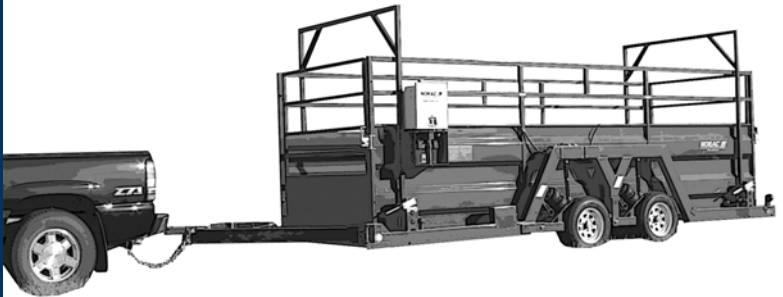




Mobile Group Animal Scale



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Reorder P/N: 42733 Rev D

NOTICE

NORAC Systems International Inc. reserves the right to improve products and their specifications without notice and without the requirement to update products sold previously. Every effort has been made to ensure the accuracy of the information contained in this manual. The technical information in this manual was reviewed at the time of approval for publication.

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Introduction

Congratulations on your purchase of a *NORAC* Digital Mobile Group Animal Scale using ONBOARD™ technology. This system is manufactured with top quality components and is engineered using the latest technology to provide operating features and reliability unmatched for years to come.

Please take the time to read this manual completely through before attempting to use the system. Although the Mobile Group Animal Scale has been designed for easy set up and use, a thorough understanding of this manual will ensure that you receive the maximum benefit from the system.

If you have any questions or comments please contact *NORAC*:

Safety Notice

Operator Safety

Warning!

This trailer is not intended for the transportation of livestock or any other goods. Any addition of weight to the scale or trailer in transport mode may cause premature component failure and voids the Norac warranty.

Always be certain when lowering the scale that everyone is clear of the scale and any moving parts.

Use two hands when gripping the lift handle to raise or lower the scale.

Be sure the gates are latched or tied inward before transporting the scale.

Ensure all three hitch lock pins are installed and the suspension stops are in the transport position before moving the scale.

Important

Animal Safety

Animal safety is a very serious issue and must be observed when handling any type of animal. The scale surface may become slippery during use; a build-up of manure on the scale may reduce traction. It is recommended that you take any necessary precautions to maintain an acceptable level of animal footing.

Description

The Digital Mobile Multiple Animal Scale is an agricultural implement consisting of a trailer with air ride suspension and swing out hitch, sheeted animal cage suspended by four S-type load cells through a cam style ONBOARD™ scale system, and weigh center. In transport mode, the scale system is locked down, protecting the load cells from damage during transport. To convert to weigh mode, the entire trailer is lowered to the ground, the hitch is split and swung outward, and the scale is raised to the weigh mode using a lever and cam system. The weigh center contains the digital indicator and ticket printer. To convert back to transport mode, the process is reversed (lower the scale, swing hitch inward and lock, and raise the suspension using the integral air pump).

The Mobile Multiple Animal Scale can be used on any firm surface up to 7% grade (4 degree slope) and offers a low deck height (6") for easy step in.



Lifting Instructions

Lift the scale only in designated locations (see Figure 1). The scale may be lifted by forklift (ensuring the forks reach through both walls), or by 4 straps and a crane or loader. **Ensure the scale is in the transport mode (locked down – see next section) when loading and transporting the scale.** (Portable Version Shown)

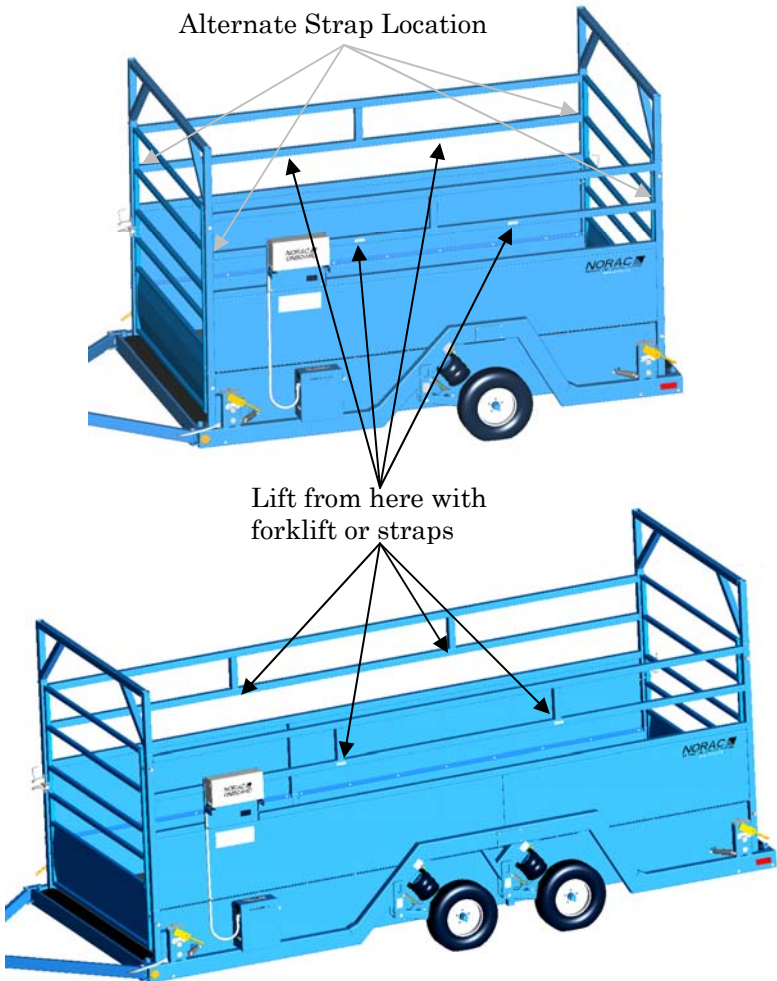


Figure 1 - Lifting Instructions

Towing Instructions

Important

Read these instructions before towing.

This trailer is not intended for the transportation of livestock or any other goods. Any addition of weight to the scale or trailer in transport mode may cause premature component failure and voids the Norac warranty.

The trailer must be in “Transport Mode” to be towed. See page 9 for converting to transport mode.

The trailer is designed to be towed level (trailer frame parallel to the ground) using a 2” ball. To achieve the level towing condition, the required hitch height of the towing vehicle must be approximately 16”. If the hitch of the towing vehicle is not in this range, use an adapter to achieve a height in this range. The hitch weight of the trailer is approximately 500lb. An equalizer hitch may be used for towing if desired (such as the EAZ-LIFT Adjustable Weight Distributing Hitch #1009).

Safety chains must be connected during towing (see Figure 2). Connect the safety chains. Cross the chains under the hitch for proper protection. Safety chain length is adjustable by inserting the quick link through any link of the chain.

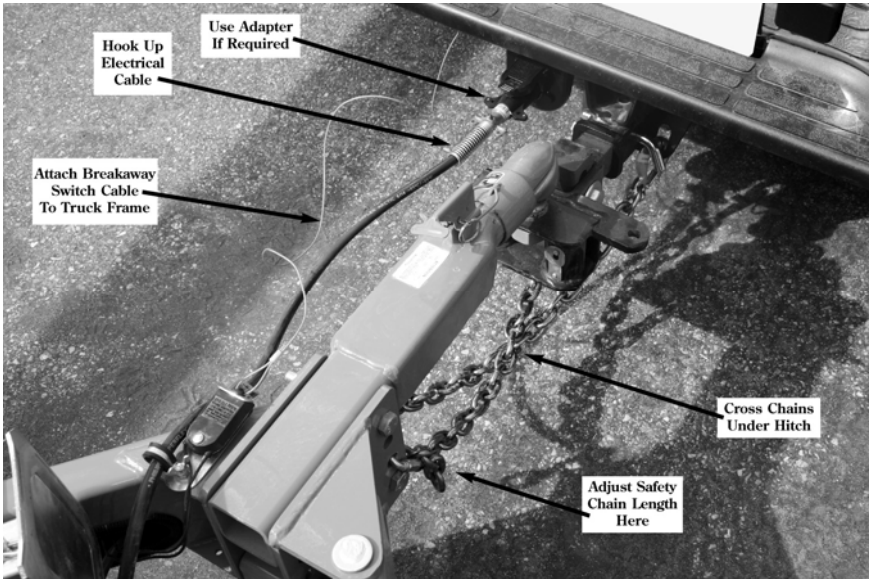


Figure 2 – Hitch Connection

The trailer must be connected electrically to the tow vehicle. Ensure that the wiring of the towing vehicle is compatible with the trailer wiring before hooking up. See the label on the hitch for the wiring code (or see page 46 for wiring diagrams). The trailer is supplied with a 6-pin connector with center pin +12V. It is crucial the wiring is correct so the trailer battery (which supplies power to the control box) is charged during transport.

⚠ Important

Improper wiring can cause brake failure.

If the trailer is to be towed at night, or if you feel the lights of the tow vehicle are obstructed by the trailer, add on lights are available. These lights plug into a 6-pin receptacle located on the rear of the battery box and attach magnetically to the trailer frame.

The trailer is equipped with electric brakes. **The brakes must be synchronized with the tow vehicle brakes before towing.** See page 39 for procedures. The breakaway switch for the electric brakes must be connected during towing. This switch activates the trailer brakes in the unlikely event of trailer separation from the tow vehicle. The metal cable must be attached to a point on the tow vehicle other than the primary connection point.

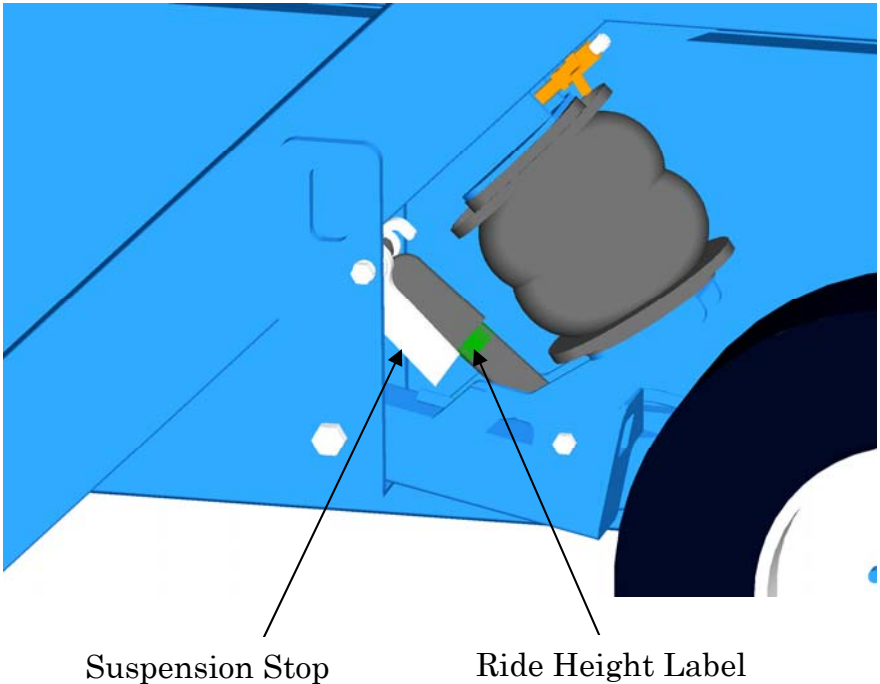
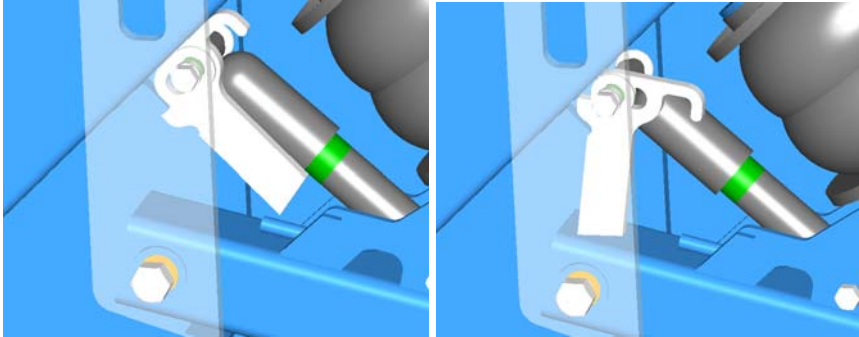


Figure 3 - Ride Height

The trailer is designed to be towed at a ride height of approximately 8 inches. A ride height label is attached to every shock absorber to visually confirm the ride height. After the trailer is hooked up to the tow vehicle, check all the ride height labels to ensure proper air bag inflation. Add or remove air as necessary.

Suspension stops (one on each axle of the trailer) are supplied to prevent the trailer from dropping to the ground in the event of an air system failure. These stops must be in the transport position during towing.



Transport Mode

Weigh Mode

Figure 4 – Suspension Stop

⚠ Warning!

The Suspension Travel Limiter is not to be used as a means of transporting the trailer. It is only to be used to as a safety device, allowing removal of the trailer from the roadway in the event of an air system failure.

Switching Between Modes

Converting to Weigh Mode

1. Park the trailer in as level a location as possible. The scale will weigh properly on a slope up to 4 degrees (approximately 7%). Ensure there are no obstructions under the deck that would affect weighing accuracy.
2. Turn the power switch located on the instrument panel to the ON position. If the level lamp does not illuminate to indicate that the unit is level, you may not be able to weigh when the trailer is lowered. Either move the trailer to another more level location, or ensure you have enough steel or wood shims to adequately level the scale.
3. With the drop leg retracted extend the jack until it begins lifting up on the trailer hitch.
4. Disconnect the trailer from the truck hitch and unplug all wiring. Move the truck clear of the trailer.
5. Using the hitch jack, lower the trailer hitch to the ground.
6. Flip the suspension stops (on on each axle of the trailer) into the weigh position (see Figure 4). Trailer will not fully lower to ground with stops in transport position.
7. Ensure the Dump valve located on the Battery box is closed and open all valves located directly above the air bags.
8. Slowly open the dump valve to empty the air from the trailer suspension. The trailer will lower to the ground.

9. Inspect all four corners of the scale. Although the scale will weigh properly up to four degrees off level, individual corners of the scale should not be allowed to teeter. If any of the corners are not contacting the ground, either move the trailer to a more level location or do the following:
10. Close the dump valve and turn on the air pump to slightly raise the trailer. Once the trailer frame has lifted sufficiently, turn off the pump. (NOTE: if the air pump is not functioning, the trailer can be raised using the auxiliary fill directly below the dump valve.)
11. Place shims directly under the base frame, under the load cell stands, to prevent teetering (see Figure 5).
12. Open the dump valves to lower the trailer onto the ground and shims.

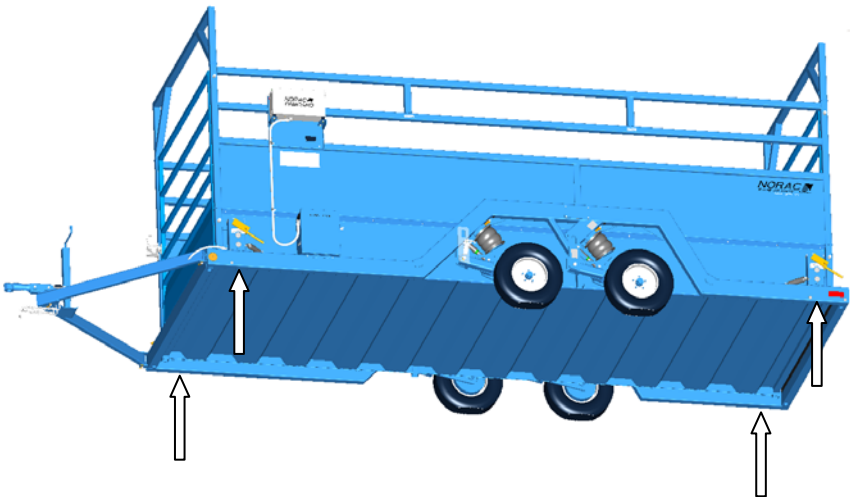


Figure 5 – Shimming Locations

13. Unpin the hitch and swing both hitch halves clear.
NOTE: The hitch sections can. To remove the hitch, remove the pins from the trailer end of the hitch arms, and pull all wiring through the driver's hitch tube.

14. **USING BOTH HANDS**, raise the platform (rotate cam handle clockwise) to enable the scale (see **Figure 6**).

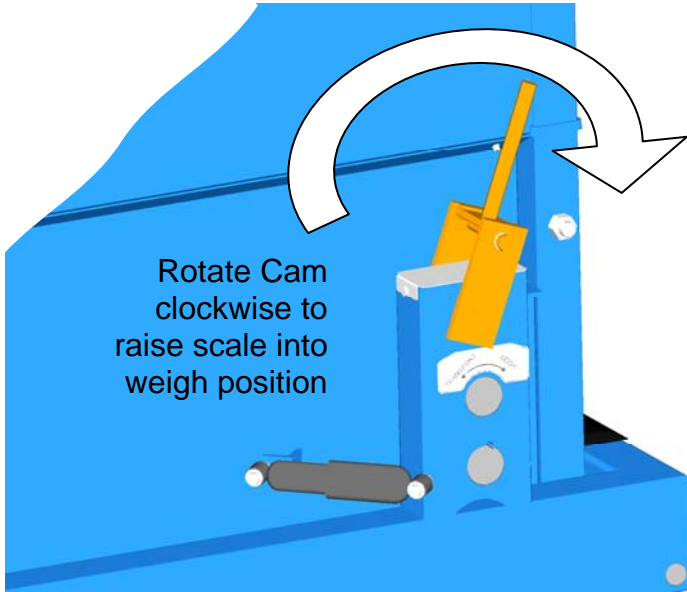


Figure 6 - Scale Lift

! Warning!

The lift mechanism is an over center cam style lift and lock. If not disturbed, the scale will remain “locked” in the up (weigh) position. Always use two hands when raising or lowering the scale.

15. Ensure the power switch located on the instrument panel is in the ON position. If the level lamp does not indicate that the unit is level, shim the scale to level using appropriate metal or wood shims (see step 9 above).

16. The weigh indicator should be powered up. The readout of GROSS weight on the indicator should be near zero (within four percent of the scale capacity). If it is not, ensure the scale is fully lifted, and that there is no debris on or under the scale.

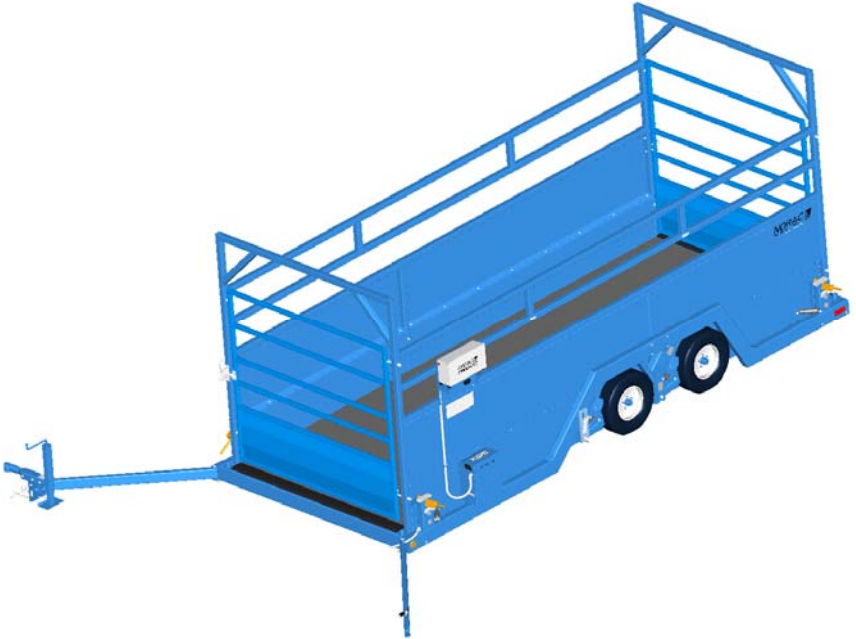


Figure 7 – Trailer and Scale in Weigh Mode

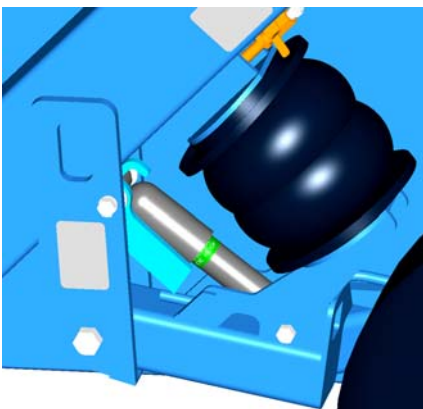
Converting to Transport Mode

1. Turn OFF the power switch located on the instrument panel. Close and latch the weight center cover.
2. **USING BOTH HANDS**, lower the platform (rotate the cam handles counter clockwise) to disengage the scale. Ensure the handles are in the fully locked position.

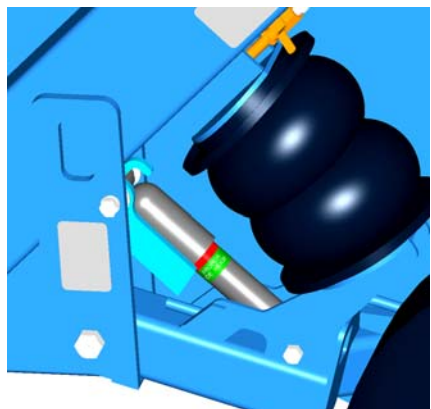
! Warning!

The lift mechanism is an over center cam style lift and lock. If not disturbed, the scale will remain “locked” in the down (transport) position. Always use two hands when raising or lowering the scale.

3. Swing the hitch halves together and pin. *Ensure the hitch pins have the safety pins installed.*
4. Add air to the trailer suspension so that the trailer frame rises evenly off the ground to the correct ride height of approximately 8 inches (as indicated by the ride height labels on the shock absorbers). Use either compressor on trailer or a remote compressor connected to the auxiliary air fill.

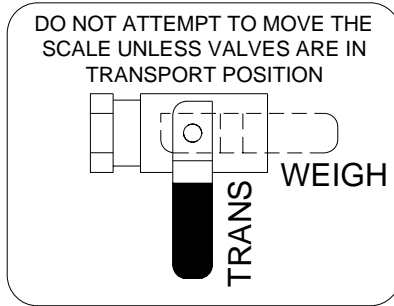


Proper Ride Height

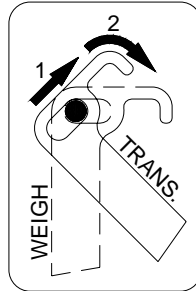


Over Inflated

5. Close all the air valves. During trailer towing, all valves **MUST** be closed. **⚠ Important** After connecting to the tow vehicle you must operate the valves again. (See next page)



6. Flip the suspension stops into the transport position.



7. Extend the jack so the trailer hitch rises off the ground.
8. Position the truck near the trailer hitch.
9. Connect the trailer to the truck and connect all wiring. **IMPORTANT: CONNECT SAFETY CHAINS.** Connect equalizer hitch if desired.
10. Retract the jack.
11. Recheck the ride height of the trailer and adjust as indicated on the ride height labels on the shock absorbers. (See page 13)

Important

For Tandem Axle Scales, once the scale is connected to the tow vehicle and the ride height has been set, with the dump valve closed, open the valve on the front and rear axle to allow the pressure to equalize. Repeat for each side of the trailer. Close the valve before transporting the scale.

Warning!

Do not move the vehicle until the scale is in the locked transport position, all air valves are closed, the jack is retracted and the drop leg pin is installed, the suspension stops are in transport position, and the safety chains are attached.



Figure 8 – Trailer and Scale in Transport Mode

NORAC Weigh Center Operation

The NORAC Weigh Center houses the M2000 indicator, circuit board and ticket printer. Figure 9 shows the layout of the control box. Figure 10 shows a close up of the M2000 indicator.

The control box is powered by a deep cycle battery located in the battery box mounted to the trailer frame. This battery is normally charged during towing, however, if the battery is low charge it using a trickle charger.

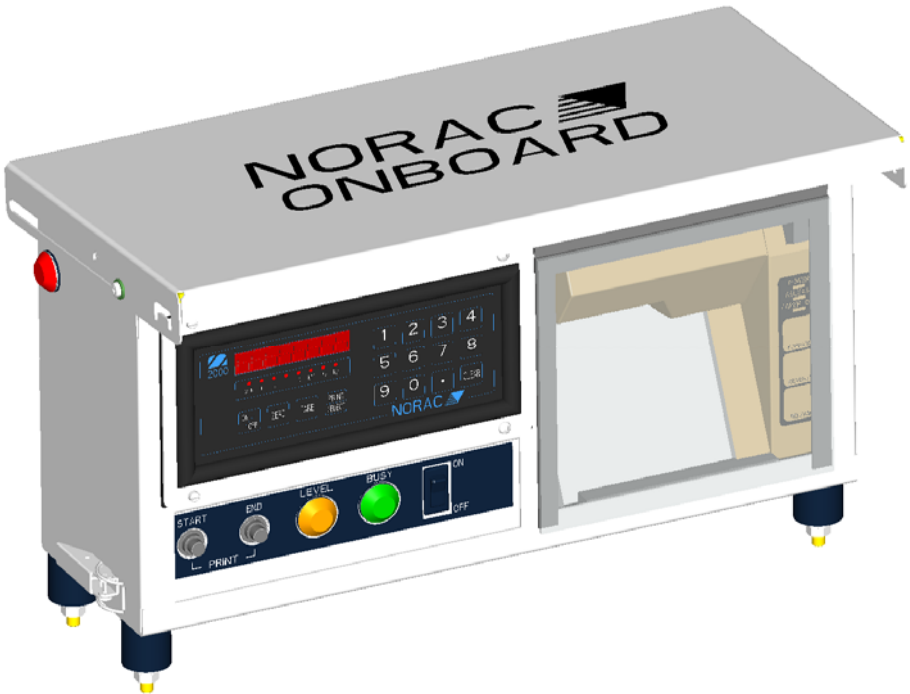


Figure 9 – Weigh Center

Important

Note: The control box should be given at least 15 minutes to warm up in cold weather before using.

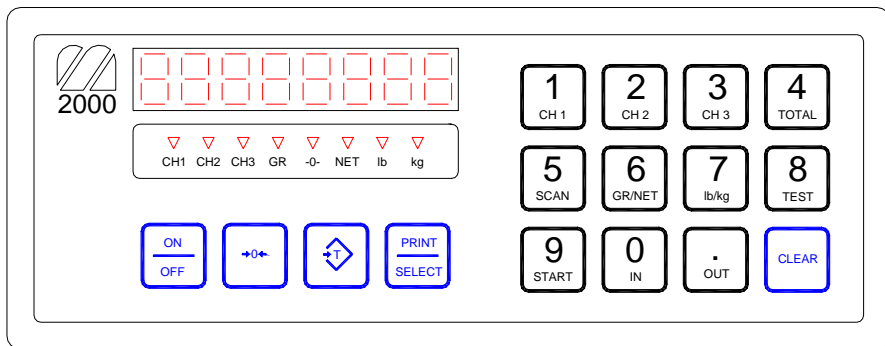
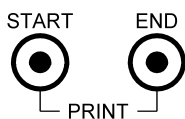


Figure 10 – M2000 Indicator

Throughout this section, you will be asked to press the start or end buttons, enter keystrokes into the indicator, or read the display. At times, you must also recognize the mode in which the unit is operating. The mode of the indicator is indicated by a series of small lights below the display.



A description of the important keys and buttons are as follows:



Weigh Center [**START**] and [**END**] buttons.



Indicator [**ZERO**] Key



Indicator [**TARE**] Key



Indicator [**PRINT/SELECT**] Key

Indicator Settings

Units

To obtain the desired units press;



until the desired *MODE* LED is on.

Eg. – Kilograms



Date and Time

The M2000 has a built-in time and date clock that is year 2000 compliant and automatically adjusts for leap years. The real-time clock will run even if power is removed from the indicator. There is a battery inside the indicator that will keep the clock running continuously while there is no power to the indicator.

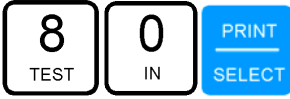


Important

You do not have to be in calibration mode to change the time and date.

Setting Time

1. From the numeric keypad enter



2. Key in the time using 6 digits formatted as HHMMSS.
3. Press



to accept

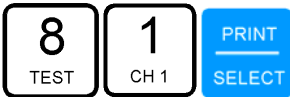
or



to cancel.

Setting Date

1. From the numeric keypad enter



2. Key in the date using 6 digits formatted as YYMMDD.
3. Press



to accept

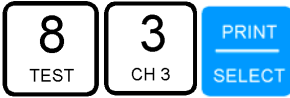
or



to cancel.

Time Mode

1. From the numeric keypad enter



2. Enter 0,1 or 2 Followed by **TARE**.



sets the time to 24hr mode.



sets the time to 12hr AM mode.



sets the time to 12hr PM mode.

Note: When you press [8][#] [**PRINT/SELECT**] the current setting for the date or time is displayed in a YY.MM.DD or HH.MM.SS format, to program the time or date simply enter the new date.

Use [8][#] [**PRINT/SELECT**] to verify the information has been entered correctly. Pressing [**PRINT/SELECT**] or [**CLEAR**] will exit the date programming mode without changing the settings.

Also note, you have an unlimited amount of time to enter the actual date keystrokes. If a mistake is made press the [**CLEAR**] button and start the process over.

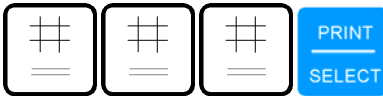
Changing ID Number

The ID number for your system is factory programmed. If you wish to change this ID number follow the instructions below:

- a) Insert the programming jumper onto the OnBoard Control Board. Cycle power, then type the following sequence on the M2000



- b) Push [START] and the indicator will prompt you to enter an id.
c) Enter the id by pressing.



(up to 6 figures)

- d) When done programming the ID remove the programming jumper and cycle power.

Note: If a mistake is made entering the id, pressing [CLEAR] will exit id programming mode. Press [START] again to enter the correct number.

⚠ Important Programming the id sets the system to return to the default 'single weigh mode' operation. Refer to the next section for details on setting the mode.

Please contact your dealer and request a programming jumper if you require an ID number change.

Operating Modes

The NORAC Weigh Center operates in two modes: single weigh mode and batch weigh mode.

Single Weigh Mode is a simple mode that allows only independent weighments. Averaging over a number of weighments is not available in this mode. Entering a shrink value is not available in this mode.

Batch Weigh Mode is a mode with more functionality. It allows average weight calculation over numerous weighments, and shrink values may be entered.

To change the mode, enter the following keystrokes into the M2000:



The M2000 will then prompt 'CONF! 9' on the display. To function in single weigh mode enter the following keystrokes:



To function in batch weigh mode enter the following keystrokes:



Single Weigh Mode Operation Instructions

1. Turn the switch located on the instrument panel to the ON position. Insert your ticket into the ticket printer and press the [FORWARD] button on the printer to secure the paper. When the system is ready to use the green LED on the front panel will go dark.
2. If the indicator is not reading zero, press



to re-zero the scale.

3. Load the scale. Push

START



once.

While the weight reading stabilizes, the CH1 light on the indicator and the LED's mounted on the sides of the weigh center will flash. Once the weight reading has stabilized, the CH1 light will turn on solid, the LED's will go dark, and the printer will print the current time and date, and the gross weight on the scale. The animals can then be released from the scale.

Important

The unit will not print while there is motion on the scale (CH1 light flashing).

4. The following is a sample of a ticket.

Date: Jun 16, 2008

Time: 11:05

2617 kg GROSS

The above ticket will print in either kilograms (kg) or pounds (lb) depending on your system settings.

5. Repeat steps 2-5 to continue weighing as necessary.

Important

Note: Pressing [END] at any time when using Single Weigh Mode will REPRINT the last ticket.

Last Ticket Reprint Feature

At any time between the end of the previous ticket and the start of a new one, the previous ticket can be reprinted. This is accomplished by pressing the [END] button.

The ticket will look identical to the previously printed ticket except for the ****REPRINT**** banner at top and bottom. Note that if the power to the control box is turned off, last ticket information will be lost and not available for reprint.

Batch Weigh Operation Instructions

Action Summary

1. Turn on the indicator and insert at ticket into the printer. Press **[FORWARD]** to secure the paper.

2. Press to re-zero the scale if necessary.

3. Load the scale and press
4. When the weight reading has stabilized the indicator will prompt "HEAD". Key in the number of animals on the scale.



5. Unload the Scale and repeat Steps 2-4 as needed.

6. At any point between drafts, press to see a running total of the batch.

7. At any point between drafts you can enter the Shrink value. "SHRINK" is entered including one decimal point up to 9.9%



8. To complete the ticket press

9. You can reprint the ticket by pressing again.

Detailed Batch Weighing Instructions

The following is a detailed step by step procedure for operating the Group Animal Scale weigh center.

1. Turn the switch located on the instrument panel to the ON position. Insert your ticket into the ticket printer and press the [FORWARD] button on the printer to secure the paper. When the system is ready to use the green LED on the front panel will go dark.

Important

When powered up, the number of head defaults to 0 and the shrink value defaults to the last entered shrink. When no shrink value is entered, the last entered shrink value is used.

2. If the indicator is not reading zero, press



to re-zero the scale.

START



3. Load the scale and press

While the weight reading stabilizes, the CH1 light on the indicator and the red and green LED's mounted on the weigh center will flash. Once the weight reading has stabilized you will be prompted to enter the number of head. Enter the number of head using the indicator keypad where ## is the number of head in the current batch.



Important

The unit will not print while there is motion on the scale (CH1 light flashing).

If the number of head has not been entered and the system has stopped prompting you to enter the number of head, you will need to press [START] again. You will then be prompted to enter the number of head.

If a mistake is made entering the number of head, pressing [CLEAR] will abort the enter number of head phase. Press [START] to enter the number of head process again.

Once the weight reading has stabilized, the CH1 light will turn on solid and the LED's will go dark. The captured weight reading will be frozen on the indicator for 6 seconds and when there is no motion. The frozen weight can be removed from the display by pressing [CLEAR]. During this time the printer will print the current time and date, and the gross weight on the scale. *The animals can be released from the scale as soon as the weight is captured and the green LED's go out.*



Pressing the [PRINT/SELECT] button in between drafts will show the current total of all completed batches. This total will remain on the display until [CLEAR] is pushed or the next batch is started.

4. Unload the Scale and Repeat steps 2-3 to continue weighing Batches as desired. Note that the maximum number of batches supported by the reprint feature is 15 see “Last Ticket Reprint Feature” on page 29

5. When you have completed weighing batches (or at any time before totaling you can enter a shrink value to be applied to this batch of weights. To enter a shrink value type in the following sequence on the indicator keypad, where xx is the desired shrink percentage in tenths of a percent



For example, a shrink of 2.0% enter:



6. To complete and total the ticket, press the [END] button. The ticket will be completed and printed out. The following is a sample of a ticket.

Date: Jun 16, 2008		Time: 13:05
# Head	Total	Average
3	3000 kg	1000 kg
3	3000 kg	1000 kg
3	3000 kg	1000 kg
Gross Batch Total		
9	9000 kg	1000 kg
Net Batch Total		
9	8820 kg	980 kg
Shrink Value 2.0 %		

The above ticket will print in either Kilograms (kgs) or Pounds (lbs) depending on your system settings.

Last Ticket Reprint Feature

At any time between the end of the previous ticket and the start of a new one, the previous ticket can be reprinted. This is accomplished by pressing the **[END]** button.

The ticket will look identical to the previously printed ticket except for the ****REPRINT**** banner at top and bottom. Note that if the power to the control box is turned off, last ticket information will be lost and not available for reprint.

In batch mode the number of drafts that can be stored is limited to 15. If a particular batch exceeds this number, the ticket reprinted will not contain the individual draft weights. It will, however, still print the gross and net totals.

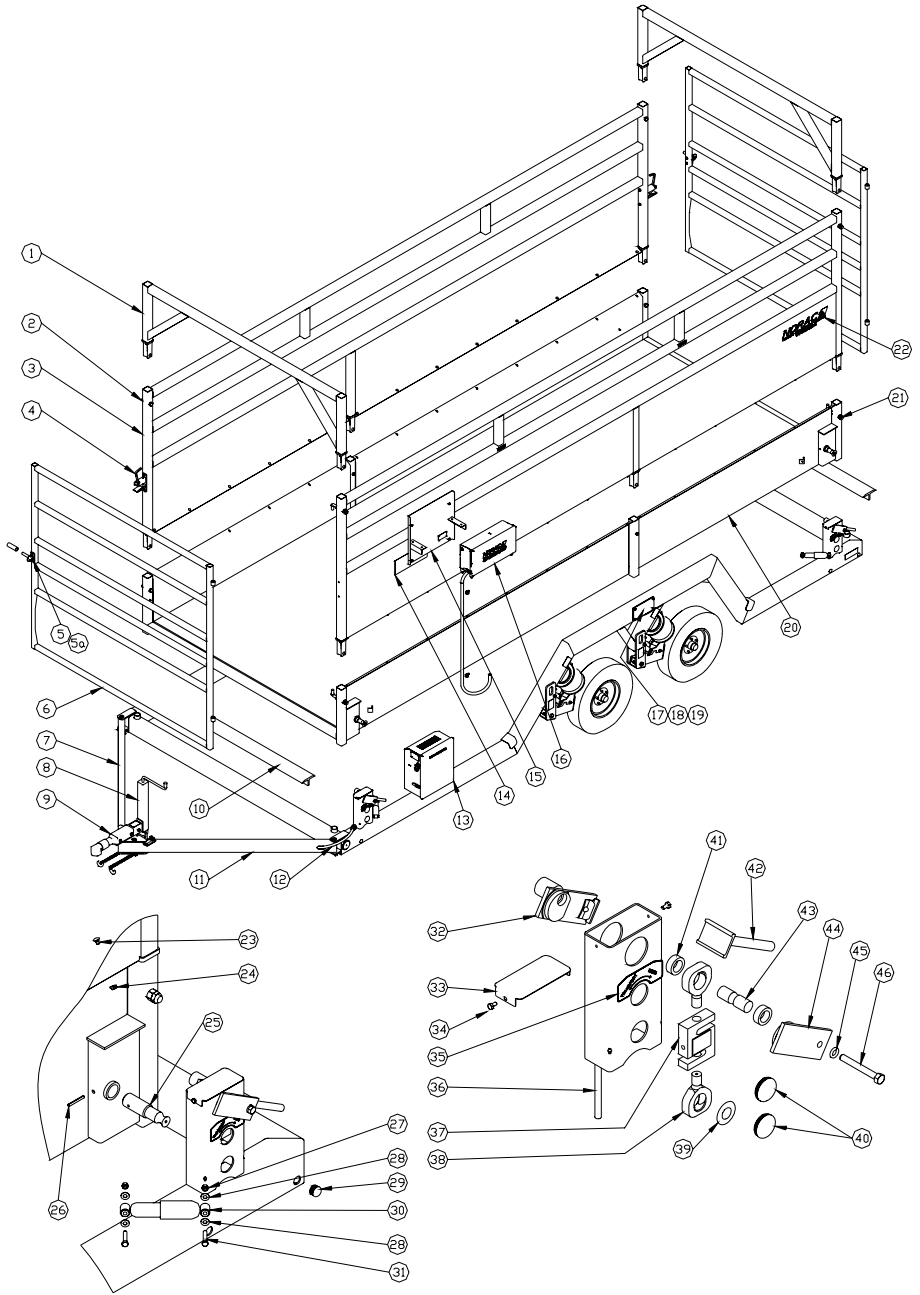
Level Indication

Located on the weigh center is a Level indication light. When the scale is operated within the 7% limit the light will be illuminated. In the event the scale is beyond the limit the Level light will turn off and the Indicator will display **"OFF LEVEL"**. No functions of the indicator will be active until the off level condition of corrected.

Important

Animal safety is a very serious issue and must be observed when handling any type of animal. The scale surface may become slippery during use; a build-up of manure on the scale may reduce traction. It is recommended that you take any necessary precautions to maintain an acceptable level of animal footing.

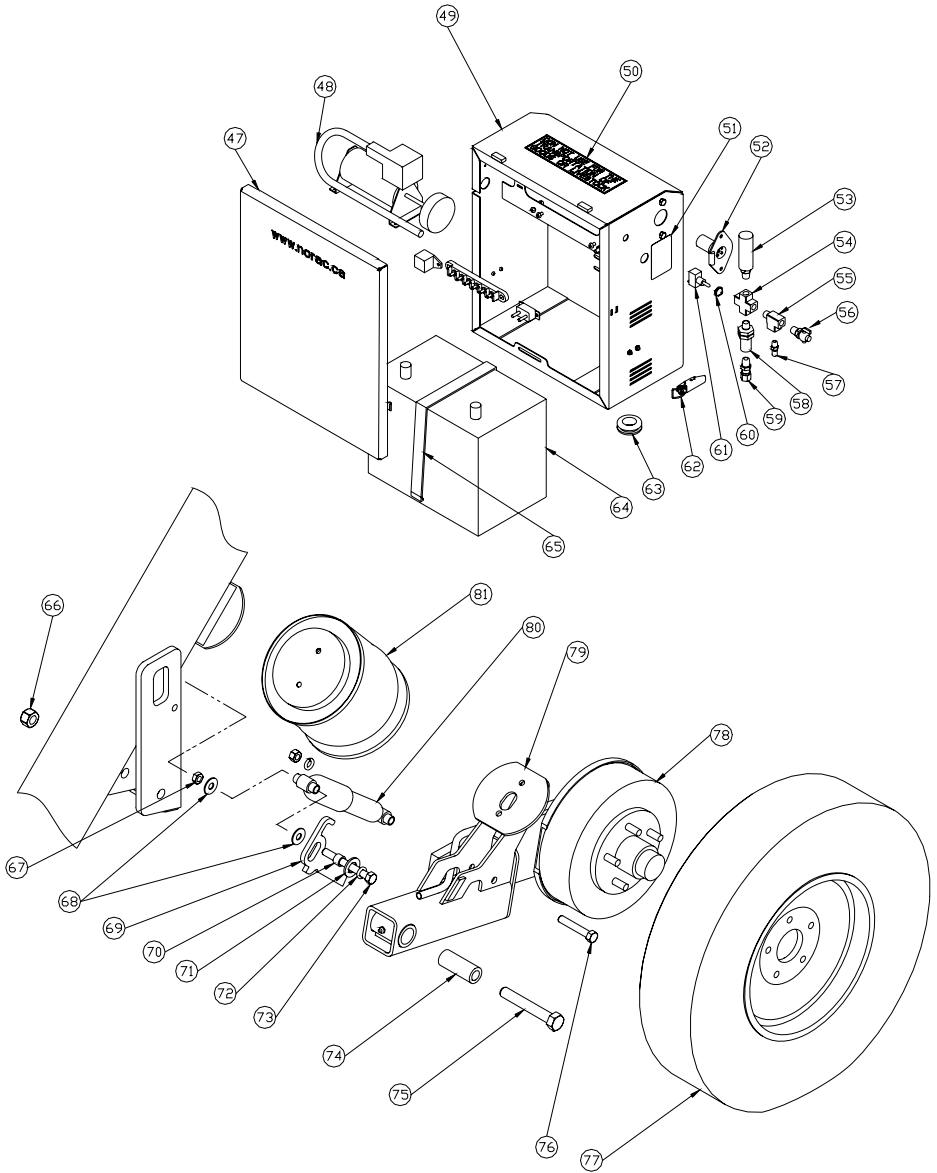
Parts List



Parts List (Models MAMS8-13 & MASM8-18)

Item #	Part #	Description
1	42812	Cage Cross-member
2	102173	Bolt 3/4x3-1/2
	100872	Locknut Nylon 3/4
3	42811	Cage Wall 13'
	42831	Cage Wall 18'
4	41-05-4	Cattle Scale Cage Latch
5	41111	Latch Pin Assembly Removable
5a	105333	Hose Plastic EVA 3/4 " x 3" long
6	106056	Gate Short Sheeted
7	42817	Hitch Member Left
8	42803	Jack w/ Drop Leg and Mount
9	42801	Hitch Coupler Mobile MAS
10	31115	Scale T-belting (83" width)
11	42818	Hitch Member Right
12	42820	Standard Hitch Cable w/Connectors
13	42809	Battery Box w/ compressor and wiring
14	105280	Label Basic Operating Instructions
15	42829	Indicator Mounting Bracket
16	42770M	Weigh Center w/ Indicator and cables
17	42836	Cover Plate Scale Frame/J-box
18	105649	Foam Gasket J-box
19	SAJ4SS	Scale Junction Box 4 Cell SS
20	42810	Cage Floor MAS8-13
	42830	Cage Floor MAS8-18
21	104468	Bolt Hook Lip Gate 3/4x6
	104473	Jam nut 3/4
	102134	Lockwasher 3/4
22	104074	Label Norac Silver 20"
23	106087	Bolt Carriage 5/16x1/2
24	106083	Nut 5/16 Flanged Serrated
25	42833	Lower Notched Load Cell Pin
26	104877	Pin Spring Slotted 1/4x2-1/4
27	100851	Nut 3/8 SS
28	100929	Flat washer 3/8 SS SAE

29	105439	Plug Plastic Round 1-1/8"
30	42843	Scale Damper Assembly w/Bushings
31	100613	Bolt 3/8x2
32	42575	Cam with Lockdown
33	106082	Load Cell Cam Stand Cover SS
34	100667	Bolt 1/4x1/2
35	105275	Label MASM Transport Weigh Mode
36	105213	Hose Grip Tight ¼ - 6.5" Long
37	82856	Load Cell S-Type 10K
38	42256	Eyebolt Machined 5K/10K
39	42633	Lower Load Cell Retainer
40	42694	Plug Plastic Round 2"
41	42675	Spacer Upper Notched Pin
42	42825	Cam Handle
43	42832	Upper Notched Load Cell Pin
44	42574	Cam Without Lockdown
45	100948	Lockwasher ½
46	100599	Bolt 1/2x4
	31102S-S132	Scale Cable Female MS Conn 132"



Item #	Part #	Description
47	42808	Door Assembly Battery Box
48	104823	Air Compressor 12V
49	42807	Battery Housing

Item #	Part #	Description
50	104948	Label "Not for Transportation"
51	104310	Label Hitch Plug Wiring
52	104408	6 Way Round Trailer Receptacle
53	106038	Relief Valve Air 150 PSI
54	106010	4FP Brass Cross
55	104748	Brass Tee Forger 4FP
56	103983	Valve Brass Drain Cock
57	104843	Valve Air Tank w/ Core and Cap
58	106011	Fitting Brass 4FP Terminal Bolt
59	106012	Fitting Brass 4MP to ¼ Synflex
60	102178	Switch Seal Hex
61	104830	Switch ON/OFF
62	106103	Latch SS Pull Up
63	106017	Grommet 1-3/8 x 1/4
64	104763	Battery Deep Cycle Marine
65	106016	Strap 1" with Clasp
66	100872	Nut Lock Nylon ¾
67	104335	Nut Jam ½
68	102340	Washer 7/16 USS
69	42826	Suspension Stop Arm
70	42837	Bushing Suspension Stop
71	100932	Washer ¾ SAE
72	100948	Lock washer ½
73	100604	Bolt ½ x4-1/2
74	42804	Bushing Pivot Axle
75	100576	Bolt ¾ x 5
76	100598	Bolt ½ x 3
77	106008	Tire and Rim 205/75/R13
78	Page 42	Dexter 3500# Axle w/ 10x2.5 Brakes
79	42805	Axle Arm Left
	42806	Axle Arm Right
80	42844	Suspension Shock Absorber
81	106001	Air Spring 2B8-250
	105920	Terminal Block 6 Pole
	104828	Relay Headlight 12v
	103537	Circuit Breaker 12V 30 Amp

Maintenance

Maintenance Schedule

First Week

1. Check torque on all wheel nuts (see page 41).

Weekly

1. Axle Pivot Locations.
2. Check entire scale for build-up of debris. Remove any debris found on, under or around the scale. Rubber T-belting at both ends of the scale are removable to make clean out easier. To remove T-belting, unhook the stretch cord that hooks into the corner tube of the cage.
3. Check for dirt and debris in the load cell stands and clean accordingly.
4. Check all external cables and conduit for damage.

First Month (in addition to weekly maintenance)

1. Check torque on all wheel nuts (see page 41).
2. Adjust trailer brakes.

Monthly (in addition to weekly maintenance)

1. Charge trailer battery if necessary.
2. Tire Pressure. 45 psi./40psi. - Single /Tandem Axle

Yearly (in addition to weekly and monthly maintenance)

1. Check and grease wheel bearings (see page 41).
2. Disassemble each load cell location and grease all pins and eyebolts (see page 37).
3. Adjust trailer brakes (see page 40).
4. Check indicator level switch (see page 36).

Scale Maintenance Procedures

Cleaning Load Cell Stands

It is very important to keep any excess debris from building up in the load cell stand. Lift scale and block it up, clean any dirt out of the load cell stands through the drain holes located at the bottom of the stand.

Checking Level Switch

Place the system on a slope greater than four degrees (example – a steep approach). Alternately jack up one side of the base frame so that the scale is off level by more than four degrees. Turn on the indicator and check the display. If the indicator does not display “OFF LEVEL” you may have a faulty PCB. Consult your local scale dealer. This test should be performed in all four directions, front low, rear low, right side low and left side low.

Disassembly and Greasing

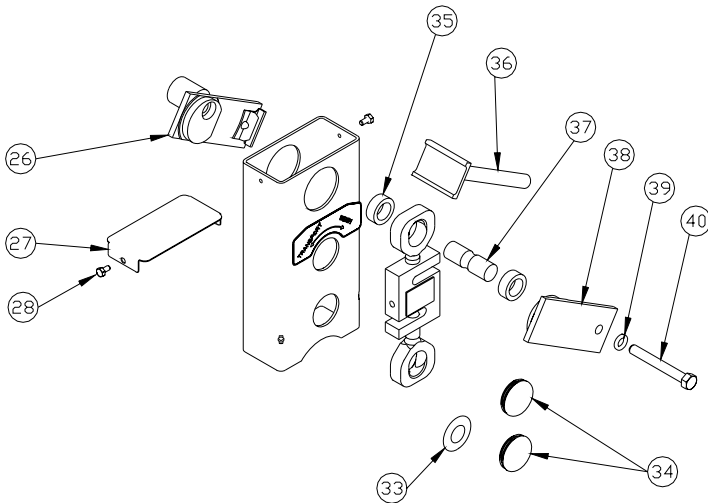
This is very important to ensure the long life of your unit. Use the parts list drawings for item numbers.

Note: Use quality high-pressure grease.

Note: Avoid bending or twisting the load cell wires.

- a Remove the cell stand cover (27).
- b Remove the plug covers (34)
- c Remove the bolt which holds together items 26, 39, 38.
- d While holding the cam handle (36), remove the outer cam (38).
- e Remove the load cell pin (37) and spacers (35). The load cell assembly will be free on top and rest against the inside of the cell stand.
- f Remove the inner cam (26).
- g Remove the lower retainer (33)
- h Grease all bearing surfaces **except where the eyebolt contacts the pin** (upper and lower pins, cams, upper and lower eyebolts).

Reassemble in reverse order as described above.



Trailer Maintenance Procedures

How to Use Your Electric Brakes Properly

Your trailer brakes are designed to work in synchronization with your tow vehicle brakes. Never use your tow vehicle or trailer brakes alone to stop the combined load.

Your brake controller must be set up according to the manufacturer's recommendations to ensure proper synchronization between the tow vehicle and the trailer. Additionally, you may have to make small adjustments occasionally to accommodate changing loads and driving conditions.

Proper synchronization of tow vehicle to trailer braking can only be accomplished by road testing. Brake lockup, grabbiness, or harshness is quite often due to the lack of synchronization between the tow vehicle and the trailer being towed, too high of a threshold voltage (over 2 volts), or under adjusted brakes.

Warning!

The following should only be performed in a safe environment such as an unpopulated road free of traffic or under controlled conditions.

Before any synchronization adjustments are made, your trailer brakes should be burnished-in by applying the brakes 20-30 times with approximately a 20 m.p.h. decrease in speed, e.g. 40 m.p.h. to 20 m.p.h. Allow ample time for brakes to cool between application. This allows the brake shoes and magnets too slightly "wear-in" to the drum surfaces.

Synchronizing Your Trailer Brakes

To ensure safe brake performance and synchronization, read the brake controller manufacturer's instructions completely before attempting any synchronization procedure.

Make several hard stops from 20 M.P.H. on a dry paved road free of sand and gravel. If the trailer brakes lock and slide, decrease the gain setting on the controller. If they do not slide, slightly increase the gain setting. Adjust the controller just to the point of impending brake lockup and wheel skid.

Note: Not all trailer brakes are capable of wheel lockup. Loading conditions, brake type, wheel and tire size can all affect whether a brake can lock. It is not generally considered desirable to lock up the brakes and slide the tires. This can cause unwanted flat spotting of the tires and could also result in a loss of control.

If the controller is applying the trailer brakes before the tow vehicle brakes, then the controller adjustments should be made so the trailer brakes come on in synchronization with the tow vehicle brakes. For proper braking performance, it is recommended that the controller be adjusted to allow the trailer brakes to come on just slightly ahead of the tow vehicle brakes. When proper synchronization is achieved there will be no sensation of the trailer “jerking” or “pushing” the tow vehicle during braking.

Brake Adjustment

Brakes should be adjusted (1) after the first 200 miles (first month) of operation when the brake shoes and drums have “seated,” (2) at 3,000 mile intervals (or yearly), (3) or as use and performance requires. The brakes should be adjusted in the following manner:

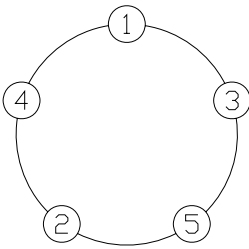
1. Jack or block the axle arm to allow free rotation of the wheel.
2. Remove the adjusting hole cover from the adjusting slot on the bottom of the brake backing plate.
3. With a screwdriver or standard adjusting tool, rotate the star wheel of the adjuster assembly to expand the brake shoes. Adjust the brake shoes out until the pressure of the linings against the drum makes the wheel very difficult to turn.
4. Then rotate the star wheel in the opposite direction until the wheel turns freely with a slight lining drag.
5. Replace the adjusting hole cover and lower the wheel to the ground.
6. Repeat the above procedure on all brakes. For best results the brakes should all be set at the same clearance.

Wheel Assembly and Torque Specification

1. Start all bolts or nuts by hand to prevent cross threading.
2. Tighten bolts or nuts in the sequence shown below.
3. The tightening of the fasteners should be done in stages. Following the recommended sequence, tighten fasteners per torque chart below.
4. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 10 miles, 25 miles, and again at 50 miles.

Wheel Torque Sequence (ft-lbs)

1st Stage	2nd Stage	3rd Stage
20-25	50-60	90-120



Bearing Adjustment

In the event the hub is removed follow this procedure for wheel bearing adjustment.

1. After placing the hub, bearings, washers, and spindle nut on the axle spindle rotate the hub assembly slowly while tightening the spindle nut to approximately 50 lbs.-ft.
2. Then loosen the spindle nut to remove the torque. Do not rotate the hub.

3. Finger tighten the spindle nut until just snug.
4. Back the spindle nut out slightly until the first castellation lines up with the cotter key hole and insert the cotter pin
5. Bend over the cotter pin legs to secure the nut.
6. The nut should be free to move with the only restraint being the cotter pin.
7. Install the dust cover and rotate the wheel to ensure the cotter key does not contact the dust cover.

Axle Parts

Axles are Dexter 3500lb, 5-bolt with 10x2- $\frac{1}{4}$ " brakes. Following are replacement parts available from Dexter.

Bearings

	Dexter Kit #	Industry Part # Cup/Cone
Inner	K71-390-00	L68111 / L68149
Outer	K71-306-00	L44610 / L44649

Description	Dexter Part #
Inner Bearing Seal	010-004-00
Magnet	K71-104-00
Brake Shoe and Lining	K71-047-00
Brake Assembly LH	023-026-00
Brake Assembly RH	023-027-00
Hub	008-247-05

Gathering Panel Attachment

Suggested Construction

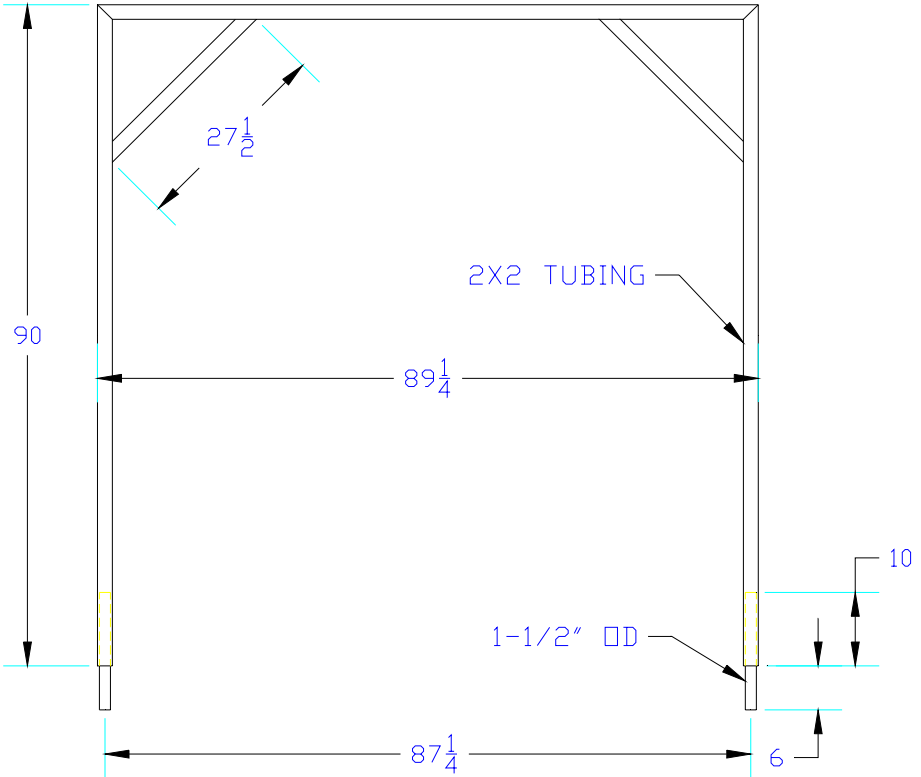


Figure 11 - Gathering Panel Frame

Building a simple framework that can be set into the provided trailer posts can accommodate mounting of most any panel. In some cases extra support of the mounting frame may be required.

Figure 11 shows the suggested construction of a framework you can build to support the type of gathering panels you have. Some gathering panels can be set directly into the corner posts located on the corners of the trailer and require only a shortened version of the

drawing above that can be set into the top of the panels. (See Figure 12) However with the wide variety of panels available we cannot provide a mounting means for all of them.

However you decide to mount you panels you must ensure the panels or framework are not attached to the scale cage and must have a clearance of 1" from any live portion of the scale. Any contact between the panels or framework and the scale can cause the weight reading to be inaccurate.

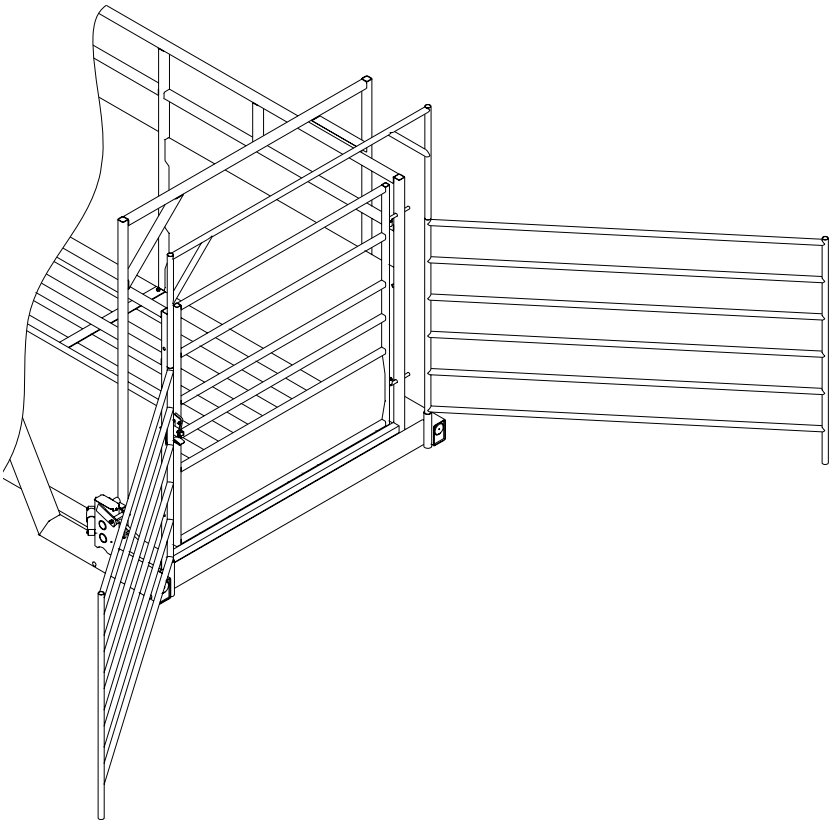


Figure 12 - Gather Panel Attachment

Gathering Panel Warranty Information

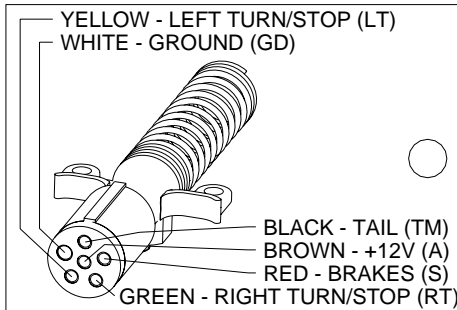
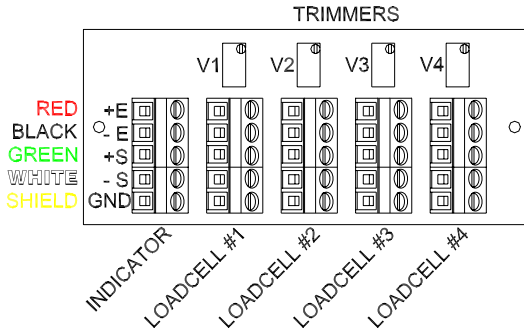
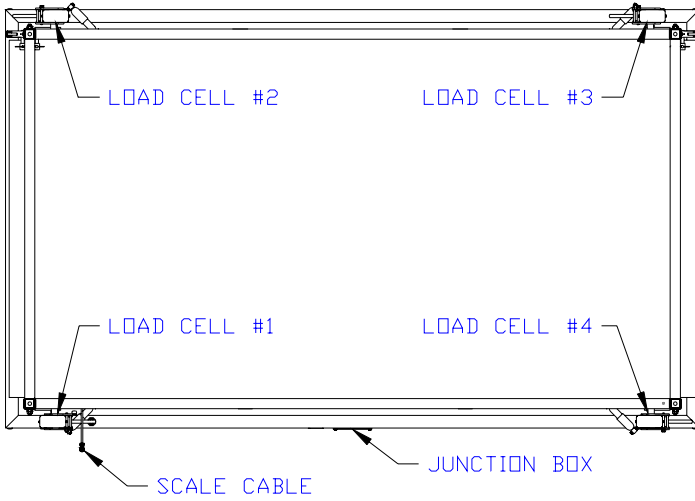
Gathering panels or handling attachments must be removed from the trailer during transport. The trailer is not intended for the transportation of goods or livestock.

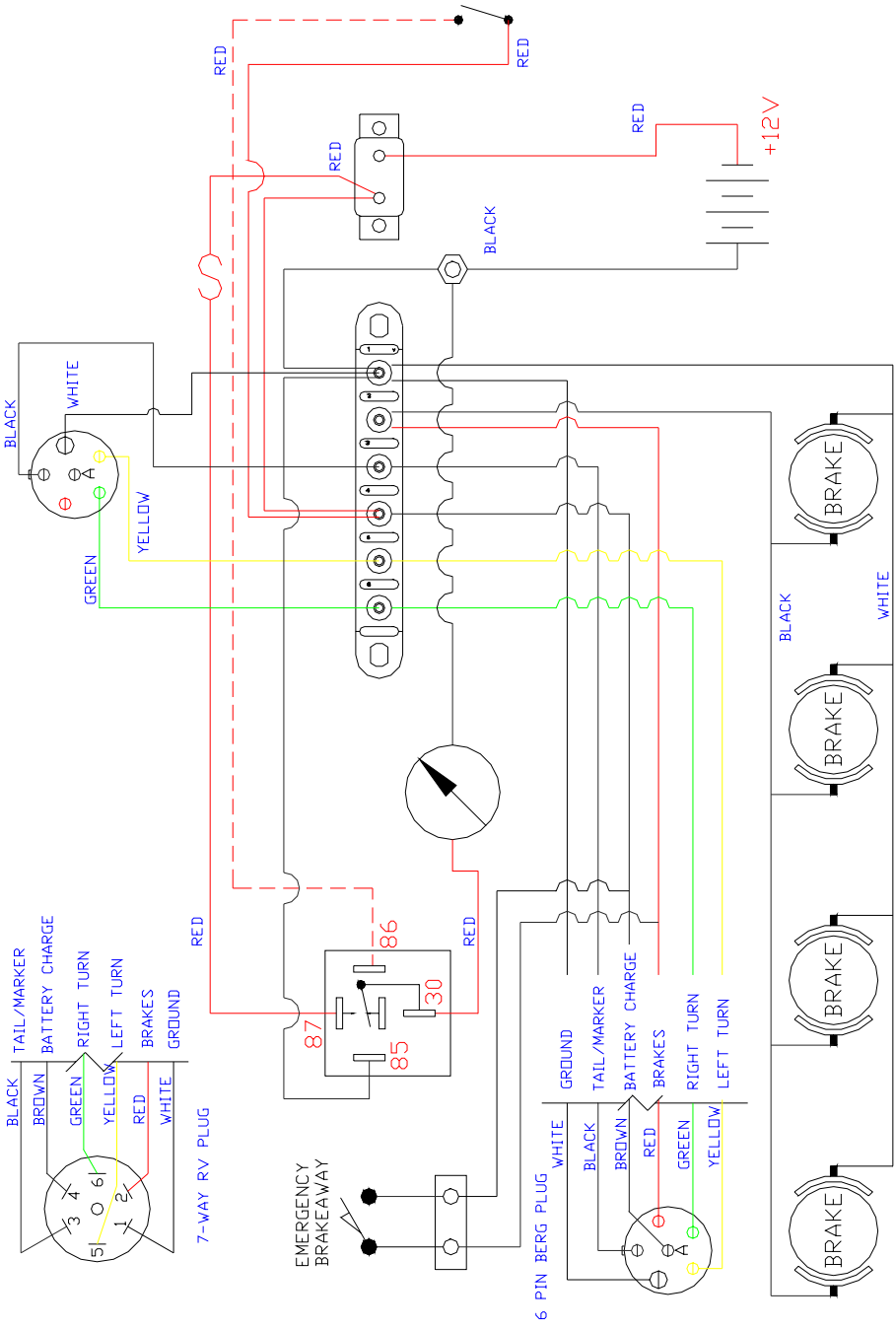
The design of the trailer only allows for 100 pounds to be added to either end of the trailer, for a **MAXIMUM** addition of 200 pounds, during transport. All attachments that will remain on the trailer must not exceed the weight limit of 100 pounds on the front and/or 100 pounds on the rear. If the total of the attachments on either the front or the rear exceeds 100 pounds the warranty will be void.

Any additions to the scale or trailer may affect the balance and towability of the trailer.

Any attachments to the trailer must be secured during transport and not interfere with any safety device or the operation scale or trailer mechanisms.

Wiring Diagrams





Trouble Shooting

Symptom	Probable Cause	Action
<p>The scale indicator will not power up.</p>	<ul style="list-style-type: none"> a) Blown in-line fuse b) Voltage is less than 11 volts. 	<ul style="list-style-type: none"> a) Replace in-line fuse, Norac part # 106130, the fuse holder is located near the battery or the indicator. b) Repair faulty electrical system. The Norac panel requires at least 11 volts to operate properly.
<p>Indicator turns off or resets in the middle of a transaction</p>	<ul style="list-style-type: none"> a) Low voltage to control panel. 	<ul style="list-style-type: none"> a) Check other electrical equipment that may be operating. Check for corrosion or damaged wiring. Measure voltage.
<p>The indicator will not come on automatically with the system power switch- it will only power up when the ON button on the indicator panel is pushed</p>	<ul style="list-style-type: none"> a) The indicator must be configured to power up automatically. 	<ul style="list-style-type: none"> a) Contact your local dealer or Norac. Only a qualified technician can perform this configuration.
<p>The level light will not illuminate and the indicator displays "OFF LEVEL"</p>	<ul style="list-style-type: none"> a) trailer is more than 4 degrees off level b) faulty tilt sensor 	<ul style="list-style-type: none"> a) return the scale to a level position. b) contact your local dealer or Norac for replacement PCB (P/N 42750T-1)

Symptom	Probable Cause	Action
The level light will not illuminate	a) the bulb is burnt out	a) replace cable (P/N 42760-01)
The system will not START or END or both	a) Weight reading is not stable enough	a) It may be too windy to get a stable weight, check the motion light on the indicator. The system can only start and end when the light is out.
The weight reading on the indicator is unstable.	a) The circuit board in the control panel may be wet or the junction box for the load cells may have moisture. b) A load cell cable may be pinched or damaged.	a) Dry any areas that are contaminated with moisture. Check for leaks and reseal. b) Contact Norac or a qualified dealer for support. Cutting the load cell cable will void the warranty. Special repair techniques are required.
The scale has a positive error when loading or a negative error when unloading	a) Mechanical binding problem on scale	a) Check for debris around or under the scale. Check each load cell location for foreign material. Check all items that run from on the scale to off the scale. Check all gates or gathering panels for contact.
The scale has a negative error when loading or a positive error when unloading.	a) Moisture is present somewhere in the electrical system.	a) Dry any areas that are contaminated with moisture. Check for leaks and reseal.

Symptom	Probable Cause	Action
Printer is not functioning – nothing is being printed at all	<p>a) Is the release light on the printer flashing? This could indicate a low voltage to the printer</p> <p>b) The print head may be jammed with paper</p> <p>c) The print head may be packed with dirt from operating in dusty conditions</p>	<p>a) The Norac system requires at least 11 volts to operate properly. Is the truck running? Your truck may need to be running to supply enough power – OR – the truck may have a faulty electrical system.</p> <p>b) Remove the print head cover and ribbon. Check for bits of paper stuck in the paper feed mechanism.</p> <p>c) Remove the print head cover and ribbon. Blow out with air. If the printer is very dirty it may require service by a qualified technician.</p>
The printer is printing unrecognizable characters	<p>a) The power supply is excessively noisy.</p> <p>b) Incorrect dip switch settings</p>	<p>a) Contact Norac, an in-line power filter may be necessary.</p> <p>b) Settings are 1,7,8 ON rest OFF</p>
The printing on the ticket is faint or hard to read.	<p>a) The printer's ink ribbon may need to be replaced.</p> <p>b) The printer head may be damaged.</p>	<p>a) Replace ribbon, Norac part # 82282-1</p> <p>b) Requires service by a qualified technician.</p>

Symptom	Probable Cause	Action
Cannot load the system to full capacity without getting “EEEEEE” on the display	a) Dead load has been added to the scale since it was calibrated	a) Contact your local scale dealer
Display reads “EEEE” or “UUUUU”	a) A load cell has become disconnected.	a) Inspect for damage and consult your local scale dealer.
Scale will not ZERO	a) Weight on scale larger than the allowable ZERO window.	a) Clean the scale deck of debris, then Zero the scale. b) A wood deck will absorb moisture. If it has been excessively damp they wood may need to dry. c) Zero Window parameter set incorrectly.

IF YOU SUSPECT THERE IS A PROBLEM INSIDE THE NORAC CONTROL PANEL THAT REQUIRES THE WEIGHTS AND MEASURES SEAL TO BE BROKEN YOU MUST CONTACT NORAC PRIOR TO BREAKING THE SEAL, OR HAVE A QUALIFIED SCALE DEALER BREAK THE SEAL.

BREAKING THE SEAL MAY VIOLATE THE WEIGHTS AND MEASURES APPROVAL OF THE SCALE.

Notes:



Size / Model # _____

Serial # _____

Date Purchased _____

Unit ID # _____

Specifications

	MASM8-13	MASM8-18
Length Overall	18'-8"	24'-5"
Length Deck	12'-9"	18'-6"
Width Overall	8'-6"	8'-6"
Width Deck	7'-5"	7'-5"
Deck Height	6"	6"
Height (Weigh)	99"	99"
Deck Covering	5/8" Recycled One Piece Molded Rubber Flooring System	
Weight	3100 lbs.	4200 lbs.
Capacity	15000 lbs.	20000 lbs.
Section Cap	10000 lbs.	20000 lbs.
Approval Class	IIIL (IIHD)	IIIL (IIHD)
Approvals	  99-091A4 AM4*	
Grad Size	5 lb (2 kg)	5 lb (2 kg)
Paint¹	Powder Coated Galvanized Steel	
Tire Pressure	50 PSI	45 PSI
Wheel Size	13" – 5 on 4.5"	13" – 5 on 4.5"
Tire Size	205/75R13	205/75R13
Lug Torque	90-120 ft-lbs	90-120 ft-lbs
Battery	12V Deep Cycle	12V Deep Cycle

¹ Structural Steel is not galvanized.

NORAC Statement of Limited Warranty

All *NORAC* scale products are warranted against defects due to faulty material or workmanship for a period of one (1) year. *NORAC* Systems International Inc. extends this warranty only to the original purchaser or original user.

In the event a defect develops during the warranty period, *NORAC* will repair or replace the unit with a new or reconditioned model of equivalent quality. In order to obtain performance of any obligation of *NORAC* Systems International Inc. under the warranty, the original purchaser or original user must return the defective unit, with a written description of the complaint, freight prepaid to the manufacturer or a designated service depot. In the event of replacement with a new or reconditioned model, the replacement unit will continue the warranty period of the original unit.

NORAC Systems International shall not be liable for loss of use of the unit or the incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss.

Any questions with respect to the warranty should be taken up with *NORAC* Systems International Inc. 306-664-6711.

Towing Checklist

Each item of checklist to be reviewed and list to be signed by dealer and customer at delivery.

- Operator Safety section of manual has been reviewed.
- Trailer is not intended for the transport of livestock or any other goods or materials.
- Ball on towing vehicle must be 2"
- Hitch height of towing vehicle must be between approximately 16" above the ground such that the trailer is towed level.
- Safety chains must always be connected during towing.
- Towing vehicle must be wired correctly (see label on hitch)
- Magnetic lighting package must be on the trailer during towing.
- Trailer is equipped with electric brakes and must be synchronized. See synchronization procedure in manual.
- Trailer is designed to be towed at a ride height indicated by labels on the suspension shock absorbers. Towing at ride heights outside of the indicated range may result in suspension damage.
- Suspension stops must be in the transport position during towing.
- Converting the trailer from weigh mode to transport mode and back to weigh mode has been reviewed.
- Safety pins are installed in all the hitch pins.
- Dexter recommends to re-torque wheel lug nuts at 10, 25 and 50 miles.

Buyer. _____ Date _____

Dealer _____

Copy to be retained by dealer

Fax copy to manufacturer: Fax #: 1-306-664-6664

Canada

NORAC Systems International Inc.

Phone: (+1) 306 664 6711

Toll Free: 1 800 667 3921

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S7P 0A6

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Norac, Inc.

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Toll Free: 1 866 306 6722

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Fridley, MN

55432-2892

