

JUMBO OPERATION & MAINTENANCE INSTRUCTIONS



GENERAL

The SELLERS JUMBO®6 is a hydraulically driven rotating head that provides effective control of rotational speed to assure optimum cleaning by the nozzle streams of internal tank surfaces to be cleaned, sanitized, treated, or rinsed. No reduction gears are used and therefore, minimal maintenance is required. The nozzles are driven by a set of bevel gears through a complete 360° path simultaneously in both the vertical and horizontal planes. This unit is complete with 4 nozzles which provide an indexing pattern of 2° per revolution. The "clean line" design of this unit ensures a minimum of outside crevices in the unit where processing material may accumulate to cause contamination. The unit may be installed on a permanent basis (C.I.P.). Many types of fluids, sanitizers, detergents, solvents and caustics may be used through this unit to assist its cleaning effectiveness. (Please note caution below) The cleaning effectiveness of this unit is proportional to all the applicable variables, such as volume, pressure, chemicals, impingement, drainage, soils, etc. The unit will operate in any attitude so it can clean almost any type of contained area within its range.



Caution: If chemicals, hazardous materials, operations, and equipment are used in conjunction with this cleaning equipment, it is the responsibility of the user to establish appropriate associated safety and health practices. Prior to application, the user must consult and determine the applicability of regulatory (federal, state, local and facility) safety and environmental agency limitations.

MODELS

J6-500-** = Base standard model - washer/ball bearing system.

J6-500-BD-** = Ball drive model with stainless/nylon ball bearing system, for use in low pressure applications.

J6-500-HT-** = High temperature model with all stainless ball bearings, capacity up to 500° F (260° C).

MATERIALS

The JUMBO 6 is made of 316 (UNS S31600) stainless steel with the exceptions of the bearings and bushings, which are Teflon and/or UHMW-PE. No lubricants are required.

CONSTRUCTION

Refer to drawings J6-500-**, J6-500-BD-**, & J6-500-HT-** & variations, the unit consists of two basic components; the drive assembly and the nozzle body assembly. This units construction does not require lubrication of any kind.

ROTATION

The liquid enters the inlet cap (1) and then flows through the oblique and bypass holes in the motor (3) causing a swirling motion in the liquid. The swirling liquid goes down the outside of the vertical shaft (5) past the 6 tooth rotor (4) imparting rotation to the rotor and thus the vertical shaft. The liquid then goes thru the holes in the vertical shaft and is divided in the tee (12) to each nozzle head shaft (14). There are two holes in the tee allowing a constant stream of liquid to be directed at the gear mesh to help prevent build-up. The liquid flows into the nozzle body and out each nozzle. The rotation of the vertical shaft causes the nozzle head assembly to rotate in a horizontal plane. The nozzle bodies rotate in the vertical plane by the meshing of the bevel gears (9 & 15); bevel gear (9) has 45 teeth while bevel gear (15) has 44 teeth. This difference in the number of teeth in each gear indexes the nozzles with each rotation. It will take 45 revolutions for one complete cleaning cycle. Thus, if the unit is rotating 5 RPM, it will take 9 minutes for a complete cleaning cycle time, divide 45 by the RPM of the head.

Other brand and product names are trademarks or registered trademarks of their respective holders. ® SELLERS is a registered trademark of Cloud Company Normal rotation of the JUMBO 6 is 5-40 RPM at 50 to 200 PSI (3.4 to 13.8 BAR) inlet pressure. The nozzle holes in the nozzle body (11) are set off of true center in favor of rotation. All units will operate in the same RPM range since a change in nozzle size is compensated by a change in the motor when the unit is assembled by the factory. The rotational speed of these units can be regulated through the use of various motor bypass plugs, which influences the fluid diversion to provide additional speed, reference the trouble shooting section and the drawing parts list for additional information and location.

THROUGHPUT

The amount of liquid going through a JUMBO 6 is proportional to the pressure applied and the nozzle orifice size. Increasing the pressure will increase the throughput. For specific information refer to the flow curve. Please note the operating pressure range.

CLEANING/WETTING RADII

The cleaning and wetting distances are a function of rotational speed and liquid pressure applied. The slower the head rotates and the higher the pressure applied, the greater the distances. The maximum wetting radius is about 30 ft (9.1 m). The EFFECTIVE CLEANING RADIUS is 15 ft (4.6 m), but the actual results will also depend on the type and condition of soils to be removed.

SUPPLY SOLUTION PRESSURE

The minimum amount of liquid that will satisfactorily run the JUMBO 6 (Std configuration) with 4 x 1/4" nozzles is about 30 GPM (6.8 M^3/hr) at 50 PSI (3.4 BAR) and the maximum is with 4 x 3/8" nozzles about 117 GPM (26.6M^3/hr) at 200 PSI (13.8 BAR). Where difficult cleaning is involved and solution pressures of 150 PSI (10.3 BAR) and above for BOTH CLEANING AND RINSING are available, the TANK-PRO is recommended. The Sellers BX3000 or BX4000 Jets will supply the capacity and pressure requirements for a single unit.

INSTALLATION

The JUMBO 6 is very easy to install as it has a single female pipe thread connection. It may be installed as a swing away unit or suspended from a pipe. The unit is dynamically balanced to avoid excessive sway and torque. The factory will preset the approximate speed(RPM) and nozzle size for the particular field application. In all installations a suitable strainer should be used (such as a 20 Mesh "Y" strainer) to prevent dirt or scale from clogging the waterways or openings.



Warning: In closed tanks, provisions should be made for adequate venting during operation to allow the escape of any gases or volatile vapors which may be produced during operation. This will also prevent the tank from collapsing due to vacuum formation, which can be caused by a cold rinse cycle in a warm tank.

OPERATION

To start the unit, turn on the fluid. An in-line valve is advised for a slow build-up of liquid pressure in the unit to prevent "water hammer". To stop the unit, turn off the liquid. The unit should always be handled carefully. If the unit is dropped or maltreated it may cause internal damage to the drive assembly, which in turn can affect the performance of the unit. If handled properly the unit will perform well and provide dependable service.

OPERATION & SPECIFICATION SHEET

Refer to drawings J6-500-**, J6-500-BD-**, & J6-500-HT-** & variations for assembly and parts list.

Pipe Connection 1 1/2" Female NPT

Operating Pressure Range 50-200 PSI (3.4-13.8 BAR)

Maximum Operating Temperature 250° F (121° C)

High-Temperature Unit 500° F (260° C)

Flow Capacity Refer to flow curve

Head Rotation Speed (Factory Set) 5-40 RPM

*Effective Cleaning Radius To 15 ft maximum (4.6 m)
Effective Wetting Radius To 30 ft maximum (9.1 m)

Nozzle quantity 4 (2 each nozzle body)

Nozzle Orifice Diameter 1/4",5/16", or 3/8" (Ø6.4,7.9 or 9.5 mm)

Overall Head Length x Body Diameter 10.25" x 8.5" (260mm x 216mm)

Installation Hole diameter 7.5" (Ø191mm)
Approximate Weight 11 3/4 lbs (5.4 kgs)
Materials of Construction 316 Stainless Steel

Teflon, UHMW-PE, & Nylon

(supplied by user - not included) 20 Mesh (1/32" openings)

NOTE: Consult Sellers where operating conditions are not covered in the above specifications.

TROUBLE SHOOTING

Due to the simplicity of the unit, very few problems should occur. If any trouble should arise, the following steps may be taken: Refer to drawings J6-500-**, J6-500-BD-**, & J6-500-HT-**& variations.

- A. Check units for external damage, look for evidence of mishandling that may have damaged shafts, bearings, or alignment.
- B. If the unit fails to rotate and no liquid passes:
 - 1. Check for liquid pressure and volume at the unit.
 - 2. Check strainer for filter blockage.
 - 3. Remove unit and check for clogged jet holes or debris in the stream straighteners.
 - 4. With the nozzle removed, recheck for flow through the unit.
- C. If the unit fails to rotate and sufficient liquid passes:
 - 1. Check for rotational freedom, by hand in the suspended and inverted positions, in the vertical and rotational axis.
 - 2. If no visible abnormalities are discovered, the balls may have brinelled the bearing raceway surface on the nozzle body and shaft assemblies, which may have been caused by water hammer or maltreatment. If this condition is severe, the brinelled spots may be removed and a fairly smooth raceway recreated. Insert a blank motor bypass plug in the motor and slowly turn on the liquid to the highest pressure available. Operate the unit at a high rotation for about 30 minutes. Reinsert the original bypass plug and the unit should operate satisfactorily.
 - 3. If the unit is free, insert a motor bypass plug. If the unit now rotates, the problem is minor friction. If the unit still does not rotate, check for:
 - a. Contamination and obstructions in the unit.
 - b. Wear of the bearing parts: the washers and the balls.
 - c. Galling and straightness of the shafts and gears.

Replace all defective parts. No lubrication!

^{**}Recommended Solution Strainer

^{*}Depends on type and conditions of soils to be removed

^{**}Required for most applications to prevent fouling or plugging of the unit from foreign material, i.e., scale, grit, and soils in solution. Additional strainers and/or finer mesh screens may be required depending upon the amount, nature, and size of foreign materials in solution.

SERVICING-DISASSEMBLY

- A. Refer to drawings J6-500-**, J6-500-BD-**, & J6-500-HT-** & variations.
 - A spanner wrench for the gears is available, part 80-124.
 - 1. Removal and disassembly of nozzle bodies.
 - a. Unscrew nozzles (10) and check condition and position of the stream straightener in the nozzle bore.
 - b. Loosen the 3 set screws (13) from tee (12).
 - c. Using a square edged tool inserted thru the nozzle body to catch the end of the nozzle head shaft (14), unscrew the assembly from the tee.
 - d. Hold the nozzle body (11), place a spanner wrench on the bevel gear (15) and unscrew the gear from the body. Remove ball bearings (16 & 17).
 - 2. Disassembly of lower body cap assembly.
 - a. Remove inlet cap (1) from body (2).
 - b. Remove the motor (3) from inside the body (2).
 - c. Remove the body (2) from the lower body cap assembly (7).
 - d. Loosen set screws (13) in the tee (12).
 - e. Locate the tee (12) in a soft jaw vice and grasp the rotor (4) and turn counterclockwise to unscrew the shaft (5).
 - f. Remove the rotor (4) from the vertical shaft (5) by unscrewing the 2 screws (24).
 - 3. Disassembly of lower body cap.
 - a. Remove the 3 screws (6) and the bearing retainer plate (23).
 - b. Remove the upper washers/bearings (20, 22, 16, & 17 dependent on the model) and the shaft bushing (21). Then remove the remaining washers/bearings.
 - c. Remove the bevel gear (9) using a spanner wrench from the lower body cap (7).

SERVICING-ASSEMBLY

- A. Refer to drawings J6-500-**, J6-500-BD-**, & J6-500-HT-** & variations.
- B. Pay particular attention to the drawing notes, as they provide the assembly notes, torques for assembly, ball counts for the bearings, and notification that a food-grade never-seez should be applied to all threads.
 - 1. Lower body cap assembly
 - a. Screw threaded bevel gear (9) to the lower body cap (7).
 - b. Depending on the model, the washer/bearing configurations vary.
 - J6-500-** = Insert 1 white (Teflon) washer (20) and 1 yellow (UHMW) (8) or bearings, surfaces of the washers with the rounded corners should face away from each other, forming a "doughnut" shape with white washer against the gear. Insert vertical shaft bushing (21) down thru the gear. Place 2 yellow (UHMW) washer (22), in "doughnut" shape over the bushing. Secure the bearing retainer plate (23) to the cap with 3 screws (6).
 - J6-500-BD-** = Invert the vertical shaft bushing (21) thru the cap/gear assembly from the bottom, apply a water film in raceway, alternately place stainless steel and nylon balls (16 & 17), 11 of each into the raceway. Carefully lift the cap assembly from the bushing, grasp and turn the bushing and place it in the cap/gear assembly from the top. Alternately place stainless steel and nylon balls (16 & 17), 14 of each into the raceway. Secure the bearing retainer plate (23) to the cap with 3 screws (6).
 - J6-500-HT-** = Invert the vertical shaft bushing (21) thru the cap/gear assembly from the bottom, apply a water film in raceway, place the stainless steel balls (16), 20 total into the raceway. Carefully lift the cap assembly from the bushing, grasp and turn the bushing and place it in the cap/gear assembly from the top. Place the stainless steel balls (16), 25 total into the raceway. Secure the bearing retainer plate (23) to the cap with 3 screws (6).
 - The vertical shaft bushing should spin freely in the lower body cap assembly.

2. Nozzle body Assembly

a. Depending on the model, the washer/bearing configurations vary.

J6-500-** & J6-500-BD-** = Invert the horizontal shaft (14) thru the bevel gear (15) from the bottom, apply a water film in raceway, alternately place stainless steel and nylon balls (16 & 17), 10 of each into the raceway. Carefully lift the gear from the shaft, grasp and turn the shaft and place it in the gear from the top. Alternately place stainless steel and nylon balls (16 & 17), 13 of each into the raceway. Install the O-Ring (19) onto the shaft. Screw nozzle body (11) onto the gear. Repeat for each nozzle body assembly.

J6-500-HT-** = Invert the horizontal shaft (14) thru the bevel gear (15) from the bottom, apply a water film in raceway, place stainless steel balls (16), 18 total into the raceway. Carefully lift the gear assembly from the shaft, grasp and turn the shaft and place it in the gear from the top. Place the stainless steel balls (16), 24 total into the raceway. Screw nozzle body (11) onto the gear. Repeat for each nozzle body assembly.

b. the horizontal shaft should spin freely in the nozzle body assembly.

3. Final assembly.

- a. Screw the nozzle body assemblies into each end of the tee (12), using a square edged tool inserted thru the nozzle holes. Lay the assembly on a bench top so that the nozzle holes in one body are right angles to the holes in the other. This so the holes in one body should be in the vertical plane while the holes of the other are in the horizontal plane.
- b. Secure the rotor (4) with the screws (24) to the vertical shaft with the short side blades facing the inlet stream from the angled drive holes of the motor.
- c. Place the lower body cap assembly in an upright position over the nozzle body/tee assembly. Mesh the bevel gears so that the nozzle body holes are at right angle to each other.
- d. Insert the vertical shaft/ rotor assembly thru the bearing bushing (21) in the lower cap assembly. Screw the vertical shaft into the tee (12) and tighten. Secure all shafts to the tee (12) by installing the 3 set screws (13).
- e. Screw the body (2) onto the lower cap assembly.
- f. Insert the motor (3) into the top of body until the motor locates on the body shoulder. Screw the inlet cap (1) to the body.
- g. Install the nozzles (10) into the nozzle bodies.
- h. All threads to be wrench tightened to the recommended torques.

PARTS FOR JUMBO® 6

(J6-500-**, J6-500-BD-**, J6-500-HT-**) & variations

PART NO.	REFERENCE NO.	DESCRIPTION
1	75-1603	Cap, Inlet
2	75-1601	Body, Outer
3	J6-101, D,P,R,S or J6-201	Motor (dependent on model)
4	J6-104	Rotor, 6T
5	J6-102	Shaft, Vertical
6	2-60-1	Screw, RH 8-32x5/16"
7	J6-305	Cap, Lower Body
* 8	J6-241 (J6-500 only)	Washer, Vert Shaft, UHMW-PE
9	J6-308-EP	Gear, 45T Bevel
10	J6-115-DA, FA, GA	Nozzles (4 reqd) 1/4", 5/16", or 3/8"
11	J6-313	Body, Nozzle
12	J6-110	Tee, Shaft
13	74-324	Screw, Set 10-32x1/4"
* 14	J6-112	Shaft, Nozzle Head
15	J6-309-EP	Gear, 44T Bevel
* 16	74-1172	Ball bearing .187 SS
* 17	J6-133 (J6-500/J6-500-BD only)	Ball bearing .156 Nylon
18	J6-314-SSA	Flow Splitter
* 19	2-31050-020 (J6-500/J6-500-BD only)	O-Ring-TFE
* 20	J6-341 (J6-500 only)	Washer, Thrust, TFE
21	J6-107	Bushing, Vert Shaft
* 22	J6-240 (J6-500 only)	Washer, Vert Shaft, UHMW-PE
23	J6-106	Plate, Bearing Retainer
24	2-61-1	Screw, RH 8-32x3/8"
25		Plugs, Motor Bypass
	*** J6-119-A	Orifice .25
	J6-119-B	Orifice.31
	J6-119-C	Orifice.38
	*** J6-119-D	Orifice.44
	J6-119-E	Orifice.50
26	*** 75-1410	Plug, Motor Bypass-solid

^(*) Recommended spare parts dependent on model, parts designated are the wear parts but the actual quantity and parts are unique to each model.

^(**) Specify nozzle size and quantity desired. Available size are 1/4", 5/16", and 3/8" nozzles. Other sizes are available but are considered special and costs will vary.

^(***) Plugs supplied with various units

















