment.
2. Check all possible problems and causes before disassembling equipment.

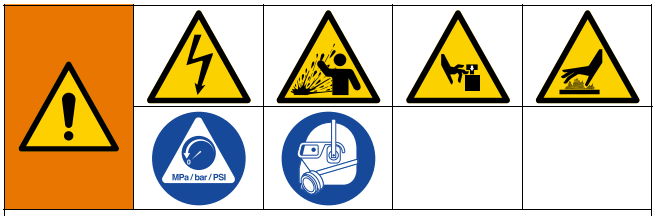
Problem	Cause	Solution
LED light flashing	Equipment error; special-case cause.	See **Troubleshoot LED Indicator Event Errors**, page 25.
Equipment cycles, but does not prime or pump	Equipment running too fast, causing cavitation before prime.	Slow down the motor controller.
	Check is worn or wedged in the seat or manifold.	Replace check and seat.
	Worn seat.	Replace check and seat.
	Restricted outlet or inlet port.	Remove restriction.
	Loose inlet fittings or manifolds.	Tighten.
	Damaged manifold seats.	Replace.
Equipment does not hold fluid pressure at stall	Worn check, seats, or seals.	Replace.
	Loose manifold connections or fluid connections.	Tighten.
	Loose diaphragm shaft fastener.	Tighten.
Equipment leaking fluid externally from joints	Loose manifold connections or fluid cover connections.	Tighten.
	Worn manifold seats or seals.	Replace.
Equipment stalled, will not cycle	Fluid line clogged or valves closed.	Inspect; clear. Open valves downstream of the equipment.
	Motor or controller wired improperly.	Wire per instructions in your related motor manual. See **Related Manuals**, page 2.
	Leak sensor tripped.	Check diaphragm for rupture or incorrect installation. Repair or replace.
Reduced performance	Fluid line clogged.	Inspect; clear.
	Checks are sticky or leaking.	Clean or replace.
	Diaphragm (or backup diaphragm, if applicable) ruptured.	Replace.

Problem	Cause	Solution
Air bubbles in fluid	Fluid line is loose.	Tighten.
	Diaphragm (or backup diaphragm, if applicable) ruptured.	Replace.
	Loose manifolds.	Tighten manifold fasteners or clamps.
	Damaged seats or seals.	Replace seats or seals.
	Loose diaphragm shaft fastener.	Tighten.
Fluid leaking from lower ports on the equipment or fluid on the floor.	Loose diaphragm shaft fastener.	Tighten.
	Diaphragm rupture. Leak in the equipment.	Replace.
Equipment suddenly stops operating or shuts down.	Ground fault circuit interrupter (GFCI) tripped.	Remove controller from the GFCI circuit.
	Poor supply power.	Check connections. Determine and fix the source of the problem with the supply power.
	Exceeded operational parameters.	See your controller manual for event codes.
	Leak sensor* alert. Leak detected in the equipment.	Check the diaphragm for rupture or incorrect installation. Repair or replace.
	The leak sensor* disconnected.	Ensure the leak sensor is properly installed. See your related leak sensor manual.

** A leak sensor is not provided with the equipment. Accessory kits are available (purchase separately). See your related motor manual. See* ***Related Manuals****, page 2.*

Repair

NOTE: Repair kits are available (purchase separately).



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

To avoid severe burns, do not touch hot fluid or hot equipment.

Follow **Prepare Equipment for Repair**, page 32, before performing any service or repair to the equipment.

Prepare Equipment for Repair

To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

Always complete the following procedure before performing any service or repair to the equipment.

1. Follow **Pressure Relief Procedure**, page 21.
2. Follow **Flush the Equipment**, page 28.
3. Verify that the equipment is turned off and power to the system is disconnected before performing any service or repair procedure.
4. Disconnect all fluid lines.

Repair the Check Valves

Required Tools:

- 10 mm socket wrench (for all QTC models and QTD,E plastic models)
- 13 mm socket wrench (for QTD,E metal models)

See FIG. 8–FIG. 10.

Disassemble Check Valves

To avoid severe burns, do not touch hot fluid or hot equipment.

1. Follow **Prepare Equipment for Repair**, page 32.
2. Drain the equipment.
   For equipment with a rotating stand: Remove the quick-release pins (29b) and rotate the equipment to drain. See FIG. 8.

   NOTE: After draining, rotate the equipment to positions which will aid disassembly.

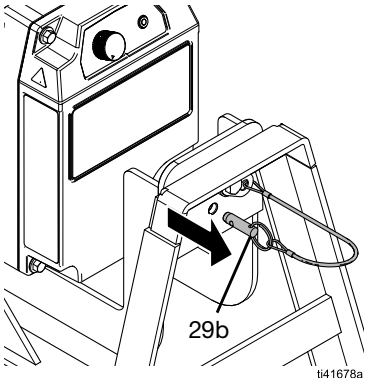


FIG. 8: Quick Release Pin, Rotating Stand

3. **For QT (Industrial) Models:** On the outlet manifold (4), remove all fasteners (6).

   For QH (Hygienic) Models: On the outlet manifold (4), remove all clamps (7a).
4. Remove the outlet manifold (4), seals (10, if applicable), guides (9b, if applicable), checks (9), and seats (8).

   NOTE: Use care while removing manifolds to avoid damage to check valve components.
5. **For QT (Industrial) Models:** On the inlet manifold (5), remove all fasteners (6).

   For QH (Hygienic) Models: On the inlet manifold (5), remove all clamps (7a).
6. Remove the inlet manifold (5), seals (10, if applicable), guides (9b, if applicable), checks (9), and seats (8).

   NOTE: Use care while removing manifolds to avoid damage to check valve components.
7. Clean and inspect parts for wear or damage. Replace as needed.

Reassemble Check Valves

1. Align and place seats (8), checks (9), guides (9b, if applicable), seals (10, if applicable), and manifolds (4, 5), exactly as shown for your equipment model. See your related parts manual. See **Related Manuals**, page 2.
2. **For QT (Industrial) Models:** Use the fasteners (6) to loosely attach the manifolds (4, 5) to the fluid covers (3). After all components are properly aligned, torque the fasteners (6) on the manifolds (4, 5). See **Torque Fasteners**, page 43.

   For QH (Hygienic) Models: Use the clamps (7a) to loosely attach the manifolds (4, 5) to the fluid covers (3). After all components are properly aligned, securely tighten the clamps (7a).

1 **For QTC models:** Torque to 100 in-lb (11 N•m).
For QTD plastic models: Torque to 80–90 in-lb (9–10 N•m).
For QTD metal models: Torque to 120–150 in-lb (14–17 N•m).
For QTE plastic models: Torque to 150–160 in-lb (17–18 N•m).
For QTE aluminum models: Torque to 120–150 in-lb (14–17 N•m).
For QTE metal models, except aluminum: Torque to 190–220 in-lb (21–25 N•m).

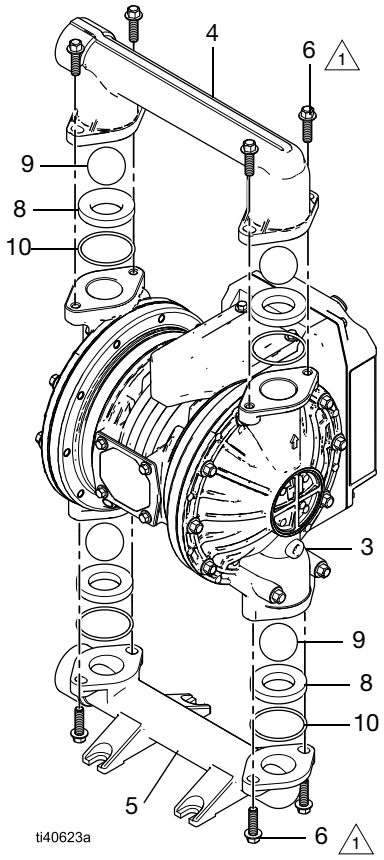


FIG. 9: Check Valves (Industrial Model Shown)

2 **For QH Models:** Lubricate clamps (7a) and seals (10) with a waterproof, sanitary lubricant.

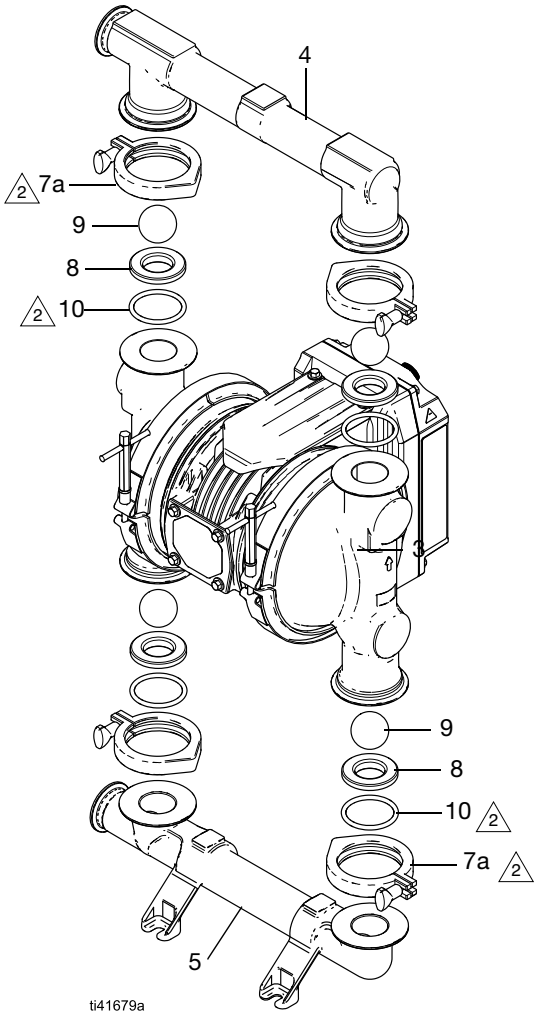


FIG. 10: Check Valves (Hygienic Model Shown)

Repair the Standard Diaphragms

Required Tools:

- 10 mm socket wrench (for all QTC models and QTD,E plastic models)
- 13 mm socket wrench (for QTD,E metal models)
- Torque wrench
- 25 mm open-end wrench
- Lubriplate Synxtreme HD Series HD-2 grease, or equivalent NLGI grade 2 synthetic bearing grease containing calcium sulfanate complex as the thickener
- 15 mm hex wrench

See FIG. 11–FIG. 20.

NOTE: Lubricate the motor rotor when replacing diaphragms. See your related motor manual. See **Related Manuals**, page 2.

Disassemble the Standard Diaphragms

To avoid severe burns, do not touch hot fluid or hot equipment.

1. Follow **Prepare Equipment for Repair**, page 32.
2. Follow **Disassemble Check Valves**, page 33.
3. **For QT (Industrial) Models:** Remove all fasteners (6 and 7, if applicable) from the fluid covers (3). Remove the fluid covers (3).

   For QH (Hygienic) Models: Remove all clamps (6a) from the fluid covers (3). Remove the fluid covers (3).

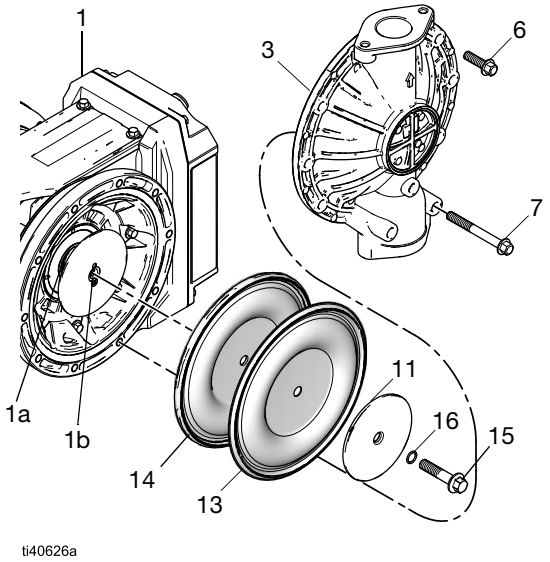


FIG. 11: Standard Diaphragms (Industrial Model Shown)

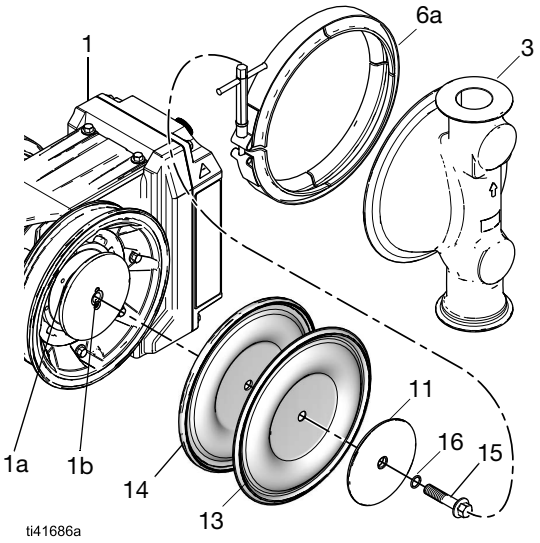


FIG. 12: Standard Diaphragms (Hygienic Model Shown)

4. Use an applicable wrenches to firmly hold one diaphragm fastener (15) while loosening the fastener (15) on the opposite side.

5. Remove the fastener (15), seal (16), fluid plate (11), diaphragm (13), and diaphragm backer (14) from the shaft (1a) on the side of the pump where the fastener (15) was loosened.

   If the diaphragm fastener (15) loosened on the wrench flat side of the shaft (1a):

   a. Use an applicable wrench to firmly hold the flat of the shaft (1a). At the same time, use an applicable wrench to loosen the remaining diaphragm fastener (15).

   b. Remove the fastener (15), seal (16), fluid plate (11), diaphragm (13), and diaphragm backer (14) from the shaft (1a).

   If the diaphragm fastener (15) loosened opposite the wrench flats on the shaft (1a):

   a. Install the grease tool, without the removable collar, to the exposed side of the shaft (1a). Ensure the shoulder of the grease tool is flush with the end of the shaft with no gap between them.

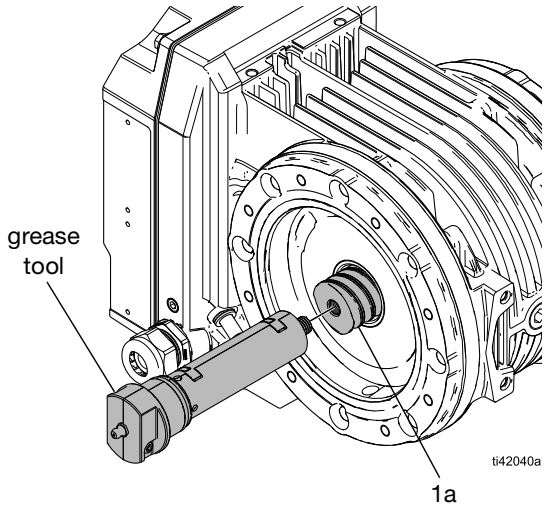


FIG. 13: Install Grease Tool

   b. Thread the grease tool into the rotor far enough to expose the wrench flats of the shaft (1a).

      NOTE: Drive rotation from the grease tool, and not from the shaft (1a). Do not rotate the shaft (1a) while trying to insert the grease tool. This may cause the shaft (1a) to un-thread from the grease tool and damage the rotor.

   c. Use an applicable wrench to firmly hold the flat of the shaft (1a). At the same time, use an applicable wrench to loosen the remaining diaphragm fastener (15).

6. Remove the remaining fastener (15), seal (16), fluid plate (11), diaphragm (13), and diaphragm backer (14) from the shaft (1a).
7. Clean and inspect parts for wear or damage. Replace parts as needed.
8. See **Lubricate the Rotor**, page 37, for re-greasing instructions.

NOTE: If you are not immediately re-greasing or reinstalling diaphragms, temporarily install the plates (1b) and fasteners (15) on each side of the shaft (1a) to ensure in remains inside the motor drive.

Lubricate the Rotor

1. Follow **Prepare Equipment for Repair**, page 32.
2. Follow **Disassemble Check Valves**, page 33.
3. Follow **Repair the Standard Diaphragms**, page 35, or **Repair the Overmolded Diaphragms**, page 40.
4. Install the grease tool, without the removable collar, to the exposed side of the shaft (1a). Ensure the shoulder of the grease tool is flush and hand-tight to the end of the shaft with no gap between them.
5. Rotate the grease tool and lightly push into the rotor (1) while inserting the grease tool until it is firmly seated against the rotor.

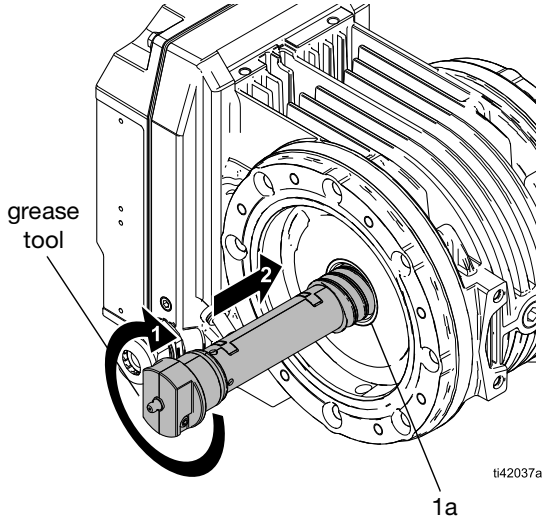


FIG. 14: Insert Grease Tool against the Rotor

NOTE: Drive rotation from the grease tool, and not from the shaft (1a). Do not rotate the shaft (1a) while trying to insert the grease tool. This may cause the shaft (1a) to un-thread from the grease tool and damage the rotor.

6. Using a grease gun filled with the appropriate grease (Lubriplate Synxtreme HD-2), attach the grease gun to the zerk on the grease tool.

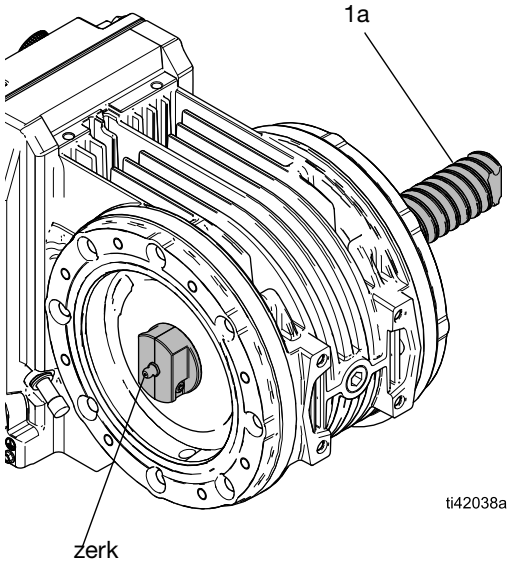


FIG. 15: Attach Grease Gun to the Zerk on Grease Tool

7. Pump the rotor full of grease until clean grease exits the rotor on the side of the grease tool and attaches to the shaft (1a).
8. Remove the grease tool by rotating the shaft (1a) and lightly pushing into the rotor (1) until the shaft (1a) is exposed on the opposite side of the rotor (1).

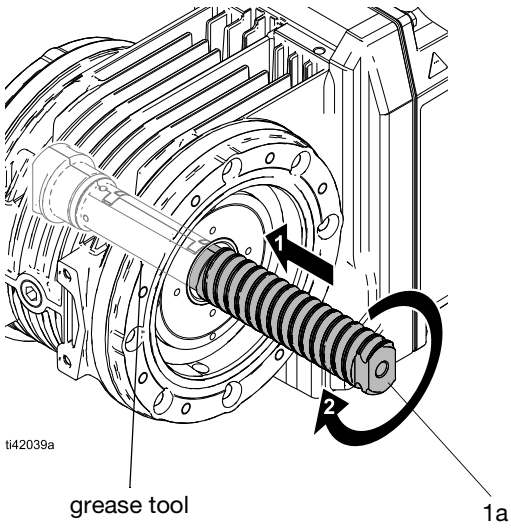


FIG. 16: Remove Grease Tool

NOTE: Drive from the shaft side and not from the tool. Do not rotate the grease tool while trying to install the shaft (1a). This may cause the shaft (1a) to un-thread from the grease tool and damage the rotor.

9. Remove the grease tool from the shaft and reinstall removable collar.

Reassemble the Standard Diaphragms

NOTICE

After reassembly, allow the thread locker to cure for 12 hours, or per instructions of the manufacturer, prior to operating the equipment. The equipment will be damaged if the diaphragm shaft fastener loosens.

1. Assemble the diaphragm backers (14, if applicable), diaphragms (13), fluid side plates (11), and seals (16, if applicable) with the fasteners (15) exactly as shown for your equipment model. See your related parts manual. See **Related Manuals**, page 2.

   NOTE: Face the rounded side of the fluid side plate (11) toward the diaphragm (13).

   NOTE: Apply thread locker to the fastener (15) for all diaphragm assemblies.

1 Apply a high-strength thread locker to attach the fastener to the diaphragm plate.

2 Apply a medium-strength thread locker to the shaft side of the fastener to attach the diaphragm to the shaft.

3 Rounded side faces toward the diaphragm (13).

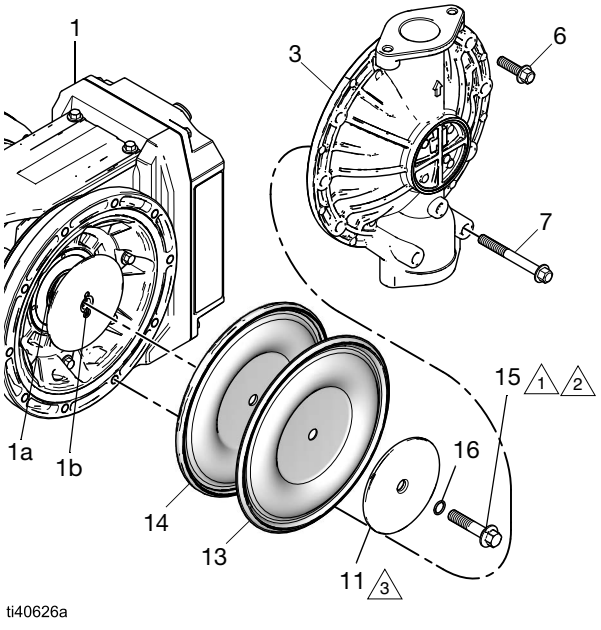


FIG. 17: Reassemble Standard Diaphragms (Industrial Model Shown)

1 Apply a high-strength thread locker to attach the fastener to the diaphragm plate.

2 Apply a medium-strength thread locker to the shaft side of the fastener to attach the diaphragm to the shaft.

3 Rounded side faces toward the diaphragm (13).

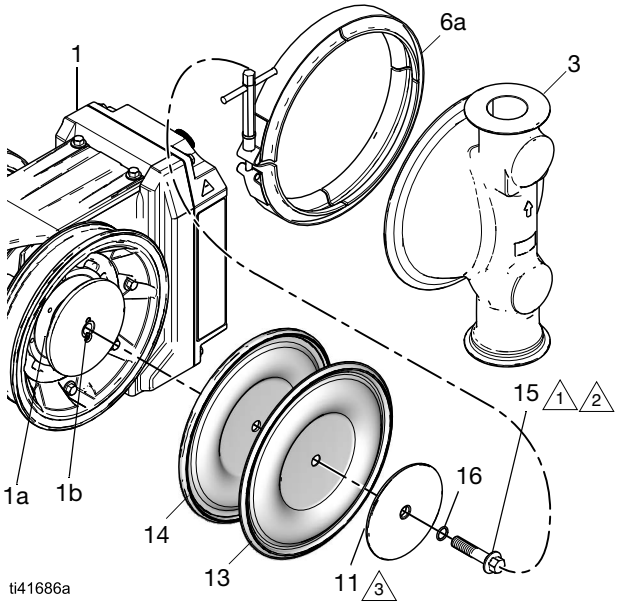


FIG. 18: Reassemble Standard Diaphragms (Hygienic Model Shown)

2. Install the assembled diaphragm assemblies into the shaft with plate (1b) and hand-tighten the fasteners (15).

3. Use an applicable wrench to firmly hold the flat of the shaft (1a) in place. At the same time, use an applicable wrench to torque the fasteners (15) to 50 ft-lb (68 N•m). See FIG. 19 or FIG. 20.

4 Torque to 50 ft-lb (68 N•m).

5 **For QTC models:** Torque to 110 in-lb (12 N•m).
For QTD,E,F,G models: Torque to 190–220 in-lb (21–25 N•m).

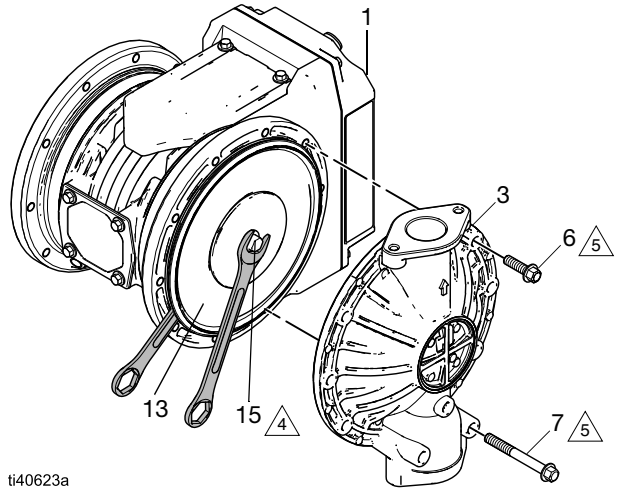


FIG. 19: Tighten Standard Diaphragms (Industrial Model Shown)

4 Torque to 50 ft-lb (68 N•m).

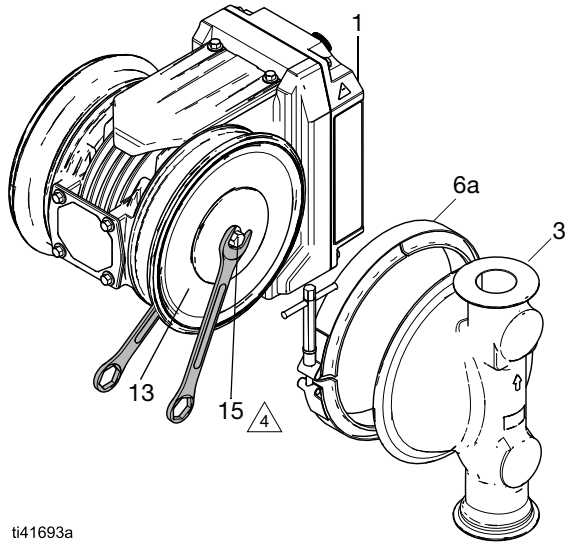


FIG. 20: Tighten Standard Diaphragms (Hygienic Model Shown)

4. **For QT (Industrial) Models:** Align the fluid covers (3) to the motor (1). Install fasteners (6, 7, if applicable) to hold the fluid covers (3) in place. Hand-tighten the fasteners (6, 7, if applicable).

   For QH (Hygienic) Models: Align the fluid covers (3) to the motor (1). Install clamps (6a) to hold the fluid covers (3) in place.

   NOTE: To ensure proper spacing and alignment of the manifolds, install fasteners (6, 7, if applicable) or clamps (6a) loose enough to allow for fluid cover movement before securing the fluid covers in place.

   NOTE: If, after installing the first fluid cover, the opposing diaphragm protrudes away from the motor (1), leaving a gap between the motor and the second fluid cover, do not try to force the diaphragm into position. Instead, complete the following steps to attach the second fluid cover:

   a. Slightly loosen the fasteners (6, 7, if applicable) or clamp (6a) on the installed fluid cover (3).

   b. Use an applicable wrench to tighten the fastener (15) on the diaphragm that protrudes away from the motor (1) until the diaphragm seats properly. Torque the fasteners (15) to 50 ft-lb (68 N•m).

      NOTE: Do not hold the shaft in place while tightening the diaphragm fastener.

   c. Align the remaining fluid cover (3) to the motor (1).

   d. Install fasteners (6, 7, if applicable) or clamps (6a) to hold the fluid cover (3) in place. Firmly tighten the fasteners (6, 7, if applicable) or clamps (6a).

5. **For QT (Industrial) Models:** Torque all fasteners (6, 7, if applicable). Follow **Torque Fasteners**, page 43.

6. Reassemble the check valves and manifolds as explained in **Reassemble Check Valves**, page 33.

Repair the Overmolded Diaphragms

Required Tools:

- 10 mm socket wrench (for all QTC models and QTD,E plastic models)
- 13 mm socket wrench (for QTD,E metal models)
- Torque wrench
- 25 mm open-end wrench
- Lubriplate Synxtreme HD Series HD-2 grease, or equivalent NLGI grade 2 synthetic bearing grease containing calcium sulfanate complex as the thickener

See FIG. 21–FIG. 26.

NOTE: Lubricate the motor rotor when replacing diaphragms. See your related motor manual. See **Related Manuals**, page 2.

Disassemble the Overmolded Diaphragms

To avoid severe burns, do not touch hot fluid or hot equipment.

1. Follow **Prepare Equipment for Repair**, page 32.
2. Follow **Disassemble Check Valves**, page 33.
3. **For QT (Industrial) Models:** Remove all fasteners (6, 7, if applicable) from the fluid covers (3). Remove the fluid covers (3).

   For QH (Hygienic) Models: Remove all clamps (7) from the fluid covers (3). Remove the fluid covers (3).
4. Locate the flat of the shaft (1a) on the load side of the motor (1).
5. Use an applicable wrench to firmly hold the flat of the shaft (1a) in place. At the same time, grip the diaphragm (13) securely around the outer edge and rotate counterclockwise to loosen. Remove the diaphragms (13).

   NOTE: Do not remove the diaphragm shaft with plate (1b) from the motor (1).

NOTICE

To avoid damage to the rotor or equipment, do not remove the shaft with plate (1b) from the motor (1). Removing the shaft will cause the rotor balls to dislodge from the rotor and the rotor will not function properly.

6. Clean and inspect parts for wear or damage. Replace parts as needed.

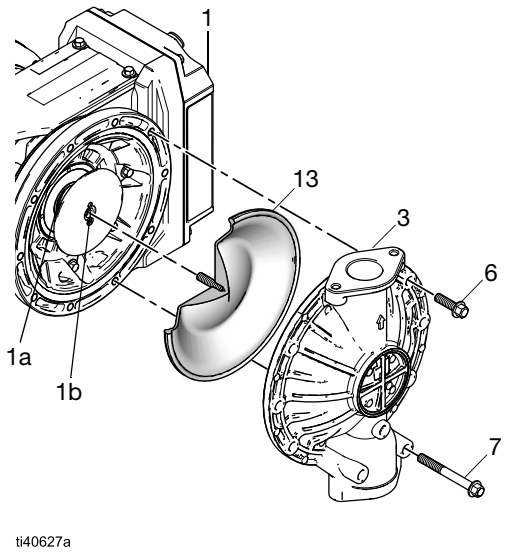


FIG. 21: Overmolded Diaphragms (Industrial Model Shown)

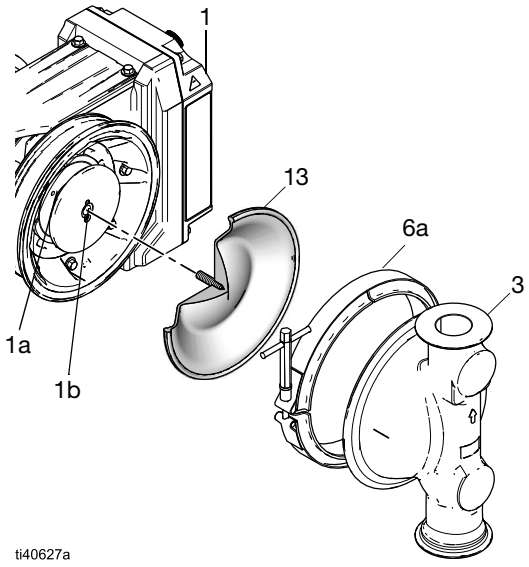


FIG. 22: Overmolded Diaphragms (Hygienic Model Shown)

Reassemble the Overmolded Diaphragms

NOTICE

After reassembly, allow the thread locker to cure for 12 hours, or per instructions of the manufacturer, prior to operating the equipment. The equipment will be damaged if the diaphragm shaft fastener loosens.

1. Install the diaphragm assemblies (13, 15) into the shaft (1a) and firmly tighten.

   NOTE: Apply thread locker to the fastener (15) for all diaphragm assemblies.

1 Apply a medium-strength thread locker to the shaft side of the fastener to attach the diaphragm to shaft.

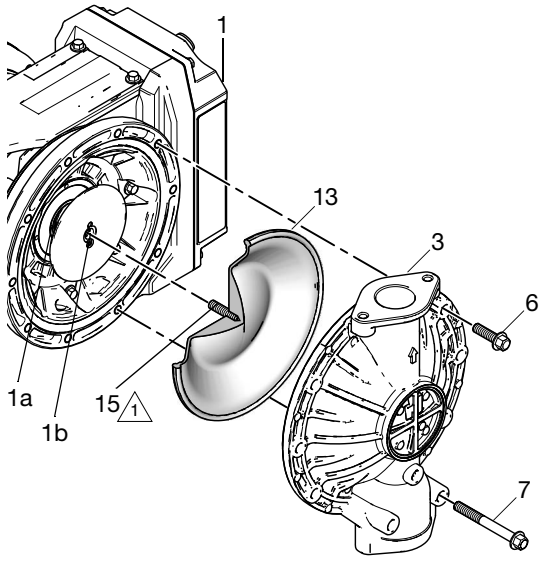


FIG. 23: Reassemble Overmolded Diaphragms (Industrial Model Shown)

1 Apply a medium-strength thread locker to the shaft side of the fastener to attach the diaphragm to the shaft.

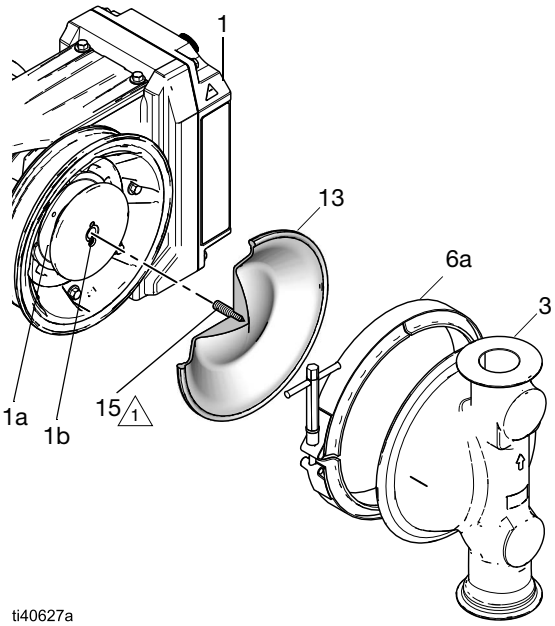


FIG. 24: Reassemble Overmolded Diaphragms (Hygienic Model Shown)

2. Use an applicable wrench to hold flat of the shaft (1a) firmly in place. At the same time, grip the diaphragm (13) securely around the outer edge and rotate clockwise to firmly tighten.

5 **For QTC models:** Torque to 110 in-lb (12 N•m).
For QTD,E models: Torque to 190–220 in-lb (21–25 N•m).

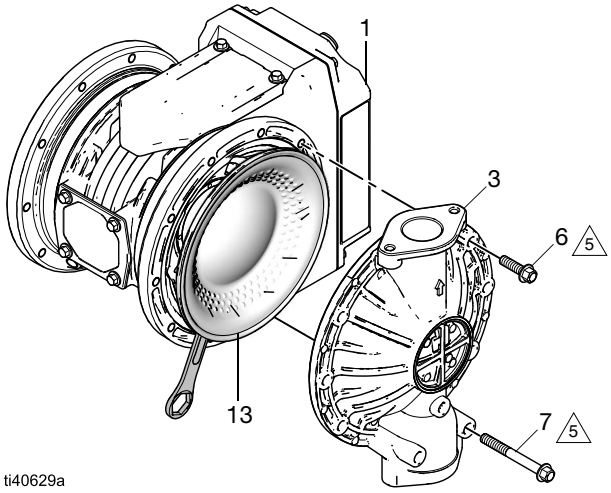


FIG. 25: Tighten Overmolded Diaphragms (Industrial Model Shown)

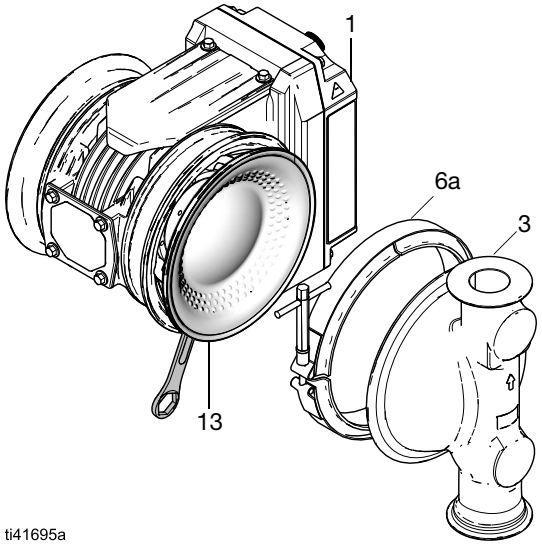


FIG. 26: Tighten Overmolded Diaphragms (Hygienic Model Shown)

3. **For QT (Industrial) Models:** Align the fluid covers (3) to the motor (1). Install fasteners (6, 7, if applicable) to hold the fluid covers (3) in place. Hand-tighten the fasteners (6, 7, if applicable).

   For QH (Hygienic) Models: Align the fluid covers (3) to the motor (1). Install clamps (6a) to hold the fluid covers (3) in place.

   NOTE: To ensure proper spacing and alignment of the manifolds, install fasteners (6, 7, if applicable) or clamps (6a) loose enough to allow for fluid cover movement before securing the fluid covers in place.

   NOTE: If, after installing the first fluid cover, the opposing diaphragm protrudes away from the motor (1), leaving a gap between the motor and the second fluid cover, do not try to force the diaphragm into position. Instead, complete the following steps to attach the second fluid cover:

   a. Slightly loosen the fasteners (6, 7, if applicable) or clamp (6a) on the installed fluid cover (3).

   b. Use an applicable wrench to firmly hold the flat of the shaft (1a) in place. At the same time, grip the diaphragm (13) securely around the outer edge and rotate clockwise to firmly tighten until the diaphragm seats properly.

   c. Align the remaining fluid cover (3) to the motor (1).

   d. Install fasteners (6, 7, if applicable) or clamps (6a) to hold the fluid cover (3) in place. Firmly tighten the fasteners (6, 7, if applicable) or clamps (6a).

4. **For QT (Industrial) Models:** Torque all fasteners (6, 7, if applicable). Follow **Torque Fasteners**, page 43.

5. Reassemble the check valves and manifolds as explained in **Reassemble Check Valves**, page 33.

Recycling and Disposal

End of Equipment Life

At the end of the useful life of the equipment, disassemble and recycle the equipment in a responsible manner.

- Follow **Pressure Relief Procedure**, page 21.
- Drain and dispose of fluids according to applicable regulations. See the Safety Data Sheet (SDS) of the material manufacturer.
- Remove motors, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of electronic components with household or commercial waste.

- Deliver remaining equipment to a recycling facility.

Torque Fasteners

Torque Instructions

To ensure proper sealing, torque fasteners using the following procedure.

1. Start all fasteners a few turns.
2. Follow the torque sequence to turn down each fastener until each fastener is slightly under the specified torque. See **Torque Sequence**, page 43.
3. Follow the torque sequence to turn each fastener by 1/2 turn or less until each fastener is at the specified torque. See **Torque Sequence**, page 43.

Torque Sequence

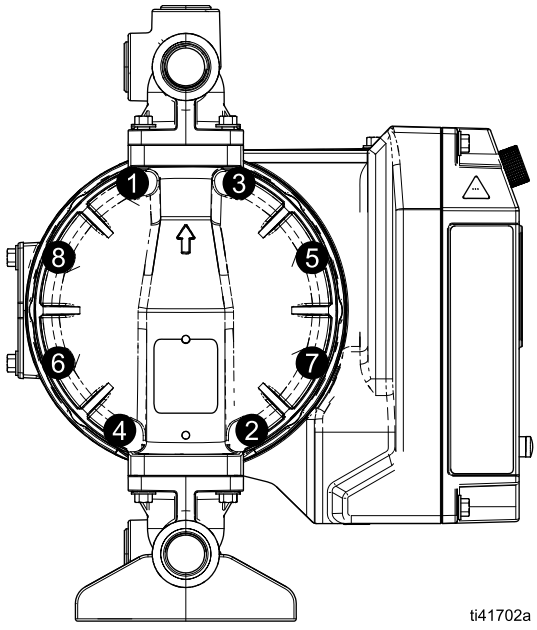
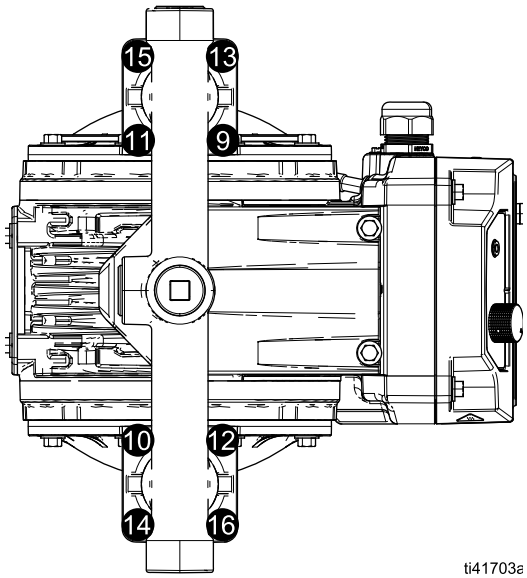
For QT (Industrial) Models only: Fully torque all fasteners (6, 7, if applicable) on the fluid covers (3) before torquing the fasteners (6) on the manifolds (4, 5).

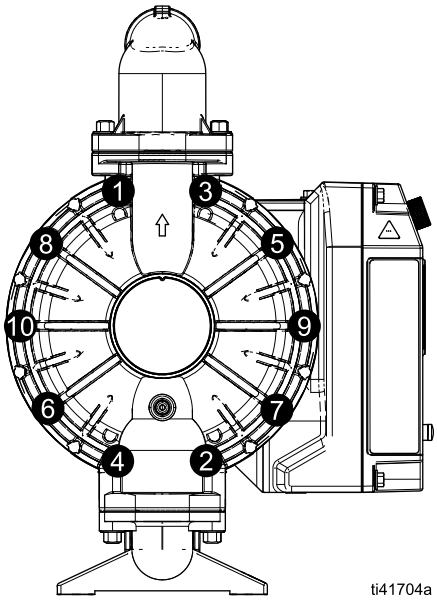
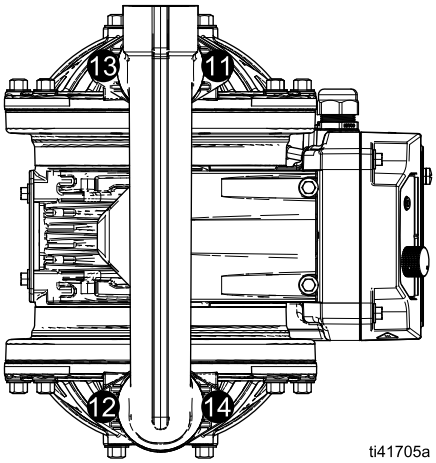
Follow **Torque Instructions**, page 43.

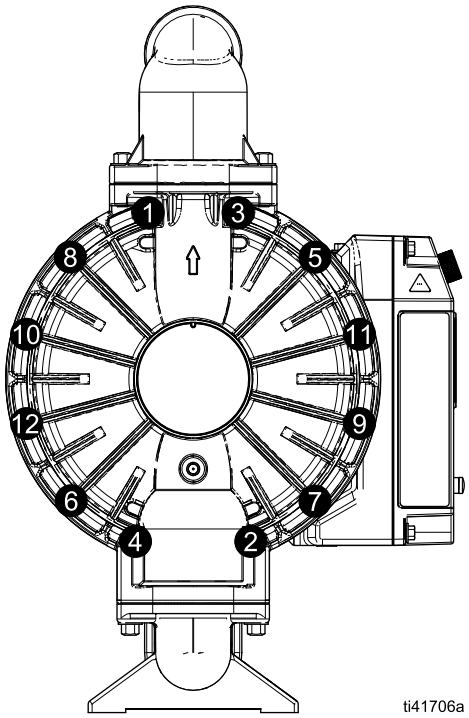
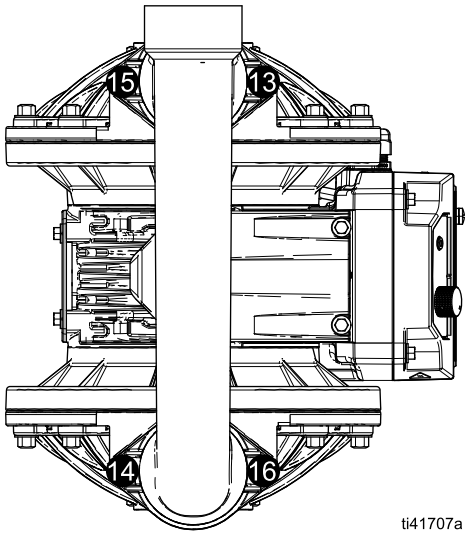
NOTICE

To avoid pump damage, do not over-torque the fasteners on the equipment.

Torque Sequence for QTC Models

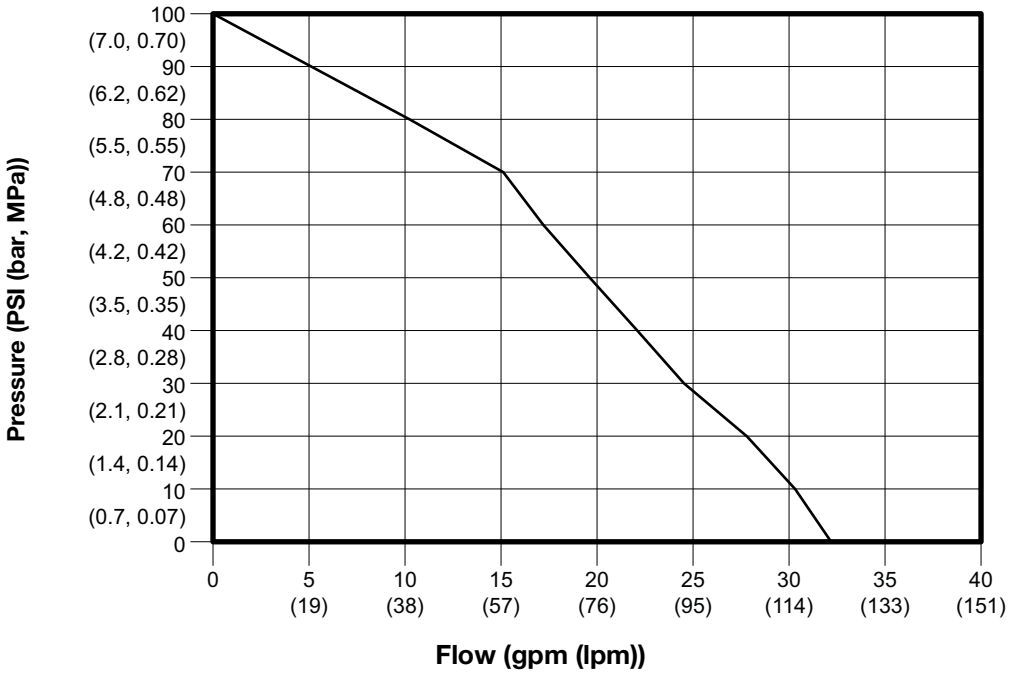
Fluid Covers (3)	Manifolds (4, 5)
Torque fasteners (6, 7 if applicable) to 110 in-lb (12 N•m).	Torque fasteners (6) to 100 in-lb (11 N•m).
	

Torque Sequence for QTD Models	
Fluid Covers (3)	**Manifolds (4, 5)**
Torque fasteners (6, 7 if applicable) to 190–220 in-lb (21–25 N•m).	**For QTD plastic models:** Torque fasteners (6) to 80–90 in-lb (9–10 N•m). **For QTD metal models:** Torque fasteners (6) to 120–150 in-lb (14–17 N•m).
	

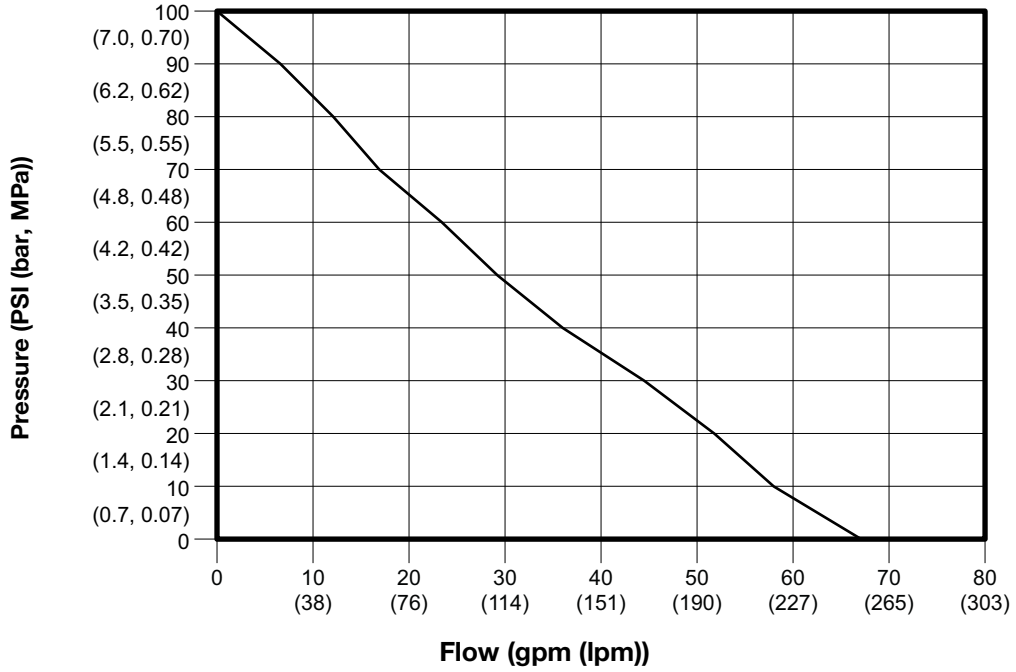
Torque Sequence for QTE Models	
Fluid Covers (3)	**Manifolds (4, 5)**
Torque fasteners (6, 7 if applicable) to 190–220 in-lb (21–25 N•m).	**For QTE plastic models:** Torque fasteners (6) to 150–160 in-lb (17–18 N•m). **For QTE aluminum models:** Torque fasteners (6) to 120–150 in-lb (14–17 N•m). **For QTE metal models, except aluminum:** Torque fasteners (6) to 190–220 in-lb (21–25 N•m).
 ti41706a	 ti41707a

Performance Charts

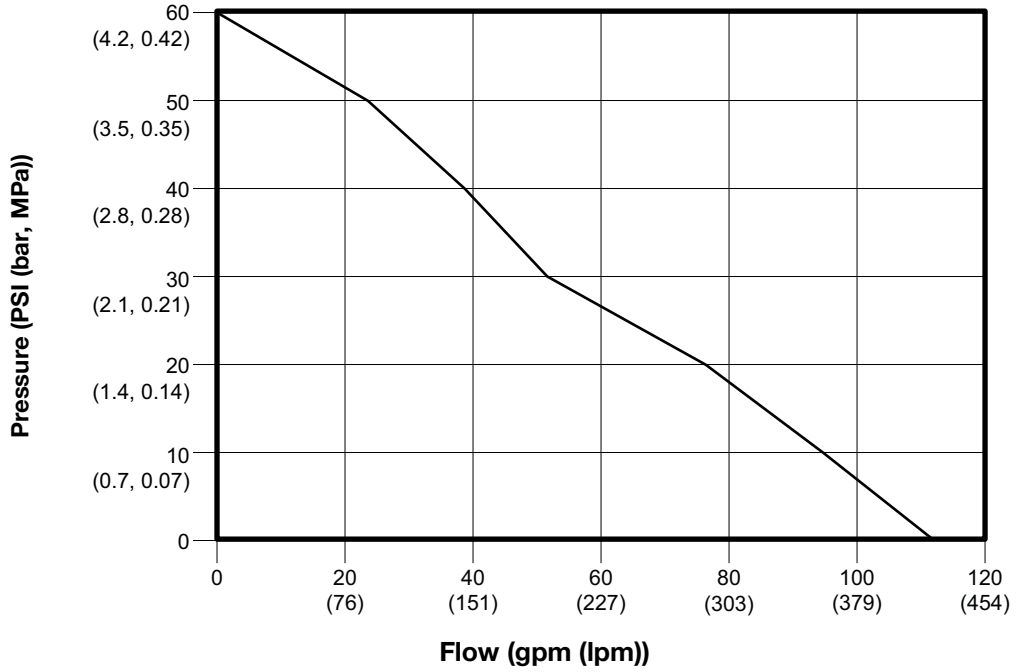
Performance Chart for Q-C Models



Performance Chart for Q-D Models



Performance Chart for Q-E Models



Dimensions

Dimensions for QTC Models

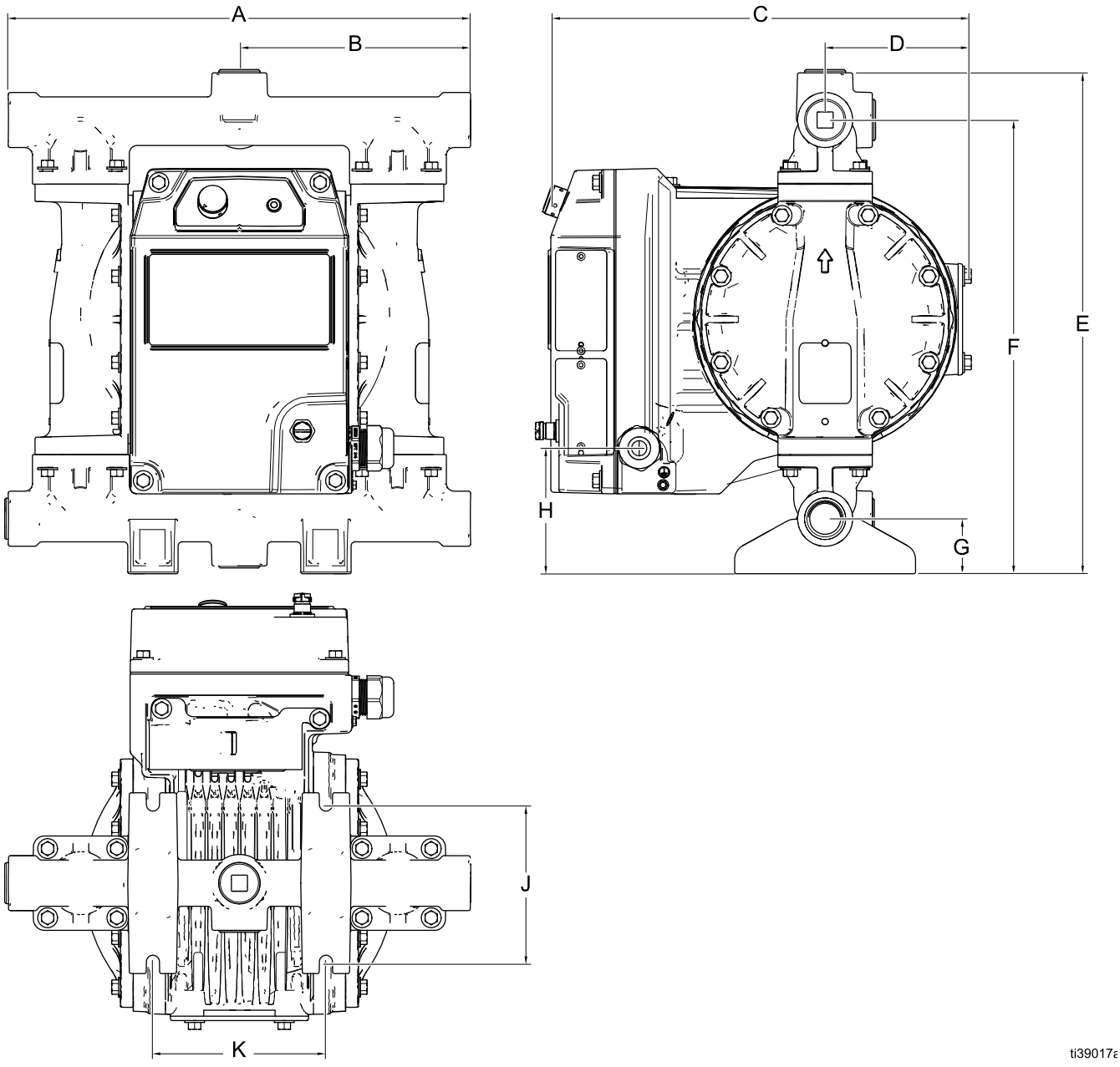


FIG. 27: QTC Industrial Model Dimensions

QTC Model Dimensions						
	Wetted Section Material					
	AL		SS, HT		CP, PP, PV	
Ref.	in.	cm	in.	cm	in.	cm
A	14.70	37.34	13.90	35.31	15.20	38.61
B	7.35	18.67	6.58	16.71	8.00	20.32
C	13.25	33.66	13.25	33.66	13.25	33.66
D	4.57	11.61	4.57	11.61	4.57	11.61
E	15.94	40.49	13.70	34.80	17.80	45.21
F	14.44	36.68	12.90	32.77	15.70	39.88
G	1.76	4.47	1.10	2.79	2.50	6.35
H	3.70	9.40	2.20	5.59	4.69	11.91
J	5.00	12.70	5.00	12.70	5.00	12.70
K	5.50	13.97	5.50	13.97	10.42	26.47

Dimensions for QHC Models

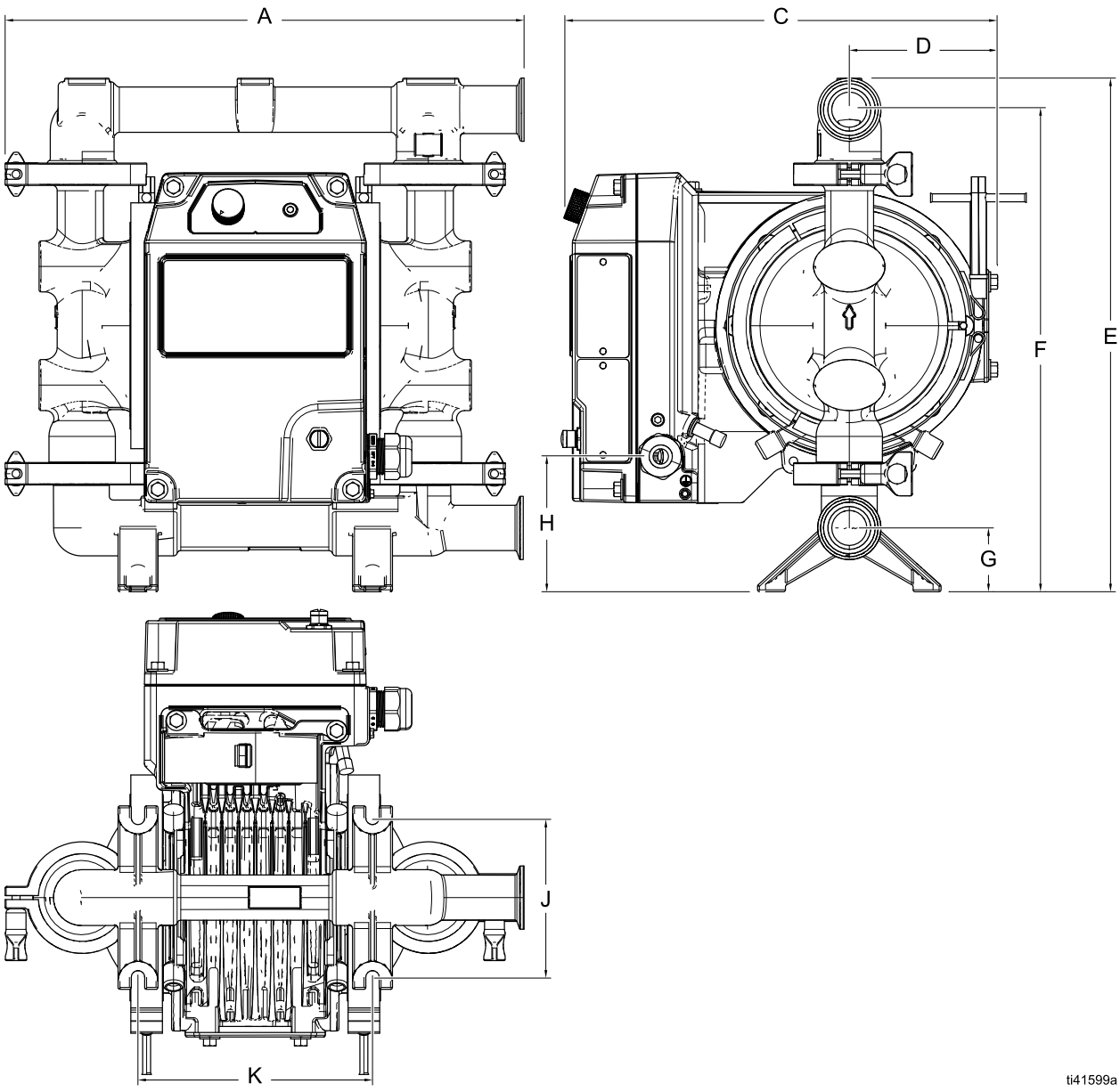


FIG. 28: QHC Hygienic Model Dimensions (FG model shown)

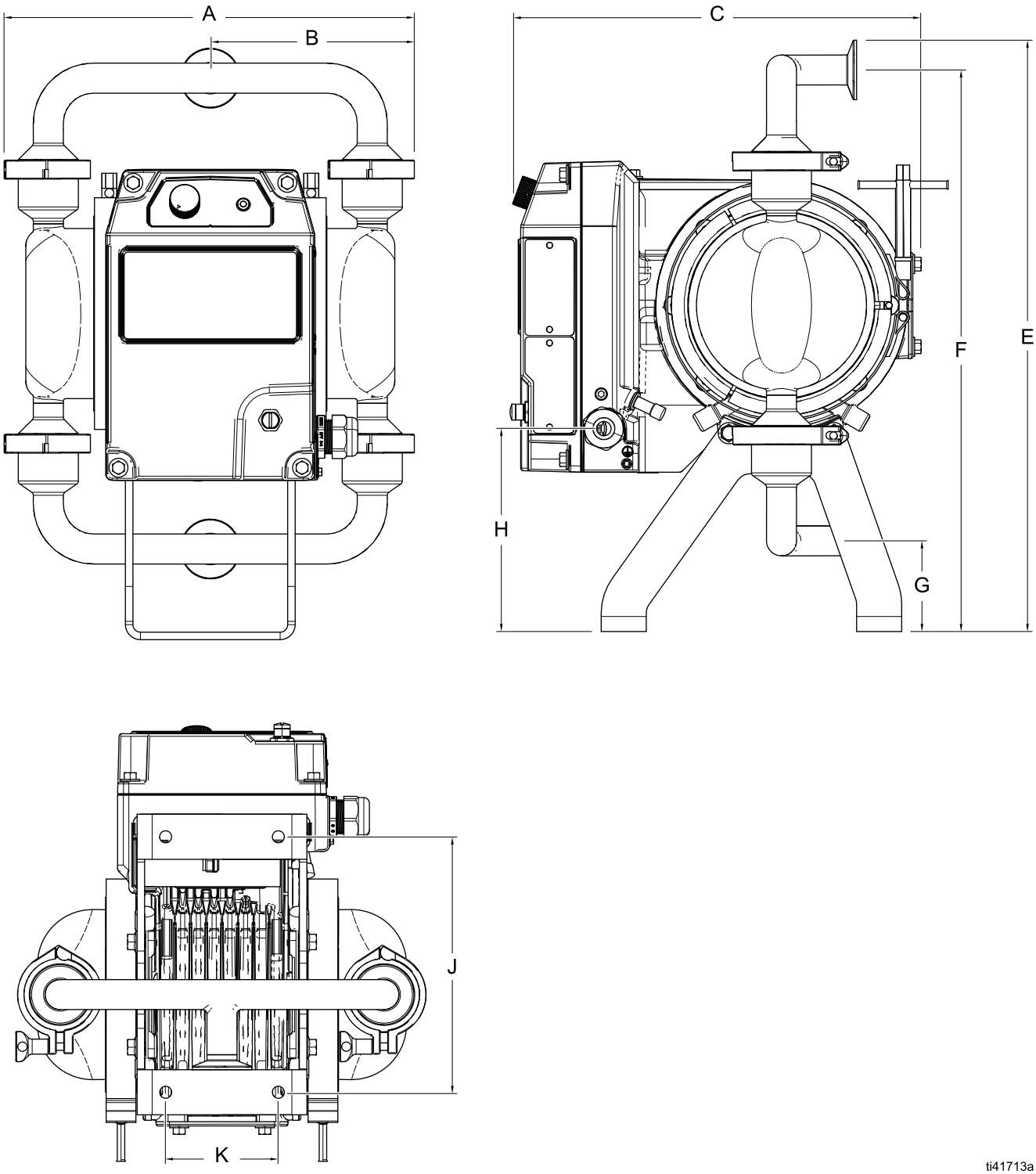


FIG. 29: QHC Hygienic Model Dimensions (HS model shown)

QHC Model Dimensions				
	Wetted Section Material			
	FG		HS, PH, 3A	
Ref.	in.	cm	in.	cm
A	16.30	41.40	13.70	34.80
B	– – –	– – –	6.85	17.40
C	13.60	34.54	13.25	33.66
D	4.65	11.81	4.57	11.61
E	16.10	40.90	19.43	49.35
F	15.12	38.40	18.43	46.81
G	2.00	5.08	2.77	7.04
H	4.24	10.77	6.20	15.75
J	5.00	12.70	4.00	10.16
K	7.35	18.67	8.50	21.59

Dimensions for QTD Models

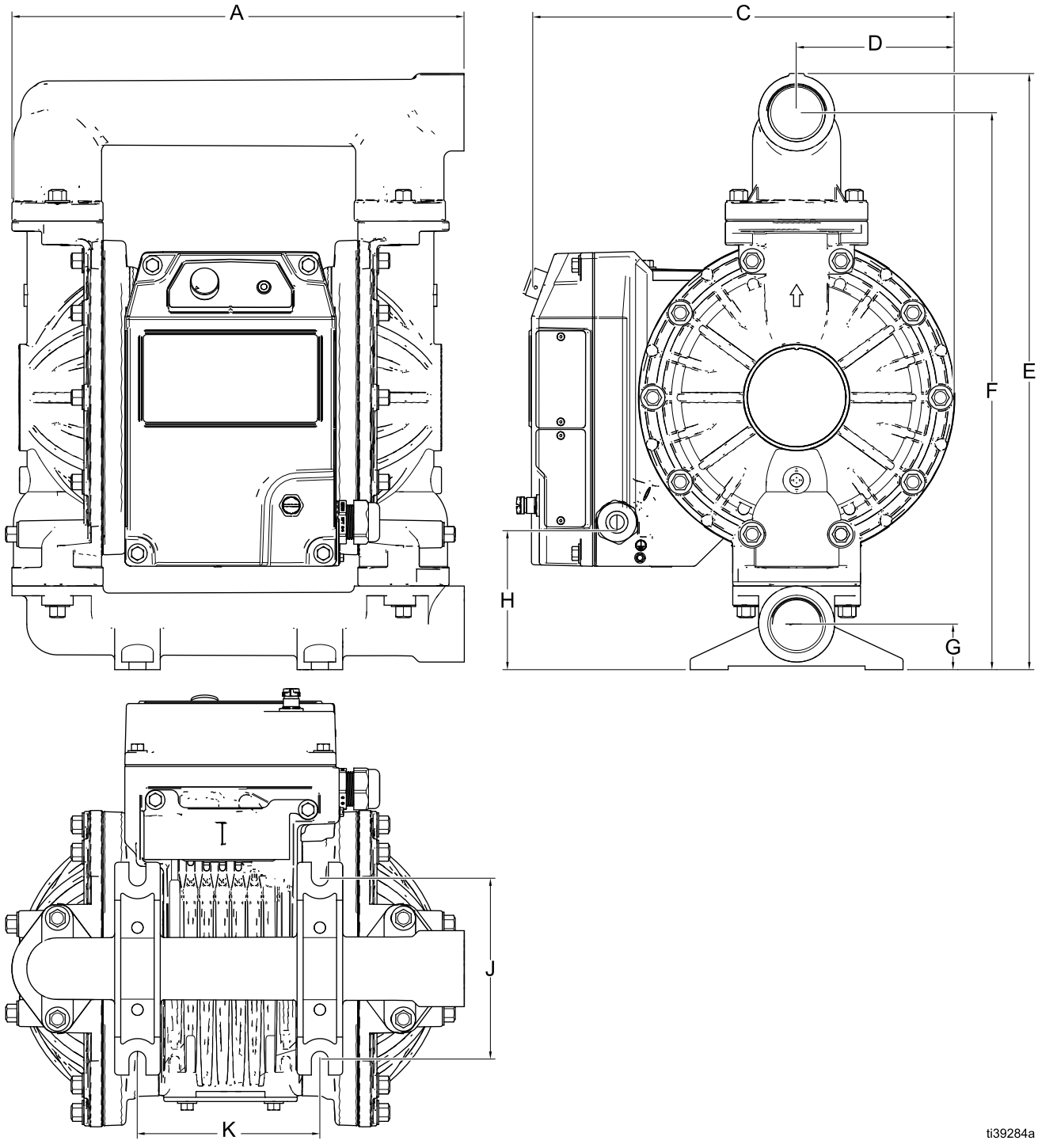


FIG. 30: QTD Industrial Model Dimensions

QTD Model Dimensions						
	Wetted Section Material					
	AL		SS		PP, PV	
Ref.	in.	cm	in.	cm	in.	cm
A	15.07	38.28	16.10	40.89	17.60	44.70
C	13.81	35.08	13.85	35.18	13.87	35.23
D	5.17	13.13	5.21	13.23	5.23	13.28
E	19.60	49.78	18.97	48.18	22.00	55.88
F	18.30	46.48	17.75	45.09	19.30	49.02
G	1.50	3.81	1.44	3.66	3.00	7.62
H	4.55	11.56	4.55	11.56	5.85	14.86
J	6.00	15.24	6.00	15.24	6.00	15.24
K	6.00	15.24	6.00	15.24	6.00	15.24

Dimensions for QHD Models

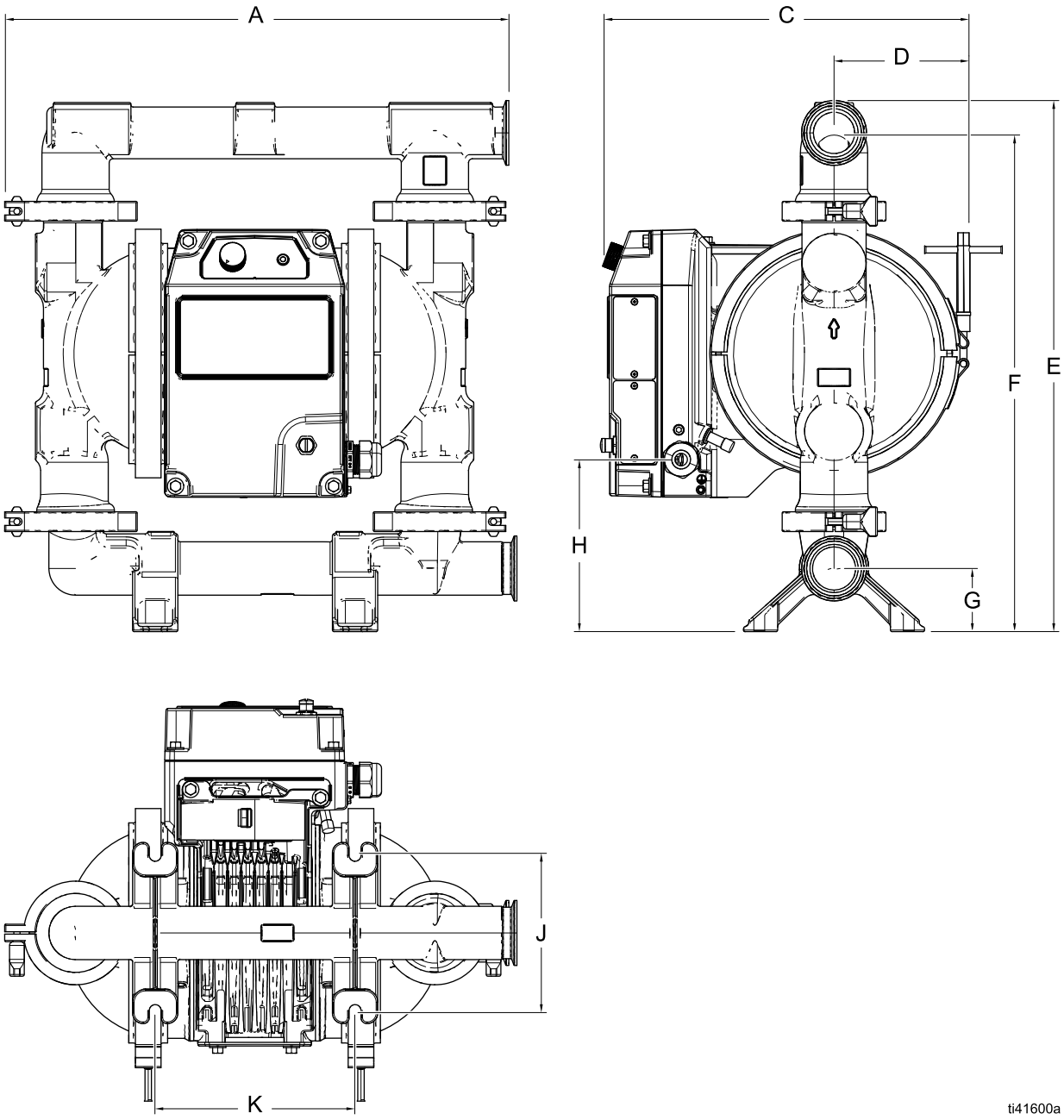


FIG. 31: QHD Hygienic Model Dimensions (FG model shown)

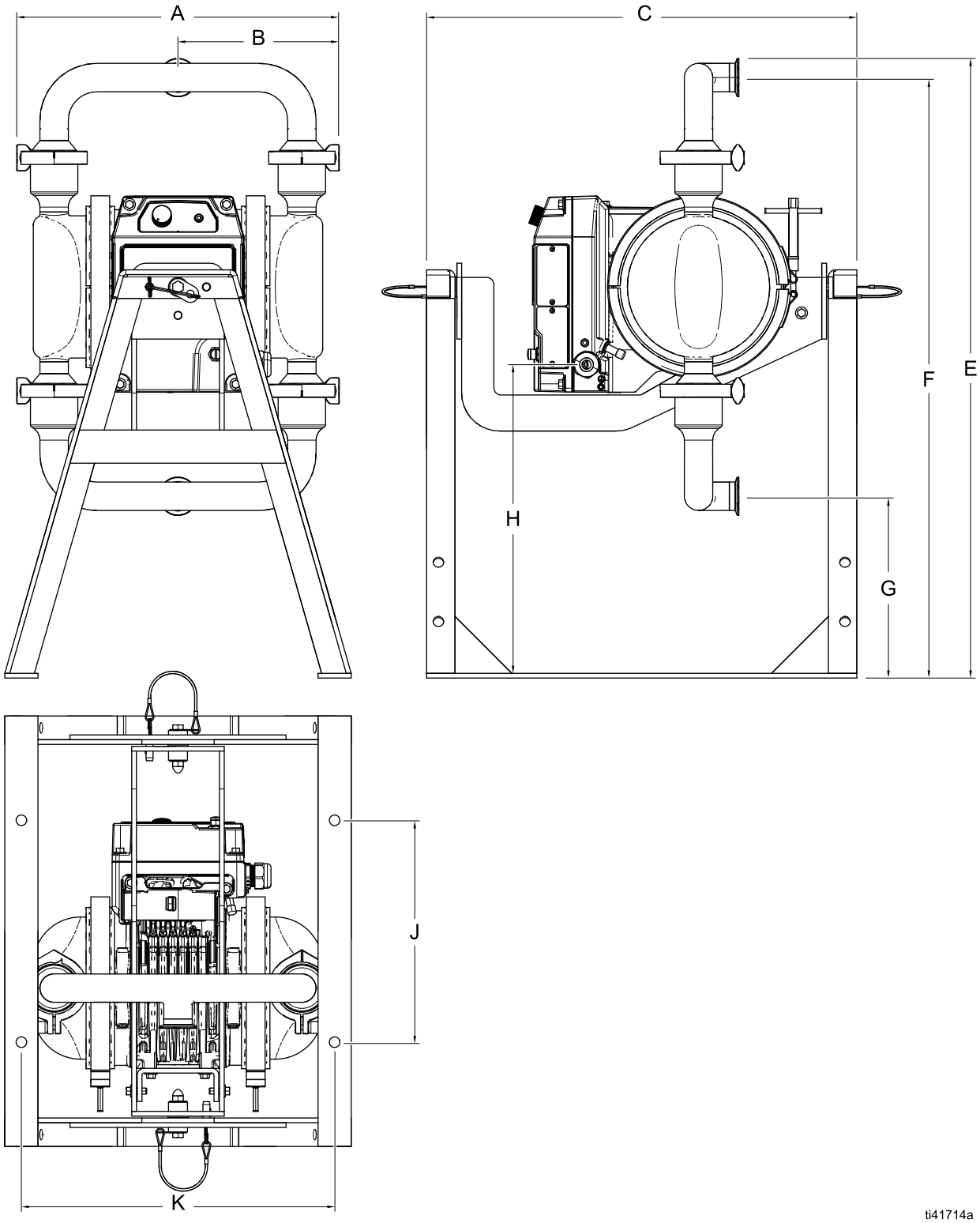


FIG. 32: QHD Hygienic Model Dimensions (HS model shown)

QHD Model Dimensions				
	Wetted Section Material			
	FG		HS, PH, 3A	
Ref.	in.	cm	in.	cm
A	19.50	49.53	17.00	43.18
B	– – –	– – –	8.50	21.60
C	14.17	36.00	13.85	35.18
D	5.22	13.26	5.22	13.26
E	20.54	52.17	32.55	82.68
F	19.28	48.97	31.54	80.11
G	2.44	6.20	9.53	24.21
H	6.65	16.90	16.10	40.89
J	6.00	15.24	16.20	41.15
K	7.73	19.63	13.00	33.02

Dimensions for QTE Models

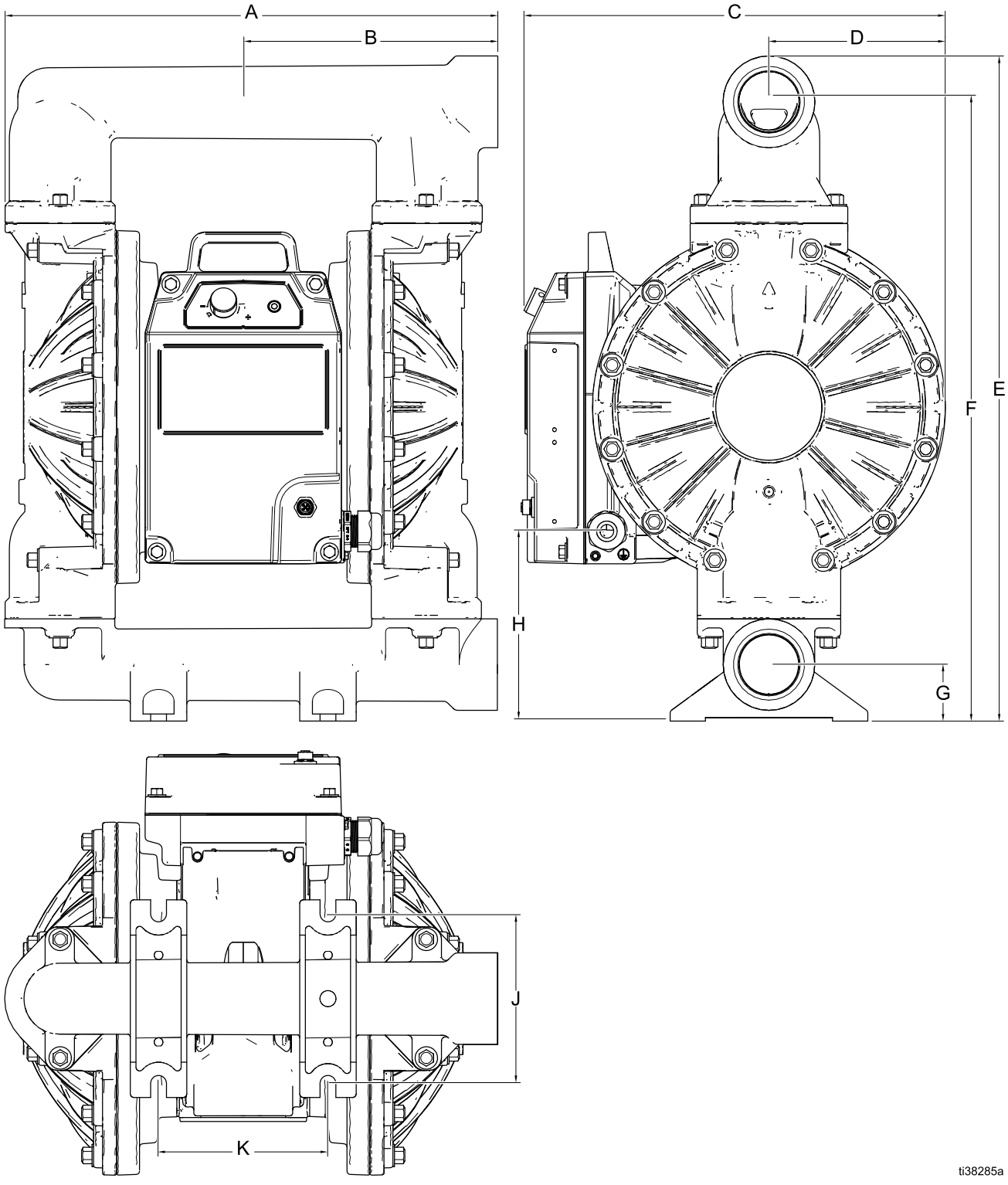


FIG. 33: QTE Industrial Model Dimensions

QTE Model Dimensions						
	Wetted Section Material					
	AL		CI, SS		CP, PP, PV	
Ref.	in.	cm	in.	cm	in.	cm
A	17.50	44.45	18.13	46.05	19.70	50.04
B	9.00	22.86	9.40	23.88	11.00	27.94
C	14.89	37.82	14.89	37.82	14.89	37.82
D	6.25	15.88	6.25	15.88	6.25	15.88
E	23.60	59.94	26.34	66.90	25.70	65.28
F	21.90	55.63	24.79	62.97	22.70	57.66
G	2.00	5.08	2.50	6.35	3.50	8.89
H	6.72	17.07	9.01	22.89	7.53	19.13
J	6.00	15.24	6.00	15.24	6.00	15.24
K	6.00	15.24	6.50	16.51	6.00	15.24

Dimensions for QHE Models

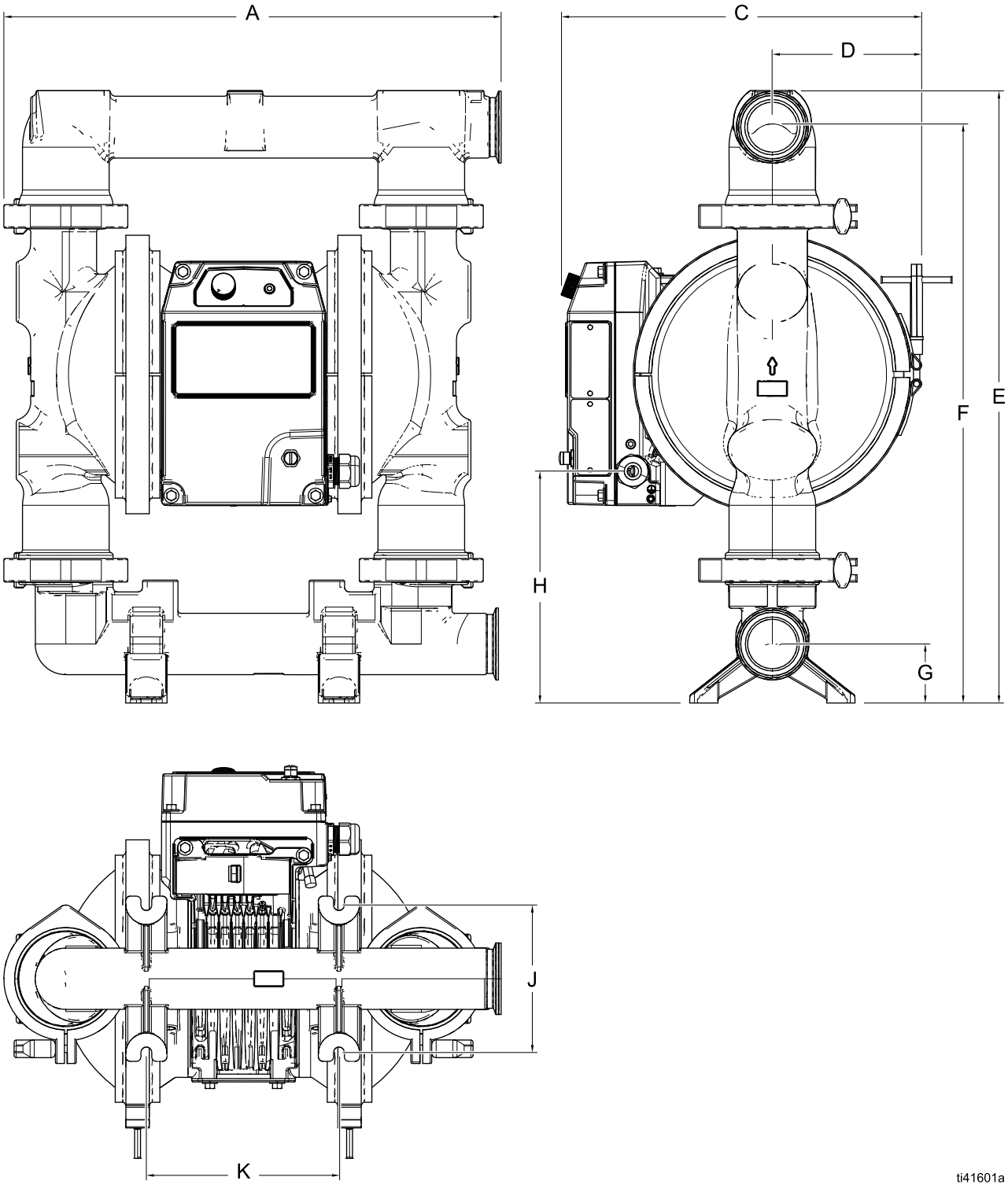


FIG. 34: QHE Hygienic Model Dimensions (FG model shown)

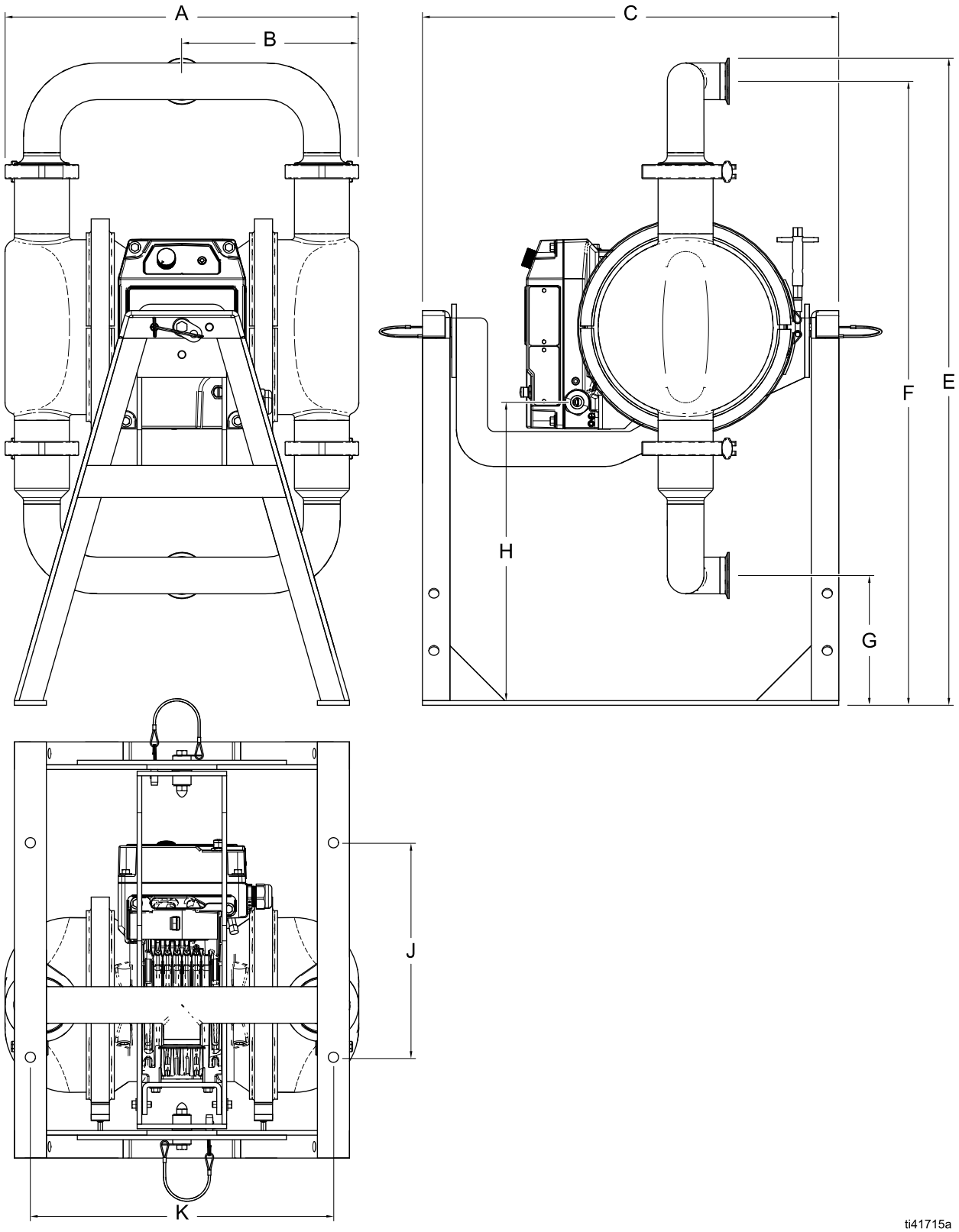


FIG. 35: QHE Hygienic Model Dimensions (HS model shown)

QHE Model Dimensions				
	Wetted Section Material			
	FG		HS, PH, 3A	
Ref.	in.	cm	in.	cm
A	21.07	53.52	19.30	49.02
B	– – –	– – –	9.65	24.51
C	15.28	38.81	14.89	37.82
D	6.33	16.08	6.33	16.08
E	25.95	65.91	35.31	89.69
F	24.40	61.98	34.05	86.49
G	2.50	6.35	7.09	18.01
H	9.82	24.94	16.10	40.89
J	6.25	15.88	16.20	41.15
K	8.16	20.73	13.00	33.02

Technical Specifications

Fluid Temperature Range

NOTICE

Temperature limits are based on mechanical stress only. Certain chemicals will further limit the fluid temperature range. Stay within the temperature range of the most-restricted wetted component. Operating at a fluid temperature that is too high or too low for the components of your pump may cause equipment damage.

Material of Wetted Contact Section Parts (Seat, Check, Diaphragm)*	Fluid Temperature Range by Wetted Section Material					
	Metal (AL,CI, CP, FG, HS, HT, PH, SS, 3A)*		Plastic (PV)*		Plastic (AC, CP, PP)*	
	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius
AC	–20° to 180°	–29° to 82°	10° to 180°	–12° to 82°	32° to 150°	0° to 66°
AL	–60° to 275°	–51° to 135°				
BN	10° to 180°	–12° to 82°				
CO	10° to 180°	–12° to 82°				
CR	10° to 180°	–12° to 82°				
CW	10° to 180°	–12° to 82°				
EO	–40° to 250°	–40° to 121°				
EP	–60° to 275°	–51° to 135°				
FK	–40° to 275°	–40° to 135°				
FL	–60° to 275°	–51° to 135°				
GE	–40° to 180°	–40° to 82°				
HD	–60° to 275°	–51° to 135°				
PO	–40° to 180°	–40° to 82°				
PP	32° to 175°	0° to 79°	32° to 175°	0° to 79°		
PS	–40° to 180°	–40° to 82°	10° to 180°	–12° to 82°		
PT	–40° to 220°	–40° to 104°				
PU	–40° to 200°	–40° to 93°				
PV	10° to 225°	–12° to 107°				
SA	–40° to 220°	–40° to 104°				
SB	–40° to 275°	–40° to 135°				
SC	–40° to 180°	–40° to 82°				
SD	–40° to 220°	–40° to 104°				
SO	–40° to 180°	–40° to 82°				
SP	–40° to 180°	–40° to 82°				
SS	–60° to 275°	–51° to 135°				
TP	–20° to 150°	–29° to 66°				
UD	–60° to 200°	–51° to 93°				

** See **Configuration Matrix**, starting on page 6, for detailed descriptions.*

Technical Specifications for Q-C Models

QUANTM Q-C Pumps				
	US		**Metric**	
Maximum fluid working pressure	100 psi		6.89 bar, 0.69 MPa	
Maximum fluid temperature	150°F		65°C	
Maximum free-flow delivery	30 gpm		114 lpm	
Maximum size pumpable solids				
High Sanitation models	0.42 in.		20.7 mm	
All other models	1/8 in.		3.2 mm	
Environmental temperature range	0° to 104°F		–18° to 40°C	
Maximum operating altitude	9842 ft		3000 m	
Electrical ratings				
	Rated Voltage	**Phase**	**Hertz**	**Current**
Q-C models, F-1 motor	200–240 V	3	50/60 Hz	7.5 A
Q-C models, F-2 motor	200–240 V	1	50/60 Hz	10 A
Q-C models, F-5 motor	100–120 V	1	50/60 Hz	12 A
Materials of construction				
See **Configuration Matrix**, starting on page 6, for materials of construction for your equipment model.				
Fluid inlet/outlet sizes				
Models with wetted section materials coded:				
AL, SS	1 in. npt(f) or 1 in. bspt			
CP, PP, PV	1 in. ANSI/DIN Raised Face Flange			
FG	1.5 in. sanitary flange or 40 mm DIN 11851			
HS, PH, 3A	1.0 in sanitary flange or RD52 x 1/6 DIN			
Maximum suction lift*				
Wet	22.6 ft		6.8 m	
Dry	11.3 ft		3.4 m	
Noise (dBa)				
Maximum sound pressure	74 dBa at full power and flow			
Sound pressure measured 1.6 feet (0.5 meter) from equipment.				
Sound power measured per ISO-9614-2.				
Weight				
Models with wetted section materials coded:				
AL	62 lb		28.1 kg	
SS	79 lb		35.8 kg	
HT	79 lb		35.8 kg	
CP, PP	61 lb		27.7 kg	
PV	67 lb		30.4 kg	
FG	88 lb		39.9 kg	
HS, PH, 3A	77 lb		34.9 kg	
Notes				
* *May vary based on pump materials, suction condition, discharge head, pressure, and fluid type.*				
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Technical Specifications for Q-D Models

QUANTM Q-D Pumps				
	US		**Metric**	
Maximum fluid working pressure	100 psi		6.89 bar, 0.69 MPa	
Maximum fluid temperature	150°F		65°C	
Maximum free-flow delivery	60 gpm		227 lpm	
Maximum size pumpable solids				
High Sanitation models, ball checks	0.5 in.		12.7 mm	
High Sanitation models, flapper checks	1.2 in.		30.5 mm	
All other models	0.19 in.		4.8 mm	
Environmental temperature range	0° to 104°F		–18° to 40°C	
Maximum operating altitude	9842 ft		3000 m	
Electrical ratings				
	Rated Voltage	**Phase**	**Hertz**	**Current**
Q-D models, F-1 motor	200–240 V	3	50/60 Hz	7.5 A
Q-D models, F-2 motor	200–240 V	1	50/60 Hz	15 A
Materials of construction				
See **Configuration Matrix**, starting on page 6, for materials of construction for your equipment model.				
Fluid inlet/outlet sizes				
Models with wetted section materials coded:				
AL, SS	1.5 in. npt(f) or 1.5 in. bspt			
PP, PV	1.5 in. ANSI/DIN Raised Face Flange			
FG	2.0 in. sanitary flange or 50 mm DIN 11851			
HS, PH, 3A	1.5 in. sanitary flange or 40 mm DIN 11851, male thread			
Maximum suction lift				
Wet	13.3 ft		4.0 m	
Dry	13.3 ft		4.0 m	
Noise (dBa)				
Maximum sound pressure	72 dBa at full power and full flow			
Sound pressure measured 1.6 feet (0.5 meter) from equipment.				
Sound power measured per ISO-9614-2.				
Weight				
Models with wetted section materials coded:				
AL	71 lb		32.2 kg	
SS	112 lb		50.8 kg	
CP, PP	75 lb		34.0 kg	
PV	85 lb		38.5 kg	
FG	120 lb		54.4 kg	
HS, PH, 3A	98 lb		44.5	
Notes				
* *May vary based on pump materials, suction condition, discharge head, pressure, and fluid type.*				
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Technical Specifications for Q-E Models

QUANTM Q-E Pumps				
	US		**Metric**	
Maximum fluid working pressure	60 psi		6.89 bar, 0.69 MPa	
Maximum fluid temperature	150°F		65°C	
Maximum free-flow delivery	100 gpm		378.5 lpm	
Maximum size pumpable solids High Sanitation models All other models	 0.5 in. 0.25 in.		 12.7 mm 6.35 mm	
Environmental temperature range	0° to 104°F		–18° to 40°C	
Maximum operating altitude	9842 ft		3000 m	
Electrical ratings				
	Rated Voltage	**Phase**	**Hertz**	**Current**
Q-E models, F-1 motor	200–240 V	3	50/60 Hz	7.5 A
Q-E models, F-2 motor	200–240 V	1	50/60 Hz	15 A
Materials of construction				
See **Configuration Matrix**, starting on page 6, for materials of construction for your equipment model.				
Fluid inlet/outlet sizes				
Inlet/Outlet size for models with wetted section materials coded:				
AL, CI. SS	2 in. npt(f) or 2 in. bspt			
CP, PP, PV	DIN PN16 050—2 in. ANSI 150 2 NPS JIS 10K 50			
HS, PH, 3A	2 in. sanitary flange or 50 mm DIN 11851, male threads			
Inlet size for models with wetted section materials coded: FG (models for ram mounting) FG (all other FG models)	 4 in. sanitary flange 2.5 in. sanitary flange or 65 mm DIN 11851, or 2.1 in. for ram mounting models only			
Outlet size for models with wetted section materials coded: FG (models for ram mounting) FG (all other FG models)	 3 in. sanitary flange 2.5 in. sanitary flange or 65 mm DIN 11851 or 1.8 in. for ram mounting models only			
Maximum suction lift				
Wet	13.3 ft		4.0 m	
Dry	13.3 ft		4.0 m	
Noise (dBa)				
Maximum sound pressure	77 dBa at full power and full flow			
Sound pressure measured 1.6 feet (0.5 meter) from equipment. *Sound power measured per ISO-9614-2.*				

QUANTM Q-E Pumps		
	US	**Metric**
Weight		
Models with wetted section materials coded:		
AL	99 lb	44.9 kg
CI	165 lb	74.8 kg
SS	162 lb	73.5 kg
CP, PP	100 lb	45.4 kg
PV	117 lb	53.0 kg
FG	170 lb	77.1 kg
HS, PH, 3A	143 lb	64.9 kg
Notes		
* *May vary based on pump materials, suction condition, discharge head, pressure, and fluid type.*		
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California Proposition 65

CALIFORNIA RESIDENTS

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

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