Cook Pump Company

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INSTALLATION & SERVICE MANUAL
for
BEAM BALANCED PUMP JACKS

Cook Pump Jacks… Precision built for long life and trouble free service.

Foreword

This manual has been compiled to assist you in properly installing, operating, and maintaining your Cook Pump Jack. With proper installation, operation, and maintenance, you can expect your Cook Pump Jack to serve you for many years.

Before setting up and installing your Cook Pump Jack, take time to thoroughly familiarize yourself with the contents of this manual. After all sections have been read and understood, retain this manual in a readily accessible location for future reference.

The information in this manual is not intended to supersede or in any way discount or replace any installation, operating, or maintenance procedures already in place with any operator, nor any requirements, regulations, safety codes, or procedures issued especially by any governmental or insurance agency. Instead, it is our wish that this information be used only in a way that compliments all such procedures, requirements, regulations, or safety codes.

Especially for the purpose of making sure critical issues are conspicuously addressed, procedure descriptions in this manual may not contain less complicated details. For the same reason, pictures may show safety protection removed. It is not intended for these omissions to be in any way construed to suggest that Cook considers or suggests it is ever OK to shortcut procedural steps or to operate yourself or your Pump Jack in any unguarded, unsafe, or improper manner. This manual is not intended to be all inclusive. A manual that would adequately address every possible variation that can be encountered in the Oil Patch would be an unbelievably huge task. Instead it is intended that this manual address many common variations. Additionally, this manual has been compiled with the assumption that all who read this manual have at least a working knowledge of mechanical operations and safety procedures. If more detail is wished simply contact your Cook Pump Jack Distributor.

Here at Cook, we are constantly listening to those who operate our equipment as well as reviewing our design and manufacturing processes for the purpose of increasing the quality and performance of our Pump Jacks. Especially because of this, everything in this manual is subject to change without notice.

Any time you are unsure of a procedure, require technical data, or wish additional information, it is always best for you to first contact your local Cook Pump Jack Distributor. Your local Distributor is usually your most accurate source for solutions and procedures that work best in your select area, and of course you are always welcome to contact us directly anytime.

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=== WARNING ===

NEVER install, operate, service, or maintain your Pump Jack without proper instructions.

NEVER service or repair your Pump Jack without first shutting off and securing the power supply then securing all moving parts of the Pump Jack and associated well equipment.

NEVER operate your Pump Jack without safety guards in place.

In this manual **"CAUTION"** is used to note when mishandling an operation, procedure, or practice can be expected to result in at least equipment damage.

And **"WARNING"** is used to note when mishandling an operation, procedure or practice can be expected to result in at least personal injury, and possibly even death.

However, do not misunderstand the above **"CAUTION"** and **"WARNING"** notes. Just because **"CAUTION"** above does not specify a risk of injury or death it is not intended to suggest such risk does not exist in those instances and likewise for **"WARNING"**. And just because no **"CAUTION"** or **"WARNING"** note appears beside a stated operation, procedure, or practice, it is not intended to suggest such risks do not exist. A percentage of risk of equipment damage, personal injury, or death is always present during any operation, procedure, or practice.

Therefore it is always best to:

Make Safety First... Not Last

Read this Manual completely before beginning installation or any procedure or operation on or around your Cook Pump Jack

Always use extreme caution during installation, operation, maintenance, or simply being near any Pump Jack. All personnel operating for any reason on or around Pump Jacks should be at least fully instructed in the movement of each part of the Pump Jack and the danger potential of each of those movements. Improper actions around any Pump Jack can be expected to produce serious results.

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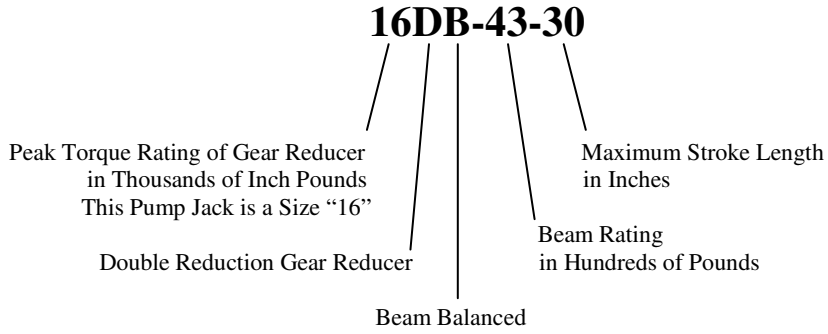
Explanation of our Pump Jack Model Numbers



In today's industry, Pump Jacks are sized according to the performance rating of the gear reducer. For instance, the performance rating of the gear reducer on our Model 16DB-43-30 Pump Jack is 16,000 inch pounds of torque. We refer to this Pump Jack as a Size 16. It is the same for our Size 25, 40, and 57 Pump Jacks as well. Our two smaller Pump Jacks are "Sized" a bit differently.

Cook Pump Jacks were born many years ago right here in the heart of shallow well territory and in those days Cook Pump Jacks ranged from Size 2D through Size 7D. Today, our Size 3D and 4D Pump Jacks continue to be favorites among shallow well producers. Many people in the industry today know exactly how much work a Cook Size 3D or Size 4D Pump Jack will do, but they are less familiar with the performance capability of a Size 10 or a Size 13 Pump Jack because they have never needed to become familiar with those numbers. We wish to honor this knowledge base and have chosen to continue referring to our two smallest Pump Jacks as Size 3D and Size 4D as a way of keeping this unique part of America's Oil History alive.

Today our current product line is:

3D-10-23-18 4D-13-32-20 4D-13-23-29

16DB-43-30 25DB-67-36 40DB-89-48 57DB-109-54

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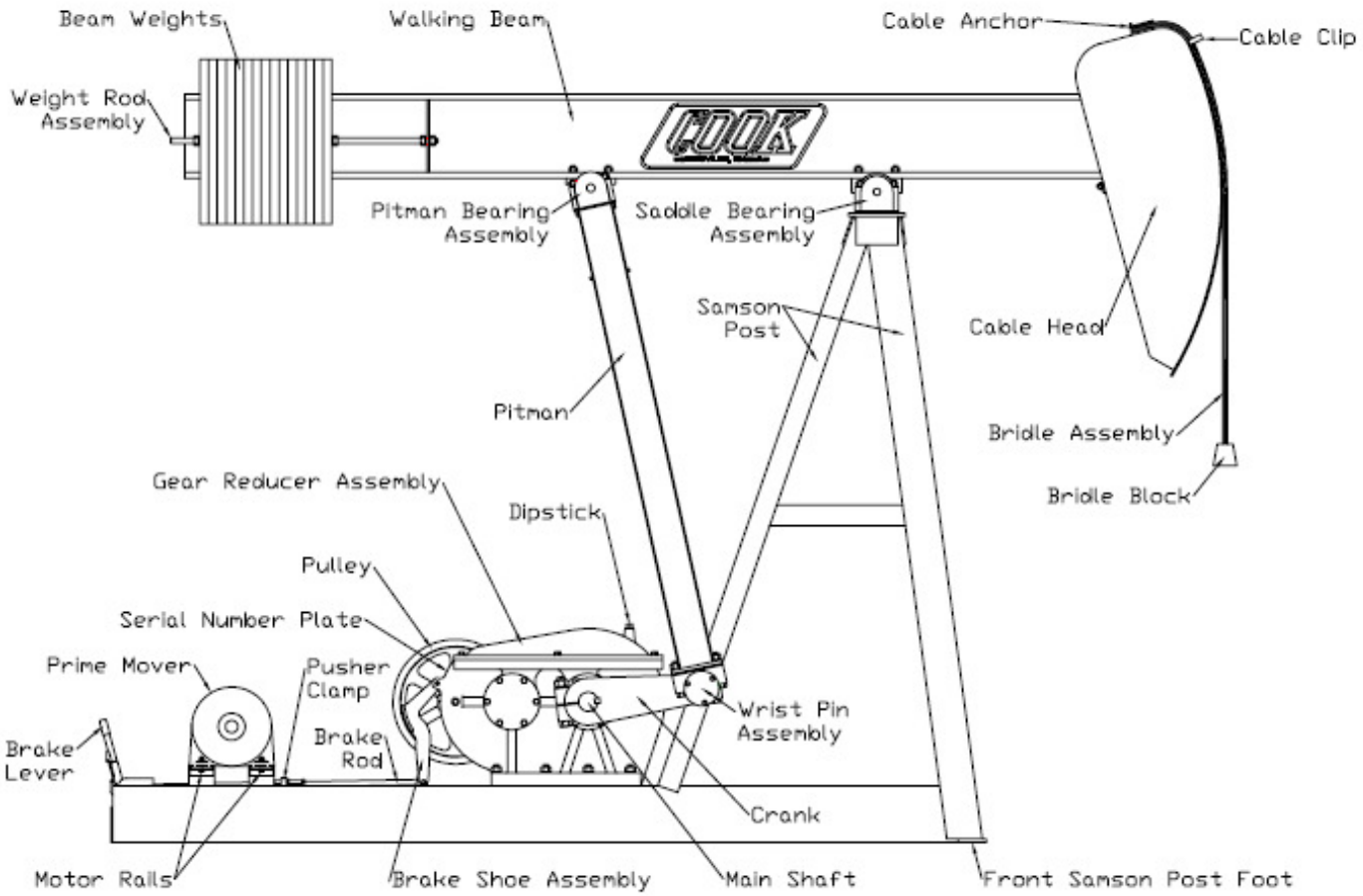
Cook Pump Company

A history of quality-built equipment and dependable service.

Cook Pump Jack
Final Assembly

Standard T-Base Frame

and the part names we use



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INSTALLING & SETTING UP YOUR NEW COOK PUMP JACK

FOUNDATION

Especially because of the vast number of variables that can be encountered in the ground conditions at each individual well site, there is no single prescribed size, shape, depth, characteristic, or materials requirement for the foundation for a Pump Jack. How you meet each of these requirements will be based upon your specific knowledge and experience with the ground conditions as they exist at the well site, the weather conditions common to your area, the freezing and thawing the ground may experience, your operational requirements, and the performance you require from your Pump Jack. It is terribly important that the foundation you provide be constructed in a way that provides a stable foundation for the Pump Jack throughout its entire life at the well. A proper, stable foundation not only helps in saving undue wear and damage to your Pump Jack and related well equipment, it can also be a significant factor in helping to make the Pump Jack more efficient as well as keeping the well site safe.

Important points to consider when constructing the foundation for your Pump Jack. Also reference figure below.

> Nearly all of the weight of the well load and counterbalance load is supported by "A" the front samson post foot, and "B" the main shaft. Those are the places the foundation must provide the greatest amount of support.

> There needs to be additional support at "C" under the prime mover to further stabilize your Pump Jack and provide proper support for the prime mover.

> These three areas of your Pump Jack require support whether you are constructing a foundation on the ground or a sub base for your Pump Jack.

> These three areas of your Pump Jack require support whether your Pump Jack is a T-Base model or Wide Base model.

> The foundation you construct should be wider and longer then the widest and longest parts of your Pump Jack frame.

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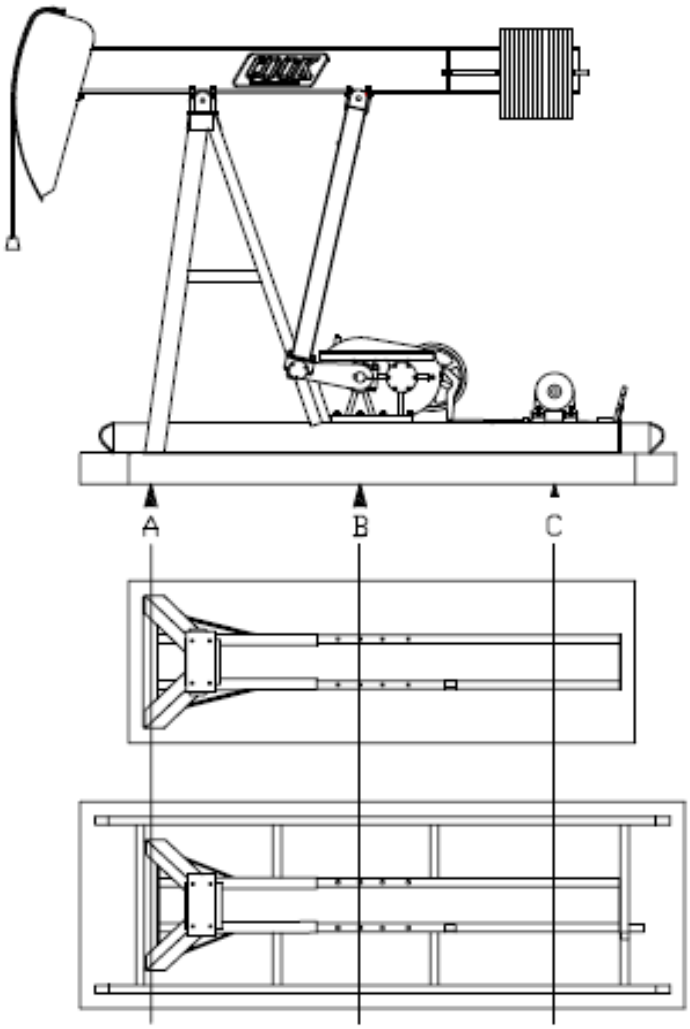
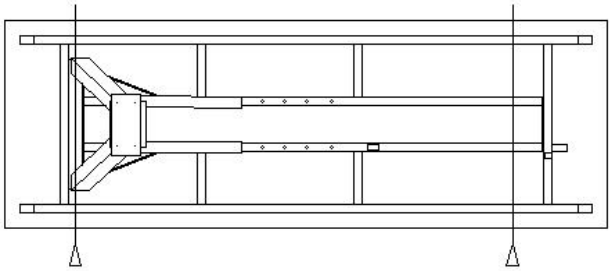


"CAUTION" *There have been instances where not providing support in the proper areas has resulted in damage to the Pump Jack. It is almost common to come upon a well site and see a Pump Jack supported in only 2 places, reference figure below.*



One support has been set toward the front of the Pump Jack and the other support toward the rear. The reason for this is somewhat understandable: it is easier to level and stabilize 2 points then it is to level and stabilize 3

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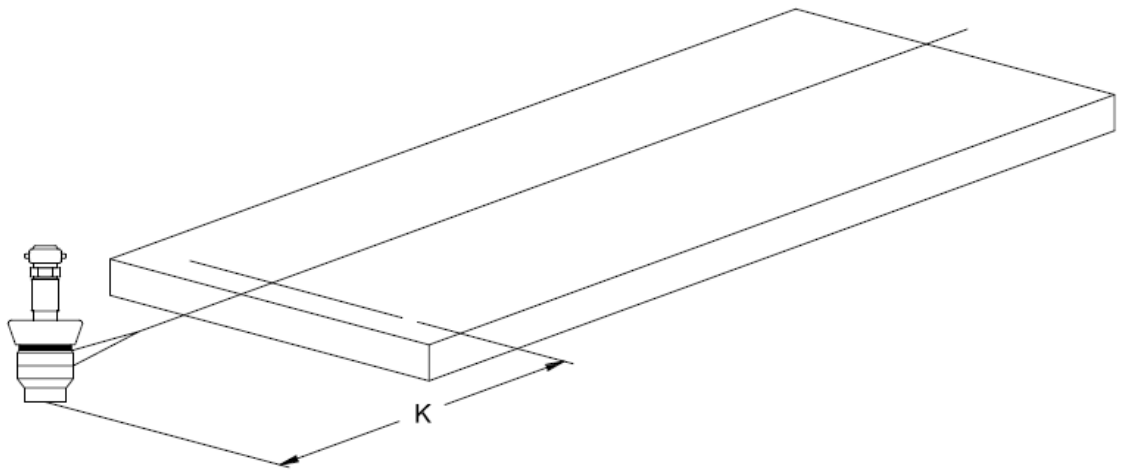
points. However, supporting your Pump Jack in this way leaves the major load point under the main shaft unsupported. When your Pump Jack is supported in only 2 places as shown above, the frame will flex up and down in the center under the main shaft through every pump cycle. What happens when you repeatedly bend metal back and forth? That's right, it breaks and the same thing happens to metal Pump Jacks that flex enough times. Usually you will first notice the bolts securing the gear reducer to the frame becoming loose or actually breaking. Next, the gear reducer feet may break. Then, as the metal continues to fatigue, other parts of your Pump Jack may break. The frame rails have been known to break at a point between the back samson post legs and the front of the gear reducer. All this grief can be avoided by properly supporting the major stress points of your Pump Jack.

Once the foundation is ready for your Pump Jack, mark the full length of your foundation with a centerline that is in line with the center of the well. Your Pump Jack is to straddle this line. A mark for how far back the front of the Pump Jack is to set from the center of the well should also be marked on the foundation. You can find this dimension "K" in the Structural Dimensions page in the back of this book. "KT" is the proper set back dimension for a T-Base model Pump Jack and "KW" is the proper set back dimension for a Wide Base model Pump Jack. Aligning your Pump Jack with these lines will provide a very close starting point for the final alignment of your Pump Jack to your well. Reference figure below.



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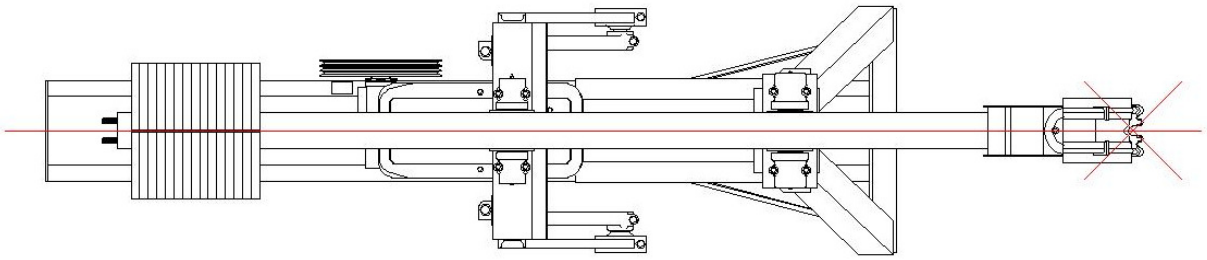
ALIGNING YOUR PUMP JACK TO THE WELL

Aligning your Pump Jack to the well is so much more than simply placing a level on the Pump Jack frame runners and dropping a plumb bob from the head to the stuffing box. Alignment in that fashion merely levels your Pump Jack with the ground and positions it over the stuffing box at whatever position the walking beam is setting at the time you dropped the plumb bob. That procedure is only successful when the well bore is 100% vertical and the foundation is 100% level. But proper alignment assures your Pump Jack is properly in line "with the well." Proper alignment to the well reduces or eliminates excessive wear on all parts of your Pump Jack as well as many of the well components.

First, your Pump Jack needs to be positioned so the Bridle Block is directly above the stuffing box. Then the rest of the Pump Jack would be positioned as if a string is run from the center of the well to the back of the Pump Jack and the Pump Jack sits completely astraddle that string. Reference figure below.



Next, your Pump Jack needs to be aligned with how the well is coming out of the ground (the well bore). As a general rule, newly drilled wells are reasonably vertical, and stay reasonably vertical – as long as the ground never shifts. But in the real world, some areas of this earth are very active. Ground movement can be from too much water or too little water, freezing and thawing, geologic activity, etc. Many different things can cause the ground at a well site to be active. Regardless of why the well is at an angle, the Pump Jack needs to continually match that angle throughout its life at the well site. This may require you to check the alignment and realign your Pump Jack often. Reference figure below.

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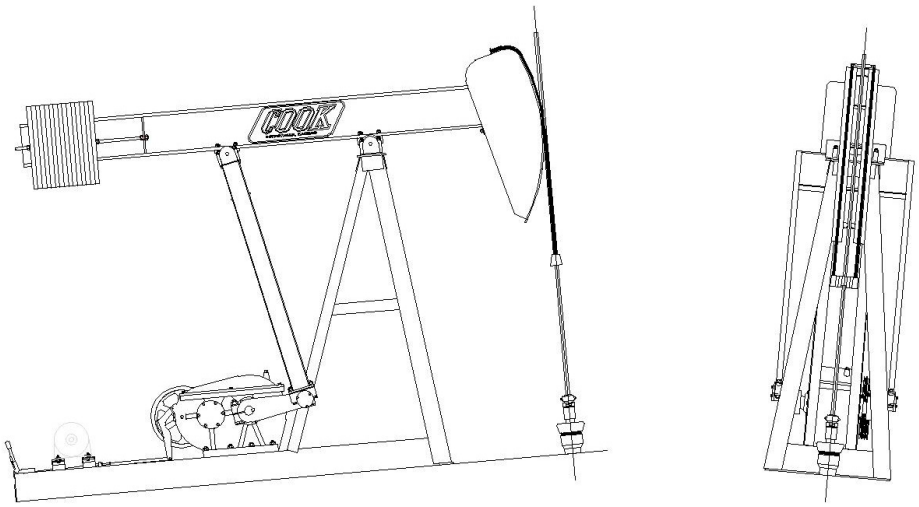

"CAUTION" *A Pump Jack that is not properly positioned or aligned to the well can be expected to pull sideways on the polish rod. Not only does this cause excessive wear on the stuffing box and related equipment, it also side-loads the Pump Jack frame bearings causing excessive wear on those parts as well. A Pump Jack that is not properly positioned or aligned to the well can also overstress the Pump Jack structure enough to shift the Pump Jack on its foundation. If the Pump Jack shifts enough that the major load points are no longer supported properly, several parts of the Pump Jack are subject to damage.*

ASSEMBLY OF YOUR PUMP JACK

All Cook Models 3, 4, and 16 usually ship completely assembled except for beam weights, safety guards, and bridle assembly. All other Cook Pump Jacks ship in varying stages of disassembly and require some assembly in the field.

SAMSON POST – The samson post of the Cook Model 57 ships as a separate piece and will require assembly in the field. Attach lifting lines to the top of the samson post and lift it up over the frame structure. Align the samson post mounting holes at the base of each samson post leg over the corresponding holes in the frame structure and fasten with the bolts, lock washers, and hex nuts provided.

WALKING BEAM – The walking beam of the Cook Models 40 & 57 ships as a separate piece and will require assembly in the field. Attach lifting lines to the walking beam, lift the walking beam and place it over the saddle and pitman bearings. Line up the holes in the walking beam with the corresponding holes in the saddle and pitman bearing assemblies and fasten with the bolts, lock washers, and hex nuts provided.

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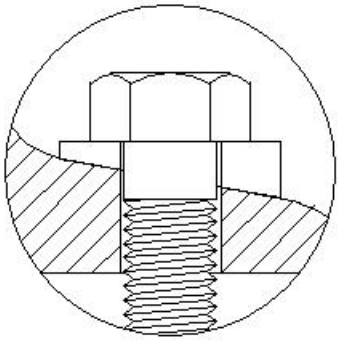
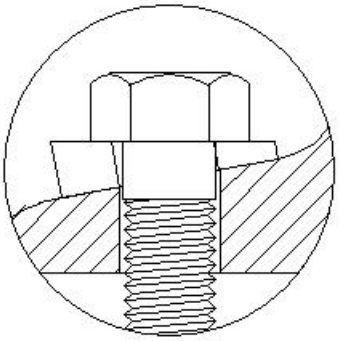
"CAUTION" *Whenever you are bolting to C Channel, or an I Beam instead of a Wide Flange Beam, wedge washers are necessary to allow the bolts proper alignment. If the wedge washers are installed upside down, bolt alignment will still be proper but the bolt clearance through the washer may not be sufficient and the interference may cause the washer to break. Reference figure below.*



RIGHT



WRONG

STROKE LENGTH – You will notice there are more than one set of bolt holes for bolting the pitman bearing assembly to the walking beam. This is where the stroke length of your Pump Jack is adjusted. The further toward the front of the Pump Jack you mount the pitman bearing to the walking beam, the longer the stroke length. Then, of course, the further toward the back of the Pump Jack you mount the pitman bearing assembly to the walking beam the shorter the stroke length. Reference figure below.

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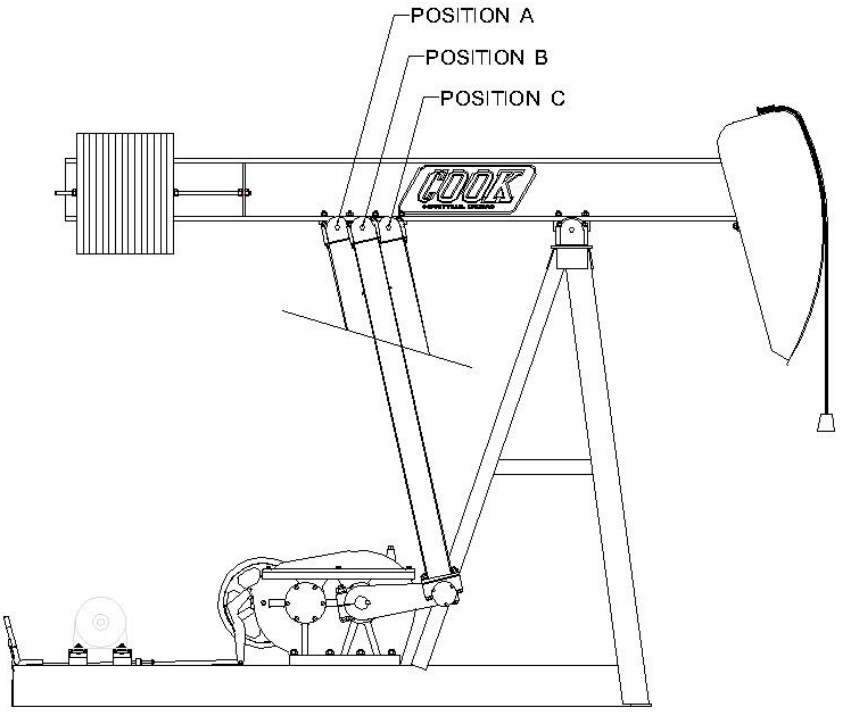

At “Position A” the stroke length will be the shortest and at “Position C” the stroke length will be the longest.

HEAD ASSEMBLY – The head of the Cook 25, 40, & 57 ships as a separate piece and will require assembly in the field. Attach a lifting line and lift the head up and hook it over the flange on the front of the walking beam. Let the mounting angle bracket rest against the faceplate and apply the bolt, lock washer, and hex nut provided. At this time, leave the mounting bolt loose. Adjust the head vertically with a plumb bob string against the cable runner on the front of the head until the string is centered in the cable runner then tighten the mounting bolt.

BRIDLE ASSEMBLY – To attach the bridle assembly to the head, simply loop the cable around the cable anchor at the top of the head and under the cable clips on the front of the head. Some models have a small hex head bolt in the top lip of the cable anchor. In that case you should first remove that small hex head bolt in the lip of the cable anchor at the top of the head then loop the cable around the cable anchor. Straighten the cable assembly so the bridle block hangs straight. Once you have a load on the bridle assembly and the load has self-centered the cable on the head, replace the small hex head bolt and tighten.

BRIDLE BLOCK TO POLISH ROD – On the Cook Models #3 & #4 the polish rod hole in the bridle block is a full circle. The bridle block must be raised to the top of the polish rod and lowered down over the polish rod. On all other Cook Pump Jacks, the polish rod hole is an open oval. The bridle block is simply pushed up against the polish

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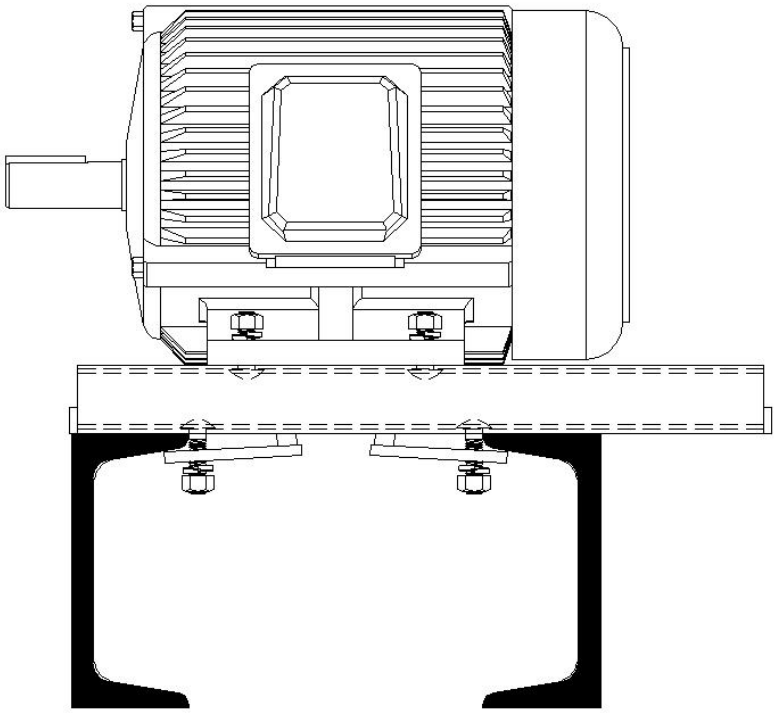
rod and the bridle block window supplied with the bridle cable assembly is dropped into the slot in the bridle block trapping the polish rod into the bridle block.

MOTOR AND MOTOR RAILS – Attach the motor to the two motor rails on the rear of the Pump Jack. These motor rails are large enough to allow motors of various sizes to be placed in proper alignment with the gear reducer sheave. Use the pusher clamps to push the motor/motor rail assembly to tighten the V-belts.



V-BELT INSTALLATION – In order to properly install V-belts, the center distance between the drive pulley and the gear reducer pulley should be reduced so the belts can be installed without force. Prying a belt over a pulley can damage the belt. Tighten the belts according to the belt manufacturer's specifications. An over tightened belt can severely shorten the life of the belt as well as the bearings in the gear reducer and the motor. As the belts reach proper tightness use a straight edge, if available, to check pulley alignment. If a straight edge is not available a taught string may be used. Be sure to check both sides of the drive.

After installation, run the drive for 30 minutes or so then recheck alignment and tension and correct as necessary. Belts should show no signs of slipping when operating under load. If the drive is a multi-belt system, a loose belt may indicate a mismatched set and a new, matched set should be installed.

BEAM WEIGHTS TO BEAM - When installing beam weights, **First Immobilize Your Pump Jack.** This includes shutting off and securing the power supply. Then securing the front and back of the walking beam with chains or other acceptable means.

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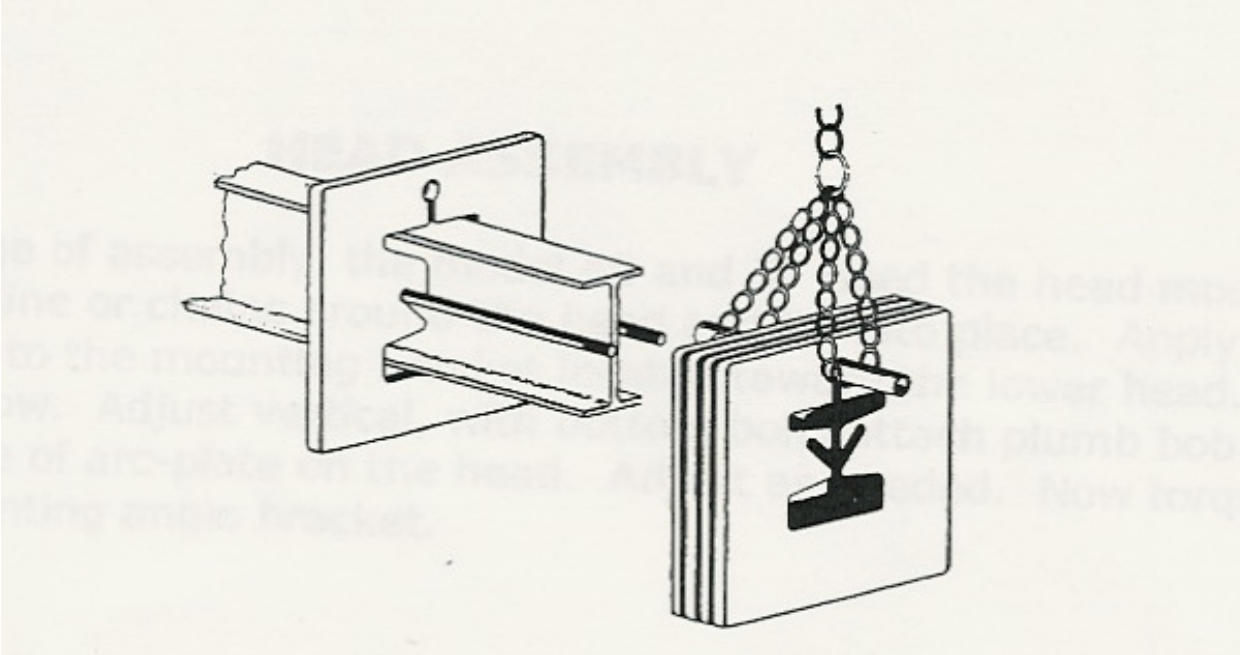
Also remember to set the brake, if your Pump Jack has a brake, otherwise secure the pulley with a chain or other acceptable means.

To place the beam weights on the counterweight section of the walking beam slide a 2” diameter steel rod through the hole in the top of the beam weights, about 3 or 4 beam weights at a time. Loop a chain around both ends of the rod and up to the lifting hook, reference figure below. Now lift them up to the walking beam and push them onto the walking beam and weight rods.



Once the proper number of beam weights are on the beam they need to be secured. Fasten with the flat washers and hex nuts provided, as shown in figure below.

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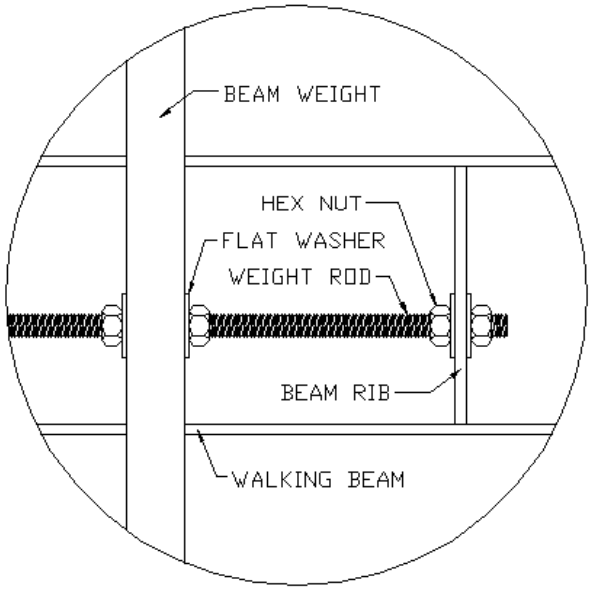

"WARNING" *Proper handling of beam weights requires great care. Mishandled beam weights can easily cause damaged equipment, crushed or severed appendages, and broken bones. Keep fingers hands and feet from under and between the beam weights at all times. Also keep fingers out of the cut-out areas where the walking beam and weight rods fit.*

"CAUTION" *Improperly fastened beam weights can allow the beam weights to move on the beam. Such movement can cause the weight rods or beam ribs to break. This could result in severe damage to your Pump Jack and possibly the well.*

COUNTERBALANCING YOUR PUMP JACK

To enjoy optimum life from your Cook Pump Jack, the load on your Pump Jack should be balanced at the two primary torque peaks. There is a torque peak when the Pump Jack is "lifting the well load," then there is another when the Pump Jack is "lifting the counterbalance." Under ideal circumstances these 2 peaks are at their greatest force when the cranks are horizontal.

"CAUTION" *The counterbalancing procedure usually requires you to run your Pump Jack to check the balance.* ***Before starting your Pump Jack for this procedure or any other reason Check the Oil Level****. All Cook Pump Jacks leave our facility with the proper amount of oil in the gear reducer. With the manufacturing and inspection procedures we have developed, it is very difficult to believe a Pump Jack could ever leave our facility without the*

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*proper amount of oil in the gear reducer. The oil level is full when the oil level showing on the dip stick is 3/4" up from the bottom of the stick. For additional Lubrication details, reference the "**GEAR REDUCER LUBRICATION SPECIFICATIONS**" section in "**MAINTAINING YOUR COOK PUMP JACK**" further on in this manual. Also before starting your Pump Jack for this operation review the 'Final' procedures at the end of this section.*

Once the proper number of beam weights is in place on the walking beam, it is time for the final counterbalancing procedure. This is done by starting your Pump Jack and measuring the torque peak on both sides of the stroke. Once you have established your measuring procedure, you balance your Pump Jack by adding or removing beam weights and by moving the cluster of beam weights forward or backwards on the walking beam until the torque peak is the same on both sides of the pump cycle, or as near the same as possible. While the hex nuts on the weight rod must be loosened to move the beam weight cluster, never run your Pump Jack, even during the balancing procedure without first securing the beam weight cluster by tightening the hex nuts against the beam weight cluster and assuring the hex nuts securing the weight rods to the beam ribs are tight.

There are several ways of determining when the torque peak is the same on both sides of the pump cycle. One method, and perhaps the most accurate for electric motor drives, is by use of an ammeter. At proper counterbalance the ammeter will peak equally on the upstroke and the downstroke.

A higher reading on the upstroke, when the Pump Jack is lifting the well load, indicates the need for more counterbalance effect. The beam weight cluster should be moved toward the back of the walking beam. If the beam weight cluster is all the way to the back of the walking beam and the counterbalance effect is not enough, then a beam weight may need to be added to the walking beam.

A higher reading on the downstroke, when the Pump Jack is lifting the counterbalance, indicates the need for less counterbalance effect. The beam weight cluster should be moved toward the front of the counterbalance area of the walking beam. If the beam weight cluster is all the way to the front of the counterbalance area on the walking beam and the counterbalance effect too heavy, then a beam weight may need to be removed from the walking beam.

For multi-cylinder combustion engines a vacuum gauge can be used to check proper counterbalance. The vacuum gauge peaks should be equal on the upstroke and the downstroke. For single cylinder combustion engines this may be accomplished with a tachometer.

Another, yet less accurate method is belt sag. If the V-belt sag appears equal on the upstroke and the downstroke then the counterbalance should be close to correct.

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Another, yet less accurate method is the sound of the prime mover. If the sound level the prime mover makes on the upstroke seems equal to the sound level on the downstroke then the counterbalance should be close to correct.

THE IMPORTANCE OF TUBING SIZE

When selecting the down hole equipment for your well, it is quite important that the inside diameter of the production tubing in the well be at least equal to, or greater than the inside diameter of the down hole pump cylinder. If the tubing ID is smaller than the down hole pump cylinder ID, on the upstroke a backpressure will be created as the larger amount of fluid in the down hole pump cylinder is forced into the smaller ID of the production tubing. This will make it impossible to properly counterbalance your Pump Jack. Perhaps more importantly though, this will significantly increase the strain on all well equipment beyond that of normal operation. You can expect this condition to significantly reduce the productive life of your Pump Jack as well as all your well equipment. This condition will also increase the amount of power consumed by the Pump Jack prime mover.

Also, if the tubing ID is too small, there will not be sufficient clearance between the inside diameter of the tubing and the outside diameter of the sucker rod coupling for the fluid to pass freely between the two surfaces. When the tubing is too small, as the sucker rods are lowered into the well the fluid is compressed between the inside wall of the tubing and the outside surface of the coupling. This will cause a buoyancy effect on the sucker rod string. The smaller the distance between the tubing and the sucker rod coupling, the greater the buoyancy effect and the further your Pump Jack will be out of balance. The table below shows the minimum tubing ID dimension to allow free passage of fluid between the inside diameter of the tubing and the outside diameter of the sucker rod coupling.

MINIMUM TUBING I.D.											
Sucker Rod	Down Hole Pump Cylinder ID										
Diameter	1 1/16	1 1/4	1 1/2	1 3/4	1 25/32	2	2 1/4	2 3/4	3 1/4	3 3/4	4 3/4
5/8	1.838	1.953	2.121	2.305	2.329	2.500	2.704	3.132	3.579	4.039	4.981
3/4	1.948	2.050	2.211	2.388	2.411	2.577	2.775	3.194	3.634	4.087	5.020
7/8	2.101	2.202	2.353	2.519	2.563	2.699	2.889	3.294	3.721	4.165	5.084
1	2.432	2.519	2.652	2.801	2.821	2.964	3.138	3.514	3.918	4.341	5.230
1 1/8	2.602	2.684	2.809	2.950	2.969	3.105	3.272	3.634	4.025	4.439	5.311

This condition will also make it nearly impossible to properly counterbalance your Pump Jack, and an improperly balanced Pump Jack is inefficient and wastes power.

>Note: *Improperly counterbalancing your Pump Jack can be a major factor in shortening the useful life of the Pump Jack and other well related equipment. A properly counterbalanced Pump Jack reduces power consumption and similar associated costs.*

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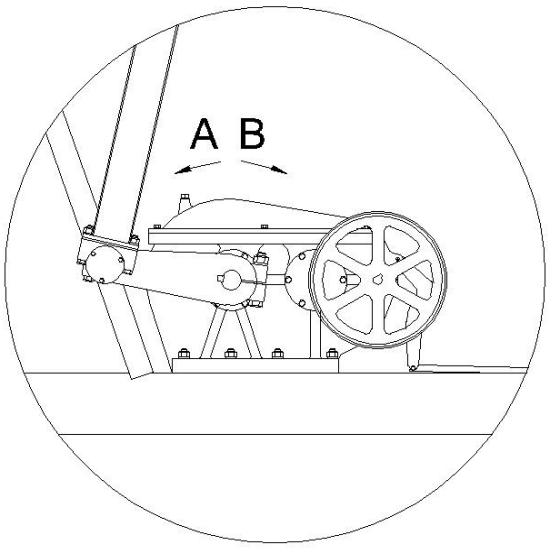
DIRECTION OF ROTATION

Some Pump Jacks in this industry are designed to rotate in a specific direction for the purpose of providing proper performance of the Pump Jack or to guarantee proper oiling of the gears and bearings within the gear reducer. All current production models of Cook Pump Jacks are designed to perform and oil properly whether they rotate Forward “A”, or Reverse “B”, reference figure below.



Even though Cook Pump Jacks are designed to perform and oil properly in forward or reverse, you may find your Pump Jack balances or performs better rotating one direction or the other. While there are many reasons for this, it is usually difficult to determine the exact cause. Consequently, if your Pump Jack is not balancing or performing as you wish, or any time you question the performance of your Pump Jack, sometimes the easiest solution is to simply change the direction of the Pump Jack’s rotation.

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FINAL

Now it is time to go back and recheck that all fasteners are in place and properly tightened, that all frame bearings are properly greased, and the gear reducer has the proper amount of oil. Also check that the cable head is properly positioned to allow the bridle cable a straight track on the cable runners throughout the full stroke travel. Then be sure the cable head is locked in place at the bottom head mounting bracket with the bolt, nut, and washers provided. And don't forget to check the weight rods for proper positioning and tightness.

Next, check to make sure the v-belt is properly aligned and tightened. Check to make sure that all safety guards are properly installed and fastened securely.

At this point, your Pump Jack should be properly assembled and installed, aligned with your well, lubricated, and ready to start pumping your well. But it is still not time to start you Pump Jack.

Once you have 'Finaled' your Pump Jack and you are satisfied it is ready to start, it is time to 'Final' the Well Site. Check to make sure all securing chains, straps, etc. have been removed and are clear of all Pump Jack movements. Check to make sure all tools and assembly equipment not required to stay at the well site have been gathered and removed from the well site. Check to make sure all tools and equipment that are to stay at the well site are properly stowed and clear of all Pump Jack movements. Check to make sure all vegetation and any natural covering or fall-off has been removed from the moving parts of your Pump Jack. Are there any valves to open or close? Are all switches in their proper positions? Then, after you are satisfied your Pump Jack and the well site are properly Finaled, it is time to 'Final' all persons in the area. Make sure everyone in the immediate area is made aware that the Pump Jack is about to start. Once you are satisfied all persons are aware, paying attention, and clear of all moving parts of your Pump Jack it is time to start your Pump Jack.

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MAINTAINING YOUR COOK PUMP JACK

Check always for safe operating procedures.

Observe Pump Jack daily for potential problems.

Oil and grease at regular intervals.

Know your Pump Jack and this service manual.

ON INITIAL STARTUP:

Check the alignment of the Pump Jack over the well head and in proper alignment to the well.

Watch to see that the bridle cable tracks properly in the center of the cable runners on the front of the head.

Check any frame anchors to be sure they are tight.

Listen to the Pump Jack. If any unusual noises occur, locate the source and make corrections.

Check the v-belts for proper tension and pulley alignment.

"CAUTION" *Wrist pins, crank arms, and frame bearings should be checked and retightened after the first several hours of operation.*

GREASING FRAME BEARINGS

Each frame bearing assembly is fitted with a hydraulic grease fitting (zerk) so the lubricant can be applied from a gun. All frame bearing assemblies should be greased at least at 6 month intervals or more often depending upon operating conditions, temperatures, and the actual physical condition of the bearing assemblies.

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On the saddle and pitman bearing assemblies use a “NLGI #00 lithium soap base grease with lead napthanate extreme pressure additive” for temperatures down to 0 degrees F. This is a flowable-type grease. If you scoop up a handful of this grease, it will flow between your fingers onto the ground. A flowable-type grease is necessary in the saddle and pitman bearings mostly because these bearings simply rock back and forth, never making a full revolution and therefore never having the opportunity to evenly distribute the grease. When using the flowable grease, as the bearing rocks the grease flows in behind, relubricating the now-exposed bearing surface. When a nonflowable grease is used, every time the bearing rocks there is no grease flowing in behind relubricating the bearing surfaces. Eventually, that bearing will be full of grease but not being lubricated.

On the wrist pin bearing assemblies use a multi-purpose lithium base ep grease. Apply grease to the zerk until grease comes out the backwards turned oil seal on the other side of the assembly. The backwards turned oil seal acts as a pressure relief vent while keeping contaminants out of the assembly. This design allows you to be constantly pumping fresh grease through the entire bearing assembly.

“CAUTION” *On all greasable assemblies, and especially your saddle and pitman bearings, always pump the grease gun slowly to avoid damage to the seals.*

GEAR REDUCER LUBRICATION SPECIFICATIONS

>Note: In order to obtain maximum life from your Pump Jack gear reducer it is necessary that at all times the oil level be maintained at the proper level with oil of suitable type & viscosity, and be free of foreign material, sludge, and water.

Oil type:

For temperatures down to 0 degrees F, use an SAE 90EP or an AGMA 6EP premium mild extreme pressure lubricant with rust and oxidation inhibitors and an anti-foam agent. Pour point of the oil should be 5 degrees F or lower. For temperatures down to -30 degrees F use SAE 80EP or an AGMA 3EP premium mild extreme pressure lubricant with rust and oxidation inhibitors and an anti-foam agent. Pour point of the oil should be -15 degrees F or lower. For low temperature operation the oil should have sufficient fluidity to permit a free flow of oil into the bearings. The viscosity of oil decreases as the temperature increases.

Amount of oil to use:

Cook Sizes 3D-10 & 4D-13 use 2 gallons; Size 16 uses 2.5 gallons; Size 25 uses 4.5 gallons; Size 40 uses 7 gallons; and Size 57 uses 7.5 gallons. Read the dipstick after filling to ensure proper filling. When filled properly, the oil level on the dip stick will show 3/4” from the bottom of the Oil Dipstick. Always allow the gear reducer to sit idle

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for a while before checking the oil level. This will give the oil time to drain back from the gearing and give a more accurate indication of the actual level.

When to change oil:

Under most favorable conditions of minimum seasonal temperature changes, low humidity, and freedom of atmospheric dust, a gear reducer may operate through one or more years before the oil is contaminated or deteriorated to the point that an oil change is required.

However, in the real world few Pump Jacks operate under these favorable conditions. Oil may become contaminated or deteriorated as often as every 3 months when pumping conditions include intermittent operation, dust in the air, corrosive fumes, a combination of high humidity and large variation of daily air temperatures.

>Note: *Sludging or emulsification of oil is usually found if there has been an excessive accumulation of water in the reducer. Small amounts of water can be drawn off to prevent this. Loosen the drain plug and check for water in the reducer at least every 6 months.*

Each time the oil is changed the gear reducer should be flushed with automobile crank case flushing oil or some other light oil. Whenever a flushing agent such as gasoline, diesel fuel, kerosene, or some other solvent is used, despite best efforts to drain the flushing agent before adding the new gear reducer oil, some solvent may remain which dilutes the new oil. If the flushing agent used is oil instead of solvent, such dilution will be less harmful. During the oil change procedure check all oil paths and be sure all foreign matter is removed. Drain the flushing oil, remove any residue and fill the gear reducer to the proper level with new oil. If the Pump Jack is not immediately returned to operation it should be operated for at least 10 minutes to insure all surfaces receive a protective film of the new oil.

>Note: Each Cook gear reducer, saddle and pitman bearing is equipped with a spring loaded pressure relief vent. Especially at the end of the installation process, then at least once per year thereafter, inspect these vents for damage and proper operation. An improperly operating vent can be detrimental to the life of the Pump Jack.

"CAUTION" *Condensation in the gear reducer can be a real problem. The Oil Level Dipstick is designed to indicate the proper oil level when the oil level shows 3/4" up from the bottom of the dipstick. If the oil level is showing higher and nobody has added any oil, one possibility is condensation has collected in the gear reducer. Whenever condensation buildup is suspected, allow your Pump Jack to sit idle long enough for any water to settle to the bottom of the gear reducer, then remove the drain plug and watch to see if any water runs out.* ***"The simple task of regularly removing the dipstick to check oil level and oil condition may be one of the***

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single most important tasks you can perform to receive the longest life possible from your Cook Pump Jack."

Gear Reducer Lubrication Troubleshooting:

Any improper lubricant selection and extreme conditions of service may lead to one or more of the following conditions:

a) ***CONDITION: Little or no oil is being carried by the gears and being diverted to the bearings.***
PROBABLE CAUSE: Under high temperature conditions oil may be too thin, or under low temperature conditions, too viscous.
REMEDY: Either modify with a heavier or lighter oil of the same grade, or drain and refill with an oil of proper viscosity for the environmental conditions.

b) ***CONDITION: Unit starts hard in cold weather.***
PROBABLE CAUSE: Oil too heavy and viscous.
REMEDY: Either modify with a lighter oil of the same grade, or drain and refill with a lighter oil. Dilution with kerosene, gasoline, or other such fuel can be dangerous and not advised.
PROBABLE CAUSE: Water has collected in the oil and has frozen.
REMEDY: Drain water after allowing time for water to thaw and settle. Or drain, flush, and refill with proper lubricant.

c) ***CONDITION: Continuing and severe pitting or scuffing of gears in the presence of sufficient lubrication. (Some slight initial corrective pitting which soon stops is not abnormal.)***
PROBABLE CAUSE: Gear may be overloaded, particularly at the load peaks. This may be caused from improper application of the pumping unit, or incorrect counterbalancing.
PROBABLE CAUSE: Oil may be of incorrect specification.
PROBABLE CAUSE: Oil may have lost its lubricity through use, emulsification with water, or contamination with foreign material.
REMEDY: Reduce loading if unit is overloaded; otherwise, drain, flush and refill with proper lubricant; make sure pump is properly balanced.

d) ***CONDITION: Gears or bearings are wearing as distinguished from pitting or scuffing.***
PROBABLE CAUSE: Dirty Oil
REMEDY: Drain, flush, and refill with proper lubricant.

e) CONDITION: Foam rises in box and in some cases leaks from shaft seals.
PROBABLE CAUSE: Incorrect lubricant, or overfilled reducer (particularly at high speeds.)

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REMEDY: Drain, flush and refill with proper lubricant.

f) ***CONDITION: Oil is milky in appearance as opposed to normal bright characteristic.***
PROBABLE CAUSE: Emulsified with water, sometimes in combination with incorrect lubricant specification.
REMEDY: Drain, flush and refill with proper lubricant.

g) ***CONDITION: Heavy soapy sludge in case.***
PROBABLE CAUSE: Incorrect lubricant.
PROBABLE CAUSE: Two lubricants of widely different characteristics have been mixed.
REMEDY: Drain, flush and refill with proper lubricant.

h) ***CONDITION: Excessive rust and corrosion of gears or bearings.***
PROBABLE CAUSE: Intermittent operation under humid conditions.
PROBABLE CAUSE: Water in gear reducer.
PROBABLE CAUSE: Improper lubricant.
PROBABLE CAUSE: Lubricant has deteriorated.
REMEDY: Drain, flush and refill with proper lubricant.

i) ***CONDITION: Sticky and insoluble deposits on gears and bearings.***
PROBABLE CAUSE: Oil operated too long; improper lubricant.
REMEDY: Drain, flush and refill with proper lubricant.

MAINTENANCE TIPS

Over these many years a few maintenance tips have been discovered that we wish to share with you.

a) ***CONDITION: Pitman bearing pin moves back and forth during the stroke cycle.***
PROBABLE CAUSE: Pump Jack may not be properly aligned with the well. At the top of the stroke the bridle is being pulled to the side and at the bottom of the stroke the bridle is being pulled to the other side. The saddle bearing acts as a pivot point causing the walking beam behind the saddle bearing to pivot back and forth.
REMEDY: Realign the Pump Jack to the well.

b) ***CONDITION: Pitman bearing pin is all the way to the right (or left) and squeaks during the stroke cycle. Grease is added, the squeak stops but soon starts again.***
PROBABLE CAUSE: The conditions at your well site most likely are not the same as they are on our assembly floor.

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REMEDY: Loosen the hex nuts on the bolts holding the pitman bearing to the pitman header just until the lock washers start to relax then start the Pump Jack and let it run 3 pump cycles. Stop the Pump Jack and check to see if the pitman bearing has realigned its position on the pitman header. If it has, start the Pump Jack and let it run 3 more cycles, and repeat this procedure until the pitman bearing stops realigning its position on the pitman header. Then retighten the hex nuts. In severe cases, it may be necessary to repeat this procedure for the bolts holding the pitman bearing to the walking beam.

c) ***CONDITION: The timer switches the power on. The motor hums but the Pump Jack doesn't move.***
or) ***CONDITION: The timer switches the power on. The motor hums. The Pump Jack struggles and finally starts moving with a crunching noise in the gear reducer.***
PROBABLE CAUSE: Over the summer water has condensed inside the gear reducer. It's now winter and while the timer had the Pump Jack shut off the water has frozen to the bull gear.
REMEDY: Remove the ice/water from the gear reducer by draining the oil, flushing the gear reducer, and refilling with the proper type and amount of oil.

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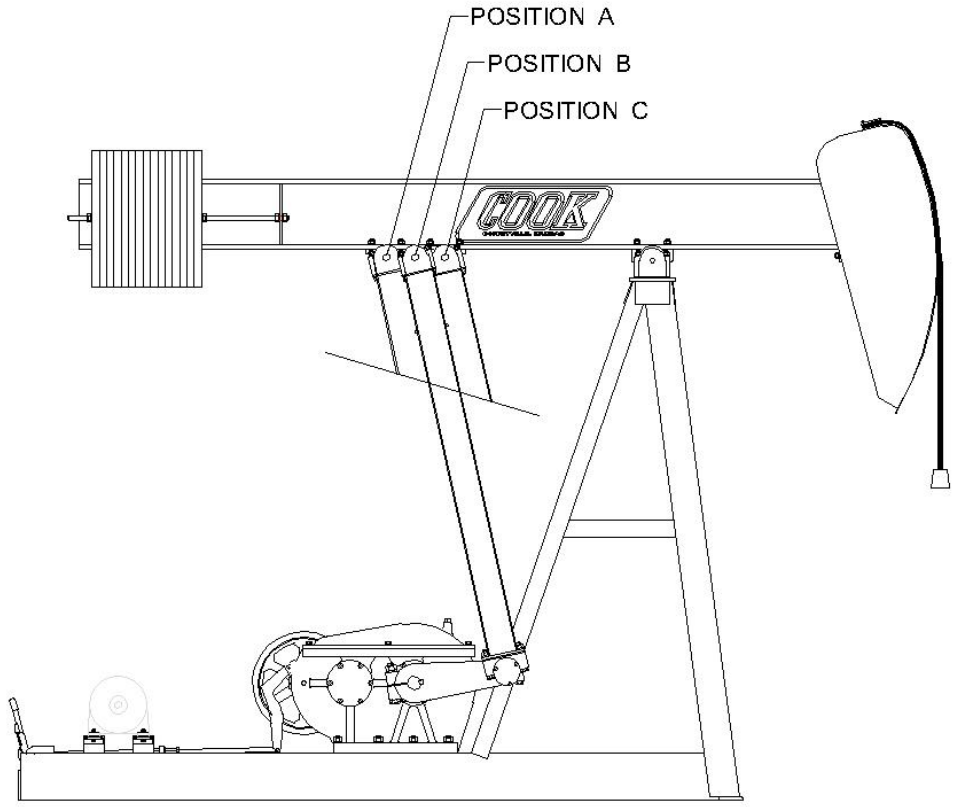
HOW THE POSITION OF THE PITMAN BEARING ASSEMBLY AFFECTS THE STROKE LENGTH

Every Cook Pump Jack has more than one location where the pitman bearing assembly can be bolted to the walking beam. As the pitman bearing assembly is installed further toward the back of the walking beam, the stroke length decreases and of course the further forward, the more the stroke length increases.

Referring to the figure below,



The shortest stroke length results when the pitman bearing assembly is located all the way back, ref “Position A”.

The longest stroke length results when the pitman bearing assembly is located all the way forward, ref “Position C”.

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BRAKES

The Standard Brakes on all Cook Pump Jacks have sufficient braking capacity to withstand a constant torque exerted by the cranks at any crank position with a maximum amount of counterbalance torque. Additionally the Standard Brakes on all Cook Pump Jacks can be used to assist in slowing an operating Pump Jack to a stop if the prime mover and its flywheel have been shut off or disengaged. In some instances the Standard Brake may be used to immediately stop an operating Pump Jack once the prime mover and its flywheel have been shut off or disengaged, but use of the Standard Brake for anything more than operational stops should not be depended upon and may cause damage to the Brake System.

The Optional Brakes on all Cook #3D and #4D Pump Jacks are designed to be 'Hold Only' Brakes. They have sufficient braking capacity to hold the crank position on the Pump Jack with no counterbalance and not attached to a well load, or the Pump Jack with the proper amount of counterbalance and properly attached to the well load, after the operating of the Pump Jack is completely stopped and the brake is set. The Optional Brake may even assist in slowing an operating Pump Jack to a stop once the prime mover and its flywheel have been shut off or disengaged, but use of the Optional Brake for anything more than operational stops should not be depended upon and may cause damage to the Brake System.

Regular maintenance and observational checks of your Cook Pump Jack should at least include checking for obstructions that would keep the brake system from operating properly; checking the Brake Shoe for proper alignment; and checking the Brake Lever Throw for proper adjustment, and finally checking that all parts of the Brake System operate as they should.

"WARNING" *In every instance, a brake system that is not properly maintained, not free of obstructions, or compromised in any other way can be expected to operate improperly when needed.*

"WARNING" *No Cook Pump Jack Brake is intended as a safety stop. Each is intended for operational stops or holds only and should never be depended upon as the only arrest of the Pump Jack movement during any procedures or maintenance. A more positive way of arresting the movement of the Pump Jack is by securing the front and back of the Walking Beam to immovable objects with sufficient chains or straps. Depending upon the requirements of the procedure to be performed, it may be necessary to secure the pitman arms or cranks additionally or instead.*

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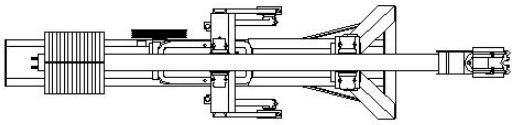
Cook Pump Company

A history of quality-built equipment and dependable service.

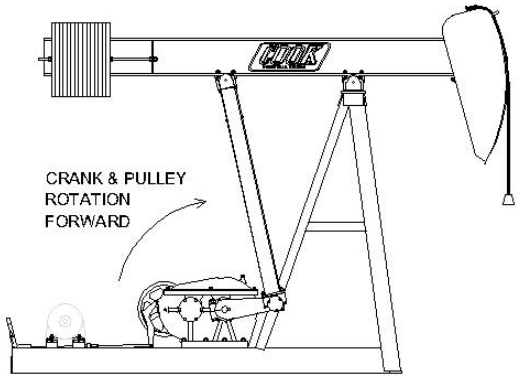
Where is your Pump Jack's Front – Back – Left – Right?

We consider the cable head the Front of the Pump Jack. The beam weights are at the Back of the Pump Jack. Then the Left and Right sides are as shown below. To avoid further chance of confusion, we refer to crank and pulley rotation as Forward or Reverse instead of clockwise and counterclockwise because CW and CCW also require a Left or Right qualifier and Forward or Reverse does not. Another way to think of it would be if the cranks were wheels, would their direction of rotation be driving the Pump Jack Forward or in Reverse?

LEFT



BACK



FRONT

RIGHT

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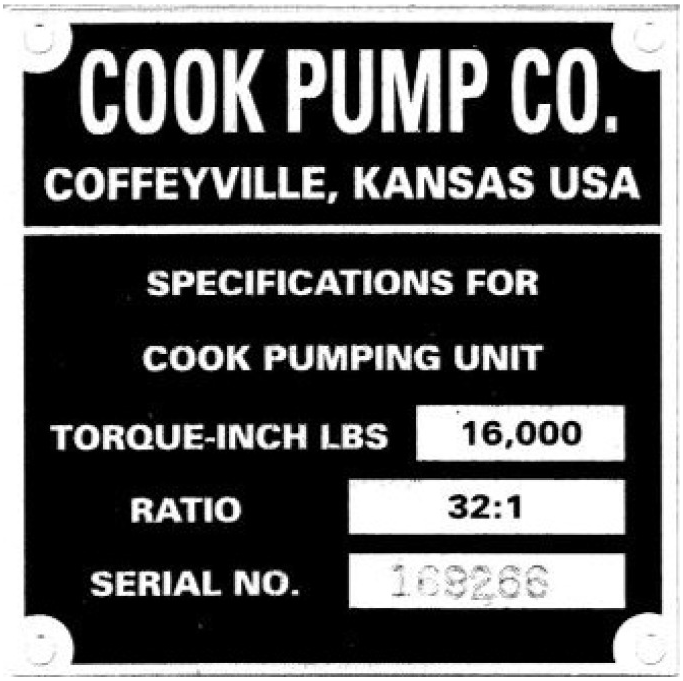
Repair Parts

Here at Cook we maintain a supply of what we have come to know as the most often requested repair parts. This supply is maintained to allow immediate shipment upon request. Shipment can usually be made same day if the order is received before noon, otherwise shipment can be expected to be next day. However, on those rare occasions when inventory is depleted, delivery may be longer.

Repair part order processing often progresses faster and more accurately when a model number and serial number for the Pump Jack to be repaired is provided along with the order.

The model and serial number of your Cook Pump Jack can be found on the serial number plate attached at the rear of the Pump Jack gear reducer. In years past one serial number plate was attached to the front samson post leg and another was attached to the lid of the gear reducer. Today, and for several years now, Cook Pump Jacks have only one serial number plate and it is attached at the rear of the Gear Reducer. A sample of our current serial number plate appears to the right. The "Size" of a Pump Jack is its torque rating. On this serial number plate the torque rating is 16,000 inch pounds. This Pump Jack is a Size 16, and its Serial Number is 169266. Over the years Cook serial numbers have been 3, 4, 5, and 6 digits as above. For a short period our serial numbers were 6 digits preceded by 4 characters such as C4FM251001. All parts of all current Cook Pump Jacks are available, and many parts of past models are available too. Simply ask your Cook Pump Jack Distributor for price and delivery.



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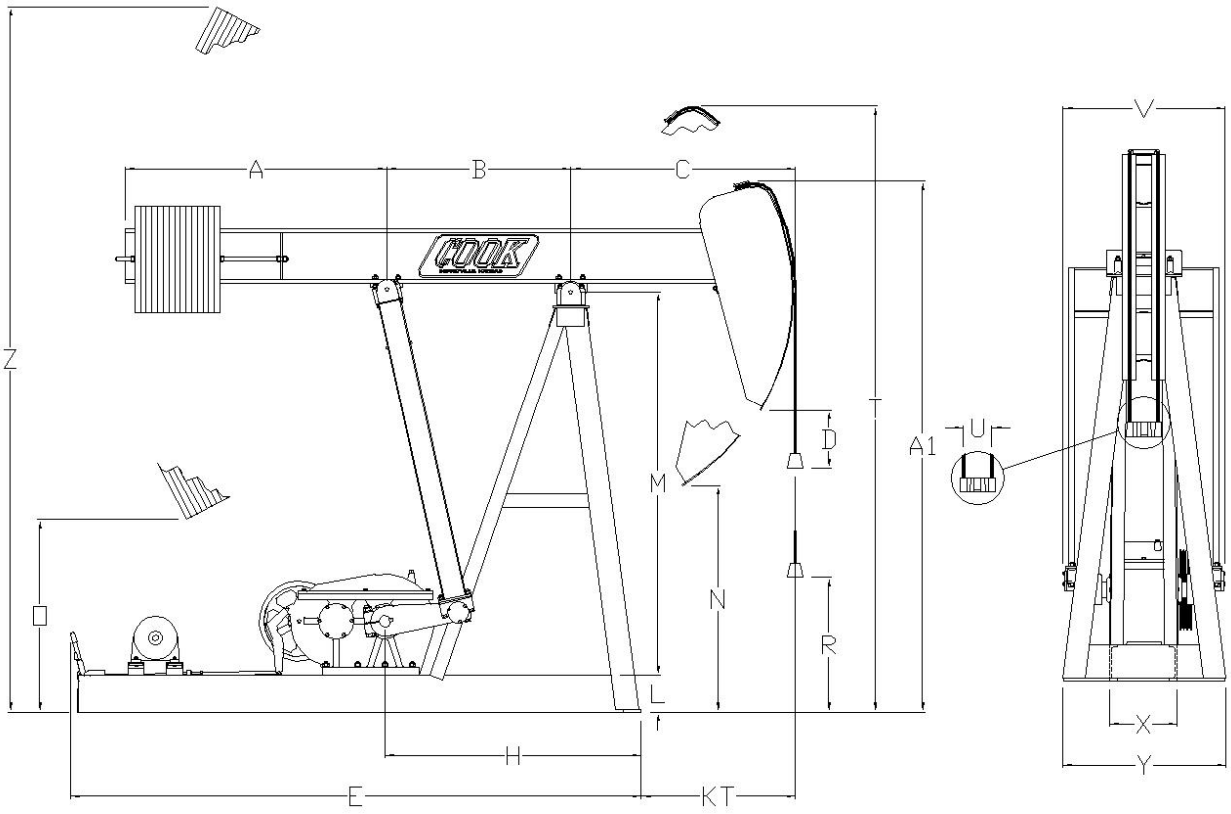
Cook Pump Company

Beam Balanced Pump Jack Assembly

Structural Dimensions for each of our T-Base Model Pump Jacks



General Dimensions for Cook Pump Jacks in T-Base Frame																				
UNIT SIZE	**A**	**B**	**C**	**D**	**E**	**H**	**KT**	**L**	**M**	**N**	**O**	**R**	**T**	**U**	**V**	**X**	**Y**	**Z**	**A1**	**Wt**
3D-10-23-18	29	18	23	8	75	25	15	4	42	28	15	21	64	4.5	22	8	25	74	58	675
4D-13-32-20	36	23	33	10	83	33	25	5	48	31	27	24	74	4.5	21	9	30	82	68	800
16DB-43-30	49	24	35	8	93	38	24	6	61	41	21	28	94	4.5	29	10	30	104	84	1150
25DB-67-36	44	35	43	13	112	55	28	8	73	50	36	34	115	6.0	31	12	36	126	103	1850
40DB-89-48	63	36	51	13	124	56	39	8	84	50	38	32	120	6.0	36	15	36	136	123	2680
57DB-109-54	84	46	71	23	168	89	72	8	107	65	54	37	149	7.5	45	22	46	168	143	4320
Dimensions are in Inches, Weight is in pounds. All are for Reference Only.																				

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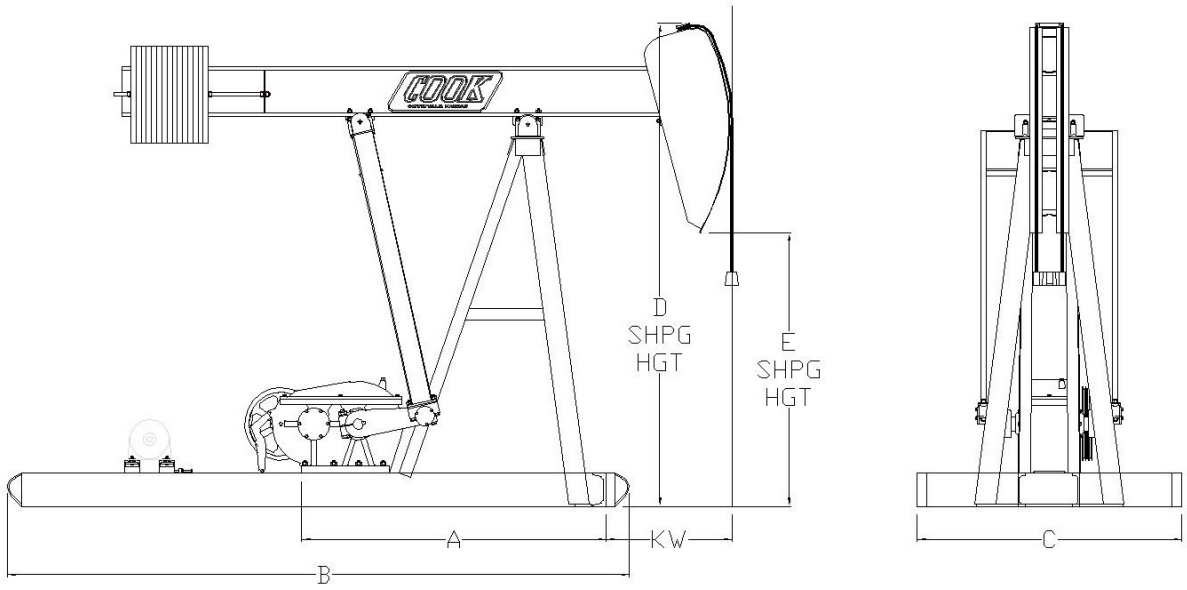
Cook Pump Company

Beam Balanced Pump Jack Assembly

Structural Dimensions for Wide Base Frame Pump Jack



General Dimensions for Cook Pump Jacks in Wide Base Frame																				
UNIT SIZE	**A**	**B**	**C**	**D**	**E**	**H**	**KW**	**L**	**M**	**N**	**O**	**R**	**T**	**U**	**V**	**X**	**Y**	**Z**	**A1**	**Wt**
3D-10-23-18	**54**	**96**	**30**	**50**	**33**		**13**													**798**
4D-13-32-20	**54**	**106**	**34**	**71**	**39**		**23**													**1000**
16DB-43-30	**76**	**121**	**41**	**84**	**51**		**22**													**1425**
25DB-67-36	**100**	**147**	**44**	**95**	**79**		**26**													**2325**
40DB-89-48	**78**	**154**	**48**	**98**	**95**		**37**													**3150**
57DB-109-54	**108**	**195**	**48**	**72**			**66**													**4740**
Dimensions are in Inches, Weight is in pounds. All are for Reference Only.																				

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Cook Pump Jack Application Calculation Sheet

Pump Jack Model No: Reducer:_____ Beam Rating:_____ Stroke Length:_____

Well Depth in feet (D):_____ Down Hole Pump ID in inches (dp):_____

Sucker Rod Dia in inches (r): _____ Length of Stroke in inches (S):_____

Pumping Speed in Strokes per Minute (SPM):_____ Diameter of Tubing in inches:_____

For Tables – See Reverse Side of This Sheet

Weight of Rods in lbs. (Wr):_____ (Table 1) Weight of Fluid in lbs. (Wf):_____ (Table 2)

Constant (K):_____ (Table 3) Impulse Factor (IF):_____ (Table 4)

Effective Counterbalance (CBe) in pounds.

Wr + (Wf/2) = CBe _____ + (_____ / 2) = _____

CBe should never exceed 75% of Beam Rating.

Number of Weights Required.

(CBe / 2) / 70 = Number of 70# Weights (_____ / 2) / 70 = _____

70# Beam Weight fit only #3D-10, #4D-13, and #16DB Pump Jacks.

(CBe / 2) / 150 = Number of 150# Weights (_____ / 2) / 150 = _____

150# Beam Weight fit only #25DB, #40DB, and #57DB Pump Jacks.

Peak Polish Rod Load (PPRL) in pounds.

(IF x Wr) + Wf = PPRL (_____ x _____) + _____ = _____

PPRL Should never exceed Beam Rating

Peak Torque (PT) in inch-pounds.

[IF x (Wr + Wf) – CBe] x (S/2) = PT

[_____ x (_____ + _____) - _____] x (_____ / 2) = _____

Well Production (WP) in Barrels per Day.

K x S x SPM x .85 = WP _____ x _____ x _____ x .85 = _____

Horsepower Required (Hp).

(S/12 x PPRL x SPM) / 33,000 = Hp [(_____ / 12) x _____ x _____] / 33,000 = _____

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Tables on Back

Cook Pump Jack Application Calculation Sheet
Continued

Table 1
Weight of Rods (Wr)

Rod Size inches	Rod Wt lbs/ft	Area Sq In
1/2	0.70	.196
5/8	1.16	.307
3/4	1.64	.442
1-P	1.68	
7/8	2.18	.601
1	2.90	.785
1 1/8	3.67	.994
5/8 Fiberglass	0.31	
7/8 Fiberglass	0.53	

Table 2
Weight of Fluid (Wf)

Pump Bore inches	Wt of Fluid lbs/ft
1 1/16	0.3838
1 1/4	0.5313
1 1/2	0.7650
1 3/4	1.0413
1 25/32	1.0788
2	1.3600
2 1/8	1.5353
2 1/4	1.7213
2 1/2	2.1250
2 3/4	2.5713
3 1/4	3.5913
3 3/4	4.7813
4 3/4	7.6713

Table 3
Constant

Tubing inches	Pump Bore inches	Constant (K)
2	1 1/16	0.132
2	1 1/4	0.182
2	1 1/2	0.262
2	1 5/8	0.308
2	1 25/32	0.370
2 1/2	1 3/4	0.357
2 1/2	2	0.466
2 1/2	2 1/8	0.526
2 1/2	2 1/4	0.590
3	2 1/2	0.729
3	2 3/4	0.882
4	3 1/4	1.231
4	3 3/4	1.639
5	4 3/4	2.630

Table A

Sucker Rod OD	Coupling OD	Min Tubing ID
1/2	1.1/4	1.953
5/8	1.1/2	2.121
3/4	1.5/8	2.211
7/8	1.13/16	2.353
1.00	2.3/16	2.652
1.1/8	2.3/8	2.809

Table 4
Impulse Factors (IF)

Strokes Per Min	2	3	4	5	6	7	8	9	10	12	14	15	16	18	20	22	25	30
14	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.05	1.06	1.08	1.09	1.12	1.18
16	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.07	1.09	1.11	1.14	1.21
18	1.00	1.00	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.06	1.08	1.10	1.12	1.16	1.23
19	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.07	1.09	1.11	1.13	1.17	1.24
S 20	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.07	1.09	1.11	1.14	1.18	1.25
T 23	1.00	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.03	1.05	1.06	1.07	1.08	1.11	1.13	1.16	1.20	1.30
R 26	1.00	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.07	1.08	1.09	1.12	1.15	1.18	1.23	1.33
O 28	1.00	1.00	1.00	1.01	1.01	1.02	1.03	1.03	1.04	1.06	1.08	1.09	1.10	1.13	1.16	1.19	1.25	1.36
K 29	1.00	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04	1.06	1.09	1.10	1.11	1.14	1.17	1.20	1.26	1.38
E 30	1.00	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04	1.06	1.09	1.10	1.11	1.14	1.17	1.20	1.26	1.39
31	1.00	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04	1.06	1.09	1.10	1.11	1.15	1.18	1.21	1.27	1.40
34	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.07	1.10	1.11	1.12	1.16	1.19	1.23	1.30	1.43
L 36	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.08	1.10	1.12	1.13	1.17	1.20	1.25	1.32	1.46
E 38	1.00	1.00	1.01	1.01	1.02	1.03	1.03	1.04	1.05	1.08	1.10	1.13	1.14	1.18	1.22	1.27	1.35	1.50
N 42	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.09	1.11	1.14	1.15	1.19	1.24	1.29	1.38	1.54
G 43	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.09	1.11	1.14	1.15	1.20	1.24	1.29	1.38	1.55
T 44	1.00	1.01	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.09	1.12	1.14	1.16	1.20	1.25	1.30	1.39	1.56
H 48	1.00	1.01	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.10	1.14	1.16	1.18	1.22	1.28	1.34	1.44	1.62
54	1.00	1.01	1.01	1.02	1.03	1.04	1.05	1.06	1.08	1.11	1.15	1.18	1.20	1.25	1.31	1.37	1.48	1.69
64	1.00	1.01	1.02	1.02	1.03	1.04	1.06	1.07	1.09	1.13	1.18	1.20	1.23	1.29	1.36	1.44	1.57	1.82
74	1.00	1.01	1.02	1.03	1.04	1.05	1.07	1.09	1.10	1.15	1.21	1.24	1.27	1.34	1.42	1.51	1.66	1.94
84	1.00	1.01	1.02	1.03	1.04	1.06	1.08	1.10	1.12	1.17	1.23	1.27	1.30	1.39	1.48	1.58	1.74	
100	1.01	1.01	1.02	1.04	1.05	1.07	1.09	1.11	1.14	1.20	1.28	1.32	1.36	1.46	1.57	1.69	1.89	

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Some handy formulas you may find useful when setting up your Cook Pump Jack.

Prime Mover Sheave Diameter

$$(SPM \times R \times D) / RPM = d$$

(_____ x _____ x _____) / _____ = _____

SPM = Strokes Per Minute of the Pump Jack
R = Ratio of gear reducer
D = Pitch Diameter of sheave on gear reducer, in inches
RPM = Revolutions Per Minute of prime mover
d = Pitch Diameter of sheave on prime mover, in inches

Strokes Per Minute

$$(RPM / R) \times (d/D) = SPM$$

(_____ / _____) x (_____ / _____) = _____

RPM = Revolutions Per Minute of prime mover
R = Ratio of gear reducer
d = Pitch Diameter of sheave on prime mover, in inches
D = Pitch Diameter of sheave on gear reducer, in inches
SPM = Strokes Per Minute of Pump Jack

Belt Length

$$(2 \times CD) + [1.57(D + d)] + [(D-d)^2 / (4 \times CD)] = PL$$

(2 x _____) + [1.57(_____ + _____)] + [(_____ - _____)^2 / (4 x _____)] = _____

CD = Center Distance between shafts, in inches
D = Pitch Diameter of sheave on gear reducer, in inches
d = Pitch Diameter of sheave on prime mover, in inches
PL = Pitch Length of belt, in inches

Horsepower Required

$$[(S / 12) \times PPRL \times SPM] / 33{,}000 = Hp$$

[(_____ / _____) x _____ x _____] / 33,000 = _____

S = Length of Stroke in Inches
PPRL = Peak Polish Rod Load in pounds
SPM = Strokes Per Minute of the Pump Jack
Hp = Horsepower

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Cook Pump Company
Warranty Information

Owner's Service Policy:

1. It is the owner's responsibility to ensure installation, operation, and maintenance of their Cook Pump Jacks is performed by skilful operators at least within the guidelines in the latest issue of the Cook "Installation & Service Manual for Beam Balanced Pump Jacks".
2. It is the owner's responsibility to ensure that each operator is properly trained in the installation, operation, lubrication, and maintenance of the Pump Jack, as well as supplying qualified installation personnel.
3. It is the owner's responsibility to ensure that their Cook Pump Jacks receive proper service and inspections during the one (1) year warranty period, to ensure proper operation.
4. It is the owner's responsibility to notify their Cook Pump Jack Distributor immediately of any potential problems or breakdowns that involve faulty material or workmanship. In the event of a warranty claim, the claim should first be submitted to the distributor for processing.
5. It is the owner's responsibility to provide regular preventative maintenance to maintain the high efficiency built into each Cook Pump Jack.
6. When repairs are necessary, it is the owner's responsibility to request genuine Cook parts from their distributor. Installation of repair parts from any other manufacturer may severely compromise the performance quality of your Cook Pump Jack and can be expected to void warranty. Cook Pump Company backs all distributors with parts availability and service personnel for assistance on special problems.

There are no warranties, express or implied, made by either the manufacturer or the distributor on new Cook Pump Company equipment, except the manufacturer's warranty against defects, material, and workmanship set out below:

New Equipment Warranty "The manufacturer warrants to the original end-use purchaser only, each new product made by the manufacturer to be free from defects in material and workmanship, its obligation and liability under this warranty being limited to replacing, free of charge at its factory, any parts proving defective under normal use and service within one (1) year from the date of initial sale. This warranty is in lieu of all other warranties, express or implied and the obligation and liability of the manufacturer under this warranty shall not include any transportation or other charges or the cost of installation or any liability for direct, indirect, or consequential damages or delay resulting from the defect. Any operation beyond rated capacity or the improper use or application of the product or the substitution upon it of parts not approved by the manufacturer shall void this warranty. This warranty covers only the products of the manufacturer, Cook Pump Company. The products of other manufacturers are covered only by such warranties as are made by those manufacturers."

In the event you wish to submit a warranty claim to your Cook Distributor, providing the following information to your Cook Distributor will help to expedite your claim:

a) model number of the Pump Jack; b) serial number of the Pump Jack; c) date the Pump Jack was purchased; d) date the Pump Jack was installed; e) the actual owners name and address; f) well depth; g) down hole pump diameter; h) sucker rod diameter; i) strokes per minute the Pump Jack was running.

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