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# **E50 to H80** (excluding E55)

## **INSTALLATION MANUAL**

Please consult Harsh if any issues arise as operating instructions are subject to change without prior notice.



FM 13737

**HARSH**<sup>®</sup>  
[www.harshuk.com](http://www.harshuk.com)

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## HARSH TIPPING GEAR E50 - H80 (excluding E55) ASSEMBLY AND INSTALLATION GUIDELINES

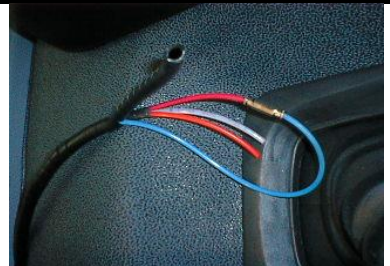
Your HARSH tipping gear will be supplied in kit form to suit the type of chassis you have ordered. The kit will be one bundle comprising of the stabiliser frame and kit box. The kit packing list will be attached to the top of the box. This should be checked against the contents before fitting commences.



Once the full kit is checked you should take out the PTO and pump – checking against the front of the packing list and also checking the actual gearbox in the vehicle is the same as that listed on the paperwork. The PTO will have separate instructions supplied in the kit.



A suitable air supply should be located to enable the PTO engagement switch and cab control to be installed (the bodybuilder guideline booklet for your particular chassis will give a air location point).



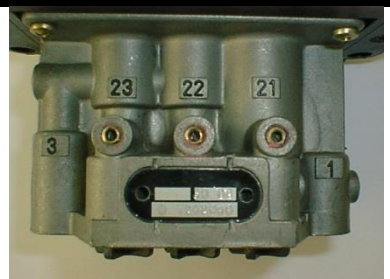
The cab control should be positioned to customer specifications, if non are given it must be easily accessible, but **must not** obstruct the drivers entrance and exit to the vehicle and also must not be located where possible knee or other injuries could occur. Ensure clearance on all areas of seating including height adjustment seats.



The control switch should be piped up as follows to ensure correct operation.

Single; Port 1 = air in  
Port 3 = exhaust  
Port 21 = lower  
Port 22 = raise

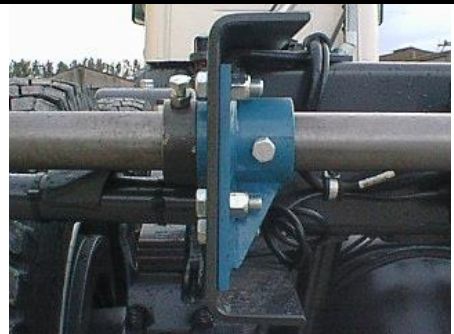
Dual; Port 1 = air in  
Port 3 = exhaust  
Port 21 = lower  
Port 22 = raise  
Port 23 = P T O



The tipper hinge point must now be located as to chassis manufacturers recommendations. Install the relevant bracketry supplied ensuring the hinge bar is level.



The hinge bar should be drilled and locked at the chassis bracket / boss points once the hinge bar is centralised.



Now the hinge bar is installed you can work out the mounting length for the tipping Gear. This dimension needs to be from the centre line of the tipper hinge bar to where the centre line of the chassis mounting bracket will be located. In your kit a mounting length chart will be supplied giving measurements for your model of tipping gear from 45 ° to 55 °. If you have a mounting length given on a HARSH drawing you will note this for reference only and should be checked against your actual chassis and against the swing diagrams for your tipping gear. See appendix at rear of manual. If you are uncertain of the space / clearance available it is recommended that the tipping gears is first clamped in position and re-calculated to ensure adequate clearance on forward and rearward crossmembers, propshafts and other chassis mounted equipment. For mounting versatility the HARSH tipping gear can be mounted with the stabiliser standard or reverse.



E50 Mount Lengths  
45° 50°  
2337mm 2801mm

F60 Mount Lengths  
45° 50°  
2591mm 2337mm

G70 Mount Lengths  
45° 50°  
2921mm 2642mm

H80 Mount Lengths  
45° 50°  
2921mm 2642mm



#### Subframe Mounted Applications;

If mounting in conjunction with a Subframe the hinge boss should pass through the subframe. Leave the required amount through the subframe to give adequate body bracket clearance. Once welded in place fit a crossmember and gussets as required. If the installation of a full length chassis subframe is required it should be mounted in line with chassis manufacturers recommendations. Locate the Tipper Hinge point to the manufacturers recommendations. Install the relevant bracketry supplied ensuring the Hinge Bar is level and centralised.



Ensure a suitable crossmember is fitted in front of the Hinge Bar. The Hinge Boss must also be fabricated with suitable gussets.



To enable the above location to be carried out you will need to assemble the tipping gear as follows:-

Lay out the stabiliser in its side and pull open into an 'A'. Insert the cylinders into the cradle with the hydraulic port(s) towards the knuckle of the stabiliser. Use the cap screws/bolts supplied in the mount box. Remove the plug from the hydraulic port(s) and install the fittings supplied. If the fitting is a taper thread use pipe sealant (loctite).



Pull out the top stage of the cylinder. Ensure the clamping ear is in the correct position with the short part towards the stabiliser knuckle.



Liberally apply grease to the clamping ear, insert the brass shim - again liberally greased with the grease hole located in line with the grease nipple in the underside of the ear.



Push the cylinder out until the clamp and shim form around the top cross tube. Grease the inside of the top clamping cap and fit to the top cross tube and bolt together.



Drill a hole through one leg of the small angle and insert the frame clamping bolt. Weld the BSP Tee Piece to the other leg of the angle provided.



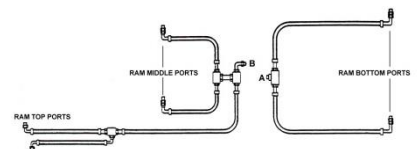
On the front face of the Cylinder Cradle there will be 2 holes. These are used for the hose fittings. A new hole will need to be drilled on the Flange of the Cradle for the Tee Piece. Run the short hoses supplied from the cylinder – do one at a time and ensure there is a good loop/curve as the hose will shorten when under pressure.



All the fittings needed to pipe up your tipping gear are supplied in the kit along with the required hoses.



See the drawing below for instructions on how to pipe up your gear.



Now attach the other hoses ensuring again a good loop/curve. Re-check all fittings are tight. Cable tie the lower hoses to the rams.



Now grease and insert the lower mounting brackets. These can be identified by the tube and the bracket construction is of rolled steel. Ensure all grease nipples are installed and none have been damaged in transit, and then liberally grease all points.



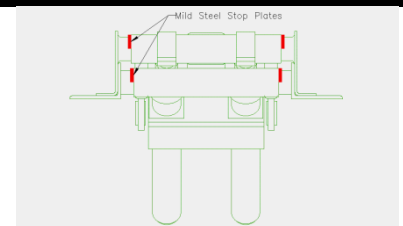
Place the assembled tipping gear on the chassis in the pre-determined position. Centralise the Tipping Gear at both ends of the frame and make sure it is sat squarely on the Chassis.



If the lower mounts are fully inserted into the lower crosstube you must ensure that they **DO NOT** overlap the inner edge of the chassis flange.



If the lower mounts do overlap the flange. The mounts should be pulled out each side and the 10mm mild steel stop plates should be welded to the lower mount tube. This is essential to prevent any side movement of the tipping gear. Once these are correctly situated the lower mounts can be temporarily clamped to the chassis.





#### Flitch Mounted Applications;

Before the Mounting Brackets can be fitted, the flitches will need to be fitted to the Chassis. The centre line on the Flitch should line up with the centre line on the Chassis and the Mounting Bracket. All Chassis obstructions need to be removed before the flitches and Mounting Brackets can be fitted.



#### Subframe Mounted Applications;

Attach mounting side angles onto subframe and down the chassis. Follow the mounting procedure as detailed, but ensure a crossmember is installed for under the rear third of the lower mount. The crossmember must be full width and installed to support the subframe top flange. Ensure the location will not interfere with the ram swing.



If the lower mounts do overlap the flange. The mounts should be pulled out each side and the 10mm stop plates should be welded to the lower mount tube. Once these are correctly situated the lower mounts can be temporarily clamped to the chassis.



With the tipping gear clamped you can use the swing diagrams to ensure clear cycle of the tipping gear. If required the tipping gear could be mock elevated to ensure no contact with chassis obstructions.



Mark the chassis, once the final position has been determined. Also locate a supporting crossmember towards the far end of the stabiliser frame, this will be used to mount a hard wood packer that will support the tipping frame and keep it parallel with the chassis.



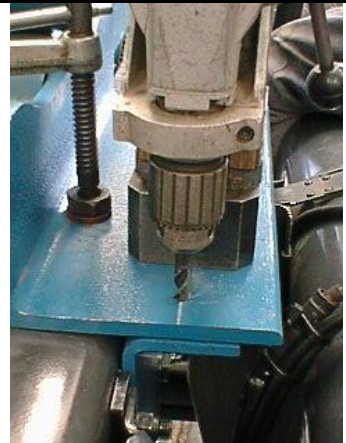
It is now time to re-mount the tipping gear. If it was removed. Ensure it is all central and parallel and clamp the lower mounts again. Now mark the lower mounts with the centre line of the side angle.



Measure for 3 bolts and centre punch.



It may be necessary to have some off centre due to chassis mounted equipment. Position and drill.



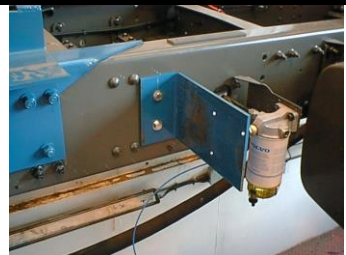
Once bolted grease and insert the upper body mounting bracket.



The hydraulic oil tank should be mounted at the same side as the PTO/pump if possible to ensure a smooth pipe run to the pump. Locate it as near to the tipping gear as possible.



The valve should then be located next to the tank on the plate supplied. Where possible mount the valve as shown below or in such a way no water can settle on the valve. It is also useful to use the valve bracket as a guard from wheel spray etc. The bolts that hold the valve in place should be tightened to no more than 20NM





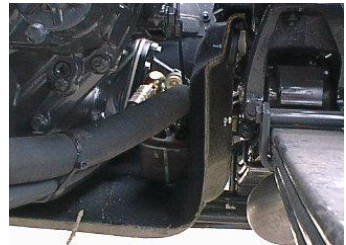
The valve ports will be marked with the following references.  
A = Pressure to rams. B = Power down. P = Pressure from the pump.  
T = Tank return.



The system piping should follow the instructions in the fitting manual. The pipes should run as direct as possible with regular clamping and any bends required should be large natural curves to allow for hose compression. Always ensure **NO** hose is straight as this will pull the ends off the hoses when compressed. A body packer of 45mm will be detailed later, but care should be taken to ensure the power down pipes ( top ) DO NOT touch the lower cross tube.



The low pressure feed from the tank to the pump should run along side the high pressure return from the pump to the valve.



The tank return hose can now be fitted. Make sure if there is a curve in the hose it is not too loose / large as when under pressure it pulls upwards and touches the floor of the body.



Slightly elevate the upper stabiliser frame to allow the piping of the rams.. Running from Port 'A' take the high pressure pipe over the lower crosstube and attach to the Tee Piece.



Wrap the hose in protective sleeving and centralise with a bracket and clamp from the chassis or a crossmember. Note the natural curve of the pipe.



The tank should be filled with oil and then the system should be tested. Remember the rams have not been bled and there is no body attached at this point. Fully raise the tipper frame and then lower it back down. Do this 3 – 4 times to make sure the air is pushed fully out of the system. Re-fill the tank as required.



Subject to chassis type and whether mounting to a subframe or direct to the chassis, it may be a requirement of the chassis manufacturer to install a rear cruciform. Reference should be made to the vehicle manufacturers body builders guidelines.

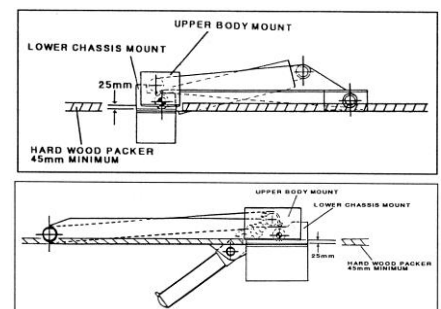


The tipping gear is now installed and a final check of the system should be made.



#### Body Mounting;

The next step is to construct your body and this is up to you as to its design, however there are still many areas you must take care over. Whether your design incorporates body longitudinal and crossbearers or "V" runners etc. you must always ensure that floor height is adequate to allow for a 25mm gap between the chassis lower and body mounting brackets. This is achieved by fitting a minimum of 45mm wood packers to the longitudinal. The runner depth is also imperative to ensure the top ram clamping lugs do not in any way interfere with the body floor as this can cause extensive damage to both body and tipping gear and ultimately could contribute to turnovers or other acts relating to possible fatal injuries.



It is highly recommended that when allowing the ram clamp clearance as detailed above, future body floor characteristics are taken into account i.e. floor sag etc. As the tipping gear and body installer you could be liable for any errors occurring from incorrect set-up.

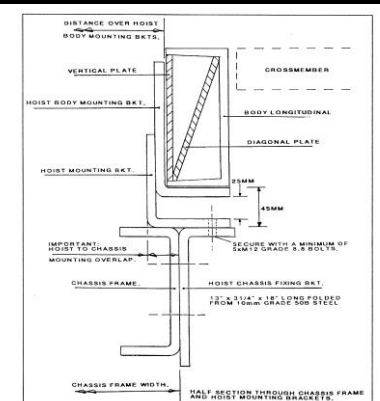
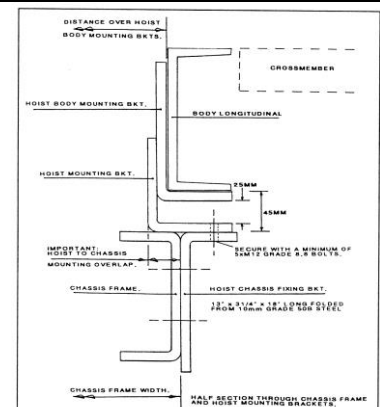
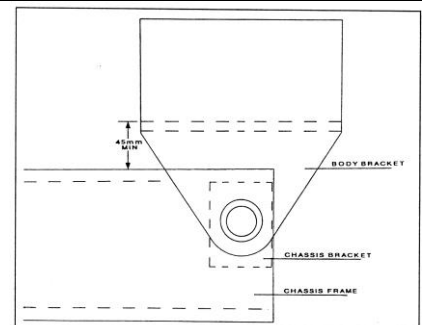
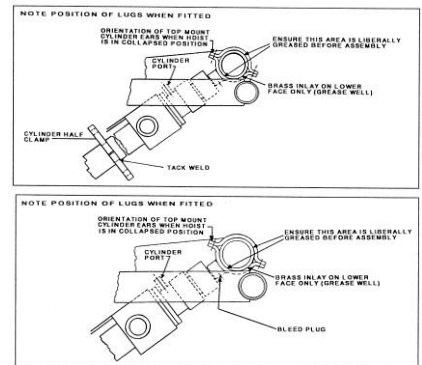
The body runner width is also an essential area of a tipper as incorrect set-up could produce unstable operating i.e., tipping, cornering etc. As HARSH recommend that when mounting the tipping gear the lower mounting brackets must NOT overlap the chassis or subframe flange and also due to the chassis width / tipping gear width compatibility you will have the two following possibilities.

One;

A straight longitudinal will be possible to incorporate your standard body design. If you have had to pull out the body mounts to meet the body runners ensure to install the half moon stop rings to the tube of the body mount.

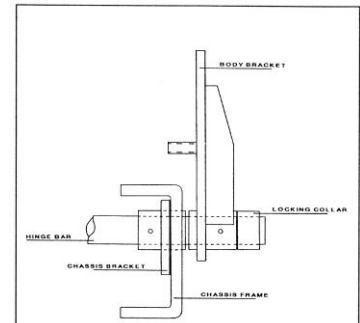
Two;

If the tipping gear installation does not allow a straight longitudinal you will need to carry out the following. Firstly assess the area around the tipping gear and measure the offending areas of protrusion. Subject to the severity of the extra width it may not be possible to still have runner edge in line with the chassis but it will be far less severe. You will need to make the area of protrusion onto the flange of your runner. Ensuring that you are comfortable with the amount of cut out in relation to your body design ( HARSH recommend no more than a third of the runner ) we propose cutting out the area required and then inserting a diagonal plate and then a further vertical plate to the runner as shown. This re-enforcement should be a minimum of twice the length of the cut out and placed centrally at the cut out to spread the loads imposed. If required a external strengthening plate may be attached.

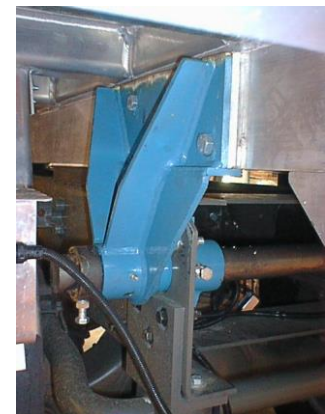




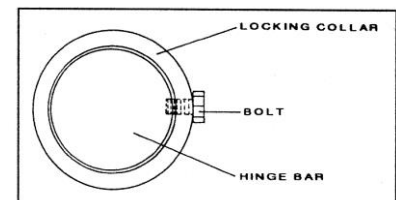
When installing the rear body brackets the following is intended as a guide to the fitment of a UK standard hinge assembly. It may not be possible to fit the following due to chassis spring hanger arrangements or crossmembers etc, which may restrict the use of a standard chassis bracket or the design of body may require non-standard body brackets.



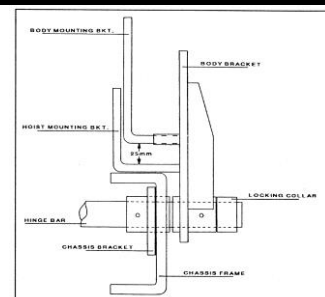
The body brackets supplied will have pre-determined height to suit the chassis and application as detailed in your order. Before inserting the bracket over the hinge bar you must grease the hinge bar over the area the bracket will sit, once installed push up lightly against the boss face protruding through the chassis / subframe. Rotate the bracket by hand to ensure clearance on bolt heads and chassis top rail when tipping. You may be supplied with a flat bracket which will require a loose runner mounting strip, this should be welded to the body bracket at the required height to suit your set-up with the required packers as shown. If mounting with loadcells please refer to the instructions supplied with your kit.



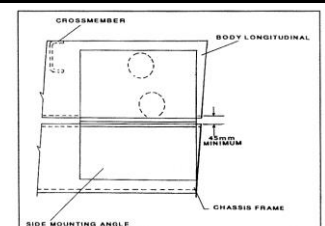
Once you have sat the body in position, before bolting to the body brackets ensure there will be no side movement from the hinge or body. Once bolted ensure the locking collars are fitted as shown with the bolt locked into the hinge bar. To achieve this you may wish to position the collar then through the tapped hole drill a pilot hole. Remove the collar and drill to suit the bolt size and depth remaining. Re-position the collar. Add locktite to the locking bolt and fix in place.



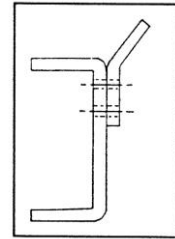
The following shows a cross section of the final hinge set-up and gear mounting brackets. Ensure all points are well greased.



When fixing body mount brackets to body longitudinal ensure, the tipping gear and body are in a fully down position to prevent the hoist jamming open. Bolting should use high grade countersunk bolts to allow for bracket positioning in down position.



The body builder should ensure suitable body guides are fitted either to the chassis as shown or to the body but ensuring a chassis wear plate is installed.



A suitable body warning device MUST now be installed, one such system is available from HARSH that allows various mounting positions without pin point accuracy.



You must now fill the oil tank and test the system. You will also need to bleed the rams. This is done by cycling the system as detailed in the maintenance section. While tipped liberally grease the stabiliser frame. There are up to 19 grease points depending on which model gear is fitted.

#### FINAL CHECKS:

ONCE THE BODY IS MOUNTED IT IS ESSENTIAL TO RE-CHECK THE FOLLOWING POINTS. ENSURE THE BODY SITS ON THE CHASSIS AND IS NOT OFF THE CHASSIS AT ANY POINT OTHER THAN IN POINT 2.

ENSURE THAT A 25MM GAP IS MAINTAINED BETWEEN THE LOWER AND UPPER MOUNTS. THIS CAN BE ACHIEVED BY FITTING A MINIMUM OF 45MM THICK HARDWOOD / RUBBER LONGITUDINAL PACKINGS BETWEEN THE BODY RUNNER AND THE CHASSIS FRAME / SUBFRAME.

CHECK TOP OF RAMS CLEAR BODY FLOOR WITH CLEARANCE FOR BODY WEAR AND CHECK RAMS ARE CLEAR OF PROPSHAFT AND ALL OTHER CHASSIS OBSTRUCTIONS. WHEN MOUNTING WITH A SUBFRAME RE-CHECK THE CLEARANCE ON THE SUBFRAME CROSSMEMBER WITH THE BODY AT FULL TIP. WELD IN PLACE WHEN ADEQUATE CLEARANCE IS ACHIEVED.

ENSURE BODY WARNING DEVICE WORKS CORRECTLY AND DEACTIVATION ARM / SENSOR IS CORRECTLY POSITIONED.

RE-CHECK ALL BOLTS AND FITTINGS.

AGAIN BLEED THE SYSTEM AND RE-FILL WITH OIL AS REQUIRED. ENSURE TO ADEQUATELY TIGHTEN BLEED SCREW AND CLEAN OFF EXCESS OIL.

ENSURE ALL OPERATION STICKERS ARE FITTED IN THE CAB AND ALL WARNING SIGNS ARE CLEARLY VISIBLE.

ENSURE FITTING AND MAINTENANCE MANUAL ARE PLACED ALONG WITH WARRANTY AND CE DOCUMENTS IN THE CAB FOR THE OPERATOR.

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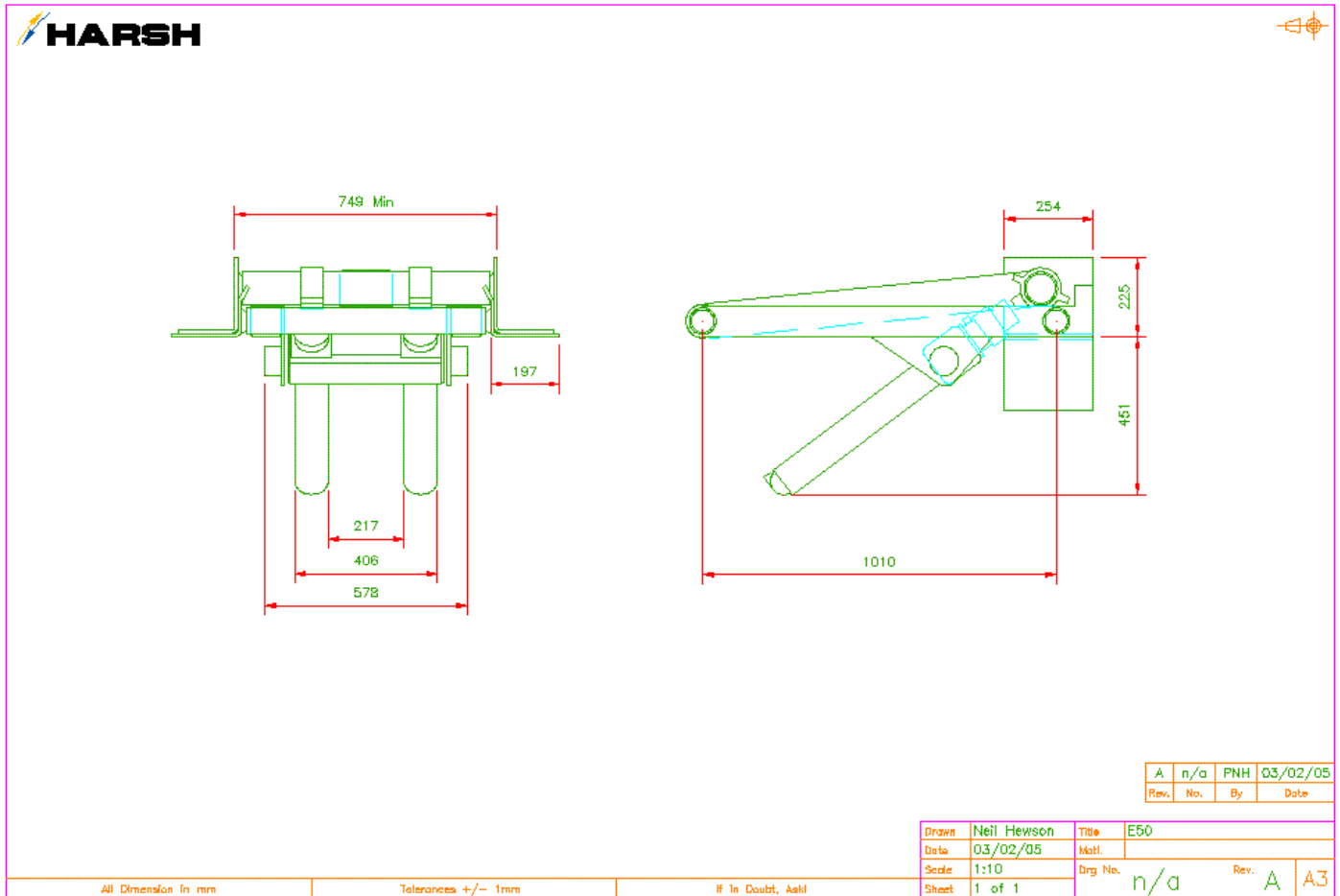
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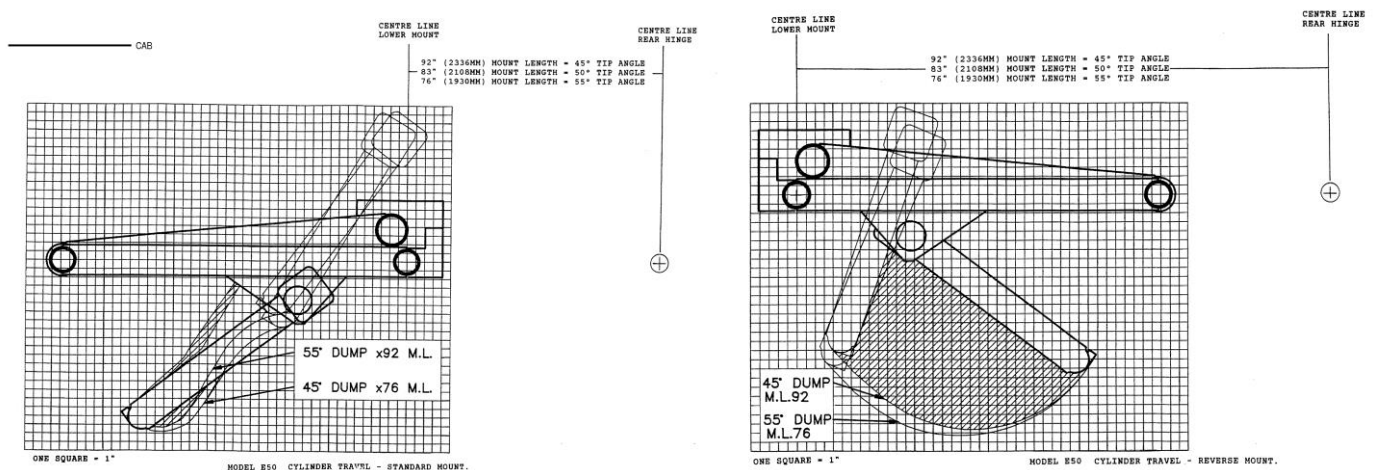
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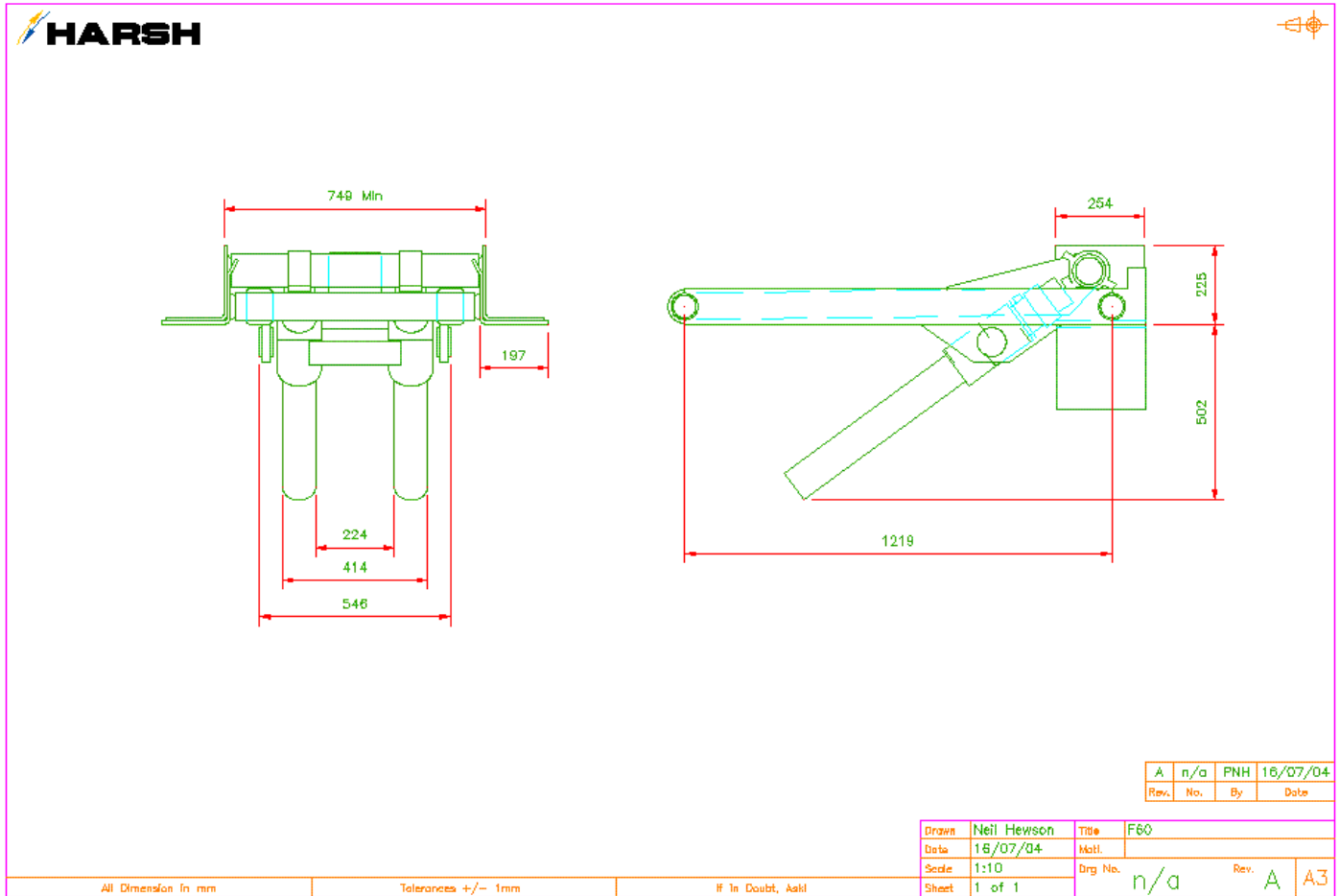
## E50 TECHNICAL DATA



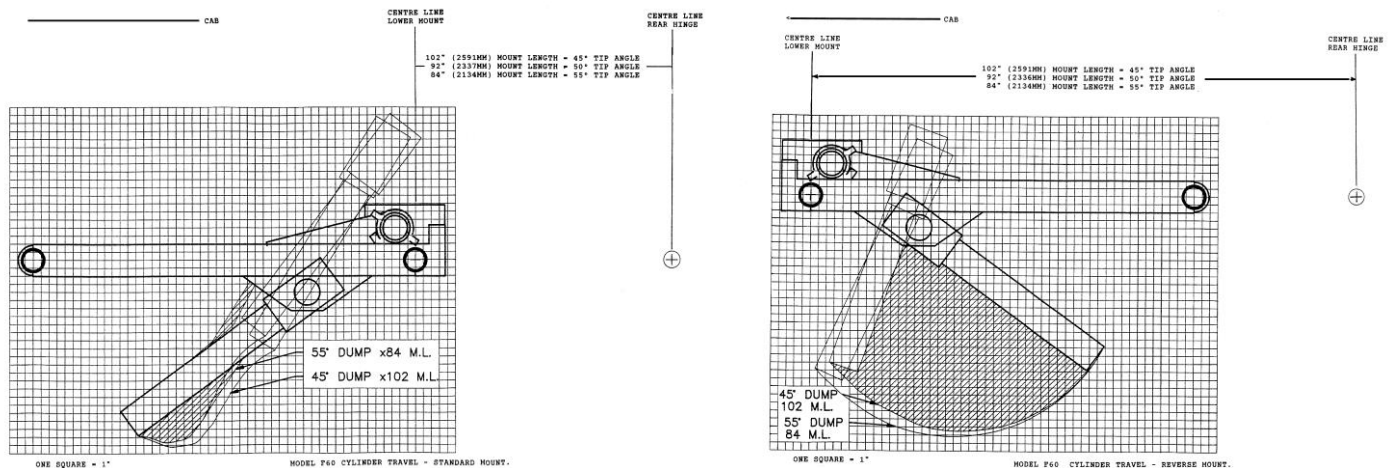
## E50 SWING DIAGRAMS



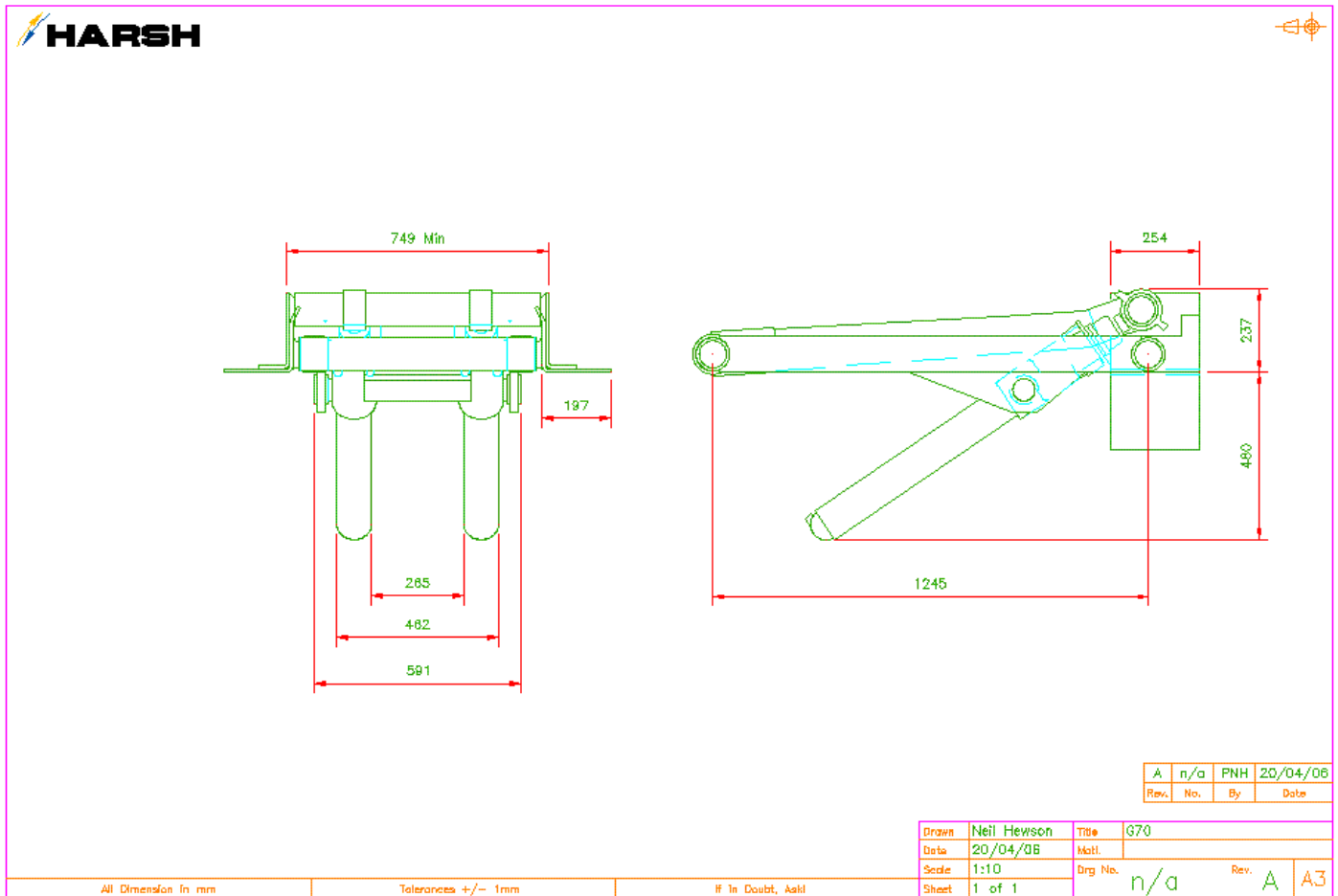
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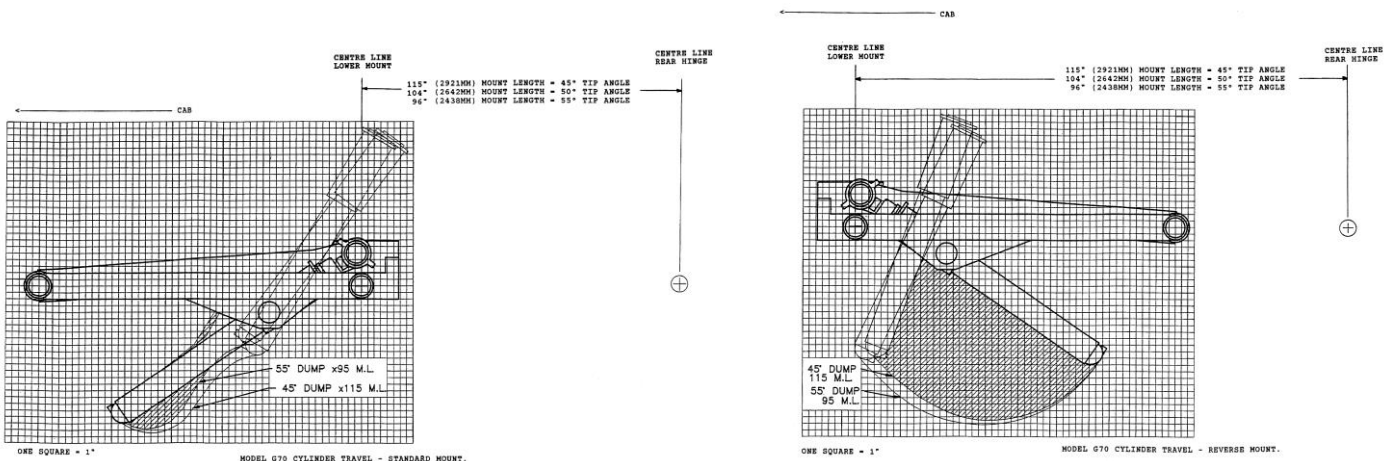
## F60 SWING DIAGRAMS



## G70 TECHNICAL DATA

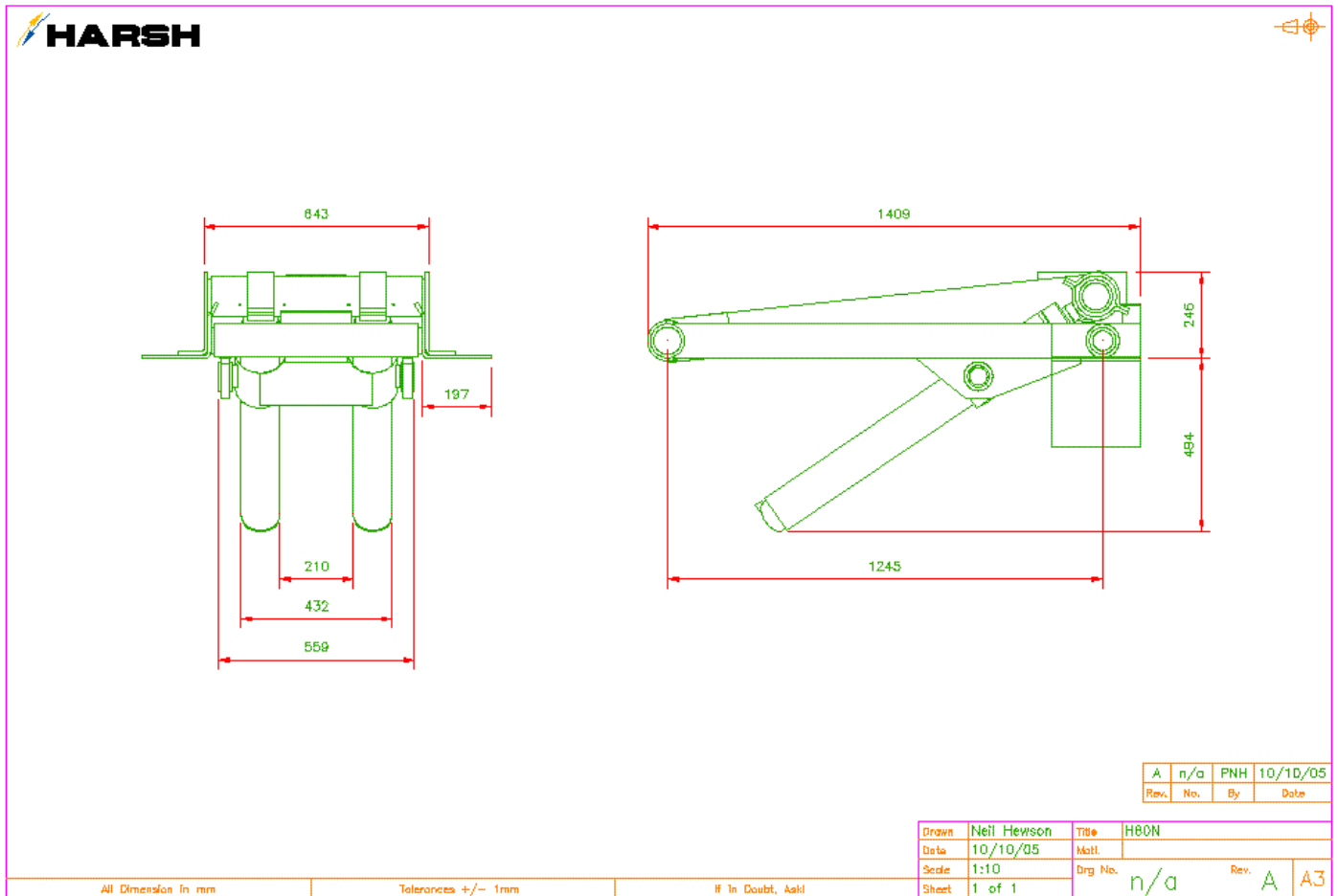


## G70 SWING DIAGRAMS

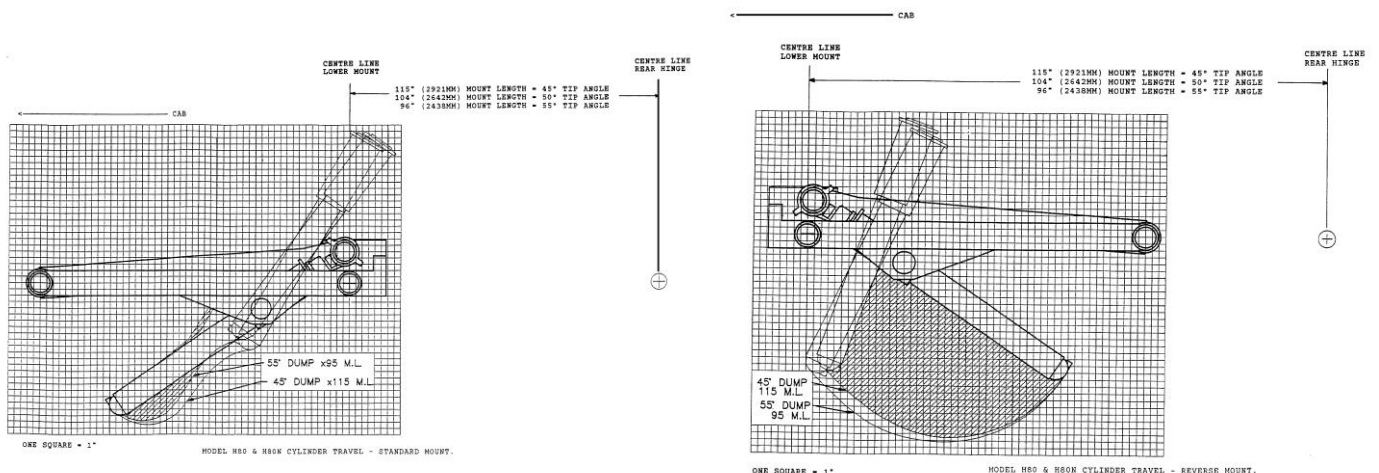




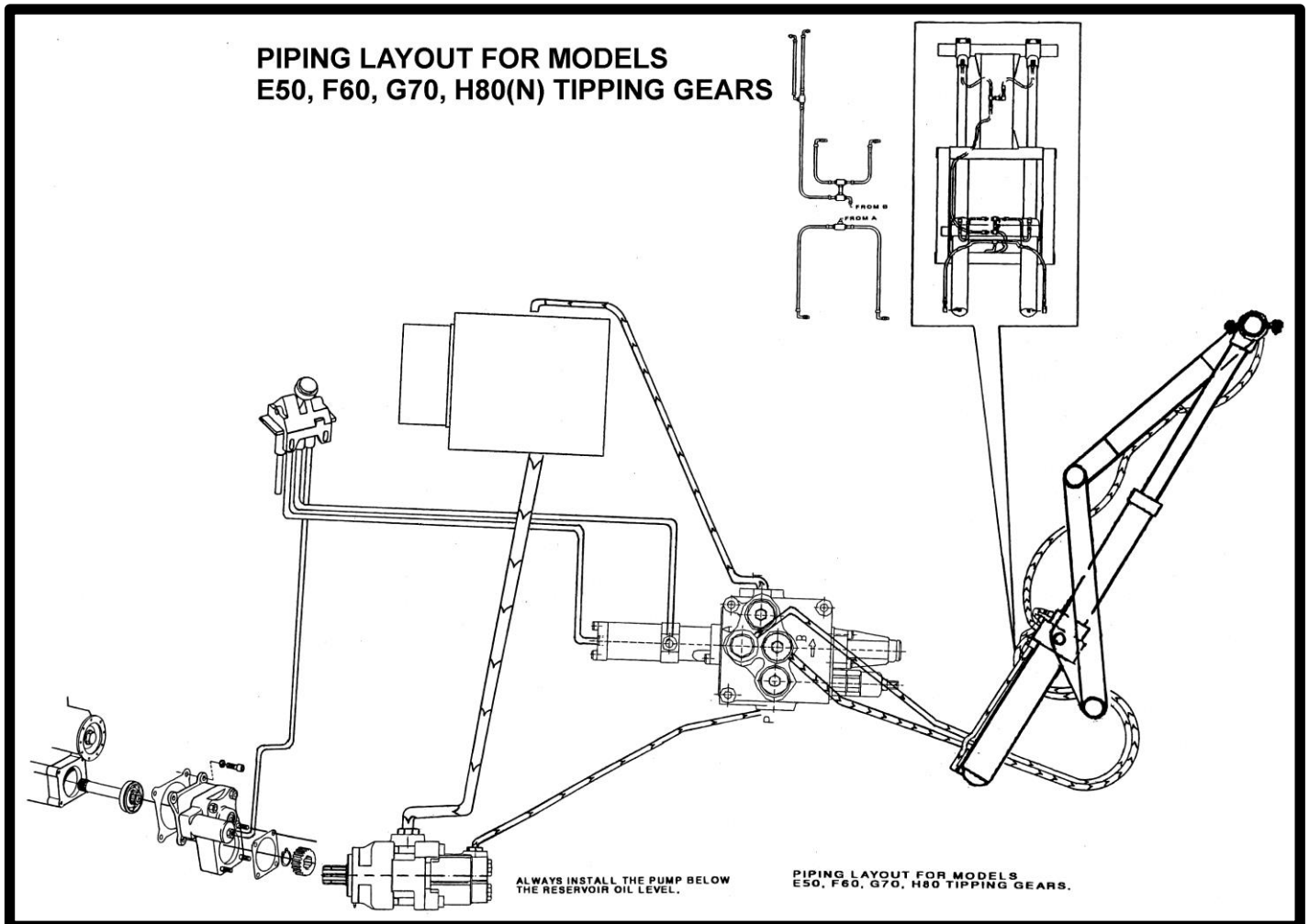
## H80 TECHNICAL DATA



## H80(N) SWING DIAGRAMS



## Piping diagram for all Models



## MAINTENANCE INSTRUCTION

Periodic maintenance and inspection will increase the working life of the Tipping hoist. Follow the routine of the check list set out below at least once per week or every 50 cycles whichever is sooner to ensure efficiency and safety of the tipping gear.

Liberally grease all grease points on the tipping gear and rear hinge.

Check all high pressure pipes and connections for oil leaks.

Check oil level in tank when Tipping hoist is at rest. Top up if necessary using the following:-

Recommend hydraulic oil:- Elf - Hydrelf 68. Morris - Triad HV37a. Texaco - Rando HD268. Shell - Tellus 68.

Check fixing bolts for damage and tightness.

Check vehicle for any form of damage or wear and take measures to fully repair or replace damage on the vehicle.

Replace any damaged tipping gear parts immediately with genuine HARSH replacements.

## SAFETY INSTRUCTION

### While Tipping

Always check for overhead wires, obstructions and make sure that no other people are in the vicinity of the vehicle or tipping area before tipping.

Tip with the vehicle at rest, on level ground and with a balanced even load.

(Never overload, or heap the load).

Always check the conditions of the area where tipping i.e. do not tip when there is:

Wet or unstable ground which may collapse or in high winds.

Stay in cab when Tipping. If the load sticks or any problems develop immediately lower the body. (Never shunt load free or leave cab and go under a raised loaded body.)

After tipping, always lower the body fully before driving off and disengage PTO.

### While Working on Vehicle

Never work under a raised loaded body even if propped.

Never work under a raised empty body unless propped.

Look for any signs of wear not only on the tipping gear but also the wood packers, hinge assembly, hoses, valve and tank assembly.

**NEVER ALLOW ANYONE UNDER AN UNPROPPED BODY**



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