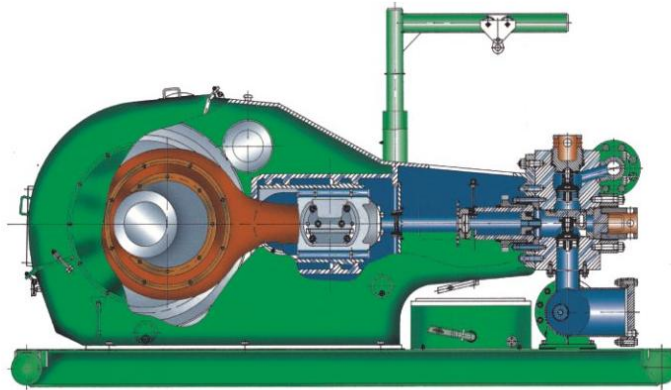


## F Series Mud Pump Specifications



### I. Basic Structure

#### 1. Power End (frame, pinion shaft, crankshaft, crosshead and extension rod)

##### 1.1 Power end features

Continuous tooth herringbone gear.

One-piece alloy steel crank.

Renewable crosshead guide.

The frame is made of welded steel plate to provide the frame with high strength, good rigidity and light weight.

The extension rod packing is duplex seal structure to provide the good seal result.

The power end uses the combined lubricating system of forced lubrication and splash lubrication.

1.2. The frame is made of welded steel plate and stress relief treated to obtain the good rigidity and high strength. The place where the crankshaft bearing is fitted is strengthened by using ribbed plates. The frame is furnished with the necessary oil basin and oil way system for cooling and lubricating purpose.

##### 1.3. Crankshaft

The crankshaft is made of casted alloy steel and furnished with herringbone gear, connecting rod and bearing. The tooth form of the big geared ring is herringbone gear. The gear bore and the crankshaft surface are interference fitted and they are both fastened with bolts and lock nuts. The big end of the connecting rod is mounted on three eccentric straps of the crankshaft through single row short cylindrical roller bearings and the small end on the crosshead pin through double row long cylindrical roller bearing. Double row radial spherical roller bearings are mounted at both ends of the crankshaft.

#### 1.4. Pinion shaft

The pinion shaft is made of forged alloy steel on which a herringbone gear with the medium-hard tooth surface is machined. For easy maintenance, the single row radial long cylindrical roller bearing with inner ring (without sides) is used. The both ends of the pinion shaft extend out, so that the sheave or the sprocket can be mounted on either end.

#### 1.5. Crosshead and Extension Rod

The crosshead and crosshead guide are made of ASTM A48-83 meehanite cast iron featured by good abrasion resistance and long service life. Upper and lower guides are used for F-800 and F-1000 mud pumps, so that the concentricity can be adjusted by adding shimes beneath the lower guide. F-500 mud pump is the cylindrical structure. The connection between the crosshead and the extension rod is made by using bolted flange. The rigid connection ensures the concentricity of the crosshead and the extension rod. The coupling is used for connecting the extension rod to the piston rod. The light-weight coupling enables the extension rod and the piston rod to connect to each other easily and reliably.

## 2. Fluid End (cylinders, valve assembly, liners and pistons)

### 2.1. Cylinders

Cylinders are made of forged alloy steel, three cylinders of each pump are interchangeable. Valve-over-valve (through type cylinder) design reduces the cylinder volume and promote the volumetric efficiency. At customers' request, the cylinder surface may be nickel plated to improve the abrasion resistance.

Discharge pulsation dampener, shear relief valve and discharge strainer are furnished at the outlet. F-500 pump suction inlet is fitted with 8"flange, F-500 pump suction inlet with 10"flange and F-1000 pump suction inlet with 12"flange.

### 2.2. Valve Assembly

The suction valve and the discharge valve for above three mud pumps are interchangeable. F-500 mud pump uses API#5 valve pot, F-800 and F-1000 mud pumps use API#6 valve pots.

### 2.3. Liner

Bi-metal liners are used. The sleeve is made of wear-resistant cast iron, the surface hardness is HRC60-65. Therefore, liners feature wear resistance, corrosion resistance and high surface finish. Liners are put in from the cylinder cover bore in the front of the cylinder and fixed with liner cage, cylinder cover plug and cylinder cover when installing.

## 2.4. Pistons and Piston Rods

They are slide fitted, sealed with rubber seal ring and finally fastened with lock nuts to prevent the piston from looseness and to play a role in sealing.

Cylinders, liners, pistons, valves, valve seats, valve springs, seal rings, valve covers and cylinder covers at the fluid end of F-800 and F-1000 mud pumps are all interchangeable.

## 3. Spraying System

The spraying system consists mainly of spray pump, cooling water box, and spray pipe, the function is to cool and rinse liners and pistons to promote their service life.

The centrifugal spray pump can be driven by a sheave mounted on the input shaft extension end or a separate motor and cooled and lubricated by water.

The spray pipe is mounted on the coupling between the extension rod and the piston rod and can reciprocate with the piston. Nozzles is near the piston end so that the lubricating-cooling fluid can rinse the contact surface between the piston and liner all the time. The durable fixed spray pipe may be used, too.

## 4. Lubricating System

The power end uses the combined lubricating system of forced lubrication ad splash lubrication. The pressure oil is conveyed through lubricating pipeline, crosshead, extension rod, crosshead guide and all bearings by a gear oil pump within the oil box to realize the forced lubrication. The working condition of the gear oil pump may be understood from the pressure gauge behind the frame.

## 5. Charging System

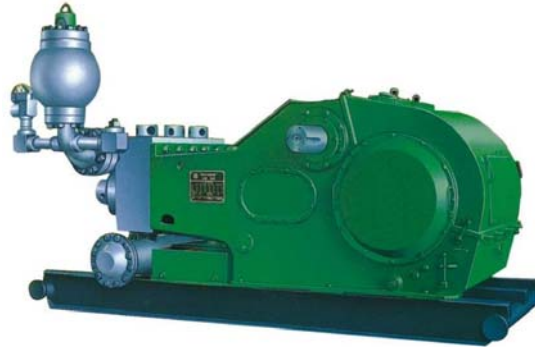
To prevent the air lock occurring for low pump inlet pressure, every mud pump is furnished with a complete charging system. It consists of charging pump, pump base, butterfly valve and corresponding manifold. Mounted on the suction manifold of the mud pump, the charging pump is driven by the special purpose motor or the input shaft of the mud pump through V-belts to reduce the power consumption.

## II. Main Model

### Specifications of Mud Pump

| Model                       | F-500               | F-800               | F-1000              | F-1300              | F-1600              | F-2200              |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Type                        | Triplex piston      | Triplex piston      | Triplex piston      | Triplex piston      | Triplex piston      | Triplex piston      |
| Max. liner size × stokes mm | 170×191             | 170×229             | 170×254             | 180×305             | 180×305             | 230×356             |
| Rating strokes rpm          | 165                 | 150                 | 140                 | 120                 | 120                 | 105                 |
| Rating power KW(HP)         | 373(500)            | 596(800)            | 746(1000)           | 969(1300)           | 1193(1600)          | 1640(2200)          |
| Gear ratio                  | 4.286:1             | 4.185:1             | 4.207:1             | 4.206:1             | 4.206:1             | 3.521:1             |
| Lubricating system          | Pressure and splash | Pressure and splash | Pressure and splash | Pressure and splash | Pressure and splash | Pressure and splash |
| Suction inlet               | 8" Flange           | 10" Flange          | 12" Flange          | 12" Flange          | 12" Flange          | 12" Flange          |
| Discharge outlet            | 4" Flange           | 5" Flange           | 5" Flange           | 5" Flange           | 5" Flange           | 5" Flange           |
| Diameter of pinion shaft mm | 139.7               | 177.8               | 196.9               | 215.9               | 215.9               | 254                 |
| Weight Kg                   | 9770                | 14500               | 18790               | 24572               | 24791               | 38460               |

### III. Performance Data



**Performance Data F-500 Pump**

| Strokes<br>per<br>minute | Rated<br>Power |                   | Liner size (mm) and Pressure Rating (MPa / psi) |        |        |        |        |        |        |        |        |        |        |        |        |        |       |       |
|--------------------------|----------------|-------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
|                          |                |                   | 170   |        | 160    |        | 150    |        | 140    |        | 130    |        | 120    |        | 110    |        | 100   |       |
|                          |                |                   | 9.3   | 95     | 10.5   | 107    | 11.9   | 122    | 13.7   | 140    | 15.9   | 162    | 18.6   | 190    | 22.2   | 226    | 26.8  | 273   |
| KW                       | HP             | Displacement(L/S) |   |        |        |        |        |        |        |        |        |        |        |        |        |        |       |       |
| 170                      | 379            | 515               | 36.75   | 36.75  | 32.56  | 32.56  | 28.61  | 28.61  | 24.93  | 24.93  | 21.49  | 21.49  | 18.31  | 18.31  | 15.39  | 15.39  | 12.72 | 12.72 |
| 165※                     | 368            | 500               | 35.67   | 35.67  | 31.60  | 31.60  | 27.77  | 27.77  | 24.19  | 24.19  | 20.86  | 20.86  | 17.77  | 17.77  | 14.93  | 14.93  | 12.34 | 12.34 |
| 150                      | 334            | 455               | 32.43   | 32.43  | 28.73  | 28.73  | 25.25  | 25.25  | 21.99  | 21.99  | 18.96  | 18.96  | 16.16  | 16.16  | 13.58  | 13.58  | 11.22 | 11.22 |
| 140                      | 312            | 424               | 30.27   | 30.27  | 26.81  | 26.81  | 23.56  | 23.56  | 20.53  | 20.53  | 17.70  | 17.70  | 15.08  | 15.08  | 12.67  | 12.67  | 10.47 | 10.47 |
| 130                      | 290            | 394               | 28.11   | 28.11  | 24.90  | 24.90  | 21.88  | 21.88  | 19.06  | 19.06  | 16.44  | 16.44  | 14.00  | 14.00  | 11.77  | 11.77  | 9.73  | 9.73  |
| 120                      | 267            | 364               | 25.94   | 25.94  | 22.98  | 22.98  | 20.20  | 20.20  | 17.60  | 17.60  | 15.17  | 15.17  | 12.93  | 12.93  | 10.86  | 10.86  | 8.98  | 8.98  |
| 110                      | 245            | 333               | 23.78   | 23.78  | 21.07  | 21.07  | 18.52  | 18.52  | 16.13  | 16.13  | 13.91  | 13.91  | 11.85  | 11.85  | 9.96   | 9.96   | 8.23  | 8.23  |
| 1                        |                |                   | 0.2162  | 0.2162 | 0.1915 | 0.1915 | 0.1683 | 0.1683 | 0.1466 | 0.1466 | 0.1264 | 0.1264 | 0.1077 | 0.1077 | 0.0905 | 0.0905 |       |       |

## Performance Data F-800 Pump

| Stroke<br>s per<br>minute | Rated<br>Power |                   | Liner size (mm) and Pressure Rating (MPa / psi) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------------------|----------------|-------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                           |                |                   | 170   |       | 160   |       | 150   |       | 140   |       | 130   |       | 120   |       | 110   |       | 100   |       |
|                           |                |                   | 13.6  | 139   | 15.4  | 157   | 17.5  | 178   | 20.1  | 205   | 23.3  | 237   | 27.3  | 278   | 32.5  | 331   | 34.3  | 350   |
| K                         | HP             | Displacement(L/S) |   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| W                         |                |                   |   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 160                       | 62<br>7        | 85<br>3           | 41.51   | 41.51 | 36.77 | 36.77 | 32.32 | 32.32 | 28.15 | 28.15 | 24.27 | 24.27 | 20.68 | 20.68 | 17.38 | 17.38 | 14.36 | 14.36 |
| 150※                      | 58<br>8        | 80<br>0           | 38.92   | 38.92 | 34.47 | 34.47 | 30.30 | 30.30 | 26.39 | 26.39 | 22.96 | 22.96 | 19.39 | 20.68 | 16.29 | 16.29 | 13.47 | 13.47 |
| 140                       | 54<br>9        | 74<br>7           | 36.32   | 36.32 | 32.17 | 32.17 | 28.28 | 28.28 | 24.63 | 24.63 | 21.24 | 21.24 | 18.10 | 18.10 | 15.21 | 15.21 | 12.57 | 12.57 |
| 130                       | 51<br>0        | 69<br>3           | 33.73   | 33.73 | 29.88 | 29.88 | 26.26 | 26.26 | 22.87 | 22.87 | 19.72 | 19.72 | 16.81 | 16.81 | 14.12 | 14.12 | 11.67 | 11.67 |
| 120                       | 47             | 64                | 31.13   | 31.13 | 27.58 | 27.58 | 24.24 | 24.24 | 21.11 | 21.11 | 18.21 | 18.21 | 15.51 | 15.51 | 13.03 | 13.03 | 10.77 | 10.77 |

|     |         |         |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|-----|---------|---------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|     | 1       | 0       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| 110 | 43<br>1 | 58<br>7 | 28.54      | 28.54      | 25.28      | 25.28      | 22.22      | 22.22      | 19.35      | 19.35      | 16.69      | 16.69      | 14.22      | 14.22      | 11.95      | 11.95      | 9.87       | 9.87       |
| 1   |         |         | 0.259<br>4 | 0.259<br>4 | 0.229<br>8 | 0.229<br>8 | 0.202<br>0 | 0.202<br>0 | 0.175<br>9 | 0.175<br>9 | 0.151<br>7 | 0.151<br>7 | 0.129<br>3 | 0.129<br>3 | 0.108<br>6 | 0.108<br>6 | 0.089<br>8 | 0.089<br>8 |

## Performance Data F-1000 Pump

| Strokes<br>per<br>minute | Rated Power |      | Liner size (mm) and Pressure Rating (MPa / psi) |        |        |        |        |        |        |        |        |        |        |        |        |        |
|--------------------------|-------------|------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                          |             |      | 170   |        | 160    |        | 150    |        | 140    |        | 130    |        | 120    |        | 110    |        |
|                          | KW          | HP   | 16.4  | 167    | 18.5   | 189    | 21.1   | 215    | 24.2   | 247    | 28.0   | 286    | 32.9   | 336    | 34.3   | 350    |
|                          |             |      | Displacement(L/S)                               |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 150                      | 788         | 1072 | 43.24   | 43.24  | 38.30  | 38.30  | 33.66  | 33.66  | 29.33  | 29.33  | 25.29  | 25.29  | 21.55  | 21.55  | 18.10  | 18.10  |
| 140※                     | 735         | 1000 | 40.36   | 40.36  | 35.75  | 35.75  | 31.42  | 31.42  | 27.37  | 27.37  | 23.60  | 23.60  | 20.11  | 20.11  | 16.90  | 16.90  |
| 130                      | 683         | 929  | 37.47   | 37.47  | 33.20  | 33.20  | 29.18  | 29.18  | 25.43  | 25.43  | 21.91  | 21.91  | 18.67  | 18.67  | 15.69  | 15.69  |
| 120                      | 630         | 857  | 34.59   | 34.59  | 30.64  | 30.64  | 26.93  | 26.93  | 23.46  | 23.46  | 20.23  | 20.23  | 17.24  | 17.24  | 14.48  | 14.48  |
| 110                      | 578         | 786  | 31.71   | 31.71  | 28.09  | 28.09  | 24.69  | 24.6   | 21.51  | 21.51  | 18.54  | 18.54  | 15.80  | 15.80  | 13.28  | 13.28  |
| 100                      | 525         | 714  | 28.83   | 28.83  | 25.53  | 25.53  | 22.44  | 22.44  | 19.55  | 19.55  | 16.86  | 16.86  | 14.36  | 14.36  | 12.07  | 12.07  |
| 1                        |             |      | 0.2883  | 0.2883 | 0.2553 | 0.2553 | 0.2244 | 0.2244 | 0.1955 | 0.1955 | 0.1686 | 0.1686 | 0.1436 | 0.1436 | 0.1207 | 0.1207 |





**Performance Data F-1300 Pump**

| Strokes<br>per<br>minute | Rated Power |      | Liner size (mm) and Pressure Rating (MPa) |        |        |        |        |        |        |        |        |        |        |        |
|--------------------------|-------------|------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                          |             |      | 180                                       |        | 170    |        | 160    |        | 150    |        | 140    |        | (130)  |        |
|                          |             |      | 18.5                                      | 189    | 20.7   | 211    | 23.4   | 239    | 26.6   | 272    | 30.5   | 312    | 34.3   | 350    |
|                          | KW          | HP   | Displacement(L/S)                         |        |        |        |        |        |        |        |        |        |        |        |
| 130                      | 1036        | 1408 | 50.42                                     | 50.42  | 44.97  | 44.97  | 39.83  | 39.83  | 35.01  | 35.01  | 30.50  | 30.50  | 26.30  | 26.30  |
| 120※                     | 956         | 1300 | 46.54                                     | 46.54  | 41.51  | 41.51  | 36.77  | 36.77  | 32.32  | 32.32  | 28.15  | 28.15  | 24.27  | 24.27  |
| 110                      | 876         | 1192 | 54.66                                     | 54.66  | 38.05  | 38.05  | 33.71  | 33.71  | 29.62  | 29.62  | 25.81  | 25.81  | 22.25  | 22.25  |
| 100                      | 797         | 1083 | 38.78                                     | 38.78  | 34.59  | 34.59  | 30.64  | 30.64  | 26.93  | 26.93  | 23.46  | 23.46  | 20.23  | 20.23  |
| 90                       | 717         | 975  | 34.90                                     | 34.90  | 31.13  | 31.13  | 27.58  | 27.58  | 24.24  | 24.24  | 21.11  | 21.11  | 18.21  | 18.21  |
| 1                        |             |      | 0.3878                                    | 0.3878 | 0.3459 | 0.3459 | 0.3064 | 0.3064 | 0.2693 | 0.2693 | 0.2346 | 0.2346 | 0.2023 | 0.2023 |

## Performance Data F-1600 Pump

| Strokes<br>per<br>minute | Rated Power |      | Liner size (mm) and Pressure Rating (MPa) |        |        |        |        |        |        |        |        |        |        |        |
|--------------------------|-------------|------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                          |             |      | 180                                       |        | 170    |        | 160    |        | 150    |        | 140    |        | (130)  |        |
|                          |             |      | 22.7                                      | 232    | 25.5   | 260    | 28.8   | 294    | 32.7   | 334    | 34.3   | 350    | 34.3   | 350    |
|                          | KW          | HP   | Displacement(L/S)                         |        |        |        |        |        |        |        |        |        |        |        |
| 130                      | 1275        | 1733 | 50.42                                     | 50.42  | 44.97  | 44.97  | 39.83  | 39.83  | 35.01  | 35.01  | 30.50  | 30.50  | 26.30  | 26.30  |
| 120※                     | 1176        | 1600 | 46.54                                     | 46.54  | 41.51  | 41.51  | 36.77  | 36.77  | 32.32  | 32.32  | 28.15  | 28.15  | 24.27  | 24.27  |
| 110                      | 1078        | 1467 | 54.66                                     | 54.66  | 38.05  | 38.05  | 33.71  | 33.71  | 29.62  | 29.62  | 25.81  | 25.81  | 22.25  | 22.25  |
| 100                      | 980         | 1333 | 38.78                                     | 38.78  | 34.59  | 34.59  | 30.64  | 30.64  | 26.93  | 26.93  | 23.46  | 23.46  | 20.23  | 20.23  |
| 90                       | 882         | 1200 | 34.90                                     | 34.90  | 31.13  | 31.13  | 27.58  | 27.58  | 24.24  | 24.24  | 21.11  | 21.11  | 18.21  | 18.21  |
| 1                        |             |      | 0.3878                                    | 0.3878 | 0.3459 | 0.3459 | 0.3064 | 0.3064 | 0.2693 | 0.2693 | 0.2346 | 0.2346 | 0.2023 | 0.2023 |



**Performance Data F- 2200 Pump**

| Strokes<br>per<br>minute | Rated Power |      | Liner size (mm) and Pressure Rating (MPa) |        |        |        |        |        |                |                |                |                |
|--------------------------|-------------|------|---|--------|--------|--------|--------|--------|----------------|----------------|----------------|----------------|
|                          |             |      | 230                                       | 220    | 210    | 200    | 190    | 180    | 170            | 160            | 150            | 140            |
|                          |             |      | 19.0                                      | 20.8   | 22.8   | 25.1   | 27.9   | 31.0   | 34.5<br>(Max.) | 34.5<br>(Max.) | 34.5<br>(Max.) | 34.5<br>(Max.) |
|                          | KW          | HP   | Displacement(L/S)                         |        |        |        |        |        |                |                |                |                |
| *105                     | *1640       | 2200 | 77.65                                     | 71.05  | 64.73  | 58.72  | 52.99  | 47.56  | 42.42          | 37.58          | 33.03          | 28.77          |
| 90                       | 1406        | 1886 | 66.56                                     | 60.90  | 55.49  | 50.33  | 45.42  | 40.77  | 36.36          | 32.21          | 28.31          | 24.66          |
| 80                       | 1250        | 1676 | 59.16                                     | 54.13  | 49.32  | 44.74  | 40.37  | 36.24  | 32.32          | 28.63          | 25.16          | 21.92          |
| 70                       | 1094        | 1467 | 51.76                                     | 47.36  | 43.16  | 39.14  | 35.33  | 31.71  | 28.28          | 25.05          | 22.02          | 19.18          |
| 60                       | 937         | 1257 | 44.37                                     | 40.60  | 36.99  | 33.55  | 30.28  | 27.18  | 24.24          | 21.47          | 18.87          | 16.44          |
| 50                       | 781         | 1048 | 36.97                                     | 33.83  | 30.83  | 27.96  | 25.23  | 22.65  | 20.20          | 17.89          | 15.73          | 13.70          |
| 1                        |             |      | 0.7395                                    | 0.6766 | 0.6165 | 0.5592 | 0.5047 | 0.4530 | 0.4040         | 0.3579         | 0.3146         | 0.2740         |

- NOTE: 1. Based on 100% Volumetric efficiency and 90% mechanical efficiency.
2. \*Recommended strokes and input power for continuous service.
  3. \*\*When the working pressure exceeds 34.5 MPa, the plunger structure is used.