EMV 300 – Used for Installation of Trench Sheets & Sheet Piles

The Excavator Mounted Vibrator (EMV) attachment is a perfect tool for readily converting any suitable size of excavator into a highly productive pile driving machine. Trench Sheet/Sheet Piles can be lifted by chain from a stack on the ground, engaged into a powerful hydraulic grip then positioned at will on a job site for vibrating and pushing into the ground. Once removed the Trench Sheet/Sheet Piles can be easily and safely laid down on the ground in a controlled and safe manner.
The EMV300 product is extremely versatile and readily adapts to most suit excavators from 12 to 25 tonnes, and with care up to 35 tonnes.
The contents of these Instructions are intended to give guidance on the installation, safe use and maintenance of the EMV product.

HAZARD AND RISK ASSESSMENTS

Before using this equipment, assess for hazards and risks and use appropriate measures to eliminate, control or reduce those risks before you commence work.

HAZARDS

- Falling piles – should the pile be handled incorrectly
- Liquids under high pressure and associated components
- Mechanical failures of equipment components
- Noise – wear ear protection equipment when inside this area
- Unexpected overturning of the excavator
- Hitting underground Services

Suggested PPE (Personal Protective Equipment)

Rings and jewellery must not be worn.

Close fitting, protective clothing or a workshop apron

Note: PPE must be suited to the risks and person(s) using the equipment

SAFETY INSTRUCTIONS

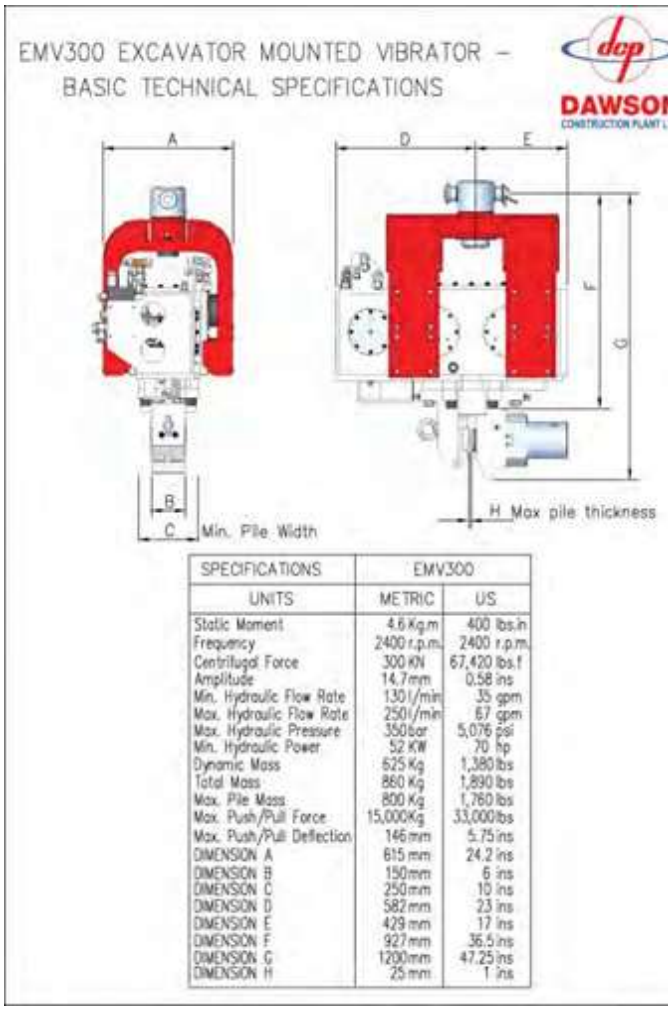
1. Operating Instructions – Before using this equipment ensure you have read the 'Operating Instructions' and taken note of the 'Hazards and Risks' detailed on this instruction sheet and taken all necessary steps to prevent injury.
2. Personal Protective Equipment – Use appropriate personal protective equipment for the job.
3. Installation Advice – Ensure all operators have received basic training in lifting and control of heavy loads. The safe use and application of the EMV 300 must be in accordance with AS3610, the Occupational Health and Safety Act, approved Codes of Practice and any other regulatory requirements. Consultation with a qualified engineer is advised.

INSPECTION

The designated competent person will inspect all components of the EMV 300 prior to use, as well as daily and when changes in job site conditions require. Replace any damaged, defective or inadequate components.

Those who are in charge of, or responsible for, the use and maintenance must ensure that the EMV 300 and all it's auxiliary equipment are in good condition before using.

Operating and Safety Instructions



SPECIFICATIONS	EMV300	
UNITS	METRIC	US
Static Moment	4.6 Kg.m	400 lbs.in
Frequency	2400 r.p.m.	2400 r.p.m.
Centrifugal Force	300 KN	67,420 lbs.f
Amplitude	14.7 mm	0.58 ins
Min. Hydraulic Flow Rate	130 l/min	35 gpm
Max. Hydraulic Flow Rate	250 l/min	67 gpm
Max. Hydraulic Pressure	350 bar	5,076 psi
Min. Hydraulic Power	52 KW	70 hp
Dynamic Mass	625 Kg	1,380 lbs
Total Mass	860 Kg	1,890 lbs
Max. Pile Mass	800 Kg	1,760 lbs
Max. Push/Pull Force	15,000Kg	33,000 lbs
Max. Push/Pull Deflection	146 mm	5.75 ins
DIMENSION A	615 mm	24.2 ins
DIMENSION B	150 mm	6 ins
DIMENSION C	250 mm	10 ins
DIMENSION D	582 mm	23 ins
DIMENSION E	429 mm	17 ins
DIMENSION F	927 mm	36.5 ins
DIMENSION G	1200 mm	47.25 ins
DIMENSION H	25 mm	1 ins

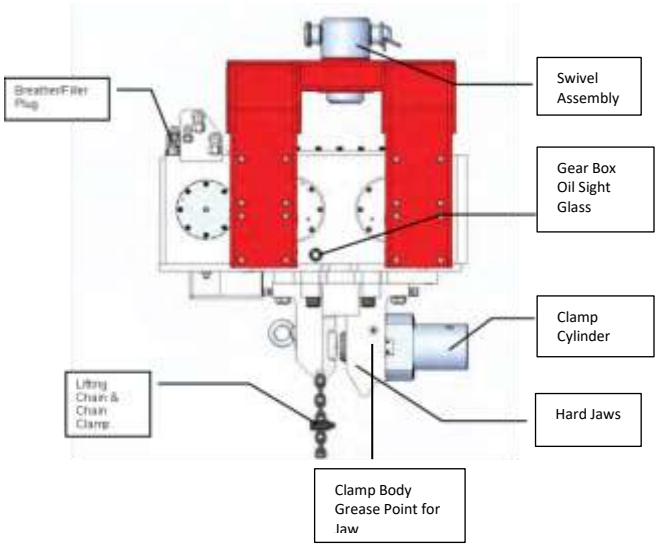
SAFETY CHECKLIST

- The vibrator should only be operated by suitably qualified personnel.
- There should be visual contact between operator and slinger (spotter) at all times.
- Monitor the piling operation constantly – interrupt the process immediately if any danger occurs.
- Do not operate the vibrator if any person is within the Danger Area.
- Consider machine stability at all times.
- The operator should inspect the equipment for defects every day and before being taken into service. Any defects that affect operational safety should be corrected before use. If unable to rectify contact Shore Hire.
- Pay attention to the Safe Working Load of all lifting accessories at all times.
- Work safely at all times and within the requirements of all local legislation.
- The vibrator can become very hot during operation – do not touch it unless wearing appropriate protective clothing.

Before the start of any piling work it is up to the contractor to find out if there are any underground obstacles within the working area which could be dangerous to personnel. In the case of unforeseeable contact or damage of an underground obstacle, then work must stop immediately and the person in charge informed.

OPERATING CONDITIONS

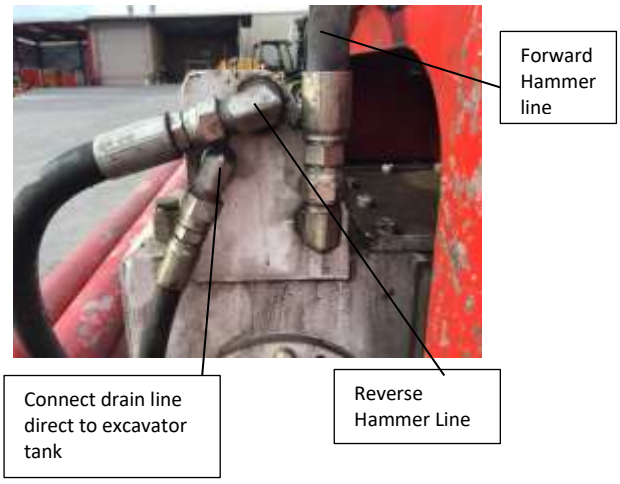
- Piling should only be carried out under the supervision of an appropriately qualified and experienced person who can assess that the work is carried out safely.
- The excavator operator must ensure that his communication signals are understood, by those on the ground, and followed. During piling operations he must watch out for any potential hazards.
- Vibrators should only be operated and driven on firm ground with clear visibility of the working area and the process monitored constantly.
- The vibrator stand must stay upright and horizontal (at all times) to avoid personnel injury. Do not operate the vibrator if any personnel are within the Danger Area.



MOUNTING THE VIBRATOR

- Attach the supplied EMV adaptor hitch to the excavator hitch
- Lower the EMV adaptor hitch onto the EMV swivel assembly, secure with pin and bolt

Connect all three hoses to excavator as shown below - If quick release couplings are installed on the excavator they should be replaced and threaded fittings used. It is strongly recommended that quick release couplings are not used for this application.



WARNING: THE DRAIN LINE MUST FLOW DIRECTLY TO TANK WITHOUT RESTRICTION. FAILURE TO DO SO WILL RESULT IN THE HYDRAULIC DRIVE MOTOR BLOWING ITS CASING SEAL OR FRONT CASING CASTING – THIS DAMAGE IS VERY COSTLY TO REPAIR.

OPERATING INSTRUCTIONS

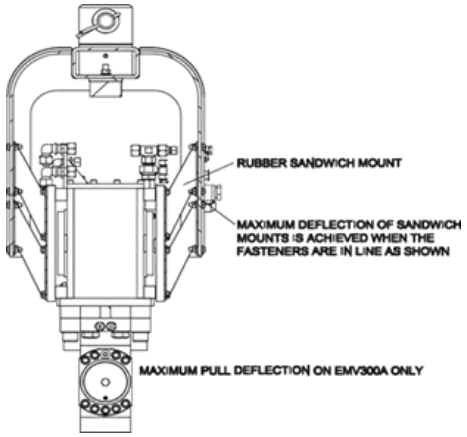
Driving Sheets:

- Ensure that all safety inspections and maintenance has been carried out before starting the excavator.
- Ensure all Hydraulic hoses & fittings are fitted correctly & EMV adaptor hitch is attached to excavator.
- Release the stand from the jaws of the vibrator by operation of the retract bucket ram control function in the cab. Manoeuvre the vibrator above one end of the pile to be pitched, so that there is enough distance to allow safe insertion of the lifting chain through the hole at the top of the pile.
- Check which way around the pile has to be lifted before inserting the lifting chain.
- Insert the lifting chain correctly (no twists, knots etc) through the lifting hole in the pile and finally with the chain clamp. **Allow enough free chain length for the pile to rotate to vertical during the lifting process without jamming against the underside of the clamp body. If this happens the chain will be overloaded, may subsequently break and allow the pile to fall – this is a severe hazard to all site personnel and must be avoided at all times.** Do not allow too much chain so that the top of the pile hangs too far away from the clamp when it is raised to the vertical – **this will make it difficult to engage the pile in the clamp.**
- Clear all personnel standing in the Danger Area and lift up the pile until it just hangs freely off the ground.
- Lower the pile slowly so that the pile can be correctly inserted into the clamp. Once firmly inserted, close the jaws.
- Manoeuvre the pile to the insertion point and push the pile slowly into the ground. Plumb the pile and ensure all personnel are out of the Danger Area.
- Start the vibrator and adjust (crowd) the hydraulic rams so that the vibrator is level and always sits directly on top of the pile as it goes into the ground. Do not over push the vibrator - stop pushing when the gearbox starts to vibrate against the rubber stops on the underside of the saddle. With the EMV300 the deflection is 146mm.
- When the pile has reached the required depth turn the vibrator off by returning the control lever to the central position and allow all vibrations to stop. Release the hard jaws from the pile by slowly operating the control lever in the opposite direction. Do not operate the control lever from one extreme position to the other whilst the EMV is running – it will cause hydraulic system pressure spikes to occur.
- Remove the chain clamp and lifting chain from the pile lifting hole.
- Repeat all the above steps for next sheet.

NOTE – If piling progress slows to less than 100mm/min stop piling. Augering or water jetting will be needed to reduce ground pressure.

Extracting Sheets:

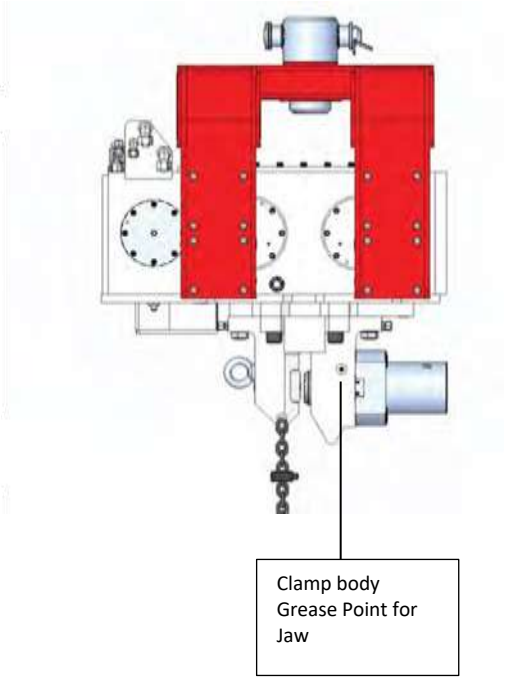
- Ensure that all safety procedures and maintenance has been carried out before starting the excavator.
- Ensure all Hydraulic hoses & fittings are fitted correctly & EMV adaptor hitch is attached to excavator.
- Release the stand from the jaws of the vibrator by operation of the retract bucket ram control function in the cab. Manoeuvre the vibrator above one end of the pile to be extracted so that there is enough distance to allow safe insertion of the lifting chain through the hole at the top of the pile.
- Insert the lifting chain correctly (no twists, knots etc) through the lifting hole in the pile and secure with the chain clamp. **Allow enough free chain length for the pile to rotate to horizontal during the lowering process without jamming against the underside of the clamp body. If this happens the chain will be overloaded, may subsequently break and allow the pile to fall – this is a sever hazard to all site personnel and must be avoided at all times. Under no circumstances should a pile be pulled using the lifting chain only.**
- Clamp the vibrator onto the pile head ensuring that it is level. Ensure all personnel are out of the Danger Area.
- Start the vibrator and allow the soil to loosen around the pile. Start to lift up the pile. Ensure the pile clutches are not rubbing together. Pay attention to the distortion of the rubber sandwich mounts - under no circumstances should these mounts be allowed to deflect by more than the stipulated amount of 146mm. If these mounts are deflected by more than the specified amount on the EMV300 reduce the extraction force to continue pulling.
- Continue extracting the pile until the pile foot is almost extracted. Stop vibration at this point and carefully pull the pile out the remaining short distance.



- Move the pile to a suitable area, and place the pile on the ground. Ensure that all personnel are out of the Danger Area.
- Hold the pile on the ground and release the jaws. Raise the vibrator off the pile slowly ensuring that there is no snatch on the lifting chain. Slowly lower the pile towards the ground.
- Remove the chain clamp and lifting chain from the pile lifting hole.

DAILY MAINTENANCE

- **Grease the two grease points on the EMV300** – one on the saddle and the other on the side of the Clamp Body. Two or three pumps with a molybdenum-based grease will be adequate
- **Check visible screws, bolts, fittings etc for tightness.**
- **Visually inspect all hydraulic hoses and fittings for leaks or damage.**
- **Check the gear oil level in the vibrator.** The level must be half way up the sight glass.
- **Inspect the lifting chain and chain clamp for damage**
- **Inspect the condition of the Hard Jaws.** Hard Jaw Wear Limit - 90% of all teeth on any hard jaw should make contact with the pile and 80% of all teeth should have points with flats no greater than 5x5mm.



RISK ASSESSMENT (1= HIGH RISK, 5 = LOW RISK)

Risk (Ranking)	Description	Control
1	Untrained operator	Ensure operator is competent and has read and fully understands operating instructions
1	Chain Clamp Failure	Test before every use and ensure everyone is outside the danger zone while lifting
1	Crushed finger from jaw	Never place anything near the EMV jaws while it is connected to the excavator
1	Falling sheet	Ensure everyone is outside the danger zone during lift
3	Hose Blows/Hot Liquid	Visual check of hoses and connections before every use
5	EMV becomes hot	Ensure correct PPE is being used
1	Hitting under Ground Services	Ensure all local government underground service checks have been completed before starting work
1	Excavator Roll Over	Only work within the excavators capable lifting & reach limits
2	Damage to Hearing	Ensure all correct PPE is worn