



DAWSON
CONSTRUCTION PLANT

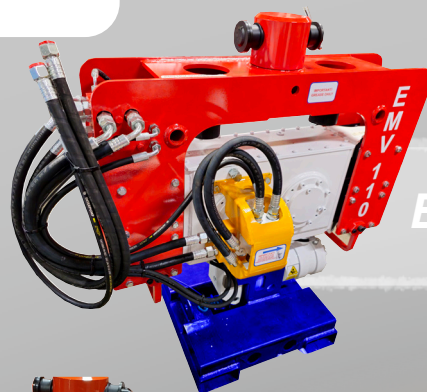
www.dcpuk.com

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EMV

excavator mounted vibrator
part i - operator's manual

*technical specifications
safety information
operator's instructions
maintenance
troubleshooting
hydraulic schematics*



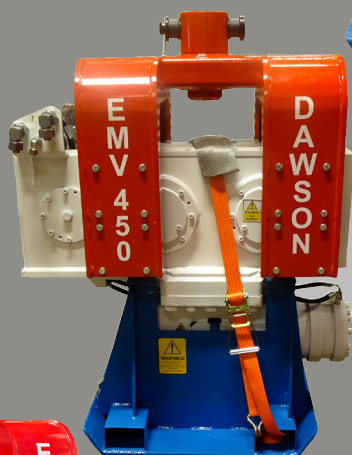
EMV110



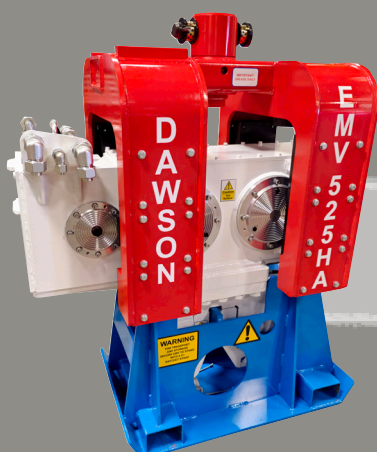
EMV220



EMV300



EMV450



EMV525HA

Original Instructions
v2026-01

preface

This Operator's Manual (Part I) is used to familiarise you with safety, assembly, operation, adjustment, troubleshooting, and maintenance. Read and follow the recommendations in this manual to ensure safe and efficient operation. Keep this manual with the attachment at all times for future reference.

To obtain a copy of the Parts Manual (Part II), please request directly from Dawson Construction Plant Ltd, quoting the machine model number, serial number & year of manufacture. You will find the required numbers on the ID plate fixed to the product.

We want you to be completely satisfied with your new product. Feel free to contact your local authorised service distributor / dealer for help with service, replacement parts, or any other information you may require. If you need assistance in locating a distributor, visit our website at www.dcpuk.com or call customer service at +44 (0) 1908 240300.

Whenever you contact your authorised service distributor, ensure you have the model number, serial number and year of manufacture of your product available. These numbers will help provide exact information about your specific product.

The descriptions and specifications in this manual are subject to change without notice. Dawson reserves the right to improve products. Some product improvements may have taken place after this manual was printed.

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emv serial numbers at revision release

	EMV110	EMV220	EMV300	EMV450	EMV525HA
SERIAL NUMBER	110-0004	220-0114	300-0740	450-0431	525-0003



EU Declaration of Incorporation

In accordance with Machinery Directive 2006/42/EC Annex II, 1., Section B

Dawson Construction Plant Ltd declare, under sole responsibility, that the machinery/equipment detailed below is compliant with the applicable regulations and harmonised standards as listed. This declaration ceases to be valid if alterations are made to the machinery/equipment without agreement with Dawson Construction Plant Ltd.

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC, where appropriate.

Category	Piling Equipment
Type	EMV
Serial Number	
Year of Manufacture	
Power	
Suitable Excavator Range	
Relevant Regulations:	
2006/42/EC	Machinery Directive
2000/14/EC	Noise emission in the environment
Measured sound power level on machines representative of this type	
Applied conformity assessment procedure according to Annex VIII	109 dB (A)
Technical documentation archive location: MK6 1NE	
Applied harmonised standards, in particular:	
EN ISO 12100:2010	Safety of machinery. General principles for design. Risk assessment and reduction.
EN 16228-1:2014+A1:2021	Drilling & foundation equipment. Safety - Common requirements.
EN 16228-4:2014+A1:2021	Drilling & foundation equipment. Safety - Foundation Equipment.
EN 16228-7:2014+A1:2021	Drilling & foundation equipment. Safety - Interchangeable auxiliary equipment.

Signed by (on behalf of DCP)

Name / Position

David Brown / Managing Director

Date / Location

_____ / _____

basic technical specifications

metric

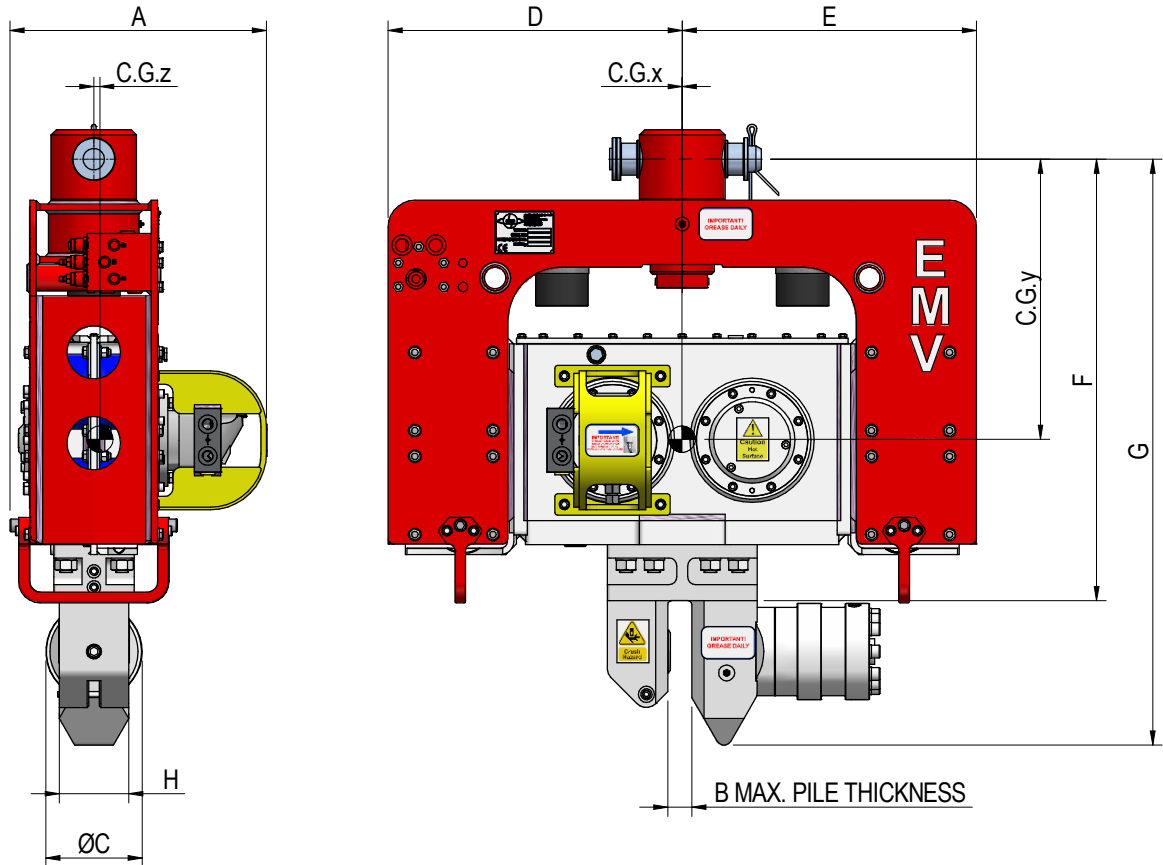
SPECIFICATIONS	EMV110	EMV220	EMV300	EMV450	EMV525HA
STATIC MOMENT (kg.m)	1.1	2.3	4.6	6.9	10.37
FREQUENCY (rpm)	3000	3000	2400	2460	2150
CENTRIFUGAL FORCE (kN)	110	220	300	450	525
AMPLITUDE (mm)	6	12	14.7	13.7	18
REQUIRED HYD. FLOW RATE (L/min)	57	90	130	195	255
MIN. HYDRAULIC PRESSURE (bar)	240	280	280	270	280
MAX. HYDRAULIC PRESSURE (bar)	350	350	350	350	350
MIN. HYDRAULIC POWER (kW)	23	42	60	88	120
DYNAMIC MASS (kg)	360	370	625	1008	1150
TOTAL MASS (kg)	570	580	965	1275	1550
MAX. PILE MASS (kg)	800	800	800	1000	1400
MAX. PUSH/PULL FORCE (kg)	2800	7500	13200	13200	13200
CLAMP FORCE (tonnes-force)	22.7	26.5	36	54	66
TYP. EXCAVATOR WEIGHT (tonnes)	6 to 18	7 to 18	14 to 25	25 to 35	30 to 55

imperial

SPECIFICATIONS	EMV110	EMV220	EMV300	EMV450	EMV525HA
STATIC MOMENT (in-lbs)	96	200	400	600	900
FREQUENCY (rpm)	3000	3000	2400	2460	2150
CENTRIFUGAL FORCE (lbf)	24729	49458	67443	101164	118025
AMPLITUDE (in)	0.24	0.47	0.58	0.54	0.71
REQUIRED HYD. FLOW RATE (gpm)	15	24	35	52	68
MIN. HYDRAULIC PRESSURE (psi)	3480	4061	4061	3915	4061
MAX. HYDRAULIC PRESSURE (psi)	5076	5076	5076	5076	5076
MIN. HYDRAULIC POWER (hp)	31	56	80	118	160
DYNAMIC MASS (lbs)	794	816	1380	2222	2535
TOTAL MASS (lbs)	1256	1278	2127	2811	3417
MAX. PILE MASS (lbs)	1760	1760	1760	2205	3087
MAX. PUSH/PULL FORCE (lbs)	6171	16500	29100	29100	29100
CLAMP FORCE (tons-force)	25	29.2	39.6	59.4	72.6
TYP. EXCAVATOR WEIGHT (tonnes)	6 to 18	7 to 18	14 to 25	25 to 35	30 to 55

basic technical specifications

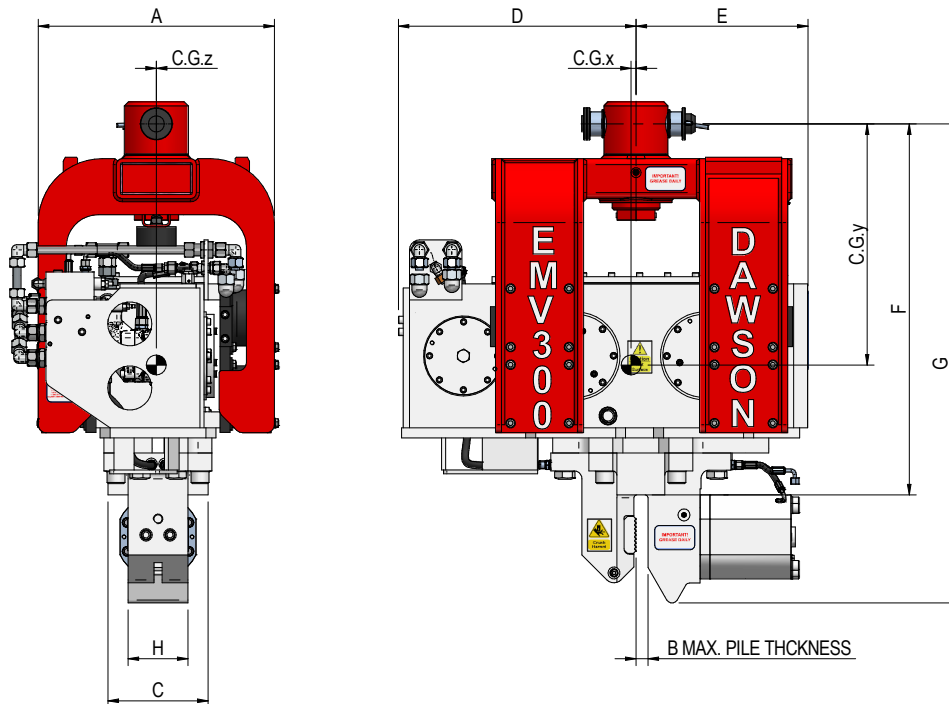
emv110
emv220



Model	Units	A	B	C	D	E	F	G	H	C.G.x	C.G.y	C.G.z
EMV110	mm	480	40	180	550	550	825	1095	130	0	524	11
	in	19	1.5	7	21.6	21.6	32.5	43	5	0	20.6	0.43
EMV220	mm	480	40	180	550	550	825	1095	130	0	524	11
	in	19	1.5	7	21.6	21.6	32.5	43	5	0	20.6	0.43

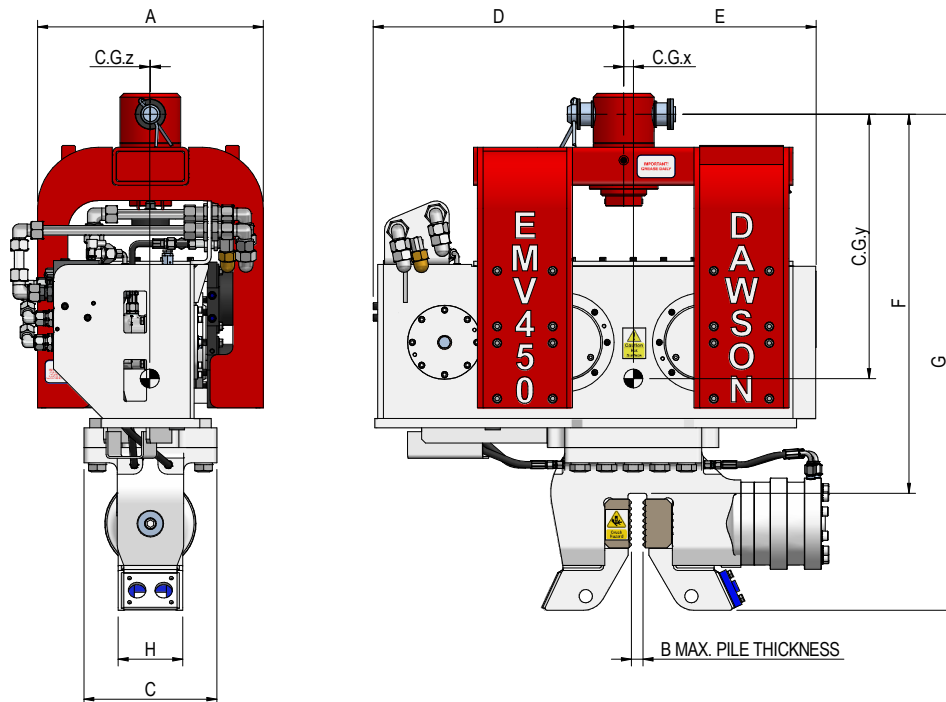
basic technical specifications

emv300



Model	Units	A	B	C	D	E	F	G	H	C.G.x	C.G.y	C.G.z
EMV300	mm	590	25	250	594	430	927	1200	150	12	603	0
	in	23	1	10	23.5	17	36.5	47	6	0.5	23.5	0

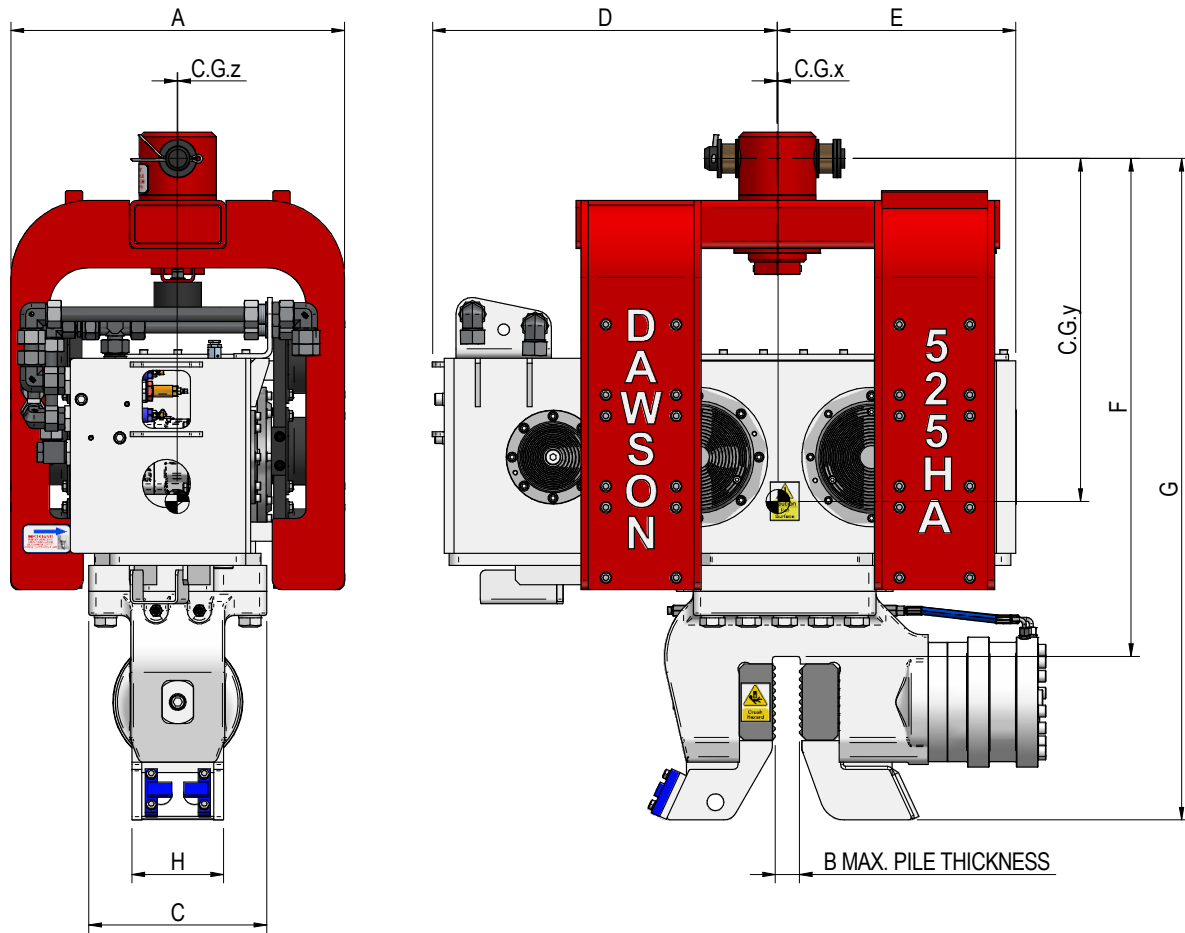
emv450



Model	Units	A	B	C	D	E	F	G	H	C.G.x	C.G.y	C.G.z
EMV450	mm	594	32	350	660	506	997	1305	170	25	695	0
	in	23.5	1.25	14	26	20	39.3	51.5	6.5	1	27.5	0

basic technical specifications

emv525ha (high amplitude)



Model	Units	A	B	C	D	E	F	G	H	C.G.x	C.G.y	C.G.z
EMV525HA	mm	693	50	370	716	496	1034	1374	190	0	713	0
	in	27.3	2	14.6	28.2	19.5	40.7	54.1	7.5	0	28	0

basic safety points

- The vibrator should only be operated by suitably qualified personnel.
- The vibrator and its clamps should not be used for anything other than its intended purpose, including **not** being used as a lifting device.
- It is prohibited to leave an object suspended in the clamps of a vibrator which is free-hanging and out of operation.
- Do not leave the vibrator clamped on a pile without being attached to the excavator.
- The stated extraction pulling force must not be exceeded.
- Piles must be secured to a lifting chain of equal or greater load capacity to the load held in the clamp.
- It is prohibited to use the vibrator as an impact hammer, i.e. by hammering with an open clamp.
- There should be visual contact between the operator and slinger (banks person) at all times.
- Monitor the piling operation at all times. Stop the process immediately if any danger occurs.
- Do not operate the vibrator if any person is within the **Danger Zone / Fall Zone** – see definition below.
- Consider machine stability at all times.
- The operator should inspect the equipment for defects every day and before being taken in to service.
Any defects that affect operational safety should be corrected before the equipment is taken into service – see section *Operating Instructions*.
- Pay attention to the Working Load Limit of all lifting accessories at all times (see also *Auxiliary Equipment*).
- The working area must be properly illuminated.
- 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.

WHO IS RESPONSIBLE?

Those who are in charge of, or responsible for, the use and maintenance of the machine must ensure that the vibrator and all its auxiliary equipment are in good condition.

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 their communication signals are understood and followed by those on the ground. During piling operations the operator must be vigilant to any potential hazards.

WORKING CONDITIONS / ADVERSE WEATHER CONDITIONS

Vibrators should only be operated and driven on firm ground with clear visibility of the working area with the process monitored constantly. Operators must have a clear understanding of the site assessment and method statement. The assessment will cover risks and site actions that have been implemented for the event of adverse weather conditions. The vibrator stand must stay upright on level ground at all times to avoid personnel injury.

WORKING NEAR UNDERGROUND / OVERHEAD OBSTACLES

Before the start of any piling work, it is the responsibility of the contractor to identify if there are any underground cables, utilities or overhead obstacles within the working area which could be dangerous to personnel, including but not limited to live electrical cables. This should be fully covered in the site specific method statement. All personnel on site should have a full understanding of the risks. In the case of unforeseeable contact or damage of an underground / overhead obstacle, then work must stop immediately and the person in charge informed.

THE DANGER ZONE / FALL ZONE

This is an area that must be kept clear of personnel. The zone area is established by defining a radius around the vibrator. The radius is calculated by the following formula: Pile length + $\frac{1}{2}$ (Pile Length).

The area will be either as above, or the distance of the slewing radius of the excavator - whichever is greater. The **Danger Zone / Fall Zone** is active while the vibrator is working or the excavator is in operation. (Refer to the *Operating Instructions* section for full details).

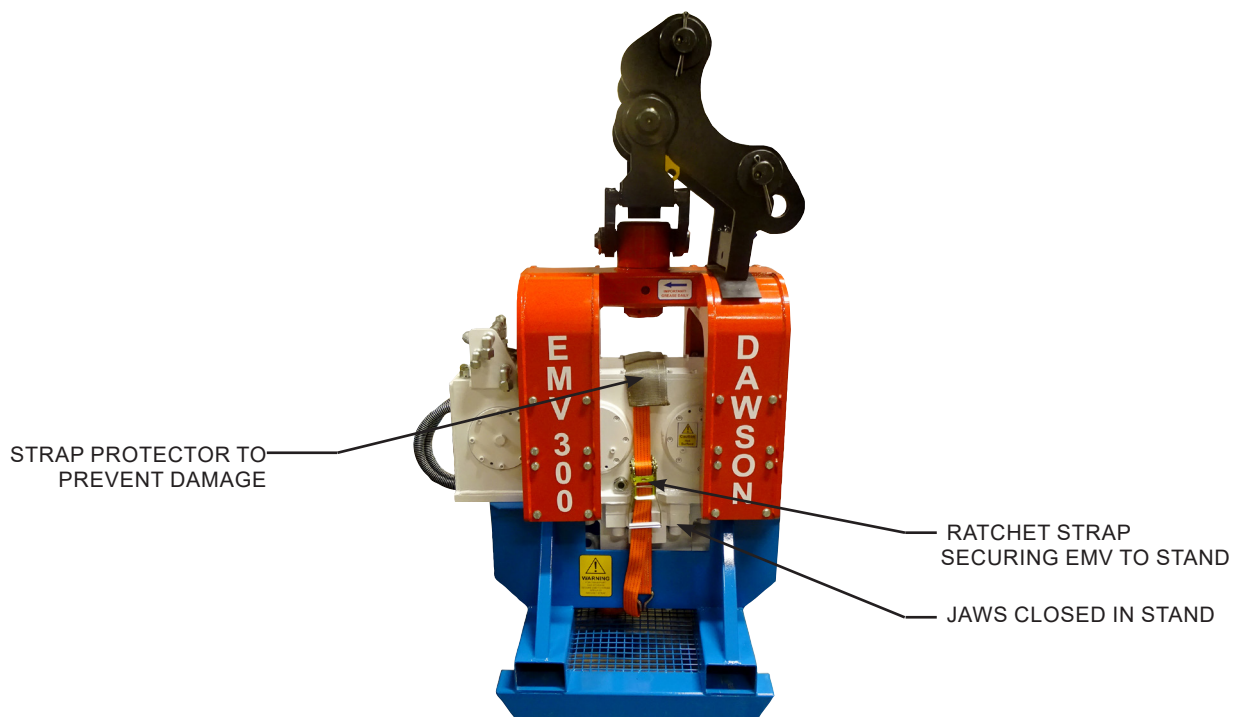
basic safety points

Personnel are at risk within the **Danger Zone / Fall Zone** from:

- Falling piles (if the pile is handled incorrectly or an accident occurs).
- Liquids under high pressure and associated components.
- Mechanical failures of equipment components.
- Noise – wear ear protection equipment.
- Unexpected movement of the excavator (via slewing, overturning etc.).

TRANSPORTING THE VIBRATOR

When transporting the vibrator, ensure it is placed correctly in the stand. Once in place on the stand, the Jaws must be closed - i.e. clamped onto the stand. Then release the hydraulic hoses from the excavator (the Jaws will remain closed) and cap the hose ends to prevent contamination. A ratchet strap is secured over the Gearbox of the EMV and fixed to the stand (see below image). Disconnect the vibrator from the excavator.



TRANSPORTING PILES ON SITE

Prior to transporting piles on site, the Lifting Chains and Chain Clamps must be fitted. For instructions on fitting the lifting chains and chain clamps, see the *Operating Instructions* section.



Important: Only the EMV450 and EMV525HA can be used to lift pairs of piles. When lifting pairs of piles, the user must use two Lifting Chains.

Transporting a pile using the vibrator should only be done over a small distance, with the Clamp fully engaged on the pile top and with the Lifting Chain(s) fitted. The load should be carried as close to the ground as possible to minimise falling risk. If grip on the pile is lost during this procedure, the excavator must stop immediately, and a full grip must be regained. If a pile slips then the Lifting Chain could snap and cause an accident.

When transporting a pile, extreme care must be taken to ensure that no one is in the **Danger Zone / Fall Zone** and that the pile is handled in such a way as to ensure no danger to site personnel at any time.

In order to avoid extensive transportation, lay the piles as close to the point of installation as possible. Do not use the excavator with an EMV installed to handle bundles of piles around the site. The maximum pile weight allowed to be transported by each EMV model is shown in the table below:

	MODEL				
	EMV110	EMV220	EMV300	EMV450	EMV525HA
MAX. PILE MASS	800 kg	800 kg	800 kg	1,000 kg	1,400 kg
LIFTING CHAIN WLL (t = 1000 kg)	3.2 t	3.2 t	3.2 t	2.5 t STD CHAIN 3.2 t ADAPTOR	2.5 t STD CHAIN 3.2 t ADAPTOR

QUICK REFERENCE GUIDE

IMPORTANT: READ FULL OPERATOR'S INSTRUCTIONS AT WWW.DCPUK.COM

SAFETY FIRST

Basic Safety Points

The vibrator should only be operated by suitably competent personnel.

There should be visual contact between operator and banksperson at all times.

Monitor the piling operation constantly. Interrupt the process immediately if any danger occurs.

Do not operate the vibrator if any unauthorised personnel are within the Danger Zone / Fall Zone (area defined as pile length + 1/2 pile length - see Operator's Manual).

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 the equipment is taken into service.

Pay attention to the Working Load Limit (WLL) of all lifting accessories at all times.

The working area should be properly illuminated.

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.

The maximum pile mass that can be driven with each EMV is:

EMV110 = 800 kg

EMV220 = 800 kg

EMV300 = 800 kg

EMV450 = 1000 kg

EMV525HA = 1400 kg

The most important hose on the machine is the drain line which must be fed either directly into the hydraulic tank of the excavator or connected to the breaker circuit return line. (Recommended Ø1/2" hose minimum).



WARNING: IT IS IMPERATIVE THAT THE DRAIN LINE IS NOT RESTRICTED AS THIS WILL CAUSE A PRESSURE INCREASE THAT WILL DAMAGE THE MOTOR.



CHECK THE RETURN LINE BACK TO THE EXCAVATOR IS CONNECTED. TAPS MUST BE OPEN!

Responsibility

Those who are in charge of, or responsible for, the use and maintenance of the machine must ensure that the vibrator and all its auxiliary equipment are in good condition.

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 their communication signals are understood and followed by people on the ground. During piling operations, the operator and bankspersons must be diligent to any potential hazards.

Operating Procedures Summary Read Full Operator's Instructions at www.dcpuk.com

Allow the excavator engine to warm up, particularly in temperatures below minus 10 °C.

Pay daily attention to the general condition of the clamping jaw pads. Ensure they are replaced once signs of wear are apparent. Check for loosened connections daily.

Check both the vibrator and auxiliary equipment for damage. Pay particular attention to the lifting equipment. Any defects should be immediately notified to the person in charge.

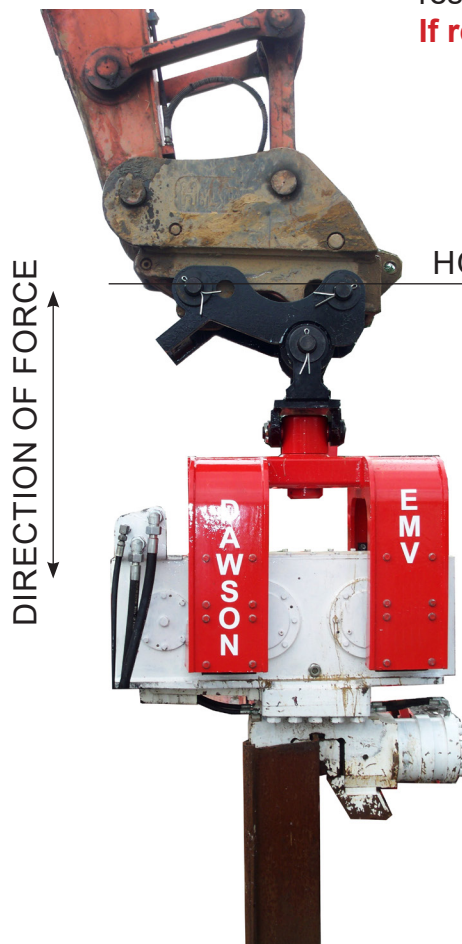
Do not operate a damaged unit. The Ø40 mm hole in the pile for the lifting chain must be spaced 250 mm from the top of the pile to avoid clashing with the EMV jaws.

Refusal: Refusal is reached when the time taken to drive a pile 100 mm exceeds 1 minute. The penetration distance of 100 mm is absolute - no conversion is allowed: for example, the operator cannot measure refusal against 500 mm over 5 minutes.

If a pile reaches refusal, stop driving immediately. Under no circumstances should the pile be driven further. Before continuing to drive, the ground must be loosened. Alternatively, a larger pile driving device should be used.

Rebound: This occurs when a large proportion of the EMV's energy is reflected back up through the pile as a result of hitting an impenetrable layer or obstruction. The reflected forces will be transferred back into the EMV and the suppressor head, and as a result, the head will start "jumping" relative to the vibratory case.

If rebound occurs, stop driving immediately.



WARNING: During operation, the excavator bucket and Quick Hitch (when used) should be horizontal at all times, with the direction of force being vertical as shown. Incorrect alignment could result in serious failure and risk to life!

	EMV	110	220	300	450	525HA
MAX. PUSH / PULL LOADING	kg	2,800	7,500	13,200	13,200	13,200
	lbs	6,171	16,500	29,100	29,100	29,100

For completeness, the flow and pressure from the excavator to the EMV should be checked against the specification sheets to confirm adequate hydraulic power. As a guide, the EMVs typically suit the following base machine sizes:

EMV110 (requires 57 L/min, 240 bar)	~ 6 - 18 t excavator
EMV220 (requires 90 L/min, 280 bar)	~ 7 - 18 t excavator
EMV300 (requires 130 L/min, 280 bar)	~ 14 - 25 t excavator
EMV450 (requires 195 L/min, 270 bar)	~ 25 - 35 t excavator
EMV525HA (requires 255 L/min, 280 bar)	~ 30 - 55 t excavator

Daily Maintenance

Grease all grease points: Clamp Body, Saddle Swivel, Dipper Pins (if applicable).

Check the screws, bolts, fitting etc. for tightness.

Check hydraulic hoses for leaks.

Check the oil level in the excavator hydraulic tank.

Check the oil level in the vibrator. The level must be halfway up the sight glass.

Change the oil every 50 hrs.

Check lifting chain & components, including clamp, for damage, wear and tear.

For full details, read the Operator's Instructions manual.

Available to view or download at www.dcpuk.com.



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ppe required

The following Personal Protective Equipment (PPE) must be worn at all times when in the vicinity of an operating EMV:

- Hard hat.
- Safety glasses.
- High-visibility clothing / overalls.
- Gloves.
- Safety boots.
- Ear defenders.
- Respiratory protection (if site conditions dictate).

how does the emv work?

Most modern pile vibrators work in the same way: pairs of high-speed contra-rotating eccentric weights are geared together to produce net vertical vibratory forces.

The vibrations produced are transmitted to the pile through a powerful hydraulic grip. Consequently, the pile is vibrated at the same speed and displacement (or movement) as the EMV Gearbox. This vibration effect is transmitted to the pile tip where the surrounding soils become almost fluid-like.

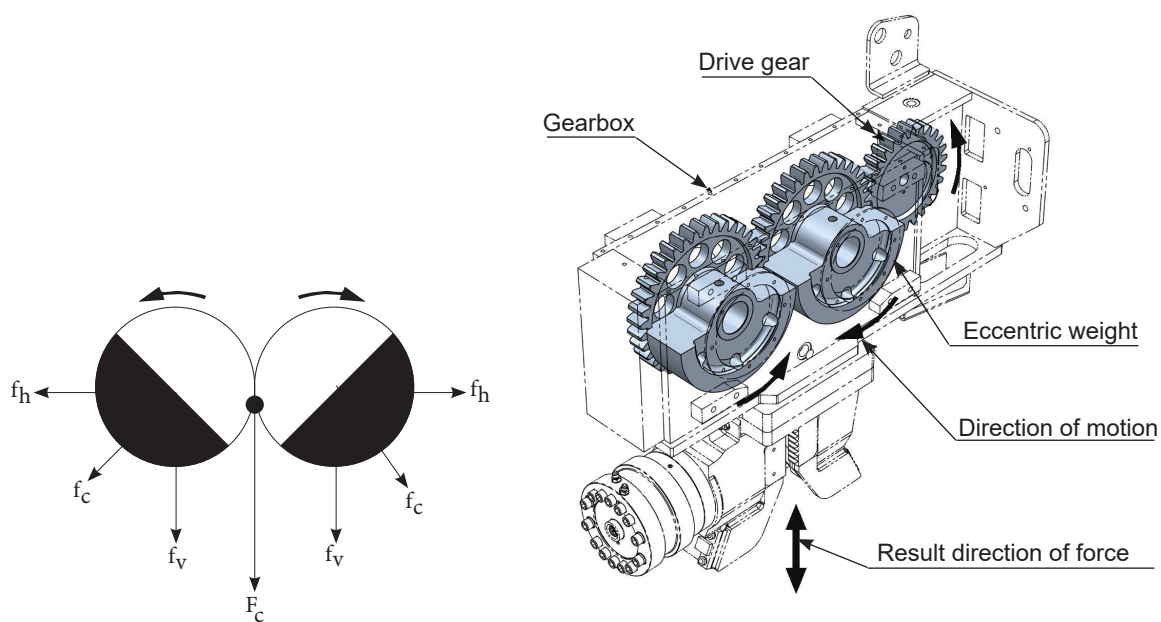
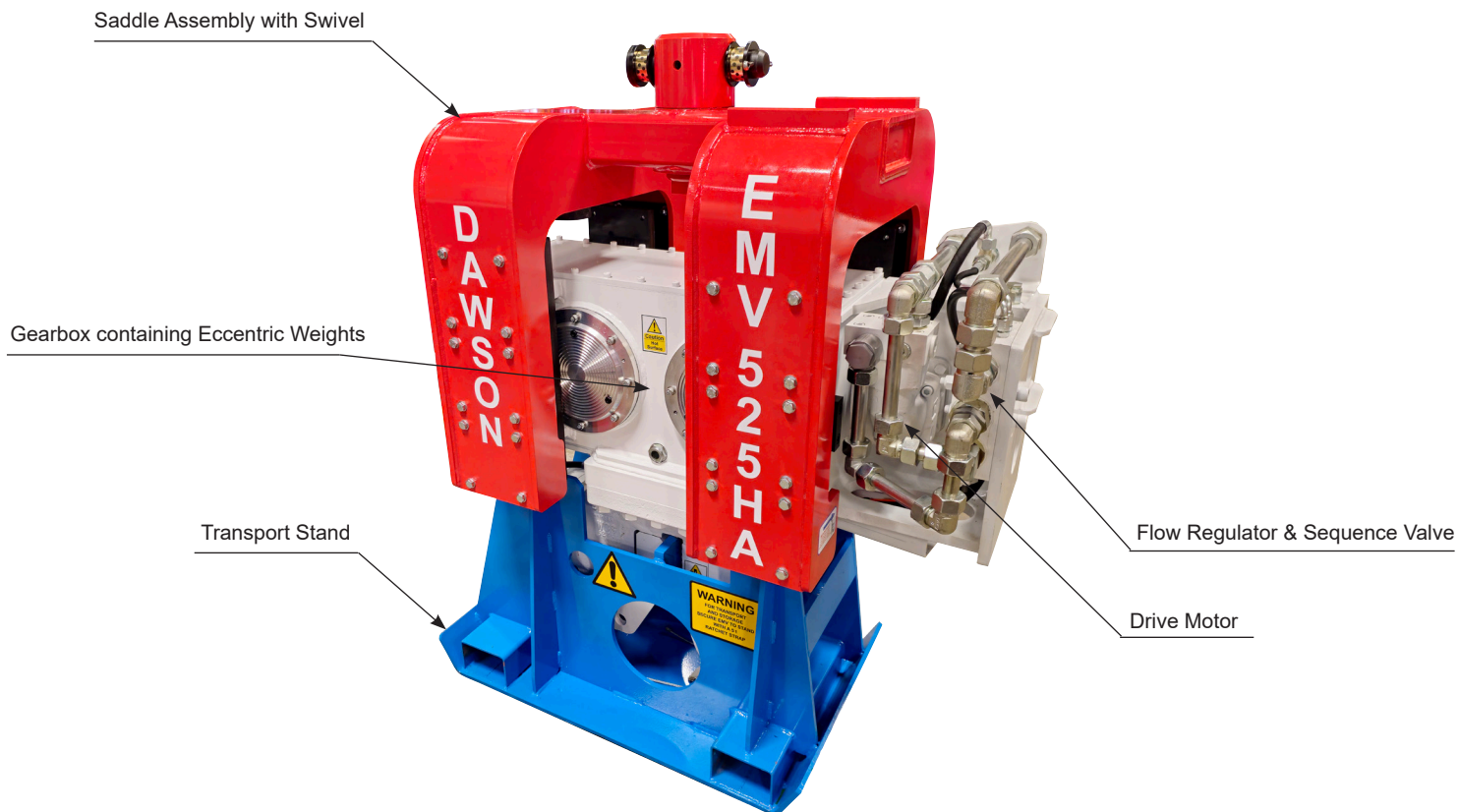
The fluidising effect on the soil permits particles to shuffle themselves around, creating space for the pile to move into. This – combined with the weight of the pile and vibrator – is sufficient to push the pile into the ground.

Not all soil types will fluidise, however. Clay soils are very cohesive and extremely dense in comparison to sands and gravels where vibrators work best. Dense clay soils do not allow soil particles to shuffle themselves around, so no fluidising effect can occur. Further, the ground effectively sticks itself to the pile and much of the power generated is lost in shaking the ground.

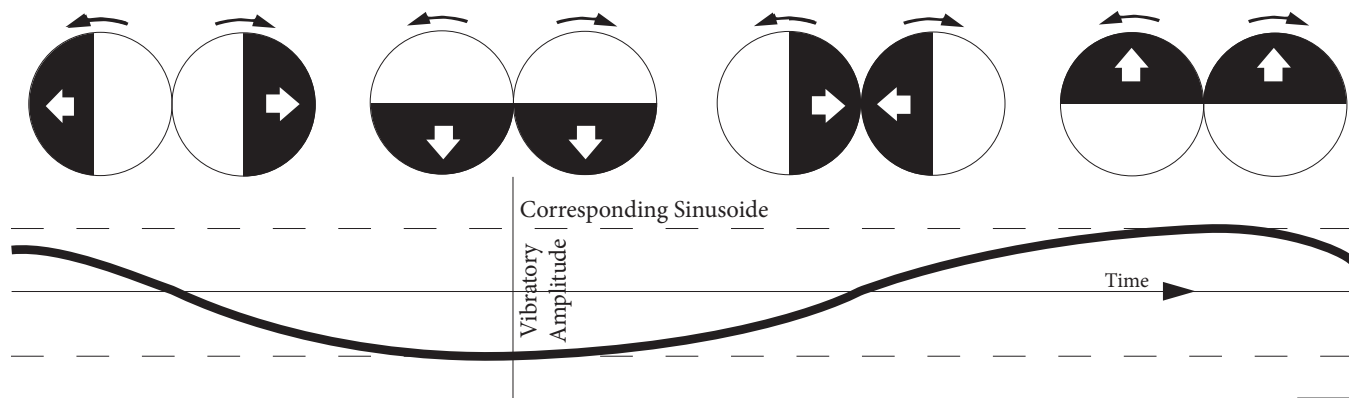
Dawson EMVs are particularly effective for their size and weight because they are able to utilise the crowd force available from the excavator to add further pushing force to the pile.

The Gearbox in the EMV unit is driven by a hydraulic Drive Motor that receives hydraulic power from the excavator's bucket ram circuit. Typically this circuit will be able to supply sufficient working pressure and an excessive amount of oil flow rate. The EMV has a built-in Flow Regulator that limits the oil flow rate supplied to the Drive Motor so that the Gearbox cannot be run too fast. This is essential to prevent excessive bearing loads and correct performance of the unit.

In addition, the Flow Regulator has a Sequence Valve built in that will not allow the vibrator to run until sufficient clamping force has been applied to the pile – an essential safety feature. The hydraulic system enables simple installation and reliable performance.



Motion of a pair of eccentrics



Before using an EMV, operators must have received suitable training in the following areas:

Mandatory:

1. Excavator operator training.
2. EMV operator training (note: a course is available delivered by DCP).
3. Lifting operations (if using the EMV to lift piles).
4. Pre-use inspection & attachment safety.
5. General health & safety (covering hazardous handling, PPE use, emergency response).
6. Vibration awareness.
7. Noise awareness & hearing protection.

Recommended:

1. First aid.
2. Exclusion zone control.
3. Structural & environmental vibration control.
4. Piling theory & ground behaviour awareness.
5. Confined excavation / trench awareness.
6. Hydraulic systems awareness.

mounting instructions

The excavator's hydraulic power output must be matched to the requirements of the vibrator before installation. A standard excavator enquiry sheet is available for the user to complete prior to considering the suitability of the excavator for use with the EMV. Request from Dawson if required.

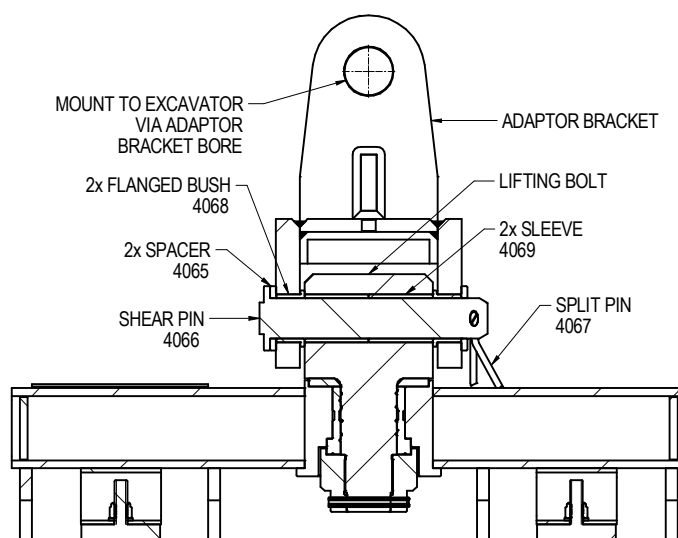
MOUNTING THE VIBRATOR

The vibrator is mounted in place of the excavator's bucket, and should be allowed to hang freely once installed. Remove the bucket prior to installing the EMV.

A shear pin is used to fix the vibrator to the boom via an Adaptor Bracket. Different Adaptor Brackets may be required for different excavators. Check this prior to starting installation. If the excavator is fitted with a quick hitch, the user must either (i) purchase a Dawson Quick Hitch Adaptor Bracket or (ii) remove the quick hitch.

Standard brackets are available for different machine size ranges. Typically, one of these brackets can be adapted to fit a variety of different pin sizes and dipper end widths by using a kit of bushes and spacers in combination with the shear pin that connects the boom to the Adaptor Bracket.

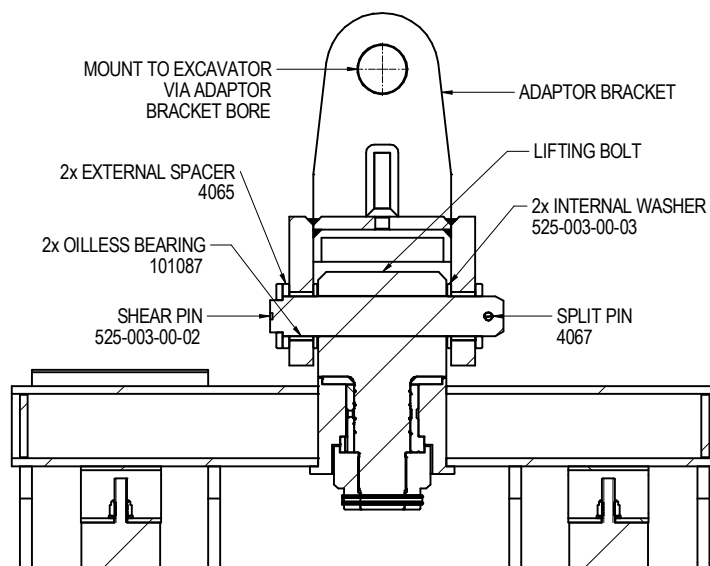
Mounting components for EMV110, EMV220, EMV300, EMV450:



Mounting components for EMV525HA:



Note: The EMV525HA Shear Pin is secured in place via a Grub Screw through the Lifting Bolt. Ensure the Grub screw is removed before removing the Shear Pin. Once the Pin is replaced, ensure the Grub Screw is reinstalled. The flat on the Shear Pin must align with the Grub Screw hole. The orientation of the flat is determined via the indicator groove on the end of the Shear Pin.



mounting instructions

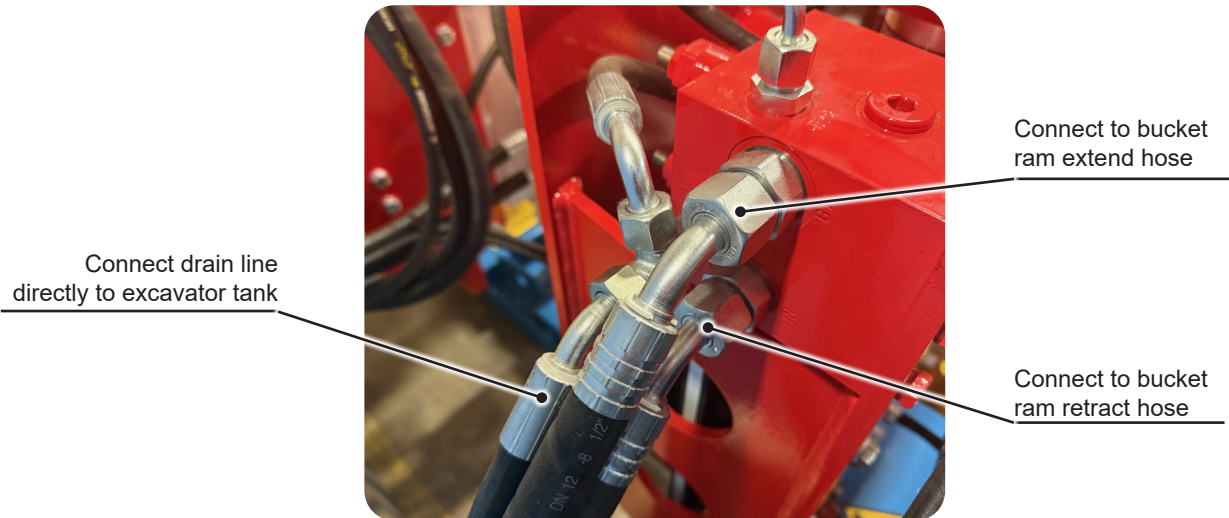
HYDRAULIC HOSES: LAYOUT & CONNECTIONS

The pressure line is usually connected to the bucket ram “extend” circuit and the return line to the bucket ram “retract” circuit. The third (smaller) drain line is fed either directly back into the hydraulic tank on the excavator, or connected to the breaker circuit return line. Excavators will rarely have the same fittings as these on their bucket circuit so adaptor fittings may need to be used.

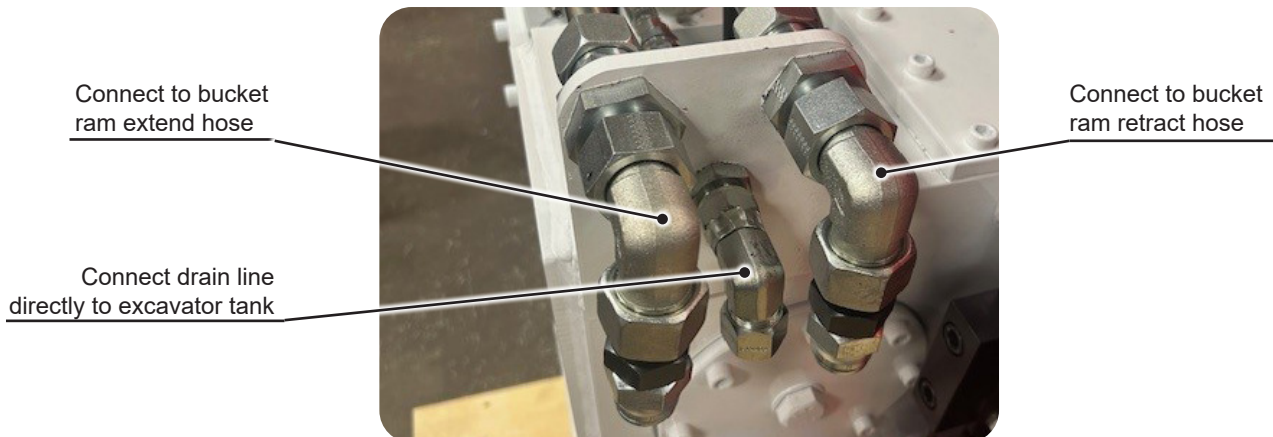


Note: All EMVs are manufactured with metric hose connections. For JIC or BSP adaptors, contact DCP.

Hydraulic connections for EMV110 & EMV220:



Hydraulic connections for EMV300, EMV450 & EMV525HA:



Ensure all hydraulic connections are clean prior to fitting and that no contamination is introduced into the hydraulic circuit during installation – this may cause internal component damage to the hydraulic system or faulty operation of the vibrator or excavator.

If quick release couplings (QRCs) are installed on the excavator, they should be replaced. It is strongly recommended that QRCs are **not** used for this application. For permanent installation, ball valves can be added to the excavator boom to ensure rapid changing between bucket and EMV hydraulic function. As the bucket ram is no longer in use, it should be retracted and fastened down.



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 its casing casting. The damage is very costly to repair.

The EMV is fitted with a motor case blow-off valve. This valve is effectively a check valve that vents some oil to atmosphere if the motor case drain line pressure exceeds approximately 7 bar. It is not a pressure protection valve and is intended only as an early warning valve, giving a visual signal that something is wrong.



If oil blows out of the motor's blow-off valve, use of the EMV should be halted immediately and the cause investigated. The blow-off valve does not guarantee the motor will be protected!

operating instructions: preparations



PREPARATIONS - BEFORE DRIVING / EXTRACTING PILES

It is the excavator operator's responsibility to ensure that the equipment is functioning and performing correctly and that the EMV method of piling is implemented efficiently.

To meet this responsibility, adhere to the following points:

- a. Bundles of sheet piles should be set out on the job site so as to minimise the amount of handling and travelling required with the EMV.
- b. Ensure that all piles have a Ø40 mm (Ø1½") hole cut in them, approximately 250 mm (10") down from the top edge of the pile and located centrally, prior to commencement of the piling operation.
- c. Allow the excavator engine to warm up, particularly in temperatures below minus 10°C and warm the excavators hydraulic system by, for example, tracking backwards and forwards – this avoids the EMV's blow-off valve spitting oil on initial start-up.
- d. Before work commences, slowly operate the bucket ram lever in both directions. It is particularly important that the vibrator is allowed to run freely for approximately 30 seconds, this allows the gearbox oil to reach all the necessary lubricating points.
- e. Review section *Basic Safety Points* in this manual before starting work.
- f. Review section *Maintenance* before taking the equipment into service.
- g. **Important:** Ensure that, during a piling operation, the vibrator is kept directly above and in line with the pile, otherwise the piling energy is transferred to the excavator arm and causes unnecessary wear and may lead to pile damage.

operating instructions: driving piles

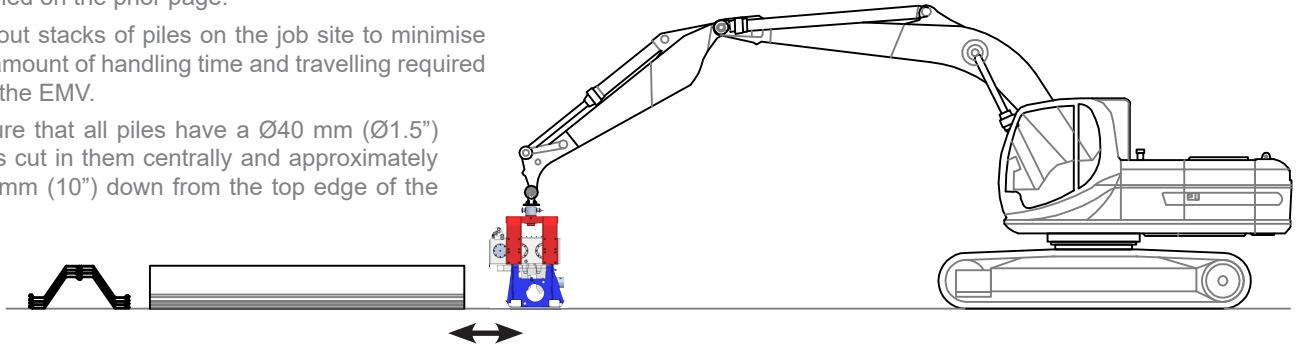


It is the excavator operator's responsibility to ensure that the equipment is functioning and performing correctly and that the EMV method of piling is implemented efficiently. To meet this responsibility, adhere to the following points.

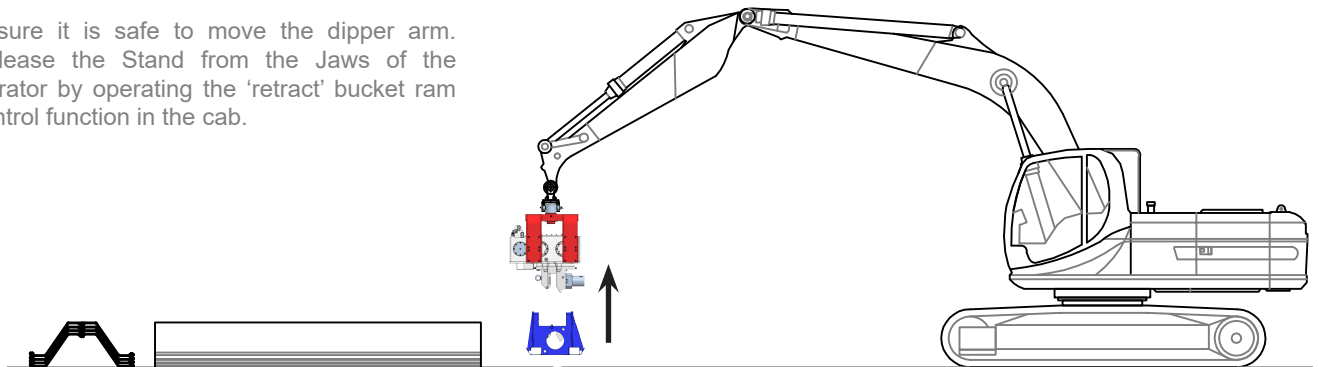
Read, understand & adhere to all preparations detailed on the prior page.

Lay out stacks of piles on the job site to minimise the amount of handling time and travelling required with the EMV.

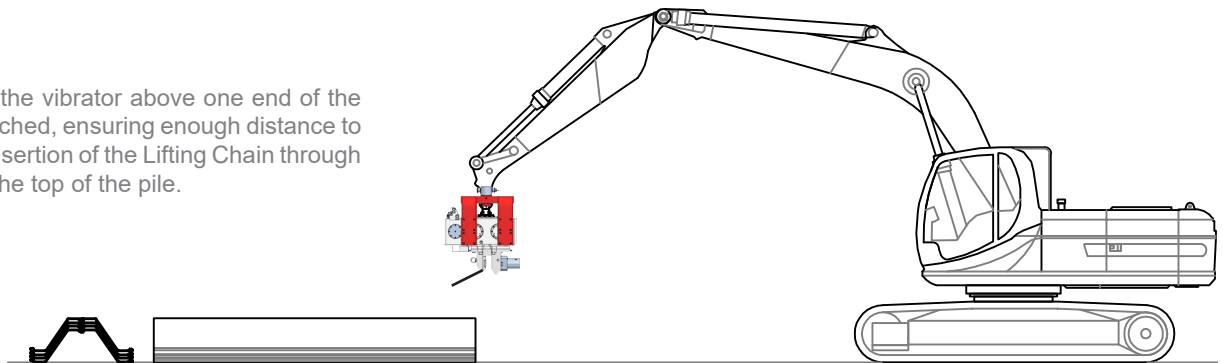
Ensure that all piles have a $\varnothing 40$ mm ($\varnothing 1.5$ ") holes cut in them centrally and approximately 250 mm (10") down from the top edge of the pile.



Ensure it is safe to move the dipper arm. Release the Stand from the Jaws of the vibrator by operating the 'retract' bucket ram control function in the cab.



Manoeuvre the vibrator above one end of the pile to be pitched, ensuring enough distance to allow safe insertion of the Lifting Chain through the hole at the top of the pile.

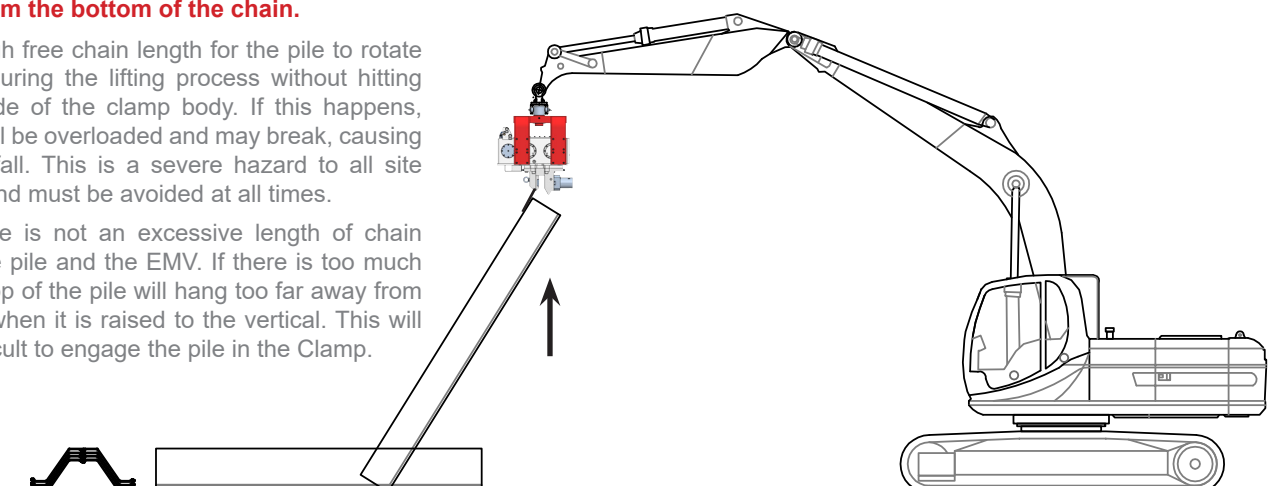


Check which way around the pile has to be lifted before inserting the Lifting Chain – e.g. was the previous pile pitched left- or right-handed? Insert the lifting chain correctly (no twists, knots etc.) through the lifting hole in the pile. Then fit the Chain Clamp.

The Chain Clamp must be secured in place at least 6 links up from the bottom of the chain.

Allow enough free chain length for the pile to rotate to vertical during the lifting process without hitting the underside of the clamp body. If this happens, the chain will be overloaded and may break, causing the pile to fall. This is a severe hazard to all site personnel and must be avoided at all times.

Ensure there is not an excessive length of chain between the pile and the EMV. If there is too much chain, the top of the pile will hang 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 Zone / Fall Zone.

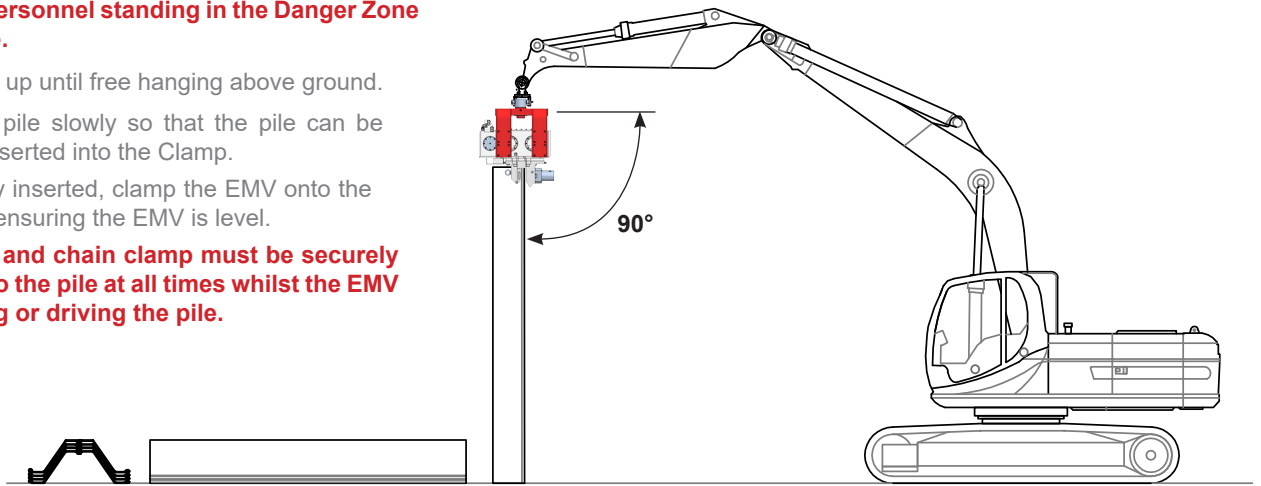
Lift the pile up until free hanging above ground.

Lower the pile slowly so that the pile can be correctly inserted into the Clamp.

Once firmly inserted, clamp the EMV onto the pile head, ensuring the EMV is level.



The chain and chain clamp must be securely attached to the pile at all times whilst the EMV is handling or driving the pile.



Manoeuvre the pile to the insertion point and push the pile slowly into the ground. Plumb the pile and **ensure there are no personnel in the Danger Zone / Fall Zone.**

Start the vibrator and adjust the hydraulic rams so that the vibrator is level and always sits directly on top of the pile as it goes into the ground.



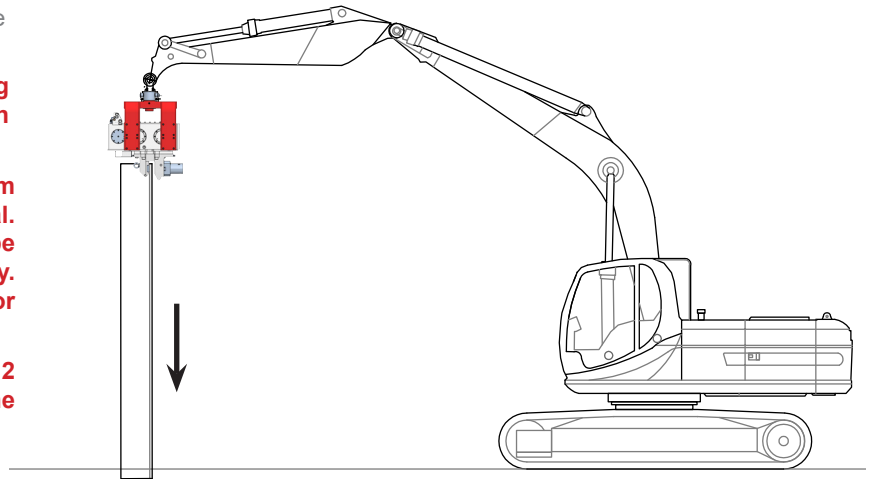
Do not over-push the vibrator: stop pushing if the Gearbox touches the Rubber Stops on the underside of the Saddle.



When piling progress is less than 100 mm per minute (4" / min), the pile is at refusal. Under no circumstances should the pile be forced any further. Stop driving immediately. Reduce the ground resistance by augering or by water jetting.

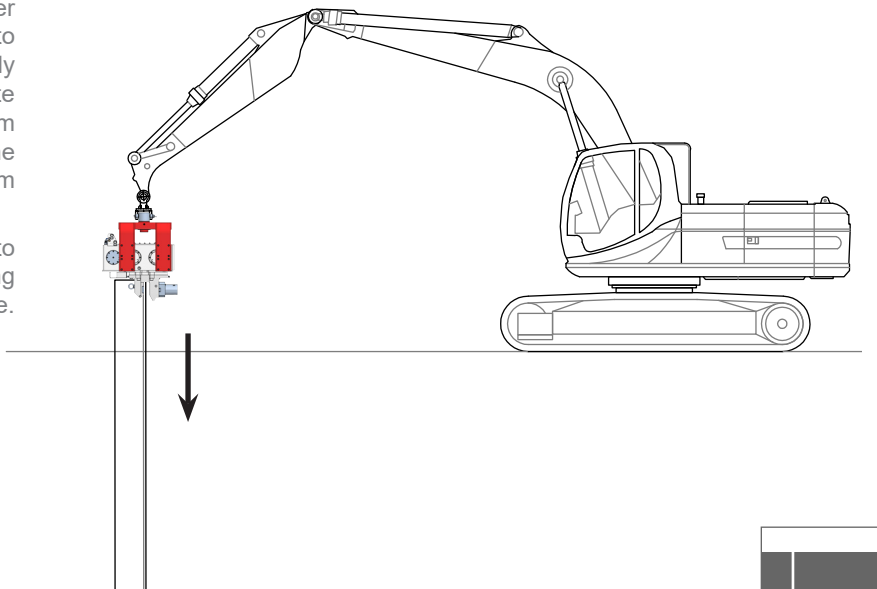


If the Bearing Covers exceed 100 °C (212 °F), stop piling immediately and allow the machine to cool down.



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 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.

Once the machine has stopped and it is safe to do so: remove the Chain Clamp from the Lifting Chain. Disengage the Lifting Chain from the pile.



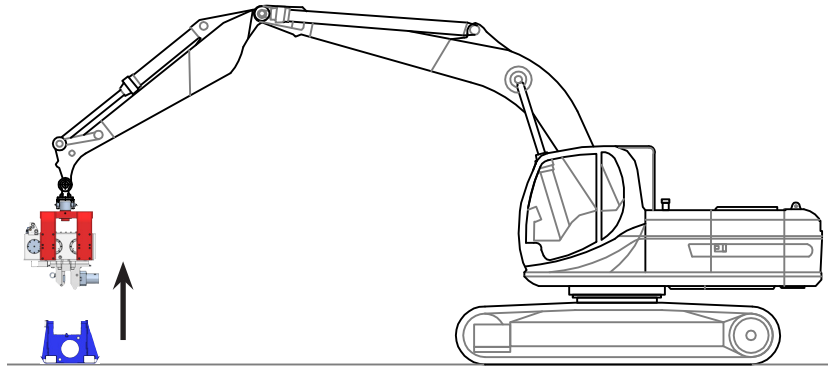
operating instructions: extracting piles



It is the excavator operator's responsibility to ensure that the equipment is functioning and performing correctly and that the EMV method of piling is implemented efficiently. To meet this responsibility, adhere to the following points.

Read, understand & adhere to all preparations detailed on the prior pages.

Ensure it is safe to move the dipper arm. Release the Stand from the Jaws of the vibrator by operating the 'retract' bucket ram control function in the cab.



Manoeuvre the vibrator above one end of the pile to be pitched, ensuring 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. Then fit the Chain Clamp.

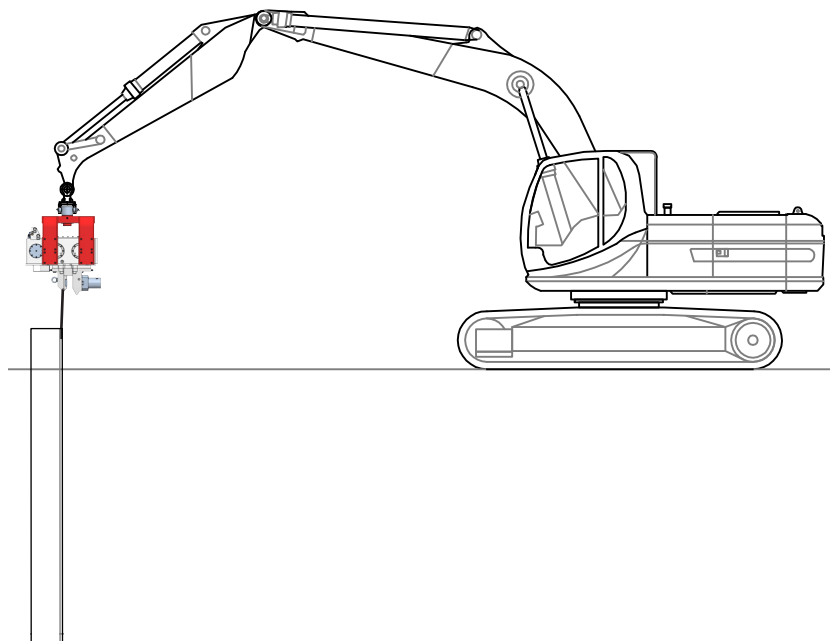


The Chain Clamp must be secured in place at least 6 links up from the bottom of the chain.

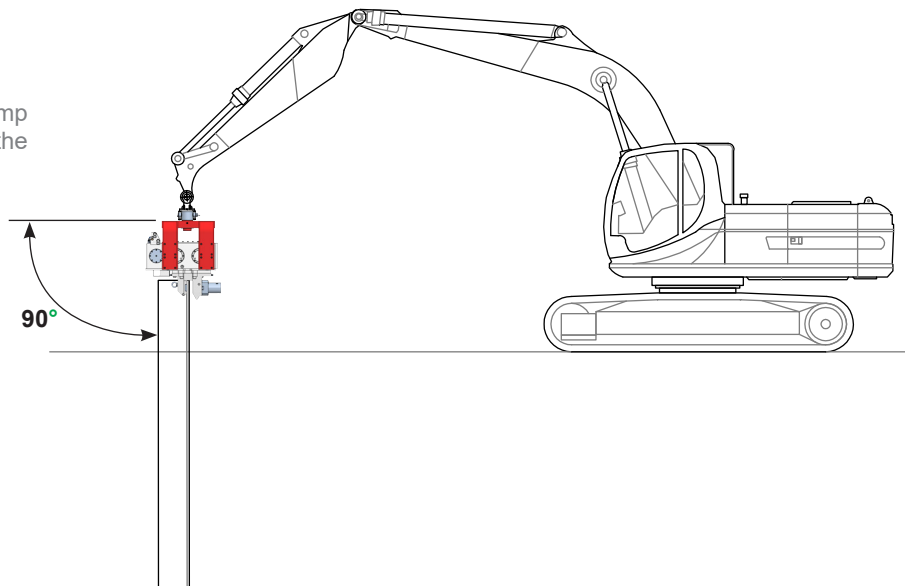
Allow enough free chain length for the pile to rotate to horizontal during the lowering process without hitting the underside of the Clamp Body. If this happens, the chain will be overloaded may break, causing the pile to fall. This is a severe hazard to all site personnel and must be avoided at all times.



Under no circumstances should the pile be extracted by pulling the pile with the lifting chain.



Lower the EMV clamp onto the pile. Clamp the EMV onto the pile, head ensuring that the EMV is level.



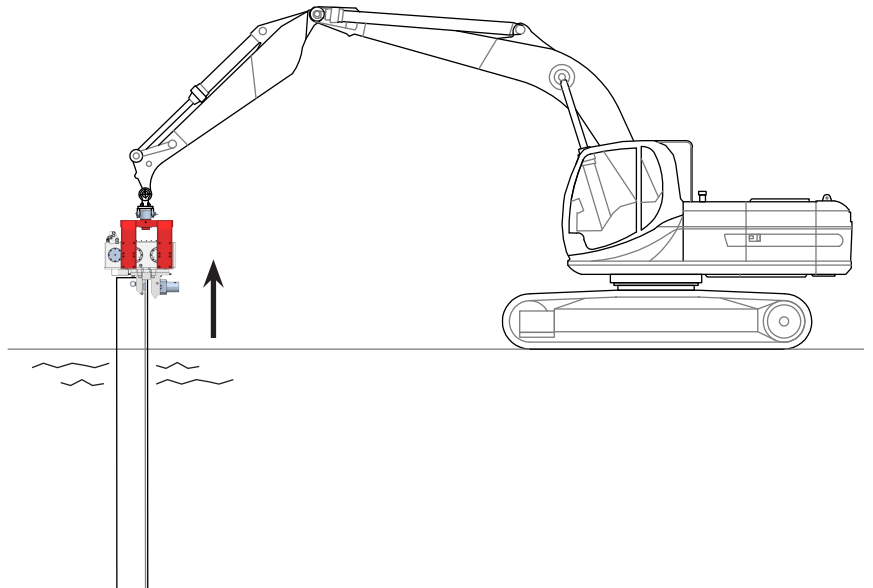
excavator mounted vibrator

Start the vibrator and allow the soil to loosen around the pile. Start to lift the pile upwards. Ensure the pile clutches are not rubbing together. Pay attention to the distortion of the Rubber Mounts connecting the Saddle to the Gearbox.

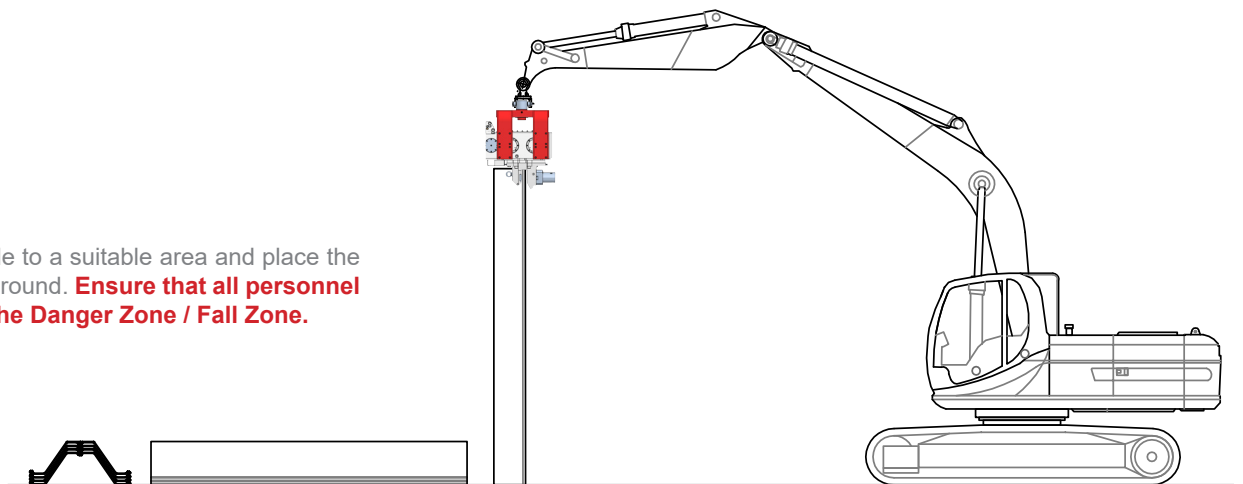


Each EMV has a mechanical stop to prevent the Rubber Mounts from overdistorting. If the Saddle and Gearbox make contact during extraction, the extraction force is too large. Reduce the extraction force before continuing.

Safely extract until the pile foot is almost above ground. Stop vibration at this point and carefully pull the pile out the remaining short distance.

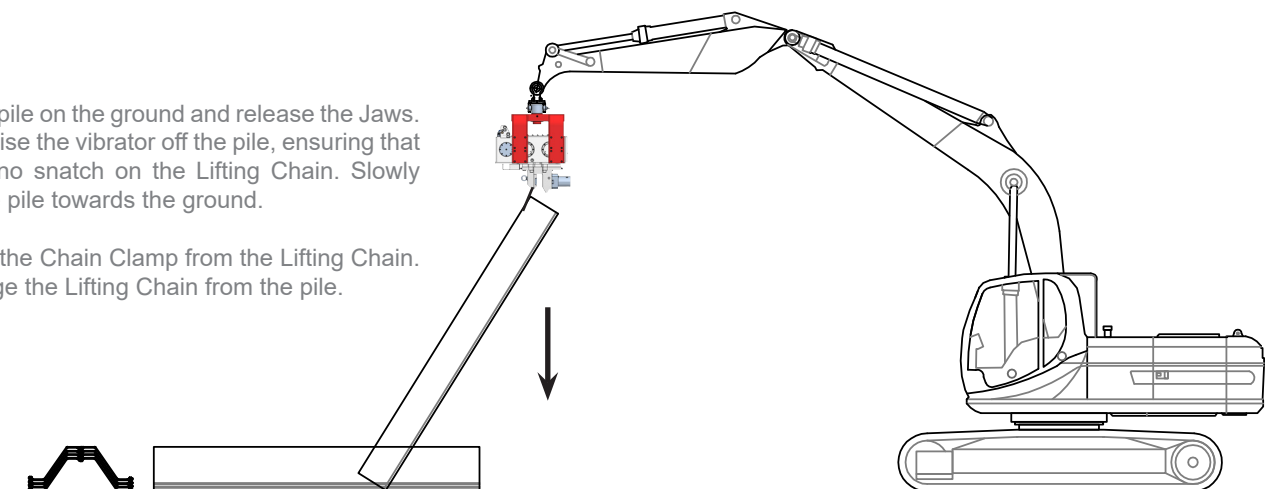


Move the pile to a suitable area and place the pile on the ground. **Ensure that all personnel are out of the Danger Zone / Fall Zone.**



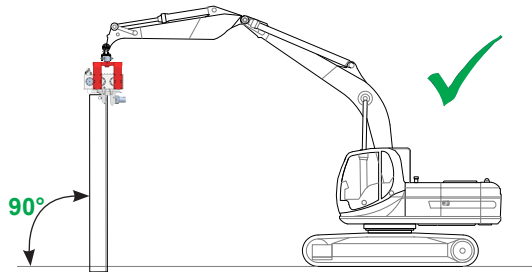
Hold the pile on the ground and release the Jaws. Slowly raise the vibrator off the pile, ensuring that there is no snatch on the Lifting Chain. Slowly lower the pile towards the ground.

Remove the Chain Clamp from the Lifting Chain. Disengage the Lifting Chain from the pile.

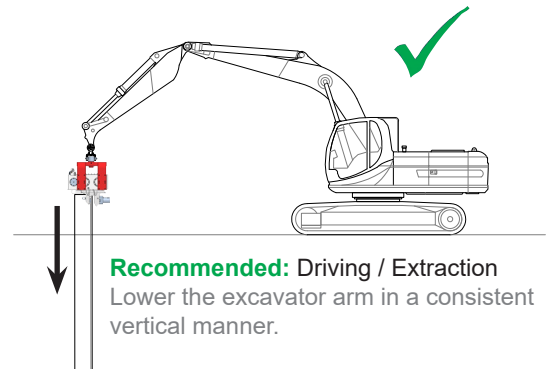


recommended excavator positions (quick reference illustrations)

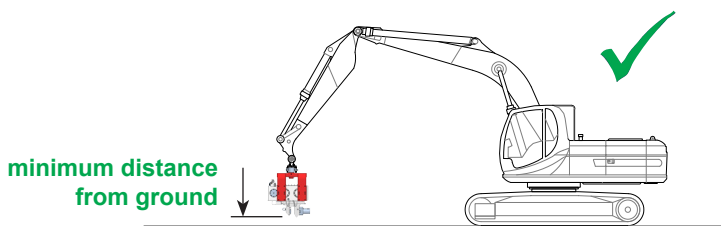
These illustrations represent the recommended working, transport and resting positions for your Dawson EMV attachment when used with an excavator.



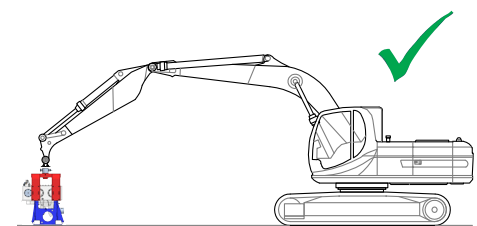
Recommended: Starting Position
Position the pile vertically in the desired location and begin driving / extracting.



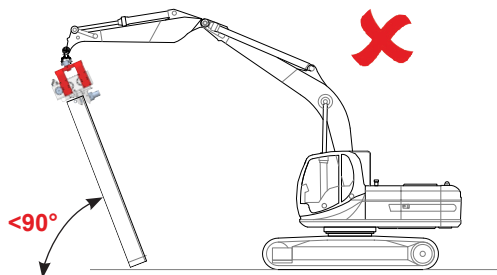
Recommended: Driving / Extraction
Lower the excavator arm in a consistent vertical manner.



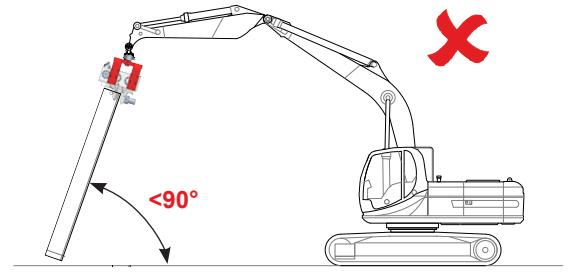
Recommended: Transport Position
Lift the EMV off the ground during transport on the job site. Keep the EMV as close to the ground as possible.



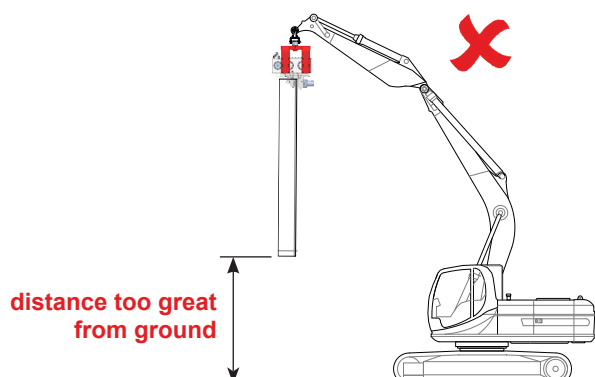
Recommended: Resting / Parking Position
Park the excavator with the vibro in its Stand.



Avoid: Driving / Extraction Position
Avoid any driving / extracting position that is not vertical. The EMV will become unstable and difficult to control.



Avoid: Driving / Extraction Position
Avoid any driving / extracting position that is not vertical. The EMV will become unstable and difficult to control.



Avoid: Transport Position
When transporting the pile on the job site, do not allow the pile to swing in an uncontrolled manner. Damage can occur to the EMV and excavator.

Avoid: Resting / Parking Position
Do not park the excavator with the EMV suspended in the air.

The Excavator Mounted Vibrators have been designed to give years of trouble-free service, provided the equipment is treated with care and basic maintenance procedures are adhered to.

The most important points are: correct installation on good quality excavators; cleanliness when connecting to the excavator's hydraulic system; and regular Gearbox Oil changes using appropriate oils.

Visual inspection of the EMV by a competent person on a daily basis and before use can prevent many potential problems from occurring.

Ensure that lifting accessory test certificates are correct and valid at all times.

All service and maintenance work must be carried out by qualified personnel using original Dawson parts. The use of non-Dawson parts will invalidate the warranty for the equipment.

The equipment should be inspected at ground level only and should be stable at all times.

Prohibit any possibility of unexpected start-ups during the maintenance process.

DAILY MAINTENANCE

- a. Grease all grease points on the EMV: there is one on the Saddle Swivel and another on the side of the Clamp Body. In some configurations, there may also be a grease point on the Dipper Pin. Two or three pumps from a grease gun with a molybdenum-based grease is adequate.
- b. Check the ID Plate and all Hazard / Information Stickers are legible and unobscured.
- c. Check visible screws, bolts, fittings etc. for tightness.
- d. Visually inspect all hydraulic hoses and fittings for leaks or damage.
- e. Check the gear oil level in the vibrator. The level must be halfway up the sight glass.
- f. Inspect the Lifting Chain and Chain Clamp for damage. The Chain should be in good order, free from any structural damage or permanent deformation of any kind. The Chain Clamp should also be free from any structural damage and its correct operation and safe function should be checked by depressing and releasing the mechanism several times – any binding or hesitancy with its operation should result in it being changed for a new certified item. For EMVs with a Chain Coupler, the Coupler and anchorage point must be in good order, showing no signs of damage, wear or cracking. For EMVs with toggles at one end of the Lifting Chain, the toggles and their anchorage points must be in good order, showing no signs of damage, wear or cracking.



Remember: if in doubt, do not use. Lifting Chains in the UK are required to have a thorough examination by a competent person at intervals not exceeding 6 months. All other local / national requirements must be adhered to as required.

- g. Inspect the condition of the Jaws. To be acceptable these should look to be in almost as-new condition. The teeth on these pads have some flats on them when new (approximately 1 mm). Over time they will round off, flatten out further and even become chipped. If not changed when required, they may lose their grip on the pile during driving and during extraction. Besides causing a reduction in performance, this can become a safety hazard.
- h. Inspect the area behind the Moving Jaw. It must be clear from debris. A build-up of debris in this area may cause Jaw failures or component failures along the Jaw / Piston assembly.
- i. Inspect the Rubber Mounts (Elastomers) for wear or damage. Wear is typified by splitting / tears. This usually occurs in the rubber adjacent to the bonded steel plates and is usually a result of fatigue in the material over a long period of time. Cracking / softening may occur but this is usually associated with long-term exposure to sunlight or exposure to petroleum-based products. As a general rule, change the Rubber Mounts if any single tear or split exceeds 40 mm (1½") or if the rubber has become contaminated.

- j. Check the overall condition of the Swivel Assembly. Check that the Lifting Bolt and Nut only allow rotational movement with minimal axial movement. Excessive axial movement will allow the assembly to rattle around, make more noise and cause more wear. If the axial play exceeds 1 mm, the Nut must be tightened. To do this remove the coil/spring pin with a punch and hammer, tighten the Nut further, then re-drill and re-pin it in the new position.
- k. Check the condition of the boom Adaptor Bracket, Shear Pins, Spacers and Bushes. The whole assembly should be relatively tight with minimal play in the components. The bracket needs to be able to float a little from side to side – as much as 5-10 mm is acceptable. The pins and bushes should be little more than a running fit – clearances of more than 0.5 mm are considered excessive.

Changing the Jaws – Static Side

EMV110 / EMV220 / EMV300

Remove the M16 Cap Head Screw(s) and M16 Nord-Lock Washer from the side of the Clamp Body, which holds the Static Jaw in place. Tap out the Jaw and inspect & clean its seating area on the Clamp Body. Ensure all faces are in good order. Slide the replacement Jaw into the Clamp Body and check that it is a snug fit - the Jaw should not easily move up and down. Refit the M16 Screw(s) with new M16 Nord-Lock Washer(s).

EMV450 / EMV525HA

Remove the M20 Cap Head Screw and M20 Nord-Lock Washer from the side of the Clamp Body, which holds the Static Jaw in place. Remove the Shim (EMV450) or Headed Bush (EMV525HA). Tap out the Jaw and inspect & clean its seating area on the Clamp Body. Ensure all faces are in good order. Slide the replacement Jaw into the Clamp Body and check that it is a snug fit - the Jaw should not easily move up and down. Refit the Shim / Headed Bush (as applicable) and the M20 Screw with a new M20 Nord-Lock Washer.

Changing the Jaws – Moving (Cylinder) Side

EMV110 / EMV220 / EMV300

Remove the two clamp supply hoses from the Clamp Cylinder and label them to ensure correct reassembly. Remove the M16 Cap Head Screws and M16 Nord-Lock Washers from the rear of the Clamp Cylinder. Slide the Clamp Cylinder assembly out of the Clamp Body and wipe clean. Inspect the bronze Bush inside the Clamp Body: clean it, check its general condition, and replace if showing signs of damage or wear. Unscrew the Moving Jaw from the Piston Rod. Check the O-Ring for damage and replace if required. Add Copaslip to the threads of the new Moving Jaw, then fit to the Piston Rod, ensuring it is tight and the reinstalled O-Ring is correctly seated. Reinstall the Clamp Cylinder assembly and refit the M16 Cap Head Screws using new M16 Nord-Lock washers. Refit the hoses.

EMV450 / EMV525HA

Inside the concave cutout of the Moving Jaw there are 4x M16 Cap Head Screws. Remove the 4x Screws and 4x M16 Nord-Lock Washers. Tap out the Jaw and inspect & clean its seating area on the Clamp Body. Ensure all faces are in good order. Inspect & clean the serrations on the Jaw Pad Support inside the Clamp Body. Slide the replacement Jaw into the Clamp Body and check that its serrations tightly engage with the serrations on the Jaw Pad Support - the Jaw should not move up and down. Refit the 4x M16 Cap Head Screws with new M16 Nord-Lock Washers.



Changing the Gearbox Oil

Change the oil in the EMV gearbox every 50 working hours. Remove the Drain Plug from underneath the gearbox and remove the Breather/Filler Plug from the top. Allow the oil to drain out completely into a suitable container. It is best done at the end of a shift when the oil is relatively warm and thin. Replace the Drain Plug and fill with new, clean oil through the Breather/Filler hole until the oil level in the gearbox is halfway up the sight glass. Re-fit the Breather/Filler Plug, using a new seal, and tighten.

DCP recommend using a fully synthetic oil meeting API GL-5 with an SAE 75W/90 viscosity grade.

The approximate oil quantities for each EMV are as follows:

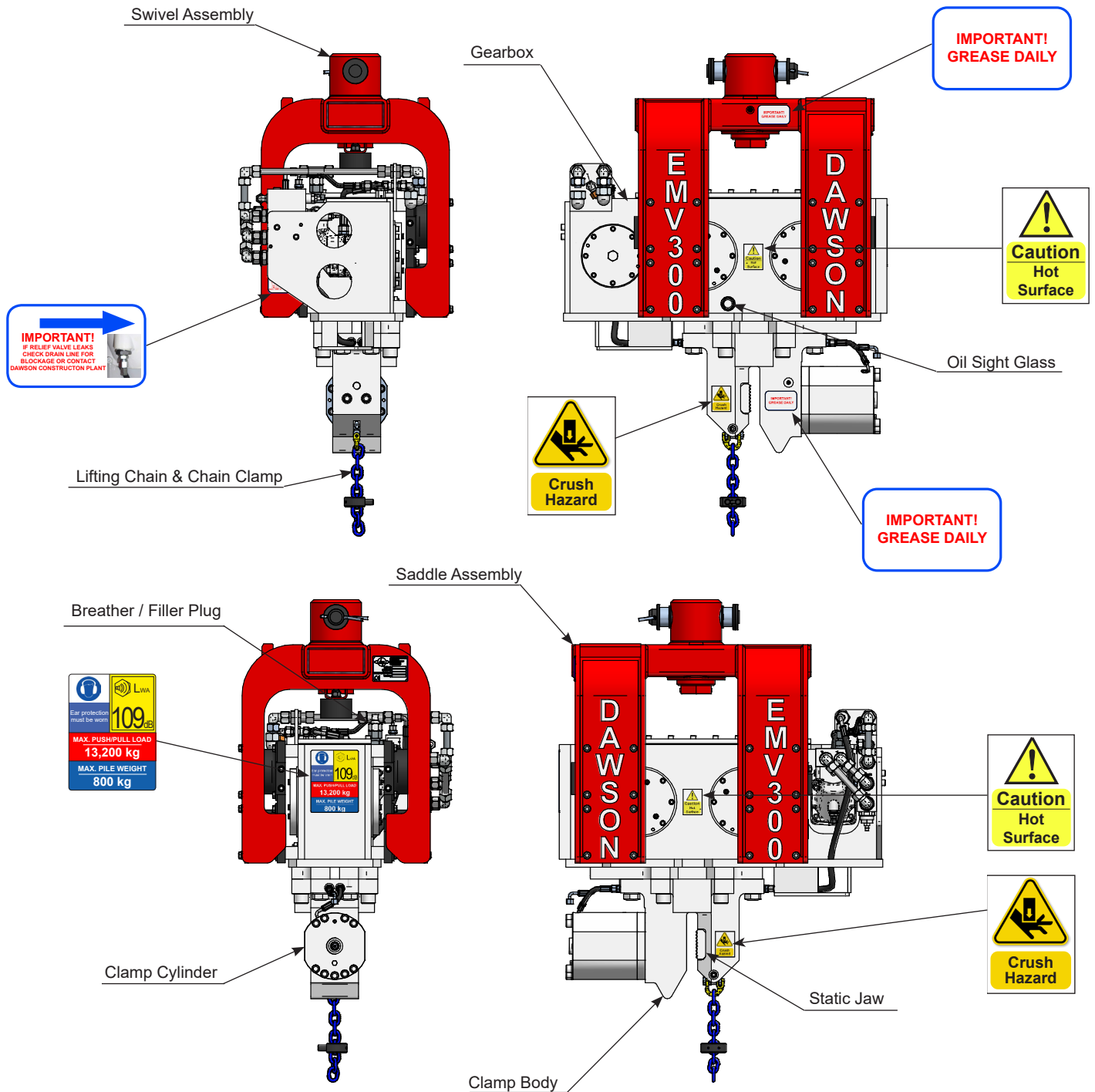
EMV110 & EMV220 - 3.5 L; EMV300 - 4.5 L; EMV450 - 5 L; EMV525HA - 6 L.

The old oil must be taken to a certified waste disposal centre or handed over to a certified waste disposal contractor.

Note: Maximum ambient operating temperature for the unit +40 °C.
Minimum ambient operating temperature for the unit -20 °C.

maintenance

The diagrams below show the typical location of the Hazard / Information stickers on an EMV (EMV300 shown) and labels selected EMV components. For a full parts list, refer to the *Parts Manual (Part II)*. Ensure all stickers are legible and unobscured.



troubleshooting

Please ensure that troubleshooting, inspection work and repairs are undertaken by suitably qualified personnel. Training can be carried out by the manufacturer or by your local approved Dawson distributor. The following guidelines are intended to assist with basic diagnostics and are not intended to be an exhaustive list. They assume the inspector has a basic understanding of servicing techniques associated with this type of equipment. Work should not be undertaken by a novice without adequate supervision.



During troubleshooting, refer to the hydraulic schematics detailed in this manual.

MOVING JAW DOES NOT CLOSE / MACHINE DOES NOT CLAMP

- 1) Check the excavator-to-EMV hydraulic lines are correctly connected. Operate the control lever in both directions to check flow directions.
- 2) Remove the Pilot-Operated Check Valve Cartridge (shown below) from the rear of the Clamp Cylinder and inspect for contamination or damage. The poppet inside the Cartridge should move freely. If in doubt, replace and use new seals.
- 3) Independently check the operation of the Clamp Cylinder with it removed from the hydraulic circuit. This should only be carried out by a competent person.
- 4) Remove the Clamp Cylinder and inspect for mechanical damage inside the clamp or inside the cylinder.

Pilot-Operated Check Valve



Note: EMV300 shown. Location is consistent across all EMVs.

troubleshooting

EMV JAWS CLOSE / CLAMP, BUT THE UNIT WILL NOT VIBRATE

1) Check the excavator operating pressure and flow rate. If the pressure output of the excavator is too low the EMV will not run. This is because the Sequence Valve pressure setting has to be overcome before oil can pass to the Drive Motor.

2) Check the Sequence Valve setting by installing a pressure test gauge in the clamp close line and monitoring the pressure at which the valve opens. Ensure it is set to 165 bar.

3) Remove and inspect the Sequence Valve to check for damage. Replace if required. If reusing the existing Sequence Valve, fit new seals.

4) Motor failure or Gearbox problem: Try connecting the two main oil supply lines directly to the Drive Motor ports and running the unit with low engine speed – effectively low oil flow rate. **Caution:** it will be easy to over-speed the motor in this case because the Flow Regulator is now out of the circuit.

If the unit does not vibrate, either the Motor has become damaged or there is a fault within the Gearbox. Check the oil level in the Gearbox to ensure that it has not become filled with hydraulic oil from the Motor, usually indicating that the Motor's shaft seal has failed. If the seal has failed, the unit usually runs very slowly. If it doesn't run, metal fragments may have become entrapped in the transmission system. Consult the manufacturer.

5) Remove the Motor from the Gearbox and test its functionality.

6) As a last resort: Take the Saddle assembly off the EMV and remove the Gearbox Lid for an internal inspection. The Gears, Shafts and Bearings should rotate freely.



Caution: Pay attention to trapping body parts in the mechanisms during inspection!

UNIT WILL NOT RUN AT THE CORRECT SPEED, "JUMPS AROUND" OR SPEED FLUCTUATES

1) Check that the excavator hydraulic output complies with the minimum specified for the unit. Specifically check what system pressure is available on the bucket ram circuit at the required flow rate for the EMV in use (see section *Basic Technical Specifications*). Ensure the available pressure and flow is suitable.

2) Check the Flow Regulator setting to ensure adequate flow is reaching the Drive Motor. Refer to the hydraulic schematics in this manual. Default settings shown on the next page.

3) Check the Sequence Valve pressure setting. If this setting is too close to the operating pressure, the EMV will speed up then slow down, speed up then slow down, etc. Default settings shown on the next page.

4) Check the Gearbox oil level. If it is much higher than the Sight Glass, the Motor's shaft seal may have blown. Remove the Motor and inspect.

troubleshooting

emv110
emv220

Flow Compensator

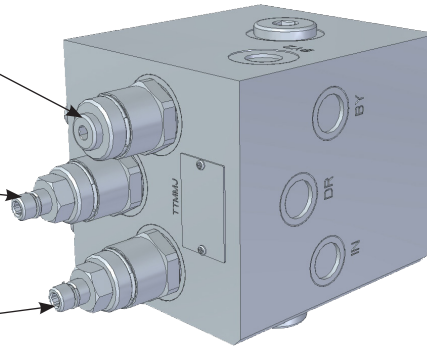
Default settings:
EMV110: 14 mm
EMV220: 15 mm

Sequence Valve

Default settings:
EMV110: 9.5 mm
EMV220: 11.5 mm

Pressure Reducer (Clamp)

Default settings:
EMV110: 10 mm
EMV220: 12.5 mm



emv300
emv450

Pressure Reducer (Clamp)

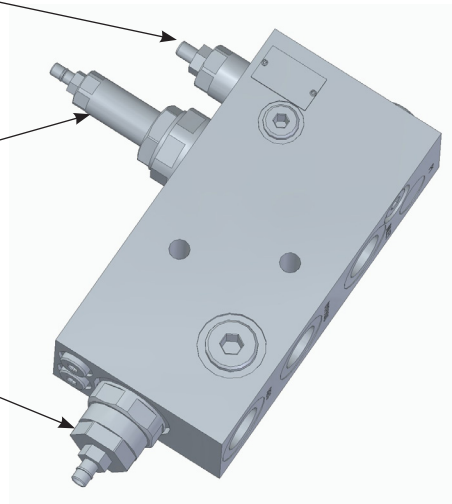
Default settings:
EMV300: 12 mm
EMV450: 12 mm

Sequence Valve

Default settings:
EMV300: 11.5 mm
EMV450: 11.5 mm

Flow Compensator

Default settings:
EMV300: 8.5 mm
EMV450: 8.5 mm



Important: The EMV300 and EMV450 use the same manifold block but with different fixed-flow orifices in. On the side of the block, below the Sequence Valve, there is a blanking plug. Remove the blanking plug to access the orifice. The EMV300 requires an orifice with a Ø8 mm bore. The EMV450 requires an orifice with a Ø10 mm bore. Check that the correct orifice is installed for your EMV.

emv525HA

Pressure Reducer (Clamp)

Default setting:
EMV525HA: 11.5 mm

Sequence Valve

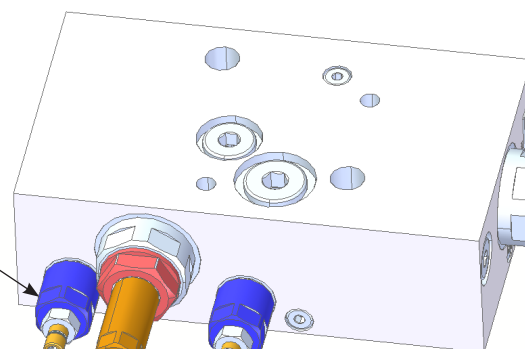
Default setting:
EMV525HA: 12 mm

Pressure Reducer (Unclamp)

Default setting:
EMV525HA: 14 mm

Flow Compensator

Default setting:
EMV525HA: 11.5 mm



troubleshooting



OIL BLOWING OUT OF THE MOTOR BLOW-OFF VALVE

Drain line restricted or blocked. Stop work immediately.



Motor Blow-Off Valve

- 1) Check the drain line hose for obvious restrictions at fittings, filters etc.
- 2) Check the drain hose for damage. Look carefully as the bore of the hose can be crushed even when the outside of the hose looks to be in good order at a casual glance.
- 3) Check the drain hose point of entry into the excavator hydraulic oil system. It is always best to run it directly to tank.
- 4) Do not use Quick Release Couplings (QRCs) on the drain line as they can cause restriction.
- 5) The drain line may be pressurised. Check that the line is not connected to a supply line e.g. the pressure line from a breaker circuit.
- 6) Long drain hose or the hose bore too small: either of these can contribute to an increase in back-pressure.
- 7) Extremely cold weather: if the excavator hydraulic oil is an inappropriate viscosity grade for the ambient temperature. It may be too thick. This will cause an increase in back-pressure in the drain hose.
- 8) Faulty Blow-Off Valve on the Motor casing: check that this has a minimum cracking pressure of 6 bar and a maximum of 7 bar. Replace if unsure using a new calibrated valve and a new sealing ring.
- 9) Leaking seals on the Sequence Valve Cartridge leading to excessive drain line flow rate: remove the drain line from the EMV and measure leakage flow rate. Leakage in excess of 5 L/min (1.33 gpm) indicates either a seal kit problem with the Sequence Valve or high internal Motor leakage. Split the Sequence Valve drain line and Motor case drain line and measure leakage rates independently. The sequence drain line should have little or no leakage.

troubleshooting

OIL BLOWING OUT OF THE GEARBOX BREATHER VALVE & THE GEARBOX IS FULL OF OIL

The Drive Motor case seal has failed, typically because the drain line pressure has been exceeded.

The unit will need to be removed from the job site and repaired in a suitably equipped workshop. The oil in the Gearbox will be a mixture of hydraulic and gear oils.

Once in the workshop, drain the oil from the Gearbox and inspect the oil for signs of debris. If only the seal has failed, without any damage to the motor casting, it may be possible to repair the Motor with an authorised Parker Hydraulics (VOAC) distributor, change the gear oil and rebuild the unit.

However, if the Motor casting has also been damaged in the area of the seal housing, the inside of the Gearbox must be fully inspected. Remove the Gearbox Lid and inspect the Gear teeth and inspect all Bearings. Check the Gears for any signs of damage. Remove all Bearing Covers from the Gearbox sides and inspect the outer races for signs of grooves or any other contamination or damage. Inspect the rollers in each Bearing. The Bearings and all running faces should be in perfect condition - if not, they will need to be replaced. Consult with the manufacturer at this stage or one of their approved distributors. It is strongly recommended that the unit be repaired by the manufacturer in order to ensure correct procedures and materials are used for an effective repair.

CLAMP LOSES GRIP ON THE PILE

1) The Clamp can lose grip on the pile when clamped, without the EMV vibrating, if the Check Valve on the rear of the Clamp Cylinder has faulty / leaking seals or if the Clamp Cylinder piston seals are damaged / worn. Inspect and replace as required.

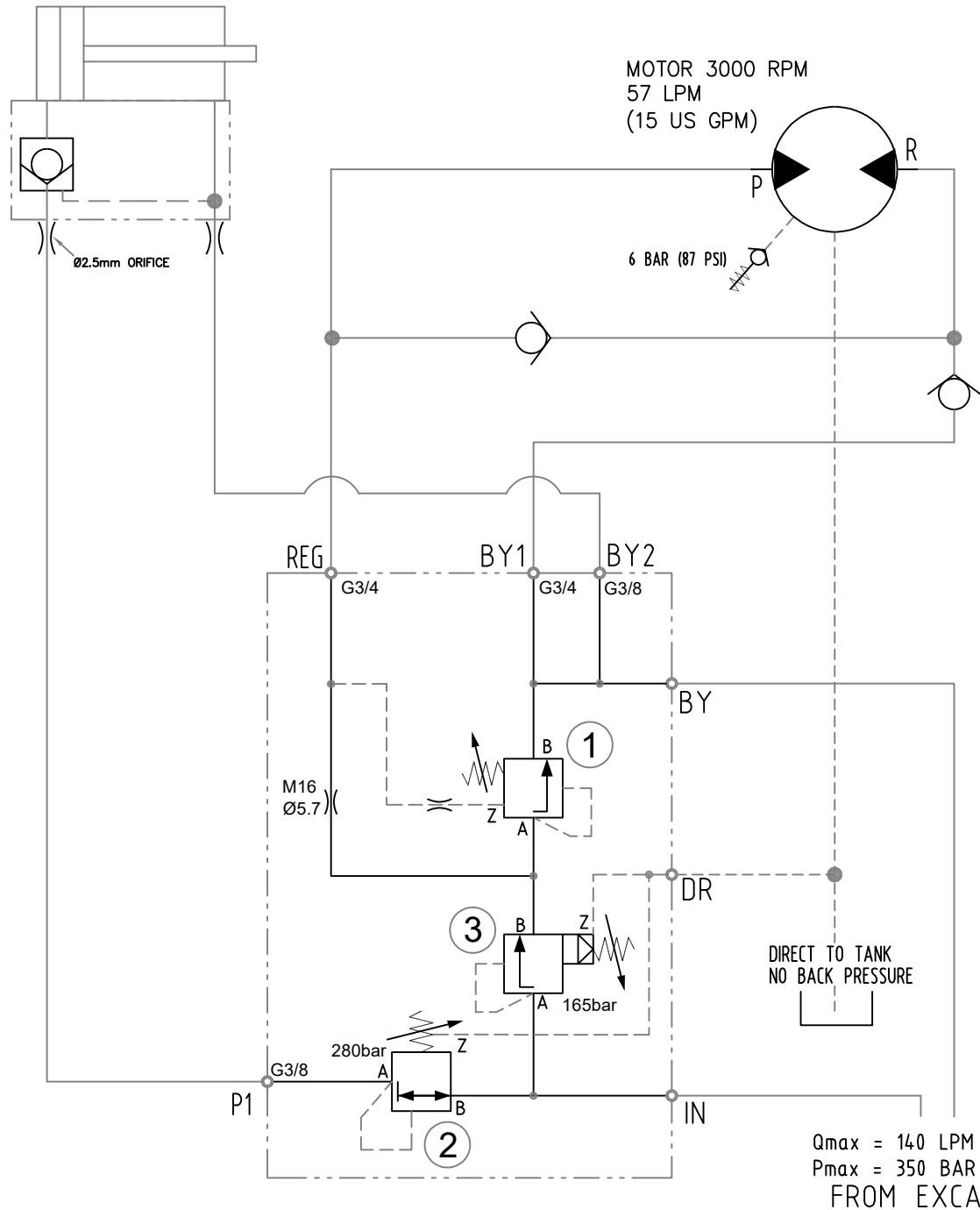
2) There may be insufficient system operating pressure if the Sequence Valve setting has been adjusted down. This may be done in an attempt to run the EMV on an unsuitable excavator. Check the system operating pressure and excavator specifications and correct as necessary.

3) The Jaws may be excessively worn. See section *Maintenance*.

hydraulic schematics

Ref.no.	Qnt.	Revision	Date	Intro.	Appr.by
A		FIRST ISSUE	15/12/23	AIB	BH

CLAMP FORCE GENERATED
22.7 t @ 240 BAR

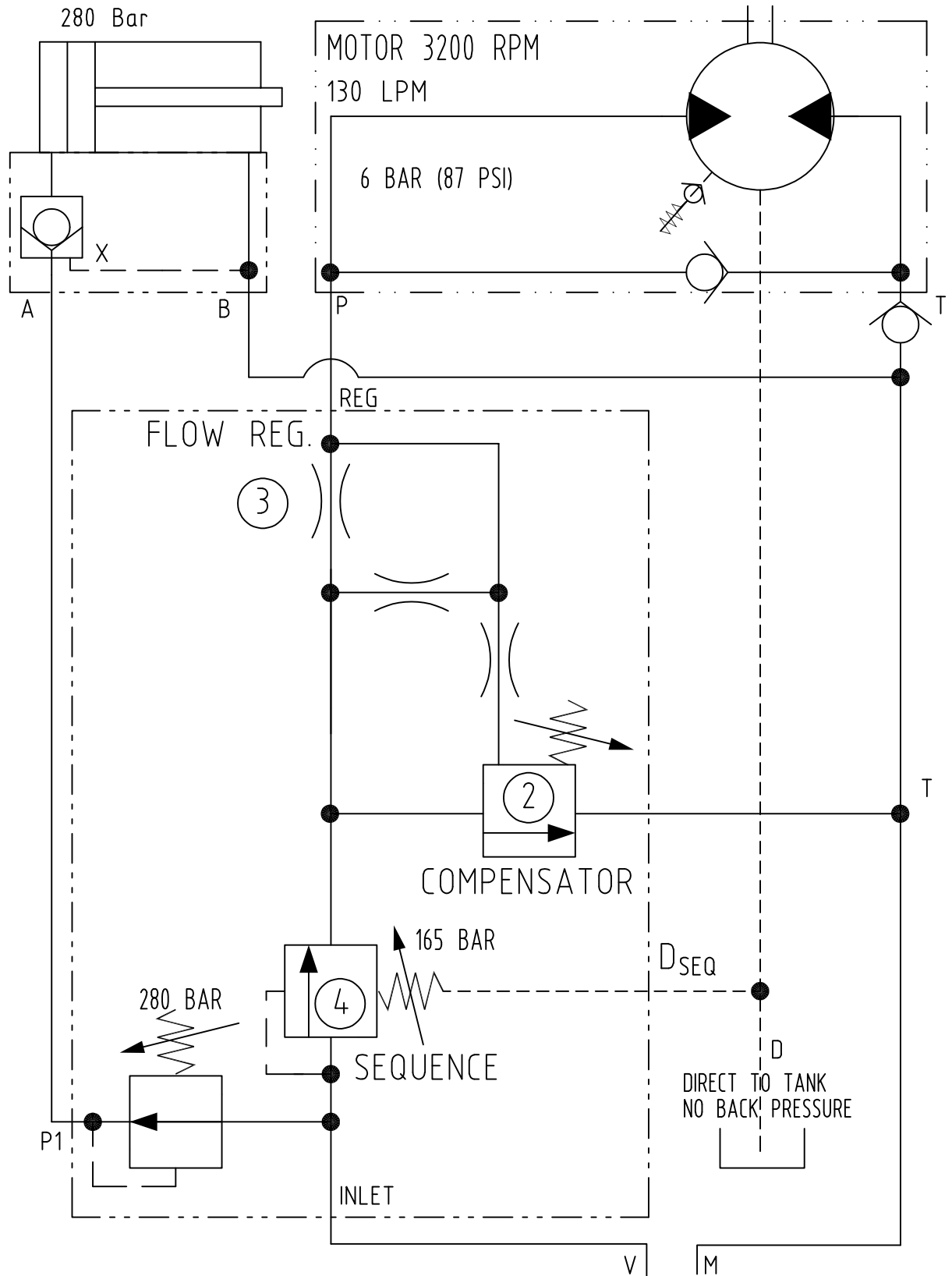


1 BAR = 14.5 PSI

Ref.no.	Qnt.	Part name			Material	Dimension	Remark	
Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
		EMV110 HYDRAULIC CIRCUIT SCHEMATIC					File name	Date 15/12/23
							Drawing no.	EMV110HYDCIR

Ref.no.	Qnt.	Revision	Date	Intro.	Appr.by
A		FIRST ISSUE	30/10/20	MDB	

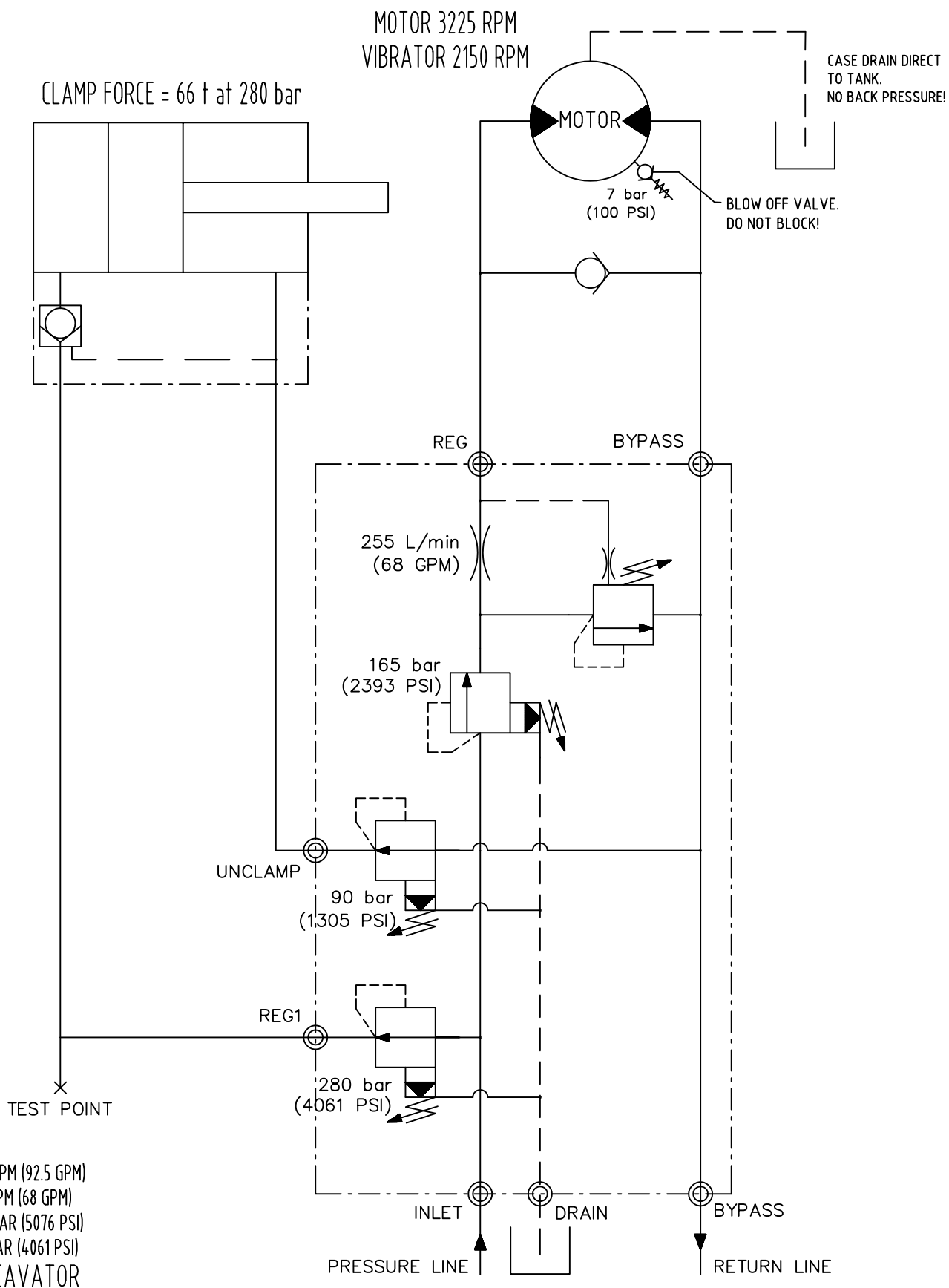
Clamp Force
Generated 36t @
280 Bar



Q_{max} = 250 LPM (66 US GPM)
P_{max} = 350 BAR (5076 PSI)
FROM EXCAVATOR

Ref.no.	Qnt.	Part name			Material	Dimension	Remark	
Design by DB	Drawn at	Copied	Checked	Standard A4	Affirmed	Scale	Replace	Replaced by
		HYDRAULIC CIRCUIT SCHEMATIC - EMV 300					File name	Date 30/10/20
							Drawing no.	emv300hydcir

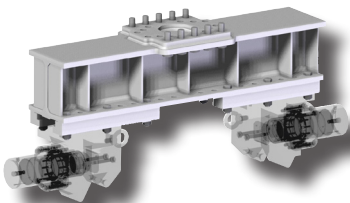
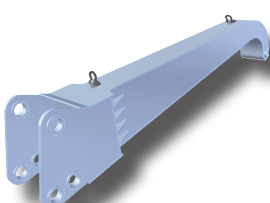
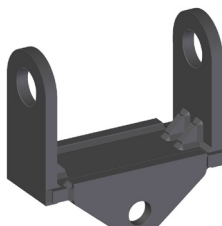
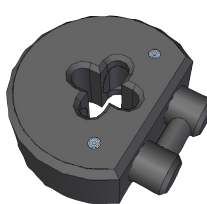
Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by
A		FIRST ISSUE	01/12/25	AIB	BH



Design by BH	Drawn at	Copied	Checked	Standard A4	Affirmed	Scale	Replace	Replaced by
 DAWSON CONSTRUCTION PLANT LTD. HYDRAULIC CIRCUIT SCHEMATIC EMV525HA							File name	Date 01/12/25
							Drawing no.	emv525ha-hydcir

appendix A: auxiliary equipment

EMV AUXILIARY EQUIPMENT

ITEM	DESCRIPTION	PART No.	APPROX. WEIGHTS
	CAISSON BEAM Caisson beam jaw assemblies can be positioned to suit any tube size between Ø300 mm & Ø1100 mm.	4900	EMV300 / 1500 kg
			EMV450 / 1700 kg
			EMV525HA / 1800 kg
	SWAN NECKS For extended reach and greater pile clearance on your excavator arm, enabling longer piles to be driven.	Various (enquire)	2m / 520 kg
			3 m / 680 kg
			4 m / 1020 kg
	ADAPTOR BRACKETS A range of brackets to suit the EMV connection to various excavators sizes.	Various (enquire)	50 - 70 kg
 4589 (with integrated adaptor bracket)  4586 (adaptor bracket sold separately)	QUICK HITCH ADAPTOR BRACKETS When an excavator has a quick hitch fitted and a double acting breaker to supply the EMV, the quick hitch adaptor bracket supplies fast, easy connection to the end equipment while maintaining the same degree of movement.	4589	200 kg
		4586	112 kg
	CHAIN CLAMPS For lifting piles under an EMV. The unit indexes along the links of a chain and locks into place giving a quick and simple chain lock for lifting.	TLR360 (10 mm)	1.2 kg
		4130 (16 mm)	3.7 kg

appendix B : tightening torques



DAWSON
CONSTRUCTION PLANT LTD

TIGHTENING TORQUES FOR SCREWS WITH STANDARD METRIC THREAD

Screw size	Preload values F_M based on Grades in N			Tightening torques M_A based on Grades in Nm			Wrench size for			
							Hex head screw		Socket head screw	
	8.8	10.9	12.9	8.8	10.9	12.9	mm	Inch	mm	Inch
M4 x 0.7	3,900	5,700	6,700	3.1	4.5	5.3	7	9/32	3	-
M5 x 0.8	6,400	9,300	10,900	6.1	8.9	10.4	8	-	4	5/32
M6 x 1	9,000	13,200	15,400	10.4	15.5	18.0	10	-	5	-
M7 x 1	13,100	19,300	22,600	17.0	25.0	30.0	11	-	-	-
M8 x 1.25	16,500	24,200	28,500	25	37	43	13	1/2	6	-
M10 x 1.5	26,000	38,500	45,000	51	75	87	17	11/16	8	-
M12 x 1.75	38,500	56,000	66,000	87	130	150	19	3/4	10	-
M14 x 2	53,000	77,000	90,000	140	205	240	22	7/8	12	-
M16 x 2	72,000	106,000	124,000	215	310	370	24	61/64	14	9/16
M18 x 2.5	91,000	129,000	151,000	300	430	510	27	1-1/16	14	9/16
M20 x 2.5	117,000	166,000	194,000	430	620	720	30	1-3/16	17	43/64
M22 x 2.5	146,000	208,000	243,000	580	970	1,125	32	1-9/32	17	43/64
M24 x 3	168,000	239,000	280,000	740	1,060	1,240	36	1-7/16	19	3/4
M27 x 3	221,000	315,000	370,000	1,100	1,550	1,850	41	1-5/8	19	3/4
M30 x 3.5	270,000	385,000	450,000	1,500	2,100	2,500	46	1-13/16	22	7/8
M33 x 3.5	335,000	480,000	560,000	2,000	2,800	3,400	50	2	24	61/64
M36 x 4	395,000	560,000	660,000	2,600	3,700	4,300	55	2-3/16	27	1-1/16
M39 x 4	475,000	670,000	790,000	3,400	4,800	5,600	60	2-3/8	27	1-1/16

NOTE!

Preload forces and tightening torques are based on lightly lubricated screws and nuts (corresponds to medium friction $\mu_G = 0.14$). Nm = x 0.7375 = ft. lbs.



D.C.P. RESERVES THE RIGHT TO DISCONTINUE EQUIPMENT AT ANY TIME, OR CHANGE SPECIFICATIONS OR DESIGNS WITHOUT NOTICE OR INCURRING OBLIGATIONS.

INNOVATIVE PILING EQUIPMENT

HYDRAULIC PILING HAMMERS

EXCAVATOR MOUNTED VIBRATORS

EXCAVATOR MOUNTED DRILLS

PUSH-PULL (SILENT) PILING

PILE EXTRACTION

SHEET PILE GUIDE FRAMES

SHEET PILE CAPPING SYSTEMS

AUGER CLEANERS

PILE POINTS & SPLICERS

SAFETY HANDLING / LIFTING EQUIPMENT

SHEET PILE THREADERS

excavator mounted vibrator

EMV525HA / EMV450 / EMV300 / EMV220 / EMV110



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