



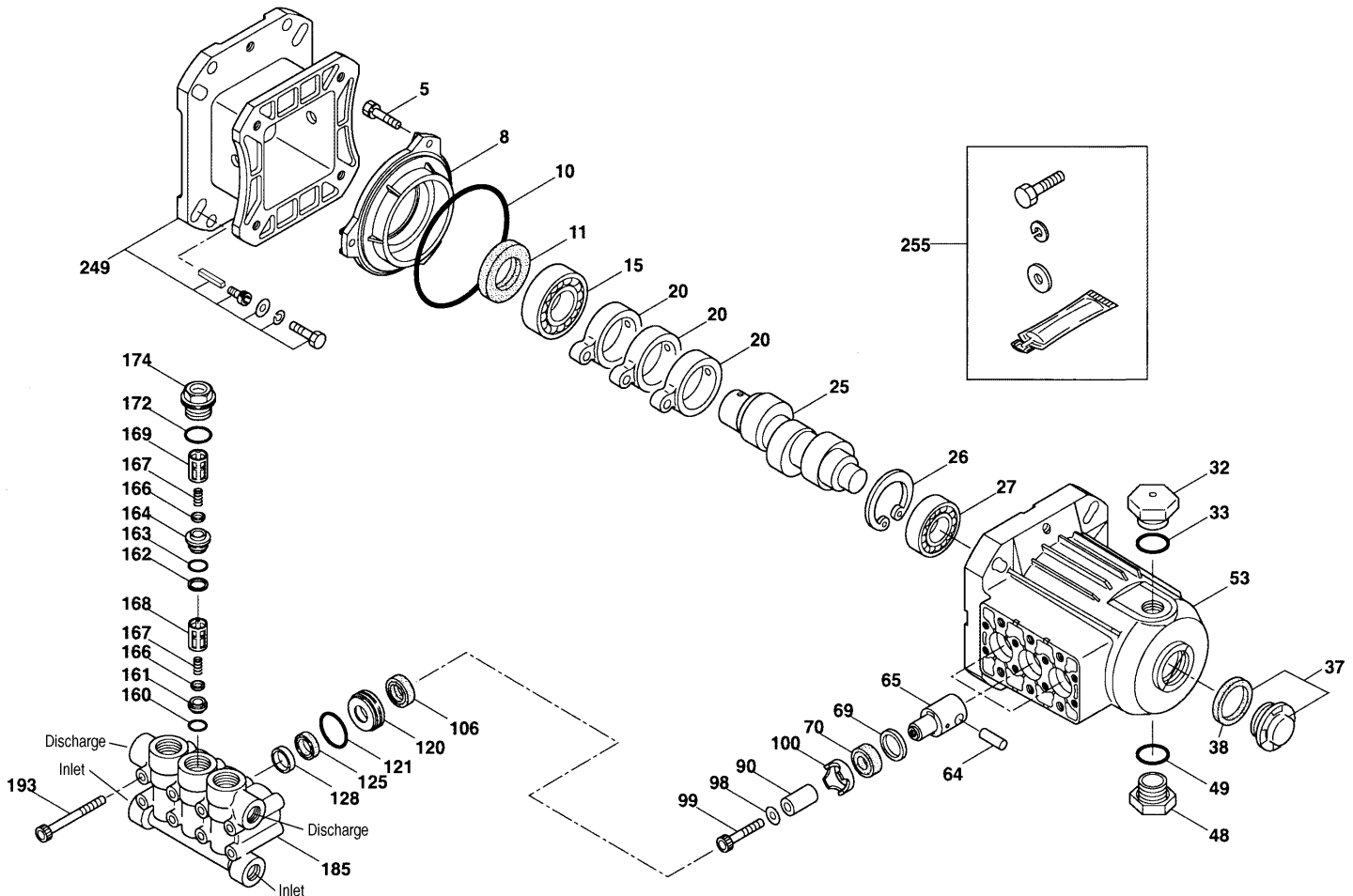
# EXPLODED VIEW

June 2003

# 3SP PLUNGER PUMPS

Electric Model: 3SP35GEI

Gas Model: 3SP30G1I



## PARTS LIST

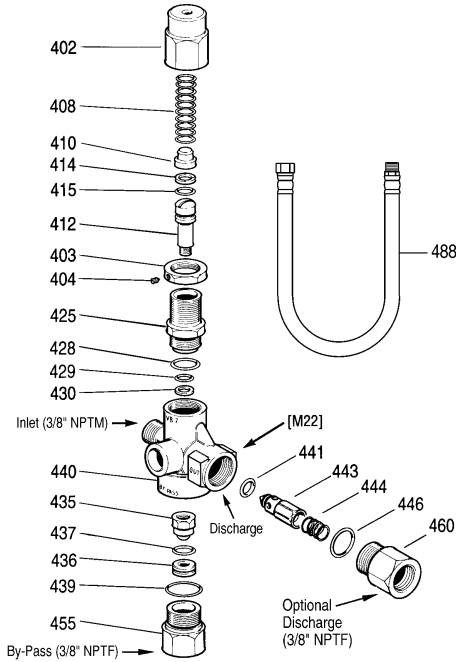
ITEM	P/N	MATL	DESCRIPTION	QTY	ITEM	P/N	MATL	DESCRIPTION	QTY	
5	547161	STCP	Screw, HH (M6X14)	3	162	48361	D	Back-up-Ring, Discharge Seat	3	
8	547084	AL	Cover, Bearing	1	163	43358	NBR	O-Ring, Discharge Seat - 70D	3	
10	14041	NBR	O-Ring, Bearing Cover - 70D	1	164	547076	S	Seat, Discharge	3	
11	46419	NBR	Seal, Oil - 70D	1	166	547098	S	Valve	6	
15	547112	STL	Bearing, Ball, Inner	1	167	46865	S	Spring	6	
20	547020	TNM	Rod, Connecting Assy	3	168	543988	PVDF	Retainer, Spring, Inlet	3	
25	547136	FCM	Crankshaft, 3400 RPM, 1", 8.0 mm	1	169	547441	PVDF	Retainer, Spring, Discharge	3	
	547148	FCM	Crankshaft, 3450 RPM, 3/4", 8.8 mm	1	172	142807	NBR	O-Ring, Valve Plug - 90D	3	
26	12385	STL	Ring, Retaining	1	174	547078	BB	Plug, Valve	3	
27	15710	STL	Bearing, Ball, Outer	1	185	546962	FBB	Head, Manifold	1	
32	45690	RTP	Cap, Oil Filler	1	193	542406	STZP	Screw, HSH (M6x60)	8	
33	14179	NBR	O-Ring, Oil Filler Cap - 70D	1	249	31643	—	Mount, Adapter Assy, Gas	1	
37	92241		Gauge, Oil, Bubble w/Gasket - 80D	1		547085	AL	Flange, Adpater	1	
38	44428	NBR	Gasket, Flat, Oil Gauge - 80D	1		817033	STCP	Screw, Hex (M8x35)	4	
48	44842	NY	Plug, Drain	1		45217	STL	Key (1/4"x1/4"x2-1/2")	1	
49	14179	NBR	O-Ring, Drain Plug - 70D	1		87788	STZP	Screw, Set (M5x8)	1	
53	547111	AL	Crankcase	1	249	31657	—	Mount, Adapter Assy, Electric	1	
64	16948	CM	Pin, Crosshead	3		547085	AL	Flange, Adpater	1	
65	547081	SZZ	Rod, Plunger	3		817033	STCP	Screw, Hex (M8x35)	4	
69	20017	STZP	Washer, Oil Seal	3		547162	STL	Key (3/16"x3/16"x1-1/2")	1	
70	25301	NBR	Seal, Oil - 80D	3		547164	STZP	Screw, Set (M4x10)	1	
90	547091	CC	Plunger (M14x25.5)	3	255	30514	STZP	Mount, Bolt Assy, Electric/Gas	1	
98	547092	CU	Gasket, Plunger Retainer	3		30980	STZP	Washer, Flat (3/8")	4	
99	547102	S	Retainer, Plunger (M6x35)	3		30921	STCP	Lockwasher (3/8")	4	
100	44869	PVDF	Retainer, Seal	3		34100	STZP	Screw (3/8"-16x1-3/8")	4	
106	45188	NBR	Seal, LPS w/S-SPG	3		6106	—	Lubricant, Anitseize	1	
120	547093	BB	Case, Seal	3	300	31644	NBR	Kit, Seal (Incls: 98,106,121,125,128)	1	
121	547103	NBR	O-Ring, Seal Case - 70D	3	310	31647	NBR	Kit, Valve (Incls: 160,161,162,163,164,166,167,168,169,172)	1	
125	547082	SNG	V-Packing	3		400	7627	BB	Unloader w/Chemical Injector	1
128	547083	PVDF	Adapter, Male	3		—	8070	Motor, 6.5 HP, 1 PH, 3/4", 3450 RPM	1	
160	17428	NBR	O-Ring, Inlet Seat - 80D	3						
161	547077	S	Seat, Inlet	3						

*Italics are optional items. See Tech Bulletins 002, 024, 036, 043, 055, 074 and 083 for additional information.*

MATERIAL CODES (Not Part of Part Number): AL=Aluminum BB=Brass CC=Ceramic CM=Chrome-Moly CU=Copper D=Delrin® FBB=Forged Brass  
 FCM=Forged Chrome-Moly NBR=Medium Nitrile (Buna-N) NY=Nylon PVDF=Fluoroplastic (High Strength) RTP=Reinforced Composite S=304SS  
 SNG=Special Blend (Buna) STCP=Steel/Chrome Plated STL=Steel STZP=Steel/Zinc Plated SZZ=304SS/Zamak 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.

## 7627 UNLOADER WITH INJECTOR

Specifications	U.S. Measure	Metric Measure
GPM .....	0.5-7.8 GPM	(1.9-29.5 L/M)
PSI Range .....	100-3145 PSI	(7-220 BAR)
Inlet Port .....	3/8" NPTM	(3/8" NPTM)
By-Pass Port .....	3/8" NPTF	3/8" NPTF
Discharge Port .....	M22x1.5	(M22x1.5)
Weight .....	20.8 oz.	(0.59 kg)
Dimensions .....	3.2 x 1.5 x 4.7"	(81 x 38 x 119.4 mm)



### PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	QTY.
402	33859	BB	Cap, Adjusting	1
403	33857	BB	Nut, Locking (M18x1)	1
404	33061	STZP	Screw, Set (M4x4)	1
408	32094	STZP	Spring (Silver)	1
410	32819	STZP	Spring, Guide	1
412	33860	S	Stem, Valve	1
414	—	PTFE	Back-up-Ring, Stem	1
415	—	NBR	O-Ring, Stem	1
425	33861	BB	Retainer, Piston	1
428	33043	NBR	O-Ring, Retainer	1
429	—	NBR	O-Ring, Stem	1
430	—	PTFE	Back-up-Ring, Stem	1
435	33853	SSS	Valve and Ball Assembly	1
436	33806	NBR	Seat w/O-Ring	1
437	—	NBR	O-Ring, Seat - 85D	1
439	—	NBR	O-Ring, By-pass Fitting - 85D	1
440	—	BB	Body, Valve	1
441	—	NBR	O-Ring, Flow Balancer	1
443	33852	BB	Valve, Check	1
444	33843	S	Spring, Valve, Check	1
446	—	NBR	O-Ring, Discharge Fitting	1
455	—	BB	Fitting, By-pass (3/8" NPTF)	1
460	33855	BB	Fitting, Discharge (3/8" NPTF)	1
468	33098	NBR	Kit, O-Ring (Incls: 414, 415, 428, 429, 430, 437, 439, 441, 446)	1
488	7099	BB	By-Pass Hose, 15" 3/8", 300 PSI	1

*Italics are optional items.*

MATERIAL CODES (Not Part of Part Number): BB=Brass NBR=Medium Nitrile (Buna-N)  
PTFE=Pure Teflon® S=304SS SSS=416SS STZP=Steel/Zinc Plated

### INSTALLATION:

A Regulating Unloader with Chemical Injector and By-Pass Hose comes with each 3SP pump to provide system pressure regulation, pump protection and metered chemical application. The Unloader is mounted directly onto the pump.

### OPERATION:

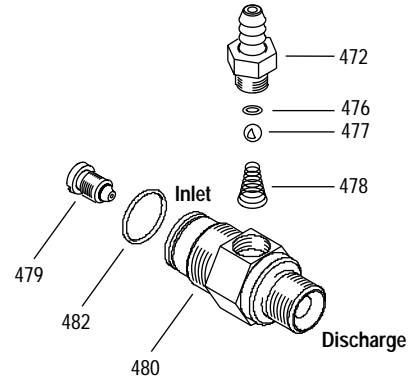
Set the unloader while the high pressure system is turned on. Adjust in small increments until the desired system pressure is reached. Install a pressure gauge to check pressure during start-up and periodically during operation.

If unit is infrequently used or periodically stored, seals and O-Rings may become dry. Check seals and O-Rings before commencing operation.

The system must be purged before operation (system liquid must flow through the pump without discharge restriction) to assure full system pressure is reached.

## 7233 FIXED CHEMICAL INJECTOR

Specifications	U.S. Measure	Metric Measure
Flow .....	2.0-3.5 GPM	(7.6-13.2 L/M)
Nozzle Orifice .....	2.1 mm	(2.1 mm)
Hose Barb, Exterior .....	1/4"	(1/4")
Hose Barb, Interior .....	8/32" UNCF	(8/32" UNCF)
Inlet Port .....	M22 x 1.5	(M22 x 1.5)
Discharge Port .....	3/8" NPTM	(3/8" NPTM)
Weight .....	6.3 oz.	(0.18 kg)
Dimensions .....	2.25 x 1.0 x 2.63"	(57 x 25 x 67 mm)



### PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	QTY.
472	33505	BB	Barb, Hose	1
476	33504	FPM	O-Ring, Retainer	1
477	34620	SS	Ball (1/4")	1
478	33501	SS	Spring	1
479	32073	SSS	Orifice, Injector (2.1 mm)	1
480	—	BB	Body-Unloader Mount	1
481	33480	BB	Fixed Barb Assembly (Incls: 472, 476, 477, 478)	1
482	13969	NBR	O-Ring, Body - 70D	1

*Italics are optional items*

MATERIAL CODES (Not Part of Part Number): BB=Brass FPM=Fluorocarbon (Viton®)  
NBR=Medium Nitrile (Buna-N) NY=Nylon SS=316SS SSS=416SS

### CHEMICAL INJECTOR PERFORMANCE CHART

Desired Pump Flow	Orifice Size	Injector Model	Maximum Injecting Pressure	Maximum Chemical Draw	Pressure Drop Across Injector At System Pressure (3000 PSI)
3.0	2.1 mm	7233	163 PSI	35.5 oz/min	200 PSI
3.5	2.1 mm	7233	200 PSI	45.6 oz/min	258 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.**

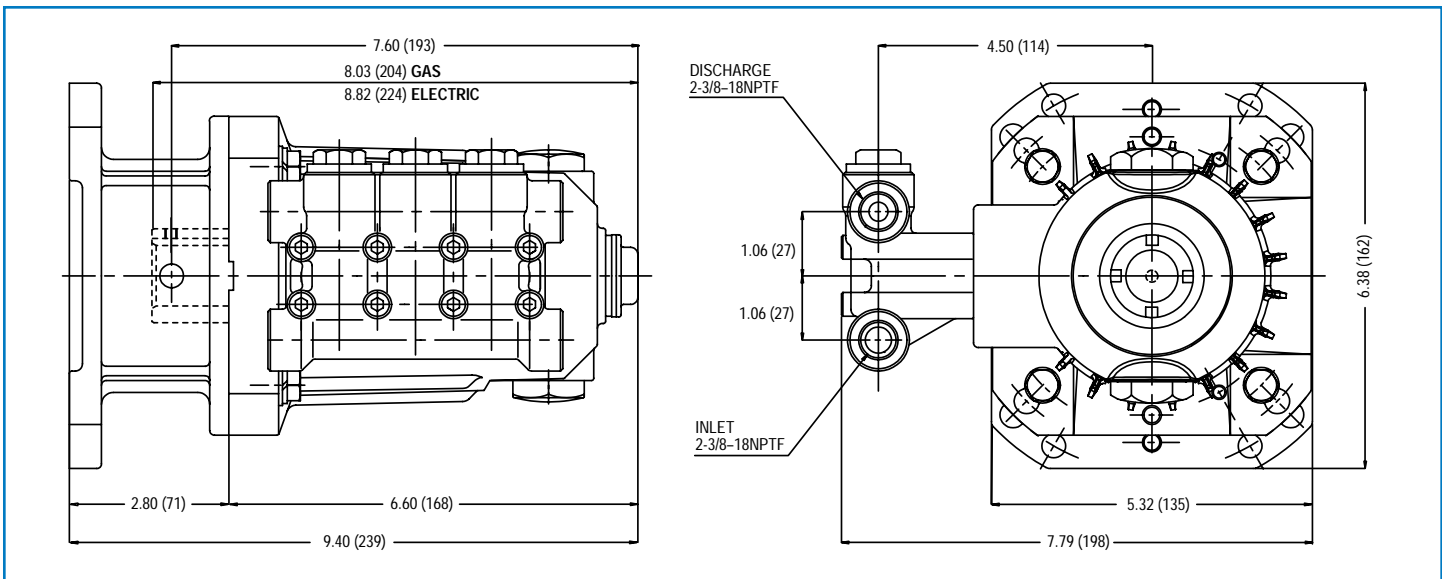
**CAUTION:** Deduct the pressure drop shown in the performance chart from your desired system pressure to arrive at the maximum high pressure nozzle rating. This is essential to avoid over-pressurizing the pump.

**NOTE:** For correct nozzle selection, **read system pressure at the pump. DO NOT READ SYSTEM PRESSURE AT THE HIGH PRESSURE GUN.** Incorrect pressure reading may result in: pump operation at excessive pressures, inconsistent chemical draw or possible damage to the pump or unloader.

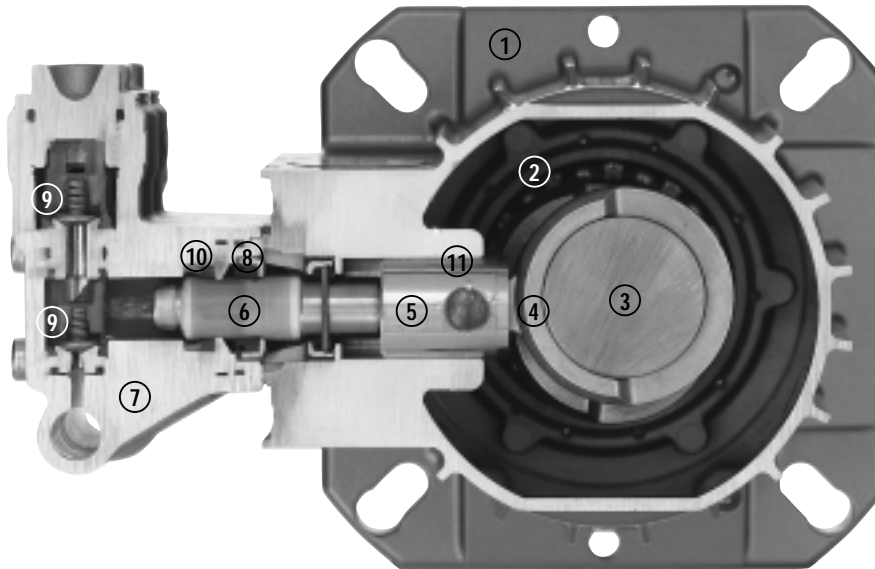
### SERVICE:

The unloader should be serviced on the same schedule as your pump. Replacing the O-Rings is generally all that is required. Lubricate the O-Rings for ease in installation and replace all O-Rings included in the kit. Examine the seating surfaces of the seat, ball and valve assembly, and valve stem and replace as needed. Check the spring and replace as needed. Examine the check valve and replace as needed. Thread the adjusting cap onto the unloader and reset system pressure.

Refer to 3SP Service Manual for start up, torque requirements, troubleshooting and servicing the seals and valves.



Model 3SP30G11, 3SP35GEI



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| <p><b>1</b> Die cast flange-style aluminum <b>crankcase</b> means high strength, lightweight, and excellent tolerance control.</p> <p><b>2</b> Heavy-duty dual crankshaft <b>bearings</b> provide extended drive-end life.</p> <p><b>3</b> Chrome-moly <b>crankshaft</b> provides unmatched strength and surface hardness for long life.</p> <p><b>4</b> High strength <b>connecting rods</b> assure durability and bearing quality.</p> | <p><b>5</b> Stainless steel <b>plunger rods</b> with chromoly crosshead pins for strength and wear resistance.</p> <p><b>6</b> Special, concentric, high-density, polished solid ceramic <b>plungers</b> are abrasion resistant and offer enhanced seal life.</p> <p><b>7</b> High tensile strength, forged brass <b>manifold head</b> with built-in modular unloader and eight mounting screws for exceptional strength.</p> <p><b>8</b> 100% wet <b>seal</b> design adds to service life by allowing pumped liquids to cool and lubricate on both sides.</p> | <p><b>9</b> Stainless steel <b>valves, seats and springs</b> provide corrosion-resistance, positive seating and long life.</p> <p><b>10</b> Unique design and specially formulated <b>Hi-Pressure Seals</b> offer unmatched performance and seal life.</p> <p><b>11</b> <b>Crossheads</b> are 360° supported for uncompromising alignment.</p> |
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Products described herein are covered by one or more of the following U.S. patents 3558244, 3652188, 3809508, 3920356, 3930756 and 5035580

**World Headquarters**  
**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

**International Inquiries**  
 FAX (763) 785-4329  
 e-mail: intlsales@catpumps.com



**CAT PUMPS (U.K.) LTD.**  
 1 Fleet Business Park, Sandy Lane, Church Crookham, Fleet  
 Hampshire GU52 8BF, England  
 Phone Fleet 44 1252-622031 — Fax 44 1252-626655  
 e-mail: sales@catpumps.co.uk

**N.V. CAT PUMPS INTERNATIONAL S.A.**  
 Heiveldekens 6A, 2550 Kontich, Belgium  
 Phone 32-3-450.71.50 — Fax 32-3-450.71.51  
 e-mail: cpi@catpumps.be www.catpumps.be

**CAT PUMPS DEUTSCHLAND GmbH**  
 Buchwiese 2, D-65510 Idstein, Germany  
 Phone 49 6126-9303 0 — Fax 49 6126-9303 33  
 e-mail: catpumps@t-online.de www.catpumps.de