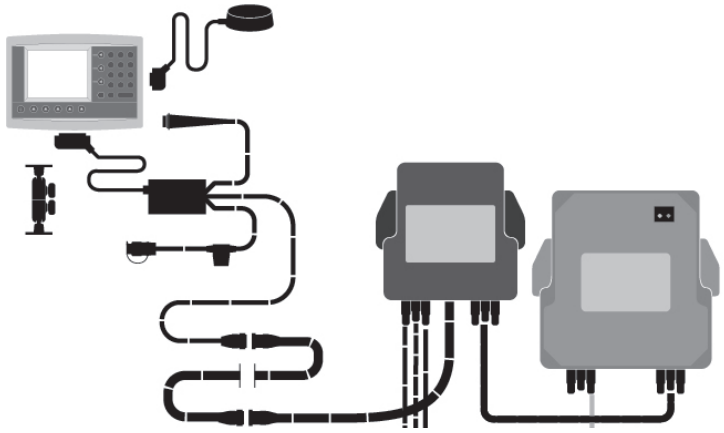
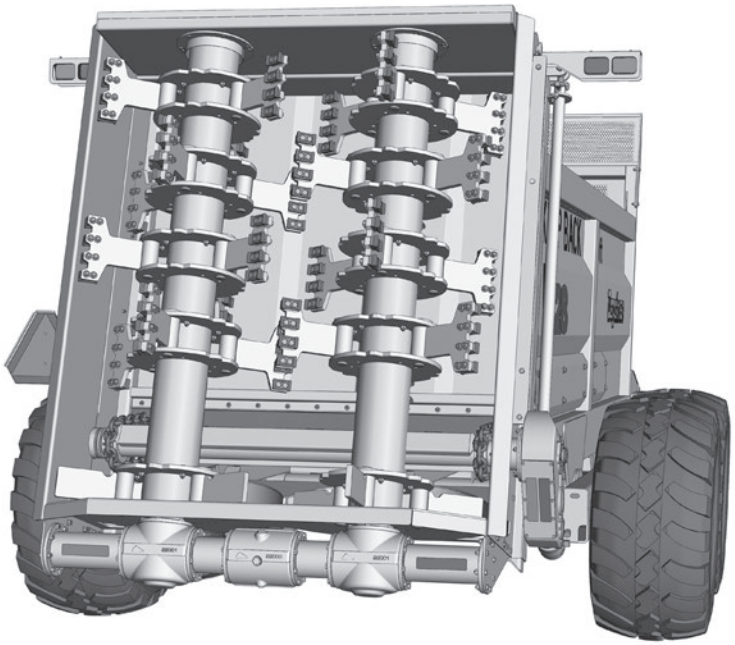
Degelman

RATE CONTOL SYSTEM
REFERENCE MANUAL

manure spreader

M28 M34





142670 v1.1

DEGELMAN INDUSTRIES LP
BOX 830-272 INDUSTRIAL DRIVE,
REGINA, SK, CANADA, S4P 3B1
FAX 306.543.2140 PH 306.543.4447
1.800.667.3545 DEGELMAN.COM

MANURE SPREADER M28/M34
OPTIONAL RATE CONTROL SYSTEM

Degelman

M28 M34

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IMPORTANT:

READ MANUAL

Variable Rate Control Quick-Start

INTRODUCTION

The Degelman variable rate control package comes with the following components:

A. NT8000i Head Unit Control Module

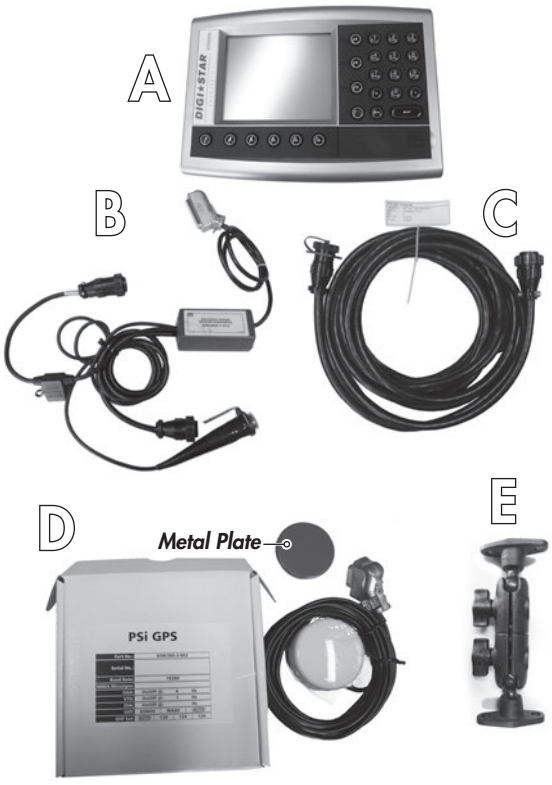
B. Tractor Terminator Box Cable

C. 6M extension Cable

D. GPS KIT

E. RAM Mount for Control Module

F. Digi-Star Manuals & Reference Material



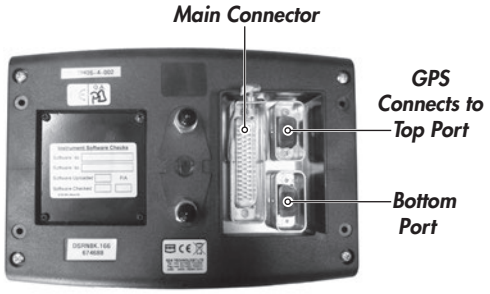
INSTALLING GPS

1. First, remove the GPS module from its package. The bottom of the GPS Module is magnetized to easily install on a metal roof. If the tractor roof is not magnetic, a metal plate with adhesive is included.
2. Mount the GPS Receiver on the roof of the tractor. Try to mount as high as possible with clear view of sky.

   Note: Install as far away from tractor GPS receiver as possible.

3. Plug the GPS into the **TOP PORT** of the Control Module.

Rear View of Control Module

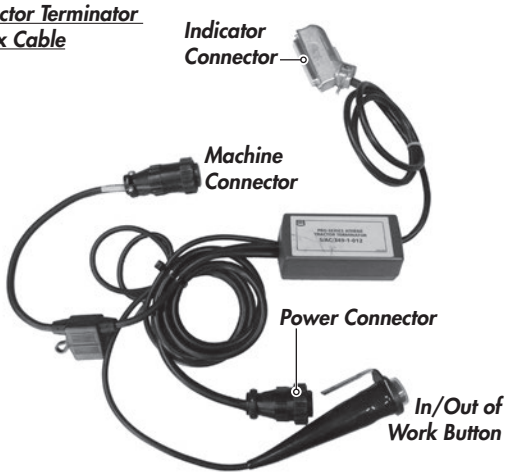


TERMINATOR BOX CABLE CONNECTION

1. Take the Tractor Terminator Box Cable & plug the "Indicator Connector" into the "Main Connector" port of the Control Module.
2. Plug the "Power Connector" into the tractor's power supply.
3. Connect the "Machine Connector" end of the cable to the cable coming from the spreader.

   Note: If the spreader cable does not reach, use the 6M extension cable provided.

Tractor Terminator Box Cable



Variable Rate Control Quick-Start

POWER ON / MAIN SCREEN

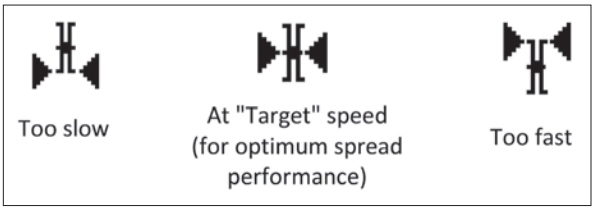
1. Push the power button on the Control Module to turn it on. The screen will power on & display the main screen.

   Note: Refer to the **DIGI-STAR operation manual** provided to walk you through the display screens more in depth.

2. The picture on the right explains the main screen icons.

   Note: Make sure the "Rate Control" & Dynamic Weighing Calibration are both set to "AUTO" so the unit can constantly adjust to different density materials.

3. The "Min/Max Motor speed indicator" shows the floor conveyor motor speed. The faster you drive, the faster the floor conveyor will move. For optimal performance try to keep the gauge in the middle.



INFO SCREEN

1. Additional work measurement functions are displayed on the INFO screen. The picture on the right explains the INFO screen icons.

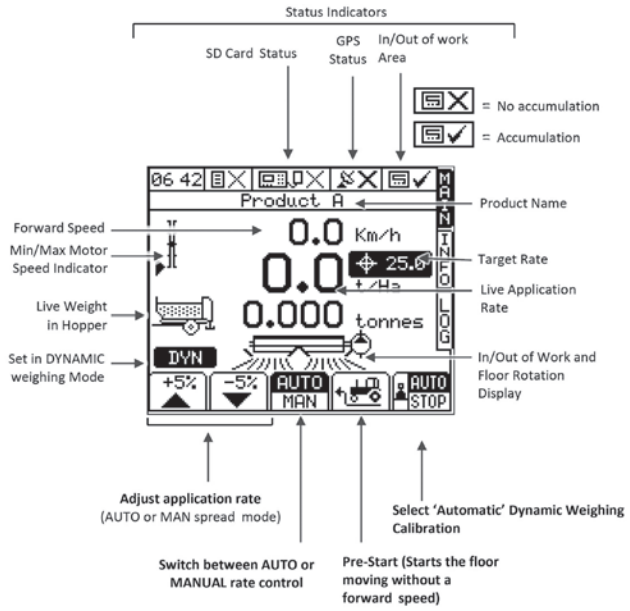
SETUP SCREEN

1. Push the ? button to enter the setup menu.

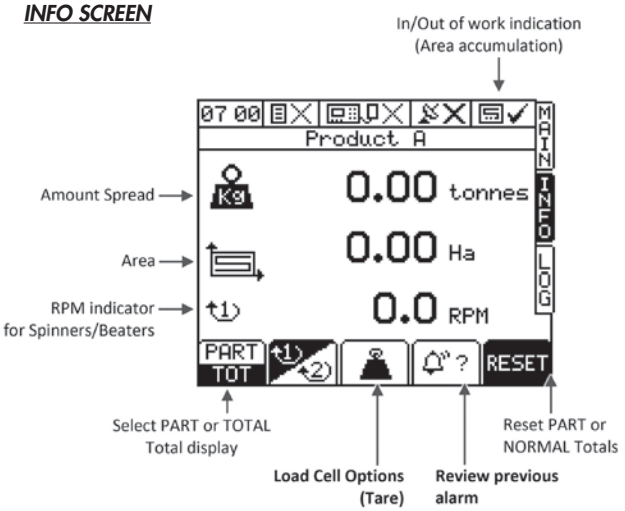
   This menu allows you to customize your "USER OPTIONS" (i.e. Time/Date, Units, Language, & Brightness) & select you "PRODUCT" (i.e. Light, Medium & Heavy)

   Note: You can add & edit different product names depending on what you're spreading.

POWER ON / MAIN SCREEN



INFO SCREEN



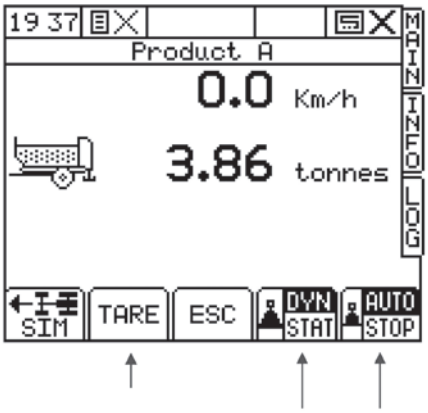
SETUP SCREEN

Variable Rate Control Quick-Start

TARE LOAD CELLS

1. Once the spreader is hooked up & the unit is powered on the load cells must be set to 0. To do this first go to the INFO screen.
2. Next, click the "Load Cells Option" button. 
3. Ensure that the Spreader is EMPTY & HORIZONTAL. Push the "**TARE**" key. This will set the hopper weight back to 0 lbs.

   Note: Ensure that both **DYN** & **AUTO** are selected.



LOAD SPREADER

1. Load the spreader with as much manure as possible. This is necessary to determine what type of manure it is (light, medium, or heavy).

SELECT PRODUCT

1. Once the spreader is fully loaded, the proper product must be selected. To do this, first go to the SETUP screen (Refer to Setup Screen Step).
2. Next, select the Product key on the bottom left. 

3. Using the arrow keys, select the appropriate product (light, medium or heavy). Use the table shown to determine the product type.

Recommended Product Type & K Values for Full Spreader Loads (M34)		
Digi-Star Product Type	**Fully Loader Spreader**	**T Factor**
Light	< 10 Tons	≈ 0.6
Medium	10 - 20 Tons	≈ 1.3
Heavy	20+ Tons	≈ 2.0

INSERT DESIRED RATE

1. Next, return to the "MAIN" screen, punch in your desired application rate, & hit the "Enter" key. 
2. The picture on the right shows typical application rates for different types of manure.
3. The new value will be displayed in the target window. 

Typical Application Rate for Different Types of Manure	
Animal	**Rate (Tons/Acre)**
Cow	15 - 20
Pig	15 - 20
Chicken	2 - 5

Variable Rate Control Quick-Start

BEGIN SPREADING

1. Now the spreader is ready to spread. Pull the spreader to its desired location & stop.
2. Start the PTO.
3. Raise the Gate.

   ⚠ **IMPORTANT:** Before starting the table, the operator should get the beaters up to speed and fully open the rear gate. This prevents the spreader from overworking itself from material being pulled up against the rear gate. Failure to do so may cause costly damage or equipment failure.

4. Switch the floor conveyor hydraulics on.
5. Push the Pre Start button  (*flow will begin moving*)
6. Begin driving.

END OF RUN

1. When the spreader is empty turn off the PTO, Close the gate, & turn off the floor conveyor.
2. The spreader should now be "Out of Work".
3. The INFO screen will display the amount of Manure spread & the Area covered during the run.
4. Refill the Spreader & repeat the "Begin Spreading" Step & "End of Run" Step until complete.

USE OF STOP BUTTON

1. If you want to stop the floor conveyor while still driving you can use the stop button on the terminator box cable. This gives you more control of where you spread. For example, when you reach the end of your field & still have product left in the hopper. You can stop the floor conveyor, take the turn, and then start the floor conveyor again. This helps eliminate overlap & unintentional manure coverage.

   Note: When the stop button is engaged, the unit does not count acres.

Note: If the floor conveyor does not begin moving the red stop button on the terminator junction cable may have been pushed. If so, push the red button to put the spreader back into work.
In work =  on the main screen.

Note: Make sure the "Rate Control" & Dynamic Weighing Calibration are both set to "AUTO" so the unit can constantly adjust to different density materials.

In/Out of Work Button

Variable Rate Control Quick-Start

MANUAL MODE / REVERSE FLOOR

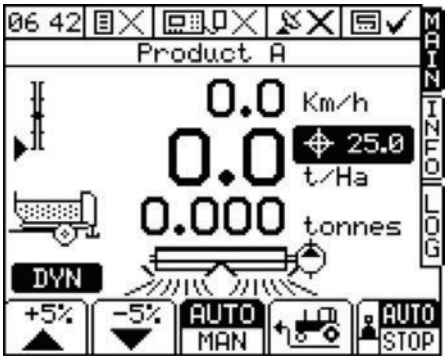
Under normal operating conditions you will not need to select this mode, however, in the event you experience a problem with automatic control (if for example the beaters plug or a sensor has stopped working), you can control the floor chain manually.

1. Select "**MAN**" from the 'MAIN' screen. Ensure the hydraulics are switched 'ON'. 

2. Press  to adjust floor speed.

   To maintain the required application rate, you must maintain a constant forward speed.

Note: To reverse the floor push the "**UP**" arrow until  the speed indicator is in the optimal range then reverse the hydraulic flow.

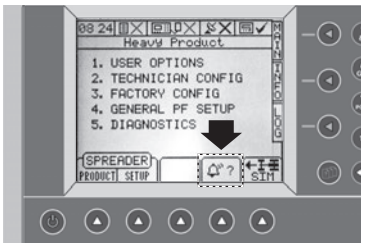


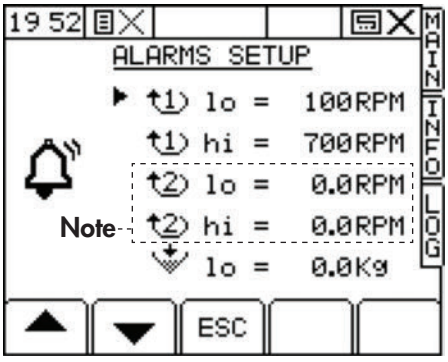
SETTING ALARMS

To set a "**Beater RPM**" Alarm to inform you of Beater/ Driveline issues or a 'Min Hopper Weight' Alarm to inform you that you've reached the end of your load.

1. Press  to select the 'Setup' Menu.
2. Select the "**ALARMS SETUP**" button  at the base of the screen.
3. Select the appropriate alarm threshold using the arrow keys, and enter the value via the numeric keypad.

   Note: Ensure **BEATER 2 RPM** Alarm is always set to **0 RPM**. The spreader will not switch into "work position" if these values are not set to 0.





TROUBLESHOOTING

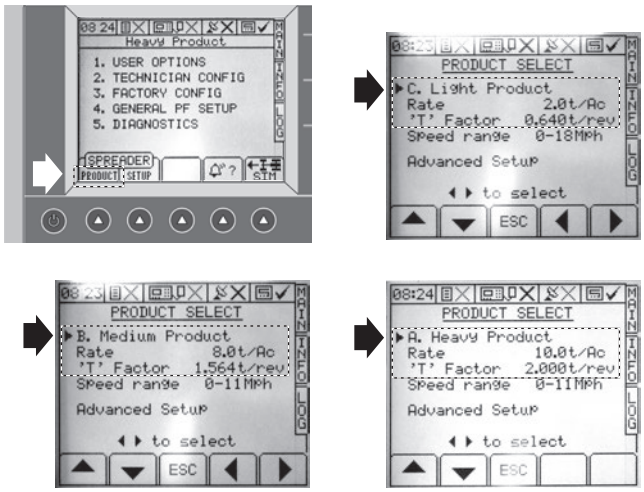
In the following section, we have listed some of the problems, causes and solutions that you may encounter. If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please call your local dealer or distributor. Before you call, have this manual and the serial number from your unit ready.

PROBLEM	CAUSE	SOLUTION
Speed displayed on Rate Control Unit different from Tractor Speed	Check to see if GPS wires are damaged.	Inspect wiring to GPS unit and repair/replace if necessary.
	GPS mounted incorrectly.	Ensure the GPS is mounted properly (*Refer to GPS Installation*).
	GPS Baudrate or GPS Port are set incorrectly.	Ensure GPS Baudrate and GPS Port set properly (*Refer to "General PF Setup" under NT8000i Control Module Settings*).
PTO Speed displayed different from tractor's display	PTO sensor wire could be damaged.	Check to see if PTO sensor wires are damaged. Fix as needed.
	Sensor is blocked.	Remove any debris around sensor/magnet.
	Sensor distance is off.	Ensure magnet is positioned between ¼" to ½" from sensor.
Display telling me to drive abnormally slow/fast.	Your product 'T' factors may be uncalibrated.	Review "Set Up Products" under the NT8000i Control Module Settings section of the manual (*or reference on next page*).
	Check to see if GPS wires are damaged.	Inspect wiring to GPS unit and repair/replace if necessary.
	GPS mounted incorrectly.	Ensure the GPS is mounted properly.
	GPS Baudrate or GPS Port are set incorrectly.	Ensure GPS Baudrate and GPS Port set properly (*Refer to "General PF Setup" under NT8000i Control Module Settings*).
Spreader won't switch to "In Work"	In/Out of work button off.	Decompress the In/Out of work button.
	Sensor wire damage.	Check to see if any Sensor wires are damaged. Fix as needed.
	Forgot to push the "Pre Start" button on module.	Ensure you push the "Pre Start" button before you start spreading.
Floor won't Start / Stop (Hydraulic Valve Check)	Valve wire damage.	Check to see if the valve wires are damaged.
	Valve settings incorrect.	Ensure proper settings for Valve. (*Refer to "Channels" next page*).
	Possible coil damage.	If setup correctly, then electronically open/close the valve to see if the coil is damaged. (*Refer to procedeure on next page*)
"Low RPM Alarm" when beaters are working properly	Issue with PTO sensor wire.	See PTO speed problem above.
	Alarm for BEATER 2 is set at a value, not "0".	Follow procedure under "Setting Alarms" to reset BEATER 2 RPM values to "0". *(Refer to "Setting Alarms" section)*

Troubleshooting

REFERENCE - "SET UP PRODUCTS" VALUES

1. From the "***Options Menu***" select the "***Product***" option on the bottom left. Ensure the settings are correct for <u>each</u> product option as shown below:
2. Select the "***Light Product***" option.
   Rate = 2.0 t/ac
   'T' Factor = .640 t/rev
3. Select the "***Medium Product***" option.
   Rate = 8.0 t/ac
   'T' Factor = 1.5640 t/rev
4. Select the "***Heavy Product***" option.
   Rate = 10.0 t/ac
   'T' Factor = 2 t/rev

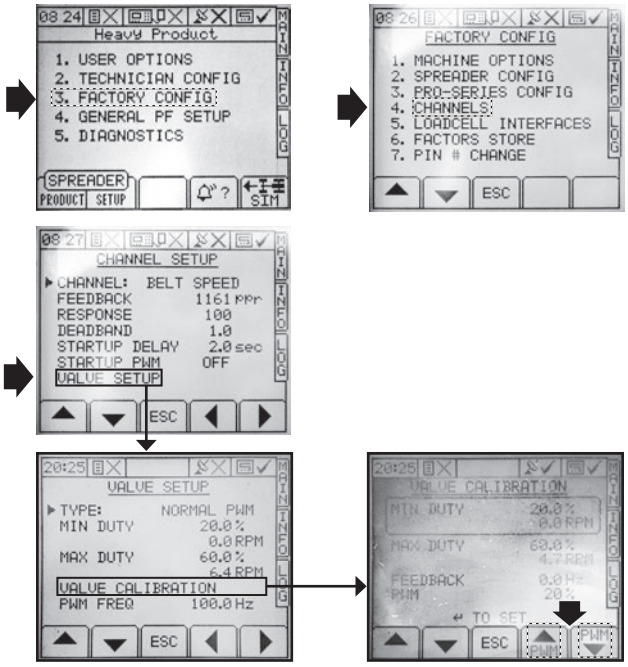


"FLOOR WON'T START"- TROUBLESHOOTING - VALVE CALIBRATION / COIL CHECK

1. Select the "***Factory Configurations***" option from the "***Options Menu***". Enter the <u>**PIN #1234**</u> & "***Enter***".
2. Navigate first to ***"Channels"*** then select the "***Valve Setup***" menu option at the bottom.
3. In this menu, select the "***Valve Calibration***" option & switch the floor conveyor hydraulics **ON** in the tractor.
4. Increase the PWM to a point where the <u>**Feedback**</u> starts showing a value (this should be at about ***20 - 25%***). Floor shouldn't be moving.

   Note: If floor is moving or there's feedback when the valve is set to ***0%*** that means the valve is stuck open and the coil most likely needs to be replaced.
5. Continue to Increase the PWM to a point where the <u>**Feedback**</u> no longer increases (this *should* be at about ***50 - 60%***). The floor should be moving at top speed.

   Note: If the Floor is not moving that means the coil in the solenoid valve needs to be replaced.



REFERENCE - "CHANNELS" SETTINGS

Select the "***Channels***" option under "***Factory Configurations***". Ensure the belt speed channel is setup with the following settings:

Feedback = 1161 ppr
Response = 100
Deadband = 1.0
Startup Delay = 2.0 sec
Startup PWM = OFF

REFERENCE - "VALVE SETUP" SETTINGS

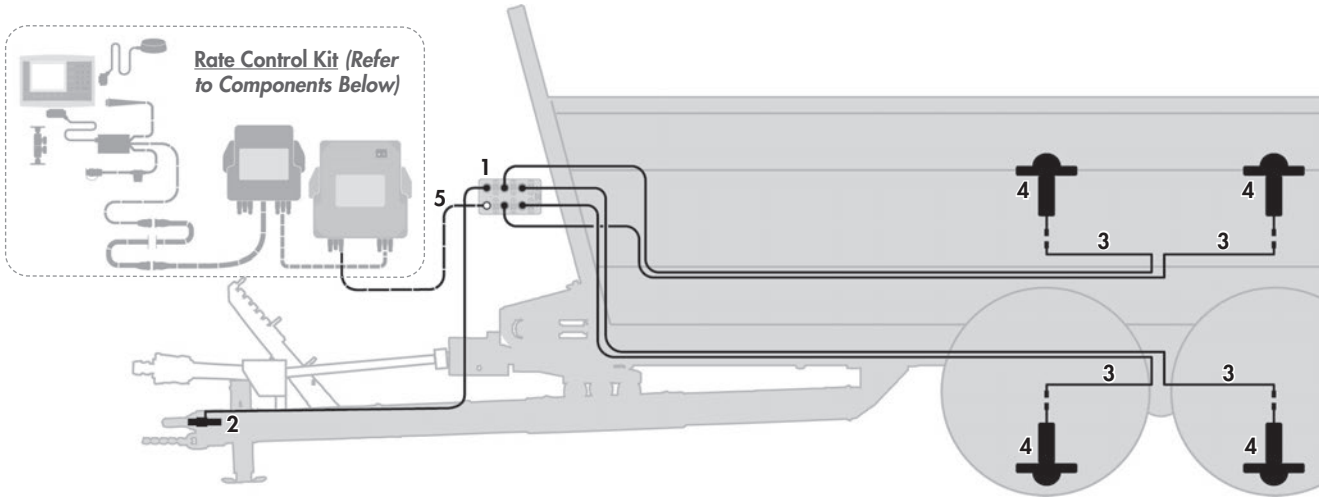
Select the "***Valve Setup***" option under "***Channels***" at the bottom of the screen and set the valve options to the following:

Type = Normal PWM
Min Duty = 20.0%
0 RPM
Max Duty = 60.0%
6.4 RPM
PWM FREQ = 100.0 Hz

If any additional troubleshooting or service is required please phone the **Top-Con Hardware Division**:
+1-920-563-9700 **tasupportds@topcon.com**

Component Routing Overview

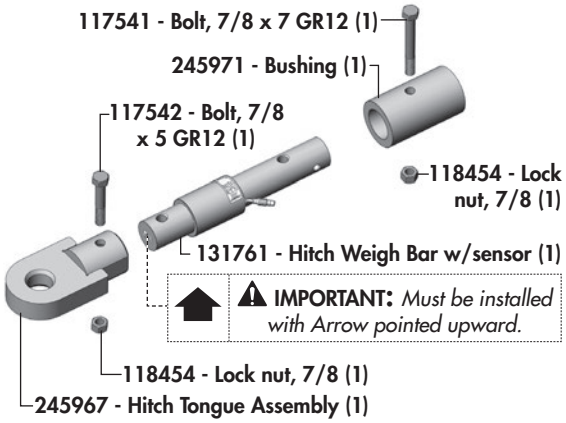
LOAD CELLS - COMPONENT ROUTING OVERVIEW

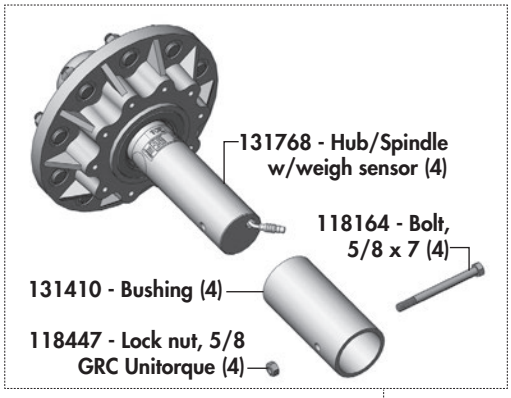


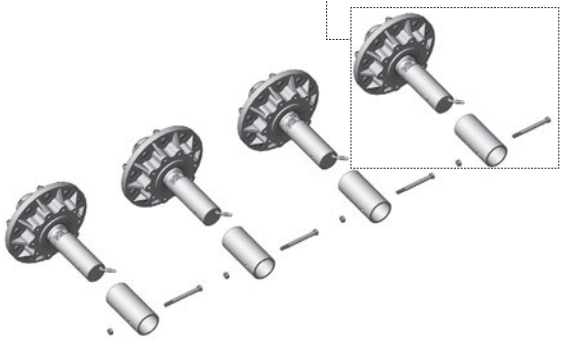
Main Load Cell Components

1	131763 - Junction Box, 6 Port - Ref #404721	(1)
2	131761 - Weigh Bar, w/cable - Ref #407069	(1)
3	131764 - Cable, 5 PIN -21' - Ref #404900	(4)
4	131768 - Hub/Spindle, Weigh Scale	(4)
5	131759 - Cable, 5 PIN -6' - Ref #407868	(4)

LOAD CELL COMPONENTS

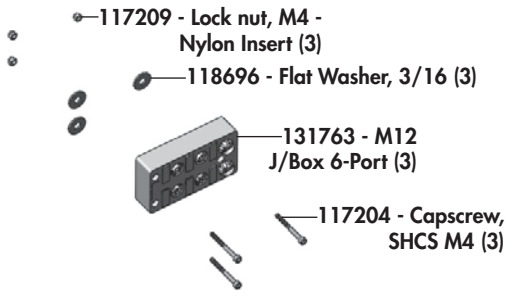






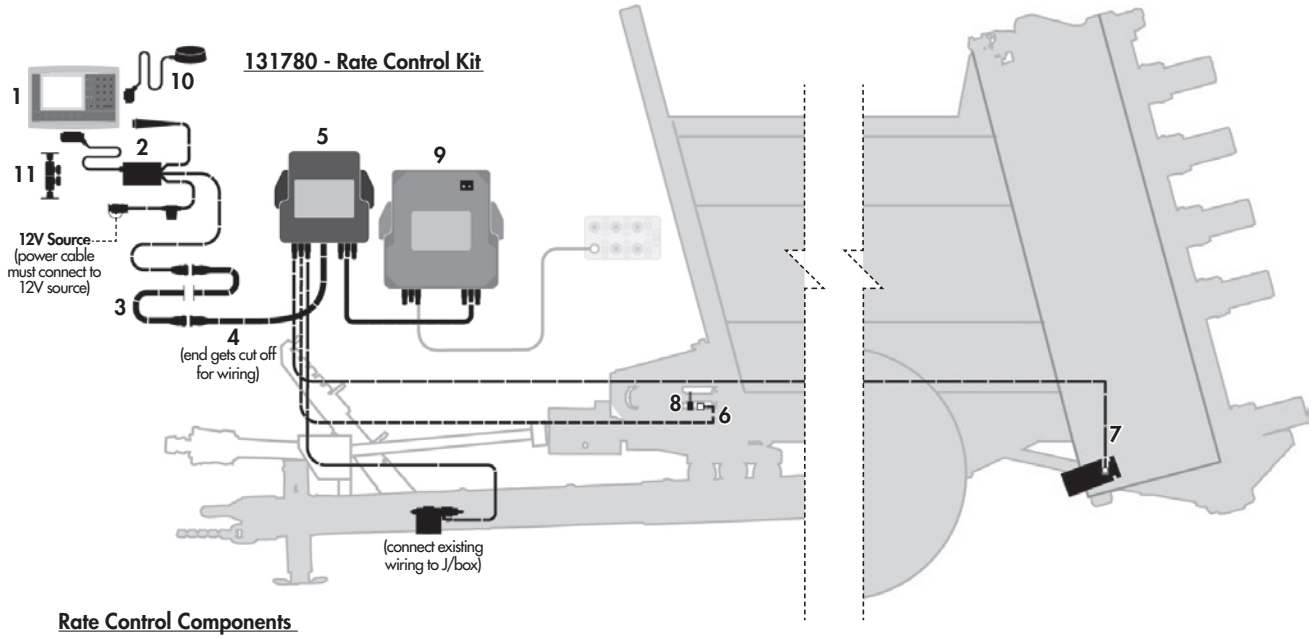
J/BOX MOUNTING COMPONENTS

Load Cell 6-Port J/Box



Component Routing Overview

RATE CONTROL KIT - COMPONENT ROUTING OVERVIEW

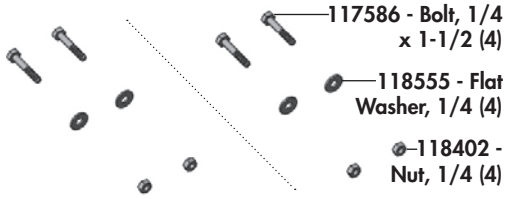


Rate Control Components

1	131781 - Module Unit	(1)	7	131787 - Motor Cable, M12	(1)
2	131782 - Module Connection Power Cable	(1)	8	131788 - RPM Sensor Magnet	(1)
3	131783 - Cable, 6M	(1)	9	131790 - Junction Box, Load Cells	(1)
4	131784 - Cable, 4M	(1)	10	131791 - GPS Kit	(1)
5	131785 - Junction Box, Sensor	(1)	11	131792 - Module Mounting Kit	(1)
6	131786 - Sensor Cable Kit, PTO RPM	(1)			

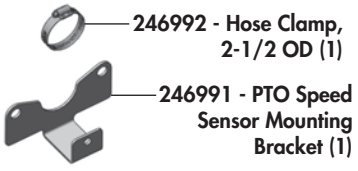
J/BOX MOUNTING COMPONENTS

Hardware for Mounting Load Cell and Sensor J/Boxes



RATE CONTROL HYDRAULIC MOTOR

PTO SENSOR MOUNTING COMPONENTS

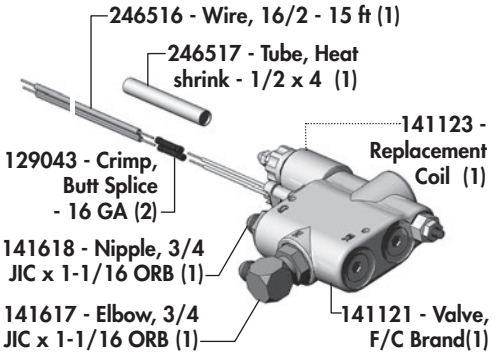


HYDRAULIC VALVE WIRING REFERENCE

(CONNECT TO EXISTING WIRE)

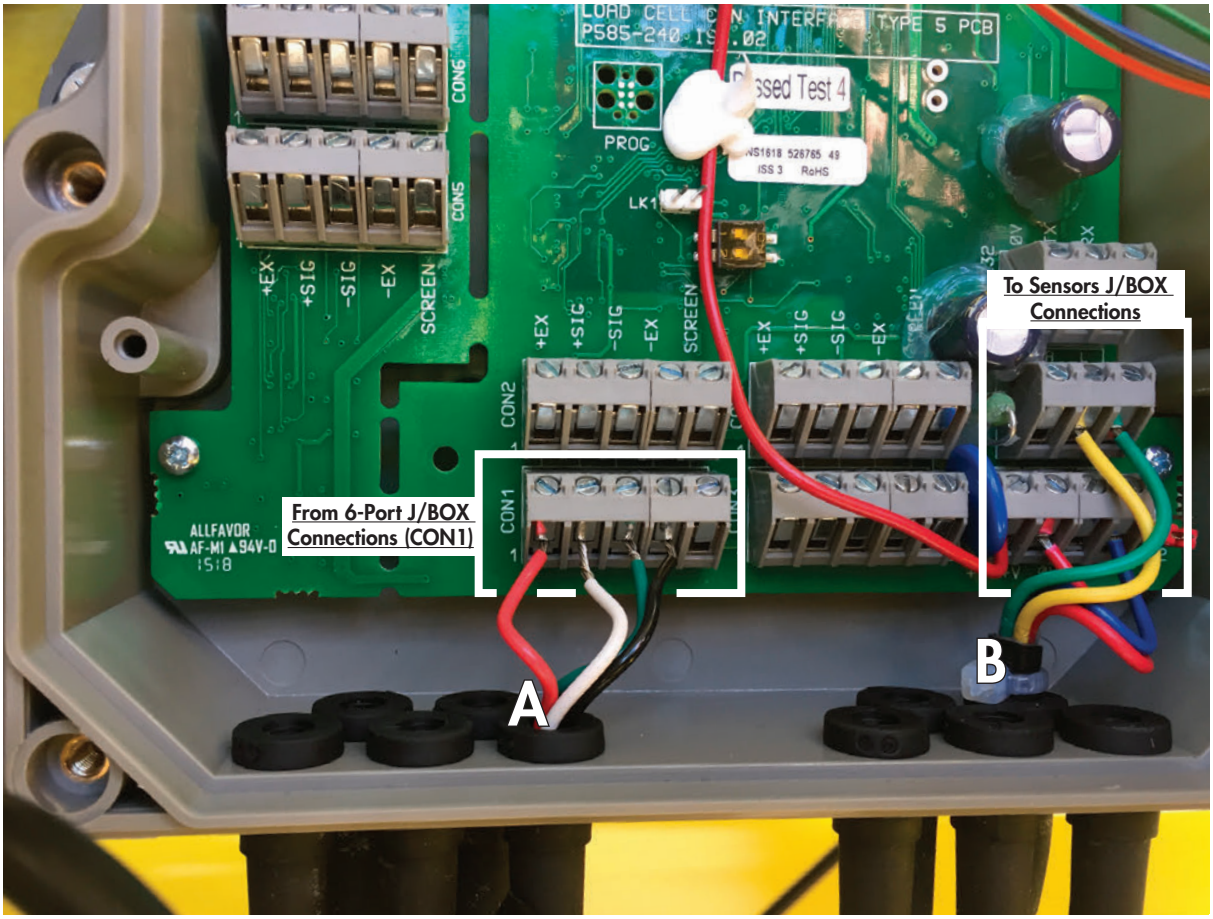
Connects to wire **246516** from existing Manure Spreader assembly...

246515 - Flow Control & Wiring Assembly (1)



Connection Detail Reference

LOAD CELLS - CONNECTION DETAILS *(J/BOX 131790)*



LOAD CELLS J/BOX CONNECTION WIRING

A - From 6-Port Load Cell J/BOX - *Wire 131759* (CON1)

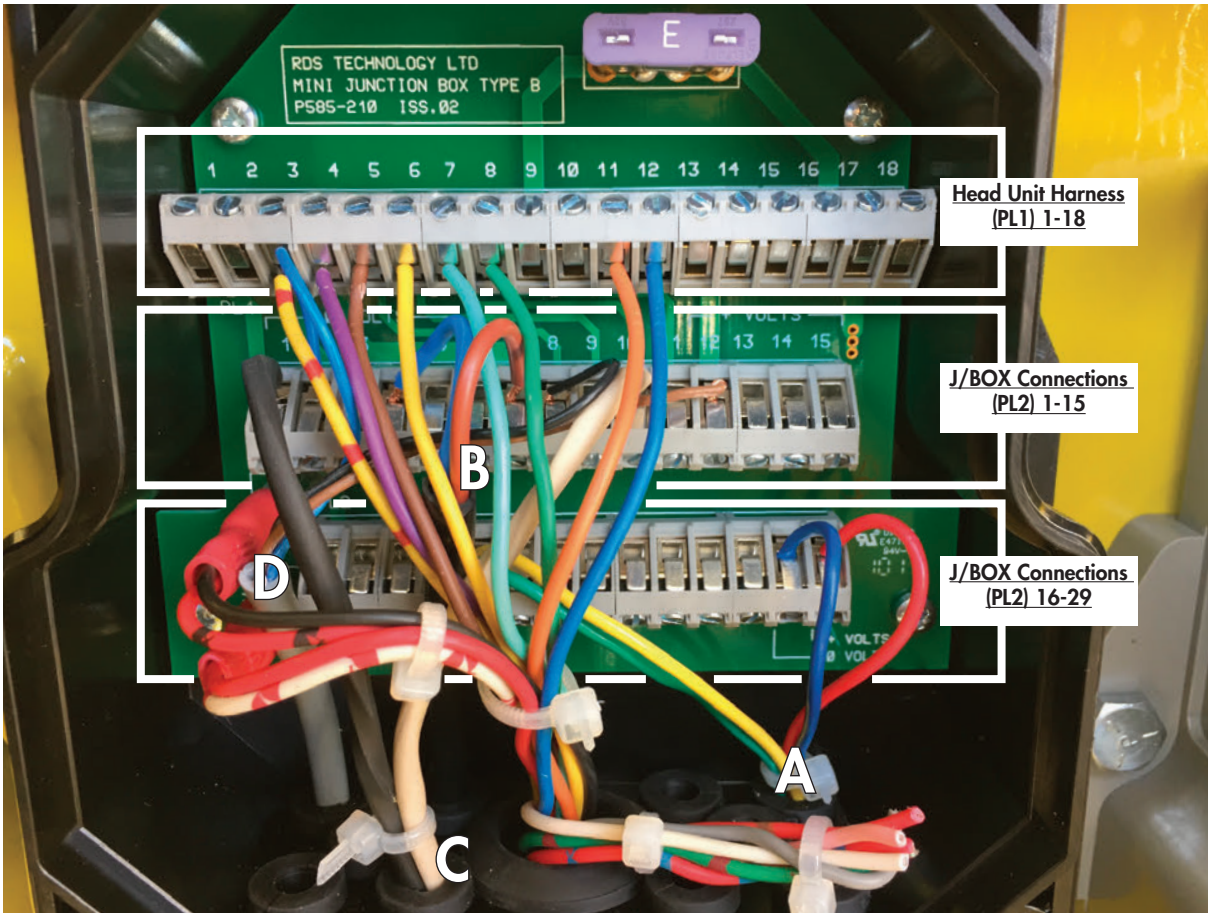
1) Red Wire	+EX	(+ Excitation)
2) White Wire	+SIG	(+ Signal)
3) Green Wire	-SIG	(- Signal)
4) Black Wire	-EX	(- Excitation)

B - To Sensors J/BOX *(comes pre-wired)*

1) Yellow Wire	"H"	(High)
2) Green Wire	"L"	(Low)
3) Red Wire	+V	(+12V)
4) Blue Wire	0v	(0v)

Connection Detail Reference

SENSORS JUNCTION BOX - CONNECTION DETAILS *(J/BOX 131785)*



MODULE UNIT CABLE WIRING

The 4m extension cable **131784** is to be connected into the junction box. The Female end must be removed and the wires stripped back and wired to the sensor junction box.

IMPORTANT: The end that needs to remain is the end with the male pins and the cap as per the image above.

1) Yellow/Red Wire	**PL1 - 03**
2) Violet Wire	**PL1 - 04**
3) Brown Wire	**PL1 - 05**
4) Yellow Wire	**PL1 - 06**
5) Turquoise Wire	**PL1 - 07**
6) Green Wire	**PL1 - 08**
7) Orange Wire	**PL1 - 11**
8) Blue Wire	**PL1 - 12**

9) Red Wire
10) White/Red Wire — Spade Crimp +V
(12v Power to the PCB)

11) Black Wire
12) Red/Black Wire — Spade Crimp 0v
(0v to the PCB)

J/BOX CONNECTION WIRING

A - From Load Cell J/Box Wire

1) Green Wire	**PL2 - 19**	(Load Cell Can LO Signal)
2) Yellow Wire	**PL2 - 20**	(Load Cell Can HI Signal)
3) Blue Wire	**PL2 - 28**	(Load Cell Can 0v)
4) Red Wire	**PL2 - 29**	(Load Cell Can 12v)

B - From Drive Shaft Sensor

1) Blue Wire	**PL2 - 04**	(From Drive Shaft Sensor)
2) Brown Wire	**PL2 - 07**	(From Drive Shaft Sensor)

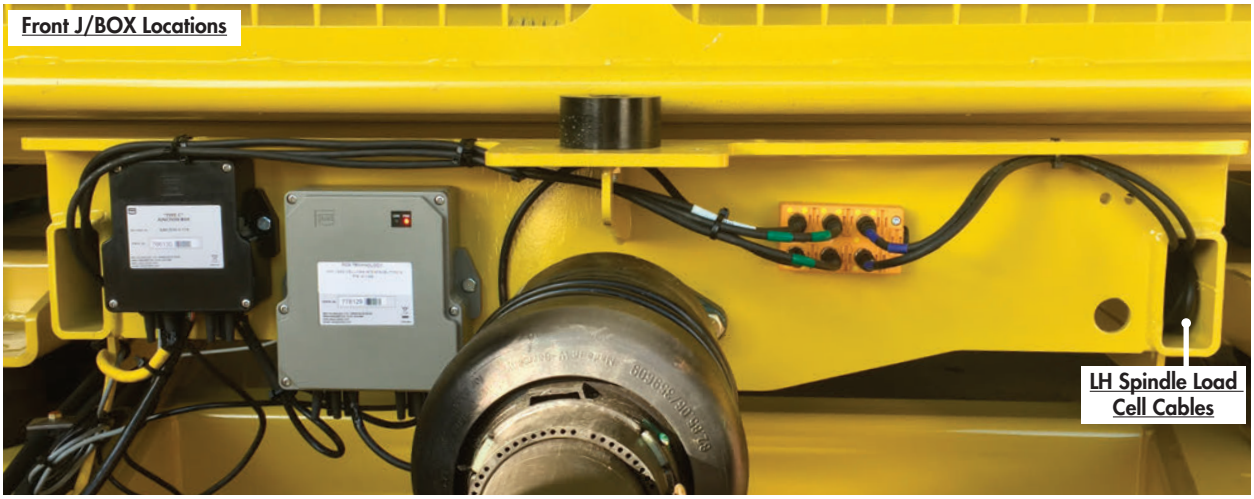
C - From Exisitng Hyd. Valve Wiring

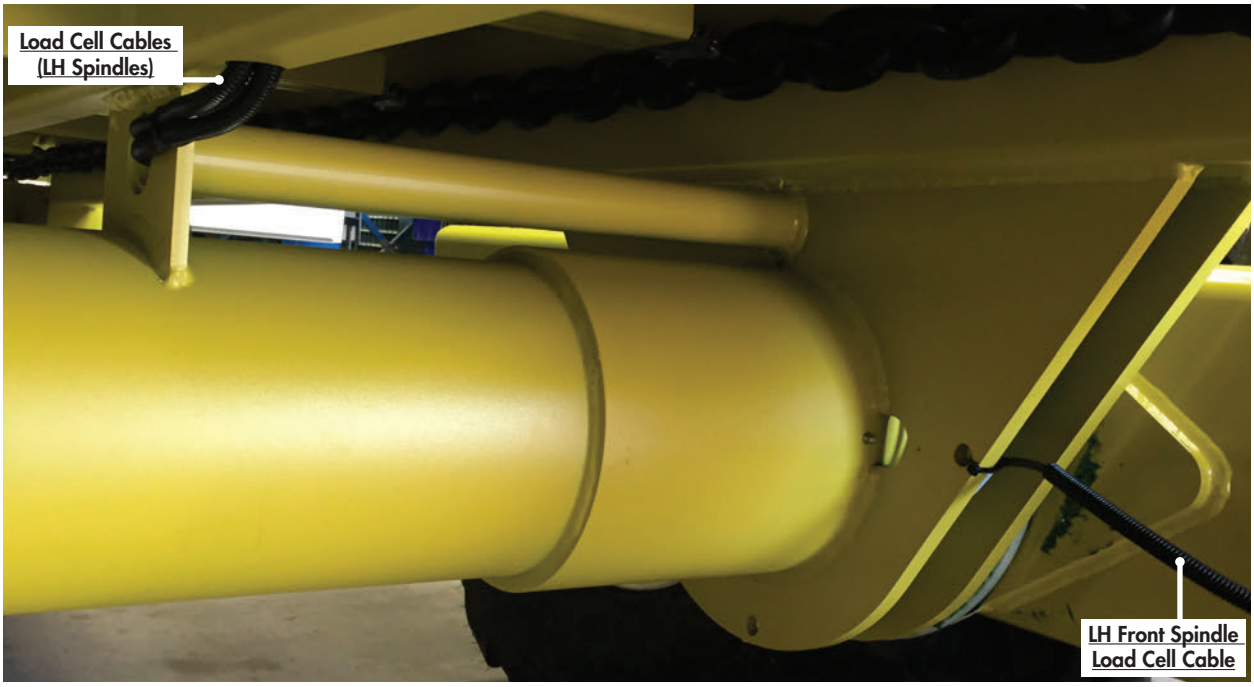
1) Black Wire	**PL2 - 01**	(From Hyd. Valve)
2) White Wire	**PL2 - 10**	(From Hyd. Valve)

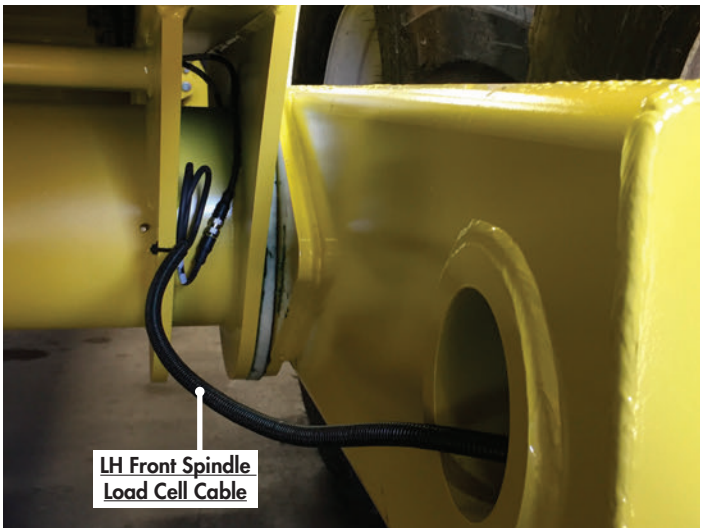
D - From Motor

1) Blue Wire	**PL2 - 02**	(From Motor)
2) Black Wire	**PL2 - 08**	(From Motor)
3) Brown Wire	**PL2 - 12**	(From Motor)

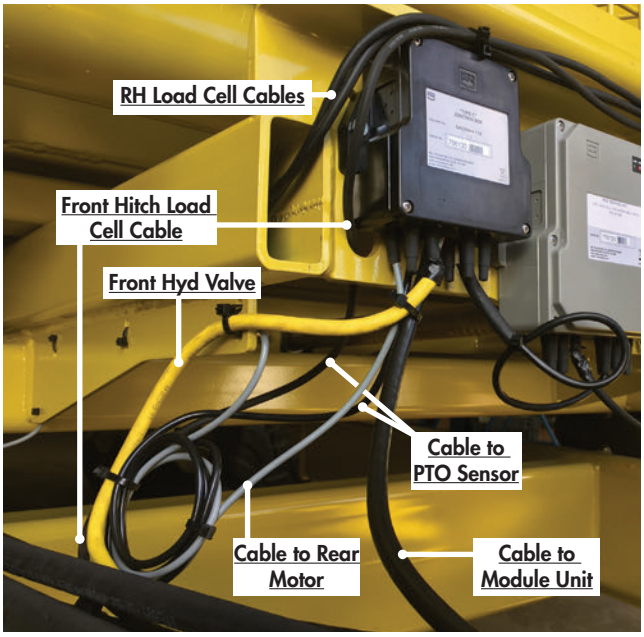
Installation Reference Photos

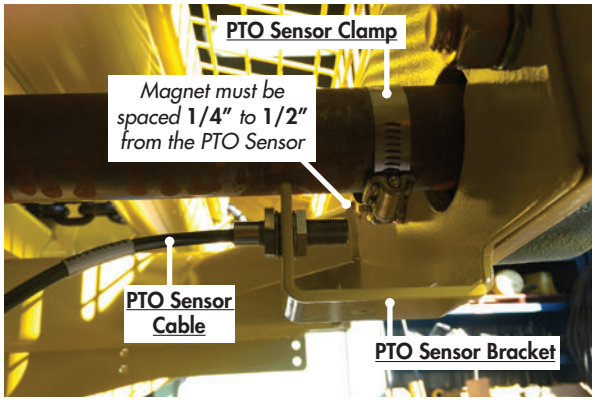


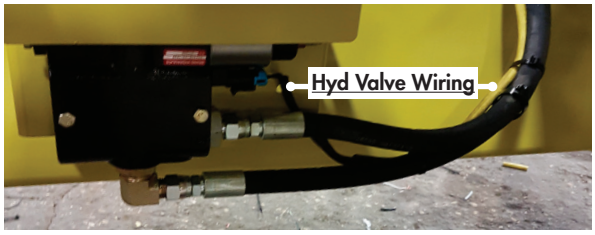


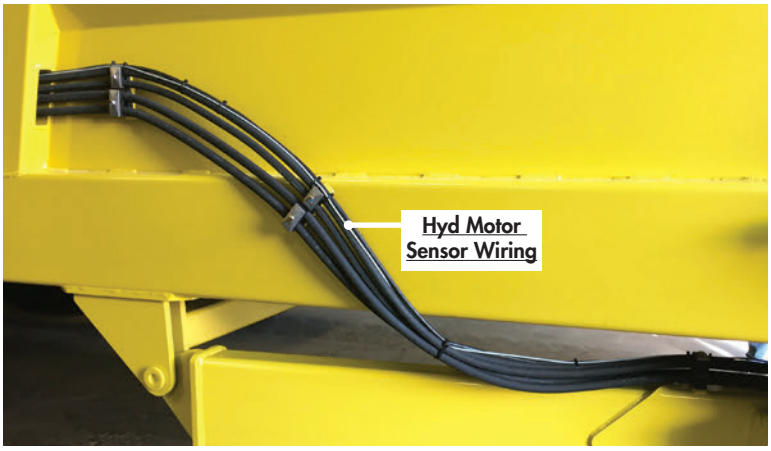


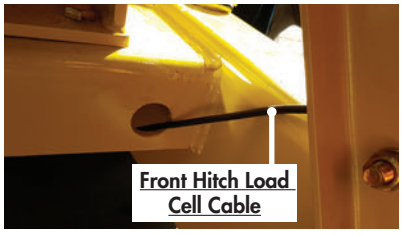
Installation Reference Photos

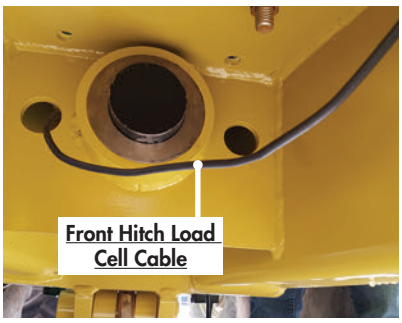












NT8000i Control Module Settings

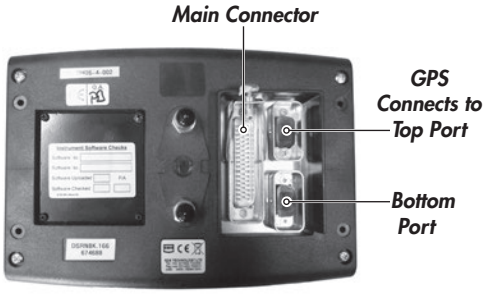
FOR FACTORY SETUP & TROUBLESHOOTING

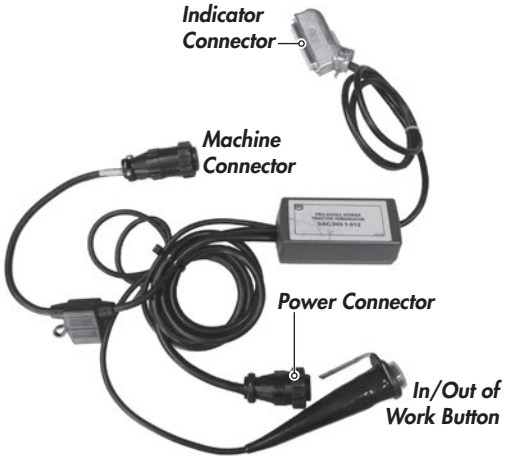
This section of the document is for reference only.
The settings should be pre-configured at the factory.

INTRODUCTION

1. This document is to ensure that the NT8000i Head unit is correctly calibrated for our Degelman Spreaders. The image on the right shows the head unit and corresponding power cable.
2. Once all the rate control components are installed onto the Degelman spreader it's time to calibrate the Head unit. Plug the "***Power Connector***" into a tractor's power supply.
3. Connect the "***Machine Connector***" end of the cable to the cable coming from the spreader.

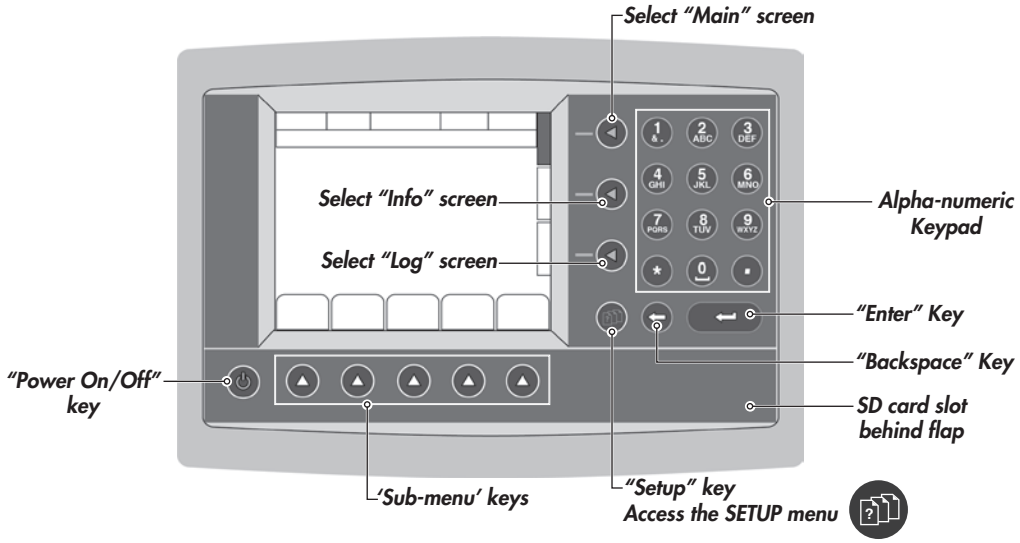
   Note: If the spreader cable does not reach, use the 6M extension cable provided
4. Plug the "***Indicator Connector***" into the back of the head unit.





POWER ON / MAIN SCREEN

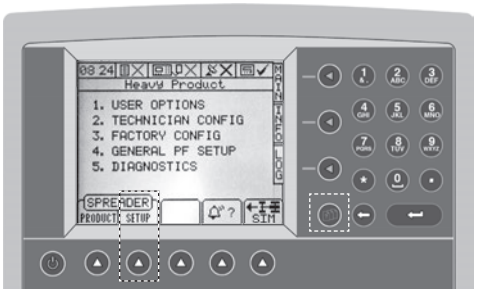
1. Once hooked up, push the power button on the Head Unit to turn it on. The screen will power on & display the main screen.
2. The image below shows the button layout of the head unit and explains which each one does.



NT8000i Control Module Settings

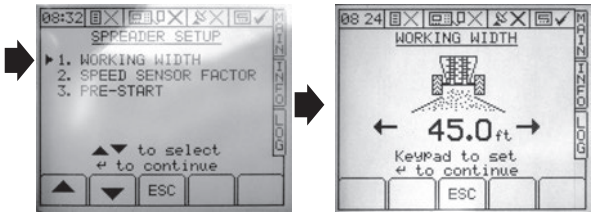
SPREADER SETUP SCREEN

1. Hit the "***Set up key***" which will take you to the "***Options Menu***" shown on the Right. Then use the appropriate submenu key & select "***Setup***".



2. Select "***Working width***" using the appropriate arrow keys and hitting "***Enter***"

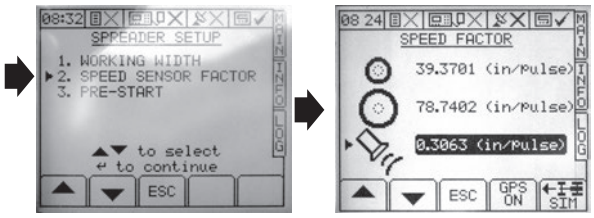
   Enter "**45 ft**" using the number pad and hit the Enter key to confirm. Hit "***ESC***" and return to the Spreader Setup page.



3. Select "***Speed Sensor Factor***" using the appropriate arrow keys and hitting "***Enter***"

   Use the arrow keys to highlight the GPS option and hit the Enter key to confirm. Hit "***ESC***" and return to the Spreader Setup page.

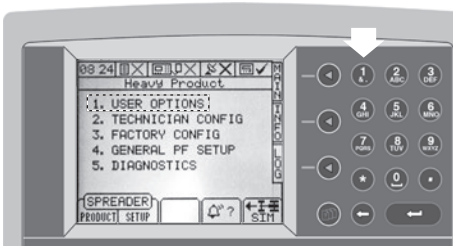
   Note: Ensure the speed factor is set to **0.3063 (in/pulse)**.



4. Hit the "***ESC***" key to return to the "***Options Menu***" shown in the Top left image.

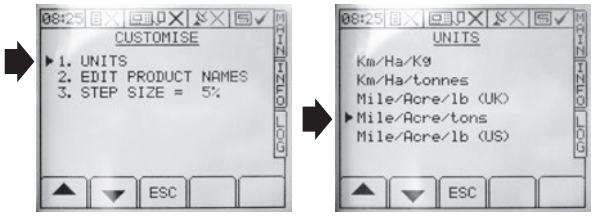
USER OPTIONS - UNITS

1. Next we need to ensure the unit is setup using the correct units. From the options list select the "***User Options***" line using the number pad.



2. Next, "***Customise***" => "***Units***" => scroll down to "***Mile/Acre/tons***" & Hit "***Enter***".

3. Return to the main "***Options Menu***". (Hit the "***ESC***" key)

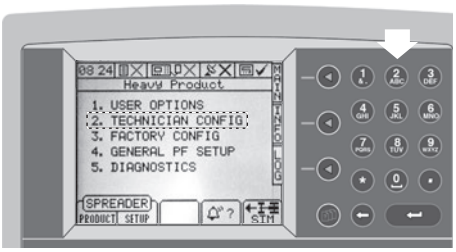


TECH CONFIG - LOAD CELL CORRECTION

1. Next, we want to double check the Load Cell Correction Values.

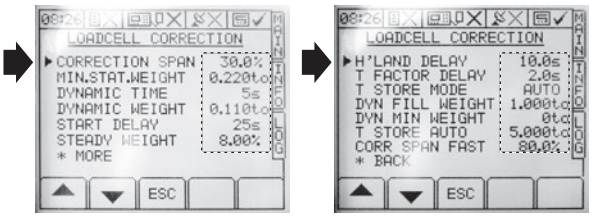
   Select the "***Technician Config***" option from the "***Options Menu***".

   Enter the **PIN #1234** & hit "***Enter***"



2. Select the "***Load Cell Correction***" option.

   Ensure **all** the values match the ones shown in images to the right.



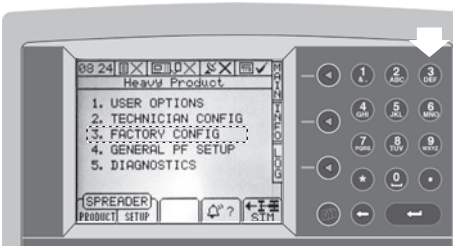
3. Return to the main "***Options Menu***". (Hit the "***ESC***" key)

FACTORY CONFIG - "MACHINE OPTIONS"

1. In the next several steps, we will adjust the options under "***Factory Configurations***".

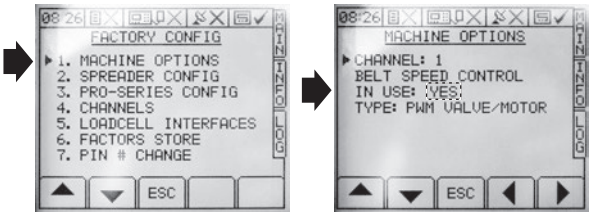
   Select the "***Factory Configurations***" option from the "***Options Menu***".

   Enter the **PIN #1234** & hit "***Enter***".

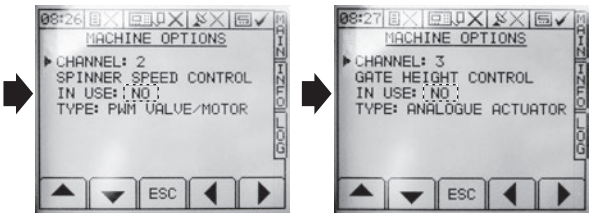


2. Select the "***Machine Options***" option.

   Ensure **Channel: 1** is the only channel "**IN USE**" with **TYPE: PWM**.



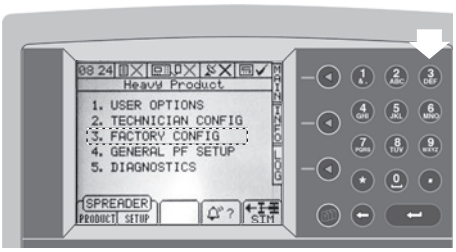
3. Using the appropriate arrows, ensure **Channel: 2** & **Channel: 3** are set to **not in use.**



4. Press "***ESC***" to return to the "***Factory Config Menu***".

FACTORY CONFIG - "SPREADER CONFIG"

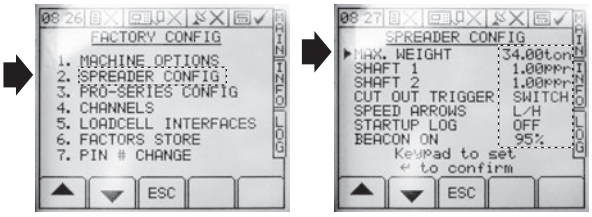
1. We are continuing to adjust the options under "***Factory Configurations***".



2. Select the "***Spreader Config***" option.

   Ensure the settings match the ones shown in the image.

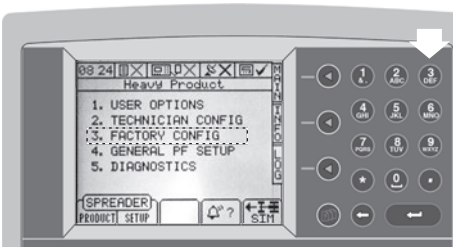
   Note: Most likely, only the "***Max. Weight***" will need to be changed to **34 ton**.



3. Press "***ESC***" to return to the "***Factory Config Menu***".

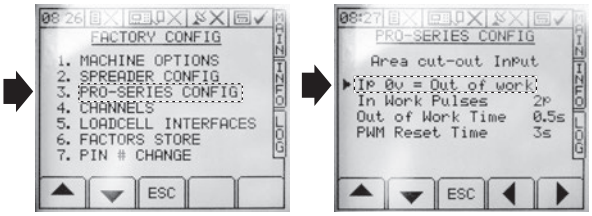
FACTORY CONFIG - "PRO-SERIES CONFIG"

1. We are continuing to adjust the options under "***Factory Configurations***".



2. Select the "***Pro-Series Config***" option.

   Ensure the "**Area cut-out Input**" is set to "***Out of work***".



3. Press "***ESC***" to return to the "***Factory Config Menu***".

FACTORY CONFIG - "CHANNELS"

1. We are continuing to adjust the options under "***Factory Configurations***".

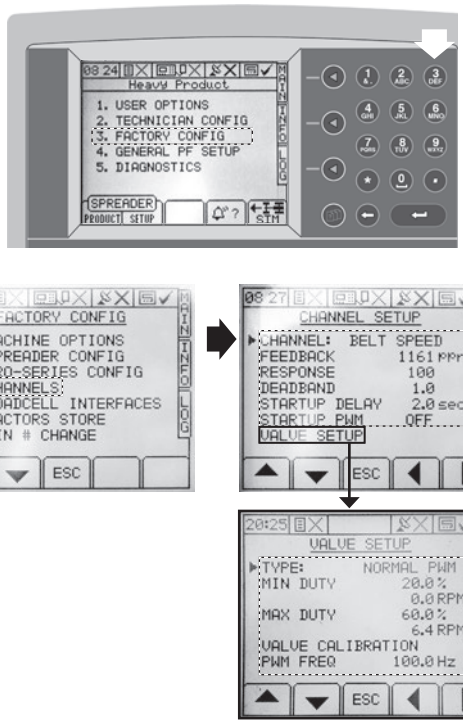
2. Select the "***Channels***" option. Ensure the belt speed channel is setup with the following settings:

   Feedback = 1161 ppr
   Response = 100
   Deadband = 1.0
   Startup Delay = 2.0 sec
   Startup PWM = OFF

3. Select the "***Valve Setup***" option at the bottom of the screen and set the valve options to the following

   Type = Normal PWM
   Min Duty = 20.0%
   0 RPM
   Max Duty = 60.0%
   6.4 RPM
   PWM FREQ = 100.0 HZ

4. Press "***ESC***" to return to the "***Factory Config Menu***".



FACTORY CONFIG - "LOADCELL INTERFACES"

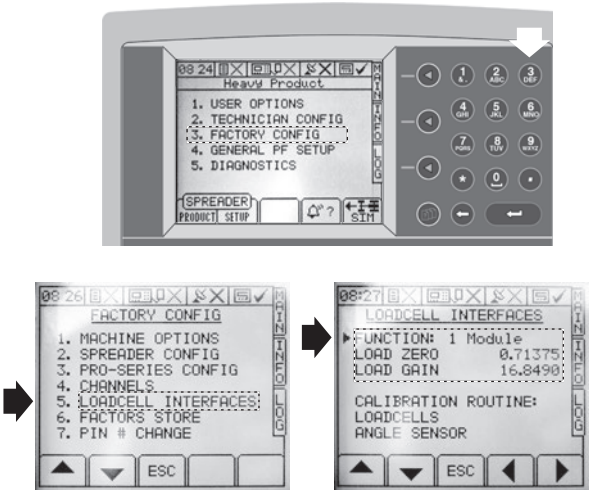
1. We are finishing adjustments to the options under "***Factory Configurations***".

2. Select the "***Loadcell Interfaces***" option.

   Ensure the Loadcell Interface is setup with the following settings:

   Function: 1 Module
   Load Zero = 0.71375
   Load Gain = 16.8490

3. Return to the main "***Options Menu***".



NT8000i Control Module Settings

GENERAL PF SETUP

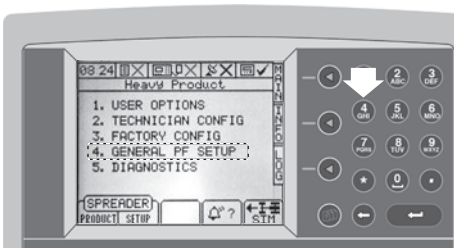
1. Select the "***General PF Setup***" option.

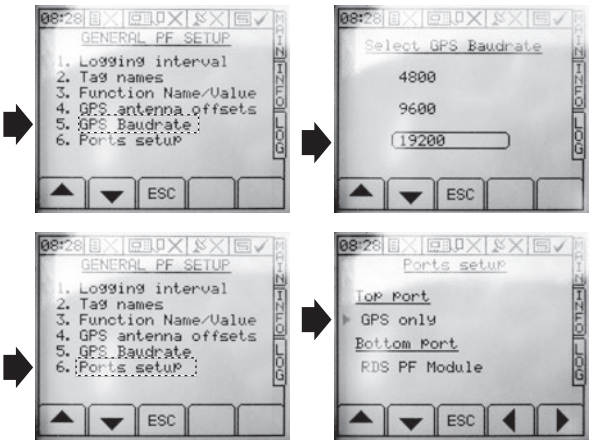
2. Select the "***GPS Baudrate***" option and ensure it is set to "**19200**".

3. Return to the "***General PF Setup***" menu & select the "***Ports setup***" option.

   Ensure the Top port is set to "***GPS only***"

4. Return to the main "***Options Menu***".
   (Hit the "***ESC***" key)





SET UP PRODUCTS

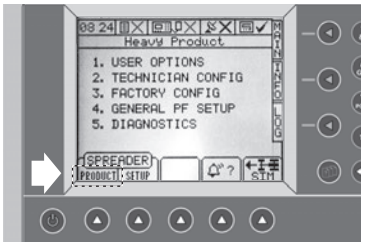
1. Finally, we want to setup the Product list accordingly. From the "***Options Menu***" select the "***Product***" option on the bottom left.

2. Select the "***Light Product***" option. Ensure the Light Product option is setup with the following settings:
   Rate = 2.0 t/ac
   'T' Factor = .640 t/rev

3. Select the "***Medium Product***" option. Ensure the Medium Product option is setup with the following settings:
   Rate = 8.0 t/ac
   'T' Factor = 1.5640 t/rev

4. Select the "***Heavy Product***" option. Ensure the Heavy Product option is setup with the following settings:
   Rate = 10.0 t/ac
   'T' Factor = 2 t/rev

5. Return to the "***Main Screen***" & power off the Control Module.



ALARMS SETUP

To set a "**Beater RPM**" Alarm to inform you of Beater/ Driveline issues or a 'Min Hopper Weight' Alarm to inform you that you've reached the end of your load.

1. Press  to select the 'Setup' Menu.
2. Select the "**ALARMS SETUP**" button  at the base of the screen.
3. Ensure **BEATER 2 RPM** Alarm is always set to **0 RPM**. The spreader will not switch into "work position" if these values are not set to 0.