

Pump Features, Selection and Operating Recommendations

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BROCHURE NOTES:

Maximum pressures indicated throughout are the maximum intermittent pressures a component can sustain for occasional, short periods of operation without appreciably reducing the life expectancy. Contact the Dynex sales department for a review of any application which requires operating above the rated pressures, flows, speeds or higher than normal operating temperatures.

Specifications shown were in effect when published. Since errors or omissions are possible, contact your sales representative for the most current specifications before ordering. Dynex reserves the right to discontinue products or change designs at any time without incurring any obligation.



High Efficiency and Long Life At Pressures to 15 000 psi (1040 bar)

Dynex checkball piston pumps are used in demanding applications requiring high pressure, compatibility with low viscosity special fluids and exceptional contamination tolerance.

TOUGHEST PUMPS AVAILABLE – Checkball pumps improve the efficiency, reliability and flexibility of a hydraulic system. Unique capabilities provide advantages that no other pump design offers.

They operate with extended service life at pressures to 15 000 psi (1040 bar). They are ideal for use with special low viscosity fluids. Even in extremely dirty environments, with difficult duty cycles, checkball pumps keep operating — day after day, year after year.

QUIET EFFICIENCY – The checkball design, with individual piston check valves, provides more positive sealing. The result is greater volumetric efficiency, less heat and quieter operation.

HIGH PRESSURE COMPENSATION – Pressure compensated models are available with rated pressures to 8500 psi (590 bar). With their unique design, these pumps operate more efficiently, even when compensating for long periods. Refer to [dynexpespvcompspecs.pdf](#).

MULTIPLE OUTPUTS – *Split-Flow*[®] pumps supply independent flows to multiple functions in a system. These pumps can eliminate separate, dedicated pumps or mechanical gear boxes. A single pump can provide synchronous movement of cylinders or motors without using flow dividers. Refer to [dynexpressplitspecs.pdf](#).

FIXED ANGLE WOBBLE PLATE
The wobble plate rotates with the drive shaft causing the pistons to reciprocate

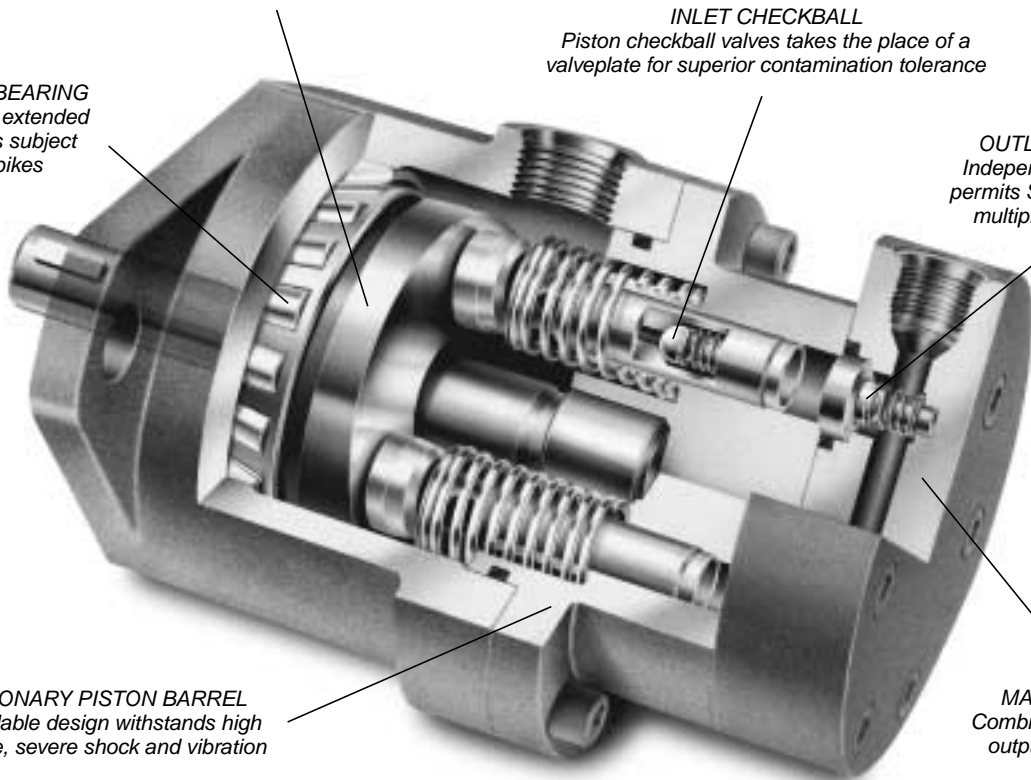
HIGH CAPACITY BEARING
Rugged design for extended life in applications subject to pressure spikes

INLET CHECKBALL
Piston checkball valves takes the place of a valveplate for superior contamination tolerance

OUTLET CHECKBALL
*Independent piston output permits *Split-Flow*[®] to supply multiple function circuits*

STATIONARY PISTON BARREL
Dependable design withstands high pressure, severe shock and vibration

MACHINED COVER
Combines individual piston outputs for smooth flow



PF2000 Series Fixed Delivery Checkball Pump

Checkball Pumps Ideal for High Pressure Operation

Fixed delivery pumps provide reliable high force operation, with models rated from 3000 psi to 15 000 psi (210 to 1040 bar). The positive sealing design makes checkball pumps an excellent choice for high pressure applications.

These pumps also provide other unique advantages: compatibility with special fluids, exceptional contamination tolerance, bi-directional operation and unique *Split-Flow*[®] capability.

Variable delivery pumps regulate output volume by changing the active displacement of each piston. Delivery is efficiently controlled by variable inlet ports located between the inlet and outlet check valve in each pumping chamber.



PUMP SELECTION AND OPTIONS

See “*Operating Recommendations*” on page 4 for information on all checkball pumps.

Specifications, installation drawings and typical performance curves are shown for each pump series in the appropriate “pdf” document.

Shaft Options

The specification tables for each pump series list the most commonly used models with standard keyed shafts. Optional spline shafts, conforming to S.A.E. standards, are available. Spline data is indicated with each installation drawing.

PV6000 Series variable delivery pumps have standard S.A.E. spline shafts.

High Pressure Models

The specification tables for fixed displacement pumps include available high pressure models. These pumps are rated for normal operating pressures of 8000 to 15 000 psi (560 to 1040 bar). High pressure outlet ports are designed to fit *Autoclave* or *Butech* fittings.

Note the special configurations to accommodate the larger ports. High pressure models in the PF1000 and PF2000 Series have over-sized covers. PF4000 and PF6000 Series have outlet blocks integrally mounted



Output flow for variable delivery PV4000 Series pumps is regulated by a spring-biased volume control stem.

to the barrel. These modifications are shown in the installation drawings printed in gray.

Some high pressure models are available with British Standard Pipe (BSP) ports, ideal for European applications.

Intermittent Pressure Ratings

All checkball pumps are especially suited for applications susceptible to excessive pressure spikes. Note the intermittent pressure ratings indicated in the specification tables.

High pressure PF4000 Series and PF6000 Series pumps are rated for the same continuous and maximum operating pressures. For other models, when the maximum pressure listed is higher than the rated pressure,

the maximum pressure is the highest intermittent pressure a pump can sustain for occasional, short periods of operation without appreciably reducing the life expectancy.

High Pressure Seals

Inlet pressures higher than 10 psig (0,7 bar) require a high pressure shaft seal. Refer to “*Inlet Conditions*” on page 4.

PF Series models listed in the specification tables have standard pressure shaft seals, with the exception of PF6000 Series models which have high pressure seals. Contact the Dynex sales department for complete model numbers for pumps requiring high pressure seals.

Seal Options

Standard seals are Buna-N (Nitrile). Options include Fluorocarbon (*Viton*[®] or *Fluorel*[®]), EPR or *Disogrin*[®].

Consult seal or fluid suppliers to determine the suitable seals for your specific operating conditions. Contact the Dynex sales department for complete pump model numbers.

Extraordinary Operation

Contact the Dynex sales department for a review of any application which requires operating above rated pressures, flows or speeds, or beyond the range of normal operating temperatures.

Installation and Performance Data

Installation drawings and typical performance curves are shown in the specific “pdf” file for each pump series.

Dimensions throughout are shown in inches (millimeters in parentheses) and are nominal. Performance curves are based on 100 SUS (20 cSt) petroleum-based fluid at 120° F (50° C), with pressurized inlet where required. See “Inlet Conditions” below and refer to table at right.

OPERATING RECOMMENDATIONS

Fluid

High-grade premium petroleum-based oil, with a combination of anti-wear, demulsibility, rust protection, and oxidation resistance and foam resistance properties.

Refer to “Fluid Specifications” table below. If fluid conditions fall outside of the range shown, consult the Dynex sales department.

Minimum Filtration Levels

Pump inlet, 150 μ nominal;
Pressure or return line, 25 μ nominal.

While finer filtration levels than these are desirable and will result in longer component life, restricting flow to the pump inlet should be avoided.

Inlet Conditions

Pumps may require pressurized inlet conditions at elevated speeds. Failure to meet inlet requirements will result in a flow reduction.

Mounting

Generally, shaft horizontal with inlet vertically up. Consult the Dynex sales department for applications requiring vertical shaft-up mounting or inlet orientation other than vertically up.

Shaft Loading

Direct drive is recommended. Indirect drive is permitted on PF2006 and PF2008 models (special mounting).

For other pump models, consult your sales representative if sideloading exists.

MINIMUM INLET PRESSURE

Pump Model	Operating Speed							
	1200 rpm		1500 rpm		1800 rpm		2400 rpm	
	psi	bar	psi	bar	psi	bar	psi	bar
FIXED DELIVERY:								
PF1 Series	0	0	0	0	0	0	5	0,4
PF2 Series	0	0	0	0	0	0	5	0,4
PF3011	0	0	0	0	0	0	5	0,4
PF3017	0	0	0	0	0	0	5	0,4
PF3015	0	0	0	0	0	0	10	0,7 ^①
PF3021	0	0	0	0	0	0	10	0,7 ^①
PF4011	0	0	0	0	0	0	5	0,4
PF4015	0	0	0	0	0	0	5	0,4
PF4021	0	0	0	0	0	0	5	0,4
PF4018	0	0	5	0,7	5	0,4	10	0,7 ^①
PF4026	0	0	5	0,7	5	0,4	10	0,7 ^①
PF4033	0	0	5	0,7	5	0,4	10	0,7 ^{①②}
PF6023	0	0	5	0,7	10	0,7 ^③	—	—
PF6033	0	0	0	0	0	0 ^③	—	—
PF6046	0	0	5	0,7	10	0,7 ^③	—	—
PF6054 ^④	0	0	5	0,7	5	0,4	10	0,7
PF6070 ^④	0	0	5	0,7	10	0,7	10	0,7 ^⑤
PF6080 ^④	5	0,4	5	0,7	10	0,7	15	1,0 ^⑥
MECHANICAL VARIABLE DELIVERY:								
PV4018	0	0	5	0,7	5	0,4	10	0,7
PV4026	0	0	5	0,7	5	0,4	10	0,7
PV4033	0	0	5	0,7	5	0,4	10	0,7 ^②
PRESSURE COMPENSATED MECHANICAL VARIABLE DELIVERY ^③ :								
PV4020	5	0,4	5	0,4	10	0,7	—	—
PV4026	5	0,4	5	0,4	10	0,7	—	—
PV4033	5	0,4	5	0,4	10	0,7	—	—
PV6046	3	0,2	5	0,4	5	0,4	—	—
PV6054	3	0,2	5	0,4	5	0,4	—	—
HYDRAULIC VARIABLE DELIVERY:								
PV6054	0	0	5	0,4	5	0,4	10	0,7
PV6070	0	0	5	0,4	10	0,7	10	0,7 ^⑤
PV6080	5	0,4	5	0,4	10	0,7	15	1,0 ^⑥

① Inlet pressures higher than 10 psig (0,7 bar) require a high pressure shaft seal.

② 10 psig (0,7 bar) at 2100 rpm maximum speed.

③ Maximum speed is 1800 rpm.

④ Auxiliary inlet port should be pressurized at same level as main inlet.

⑤ 10 psig (0,7 bar) at 2300 rpm maximum speed.

⑥ 15 psig (1,0 bar) at 2200 rpm maximum speed.

FLUID SPECIFICATIONS

Specification	Fluid Grade	
	Summer ^①	Winter ^②
Viscosity at 100° F (37,8° C):	150-300 SUS (38,3-64,9 cSt)	75-200 SUS (14,4-43,1 cSt)
Viscosity at 210° F (98,9° C):	43 SUS (5,2 cSt) Minimum	43 SUS (5,2 cSt) Minimum
Pour Point, Typical:	0° F (-17,8° C)	-40° F (-40° C) or Less
Viscosity Index	95 Minimum	95 Minimum

① Warm Weather Grade, Above +40° F (4,4° C)

② Cold Weather Grade, Below +40° F (4,4° C)