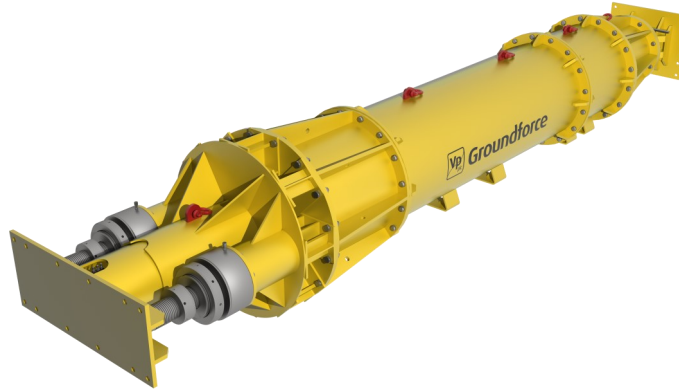




MP750 Strut (c/w Hydraulic Release Nuts)



Important Notes

All excavation work must be thoroughly planned and a risk assessment completed before work commences on site.

These instructions form guidance for the MP750 Strut. All stages of assembly, installation, pressurisation and removal must be supervised by a Groundforce engineer.

Hydraulic nuts operate at very high pressures and complex pumping equipment is consequently required. For this reason, only qualified Groundforce engineers are authorised to operate the hydraulic nuts.

The equipment used in this manual must not be modified in any way without the express permission of Groundforce

All contractor's personnel involved the use of this equipment must be fully briefed and adequately supervised by a competent person.

All hires for this equipment will be accompanied by a scheme specific general arrangement drawing. This must be read in conjunction with these instructions.

THIS USER GUIDE IS NOT CONTROLLED WHEN PRINTED



A 3D video animation showing the MP750 Hydraulic Nuts typical installation is available to [watch now](#) on our YouTube channel.

**IF IN ANY DOUBT SEEK FURTHER ADVICE:
ON FREEPHONE - 0800 000 345**



Certification Number 14419
ISO 9001 • ISO14001 • ISO45001

<https://www.vpgroundforce.com/qb/>

Rev	Date	Comments	Initial
2.2	19/05/23	Lock-off Valve tightening comments added	DSW

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SAFETY

Common Symbols and Meanings

Safety Note: It is recommended that hand and eye protection is used when operating hydraulic equipment.

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
	Use eye protection
	Use hearing protection
	Wear protective gloves
	Wear head protection
	Wear protective footwear

WARNING SYMBOLS	
	General warning
	Crushing of hands

Introduction

The MP750 is a high load capacity, hydraulically activated strut, employing a modular format to achieve its overall length when installed. The strut consists of a central low pressure hydraulic ram unit with a 500mm stroke for fine length adjustment on site. Once installed, load is resisted by a twin screw mechanical locking system. The unit also incorporates an advanced high pressure hydraulic nut system to aid installation, high level pre-stressing (if required) and subsequent removal of the strut under residual load.

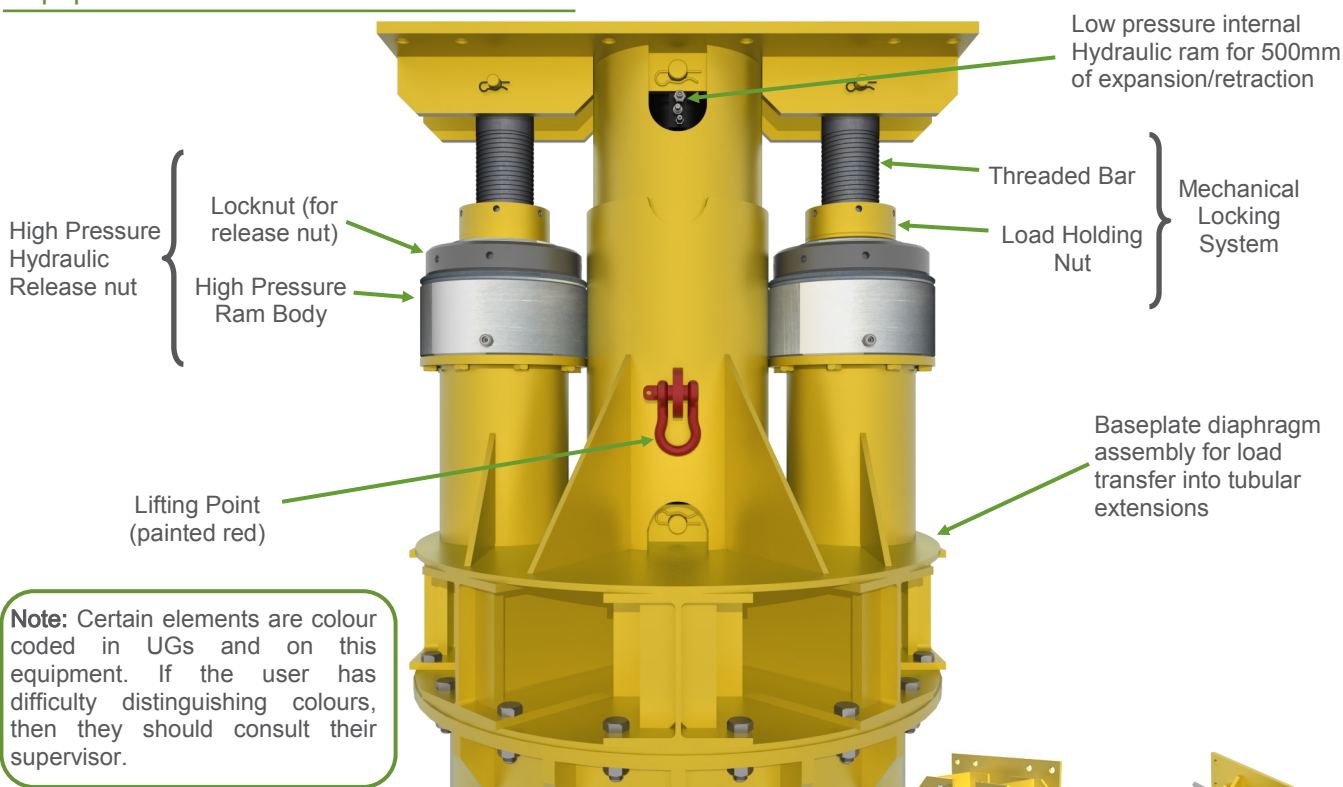
Hydraulic extension and retraction of the double acting central ram is facilitated by an oil based motorised pump connected to the ram by two hoses via quick release couplings located on the top of the hydraulic unit. **Note:** the use of the high pressure pre-stress and release nuts must only be carried out by Groundforce personnel using specialist equipment and is therefore not covered in this document.

MP750s can be used with either 1.2m dia "Super Tube" (UK market use) or 1m dia "Euro Tube" (EU market use) extensions tubes. All flange connections comprise a ring of 16 No. M30 bolts. A combination of various extension tubes are capable of achieving large spans without intermediate support; subject to loading requirements.

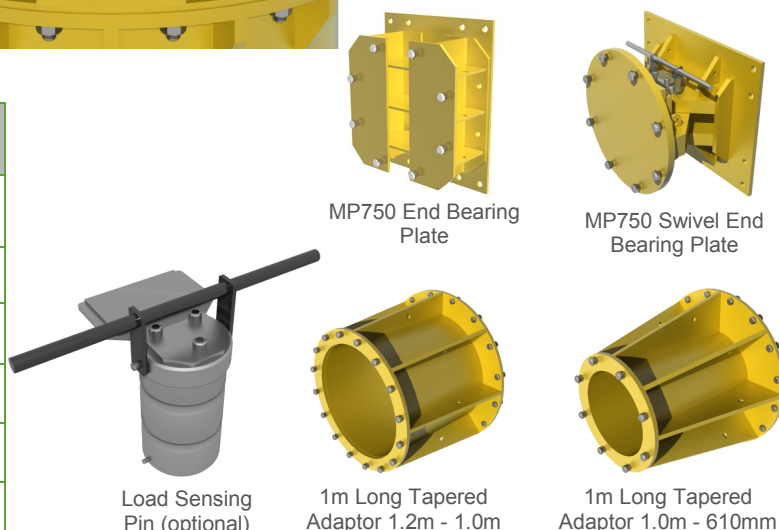
Note: this equipment should only be used in the temperature range -20°C to +40°C unless otherwise stated.

Note: For further details on 1.2m diameter Super Extensions, 1m Diameter Euro Extensions and the Motorised Pump, refer to the relevant Groundforce user guides which are available to [download as a pdf](#) from the Groundforce Technical Library.

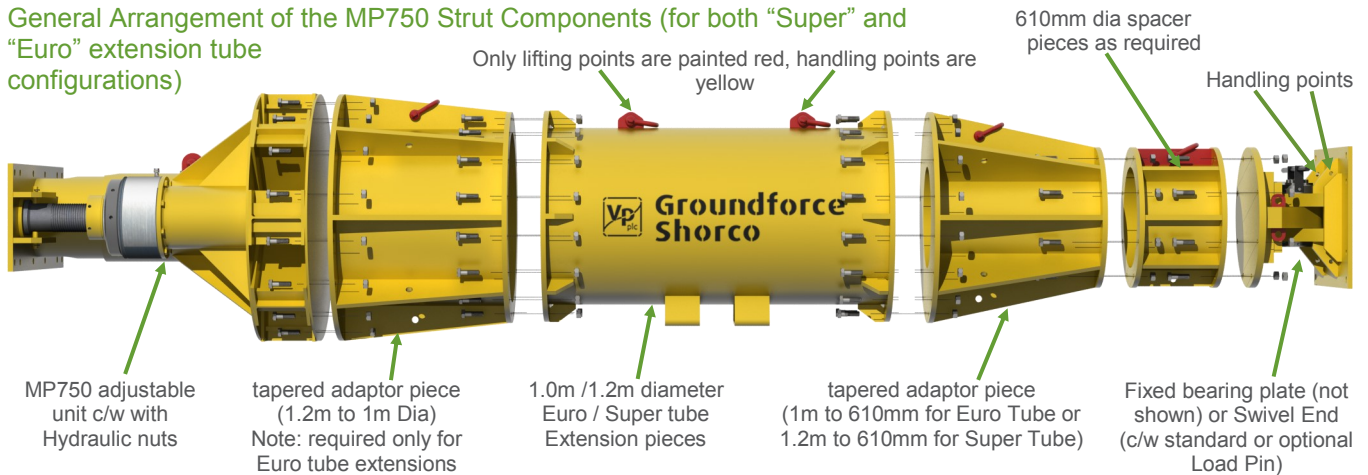
Equipment Identification



Component	Weight (kg)
MP750 Unit c/w Hydraulic Nuts	3200
Non-swivel End Bearing Plate	330
Swivel unit complete with Pin	750
Swivel pin or Load Sensing Pin	95
1.2m - 1m Dia Tapered Adaptor	1120
1.0m - 610mm Dia Tapered Adaptor	850



General Arrangement of the MP750 Strut Components (for both "Super" and "Euro" extension tube configurations)



Item Code	Description	Length (m)	Weight (kg)
HS250.EEX1	MP250 Euro Strut Extn 1.0m	1.0	750
HS250.EEX2	MP250 Euro Strut Extn 2.0m	2.0	1260
HS250.EEX3	MP250 Euro Strut Extn 3.0m	3.0	1810
HS250.EEX5	MP250 Euro Strut Extn 5.0m	5.0	2800
HS250.EEX6	MP250 Euro Strut Extn 6.0m	6.0	3350
HS250.EEX10	MP250 Euro Strut Extn 10.0m	10.0	5340

Item Code	Description	Length (m)	Weight (kg)
HS250.SEX1	MP250 Super Extn 1.0m	1.0	750
HS250.SEX2	MP250 Super Extn 2.0m	2.0	1100
HS250.SEX4	MP250 Super Extn 4.0m	4.0	2100
HS250.SEX8	MP250 Super Extn 8.0m	8.0	4100
HS250.SEX10	MP250 Super Extn 10.0m	10.0	5000
HS250.SEX12	MP250 Super Extn 12.0m	12.0	6000

Item Code	Description	Length (m)	Weight (kg)
HS250.20SEX5	MP250 Super Extension 5m (20WT) - HD	5.0	3602
HS250.20SEX8	MP250 Super Extension 8m (20WT) - HD	8.0	5094
HS250.20SEX10	MP250 Super Extension 10m (20WT) - HD	10.0	6276

Notes on Handling, Lifting and Installation



Safety Note: No attempt must be made to lift assemblies or sub-assemblies greater than 30m long without a detailed lift plan being supplied by Groundforce, otherwise there is a risk of overloading individual lifting points or bolted connections.



MP750 components are very heavy. It is essential to have a detailed lifting and installation/removal plan in place prior to commencing work. Components must be lifted from the correct lifting points provided. All lifting equipment must have current test certificates and appropriate working load limit values.

Note: the weight of an assembled strut is concentrated towards the end incorporating the hydraulic unit. The slinging positions should be adjusted by trial lift until a near horizontal lift is achieved.

Consideration must be given to the capacities of the individual red lifting points welded to the equipment when preparing the lifting plan. (see table below). **Note:** Lifting points painted red must only be used when the equipment is elevated clear of the ground: designated yellow points are limited to manoeuvring and positioning of equipment.

Description	Individual Lifting Point Capacity (tonnes)
MP750 Hydraulic Strut Unit	12
Super Tube Extn	12
Euro Strut Extn	12



Safety Note: it is ultimately the responsibility of the user to provide a safe method of access to and egress from excavations.



- Always work from a detailed lifting plan
- Ensure adequate capacity of lifting equipment
- Know the weight of the load
- Adjust slings so that struts are lifted horizontally
- Ensure the safe lift angle of chains is not exceeded
- Do not exceed the capacity of individual lifting points

- Use clear and precise hand signals
- Be aware of personnel in the vicinity
- Use tag lines to control load
- Ensure all lifting equipment has valid certification
- Do not use damaged lifting points
- Report damaged lifting points and equipment

Bolt Tightening Specifications

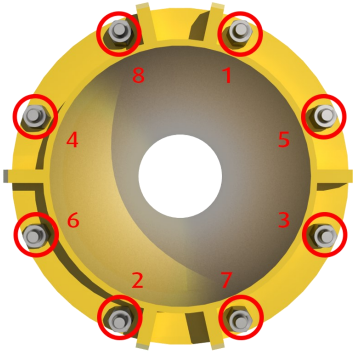
Safety Notes:



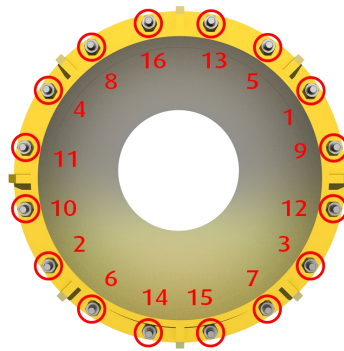
All flange connections use M30 grade 10.9 bolts in **every** joint throughout its length and are torqued to 1500Nm (1100 ft lb) in a diagonal sequence as shown below. Do not use bolts other than supplied by Groundforce. Strut assembly on site must be supervised by a Groundforce engineer.



Proprietary anti-seize compound must be applied to the nut and bolt threads prior to assembly



Diagonal tightening sequence for an eight hole flange or tube connection.



Diagonal tightening sequence for a sixteen hole flange or tube connection.

Note: On shorter spans, there may be difficulty accessing nuts 2 and 7 on an 8 hole flange or nuts 14 and 15 on a 16 hole flange when attempting to use a Torque Wrench and Multiplier. This is due to obstructions caused by the strut foot.

If access is difficult, it is permissible to use a 'Slogging Spanner' in conjunction with a lump hammer to tighten the above nuts.

Always follow the diagonal tightening sequence wherever possible.

Item No.	Description
SIA.SSW46	46mm Ring Slogging Spanner

- It is essential that a bolt tightening sequence is adopted where opposite bolts are tightened in diametric sequence for all flanges/adaptors. This ensures an even distribution over the entire flange and prevents a kink forming over the length of connected extensions.
- Once all bolts have been tightened to the correct torque, the sequence should be repeated as some bolts may become loose during the initial tightening process.
- When complete, due to fabrication methods of the flanges, it is normal on occasions to have an even gap of up to 2mm between the adjacent flanges.

End Plate Attachments

It is essential that a bolted connection is used to fix the strut end plates to the structure i.e. a capping beam. Pre-drilled holes are located in the end plates to accommodate 30mm dia fixings. Bolt design must take into account the necessary design loadings; including accidental load likely to be encountered. **Refer to scheme specific design for more information.**

Typical Assembly Methodology (where no significant pre-stressing is required)

Safety Notes:



Assembly techniques will vary from site to site depending on the space, and lifting equipment available. If adequate lifting equipment and space is available, struts less than 40m long can be assembled away from the excavation and lifted in whole, **however it is essential that individual lifting point capacities on the tubes are not exceeded.** It is more likely that the strut will be assembled from within the excavation



Safety Note: Extreme care and adequate precautions must be taken to prevent trapping fingers during all stages of work.



Typical Assembly Cont...

1. Excavate to approximately 1.2m below the centre line of the strut to form a level working area.
2. Struts will be delivered to site either fully assembled or as pre-assembled sub-assemblies. Refer to the general arrangement and configuration drawings for the correct identification of sub assemblies to be connected together. **If in doubt ask.**
3. Lift the non-hydraulic end first and locate and fix the swivel onto its bearing location: for example a bolted connection to a capping beam. Support the free end of the sub assembly on solid timber packing pieces on firm ground ensuring that the strut is horizontal.
4. Offer up the next sub assembly to be joined, ensuring that the flange mating faces are clean and are aligned with the flange bolt holes; guide spigots are provided to assist. Insert the bolts and tighten in a diagonal sequence as described earlier before finally torqueing to the correct specification.
5. Lift the strut slightly and re-support near the free end, ensuring that the strut is horizontal.
6. Continue generally as in points 3 and 4 until the strut is fully assembled.
7. Operate the hydraulic ram to expand and pressurise the strut to its final size as described in the next section.
8. Once the strut is fully installed and secured to its end location the lifting chains can be removed.
9. Install any secondary restraint i.e. hanging chains as specified on the general arrangement drawings.

Installation - Operating the integral hydraulic ram



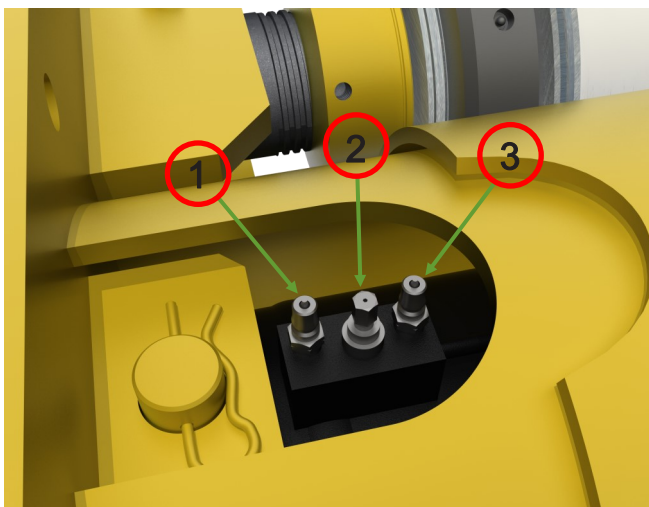
Safety Note: Before proceeding, ensure the strut is correctly assembled and all nuts/bolts are fitted to the recommended torque setting with the End Bearing Plates bolted in place.



Hydraulic pressurisation of the MP750 is carried out in two separate operations: if no specific pre-loading is required, the central low pressure ram only is employed to provide a nominal pre-loading. This has the benefit of removing any slack and gaps in the strut joints and end connections. Standard pumping equipment is used for this purpose. **Note:** Pre-load is not a critical part of the structural capacity and governed by the limitations of the pumping equipment.

If higher levels of strut pre-loading is required, the hydraulic nuts are used to achieve specific values of pre-stress, preferably in conjunction with the load monitoring system. Hydraulic nuts operate at very high pressures and complex pumping equipment is consequently required. **For this reason, only qualified Groundforce engineers are authorised to operate the hydraulic nuts.**

Installation - Operating the central hydraulic ram



1. Expand Quick Release Coupling
2. Lock-Off Load Hold Valve
3. Return Quick Release Coupling

Note: It is important that the Lock-off Valve is not tightened in excess of 10Nm, therefore only use the Lock-off Tool provided to hand tighten.



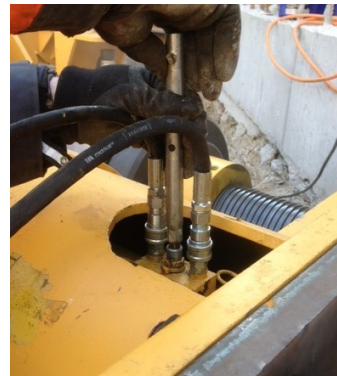
Lock-off Valve Tool



Note: The ram on the MP750 must be only be used with dedicated pumps filled with hydraulic oil such as Millmax 32HV or similar viscosity oil only. Water based shoring fluid must not be used in any circumstances. COSHH report is available on request.

Operation sequence

1. Remove the protective caps from the couplings and connect **both** pump hoses to the ram - see previous page. Note that the couplings must be scrupulously clean and ideally sprayed with penetrating oil before attempting to make the connections. Ensure that the sliding collars on the quick release couplings are fully engaged before attempting to use the pump. Note: If screw type fittings are used, ensure that these are fully engaged with the collar screwed down before use, hand tighten the collars only
2. Ensure the lock off valve on the ram is open by at least two full turns anticlockwise. Start the pump and move the lever on the pump to the “expand” position and operate the pump to expand the strut. (refer to separate user guides for the pump operation)
3. Once positive contact is made between the bearing surface and the strut, in the absence of specific pre-load continue to expand the strut until a pressure of 1500psi (~100 bar[#]) (unless otherwise stated) is achieved as indicated on the pump pressure gauge. Note that pumps have a pressure relief valve pre-set to this value.
4. Close the lock off valve using the tool provided, by turning clockwise; **DO NOT OVER TIGHTEN THE LOCK OFF VALVE** (see note on page 6). **Note:** the valve is fully closed when lock nut is seated on the body of valve.
5. Move the pump delivery lever to the central neutral position to depressurise the hoses, **Note:** do not remove the hoses at this stage.
6. Wind down both load holding nuts to contact the face of the hydraulic nuts (see photo opposite) and tighten with the “C” spanner provided in the installation kit.
7. Finally undo the lock-off valve by turning at least two full turns anticlockwise to de-pressurise the hydraulic ram, allowing fluid to return to the pump tank. The hoses can now be removed from the ram.
8. Re-cap the hose and coupling connections with the protective covers.
9. Wrap all exposed threads and nuts with oil impregnated tape (see photo opposite).



Safety Notes:



If fitted with load monitoring, ensure pressures are not exceeded. If in doubt, contact Groundforce.



Any sign of damage or fluid loss or hydraulic systems failure during use must be notified to Groundforce immediately.

Note: Waste fluids should be disposed of safely with due regard to local regulations

[#] 1 bar = 100 kPa

Do	Do Not
✓ Prepare a detailed site specific method statement in place before installation and removal operations commence ✓ Visually check all safety critical parts as listed below prior to each use and replace if necessary: • Lifting eyes, Handling points • Hydraulic couplings and Lock-off valve • Lifting equipment (e.g. chains and slings) ✓ Ensure the strut is adequately located onto the bearing surface and always use a designed and approved connection to support both ends of each strut ✓ Clean and oil the hose couplings before making connections ✓ Only use this equipment in temperature range -20°C to $+40^{\circ}\text{C}$ ✓ Only use the red painted points for lifting ✓ Inspect struts regularly and check overall strut alignment after installation ✓ Adequately support strut sub-assemblies during installation / removal ✓ Ensure all flange joint bolts are of the correct grade and are torqued to the specified figure ✓ Take care to protect the strut from accidental strikes, concrete accumulation, etc ✓ Ensure exposed screw threads are well protected with grease tape after installation ✓ Take care to avoid trapping fingers at all stages of work ✓ Store all equipment in a safe manner when not in use or when ready for collection. Ensure equipment stability and protection from damage, away from site activity	✗ Use bolts other than those supplied by Groundforce for any flange connection ✗ Strike or impact the strut ✗ Allow debris to accumulate on the strut ✗ Exceed the stated installation pressure ✗ Use water based shoring fluid with the MP750 rams ✗ Use uncertified lifting equipment ✗ Attempt to remove the strut under load ✗ Relocate the equipment once it is installed ✗ Suspend or store materials on the struts ✗ Over-tighten the lock-off valve (see note on page 6) ✗ Assemble, install or remove MP750 struts without direct supervision from a Groundforce engineer ✗ Attempt to lift assemblies greater than 30m long without a lift plan being supplied by Groundforce ✗ Operate or continue if any of the equipment is found to be damaged, or in need of repair. Contact Groundforce if such damage is found

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