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HydraDrop Suspension Product Manual

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Introduction

HydraDrop is an innovative hydro-pneumatic suspension system designed to allow trailers to easily lower to ground level for safe and easy access. This product manual covers all aspects of safely integrating, operating and maintaining a HydraDrop trailer and should be made available to the manufacturer, resellers, owners and operators of all HydraDrop trailers.

Standard Specifications

Carrying capacity - single axle	1800kg
Carrying capacity - tandem axle	3500kg
Recommended wheel size	195R15C - 0 offset
Brakes	10” electric drum
Hubs	Trailparts UniHub 1.8T
Maximum chassis width	2000mm
Minimum chassis length - single axle	1500mm
Minimum chassis length - tandem axle	3000mm
Maximum ride height	400mm

Safe Operation

Lowering

1. If connected to a vehicle, ensure the tow vehicle is safely stopped with handbrake on, and trailer is in an appropriate position to be lowered safely.
2. If disconnected from the vehicle, ensure the trailer is stable and the jacking leg/wheel is sufficient to support the additional weight of the lowered trailer.
3. Check there are no obstructions or items which may be damaged by the weight of the trailer when lowered, and ensure people remain clear of the trailer while lowering. If using a remote control system, ensure the operator is also clear of the trailer.
4. Trailers may be fitted with various control systems, check with your trailer manufacturer if operation varies from this manual. Most HydraDrop trailers are fitted with an isolation switch, and an up/down switch. To lower the trailer, turn the isolation switch on and hold the down button.
5. Continue holding the down button for 5-10 seconds after the trailer is completely lowered to ensure all pressure is relieved. Failure to do so may result in the trailer raising if load is removed.
6. Turn the isolation switch off to prevent accidental operation of the hydraulic system.

Raising

1. If connected to a vehicle, ensure the tow vehicle is safely stopped with handbrake on, and trailer is in an appropriate position to be raised safely.
2. If disconnected from the vehicle, ensure the trailer is stable and the jacking leg/wheel is sufficient to support the raised trailer.
3. Check there are no obstructions or items which may be damaged by the trailer being raised, and ensure people remain clear of the trailer while raising. If using a remote control system, ensure the operator is also clear of the trailer.
4. Trailers may be fitted with various control systems, check with your trailer manufacturer if operation varies from this manual. Most HydraDrop trailers are fitted with an isolation switch, and an up/down switch. To lower the trailer, turn the isolation switch on and hold the up button.
5. Raise the trailer until it is at the desired ride height, usually level with the tow vehicle. HydraDrop trailers should not be operated at the full ride height, always ensure there is at least 50mm of additional height adjustment to allow the suspension to operate.
6. Turn the isolation switch off to prevent accidental operation of the hydraulic system.

Towing

When towing HydraDrop trailers ensure the ride height is high enough to provide sufficient running clearance, and that lights, reflectors and registration plates are within acceptable limits. Also ensure that the ride height is not within 50mm of the maximum height of the hydraulic system.

Storage

HydraDrop trailers should always be stored in the lowered position. This not only ensures that the trailer is stable, but also relieves pressure on the hydraulic system and helps to maintain lubrication of the seals and rods of the hydraulic cylinders.

Maintenance

Maintenance Schedule

Task	Frequency
Check for leaks/damage to hydraulic system (fix if required)	Frequently
Check/fill hydraulic fluid (replace if required)	Frequently
Check lowering speed (adjust if required)	Frequently
Check wiring/electrical system (fix if required)	Frequently
Check & grease suspension bushes (replace if required)	12 months/10,000kms
Check hydraulic cylinder pins, bolts and bushes (replace if required)	12 months/10,000kms

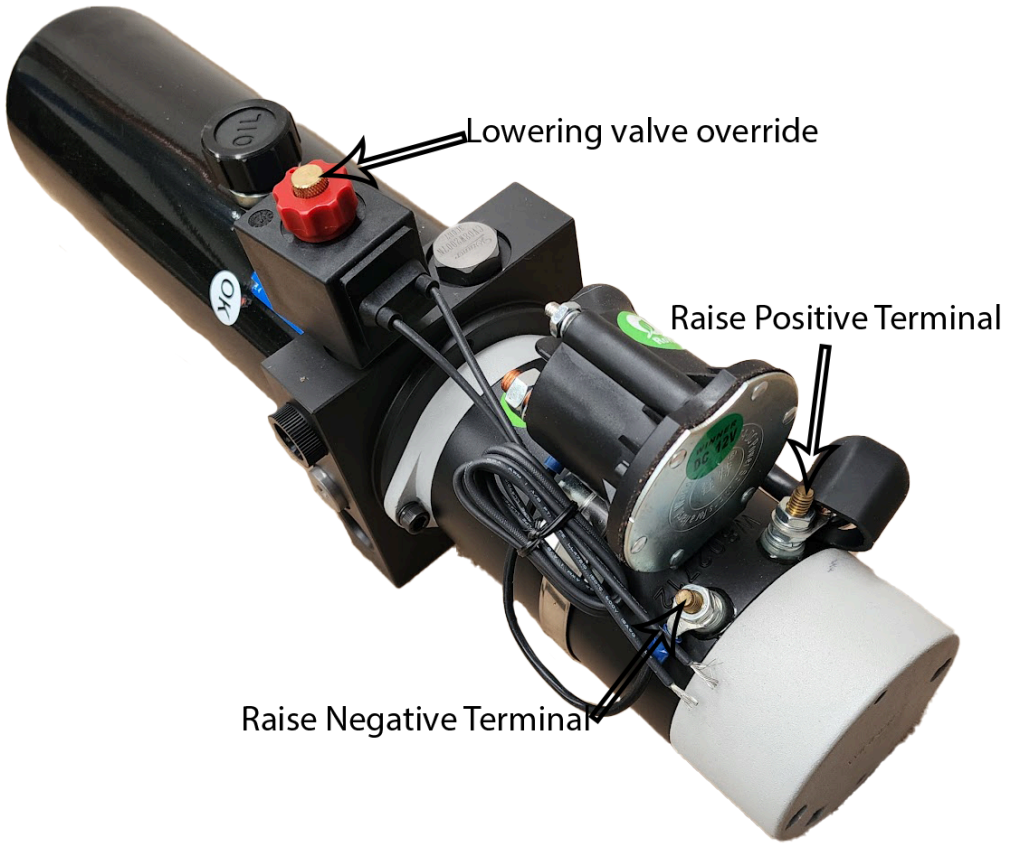
Note: refer to trailer/hub manual for wheel end maintenance requirements.

Troubleshooting

Issue	Potential Causes	Solution
Trailer won't lower	Electrical system fault	Check lowering solenoid is receiving power.
	Solenoid fault	Open manual override of lowering valve - if trailer lowers and solenoid receives power then solenoid is faulty and must be replaced.
	Hydraulic/mechanical fault	Open manual override of lowering valve - if trailer doesn't lower hydraulic or mechanical fault preventing lowering.
Trailer won't raise	Electrical system fault	Check raising solenoid is receiving power.
	Solenoid fault	Bypass raising solenoid - if trailer raises and solenoid receives power then solenoid is faulty and must be replaced.
	Hydraulic/mechanical fault	Bypass raising solenoid - if pump operates and trailer does not raise hydraulic or mechanical fault preventing raising.
Trailer lowes unintentionally	Electrical system fault	Check lowering solenoid is not receiving power.
	Hydraulic system fault	External (hose, seals fittings etc.) or internal (valves) leaking.

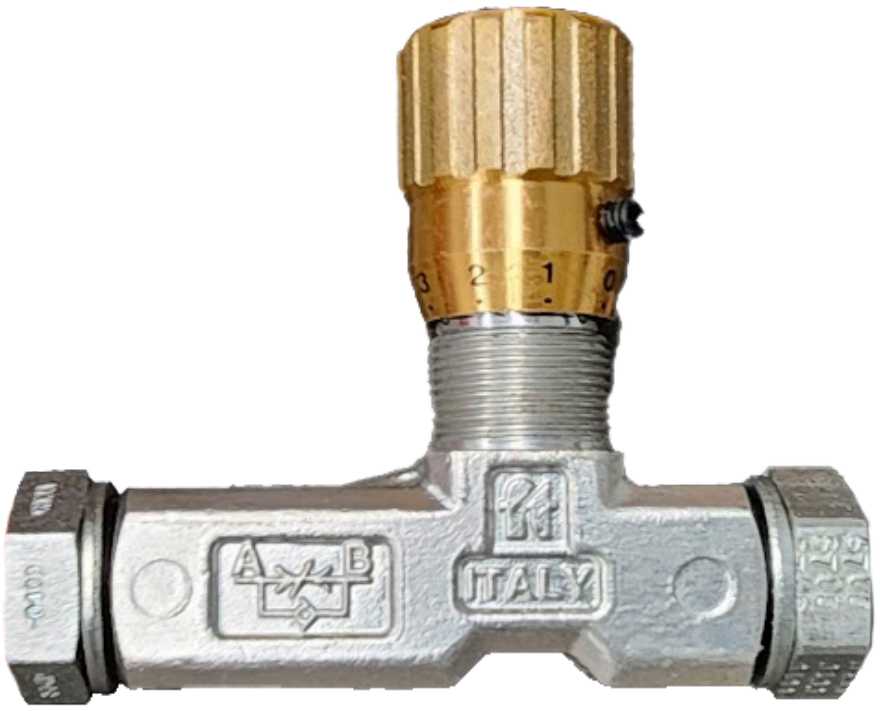
Manual Overrides

To bypass the electrical system and lower the trailer manually, undo the screw on top of the lowering valve. To bypass the electrical system and raise the trailer manually, connect 12V directly to the motor terminals. Ensure the correct polarity, the positive terminal has a larger cable going to the motor solenoid.



Lowering Speed Adjustment

To adjust the lowering speed undo the grub screw on the adjustment knob on the return speed valve located near the power pack. Turn the knob until the desired lowering speed is reached. The lowering speed should be kept slow enough to maintain safe operation and avoid damage to the trailer.



Integration

Due to the unique design of HydraDrop suspension, it must be tightly integrated into your trailer chassis and overall trailer design. This manual provides key information and dimensions however we cannot provide a comprehensive guide due to the wide variation in possible trailer designs. Ensure your trailer design has adequate space required to fit the suspension system, including space for the wheels to move when lowered and consider how and where the hydraulic components including the power pack and accumulator will be mounted, and their connection to the suspension cylinders. Consideration will also need to be given to the electrical and control system required to operate HydraDrop suspension. Contact Carbon Equipment for more tailored information on integrating HydraDrop suspension into your trailers.

Kit Contents

Your HydraDrop suspension kit typically includes:

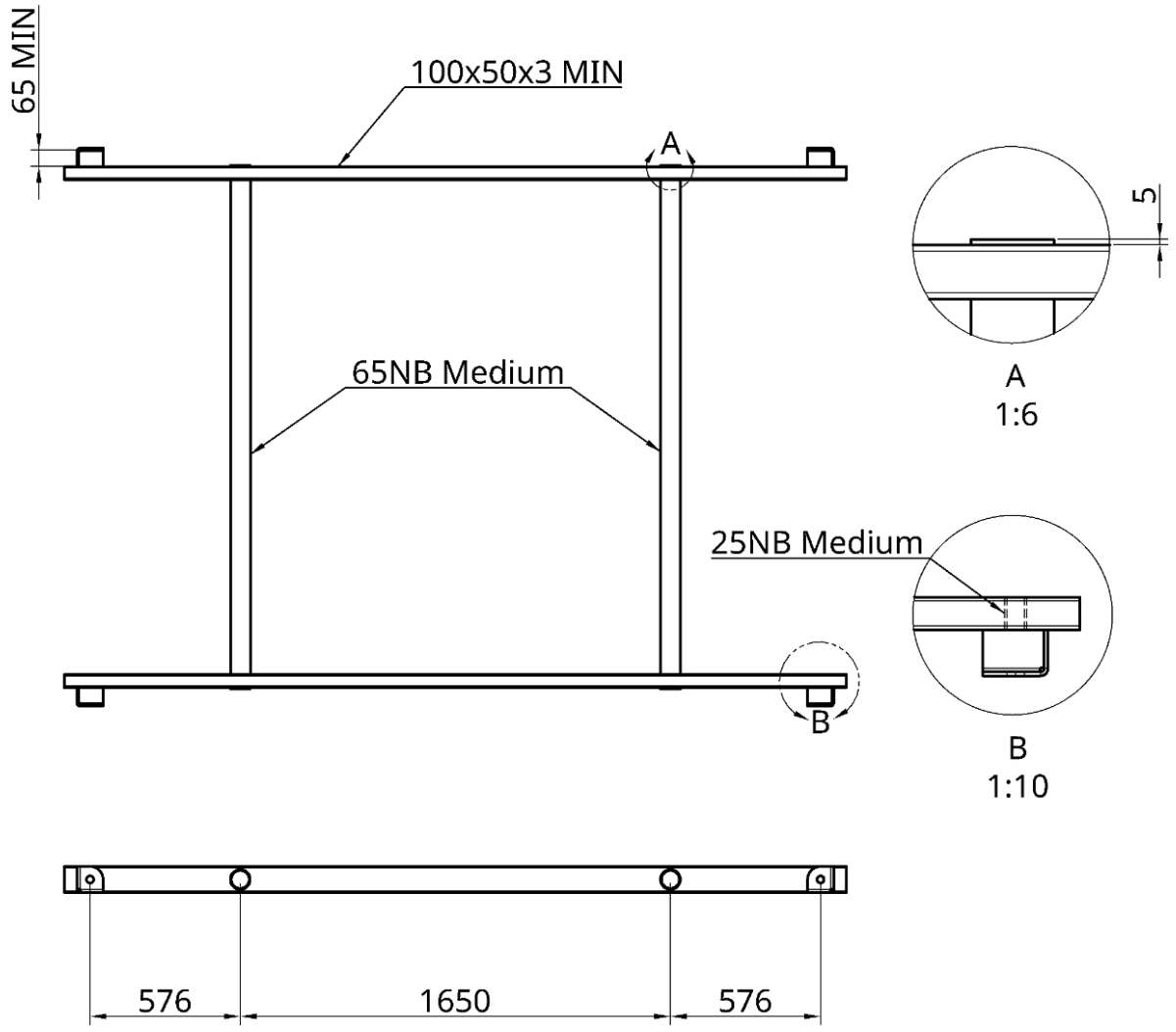
- Swingarms with integrated stub axles (optional integrated mudguards)
- Hydraulic suspension cylinders
- Sway bars
- Suspension bushes
- 12V power pack (inc. valves)
- Accumulator
- Hubs
- Brakes
- Fasteners & bearings

Due to the wide variety of trailer sizes and designs HydraDrop does not include:

- Hydraulic lines/hoses
- Hydraulic fluid
- Chassis crossmembers
- Hydraulic cylinder mounts
- Wheels & tyres

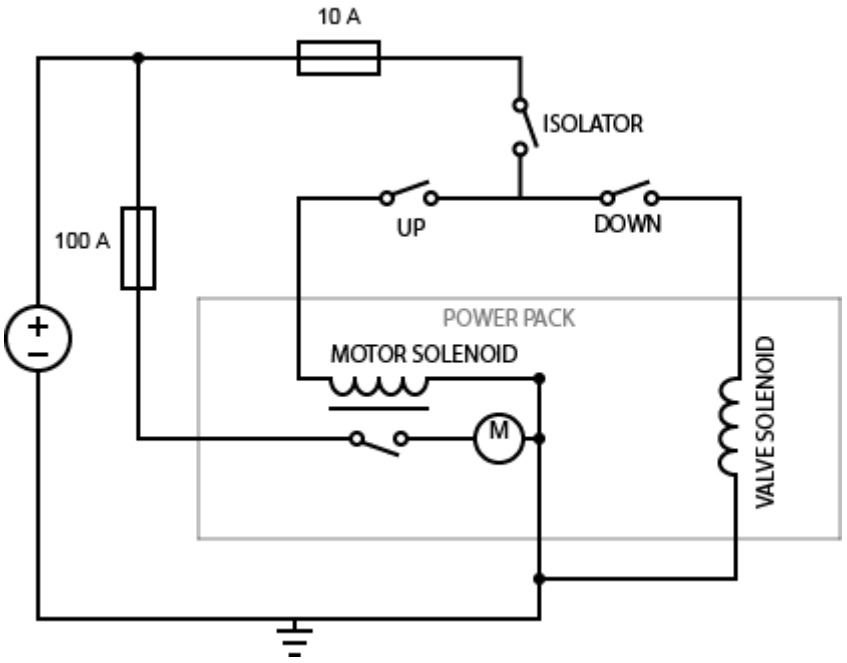
Chassis Design

HydraDrop suspension's cantilevered design applies significant load to the chassis - we recommend using minimum 100x50x3mm RHS chassis rails. The sway bar bushes and sway bars are designed to fit into 65NB Medium (3.6mm) wall CHS crossmembers with 5mm additional width either side of the chassis rails. Tandem suspension crossmembers should be minimum 1650mm apart. Hydraulic cylinder mounts should be 576mm (centre to centre) from sway bar crossmembers. Hydraulic cylinder mounts must allow for a 1" diameter bolt and a minimum width of 65mm, we recommend 25NB crush sleeves to bolt through the chassis. Minimum chassis length of HydraDrop trailers is 1500mm for single axle and 3000mm for tandem axle.



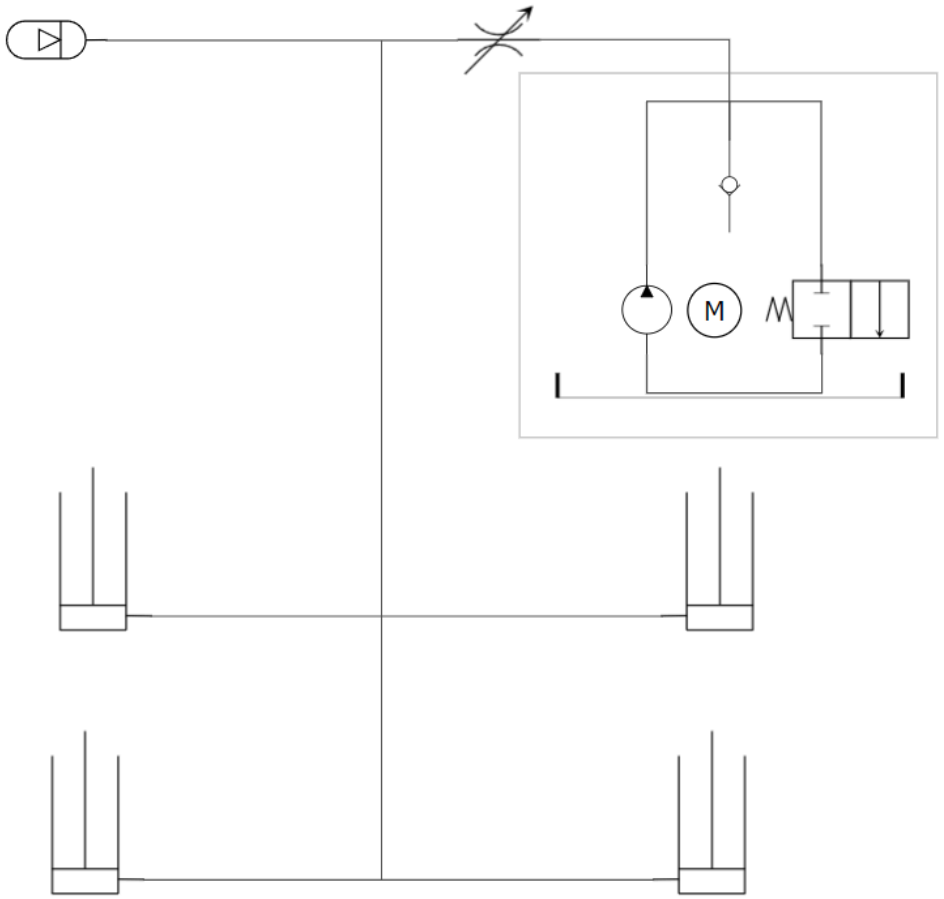
Electrical Connection

An electrical system capable of supplying 800W must be provided, as well as a two way switch or remote control. An isolation switch is also recommended. The down switch should provide power to the return valve solenoid, and the up switch should provide power to the motor solenoid. Ensure all electrical connections are appropriately fused, and consider charging options for the power system.



Hydraulic Connection

The hydraulic system should be connected to allow open flow at all times between all suspension cylinders, the accumulator and the power pack. We recommend a combination of hard and flexible lines made to suit your chassis layout. All lines and fittings should be rated to minimum 350 bar (5000 PSI).



Installation

1. Insert the sway bar through the chassis crossmembers.
2. Grease the inside of the suspension bushes and the ends of the sway bars.
3. Slide the bushes onto each end of the sway bars, and into the suspension crossmembers.
4. Center sway bars and remove excess grease from the ends of the sway bars.
5. Slide the swingarms onto the ends of the sway bars, ensuring the correct swingarms for each side.
6. Insert and fasten the two M16 bolts and nuts per swingarm, fastening all swingarms to the sway bars.
7. Insert the teflon bearings into the swingarms cylinder mounting holes.
8. Slide the clevis end of the suspension cylinders over the swingarms, and insert the cylinder pins through the teflon bearings. Secure the pins by fastening the M6 bolts with threadlocker applied.
9. Place the other end of the suspension cylinders into the mounts on the chassis, then insert and fasten the 1” bolts.
10. Fit brakes, hubs and wheels as per the manufacturer's instructions.
11. Mount the power pack (with speed valve fitted) and accumulator in the desired locations.
12. Connect the suspension cylinders, power pack and accumulator with suitably rated hydraulic hoses as per the schematic. Check all fittings are tight.
13. Connect the electrical system and switches as per the schematic.
14. Fill the power pack tank with hydraulic fluid (ATF Dex III).
15. Raise trailers and check for leaks at all fittings and joins. Lower the trailer and relieve pressure before fixing leaks. Raise and lower a few more times and then raise the trailer and leave raised to check for slower leaks.

Warranty

HydraDrop suspension is covered by a 12 month warranty on manufacturing defects. This warranty does not cover damage from misuse, lack of maintenance, improper installation or general wear and tear. Carbon Equipment will choose to repair or replace faulty components, but will not cover any costs relating to the failure such as, but not limited to, transport costs, towing costs, hire costs, repair costs, fittings costs or any other third party costs. This warranty does not cover other related components such as brakes and hubs, which are covered under their own warranty.