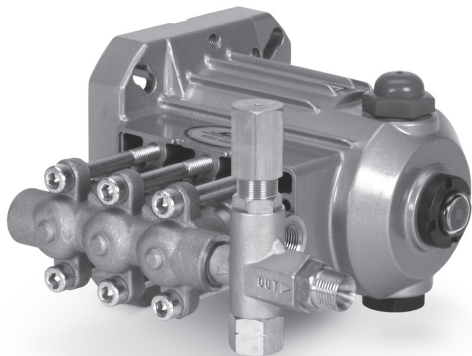


# DATA SHEET

## DIRECT DRIVE PLUNGER PUMPS



**Brass Models: 2SF09ES, 2SF11ES, 2SF13ES**



Unloader included with pump

SPECIFICATIONS	U.S. Measure	Metric Measure
<b>2SF09ES</b>		
Flow	2.4 gpm	9 lpm
Pressure Range	up to 1886 psi	up to 130 bar
Pump RPM	2800 rpm	2800 rpm
Stroke	0.18"	4.6 mm
<b>2SF11ES</b>		
Flow	2.9 gpm	11 lpm
Pressure Range	up to 130 bar	up to 130 bar
Pump RPM	2800 rpm	2800 rpm
Stroke	0.23"	5.8 mm
<b>2SF13ES</b>		
Flow	3.4 gpm	13 lpm
Pressure Range	up to 130 bar	up to 130 bar
Pump RPM	2800 rpm	2800 rpm
Stroke	0.27"	6.8 mm

### EIGENSCHAFTEN

- Your choice of motorized unit or hollow shaft pumps only for direct mounting to gas engine or electric motor.
- Includes regulating unloader to assure system pressure control and pump protection.
- Standard NBR seals with alternative options for temperature and chemical compatibility.



**PIJTERSEN**  
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 Internet: [www.pijtersen.nl](http://www.pijtersen.nl) / [www.catpumps.nl](http://www.catpumps.nl)

### COMMON SPECIFICATIONS

	U.S.	Metric
Inlet Pressure Range	1.5 to 75.4 psi	0.1 to 5.2 bar
Max. Liquid Temperature (NBR)	160°F	71°C
<b>Alternate seals available for high temperature up to 82°C (180 ° F)</b>		
Bore	0.708"	18 mm
Crankcase Capacity	10.1 oz.	0.3 l
Inlet Port (1)	3/8" NPT(F)	3/8" NPT(F)
Discharge Port (1)	3/8" NPT(F)	3/8" NPT(F)
Discharge Port (1)	3/8" NPT(M)	3/8" NPT(M)
By-pass Port (1)	1/4" NPT(F)	1/4" NPT(F)
Shaft Diameter, Hohlwelle	0.945"	24 mm
Weight (Pump Only)	10.6 lbs.	4.8 kg
Dimensions (Pump Only)	9.13 x 6.65 x 6.50"	232 x 169 x 165 mm

**DETERMINING THE PUMP R.P.M.**

$$\frac{\text{Rated gpm}}{\text{Rated rpm}} = \frac{\text{"Desired" gpm}}{\text{"Desired" rpm}}$$

**DETERMINING THE REQUIRED H.P.**

$$\text{Hp (Electric Brake)} = \frac{\text{gpm} \times \text{psi}}{1460}$$

**DETERMINING MOTOR PULLEY SIZE**

$$\frac{\text{Motor Pulley O.D.}}{\text{Pump rpm}} = \frac{\text{Pump Pulley O.D.}}{\text{Motor rpm}}$$

Refer to pump **Service Manual** for repair procedure and additional technical information.

# PARTS LIST

ITEM	PART NO.	MATL	DESCRIPTION	QTY
<b>2SF09ES, 2SF11ES, 2SF13ES</b>				
5	549360	STCP R	Screw, HH (M6x14) (See Tech Bulletin 092)	3
8	547084	AL	Cover, Bearing	1
10	14041	NBR	O-Ring, Bearing Cover - 70D (See Tech Bulletin 092)	1
11	46419	NBR	Seal, Oil	1
15	56110	STL	Bearing, Ball, Inner	1
20	547046	TNM	Rod, Connecting	3
25	<b>548584</b>	FCM	Crankshaft - 2SF09ES	1
	<b>548583</b>	FCM	Crankshaft - 2SF11ES	1
	<b>548582</b>	FCM	Crankshaft - 2SF13ES	1
26	12385	STL	Ring, Retaining	1
27	15710	STL	Bearing, Ball, Outer	1
32	547961	RTP	Cap, Oil Filler	1
33	14179	NBR	O-Ring, Oil Filler Cap - 70D	1
37	92241	—	Gauge, Bubble Oil w/Gasket - 80D	1
38	44428	NBR	Gasket, Flat Flex., Oil Gauge - 80D	1
48	44842	NY	Plug, Drain (1/2" NPT(F))	1
49	14179	NBR	O-Ring, Drain Plug - 70D	1
53	547285	AL	Crankcase (See Tech Bulletin 092)	1
64	16948	CM	Pin, Crosshead	3
65	834359	SS303	Rod, Plunger	3
69	126259	STCP R	Washer (M24)	3
70	25461	NBR	Seal, Oil	3
90	45847	CC	Plunger, Ceramic	3
100	44869	PVDF	Retainer, Seal	3
106	834378	NBR	Seal, LPS	3
110	44874	BB	Manifold, Inlet	1
125	43245	SNG	Seal, HPS w/S	3
	<i>46652</i>	<i>HT</i>	<i>Seal, HPS "Hi-Temp", 2-Pc w/S-Support</i>	<i>3</i>
	<i>76052</i>	<i>ST4</i>	<i>Seal, HPS w/S</i>	<i>3</i>
134	45854	S	Valve, Inlet	3
	33873	D	Valve, Inlet, Hi-Temp	3
135	549520	S	Spacer, Inlet	3
136	44872	S	Spring, Inlet Valve	3
137	88575	S	Washer, Conical (M6)	3
138	27000	S	Nut, Slotted (M6)	3
139	14158	S	Cotterpin (M1.6x10)	3
152	† 26089	NBR	O-Ring, Adapter Spacer, Inner - 80D	3
	<i>11377</i>	<i>FPM</i>	<i>O-Ring, Adapter Spacer, Inner - 80D</i>	<i>3</i>
	◆ 46647	EPDM	O-Ring, Adapter Spacer, Inner - 80D	3
	<i>703244</i>	<i>IPFE</i>	<i>O-Ring, Adapter Spacer, Inner</i>	<i>3</i>
157	44878	BB	Spacer, Discharge Valve	3
159	† 26089	NBR	O-Ring, Adapter Spacer, Outer - 80D	3
	<i>11377</i>	<i>FPM</i>	<i>O-Ring, Adapter Spacer, Outer - 80D</i>	<i>3</i>
	◆ 46647	EPDM	O-Ring, Adapter Spacer, Outer - 80D	3
	<i>703244</i>	<i>IPFE</i>	<i>O-Ring, Adapter Spacer, Outer</i>	<i>3</i>
164	44881	S	Seat	3
166	43723	S	Valve	3
167	541062	S	Spring	3
168	44565	PVDF	Retainer, Spring	3
185	44879	BB	Manifold, Discharge	1
188	126762	STCP R	Screw, HSH (M8x75)	6
255	30517	STZP R	Kit, Mounting Motor Bolt	1
300	34053	NBR	Kit, Seal (Incls: 106, 125, 39, 152, 159)	1
310	34052	NBR	Kit, Discharge Valve (Incls 152, 159, 164, 166, 167, 168)	1
311	34668	NBR	Kit, Inlet Valve (Incls: 134, 135, 136, 137, 139, 152, 159)	1
400	107667	—	Regulating Unloader	1
—	6107	—	Oil, Bottle (21 oz) ISO 68 Hydraulic (Fill to specified crankcase capacity prior to start-up)	1

**Bold print part numbers are unique to a particular pump model. Italics are optional items.**

◆ Silicone Oil /Grease Required. R Components comply with RoHS Directive.

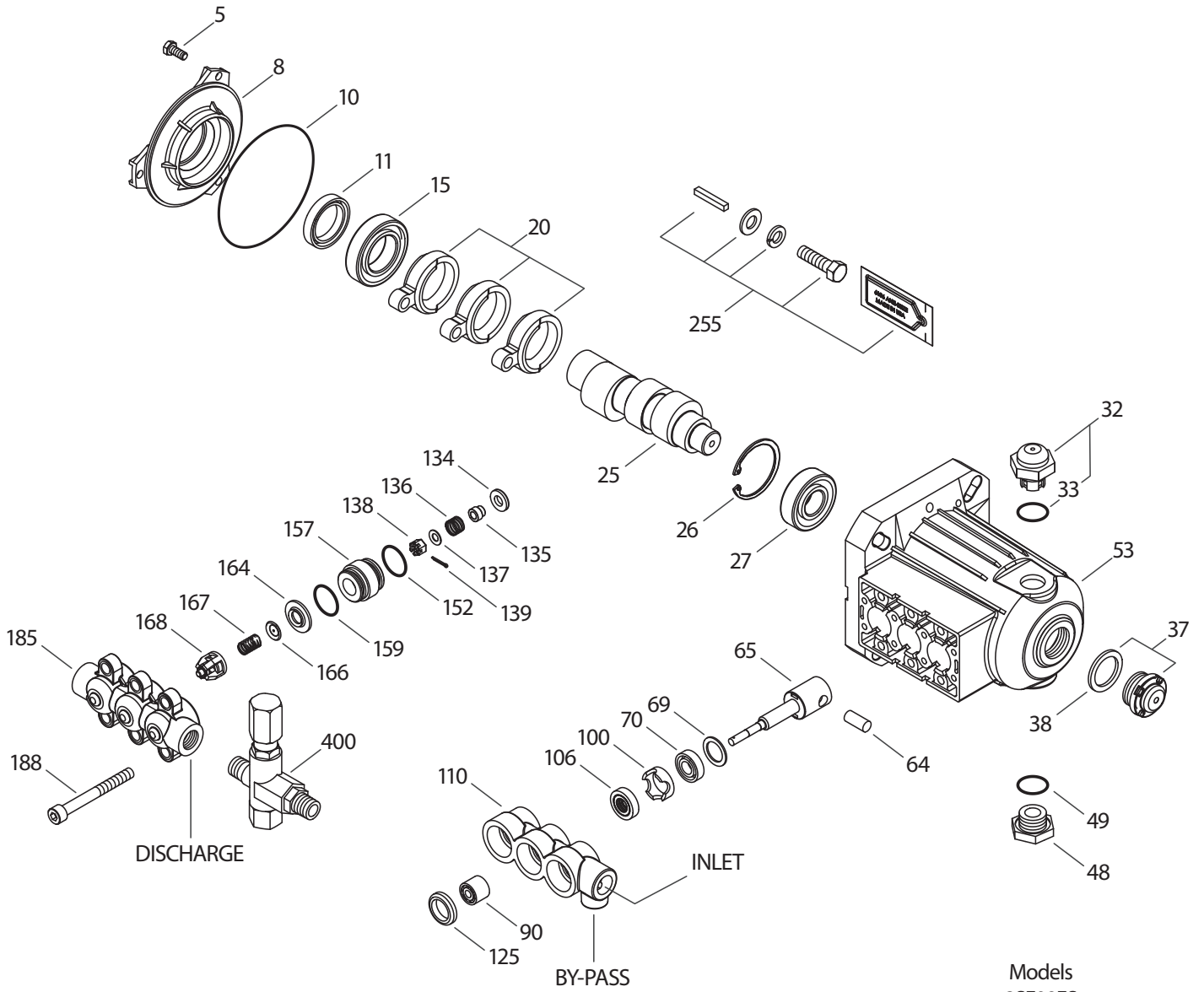
MATERIAL CODES (Not Part of Part Number): AL=Aluminum BB=Brass CC=Ceramic CM=Chrome-Moly D=Acetal EPDM=Ethylene Propylene Diene Monomer

FCM=Forged Chrome-Moly FPM=Fluorocarbon HT=Hi-Temp (EPDM Alternative) IPFE=I-Perfluoroelastomer

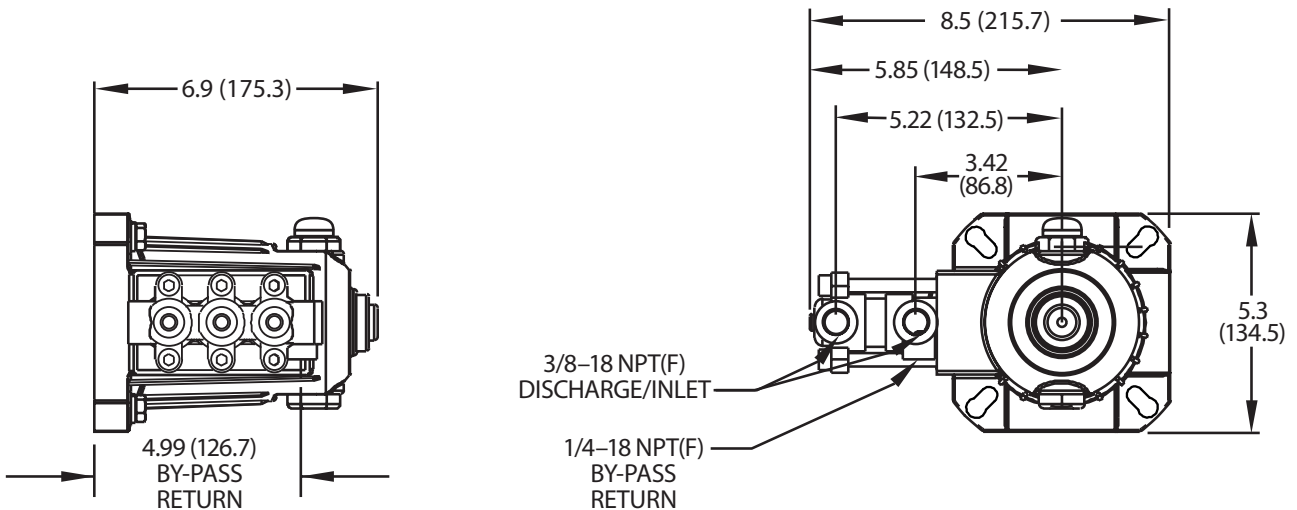
NBR=Medium Nitrile (Buna-N) NY=Nylon PTFE=Pure Polytetrafluoroethylene PVDF=Polyvinylidene Fluoride RTP=Reinforced Composite S=304SS

SNG=Special Blend (Buna) SS=316SS SS303=303SS ST4=Special PTFE 4 STL=Steel STCP=Steel/Chrome Plated STZP=Steel/Zinc Plated TNM=Special High Strength

# EXPLODED VIEW



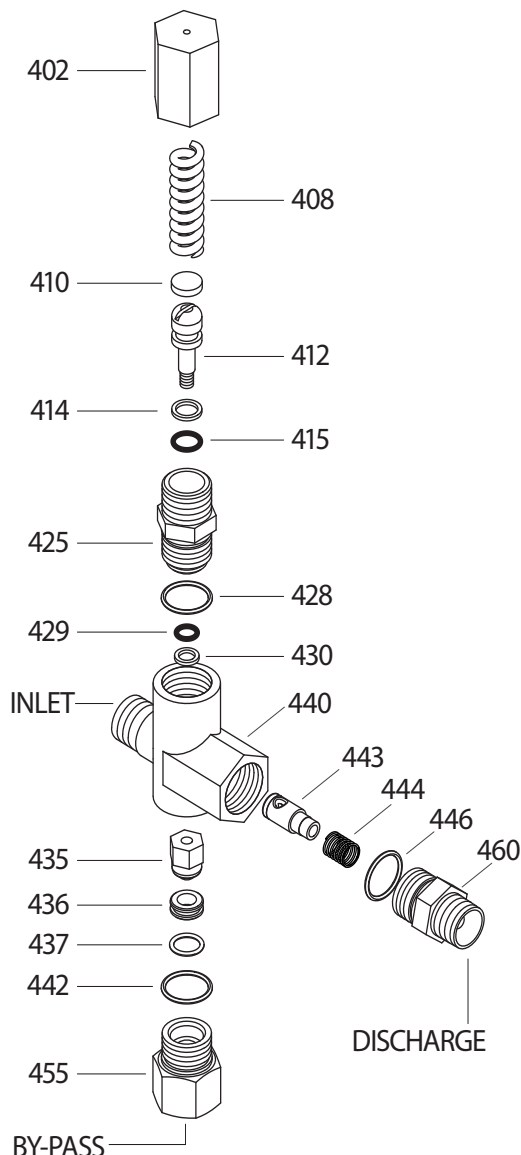
Models  
2SF09ES  
2SF11ES  
2SF13ES  
February 2021



# REGULATIG UNLOADER 107667

SPECIFICATIONS	U.S.	Metric
Flow Range	0.5 - 6.0 gpm	2 -23 lpm
Pressure Range	102 - 2031 psi	7 - 140 bar
Inlet Port	3/8" NPT(M)	3/8" NPT(M)
Discharge Port	3/8" NPT(M)	3/8" NPT(M)
By-Pass Port	3/8" NPT(F)	3/8" NPT(F)
Weight	14.4 oz.	0.41kg
Dimensions	3.0 x 1.0 x 4.25"	76.2 x 25.4 x 108 mm

ITEM	P/N	MATL	DESCRIPTION	QTY
402	540081	BB	Cap, Hex Adjusting	1
408	549124	STZP R	Spring, Pressure	1
410	549352	STCP R	Retainer, Spring	1
412	45694	S	Stem, Piston	1
414	20184	PTFE	Back-up-Ring, Piston Stem	1
415	14190	NBR	O-Ring, Piston Stem	1
	14161	FPM	O-Ring, Piston Stem	1
425	107673	BB	Retainer, Piston	1
428	13969	NBR	O-Ring, Piston Retainer	1
	14320	FPM	O-Ring, Piston Retainer	1
429	14759	NBR	O-Ring, Stem	1
	14160	FPM	O-Ring, Stem	1
430	107675	PTFE	Back-up-Ring, Piston Stem	1
435	45696	BB	Valve and Ball Assembly	1
436	107680	S	Seat	1
437	13963	NBR	O-Ring, Seat	1
	14303	FPM	O-Ring, Seat	1
440	107669	BB	Body	1
442	13969	NBR	O-Ring, By-Pass Fitting	1
	14320	FPM	O-Ring, By-Pass Fitting	1
443	541060	BB	Valve, Check w/NBR O-Ring	1
	549468	SS	Valve, Check w/FPM O-Ring	1
	831515	SS	Valve, Check w/EPDM O-Ring	1
444	45924	S	Spring, Check valve	1
446	26133	NBR	O-Ring, Discharge Fitting	1
455	45695	BB	Fitting, By-Pass [3/8" NPT(F)]	1
460	107681	BB	Fitting, Discharge [3/8" NPT(M)]	1



## INSTALLATION AND START-UP

Install a pressure gauge close to the manifold head of the pump to assist in setting system pressure and to periodically monitor system pressure. By-pass line can be directed to the ground, or to a reservoir or be redirected to the 1/4" NPT(F) port on bottom side of inlet manifold. If routing to pump inlet use a 3/8" flexible hose and thermo valve.

**NOTE:** If not using a thermo valve **DO NOT EXCEED 6 MINUTES** in by-pass.

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.

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:** By removing the check valve and spring, this unloader can function as a regulator.



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