MK4 Pendulum® Dairy Gates

Fitting, Operational & Maintenance Instructions



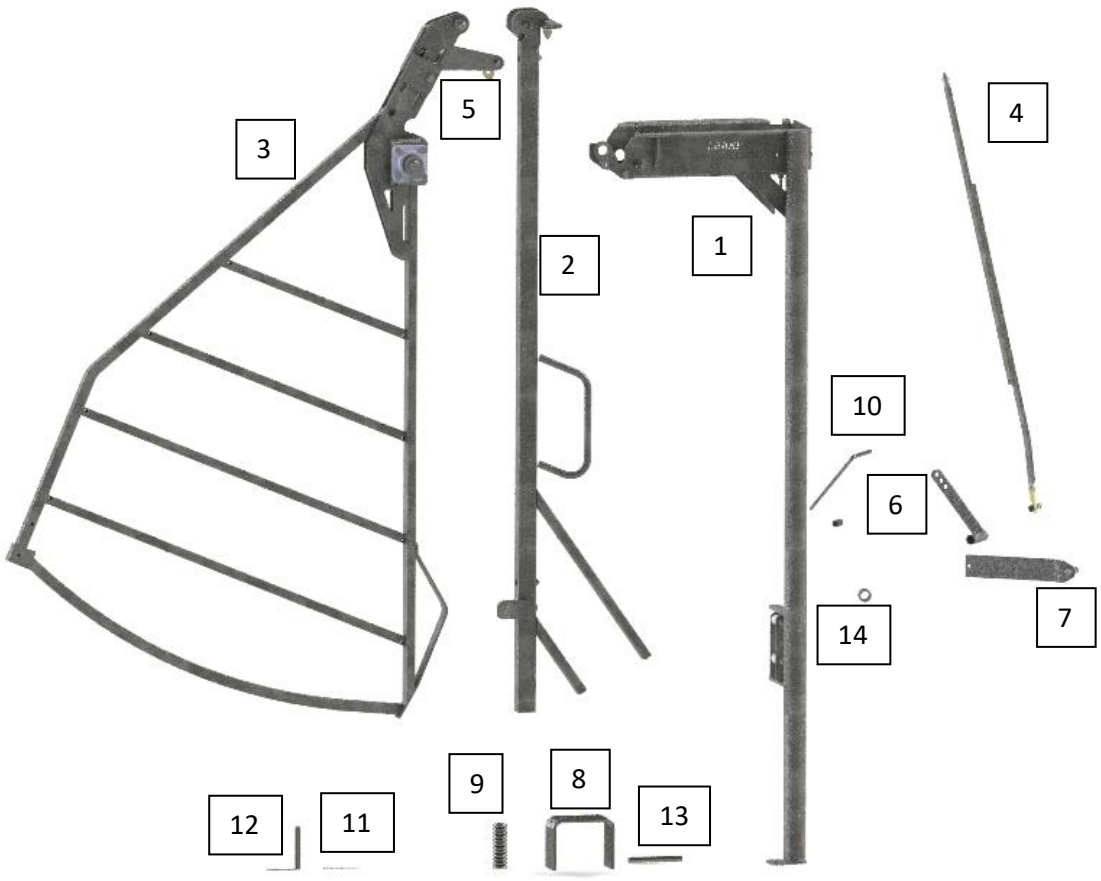
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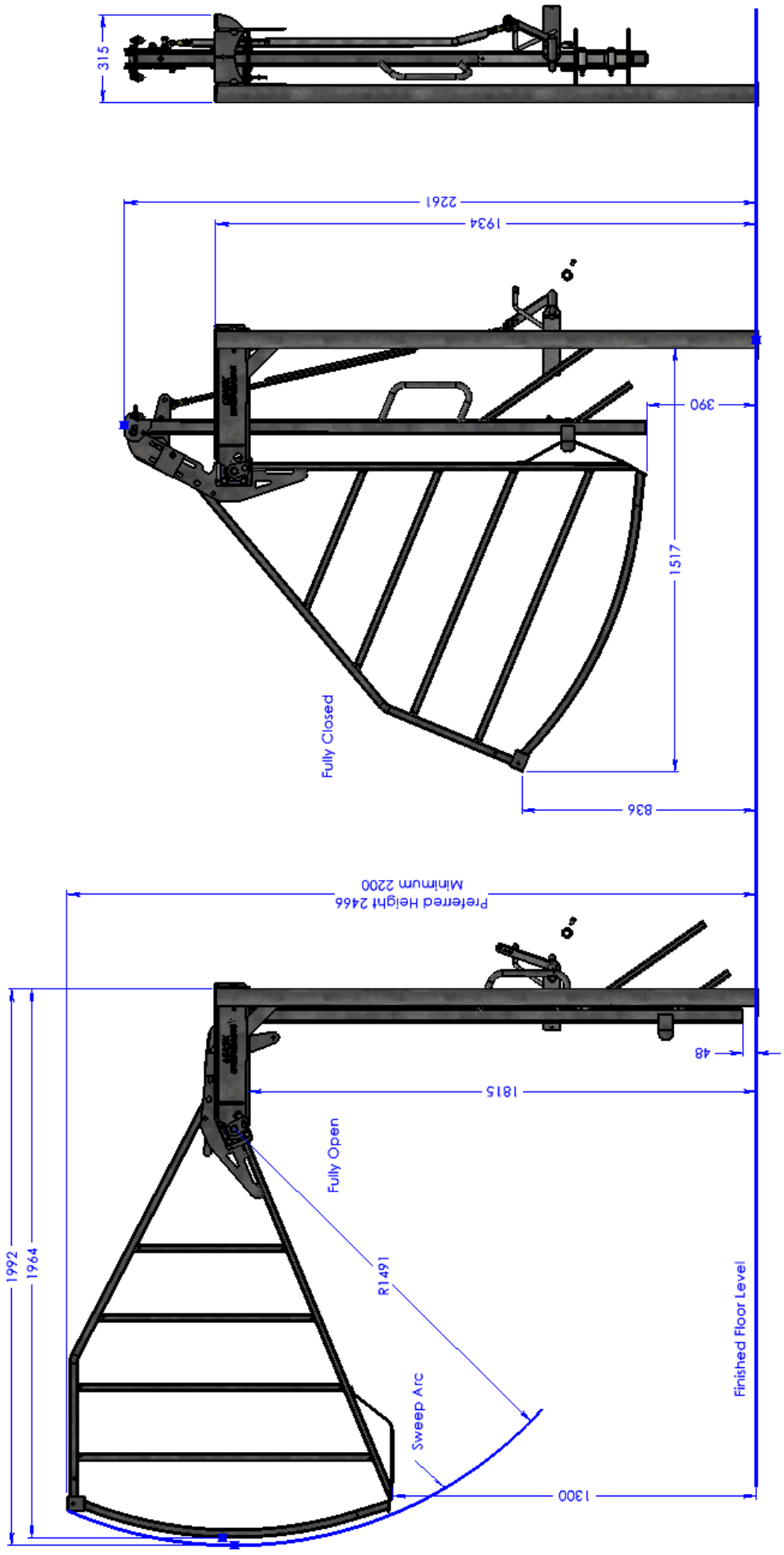
Kit List

Item No.	Part Number	Description	Side	Qty (pair of gates)
1	S004 10 00 00 1 1	Mounting Frame	RH	1
	S004 10 00 01 1 1	Mounting Frame	LH	1
2	S004 20 00 00 1 1	Weight Arm	RH	1
	S004 20 00 01 1 1	Weight Arm	LH	1
3	S004 30 00 00 1 1	Gate (with pin retaining plate)	RH	1
	S004 30 00 01 1 1	Gate (with pin retaining plate)	LH	1
4	S004 40 00 00 0 1	Linkage Arm (2 piece, 1 rod end)	Common	2
5	S004 40 00 02 1 1	Adjuster (with 1 rod end)	RH	on gate
	S004 40 00 03 1 1	Adjuster (with 1 rod end)	LH	on gate
6	S004 40 30 04 1 1	Crank Lever	Common	2
7	S004 40 30 06 0 1	End Bracket	Common	2
8	S004 40 65 00 0 1	Handles	Common	12
9	S004 40 65 10 0 1	20NB Control Rod Ring	Common	24
10	S004 40 65 12 0 1	Crank Stopper with Rubber	Common	2
11	S004 40 65 14 0 1	Crank Stopper Support	Common	2
12	S004 40 65 16 0 1	Closed Gate Stopper	Common	2
13	S004 40 65 18 0 1	Closed Gate Stopper Support	Common	2
14	SHAFT COLLAR 28.6	Shaft Collar for 20NB Control Rod	Common	2
15	Masonry Screw Bolts	M10 x 60 (not shown)	Common	4
16	U Bolt	M8 x 65 (not shown)		1



Kit for 1 gate shown

Overall Dimensions



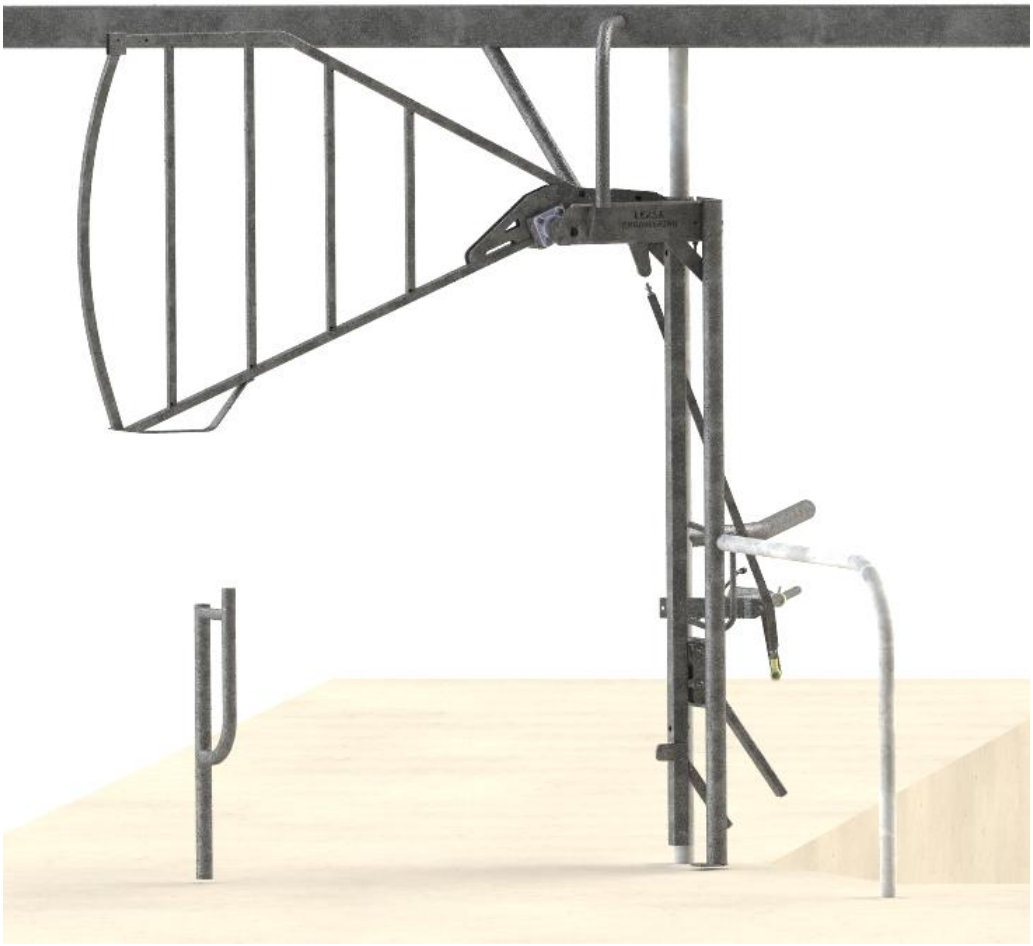


Illustration of RH Gate fully open

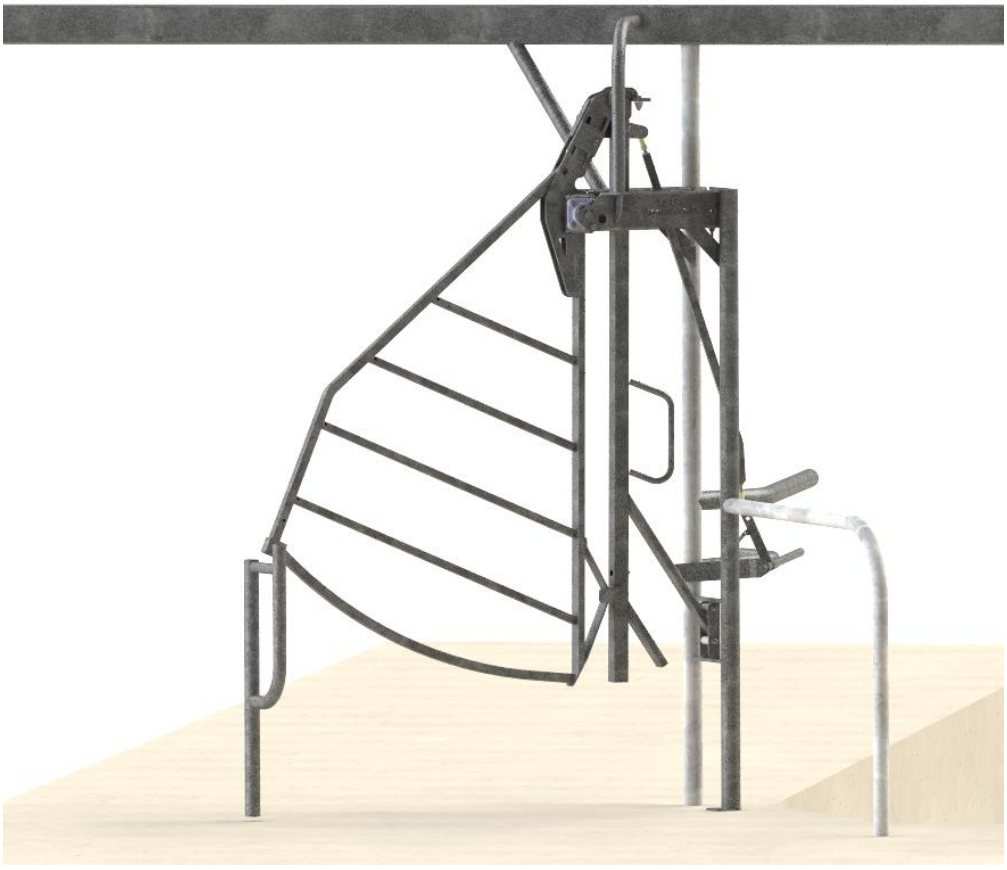


Illustration of RH Gate fully closed

Other Requirements (not supplied)

Tools

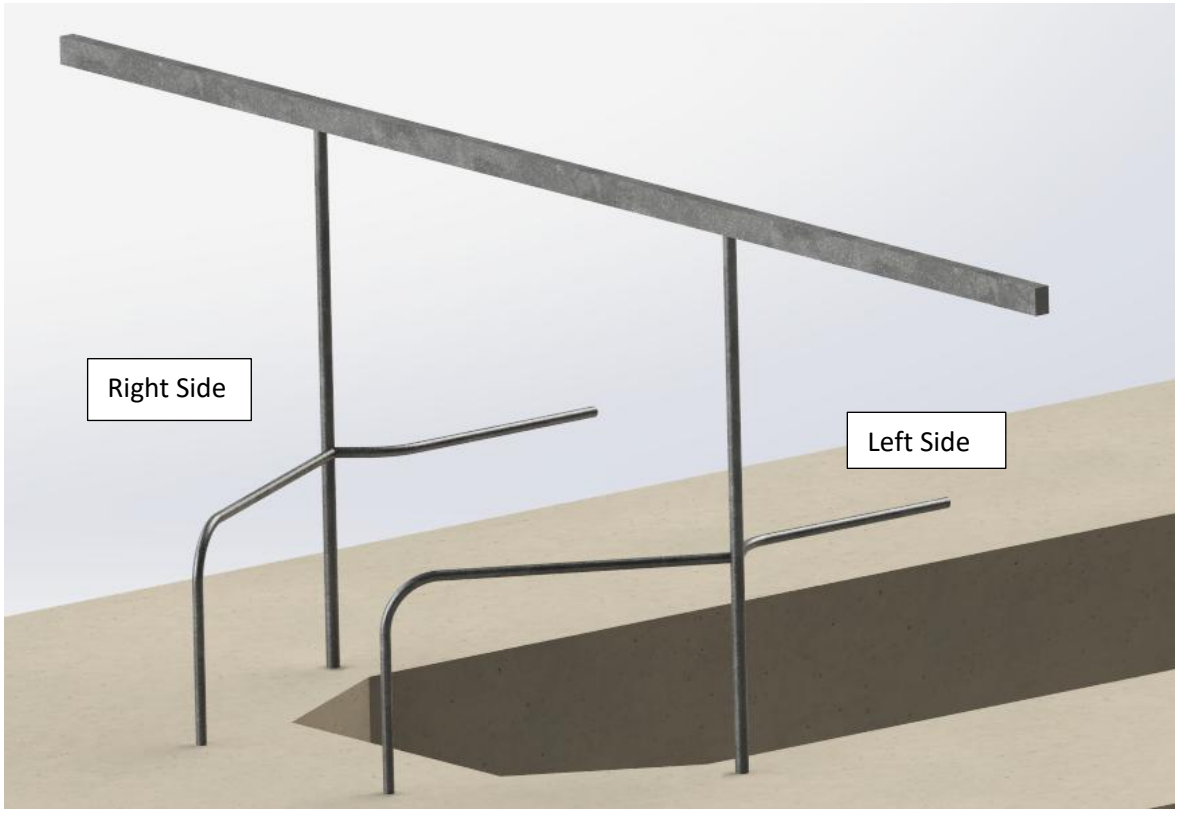
Marker	Grinder with cutting discs for steel
Plumb line or 2.5m straight edge	Spirit Level
Arc welder	2.5, 3, 4 allen keys
Hammer	Measuring tape
13, 15, 16,17,18, 19, 24 & 9/16 spanners	3.2mm general purpose welding rods
Wire Brush	2 of G clamps or similar
Paint and painting equipment	Grease gun with multipurpose grease
Rope or strap	2 pairs of vice grips
Combination Square	Masonry Drill, 10mm

Galvanised Medium Purpose Pipe

20NB – sufficient length for 2 Control Rods running the full length of the pit.

32NB – for bracing to roof rafters and fabrication of the closed gate supports. Lengths are site specific.

50NB Breech Rail Front Posts – minimum straight height 1940mm from finished floor level, preferably higher and connected to a roof rafter as shown below. Alternatively connect the two Breech Rail Front Posts together with a 50NB hoop.



Safety Requirements

These installation instructions provide guidance for the correct installation of the Pendulum® gates and are intended to be used by qualified and experienced site engineers, who are competent and fit to do the job safely. These gates are fitted internationally, therefore local or site-specific health and safety legislative requirements are not detailed within. Installers must adhere to all local health and safety legislation. It is the responsibility of the personnel on site to ensure the health and safety of everyone on and around their worksite, including workers, clients and members of the public. Within New Zealand, the Health and Safety at Work Act 2015 applies. If you have any queries or concerns regarding safe working practices, please contact your supervisor, site foreman/manager or local safety advisor before proceeding.

Leask Engineering is not responsible for the results of any action taken on the basis of information in this document, or for any errors or omissions. The following safety list is not exhaustive but is intended as a quick guide.

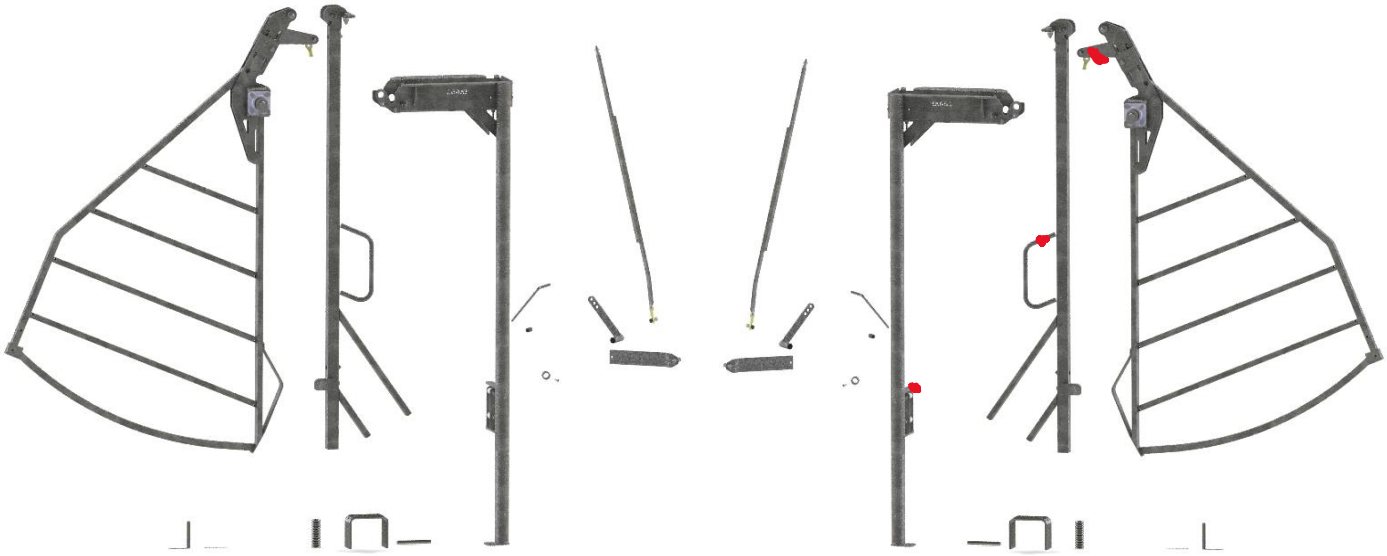
Ensure:

- The worksite remains safe
- You are aware of the site hazards and controls implemented
- You report accidents or near misses in the required timeframes
- Personal protective equipment is worn in the correct manner (head, eyes, ears, hands, feet), relative to site hazards and/or other hazards
- Tools and equipment
    - are right for the job
    - have been tested and visually examined by a competent person
    - guards are secure and in good repair
    - safety devices are operating correctly
- All operators are trained and competent
- Electrical cables are within test date, and are routed to guarantee safe working practices
- The work area is fenced off from the public
- The pit is guarded to prevent accidental falling
- Suitable steps or a platform are available (600mm should suffice but depends upon roof height)
- Proper manual lifting techniques are used to avoid injury
- Appropriate first aid and fire extinguishing equipment is at hand
- Safe work procedures associated with welding or grinding hot works are followed (welding flashes, fumes, sparks, burns, fire)

Gate Installation

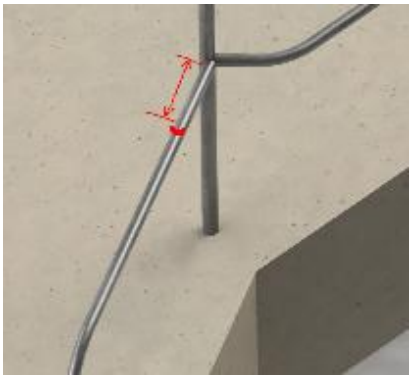
Instruction steps 2 to 22 are for the RH gate, when viewing the rear of the cows, looking toward the cow exit. Repeat all steps for the opposite side.

Step 1: Unpack the components



The left-hand items (when looking at cow's rear) are marked with red tape.

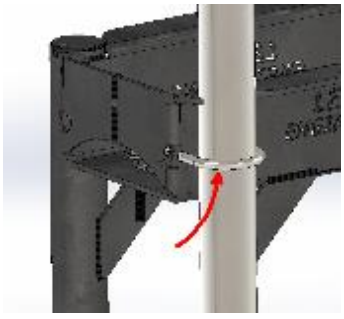
Step 2: Where lead out rails are present, cut 250mm + 15mm scallop (if applicable)





Step 3: Lift the Mounting Frame into position and clamp to the front post





Use the setup U bolt supplied to temporarily hold the mounting frame in position.

Step 4: Determine the gate angle.

Clamp a straight edge across the front posts, make perpendicular to the pit. Measure from the back of the straight edge and rotate the mounting frame to achieve the preferred gate angle/dimension.





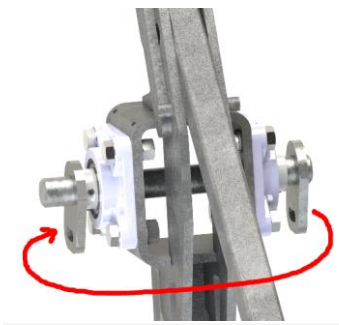
Suggested gate angles for 1600mm platform width (pit edge to breast rail posts):

Cup centres	Gate angle to pit	Mounting Frame Position
660mm	118.5°	203mm
700mm	119.5°	209mm
760mm	121.5°	222mm
800mm	122.5°	228mm
900mm	125°	243mm

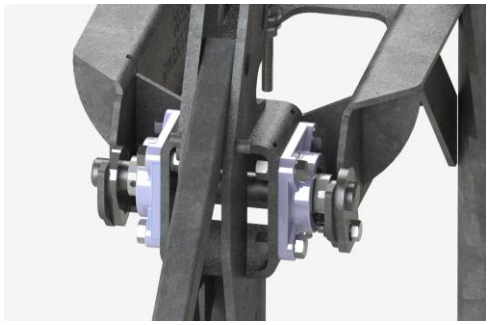


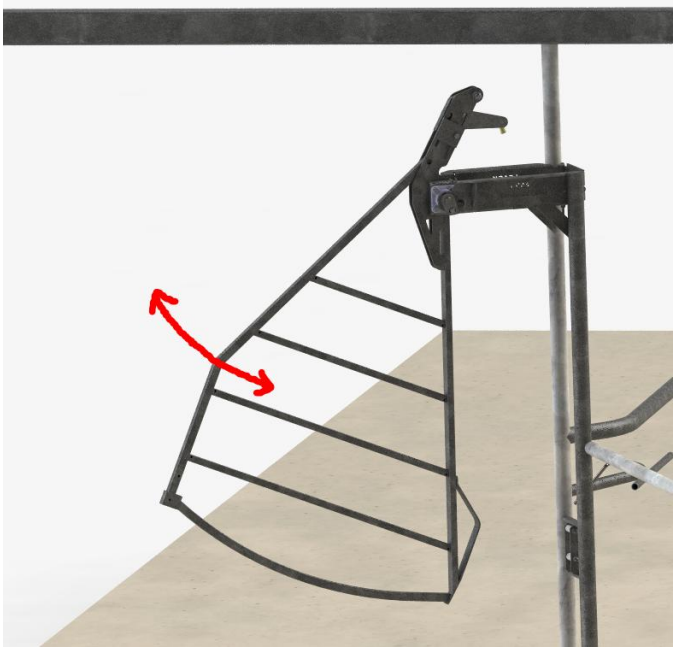
Securely tack the mounting frame to the front post, make sure the tacks don't pull the mounting frame out of position.

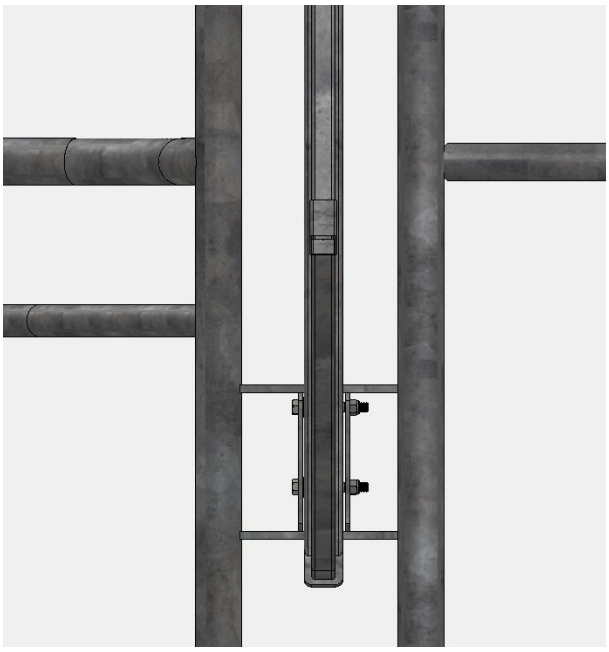
Step 5: Temporarily hang the gate and check the gate clearance and alignment.











Check there is clearance at the roof in both open and closed positions. Also check the end of the gate has clearance to auger lines and troughs etc.

MK4 gates have up to 90mm adjustment for auger line clearance. If need be, shorten the gate by unbolting and moving the position of the curved gate end, relocate to the 90mm adjustment hole or drill and use an alternative hole in-between. Shorten the top bar of the gate as need be.



Adjust the mounting frame position and gate until a workable solution is found, then remove the gate.

Step 6: Level the Mounting Frame and weld two braces in place

(Bracing not included in the kit)



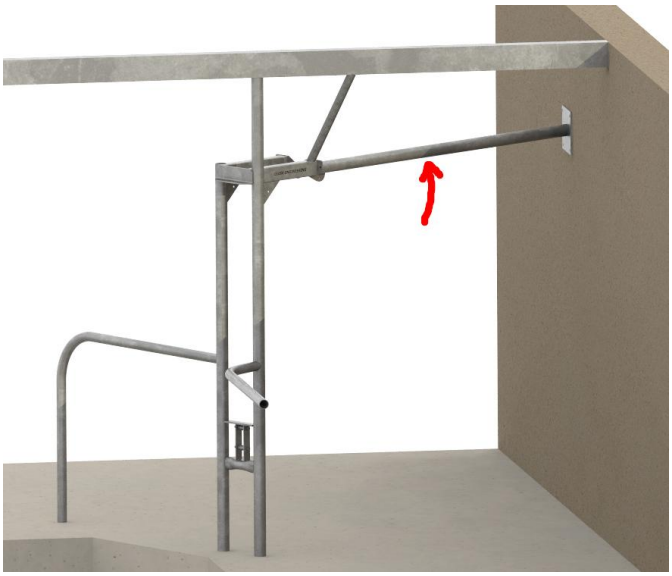


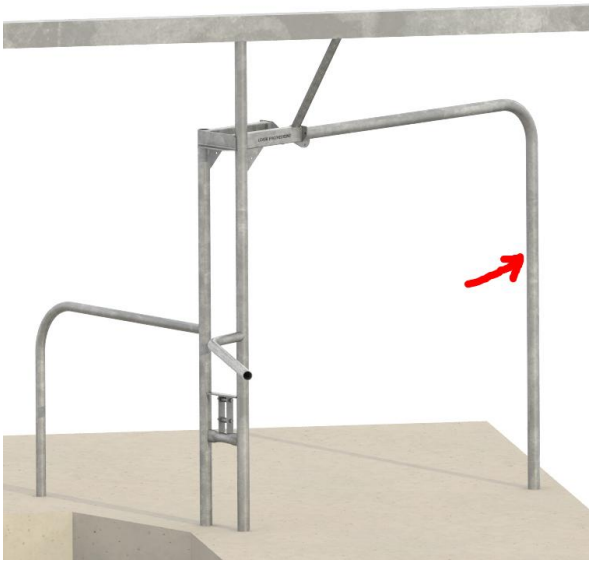


Make sure gate hooks are level and the mounting frame post is plumb.

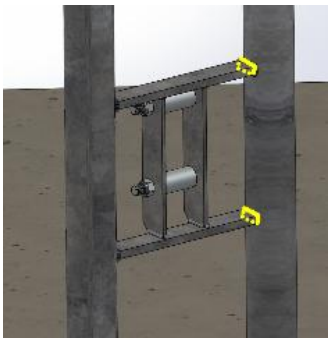
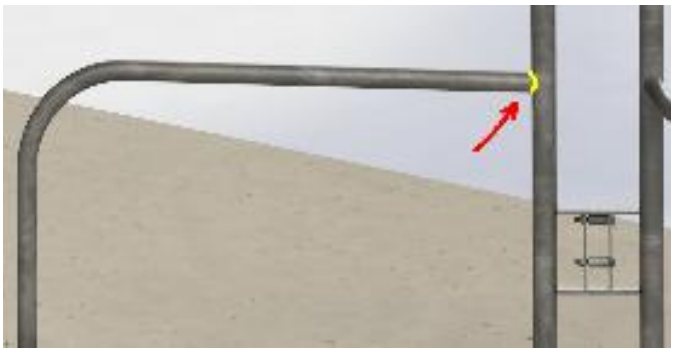
Existing obstacles e.g. rafters, drafting gate mechanisms and milk lines may dictate the use of alternative bracing supports, some possibilities are shown below.



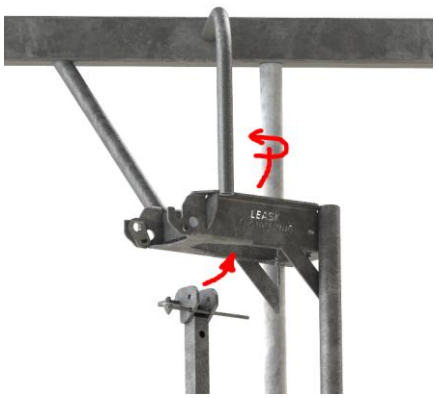


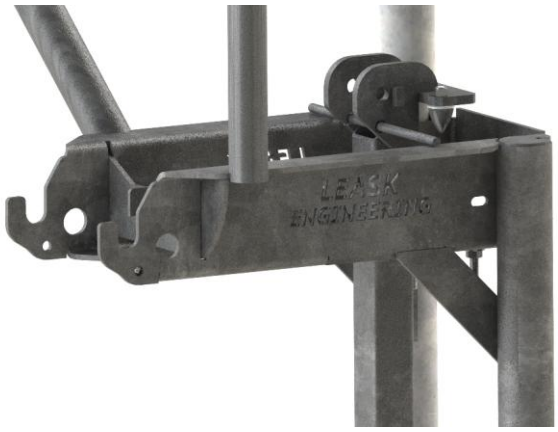


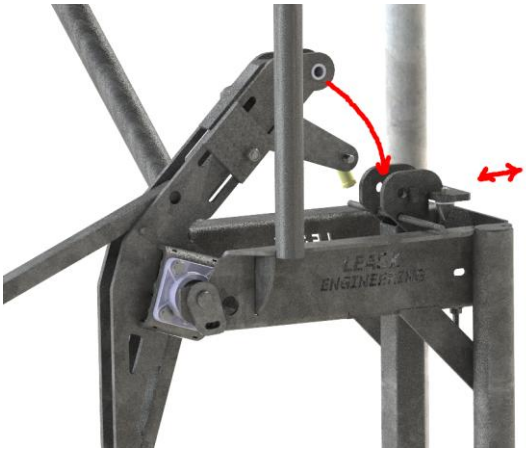
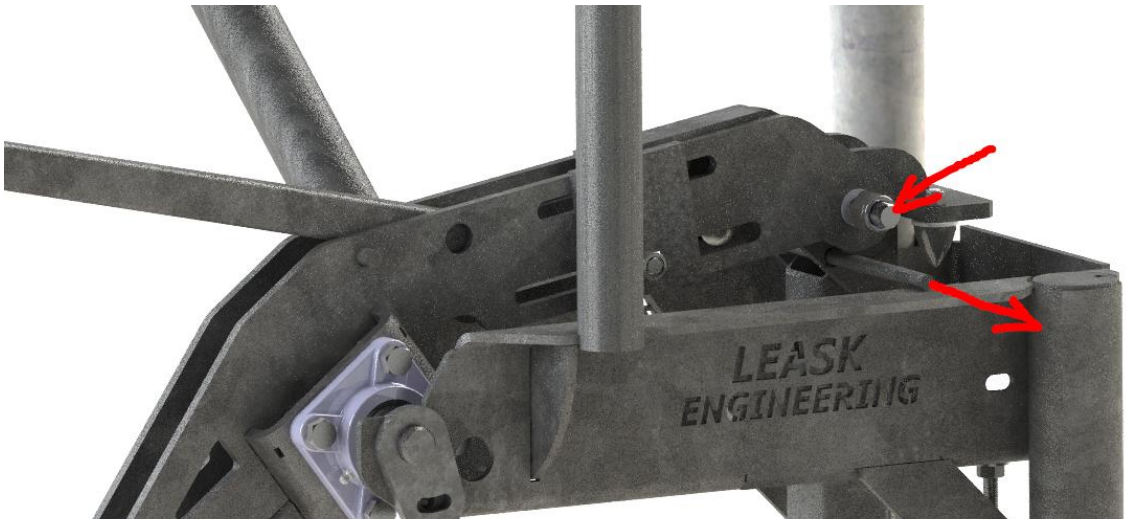
Step 7: Complete the Mounting Frame welding and bolt to the floor.

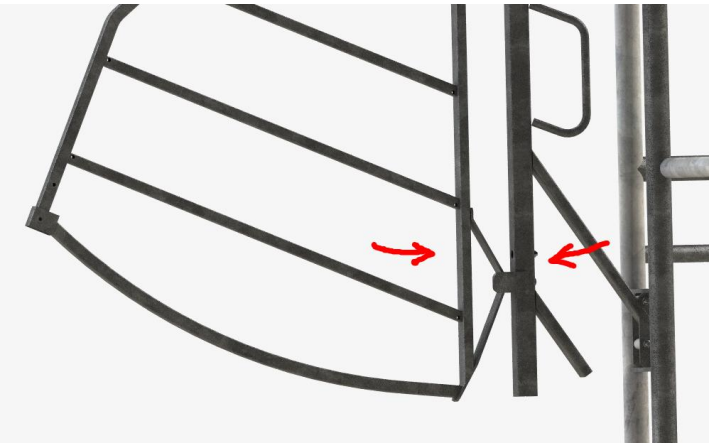
Step 8: Add the weight arm and re-hang the gate

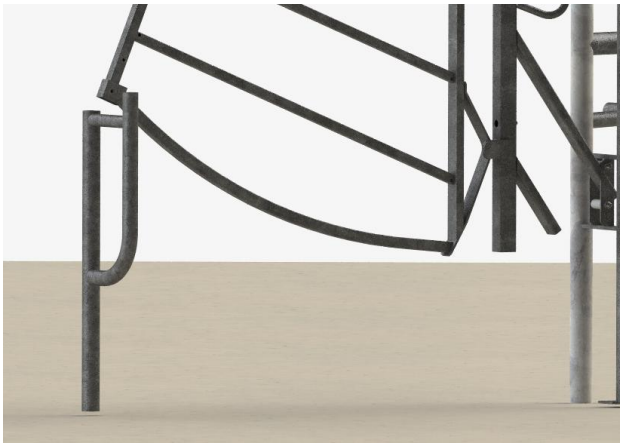





Step 9: Fabricate the closed gate catch at the breast rail



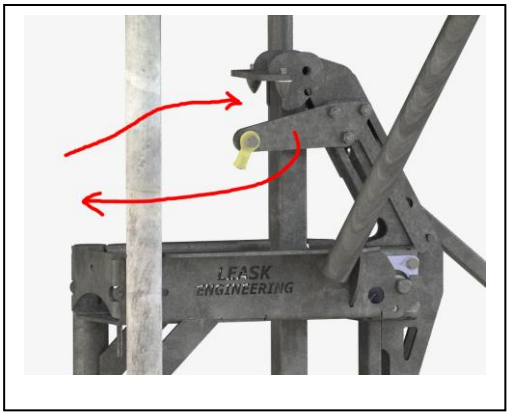


The front catch should ensure the cows can't push a closed gate outward. Make sure the gate is fully closed when determining the catch position. Allow 30mm sideways clearance between the gate catch and the gate for the gate to have a clear swing.

Installation of the control mechanism

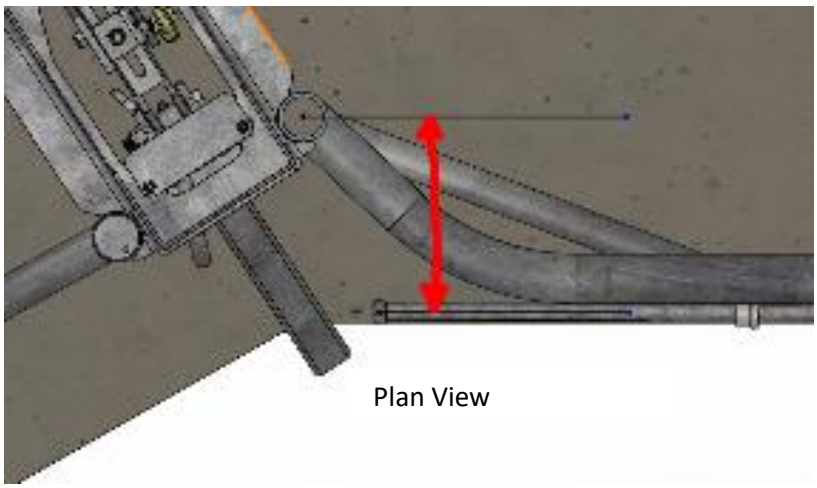
NOTE: The Linkage arm is usually located on the cow side of the gate, however some circumstances (e.g., long cup centres) may require the adjuster brackets to be swapped to the exit side of the opposite gate.

Normal short cup centres installation shown in the steps below.



Step 10: Mount the Control Rod along the pit (min 80mm from centre of front post).

Add the shaft collar to limit axial movement.

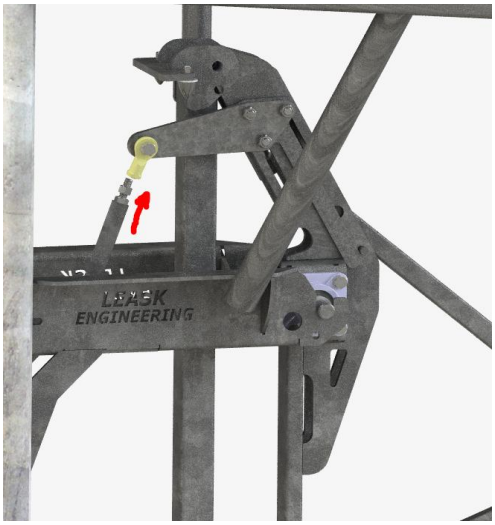


Plan View



Step 11: Attach the top and bottom section of linkage arm to the gate.

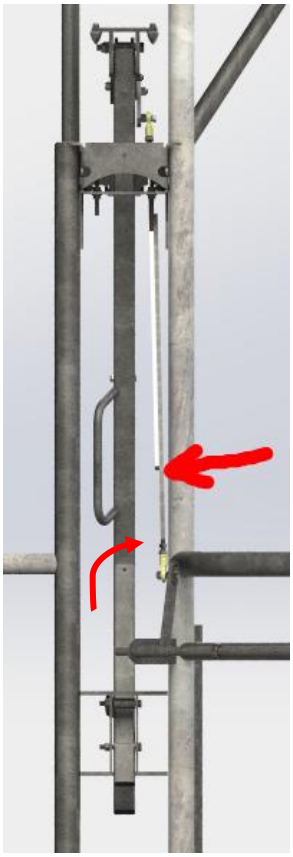
Use 2 pairs of vice grips to temporarily join the 2 pieces of linkage arm.

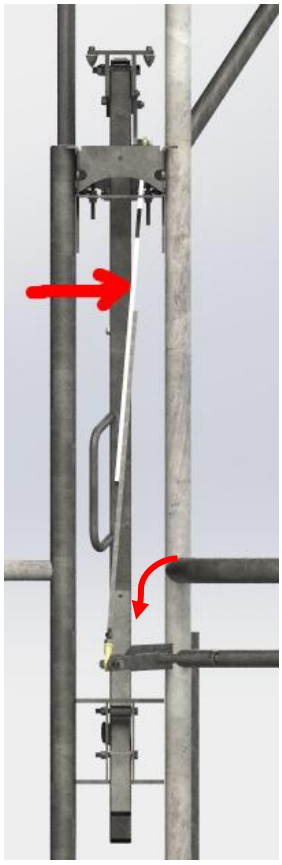




Step 12: Operate the gate and observe where the crank lever needs to be positioned



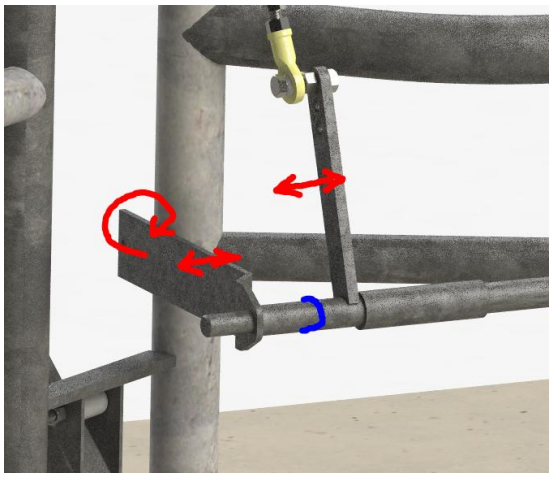




Ensure that:

- The linkage arm does not foul against the front post when the gate is fully closed (crank lever fully rotated upwards towards the post).
- The linkage arm does not foul against the weight arm when the gate is partially open, crank lever horizontal.

To avoid fouling, choose an appropriate crank lever position. The end plate can be flipped over and/or positioned differently on the front post, and the crank 20NB pipe can be shortened to achieve the desired position.



Ensure the crank lever can go over centre in both open and closed positions.

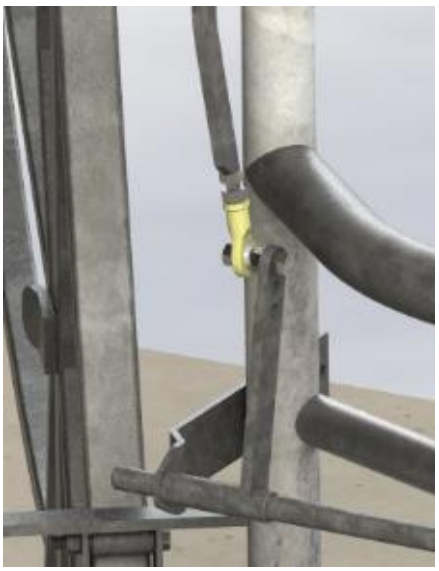
Example 1





Example 2



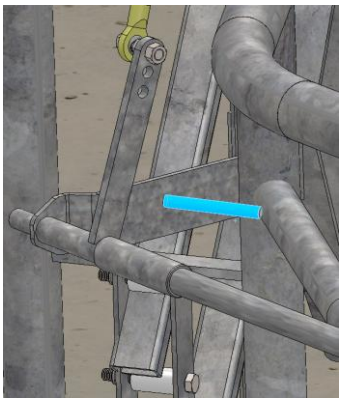


If the above is not possible, try swapping the adjuster bracket and control arm on the opposite side of the gate (see NOTE on page 13)

Step 13: Weld the control mechanism parts

Weld the end plate to the front post and add a diagonal support. Weld the crank lever to the control rail. Tighten the shaft collar and ball joints.

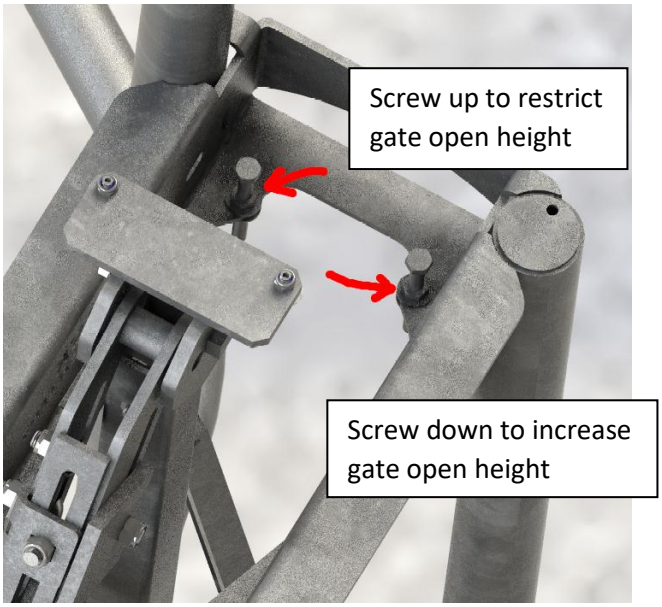






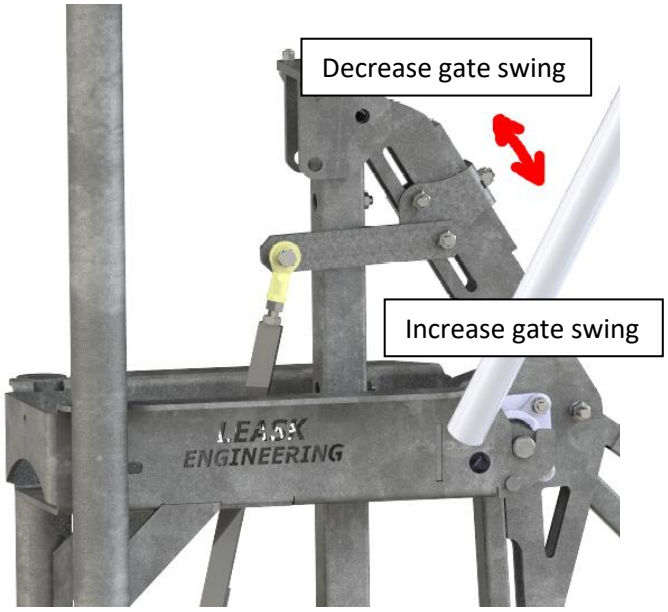
Step 14: Adjust the Maximum Height

Extend the top gate stops to decrease the max opening height (e.g., to avoid hitting the roof) and vice versa. Ensure stoppers and bumpers are adjusted to

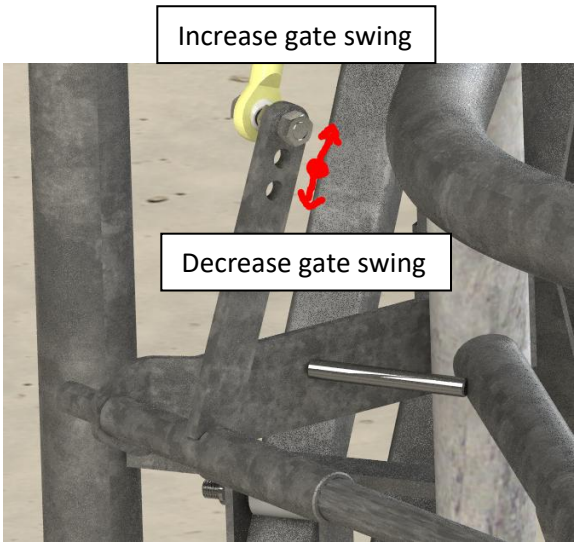


Step 15: Adjust the Gate Swing

Slide the adjuster towards the gate hinge pin to increase the gate swing (both directions), and vice versa and/or

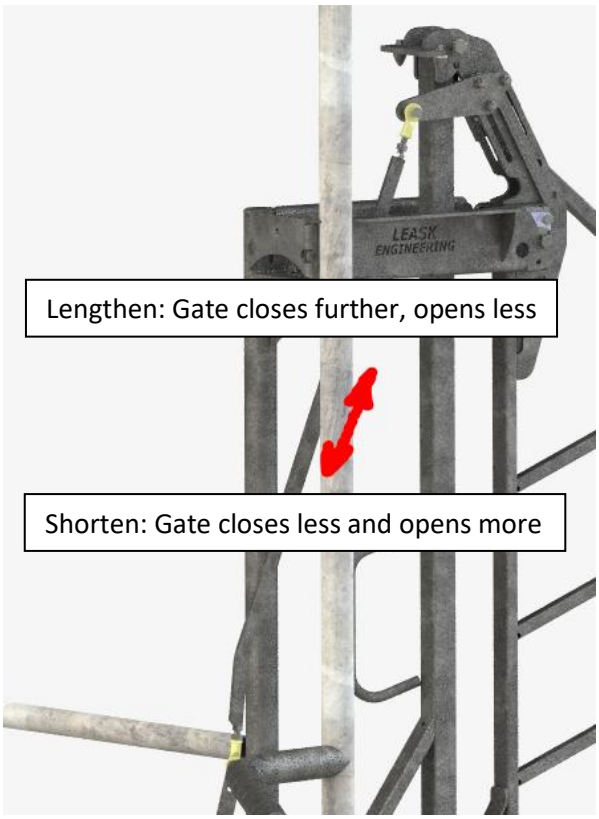


Shorten the crank to decrease the gate swing (both directions), and vice versa.



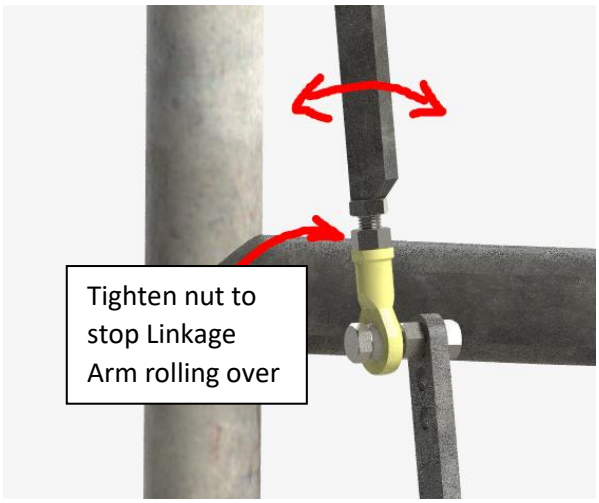
Step 16: Adjust the Gate Position

Shorten the linkage arm (where the two parts overlap, or at either rod end) to close less and open more, and vice versa.



Step 17: Adjust the Linkage Arm Roll

Tighten both rod end nuts to control the linkage arm roll



Use a combination of adjustments to achieve slight resistance when crank lever goes over centre at the top (gate hard against the closed rubber bumper) and the bottom (gate hard against the top rubber bumpers).

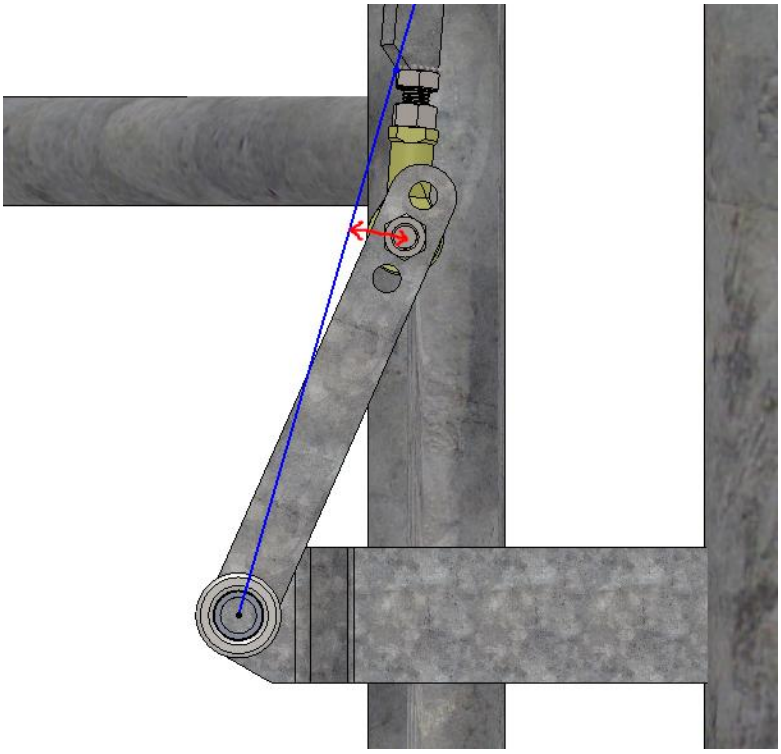
Step 18: Weld the linkage arm

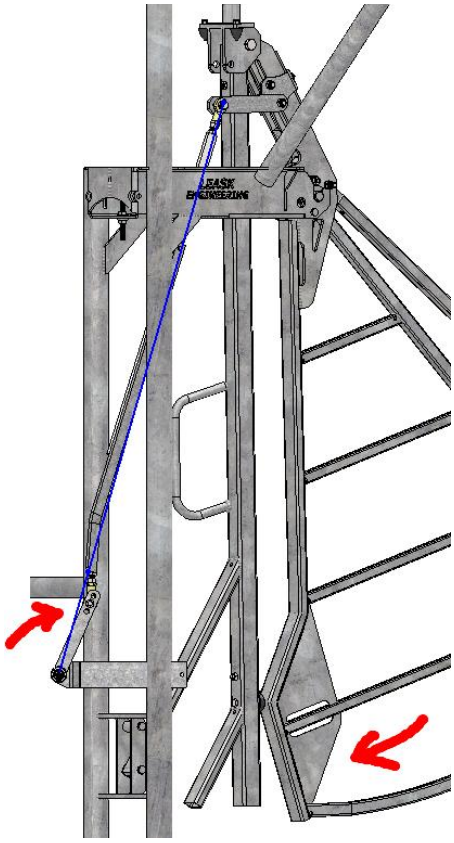


Step 19: Add the control rail handles



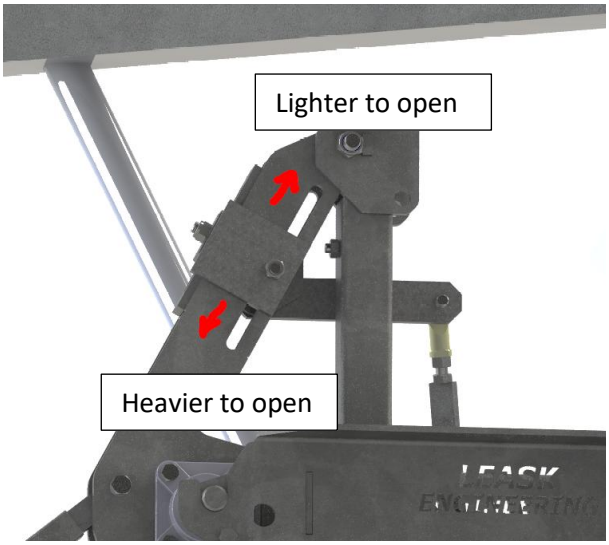
Step 20: Fit the Crank Stopper with Rubber, enabling the Linkage Arm to go 20mm over centre.







Step 21: Adjust the weight of the gate



Step 22: Clean and paint the welds. Lubricate the control rod and check all fasteners are tight.

Gate Operation

Beware of low head height when walking under the gate.

Keep clear of moving parts, to avoid impact or nips. A gate moving at speed can create serious impact.

To make operation easier the gates have been weighted so they are lighter to close (pushing the handle upwards) than they are to open, (pulling the handle downwards).

It is recommended not to use the front handles to close the gate and stop cows when they are exiting. Instead operate the gate from further down the pit, helping to prevent the cows from rushing out.

Do not operate the gate without visually checking it is safe to do so.

Do not operate the gate if any components become loose or damaged. Get the gates repaired immediately.

The gate should be opened and closed gently to avoid continuous heavy impacts creating unnecessary wear and tear.

If gates become difficult to operate, adjust the gate as per Step 14-18, or contact the supplier/installer for advice.

Maintenance

Monthly:

- Check all nuts and bolts are tight.
- Grease linkage arm rings.
- Check the gate adjustment as per step 14-18 and adjust as necessary.
- If rubber stoppers are damaged, replace as soon as possible.
- Ensure all the moving parts are not fouling during their movement.

Additional 6 monthly maintenance – grease the bearings and rod ends.

If a cow hits the gate and pushes it out of alignment, slacken the 8 bearing bolts and pull the gate back into alignment again. The gate rails should be vertical, and the gate should be inline with the weight arm and 30mm clear of the front stopper. Retighten all the bolts. If this is not successful, contact Leask Engineering for further instructions.

Oct 25