



CASINJAC PRIMER

What is a Casinjac?

A Casinjac is a hydraulic jack used to lift and or lower strings of casing. Where did the term Casinjac come from?

The term Casinjac is derived from two words: casing (as in oil well casing) and jack (as in a lifting device).

It is a word made by combining two words and leaving off the last letter of each word.

What is a Casinjac used for?

A Casinjac's principle use is to lift and lower heavy strings of oil well casing and/or tubing.

A Casinjac is used to stretch a string of pipe by applying a known stretch force. The amount of stretch force, the resulting stretch, and the pipe's weight per foot are used as variables in a free point formula to determine the number of pipe that is being stretched.

A Casinjac is used to strain the pipe by applying an external force thereby creating a corresponding internal stress. The internal stress facilitates parting the pipe with explosive and other types of pipe cutters.

A Casinjac is used to apply the necessary lifting force to (1) finish parting the pipe or (2) start the pipe moving upward by overcoming the pipe string's weight and frictional forces.

A Casinjac is used to jack the pipe string up and remove joints of pipe until the load is within the safe pull force of a work-over or drilling rig.

A Casinjac is used to lower pipe strings when the weight of the string of pipe is more than the safe capacity of a work-over or drilling rig.

A Casinjac is used to "work pipe" by alternately raising and lowering a pipe string to condition the hole thereby potentially freeing up pipe that is stuck.

What is the lift capacity of a Casinjac?

Casinjacs are available in different models; current models have lift capacities of:

- 125 tons
- 196 tons
- 212 tons
- 282 tons
- 385 tons
- 424 tons
- 500 tons
- 1000 tons

A Casinjacs lift capacity is determined by;

- The number of cylinders used
- The bore of each cylinder
- The amount of hydraulic pressure applied (pounds per square inch)

Example:

Model 500 – 60 – 13 3/8 – 10.75 – 8.625 - 2

Max. Lift Capacity: 500 tons

Stroke: 60 inches

Pipe Capacity: 2 3/8" to 13 3/8"

Speeds: 2

Working Pressure: 5,000 psi

Cylinder Bore: 8.005 ins.

Cylinder Bore Area: 50.329 sq. ins. $(8.005/2)^2 * 3.1416$

4-Cylinder Area: 201.31 sq. ins. $(4 * 50.329)$

2-Cylinder Area: 100.66 sq. ins. $(201.31/2)$

4-Cylinder Lift Cap 1,006,550 lbs. $(201.31 * 5,000)$

2-Cylinder Lift Cap. 503,275 lbs. $(1,006,550/2)$

How do you determine the lifting or jacking speed?

The lifting or jacking speed is usually expressed in feet per hour.

The lifting speed is dependent upon the rate of flow of hydraulic fluid to the Casinjac. Higher rates of flow produce higher the lifting speeds.

Example:

A Model 196 – 60 – 10.75 - 8.625

Cylinder Bore (ins.): 5

Cylinder Rod Diameter (ins.): 3.5

Stroke (ins.): 60

Cylinder Bore Area (sq. ins.): 19.635 $((5/2)^2 * 3.1416)$

Cylinder Rod Area (sq. ins.): 9.621 $((3.5/2)^2 * 3.1416)$

4 – Cylinder Extend Volume (cu. Ins.): 4,712.4 $(19.635 * 60 * 4)$

4 – Cylinder Extend Volume (gals): 20.4 $(4,712.4/231)$

4 – Cylinder Retract Volume (cu. Ins.): 2403.4 $((19.635 - 9.621) * 60 * 4)$

4 – Cylinder Retract Volume (gals): 10.4 $(2,403.4/231)$

4 – Cylinder Extend-Retract Vol. (gals): 30.8 $(20.4 + 10.3)$

4 – Cylinder Total area 19.635 * 4 = 78.54

4 – Cylinder Lift Capacity 78.54 in. ² * 5000 psi = 393,700

lbs

2 – Cylinder Lift Capacity 19.635 in² * 2 = 39.37 in²

2 – Cylinder Lift Capacity 29.37in² x 5000 psi = 196,350 lbs.

Using a 50 gpm pump the above described Casinjac will extend and retract 97 inches per minute. (30.8:60:: 50:97)

4 - Cylinder Jacking Speed: 485 ft. /hr.

2 - Cylinder Jacking Speed: 970 ft. /hr.

OPERATING USING TWO CYLINDERS:

PROCEDURE

1. Fully retract the cylinder rods.
2. Pull pins on cylinder rod sleeves on cylinders to be isolated.
3. Close ball valves on lower manifold.

RETURNING TO FOUR CYLINDERS

1. Fully retract the cylinder rods.
2. Open ball valves on lower manifold.
3. Place pins in cylinder rod sleeves

INSTALLING HOSES TO CONNECT CASINJAC TO HPU

1. Refer to HPU operating Instructions to determine what connection on the HPU connects to the Top Manifold and what connection connects to the bottom manifold and connect the hose assemblies accordingly.
2. Bleed the pressure off the lines that have quick- disconnects on each end of the hose assemblies, the Casinjacs manifolds, and the HPU **should not be connected or disconnected under pressure.** The Quick Disconnects should be fully made up before using. Connecting or disconnecting under pressure and/or not fully making up can cause damage to the quick disconnects and cause them to act like check valves.

**STOP EXTENDING RODS BEFORE THEY ARE FULLY EXTENDED.
STOP RETRACTING RODS BEFORE THEY ARE FULLY RETRACTED.**

Take time to bleed air from the cylinders. When the Casinjacs are lifted via the pad eyes on top and the rods extend this is evidence of entrained air. Keep air bled-off to prevent damage to the cylinder rod seals.

Determine the size and working pressure of the wellhead flange the Casinjac is to be mounted on and determine bolts needed (2) to fit holes drilled and tapped in wellhead flange that bolt circle and bolt hole in the flange bolt circle.

PIPE CAPACITY OF 500 – 60 – 13.375 – 10.75 – 8.625

TOP BOWL	13 3/8 – 11 3/4
BOTTOM BOWL	13 3/8 – 11 3/4
LARGE INSERT BOWL (2)	10 3/4 - 9 5/8
SMALL INSERT BOWL (2)	8 5/8- 2 3/8

The taper of all bowls is 4/12 and all slips used in them should have 4/12 taper

A good quality of thread dope should be used to coat the tapered surfaces of the bowls and slips.

Periodically stop and clean the back of the slips and the slip- bowls inclined surface.

Inserts – make sure the slip inserts are clean and in good condition

Operating a Casinjac

Extend the rods 18 – 24 inches before placing slips in top bowl. This will assure that you will always be able to “get off “the pipe string.

It is a good practice to stop the upstroke before the rods are fully extended and to stop the down stroke before the rods are fully retracted.

Casinjac Counter Balance Valve

The counterbalance valve is installed on the lower manifold of the Casinjac. The counterbalance valve on Model 500 – 60 – 13.375 has a KFF/S steel body and a CBIG-LCN cartridge manufactured by Sun Hydraulics Corporation.

- 4.5 :1 pilot ratio, load holding to 4000 psi (with 5000 psi settings)
- Load reactive pilot assist for over center load control
- 25 psi cracking pressure
- Adjustment range 2000 – 5000 psi
- 3000 psi Standard Setting
- Standard Screw adjustment (turn screw adjustment clockwise to reduce setting and release load. Complete adjustment range in 3 turns.
- Setting should be 1.3 times max. load induced pressure (Since it is difficult to set the other than on a bench the factory setting at 3000 is usually maintained.)

The bottom plate (WAP) on a Casinjac should be used at all times. In some Models this plate has holes drilled and tapped to fit wellhead flange bolt circles and bolts. Placing flange bolts in the WAP holes assists in centering the Casinjac over the wellhead.