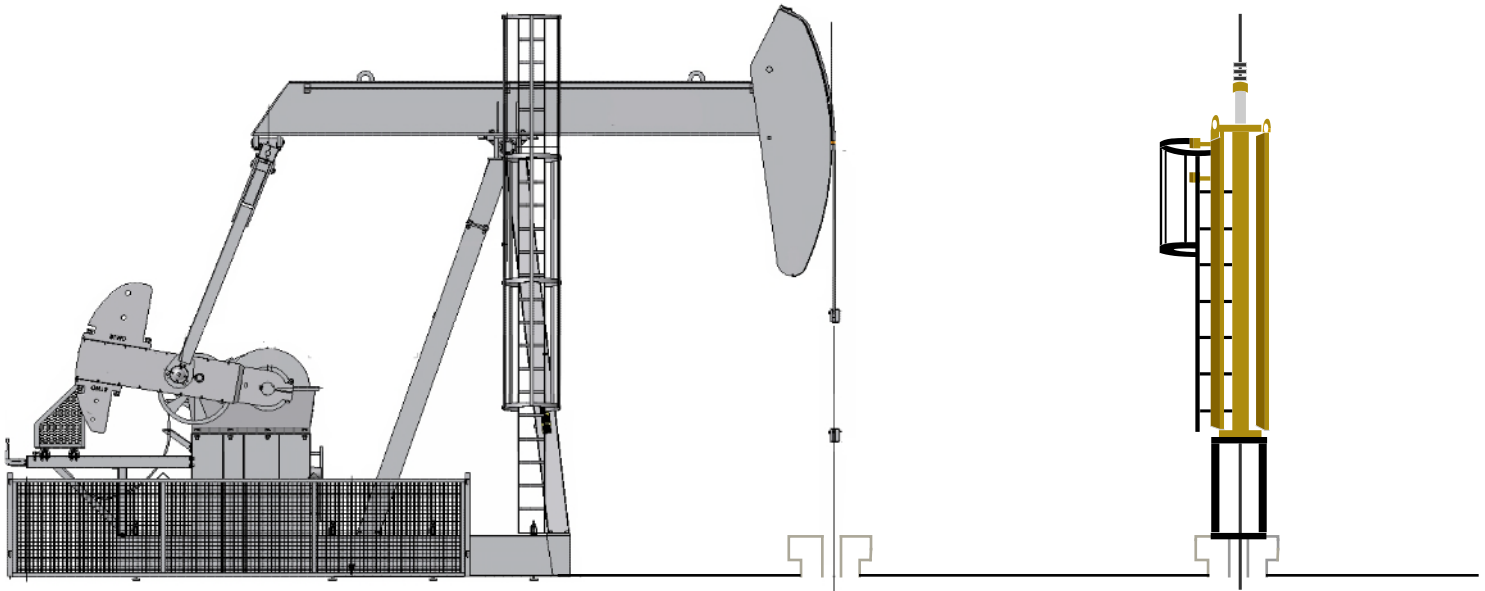


# GOLDEN ROD HYDRAULIC PUMP JACK

# 20 Series

## Why Buy ICI?

CONVENTIONAL PUMP JACK  
VERSUS THE ICI GOLDEN ROD



### WELL SPECIFICATIONS

Pump Depth	<b>6520</b>	Feet
Stroke Length	<b>120</b>	Inches
Pump Diameter	<b>2</b>	Inches
Tubing Size	<b>2.875</b>	Inches
Strokes Per Minute	<b>5.5</b>	SPM
Peak Polished Rod Load	<b>22,100</b>	lbs

### PRODUCTION POTENTIAL

	Bbls/Day	M3/Day
Production @ 100%	<b>306.0</b>	<b>48.9</b>
Production @ 80%	<b>244.8</b>	<b>39.1</b>

### PRODUCTION REVENUES assuming \$50/bbl

Gross Revenue per Day	<b>CAN\$12,240.00</b>
Gross Revenue per Hour	<b>CAN\$ 510.00</b>

### UNIT SPECIFICATIONS

#### 320-256-120

#### GR-20-120

	320-256-120	Units	GR-20-120	Units
Polished Rod Capacity	<b>25,600</b>	lbs	<b>30,000</b>	lbs
Stroke Lengths	<b>90 , 105 , 120</b>	Inches	<b>0 - 120</b>	Inches
Unit Width	<b>6.9</b>	Feet	<b>5 (incl. ladder)</b>	Feet
Unit Length	<b>30.4</b>	Feet	<b>3</b>	Feet
Unit Height	<b>23</b>	Feet	<b>15</b>	Feet
Foot Print	<b>22 X 7</b>	Feet	<b>n/a (bolts directly to wellhead)</b>	
Total Weight	<b>32,550*</b>	lbs	<b>1,050</b>	lbs

(\*not including counter balance weights, concrete pad and crank arms)



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### INITIAL CAPITAL COSTS SAVINGS

Depending on the size of the conventional unit selected, initial capital cost savings for the surface pumping equipment will range from \$15,000 - \$25,000 +

### INSTALLATION COSTS SAVINGS

	320-256-120	GR-20-120	SAVINGS
Gravel Base and Cribbing	\$2,500.00	N/A (bolts to wellhead)	
Concrete Pad	\$1,975.00	N/A (bolts to wellhead)	
Shipping of Unit (300km radius)	\$1,200.00	\$330.00 (\$1.10 per km)	
Shipping of Pad (300km radius)	\$1,000.00	N/A	
Picker and Crew	\$1,500.00 *Excludes cost of driving piles ~\$4,000 - \$15,000	\$520.00 (\$90/hr for picker) (\$40/hr for second mechanic)	
	<b>\$8,175.00</b>	<b>\$850.00</b>	<b>\$7,325.00</b>

INSTALLATION COST SAVINGS **\$7,325.00**

### PRODUCTION DOWNTIME

	320-256-120	GR-20-120
Estimated Time	24 - 48 hours	3 hours
Production Downtime	24 - 48 hours	3 hours
Production Costs (@ \$510/hr)	\$12,240 - \$24,480	\$1,530

### Additional Notes:

- Further installation cost savings can be achieved by shipping the ICI pump jack with the downhole pump and rods.
- ICI's pump jack can be installed with the service rig or a flushby unit. The unit can be pumping the well within 45 minutes of installing the rods.
- Typical installations can be completed within 3 hours (versus days for a conventional jack with the required site preparation).
- ICI's pump jack can be used to production test the well



## Why Buy ICI?

### CONVENTIONAL PUMP JACK VERSUS THE ICI GOLDEN ROD

#### OPERATIONAL COSTS SAVINGS

The Golden Rod 20-Series hydraulic pump jack was designed as a user-friendly, easy-to-optimize artificial lift solution. No two wells are the same and the surface equipment must adapt to changes in the well to ensure reserves are produced in an efficient and optimized manner. The following highlights ICI's built in operational cost saving features:

#### CHANGE OF STROKE LENGTH

##### Steps:

##### 320-256-120

- 1 Shut down surface pumping equipment  
Lower rod string until horse's head is down
- 2 Chain beam down to prevent movement
- 3 Undo bolts on pitman arm
- 4 Remove pitman arm from wrist pin
- 5 Hammer wrist pin nut to remove from crank arm
- 6 Clean out desired hole on crank arm
- 7 Clean wrist pin
- 8 Hammer wrench wrist pin onto crank arm
- 9 Attach pitman arm
- 10 Repeat from step 3 on the other side of the jack

##### Steps:

##### GR-20-120

- 1 Adjust proximity switch bracket  
Using a 9/16 wrench, lower or raise the proximity switches to achieve the desired stroke length

	320-256-120	GR-20-120
Estimated Time	4-8 hours	1 minutes
Production Downtime	4-8 hours	no downtime
Production Costs (@ \$510/hr)	\$2,040-\$4,080	\$0

**COST SAVINGS ON EACH STROKE LENGTH CHANGE (not including labour) \$2,040.00 - \$4,080.00**

#### Additional Notes:

- Conventional jacks are limited to certain stroke lengths, typically having 3 settings available. Any change in behavior of the well may require re-sizing of equipment to optimize the well and removal of the existing equipment and concrete pad. The ICI hydraulic pump jack, on the other hand, was designed to have a truly variable stroke length. Two proximity switches on the top and bottom of the jack are used to determine when the jack should shift from the upstroke to the downstroke and vice versa. The spacing of the proximity switches determines the length of the stroke. Moving them closer together will result in a shorter stroke. Moving them further apart results in a longer stroke. Its that simple. Adjusting two 9/16 bolts while the unit is running will allow you to achieve from a 0" up to a 120 inch stroke and any length in between.

- Given the it's ability to achieve numerous stroke lengths, the Golden Rod becomes very versatile, replacing several pumping requirements with just one jack:

- The GR-20-120 can replace conventional pumpjacks:
  - 456-256-120
  - 320-256-120
  - 320-213-120
  - 228-213-120 and anything below.
- The GR-20-86 can replace conventional pumpjacks
  - 320-213-86
  - 228-246-86
  - 228-213-86
  - 160-173-86
  - 114-119-86 and anything below.



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#### CHANGE OF STROKE SPEED

##### Steps:

##### 320-256-120

- 1 Shut down surface pumping equipment
- 2 Apply Brake
- 3 Clamp off polished rod at stuffing box
- 4 Remove bridal clamp on the polished rod  
This will release the energy from the system
- 5 Loosen motor  
Undo motor mounts  
Slide motor ahead to loosen belt  
Remove belt and sheaves
- 6 Change Sheave  
Replace with smaller or larger sheave  
Add jack shaft or extra pulleys
- 7 Realign Drive System
- 8 Attach bridal clamp
- 9 Remove polished rod clamp
- 10 Restart system and check speed  
If incorrect repeat from Step 1

##### Steps:

##### GR-20-120

- 1 Turn flow control knob  
Turn knob clockwise to decrease downstroke speed  
Turn knob counter clockwise to increase downstroke speed
- 2 Adjust Pressure Screw  
Increase hydraulic pressure for faster upstroke  
Decrease hydraulic pressure for slower upstroke

	320-256-120	GR-20-120
Estimated Time	2-4 hours	15 minutes
Production Downtime	2-4 hours	no downtime
Production Costs (@ \$510/hr)	\$1,020-\$2,040	\$0

**COST SAVINGS ON EACH STROKE SPEED CHANGE (not including labour) \$1,020.00 - \$2,040.00**

#### Additional Notes:

- The ICI hydraulic pump jack was designed for easy optimization with no production down time. This capability is particularly important in heavy oil and in dewatering applications. In high sand content heavy oil production, stopping production even for a short period of time can allow the sand to settle out of the fluid and plug the flow of the well.
- Conventional pump jacks, by their design are restricted to having an upstroke speed that is the same as the downstroke speed. This constant motion creates difficulty in optimization, as full downhole pump fillage is difficult to obtain (if the upstroke only allows the pump to be filled half way, a half filled pump will be discharged on the next stroke). The ICI hydraulic jack has independently controlled up stroke and down stroke speeds. By varying the speeds to maximize pump fillage, the ICI hydraulic jack can achieve higher production rates at a lower stroke rate.
- Additionally, the up and down speed of conventional jacks can exacerbate the problem of rod stretch (surface equipment may be starting the upstroke while the bottom of the rod string may still be moving downwards). This whipping effect will cause premature wear on pump or parting of the rods. Rod stretch also results in a shorter effective stroke. The ICI hydraulic jack has the ability to pause on both the upstroke and downstroke. This will allow the rod string to "catch up" to the surface equipment, reducing rod stretch and increasing production efficiency.
- Overspeeding conventional jacks can result in fluid pound, causing potential damage to the pump and buckling of the rod string.



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#### TAPPING THE WELL TO RID OF GAS LOCK

##### Steps:

##### 320-256-120

- 1 Shut down surface pumping equipment  
Bring crank arms to 11 o'clock
- 2 Apply brake
- 3 Clamp polished rod at stuffing box
- 4 Release break - move arms to 12 o'clock
- 5 Adjust top clamp  
Loosen clamp  
Move down (or up) ~ 6 inches  
Retighten clamp
- 6 Loosen bottom clamp  
Let bridal cable fall to stuffing box
- 7 Restart jack
- 8 Repeat if not on tap
- 9 Repeat to take well off tap

##### Steps:

##### GR-20-120

- 1 Lower bottom proximity switch  
Using a 9/16 wrench, lower switch 6"  
Feel polish rod to determine if well is on tap
- 2 Raise bottom proximity switch to take off tap

	320-256-120	GR-20-120
Estimated Time	2-4 hours	4 minutes
Production Downtime	2-4 hours	no downtime
Production Costs (@ \$510/hr)	\$1,020-\$2,040	\$0

**COST SAVINGS ON EACH ON TAP/ OFF TAP CHANGE (not including labour) \$1,020.00 - \$2,040.00**

#### Additional Notes:

- In normal pump operation, downward pressure is applied to the fluid inside the pump - which cannot be compressed - forcing the standing valve to seat. As the stroke continues downwards, the pressure inside the pump will exceed the pressure in the tubing string above, causing the traveling valve to open and allowing it to move to the bottom of the pump. When gas enters the pump (either as free gas or through flashing of the fluid as it moves from high pressure to the lower pressure in the pump) the downward pressure compresses the gas, and as a result, does not create the force necessary to unseat the traveling valve. On the upstroke, the gas decompresses and does not create the pressure differential necessary to unseat the standing valve. In this state no fluid can enter the pump as it is gas locked. Tapping the well can eliminate the gas and restore the pump to normal operation.

- ICI typically installs 6 inches off tap to aid the operators in making quick adjustments. Lowering the bottom proximity switch bracket 6 inches will allow the operator to put the well on tap in seconds with no downtime.

