

SPREADLEVER BRAKES

THE OVERRUN PRINCIPLE

The hydraulically damped overrun control device is made up of six main elements that control and operate the braking system.

1. The Housing
2. The Drawtube
3. The Overrun Lever of Brake Link
4. The Damper
5. The Hand / Parking Brake
6. The Energy Store Unit

The drawtube slides through the centre bore of the housing with its rear end plate in contact with the overrun lever which is pivoted at the rear of the housing. As the top of the overrun lever is pushed back, the bottom, to which the transmission rod is attached, moves forward pulling the brake rod and applying the brakes.

The damper, located within the drawtube, is fitted to maintain smooth and efficient brake application. The performance of the damper has been tailored to be compatible with the brakes and the gross weight of the trailer.

The actuating force for the wheel brake is generated at the overrun device through overrunning action of the trailer (FORWARD BRAKING), reversal of trailer by the towing vehicle (AUTO-REVERSE), or operation of the hand/parking brake.

FORWARD BRAKING

The actuating force for the wheel brake is generated during braking of the towing vehicle, as the trailer tends to overrun and pushes the drawtube in. This force is transmitted to the expander devices in the wheel brakes via the overrun lever, brake rod, compensator and brake cables.

As a result, the brake shoes are pressed against the brake drum. The resulting friction from contact of brake linings and drum produces the required braking.

On releasing the brake on the towing vehicle, the drawtube returns to its original position and the brake shoes are released from the drums by means of the tension springs.

AUTO-REVERSE

During reversing the drawtube is pushed in and the brake shoes press against the drum (as in forward braking).

When the trailer wheels are in reverse, the reverse rotation, combined with the friction generated from drum and lining contact, causes the sliding shoe to slide on its carrier towards the adjuster.

This displaces the sliding shoe radially inwards away from the drum. The drawtube may then travel fully to its end stop without applying further force to the brake shoes and the trailer can be reversed without any difficulties.

Changing direction from reverse to forward travel results in the drawtube being pulled out, allowing the sliding shoes to be returned to the forward braking position by means of the tension springs.

PARKING

The handbrake, in conjunction with the energy store, is used to apply the brakes when the trailer is parked.

As the handbrake lever is raised, its lower end makes contact with the lower end of the overrun lever and begins to apply tension to the brake linkage.

As the handbrake is raised further the energy store mechanism moves overcentre and pulls the brakes on fully. The spring energy store is pre-tensioned with a force corresponding to at least the actuating force applied during normal trailer braking.

If the trailer is rolling rearwards as the handbrake is applied, or if it is pushed backwards with the handbrake on, the autoreverse mechanism will be brought into action.

To overcome this, a greater actuating movement is introduced from the spring energy store, expanding the brake shoes further so that full brake effectiveness is maintained.

SPREADLEVER BRAKES

TRAILER BREAKAWAY CABLE

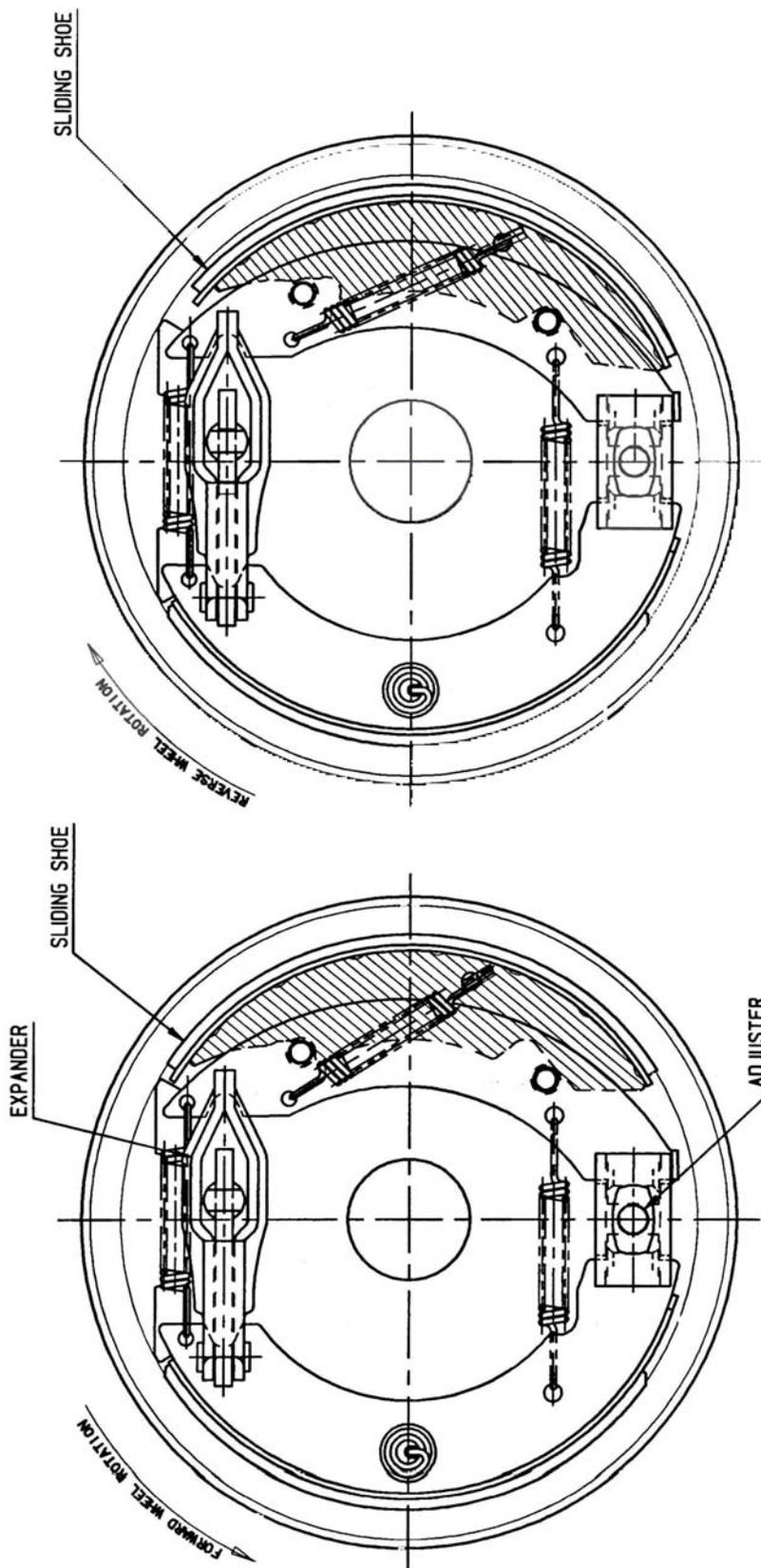
In the event of the trailer becoming detached from the towing vehicle the breakaway cable which must pass through a guide at the forward end of the hitch applies a direct forward pull to the base of the handbrake lever. This applies the parking brake and operates the brakes. The cable then snaps or the cable attachment "burst" ring opens (AS IT IS DESIGNED TO DO).

BRAKE SYSTEM TENSIONING (System Components Assembled)

1. Jack up the trailer and support the axles on suitable stands so that all wheels are clear of the ground.
2. Release the handbrake fully ensuring that the coupling head is fully extended. Secure handbrake.
TAKE THE TENSION OUT OF THE SYSTEM BY SLACKENING THE NUT AT THE REAR OF THE BRAKE ROD. It is now possible to begin the set-up procedure starting with the wheel brakes.
 - i. Adjust each wheel brake as follows:
Using a spanner/socket (17mm A/F for 200x50 brake, 19mm A/F for 250x40 brake) turn the hexagonal adjuster bolt in a clockwise direction until brake shoes start to lock.
THE DRUM MUST ONLY BE TURNED IN THE DIRECTION OF FORWARD ROTATION.
 - ii. Slacken the adjuster until the wheel just turns freely in the forward direction.
 - iii. Check the travel of the brake cables. This should be 2 – 5mm. If not, adjust the brake as appropriate.
3. Take up the slack in the brake rod at the rear nut. This is best achieved by turning the nut until finger tight. Fig. 1.
4. Apply the handbrake.
5. With the handbrake engaged, turn each wheel in the reverse direction. They should turn a little then lock as the auto-reverse mechanism is over ridden by the handbrake energy store.

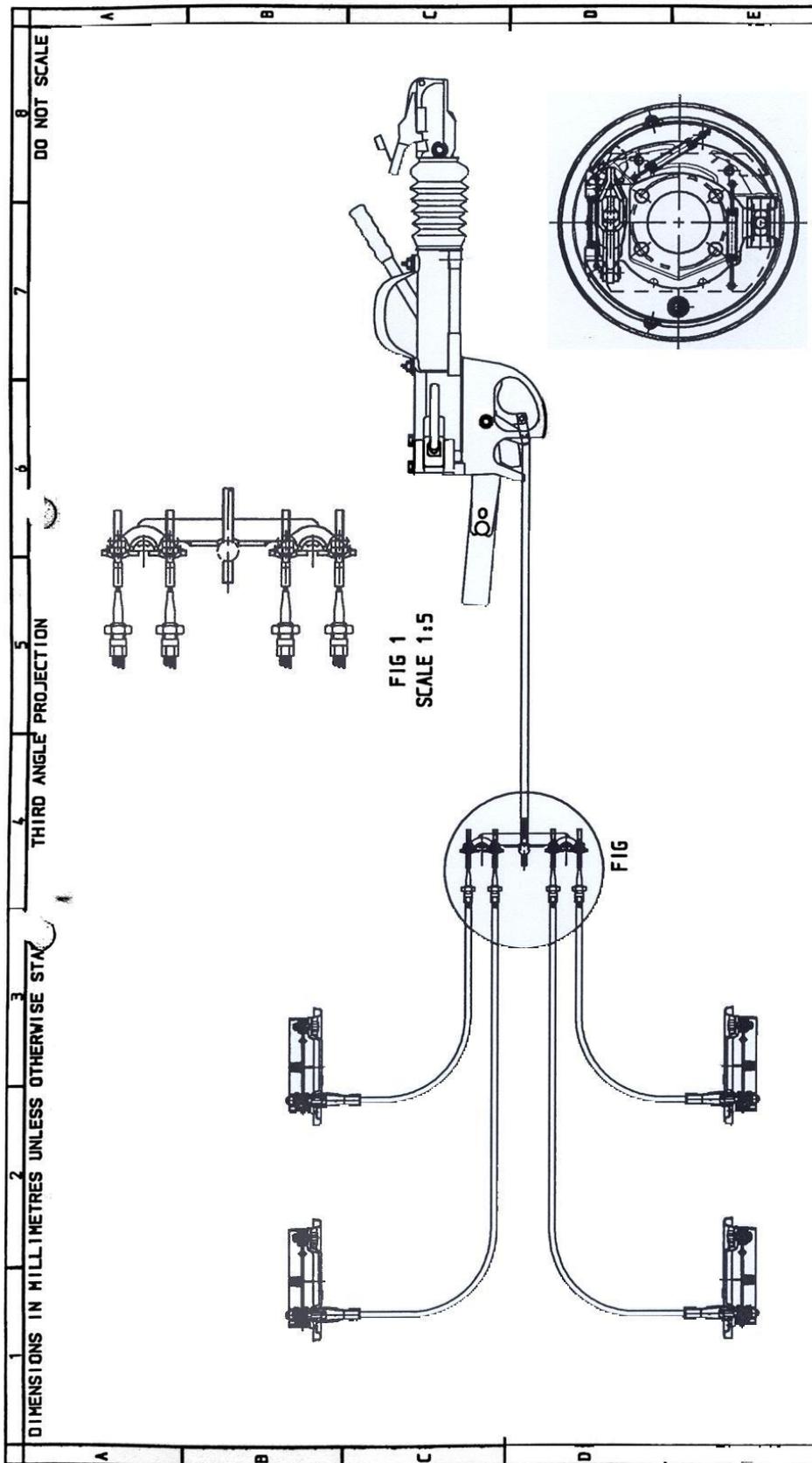
NB: As each wheel is turned backwards you should note the rearward movement of the brake lever as the reservoir of power in the pre-charged spring takes up the slack when the reversing shoe slides backward on its carrier and then re-applies. This action should occur once on the rearward turn of each wheel.
6. Check that the compensator elements are parallel with the brakes applied in forward and reverse modes.
7. REPEAT STEP 3.
8. If all adjustments are satisfactory, ensure that the nuts on brake rod end are locked.
9. The trailer can now be returned to the ground in preparation for a towing test.

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Knott Auto-reverse Brake Unit
(Left hand / Nearside)

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SERVICING

1. The coupling
2. Transmission

- Coupling Head : Check handle and trigger for smooth operation. Clean out any dirt that could cause handle to stick.
Using towball of known size, check for wear at the indicator lug.
- Drawtube : Check that the drawtube is not bent. Check for excessive wear at the front bearing.
Allowance for wear = 0.5mm.
- Damper : Depress coupling head fully, it should return by itself. If not, remove damper from coupling and test on its own. If OK problem is with drawtube.
- Brake Link : If the brake link appears to be sticking, it must be freed off.
- Bellows : Check for splits and secure fastening. The bellows are provided to prevent the ingress of salt, dirt etc. onto the drawtube, which not only may prevent smooth operation but also cause rusting or accelerated wear at the front bearing. This could eventually lead to the complete seizing of the drawtube.
- Handbrake : If sticking, free off and lubricate where necessary.
Exceptionally, tight handbrake movement could also be effected by the energy store – over tensioned or incorrect length springs could lead to the store being 'coilbound'.
- Breakaway Cable : If there are kinks or knots in the cable, or it is frayed, replace it.
Always ensure straight line operation in the event of a breakaway by passing it through a hole or guide in the front of the chassis.
- Grease : Use the nipples provided to grease the coupling and lubricate where necessary.

TRANSMISSION

- Brake Cable : Check for both sticking and kinking. To gain the best performance on a regularly used trailer it is recommended that brake cables be changed every 12 months or 20,000 miles. Always replace in sets.
- Linkages : Check that all linkages are secure, nuts locked up where appropriate and that there is no binding throughout the transmission system.
- Brake Shoes : Check brake shoes for wear. Minimum lining thickness should be 1.5mm

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FAULT DIAGNOSIS

Symptom

Cause

Brakes sticking on

Binding overrun lever
Clevis fouling
Sticking drawtube
Brake cable kinked
Trailer parked with handbrake

Individual brakes sticking on

Left on for prolonged periods

Cannot adjust brakes

Faulty shoe assembly / backplate

Wheel drums over-heating

Brakes binding
Handbrake left on / partly on
Wheel brakes dirty

Cannot reverse trailer, brakes locking on

Incorrectly adjusted braking system
Brake rod tension

Coupling Seized

Lack of maintenance

Handbrake difficult to operate

Coilbound – lack of lubrication

Trailer banging into towing vehicles

Faulty damper – brakes incorrectly adjusted

No brakes

Shoes not “bedded in”
Damper seized
Worn shoes
Seized, kinked brake cable
Seized / bent drawtube
Shoes / drum contaminated with grease / oil

Braking effect too weak

Brake linings not run in
Too much play in the brake system
Brake linings smooth, oil or damaged
Overrunning hitch is tight
Brake rod skewed or bent
Brake cables rusty or buckled

Jerky Braking

Too much play in the brake system
Shock absorber of overrunning hitch defective
Sliding shoe skews in the brake shoe carrier