DEDENBEAR®

THUNDER
INSTALLATION & OPERATION MANUAL

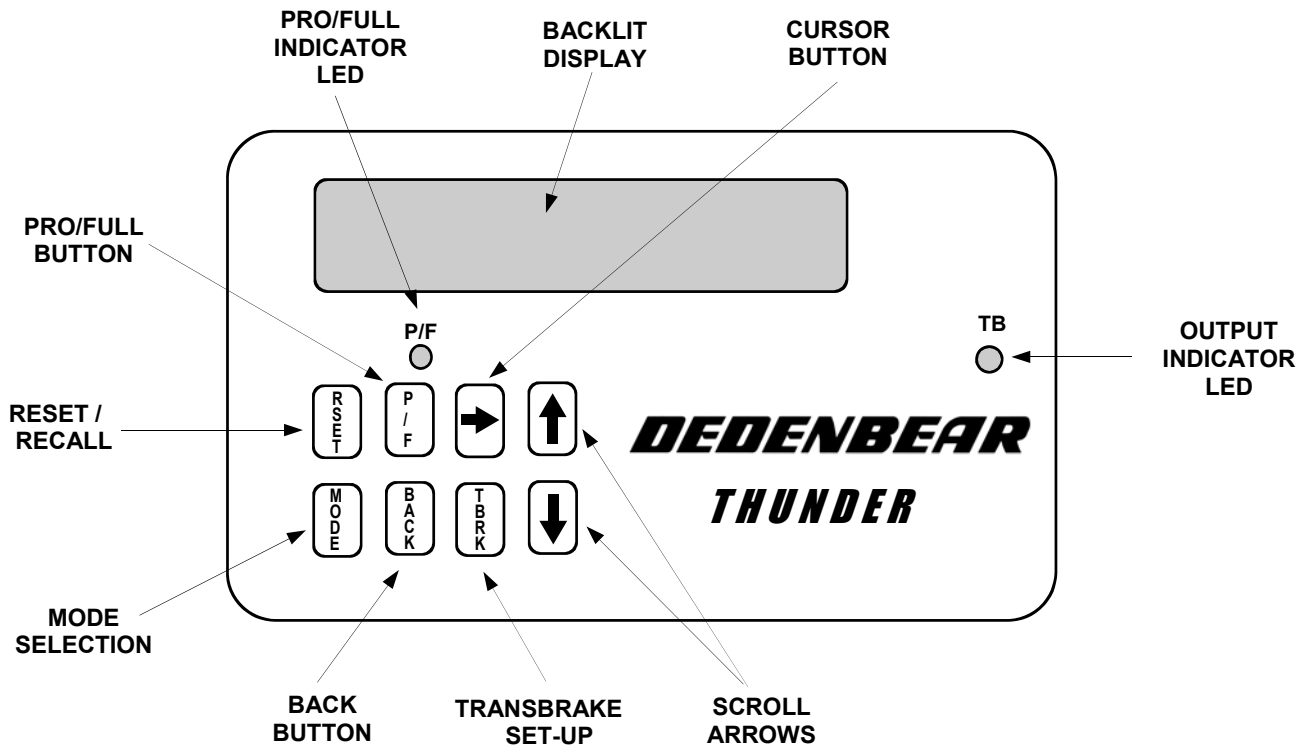### INDEX

INSTALLATION

Using #8 screws through the rubber grommets in the base, mount the *THUNDER* away from heat, vibration and the ignition system.

Make sure the driver can reach the buttons when strapped in and angle the unit, if needed, so the display can be read straight on.

Wire the *THUNDER* as shown on page 7&8. Make sure the power lead comes straight from the master switch and the ground goes to a solid chassis ground, not sheet metal panels.

BUTTON QUICK REFERENCE

413 W. Elm Street, Sycamore, 60178 • (866) 248-6357 • www.autometer.com • service@autometer.com

THUNDER Inst. Orig. 10/04 Rev. 8/16

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PROGRAMMING BUTTONS

Arrow (scroll) Buttons: These buttons are used for making small changes to your settings. You can add to a setting by pressing the up arrow or subtract with the down. If you push and hold an arrow key, the setting will continue to change faster and faster.

Cursor Button: This button allows you to change each digit individually. This makes large number changes much quicker than just using the scroll. When you push the cursor button the first time, a cursor appears under the left most digit. Each press of the cursor button thereafter moves the cursor one digit to the right. Stop the cursor under the digit you wish to change and use the arrow (scroll) buttons to change that digit up or down. Pressing the cursor button one more time after the cursor is under the right most digit will remove the cursor from the screen and return the arrow buttons to regular scrolling action.

TBRK Button: This button accesses your Delay settings. Each time you press the TBRK button, different set-up screens come up and allow you to make changes to your Delay, Delay 2, Your ET, Their ET, Bottom Delay, Cross Comp, Skip Up/Down, TB Pause, & TB Lockout settings.

MODE Button: This button selects which of the 4 delay box modes you wish to run. They are Delay, Crossover, Interface and Cross Talk.

Reset/Recall Button: This button is used to cancel the transbrake lockout. It also recalls information about the run after the pass has been made.

Back Button: This button is used if, when stepping through the set-up screens, you accidentally pass the screen you want. Press the Back button to move back one set-up screen.

The **THUNDER**'s **PRO/FULL** feature allows you to switch between two complete setting groups for the delay box and throttle stop features. This enables you to program the box for your "Super" class settings in **PRO**, and then program your bracket race settings in **FULL**. Now when you switch between classes, you no longer need to re-program the **THUNDER**, just push and hold the PRO/FULL button to switch between groups of settings. The red LED indicator light to the left side of the keypad will indicate which setting group you are in. When you are in the **PRO** group, the **PRO/FULL** LED will turn on and stay on. When you are in the **FULL** group, the LED will be off.

REMEMBER: It is extremely important when you change a setting that you are in the setting group (PRO or FULL) in which you want the change to occur since each group has its own complete set of settings.

DELAY BOX MODES

The **THUNDER** has four different types of delay boxes built in. They are:

1. **DELAY**: A simple 4 digit delay box used for pro tree classes and leaving off your top amber for full tree classes. The box simply delays for the time set and releases the transbrake.
2. **CROSSOVER**: Used in full tree bracket racing for launching off your opponent's top bulb when you are the faster car. The box calculates the handicap and adds it to your delay time.
3. **INTERFACE**: This is used the same as crossover except it allows you to take two hits at the tree. You leave off the opponent's top bulb, press the transbrake button again, then release off your own top bulb. The box will release the transbrake on the *quicker* of the two releases. This means if your release on the opponent's top bulb gives you a .520 light and the release on your top bulb gives you a .505 light, the box will launch the car on the .505 light. Remember, the interface always chooses the *quicker* light and will choose a .490 over a .500.
4. **CROSS TALK**: Used for the cross talk bracket tree, this mode functions the same as the Interface mode except it allows you to take two hits at your tree, one off your top amber, and one off your second amber. Like the Interface, the box will choose the *quicker* of the two reaction times.

SETTING TRANSBRAKE DELAY

To set your transbrake delay, you must first choose which delay box type you wish to run by pressing the MODE button. The *THUNDER* will only ask for the settings required for that particular mode. Example: When you are in RUN (DELAY) it will not ask you for THEIR ET setting since you are not crossing over. All of the shared settings between these modes will transfer when you change to a different mode. Example: Your delay setting will transfer over to all four different delay box modes along with your SKIP, TB PAUSE, and TB LOCK OUT settings.

THEIR ET   YOUR ET   DELAY

**10.00 9.00 1.000
RUN (INTERFACE)**

RUN SCREEN: This is the screen the *THUNDER* will display when it is "ready to run". It will always display YOUR ET and your DELAY. When in Crossover, Interface and Cross Talk modes it will also display THEIR ET. **NOTE: If you are not using the remote display dial-in board (part# RD-1) the YOUR ET setting is not important when in the DELAY mode. This setting will not effect your delay time.**

T
B
R
K

Press the TBRK button to enter the transbrake adjust settings menu. Each time you press this button it will advance to the next set-up screen. Once you have advanced through all of the screens, the box returns back to run mode. When you are through making adjustments to the settings, the box will automatically return to the run mode in 8 seconds.

**SETUP MODE
DELAY   1.000**

DELAY: When you first press the TBRK button, the delay setting will appear. Use the scroll arrows or the cursor button to change this setting. For leaving off the top bulb on a full tree, this setting is typically around 1.000 second.

**SETUP MODE
DELAY 2   .500**

DELAY 2: This screen will appear next only in Cross Talk mode (not needed in Delay, Crossover or Interface). Delay 2 is the amount of delay used for taking a 2nd hit at the 2nd amber bulb on a Cross Talk bracket tree. Typical 2nd amber delay setting is around .500 second. Use the scroll arrows or cursor button to change this setting.

**SETUP MODE
THEIR ET   10.00**

THEIR ET: This is the next screen that will appear in Interface, Crossover and Cross Talk modes (not needed in Delay mode). Use the scroll arrows or cursor button to change this setting to your opponent's dial-in.

**SETUP MODE
YOUR ET   09.00**

YOUR ET: This is where you enter you own vehicle's dial-in. Use the scroll arrows or cursor button to make changes. If you run a Remote Display dial-in board, this is the setting that will be displayed upon return to run mode.

**SETUP MODE
BOT DELAY .100**

BOT DELAY: Bottom bulb delay time is the amount of delay you need for a bottom bulb release on a full tree when using the "Last Chance" feature while in Interface and Cross Talk modes. Adjust with scroll or cursor button.

**SETUP MODE
CROSS COMP .015**

CROSS COMP: Crossover compensation time is used to compensate for late lights when crossing over. When you cross over and leave off your opponent's tree, you get an indirect view of his top bulb instead of a direct view like on your side. This results in a reaction time that is about .010 to .020 seconds slower. Crossover compensation automatically subtracts this time from your delay setting whenever you cross-over. Use the scroll arrows or cursor button to change this setting. **NOTE: Cross comp should be set for 0.000 when running in Cross-over mode on a Cross Talk bracket tree.**

**SETUP MODE
SKIP DOWN -.015**

SKIP DOWN or **SKIP UP:** This is the amount of time you want to add (Skip UP) or subtract (Skip Down) from your delay time *after* you have released the transbrake button. If you feel you "missed" the tree, every time you push the skip button the box will add or subtract this amount from your delay time. Use the scroll arrows to change this setting.

**SETUP MODE
TB PAUSE .100**

TB PAUSE: This is the amount of time the box pauses from when the transbrake button is depressed until the transbrake sets. This prevents transbrake application if the button is accidentally bumped or brushed while driving down the return road or in the staging lanes.

**SETUP MODE
TB LOCKOUT 03**

TB LOCK OUT: This is the amount of time the box will lock out the transbrake so the driver cannot re-apply the transbrake during the pass. Use the scroll arrows or cursor button to change the lock out in increments of whole seconds.

FACTORY SETTINGS AND PARAMETERS

PRO-FULL SETTING PARAMETERS: PRO MODE = P/F LIGHT ON FULL MODE = P/F LIGHT OFF		FACTORY SETTINGS	
SETTING	**RANGE**	**PRO**	**FULL**
DELAY	0.000 to 1.999 sec.	.010	1.000
DELAY 2	0.000 to 1.999 sec.	.010	.500
THEIR E.T.	00.00 to 19.99 sec.	10.90	10.00
YOUR E.T.	00.00 to 19.99 sec.	9.90	9.00
BOTTOM DELAY	0.00 to .299 sec.	.010	.100
CROSS COMP	.000 to .099 sec.	.015	.015
SKIP UP / SKIP DOWN	+.050 to –.050 sec.	-.010	-.010
TB PAUSE	0.000 to 1.999 sec.	.010	.010
TB LOCK OUT	00 to 19 seconds	01	03

GENERAL INFORMATION AND DEFINITIONS OF FEATURES

Reset/Recall Button: Used to cancel the transbrake lockout and return the *THUNDER* to a ready to run condition. If pressed after the run, the RSET button will recall the "How Late" information and how many times you "Skipped".

ARP (Accidental Release Protection): Occasionally you may anticipate the lights and release the button too early. ARP lets you recover from this situation. In Delay and Crossover modes, you simply press the transbrake button again before the car launches and the *THUNDER* will instantly reset itself. In Interface and Cross Talk modes this does not work because the *THUNDER* is expecting a second hit. To avoid a red light you can use the Last Chance feature.

Last Chance: This feature works only in Interface and Cross Talk modes. If you think either or both of your releases were too quick, press the transbrake button down a third time to cancel the first two hits, then release the button off your bottom bulb to launch the car. If your car red lights off the bottom bulb, add some time to the Bottom Bulb delay and the Last Chance feature will use the delay from that setting.

How Late: In the Interface and Cross Talk modes where you can take two hits at the tree, the How Late feature tells you which of the hits was faster and by how much. In Interface mode the How Late timer will display "THEIR TREE BY: .XXX" or "YOUR TREE BY: .XXX" or "LAST CHANCE ACTIVATED". As an example, if you were in Cross Talk mode, the display might read "FIRST HIT BY: .023". This means that you were quicker leaving off your top bulb than your second bulb and that you were .023 seconds quicker. The *THUNDER* released the transbrake off the top bulb hit in this example. If you had cancelled the first two hits by pressing the button a third time, the display would read "LAST CHANCE ACTIVATED". After a run is made, the How Late information is recalled by pressing and holding the RSET button. The display will alternate between the How Late information and the number of Skips.

Skip Recall: Skip Recall tells you the number of times you pressed the Skip button during the delay box time out. By checking the set up menu you can determine how much time each Skip was and whether it added or subtracted time to the delay setting. By multiplying the Skip time by the number of Skips, you can calculate the total amount of time that was added or subtracted from your delay time. The number of Skips used can be recalled after the run by pressing and holding the RSET button. The display will alternate between the How Late information and the number of Skips.

Dial-ins Incorrect: If the Their E.T. setting is accidentally set lower than Your E.T. this message will be displayed. If you make a pass without fixing the problem, the *THUNDER* will assume the handicap is zero and will only use the delay setting.

Line Lock Output: The Line Lock Output is exactly the same as the Transbrake Output except that it is diode protected. This means that if wired in (see page 8) the delay box will operate the line lock on the starting line, but the line lock will not back feed to the transbrake solenoid while doing a burnout.

Leaving Set Up Menus, Four Ways To Leave:
1) Do nothing and the unit will return to the run mode automatically after 8 seconds.
2) Press the Transbrake switch and the unit will instantly return to run mode.
3) Clock through the set up menu by repeatedly pushing the setting button until you get back to run mode.
4) Press the BACK button repeatedly to back out of the set up menu to the run screen.

Memory: The microprocessor in the *THUNDER* will remember all of your settings, even after turning off the power. There are no internal batteries to die, so the unit will keep your last settings forever.

Battery Chargers: It is important to make sure to have your master disconnect switch off while hooking up your charger between rounds. When the first contact is made between the charger and the battery there may be a voltage spike that could damage electronics. After the charger is hooked up, the master switch can be turned back on to run the water pump, fan, etc.

Temperature: If the *THUNDER* ever gets over 160 degrees, the display will get dark and unreadable. This does not damage the unit, simply cool it off and the display will return to normal.

Welding: If any welding needs to be done to the car, disconnect all wiring from the *THUNDER* to prevent damage.

OPERATION

Set the *THUNDER* with all your settings. Shallow stage the car. Press the transbrake button to set the transbrake. Release the transbrake button at the flash of all three amber bulbs (pro tree) or at the flash of the top amber bulb (full tree). The *THUNDER* will continue to hold the transbrake for the preset delay time. When the time expires, the *THUNDER* will release the transbrake solenoid, launching the car.

PRO TREE RACING

The *THUNDER* is used to keep a car from red lighting on a pro tree by delaying the release of the transbrake. The delay type should be set to Run Delay. Typical delay settings on a pro tree range from 0.001 to 0.050. If your car will not red light on a pro tree, set the *THUNDER* Delay Setting to 0.000.

FULL TREE RACING

By delaying the release of the transbrake it becomes possible to release the transbrake button on the top (first) amber bulb of the christmas tree. Releasing off the top bulb is the preferred method because it is more consistent than a bottom bulb release. The increased consistency comes from not anticipating the bottom bulb and being able to just "hit" the top bulb as quick as possible allowing for a more natural human reaction. Top bulb release also allows the driver to stage and release the button the same every pass. If the car is launching late or early, changes to reaction times can now be made by adjusting the *THUNDER* instead of having the driver try to mentally speed up or slow down.

Typical delay settings for launching off the top bulb are 0.950 to 0.990 for door cars and 1.020 to 1.080 for dragsters and altereds. Delays as low as 0.850 for slower cars and as high as 1.100 for very hard launching cars can be reached.

USING CROSSOVER

When racing a full bracket tree or a cross talk tree, if you are the faster car, your opponent will be leaving first. This means his/her top amber bulb will light first on a bracket tree, or both top bulbs will light at the same time on a cross talk tree. In this situation you need to cross over. Crossing over allows you to release the transbrake button on your opponent's top amber (full tree) or your top amber (cross talk tree). Crossing over is done with the *THUNDER* by switching the delay type to Run Crossover and entering your dial-in and your opponent's dial-in to the delay settings. The *THUNDER* will automatically calculate the handicap and add it to your delay setting allowing you to launch off your opponent's top amber. For example your delay setting is 1.020 and you are dialed in at 8.50, your opponent's dialed in at 9.70. The *THUNDER* will subtract your dial from your opponent's dial (9.70 - 8.50 = 1.20) then add it to your delay setting (1.20 + 1.020 = 2.220).

USING INTERFACE

When you are the faster car by a minimum of 1 second, the Interface mode can be used. This is used the same as crossover except it allows you to take two hits at the tree. You leave off the opponent's top bulb, press the transbrake button again, then release off your own top bulb. The box will release the transbrake on the *quicker* of the two releases. This means if your release on the opponent's top bulb gives you a .520 light and the release on your top bulb gives you a .505 light, the box will launch the car on the .505 light. Remember, the interface always chooses the *quicker* light and will choose a .490 over a .500.

If you feel that one of the button releases was a red light, push the button down a third time to activate the Last Chance feature so you can leave off the bottom bulb. This will cancel out the first two releases and allow for a single-shot at your bottom bulb.

If you only release the button once in Interface mode, the *THUNDER* will choose that release for the delay of the transbrake.

USING CROSS TALK

This mode functions the same as the Interface mode except it allows you to take two hits at your tree, one off your top amber, and one off your second amber. As in the Interface mode, the *THUNDER* will choose the *quicker* of the two reaction times.

ADJUSTING FOR EARLY (RED) LIGHTS

When a car red lights, it has left too early. To compensate for this in the *THUNDER*, you must add time to the delay setting. For example, if you had 0.980 in your delay setting and went –0.040 red, you would want to add at least 0.040 to your setting making it 1.020. In addition, a "cushion" of 0.010 is usually added on top to avoid cutting another red light making the delay setting 1.030.

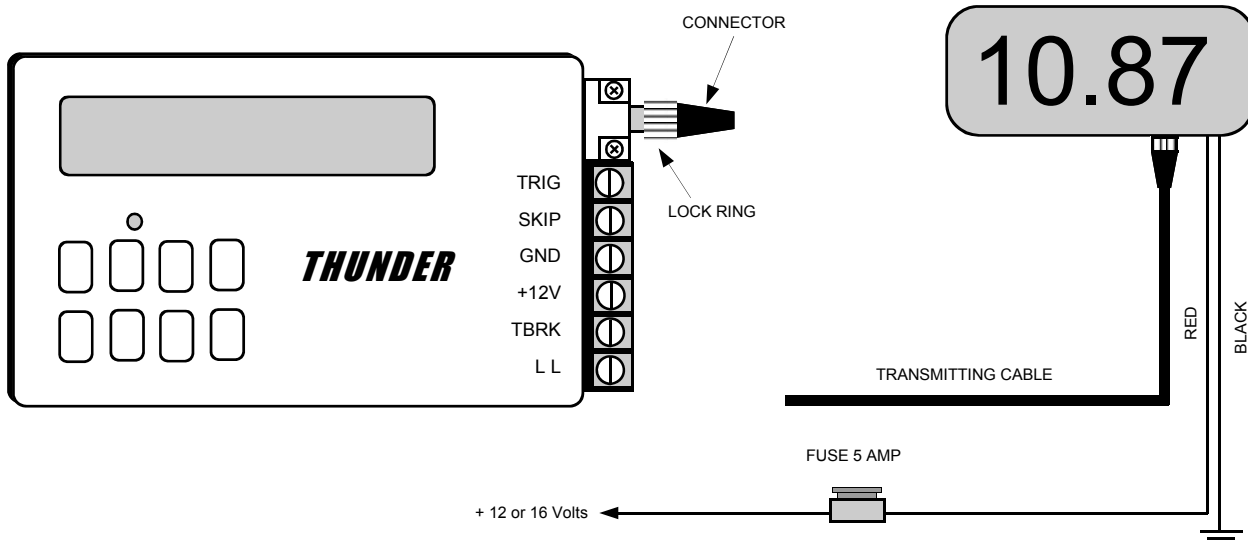### ADJUSTING FOR LATE (GREEN) LIGHTS

When a car green lights, it has left too late. To compensate for this in the *THUNDER* you must subtract time from the delay setting. For example, if you had 0.980 in your delay setting and went +0.040 green, you would want to subtract 0.040 from your setting making it 0.940. A "cushion" of 0.010 is usually added back to the delay setting to avoid cutting a red light making the delay setting 0.950.

WIRING THE THUNDER

1. Wire the 12v power supply wire **directly** to the master on-off switch at the back of the car. Use at least 10 gauge wire. Do **not** wire the power supply to the starter solenoid, Ford style solenoid, switch panels or existing fuse blocks. Install a 15 amp fuse or circuit breaker to protect the *THUNDER* from short circuits.
2. Install a 14 gauge wire from the ground terminal to a solid chassis ground, do **not** use the same ground that the ignition box uses and do **not** use aluminum or sheet metal panels as these are not reliable grounds.
3. Wire the transbrake solenoid directly to the Transbrake terminal using 14 gauge wire.
4. If you are going to use a rev limiter on the starting line, tie the rev limiter activation wire in with the transbrake wire.
5. Run a 14 gauge wire from the *THUNDER* 's +12 volt terminal to one side of the transbrake button used to launch the car. Run the other side of the button back to the Trigger terminal on the *THUNDER*. If the button is mounted on the steering wheel, make sure the stretch cord is at least 14 gauge wire.
6. If you wish to use the **optional** Skip button, supply power to one side of the button from the *THUNDER* 's +12 volt terminal using 18 gauge wire. Run a wire from the other side of the skip button to the Skip terminal on the *THUNDER* using 18 gauge wire.
7. If you wish to use the **optional** line lock output on the *THUNDER* to simultaneously hold the line lock and transbrake on the starting line, run a 14 gauge wire from the Line Lock terminal on the *THUNDER* to the line lock solenoid.

WIRING FOR REMOTE DISPLAY

Wire the Remote Display unit as shown. Use at least 18 gauge wire connecting the black wire to a solid chassis ground and the red to +12 volts. Use a 5 amp fuse in the red wire to protect the Remote Display from damage. Connect the display to your **THUNDER** using the transmitting cable included with the display unit. Slip the connectors into the jacks and turn the lock ring clockwise to lock in place.

The display unit needs no set up, just power both units up and the Remote Display will show whatever is dialed in to "YOUR E.T." setting of the **THUNDER**. When you make a change to "YOUR E.T." setting in the **THUNDER** and the box returns to the run mode, the Remote Display will change accordingly.

LIMITED 1 YEAR WARRANTY