FORTRONICS™ LTD

FORESTRY ELECTRONIC CHOKER SYSTEMS

# USER MANUAL

## North America

## Copyright



## This material is preliminary

Information furnished by Fortronics™ Limited in this specification is believed to be accurate. Fortronics™ Limited makes no warranty, express, statutory, and implied or by description, regarding the information set forth herein. Fortronics™ Limited reserves the right to change specifications at any time and without notice.
Fortronics™ Limited 's products are intended for use in normal commercial and industrial applications. Applications requiring unusual environmental requirements such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional testing for such application.

## Safety Precautions

Proper operation of this will result in user exposure to radiation well below that described by international and local authorities. To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.

**DO NOT** hold the unit such that the antenna is very close to, or touching, exposed parts of the body, especially the face or eyes, while transmitting.
**DO NOT** key the transmitter when not actually desiring to transmit
**DO NOT** allow children to play with any radio equipment containing a transmitter
**DO NOT** operate the transmitter near unshielded electrical blasting caps or in an explosive environment unless it is a type especially qualified for such use

## Service Precautions

The modules contain CMOS devices that may be damaged by electrostatic discharge (ESD). Electrostatic charges up to 35,000 volts may be present at the workbench and on synthetic clothing. Since CMOS devices may be damaged by charges as low as 50volts, it is imperative that proper ESD safe practices be followed when working on the units.

## Unauthorized Modifications

The units have been designed to comply with strict radio frequency performance regulations. In order to continue good performance and prevent interference with other users and electrical equipment, it is imperative that no changes or alterations be made to the units without the express approval of Fortronics™ Limited.

## Compliance Statement

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

## Information to the User

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

| Revision | Date | Description |
|---|---|---|
| Version 1.0 | 7/Dec/04 - | Initial Release Version |
| Version 1.1 | 1/May/07 - | Changes applicable to North American Market. Manual redesign |

# INDEX

# The Fortronics™ Electronic Choker Bell system

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Our electronic Choker Bell has been designed to make a difference to the safety and efficiency of timber recovery between felling and yarding.

It works by giving forestry contractors a remote-release option that allows the operator to be safely separated from the most hazardous part of the recovery process. With the simple press of a button, the Choker Bell releases the Choker Wire as soon as the log has been dragged to its required position.
This removes a man from a dangerous situation among unstable timber, and leaves the Choker Bell ready for the next haul.

**System Overview**

Specifically designed for harvesting timber in difficult hill country, the Choker Bell is used to attach a hauling rope to felled logs, ready to drag them to the yarder for trimming and transportation.

The Choker Bell comprises the most advanced engineering in its class. The electronic-release switching mechanism is encased to protect it from impact and weather damage, and ensure its reliability, even in the harshest conditions.

**The Choker Bell**

Fortronics Electronic Choker Bells are radio-controlled devices. A UHF radio frequency digitally coded signal is used to command a set of Choker Bells. Each Choker Bell is identified by a group code number and a Choker Bell ID number.
A valid digital signal activates a servo motor which then operates a trigger mechanism that unlatches the spring-loaded locking pin.

Every two seconds, the inbuilt transmitter sends out data a burst that allows remote monitoring of the Choker Bell battery status. These bursts are also the locating signal which reveals the Choker Bell's location.

The Fortronics Electronic Choker Bell is far superior to any other on the market.

Here are some of the reasons why:

- Small size – height 3 3/4"
- Rugged and reliable – proven to handle extreme shock year after year even in freezing conditions
- Minimal maintenance – 15 minutes per Choker Bell every 3 months
- Uses 2 X CR2, 3 Volt lithium batteries which are widely available, cost effective and plug in
- Reprogrammable to any of the 891 digital codes available
- Easy to set – less thumb pressure
- Instant release – release mechanism activated whilst logs/stems are being lowered i.e. as soon as slack occurs the release is completed
- Locator transmitter in each Choker Bell allows for lost Choker Bells to be easily found (refer Fortronics Locator system)
- Battery status data is also transmitted (refer Choker Bell tester).
- Any Choker Bell wire size from 1/2" to 7/8" can be used by selecting one of the three latch arm sizes available. Battery status data is also transmitted (refer Choker Bell tester).


**Main Transmitter:**

Up to nine Choker Bells can be commanded to release collectively in any combination or individually by simply pressing on the appropriate keypad release button momentarily.

*Features:*

- The MTX5 is a UHF digitally modulated transmitter that can command a set of 9 Choker Bells either collectively or in any combination.
- Each transmitter can be reprogrammable to transmit any of 99 group and 9 address codes (891 codes in total)
- An audible beep verifies momentary release button activation
- Operates on 12 or 24Vdc
- FCC compliant to Part 90.267 – Section C

**Portable Transmitter:**

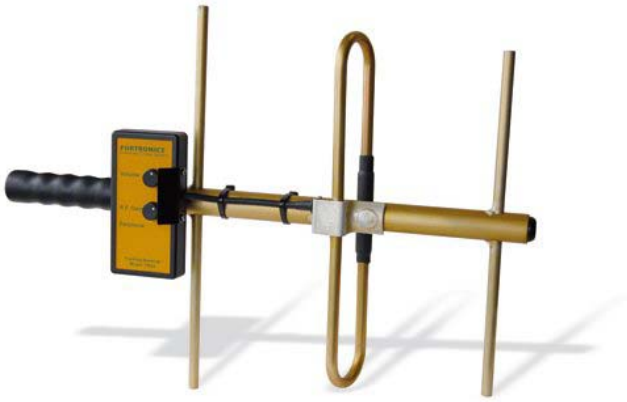
A lower power and portable version of the Main Transmitter. Once the power switch is on and the release button is pushed momentarily, all Choker Bells of the same group code will release.


**Choker Bell Tester:**

This hand-held device remotely monitors an individual Choker Bell status by indicating the battery condition and the verification of a locating signal.


**Locating Lost Choker Bells:**

A sensitive UHF receiver connected to a directional yagi aerial is the basis of the locating system. The receiver sounds a signal when the aerial is pointed towards the lost Choker Bell. This locating system is easy to use and results in the easy location of a buried Choker Bell.



# Specifications

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**Transmitter MTX5**

| | |
|---|---|
| Frequency | 462.8125 MHz |
| Supply | 12 to 30 Volts dc, -ve earth |
| Output power | 500mW |
| Digital Group Codes | 99 |
| Digital Address Codes | 9 per group code – selectable |
| Internal Fuse | Resetable 0.6 Amp |

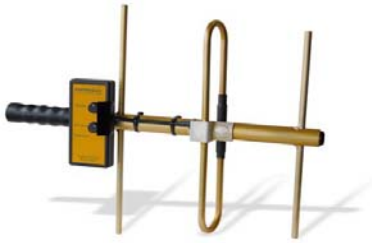
**Portable Transmitter PTX5**

| | |
|---|---|
| Frequency | 462.8125 MHz |
| Supply | 2CR5 6V Lithium Battery<br>Battery Life is typically better than 6 months (based on normal daily use) |
| Digital Group Modes | 99 |
| Digital Address Codes | 9 per group code – non selectable |

**Choker Bell Tester CT5**

| | |
|---|---|
| Receiver Frequency | 418.000 MHz |
| Battery | Type 216 – 9 Volt |
| Range | 2 to 3 yards |

**Choker Bell Locating System TRX5**



| | |
|---|---|
| Receiver Frequency | 418.000 MHz |
| Battery | Type 216 – 9 Volt |
| Battery Life | Approx 1 ½ hours |
| Range | Depends upon direction the Choker Bell aerial is facing.<br>Flat terrain – typically 50 yards<br>Hilly terrain – typically >50 yards<br>Reception is line of sight |

**Choker Bell**

| | |
|---|---|
| Locating Transmitter | 418.000 MHz |
| Battery | 2 x CR2 3 Volt Lithium Cells |
| Battery Life | Typically 5 to 6 working weeks |
| Servo Motor | 4.8 Volts dc – *designed and built by Fortronics™ Ltd.* |

# Installation

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## 3.1 Main Transmitter

Using the bracket provided position the transmitter so that the operator can see the front panel.

**Power Connection:**

Red Positive – 12 to 30 Volts dc
Black Negative – earth

**Magnetic Based Aerial**

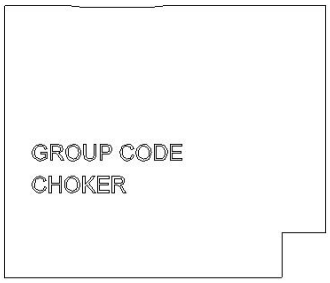
Attach on top of cab roof preferably near the front

## 3.2 Attaching Choker Bell to Choker Bell wire

Feed wire rope through the slider with the Choker Bell end cap at the butt rigging end. This is the preferred option, however the Choker Bell will still release if connected in the opposite manner.

## 3.3 System ID

A UHF r.f. digitally coded signal is used to command a set of Choker Bells.
Each Choker Bell is identified by a **group code number** and a **Choker Bell ID number**.



The **group code number** must be identical to the main and portable transmitters that make up the system, i.e. the transmitters will only command Choker Bells with the same group code number.

The **ID number** relates directly to the main transmitter front panel selector buttons 1 to 9.

Up to 9 Choker Bells can be commanded to release collectively in any combination or individually by simply momentarily pressing the appropriate keypad button.

The transmitter will then transmit data for 5 seconds.

## 3.4 Choker Bell Electronics – Encapsulated in the Choker Bell Block

Apart from being able to receive digital information the Choker Bell also transmits data every 2 seconds.

These transmission bursts allow the Choker Bell to be located when lost and also allow us to monitor the Choker Bell battery status remotely.

Refer ‘Lost Choker Bell’ and ‘Choker Bell Tester’.

# Operation

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## 4.1 Choker Bell Tester

Hold the tester close to each Choker Bell when turning “ON”.
By holding down the tester button an audible burst will be heard (locating signal).

The initial number of locator pulses heard will indicate the choker Bell ID number.

**Choker Bell is OK:**

a) The audible locating burst is heard
b) A clear audible signal indicates the battery level is above 5.2Volts

**Choker Bell is NOT OK:**

NO AUDIBLE or LED INDICATION

a) Flat batteries
b) Faulty switch
c) Faulty battery connections
d) Electronic problem

DISTORTED AUDIBLE SOUND and FLASHING RED LED

a) Locating is OK
b) Batteries are low and require replacing

## 4.2 Locating Lost Choker Bells – Locating System

A sensitive UHF receiver connected to a directional Yagi aerial is the basis of the locating system. The locator only receives power whilst the switch button is held down. Turn both the volume and gain controls clockwise to maximum.
Holding the aerial with the elements being vertical, simply slowly sweep in an arc. There will be two outer points whereby the signal will be lost. Proceed down the centre line between these points.
As you approach the lost Choker Bell, back off the gain control so as to reduce the arc angle. Adjust the volume to suit.
When the gain control is fully wound back, the lost Choker Bell is very close.

*NB: This locating system will detect the location of buried Choker Bells.*

## 4.3 Portable Transmitter

Keeping the aerial vertical, turn on the power switch and momentarily push the release button.

- The “solid red” LED illumination indicates transmission
- A “blinking red” LED indicates a weak battery

## 4.4 Yarder Operator

*NB: Fortronics Choker Bells will not release under load*

The ideal moment to push the release button is when the drag has stopped and the strop or rigging is about to be lowered. It is important that the Choker Bell receives a valid signal before the log or logs hit the ground.
Whilst still under load the trigger mechanism is activated. The trigger assumes a parked position by resting on the outside edge of the locking pin sleeve.
As soon as the strop goes slack, even for a second, the locking pin will retract and the release process is accomplished.

## 4.5 Choker Setters

Hold the Choker Bell and push the locking pin into the locked position.
Feed the strop around the log in the normal way. Lay the strop across the slider and slam the body onto the slider so that the locking pin latches. The nub must point to the back of the log.

Choker Bells can be released by using the portable transmitter or by prodding the locking pin back into the body momentarily. DO NOT USE FINGERS.

# Service Advice

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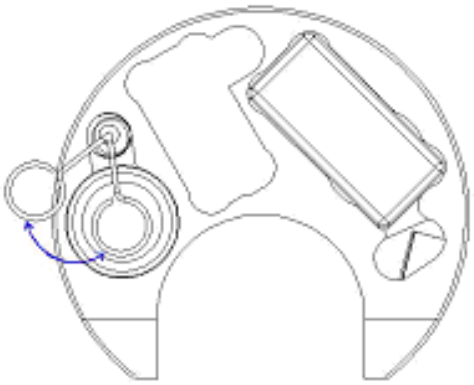
## 5.1 Servo Motor Test and Replacement

A test battery is provided to prove the servo motor rotates smoothly and strongly. When replacing, a slight downward pressure on the servo motor is required whilst the release button is pushed. This allows the servo motor to drop into its cavity with the drive T bar and cam drive dog being able to mesh.
DO NOT rotate the drive T bar by hand as often the gears will strip.

## 5.2 Fitting New Batteries

Always replace both batteries. The positive (+ve) end goes into the cavity first.
The negative battery terminal can swing outside the block circumference so that the batteries can be extracted.
Re-centre the hooped terminal when new batteries are fitted.



## 5.3 Low temperature (sub Zero) conditions

When the standard CR2 batteries fail to operate in sub Zero conditions, replace with Tadiran TLM-1530MP batteries.

## 5.4 Servo Motor Switch Test

1) Ensure batteries are OK
2) Remove locking pin and servo motor
3) Plug test lead “LED on one end” into the servo motor socket
4) The alligator clip end to battery negative (-ve)
5) With the trigger in the ‘locked’ position the LED should illuminate
6) Conversely by rotating the trigger to the ‘unlocked’ position by hand the LED should extinguish
7) The LED should extinguish when the trigger point is 3/32 inch from the edge of the locking pin hole.

IMPORTANT: Make sure the cam position allows the ball bearing to travel
If incorrect, carefully reshape the switch lever as per part 7) above.
Replace lever or switch if necessary.

# Choker Bell Maintenance

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- *The Fortronics Electronic Choker Bell System* has been designed so that only minimal maintenance is required
- It is important that the trigger and locking pin mechanisms are cleaned and re-greased periodically
- Depending upon the operating conditions, this requirement is typically every 3 months.

**PROCEDURE:**

Extract the internal block by removing the 5 end cap set screws

**End Cap / Block Assembly**

We recommend the contaminated grease be removed by using a parts wash solution, such as 'Caltex Stoddards Solvent'.
DO NOT use petrol or diesel.

Pour solvent into a bowl type vessel and submerse the end cap end in the solution. Then brush the contaminated grease away from the block and trigger mechanism. An air gun is ideal for this purpose.

DO NOT submerge the whole block. Ensure the solvent does not enter the servo motor lead socket or the battery cavity.

**Electrical Connections**

Electrical contact cleaner can be sprayed into the battery cavity and servo motor lead socket.

Before replacing a servo motor always add electrical silicon paste, such as Dow Corning Compound 4, to the electrical socket.

Every 3 months unscrew the negative battery terminal to clean the thread. Spray terminal and threaded hole with Electrical contact cleaner.

**Locking Pin Assembly**

Wash separately.

**Body Case**

Remove the cork seal before washing.

**Re-greasing**

Add a generous amount of light lithium based grease to the trigger and locking pin mechanisms.

DO NOT USE A THICK TACKY GREASE

For sub-Zero conditions use Silicon grease.

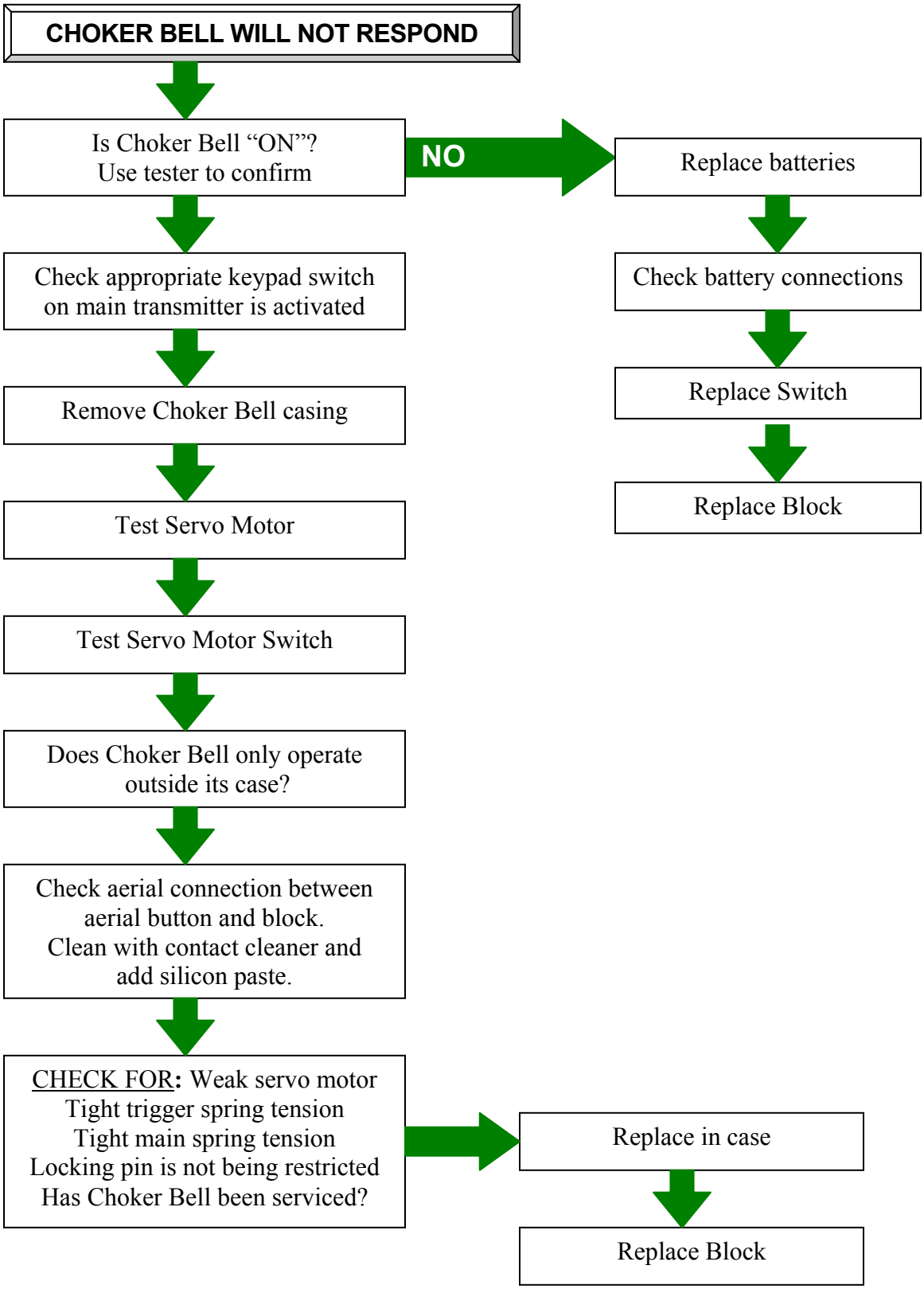
**Re-Assembly**

Before re-assembly CHECK:

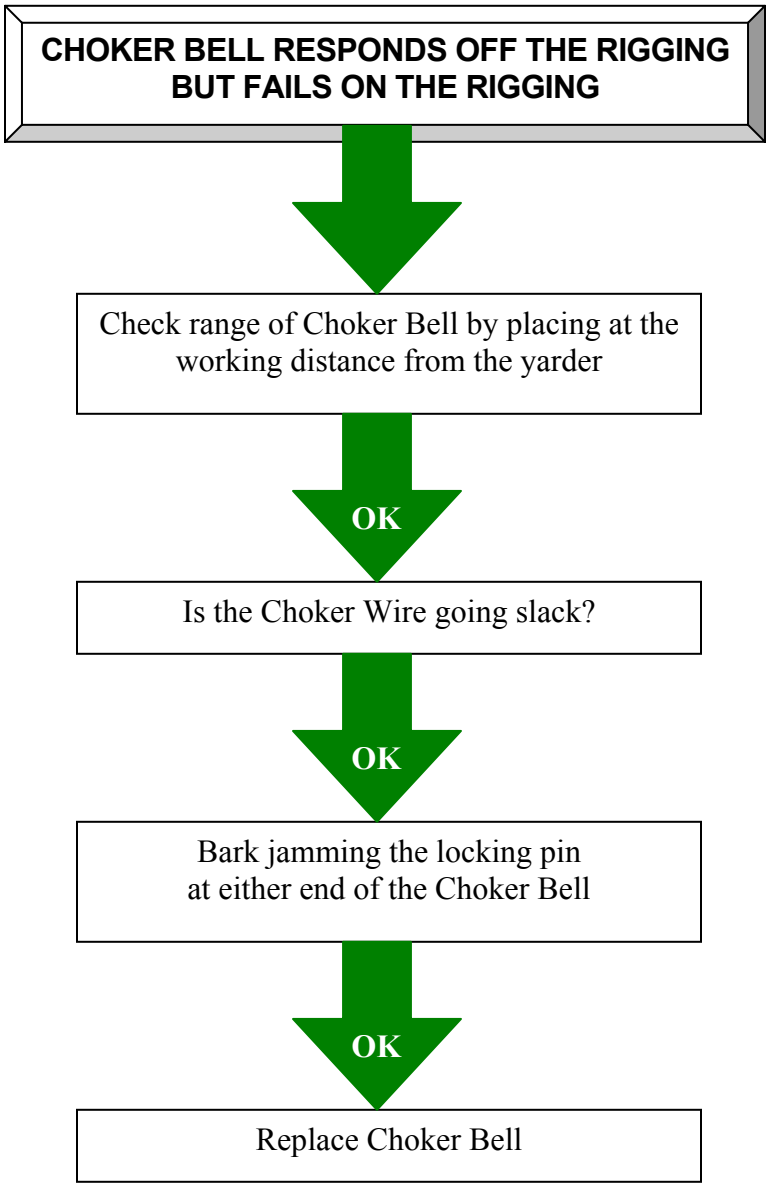
1) The end cap is secure
2) The cork seal still retains tension
3) The end cap O-ring is OK

It is easier to push the end cap / block assembly back into the case if the locking pin is in the “unlocked” position.

# Fault Finding



## 7.1 Fault Finding



## Choker Bell

| Part No. | Description. | |
|---|---|---|
| C400 | Complete Choker Bell Body Assembly | |
| C401 | Rope Slider (State rope size) | |
| C402 | Rope Slider Hinge Pin | |
| C406 | Complete End Cap and Block Assembly | |
| | State, Group Code | ___ |
| | State, Choker no – no's | ___ ___ ___ ___ |
| | | ___ ___ ___ ___ |
| C407 | Complete End Cap Assembly | |
| C408 | Complete Block Assembly | |
| | State, Group Code | ___ |
| | State, Choker no – no's | ___ ___ ___ ___ |
| | | ___ ___ ___ ___ |
| C409 | End Cap | |
| C410 | Trigger | |
| C411 | Shoulder Screw | |
| C412 | Trigger Spring | |
| C413 | Locating Pin | |
| C414 | Aerial Bush | |
| C415 | Aerial O Ring | |
| C416 | Spacer | |
| C417 | Aerial Button, State No | ___ |
| C418 | Wiper Seal | |
| C419 | End Cap O Ring | |
| C420 | Battery –ve Terminal | |
| C421 | CR2-3 Volt Lithium Battery | |
| C422 | Servo Motor | |
| C423 | Drive Dog and Screws | |
| C424 | Cam Bearing | |
| C425 | Cam | |
| C426 | 8mm S/S Ball Bearing | |
| C427 | On/Off Switch and Lever | |
| C429 | Complete Locking Pin Assembly | |
| C430 | Locking Pin | |
| C431 | Locking Pin Sleeve | |
| C432 | Sleeve Pin | |
| C433 | Sleeve Spring | |
| C434 | Locking Pin Washer | |
| C435 | Main Spring | |

| | |
|---|---|
| C436 | Body Case |
| C437 | Hinge Pin Set Screw |
| C438 | End Cap Set Screw |
| C439 | Cork Seal |
| C441 | End Cap, Cap Screw |

## Portable Transmitter

| Part No. | Description. |
|---|---|
| PT442 | Portable Transmitter Sate, Group Code |
| PT443 | Portable Transmitter Pouch |
| PT444 | 6 Volt Lithium Battery |
| PT445 | Aerial |

## Main Transmitter

| Part No. | Description. |
|---|---|
| MT448 | Main Transmitter State, Group Code |
| MT449 | Mounting Bracket |
| MT450 | Mounting Bracket Knob |
| MT452 | Keypad |
| MT454 | Power Lead |

## Locator System

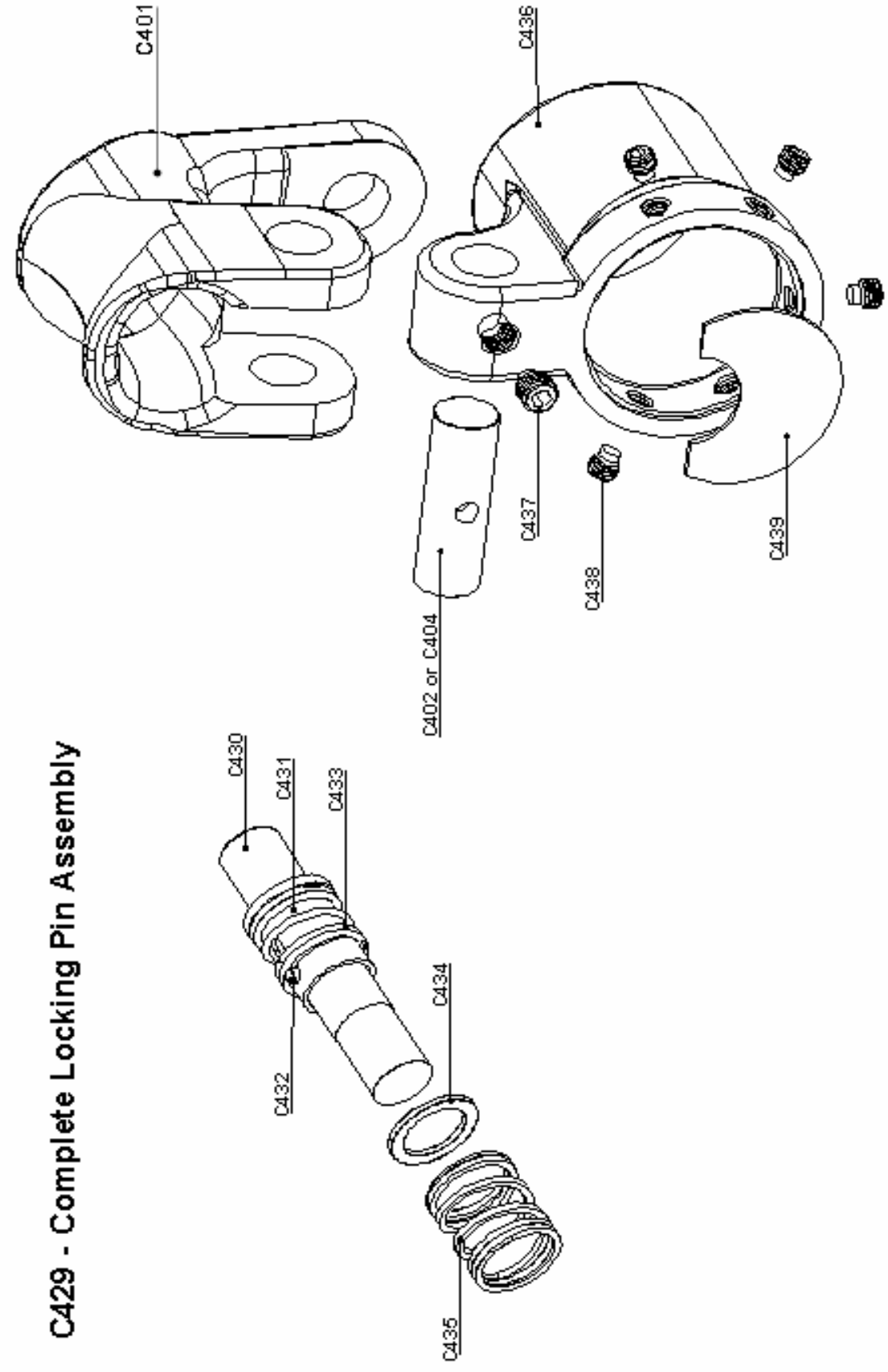
| Part No. | Description. |
|---|---|
| T456 | Complete Locator |
| T457 | Locator Back Pack |
| T458 | Battery – 9 Volt Type 216 |
| T459 | Volume Control |
| T460 | Gain Control |
| T462 | On/Off Switch |

## Choker Tester

| Part No. | Description. |
|---|---|
| CT464 | Complete Tester |
| CT465 | Battery – 9 Volt Type 216 |

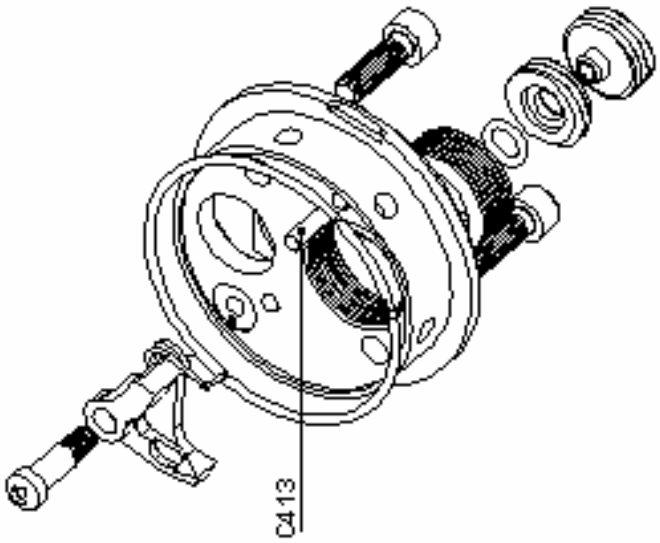
## Servicing Aids

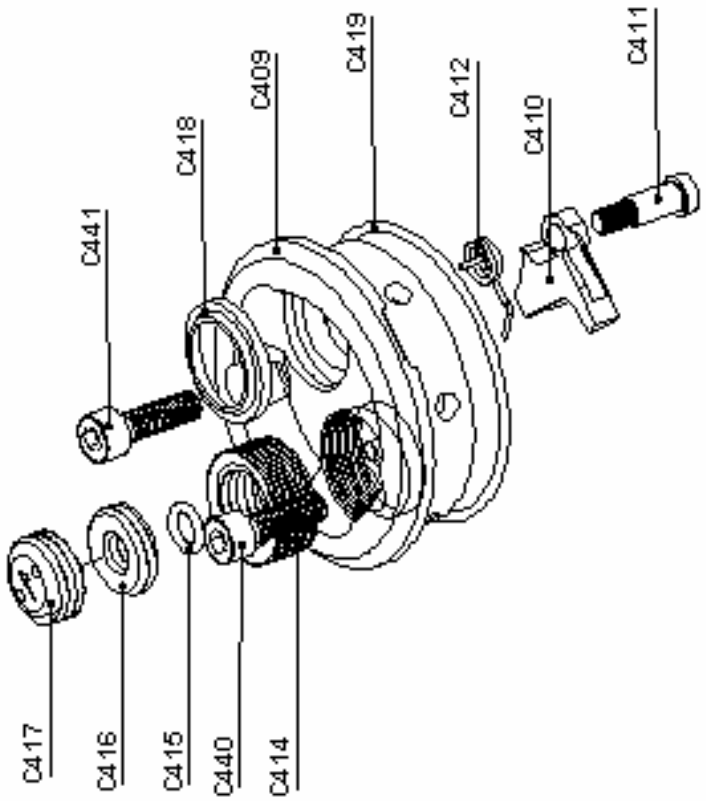
| Part No. | Description. |
|---|---|
| SA467 | Test Battery for Servo Motor |
| SA468 | 5mm Alan Key |
| SA469 | 4mm Alan Key |




C429 - Complete Locking Pin Assembly

## C407 - Complete Endcap Assembly



# About Fortronics

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I'm Ross Lumsden. I can guarantee that your investment in my product will be the best cost-recovery decision you can make for your business.

Fortronics designs and markets electronic choker systems for timber recovery.. It's all we do. And the research and design development we have undertaken has produced a world-class product, proven to contribute benefits to the worldwide forestry industry.

Find out here about our electronic choker systems for timber recovery, or contact us if you need to take your enquiry further.


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