

# Hydra-Cell<sup>®</sup>

## Seal-less Pumps

**Versatile, Reliable Pumps for a Wide Range of Applications**



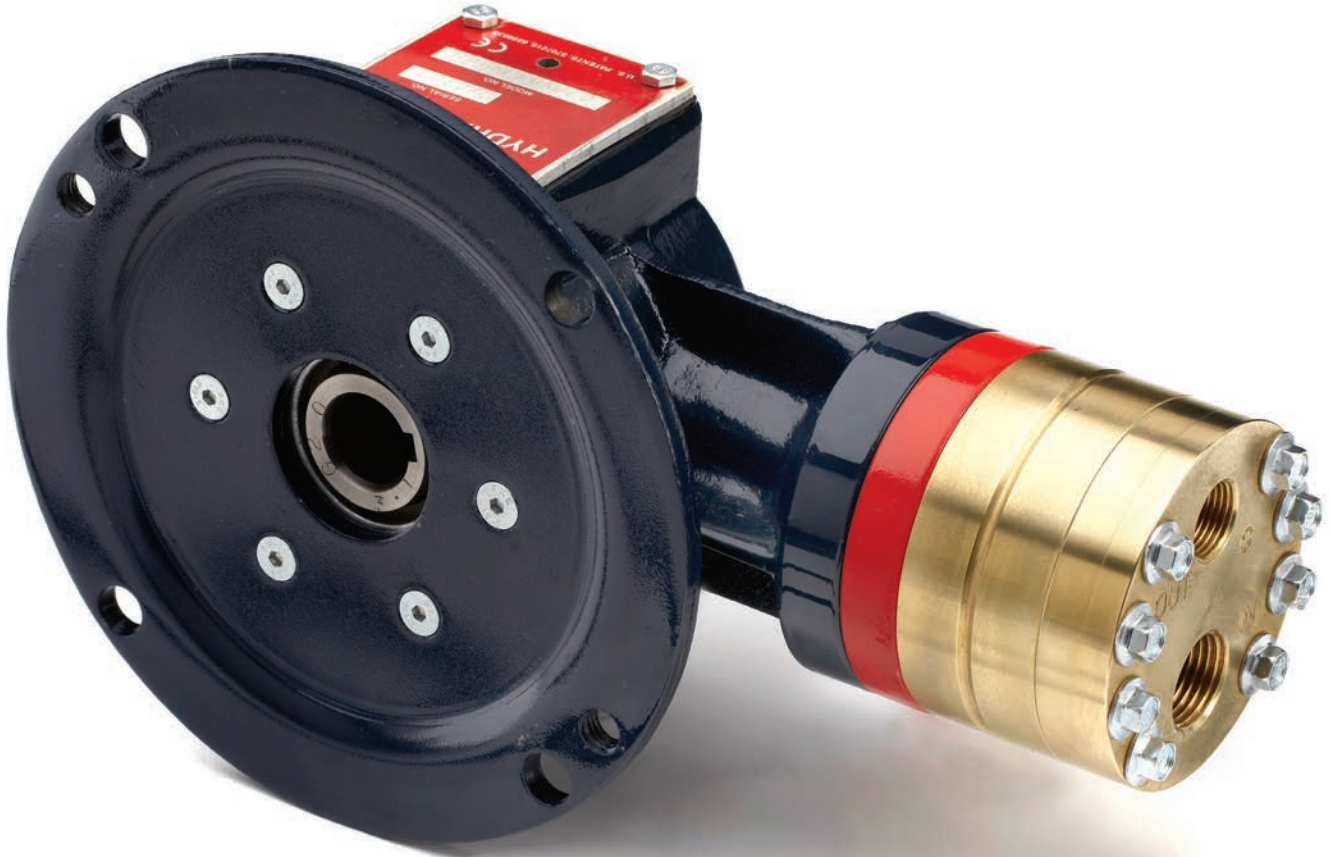
### F20 Series

- Pumps the full spectrum of low-to-high viscosity fluids.
- Features a seal-less design and horizontal disk check valves that enable the pump to handle abrasives and particulates that might damage or destroy other types of pumps.
- Simple, compact design reduces initial investment and lowers maintenance costs.
- Operational efficiencies reduce energy costs.
- Tolerates non-ideal operating conditions.
- Minimizes maintenance and downtime because there are no mechanical or dynamic seals, packing, or cups to leak, wear, or replace.

# F20 Series

Maximum Flow Rate: 1.0 gpm (3.8 l/min)

Maximum Pressure: 1500 psi (103 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



*F20 close-coupled (hollow shaft) for 56C frame motors, shown with Brass pump head.*



*F21 external shaft-driven with Polypropylene pump head.*



*F22 flexible-coupled to 56C, 142TC, and 145TC frame motors, shown with 316L Stainless Steel pump head.*

# F20 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 1000 psi (69 bar)	
		gpm	l/min
F20-X	1750	1.01	3.82
F20-E	1750	0.71	2.69
F20-S	1750	0.56	2.12
F20-B	1750	0.31	1.17
F20-G	1750	0.20	0.76

### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

#### Maximum Discharge Pressure

Metallic Pump Heads:

F20 to 1000 psi (69 bar)

F21 to 1500 psi (103 bar)

F22 to 1500 psi (103 bar)

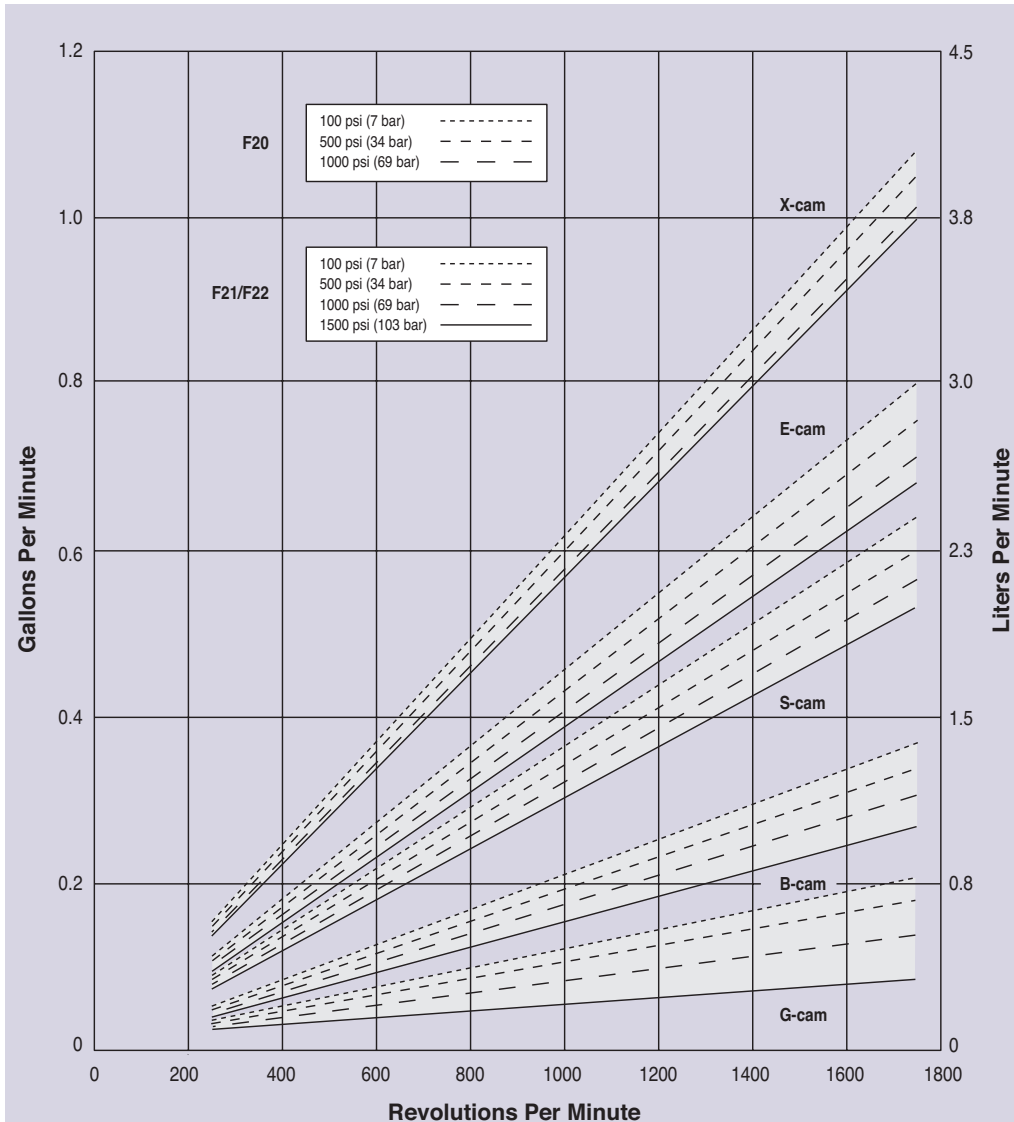
Non-metallic Pump Heads:

250 psi (17 bar) Polypropylene

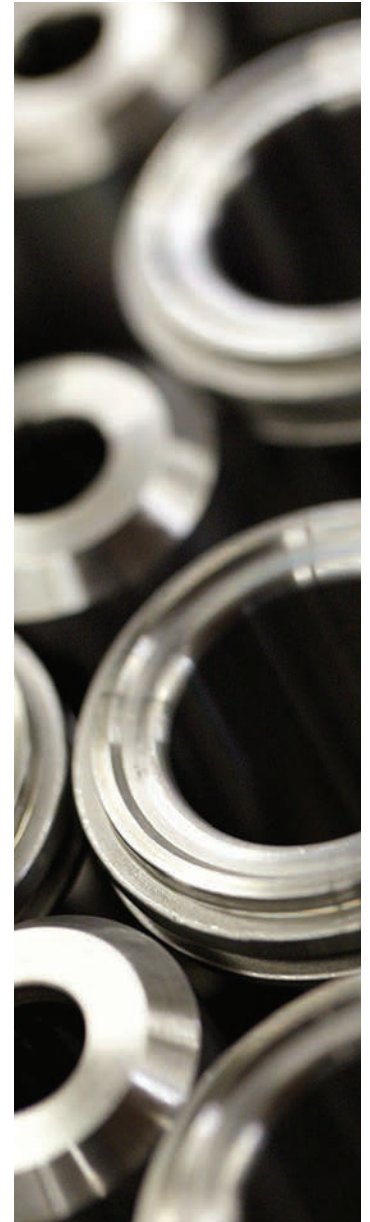
350 psi (24 bar) PVDF

Performance and specification ratings apply to F20, F21 and F22 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



S, B & G cam options based on 10 psi (0.7 bar) inlet pressure.



# F20 Series Specifications

## Flow Capacities @1000 psi (69 bar)

Model	rpm	gpm	l/min
F20-X	1750	1.01	3.82
F20-E	1750	0.71	2.69
F20-S	1750	0.56	2.12
F20-B	1750	0.31	1.17
F20-G	1750	0.20	0.76

## Delivery @1000 psi (69 bar)

Model	gal/rev	liters/rev
F20-X	0.0006	0.0022
F20-E	0.0004	0.0015
F20-S	0.0003	0.0012
F20-B	0.0002	0.0007
F20-G	0.0001	0.0004

## Maximum Discharge Pressure

Metallic Heads:	F20 to 1000 psi (69 bar)
	F21 to 1500 psi (103 bar)
	F22 to 1500 psi (103 bar)
Non-metallic Heads:	250 psi (17 bar) Polypropylene
	350 psi (24 bar) PVDF

## Maximum Inlet Pressure 250 psi (17 bar)

## Maximum Operating Temperature

Metallic Heads:	250 °F (121 °C) - Consult factory for correct component selection for temperatures from 160 °F (71 °C) to 250 °F (121 °C).
Non-metallic Heads:	140 °F (60 °C)

## Maximum Solids Size 200 microns

## Inlet Port 1/2 inch NPT

## Discharge Port 3/8 inch NPT

## Shaft Diameter

F20: 5/8 inch hollow shaft  
F21 & F22: 5/8 inch (15.9 mm)

## Shaft Rotation Reverse (bi-directional)

## Bearings Precision ball bearings

## Oil Capacity 0.125 US quart (0.12 liters)

## Weight

Metallic Heads:	12 lbs. (5.5 kg)
Non-metallic Heads:	9 lbs. (4.1 kg)

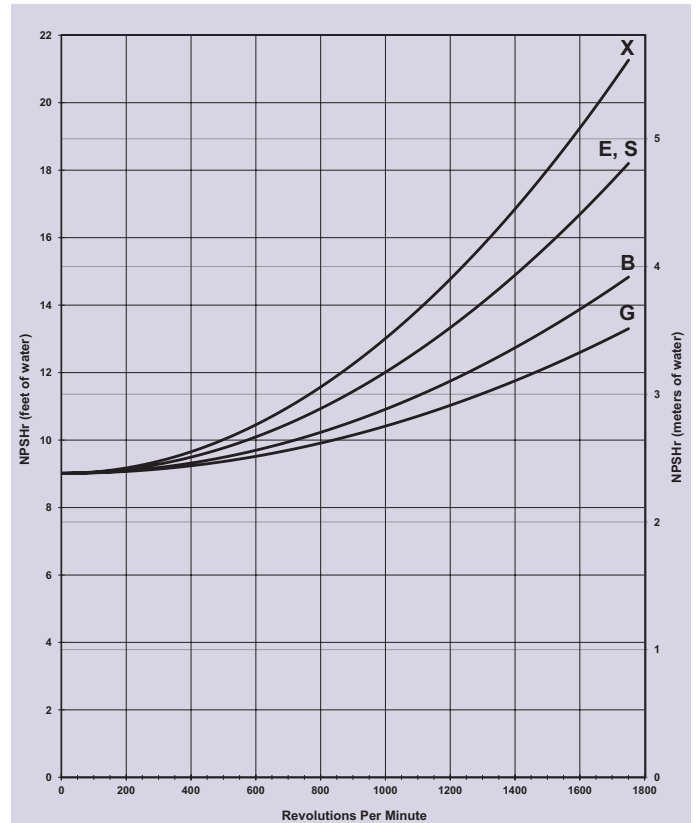
## Calculating Required Power

$$\frac{\text{rpm} + 1000}{7000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{\text{rpm} + 1000}{9383} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

When using a variable frequency drive (VFD) controller, calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



Positive inlet pressure required for:

- A) All pumps with PTFE diaphragms
- B) Pumps with B-cam or G-cam (consult factory)

## Suction Lift:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

## Calculating Pulley Size

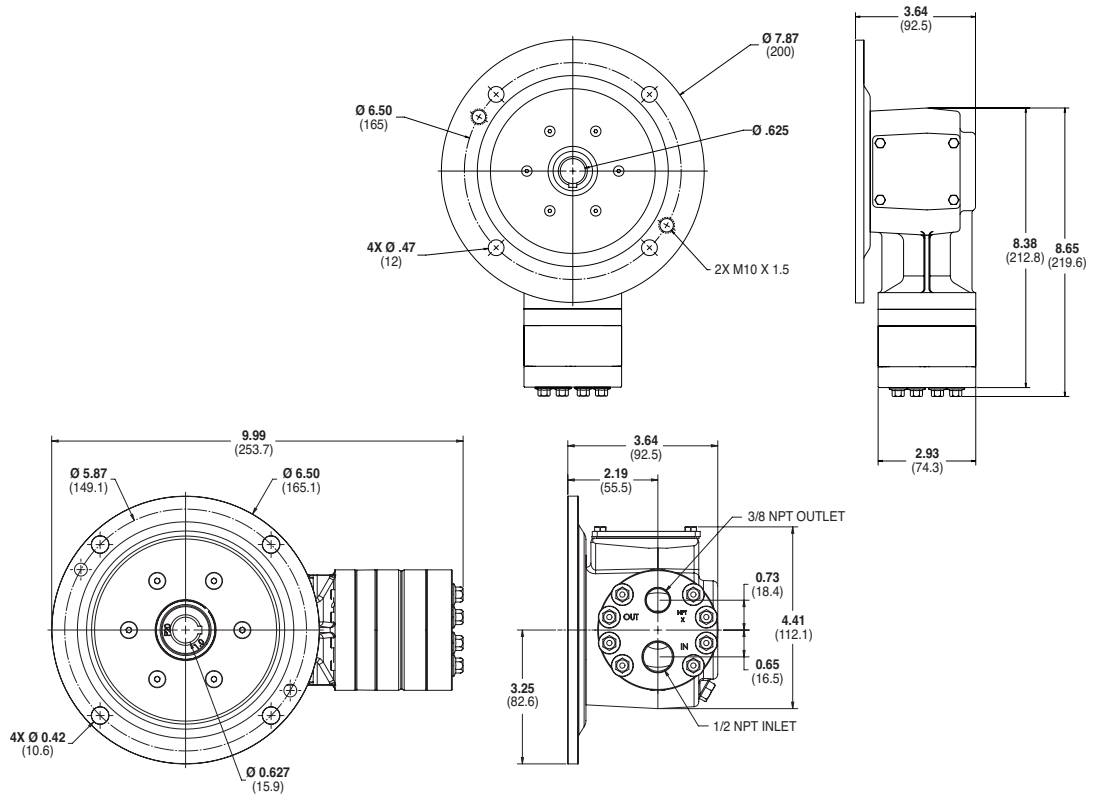
$$\frac{\text{motor pulley OD}}{\text{pump rpm}} = \frac{\text{pump pulley OD}}{\text{motor rpm}}$$



# F20 Series Representative Drawings

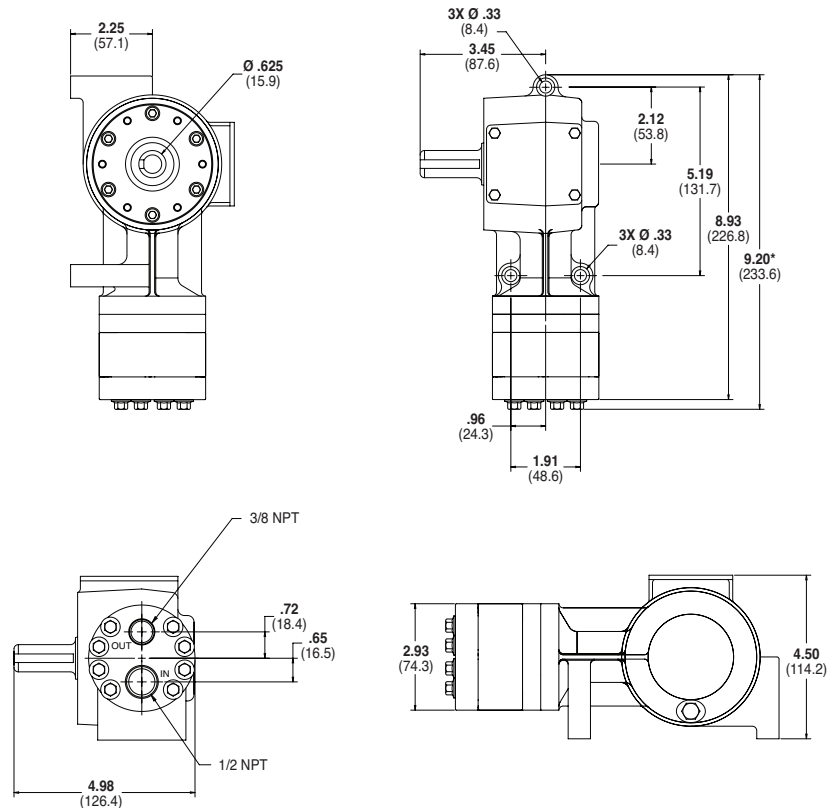
## F20 Models with Metallic Pump Head Inches (mm)

\* Add 0.25" (6.35mm) where shown for manifold cover plate on non-metallic models.



## F21 Models with Metallic Pump Head Inches (mm)

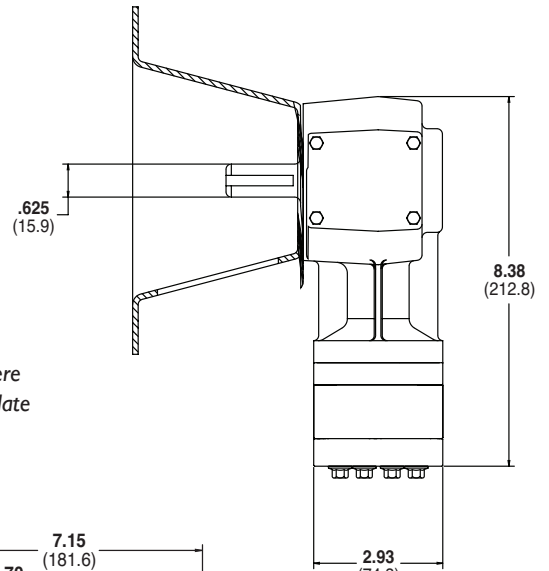
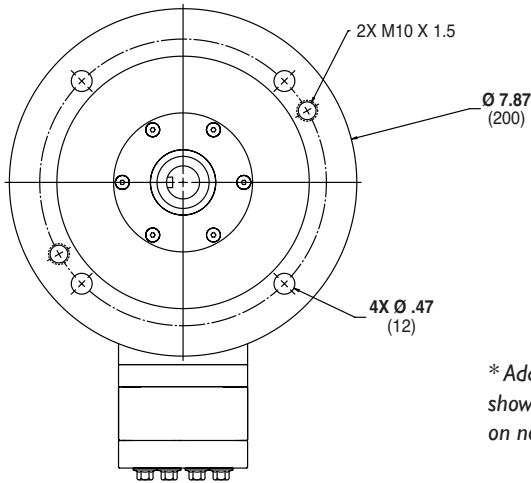
\* Add 0.25" (6.35mm) where shown for manifold cover plate on non-metallic models.



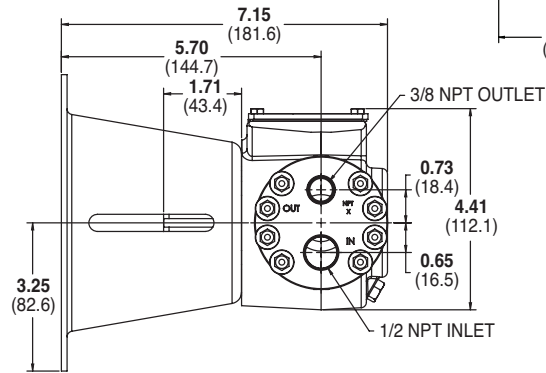
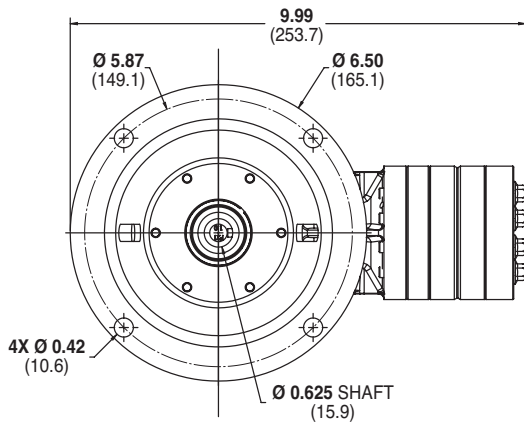
**Note:** Dimensions are for reference only. Contact factory for certified drawings.

# F20 Series Drawings/Adapters/Valves

## F22 Models with Metallic Pump Head Inches (mm)

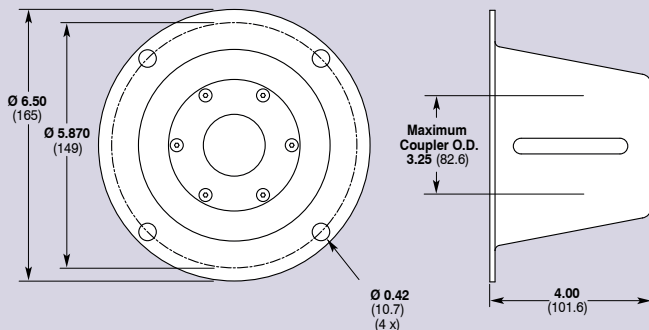


\* Add 0.25" (6.35mm) where shown for manifold cover plate on non-metallic models.



**Note:** Dimensions are for reference only. Contact factory for certified drawings.

### Pump/Motor Adapter Inches (mm)



#### Part Number: A04-005-1200

Must be ordered separately for F22 models (optional for F21 models) for use with 56C, I43TC and I45TC frame motors.

Metric adapter available - consult factory.

### Valve Selection

A Hydra-Cell F20, F21 or F22 pumping system uses a C46 Pressure Regulating Valve.



For complete specifications and ordering information, consult the Hydra-Cell Master Catalog.

# F20 Series How to Order

## Ordering Information



A complete F20 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: F20GAPGHFECCG.

Digit	Order Code	Description
<b>1-3</b>	<b>F20</b>	Close-coupled to NEMA 56C footed motor (NPT Ports)
	<b>F21</b>	Shaft-driven (NPT Ports)*
	<b>F22</b>	For use with pump/motor adapter (NPT Ports)* *Pump/motor adapters ordered separately. See previous page.
<b>4</b>	<b>X</b>	Max 1.01 gpm (3.8 l/min) @ 1750 rpm
	<b>E</b>	Max 0.71 gpm (2.7 l/min) @ 1750 rpm
	<b>S</b>	Max 0.56 gpm (2.1 l/min) @ 1750 rpm
	<b>B</b>	Max 0.31 gpm (1.2 l/min) @ 1750 rpm**
	<b>G</b>	Max 0.20 gpm (0.8 l/min) @ 1750 rpm**
<b>5</b>	<b>A</b>	NPT Ports (for all F20, F21 & F22 pumps)
<b>6</b>	<b>B</b>	Brass
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C
<b>7</b>	<b>A</b>	Aflas diaphragm/PTFE o-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code J)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with X and E cams only)**
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C

Digit	Order Code	Description
<b>9</b>	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>	<b>E</b>	Elgiloy
	<b>T</b>	Hastelloy C
<b>11</b>	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel (used with metallic heads only)
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C (used with metallic heads only)
	<b>Y</b>	Nylon
<b>12</b>	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>J</b>	EPDM-compatible oil
	<b>K</b>	Food-contact oil

### Consult the Hydra-Cell Master Catalog for:

- Motors, bases, couplings and other pump accessories
- Hydra-Oil selection and specification information
- Design considerations, installation guidelines, and other technical assistance in pump selection

\*\*Positive inlet pressure required for B and G cams and for PTFE diaphragms.

# Hydra-Cell®

## Seal-less Pumps



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