

# DIRECT-DRIVE PLUNGER PUMPS



## Standard Brass Models: **1CX013R, 1CX025R, 1CX050R**

See page 4 for complete pump model number selection.



Model 1CX050RA2  
Motor-Pump-Unit Without Pulse Hose

### FEATURES

- Ultra-compact, direct-drive motor-pump-unit for portability and small spaces.
- Four-position head mounting for plumbing flexibility.
- Concentric ceramic plunger and specially formulated seals provide extended seal life.
- Oil bath lubrication assures optimum drive-end lubrication.
- Pressure regulator offers precision pressure setting and over-pressure protection.
- Includes oil in crankcase.

### COMMON SPECIFICATIONS

|                            | U.S.                | Metric            |
|----------------------------|---------------------|-------------------|
| Maximum RPM                | 1750 rpm            | 1750 rpm          |
| Inlet Pressure Range       | Flooded to 60 psi   | Flooded to 4 bar  |
| Bore                       | 0.630"              | 16 mm             |
| Crankcase Capacity         | 2.03 oz.            | 0.06 l            |
| Maximum Liquid Temperature | up to 140°F         | up to 60°C        |
| Inlet Port                 | 3/8" NPT(F)         | 3/8" NPT(F)       |
| Discharge Port             | 1/4" NPT(F)         | 1/4" NPT(F)       |
| By-Pass Port               | 1/4" NPT(F)         | 1/4" NPT(F)       |
| Shaft Diameter             | 1/2"                | 12.7 mm           |
| Weight (Pump Only)         | 3.45 lbs.           | 1.56 kg           |
| Dimensions (Pump Only)     | 3.62 x 5.12 x 6.85" | 92 x 130 x 174 mm |

| SPECIFICATIONS          | U.S. Measure | Metric Measure |
|-------------------------|--------------|----------------|
| <b>1CX013R</b>          |              |                |
| Flow                    | 0.13 gpm     | 0.49 lpm       |
| Pressure Range          | 100-1000 psi | 7-70 bar       |
| Stroke (Single Plunger) | 0.079"       | 2.0 mm         |
| <b>1CX025R</b>          |              |                |
| Flow                    | 0.25 gpm     | 0.95 lpm       |
| Pressure Range          | 100-1000 psi | 7-70 bar       |
| Stroke (Single Plunger) | 0.130"       | 3.3 mm         |
| <b>1CX050R</b>          |              |                |
| Flow                    | 0.50 gpm     | 1.89 lpm       |
| Pressure Range          | 100-1000 psi | 7-70 bar       |
| Stroke (Single Plunger) | 0.248"       | 6.3 mm         |

### ELECTRIC HORSEPOWER REQUIREMENTS

| MODELS         | FLOW        |      | PRESSURE   |            |             | RPM  |
|----------------|-------------|------|------------|------------|-------------|------|
|                |             |      | psi<br>500 | psi<br>800 | psi<br>1000 |      |
|                | U.S.<br>gpm | lpm  | bar<br>35  | bar<br>55  | bar<br>70   |      |
| <b>1CX013R</b> | 0.13        | 0.49 | .06        | .10        | .12         | 1750 |
| <b>1CX025R</b> | 0.25        | 0.95 | .12        | .19        | .24         | 1750 |
| <b>1CX050R</b> | 0.50        | 1.89 | .24        | .38        | .47         | 1750 |

See page 4 for complete pump model number selection.

$$\text{DETERMINING THE REQUIRED H.P.} = \frac{\text{gpm} \times \text{psi}}{1060} = \frac{\text{Electric Brake H. P. Required}}{1060}$$

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

### CAUTIONS AND WARNINGS

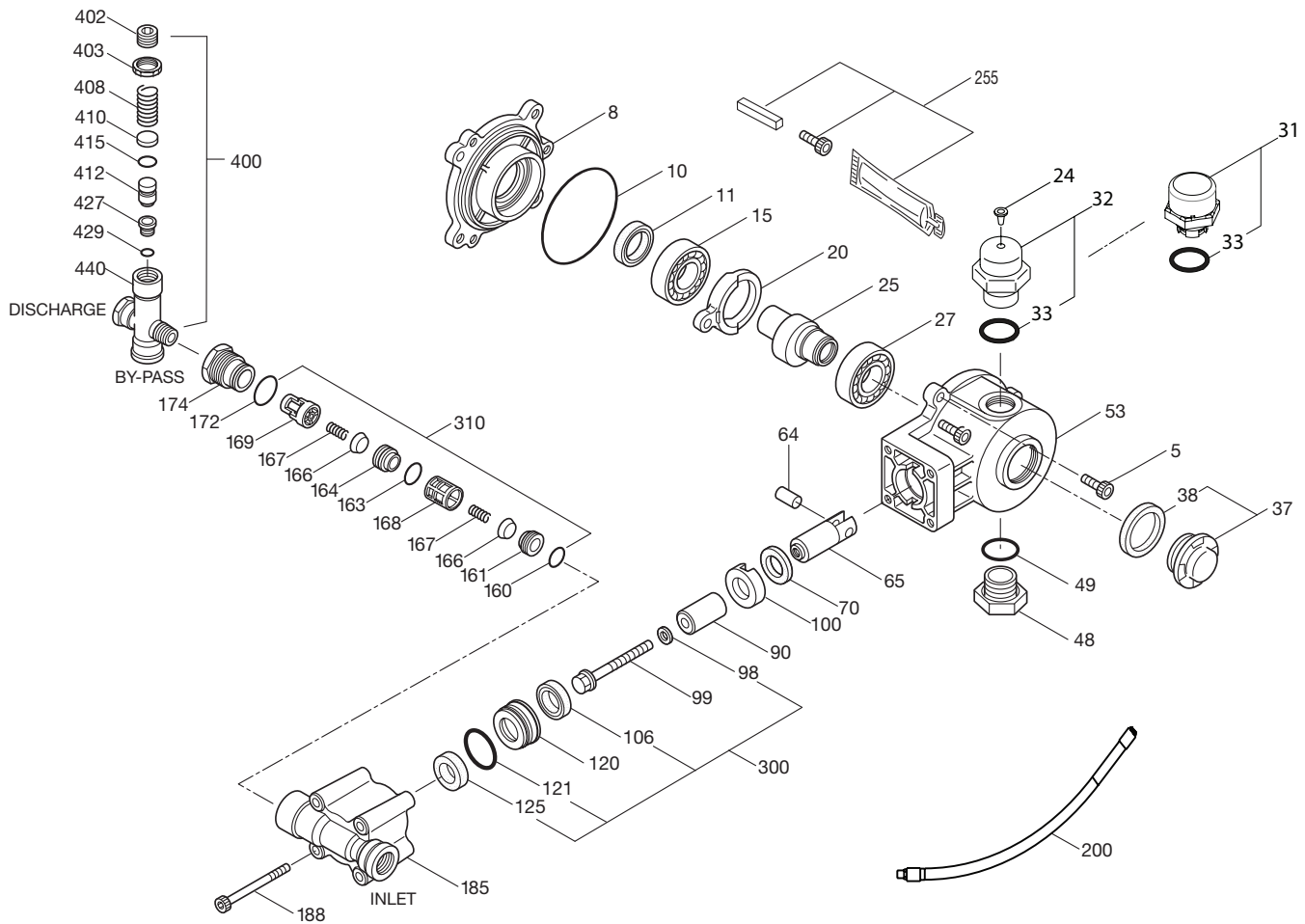
All High Pressure Systems require a primary pressure regulating device (i.e. regulator, unloader) and a secondary pressure relief device (i.e. pop-off valve, relief valve). Failure to install such relief devices could result in personal injury or damage to pump or property. Cat Pumps does not assume 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).

## EXPLODED VIEW



## PARTS LIST

| ITEM | P/N          | MATL       | DESCRIPTION                             | QTY | ITEM | P/N    | MATL   | DESCRIPTION  | QTY |
|------|--------------|------------|---|-----|------|--------|--------|--|-----|
| 2    | 76059        | STL        | Key (1/8 sq x 1.5") (Included in 30555) | 1   | 160  | 13965  | NBR    | O-Ring, Inlet Seat - 70D                             | 1   |
| 5    | 180318       | STCP R     | Screw, Bearing Cover (M6x14)            | 3   | 161  | 545177 | S      | Seat, Inlet  | 1   |
| 8    | 49563        | AL         | Cover, Bearing                          | 1   | 163  | 19285  | NBR    | O-Ring, Discharge Seat - 70D                         | 1   |
| 10   | 14035        | NBR        | O-Ring, Bearing Cover - 70D             | 1   | 164  | 545178 | S      | Seat, Discharge                                      | 1   |
| 11   | 49565        | NBR        | Seal, Oil - 70D                         | 1   | 166  | 46764  | S      | Valve  | 2   |
| 15   | 47862        | STL        | Bearing, Inner Ball                     | 1   | 167  | 46865  | S      | Spring   | 2   |
| 20   | 49566        | TNM        | Rod, Connecting                         | 1   | 168  | 543988 | PVDF   | Retainer, Inlet Spring                               | 1   |
| 24   | 549608       | LDPE       | Plug, Oil Cap (remove before startup)   | 1   | 169  | 49569  | PVDF   | Retainer, Discharge Spring                           | 1   |
| 25   | <b>49560</b> | <b>STL</b> | Crankshaft - 1CX050R, 6.3 mm            | 1   | 172  | 11346  | NBR    | O-Ring, Discharge Fitting - 70D                      | 1   |
|      | <b>49602</b> | <b>STL</b> | Crankshaft - 1CX013R, 2.0 mm            | 1   | 174  | 49570  | BB     | Plug, Valve w/1/4" NPT(F) Port                       | 1   |
|      | <b>49598</b> | <b>STL</b> | Crankshaft - 1CX025R, 3.3 mm            | 1   | 185  | 49515  | BB     | Head, Manifold                                       | 1   |
| 27   | 47862        | STL        | Bearing, Outer Ball                     | 1   | 188  | 89953  | STCP   | Screw, HSH (M6x55)                                   | 4   |
| 31   | 129254       | ABS        | Cap, Rain Proof w/O-Ring                | 1   | 200  | 76225  | —      | Hose, Pulse (3/8" x 24")                             | 1   |
| 32   | 49557        | ABS        | Cap, Oil Filler w/O-Ring                | 1   | 255  | 30555  | STZP R | Assy, Bolt Mount                                     | 1   |
| 33   | 14179        | NBR        | O-Ring, Oil Filler Cap - 70D            | 1   | 300  | 76063  | NBR    | Kit, Seal (Incls: 98, 106, 121, 125)                 | 1   |
| 37   | 92241        | —          | Gauge, Bubble Oil w/Gasket - 80D        | 1   | 310  | 76033  | NBR    | Kit, Valve   | 1   |
| 38   | 44428        | NBR        | Gasket, Flat Flex, Oil Gauge - 80D      | 1   |      |        |        | (Incls: 160, 161, 163, 164, 166, 167, 168, 169, 172) |     |
| 48   | 44842        | NY         | Plug, Drain                             | 1   | 400  | 7561   | BB     | Regulator  | 1   |
| 49   | 14179        | NBR        | O-Ring, Drain Plug - 70D                | 1   | 402  | 49681  | BB     | Adjuster, Pressure                                   | 1   |
| 53   | 49554        | AL         | Crankcase                               | 1   | 403  | 49682  | BB     | Nut, Locking   | 1   |
| 64   | 46229        | STL        | Pin, Crosshead                          | 1   | 408  | 49876  | STZP   | Spring   | 1   |
| 65   | 542402       | BB         | Rod, Plunger                            | 1   | 410  | 549352 | STCP R | Retainer, Spring                                     | 1   |
| 70   | 47215        | NBR        | Seal, Oil - 70D                         | 1   | 412  | 49877  | S      | Stem, Piston   | 1   |
| 90   | 542403       | CC         | Plunger (M16x27)                        | 1   | 415  | 14759  | NBR    | O-Ring, Piston Stem - 70D                            | 1   |
| 98   | 46730        | NBR        | Washer, Seal - 90D                      | 1   | 427  | 49878  | S      | Seat   | 1   |
| 99   | 542405       | S          | Retainer, Plunger (M6x35)               | 1   | 429  | 25300  | NBR    | O-Ring, Seat - 70D                                   | 1   |
| 100  | 46233        | D          | Retainer, Seal                          | 1   | 440  | —      | BB     | Body   | 1   |
| 106  | 48222        | NBR        | Seal, LPS w/S-Spg - 85D                 | 1   | 468  | 31555  | NBR    | Kit, O-Ring (Incls: 172, 415, 429)                   | 1   |
| 120  | 547357       | BB         | Case, Seal                              | 1   |      |        |        | See Back Page For Motors                             |     |
| 121  | 13976        | NBR        | O-Ring, Seal Case - 70D                 | 1   |      |        |        |  |     |
| 125  | 46240        | NBR        | Seal, HPS w/S - 85D                     | 1   |      |        |        |  |     |

**Bold part numbers are unique to a particular pump model. Italics are optional items.** R Components comply with RoHS Directive.

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

MATERIAL CODES (Not Part of Part Number): ABS=ABS Plastic 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 S=304SS STCP=Steel/Chrome Plated  
 STL=Steel STZP=Steel/Zinc Plated TNM=Special High Strength

## OPERATION:

A pressure regulator is included with each 1CX plunger pump. The regulator is not pre-set at the factory. Set system pressure once the system is started. Start at the lowest pressure reading and adjust the pressure adjuster in small increments until the desired system pressure is attained. Remember to service the regulator on the same schedule as the pump seals and valves. Refer to 1CX service manual for start-up, servicing of seals and valves, torque requirements and diagnosis/maintenance chart.

## INLET:

It is recommended to install a flexible hose at the pump inlet. Assure flooded or up to 60 psi inlet pressure for optimum performance. Install an inlet filter to remove standard water debris.

## DISCHARGE:

All discharge plumbing for the 1CX pump connects to the regulator outlet port.

## PULSE HOSE MOUNTING:

Mount the pulse hose by installing a tee fitting into the regulator outlet port. Install the pulse hose into the top port. Coil hose and tie wrap as shown. Add nipple with a tee to mount pressure gauge. The other end of the pulse hose is plugged to capture the pulse.

Note: Without a pulse hose, the pump may draw as much as 2 additional AMPS above full load AMPS.

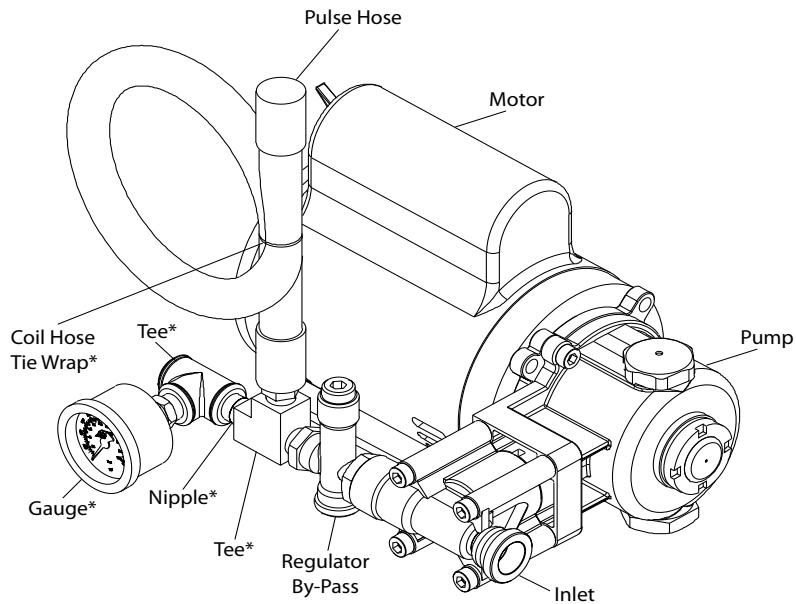
## BY-PASS:

The regulator by-pass is at the bottom. Connect a 1/4" flexible hose and route to inlet of pump, to tank, or to drain.

## NOTICE

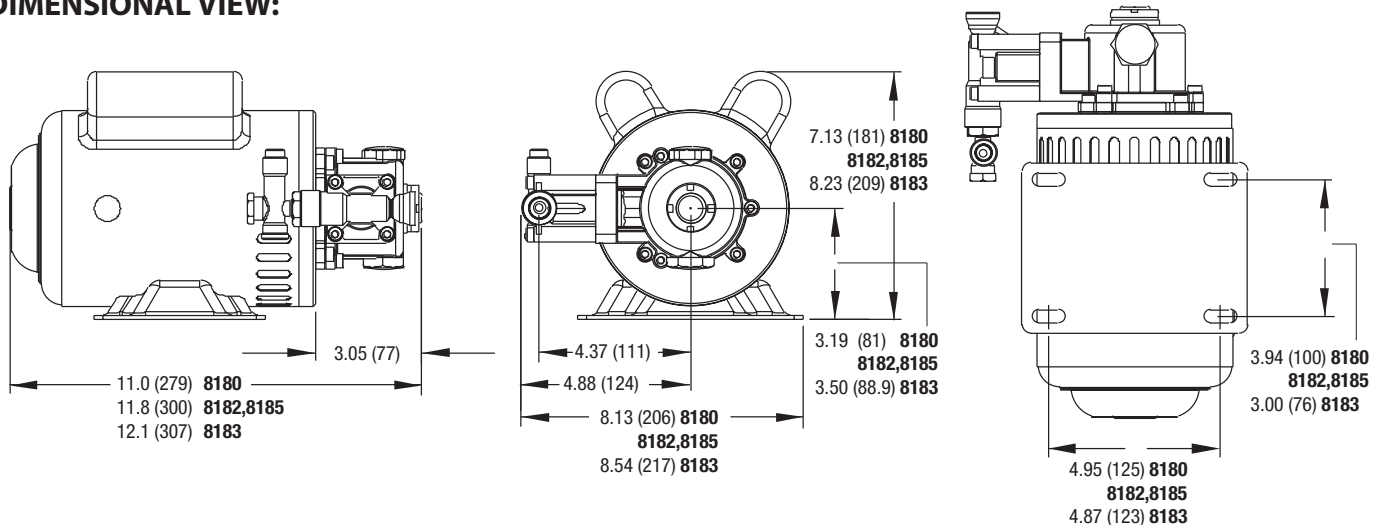
By-pass to the pump inlet is designed for cold water or ambient temperature operation. **DO NOT EXCEED 6 MINUTES IN BY-PASS** operation. Excessive temperatures will cause premature wear or damage to the pump and **VOID THE WARRANTY.**

## TYPICAL SET-UP:



\*Not Supplied With Motorized Pump Unit

## DIMENSIONAL VIEW:



## Model Number Selection Chart

| Series | Flow (1750 rpm) | Regulator              | Assemble Option                                     | Motor Option* | Pulse Hose Option       |
|--------|-----------------|------------------------|---|---------------|-------------------------|
| 1CX    | 013 = .13 gpm   | R = Regulator Included | D = Pump and Motor shipped together – not assembled | 1 = 8180      | Blank = No Pulse Hose   |
|        | 025 = .25 gpm   |                        |   | 2 = 8182      |                         |
|        | 050 = .5 gpm    |                        | A = Pump and Motor assembled together               | 3 = 8185      | P = Pulse Hose Included |
|        |                 |                        |   | 4 = 8183      |                         |

**Example:** 1CX050RA2P = .5 gpm, Regulator, 8182 Motor, Assembled, Pulse Hose Included

\* See Motor Options Chart Below

## Motor Options

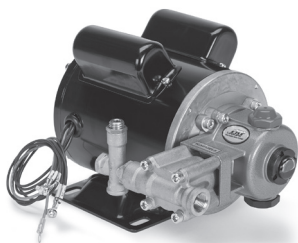
| Motors           | 8180          | 8182          | 8185          | 8183                |
|------------------|---------------|---------------|---------------|---------------------|
| Horsepower**     | 1/4 Hp        | 1/2 Hp        | 1/2 Hp        | 1/2 Hp              |
| Phase            | Single        | Single        | Single        | Single              |
| Hertz            | 60 Hz         | 60 Hz         | 60 Hz         | 50 Hz               |
| Voltage          | 115V / 230V   | 115V / 230V   | 115V / 230V   | 115V / 230V         |
| rpm              | 1750 rpm      | 1750 rpm      | 1750 rpm      | 1450 rpm            |
| Full load amp*   | 2.8 / 1.4     | 4.8 / 2.4     | 4.8 / 2.4     | 6.4 / 3.2           |
| Service factor   | 1.0           | 1.0           | 1.0           | 1.0                 |
| Shaft diameter   | 1/2"          | 1/2"          | 1/2"          | 1/2"                |
| Connection       | 12" leads     | 12" leads     | Terminal Box  | Terminal Box        |
| Capacitors       | Start and Run | Start and Run | Start and Run | Start and Run       |
| Insulation class | E             | E             | E             | F                   |
| Motor type       | ODP           | ODP           | ODP           | TEFC                |
| Compliance       | RoHS<br>CSA   | RoHS<br>CSA   | RoHS<br>CSA   | RoHS, CE<br>UL, CSA |
| Weight           | 15.80 lbs     | 21.75 lbs     | 22.25 lbs     | 28.85 lbs           |

\*NOTE: Without pulse hose amp draw will increase as much as 2 amps depending upon pump model and discharge pressure.

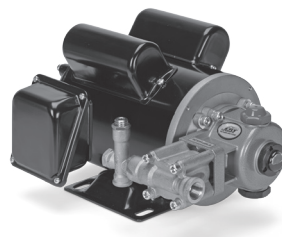
\*\* HP Calculation = (GPM X PSI) ÷ 1060

## Replacement Parts

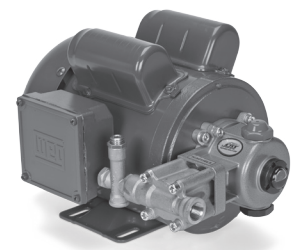
|                 |        |        |        |     |
|-----------------|--------|--------|--------|-----|
| Fan Cover       | 999525 | 999525 | 999525 | N/A |
| Capacitor Cover | 999529 | 999526 | 999526 | N/A |



**8180 and 8182**  
12" wire leads



**8185**  
Terminal Box



**8183**  
Terminal Box



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