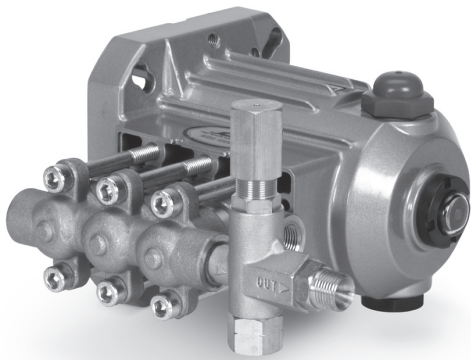


DATA SHEET

DIRECT DRIVE PLUNGER PUMPS



Brass Models: 2SF09ES, 2SF11ES, 2SF13ES



Unloader included with pump

| SPECIFICATIONS | U.S. Measure | Metric Measure |
|----------------|----------------|----------------|
| 2SF09ES | | |
| 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 |
| 2SF11ES | | |
| 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 |
| 2SF13ES | | |
| 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.

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 |
| Alternate seals available for high temperature up to 82°C (180 ° F) | | |
| 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 |
|----------------------------------|---------------|--------|---|-----|
| 2SF09ES, 2SF11ES, 2SF13ES | | | | |
| 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 | 548584 | FCM | Crankshaft - 2SF09ES | 1 |
| | 548583 | FCM | Crankshaft - 2SF11ES | 1 |
| | 548582 | 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 |
| | 46652 | HT | Seal, HPS "Hi-Temp", 2-Pc w/S-Support | 3 |
| | 76052 | ST4 | Seal, HPS w/S | 3 |
| 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 |
| | 11377 | FPM | O-Ring, Adapter Spacer, Inner - 80D | 3 |
| | ◆ 46647 | EPDM | O-Ring, Adapter Spacer, Inner - 80D | 3 |
| | 703244 | IPFE | O-Ring, Adapter Spacer, Inner | 3 |
| 157 | 44878 | BB | Spacer, Discharge Valve | 3 |
| 159 | † 26089 | NBR | O-Ring, Adapter Spacer, Outer - 80D | 3 |
| | 11377 | FPM | O-Ring, Adapter Spacer, Outer - 80D | 3 |
| | ◆ 46647 | EPDM | O-Ring, Adapter Spacer, Outer - 80D | 3 |
| | 703244 | IPFE | O-Ring, Adapter Spacer, Outer | 3 |
| 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, 139, 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 | 75005 | — | 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.

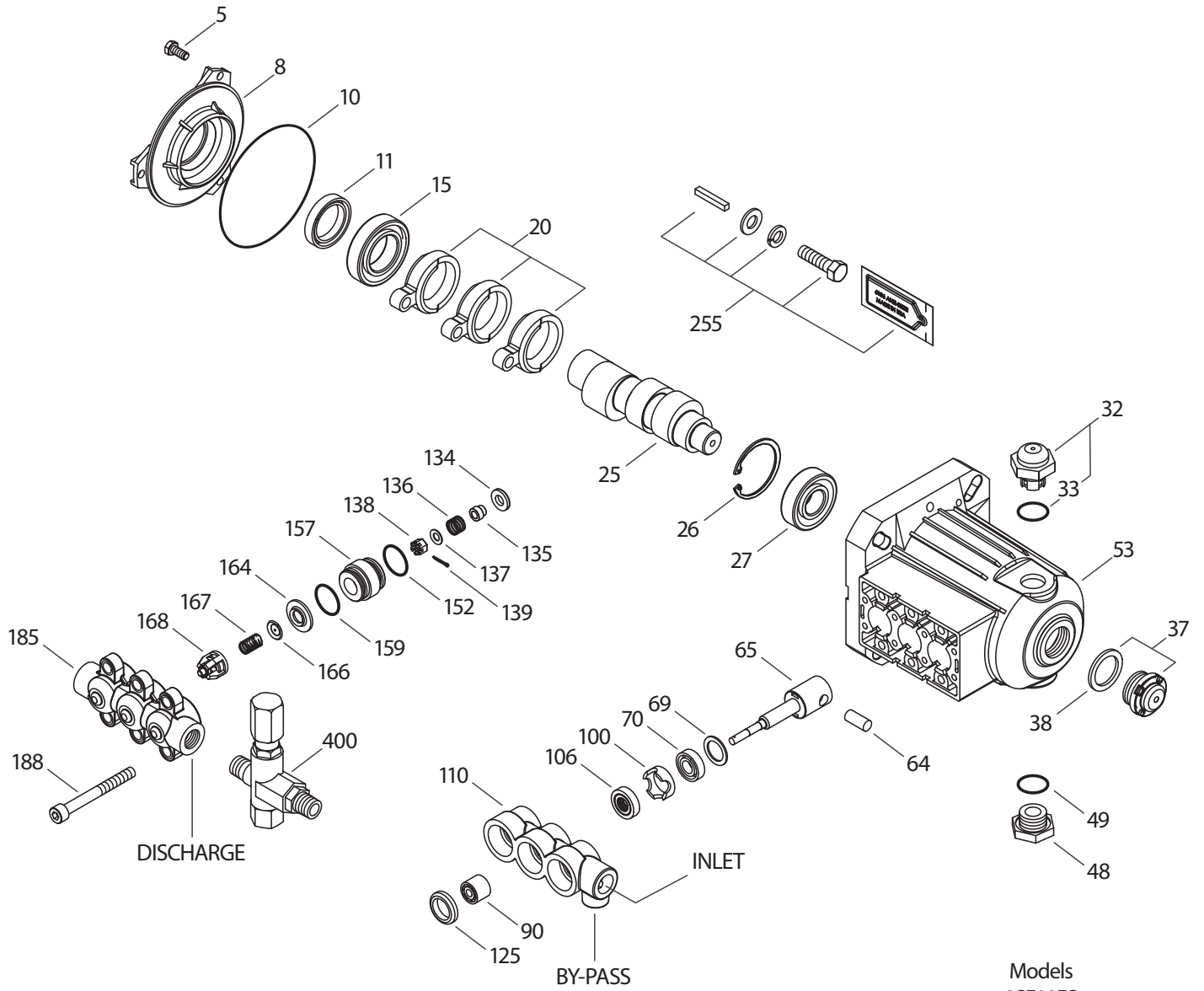
MATERIAL CODES (Not Part of Part Number): AL=Aluminum BB=Brass CC=Ceramic CM=Chrome-Moly D=Acetal EPDM=Ethylene Propylene Diene Monomer

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

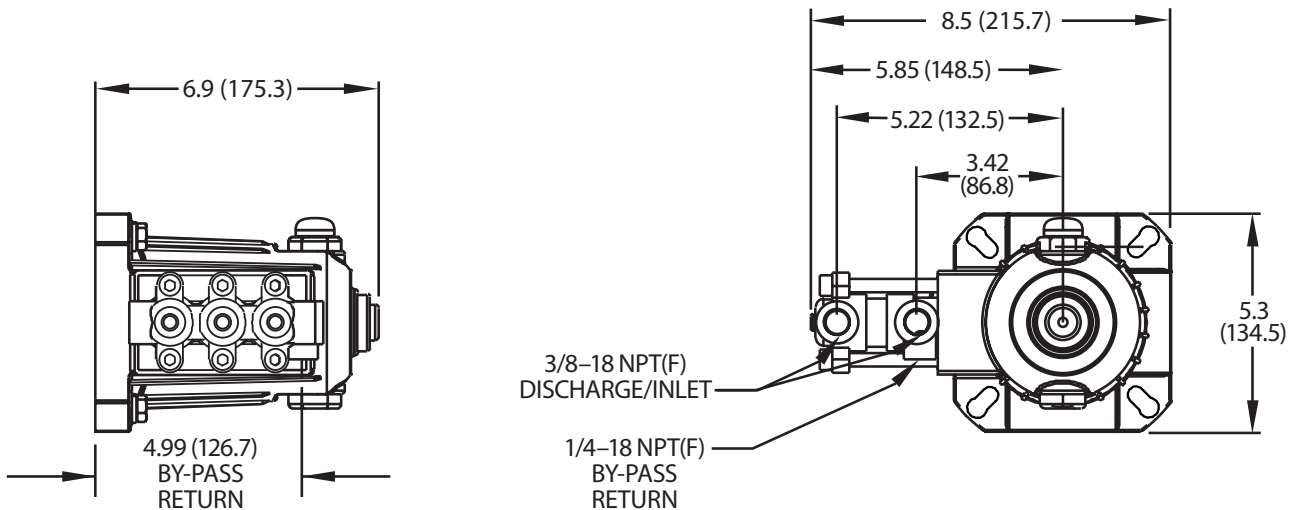
NBR=Medium Nitrile (Buna-N) NY=Nylon PTFE=Pure Polytetrafluoroethylene PVDF=Polyvinylidene Fluoride RTP=Reinforced Composite S=304SS

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



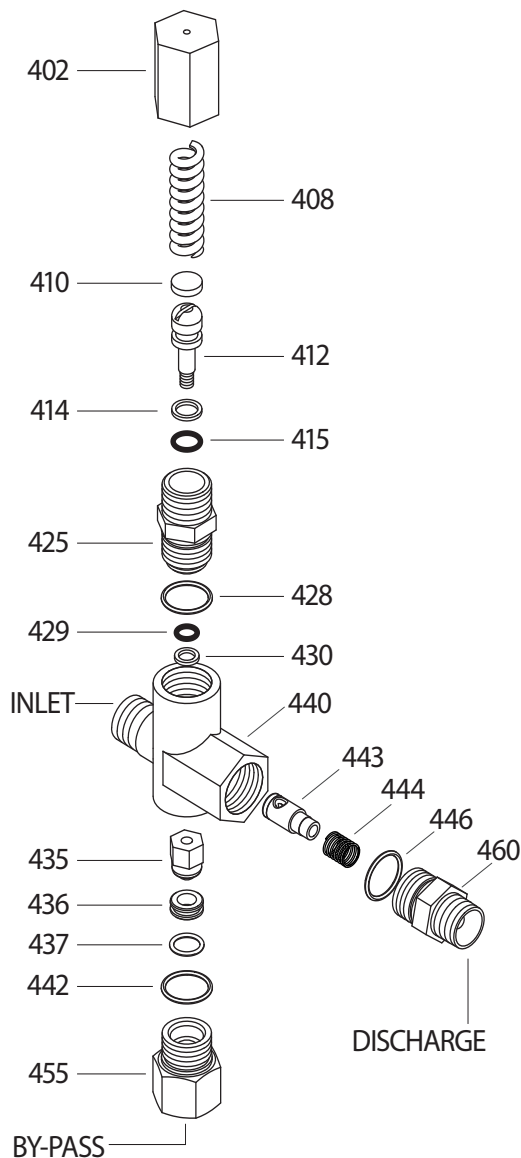
Models
 2SF09ES
 2SF11ES
 2SF13ES
 February 2021



REGULATIG UNLOADER 7500S

| 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.

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.de or can be requested directly from CAT PUMPS.