

FELK ENGINEERING PTY LTD

ABN 17 605 913 004

54 MEDCALF STREET

WARNERS BAY

NSW 2282

Phone: 02 49546955

Email: admin@felks.com.au

FELK

TF 1600 Hydraulic

Brake Actuator

Service and

Warranty Manual

**MUST BE INSTALLED BY A LICENCED
ELECTRICIAN OR WARRANTY VOIDED.**

Introduction

The TF Hydraulic Brake Actuator has been designed and manufactured to provide safe & reliable power to your hydraulic braking system.

This electronically powered TF 1600 Actuator is designed to perform with all **Proportional** Brake Control Units. Please note: Most older models of Brake Control units do not have this feature and are therefore unsuitable to use with the TF 1600 Actuator and will void warranty.

Spare Parts & Service Facility

Located at

FELK ENGINEERING

54 Medcalf Street Warners Bay NSW 2282

Ph: (02) 4954 6955

admin@felks.com.au

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WARNING

This is the safety alert warning. It is used to alert you to potential injury and hazards. Obey all safety messages that follow this warning to avoid possible injury or death.

Actuator Installation Instructions

Getting Started

This unit MUST be wired by a Professional Electrician/Auto Electrician.

The following materials will be required for installation: -

- One litre of DOT 3 or DOT 4 brake fluid (from a new sealed container).
- **One Emergency Breakaway Kit** – must include a 12 volt 4 amp hour (minimum) battery.
- Wire (see Electrical Installation Requirements for proper wire size).

When selecting the location, the following items should be considered:

WARNING

- 1. It is crucial to mount the TF unit in a position where it will not be immersed in water. Failure to do so will void manufacturers warranty in the event of water damage.**
2. The wiring should be as direct as possible from the TF unit to the tow vehicle to avoid voltage drop.

The TF actuator is powered from the electrical system of the tow vehicle. In order for the unit to function properly, it must have adequate electrical power (see Electrical Installation Requirements).

WARNING

The TF actuator contains sensitive electronics that must be protected. Drilling additional holes in the housing or welding anywhere on the unit will damage the unit making it inoperable & void the manufacturer's warranty.

Connect the trailer brake lines to the actuator as follows:

- a) Connect the brake line to the inverted flare brake port on the actuator.
- b) Brake line must be compatible with DOT 3 & DOT 4 brake fluid.
- c) Fill the TF unit with DOT 3 or DOT 4 brake fluid to the bottom of the reservoir filler neck.

WARNING

Always use NEW DOT 3 or DOT 4 brake fluid from a sealed container. Never attempt to reuse old dirty fluid. Do not overfill the unit. To avoid damage to paint surfaces etc., avoid contact with the brake fluid. Wash any spilt brake fluid immediately with soapy water to avoid damage to those surfaces & rinse off.

Electrical Installation Requirements

Mount the emergency breakaway switch and emergency breakaway battery on the trailer (as detailed in the instruction sheets provided with the emergency breakaway kit), **ensuring it will not be immersed in water.**

WARNING

Undersized wire will increase electrical resistance and will prevent proper operation of this unit.

It is **critical** that the BLACK “Power” & WHITE “Ground” wires that lead from the Tow vehicle to the Actuator, are **minimum 4mm wire.**

The BLUE wire from the in-cab electronic brake control, is connected to the BLUE wire on the actuator.

The YELLOW wire from the actuator is connected to the cold side of the trailer Emergency Breakaway Switch.

Wire Colours and Function

BLACK: 25 - 40 amp 12 volt supply from tow vehicle

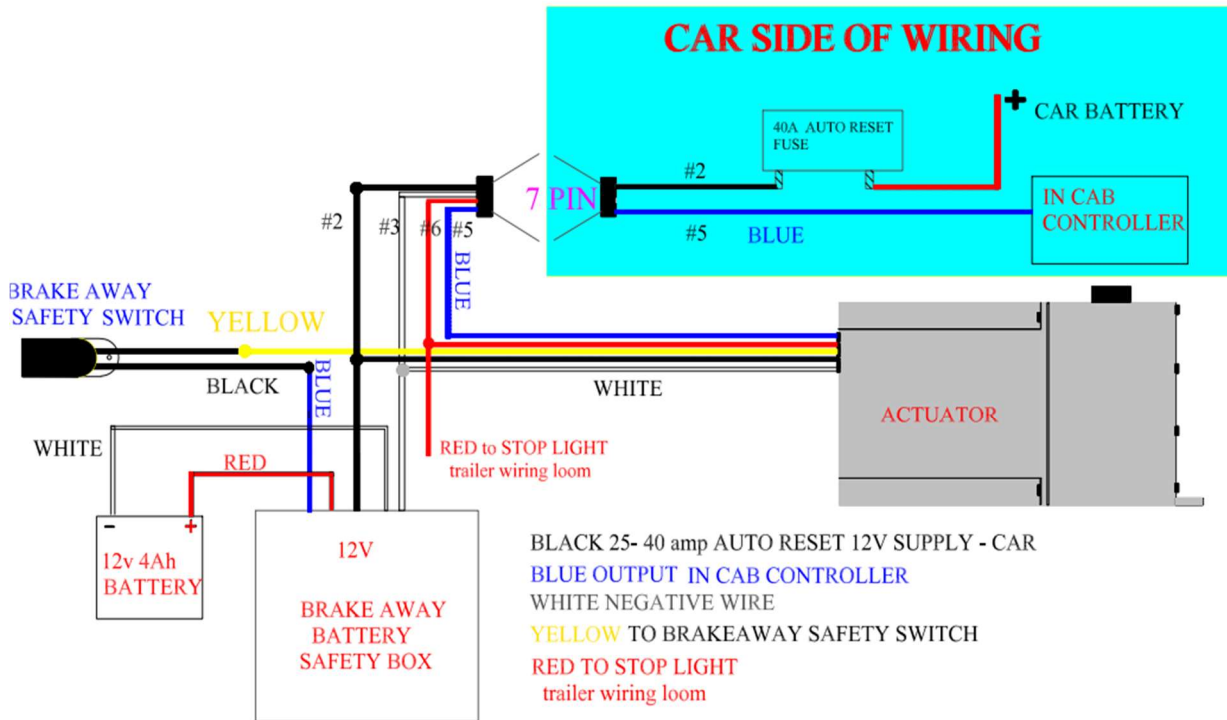
BLUE: Output from in-cab electronic brake controller

WHITE: Ground must be directly connected to tow vehicle ground

YELLOW: Cold side of breakaway switch

Cold temperature applications (below **0** degrees F/ **-18** degrees C) require 40 amp

5 Wire Diagram



WARNING

It is the responsibility of the end user to ensure that their in-cab electronic controller is compatible with the TF actuator.

The TF Actuator is designed to perform with all **Proportional Brake Control Units**.

Electrical Connections – Make sure all electrical connections are clean, dry and weather tight.

Breakaway Battery Requirement - To comply with standard requirements, a trailer must be equipped with a breakaway system. The breakaway battery, needs to have a minimum capacity of 4 amp hours and needs to be maintained in a fully charged condition at all times. The breakaway battery should be checked for proper charge level before every use.

Charging the Breakaway Battery – The breakaway battery must be kept fully charged in order to function properly. Do not attempt to charge the breakaway battery directly from the tow vehicle without the appropriate charging device included with the breakaway kit.

Test Electrical Operation

1. Attach the trailer to the towing vehicle. Do not connect trailer plug to tow vehicle until step 2 has been completed.
2. Pull the breakaway switch. The TF unit should run. If the unit does not run, check breakaway battery and wiring system. Reset the breakaway switch that will turn the unit off.

When the TF unit is running, the motor will generate a “hum” that changes pitch as the unit is pressurized. This is normal.

3. Connect the trailer plug to tow vehicle.
4. Turn the ignition switch on and turn the in-cab electronic brake controller on. The TF unit will require the vehicle to be moving in order for the TF unit to come on by means of the brake pedal. If the unit does not run, check the wiring system.

WARNING

Testing the TF 1600 unit only confirms that it is operating, however it may not be operating properly. Regular inspection, adjustment and maintenance of the brakes is necessary to ensure proper brake operation. Brake fluid must be changed every 2 years regardless of the kilometers travelled.

Bleeding and Brake Adjustment

1. If the trailer is equipped with drum brakes adjust the brakes shoes before bleeding the brakes.
2. It is much easier to bleed the brakes with two people working together.
3. Make sure that the TF unit does not run out of brake fluid. Check the fluid level frequently during the bleeding process, ensuring fluid does not fall below halfway, otherwise you will pump air into the brake lines and the procedure will need to be repeated. **Failure to properly adjust drum brakes on trailers will result in a slower response time of the TF unit.**
4. Install plastic tubing onto the bleeding nipple of the wheel cylinder or caliper.

5. Immerse the free end of the plastic tube in a clean container.
6. Open the bleeding nipple on the wheel cylinder or caliper farthest from the TF unit. If tow vehicle has more than one axle, always start bleeding the wheel farthest from the TF unit first. i.e. In order of length of brake line, longest to shortest.
7. To activate the TF unit, turn the ignition switch on and press on the brake pedal, or use manual slide.
8. Watch the free end of the bleeder hose for air bubbles escaping into the clean container. As soon as the bubbles stop, lock the bleeding nipple.
9. Turn off the TF unit and remove plastic tubing from the bleeding nipple. Bleeding of the wheel cylinder or caliper is now complete.
10. Refill the TF unit with brake fluid.
11. Repeat the process (step 1 to 8) on the rest of the wheels, always starting on the next farthest on from the TF unit.
12. New trailers fitted with disc brakes it is recommended that they are bled twice. Air trapped in the brake system will cause brake delay with an Electronic-Hydraulic system.
13. When finished, ensure the rubber or plastic dust cap lid is **securely fitted** to ensure outside elements (water, dust condensation etc.) do not enter the brake fluid chamber. Brake fluid is Hygroscopic and will absorb moisture from the atmosphere. Exposure to outside elements will result in rust and mechanical failure of the TF 1600 unit and will not be covered under warranty. Replacement dust caps are readily available.

Adjustment of Electronic Controller Unit

1. Adjust the gain setting on the in-cab controller to a mid range setting.
2. Drive vehicle at 15 to 20 kph
3. Apply the brakes. If braking is too severe, adjust the gain setting down to decrease pressure and retest.

Repeat this process until the brakes respond appropriately.

WARNING

The correct pressure setting will vary depending on the weight of the load, weather and road conditions. Retest the brake performance each time the trailer is used. Failure to properly adjust the TF 1600 actuator may result in poor brake performance and could result in serious or fatal injuries or property damage.

Troubleshooting Guide

Unit will not run or brakes are slow to respond. To determine if the unit is functioning properly, perform the checks outlined below.

1. Check that the wiring is according to the electrical schematic in “Electrical Requirements”.
2. Re-bleed trailer brakes. Air trapped in the trailer brake system causes brake delay.
3. If the trailer is equipped with drum brakes, re-adjust the drum brakes to the trailer manufacturers recommended tolerance.

4. Trailer wiring that is too small can cause slow response (see section on Electrical Installation Requirements)
5. Slow response can be caused by undersized brake line. The trailer brake line must be at least 4mm in diameter.
6. Check to see if the white ground wire runs directly to the tow vehicle ground. It must be connected directly to the vehicle battery ground. **NO EXCEPTIONS.**
7. Detach all wires from the TF unit leaving only the blue, black, white and yellow wires. It is important to disconnect all wires to the tow vehicle. Failure to do so may result in a faulty test.
8. Using a 12 volt battery, connect the white wire to the negative (-) terminal of the battery.
9. Connect the black wire to the positive (+) terminal of the battery. The motor should **not run**. If it runs, the unit could be faulty.
10. Leave the white wire connected to the negative (-) terminal of the battery.
11. Connect the blue and black wires together to the positive (+) terminal of the battery.
12. The motor should run and the unit should pressurize.
13. If this does not occur, the unit may be faulty.
14. Leave the white wire connected to the negative (-) terminal of the battery.
15. Connect only the yellow wire to the positive (+) terminal of the battery.
16. The motor should run and the unit should pressurize.

17. If this does not occur, the unit could be faulty.
18. If the unit checks OK, reconnect the wires leading to the trailer plug and repeat steps 9 through to 14 at the trailer plug. If you do not get the same results as before, the problem is the trailer wiring or the electronic in-cab brake controller.

Using the breakaway system to check a unit that is not operating correctly.

1. With a fully charged breakaway battery and the trailer plug disconnected, pull the breakaway switch on the trailer.
 - a. If the unit runs and builds up pressure, the breakaway system is functioning properly.
 - b. If the unit runs and builds up pressure when the breakaway switch is pulled , but will not function under normal operating condition, the problem is most likely a faulty in-cab controller or defective wiring between the tow vehicle and the TF actuator.
 - c. If the unit runs but will not build pressure when the breakaway switch is pulled, the TF unit may be faulty.
 - d. If the unit does not run, measure the DC voltage between the white wire and the yellow wire. If the voltage is less than 12 volts, either the battery hasn't had enough charge, the breakaway switch or the breakaway wiring is at fault.
2. After completing the above steps, reset the breakaway switch and reconnect the trailer plug.

If the trailer brakes are too aggressive: -

1. Reduce the gains setting on the in-cab electronic brake controller.
2. Check brake adjustment.

TF Electro-Hydraulic Brake Actuator Limited Warranty

1. Warranty Contact: [the Manager], FELK Engineering Pty Ltd, 54 Medcalf Street, Warners Bay, NSW 2282, (02) 4954 6955, admin@felks.com.au.
2. FELK Engineering Pty Ltd ACN 605 913 004 (**FELK Engineering**) provides a warranty that a new TF Electro-Hydraulic Brake Actuator (**TF Brake Actuator**) will be free from defects in material and workmanship for a period of two (2) years from the date of original purchase (as provided in the invoice for the purchase of a new TF Brake Actuator unit or for a trailer or other towed device to which the new TF Brake Actuator is fitted, as applicable (if more than one invoice was the provided, the date in the initial invoice is the date of original purchase)), to the end user consumer shown in the invoice of purchase for the new TF Brake Actuator or trailer or towed device to which the new TF Actuator is fitted (**You**), on the conditions set out in this warranty document (**TF Warranty**).
3. Any receipts, proof of purchase, or other documents obtained at the time of purchase from a dealer/distributor, should be retained.
4. The TF Warranty is subject to the following conditions:

TF Warranty not transferable:

- (a) The TF Warranty provided in this warranty document is not transferrable and ends on the date title is transferred (whether title to the TF Brake Actuator or the trailer or towed device to which the TF Brake Actuator is fitted). To avoid doubt, the TF Warranty is provided by FELK Engineering only to You.

TF Warranty Does not apply to a re-supplier, only to end user consumers:

- (b) The TF Warranty does not apply to, and FELK Engineering is not liable under this TF Warranty to, a person or entity resupplying the TF Brake Actuator, whether or not the TF Brake Actuator is fitted to a trailer or other towed device at the time of resupply.

TF Warranty remedy and FELK Engineering only to provide remedy:

- (c) Unless otherwise agreed in writing by FELK Engineering, FELK Engineering limits its liability for the TF Warranty it provides under this warranty document to, at the option of FELK Engineering, FELK Engineering repairing the defect, replacing the TF Actuator or providing credit.
- (d) To the extent permitted by law, FELK Engineering will not be liable under this TF Warranty for any transport charges, postage charges, towing fees, or for any reasonably foreseeable loss, or for any direct, special, consequential (including loss of profits) or other loss or damage.
- (e) Unless otherwise agreed in writing by FELK Engineering, any TF Warranty claim remedy (as set out in this warranty document), must be provided FELK Engineering and FELK Engineering will not be liable under this TF Warranty for any repair made, or replacement provided, by a third party.

TF Warranty limitations:

- (f) FELK Engineering is not liable under this TF Warranty in connection with the following circumstances, and this TF Warranty will not apply and does not extend to any of the following circumstances:

- the TF Brake Actuator, or any part of it, is improperly installed or installed contrary to the instructions provided by FELK Engineering for the TF Brake Actuator by You or a third party;
- the TF Brake Actuator, or any part of it, has been incorrectly or improperly wired, altered, tampered with, or the engineering and design of the TF Brake Actuator has been changed in any way by You or a third party;
- the incorrect or negligent, installation, servicing or repair of a TF Brake Actuator by You or a third party;
- the TF Brake Actuator, or a trailer or towed device to which the TF Brake Actuator is fitted (where this adversely impacts the TF Brake Actuator), is found to have been used for any purpose other than that for which it was manufactured.
- the TF Brake Actuator, or a trailer or towed device to which the TF Brake Actuator is fitted (where this adversely impacts the TF Brake Actuator), has malfunctioned, been damaged or adversely affected due to accident, due to prior damage or due to any of the following by You or a third party: abnormal use, abuse, misuse, use off-road or on unsealed and/or unsuitable roads, use of improper tow hitches, unreasonable use, failure to provide reasonable and/or necessary maintenance, failure to use correct lubricants;
- the TF Brake Actuator, or a trailer or towed device to which the TF Brake Actuator is fitted (where this adversely impacts the TF Brake Actuator), is altered or modified in any way; and

- (g) The warranty does not apply to any secondhand TF Brake Actuators.

Process to make a warranty claim:

- (h) To make a warranty claim the customer must contact FELK Engineering using the contact details provided in this warranty document within the warranty period, deliver to FELK Engineering the TF Brake Actuator or, if the TF Brake Actuator is fitted to a trailer or other towed device then the entire trailer or towed device (unless otherwise directed by FELK Engineering in writing), provide a proof of purchase and the date of purchase (FELK Engineering records will be conclusive in the event of disagreement).

Cost of warranty claim:

- (i) Unless otherwise agreed in writing, FELK Engineering will test and assess the TF Brake Actuator to assess if there is a valid warranty claim. Responsibility for the cost of testing and/or assessing the TF Brake Actuator, and transport costs, is as follows:
- if FELK Engineering accepts there is a valid warranty claim, FELK Engineering will be responsible for the cost of any testing and/or assessment undertaken by FELK Engineering and, where FELK Engineering has agreed in writing to a third party testing and/or assessing the TF Brake Actuator, the reasonable third party costs for testing and/or assessing the TF Brake Actuator;
 - if FELK Engineering does not accept there is a valid warranty claim, or FELK Engineering has not agreed to a third party testing and/or assessing the TF Brake Actuator, You will be responsible for the cost of testing and/or assessing the TF Brake Actuator; and

(j) You are responsible for the cost of transport, towing and/or postage costs and, if claim is assessed as invalid, the TF Brake Actuator will be returned to You by freight collect (You will be responsible for the freight collect cost).

5. FELK Engineering's warranty is in addition to other rights and remedies that may be available under the law.

Our goods and services come with guarantees that cannot be excluded under the Australian Consumer Law. For major failures with the service, you are entitled:

- to cancel your service contract with us; and
- to a refund for the unused portion, or to compensation for its reduced value.

You are also entitled to choose a refund or replacement for major failures with goods. If a failure with the goods or a service does not amount to a major failure, you are entitled to have the failure rectified in a reasonable time. If this is not done you are entitled to a refund for the goods and to cancel the contract for the service and obtain a refund of any unused portion. You are also entitled to be compensated for any other reasonably foreseeable loss or damage from a failure in the goods or service'.

FELK