Rail-Reach III 500-Fly

Intermodal Truck mounted Road Rail Vehicle
MEWP (with Crane)

****DRAFT****
Operator's Manual

Part no. RRIIIM001
Issue 1 - 1 May 2014
Original Instructions (English)

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FIGURES **Page**

1 Introduction

This Operator's Manual has been compiled for the purposes of safe operation, maintenance and servicing of Rail-Ability components and systems.

For other operating details (e.g. Truck vehicle, Crane, Road Rail Operations, Rail Gear, etc.) refer to the publications listed in the section 4.

Left or right are to be with the reader sitting in the driver's seat in the cab facing forwards, unless otherwise stated.

IMPORTANT

READ, UNDERSTAND AND OBEY THE CONTENTS OF THIS OPERATOR'S MANUAL BEFORE THE OPERATION OF THIS MACHINE.

ONLY TRAINED AND AUTHORISED PERSONNEL SHALL BE PERMITTED TO OPERATE THIS MACHINE.

THIS MACHINE IS VERY COMPLEX AND POTENTIALLY DANGEROUS. IT IS IMPORTANT THAT BEFORE ANY USE OF THE MACHINE OCCURS, EXCEPT TRANSPORTATION AND MODULE HANDLING, THE FOLLOWING ACTIVITIES HAVE ALL BEEN PERFORMED AND CARRIED OUT IN THE ORDER STATED:

1. Pre-Operation Actions
2. Routine Maintenance as determined by the Pre-Operation Actions
3. Function Tests
4. Workplace Assessment
5. Operating Instructions.

THIS MANUAL SHOULD BE CONSIDERED A PERMANENT PART OF THIS MACHINE AND SHOULD REMAIN WITH THE MACHINE AT ALL TIMES.

Should you have any questions, contact Rail-Ability Ltd:

Rail-Ability Ltd
Tilcon Avenue
Stafford
ST18 0YJ

Tel: (01785) 214747
Fax: (01785) 214717
E-Mail: mail@railability.co.uk

The Rail-Ability web site is www.railability.co.uk.

2 Description and Intended Use

The Rail-Ability Rail-Reach machine consists of a road-going 4x4 ridged truck chassis, modified for use on rail by Rail-Ability Ltd as detailed in section 4. The chassis is fitted with rail gear front and rear to enable rail work. Mounted to the rear of the chassis is a demountable elevating work platform and demountable manipulator crane. The MEWP boom, crane and stabilisers can be operated from the work platform. The crane and stabilisers can also be remotely operated. The stabilisers also have ground controls. The Access Platform module is often referred to as a Mobile Elevating Work Platform (MEWP).

The Rail-Reach is intended for use on both stabilisers and/or rail wheels to enable operators and personnel to undertake maintenance work on overhead lines and structures forming part of the rail infrastructure.

The Rail-Reach complies with the provisions of the following EC Council Directives:

- **Machinery** **2006/42/EC**
- **Electromagnetic Compatibility (EMC)** **2004/108/EC**
- **Noise Emission in the Environment by Equipment for use Outdoors** **2000/14/EC.**

Guidance has also been taken from:

- **European standard EN 280:2001+ A2:2009**
- **PR EN 280:2009 Mobile Elevating Work Platforms.**

For further compliance information, refer to the EC Declaration of Conformity supplied with this machine.

3 Limitations

The use of this machine is limited to its intended use, as described above. If additional or special applications or uses are required which are not covered by this Operator's Manual, carefully analyse the situation and refer to Rail-Ability Ltd for advice before proceeding.

Operational and environmental limitations of the equipment are described in the Specifications section of this manual.

4 Manuals

Title	Part No
Rail-Ability Rail-Reach III **Operator's Manual (this manual)** Issue 1 May 2014 - Original Instructions (English)	RRIIIM001
Rail-Ability Rail-Reach MEWP **Duty Charts for Crane and Stabiliser combinations**	RRIIISS001
Rail-Ability Rail-Reach **Parts Manual** 1st Edition	RARRIIIMP001
EMI Safety Manual	27581
Manual of Responsibilities ANSI A92.6-1990	44163
Rail-Ability Service Manual Road Rail 4x4 MAN Truck Host machine	RATMCMRM&MP01
Rail-Ability Service Manual 6.5tm Crane Module	RA65RMPS001
MAN Service Manual	**********
MAN Parts Book	**********

Be sure the Operator's, Safety, and Responsibilities manuals are complete, legible and located with the machine.

5 Decal Legend

The decals on this machine use symbols, colour coding and signal words to identify the following:

	Red with safety alert symbol – used to indicate the presence of an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Safety alert symbol – used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	Orange with safety alert symbol – used to indicate the presence of a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Yellow with safety alert symbol – used to indicate the presence of a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.
	Yellow without safety alert symbol – used to indicate the presence of a potentially hazardous situation which, if not avoided, may result in property damage.
	Green – used to indicate operation or maintenance information.

These symbols are also used in this manual as an appropriate visual indication and their meaning is as detailed above.

Be sure all decals, including those shown in the Decals Section of this manual, are in place and legible.

6 Safety Rules

DANGER. FAILURE TO OBEY THE INSTRUCTIONS AND SAFETY RULES IN THIS MANUAL MAY RESULT IN DEATH OR SERIOUS INJURY.

6.1 General

- Read, understand and obey all applicable governmental regulations.
- Read, understand and obey the employer's safety rules and worksite regulations.
- Comply with the employer's, job site and governmental rules regarding use of personal protective equipment.
- Read, understand and obey the manufacturer's instructions and safety rules, safety and operator's manuals and machine decals.
- Learn and practice the principles of safe machine operation contained in this operator's manual.
- Be properly trained to safely operate the machine.
- Always obey national traffic regulations while driving the vehicle on roads. Be aware of the vehicle's overall length, width and height.
- Avoid hazardous situations.
- The lack of maintenance may cause damage or hurt people.
- **Know and understand the safety rules before going on to the next items:**
  - Prior to use:
    - Always perform Pre-Operation Actions
    - Always perform Function Tests
    - Always perform a Workplace Inspection.
  - Only use the machine as it was intended:
    - Using the work platform for anything other than lifting personnel, along with their tools and materials, to an aerial work site is unsafe and dangerous.
    - Do not engage in stunt driving or misbehave while operating the machine.

6.2 Electrocution Hazards

- This machine is **NOT** electrically insulated and will **NOT** provide protection from contact with or proximity to electrical current.
- When in operation maintain the minimum safe distances from electrical power lines and apparatus in accordance with the applicable governmental regulations and Figures 1 and 2 below.

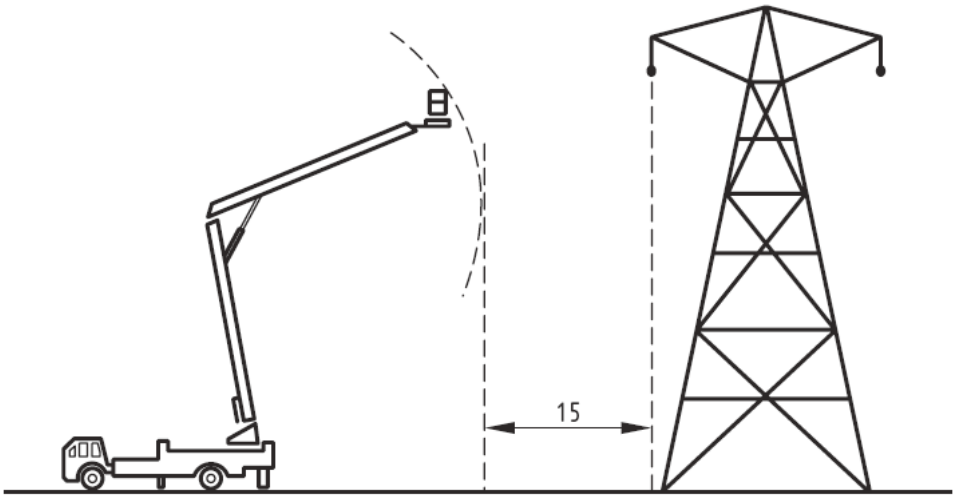


Figure 1 - Safe Distance (metres) from Power Lines in excess of 33kV on Steel Towers

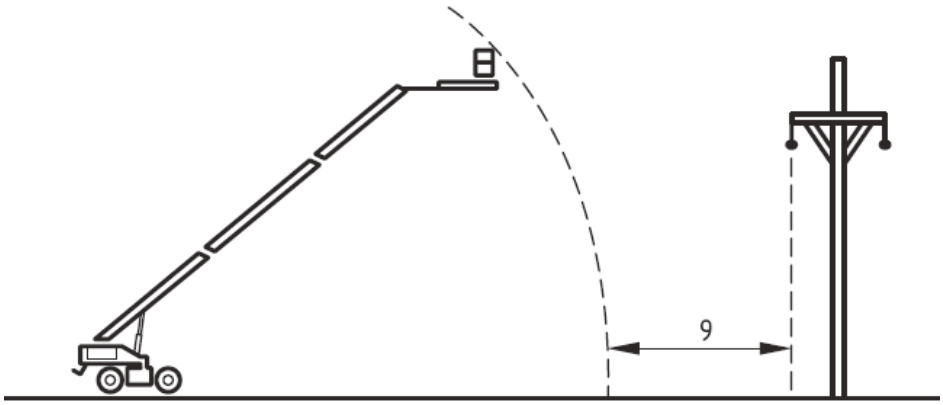


Figure 2 - Safe Distance (metres) from Power Lines up to 33kV on Wooden Poles

- Personnel must carefully evaluate the danger of electrocution before moving. If closer than 10 metres from the crane, the truck, the load or the electric line, move at least 10 metres away, by shuffling away with small steps, in order to minimize the chance of getting a high voltage difference between the feet.
- OLE lines on rail are 25kV and require a minimum safe approach distance of 2.75 metres.
- Allow for platform movement, electrical line sway or sag and beware of strong or gusty winds.
- **Keep away from the machine if it contacts energised power lines. Personnel on the ground or in the platform must NOT touch or operate the machine until energised power lines are shut off.**
  - Do not attempt to assist someone in direct or indirect contact with the power line before the power has been disabled as you run the risk of being electrocuted yourself.
  - Warn others to stay away.
  - Call for help.
  - Contact the power company to de-energize the line.
  - If you are in the truck cabin, stay inside without touching the vehicle body because it's extremely hazardous to go out before the line is de-energised.
  - Help the electrocuted person if you know the first-aid procedures, otherwise wait for the paramedics to arrive.
- Do not operate the machine during lightning or storms.
- **Refer to Engineering Acceptance Certificate for live OLE limitations.**

- Do not use the machine as a ground for welding unless the machine is equipped with the weld line to platform option and it is properly connected.
- Inspect daily for damaged cables and wires. Replace damaged items before operating.
- Avoid contact with electrical terminals.
- Earth bonding straps:
  - Straps must be in place at all times and securely fastened.
  - Inspect the straps daily.
  - Replace straps immediately if there are any signs of burning or damage.
  - Replace damaged straps before operating.
  - Check impedance levels after refitting any straps.
  - Earth bonding straps are fitted on the machine in the following positions:
    - Between front and rear rail axles and chassis
    - Between the chassis and the sub-frame and from the sub-frame to the king-post
    - Between the king-post and boom, and between the boom and the work platform.
- Avoid electrical shock from contact with battery terminals. Remove all rings, watches and other jewellery.
- Ensure a C Form has been obtained before on-tracking the machine in OLE areas.

6.3 Travel Hazards

- Observe and use colour-coded direction arrows on the machine for drive functions.
- Be aware of limited sight distance and blind spots when driving. Use a 'banksman' or machine controller when required.
- Limit travel speed according to conditions, slope, location of personnel, and any other factors, which may cause collision.
- If a hook protrudes outside the edge of the truck, it must be removed before travelling.
- Take care while travelling on rail, especially when the work platform is elevated.
- Beware of slippery and limited traction conditions on rail. Braking distance can increase significantly in wet or icy conditions.

6.4 Tip-over Hazards

6.4.1 General

- Do not alter or disable the safety switches (e.g. limit and proximity switches).
- Do not alter or disable machine components that in any way affect safety and stability.
- Do not replace items critical to machine stability with items of different weight or specification. If in doubt, contact Rail-Ability Ltd.
- Do not modify or alter this machine without prior written permission from Rail-Ability Ltd.
- Do not operate the machine in strong or gusty winds.
- Ensure that all tyres are in good condition, wheel nuts (including rail wheels) are properly tightened and tyres are inflated to rated pressure (see specifications section of this manual).

- Do not drive the machine on temporary track, uneven or unstable track or other hazardous conditions with the platform raised.

- Do not use the machine while mounted on another moving surface of a vehicle.

6.4.2 Work Platform

- Occupants, equipment and materials must not exceed the maximum capacity of the work platform:

Maximum number of occupants	Maximum platform capacity
5	500 kg

Possible load configurations in the work platform are:

Number of occupants	Maximum weight of equipment/materials
5	100 kg
4	180 kg
3	260 kg
2	340 kg
1	420 kg

The capacity ratings shown are related to the maximum platform loads in rail mounted operation while the Crane and Stabilisers are stowed. For further configurations see the associated duty charts.

- Tilt alarm:
  - Do not depend on the tilt alarm as a level indicator. The tilt alarm sounds only when the machine is on a slope (Cant/Gradient).
  - If the tilt alarm (a low frequency buzzer) sounds, use the corrective tilt function to adjust the angle of the king-post. Drive and boom functions will be locked out until the king-post is adjusted. If the tilt alarm sounds when the platform is in the raised position, use caution when adjusting the king-post.

- Do not use the platform controls to free a platform that is caught, snagged or otherwise prevented from normal motion by an adjacent structure. If possible, all personnel must be removed from the platform before attempting to free the platform using the auxiliary controls.

- Windy conditions:
  - Do not raise the boom when wind speeds may exceed 46 mph/20.7 m/s. This corresponds to Force 8 on the Beaufort Wind Scale (gale).
  - If wind speeds exceed 46 mph/20.7 m/s when the boom is raised, lower the boom and cease operation immediately.
  - Do not increase the surface area of the work platform or the load. Increasing the area exposed to the wind will decrease machine stability.

- Always ensure the boom is stowed in the transport position and use extreme care and slow speeds while driving the machine in stowed position across uneven terrain, debris, unstable or slippery surfaces and near holes and drop-offs.

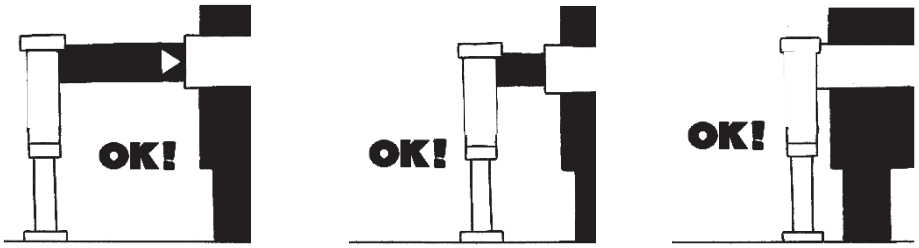
- Do not drive the machine in situations that exceed any of the following maximum ratings:
  - In stowed position, subject to ground conditions and adequate traction:
    - Slope 3.0°
    - Side slope 3.0°.
  - In raised position, subject to being mounted on rail only:
    - Cant 150 mm (5.6°)
    - Gradient 1 in 25 (2.5°).

- Do not push-off or pull-toward any object outside of the platform. The Maximum allowable manual force to be applied to the platform is 2000 N.

- Do not place or attach fixed or overhanging loads to any part of this machine. Do not place loads outside the work platform perimeter.
- Do not transport tools and materials unless they are evenly distributed and can be safely handled by person(s) in the work platform.
- Do not place ladders or scaffolds in the work platform or against any part of this machine.
- NOTE: Fitting attachments for holding equipment, tools or other materials onto the work platform, toe-boards or guard rail system can increase the weight in the platform and the surface area of the platform or the load.
- Do not use the elevating work platform structure or any part of the boom as a crane.
- Do not push the machine or other objects with the work platform.
- Do not contact adjacent structures or other vehicles with the work platform.
- Do not tie the work platform to adjacent structures.

6.4.3 Stabilisers

- Observe the shear and trapping hazard decals where guards cannot be placed, such as:
  - outrigger running towards rest position
  - leaning and folding points of the booms in rest position
  - recovery control swinging column
  - running inner boom.
- The rear stabiliser beams must be extended partially before the leg rams can be rotated
- Stabiliser leg rams must be fully raised before the leg beam can be extended or retracted
- In road mode, stabilize the vehicle on a horizontal plane with a maximum tolerance of 1.5 degrees.
- In rail mode stabilise the machine at the current angle of the cant and gradient (Do not attempt to level the machine)
- In rail mode the front stabilisers deploy first then the rear
- In rail mode the leg beams must be extended beyond the sleeper ends
- In rail mode all legs have to be fully stowed to travel the machine
- When stabilizing the vehicle, make sure that no one is or approaches in close proximity of the working area of the outriggers.
- When the stabilisers move out of the stowed position the work light on the associated leg ram will illuminate
- Make sure that the outrigger rams rest on a solid base, and not on manholes or other covered areas. If necessary, use larger outrigger base plates (available on request) to avoid sinking. If you adopt other means, make sure that they are suitably sized for the load they must bear.
- When the stabilisers are deployed and support the machine the work light on the associated leg ram will pulse on and off
- Examples of acceptable and unacceptable use of outriggers:

The three figures on the right show acceptable use.	
These two figures on the right show unacceptable use	

6.5 Fall Hazards

- Always sit in the seat and fasten the seat-belt when operating the cab controls.
- Always use the steps and handholds provided when accessing and exiting the vehicle deck, work platform or cab. Never climb onto the deck by other means or jump from the deck onto the ground.
- Vehicle deck:
  - Take care when on the deck (either when accessing the work platform or performing inspection or maintenance), particularly in wet or icy conditions.
  - Remove or secure any loose equipment or tools that could fall off during transit or present a trip hazard.
  - Clean up any oil or other fluid spillages on the deck which could create a slippery surface.
  - Keep the deck clean and tidy.
- Work platform:
  - The guard rails provide fall protection.
  - Occupants may be required to wear personal fall protection equipment (PFPE) due to job site or employer rules or governmental regulations.
  - PFPE equipment and its use shall be in accordance with the PFPE manufacturer's instructions and applicable rules and regulations.
  - Attach lanyards to the anchor points provided.
  - Do not sit, stand or climb on the guard rails.
  - Maintain a firm footing on the floor at all times.
  - Do not climb down from the platform when it is raised.
  - Keep the work floor clear of debris.
  - Close and latch the entry gate before operation.
  - Do not attempt to enter or exit the platform when it is raised out of the stowed position.
  - Do not increase the working height or reach (e.g. by use of step-ladders, etc.).

6.6 Collision Hazards

- Check the work area for overhead obstructions or other possible hazards.
- Do not operate the machine in the path of any crane or other moving machinery unless the controls of that machinery have been locked out and/or precautions have been taken to prevent any potential collision. Use a 'banksman' or machine controller to alert the operator/driver when

required.

- Booms and platform:
  - Be aware of limited sight distance and blind spots when operating the boom. Use a 'banksman' or machine controller when required.
  - Be aware of boom position and tail-swing when slewing.
  - Take extra care when the crane and MEWP booms are elevated at the same time. Controls are interlocked to prevent simultaneous boom movements but the working envelopes of the crane and MEWP are designed to coincide for operational requirements.
  - Do not lower the work platform unless the area below is clear of personnel and obstructions.

6.7 Crushing Hazards

- Keep hands and limbs away from moving parts of the machinery.
- Maintain safe distances between the operator, the machine and fixed objects.
- Use common sense and planning when operating the machine with a 'banksman' or controller from the ground.

6.8 Explosion and Fire Hazards

- Do not start the engine if you smell or detect Liquid Petroleum Gas (LPG), gasoline, diesel fuel or other explosive substances.
- Do not refuel the tank(s) when the engine is running.
- Refuel the tank(s) and charge the battery only in an open, well-ventilated area away from sparks, flames and lighted tobacco.
- Do not operate the machine in hazardous locations or locations where potentially flammable or explosive gases or particles may be present.
- Do not spray ether into engines equipped with glow plugs.
- Keep sparks, flames and lighted tobacco away from the batteries as batteries emit an explosive gas.
- Do not contact the battery terminals or the cable clamps with tools that may cause sparks.

6.9 Burn Hazards

- As batteries contain acid, always wear protective clothing and eye wear when working with batteries.
- Avoid spilling or contacting battery acid.
- Neutralise battery acid spills with baking soda and water.
- Do not expose batteries to water or rain.

6.10 Bodily Injury Hazards

- Be aware of Crushing Hazards when grasping the work platform guard rail.
- Do not operate a machine with a hydraulic oil or air leak as a hydraulic leak can penetrate and/or burn skin.

- Improper contact with components under any cover will cause serious injury. Only trained maintenance personnel should access compartments. Access by the operator is only advised when performing a pre-operation inspection.
- All compartments must remain closed and secured during operation.
- Always operate the machine in a well-ventilated area to avoid carbon monoxide poisoning.

6.11 Lifting Hazard

- Use the appropriate number of people and proper lifting techniques when lifting:
  - batteries
  - drawbars
  - tools
  - other removable items.

6.12 Damaged or Malfunctioning Machine Hazards

- Do not use a damaged or malfunctioning machine.
- Tag and remove from service a damaged or malfunctioning machine.

6.13 Component Damage Hazards

- Do not use any battery or charger greater than 24V to jump-start the host vehicle OEM engine detailed in section 4.
- Do not use the machine as a ground for welding unless the machine is equipped with the Weld Line to Platform option and is properly connected.

7 Rail Safety

DANGER. FAILURE TO OBEY THE INSTRUCTIONS AND SAFETY RULES IN THIS MANUAL MAY RESULT IN DEATH OR SERIOUS INJURY.

Failure to comply with these requirements may result in severe damage to the machine and/or the rail infrastructure.

7.1 General

- All work on or near the railway infrastructure must be carried out strictly in accordance with railway regulations.
- Always observe Network Rail codes of practice.
- Work must be carried out in accordance to rulebook GE/RT 8000 and all safety precautions must be followed at all times.
- Attention must be paid to Railway Group Standards and all safety precautions must be followed at all times.
- All staff must be fully trained and certified as competent to use this piece of equipment on railway infrastructure by the owner/operator.
- When working on electrically operated routes, be sure to observe official regulations. Always observe minimum clearance from overhead wires.
- Never use in 3rd and 4th rail areas.

- Never use on track without a possession.
- Never use on track under live OLE, ensure a relevant C Form is obtained.
- Never use on track when trains are running.
- Never On/Off-Track in areas with close proximity hazards such as in station platforms under/on bridges, in tunnels or in areas with low overhead structures or line side structures.

See the Network Rail V.A.B. Engineering Acceptance Certificate and EC Type Examination Certificate for additional, specific machine limitations of use.

7.2 On/Off Track

- Always utilise an approved On/Off-Tracking method.
- Never On/Off-Track in areas with any cable connections to the rail.
- Never On/Off-Track in areas with ATP loop cables either in the rail web or in the "four foot".
- Never On/Off-Track in areas with any cables cleated to the top surfaces of sleepers.
- Never On/Off -rack in areas with any signalling equipment fitted in the "four foot".

7.3 Travelling on the Rail

Before travel commences, ensure the following:
- Rail Gear deployed fully
- MEWP stowed in the fully lowered (transport) position
- Crane stowed in the fully lowered (transport) position
- Platform gate closed and latched
- King-post is levelled parallel with the chassis
- MEWP system key-switch de-activated.

To ensure the machine is complying with the W6 gauge requirement, before travelling on rail, it is essential that the machine is configured as above to ensure overhead and line-side structures are not struck.

8 Crane Safety

8.1 Requirements

- The crane operator shall be held directly responsible for the correct operation of the crane including any requirements of the site conditions.

8.2 General

Adhere to the following items in order to avoid possible accidents while operating the crane.

- **Do not interfere with the safety and protection devices.** Note that interference with the check valves and removal of the lead seal removes and invalidates the Manufacturer's warranty.
- Only authorized persons are allowed to operate the crane.
- The crane must be used on firm, level ground.
- Check that the vehicle hand brake is on and that the wheels are locked.

- Before every operation make sure that:
  - no-one is within the working area of the crane
  - the safety devices are in place and operative
  - the minimum safe working distances from power lines are observed
  - the load is correctly slung and hooked.

- Stabilize the vehicle by the outrigger rams, making sure that:
  - the lateral supports are fully extended
  - either the rail wheels are properly positioned on the track or the road wheels are in contact with the ground and the suspension is not completely unloaded.

- Use the crane in accordance with the use and maintenance manual, making sure that:
  - the load and radius are within the maximum limits shown on the crane capacity plate
  - the crane is used progressively, avoiding sudden load movements
  - swinging or dragging of the load is avoided
  - the load is lifted before rotating.

- When using implements, protect the crane working area with a barrier.

- The vehicle/crane is not left unless the power take off is disengaged and the load is on the ground.

- Before driving the vehicle make sure that the outriggers are fully retracted and re-entered, the safety taps closed and the crane is in the folded position.

- The use of the crane is reserved for authorized personnel, instructed in advance, who must conform to the safety norms and instructions contained in the use manual supplied with the crane (see norms ISO 9926-1).

- It is prohibited to walk or stop under a suspended load.

- It is prohibited for unauthorized persons to be within the working area.

- Warning plates, as well as instruction and operation plates must be replaced when no longer readable or missing. Contact Rail-Ability to replace any missing plates.

- Do not use the outriggers to raise the vehicle.

- To avoid hitting bridges or tunnels know the overall height of the crane in the folded position or in laid position in the body or on the load. Always respect and pay proper attention to road signs placed in proximity of such obstacles.

8.3 Residual Risks

It is forbidden to use the crane without having read and understood the manual for use and maintenance and without having being previously instructed by experienced personnel on all aspects of safe crane operation.

Risk evaluation shall be followed by adequate provisions in order to avoid risks and damage to people and objects.

- **Overturn:** the crane can overturn, thus hurting people and damaging objects especially in the following conditions:
  - not correctly stabilized
  - moment limiting device disabled
  - ground conditions at the site not stable enough with respect to the dimensions of the outrigger base and/or of the additional base plate
  - pump oil flow increased above the design parameters.

- **Moment limiting device**: never try to bypass or tamper with the moment limiting device and the various safety systems installed on the crane. Understand the alarm messages generated by the "moment limiting device" and act accordingly.

- **Control position**: before operating the controls the operator shall make sure that they are safe from hazards (i.e. is clear of the load and there is a way of escape). Otherwise they shall manoeuvre from a different control point. If there is none available, the crane should be operated with the radio control or remote control in order to allow the operator to safely operate the crane.

  From the control position the operator shall be able to visually inspect the whole working area at all times. If it is not possible they shall team up with a co-worker able to control the whole area, otherwise the crane shall be used with the radio control in order to afford the operator with the perfect position to see all potential hazards clearly at all times.

- **Load rigging**: carefully inspect the load rigging. The operator shall make sure that the load is properly attached and balanced and that all unexpected movements are not allowed. Be careful not to hit any potential impediments during the crane movements.

- **Overload and/or fatigue**: the crane can break down due to fatigue or overload:
  - if it is misused (with cycles, loads or pump oil flow not pertinent to the crane class)
  - if it is used for improper tasks (side, oblique or reversal pull)
  - if it is used in poor sites (corrosive environment, too high or too low temperature, foundry - see Workplace Assessment)
  - if the load exceeds the rated capacity indicated on the relevant plates.

- **Wrong manoeuvring**: the crane can fall, break or overturn if the operator performs a wrong manoeuvre due to the lack of familiarity with the operation procedures or due to inadequate psychophysical conditions. There are directives and rail regulations in force that impose suitable training of the personnel before using these types of machines and they require an adequate psychophysical condition to operate safely a lifting device that implies an inherent danger when lifting a load.

- **Weather conditions**: too high or too low temperatures may damage the components of the hydraulic and electric circuits. Do not operate the machine during a storm with lightning hazards, and if these condition occur it is recommended that the crane is folded down and put to rest. When the wind is too strong the crane can overturn or break down.

- **Shearing, entrapment**: the crane has a lot of parts in movement that it is impossible to protect, therefore the operator shall always be aware of this residual risk and keep clear from the parts in movement, particularly from the load. The operator is held responsible not only for them self but also for those working in proximity of the crane including any that are not authorized.

- **Electrocution**: the crane is not eclectically insulated and therefore it is not equipped to work with conductors, including if a contact is accidental. Be compliant with the minimum clearance prescribed by the national directives in force. Generally speaking the clearance from electric lines of 33kV should be at least 9 metres. Above 33kV, the distance should be at least 15m and be verified in each case by competent technicians and with respect to the environment conditions.

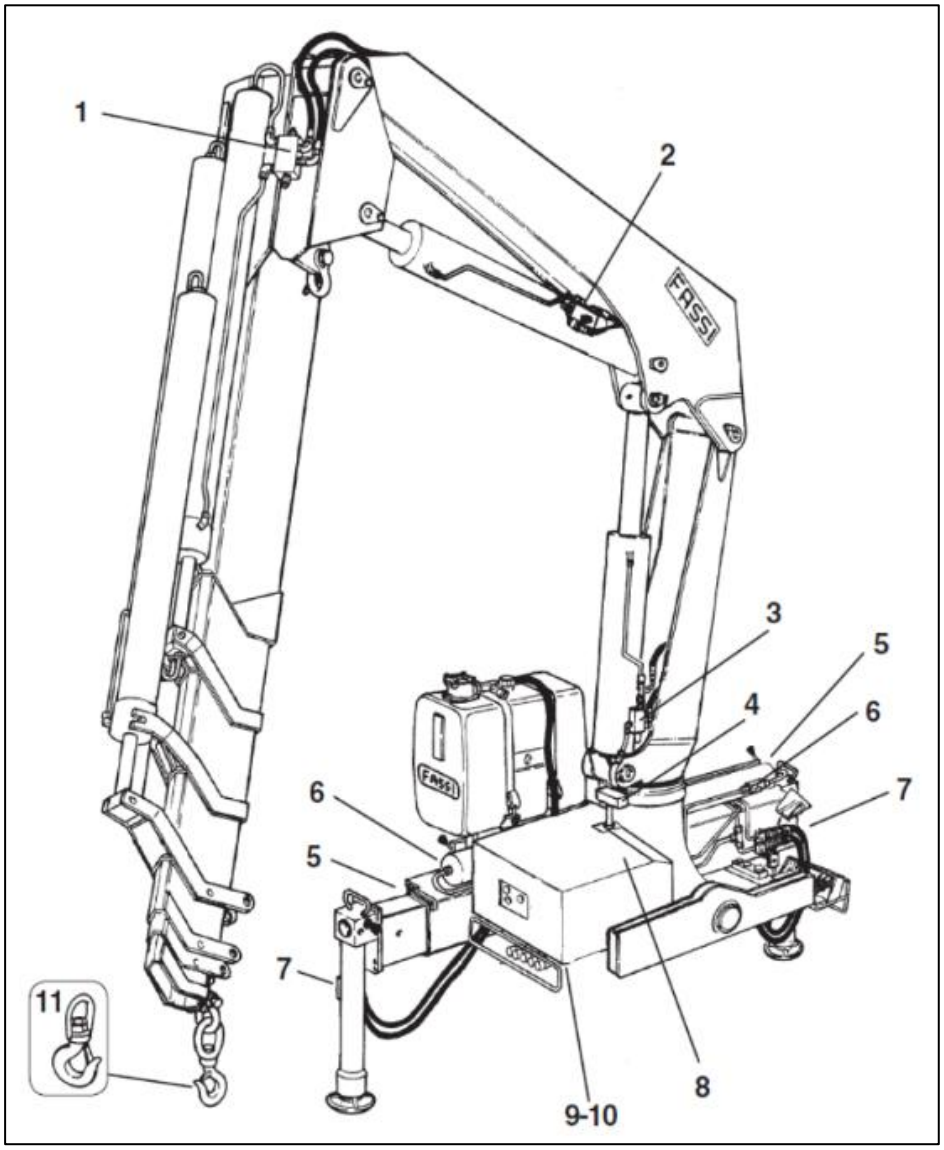
- **Manual extension overload**: manual extensions are controlled by the moment limiting device only under the conditions described in this manual.

- **Accessories**: be careful when assembling and disassembling any accessories (extensions, buckets, baskets, etc). First verify the weight, the securing systems and the instructions for assembly and dismantlement. Then appraise their centres of gravity and provide for adequate provisional blocking systems in order to avoid sudden movements.

- **Breakdown of some sensors**: the moment limiting device is always monitored during operation (the system, after having activated the various circuits, checks the presence of all the inputs for around 4 seconds) and then continuously monitors the operation and the efficiency of

the limiting device (approx. every 25 milliseconds). For most of the components the system checks also the congruence of the incoming signal with the one the system expects.

8.4 Before Operating

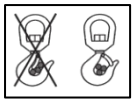


- **WARNING: Before crane use check that safety and protection devices shown above and detailed below are fitted and active:**
  - Check valve for booms extension rams (1)
  - Check valve for outer ram (2)
  - Check valve for inner ram (3)
  - Rotation limiting device (4)
  - Safety devices for outriggers supports (5)
  - Check valves for rotation control (flow regulators) (6)
  - Check valves for outrigger rams (7)
  - Lifting moment limiting device assembly (8)
  - Main pressure valve (crane-outriggers) (9)
  - Auxiliary valves (crane-outriggers) (10)
  - Hook safety device (11).

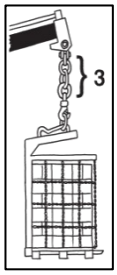
- Keep the ladder and the recovery control station clean.

- Make sure that control stations are properly illuminated to ensure safety while operating and instruction plates to be visible.

- Check that the working area is adequate and properly illuminated.
- Make sure that the hook is always free to rotate on its pin and that nothing obstructs its vertical positioning.
- Check the efficiency of the hook safety catch.



- Carefully inspect the condition of ropes or chains if present.
- Make sure that the pallet fork (if present) is connected to the crane hook by means of a chain having at least three (3) rings.



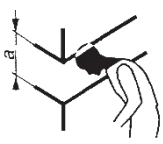
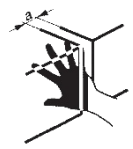
8.5 During Operation

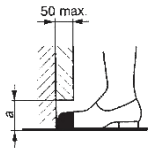
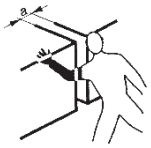
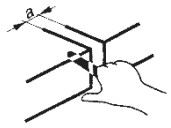
- Do not run the engine in an indoor area without first making sure there is adequate ventilation.
- If there is inadequate ventilation, take the vehicle fumes away from the working area by fitting an extension tube of a suitable diameter and of sufficient length to the exhaust system.
- When using the ladder to reach the recovery control station, avoid knocking into the controls while going up or down the ladder.
- Stay within the recovery control station side safety guards at all times.
- Make sure that no one is within the working area of the crane.

8.5.1 Safe Working Distances

- Avoid swinging the load above working and transit areas, any hidden danger situation must be audibly alarmed.
- Avoid all those situations which may result in crushing during vehicle stabilization, crane movement and load handling.

Avoid crushing parts of the body by following the minimum safe working distances below (see EN 349 standard for further guidance). The table below indicates the minimum safety working distances concerning the various parts of the body and each figure illustrate circumstances which may turn out to be dangerous if you fail to respect the minimum safe distances.

Part of body	Minimum safe working distance (mm)	Figure		Part of body	Minimum safe working distance (mm)	Figure
Whole body	500			Foot	120	
Head	300			Hand/wrist/fist	100	

Part of body	Minimum safe working distance (mm)	Figure		Part of body	Minimum safe working distance (mm)	Figure
Leg	180			Toe	50	
Arm	120			Finger	25	

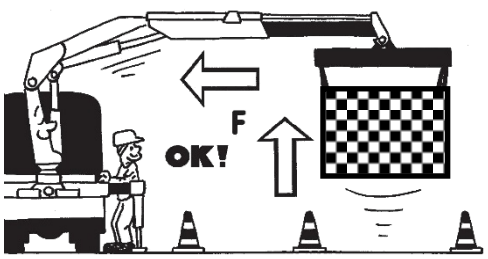
8.5.2 Weather Extremes

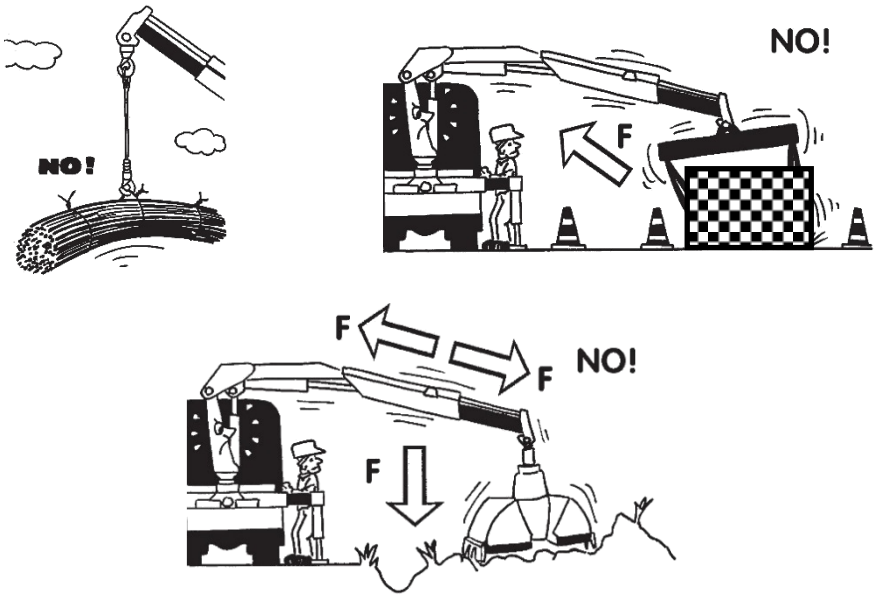
Do not utilize the crane during thunderstorms and with wind speed exceeding 20.7 m/s (74 km/h / 46 mph), maximum value of the Beaufort scale degree 8. An indication of these classifications and their characteristics is given below.

Force of the wind Beaufort scale	Wind speed m/s	Classification	Characteristics
0	0.0 → 0.2	Calm	Calm wind, smoke goes up quite vertically
1	0.3 → 1.5	Light breeze	Smoke reveals the direction of the wind, one can feel the wind blowing, leaves start fluttering.
2	1.6 → 3.3		
3	3.4 → 5.4	Moderate breeze	Leaves and branches are in constant motion, small branches start fluttering. Dust and papers dance on the ground.
4	5.5 → 7.9		
5	8.0 → 10.7	Fresh breeze	Small green branches bend, the surface of waterways and lakes are wavy.
6	10.8 → 13.8	Strong breeze	Big branches bend, wind whistles through high-tension cables, it's difficult to walk keeping the umbrella open.
7	13.9 → 17.1	Near gale	Trees sway, it's hard to walk
8	**17.2 → 20.7**	**Gale**	**Branches get broken, it's hard to walk.**
9	20.8 → 24.4	Severe gale	It damages houses (antennas and roof tiles fall down)

8.5.3 Load Handling

- Examples of good and poor practices:

Carefully inspect the load rigging. Ensure you follow good practice, such as that shown on the right.	 

These items on the right show poor practice and must not be used. **Do not utilize the crane for push/pull (F), lateral (F) or sideways (F) operations.** **Crushing (F) or push (F) manoeuvres are not permitted.**	

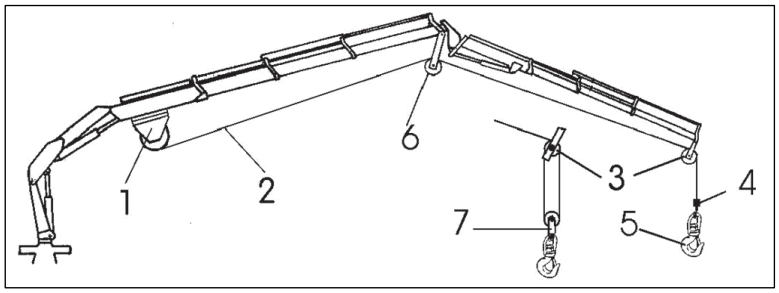
- Hook up the load, checking that it does not exceed the capacity indicated on the lifting diagram specific to each load configuration.
- Make sure that the lifted load is balanced.
- Avoid swinging the load above the control station. In cases where the load is too close, the crane must be operated from the opposite side or with the radio-remote control. When operating through a winch, lift the load vertically using the cable and not the booms in order to avoid swinging the load.
- Do not rotate the crane before the load is lifted.
- Do not operate with sudden movements. Activate the controls with slow and progressive movements and rotate slowly and with care paying attention to the stability of the vehicle.
- With vertical lift, on hydraulic and mechanical extension, rotate slowly in order to avoid side-skidding.
- Only move the vehicle when the crane is in transport position.
- Do not move the vehicle with a load suspended on the crane.
- **Never operate the outriggers when the crane is loaded.**
- **The vehicle/crane must not be left unless the load is on the ground, the booms of the crane (and of the hydraulic jib) are folded and laid on a solid base, and the power take-off is disengaged.**

8.5.4 Winch

8.5.4.1 General

- As well as these instructions, see the operator winch manual as detailed in section 4 of this manual.
- Check the condition of wire rope with reference to the items shown below.

1. Winch
2. Cable
3. Fixed pulley
4. Balance weight
5. Hook
6. Transmission pulley
7. Block (double-triple line)



- **NOTE: On winches not equipped with cable layer, check the rewinding of the cable on winch drum proceeds regularly and without overlapping. Rewind the cable only if it is sufficiently taut.**

- Do not rotate the crane before the load is lifted. Lift the load vertically using the cable and not the boom in order to avoid swinging the load. With the suspended load, rotate slowly and with care while checking the stability of the vehicle.

- The winch has a maximum capacity indicated by a fixed plate which cannot be exceeded. This capacity is not related to the crane's capacity, which may be lower. Do not lift heavier loads that those allowed by either the crane or the winch. The identification data and the essential characteristics are:
  - Manufacturer mark
  - Winch type
  - Serial number
  - Maximum line in N at the 4th layer
  - Maximum speed in m/min or Maximum capacity pump l/min.

- The crane features a sensor that deactivates the exit of the extension boom sections when the load on the winch exceeds the nominal load by 20%. There is no other control on the maximum load lifting which is therefore limited only by the lifting limit of the winch itself. In order not to overload the winch, do not lift a load attached to the winch cable using the crane rams when the load exceeds the values indicated on the capacity plate of the crane.

- Note: It is not recommended to use the winch with load moving (winch in or out) at the same time as the extension booms or the crane and hydraulic jib (if fitted), since it accelerates the wear of the extension guide pads reducing their life to one third compared to a standard application.

8.5.4.2 Mechanical Stroke End Device

- **The end stroke condition takes place when the block makes contact with the pulley structure. The operator must stop the manoeuvre before the block rotates the pulley completely. Such end stroke device shall be used only under emergency conditions and not as a simple end stroke interrupter.**

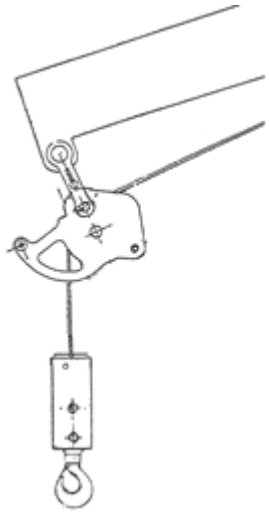
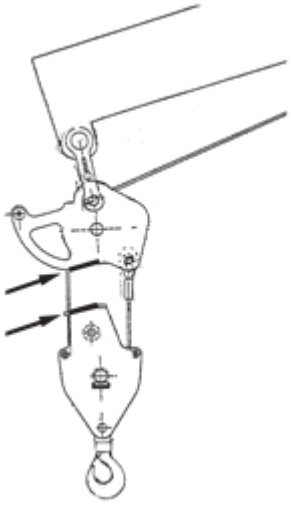
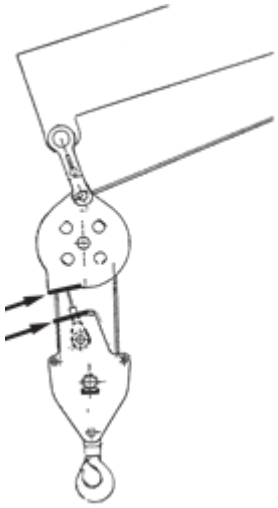
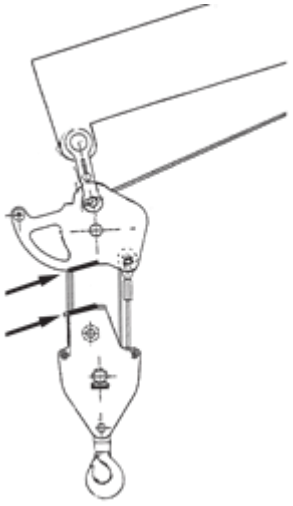
- When the load exceeds the winch nominal load by 20%, the exit of the extension boom sections is deactivated.

- When unwinding, an electric device maintains at least three (3) turns of the lifting cable wound around the winch drum. At this point, the following controls are implemented:
- Manoeuvres not allowed: winch rope descent
- Manoeuvres allowed: all other movements.

- **Limit the exit speed of the extension rams when, during the lifting, the hook bracket (or pulley/snatch block) is next to the fixed pulley, in order to avoid unnecessary stress to the cable.**

- **When the hook bracket (or pulley/snatch block, in case of double or triple line) and the fixed pulley are very close, and the operator needs to manoeuvre in their proximity (i.e. operations like load hook-up, arms folding, etc), always stand side on with respect to the pulley plan (never in front or at the back) and operate the crane at a low speed, since the contact (especially without load) can result in rapid and violent rotations of the hook group (from the fig. near right to the fig. on the far right).**

- Ensure that the pulley and block are in the correct position depending upon single, double, triple or quadruple line use as shown below.

			
Single line	Double line	Triple line	Quadruple line

8.6 Completion

- Fold the crane.
- If the booms of the crane (or of the hydraulic jib) are to be laid on the body or on the load, they must be suitably blocked to prevent possible sideways movements.
- Make sure that the indications about the overall dimensions are respected.
- NOTE: Implements can be left mounted on the booms of the crane (or of the hydraulic jib) only if the overall dimensions are respected, they must be suitably blocked to prevent possible sideways movements.
- If an accessory (fork, hook etc) is mounted, it must be tied down at all times during transport.
- Make sure that the outrigger supports and rams are re-entered within the overall width of the truck and locked by the safety devices.

- Disengage the power take off.

9 On/Off-Tracking the Machine

9.1 General

- Refer to the MAN manuals detailed in section 4 and adhere to all instructions before commencing on/off tracking.
- Cant – not to exceed 150 mm.
- Adequately prepared Access Point installed.
- Ballast shoulder – high/low identified.
- Deep cess/soft cess identified and avoided
- Drainage routes, troughing routes and other services/cables identified and avoided.
- OHLE power cables acknowledged.
- Switches and Crossings avoided.
- Overhead and close proximity structures and infrastructure observed.
- All work on or near the railway infrastructure must be carried out in accordance with railway regulations.
- Work must be carried out in accordance to rulebook GE/RT 8000 and all safety precautions must be followed at all times.
- When working on electrically operated routes, be sure to observe official regulations. Always observe minimum clearance from overhead wires.
- Never install TAS or on track the machine without a possession.
- All staff must be fully trained and certified as competent to use this piece of equipment on railway infrastructure by the owner/operator.

9.2 Access Points

- On/Off-Track the vehicle only at an approved access point.
- An approved access point is one of the following:
  - Level crossing
  - Yard where surface is level with the top of the rail
  - Proprietary approved track access system with bolted down timbers
  - Consolidated ballast to at least the underside of the railhead with bolted down timbers.

10 Emergency Operations

10.1 Recovery Options

The normal method of recovery is available when the vehicle engine is driving the hydraulic pump and the remote control unit is available, either in cab, stand alone or placed in the work platform unit. Follow the instructions in this manual for normal operations, detailed depending upon which mode of operation is being used and which control mechanism.

If the electrical and hydraulic control systems have failed, or the engine has failed (e.g. run out of fuel) then the boom may only be returned to its stowed position using the Battery Driven Pump or the Hand pump.

There are 4 methods of emergency recovery of the vehicle, in order of preference these are:
- Vehicle Engine with Manual Control Levers
- Battery Driven Pump with Remote Control Unit
- Battery Driven Pump with Manual Control Levers
- Hand Pump with Manual Levers.

To use these systems, the safety systems must be overridden. This is done using one of the Over-rides:
- Button on Work Platform
- Key Switch in Engine Bay.

Each of the 4 methods above is expanded upon below, with specific instruction as to the use of:
- over-ride
- power source
- control mechanism.

10.1.1 Vehicle Engine with Manual Control Levers

Where the remote control unit is not available:
- Operate the Engine Bay Over-ride Key Switch
- Utilise the Vehicle Engine
- Use the Manual Levers.

10.1.2 Battery Driven Pump with Remote Control Unit

Where the vehicle engine has failed:
- Do not use either of the over-ride buttons.
- Use the Battery Driven Pump
- Use the remote control unit.

10.1.3 Battery Driven Pump with Manual Control Levers

Where the vehicle engine has failed and the remote control unit is not available:
- Operate the Work Platform Over-ride Button
- Utilise the Battery Powered Pump
- Use the Manual Levers.

10.1.4 Hand Pump with Manual Control Levers

Where the vehicle engine and Battery Driven Pump have both failed:
- Operate the Engine Bay Over-ride Key Switch
- Utilise the Hydraulic Hand Pump
- Use the Manual Levers.

10.1.5 Manual Over-ride Buttons

In the event of an emergency, loss of power or control system failure an over-ride is fitted to this machine to enable the booms to be slewed, retracted and lowered to their stowed positions. This is used in conjunction with various power sources and control mechanisms as detailed above.

The two over-rides are located at:

- Work Platform
- Engine Bay.

Ensure that all personnel, either operating or working alongside this machine, are aware of the location and operation of each of these systems.

NOTICE

THESE OVER-RIDE FEATURES MUST ONLY BE EMPLOYED IN THE EVENT OF AN EMERGENCY, LOSS OF POWER OR CONTROL SYSTEM FAILURE. THEY ARE NOT CONSIDERED SUITABLE FOR NORMAL USE.

The over-rides, when activated, allow the operator to bypass the following safety interlock systems on both the crane and MEWP:

- Over-tilt (cant) in both directions
- Chassis body-lock status
- MEWP 'on' key-switch
- Load sensing system
- Moment sensing system
- Slew restriction.

During an over-ride situation all audible or visual warnings associated with any of the above interlocks will continue to actuate. An additional buzzer will sound whenever an over-ride button is pressed to indicate that the over-ride feature is being activated. Once the over-ride system is activated the blue LED strip round the platform will turn strobe.

Note that it is possible to overstress and overturn the machine while the safety systems are overridden. The operator should prioritise the use of the Tele in function wherever possible to assist in correcting the situation.

Once the booms have been lowered to a stowed position, after the over-ride been activated, the blue LED strip warning will strobe indicating that the machine must be inspected. The system and machine must be inspected and reset by Rail-Ability Ltd prior to being put back into service.

10.1.5.1 Work Platform Over-ride Button

To slew/lower the boom in the event of an emergency or control system failure:

- Break the seal on the work platform over-ride button (see Figure 3), then rotate the cover
- Press and hold the over-ride button and simultaneously press and hold the enable button and actuate the required boom control joystick.

Note that while depressing the over-ride button, power is only available for a maximum of 5 seconds in a 30 second period. During the 30 second deactivated period, the operator must have released the enable button on the joysticks. The enable button and joystick must again be actuated during the 5 second period.

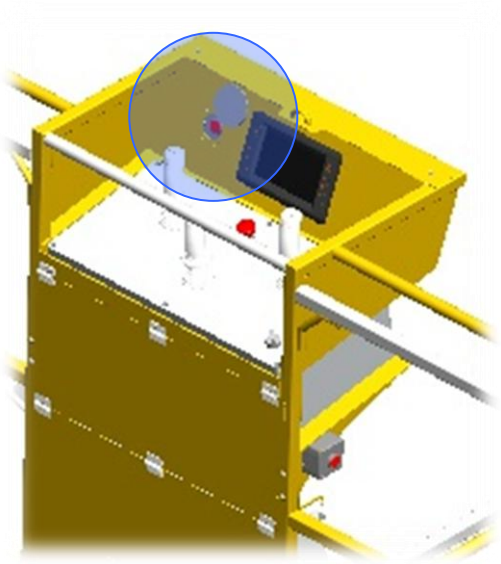


Figure 3 - Work Platform Over-ride Button Location

10.1.5.2 Engine Bay Over-ride Key Switch

If the electrical control system has failed then it may be necessary to actuate the hydraulic valves directly with the Manual Levers at the valve block, located on the chassis. An over-ride is provided for this event and is located in a box under the vehicle bonnet in the engine bay (see Figure 4). A screwdriver will be required to access this box.

To slew/lower the boom in the event of an emergency or control system failure:

- Open the vehicle bonnet hatch cover on the cab
- Break the seal on the box containing the over-ride key switch
- Pull and hold the manual control Valve segment and simultaneously actuate the required control lever on the boom and auxiliary valve blocks
- Switch the over-ride and simultaneously actuate the required control lever on the stabiliser valve blocks.

While this over-ride system has been activated the other control stations (Cab work platform, etc.) will be isolated and will indicate an error state.

This function is data logged and is only available for five seconds in a 30 second period. This 5 second period is identified by 5 short tones from the vehicle horn. After 30 seconds a long tone sounds from the vehicle horn to identify that the switch can be turned again. The key switch can be turned to reactivate the controls an unlimited number of times in order to recover the machine.

Figure 4 - Engine Bay Over-ride Button Location

10.1.6 Manual Levers

The levers are arranged so that each bank requires a Recovery Enable Lever to be inserted at one end and held in the sprung position before any of the other levers can be utilised. The required position of this additional lever is given in each of the following areas.

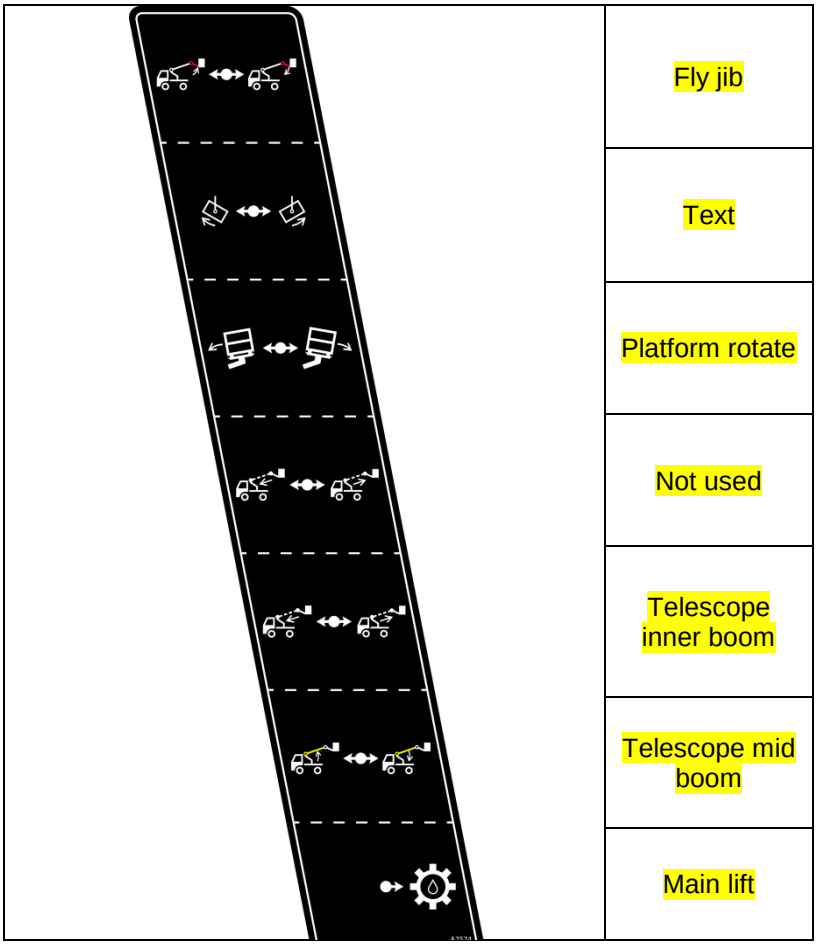
10.1.6.1 Work Platform

There are two sets of levers for the work platform. The main set is held within the left hand cover at the base of the kingpin, and the other set - which only carries out slew and table tilt activities - is held at the base of the slew ring just beneath the platform level.

The main set of levers are detailed to the right and are shown in the order that they are on the control bank. This bank of levers requires a small lever to facilitate operation of all the other levers. This small additional lever is not shown but is at the bottom of the other levers. It is not kept with the bank of levers but stored in the truck side boxes.

Make sure that the lever selected corresponds to the required component.

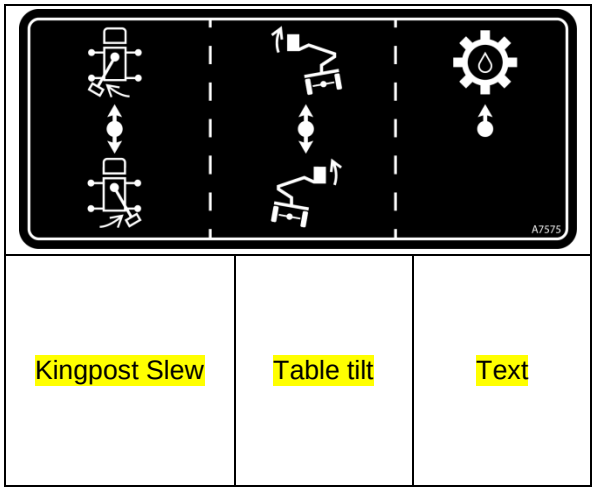
NOTE: Operate the levers smoothly and gradually.



The smaller bank of levers are detailed to the right and are shown in the order that they are on the control bank when viewed from above. This bank of levers requires a small lever to facilitate operation of all the other levers. This small additional lever is not shown but is to the right of the other levers. It is not kept with the bank of levers but stored in the truck side boxes.

Make sure that the lever selected corresponds to the required component.

NOTE: Operate the levers smoothly and gradually.



NOTE: Be aware that when carrying out simultaneous movements of two or more functions, it is possible that on reaching the stroke end of a particular function, an increase in speed of the other function will occur.

WHILE SLEWING THE PLATFORM, OPERATE USING THE LOWER LEVERS AND FROM THE OPPOSITE SIDE TO THE DIRECTION REQUIRED. DO NOT OPERATE FROM THE SIDE TO BE SLEWED TOWARDS BECAUSE OF THE DANGER OF DEATH OR INJURY.

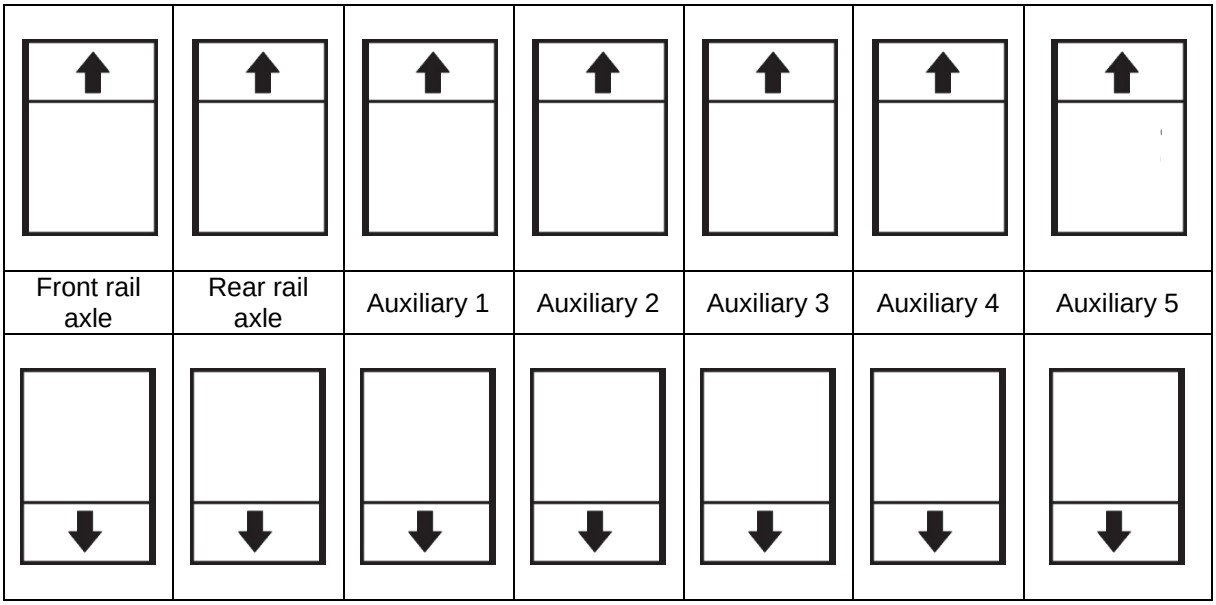
10.1.6.2 Stabilisers

The levers for the stabilisers are covered in the stabiliser section of this manual, the only difference in operation is that of using the small lever in addition to the other levers. This small lever is not kept with the bank of levers but stored in the truck side boxes.

10.1.6.3 Rail Axles

These levers are detailed below and are shown in the order that they are on the control bank when in the cab and facing the rear of the vehicle. This bank of levers requires a small lever to facilitate operation of all the other levers. This small additional lever is not shown below but is to the right of the other levers. It is not kept with the bank of levers but stored in the truck side boxes.

Make sure that the lever selected corresponds to the required component.



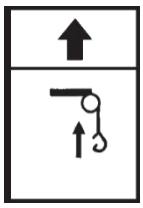
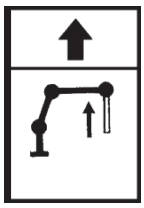
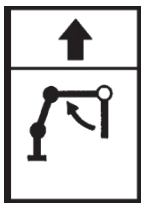
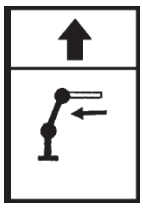
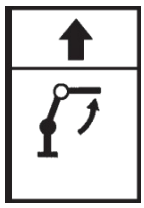
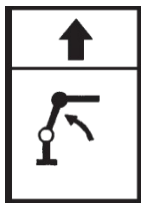
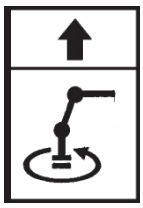
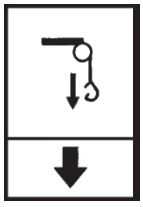
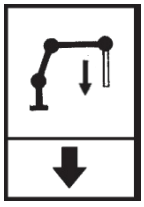
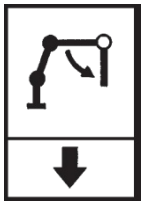
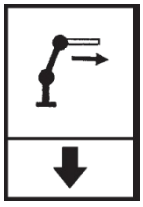
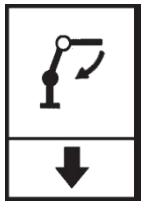
NOTE: Operate the levers smoothly and gradually.

10.1.6.4 Crane

The levers for the crane are only used during recovery operations.

These levers are detailed below and are shown in the order that they are on the control bank. This bank of levers requires a small lever to facilitate operation of all the other levers. This small additional lever is not shown below but is to the right of the other levers. It is not kept with the bank of levers but stored in the truck side boxes.

Make sure that the lever selected corresponds to the required component.

						
Winch	Jib extension booms	Jib outer boom	Extension booms	Outer boom	Inner boom	Rotation/slew
						

NOTE: Operate the levers smoothly and gradually.

NOTE: Be aware that when carrying out simultaneous movements of two or more functions, it is possible that on reaching the stroke end of a particular function, an increase in speed of the other function will occur.

While exiting and folding the crane, operate from the distributor side. Do not operate from the double control side because of the overall dimensions of the booms.

10.2 Battery Driven Pump

The battery driven hydraulic pump is activated via the in cab onscreen display auxiliary hydraulics function menu or the platform onscreen display.

The electric pump will not run if the main pumps are operating or if the batteries are discharged below 11 volts.

10.3 Hand Pump

The hand pump is located to the right of the rear tow coupling on the chassis (see Figure 5). During normal use, the handle is stored in the chassis compartment of the vehicle (opposite to the remote controls storage compartment).

Note that this hand pump is only required if the electrical systems have failed.

NOTICE **THIS PROCEDURE MAY REQUIRE MORE THAN ONE PERSON**.

To lower the boom in the event of an emergency, control system failure or loss of power:

- Retrieve the hand pump handle from the chassis compartment and insert it into the hand pump
- Operate the hand-pump by moving the handle back and forth.
- Operate the required Manual Levers.

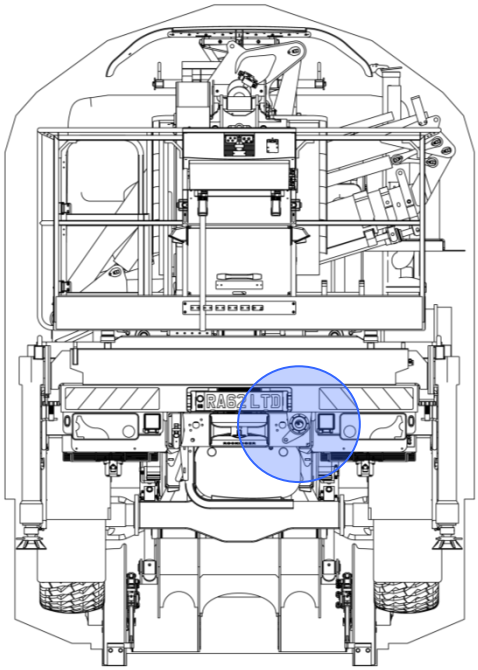


Figure 5 - Auxiliary Hand Pump Location

10.4 On Rail Recovery

10.4.1 Towing

- Refer to the MAN manuals detailed in section 4 and adhere to all instructions before commencing towing.

- Ensure that the towing vehicle is connected with the tow bar before the rail brakes are released via hub disengagement, to enable towing to commence:
  - A Network Rail pattern tow bar is located at the rear of the vehicle
  - Only use the rigid tow bar provided
  - Tow eyes and pins are fitted to the front and rear of the machine.

- Do not exceed 10 km/h (6 mph)

- Use the appropriate number of people and proper lifting techniques when lifting the tow bar.

- The tow bar must remain with the vehicle at all times and must never be removed unless when actually towing.

If the main hydraulic pump is not functioning, use the Electric Power option as detailed below.

10.4.2 Electrical Power

In case of failure of the main hydraulic pump or engine failure:
- Raise the rail gear using the Battery Driven Pump with Remote Control Levers Recovery Option detailed previously.
- If the Remote Control Unit is unavailable, raise the rail gear using the Battery Driven Pump with Manual Control Levers Recovery Option for the Rail Axles detailed previously.
- Use the Rail Gear Recovery Controls in order to Off-Track the vehicle.

If the Electrical option is not functional, use Manual Power option detailed below.

10.4.3 Manual Power

In case of failure of the main hydraulic pump, engine failure or optional electric hydraulic pump:

- Raise the rail gear using the Hand Pump with Manual Control Levers Recovery Option for the Rail Axles detailed previously.
- Use the Rail Gear Recovery Controls in order to Off-Track the vehicle.

10.5 Emergency Off Tracking

EMERGENCY ON-TRACKING IS NOT COVERED IN THIS MANUAL AS THERE IS NO OCCASION WHEN THIS PROCEDURE WOULD BE CONDONED.

Emergency Off-Tracking however may be necessary at some point. It must be stressed that this is an **Emergency Procedure Only** and should **NOT** be used for normal operation. If you are asked to Off-Track using this method (at an unprepared location) without suitable justification you should report to your On-call Manager and ask their advice before attempting this manoeuvre.

Carry out the preparation below, then the procedure.

10.5.1 Preparation

If there is real cause to use this method there are still certain procedures that must be followed:

- The Off-Tracking area must be inspected for its suitability as normal
- An area where there are no obstructions should be selected. For example, there should be no conductor rail present, no high ballast shoulders and no obvious hazards
- Emergency Off-Tracking must not be carried out on a cant that exceeds 5.6º.

10.5.2 Procedure

In the event of a real emergency the procedure for Emergency Off-Tracking is as follows:

- Ensure the machine is configured for travel (boom fully stowed)
- Approach the Off-Tracking area at a safe speed
- Sound the horn to alert personnel at the Off-Tracking area as you approach
- Raise the front and rear rail gear fully
- Deselect rail mode and steering lock
- Slowly drive clear of the rail
- Move the machine at least 3 metres from the closest rail.

When carrying out this operation always follow any hand signals given by a 'banksman' or machine controller and carry out all movements smoothly and at a safe speed.

Ensure you are clear of all obstructions.

Ensure the machine is configured to travel to avoid causing instability or a possible tip over situation occurring.

THIS MANOEUVRE INCREASES RISK AND MUST ONLY BE CARRIED OUT IN AN EMERGENCY.

When Off-Tracking, care must be taken when the machine manoeuvres off the railhead. Make certain that the rail bogies are raised up to the maximum height for travel.

'Grounding out' the machine, while the machine is travelling off rail may result in severe damage to the machine and/or infrastructure.

11 Machine Overview

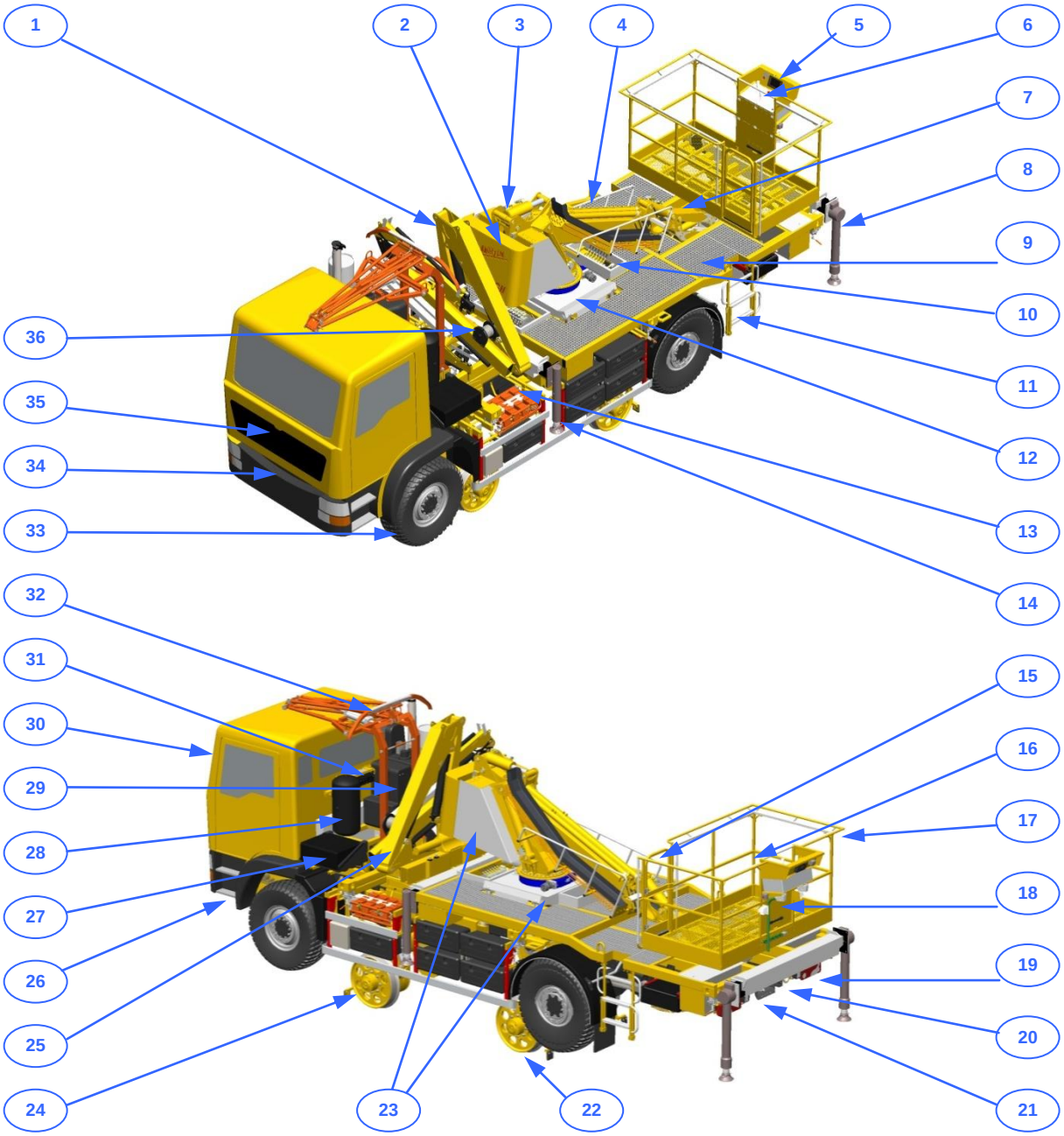


Figure 6 - Location of Machine Components

1. Crane Recovery Controls
2. Counter Weight
3. King-Post
4. MEWP Boom
5. Work Platform Controls
6. Connection for Remote Controls (optional)
7. MEWP Fly Jib
8. Rear Stabilisers
9. Chassis Deck
10. Chassis Access Hatch
11. Access Ladder
12. Slew Unit and Tilt Table
13. Stabiliser Ground Controls
14. Front Stabilisers
15. Work Platform Access Gate
16. Work Platform
17. Platform Guard Rails
18. Auxiliary Outlets at Work Platform
19. Tow Bar
20. Fuel Filler
21. Rear Tow Coupling
22. Rear Rail Gear
23. MEWP Recovery Controls
24. Front Rail Gear
25. Manipulator Crane
26. Access Steps to Vehicle Cab
27. Vehicle Batteries
28. Aux Air Tank
29. Hydraulic Tank
30. Vehicle Cab
31. Rail Gear Recovery Controls
32. Pantograph
33. Front Steering wheels
34. Front Tow Coupling
35. Vehicle Engine
36. Crane Winch

There are four sets of normal (non-emergency) controls on this machine:

- In-Cab Controls
- Stabiliser Ground Controls
- Remote Control Unit - Stand Alone
- Remote Control Unit - Docked in MEWP.

These controls are located on the machine as shown in Figure 7.

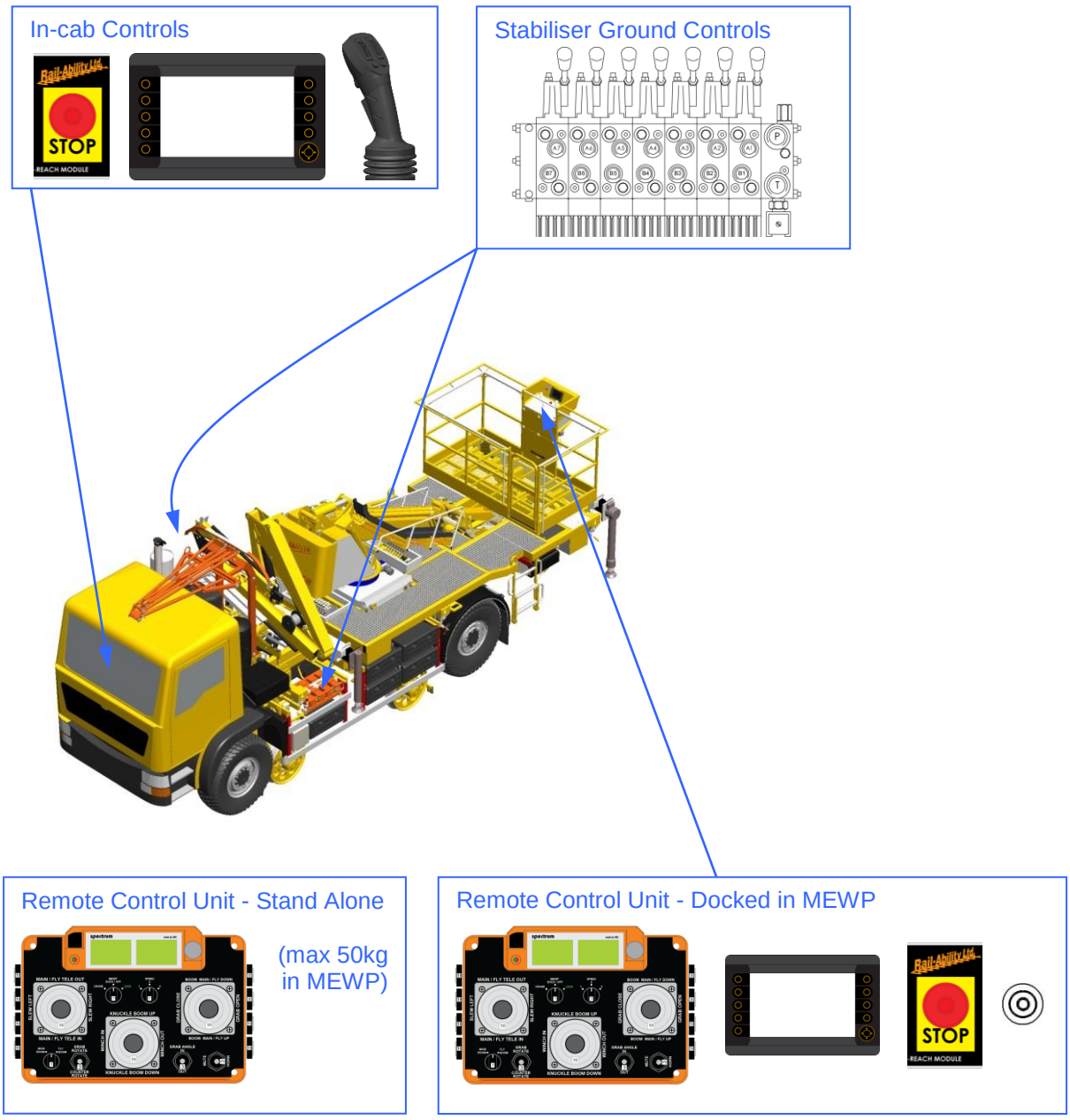


Figure 7 - Location of Machine Controls

The controls on each panel are identified on the following pages along with a description of their function.

The remote control unit used can be used as either standalone (fitted with a carrying frame and neck-strap for ease of use), or docked within the MEPW platform. It can be used to control movements of the Crane boom and Stabilisers from ground level if the weight in the MEWP is less than 50kg. No drive function is available from the remote control unit.

12 In-Cab Controls

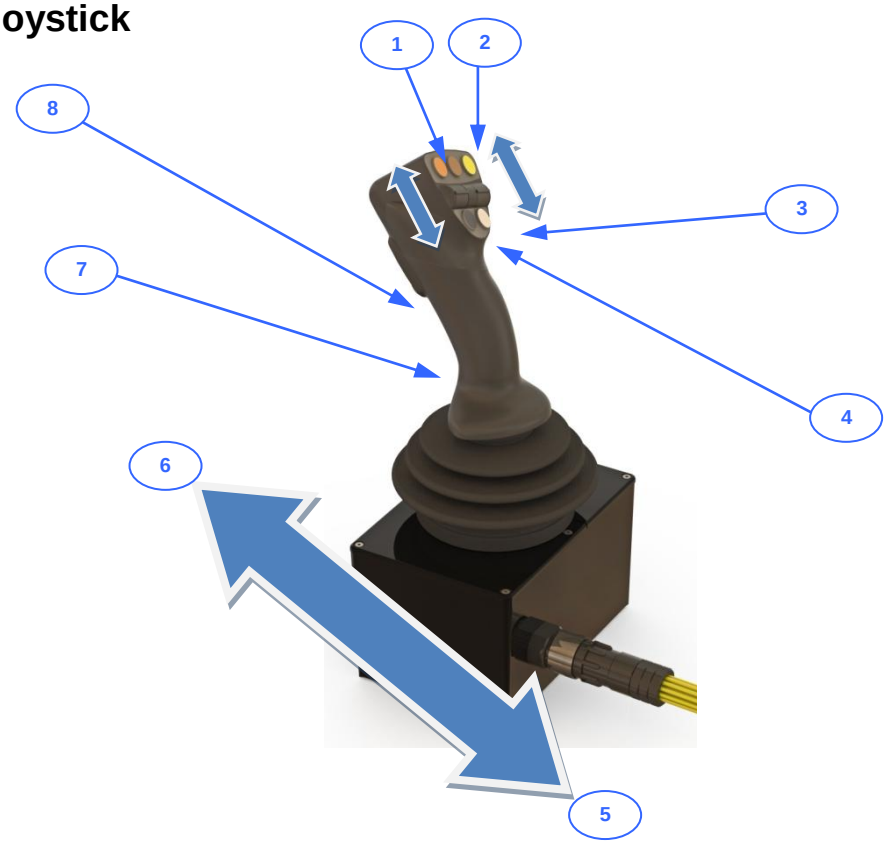
Within the cab there are controls and displays which are detailed in the following paragraphs.

12.1 Emergency Stop

Disables all rail control functions and stops machine movements when not on the Highway, see Fig 8.

Figure 8 - In-Cab Dashboard Emergency Stop Button

12.2 Joystick



1. Front Rail Axle Deploy Roller switch
2. Rear Rail Axle Deploy Roller switch
3. Horn Mute Button
4. Horn Button
5. Joystick Reverse Travel Direction
6. Joystick Forward Travel Direction
7. Travel direction acknowledge trigger switch
8. Rail axle acknowledge trigger button

Figure 9 - In-Cab Joystick Control

1 Front Rail Axle Deploy Roller switch

Moving the thumb roller up/away raises the front rail gear. Moving the thumb roller down/towards you lowers the front rail gear (button 8 must first be pressed and held to enable this function).

2 **Rear Rail Axle Deploy Roller switch**

Moving the thumb roller up/away raises the rear rail gear. Moving the thumb roller down/towards you lowers the rear rail gear (button 8 must first be pressed and held to enable this function).

3 **Horn Mute Button**

Pressing and holding this button prevents the machine from automatically sounding the horn prior to rail travel commencing.

4 **Horn Button**

Pressing this button sounds the rail horn.

5 **Joystick Reverse Travel Direction**

Moving the Joystick backwards travels the machine in the reverse direction on rail (button 7 must first be pressed and held to enable this function).

6 **Joystick Forward Travel Direction**

Moving the Joystick forward travels the machine in the forward direction on rail (button 7 must first be pressed and held to enable this function).

7 **Travel direction acknowledge trigger switch**

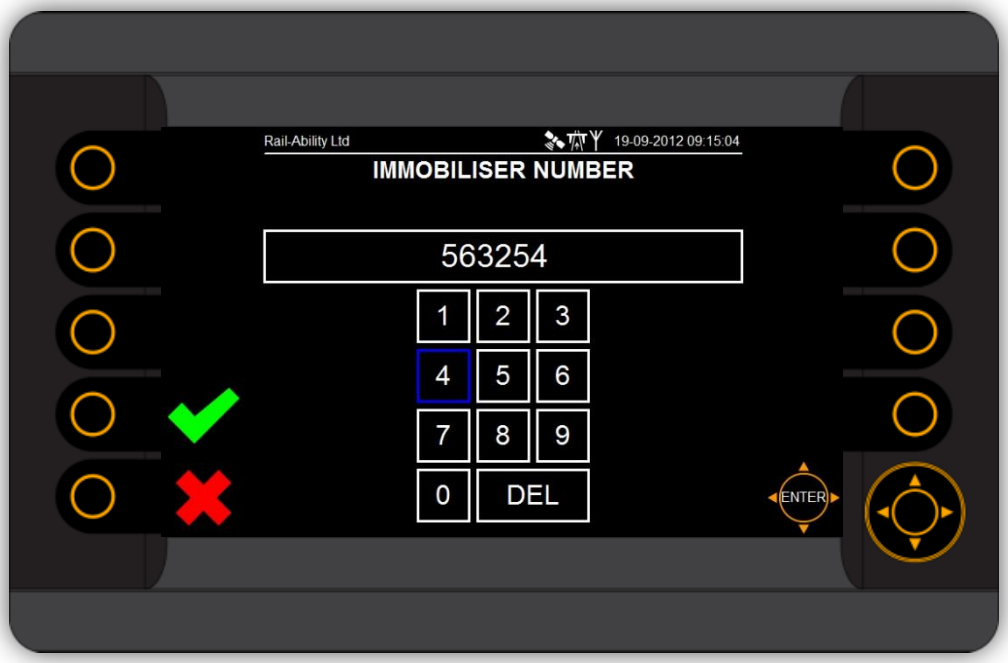
Pressing this switch activates the Rail Travel Functions.

8 **Rail axle acknowledge trigger button**

Pressing this switch activates the Rail Gear or low flow auxiliary hydraulic systems (used in conjunction with Thumb Rollers 1 and 2).

12.3 Display

The On screen operator input and status for the engine start immobiliser system (as shown on Figure 10) required the operator to input the correct code. The PIN code is owner specified who will provide the relevant details. As a number is pressed, its border changes colour (as per the number 4 below) until the next number is pressed, and the figures entered will show on the display as the digits are keyed in.

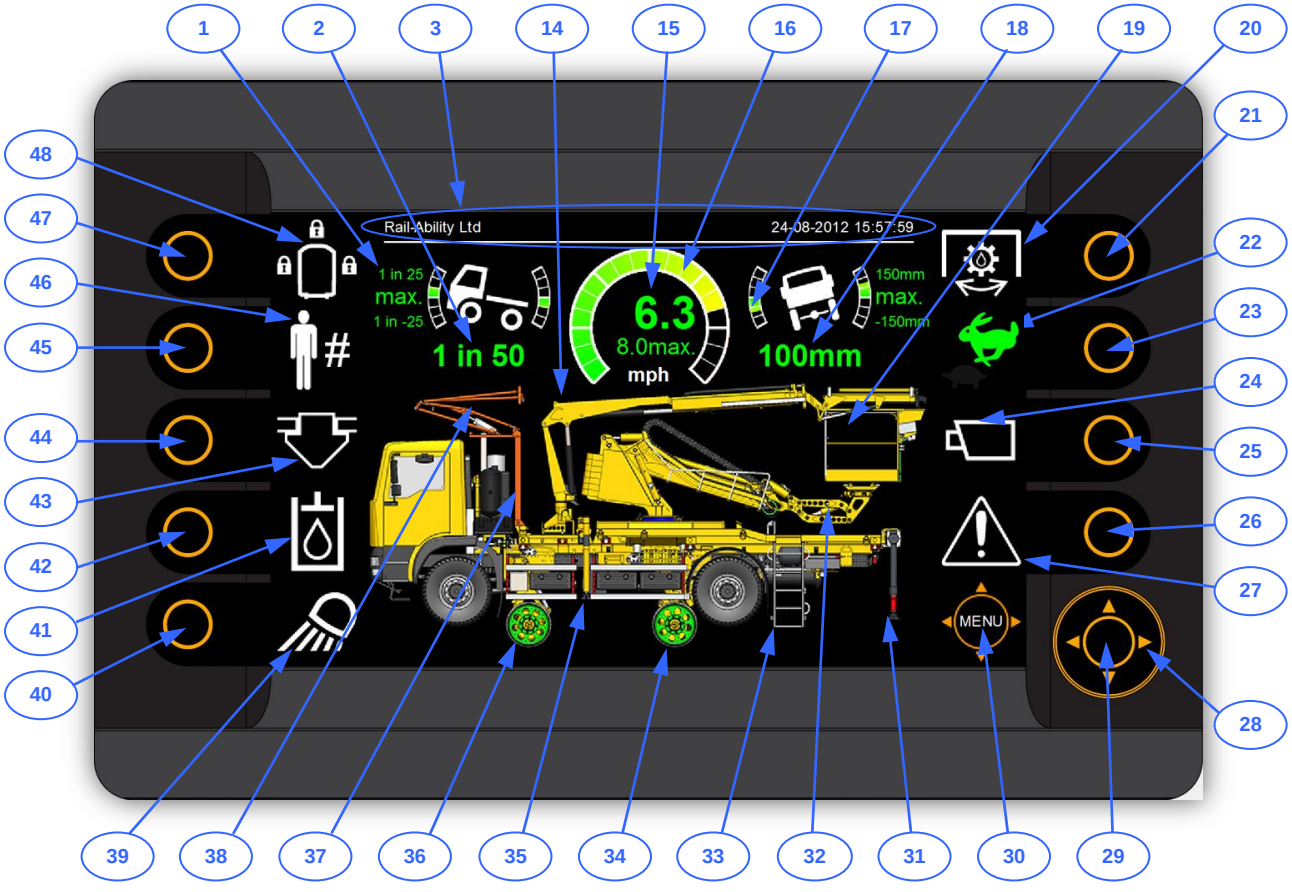


Press = OK

Press = CANCEL

Figure 10 - In-Cab Access Display Panel

Following the correct PIN code, the display changes to the standard mode shown in Figure 11 below.



1. Max Gradient Range Indicator
2. Current Gradient Indicator
3. Top Bar (items 4 to 13)
14. Crane Boom Not Stowed Indicator
15. Current Speed Indicator
16. Max Speed Range Indicator
17. Max Cant/Cross Elevation Range Indicator
18. Current Cant/Cross Elevation Indicator
19. MEWP Boom Not Stowed Indicator
20. Auxiliary Hydraulics Active Icon
21. Auxiliary Hydraulic Port Selector Menu Button
22. Rail Travel Speed Indicator Icon
23. Rail Travel Speed Select Button
24. Blind Spot Viewing Camera Icon
25. Blind Spot Viewing Camera Display Screen Button
26. Machine Error Status Details Menu Button
27. Machine Error Status Icon
28. Electronics System Functions Arrow Key Buttons
29. Electronics System Functions Menu Button
30. Electronics System Functions Menu Icon
31. Rear Stabiliser Leg Status Indicator
32. MEWP Module Fitted Indicator
33. Rear Access Ladder Status Indicator
34. Rear Rail Axle Status Indicator
35. Front Stabiliser Leg Status Indicator
36. Front Rail Axle Status Indicator
37. Crane Module Fitted Indicator
38. Pantograph Status Indicator
39. Work Lights Status Icon
40. Work Lights On/Off Button
41. Hydraulics Status Icon
42. Hydraulics System Health Menu Button
43. Twist locks Status Icon
44. All Twist Locks Status Details Menu Button
45. Driver sentinel ID Number Entry Menu Button
46. Driver sentinel ID Number Icon
47. Gauge Limits Virtual Wall Settings Menu Button
48. Gauge Limits Set Icon

Figure 11 - In-Cab Control Display Panel

If at any time an emergency stop button is pressed, which activates the emergency stop switch circuit, the display changes as shown on Figure 12. Press button 26 for more information (OK/Activated/Error).

Figure 12 - Emergency Stop Status Indicator

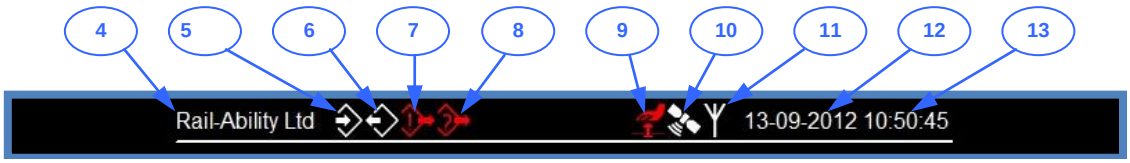
1 Max Gradient Range Indicator

Displays the maximum allowable angle (front to rear) for the machine in the current duty.

2 Current Gradient Indicator

Displays the current angle (front to rear) for the machine (figure displays in Red and interlock activates if the maximum is exceeded).

3 Top Bar



4 OEM Name
5 Data Logger Save to Memory status
6 Data Logger Download status
7 Data Logger Memory Full/Over Write
8 Data Logger Fault
9 E Stop Status Indicator
10 GPRS Signal Indicator
11 GSM Signal Indicator
12 Data Logger Current Date
13 Data Logger Current Time

14 Crane Boom Not Stowed Indicator

Shows the image of the crane with the boom in the elevated position if the crane boom is not fully stowed correctly (image alternates with correct position if interlocked).

15 Current Speed Indicator

Displays the current speed of the machine (figure displays in Red if the maximum is exceeded).

16 Max Speed Range Indicator

Displays the maximum allowable speed for the machine in the current duty.

17 Max Cant/Cross Elevation Range Indicator

Displays the maximum allowable angle (side to side) for the machine in the current duty.

18 Current Cant/Cross Elevation Indicator

Displays the current angle (side to side) for the machine (figure displays in Red and interlock activates if the maximum is exceeded).

19 MEWP Boom Not Stowed Indicator

Shows the image of the MEWP with the boom in the elevated position if the boom is not fully stowed correctly (image alternates with correct position if interlocked - press button 26 for more information).

20 Auxiliary Hydraulics Active Icon

Colour shows current status:

- White = Aux hydraulics off
- Green = Aux hydraulics active.

21 Auxiliary Hydraulic Port Selector Menu Button

This button is disabled on this machine.

22 Travel Speed Indicator Icon

Shows current status:
- Rabbit = Fast
- Tortoise = Slow

23 Travel Speed Select Button

Button illuminates when available. Press to select high and low speed travel

24 Blind Spot Viewing Camera Icon

Colour shows current status:
- White = Cameras inactive
- Green = Cameras active.

25 Blind Spot Viewing Camera Display Screen Button

Button illuminates when available. Press to view the camera displays and choose cameras to tile/select.

26 Machine Error Status Details Menu Button

Button illuminates when available. Press to see additional status information and view active interlocks and system/sensor errors. Refer to Cab and Platform Display Error Codes section.

27 Machine Error Status Icon

Colour shows current status:
- Green = Systems and sensors normal
- White = System(s)/sensor(s) interlocked
- Red = System(s) problem/sensor error(s).

28 Electronics System Functions Arrow Key Buttons

Button illuminates when available. Press to navigate around function and status menus.

29 Electronics System Functions Menu Button

Button illuminates when available. Press to set customisable features such as screen contrast and brightness.

30 Electronics System Functions Menu Icon

Displays depending upon button 29 activity, such as screen contrast and brightness.

31 Rear Stabiliser Leg Status Indicator

Shows the image of the rear stabiliser leg (if fitted) and displays the foot in the deployed position if either of the rear legs are not fully retracted, raised, rotated and stowed correctly (image alternates with correct position if interlocked - press button 26 for more information).

32 MEWP Module Fitted Indicator

Shows the image of the MEWP if the MEWP is fully fitted correctly (image flashes if interlocked due to incomplete installation/error - press button 26 for more information).

33 Rear Access Ladder Status Indicator

Shows the image of the ladder if fitted and displays the ladder in the deployed position if either of the ladders are not fully raised and stowed correctly (image alternates with correct position if interlocked - press button 26 for more information).

34 Rear Rail Axle Status Indicator

Shows the image of the rear rail axle in an up, midway or deployed state:

- Yellow wheels = Fully up in the stowed for road travel position
- Red wheels = Mid position for on and off track manoeuvring
- Green wheels = Fully deployed position in rail mode ready for rail travel
- Green turning wheels = Machine travelling on rail gear.

Press button 26 for more information - On screen notification when rear rail gear is fully lowered (Up/Not Up or Down/Down/Error/Conflict).

35 Front Stabiliser Leg Status Indicator

Shows the image of the front stabiliser leg (if fitted) and displays the foot in the deployed position if either of the front legs are not fully retracted, raised and stowed correctly (image alternates with correct position if interlocked - press button 26 for more information)

36 Front Rail Axle Status Indicator

Shows the image of the front rail axle in an up, midway or deployed state:

- Yellow wheels = Fully up in the stowed for road travel position
- Red wheels = Mid position for on and off track manoeuvring
- Green wheels = Fully deployed position on in rail mode ready for rail travel
- Green turning wheels = Machine travelling on rail gear.

Press button 26 for more information - On screen notification when front rail gear is fully lowered (Up/Not Up or Down/Down/Error/Conflict).

37 Crane Module Fitted Indicator

Shows the image of the crane if the crane is fully fitted correctly (image flashes if interlocked due to incomplete installation/error - press button 26 for more information).

38 Pantograph Status Indicator

Shows the image of the Pantograph (if fitted) and with the head in the elevated position if the arm is not fully stowed correctly (image alternates with correct position if interlocked - press button 26 for more information).

39 Work Lights Status Icon

Colour shows current status:

- White = Work lights off
- Green = Work lights on.

40 Work Lights On/Off button

Button illuminates when available. Press to see additional status information on Truck and Module work lights and select which work lighting is on/off.

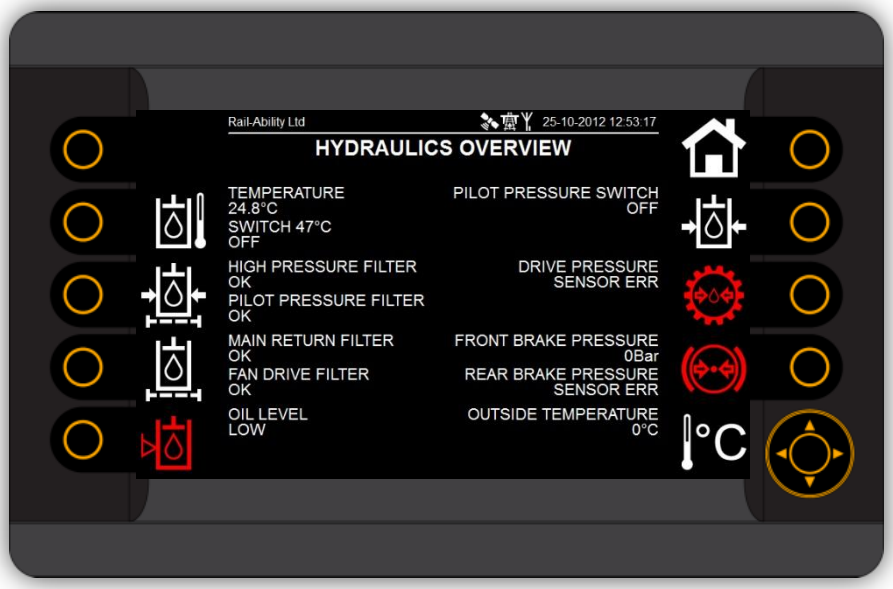
41 Hydraulics Status Icon

Colour shows current status:

- White = Hydraulic systems and sensors normal
- Red = Hydraulic systems problem/sensors error.

42 Hydraulics System Health Menu Button

Button illuminates when available. Press to see additional individual hydraulic sensor information/hydraulic system fault status information (shown below) for filters and system pressures.



	Hydraulic Temperature Monitor
	High Pressure Filters Status Monitor
	Return Filters Status Monitor
	Hydraulic Oil Level Status Monitor

Back Button	
Pilot System Pressure Monitor	
Drive Pressure Monitor	
Brake Pressure Monitor	
Ambient Temperature	

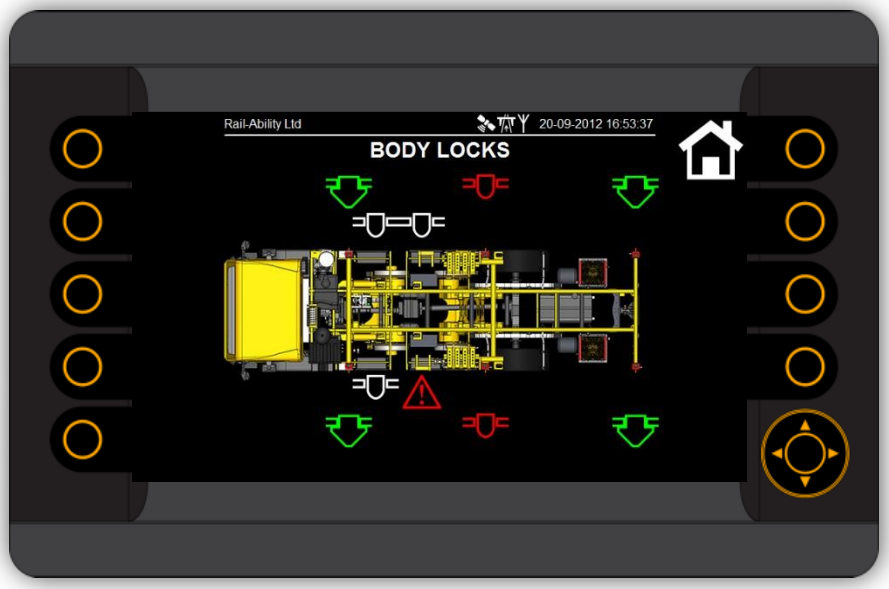
43 Twist Locks Status Icon

Colour shows current status:

- Green = All Twist locks locked
- White = Twist lock(s) unlocked - unknown/no module
- Red = Twist lock(s) unlocked - known module(s).

44 All Twist Locks Status Details Menu Button

Button illuminates when available. Press to see additional individual locked/unlocked/error status information on twist lock sub frame layout (shown below).



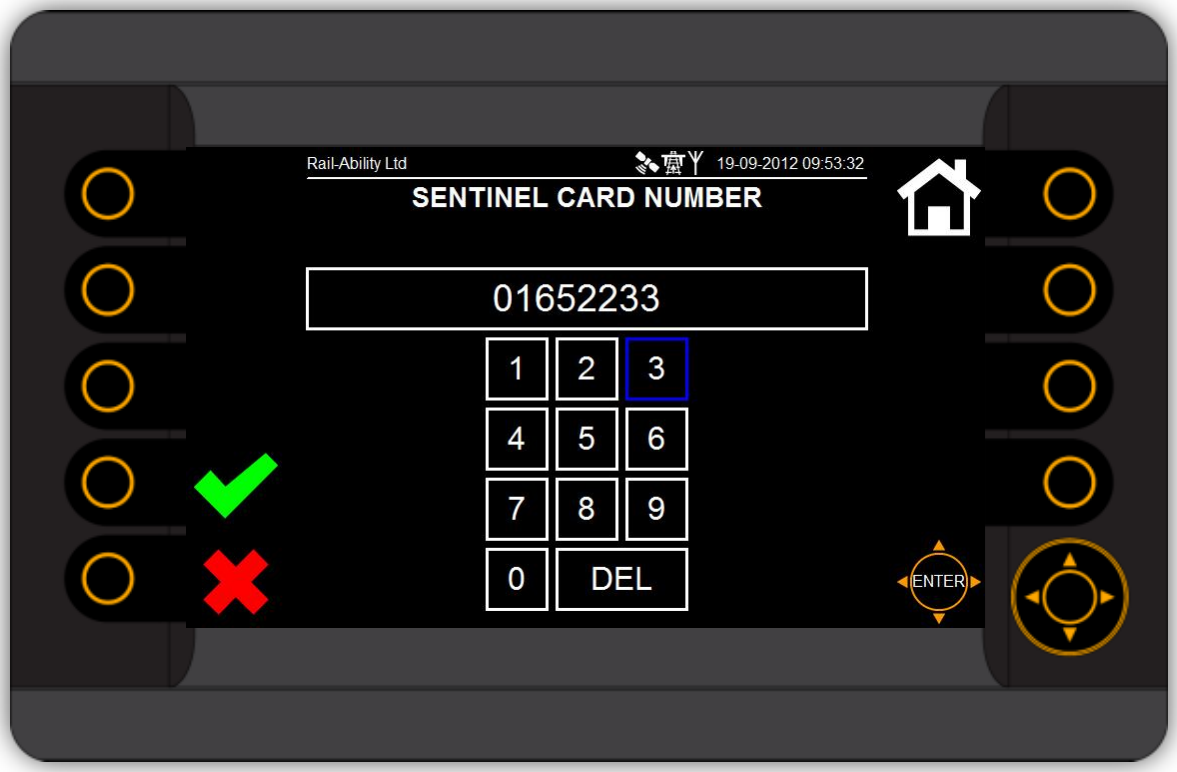
On screen notification when each body lock is engaged:

	Locked
	Unlocked - Required for Module fitted

Back Button	
Unlocked - Unknown/No Module fitted	
Error	

45 Driver Sentinel ID Number Entry Menu Button

Button illuminates when available. Press to enter driver 8 digit sentinel ID number (shown below).



Before the Rail Gear, MEWP or Crane module will function, the Operator must enter their personal sentinel card number with the digital key pad and arrow keys. As a number is pressed, its border changes colour (as per the number 3 above) until the next number is pressed, and the figures entered show on the display as the digits are keyed in. The operator can press cancel at any time to start again to enter the PIN code. The data logger then records this for the duration that the machine systems are powered up.

The system should be updated with a new ID number in the event of a change in operator by pressing the button again and entering the number. If the system is powered down the operator will have to re-enter this PIN code.

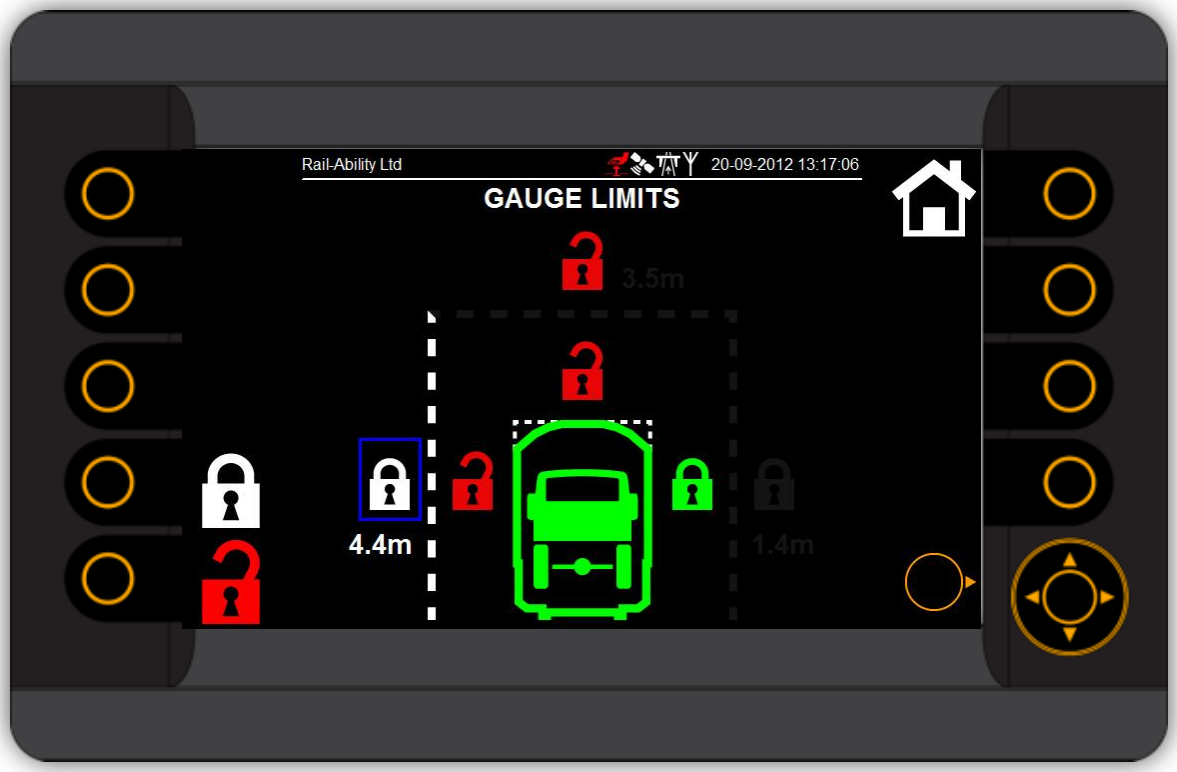
46 Driver Sentinel ID Number Icon

Press to enter 8 digit driver number. All rail functions are disabled and the icon shows as Red until the PTS (Personal Track Safety) number is entered:

- Green = ID entered - All functions available
- White = ID entered - allowed functions available
- Red = no ID entered - no functions unavailable.

47 **Gauge Limits Virtual Wall Settings Menu Button**

Button illuminates when available. Press to see additional status information (shown below) and set gauge limits and virtual wall limits.



On screen notifications:

	Gauge Limit locked
	Virtual Wall/Ceiling Locked
4.4m	Virtual Wall/Ceiling value set from track centre of 4 foot
	Travelling Mode - Machine stowed within Gauge limits

Back Button	
Virtual Wall/Ceiling/Gauge Limit Unlocked	
Selected Icon	
Working Mode - Gauge limits exceeded	
Gauge Limits/Set Virtual Wall Limits/Set Virtual Ceiling Limits - Exceeded	

48 **Gauge Limits Set Icon**

Changes colour to show current status:

- Green = locked limit stowed within gauge for rail full speed rail travel mode
- White = working mode, out of gauge enabled, and/or with limits set
- Red = Outside of gauge/outside of set limits.

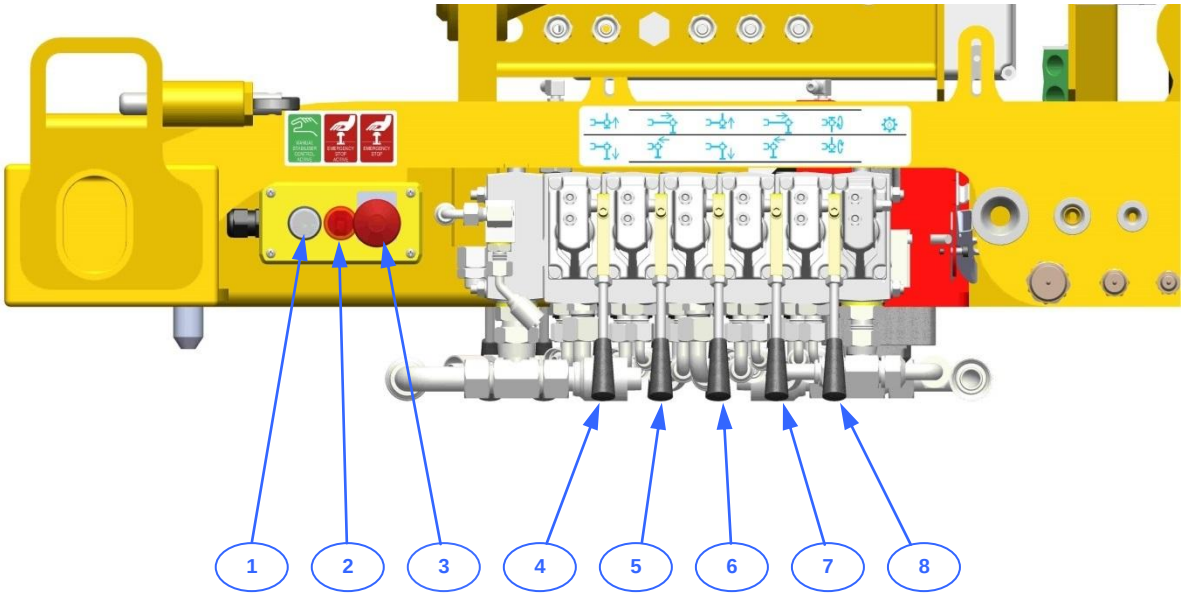
12.4 MAN Highway Driving Controls

For other cab controls refer to the MAN manual detailed in section 4.

13 Stabiliser Ground Controls

These controls are located on the Left and Right hand sides of the vehicle for stabiliser functions on the associated sides and detailed below.

13.1 Left Hand Side



1. Lever Enable Button
2. Emergency Stop Active Light
3. Emergency Stop Button
4. Lever 1 – Front Leg Raise/Lower
5. Lever 2 – Front Leg Beam Retract In/Extend Out
6. Lever 3 – Rear Leg Raise/Lower
7. Lever 4 – Rear Leg Beam Retract In/Extend Out
8. Lever 5 – Rear Leg Rotate Up/Rotate Down

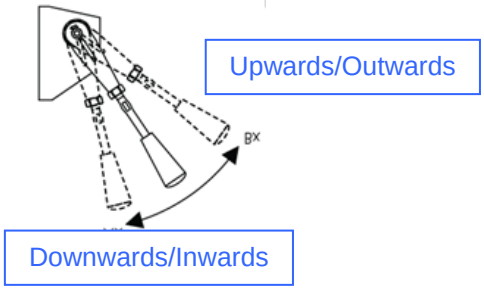


Figure 13 - Left Hand Stabiliser Ground Controls

1 Lever Enable button

Pressing and holding this button 'enables' the levers to function. The enable system 'times out' after a period of 5 seconds if the lever is not moved, after which the button must be released and depressed again.

2 Emergency Stop Active Light

Displays when any emergency stop button has been pressed.

3 Emergency Stop Button

Pressing the emergency stop switch cuts hydraulic and electrical power to work platform and crane, preventing any further movement.

4 Lever 1 – Front Leg Raise/Lower

Moving the lever downwards lowers the leg, moving lever upwards raises the leg.

5 Lever 2 – Front Leg Beam Retract In/Extend Out

Moving the lever outwards extends the leg beam, moving the lever inwards retracts the leg beam.

6 Lever 3 – Rear Leg Raise/Lower

Moving the lever downwards lowers the leg, moving lever upwards raises the leg.

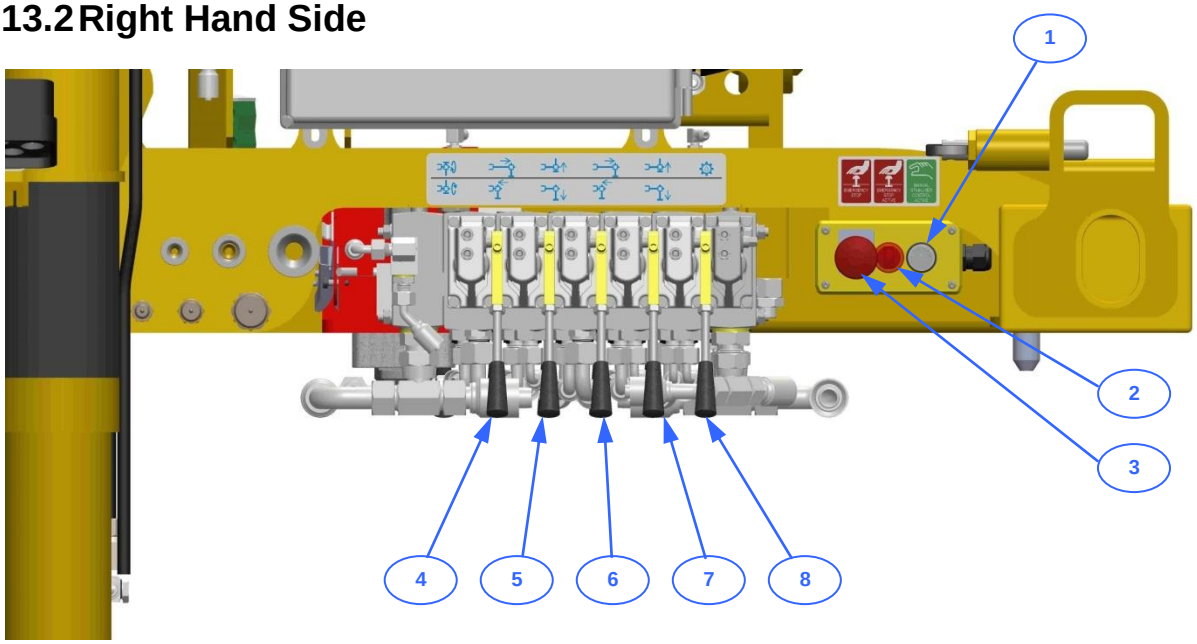
7 Lever 4 – Rear Leg Beam Retract In/Extend Out

Moving the lever outwards extends the leg beam, moving the lever inwards retracts the leg beam. Do not extend the rear leg beam fully until the leg rotate operation has been completed. These requirements are interlocked in normal operating mode but have to be considered by the operator in recovery mode as the interlocks are not functional.

8 Lever 5 – Rear Leg Rotate Up/Rotate Down

Moving the lever downwards rotates the leg down, moving lever upwards rotates the leg up. Ensure that the leg beam is extended partially to allow the leg to rotate past the deck. Do not extend the leg beam fully until the leg is rotated into the downward position. Always lock the legs with the mechanical pins once actuated. All of these requirements are interlocked in normal operating mode but have to be considered by the operator in recovery mode as the interlocks are not functional.

13.2 Right Hand Side



1. Lever Enable Button
2. Emergency Stop Active Light
3. Emergency Stop Button
4. Lever 1 – Front Leg Raise/Lower
5. Lever 2 – Front Leg Beam Retract In/Extend Out
6. Lever 3 – Rear Leg Raise/Lower
7. Lever 4 – Rear Leg Beam Retract In/Extend Out
8. Lever 5 – Rear Leg Rotate Up/Rotate Down

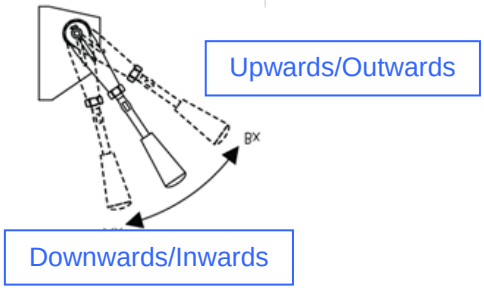


Figure 14 - Right Hand Stabiliser Ground Controls

1 Lever Enable button

Pressing and holding this button 'enables' the levers to function. The enable system 'times out' after a period of 5 seconds if the lever is not moved, after which the button must be released and depressed again.

2 Emergency Stop Active Light

Displays when any emergency stop button has been pressed.

3 **Emergency Stop Button**

Pressing the emergency stop switch cuts hydraulic and electrical power to work platform and crane, preventing any further movement.

4 **Lever 1 – Front Leg Raise/Lower**

Moving the lever downwards lowers the leg, moving lever upwards raises the leg.

5 **Lever 2 – Front Leg Beam Retract In/Extend Out**

Moving the lever outwards extends the leg beam, moving the lever inwards retracts the leg beam.

6 **Lever 3 – Rear Leg Raise/Lower**

Moving the lever downwards lowers the leg, moving lever upwards raises the leg.

7 **Lever 4 – Rear Leg Beam Retract In/Extend Out**

Moving the lever outwards extends the leg beam, moving the lever inwards retracts the leg beam. Do not extend the rear leg beam fully until the leg rotate operation has been completed. These requirements are interlocked in normal operating mode but have to be considered by the operator in recovery mode as the interlocks are not functional.

8 **Lever 5 – Rear Leg Rotate Up/Rotate Down**

Moving the lever downwards rotates the leg down, moving lever upwards rotates the leg up. Ensure that the leg beam is extended partially to allow the leg to rotate past the deck. Do not extend the leg beam fully until the leg is rotated into the downward position. Always lock the legs with the mechanical pins once actuated. All of these requirements are interlocked in normal operating mode but have to be considered by the operator in recovery mode as the interlocks are not functional.

13.3 Emergency Recovery

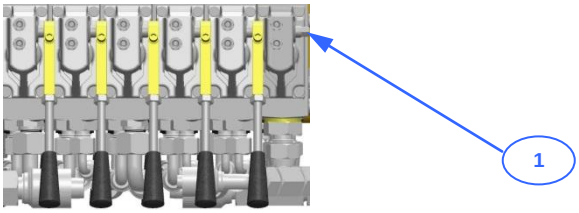


Figure 15 - Emergency Recovery Enable Lever

1 **Recovery Enable Lever position**

The Recovery Enable Lever is not required under normal operations and is stowed separately. If the electrical systems have failed, use this lever instead of the white enable button.

The lever is inserted as shown above and must be held in the sprung position before any of the other levers can be utilised. The recovery segment levers are normally kept in the truck side boxes.

14 Remote Control Unit - Stand Alone

All remote control unit items referred to in this manual are as annotated on Figure 16.

The standalone remote control can be in either:

- Crane Mode
- Stabiliser Mode.

Figure 16 - Remote Control Unit

14.1 Stabiliser Mode

CHECK ALL THE FUNCTIONS OPERATE CORRECTLY WHEN IN STABILISER MODE PRIOR TO STARTING WORK

When in stabiliser mode, the actions of the annotated items in Figure 16 are shown alongside their number in brief and subsequently expanded upon.

1 **Joystick 1 - Left Hand Stabilisers Raise/Lower and Extend/Retract**

Moving joystick forwards raises the leg rams, moving joystick backwards lowers the leg rams. Moving joystick to the right retracts the leg beams, moving joystick to the left extends the leg beams.

2 **Joystick 1 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

3 **Communication Activity Indicator Light**

At switch on:

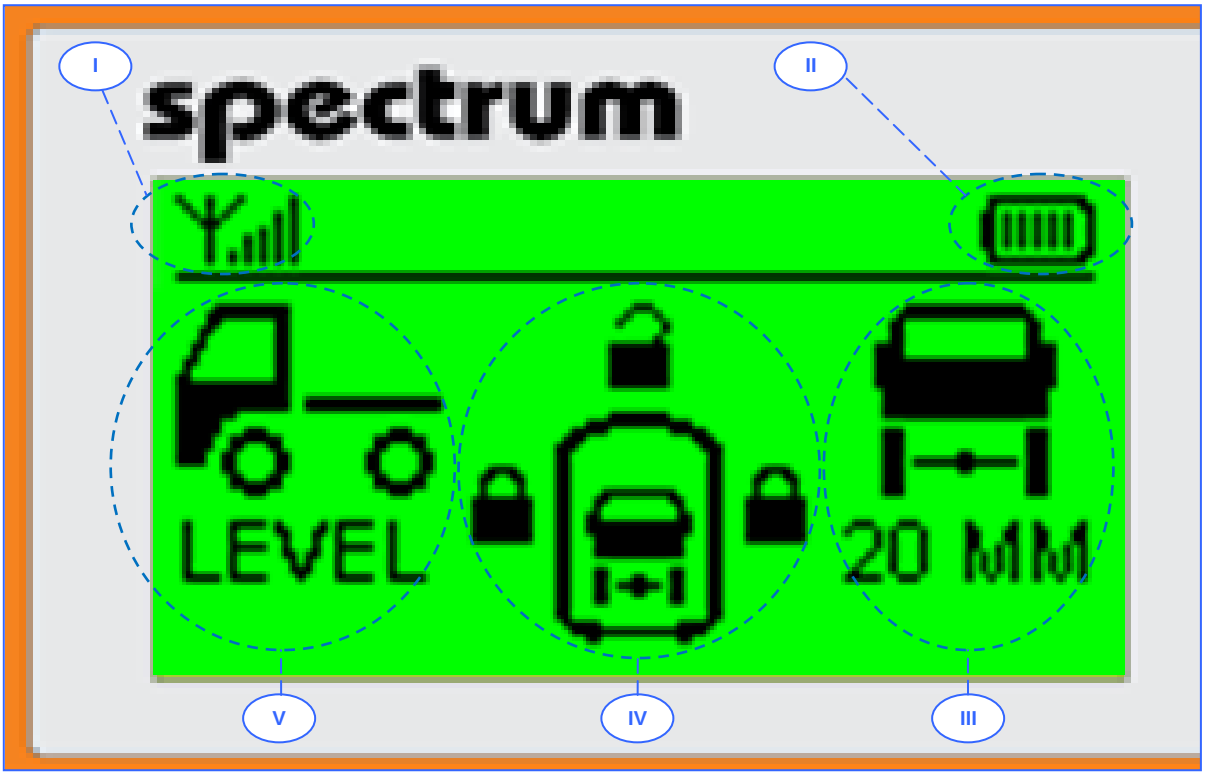
- Glows Red when attempted switch on is prevented by the Emergency Stop being active
- Glows Amber when booting up the communications
- Glows flashing Green when communication is established and until ceased.

4 **Function Control Position Selector Switch - Blue for Stabiliser Mode**

This switch changes the control panel functions from MEWP to Crane to Stabilisers depending on the position of the switch. The remapped control layouts are shown on the associated symbols via the corresponding colours to the mode colour. Blue is for stabiliser mode. While the controls are docked into the platform and connected via the control cable all modes are available and the platform control layout is shown on an additional decal on the platform consol. In radio remote mode only the Crane and Stabiliser functions are available.

5 Left Hand Display

On this left hand display, there are 5 areas of information, as shown below.

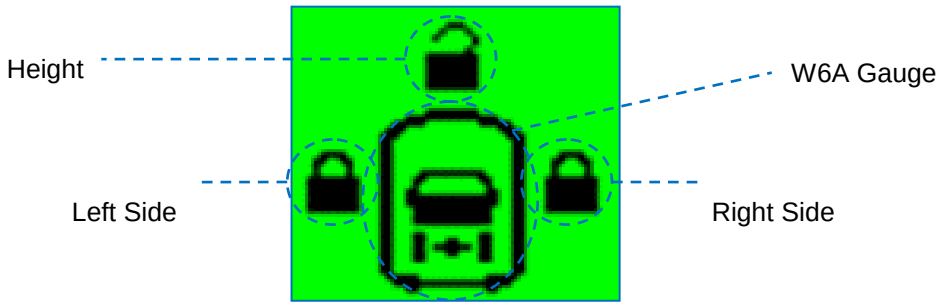


I **Signal strength.** Each bar shows 20% increments from 0% to 100%.

II **Battery power.** Each bar shows 20% increments form 0% to 100%.

III **Chassis Roll/Cant.** Displays as ^{o} in road mode and mm in rail mode.

IV **Gauge Limits.** Symbol represents which directions are locked to prevent movement, as shown below.



Each lock symbol (Left, Right and Height) changes to show either a locked padlock or an unlocked padlock. In the scenario above both left and right limits are locked to prevent the crane boom exceeding the set side limits with height unlocked for working the crane boom above the machine.

V **Chassis Gradient.** Displays as a % in road mode and a 1 in X value in rail mode.

6 **Right Hand Display**

This display shows one of four screens depending on certain conditions:

- Emergency Stop
- Crane Stowed Position
- Crane Up Position
- Crane OLE Tracing Position.

14.1.1 Emergency Stop

The Overload warning triangle and the Emergency STOP sign will appear as shown below on the right hand display if any one of the Emergency stop buttons is pressed on the machine.

See 'Platform controls indicator panel' section.

7 **Yellow for Front Legs/Pink for Rear Legs Selector Switch**

This switch changes the control panel functions from Front Stabiliser Legs to Rear Stabiliser Legs control for both the MEWP and the Crane when in stabiliser mode depending on the position of the switch. The remapped control layouts are shown on the associated symbols via the corresponding colours to the mode colour. Yellow for front stabilisers and Pink for rear stabilisers. The functions that remap are Legs Raise/Lower and Legs Extend/Retract.

8 **Screen Contrast/Brightness Dial**

Adjusts the Contrast and Brightness of the screen. Press and turn to select and adjust respectively.

9 **Joystick 2 - Right Hand Stabilisers Raise/Lower and Extend/Retract**

Moving joystick forwards raises the leg rams, moving joystick backwards lowers the leg rams. Moving joystick to the right extends the leg beams, moving joystick to the left retracts the leg beams.

10 **Joystick 2 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

11 **Panel Illumination Button**

Switches the remote control panel LED lighting on and off.

12 **On Button**

Turns the unit on, using the power on up sequence ***PRESS*** then ***PAUSE*** then ***HOLD***.

13 **Spare**

This button is not used.

14 **Spare**

This button is not used.

15 **Emergency Stop/Power Off Button**

Pressing the emergency stop switch cuts hydraulic and electrical power to work platform and Crane, preventing any further movement.

16 **Horn Switch (and Momentary Horn Mute)**

The horn switch sounds the vehicle automotive horn, push forward to sound horn. The horn automatically sounds for rail travel. This can be muted on each occasion by pulling the horn switch backwards while moving the travel joystick.

17 **Aux 3/Aux 4 Switch**

Operates the auxiliary hydraulic functions.

18 **Joystick 3 - Rail Travel Forward/Reverse and (MEWP Slew Left/MEWP Slew Right)**

Moving the joystick forwards enables rail travel in the direction indicated on the chassis by the Blue arrow. Moving the joystick backwards enables rail travel in the direction indicated on the chassis by the Yellow arrow. Moving the Joystick left and right operates the auxiliary hydraulic functions.

19 **Joystick 3 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

20 **Aux 5/Aux 6 Switch**

Operates the auxiliary hydraulic functions.

21 **Boom Speed Switch**

Selecting the boom speed button while actuating the joystick enables higher speed movement of the boom.

22 **Connection of Serial Coms**

Cable connection to enable MEWP mode when docking controls into the Platform control station

23 **Spare**

This button is not used.

24 **Spare**

This button is not used.

25 **Spare**

This button is not used.

26 **Spare**

This button is not used.

14.2 Crane Mode

CHECK ALL THE FUNCTIONS OPERATE CORRECTLY WHEN IN CRANE MODE PRIOR TO STARTING WORK

When in crane mode, the actions of the annotated items in Figure 16 are shown alongside their number in brief and subsequently expanded upon.

1 **Joystick 1 - Slew and Boom Extend/Retract**

Moving joystick forwards extends the boom, moving joystick backwards retracts the boom. Moving joystick to the right slews the boom clockwise, moving joystick to the left slews the boom anti-clockwise.

2 **Joystick 1 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

3 **Communication Activity Indicator Light**

At switch on:

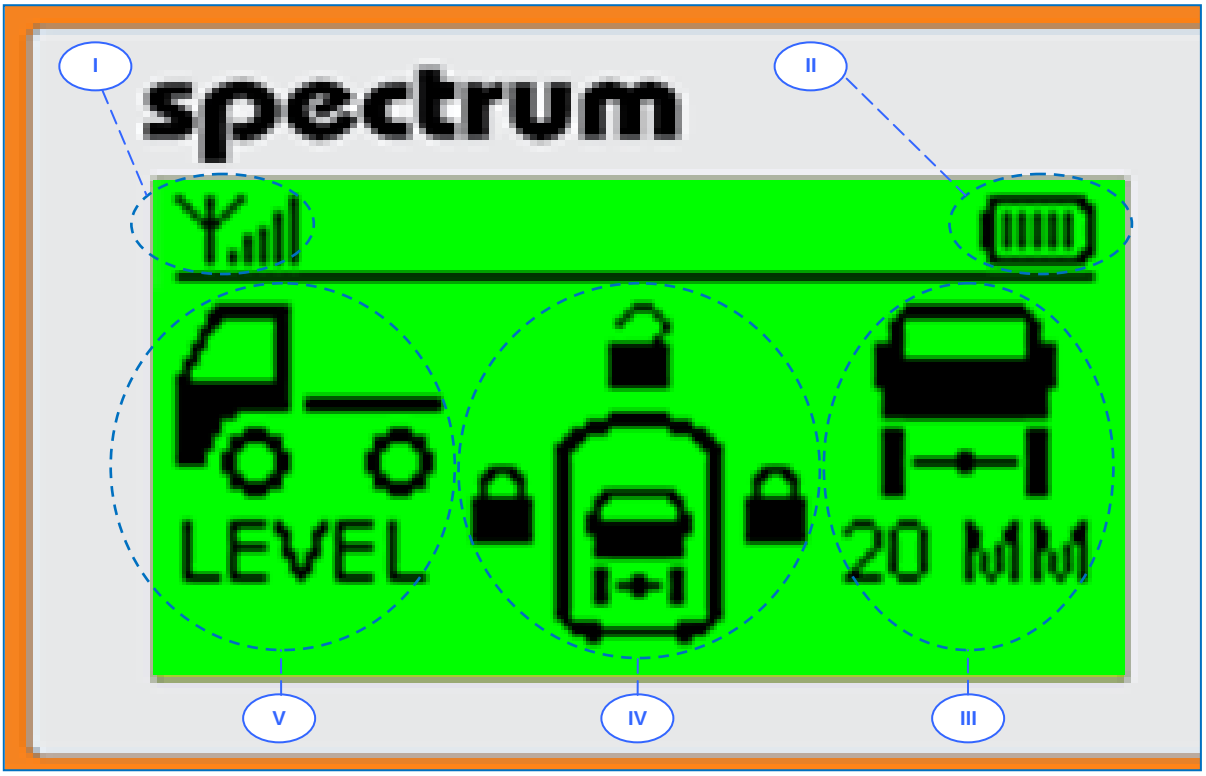
- Glows Red when attempted switch on is prevented by the Emergency Stop being active
- Glows Amber when booting up the communications
- Glows flashing Green when communication is established and until ceased.

4 **Function Control Position Selector Switch - Green for Crane Mode**

This switch changes the control panel functions from MEWP to Crane to Stabilisers depending on the position of the switch. The remapped control allowed movements are shown on Display unit 2. While the controls are docked into the platform and connected via the control cable all modes are available. In radio remote mode only the Crane and Stabiliser functions are available.

5 Left Hand Display

On this left hand display, there are 5 areas of information, as shown below.

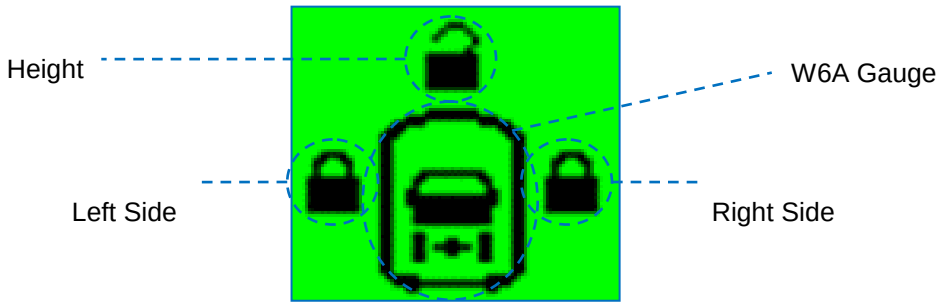


I **Signal strength.** Each bar shows 20% increments from 0% to 100%.

II **Battery power.** Each bar shows 20% increments form 0% to 100%.

III **Chassis Roll/Cant.** Displays as ^{o} in road mode and mm in rail mode.

IV **Gauge Limits.** Symbol represents which directions are locked to prevent movement, as shown below.



Each lock symbol (Left, Right and Height) changes to show either a locked padlock or an unlocked padlock. In the scenario above both left and right limits are locked to prevent the crane boom exceeding the set side limits with height unlocked for working the crane boom above the machine.

V **Chassis Pitch/Gradient.** Displays as a % in road mode and a 1 in X value in rail mode.

6 **Right Hand Display**

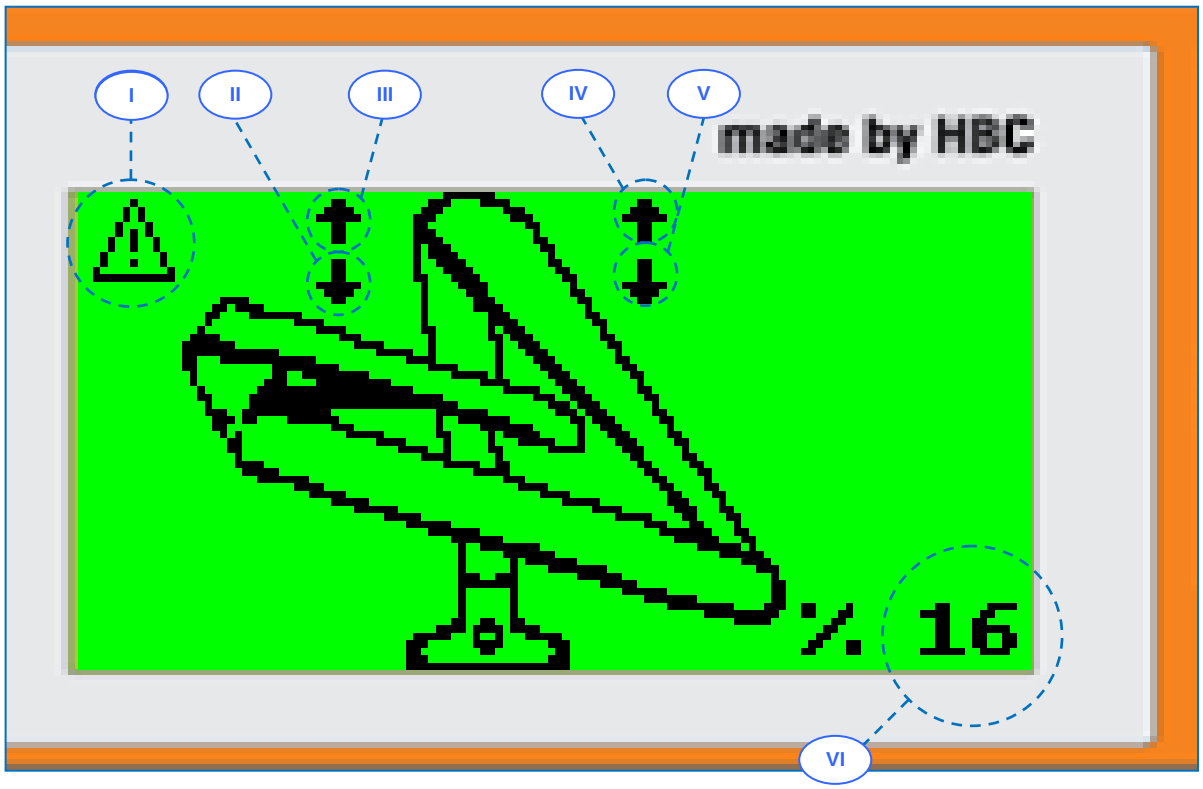
This display shows one of four screens depending on certain conditions:

- Emergency Stop
- Crane Stowed Position
- Crane Up Position
- Crane OLE Tracing Position.

14.2.1 Emergency Stop

The Overload warning triangle and the Emergency STOP sign will appear as shown below on the right hand display if any one of the Emergency stop buttons is pressed on the machine.

14.2.2 Crane Stowed Position



I Overload

Shows crane overload.

II Fly Boom Lower Arrow

Shown if fly down movement is allowed for OLE tracing mode, flashes when movement is inhibited.

III Fly Boom Up Arrow

Shown if fly up movement is allowed for OLE tracing mode, flashes when movement is inhibited.

IV Main Boom Up Arrow

Shown if main lift up movement is allowed for Crane duties, flashes when movement is inhibited.

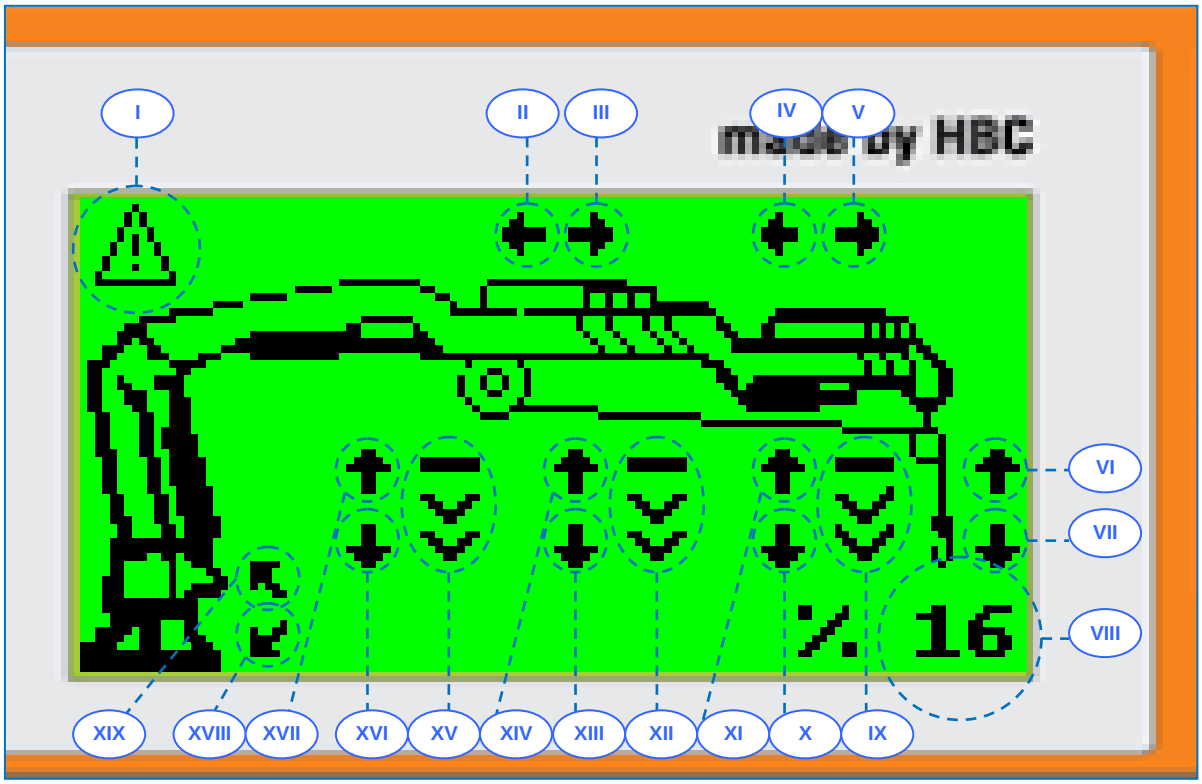
V Main Boom Down Arrow

Shown if main lift down movement is allowed for Crane duties, flashes when movement is inhibited.

VI Current Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

14.2.3 Crane Up Position



I Overload

Shows crane overload.

II Telescope In Arrow

Shown if telescope in movement is allowed, flashes when movement is inhibited.

III Telescope Out Arrow

Shown if telescope out movement is allowed, flashes when movement is inhibited.

IV Fly Boom Telescope In Arrow

Shown if fly boom telescope in movement is allowed, flashes when movement is inhibited.

V Fly Boom Telescope Out Arrow

Shown if fly boom telescope out movement is allowed, flashes when movement is inhibited.

VI Winch In Arrow

Shown if winch in movement is allowed, flashes when movement is inhibited.

VII Winch Out Arrow

Shown if winch out movement is allowed, flashes when movement is inhibited.

VIII Current Maximum Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

IX **Fly Boom Below Horizontal**

Shown if fly boom is below horizontal.

X **Fly Boom Lower Arrow**

Shown if fly lower movement is allowed, flashes when movement is inhibited.

XI **Fly Boom Up Arrow**

Shown if fly up movement is allowed, flashes when movement is inhibited.

XII **Knuckle Boom Below Horizontal**

Shown if knuckle boom is below horizontal.

XIII **Knuckle Boom Lower Arrow**

Shown if knuckle boom lower movement is allowed, flashes when movement is inhibited.

XIV **Knuckle Boom Up Arrow**

Shown if knuckle boom lift movement is allowed, flashes when movement is inhibited.

XV **Main Boom Below Horizontal**

Shown if main boom is below horizontal.

XVI **Main Boom Down Arrow**

Shown if main lift down movement is allowed for Crane duties, flashes when movement is inhibited.

XVII **Main Boom Up Arrow**

Shown if main lift up movement is allowed for Crane duties, flashes when movement is inhibited.

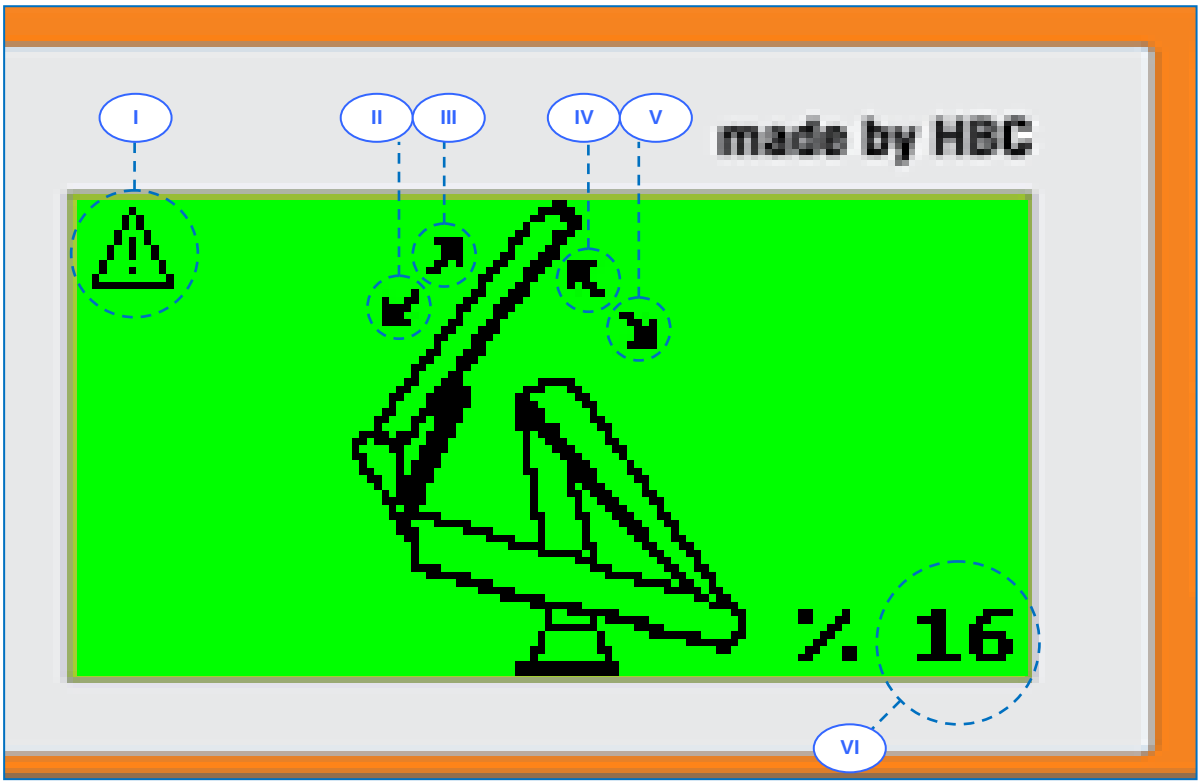
XVIII **18. Slew Counter Clockwise Arrow**

Shown if slew counter clockwise movement is allowed, flashes when movement is inhibited.

XIX **19. Slew Clockwise Arrow**

Shown if slew clockwise movement is allowed, flashes when movement is inhibited.

14.2.4 Crane OLE Tracing Position



I Overload

Shows crane overload.

II Fly Boom Telescope In Arrow

Shown if fly boom telescope in movement is allowed, flashes when movement is inhibited

III Fly Boom Telescope Out Arrow

Shown if fly boom telescope out movement is allowed, flashes when movement is inhibited

IV Fly Boom Up Arrow

Shown if fly boom up movement is allowed, flashes when movement is inhibited

V 5. Fly Boom Lower Arrow

Shown if fly boom down movement is allowed, flashes when movement is inhibited

VI Current Maximum Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

7 Yellow for Knuckle Boom/Pink for Fly Boom Selector Switch

This switch changes the control panel functions from Main Boom control to Fly Boom control for both the MEWP and the Crane depending on the position of the switch. The remapped control layouts are shown on controls decal. The functions that remap are Knuckle Boom/Fly Boom Raise/Lower and Telescopic In/Out.

8 **Screen Contrast/Brightness Dial**

Adjusts the Contrast and Brightness of the screen. Press and turn to select and adjust respectively.

9 **Joystick 2 - 2nd or 3rd Boom Raise/Lower and (optional) Grab Open/Close**

Moving joystick forwards lowers the boom, moving joystick backwards raises the boom. Moving joystick to the right rotates the optional Grab clockwise, moving joystick to the left rotates the Grab anti-clockwise.

10 **Joystick 2 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

11 **Panel Illumination Button**

Switches the remote control panel LED lighting on and off.

12 **On Button**

Turns the unit on, using the power on up sequence ***PRESS*** then ***PAUSE*** then ***HOLD***.

13 **Spare**

This button is not used.

14 **Spare**

This button is not used.

15 **Emergency Stop/Power Off Button**

Pressing the emergency stop switch cuts hydraulic and electrical power to work platform and Crane, preventing any further movement.

16 **Horn Button (and Momentary Horn Mute)**

The horn switch sounds the vehicle automotive horn, push forward to sound horn. The horn automatically sounds for rail travel. This can be muted on each occasion by pulling the horn switch backwards while moving the travel joystick.

17 **Aux 3/Aux 4 Switch**

Operates the auxiliary hydraulic functions.

18 **Joystick 3 - 1st Boom Raise/Lower and Winch In/Winch Out**

Moving the joystick forwards lowers the cranes main 1st boom moving the joystick backwards raises the main boom. Moving the Joystick left and right operates the auxiliary hydraulic functions which is winch in and out respectively if the crane winch is installed.

19 **Joystick 3 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

20 **Aux 5/Aux 6 Switch**

Operates the auxiliary hydraulic functions.

21 **Boom Speed Switch**

Selecting the boom speed button while actuating the joystick enables higher speed movement of the boom. (The machine will ignore high speed selections when approaching maximum load/radius)

22 **Connection of Serial Coms**

Cable connection to enable MEWP mode when docking controls into the Platform control station

23 **Spare**

This button is not used.

24 **Spare**

This button is not used.

25 **Spare**

This button is not used.

26 **Spare**

This button is not used.

15 Remote Control Unit - Docked in MEWP

15.1 Docking

The remote controls can be docked in the MEWP and used to control movements of the Crane boom, Stabilisers and MEWP functions. Machine power to the docked control unit is via an umbilical cable, which plugs into the Coms connection on the left hand side of the unit below the controls.

Always ensure the remote controls are returned to the machine cab after use, and secured against unauthorised operation.

It is possible to operate the platform boom below the horizontal position via the remote controls (undocked) if there is less than 50kg in than platform to enable the operator to bring the platform down to ground level for direct personnel and tools access rather than having to climb on the vehicle deck. This function is disabled with more than 50kg in the platform and the controls must be docked and operated from within the platform to continue.

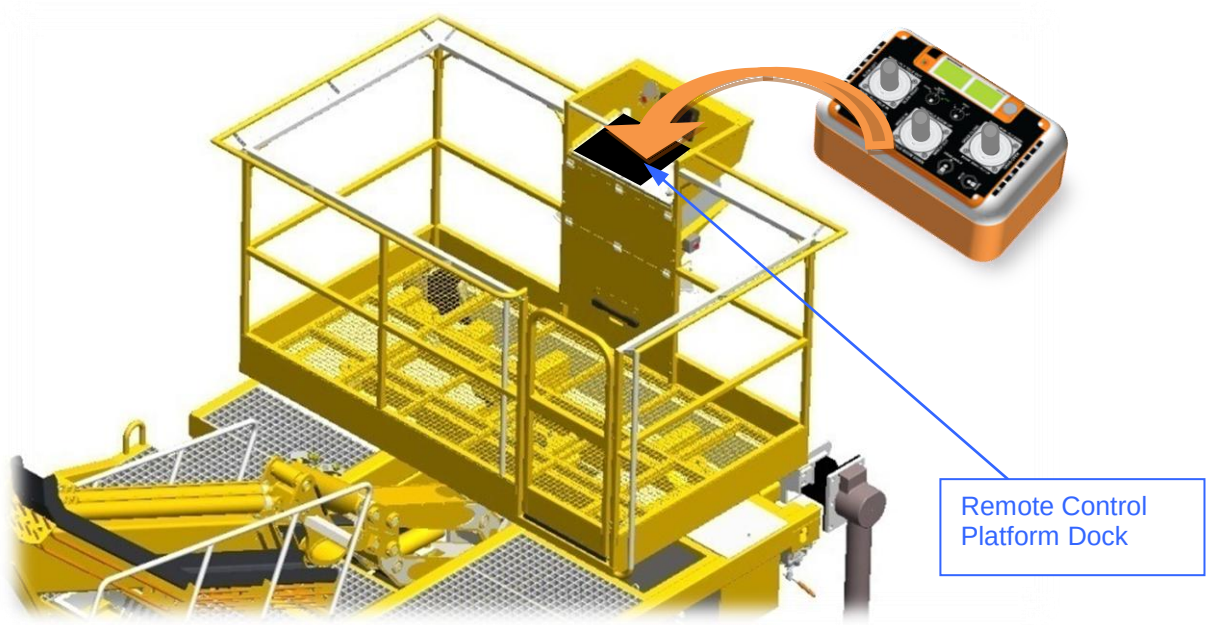


Figure 17 - Docked Position of Remote Control Unit

15.2 Platform Console and Emergency Stops

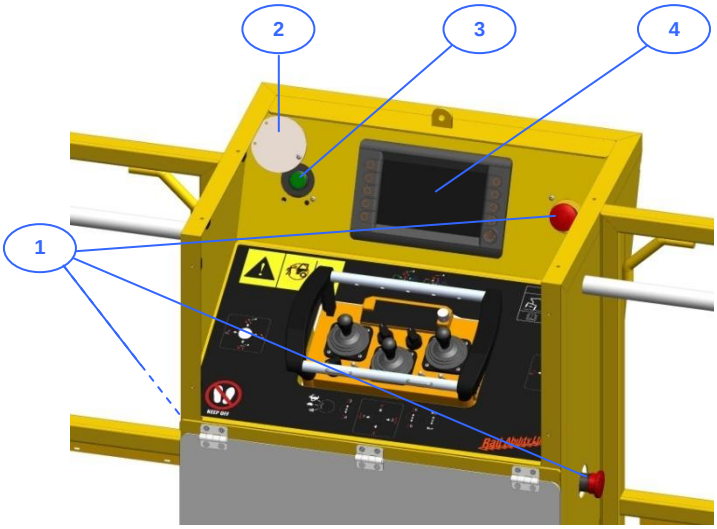


Figure 18 - Platform Console

1 **Emergency Stop**

Disables all control functions and stops all movements.

2 **Override Cover**

Swings sideways to reveal the Override Button.

3 **Override Button**

Used to return the machine to a safe operating condition after an exeedance or to free an operator from a situation where normal operating safeguards have interlocked the movement of the structure.

4 **Platform Display Unit**

15.3 MEWP Controls

CHECK ALL THE FUNCTIONS OPERATE CORRECTLY WHEN IN MEWP MODE PRIOR TO STARTING WORK

When in MEWP mode, the actions of the annotated items in Figure 16 are shown alongside their number in brief and subsequently expanded upon. As the unit is docked, items 11, 12, 13, 14, 15, 23, 24, 25 and 26 are not accessible. Item 22, though not visible, is connected with a control cable prior to insertion into the Platform.

1 **Joystick 1 - Slew and Boom Extend/Retract**

Moving joystick forwards extends the boom, moving joystick backwards retracts the boom. Moving joystick to the right slews the boom clockwise, moving joystick to the left slews the boom anti-clockwise.

2 **Joystick 1 - Enable Button**

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

3 **Communication Activity Indicator Light**

At switch on:

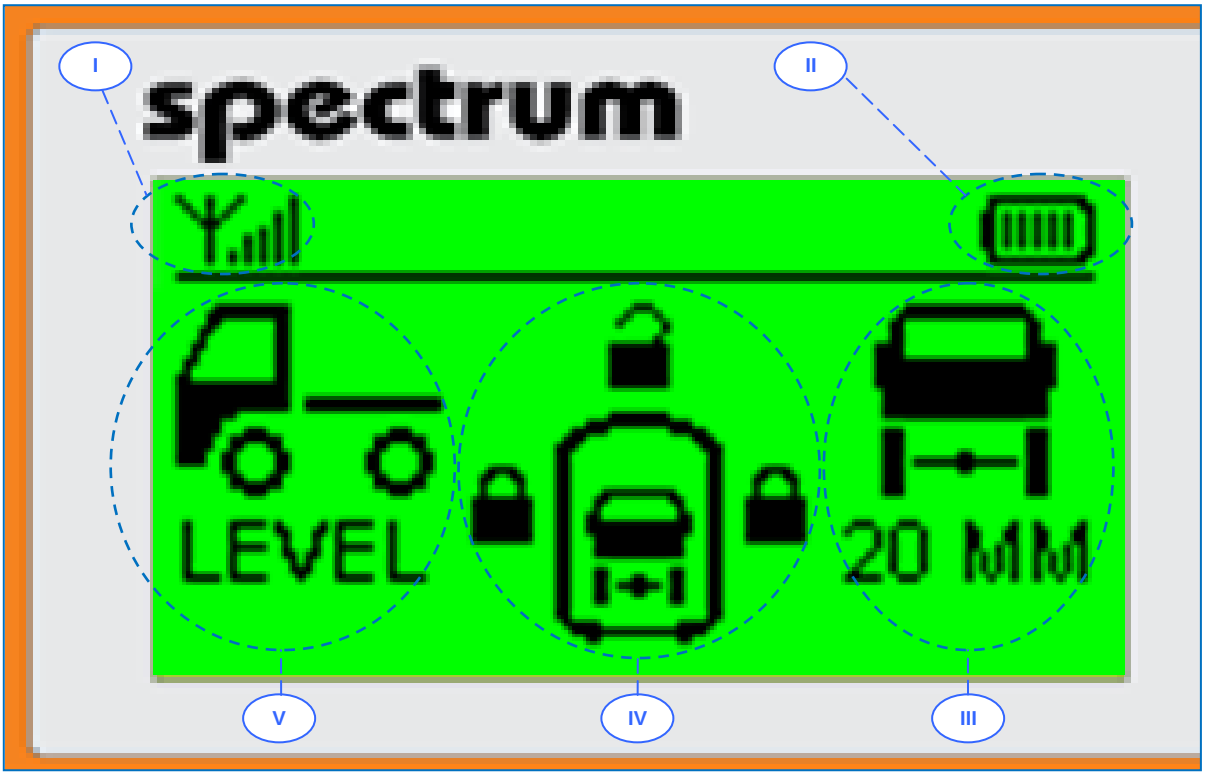
- Glows Red when attempted switch on is prevented by the Emergency Stop being active
- Glows Amber when booting up the communications
- Glows flashing Green when communication is established and until ceased.

4 **Function Control Position Selector Switch - Red for MEWP Mode**

This switch changes the control panel functions from MEWP to Crane to Stabilisers depending on the position of the switch. The remapped control layouts are shown on the platform console decal in Red. While the controls are docked into the platform and connected via the control cable all modes are available.

5 Left Hand Display

On this left hand display, there are 5 areas of information, as shown below.

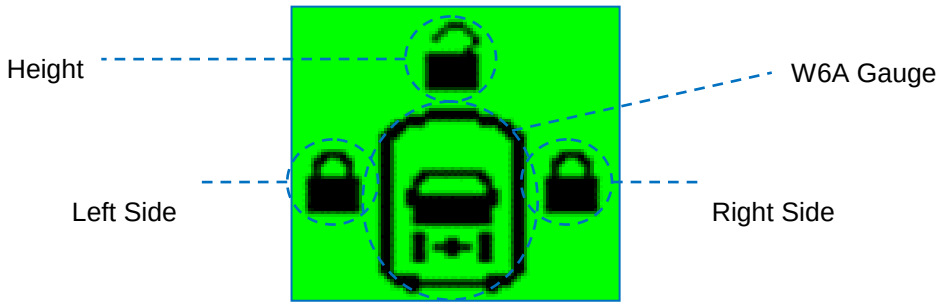


I **Signal strength.** Each bar shows 20% increments from 0% to 100%.

II **Battery power.** Each bar shows 20% increments form 0% to 100%.

III **Chassis Roll/Cant.** Displays as ^{o} in road mode and mm in rail mode.

IV **Gauge Limits.** Symbol represents which directions are locked to prevent movement, as shown below.



Each lock symbol (Left, Right and Height) changes to show either a locked padlock or an unlocked padlock. In the scenario above both left and right limits are locked to prevent the crane boom exceeding the set side limits with height unlocked for working the crane boom above the machine.

V **Chassis Gradient.** Displays as a % in road mode and a 1 in X value in rail mode.

6 **Right Hand Display**

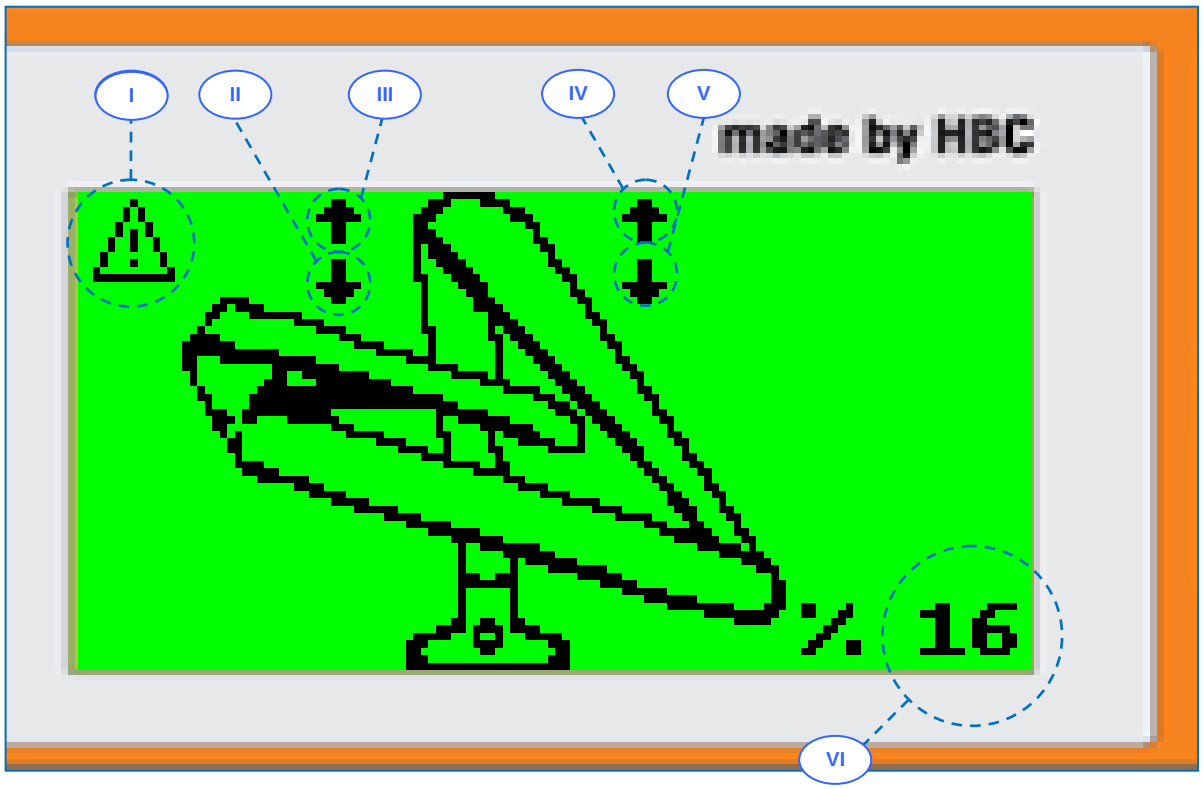
This display shows one of four screens depending on certain conditions:

- Emergency Stop
- Crane Stowed Position
- Crane Up Position
- Crane OLE Tracing Position.

15.3.1 Emergency Stop

The Overload warning triangle and the Emergency STOP sign will appear as shown below on the right hand display if any one of the Emergency stop buttons is pressed on the machine.

15.3.2 Crane Stowed Position



I Overload

Shows crane overload.

II Fly Boom Lower Arrow

Shown if fly down movement is allowed for OLE tracing mode, flashes when movement is inhibited.

III Fly Boom Up Arrow

Shown if fly up movement is allowed for OLE tracing mode, flashes when movement is inhibited.

IV Main Boom Up Arrow

Shown if main lift up movement is allowed for Crane duties, flashes when movement is inhibited.

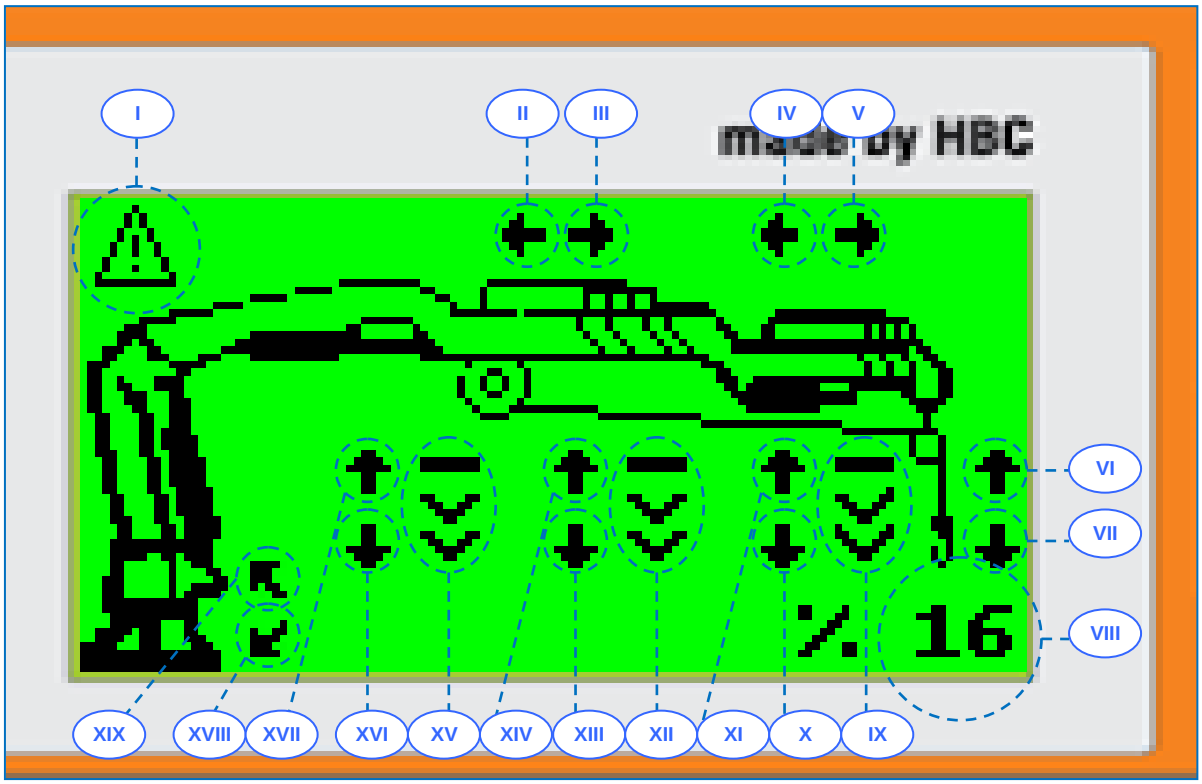
V Main Boom Down Arrow

Shown if main lift down movement is allowed for Crane duties, flashes when movement is inhibited.

VI Current Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

15.3.3 Crane Up Position



I Overload

Shows crane overload.

II Telescope In Arrow

Shown if telescope in movement is allowed, flashes when movement is inhibited.

III Telescope Out Arrow

Shown if telescope out movement is allowed, flashes when movement is inhibited.

IV Fly Boom Telescope In Arrow

Shown if fly boom telescope in movement is allowed, flashes when movement is inhibited.

V Fly Boom Telescope Out Arrow

Shown if fly boom telescope out movement is allowed, flashes when movement is inhibited.

VI Winch In Arrow

Shown if winch in movement is allowed, flashes when movement is inhibited.

VII Winch Out Arrow

Shown if winch out movement is allowed, flashes when movement is inhibited.

VIII Current Maximum Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

IX **Fly Boom Below Horizontal**

Shown if fly boom is below horizontal.

X **Fly Boom Lower Arrow**

Shown if fly lower movement is allowed, flashes when movement is inhibited.

XI **Fly Boom Up Arrow**

Shown if fly up movement is allowed, flashes when movement is inhibited.

XII **Knuckle Boom Below Horizontal**

Shown if knuckle boom is below horizontal.

XIII **Knuckle Boom Lower Arrow**

Shown if knuckle boom lower movement is allowed, flashes when movement is inhibited.

XIV **Knuckle Boom Up Arrow**

Shown if knuckle boom lift movement is allowed, flashes when movement is inhibited.

XV **Main Boom Below Horizontal**

Shown if main boom is below horizontal.

XVI **Main Boom Down Arrow**

Shown if main lift down movement is allowed for Crane duties, flashes when movement is inhibited.

XVII **Main Boom Up Arrow**

Shown if main lift up movement is allowed for Crane duties, flashes when movement is inhibited.

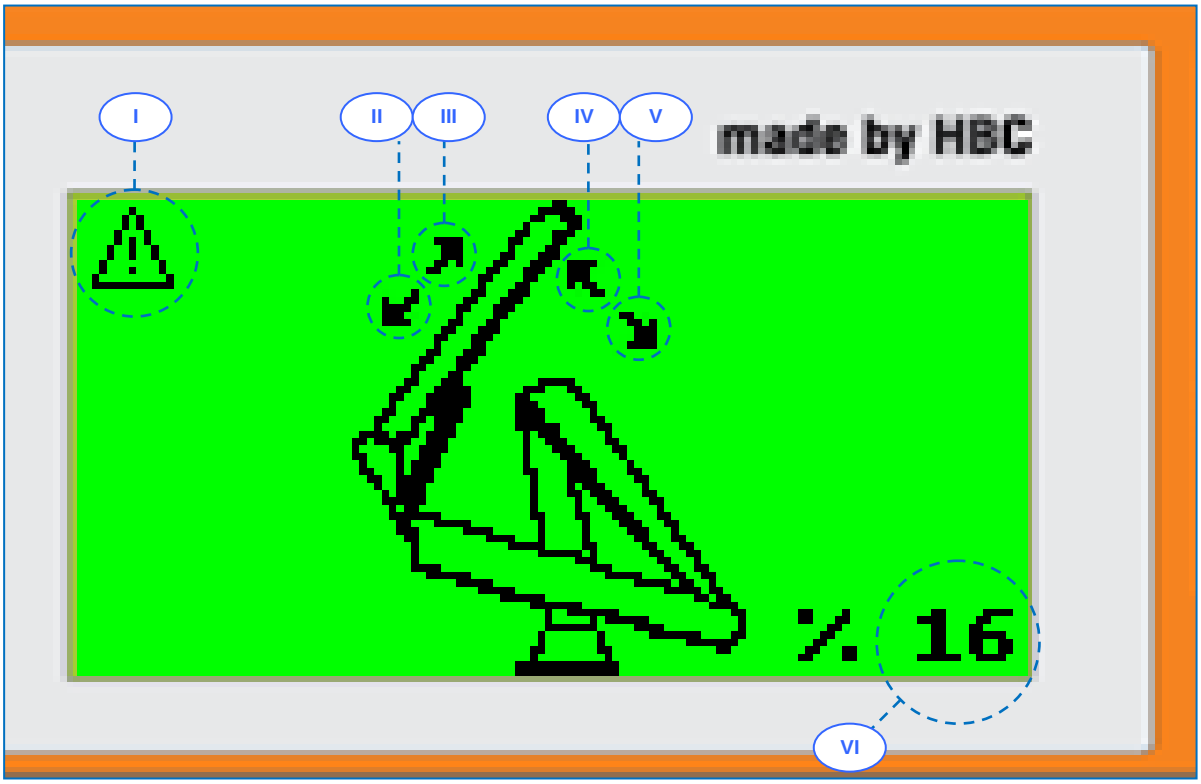
XVIII **18. Slew Counter Clockwise Arrow**

Shown if slew counter clockwise movement is allowed, flashes when movement is inhibited.

XIX **19. Slew Clockwise Arrow**

Shown if slew clockwise movement is allowed, flashes when movement is inhibited.

15.3.4 Crane OLE Tracing Position



I Overload

Shows crane overload.

II Fly Boom Telescope In Arrow

Shown if fly boom telescope in movement is allowed, flashes when movement is inhibited

III Fly Boom Telescope Out Arrow

Shown if fly boom telescope out movement is allowed, flashes when movement is inhibited

IV Fly Boom Up Arrow

Shown if fly boom up movement is allowed, flashes when movement is inhibited

V 5. Fly Boom Lower Arrow

Shown if fly boom down movement is allowed, flashes when movement is inhibited

VI Current Maximum Load

Displays up to 80% as crane approaches max capacity or 100% when crane max capacity is reached.

7 Yellow for Knuckle Boom/Pink for Fly Boom Selector Switch

This switch changes the control panel functions from Main Boom control to Fly Boom control for both the MEWP and the Crane depending on the position of the switch. The remapped control layouts are shown on the platform console decal in Yellow or Pink respectively. The functions that remap are Boom Raise/Lower and Telescopic In/Out.

8 Screen Contrast/Brightness Dial

Adjusts the Contrast and Brightness of the screen. Press and turn to select and adjust respectively.

9 Joystick 2 - 2nd or 3rd Boom Raise/Lower and Platform Rotate

Moving joystick forwards lowers the boom, moving joystick backwards raises the boom. Moving joystick to the right rotates the work platform clockwise, moving joystick to the left rotates the work platform anti-clockwise.

10 Joystick 2 - Enable Button

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

16 Horn Button (and Momentary Horn Mute)

Pressing the horn button sounds the vehicle automotive horn. The horn automatically sounds for rail travel. This can be muted on each occasion by momentarily holding the mute direction while moving the travel joystick.

17 Aux 3/Aux 4 Button

Operates the auxiliary hydraulic functions.

18 Joystick 3 – Drive Forwards/Reverse and Aux 1/Aux 2

Moving the joystick forwards enables rail travel in the direction indicated on the chassis by the Blue arrow. Moving the joystick backwards enables rail travel in the direction indicated on the chassis by the Yellow arrow. Moving the Joystick left and right operates the auxiliary hydraulic functions.

19 Joystick 3 - Enable Button

Pressing and holding this button 'enables' the joystick function. The enable system 'times out' after a period of 5 seconds if the joystick is not moved, after which the button must be released and depressed again.

20 Aux 5/Aux 6 Button

Operates the auxiliary hydraulic functions.

21 Boom Speed Button

Selecting the boom speed button while actuating the joystick enables higher speed movement of the boom.

22 Connection of Serial Coms

Cable connection to enable MEWP mode when docking controls into the Platform control station

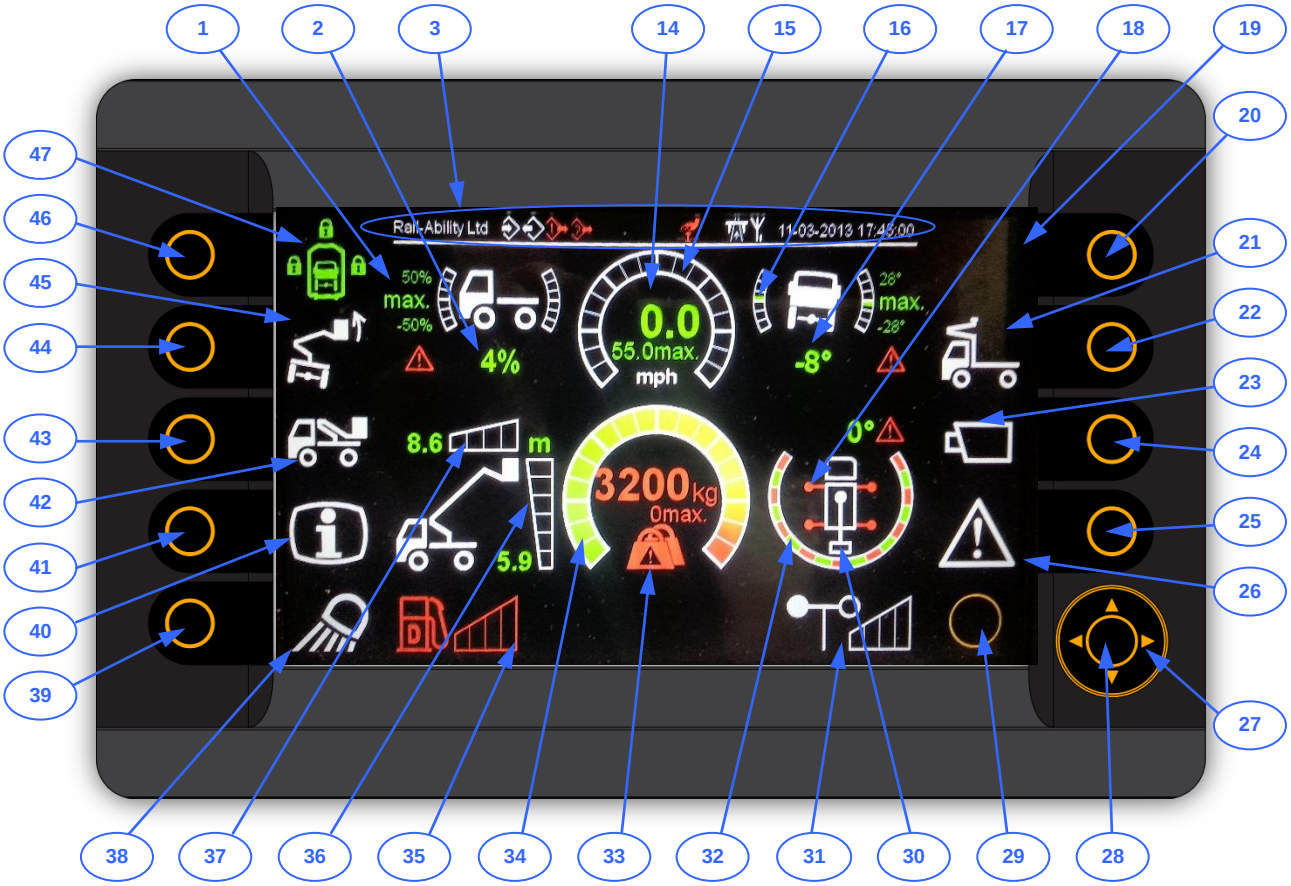
15.3.5 Docked Console Decal

Additional graphics which surround the Docked Console are displayed on the Docked Console Decal as shown in Figure 19. All the Red functions are MEWP activities that are selectable in MEWP mode.

Figure 19 - Docked Console Decal

15.4 Display

CHECK ALL THE FUNCTIONS OPERATE CORRECTLY WHEN IN MEWP MODE PRIOR TO STARTING WORK



1. Max Gradient Range Indicator
2. Current Gradient Indicator
3. Top Bar (items 4 to 13)
14. Current Speed indicator
15. Max Speed Range Indicator
16. Max Cant/Cross Elevation Range Indicator
17. Current Cant/Cross Elevation Indicator
18. Stabiliser Position Set Indicator
19. Auxiliary Hydraulics Active Icon
20. Auxiliary Hydraulic Port Selector Menu Button
21. Pantograph Raise Indicator Icon
22. Pantograph Raise/Lower Actuation Button
23. Blind Spot Viewing Camera Icon
24. Blind Spot Viewing Camera Display Screen Button
25. Machine Error Status Details Menu Button
26. Machine Error Status Icon
27. Electronics System Functions Arrow Key Buttons
28. Electronics System Functions Menu Button
29. Electronics System Functions Menu Icon
30. MEWP Slew Position Indicator
31. MEWP Module Wind Speed Indicator
32. MEWP Slew Range Indicator
33. MEWP Platform Current Load Indicator
34. MEWP Platform Load Duty Range Indicator
35. Diesel Fuel Status Indicator
36. MEWP Boom Height Position Indicator
37. MEWP Boom Reach Position Indicator
38. Work Lights Status Icon
39. Work Lights On/Off Button
40. Sensor Status Information Icon
41. Sensor Status Information Menu Button
42. MEWP / Crane Stow Assist Icon
43. MEWP / Crane Stow Assist Activation Button
44. MEWP Cant Compensation Acknowledge Button
45. MEWP Cant Compensation Icon
46. Gauge Limits Virtual Wall Settings Menu Button
47. Gauge Limits Set Icon

Figure 20 - Platform Control Display Panel

If at any time an emergency stop button is pressed, which activates the emergency stop switch circuit, the display changes as shown on Figure 21. Press button 25 for more information.

Figure 21 - Emergency Stop Status Indicator

1 Max Gradient Range Indicator

Displays the maximum allowable angle (front to rear) for the machine in the current duty.

2 Current Gradient Indicator

Displays the current angle (front to rear) for the machine (figure displays in Red and interlock activates if the maximum is exceeded).

3 Top Bar

4 OEM Name
5 Data Logger Save to Memory status
6 Data Logger Download status
7 Data Logger Memory Full/Over Write
8 Data Logger Fault
9 E Stop Status Indicator
10 GPRS Signal Indicator
11 GSM Signal Indicator
12 Data logger Current Date
13 Data logger Current Time

14 Current Speed Indicator

Displays the current speed of the machine (figure displays in Red if the maximum is exceeded).

15 Max Speed Range Indicator

Displays the maximum allowable speed for the machine in the current duty.

16 Max Cant/Cross Elevation Range Indicator

Displays the maximum allowable angle (side to side) for the machine in the current duty.

17 Current Cant/Cross Elevation Indicator

Displays the current angle (side to side) for the machine (figure displays in Red and interlock activates if the maximum is exceeded).

18 Stabiliser Position Set Indicator

Shows the image of the MEWP stabilisers red and extended when in use, and green retracted when stowed.

19 Auxiliary Hydraulics Active Icon

Colour shows current status:

- White = Aux hydraulics off
- Green = Aux hydraulics active.

20 Auxiliary Hydraulic Port Selector Menu Button

Button illuminates when available. Selects mode and flow rate on truck auxiliary hydraulic port bank for each A and B service - Not available with MEWP and Crane modules fitted.

21 Pantograph Raise Indicator Icon

Colour shows current status:
- White = Pantograph raised
- Green = Pantograph stowed.

22 Pantograph Raise/Lower Actuation Button

Button illuminates when available. Press to raise/stow pantograph

23 Blind Spot Viewing Camera Icon

Colour shows current status:
- White = Cameras inactive
- Green = Cameras active.

24 Blind Spot Viewing Camera Display Screen Button

Button illuminates when available. Press to view the camera displays and choose cameras to tile/select.

25 Machine Error Status Details Menu Button

Button illuminates when available. Press to see additional status information and view active interlocks and system/sensor errors. Refer to Cab and Platform Display Error Codes section.

26 Machine Error Status Icon

Colour shows current status:
- Green = Systems and sensors normal
- White = System(s)/sensor(s) interlocked
- Red = System(s) problem/sensor error(s).

27 Electronics System Functions Arrow Key Buttons

Button illuminates when available. Press to navigate around function and status menus.

28 Electronics System Functions Menu Button

Button illuminates when available. Press to set customisable features such as screen contrast and brightness.

29 Electronics System Functions Menu Icon

Displays depending upon button 28 activity, such as screen contrast and brightness.

30 MEWP Slew Position Indicator

Shows the image of the MEWP boom slew position

31 MEWP Module Wind Speed Indicator

Shows the image of the MEWP wind speed indicator if fitted

32 MEWP Slew Range Indicator

Shows the image of the MEWP boom slew position

33 MEWP Platform Current Load Indicator

Displays the current load in the work platform (figure displays in Red if the maximum is exceeded).

34 MEWP Platform Load Duty Range Indicator

Displays the maximum allowable load in the work platform for the machine in the current duty.

35 Diesel Fuel Status Indicator

Displays the current fuel level of the machine

36 MEWP Boom Height Position Indicator

Displays the current MEWP boom elevation of the machine

37 MEWP Boom Reach Position Indicator

Displays the current MEWP boom radius of the machine

38 Work Lights Status Icon

Colour shows current status:

- White = Work lights off
- Green = Work lights on.

39 Work Lights On/Off Button

Button illuminates when available. Press to see additional status information on Truck and Module work lights and select which work lighting is on/off.

40 Sensor Status Information Icon

Colour shows current status:

- White = Electronic systems and sensors normal
- Red = Electronic systems problem/sensor error.

41 Sensor Status Information Menu Button

Button illuminates when available. Press to see additional individual Electronic sensor information/Electronic system fault status information for filters and system pressures (see below).

42 MEWP / Crane Stow Assist Icon

Colour shows current boom status:

- Green = Booms Stowed
- White = Inactive
- Blue = Active

43 MEWP / Crane Stow Assist Activation Button

Button illuminates when available. Press to activate or deactivate the feature. When active the crane and MEWP boom functions that are incorrect to enable the booms to be stowed are disabled.

44 MEWP Cant Compensation Acknowledge Button

Button illuminates when available. Press and hold to level the tilt table.

Before the Rail Gear, MEWP or Crane module will function, the Operator must ensure that the Tilt table is levelled to compensate the MEWP for Track Cant. It is recommended that the operator press to level at any time while the Compensation Icon is white to prevent the icon from going Red and the machine interlocks becoming active. This function is not available while the MEWP is stowed.

While the icon is Green the machine is optimised for Cant. The operator must press and hold both this button and an activation button on one of the joysticks to activate levelling correction. If the operator releases either button levelling will stop and the machine will not be fully compensated for the current angle of track cant. Pressing and holding the buttons is recommended until levelling stops automatically and the icon will go Green. If there is potential for the booms or platform to come into contact with anything during levelling the operator must release the button to stop the compensation system. If the icon is still Red then only tele in functions are available to manoeuvre away from the obstacle. If the icon is white then the machine will have all functions available to manoeuvre the machine away from the obstacle. Once clear of obstacles cant, compensation can be finished to enable a Green icon state.

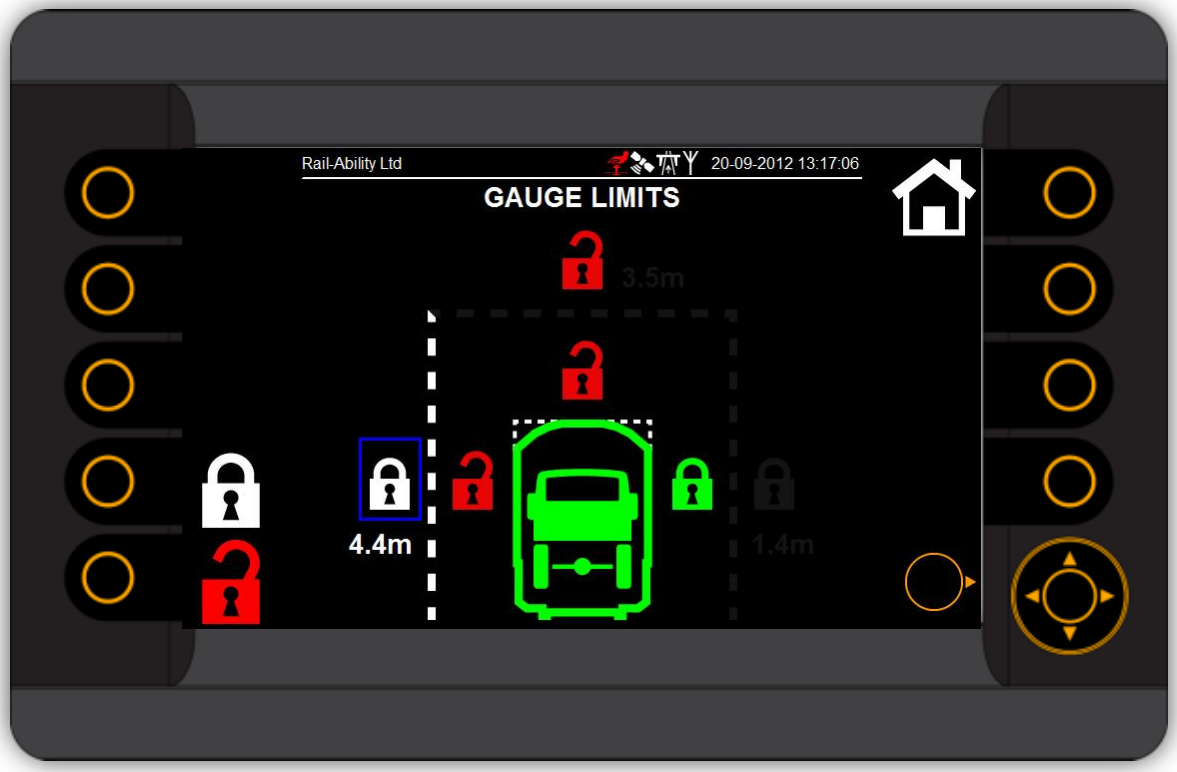
45 **MEWP Cant Compensation Icon**

Colour shows current status:

- Green = Cant Angle Good - No functions available
- White = Cant Angle Acceptable – Tilt Table Level function available
- Red = Cant Angle Exceeded – Interlocks active - Tilt Table Level function mandatory

46 Gauge Limits Virtual Wall Settings Menu Button

Button illuminates when available. Press to see additional status information and set gauge limits and virtual wall limits (shown below).



	Gauge Limit locked	Virtual Wall/Ceiling/Gauge Limit Unlocked	
	Virtual Wall/Ceiling Locked	Selected Icon	
	Virtual Wall/Ceiling value set from centre of 4 foot	Working Mode - Gauge limits exceeded	
	Travelling Mode - Machine stowed within Gauge limits	Gauge Limits/Set Virtual Wall Limits/Set Virtual Ceiling Limits - Exceeded	

47 Gauge Limits Set Icon

Changes colour to show current status:

- Green = all stowed in gauge rail travel mode
- White = working mode, out of gauge with set limits
- Red = Outside of gauge/outside of set limits.

Gauge & Virtual Wall/Ceiling limits can be set and dimensions applied from the platform position.

NOTE: LIMITS CANNOT BE DERESTRICTED OR DEACTIVATED FROM THE PLATFORM POSITION, EVEN IF THE BOOMS ARE ALL STOWED.

16 Cab and Platform Display Error Codes

A system error indicator menu is provided on the cab and work platform display controls panels to warn the operator in the unlikely event of a failure within the control system.

If an error condition exists, this indicator display will change the explanation mark icon to Red. When the associated button on the display unit is pressed, it will display the error menu page for a description of the error(s).

Before continuing to use the machine, contact Rail-Ability Ltd with details of the displayed error code(s) for advice.

17 Pre-Operation Actions

17.1 Requirements

It is the responsibility of the operator to perform a pre-operation inspection and routine maintenance.

Scheduled maintenance inspections shall be performed by qualified service technicians, according to the manufacturer's specifications, governmental regulations and the requirements listed in the Service Manual.

Repairs to the machine may only be made by a qualified service technician, according to the manufacturer's specifications. After repairs are completed, the operator must perform a pre-operation inspection again before going on to the function tests. If in doubt, contact Rail-Ability Ltd.

17.2 General

- Learn and practice the principles of safe machine operation contained in this operator's manual before carrying out these inspections.
- Avoid hazardous situations.
- Always perform a pre-operation inspection prior to use.
- Only use the machine as it was intended.

The pre-operation inspection is a visual inspection performed by the operator prior to each work shift. The inspection is designed to discover if anything is apparently wrong with a machine before the operator performs the function tests.

The pre-operation inspection also serves to determine if routine maintenance procedures are required. Only routine maintenance items specified in this manual may be performed by the operator.

If damage or any unauthorised variation from factory delivered condition is discovered, the machine must be tagged and removed from service.

Refer to the list in the Inspection section below and check each of the items in turn.

17.3 Inspection

- ❑ Ensure that the Operator's and Service manuals are complete, legible and in the storage container located in the cab.
- ❑ Ensure that all decals are legible and in place. See Decals section.
- ❑ Ensure gear shift lever is in neutral.
- ❑ Check engine and related components (e.g. radiator, alternator, belts, etc.). See MAN Manual detailed in section 4.
- ❑ Check for engine oil leaks and proper oil level. Add oil if needed. See Service Manuals.
- ❑ Check for hydraulic oil leaks and proper oil levels. Add oil if needed. See Maintenance section.
- ❑ Check tightness of wheel nuts.
- ❑ Check condition of tyres and wheels.
- ❑ Check for proper tyre pressure. Add air if needed. See Maintenance and Specifications sections.
- ❑ Check condition of axles, transmission and steering.

- Check operation of service and parking brake. See MAN Manual detailed in section 4.
- Check operation of the road and rail lights and warning beacons.
- Check for battery fluid leaks. See Service Manuals.
- Check cab windscreen and wipers.
- Check all electrical plugs are connected and hydraulic connections are coupled.
- Check all body-locks are engaged and locked.

Check the following components and areas for damage, improperly installed, loose or missing parts and unauthorised modifications:

- Electrical components, wiring, electrical cables and earth straps.
- Hydraulic power unit, tank, hoses, pipes, fittings, cylinders and manifolds.
- Batteries and connections.
- Fuel and hydraulic tanks.
- Turntable drive motor.
- Boom wear pads.
- Proximity switches, alarms and horns.
- Nuts, bolts, pins and other fasteners.
- Lubrication points.
- Platform entry gate.
- Platform levelling system.
- All control panels and displays.
- King-post doors.
- Tow bar.
- Fire extinguisher.
- Rail wheel hubs, treads, flanges and rail sweepers.
- Ladders, steps and hand rails.
- Guards and covers.

Check the entire machine for:

- Cracks in welds or structural components.
- Dents or damage to machine.
- Excessive wear, rust, corrosion or oxidation.

Ensure that all structural and other critical components are present and all associated fasteners and pins are in place and properly tightened.

- Following inspection, ensure that all compartment covers are in place and latched.

17.4 Completion

If any routine maintenance has been identified in these pre-operation actions, carry it out as specified in the Routine Maintenance section of this manual.

If no routine maintenance is required, carry out the Function Tests detailed in this manual.

18 Routine Maintenance

18.1 Requirements

It is the responsibility of the operator to perform routine maintenance as required by the pre-operation inspection.

Scheduled maintenance inspections shall be completed by qualified service technicians, according to the manufacturer's specifications, governmental regulations and the requirements specified in the Service Manual.

18.2 General

- Only routine maintenance items specified in this manual shall be performed by the operator.
- Use only manufacturer's original replacement parts. Contact Rail-Ability Ltd if in doubt.
- Machines that have been out of service for more than three months must receive at least the Quarterly Inspection before they are put back into service (see Service Manual in section 4).

Carry out the maintenance below as required by the Pre-operation Actions.

18.3 Engine Oil Level

Maintaining the proper engine oil level is essential to good engine performance and service life. Operating the machine with an improper oil level can damage engine components.

NOTICE Check the oil level with the engine off.

Refer to the OEM manuals detailed in section 4.

18.4 Hydraulic Oil Level

Maintaining the hydraulic oil at the proper level is essential to machine operation. Improper hydraulic oil levels can damage hydraulic components.

Daily checks allow the inspector to identify changes in oil level that might indicate the presence of hydraulic system problems.

NOTICE Perform this procedure with the boom in the stowed position.

1. Visually inspect the oil level in the hydraulic tank. The sight gauge is located on the side of the hydraulic oil tank (right hand side of vehicle cab). With the boom in its stowed position, the hydraulic oil level should be half way up the sight gauge.

2. Add oil if necessary using Hydraulic oil type ISO 46 Grade. Do not overfill.

18.5 Batteries

Proper battery condition is essential to good engine performance and operational safety. Damaged cables and connections can result in engine component damage and hazardous conditions.

Electrocution hazard.
Contact with hot or live circuits may result in death or serious injury. Remove all rings, watches and other jewellery.

Bodily injury hazard.
Batteries contain acid. Avoid spilling or contacting battery acid. Neutralise battery acid spills with baking soda and water.

1. Put on protective clothing and eye wear.

2. Be sure that the battery cable connections are tight and free of corrosion.

3. Be sure that the battery retaining fasteners are in place and secure.

18.6 Tyre Pressures

The tyres on the host machine detailed in section 4 are air filled.

To achieve optimum vehicle handling and minimize tyre wear, it is essential to maintain proper pressure in air-filled tyres.

Bodily injury hazard.
An over-inflated tyre can explode and could cause death or serious injury. Do not use temporary flat tyre repair products.

1. Check each front tyre (if applicable) with an air pressure gauge. Add air as needed.

For recommended tyre pressures refer to Specifications section of this manual.

18.7 Rail Wheels and Profiles

Maintaining the rail wheels in good condition is essential to safe operation and good performance. Excessive flange and/or tread wear could result in machine derailment and tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion

Bodily injury hazard.
Excessively worn rail wheels can develop sharp burrs due to material migration.

Tip-over hazard.
Do not attempt to re-machine and/or re-apply heat treatment to the rail wheels.

1. Check rail wheels friction drive hubs for missing or loose bolts.

2. Check condition of rail wheel treads and flanges for pitting scoring, bruising, flat spots or other damage.

3. Check that no cracks, flats or scoring are visible.

Refer to Service Manual listed in section 4 for further checks and limits.

18.8 Fuel Leaks

Failure to detect and correct fuel leaks will result in an unsafe condition. An explosion or fire resulting from a fuel leak may cause death or serious injury.

Explosion and fire hazard

Engine fuels are combustible. Inspect the machine in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach (one is also fitted inside the vehicle cab).

1. Perform a visual inspection in the areas surrounding the fuel tanks, hoses and fittings, fuel pump, fuel filter, fuel injection pumps and fuel injectors.

Explosion and fire hazard.
If a fuel leak is discovered, keep any additional personnel from entering the area and do not operate the machine. Repair the leak immediately.

18.9 Completion

Carry out the Function Tests detailed in this manual.

19 Function Tests

19.1 Requirements

It is the responsibility of the operator to perform Function Tests following Pre-operation Inspection.

19.2 General

The Function Tests are designed to discover any malfunctions before the machine is put into service.

- A malfunctioning machine must never be used. If malfunctions are discovered, the machine must be tagged and removed from service.
- Repairs to the machine may only be made by a qualified service technician, according to the manufacturer's specifications.
- After repairs are completed, the operator must perform a Pre-operation Inspection and carry out the Function Tests again before putting the machine into service. If in doubt, contact Rail-Ability Ltd.

Refer to the sections below and carry out each of the items in turn.

19.3 From Ground Level

1. Ensure that the battery isolator switch (located at the rear of the truck next to the auxiliary battery bank) is switched on.
2. Ensure that all Red Emergency Stop buttons are all pulled out to the 'ON' position. These are located at the work platform, stabiliser, in-cab and remote controls (if connected).
3. Confirm the front and rear rail gear are in the fully stowed (raised) position.

19.3.1 Rail Wheels

THE RAIL WHEELS MUST NOT BE ABLE TO BE TURNED BY HAND

4. Firmly hold each of the rail wheels in turn. Apply rotational force by pushing or pulling on the wheel.

    - Result: All of the wheels should NOT turn.

19.4 From the Vehicle Cab

5. Ensure the gear shift lever is in the neutral position.

6. Turn the ignition key in the cab to position 'two'.

7. Wait for the display to show the immobiliser PIN code entry interface.

8. Enter the correct immobiliser PIN code.

9. Enter the 8 digit sentinel PTS operator number. Ensure that this is correct.

19.4.1 Emergency Stop

10. Press the emergency stop button in the cab.

    - Result: The display will show Emergency Stop Active. The engine will still run.

11. Reset the emergency stop by pulling out the button.

19.4.2 Horn

12. Push the horn button on the rail travel joystick.

    - Result: The vehicle horn should sound.

19.4.3 Road Drive Braking

THE BRAKES MUST BE ABLE TO HOLD THE MACHINE ON ANY SLOPE IT IS ABLE TO CLIMB.

13. Release the park brake using the hand brake lever.

14. Select first gear and drive forwards slowly.

15. Brake firmly using the brake pedal.

    - Result: The machine should stop promptly and firmly.

16. Select neutral on the transmission.

19.4.4 Rail Gear Deployment

17. When instructed it is safe to do so by the machine controller, inspect the On-Tracking access point and ensure that it is suitably prepared.

18. When instructed it is safe to do so by the machine controller, drive the machine to the On-Tracking point and align the machine over the track.

19. Do not select the joystick rail gear acknowledge trigger.

20. Move the rear rail gear raise/lower roller down (back).

    - Result: The rail gear should not lower.

21. Press and hold the rail gear acknowledge trigger to activate the rail gear.

22. Move the rear rail gear raise/lower roller back (down).
    - Result: The rear rail gear will lower onto the rails and lift the machine off the ground.
    - Result: The display will indicate when the rear rail gear is partially deployed (Red rail wheel).
23. Repeat for the front rail gear using the other roller.
24. Move the front rail gear raise/lower roller down.
    - Result: The front rail gear will lower onto the rails and lift the machine off the ground.
    - Result: The display will indicate when the front rail gear is fully deployed (Green rail wheel).
25. Repeat for the rear rail gear using the previous roller.
26. Move the rear rail gear raise/lower roller down.
    - Result: The rear rail gear will fully lift the machine.
    - Result: The display will indicate when the rear rail gear is fully deployed (Green rail wheel).
    - Result: The track sweepers will fully deploy.
    - Result: The display will indicate when the track sweepers are fully deployed.

Note: The front rear gear should not deploy fully until the rear rail gear is fully deployed. The rear rail gear should not fully retract until the front rail gear is fully retracted. This ensures that the operator cannot induce excessive chassis angle while on and off tracking.

19.4.5 Rail Drive and Rail Braking

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE FRONT STEERING WHEELS ARE STRAIGHT.

27. Select tortoise gear. Press the travel acknowledge trigger drive and push the joystick forward to travel forwards slowly.
    - Result: The machine should move forwards.
28. Press the brake firmly.
    - Result: The machine should stop promptly and firmly.
29. Release the joystick to select neutral on the rail transmission.

THE FOOT BRAKES MUST BE ABLE TO HOLD THE MACHINE ON ANY SLOPE IT IS ABLE TO CLIMB.

30. With engine still running, leave the vehicle cab and close the door.

19.5 At the Remote Controls

31. Put the harness around your waist and adjust to be a snug but comfortable fit.

32. Press and hold the power button then press it once more.

    - Result: The unit will beep once and the 2 displays at the centre of the controls should illuminate.

    - Result: The orange light on the controls should flash and the unit becomes operational.

19.5.1 Emergency Stop

33. Press the emergency stop button.

    - Result: The emergency stop sign should illuminate on the display and no functions should operate.

34. Reset the emergency stop by pulling out the button.

19.5.2 Horn

35. Press the horn button (on the remote controls).

    - Result: The rail air horn should sound.

19.5.3 Rear Auto Stabiliser Set Feature

36. Unlock both rear stabiliser rotate mechanical locks.

37. Select Blue stabiliser mode on the remote controls.

38. Select Pink rear stabiliser mode on the remote controls.

39. Press and hold one of the joystick enable buttons and simultaneously press the stabiliser rotate switches.

    - Result: The rear corresponding stabiliser will fully retract then partially extend and the leg ram will rotated forwards as part of the pre-use set sequence. The sequence has finished after the stabiliser leg is deployed vertically downwards and the leg beam has fully retracted again. Continue to hold the button until this position is achieved for each rear leg.

40. Lock both rear stabiliser rotate mechanical locks.

19.5.4 Stabiliser Functions

PRIOR TO TESTING THE MACHINE FUNCTIONS, ENSURE THAT THE AREA SURROUNDING THE MACHINE IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

41. Without pressing the enable button on top of joystick 2 (right hand joystick), attempt to activate the stabiliser functions by moving the joystick backwards (towards you), forwards (away from you) and side to side.

    - Result: None of the boom or stabiliser functions should operate.

42. Press and hold the enable button at the top of joystick 2 (centre) and activate the travel function by moving the joystick backwards.

    - Result: If both booms are properly stowed the machine should move very slowly backwards.

43. Return joystick 2 to its neutral position.

44. Press and hold the enable button at the top of joystick 2 (centre) and activate the travel function by moving the joystick forwards.

    - Result: If both booms are properly stowed the machine should move very slowly forwards.

45. Return joystick 2 to its neutral position.

46. Press and hold one of the enable buttons at the top of joysticks and activate each of the rear stabiliser functions in turn by sequentially moving the joysticks in the corresponding directions to each function symbol. Release the joystick fully between each function check.

    - Result: The corresponding movement and direction of movement of the rear stabilisers should match the symbol in each case.

    - Result: The corresponding movement and direction of movement should discontinue in each case when the joystick is released.

    - Result: The corresponding movement and direction of movement should discontinue in each case when the acknowledge button is released.

47. Select Yellow front stabiliser mode on the remote controls.

48. Press and hold one of the enable buttons at the top of joysticks and activate each of the front stabiliser functions in turn by sequentially moving the joysticks in the corresponding directions to each function symbol. Release the joystick fully between each function check.

    - Result: The corresponding movement and direction of movement of the front stabilisers should match the symbol in each case.

    - Result: The corresponding movement and direction of movement should discontinue in each case when the joystick is released.

    - Result: The corresponding movement and direction of movement should discontinue in each case when the acknowledge button is released.

19.5.5 Crane Functions

PRIOR TO TESTING THE MACHINE FUNCTIONS, ENSURE THAT THE AREA SURROUNDING THE MACHINE IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

19.5.5.1 Lift Unfold Feature

49. Unlock both the crane stowage lock pins.

50. Select Green crane mode on the remote controls.

51. Select Yellow main boom mode on the remote controls.

52. Press and hold one of the joystick enable buttons and simultaneously push any function except main boom raise.

    - Result: None of the functions should operate.

53. Without pressing the enable button on top of joystick 2 (right hand joystick), attempt to activate the crane and work platform functions by moving the joystick backwards (towards you), forwards (away from you) and side to side.

    - Result: None of the crane or platform functions should operate.

54. Press and hold the enable button at the top of joystick 3 and activate the boom raise function by moving the joystick backwards until the boom is above horizontal.

    - Result: The boom should elevate.

55. Return joystick 3 to its neutral position.

56. Press and hold the enable button at the top of joystick 3 and activate the boom lower function by moving the joystick forwards. Release the joystick once the boom is below horizontal.

    - Result: The boom movement should stop.

57. Press and hold the enable button at the top of joystick 2 and move the joystick backwards (towards you).

    - Result: The boom should not unfold.

58. Press and hold the enable button at the top of joystick 3 and activate the boom lift function by moving the joystick backwards. Release the joystick once the boom is above horizontal.

    - Result: The boom movement should stop.

59. Press and hold the enable button at the top of joystick 2 and move the joystick forwards (away from you).

    - Result: The boom should now unfold.

60. If the Fly boom is fitted, select the Pink on the Boom selector switch.

61. Press and hold the enable button at the top of joystick 2 and move the joystick forwards (away from you).

    - Result: The fly boom should now unfold.

62. Press and hold the enable button at the top of joystick 1 and move the joystick forwards (away from you).

    - Result: The fly boom should extend.

63. Press and hold the enable button at the top of joystick 1 and move the joystick backwards (towards you).

    - Result: The fly boom should retract.

64. Press and hold the enable button at the top of joystick 1 and move the joystick to the right.

    - Result: The work crane should slew in an anti-clockwise direction.

65. Press and hold the enable button at the top of joystick 1 and move the joystick to the left.

    - Result: The work crane should slew in a clockwise direction.

66. Return the crane to its perpendicular position.

67. Using joystick 3, raise the boom so that it is at an angle of approximately 30 degrees above horizontal.

68. Press and hold the enable button at the top of joystick 3 (middle joystick) and move the joystick to the right.

    - Result: The winch should wind out (cable extend).

69. Press and hold the enable button at the top of joystick 3 (middle joystick) and move the joystick to the left.

    - Result: The winch should wind in (cable retract).

70. Select the Yellow on the Boom selector switch.

71. Press and hold the enable button at the top of joystick 1 and move the joystick forwards (away from you).

    - Result: The boom should extend.

72. Press and hold the enable button at the top of joystick 1 and move the joystick backwards (towards you).

    - Result: The boom should retract.

19.5.5.2 Slew Restriction

73. Slew the crane parallel with the vehicle over the MEWP boom.

74. **Enter the vehicle cab.**

75. Select the 'left hand slew restriction' by setting a left hand virtual wall lock at any distance using the cab display unit.

76. **Exit the vehicle cab.**

77. Press and hold the enable button on top of joystick 1 and move the joystick to the left.

    - Result: The boom should not slew over the left hand side of the machine.

78. Press and hold the enable button on top of joystick 1 and move the joystick to the right.

    - Result: The boom should slew clockwise but should come to a stop after approximately 180 degrees (½ turn) over the cab.

79. Move the joystick to the left to bring the boom back to the central, rearward position.

80. De-select the 'left hand slew restriction' by unlocking the virtual left hand wall.

81. Repeat the above steps for the 'right hand slew restriction'.

19.5.5.3 Boom Stowed Interlock

82. Use joysticks 1, 2 and 3 and the Yellow/Pink boom selector switch to lower the boom to its fully lowered and retracted, transport position.

    - Result: The boom stowed image should display on the cab display.

19.5.6 Rail Travel

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE FRONT STEERING WHEELS ARE STRAIGHT AND THAT THE INNER SIDE WALLS ARE NOT CONTACTING THE FRONT RAIL WHEELS.

PRIOR TO TESTING THE TRAVEL FUNCTION, ENSURE THAT THE AREA OF RAIL IN FRONT AND BEHIND YOU IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

83. Select Blue stabiliser mode.

84. Stand clear of the machine.

85. Press and hold the enable button at the top of joystick 3 (central joystick) and gently move the joystick forwards (away from you).

    - Result: The horn should sound automatically.
    - Result: The machine should travel slowly in the forward direction.
    - Result: The indicator readout on the In-Cab and remote control displays should display the correct current speed measurement which should not be able to exceed 2 mph for pedestrian mode.

86. Release the joystick gently.

    - Result: The machine should come to a stop.

87. Press and hold the enable button at the top of joystick 3 and gently move the joystick backwards (towards you).

    - Result: The horn should sound automatically.
    - Result: The machine should travel slowly in the rearward direction.
    - Result: The indicator readout on the In-Cab and remote control displays should display the correct current speed measurement which should not be able to exceed 2 mph for pedestrian mode.

88. Release the joystick gently.

    - Result: The machine should come to a stop.

19.5.7 Work Lights

89. Push the work lights button.

    - Result: The work lights should switch on.

90. Push the work lights button again.

    - Result: The work lights should switch off.

19.5.8 Cant Measurement

91. If possible, drive to a section of track that has a canted curve (side tilt roll angle).

    - Result: The indicator readout on the In-Cab and remote control displays should display the correct current cant measurement.

19.5.9 Gradient Measurement

92. If possible, drive to a section of track that has a gradient (pitch inclination angle).

    - Result: The indicator readout on the In-Cab and remote control displays should display the correct current gradient measurement.

93. **Select work platform controls.**

94. Turn the control position switch to the Red 'work platform' position.

95. Climb up to the vehicle deck. Enter the work platform and securely fasten the gate behind you.

19.6 At the Work Platform Controls

96. Connect the platform control power lead to the remote controls and dock the remote controls into the platform console.

    - Result: The platform screen will load the platform status display to show cant, speed, gradient, load, moments, etc.

19.6.1 Emergency Stop

97. Press the emergency stop button on the platform consol.

    - Result: The display unit will show the emergency stop symbol and no functions should operate.

98. Reset the emergency stop by pulling out the button.

19.6.2 Horn

99. Press the horn button on the controls.

    - Result: The air horn should sound.

19.6.3 Pre-Lift Feature

100. Press and hold one of the joystick enable buttons and simultaneously press and release the stow button on the platform display control panel.

    - Result: The boom will fully retract and the work platform will tilt forwards and backwards as part of the pre-use calibration sequence. Calibration has finished after the fourth tone. If the work platform is not level repeat the previous step.

19.6.4 Machine Functions

PRIOR TO TESTING THE MACHINE FUNCTIONS, ENSURE THAT THE AREA SURROUNDING THE MACHINE IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

101. Without pressing the enable button on top of joystick 2 (right hand Joystick), attempt to activate the boom and work platform functions by moving the joystick backwards (towards you), forwards (away from you) and side to side.

    - Result: None of the boom or platform functions should operate.

102. Select the Pink Mode on the boom selector switch.

103. Press and hold the enable button at the top of joystick 2 and activate the fly boom raise function by moving the joystick backwards.
    - Result: The fly boom should elevate.
104. Return joystick 2 to its neutral position.
    - Result: The fly boom movement should stop.
105. Select the Yellow Mode on the boom selector switch.
106. Press and hold the enable button at the top of joystick 2 and activate the main boom raise function by moving the joystick backwards until the boom is above the horizontal position.
    - Result: The main boom should elevate.
107. Return joystick 2 to its neutral position.
    - Result: The boom movement should stop.
108. Press and hold the enable button at the top of joystick 2 and activate the boom lower function by moving the joystick forwards. Release the joystick once the boom is approximately horizontal.
    - Result: The boom movement should stop.
109. Press and hold the enable button at the top of joystick 2 and move the joystick to the left.
    - Result: The work platform should rotate in an anti-clockwise direction.
110. Press and hold the enable button at the top of joystick 2 and move the joystick to the right.
    - Result: The work platform should rotate in a clockwise direction.
111. Return the work platform to its central position.
112. Using joystick 2, raise the boom so that it is at an angle of approximately 30 degrees.
113. Press and hold the enable button at the top of joystick 1 (left hand joystick) and move the joystick to the left.
    - Result: The boom should slew to the left (in a clockwise direction).
114. Press and hold the enable button at the top of joystick 1 and move the joystick to the right.
    - Result: The boom should slew to the right (in an anti-clockwise direction).
115. Slew the boom back to the central reward position.
116. Press and hold the enable button at the top of joystick 1 and move the joystick forwards (away from you).
    - Result: The boom should extend.
117. Press and hold the enable button at the top of joystick 1 and move the joystick backwards (towards you).
    - Result: The boom should retract.

19.6.5 Rail Travel

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE FRONT STEERING WHEELS ARE STRAIGHT AND THAT THE INNER SIDE WALLS ARE NOT CONTACTING THE FRONT RAIL WHEELS.

PRIOR TO TESTING THE TRAVEL FUNCTION, ENSURE THAT THE AREA OF RAIL IN FRONT AND BEHIND YOU IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

118. Press and hold the enable button at the top of joystick 3 (central joystick) and gently move the joystick forwards (away from you).

    - Result: The horn should sound automatically.
    - Result: The machine should travel slowly in the forward direction.
    - Result: The indicator readout on the platform console and control displays should display the correct current speed measurement which should not be able to exceed 6 mph for MEWP mode.

119. Release the joystick gently.

    - Result: The machine should come to a stop.

120. Press and hold the enable button at the top of joystick 3 and gently move the joystick backwards (towards you).

    - Result: The horn should sound automatically.
    - Result: The machine should travel slowly in the rearward direction.
    - Result: The indicator readout on the platform console and control displays should display the correct current speed measurement which should not be able to exceed 6 mph for MEWP mode.

121. Release the joystick gently.

    - Result: The machine should come to a stop.

19.6.6 Corrective Tilt Function

122. If possible, drive to a section of track that exceeds approx. 65 mm cant (side tilt angle of 2.5 degrees).

    - Result: Rail travel and all other functions (except telescope in) should cut out. The indicator light in the corrective tilt button and the over-tilt indicator will display on the console screen panel. A low frequency buzzer should also sound.

123. Press and hold the enable button (on either the left or right hand joystick) and press and hold the corrective tilt button on the platform console display unit.

    - Result: The king-post will level itself to within its side to side limits. All functions should again be operable. The indicator will no longer be showing on the screen and the buzzer should not sound.

19.6.7 Work Lights

124. Push the work lights button.

    - Result: The work lights should switch on.

125. Push the work lights button again.

    - Result: The work lights should switch off.

19.6.8 Boom Stowed Interlock

126. Press the stow button on the platform console screen.

127. Use joysticks 1 and 2 to fully retracted, and manoeuvre the boom towards the transport position.

    - Result: Only the correct boom functions to assist in stowing the boom should be available.

    - Result: On approach the boom should stop and the stow button should illuminate again.

128. Press the stow button on the platform console screen.

    - Result: The king post should align perpendicular to the chassis angle for transport.

129. Use joysticks 1 and 2 to lower the main boom and then fly boom to their fully lowered and retracted, transport position.

    - Result: The boom stowed icon should display Green.

130. Disconnect the remote controls and stow them in the designated storage area.

131. Exit the work platform and climb back down to ground level using the three points of contact procedure at all times (two hands one foot, or two feet one hand in contact with the white coloured approved hand rails and steps).

IF ANY MALFUNCTIONS ARE FOUND, TAG AND REMOVE THE MACHINE FROM SERVICE.

REPAIR ANY MALFUNCTIONS, PERFORM THE PRE-OPERATION INSPECTION AND FUNCTION TESTS AGAIN BEFORE OPERATING THE MACHINE.

19.7 Completion

If the machine is to be used, carry out the Workplace Assessment detailed in this manual.

20 Workplace Assessment

20.1 Requirements

It is the responsibility of the operator to perform Workplace Assessment following Function Tests.

20.2 General

The workplace assessment helps determine if the workplace is suitable for safe machine operation. It should be performed by the operator prior to moving the machine to the workplace.

20.3 Assessment

Assess for the following potential obstacles and hazardous situations as they may hurt people, damage both the vehicle and the crane, and cause the vehicle to overturn:

- Hazardous locations.
- OHLE power cables.
- Overhead and high voltage conductors.
- Obstructions, including:
  - Building walls
  - Balconies
  - Eaves
  - Scaffoldings
  - Tree branches.
- Any items that may lift the vehicle.
- Other machines.
- Inadequate surface support to withstand all load forces imposed by the machine.
- Wind and weather conditions.
- The presence of unauthorised personnel.
- Any possible unsafe conditions.
- Cant – not to exceed 150 mm.
- Ballast shoulder – not too high or too low.
- Deep cess or soft cess.
- Drainage routes, troughing routes and other services/cables.

Make sure that there is no risk of elements falling on the operator or on the crane and take the right precautions to prevent it.

Ensure any items assessed as hazardous above are addressed before the machine can be used.

20.4 Completion

If the machine is to be used, carry out the Operating Instructions detailed in this manual.

21 Operating Instructions

21.1 Requirements

It is the operator's responsibility to follow all the safety rules and instructions in this Operator's Manual and all the other documents listed in section 4 of this manual.

Only trained and authorised personnel should be permitted to operate the machine.

If more than one operator is expected to use a machine at different times in the same work shift, they must all be qualified operators and are all expected to follow all safety rules and instructions in this Operator's Manual and all the other documents listed in section 4 of this manual.

21.2 General

A malfunctioning machine must never be used. If malfunctions are discovered, the machine must be tagged and removed from service.

Prior to use, ensure the following:

1. Learn and practice the principles of safe machine operation contained in this operator's manual.
2. Perform Pre-operation Actions.
3. Perform Function Tests.
4. Carry out a Workplace Assessment.

These Operating Instructions detail each aspect of machine operation.

21.3 Emergency Stop

Ensure that all personnel, either operating or working alongside this machine, are aware of the locations and function of the emergency stop buttons.

The emergency stop buttons are located in the vehicle cab, at the stabiliser controls, the work platform controls and (if supplied) the remote controls.

The emergency stop function provides a facility to isolate machine functions in the event of an emergency situation.

- To stop all functions push any of the Red emergency stop buttons to the 'OFF' position.

An indicator light on each panel will illuminate when any of the emergency stop buttons have been depressed. The engine will continue to run when an emergency stop button has been pressed.

Repair any function that operates when any of the emergency stop buttons are depressed.

- To reset all functions, pull out any Red emergency stop buttons that may have been depressed.

21.4 Switch Selection

Many of the operating instructions that follow require the two function selector switches to have specific selections. These selections have been denoted in this manual as per the colour associated with the switch/selection combination position and are in bold, italic and underlined.

The first function selector switch (to the left of the other selector switch) has three positions and each position is as shown below:

- Left (anticlockwise) is for Crane ***Green***
- Middle (centred) is for MEWP ***Red***
- Right (clockwise) is for stabilisers ***Blue***

The second function selector switch (to the right of the other selector switch) has two positions whose action is variable. Each position is as shown below:

- Left (anticlockwise) ***Yellow***
- Right (clockwise) ***Pink***

Where a position is not relevant and any choice will suffice, this is denoted as ***Any***.

Throughout these instructions, there is always two of the above and these are simply stated to enhance clarity. For example, to raise the main MEWP boom is denoted "Select ***Red*** and ***Yellow***".

21.5 Deploying the Rail Gear

The rail gear can only be deployed using the controls located in the vehicle cab. These controls are located on the two panels to the right of the driver's seat.

- To deploy the rear rail gear, push and hold the front/rear rail gear acknowledge switch. Move the rear rail gear raise/lower lever away to lower the rear rail gear. Once the rear rail gear is fully deployed, the indicator screen will confirm.

- To deploy the front rail gear, push and hold the front/rear rail gear acknowledge switch. Move the front rail gear raise/lower lever away to lower the front rail gear. Once the rail gear is fully deployed, the indicator screen will confirm.

The steering lock is activated and deactivated automatically when the front rail axle is deployed and retracted respectively. If the steering is miss aligned the front rail axle must be raised slightly to disengage the tyre contact from the rail wheel drive hubs and to unlock the steering. The current steering wheel position and steering lock status is displayed on the status screen in the cab.

- To retract the rail gear, select the front/rear rail gear acknowledge switch as required. Move the appropriate rail gear raise/lower lever towards (left) to raise the front rail gear then the rear rail gear.

Once the boom has been fully stowed and both front and rear rail gear have been fully raised, the machine will shut down the rail lights and rail mode systems and activate the road lighting systems automatically.

The vehicle is now in road mode and can be driven using the normal cab controls. Follow the Off-Tracking procedure described in this manual and the relevant Rail-Ability manual.

21.6 Drive on Rail

21.6.1 From Vehicle Cab

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE FRONT STEERING WHEELS ARE STRAIGHT.

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE AREA OF RAIL IN FRONT AND BEHIND YOU IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

When on rail, with the front and rear rail gear fully deployed, the machine can be driven forwards and backwards using the cab rail drive controls. If the boom is fully stowed, 1st, and 2nd gears are available. Once the boom is elevated, no drive function is available from the cab, and the machine must be driven using the work platform controls.

- The travel confirm trigger must be pressed while selecting the direction of travel to enable drive.

- To move the entire machine forwards from the cab, select tortoise on the display. Gently press the joystick in the forward direction to reach the desired speed. Higher speeds can be obtained by further selecting rabbit on the display and press the accelerator if required.

- To move the entire machine backwards from the cab, select tortoise on the display. Gently press the joystick in the rearward direction to reach the desired speed. Higher speeds can be obtained by further selecting rabbit on the display and press the accelerator if required.

21.6.2 With Platform Elevated (from work platform controls only)

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE FRONT STEERING WHEELS ARE STRAIGHT.

PRIOR TO DRIVING ON RAIL, ENSURE THAT THE AREA OF RAIL IN FRONT AND BEHIND YOU IS CLEAR OF ANY OBSTRUCTIONS OR PERSONNEL. SOUND THE HORN AND USE A MACHINE CONTROLLER OR 'BANKSMAN' IF NECESSARY.

Drive controls are provided at the remote and work platform control panels. The joystick controlling forwards and reverse rail travel is proportional and includes a ramp up and down feature, to ensure smooth starting and stopping.

Travel with the work platform elevated is only permitted when the controls are docked in the work platform in rail mode, with rail wheels fully deployed.

- To move the entire machine forwards, press and hold the enable button and slowly move the drive joystick in the direction indicated by the Red arrow.
- To move the entire machine backwards, press and hold the enable button and slowly move the joystick in the direction indicated by the Red arrow.
- To increase speed in either direction, move the joystick further away from its centre position.
- To decrease speed in either direction, move the joystick towards the centre position.

21.7 Work Lights

The work lights on the booms can be switched on and off by using either of the pushbuttons on the In-Cab and work platform control display panels. The lights can be switched on at one panel and switched off at another for ease of use.

- To switch the work lights ON, push the button on either the in-cab or work platform panels.
- To switch the work lights OFF, push the button on either the in-cab or work platform panels.

The work lights will switch off automatically if the battery voltage drops to 21½ Volts to ensure that the control system remains functional and allows boom functions to operate. If the work lights switch off automatically, recharge the batteries.

LED working lights have been fitted to the MEWP module and to the Crane module and Cab to keep the current requirements low at 24 volts. Under no circumstances can these be replaced, exchanged or have additional lights added with standard filament type bulbs.

21.8 Stabilisers

OPERATING INSTRUCTIONS The data following came from FASSI page 33 (their section 13 and 13.1).

21.8.1 General

- Select ***Blue*** and ***Any***.

The outriggers rams prevent damaging stresses both to the frame and to the vehicle suspensions on which the crane is mounted to and assure the stability of the unit during load handling.

NOTE: The machine stability is maintained by the maximum extension of the outrigger supports, the solidity of the base underneath the plates of the outrigger rams and the observance of the capacity plates. To check the maximum working pressure see the Specifications section in this manual.

21.8.2 Engage

- Ensure that the rear leg rotators are mechanically unlocked from the up position
- The rear stabiliser beams must be extended partially before the leg rams can be rotated down
- Ensure that the rear leg rotators are mechanically locked in the down position (MEWP module will then be enabled)
- Stabiliser leg rams must be fully raised before the leg beam can be extended
- In road mode, stabilize the vehicle on a horizontal plane with a maximum tolerance of 1.5 degrees.
- In rail mode stabilise the machine at the current angle of the cant and gradient (Do not attempt to level the machine)
- In rail mode the front stabilisers deploy first then the rears
- In rail mode the leg beams must be extended beyond the sleeper ends

When stabilization is complete the wheels of the vehicle must still be in contact with the ground and the suspensions must not be fully unloaded.

21.8.3 Adjust During Use

While loading, it may be necessary to vertically adjust the outrigger rams to prevent an overload on the outriggers.

While unloading, the outrigger rams may not be perfectly in contact with the ground because of a rise in the suspension, it is therefore recommended to stabilize the vehicle during operation to avoid an overturn.

- If the leg rams are not fully deployed and set the work light on the associated leg will be illuminated solid
- If the leg rams are fully deployed and set the work light on the associated leg will be illuminating in steady pulses
- It is only possible to deploy the leg rams further one side of the vehicle, if the booms are both over that same side (or stowed) in road mode only.

21.8.4 Disengage

- In rail mode all legs have to be fully stowed to travel the machine
- Ensure that the rear leg rotators are mechanically unlocked from the down position
- The rear stabiliser beams must be retracted partially before the leg rams can be rotated up
- Ensure that the rear leg rotators are mechanically locked in the up position (MEWP must be

stowed – MEWP module will then be disabled)

- Stabiliser leg rams must be fully raised before the leg beam can be retracted
- In rail mode the rear stabilisers must retract first then the fronts
- When the legs and leg beams are fully stowed for travel the work light on the associated leg will be off.

21.9 Restricting the Operating Envelopes

21.9.1 General

It may be necessary to use the slew restriction if the machine is working alongside a rail line which is still in service. This feature prevents the boom from accidentally being slewed over the adjacent track and therefore presenting a significant collision hazard. The slew restriction must be used in these circumstances as follows:

- To set the virtual wall over the left hand side of the machine, with the platform stowed, lock and set the parameters in the vehicle cab utilising the virtual wall menu screen on the dashboard display panel.
- To set the virtual wall over the right hand side of the machine, with the platform stowed, lock and set the parameters in the vehicle cab utilising the virtual wall menu screen on the dashboard display panel.
- To set the virtual ceiling above the machine, with the platform stowed, lock and set the parameters in the vehicle cab utilising the virtual wall menu screen on the dashboard display panel.

The settings above are used to restrict slew movement when using the crane and the MEWP, which behave differently as detailed below.

21.9.2 Crane

ENSURE THAT THIS FUNCTION IS TESTED FOR CORRECT OPERATION PRIOR TO RELYING ON IT.

The Crane will not work to the exact virtual wall setting and instead is restricted to slew limited sectors. As such, the crane operations on the related side of the machine will be disabled from the centre line of the machine due to unknown load size parameters. This limitation is implemented in relation to ORR defined best practice guidance.

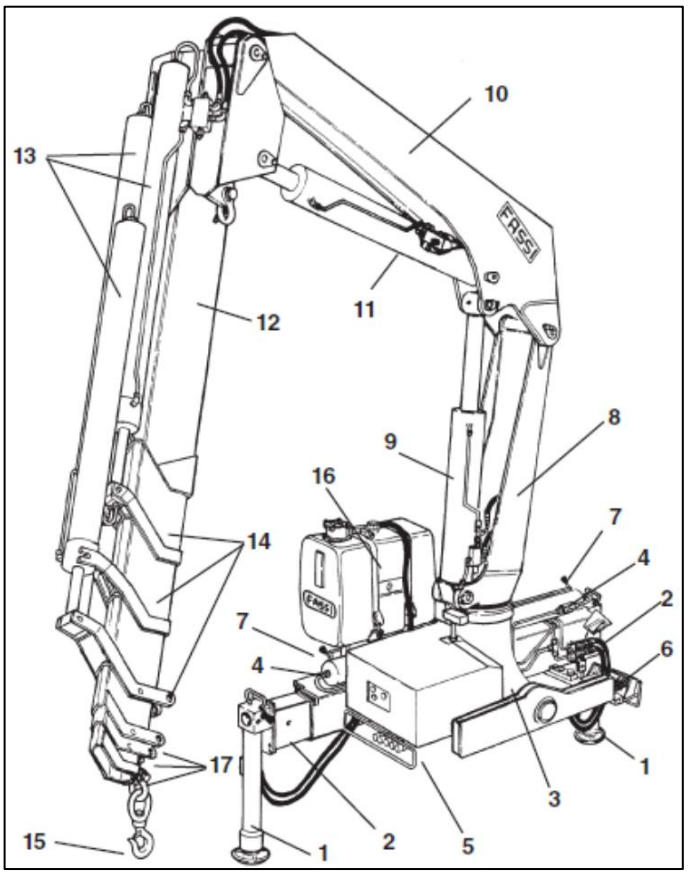
21.9.3 MEWP

ENSURE THAT THIS FUNCTION IS TESTED FOR CORRECT OPERATION PRIOR TO RELYING ON IT.

Unlike the Crane, the MEWP will work to the exact virtual wall setting because MEWP operations on the related side of the machine will only be interlocked when the virtual wall/ceiling is approached. This additional functionality is due to known physical size parameters allowing virtual walls in relation to best practice guidance

21.10 Crane Booms

21.10.1 General



The crane parts are shown on the right:

1. Outrigger rams
2. Outrigger supports
3. Base
4. Rotation cylinders
5. Distributor for crane-outriggers
6. Double control for crane-outriggers
7. Deviator control for selecting the rams
8. Column
9. Inner ram
10. Inner boom
11. Outer ram
12. Outer boom
13. Booms extension rams
14. Extension boom sections
15. Lifting hook
16. Oil tank
17. Manual extensions (optional).

Boom control joysticks are provided at the work platform/remote controls. The joysticks controlling the boom movements (raise, lower, extend, retract and slew) are proportional. This means that the further a joystick is moved from its neutral (centre-off) position the faster that motion is. The joysticks also incorporate a ramp-up and ramp-down feature which enables the smooth starting and stopping of movements. The crane auxiliary functions are not proportional and therefore only have one speed.

An 'enable' button is fitted to each joystick, which is of a 'hold to run type'. This means that the button must be pressed and held prior to that particular joystick being actuated before any movement can take place. If an enable button is pressed but the joystick is not moved within 5 seconds, the system will reset and the button must be released and pressed once again.

Toggling the snail/tortoise/rabbit switch changes the speeds of the boom movements. Snail is a very **slow** operating speed. Selecting rabbit is for **normal** operating speeds. Tortoise Slow speeds and snail, very slow speeds are useful when manoeuvring the work platform and crane alongside each other and around fixed work locations. Note that only the slow speed controls are available when using the booms at long extensions.

To operate the Crane boom from its stowed position, the un-stow instructions below must be undertaken to ensure the operator does not damage the crane or truck during the unfolding process. The plate DE4452A indicates the sequence of the manoeuvres to be carried out to unfold and to fold the crane.

- Select Green Crane mode on the remote controls or from the platform console position.

After use, the stow sequence must be undertaken to ensure the operator does not damage the crane or truck during the folding process.

21.10.2 Un-Stow

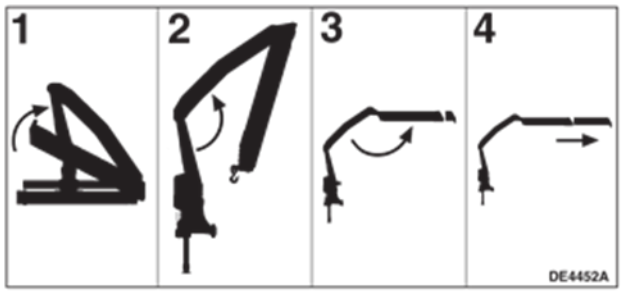
- Select ***Green*** and ***Any***.
- Engage the power take off.

- Stabilize the vehicle using the stabilisers.

DO NOT OPERATE FROM THE DOUBLE CONTROL SIDE.

OPERATE FROM GROUND CONTROL DISTRIBUTOR SIDE.

- Un-stow (as shown in the figure below) by using the appropriate joysticks:
  1. Make sure that the extension booms and the outer ram are closed.
  2. Lift the inner boom over the horizontal line.
  3. Open the outer boom to the "horizontal" position.
  4. Position the hook on the vertical line above the load.



21.10.3 Main

- Select ***Green*** and ***Yellow***.
- To raise the main boom, press and hold the enable button, then move the middle joystick on the controls backwards (towards you).
- To lower the main boom, press and hold the enable button, then move the middle joystick on the controls forwards (away from you).
- To extend the boom, press and hold the enable button, then move the left hand joystick on the controls forwards (away from you).
- To retract the boom, press and hold the enable button, then move the left hand joystick on the controls backwards (towards you).

21.10.4 Knuckle

- Select ***Green*** and ***Yellow***.
- To raise the knuckle boom, press and hold the enable button, then move the right hand joystick on the controls backwards (towards you).
- To lower the knuckle boom, press and hold the enable button, then move the right hand joystick on the controls forwards (away from you).

21.10.5 Fly

- Select ***Green*** and ***Pink***.
- To raise the fly boom, press and hold the enable button, then move the right hand joystick on the, controls backwards (towards you).
- To lower the fly boom, press and hold the enable button, then move the right hand joystick on the controls forwards (away from you).
- To extend the fly boom, press and hold the enable button, then move the left hand joystick on the controls forwards (away from you).

- To retract the fly boom, press and hold the enable button, then move the left hand joystick on the controls backwards (towards you).

21.10.6 Winch

- Select ***Green*** and ***Pink***.
- To winch out, press and hold the enable button, then move the middle joystick on controls to the right.
- To winch in, press and hold the enable button, then move the middle joystick on controls to the left.

21.10.7 Slew

NOTICE **THE SLEWING CONTROLS ARE REVERSED ON THE WORK PLATFORM, WHEN COMPARED TO THE REMOTE CONTROL PANELS. THIS IS BECAUSE WHEN THE OPERATOR IS FACING THE WORK PLATFORM CONTROL PANEL HE IS FACING IN THE OPPOSITE DIRECTION.**

- At the work platform controls:
  - Select ***Green*** and ***Any***.
  - To slew the boom in a clockwise direction, press and hold the enable button, then move the left hand joystick to the left.
  - To slew the boom in an anti-clockwise direction, press and hold the enable button, then move the left hand joystick to the right.

The slewing mechanism has a maximum rotation of 200 degrees (½ turn) clockwise and 200 degrees (½ turn) anti-clockwise from the central stowed position. From one extreme to the other this permits 400 degrees, a little over 1 full rotation, as indicated on the panels.

21.10.8 Load Handling

21.10.8.1 General

NOTICE **Before manoeuvring the load, verify that the working area is suitable for the crane.**

The lifting curves of the capacity plate indicate the maximum load that the crane can lift at a certain radius and at a certain height. To utilize the maximum capacity of the crane, it is necessary to position the inner boom as indicated on the capacity plate. During load handling, do not exceed the reach limits given, or the load indicated on the above mentioned charts. If the limits are exceeded, the limiting device will be activated.

21.10.8.2 Lifting Moment Limiting Device

A characteristic which permits the classification of cranes is their lifting capacity or maximum lifting moment. The moment is defined by the value obtained from the weight of the load to be lifted (**kg**) by its distance (**metres**) from the centreline of the crane rotation.

The "lifting moment limiting device" preserves the crane structure from overloads, as it prevents any movement which increases the value of the moment up to the maximum established value.

21.10.8.3 Manoeuvres of the crane

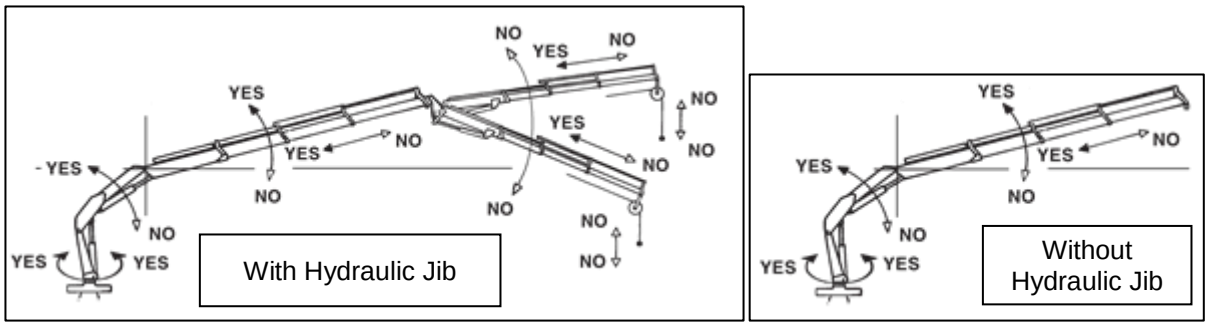
The four figures below illustrate the configurations of the crane (and of the eventual hydraulic extension) with the manoeuvres allowed and not allowed by the device, in relation to the horizontal position of the crane and extension of outer booms.

In the overload condition, if you simultaneously effect one permitted and one non permitted

manoeuvre no movement will occur. In the overload condition, before effecting a permitted manoeuvre, it is necessary to return all the levers to the neutral position.

During load handling with the crane, and with the hydraulic fly jib, in a vertical configuration or close to, the operator must refer to the loads indicated on the capacity plates since the limiting device is not particularly sensitive with vertical lifts.

21.10.8.4 Crane Above Horizontal



Crane with activated limiting device by the intervention of the crane or the hydraulic jib (overload condition) and with outer boom of the crane above the horizontal line (as shown above).

Manoeuvres not allowed:

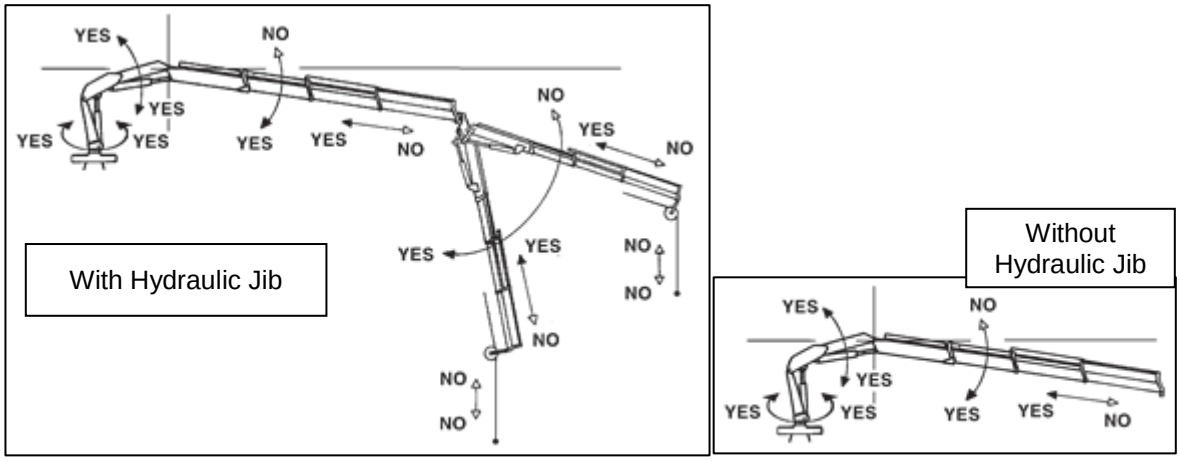
- Inner boom descent
- Outer boom descent
- Extension of the crane extension boom sections (*)
- Lift and descent of the hydraulic jib
- Extension of the extension booms section of the jib
- Winch rope lift
- Movement of the hydraulic accessories (**).

NOTES: (*) If the overload condition has been activated by the hydraulic extension, the extension of the crane boom sections is permitted.
(**) It is permitted only when coupled with permitted manoeuvres.

Manoeuvres allowed:

- All the manoeuvres that bring the load closer to the column and therefore the overload
- Rotation in both directions
- Inner boom lift
- Outer boom lift
- Re-entry of the crane extension boom sections
- Re-entry of the jib extension boom sections
- Winch rope descent.

21.10.8.5 Crane Under Horizontal



Crane with activated limiting device by the intervention of the crane or the hydraulic jib (overload condition) and with outer boom of the crane under the horizontal line (as shown above).

Manoeuvres not allowed:

- Inner boom lift
- Outer boom lift
- Extension of the crane extension boom sections (*)
- Lift of the hydraulic jib
- Extension of the extension booms section of the jib
- Winch rope lift
- Movement of the hydraulic accessories (**)

NOTES: (*) If the overload condition has been activated by the hydraulic extension, the extension of the crane boom sections is permitted.
(**) It is permitted only when coupled with permitted manoeuvres.

Manoeuvres allowed:

- All the manoeuvres that bring the load closer to the column and therefore the overload fig. 20c
- Rotation in both directions
- Inner boom descent
- Outer boom descent
- Re-entry of the crane extension boom sections
- Descent of the hydraulic jib
- Re-entry of the extension booms section of the jib
- Winch rope descent.

21.10.8.6 Crane with Activated Winch Load Limiter

Crane with activated limiting device (overload condition) by the intervention of the load limiter of the winch.

Manoeuvres allowed:

- Rotation in both directions
- Re-entry of the crane extension boom sections
- Re-entry of the jib extension boom sections
- Winch rope descent.

Manoeuvres not allowed:

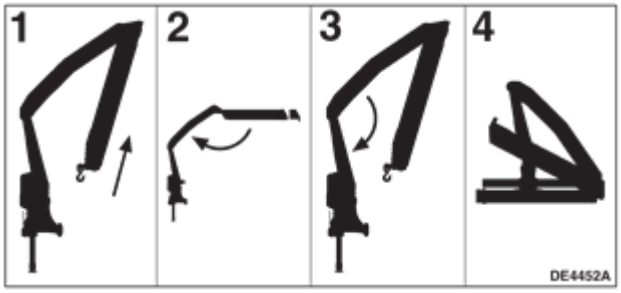
- All other movements.

21.10.9 Stow

DO NOT OPERATE FROM THE DOUBLE CONTROL SIDE.

OPERATE FROM GROUND CONTROL DISTRIBUTOR SIDE.

- Select ***Green*** and ***Any***.
- Press the stow button. All of the incorrect functions and movements will then be disabled to assist the operator.
- Stow (as shown in the figure below) by using the appropriate joysticks:
  1. Fold the extension booms to their stroke end.
  2. Lift the inner boom to its stroke end.
  3. Fold the outer boom to its stroke end. Rotate the crane until the reference arrows coincide (on the column and on the base). Press and hold the enable button on the right hand joystick and simultaneously press and hold the stow button. The lower function will re-enable and reduce in speed.
  4. Fold the inner boom to its stroke end; the rest locating pin locates into its C retainer and the locking pin contacts the crane base members.



- If this marks completion of a task, prior to and before movement occurs, re-position the outriggers to within the overall vehicle width.

21.11 Work Platform

- Select Red MEWP mode on the remote controls or from the platform console position.

21.11.1 Level

The level of the work platform can only be adjusted when in 'rail mode', with rail wheels fully deployed.

- Select ***Red*** and ***Any***.
- To level the work platform, press and hold an enable button (on either the left or right hand joystick) and press and hold the corrective tilt button.

This function is only available when on rail and is mandatory following excess cant angle resulting in an over-tilt condition. The boom 'telescope in' function is available in an over-tilt condition, if required.

In 'road mode', i.e. when the work platform is elevated when on stabilisers with the rail gear retracted, the platform will remain within 4 degrees of the horizontal in all directions, as long as the chassis inclination does not exceed 3 degrees.

21.11.2 Auxiliary Hydraulic Ports

Two ports are provided at the right hand side of the work platform controls for the connection of hydraulically powered tools. These ports are labelled A and B and can be selected individually from the switch on the control panel.

An ON/OFF button is provided on the platform console display panel to start and stop the hydraulic supply once a tool is connected to the selected port. An indicator lamp within the button illuminates when the hydraulic supply is connected to the tool. If the A/B selector switch is actuated when a tool is being powered, then power to that tool is automatically stopped.

21.11.3 24 Volt DC Supply

A socket is provided at the right hand side of the work platform controls for the connection of 24 volt DC equipment with a maximum of 10 amp current requirement. Unscrew the protective blue plastic cap and connect equipment as required. Be sure to replace the protective cap when not in use.

21.11.4 110 Volt AC Supply

A socket is provided at the right hand side of the work platform controls for the connection of 110 volt AC equipment. Lift the protective yellow plastic cap and connect equipment as required. Be sure to replace the protective cap when not in use.

21.11.5 Load Sensing System

This machine is fitted with a system that measures the load within the work platform. When the load in the work platform is nearing its limit, the amber range bar on the platform control display will display. If the rated capacity of the work platform is exceeded then the Red overload warning bar flashes on the platform control display and a high frequency buzzer sounds. All functions are locked out, preventing any further boom movement - the overload must be removed to enable functions again and the overload value is data logged and time and date stamped.

Once the overload is removed from the work platform the warning display ceases to flash, the buzzer ceases to sound and boom functions are again available.

Where there is an instance whereby an overload cannot be removed, carry out the sensing system over-ride.

21.11.6 Moment Sensing System

This system monitors the combination of the load in the work platform coupled with the outreach of the boom. The amber warning icon displays when the work platform load/outreach combination is approaching its limit. The Red warning icon displays when the limit has been reached. Once the limit is reached all functions except boom retract (telescope in) are interlocked. This enables the operator to retract the boom to bring the load/outreach combination back to within its limit.

Where there is an instance whereby an overload cannot be removed, carry out the sensing system over-ride.

21.11.7 Sensing System Over-ride

There may be an instance whereby an overload cannot be removed, for example if the load sense system has been triggered due to contact with an external fixed structure. In such an instance it may be necessary to release the machine by other means. An over-ride system is provided for such a situation, however this must only be used when the work platform overload cannot easily be removed.

- Break the orange tag on the cover plate
- Press and hold the green button underneath to re-enable the controls.

This function is available for five seconds in a 30 second period. This 5 second period is identified by 5 short tones from the vehicle horn. After 30 seconds a long tone sounds from the vehicle horn to identify that the button can be repressed and held again. The button can be pressed and held to reactivate the controls an unlimited number of times in order to get the machine into a safe state or to remove the exceedance.

Having used this system the blue LED strip round the perimeter of the platform will go off until the machine has been inspected by the manufacturer.

NOTE THAT IT IS POSSIBLE TO OVERSTRESS AND OVERTURN THE MACHINE WHILE THE SAFETY SYSTEMS ARE OVERRIDDEN. THE OPERATOR SHOULD PRIORITISE THE USE OF THE TELE IN FUNCTION WHEREVER POSSIBLE TO ASSIST IN CORRECTING THE SITUATION.

21.12 MEWP Boom

21.12.1 General

Boom control joysticks are provided at the work platform/remote controls. The joysticks controlling the boom movements (raise, lower, extend, retract and slew) are proportional. This means that the further a joystick is moved from its neutral (centre-off) position the faster that motion is. The joysticks also incorporate a ramp-up and ramp-down feature which enables the smooth starting and stopping of movements. The crane auxiliary functions are not proportional and therefore only have one speed.

An 'enable' button is fitted to each joystick, which is of a 'hold to run type'. This means that the button must be pressed and held prior to that particular joystick being actuated, and any movement taking place. If an enable button is pressed but the joystick is not moved within 5 seconds, the system will reset and the button must be released and pressed once again.

Toggling the snail/tortoise/rabbit switch changes the speeds of the boom movements. Snail is a very **slow** operating speed. Selecting rabbit is for **normal** operating speeds. Tortoise Slow speeds and snail, very slow speeds are useful when manoeuvring the work platform and crane alongside each other and around fixed work locations. Note that only the slow speed controls are available when using the booms at long extensions.

Prior to operation of the MEWP boom from its stowed position, a calibration sequence must be undertaken to ensure the initial level of the work platform and platform levelling system pressures are charged. This is referred to as 'un-stowing the boom' and the steps are described below.

- Select Red MEWP mode on the remote controls or from the platform console position.

21.12.2 Un-Stow

- Select ***Red*** and ***Yellow***.
- Press and hold one of the joystick enable buttons and simultaneously press and release the stow button at the bottom on the platform display control panel.

The boom will fully retract and the work platform will tilt forwards and backwards as part of the pre-use calibration sequence. Calibration has finished after the fourth tone. The work platform can now be lifted from the stowage cup.

If the platform is raised above the stowage cup and the platform is not level, the raise function will be disabled. The boom must then be returned to the cup and calibrated as above again.

21.12.3 Main

- Select ***Red*** and ***Yellow***.
- To raise the main boom, press and hold the enable button, then move the right hand joystick on the work platform controls backwards (towards you).
- To lower the main boom, press and hold the enable button, then move the right hand joystick on the work platform controls forwards (away from you).
- To extend the boom, press and hold the enable button, then move the left hand joystick on the work platform controls forwards (away from you).

- To retract the boom, press and hold the enable button, then move the right hand joystick on the work platform controls backwards (towards you).

21.12.4 Fly

- Select ***Red*** and ***Pink***.
- To raise the fly boom, press and hold the enable button, then move the right hand joystick on the work platform controls backwards (towards you).
- To lower the fly boom, press and hold the enable button, then move the right hand joystick on the work platform controls forwards (away from you).

21.12.5 Rotate

- Select ***Red*** and ***Yellow***.
- To rotate the work platform in a clockwise direction, press and hold the enable button, then move the right hand joystick on work platform controls to the right.
- To rotate the work platform in an anti-clockwise direction, press and hold the enable button, then move the right hand joystick on the work platform controls to the left.

21.12.6 Slew

THE SLEWING CONTROLS ARE REVERSED ON THE WORK PLATFORM, WHEN COMPARED TO THE REMOTE CONTROL PANELS. THIS IS BECAUSE WHEN THE OPERATOR IS FACING THE WORK PLATFORM CONTROL PANEL HE IS FACING IN THE OPPOSITE DIRECTION.

At the work platform controls -

- Select ***Red*** and ***Any***.
- To slew the boom in a clockwise direction, press and hold the enable button, then move the left hand joystick to the left.
- To slew the boom in an anti-clockwise direction, press and hold the enable button, then move the left hand joystick to the right.

The slewing mechanism has a maximum rotation of 100 degrees (¼ turn) clockwise and 100 degrees (¼ turn) anti-clockwise from the central stowed position. From one extreme to the other this permits 200 degrees, ½ a full rotation, as indicated on the panels.

21.12.7 Stow

- Select ***Red*** and ***Yellow***.
- Press the stow button. All of the incorrect functions and movement are then disabled to assist the operator and the icon turns blue.
- Use the appropriate joysticks to approach the sub-frame recess.
- Tele the main boom to the fully retracted position.
- Set the fly boom to the horizontal position.
- Slew the MEWP boom parallel to the vehicle.
- Rotated the platform so that the console is orientated over the rear of the vehicle.

- Lower the work platform into the recess until the indicator screen icon displays and the stow icon flashes blue. Lowering function will then be disabled.
- Press and hold the enable button on the right hand joystick and simultaneously press and hold the stow button again until the platform floor is aligned with the chassis. The lower function will re-enable and reduce in speed.
- Lower the main boom into the stowage cup.
- Lower the fly boom until the platform rubber buffers contact the MEWP module subframe members.

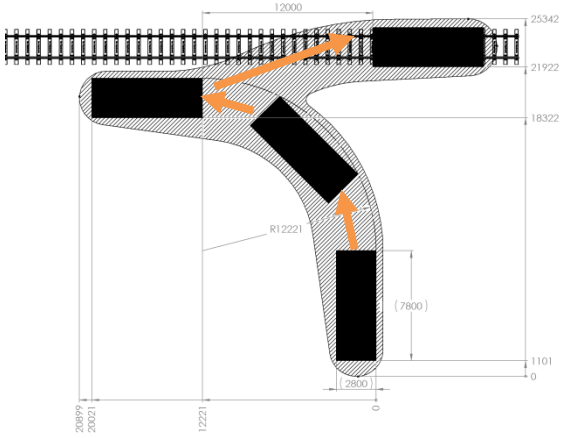
21.13 After Each Use

Perform the following steps at the end of every work shift.

1. Ensure the platform, pantograph and crane are fully stowed.
2. Off-Track the machine.
3. Park the machine on a firm level surface, clear of obstruction and traffic at least 3 metres away from the nearest railway lines.
4. Store the remote controls in the vehicle cab.
5. Turn off the ignition, remove the keys and lock both cab doors to secure from unauthorised use.

21.14 On and Off Tracking

Carry out the following in the order shown.



1. Drive forwards and align the machine parallel to the track.
2. Reverse the machine at 30° to the track from the parallel position to traverse the track.
3. Track Access Ramps are provided on the machine and should be deployed at the positions that the road wheels will contact the rails.
4. Straddle the track and align the rear rail axle with the track.

5. Deploy the rear rail axle to only just lift the rear road wheels slightly clear of the sleeper ends.

6. Manoeuvre the machine to align the front rail axle with the track.

7. Deploy the rear rail axle then deploy the front rail axle in stages to keep the machine relatively level as it raises.

8. Straighten the front road wheel steering.

9. Fully deploy the rear MEWP stabiliser rotation and engage the mechanical lockouts prior to rail travel.

Note: The rail lights will automatically illuminate, the drive travel Joystick will become active and the speedometer will recalibrate for rail mode.

22 Transportation

22.1 General

✓ Never lift the machine with a crane.

✓ The transport vehicle must be parked on a level surface.

✓ The transport vehicle must be secured to prevent rolling while the machine is being loaded.

✓ Be sure the transport vehicle capacity, loading surfaces and chains or straps are sufficient to withstand the machine weight. See the serial plate on the machine for the machine weight or the Specification section in this manual.

Towing the machine is not recommended. If the machine must be towed due to failure on track, do not exceed 6 mph.

22.2 Loading

✓ Do not drive the machine on a slope that exceeds the slope rating. See Driving on a Slope in the Operating Instructions section.

✓ If the slope of the transport vehicle bed exceeds the maximum slope rating, the machine must not be loaded and a suitable transport vehicle must be obtained.

After the machine is loaded:

1. Ensure that the rail gear remains raised after loading. Only the road wheels must be contacting the deck of the transport vehicle.

2. Ensure that the machine parking brake is applied.

3. Never leave the machine in gear as this can damage the transmission and gearbox.

4. Ensure that the Pantograph is secure if fitted.

22.3 Transit

- ✓ Turn the machine ignition key switch to the off position, remove the key and lock the cab doors before transporting.
- ✓ Inspect the entire machine for loose or unsecured items.
- ✓ Use chains of ample load capacity.
- ✓ Use a minimum of 2 chains per side.
- ✓ Adjust the rigging to prevent damage to the chains and machine.
- ✓ Never chain over the work platform, boom, king-post, crane or rail gear.
- ✓ Only chain to the dedicated identified chaining-down eyes.

23 Module Handling

23.1 General

- ✓ Never lift the entire machine with a crane.
- ✓ The machine must be parked on a level surface.
- ✓ The machine must be secured to prevent rolling while the module is being demounted.
- ✓ If the modules are being lifted off, be sure the crane vehicle capacity, and lifting chains or straps are sufficient to withstand the module weight. See the serial plate on the machine for the module weight or the Specification section in this manual.
- ✓ Do not demount removable counterweights or the module when on a slope.
- ✓ Rear modules must be demounted first.
- ✓ Never demount the module with the booms out of the stowed positions.
- ✓ Always fully stow the modules before disengaging the body locks.
- ✓ Always pre-tension each and every body lock with the tool provided
- ✓ Always latch and padlock every body lock

23.2 Demounting

After the machine has been stabled on flat level ground:

1. Install the module landing legs if provided into the sockets at the front of the module.
2. Unlock the padlocks and detention the twist locks with the tool provided
3. Release all of the body locks.
4. Deploy the manual landing legs.

5. Deploy the hydraulic stabiliser legs.
6. Ensure there is at least 300 mm of clearance above the subframe.
7. Disengage the hydraulic, air and electrical connections to the host machine.
8. Drive the truck forward from under the module.

23.3 Lifting

- ✓ Manual landing legs are not required.
- ✓ Release all of the body locks.
- ✓ Disengage the hydraulic, air and electrical connections to the host machine.
- ✓ Do not deploy the hydraulic stabiliser legs.
- ✓ Use a tether and slingers to control the module rotation as it is lifted.
- ✓ Attach the lifting machine to the four designated module lifting points.
- ✓ Ensure that the lifting chains/straps do not contact the boom while lifting.
- ✓ Lift the module until it is higher than the top of the rear wheels of the truck. Take care not to swing the module into the machine.
- ✓ Lift the module clear.

24 Decals

Use the illustrations on the following pages to verify that all decals are legible and in place.

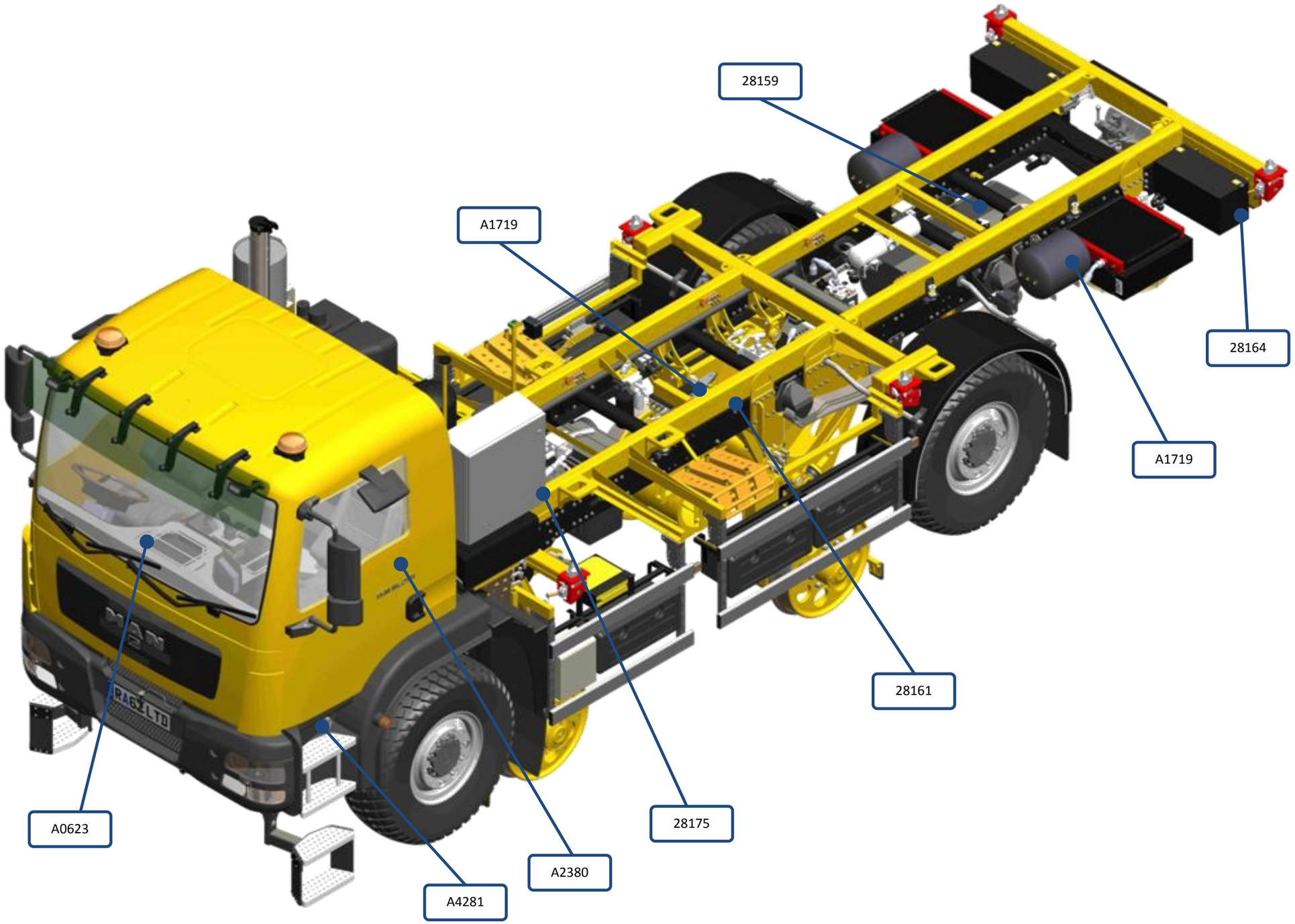


Figure 22 - Base Vehicle - Front Nearside Isometric View

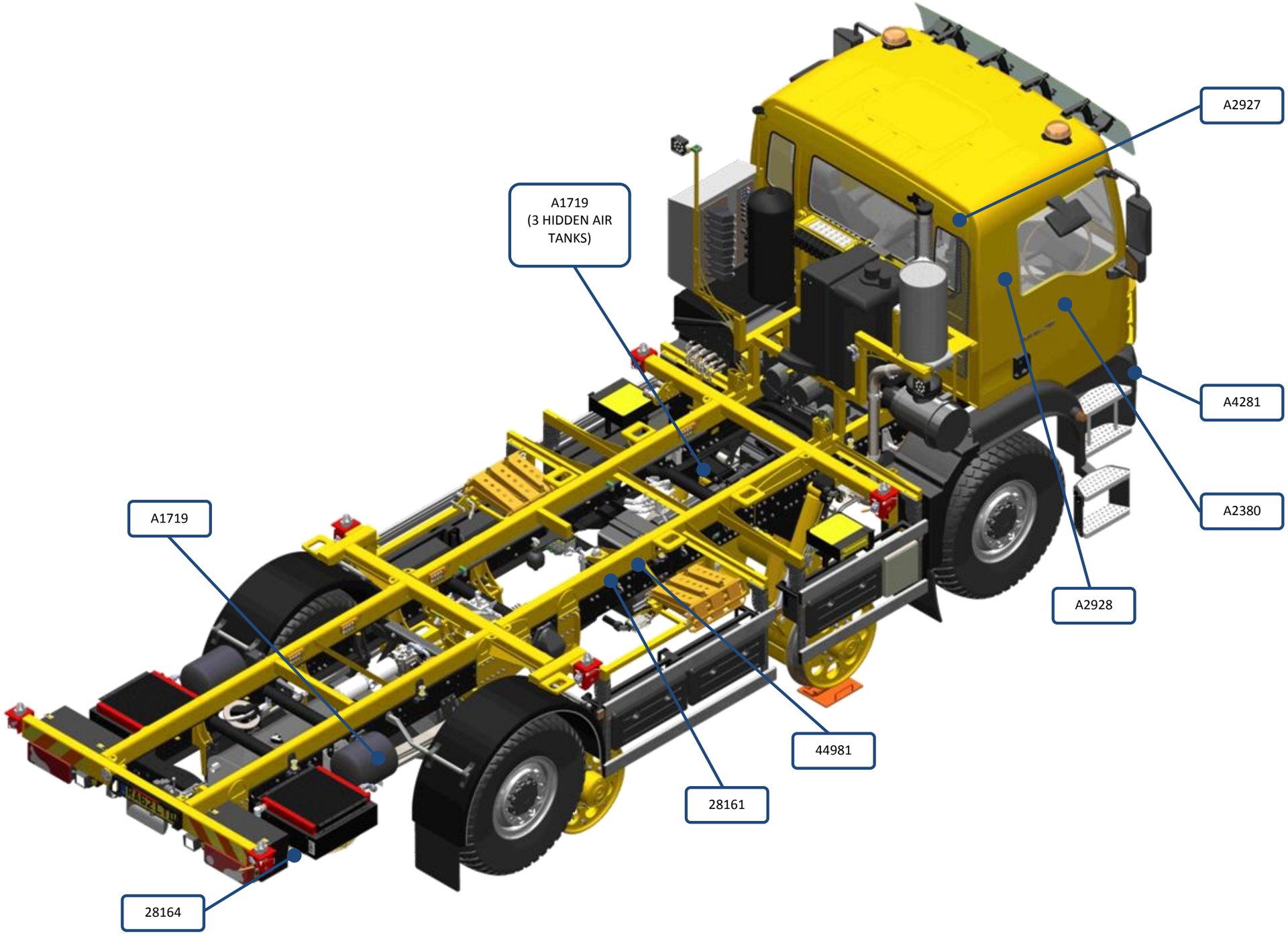


Figure 23 - Base Vehicle - Rear Offside Isometric View

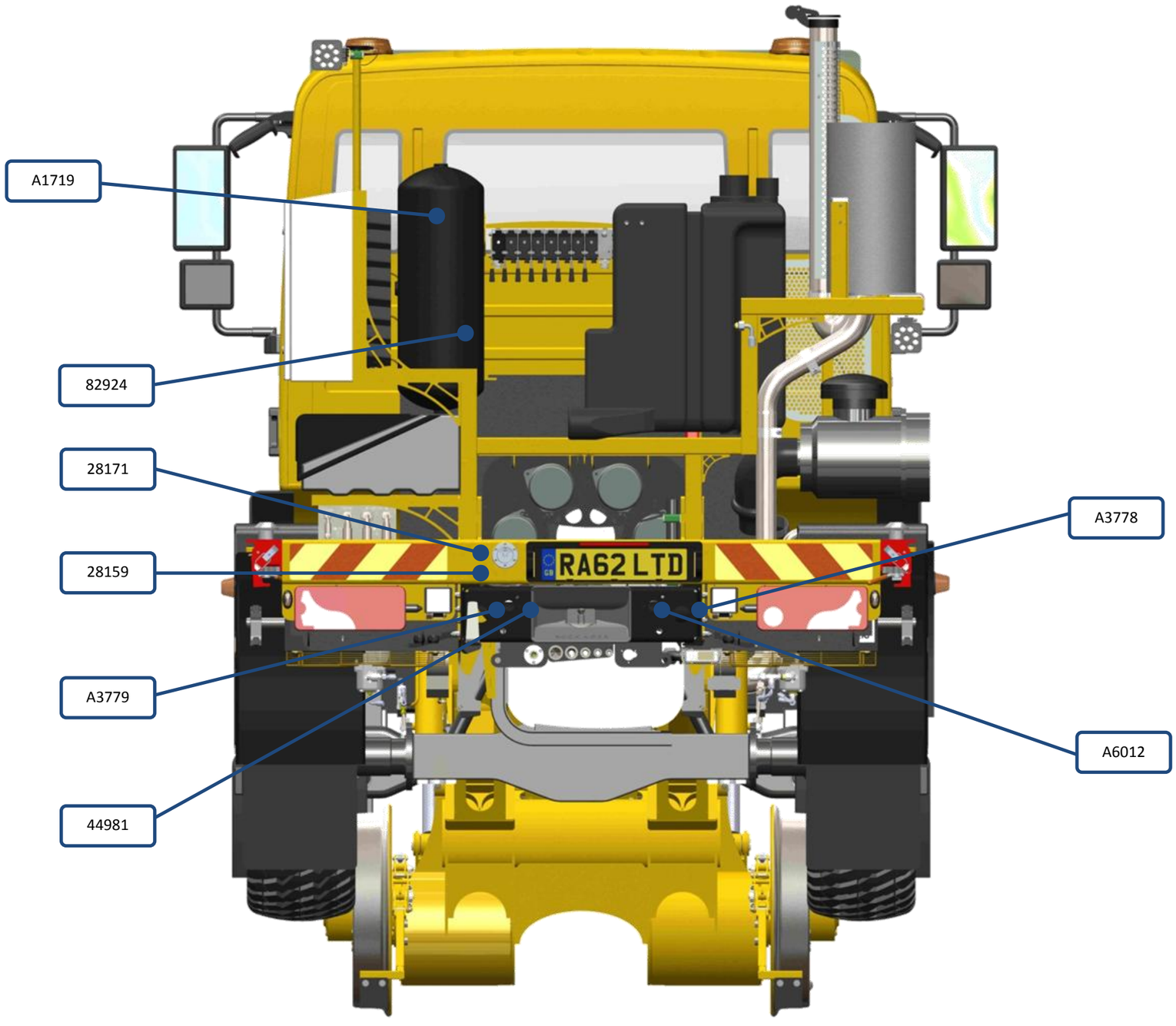


Figure 24 - Base Vehicle - Rear View

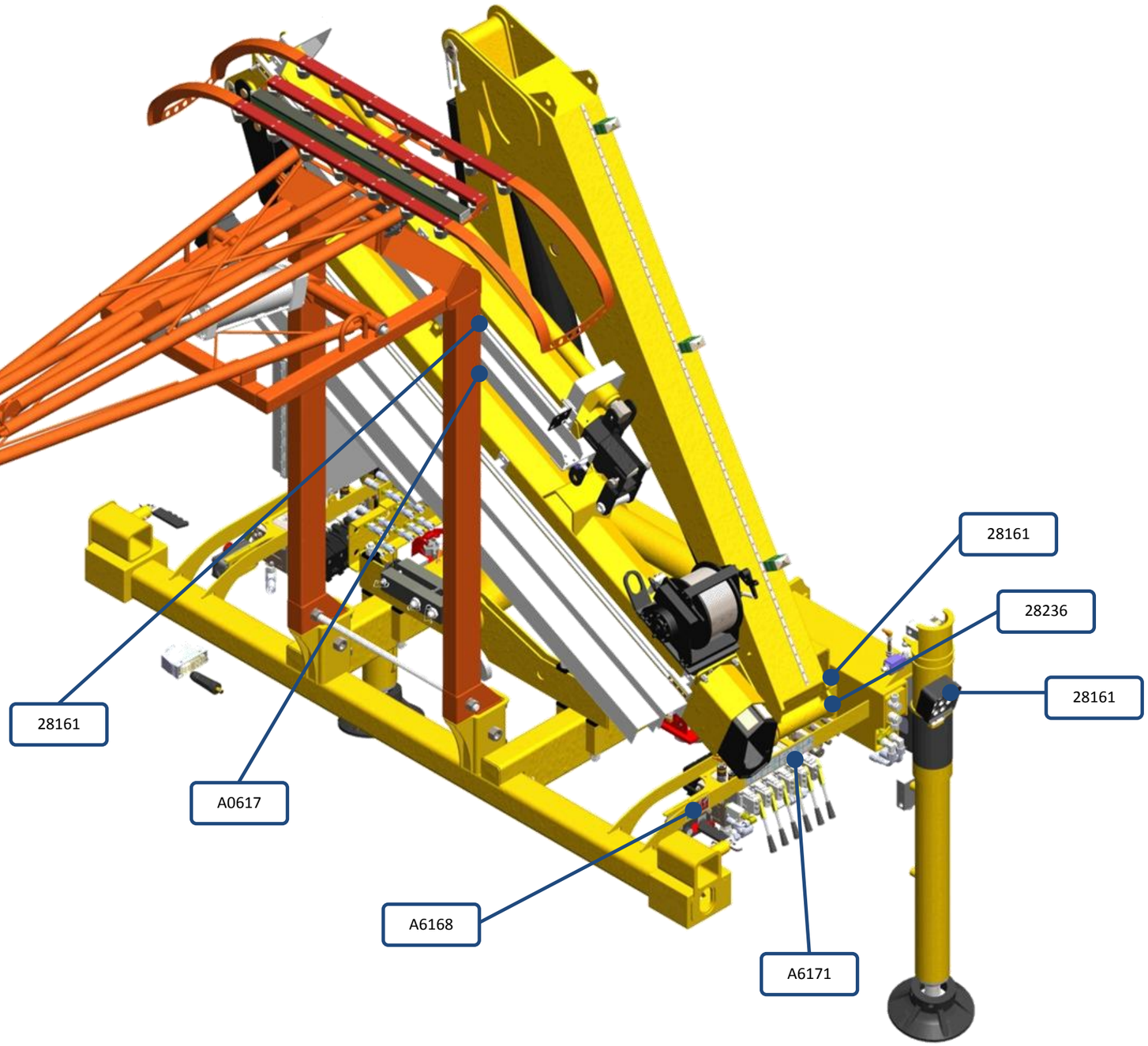


Figure 25 - Crane Module - Front Nearside Isometric View

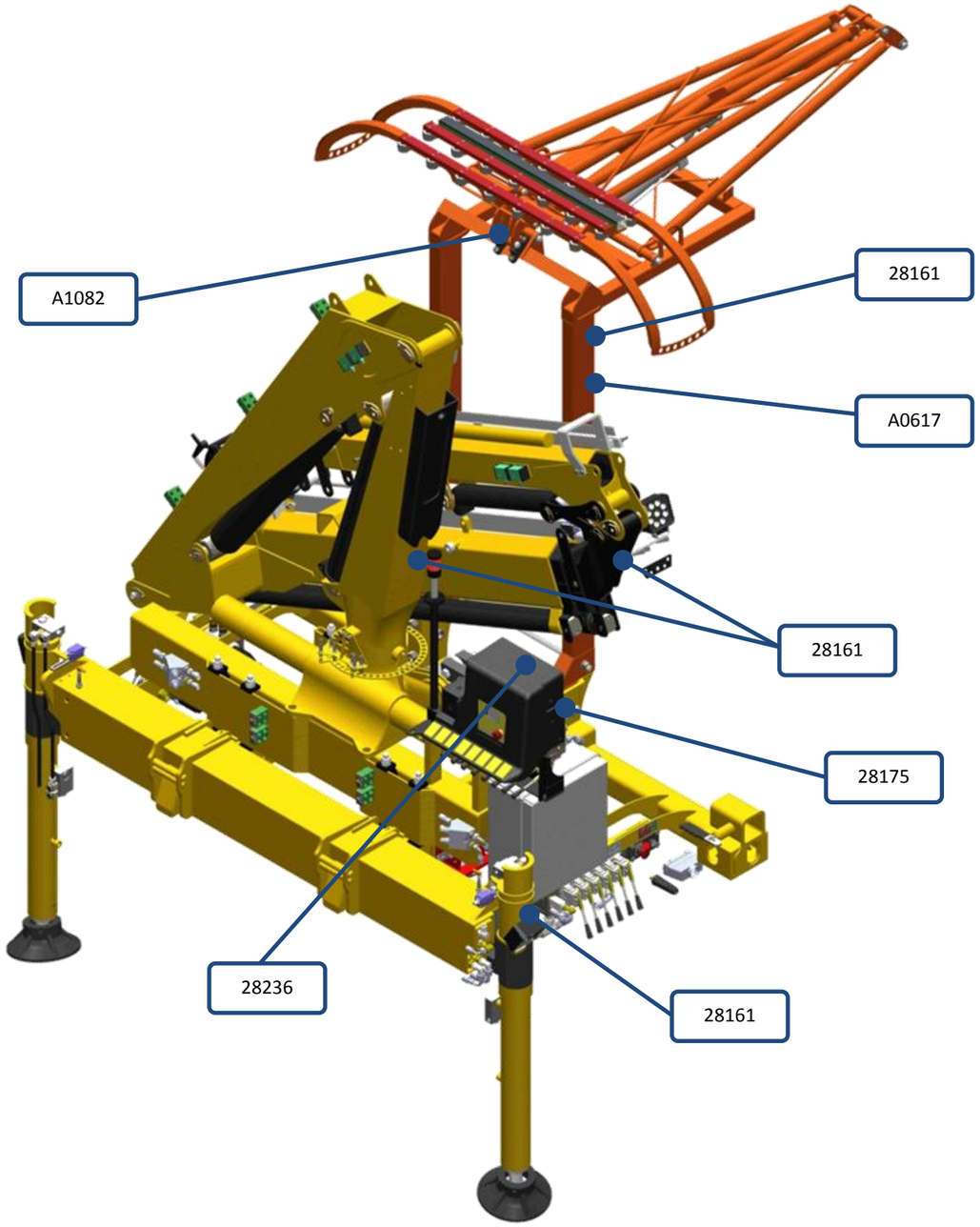


Figure 26 - Crane Module - Rear Offside Isometric View

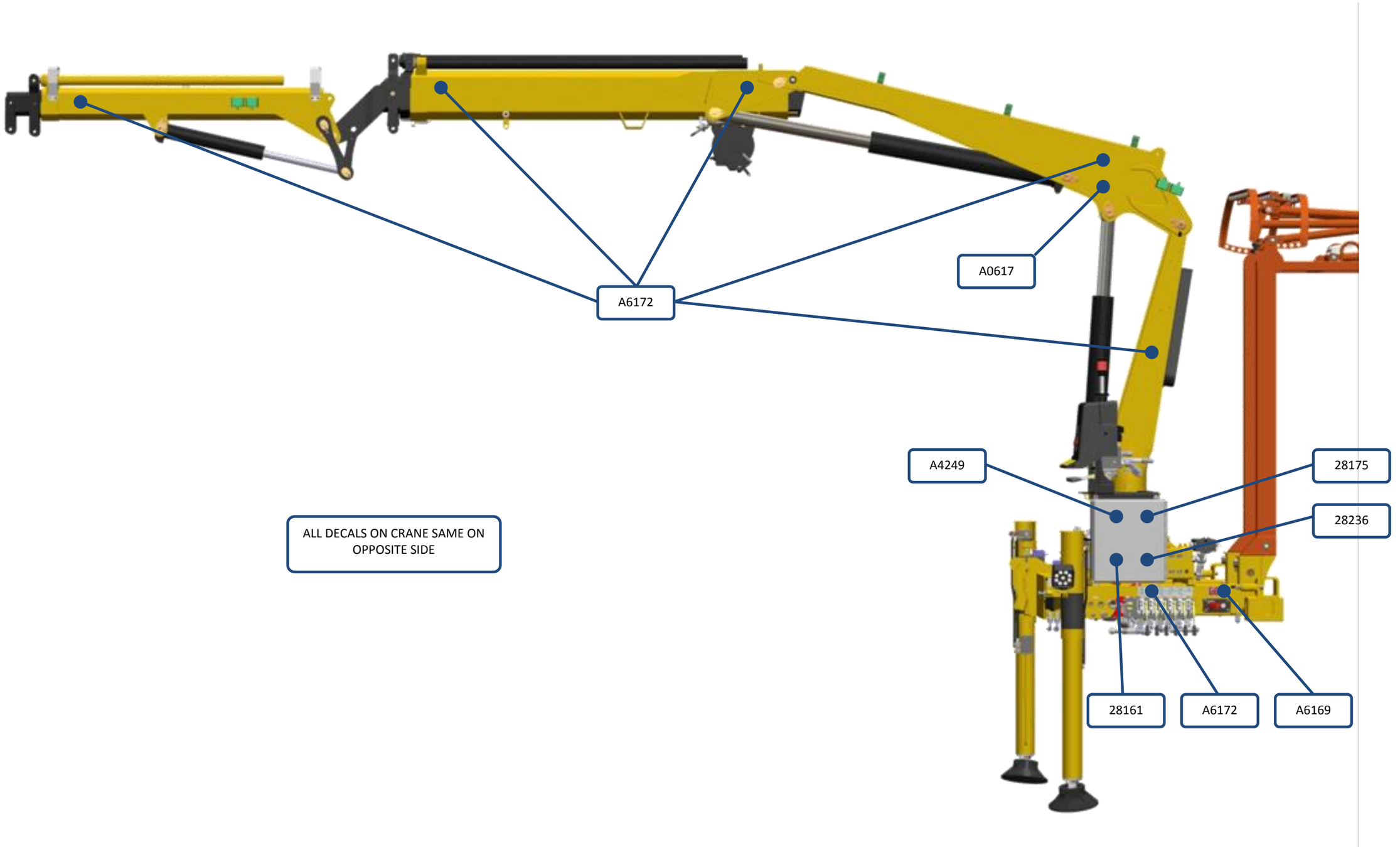


Figure 27 - Crane Module - Booms Out, Offside View

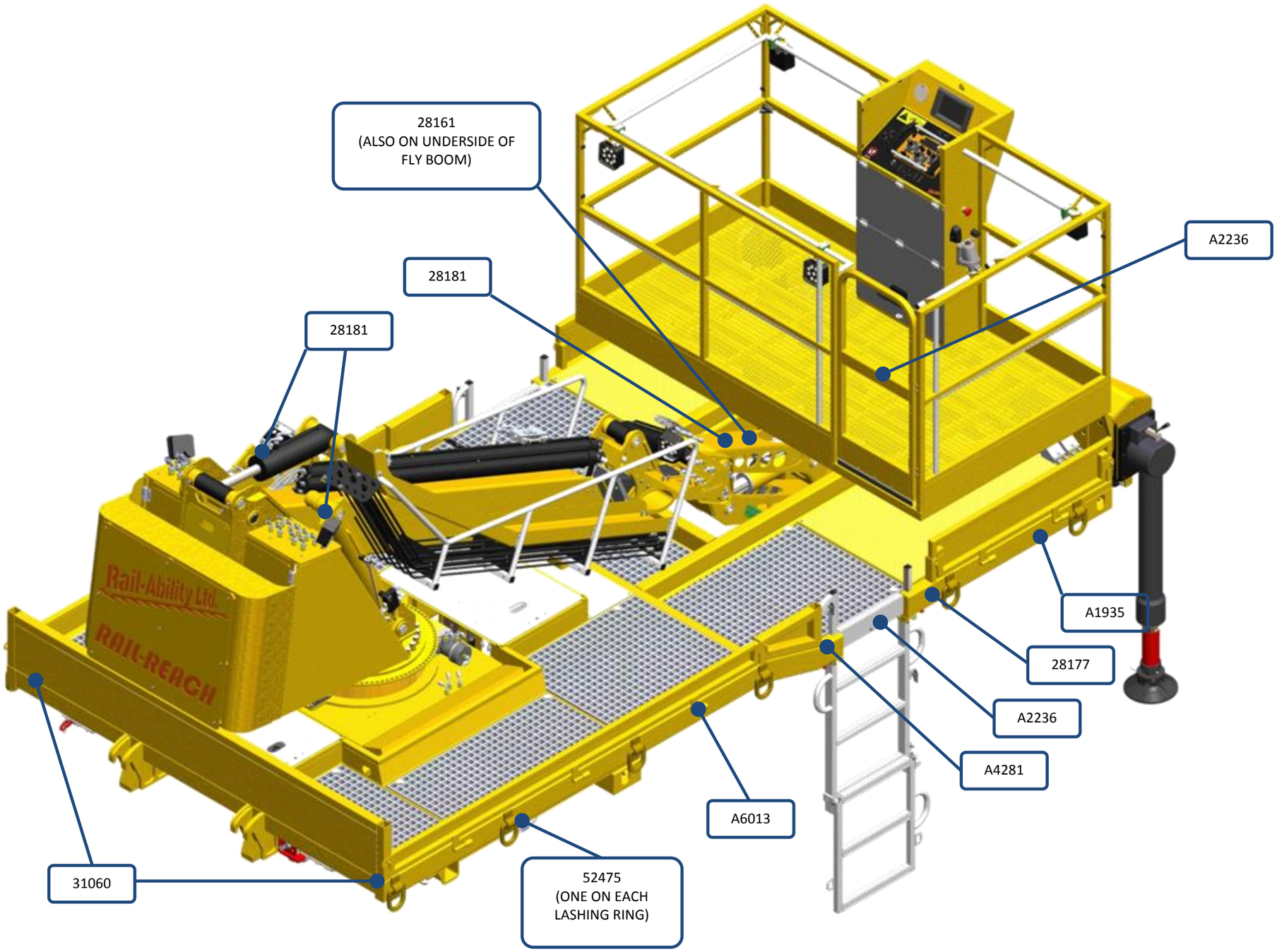


Figure 28 - MEWP Module - Front Nearside Isometric View

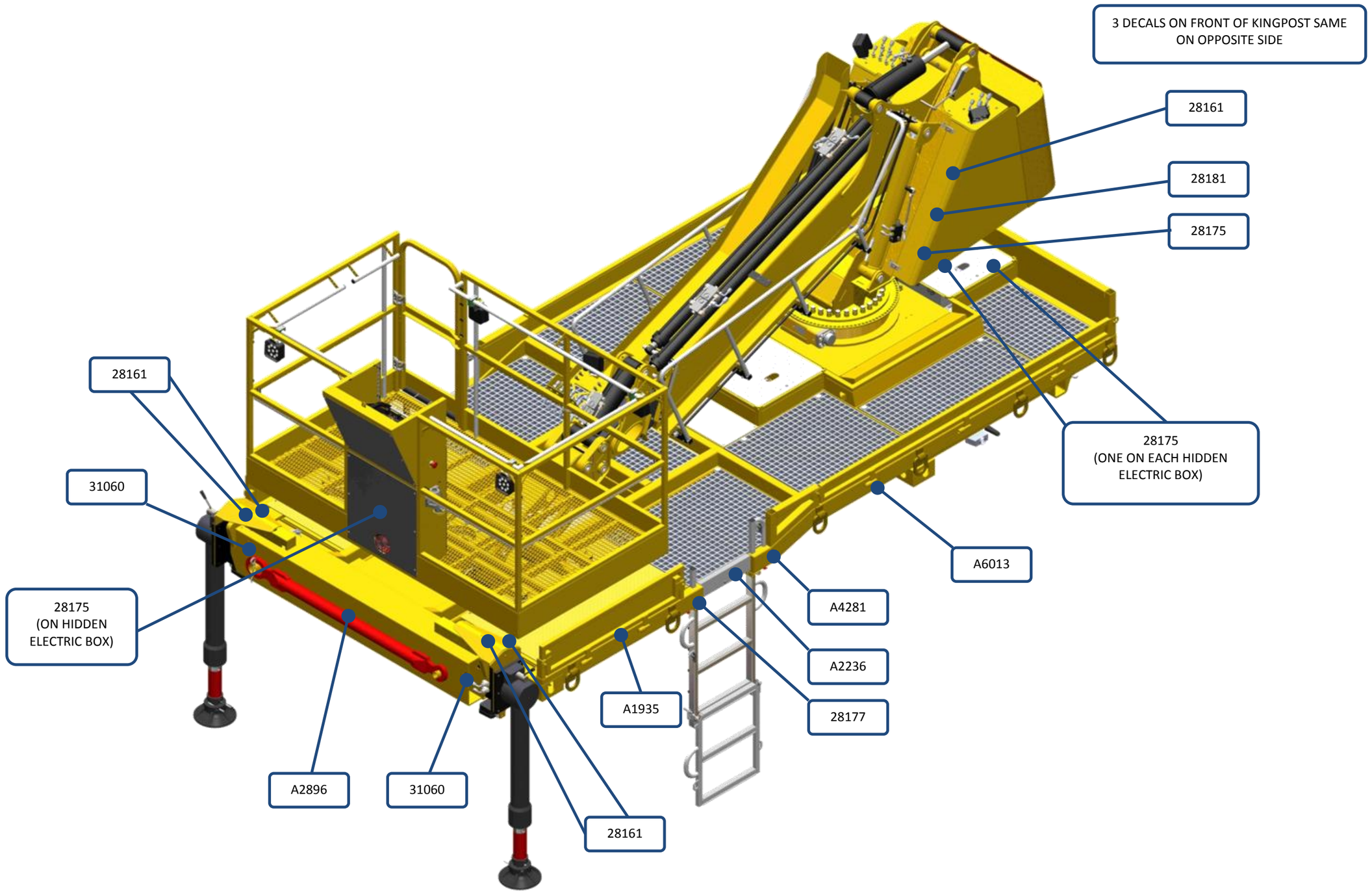


Figure 29 - MEWP Module - Rear Offside Isometric View

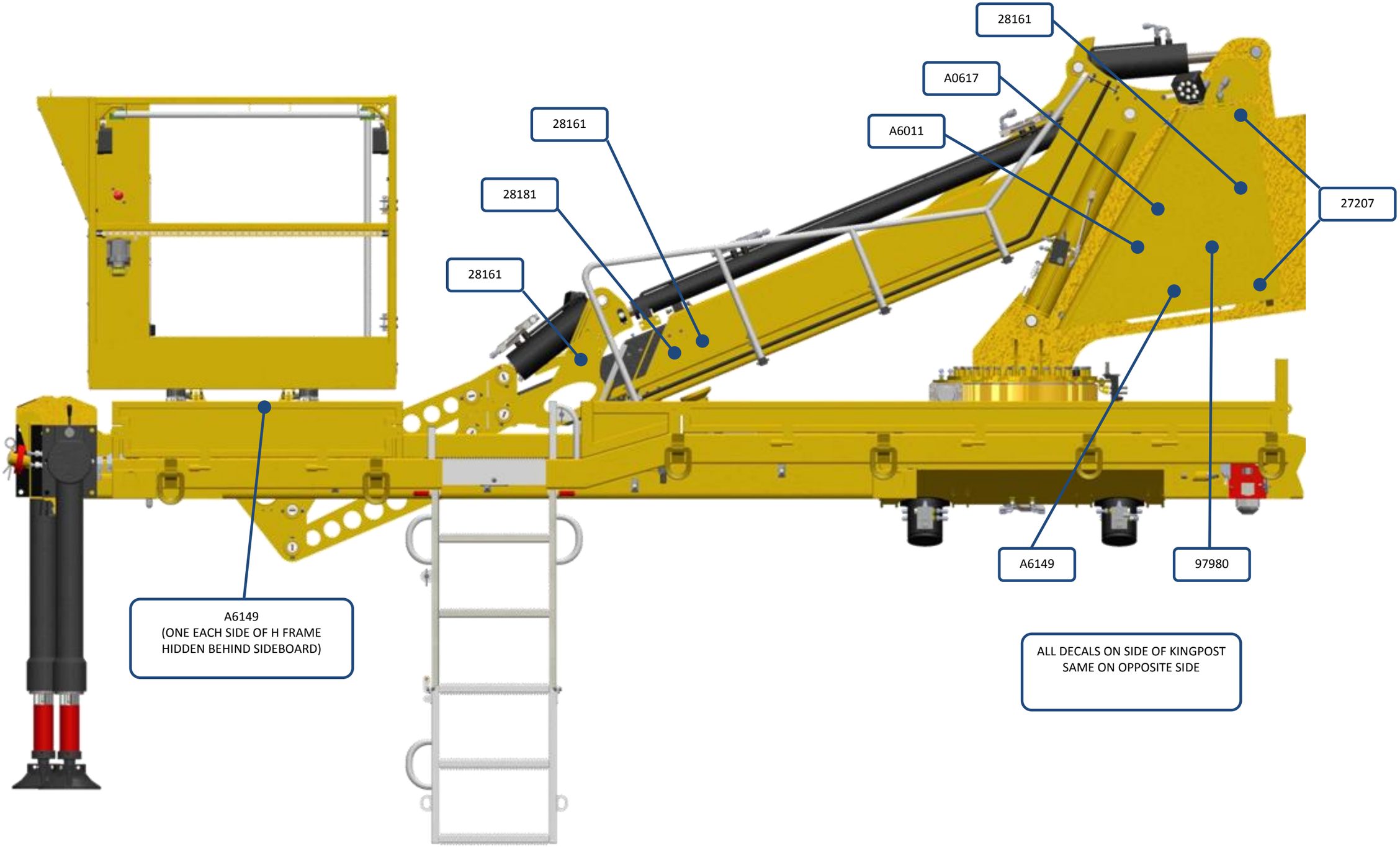


Figure 30 - MEWP Module - Offside View

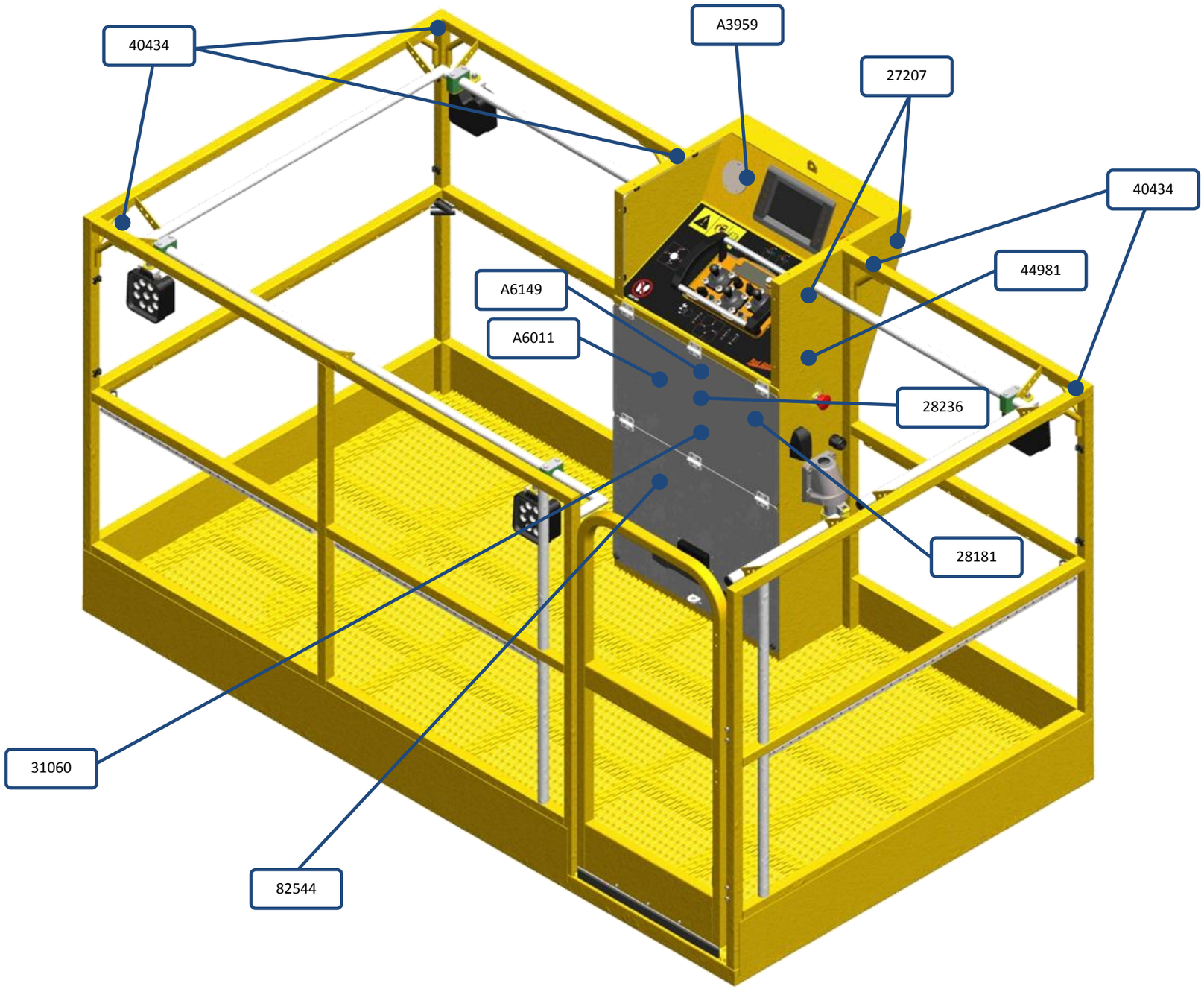


Figure 31 - Platform - Front Offside Isometric View

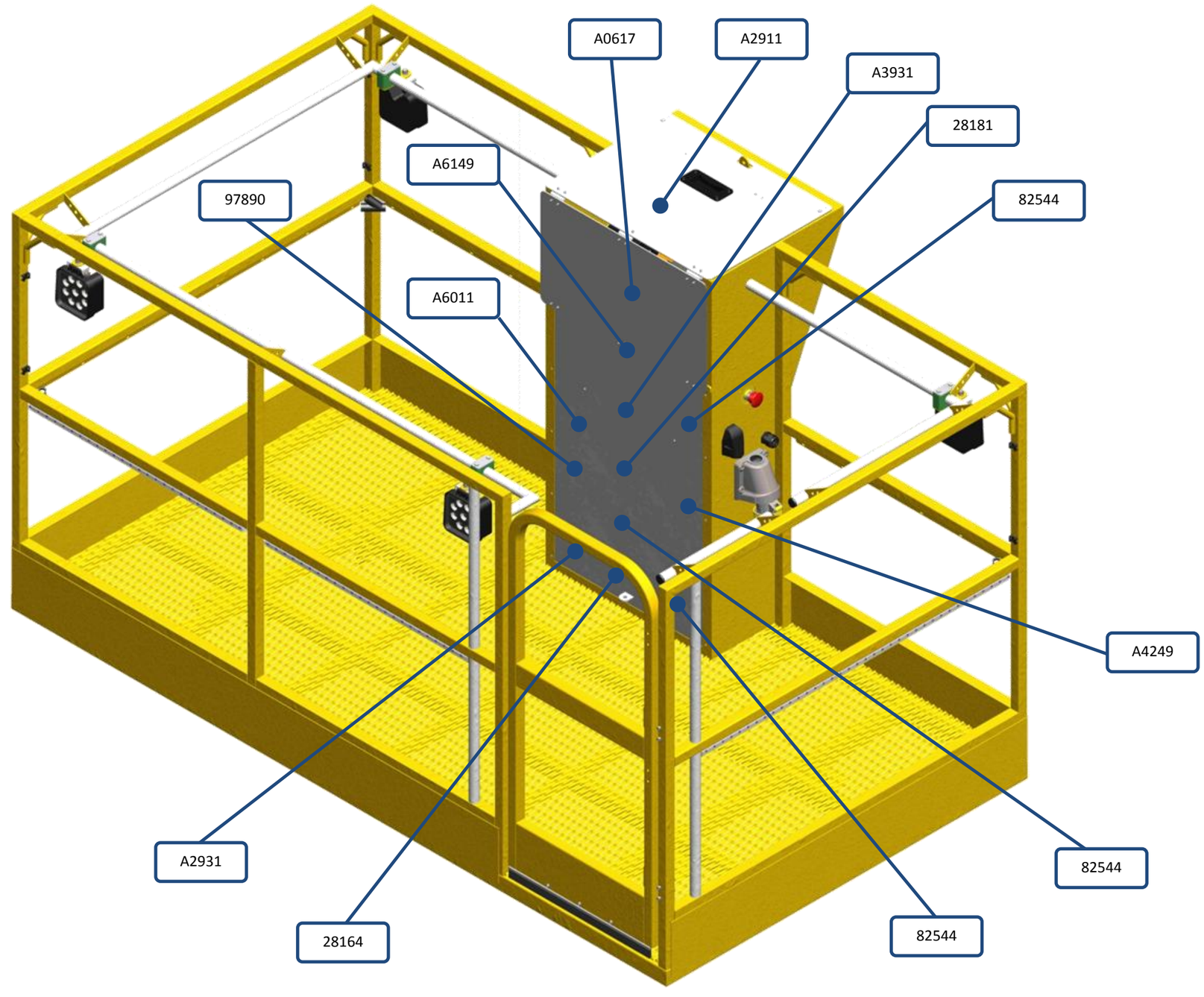


Figure 32 - Platform - Front Offside Isometric View, Console Cover Closed

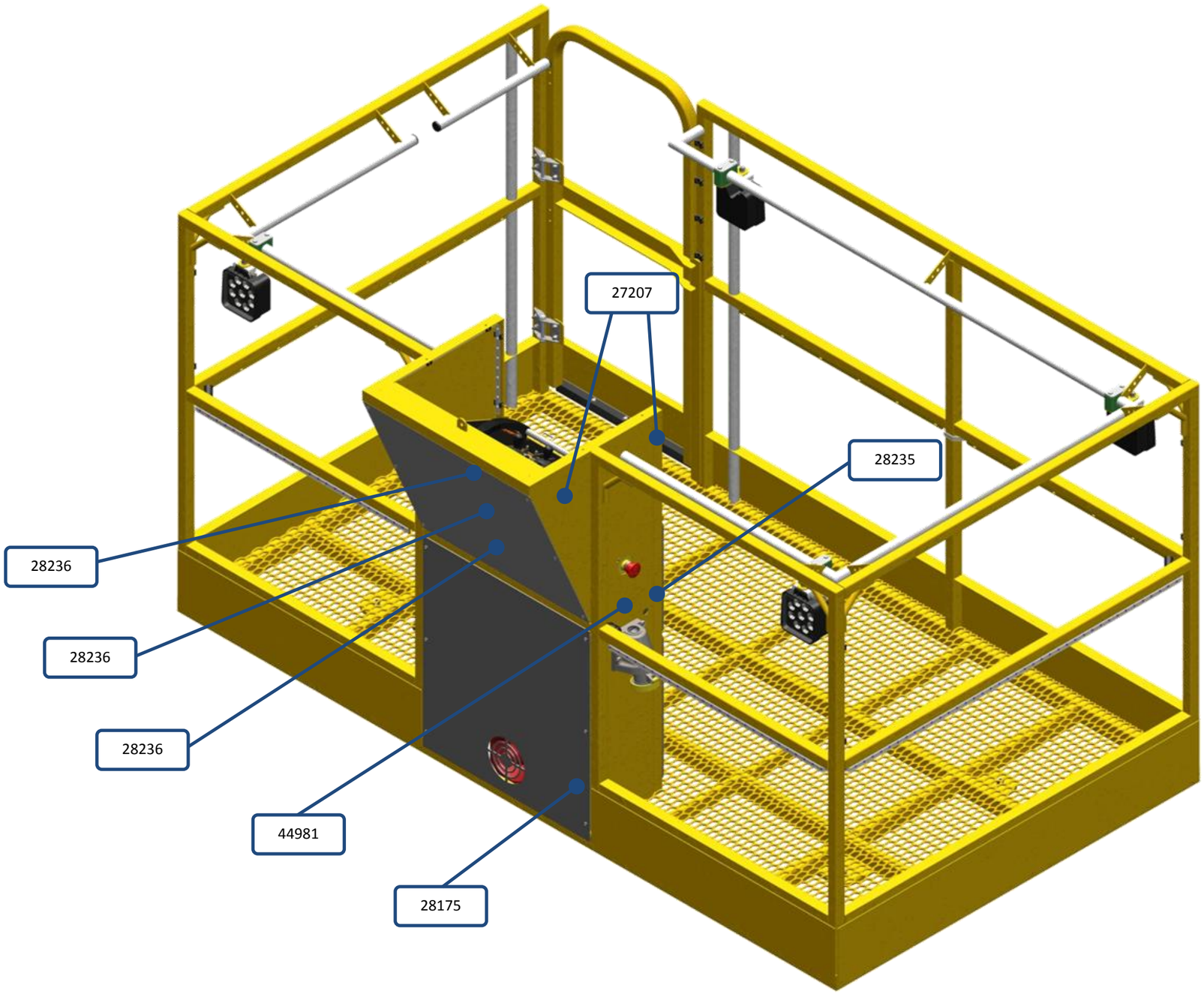


Figure 33 - Platform - Rear Nearside Isometric View

Part no.	Description	Quantity
27207	Yellow Triangle	8
28159	Diesel	2
28161	Crushing hazard	31
28164	Hazardous materials	3
28171	No smoking	1
28175	Compartment access	12
28177	Crush hazard	2
28181	Fall hazard	8
28235	115V AV power to platform	1
28236	Failure to read manual	5
31060	Tip-over hazard interlock	5
40434	Harness attachment point	5
44981	Air line 110 PSI	4
52475	Tie down	12
82544	Electrocution hazard	2
82924	Caution shutoff valves	1
97890	Operating instructions	3
A0617	Danger overhead live wires	6
A0623	VAB instruction label	1
A1082	Pantograph not to be used for earthing live O.L.E.	1
A1719	Pressurised vessel	7
A1935	Do not stand within 10 metres of working machine	2
A2236	No access under live O.L.E.	3
A2380	Data panel	2
A2896	Tow bar removal	1
A2911	Keep off	1
A2927	Hydraulic oil tank filler	1
A2928	Hydraulic oil tank sight gauge	1
A2931	Work restraint anchorage point	1
A3778	Trailer park brake	1
A3779	Trailer service brake	1
A3931	Decibel level	1
A3959	Override	1
A4249	Serial plate	2
A4281	3 point contact	4
A6011	Max wind and manual warning	4
A6012	Recovery pump	1
A6013	Lifting point	2
A6149	Work platform load	6
A6168	RA65A outrigger decal 1	1
A6169	RA65A outrigger decal 2	1
A6171	RA65A outrigger override 1	1
A6172	RA65A outrigger override 2	1

For other decals fitted which are marked '817/…..' refer to the OEM Manuals referred to in section 4.

25 Specifications

Dimensions	
Maximum platform height (on rail)	12.6 m
Horizontal reach	10.5 m
Maximum rated capacity	500kg
Overall height, stowed (road)	3.603 m
Overall width, stowed	2.500 m
Overall length, stowed	8.940 m
Road Wheelbase	4.500 m
Rail Wheelbase	2.500 m
Front overhang (road)	1.337 m
Rear overhang (road)	2.143 m
Approach angle (road)	22°
Departure angle (road)	22°
Turning radius (road)	*** m
Steering angle (lock to lock)	33°
Minimum Track Curve Radius	60 m
Ground clearance (rail)	150 mm
Ground clearance (road)	310 mm
Vehicle deck height (road)	1.5 m
Vehicle deck height (rail)	2 m

Power supply	
Power Source	24 volt D.C.
Batteries	4 x 115 Ah
Controls	Proportional
110 Volt AC outlet at work platform	Standard
24 Volt DC outlet at work platform	Standard
Maximum hydraulic pressure (functions)	(320 bar) 220 bar
Hydraulic supply at work platform	Standard
Hydraulic tank	200 litres
Fuel tank	180 litres
Air supply at work platform	10bar
Tyre size	295/85R20
Tyre pressure (front)	125 PSI
Tyre pressure (rear)	125 PSI

Platform dimensions	
Length x width	2.2 x 1.2 m
Maximum number of persons	5

Drive speeds	
Platform stowed -	
Cab controls	32 km/h (20 mph)
Platform controls	9.6 km/h (6 mph)
Platform elevated -	
Platform controls	9.6 km/h (6 mph)

Weights	
Overall weight comprising -	18,000 kg
Front axle (road wheels)	7,500 kg
Rear axle(road wheels)	11,500 kg
Maximum load	8,000 kg

Environmental data and limits	
Maximum allowable wind speed	18.9 metres/sec (42 mph = BWS 8)
Maximum allowable manual force	2000 N
Sound power level (MAN engine)	L_{WA} 90dB
Sound pressure level at operating work-stations (A-weighted)	
Cab controls	74 dB
Platform controls	(stowed) 77 dB
Remote controls	(average) 90 dB
Vibration	< 2.5 m/s^2
Operating temperature	-5 °C to + 30 °C
Maximum Gradient (rail)	1 in 25
Maximum rail Cant (travelling)	200 mm
Maximum rail Cant (working)	200 mm
Maximum slope rating, stowed position, on tyres	3.0°
Maximum side slope rating, stowed position, on tyres	3.0°

F 65A.22 Crane – Technical Data	
Standard reach	7.20 m / 23'7" (ft/in)
Lifting capacity	6.55 tm / 64.2 kNm / 47.376 lbf.ft
Standard reach	7.20 m / 23'7" (ft/in)
Hydraulic extension	3.25 m / 5'3" (ft/in)
Rotation arc	370°
Rotation torque	1.00 tm / 9.8 kNm / 7.233 lbs.ft
Working pressure	26.0 MPa / 3.771 psi
Pump capacity	20 l/min / 5.28 gal/min
Oil tank capacity	60 l / 15.85 gals
Crane weight	850 kg / 1.764 lbs
Max. working pressure on the outrigger(Φ 140)	31.5 daN\cm^2 / 456.87 psi

26 Test Report

This product has been tested in accordance with the following European Standards:

BS EN 280:2001/2009 Mobile Elevating Work Platforms – Design calculations – Stability criteria – Construction – Safety – Examinations and tests

Type	**Rail-Ability Ltd Rail-Reach**
Serial number	
Rated capacity	**500 kg**

Prior to despatch from Rail-Ability Ltd, the above machine has undergone the following load test(s) in which to demonstrate structural integrity and fitness for purpose -

Load	**kg**
Equivalent to	**% of rated capacity**

During the test, the load indicated above was placed in the work platform and all the boom functions were operated separately to place the work platform in all available operating positions. Following the test, the structure was visually inspected to ensure that no deformation or failure had occurred. This test substantiates the structural design calculations undertaken on this product.

Signed	
Name	
Position	
Date	

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