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Graco’s Next-Generation Electric Diaphragm Pump

QUANTM®

Product Introduction

Contents

Why was QUANTM Developed?

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Pneumatic pumps consume too much energy……

- Industry asked for affordable and more efficient pumps that offer same benefits of an AODD
- EODD line was great intro into market, but had challenges with costs and still used air
- QUANTM integrates the electric motor and controls in a small package while eliminating the need for a gear box and VFD

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What is QUANTM?

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QUANTM is the Future of Fluid Handling!

- It's an AODD pump that runs entirely on **electricity**
- It performs like an AODD pump
  - Stalls under pressure
  - Uses same ball, seats, diaphragms, fluid covers and manifolds as Husky and SaniForce lines
  - Quiet operation, doesn't use air
  - No freezing
  - Integrated controls

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QUANTM Industrial Process Pumps

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QUANTM F&Bs

Aluminum Drive Housing
- Powder-coated IND pumps
- Leak sensors available
- IP 66 wash-down rated Not Atex
- IP 55 Atex area

Modular Fluid Components
- Many Fluid components shared with existing Graco AODD and EODD
  - Diaphragm Backers on all diaphragms for added life
- Configurations to suit nearly every application

I/O
- Discreet start/stop
- 4-20mA speed control

Footprint
- Elimination of gearbox allows for compact footprint
- Virtually identical to AODD

Integrated Control
- Easily adjust pump output
- Operates like the AODD you're used to
- Multi-color LED
  - System status indicator
  - Troubleshooting

Plug-and-Play
- 120V and 240V (1Ø)

QUANTM Components

Aluminum Drive Housing

Stator Cap

Auto-Prime
And runaway protection

Cooling Fan

Potentiometer/Flow
Selector

LED Light Indicator

Leak Detector Port

I/O Port

QUANTM Nomenclature

Industrial (i)	Hygienic (h)
• I30 comparable to Husky 1050	• h30 comparable to SaniForce 1040
• I80 comparable to Husky 1590	• h80 comparable to SaniForce 1590
• I120 comparable to Husky 2150	• h120 comparable to SaniForce 2150

- ✓ i = for industrial applications
- ✓ h = for sanitary/hygienic applications
- ✓ 30, 80 and 120 refers to maximum flow rate

	i30	i80	i120
Max Flow Rate (gpm/lpm)	32/120	80/300	120/455
Max Pressure (psi/Bar)	100/7	100/7	60/4.2
Fluid Connection (in/mm)	1.0/25 (NPT & BSPT)	1.5/40 (NPT & BSPT)	2.0/50 (NPT & BSPT)
Power Input (VAC)	120/240V (1Ø) 50/60 Hz	240V (1/3Ø) 50/60 Hz	240V (1/3Ø) 50/60 Hz
Max Current Draw (amps)	12	7.5	7.5
Fluid Section Options	Same as AODD		
Seat, Check Ball, Diaphragm	Same as AODD		

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QUANTM Sanitary/Hygienic Pumps

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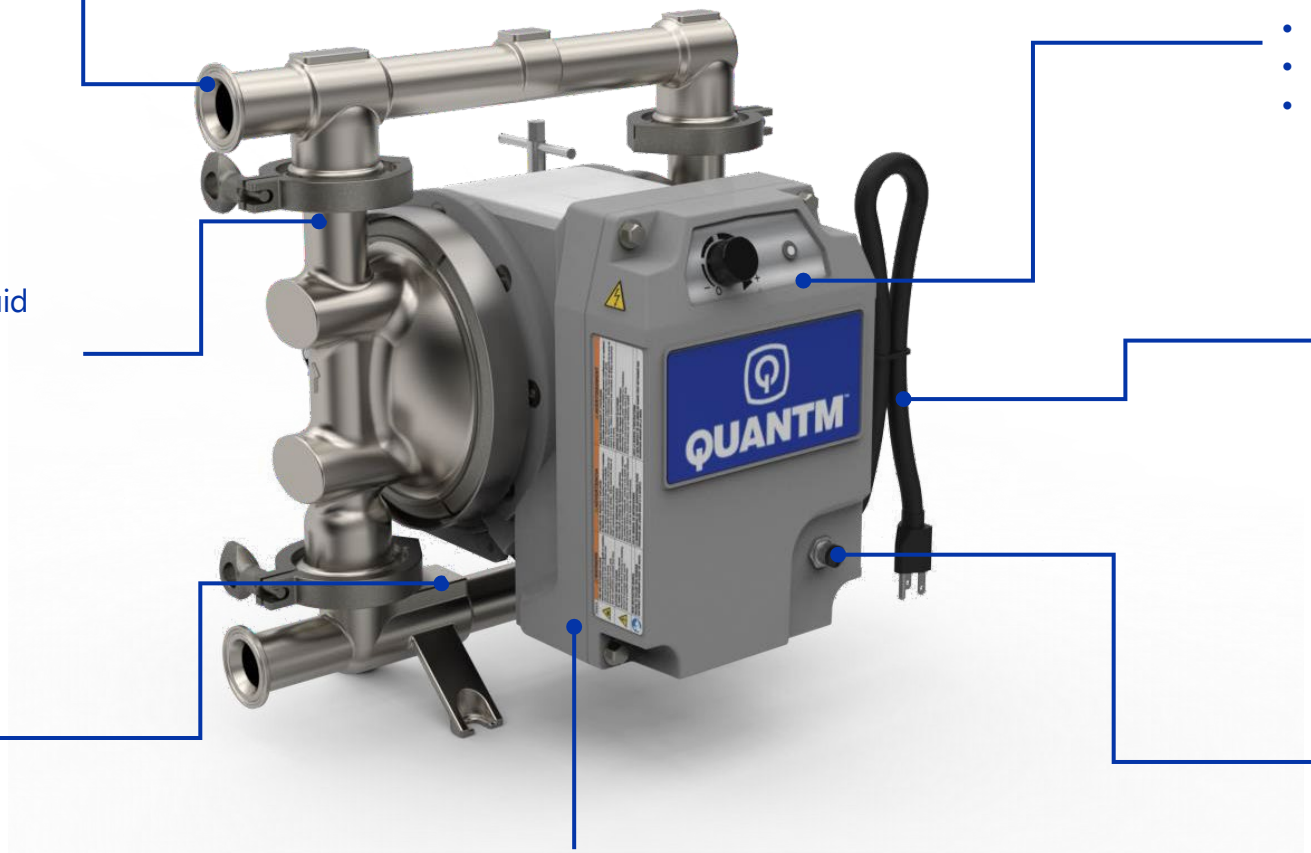
QUANTM Sanitary/Hygienic F&Bs

Sanitary Design
- Tri-clamp or DIN fluid connections
- Tri-clamp quick knock down fluid sections

Modular Fluid Components
- Seats, check balls, diaphragms and fluid sections
  - Diaphragm Backers added
- Create a pump configuration that matches your fluid handling needs

Footprint
- Similar size to existing AODD
- Removal of gearbox reduced footprint compared to other electric options



Integrated Control
- Control the pump with the turn of a dial
- Operates like the AODD you are used to
- Wash-down rated

Plug and Play
- Factory wired for quick install
- 120V and 240V options

External Control
- Standard I/O for remote or PLC pump control
  - Start/Stop
  - Speed Control

Protected Center
- FEP compliant coating – similar to PTFE
- Optional leak sensors

FEP Center Section Coating

(FEP = fluorinated-ethylene-propylene)

- Specially Formulated to be FDA Compliant
- Similar chemical resistance to PTFE and Xylan

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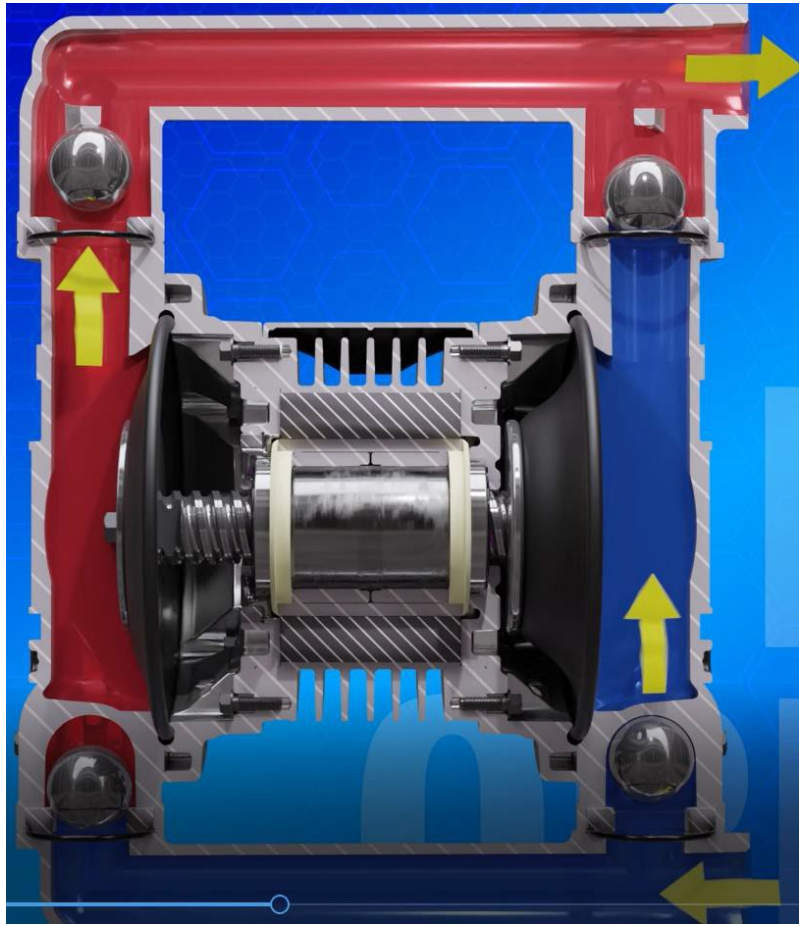
		h30	h80	h120	h120 3”LP	h120 4”LP
Max Flow Rate	(gpm/lpm)	30/115	80/300	120/455	100/380	80/300
Max Pressure	(psi/Bar)	100/7	100/7	60/4.2	60/4.2	60/4.2
Fluid Connection	(tri-clamp)	HS/PH/3A - 1.0 in FG - 1.5 in	HS/PH/3A - 1.5 in FG - 2.0 in	2.0 in & 2.5 in	3.0 in	4.0 in
Power Input	(VAC)	120 (1Ø) or 240 (1/3Ø)	240V (1/3Ø)	240 (1/3Ø)	240 (1/3Ø)	240 (1/3Ø)
Max Current Draw	(amp)	12	7.5	7.5	7.5	7.5
Fluid Section Options		FG, HS, PH	FG, HS, 3A, PH	FG, HS, 3A, PH	FL	FL
Seat, Check Ball, Diaphragm		316 SST, 316L SST, PTFE, Santoprene, Buna, FKM, EPDM, Neoprene				



How it Works

FluxCore Drive

QUANTM FEATURES FLUXCORE® ELECTRIC MOTOR TECHNOLOGY

LIGHTER, MORE RELIABLE AND UP TO 80% MORE EFFICIENT THAN TRADITIONAL AC GEARED SYSTEMS.

The market has never seen an electric pump like this. FLUXCORE technology removes the drivetrain that alternating current (AC) motors rely on – instead, it increases torque at lower speeds.

Standard AC Induction Motor

Lorem ips

FLUXCORE electric motor technology
- up to 80% more efficient

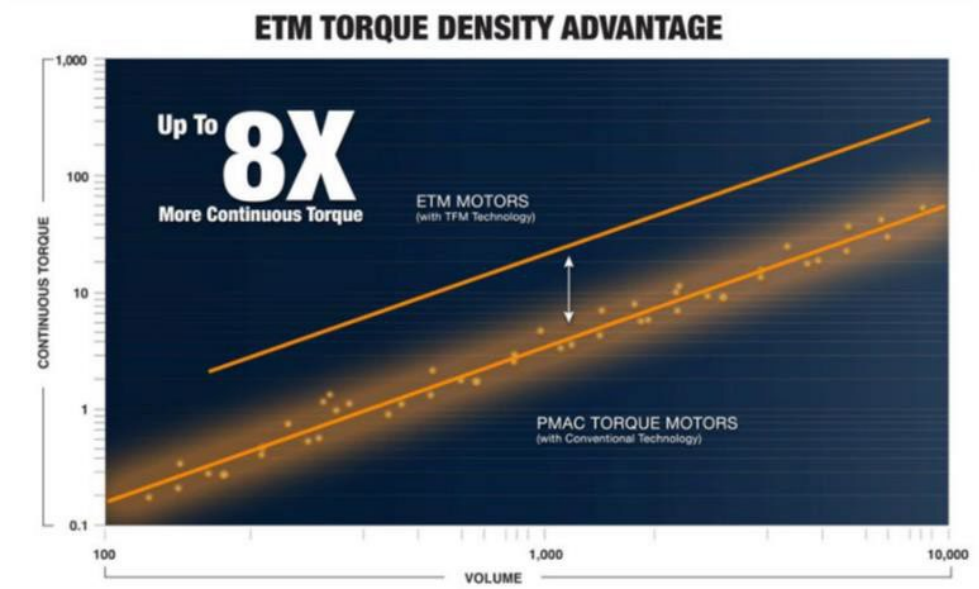
FluxCore Drive

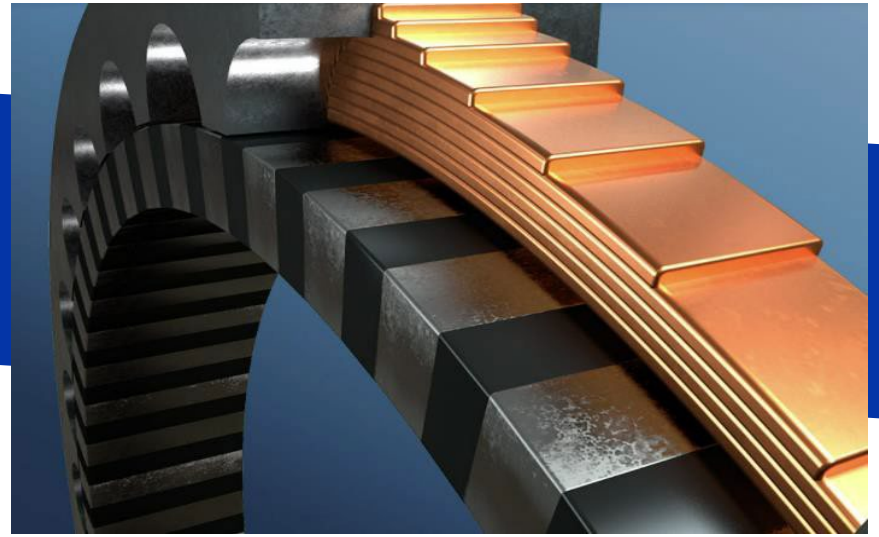
At the heart of this innovative technology is the use of a specially designed transverse flux motor.
The design uses up to ten times more electrical motor poles and drastically reduces electrical losses with low resistance coils.
These low resistance coils consist of a unique inner ring of simple copper windings that replaces the “rat’s nest” of wiring typically found in a conventional motor.
This simple and compact winding set facilitates much more effective and efficient conversion of electrical current into mechanical torque.

QUANTM is gearbox-free. Traditional motor technology using an AC or DC motor requires gearboxes and couplings, which introduce mechanical losses, additional maintenance and expensive control systems. QUANTM avoids all these drawbacks.

Further improving the efficiency of this design is the encapsulation of the windings within the housing instead of wrapping the coils around a core.
This change means that far more electromagnetic flux lines are captured and utilized in the creation of the electromotive field in the motor.
Coupling this improved electrical induction with the increased number of poles creating magnetic fields leads to the creation of a more consistent and stable overall field.
This translates to a continuous torque force that is eight times higher than equivalently sized AC induction motors running at nominal speed;

FluxCore Drive





- Graco FluxCore, transverse flux motors provide up to 8x more continuous torque at low speeds than conventional motors.
- Graco technology increases torque and power density while minimizing size and resistance losses

QUANTM Drive Module

Control

- Potentiometer to adjust pump speed and pressure
- LED indicates status and trouble codes
- Contains software required for pump operation

Ball Screw and Nut

- Converts rotational motion to linear motion
- Diaphragm connected to ball screw

FluxCore™ Stator

- Creates electromagnetic field

Rotor

- Transmits electromagnetic energy from stator to ball nut

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General Operation

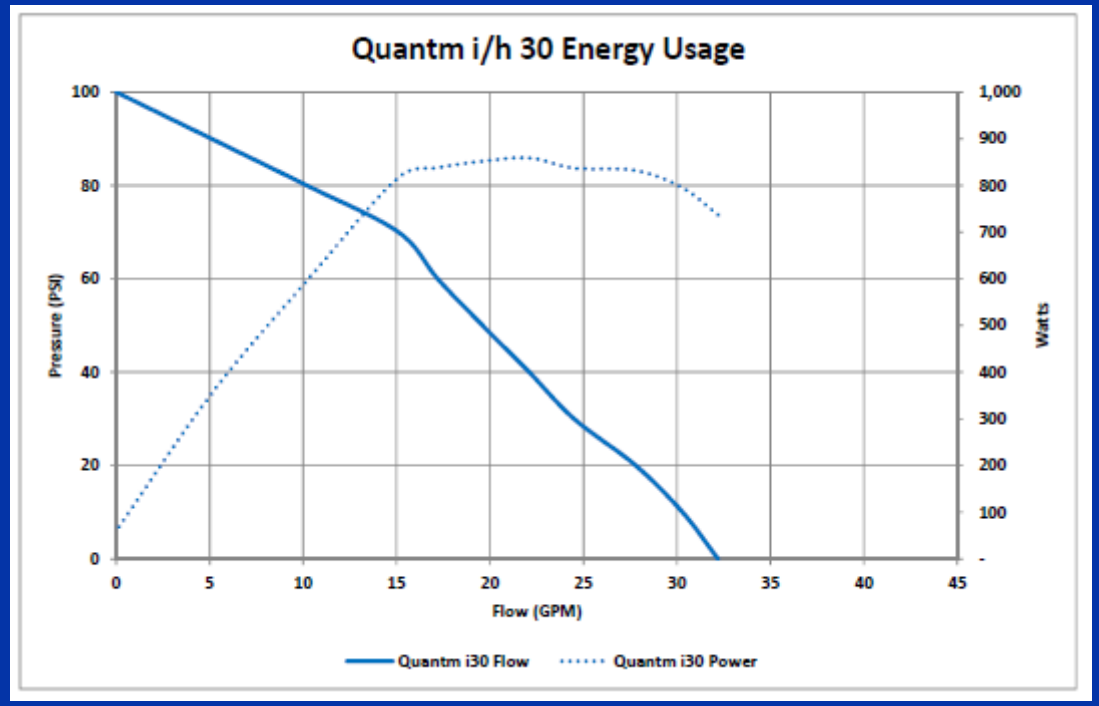
- Uses an AC motor that looks and acts like a DC motor
- Able to stall pump through monitoring current draw
  - Sends low wattage signal 30X per second
- Motor does not need soft start feature like AC motor
- Has auto prime and restart features
- Can run 5 cpm to +200 cpm

Performance

1” (i/h30) Performance/Energy Consumption

1” pump

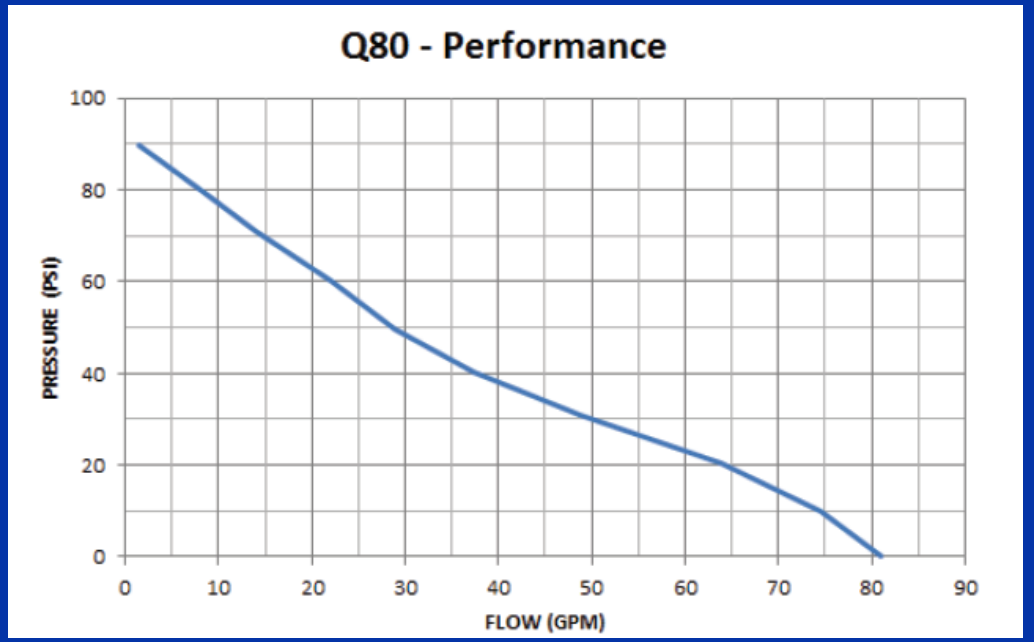
- Husky 1050 – 175 lpm 7 Bar
- **QUANTM i/h30– 120 lpm 7 Bar**



1.5” (i/h80) Performance

1 ½” pump

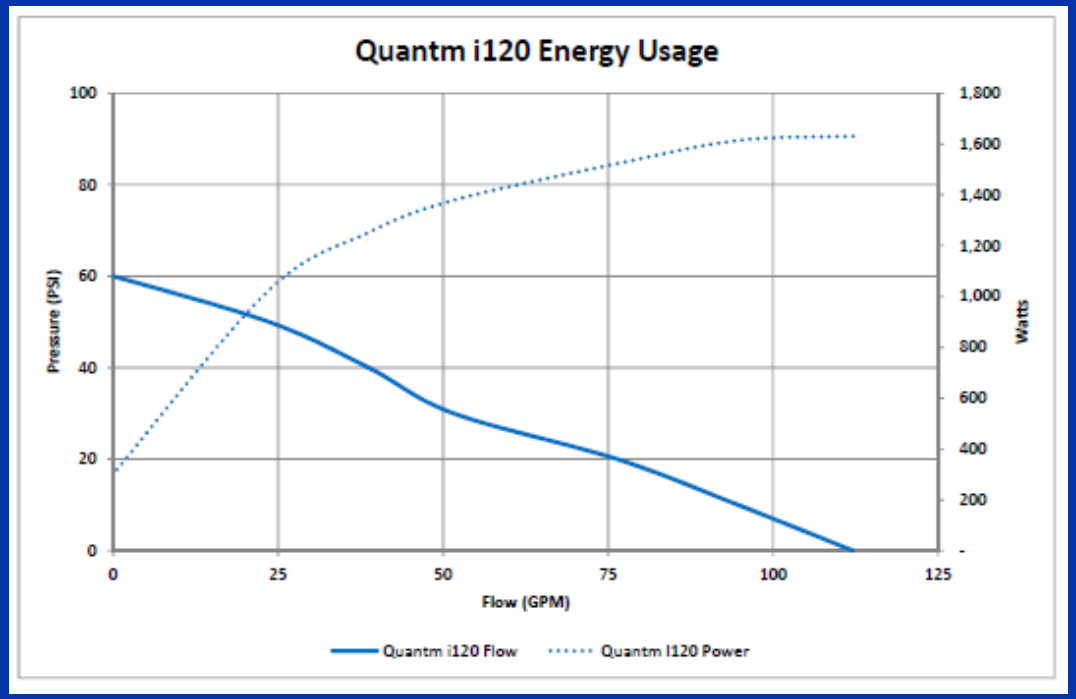
- Husky 1590 – 340 lpm 7 Bar
- **QUANTM i/h80 – 300 lpm 7 Bar**



2” (i/h120) Performance/Energy Consumption

2” pump

- Husky 2150 – 570 lpm 7 Bar
- **QUANTM i/h120 – 455 lpm 4.2 Bar**



Approvals and Certifications

QUANTM Certifications and Approvals

- Explosion Proof
  - Class 1 Division 1
- ATEX
  - Class 1 Zone 1 AEx db IIb T4 Gb
- IEC
  - Ex db IIb T4 Gb
- Ingress Protection
  - IP66 (Normal Location)
  - IP55 (Hazardous Location)
- UL Listings
  - Normal Location - 1004
  - Hazardous Location - 674 & 60079
- FDA, USP Class VI, 3A
- EC 1935/2004

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Accessories

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QUANTM Accessories

Carts

Hygienic

- 304 stainless steel welded cart for hygienic pumps and applications
- Fits h30, h80, and h120 Food Grade pumps
  Fits h30 High Sanitary pumps

Industrial

- Fits i30, i80, and i120 pumps

Leak Sensors

- Sold as an optional accessory
- Shuts down pump in event of a diaphragm leak
- Normal and hazardous location option available
  - C1D1 and ATEX approved
- Wires into control board

Competition

QUANTM Competition

- **In double diaphragm pump market, QUANTM stands alone**
  - +15 patents
  - Electric motors made in Graco factory

- **All competitors need to use expensive gear boxes, VFD and have fluid backed diaphragms**
  - Limited flow and pressure
  - Up to 8X more expensive than QUANTM
  - Huge foot print
    - QUANTM motor fits between Husky and SaniForce fluid covers

- **Competitors w/ Electric DD Pumps**
  - ARO - EVO
  - IDEX – Abel
  - Tapflo
  - Demellco

Target Applications

Target Applications

Based on preliminary QUANTM successes, below a few of the key applications areas identified

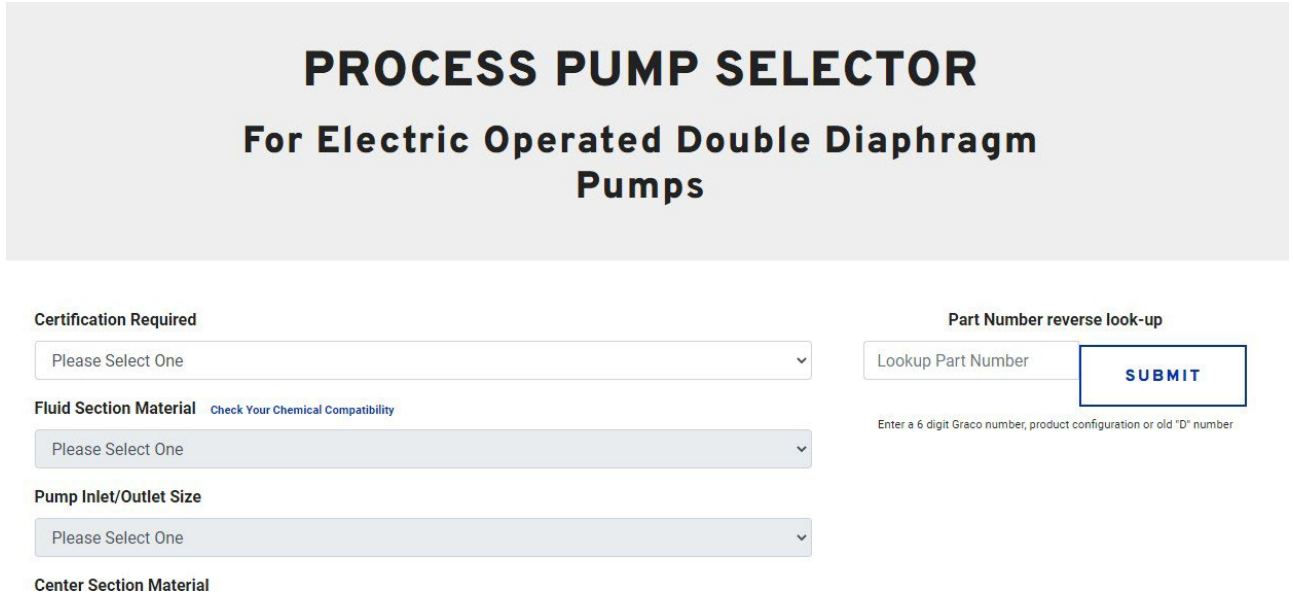
- **Automotive: Assemblers, Tier 1 and Tier 2**
  - Paint kitchens
  - Water treatment facilities
- **Paint Manufacturing**
  - Sand bead milling
  - Blending and transfer
- **Plating and Foundries**
  - Chemical transfer
  - Waste materials handling
- **Paper Mills**
  - Chemicals
  - Pulp transfer
- **Sanitary: Co-Packers and Pet Food**
  - Ingredient transfer
  - Water treatment
- **Chemical Blenders**
  - Material transfer
  - Waste water
- **Building Construction Materials**
  - Paint supply systems
- **Heavy Metal Fabricators**
  - Paint transfer
  - Waste material handling
- **Ceramics**
  - Slip transfer
  - Waste water
- **Corrugated Card Board**
  - Adhesive transfer
  - Ink
- **Tire Manufacturing**
  - Mold release

Return on Investment

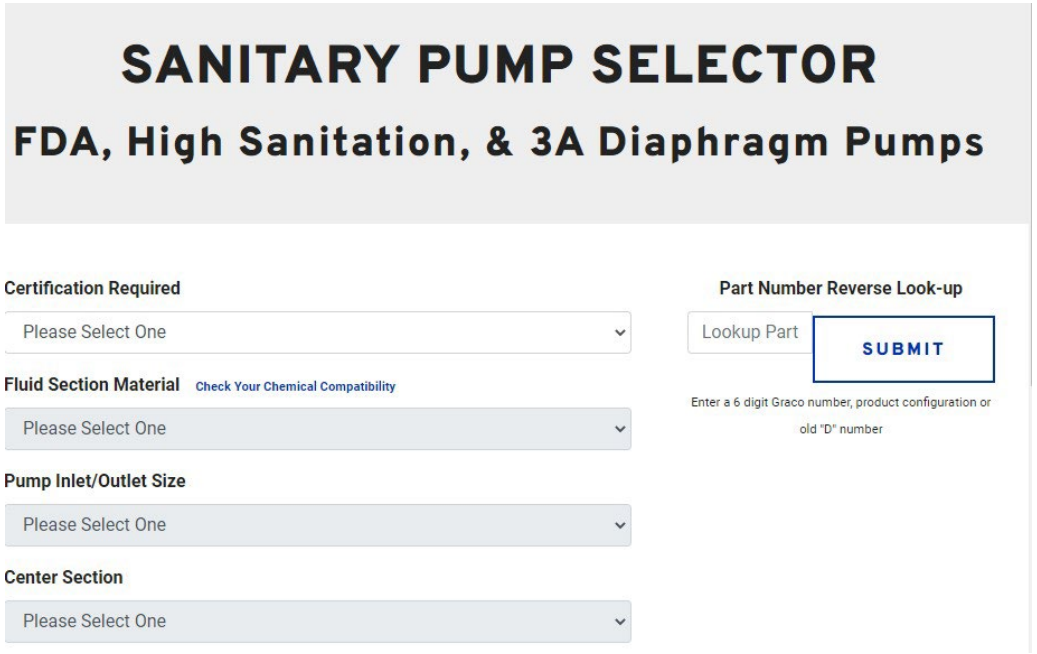
Pump Selector Tool

Pump Selector Tools

Industrial



Sanitary/Hygienic



- QUANTM pump selectors with Husky and SaniForce AODD cross references will be released when QUANTM is fully launched

Pump Selection

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.

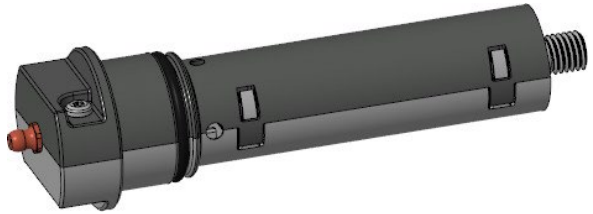
Brand		Application		Model		Wetted Section Material	
Q	QUANTM	T	Industrial	C	30 (1 in. port)	AC	Acetal
		H	Hygienic	D	60 (1-1/2 in. port)	AL	Aluminum
				E	120 (2 in. port)	CI	Cast Iron
						CP	Conductive Polypropylene
						FG	Food Grade, Stainless Steel, 125 micro finish (cast CF8M)
						HS	Hygienic, 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

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						

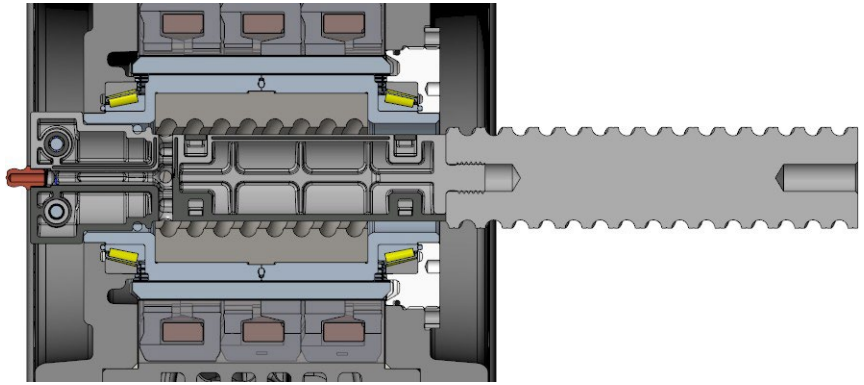
Maintenance

Maintenance

Center Section Greaser Tool

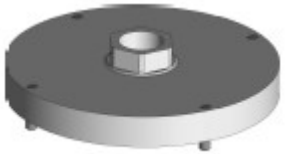


- Lubrication is done **without removing the motor** from the pump housing by fully seating the greaser tool in the center section and applying grease through the zerk fitting

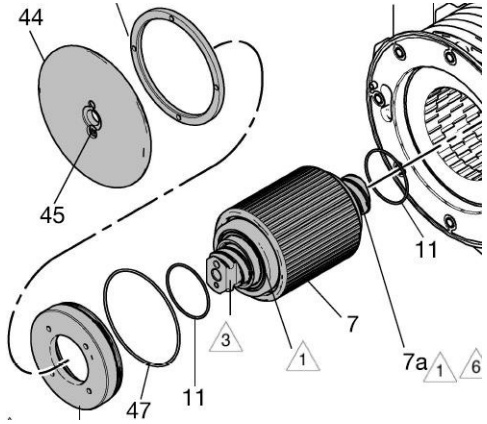


- Lubrication should be done whenever replacing diaphragms

Rotor/Shaft Assembly Removal



- Rotor assembly removal is done with the preload nut installation tool. The tool is used to remove the stator caps which retain the rotor assembly. The entire rotor assembly is removable as a unit.



- This repair is typically only required if the pump is run with material behind the diaphragm, left with fluid on the back of the diaphragms or if proper greasing is not conducted over the life of the pump.

End User Personas

Special Considerations

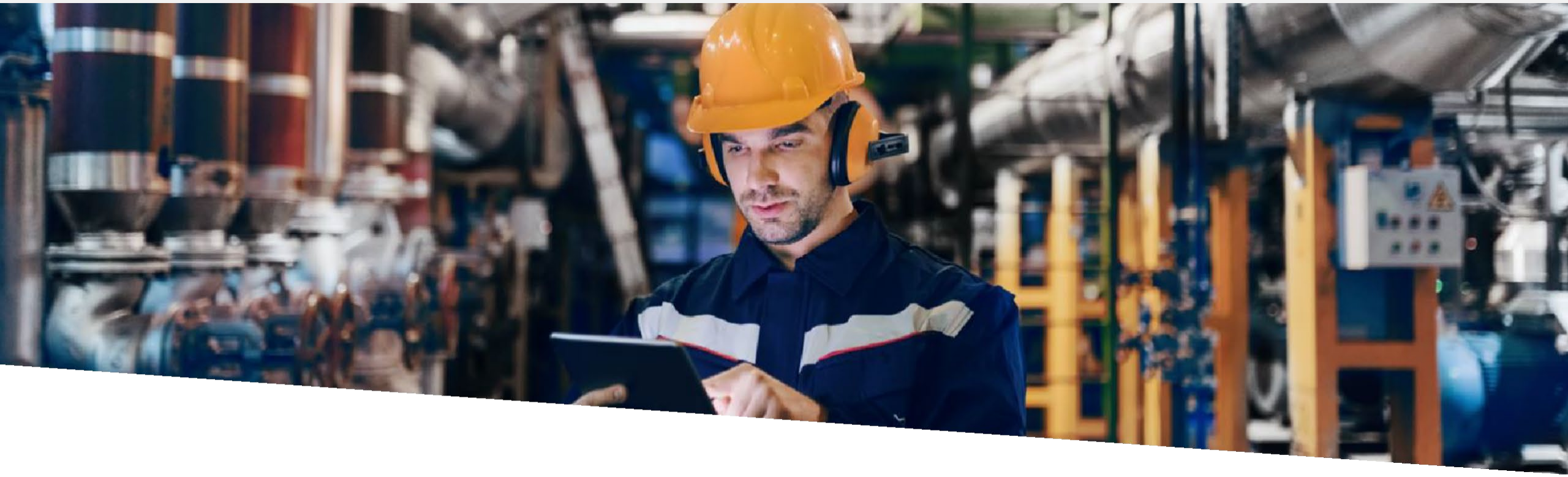
Special Considerations

Special Consideration for Select Application Areas

- If you are pumping harsh chemicals in industrial applications
  - The motor housing is made from aluminum and may be susceptible to premature corrosion when harsh chemicals are in the atmosphere
  - Only hygienic pumps have FEP coating on aluminum components

- If you need high flow and high pressure
  - The i/h120 pump versions (2”) is limited in flow and pressure when compared to the 2” AODD or EODD pumps
  - The maximum pressure is 60 PSI and the highest flow rate is 120 gpm, however, keep in mind the QUANTM pump follows similar pressure flow curves as AODD pumps. The higher the flow, the lower the pressure

- If you need low pulsation
  - QUANTM does not have a low pulsation mode and pulsation will be similar to a comparable AODD pump



Questions?