Operation Manual

Version: 2400-6657 – 4  December 2016
This section contains:

- Introduction
- Important Safety Warning
- Important Safety Information
- Table of Contents
- Warranty
- Disclaimer. Limit of Liability
- Unpacking your Smart Control console
Introduction

Congratulations on your purchase of a C-Dax Smart Control Console. It represents World’s Best Technology, which has been carefully designed to provide key decision making tools to pastoral farmers. We anticipate these tools will deliver economic benefits to our customers - please be assured that this is our objective.

We are confident that your Smart Control console will perform for many years as long as sensible equipment husbandry practices are followed. Extensive trials have been conducted during the development phase to ensure that this product is able to function reliably in the punishing agricultural environment. We have endeavoured to make the unit as robust and functional as possible, but please remember that like any piece of precision electronic equipment, its performance parameters need to be respected.

We thank you for making this investment and assure you of our attention at all times.

IMPORTANT SAFETY WARNING

The C-Dax Smart Control console is designed to be used with the C-Dax trailed Pasturemeter and CDIT400 trailed spreaders towed behind an All Terrain Vehicle (ATV) or similar type of agricultural vehicle. Operators should note that like any piece of trailed or mounted agricultural equipment, THE PASTUREMETER/CDIT400 WILL EFFECT THE STABILITY AND HANDLING CHARACTERISTICS OF THE TOWING VEHICLE. FAILURE TO TAKE ACCOUNT OF THIS AND EXERCISE CAUTION WHEN OPERATING THE TOWED DEVICE MAY RESULT IN INJURY, OR IN EXTREME CIRCUMSTANCES, DEATH TO THE OPERATOR OR BYSTANDERS. OPERATORS ARE REMINDED THAT GROUND CONDITIONS COULD BE SLIPPERY AND THAT UNDULATIONS IN TERRAIN MAY BE CONCEALED BY GRASS OR OTHER VEGETATION.

OPERATORS ARE FURTHER REMINDED NEVER TO EXCEED THE MANUFACTURERS RECOMMENDED LOADING LIMITS FOR THE TOWING VEHICLE. C-Dax accepts no liability whatsoever for damage or injuries sustained while using The Smart Control console.
IMPORTANT SAFETY INFORMATION

Be warned of the dangers of loading your ATV or other vehicle in excess of its carrying capacity. It is important to understand that any loads or attachments, whether fastened to, or placed on a vehicle or an ATV, will alter the stability or handling characteristics of that vehicle or ATV. Spray tanks or other equipment must be filled only to a level where the gross weight is within the load limit of the ATV or other vehicle.

Safety is a primary concern in the design, manufacture, sale, and use of spray tanks and other equipment. As manufacturers of spray tanks and other equipment, we want to confirm to you, our customers, our concern for safety. We take this opportunity to remind you about the simple, basic and common sense rules of safety when using spray tanks and other equipment. Failure to follow these rules can result in severe injury or death to operators and bystanders.

It is essential that everyone involved in the assembly, operation, transport, maintenance and storage of this equipment be aware, concerned, prudent and properly trained in safety. This also applies to equipment that is loaned or rented to someone who has not read the owner’s manual and is not familiar with the operation of the equipment.

- NEVER EXCEED THE LOAD LIMIT CAPACITY OF THE ATV OR OTHER VEHICLE.
- ALL ATV AND TRAILED EQUIPMENT TYRES SHOULD BE INFLATED TO MANUFACTURERS RECOMMENDED OPERATING PRESSURES.
- PLEASE NOTE THAT FILLING THE SPRAY TANK OR OTHER EQUIPMENT COMPLETELY AND OR THE ATTACHMENT OF ADDITIONAL EQUIPMENT TO THE ATV MAY EXCEED THE ATV’S MAXIMUM LOAD/S CAPACITY AND IT IS NOT RECOMMENDED TO EXCEED MANUFACTURERS GUIDELINES
- LOAD/S SHOULD BE PROPERLY DISTRIBUTED AND SECURELY ATTACHED.
- REDUCE SPEED WHEN CARRYING LOAD/S OR PULLING A TRAILER OR TRAILED APPLICATION EQUIPMENT AND ALLOW GREATER DISTANCE FOR BRAKING.
- NEVER ALLOW ANYONE TO RIDE ON YOUR SPRAYER OR OTHER EQUIPMENT.
- ALWAYS FOLLOW THE INSTRUCTIONS IN THE OWNER’S VEHICLE MANUAL FOR CARRYING LOADS OR PULLING A TRAILER.
- PROPER MAINTENANCE IN LINE WITH MANUFACTURER’S RECOMMENDED MAINTENANCE PROCEDURES IS ESSENTIAL.
- BEFORE APPLYING CHEMICALS, READ THE LABEL OF THE CHEMICAL MANUFACTURER OR SUPPLIER FOR THEIR PERSONAL PROTECTIVE EQUIPMENT INSTRUCTIONS AND OPERATE AS RECOMMENDED.
- THE SAFETY OF ALL CHEMICALS USED IN AGRICULTURE IS UNDER THE JURISDICTION OF A GOVERNMENT AGENCY, E.G. N.Z. MINISTRY FOR THE ENVIRONMENT; USA ENVIRONMENTAL PROTECTION AGENCY ETC. FURTHER LOCAL GOVERNMENT OR STATE LAWS MAY APPLY.
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Warranty

1. WARRANTY AND LIABILITY

Use of the equipment

1.1 You must satisfy yourself as to the suitability of the equipment for your intended use(s) of the equipment.

Your relationship with the retailer

1.2 Where you consider you have a warranty claim (or any other claim) in relation to the equipment, you must contact the retailer who sold you the equipment, not C-Dax directly. The retailer is responsible for liaising with C-Dax in respect of your claim.

Warranty

1.3 C-Dax warrants to the original purchaser that the equipment is sold free from defects in materials and workmanship for a period of 12 months from date of first retail sale (6 months from date of first retail sale if the equipment is sold in the U.K.) subject to the terms set out below.

1.4 C-Dax will at its option repair or replace the defective equipment (or part of the equipment) or notify the retailer of the equipment to refund the purchase price for such defective equipment to you in the event of a breach of this warranty, subject to the terms set out below.

Liability

1.5 Except for the warranty set out in clause 1.2 above, all warranties and representations (including those expressed or implied by law) in respect of the equipment or advice relating to the equipment provided to you by C-Dax are excluded to the extent permitted by law.

1.6 Notwithstanding anything else in this manual, C-Dax’s maximum liability to you (in the event that such liability exists) in respect of any breach of warranty, any matter set out in this manual, or for defective equipment or advice relating to the equipment provided is limited at C-Dax’s option to:

   (a) repairing or replacing the equipment (or part of the equipment); or

   (b) notifying the retailer of the equipment to refund the price for the equipment paid by you.
1.7 Notwithstanding anything else in this manual, in no event will C-Dax be liable, whether in contract, tort (including negligence) or otherwise:

(a) where you have altered or modified the equipment, misused or misapplied the equipment, or the equipment has been subjected to any unusual, excessive or non-recommended use, service or handling (including as set out in this manual);

(b) where the equipment is not transported, stored, handled or used in accordance with any directions given by C-Dax (or the retailer) to you (including as set out in this manual);

(c) where the equipment:

(i) has been subject to neglect, accident or hireage, or the damage arises from fair wear and tear, battery damage or chemical attack;

(ii) has been built to a customer’s specifications; or

(iii) has been dismantled, repaired or serviced other than by an authorised service agent of C-Dax;

(d) for loss or damage caused by any factors beyond C-Dax’s control; or

(e) for any loss of profit or revenue, or for any special, indirect, incidental or consequential damage, loss or injury of any kind suffered by you.

1.8 Where C-Dax elects to repair or replace the equipment it will use reasonable endeavours to do so as soon as practicable but will not be liable for any delay in doing so.

1.9 You agree that the transactions entered into between you and the retailer (and C-Dax) are for the purposes of trade and that, having regard to all relevant circumstances of the transactions, it is fair and reasonable that the provisions of the Consumer Guarantees Act 1993 (NZ) do not apply to those transactions to the fullest extent permitted by law.
Unpacking Your XC1 Console

When unpacked, you should have the following components:

- Indicator Console
- Indicator Console Mounting Bracket
- Data Cable
- Power Cable
- Battery Connecting Cable
- Operation & Assembly Manual
- Indicator Console Mains Adaptor

Should any of the above items be missing or damaged, please contact our Customer Service Department for replacement.

Customer Services
C-DAX Limited
145 Harts Road
Palmerston North
New Zealand
Freephone: 0800 230 230
E-Mail: sales@c-dax.co.nz
This section contains:

- The Indicator Console mounting
- Assembly & Setup – Indicator Console
The Indicator Console

This is normally mounted in a convenient position on the front carrier of the ATV. It is connected by cable to the ATVs battery and also by a thick black data cable to the trailed unit. Various functions are shown on the display and the operator has the ability to adjust each of these. The indicator console is mounted on a purpose built bracket and locked in place with a swivel latch. The two cables can then be connected.
Assembly & Setup – Indicator Console

Step One
- Locate bottom plate under carrier tube and position as desired
- Place bolts through the carrier mounting bracket
- Tighten nuts firmly – do not over tighten to the point where the carrier or bracket deforms
- Attach two smaller bolts through brackets and tighten

Step Two
- Locate swivel latch on back of console so that it fits through bracket
- Slide console onto bracket until it rests on the back bracket
- Tighten swivel latch firmly

Step Three
- Connect silver plug wired to blue / white power cable to underside of indicator console.
- Connect other end of power cable to battery connector cable and run power cable to ATV battery housing
- Connect pin (Male) end of coiled black cable to underside of indicator console.
- Run cable to rear of ATV
- Removal of the indicator console is the reverse process.
Important:
Make sure you attach the end of the cable to the rear carrier so that it is on the opposite side of the ATV from the exhaust pipe.

Note:
The battery connector cable is supplied for connection to batteries that do not already have a C-Dax battery connector cable fitted. If already fitted, connect the blue / white power cable directly to it.

The path to run the cables to the battery and rear carrier is up to the installer but should be chosen to protect the cables and so as not to obstruct the operator.

The rear end of the black cable should be attached so that just the plug and 50mm of cable hang down for attachment to the trailed implement cable. Coil excess cable under seat or tie under rear carrier out of the way.
This section contains:

- General Description
- Understanding the indicator console
- Understanding pasture covers
- How the measurement process works
- Measuring your first paddock
General Description

To date, pasture cover measurement is normally performed by one of the following 3 methods.

- Visual assessment
- Rising Plate Meter
- Pasture Probe

These methods can either be subjective, time consuming or rely on a limited number of individual measurements per paddock.

The C-Dax Pasture Meter has been designed to greatly improve the collection of pasture cover data in quantity, speed and ease of collection.

It is an electronic device that is trailed behind an ATV, and operated at speeds of up to 20 kph. It has wheels which are lowered to allow travel on roads, farm races / tracks, and which can be raised to allow the sled to run directly on the ground in the measurement position. The wheels then act as outriggers for stability.
The Pasture Meter has been designed to measure the height of pasture grass and average the readings. Internal software then converts the averaged readings to kgDM/ha by using a calibration equation that can be changed for different times of the year.

**Note:** The operator is able to set the indicator console to show pasture height in “mm” or the available pasture cover in “kgDM/ha.”

The sensor takes 200 height readings per second. At a ground speed of 20kph, this represents a reading every 27mm of ground traveled.

The measuring sensor is mounted on a purpose built sled, which is trailed behind an ATV or farm vehicle at speeds of up to 20 kph depending on terrain. The sensor has 18 light beams for measurement purposes between the left and right vertical arms. The indicator console is normally mounted at the front of the vehicle for easy observation by the operator. It is connected to the sensor by cable and also to the vehicle’s own 12 volt battery system.

The operator should exercise care and common sense when determining the speed to be traveled. The equipment is designed to travel at up to 20kph on ideal terrain. This maximum speed applies regardless of whether the unit is measuring or in transit. If the surface is rough, or if obstacles are present, then a much slower speed should be used.
Understanding the Indicator Console

In preparation for use of your Pasture Meter Indicator Console you need to ensure that you have attended to the following:

- Made the initial hardware setups for the Pasture Meter
- You have successfully set up your Smart Maps account
- Made sure that Bluetooth is operational on your computer

**NOTE:** (Refer to software section of manual)

**Please Note:** It is critical that your farm is accurately mapped to ensure the correct pasture cover information is recorded against the corresponding farm and paddock.
This C-Dax Smart Control console can operate in two modes, either Auto or User. A brief explanation of each mode follows below

Auto mode:
Method of operation. Switch the unit on and once a valid GPS signal has been acquired the unit will start to record pasture cover data if it meets two further criteria.

Criteria 1. The unit will record pasture cover data only when vehicle speed is above factory setting (default = 4km/hr)

Criteria 2. The unit will pause data recording when a number of consecutive “10mm” heights are read (default = 4 readings)

Once the entire pasture ride is complete simply switch the console off. Each pasture cover reading has an associated GPS location and provided that your farm has been accurately setup in Smart Maps it will automatically recognise that appropriate paddock and update the pasture cover information when the data is downloaded to the PC or laptop.

In this mode you can always override the auto mode at any time by pressing the grey cursor button to pause recording pasture covers.

User mode:
Switch the unit on and once a valid GPS signal has been acquired the unit can then be used to collect pasture cover data. In this mode you will need press the grey cursor button each time you want to record or pause data collection. For example you may drive into the paddock and press the grey cursor button to start recording. When leaving the paddock press the grey cursor button to pause recording. When entering the next paddock press the grey cursor button once and wait two seconds to continue recording. Once the entire pasture ride is complete simply switch the console off. Each pasture cover reading has an associated GPS location and provided that your farm has been accurately setup in Smart Maps it will automatically recognise that appropriate paddock and update the pasture cover information when the data is downloaded to the PC or laptop. **Note:** The unit can be switched to Tier 2 mode, please contact C-Dax customer services for further information.
Understanding Pasture Covers

Pasture Cover Equations are used to convert the height of the grass measured into the more useful Pasture Dry Matter, displayed as Kilograms per Hectare (KgDM/Ha). There is more than one pasture cover equation available, and you need to make sure that you enter the correct equation to suit the seasonal growth stage of the grass. Equations are continually evolving for different regions and pasture species. Contact C-Dax or visit our website to find up to date equations that suit your conditions.

A set of suggested pasture cover equations have been developed for typical New Zealand ryegrass and clover mix pastures, under non-irrigated conditions. Under irrigated conditions, the pasture cover equation designed for use in Winter may be appropriate all year round. As a starting point use the following equation:

\[ \text{KgDM/ha} = \text{Pasture height} \times 18.6 + 750 \]

**Pasture cover equation adjustment**

- If low covers are reading too high on the Pasture Meter then reduce the adder
- If low covers are reading too low on the Pasture Meter then increase the adder
- If high covers are reading too high on the Pasture Meter then reduce the factor
- If high covers are reading too low on the Pasture Meter then increase the factor

**Keep in Mind**

Because the Pasture Meter uses a standing height measurement, it may give slightly different results to that of a Rising Plate Meter, in some circumstances. The accuracy of a Rising Plate Meter is typically +/- 300KgDM/ha, however unlike a Rising Plate Meter, the Pasture Meter is not dependant on operator technique to achieve consistent results.

**N.B. For information on DIY calibration refer to page 34 of this manual.**
How the measurement process works

The steps below outline the overall process for obtaining and recording your farm's pasture cover. They will be explained in the remaining sections of this guide.

1. **Turn on Smart Control console**
   - Press ON Button

2. **Adjust Calibration Equation if Necessary**
   - Press MENU Button and scroll through menu

3. **Enter Paddock and Lower Sled**
   - Lower Sled into measuring position

4. **Measure Paddocks**
   - Drive around paddock (either transect or figure 8)

5. **Upload Pasture Covers into SmartMaps**
   - Plug console into wall adaptor and transfer using Bluetooth

6. **Create Feed Wedge**
   - Feed wedge will display pasture covers for measured paddocks

7. **Determine Grazing Plans**
   - Create weekly grazing plans
Measuring your First Paddock

Step 1 – Turning the Indicator Console ON

Push this button

Step 2 – GPS startup

- You are not required to do anything. The GPS will acquire satellites and get a fix, NOTE: A small triangle will appear on the display by the GPS label when a fix has been obtained.
- In Auto mode the unit will start to record provided that the speed and auto pause criteria are not active.
- By default the unit will operate when speed is greater than 4 km/hr and grass is passing through the sensor (i.e. the unit displays 10mm when no grass is passing through the sensor)

Step 3 – Adjust Your Calibration Equation if Necessary

Press MENU:

- Scroll by pressing the grey cursor key on the right hand side until ConSt appears
- Adjust the constant by pressing the up and down cursor
- Scroll by pressing the grey cursor key on the right hand side until FACTr appears
- Adjust the constant by pressing the up and down cursor
- Press MENU again to save settings and return to pasture cover display
Step 4 – Measure your paddocks

- Ensure that the sensor is clear of any interference. The display should read 10mm. This confirms that all light beams are functioning correctly.
- Lower sled and set Indicator Console to either kgDM/ha or mm.
- You may override the auto settings at any time by pressing the grey cursor key, this will force the unit into USER mode.
- To revert back to AUTO mode you must save you data by pressing the grey cursor twice then switch the unit off, then back on.
- To adjust the system to USER mode by default, Press MENU and select USER by pressing the grey cursor button down.

Data displayed during recording

- While recording, the normal display mode shows the running average. This can be changed at anytime to show a live reading (the reading detected by the sensor at any instant) of the mm or kgDM/ha
- To switch between the Average and Live modes, press LIVE/AVERAGE:

Disconnected Sensor

When the Sensor is disconnected from the console, the console will display 5 dashes as shown:

If this occurs unexpectedly check cable connection between sensor and console.
This section contains:

- Understanding the indicator console
- How the spreading process works
- Spreading in your first paddock
Understanding the Indicator Console

In preparation for use of your CDIT400 or CDIT1300 Smart Spreader you need to ensure that you have attended to the following:

- Made the initial hardware setups for the spreader
- You have successfully set up your Smart Maps account
- Made sure that Bluetooth is operational on your computer

NOTE: (Refer to Software section)

Please Note: It is critical that your farm is accurately mapped to ensure the correct information is recorded against the corresponding farm and paddock.
How the spreading process works

The steps below outline the overall process for obtaining and recording your farm's spreading operations.

1. **Turn on Smart Control console**
   - Press ON Button

2. **Adjust Application Rate**
   - Press MENU Button and scroll through menu

3. **Set Product Type**
   - Press MENU Button and scroll through menu. Recommended bout width is displayed.

4. **Begin Spreading**
   - Press the cursor button to start spread control. Drive around paddock at recommended bout width. Press cursor again to stop spread control.

5. **Upload Spread Data into SmartMaps**
   - Plug console into wall adaptor and transfer using Bluetooth

6. **Review Spread Information**
   - Review ride trail or paddock spread summary.
Spreading in your First Paddock

Step 1 – Turning the Indicator Console ON

Push this button

ON

Step 2 – GPS startup

- You are not required to do anything. The GPS will acquire satellites and get a fix, NOTE: A small triangle will appear on the display by the GPS label when a fix has been obtained.

Step 3 – Select Application rate

Press MENU:

- Scroll by pressing the grey cursor key on the right hand side until rATE appears
- Adjust the rate by pressing the up and down cursor
- Scroll until to the right until type appears
- Adjust the fertilizer/seed type by pressing the up and down cursor
- Press MENU again to save settings and the spreader bout width will be displayed.

Step 4 – Activate spreader and begin spreading

- Ensure area around spreader is clear of persons or animals
- Push anywhere on grey cursor. StArt is displayed on the screen
- Begin driving. By default the unit will operate when spreading has been initiated and speed is greater than 7 km/hr (C-DIT400) or 5 km/hr (C-DIT1300).
- When you have finished spreading press the grey cursor. STOP is displayed.
Data displayed during recording

- While recording, the unit will display the current vehicle speed.
- When the unit auto-pauses it will flash **PAUSE** on screen

Disconnected Sensor

When the spreader is disconnected from the console, the console will display 5 dashes as shown:

![Disconnected Sensor](image)

If this occurs unexpectedly check cable connection between spreader and console.
This section contains:

- Downloading Your Pasture Measurements
- Downloading Your Spread Data
Software Installation

Introduction
This installation and setup guide will assist you in getting the C-Dax Smart Controller Bluetooth™ software up and running.

Smart Control Installation Components
Before using your XC1 console the following is required:

- A SmartMaps account. Go to www.c-dax.co.nz and follow the SmartMaps link. Click ‘create account’ next to the login button. Follow the on-screen prompts from there.

- A map either drawn or uploaded to Smart Maps. If you have an existing map which you would like uploaded please contact C-Dax.

- A Bluetooth™ to USB adapter and associated driver software (supplied).

System Requirements
IMPORTANT: The Smart Controller software requires a desktop or notebook computer running Windows XP with Service Pack 2 (SP2) or Windows 7 or 8. [Note: Previous versions of Windows do not have built-in support for Bluetooth™]

The Pasturemeter software is not compatible with Apple computers.
Downloading your Paddock Measurements

Once you have measured all of your paddocks, you can download your measurements into Smart Maps and then plot a feed wedge to determine optimum grazing breaks. To do this, follow the instructions below:

- Open your internet browser (Google Chrome is being used for the purposes of this manual) and go to: www.myravensdown.co.nz/Account/LogOn/?theme=cdax.
- Log in using your existing email address and password (or create an account if you haven’t already done so)
Once you log in to Smart Maps, you should see the following screen:

- Click on the SmartMaps tab then the C-Dax Uploads tab
- Click on the ‘How to upload button’

- Follow the on-screen prompts
- Click the “Download Installer Now” button
- Click the CDAX.Upload.Application button when it appears.

- Click the ‘Install’ button.

Do you want to install this application?

**Name:**
C-Dax Uploader

**From (hover over the string below to see the full domain):**
clickonce.ravensdown.co.nz

**Publisher:**
Ravensdown Fertiliser Co-operative Ltd

[Install]  [Don't Install]

While applications from the Internet can be useful, they can potentially harm your computer. If you do not trust the source, do not install this software. [More Information...]
Once the program has installed and you have entered your login credentials, ‘Looking for Bluetooth radio’ will appear.

- Make sure you have plugged in the dongle that was supplied with your Pasturemeter.
- The first time through Windows may need to install the Bluetooth serial driver.
• ‘Looking for C-Dax devices’ will appear.

• Once the console has been discovered “Reading Summary” and “Reading Records” will appear.

• Follow the onscreen prompts to send the desired records to SmartMaps

• Go to your web-browser and log into your SmartMaps account

• Newly uploaded data will appear in SmartMaps under the “Unallocated Data” tab

• To confirm data so it appears on your feed wedge simply click on the record and click the “Review and edit” button

• Check the information then click “Save and confirm”
This section contains:

- Exploded parts diagram
- Parts list
### Exploded Parts Diagram

<table>
<thead>
<tr>
<th>Item No.</th>
<th>e9 part no</th>
<th>e9 description</th>
<th>Default/QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1300-3750</td>
<td>Bracket-Controller-Pasturemeter console-Bottom-ZP</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1300-3755</td>
<td>Bracket-Controller-Pasturemeter console-Top-ZP</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3310-2812</td>
<td>Fastener-Washer-Flat-M12x32x1.5-Grade 304-Stainless</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>1300-3700</td>
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<tr>
<td>5</td>
<td>3290-1250</td>
<td>Fastener-Set Screw-Hex-8.8 Grade-M12x50-ZP</td>
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<td>Fastener-Nut-Nyloc-M12-ZP</td>
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<tr>
<td>7</td>
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<td>3170-0006</td>
<td>Fastener-Nut-Nyloc-M6-ZP</td>
<td>2</td>
</tr>
</tbody>
</table>
This section contains:

- Trouble Shooting Tips
Troubleshooting

1. UNIT WILL NOT TURN ON
   - Check Battery Connections

2. UNIT TURNS ON BUT INDICATES "---"
   - Check Black Sensor Cable connections at indicator console and at rear of ATV where joined to Sled

3. UNIT TURNS ON BUT GIVES FALSE OR UNEXPECTED READINGS
   - Assuming the indicator console is switched on & set to mm while in the 'wheels-down' transport position, and has no light beams broken, the indicator console should be reading 10mm. This shows that all 18 light beams are clear and unbroken.
   - Note: Should any other height reading be shown while in this position, it indicates that one or more of the glass windows is obstructed. Inspect the glass windows and the side protective tapered edge shields & wipe off the obstructing material with a soft damp cloth.

4. ALL OTHER FAULTS
   - Contact C-DAX Limited

NOTE:
When stationary in the Pasture Measurement position (Wheels Up), the indicator console readings can vary if individual blades of grass are blown across the light beams intermittently. The glass windows should be inspected at the beginning and end of any period of operation.
This section contains:

- Quick Reference Guide
- DIY Calibration Method
DIY Calibration Method Purpose

Every farm is different in terms of Soil type, pasture type and climate. Pasture measuring devices are calibrated on a regional basis and may not always be representative of your particular farming operation.

This **DIY Calibration Method** will allow you to self calibrate your pasture meter so you can make decisions with confidence on your collected data.

1. Find a range of paddocks to calibrate against – Pre Grazing, post grazing, and in between (approximately 5 paddocks).

2. Turn your pasture meter on and set the units to mm.

3. Sit the pasture meter over each of your pastures of differing growth stages.

   ![Pasture Meters](image)

   1600KgDM/ha 2100KgDM/ha

4. Read the height off the console and record in Column A in the table provided.

   ![Display](image)

5. Visually estimate (using consultant or experienced visual pasture estimator) the pasture cover (kgDM/ha) underneath the pasture sensor and record in the table provided.

6. Use the calculation steps and table to calculate your personal calibration equation for your farm.
Equation Calculation Steps

Step 1 - Calculate total and Avg. For columns A & B
- Calculate (G) = Sum of Column A (i.e. 25 + 40 + ... = 250)
- Calculate (H) = Sum of Column B (i.e. 1200 + 2350 + ... = 7800)
- Calculate (I) = G ÷ No. of Samples (i.e. 250 ÷ 5 = 50)
- Calculate (J) = H ÷ No. of Samples (i.e. 7800 ÷ 5 = 1560)

Step 2 – Subtract the averages (I & J) from each entry
- Calculate values for Column C = A – I (i.e. 10 – 50 = -40)
- Calculate values for Column D = B – J (i.e. 1200 – 1560 = -360)

Step 3 – Calculate Column E
- Square each entry in Column C (i.e. -40 x -40 = 1600)

Step 4 – Calculate Column F
- Multiply each entry in Column C by it’s corresponding entry in Column D
  (i.e. -40 x -360 = 14400)

Step 5 – Add up columns E & F and record in cells K & L respectively

Step 6 – Calculate parameters to use in pasture equation
- Calculate Slope of line (Factr) M = L ÷ K
- Calculate the Constant (Const) N = J – (M x I)

Pasture Meter Formula Equation Table

<table>
<thead>
<tr>
<th>Pasture Sample</th>
<th>A Pasture Height (mm)</th>
<th>B Pasture Cover (kgDM/ha)</th>
<th>C (A - I)</th>
<th>D (B - J)</th>
<th>E (C²)</th>
<th>F (C x D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>40</td>
<td>1500</td>
<td>-40</td>
<td>-360</td>
<td>1600</td>
<td>14400</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum</td>
<td>G</td>
<td>H</td>
<td></td>
<td>K</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>I</td>
<td>J</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. Slope</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. Constant</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Understanding the Pasture Calibration Process

Calibration Equations are used to convert the raw sensor measurement, pasture height (reordered in mm), to pasture cover (kgDM/ha).

There are several ways to do this; these include comparing your height reading with:
- Calibration cuts
- Visual assessment
- Rising Plate Meter

A calibration equation is most commonly expressed as a straight line formula, a straight line formula has two parameters slope of the line (m) and where the line intercepts the y axis of a graph (c) (see below).

The parameters are used to convert pasture height to pasture dry matter using the formula below:

\[ \text{kgDM/ha} = \text{Pasture height} \times \text{Slope} + \text{Intercept} \]

N.B. Use the form on the previous page to calculate both Slope and Intercept for your equation.

What do the Values Mean?

**Slope**
- On your console the slope is referred to as “FACtr”
- The slope measures how much dry matter (expressed as kgDM/ha) there is per increase in measured unit (i.e. mm).

- If your calculated slope = 18.6 this means:
  - For every 1 mm increase in pasture height there is an increase of 18.6 kgDM/ha.
  - Therefore if the difference in pasture height was 10mm then the difference in pasture drymatter is 186 kgDM/ha.
Intercept
- On your console the intercept is referred to as “ConSt”
- The intercept relates to how much dry matter cannot be read by the sensor (i.e. is below the bottom sensor)
- If your calculated intercept = 750 this means:
  - 750 kg DM/ha sits below the bottom sensor and cannot be read
  - When pasture height using the sensor 0 mm there is actually 750 kgDM/ha of pasture residue
  - Pasture residue accumulates (increases) as grasses become more established and/or the growing season becomes drier (i.e. moving from spring through to summer).

Working Example
- Slope “Factr” = 18.6, intercept “ConSt” = 750
- Measured pasture height = 110 mm

\[ \text{Pasture height} \times \text{Slope} + \text{Intercept} = \text{kgDM/ha} \]
\[ 110 \times 18.6 + 750 = 2796 \text{ kgDM/ha} \]

During 2008, AgResearch, DairyNZ and Massey University with the support of Pastoral 21 Feeds Program conducted extensive independent calibration of the C-Dax Pasture Meter on dairy pastures throughout New Zealand. Pastoral 21 is funded by NZ Governments Foundation for Research, Science and Technology (FRST), DairyNZ, Fonterra and Meat &Wool NZ.

Standardised trials were run in Northland (Dargaville), Waikato (Ruakura), Taranaki (Hawera), Canterbury (Lincoln) and Southland (Wallacetown). The results of these trials are shown in the table below.

### Year Round Pasture Cover Equations Table
Use the following table to select the suggested Pasture Cover Equation:

<table>
<thead>
<tr>
<th>Region</th>
<th>Multiplier (FACTr)</th>
<th>Constant (ConSt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northland</td>
<td>22.6</td>
<td>744</td>
</tr>
<tr>
<td>Waikato</td>
<td>16.3</td>
<td>700</td>
</tr>
<tr>
<td>Taranaki</td>
<td>21.8</td>
<td>827</td>
</tr>
<tr>
<td>Canterbury</td>
<td>18.1</td>
<td>729</td>
</tr>
<tr>
<td>Southland</td>
<td>17.7</td>
<td>825</td>
</tr>
</tbody>
</table>
Clearing The Console Memory
From time to time it is good practice to clear the console memory. If the memory is getting full you may experience a slower than usual download of pasture cover to your PC. Please note that this will remove all of the pasture data retained in the console memory so please ensure that the data has been downloaded prior to running this procedure. All other settings will be retained it is just clearing the memory.

Make sure unit is off. Hold down UNITS and tap the ON button.

Continue to hold UNITS until DEL? is shown, take your finger off UNITS then quickly press the * button once.

The clearing procedure should take approximately 30 seconds.