

Model 2DX20ES Shown  
Electric motor must be purchased separately.

## FEATURES

- Triplex plunger design provides a smooth liquid flow.
- Specially formulated Hi-Pressure Seals and concentric solid ceramic plungers assure true wear surface and extended seal life.
- Stacked stainless steel valve design for long life and easy servicing.
- Ultimate compact, direct-drive unit for maximum portability.
- Integral Regulating Unloader with built-in by-pass standard on all units to assure system pressure control and pump protection.

## COMMON SPECIFICATIONS

Inlet Pressure Range.....	Flooded to 60 psi	(Flooded to 4 bar)
Bore .....	0.630"	(16 mm)
Max. Liquid Temperature .....	140°F	(60°C)
Above 130°F call CAT PUMPS for inlet conditions and elastomer recommendations.		
Crankcase Capacity.....	8.5 oz.	(0.25 l)
Inlet Ports (1).....	3/4" GH	(3/4" GH)
Discharge Port (1).....	3/8" NPTM	(3/8" NPTM)
Chemical Injection Barb.....	8/32" UNF	(8/32" UNF)
Weight.....	10.7 lbs.	(4.9 kg)
Dimensions.....	7.99 x 7.75 x 6.29"	(203 x 197 x 160 mm)

### ⚠ CAUTIONS AND WARNINGS

All High Pressure Systems require a primary pressure regulating device (i.e. regulator, unloader) and a secondary pressure relief device (i.e. pop-off valve, relief valve). Failure to install such relief devices could result in personal injury or damage to pump or property. CAT PUMPS does not assume any liability or responsibility for the operation of a customer's high pressure system.

Read all CAUTIONS and WARNINGS before commencing service or operation of any high pressure system. The CAUTIONS and WARNINGS are included in each service manual and with each Accessory Data sheet. CAUTIONS and WARNINGS can also be viewed online at [www.catpumps.com/cautions-warnings](http://www.catpumps.com/cautions-warnings) or can be requested directly from CAT PUMPS.

### WARRANTY

View the Limited Warranty on-line at [www.catpumps.com/warranty](http://www.catpumps.com/warranty).

## Direct-Drive Plunger Pumps

### Electric Models

**2DX15ES**

**2DX20ES**

**2DX27ES**

**2DX30ES**

### SPECIFICATIONS

	U.S. Measure	Metric Measure
<b>Model 2DX15ES</b>		
Flow .....	1.5 gpm	(5.7 lpm)
Max. Discharge Pressure.....	2000 psi	(140 bar)
Stroke.....	0.118"	(3.0 mm)
Shaft Diameter .....	5/8"	(15.8 mm)
<b>Model 2DX20ES</b>		
Flow .....	2.0 gpm	(7.6 lpm)
Max. Discharge Pressure.....	2000 psi	(140 bar)
Stroke.....	0.157"	(4.0 mm)
Shaft Diameter .....	5/8"	(15.8 mm)
<b>Model 2DX27ES</b>		
Flow .....	2.7 gpm	(10.2 lpm)
Max. Discharge Pressure.....	2000 psi	(140 bar)
Stroke.....	0.220"	(5.6 mm)
Shaft Diameter .....	5/8"	(15.8 mm)
<b>Model 2DX30ES</b>		
Flow .....	3.0 gpm	(11.4 l/m)
Max. Discharge Pressure.....	1500 psi	(105 bar)
Stroke.....	0.244"	(6.2 mm)
Shaft Diameter .....	5/8"	(15.8 mm)

### ELECTRIC HORSEPOWER REQUIREMENTS

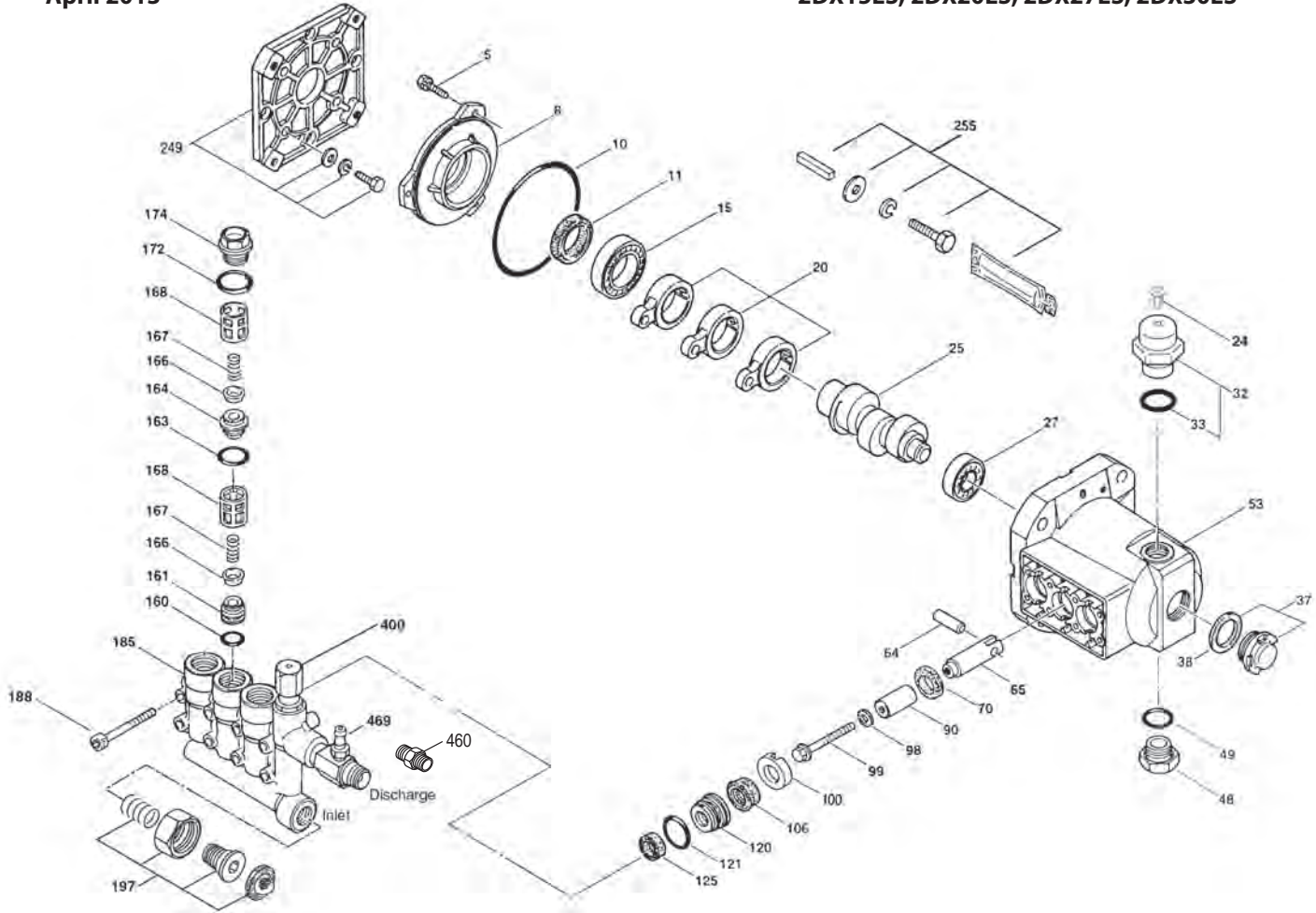
MODELS	FLOW		PRESSURE				RPM
			psi	psi	psi	psi	
	U.S. gpm	lpm	1000	1200	1500	2000	
2DX15ES	1.5	5.7	1.03	1.23	1.54	2.05	3450
2DX20ES	2.0	7.6	1.37	1.64	2.05	2.74	3450
2DX27ES	2.7	10.2	1.85	2.22	2.77	3.70	3450
2DX30ES	3.0	11.4	2.05	2.46	3.08	N/A	3450

<b>DETERMINING THE PUMP R.P.M.</b>	Rated gpm	=	"Desired" gpm
	Rated rpm	=	"Desired" rpm
<b>DETERMINING THE REQUIRED H.P.</b>	gpm x psi	=	Electric Brake
	1460	=	H. P. Required

Note: Consult engine manufacturer when using gas or diesel engine. Refer to pump **Service Manual** for repair procedure and additional technical information.

# EXPLODED VIEW

April 2013



# PLUNGER PUMP MODELS

2DX15ES, 2DX20ES, 2DX27ES, 2DX30ES

## PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	QTY	ITEM	P/N	MATL	DESCRIPTION	QTY
5	549360	STCP R	Screw, HH (M6x14) [04/05]	3	100	46233	D	Retainer, Seal	3
8	547153	AL	Cover, Bearing [04/05]	1	106	48222	NBR	Seal, LPS w/S-Spg - 85D	3
10	14041	NBR	O-Ring, Bearing Cover - 70D	1	120	547357	BB	Case, Seal [02/03]	3
11	55337	NBR	Seal, Oil - 70D	1	121	13976	NBR	O-Ring, Seal Case - 70D	3
15	14488	STL	Bearing, Ball - Inner	1	125	46240	NBR	Seal, HPS w/S	3
20	547048	TNM	Rod, Connecting	3	160	13965	NBR	O-Ring, Seat, Inlet - 70D	3
24	76045	LDPE	Plug, Oil Cap (Remove Before Startup)	1	161	545177	S	Seat, Inlet	3
25	<b>545144</b>	<b>CM</b>	Crankshaft, 3450 RPM, 5/8", 2.0 mm, 2DX15ES	1	163	19285	NBR	O-Ring, Seat, Discharge - 70D	3
	<b>545765</b>	<b>CM</b>	Crankshaft, 3450 RPM, 5/8", 4.0 mm, 2DX20ES	1	164	545178	S	Seat, Discharge	3
	<b>545145</b>	<b>CM</b>	Crankshaft, 3450 RPM, 5/8", 5.6 mm, 2DX27ES	1	166	46764	S	Valve	6
	<b>549901</b>	<b>CM</b>	Crankshaft, 3450 RPM, 5/8", 6.2 mm, 2DX30ES	1	167	46865	S	Spring	6
27	13832	STL	Bearing, Ball - Outer	1	168	543988	PVDF	Retainer, Spring	6
32	547961	RTP	Cap, Oil Filler w/O-Ring [01/04]	1	172	142807	NBR	O-Ring, Plug - 90D	3
33	14179	NBR	O-Ring, Oil Filler Cap - 70D	1	174	46759	BB	Plug, Valve (M20x1.5)	3
37	92241	—	Gauge, Bubble Oil w/Gasket	1		35759	BB	Plug, Valve w/1/4" NPT Port	1
38	44428	NBR	Gasket, Flat Flex, Oil Gauge - 80D	1	185	49523	BB	Head, Manifold w/Integral Unloader Body	1
48	44842	NY	Plug, Drain	1	188	549357	STCP R	Screw, HSH (M6x60)	8
49	14179	NBR	O-Ring, Drain Plug - 70D	1	197	941516	BB	Assy, GH, 3/8" NPTF	1
53	542407	AL	Crankcase [02/05]	1	249	30520	—	Assy, Adapter Mount, Standard, GAS	1
64	46229	CM	Pin, Crosshead	3	255	30516	STZP R	Assy, Bolt Mount, ELECTRIC/GAS	1
65	542402	BB	Rod, Plunger	3	300	33053	NBR	Kit, Seal (Incls: 98, 106, 121, 125)	1
70	47215	NBR	Seal, Oil - 70D	3	310	33057	NBR	Kit, Valve (Incls: 160, 161, 163, 164, 166, 167, 168, 172)	1
90	542403	CC	Plunger (M16x27)	3	400	—	—	Unloader, Integral (See Individual Parts)	1
98	46730	NBR	Washer, Seal - 90D	3	460	107681	BB	Fitting, Discharge (2DX15ES, 27ES, 30ES)	1
99	542405	S	Retainer, Plunger (M6x35)	3	469	—	—	Injector, Chemical (2DX20ES)	1

*Italics are optional items. [ ] Date of latest production change. R Components comply with RoHS Directive.*

See Tech Bulletins 002, 024, 036, 043, 055, 074, 083, 086 and 094 for additional information.

MATERIAL CODES (Not Part of Part Number): AL=Aluminum BB=Brass CC=Ceramic CM=Chrome-moly

D=Acetal LDPE=Low Density Polyethylene NBR=Medium Nitrile (Buna-N) NY=Nylon PVDF=Polyvinylidene Fluoride

RTP=Reinforced Composite S=304SS STL=Steel STCP=Steel/Chrome Plated STZP=Steel/Zinc Plated TNM=Special High Strength

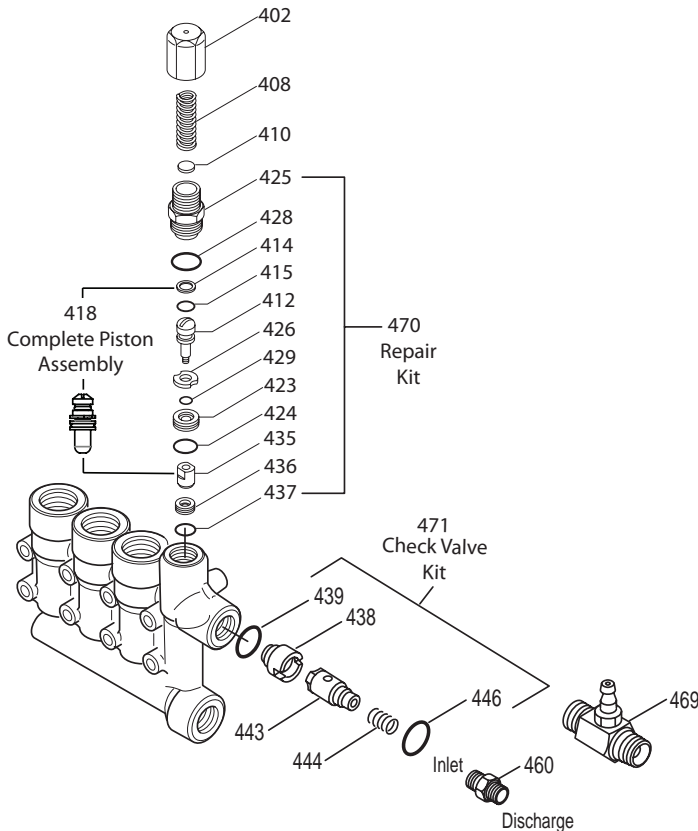
**NOTE:** Discard Key which may come standard with most motors and engines and **use only the key included in this kit.**

Center raised pilot guide on the **Adapter Plate** assures proper alignment of pump and engine. Before mounting pump onto engine inspect engine for **recessed seal and bearing guide** to permit adapter to completely seat into recess and four bosses to be flush with engine face.

# INTEGRAL UNLOADER

## SPECIFICATIONS

	U.S. Measure	Metric Measure
Flow.....	3.1 gpm	(11.7 lpm)
PSI Range.....	100-2000 psi	(7-140 bar)
Inlet Port .....	3/4" GHF	(3/4" GHF)
Discharge Port .....	M18x1.0	(M18x1.0)



## PARTS LIST

ITEM	PN	MATL	DESCRIPTION	QTY
401	32088	NY	Handle, Adjustable (Not Shown)	1
402	46570	BB	Cap, Adjusting	1
408	33394	STZP R	Spring, Pressure	1
410	549352	STCP	Retainer, Spring	1
412	46251	BB	Stem, Piston	1
414	28338	PTFE	Back-up-Ring, Piston Stem	1
415	22056	NBR	O-Ring, Piston Stem - 70D	1
418	—	—	Assy, Piston Included In Repair Kit	1
423	46249	BB	Retainer, Valve	1
424	13966	NBR	O-Ring, Valve Retainer (Outer) - 70D	1
425	46248	BB	Retainer, Piston	1
426	46250	S	Washer	1
428	13969	NBR	O-Ring, Piston Retainer - 70D	1
429	17399	NBR	O-Ring, Valve Retainer (Inner) - 80D	1
435	548193	S	Valve	1
436	46253	S	Seat	1
437	13963	NBR	O-Ring, Seat - 70D	1
439	13963	NBR	O-Ring, Seat, Check Valve - 70D	1
438	46254	NY	Seat, Check Valve	1
443	541060	BB	Valve, Check w/O-Ring	1
444	45924	S	Spring	1
446	13969	NBR	O-Ring, Body - 70D	1
460	107681	BB	Fitting, Discharge (3/8" NPTM)	1
468	33099	NBR	Kit, O-Ring (Incls: 414,415,428,429,431,441)	1
469	7231	BB	Injector, Chemical Fixed, 2DX20ES	1
470	31088	NBR	Kit, Repair (Incls: 412,431,436,441)	1
471	†76146	NBR	Kit, Check Valve (Incls: 438,439,443,444,446)	1

*Italics are optional items.* R Components comply with RoHS Directive.

† Production parts are different than repair parts.

NOTE: If check valve is removed, unloader becomes a regulator.

MATERIAL CODES (Not Part of Part Number): BB=Brass NBR=Medium Nitrile (Buna-N)

NY=Nylon PTFE=Pure Polytetrafluoroethylene S=304SS

STCP=Steel/Chrome Plated STZP=Steel/Zinc Plated

# UNLOADER TYPE

An integral unloader with built-in by-pass is part of the discharge manifold to provide system pressure regulation and pump protection. This pump also includes a fixed chemical injector for chemical application.

## OPERATION:

Pump should be purged of air before commencing with operation. Liquid must flow through the pump without discharge restriction to assure full system pressure is reached

Install a pressure gauge close to the manifold head of the pump to assist in setting system pressure and to periodically monitor system pressure.

Setting and adjusting the unloader pressure must be done with the system turned on. Start the system with the unloader backed off to the lowest pressure setting (counterclockwise direction). Squeeze the trigger and read the pressure on the gauge at the pump. Do not read pressure at the gun or nozzle. If more pressure is desired, release the trigger, turn adjusting cap one quarter turn in a clockwise direction. Squeeze the trigger and read the pressure. Repeat this process until the desired system pressure is reached.

**NOTE:** Pressure is not set at the factory.

## SERVICE:

The unloader should be serviced on the same schedule as the seals in the pump. Refer to 2DX Service Manual for start-up, servicing of seals and valves, torque requirements and diagnosis and maintenance chart.

# FIXED CHEMICAL INJECTOR

## SPECIFICATIONS

	U.S. Measure	Metric Measure
<b>Model 7231</b>		
GPM.....	2.0 gpm	(7.6 lpm)
Nozzle Orifice.....	1.8 mm	(1.8 mm)

## COMMON SPECIFICATIONS

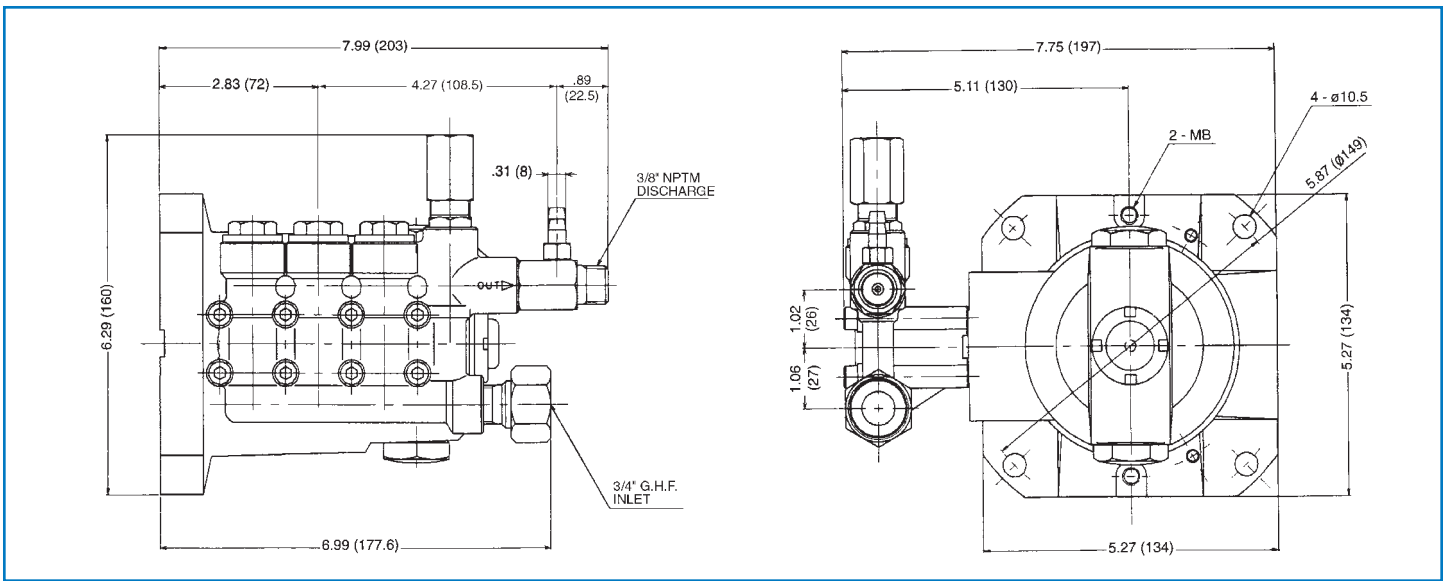
Hose Barb.....	1/4"	(1/4")
Tapped Barb.....	8/32" UNF	(8/32" UNF)
Inlet Port.....	M18x1.0	(M18x1.0)
Discharge Port .....	3/8" NPTM	(3/8" NPTM)
Weight.....	5.3 oz.	(0.15 kg)
Dimensions.....	2 x 1 x 1.75"	(52 x 25 x 45 mm)

### CHEMICAL INJECTOR PERFORMANCE CHART Optional Special Ported Chemical Injector for Unloader Mounting

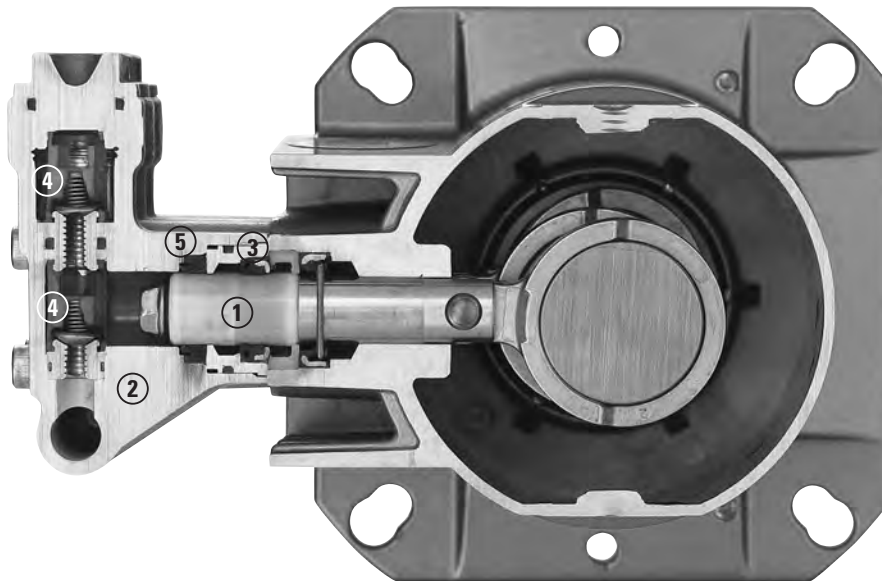
Standard Pump Model	Injector Orifice Size	Injector Model	Lo-Pressure Nozzle Rating (Max. Downstream) (Press for Injector)	Max. Chem. Draw (0 PSI) (Downstream)	Hi-Press Nozzle "Deduction" (Press drop across Inj.)
2DX20ES	1.8 mm	7231	100 psi	52 oz/min	100 psi

Optimum performance of chemical injector occurs with a 35 ft. high pressure hose and a minimum 3/8" I.D. The type of hose, extended lengths, reduced I.D. and fittings may create back pressures in excess of the low pressure nozzle rating and prevent the injector from drawing chemical. See Hose Friction Loss Chart in Service Manual. **Deduct hose friction loss from above low psi Nozzle. Consult Cat Pumps for assistance with other options.**

**CAUTION:** Deduct the pressure drop shown in the performance chart from your desired system pressure to arrive at the maximum high pressure nozzle rating. This is essential to avoid over-pressurizing the pump.



Models 2DX15ES, 2DX20ES, 2DX27ES, 2DX30ES



- 1 Special, concentric, high-density, polished solid ceramic **plungers** provide a true wear surface and extended seal life.
- 2 High tensile strength, forged brass **manifold head** with built-in integral unloader and eight mounting screws for exceptional strength.
- 3 100% wet **seal** design adds to service life by allowing pumped liquids to cool and lubricate on both sides.
- 4 Stacked **valve assemblies** include stainless steel valves, seats and springs to provide corrosion-resistance, ultimate seating and extended life.
- 5 Unique design and specially formulated **Hi-Pressure Seals** offer unmatched performance and seal life.



**CAT PUMPS**  
 1681 - 94TH LANE N.E. MINNEAPOLIS, MN 55449-4324  
 PHONE (763) 780-5440 — FAX (763) 780-2958  
 e-mail: techsupport@catpumps.com  
 www.catpumps.com