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# IBCR-2

## BOOST CONTROLLER

*Thank you for purchasing the Gizzmo IBCR2 RPM dependent Boost Controller. This manual contains operating instructions and installation procedures that are needed for the fitment and operation of this product*


Instruction Manual

GIZZMO ELECTRONICS

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# Gizzmo IBCR2 Boost Controller

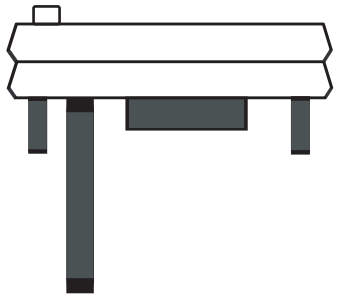
THE COMPETITION GRADE BOOST CONTROLLER WITH EVERYDAY FUNCTIONALITY.
TAKING WHAT WE KNOW FROM A DECADE OF DEVELOPMENT, AND FROM LISTENING TO WHAT YOU END USERS WANT WE SET ABOUT PRODUCING THE IBCR2.

THE INGREDIENTS ARE SIMPLE. TAKE AN MS-IBC AND MAKE IT BETTER, FASTER AND EASIER TO USE.
BETTER: WE HAVE ADDED THE ABILITY TO EASILY ADJUST BOOST DEPENDING ON RPM (RPM DUTY OFFSET)
IF YOU WANT A HARD HIT OF BOOST, THEN FOR IT TO LEVEL OUT, THEN RISE AT THE TOP END? NO PROBLEM
IF YOU HAVE BOOST CREEP THAT YOU WANT TO MINIMISE BY OPENING THE WASTEGATE AS YOUR RPM'S RISE? NO PROBLEM
IF YOU HAVE BOOST DROP OFF THAT YOU WANT TO MINIMISE BY SHUTTING YOUR WASTEGATE AT HIGH RPM? NO PROBLEM

FASTER: 32MHZ 16bit PROCESSOR. USING THE LATEST PROCESSOR TECHNOLOGY MEANS THAT THIS UNIT WILL NEVER BE WANTING FOR MORE PROCESSING POWER! THIS MEANS YOU WILL ALWAYS HAVE THE BEST, MOST ACCURATE BOOST CONTROL

EASE OF USE: SOMETIMES YOU JUST WANT TO KNOW WHAT THE UNIT IS DOING... NOW YOU CAN! WE HAVE ENABLED THE DISPLAY TO SHOW NOT ONLY THECONVENTIONAL BOOST BUT HAVE ALSO ADDED THE ABILITY TO SEE DUTY OR RPM DUTY OFFSET

# What's New in the IBCR2



## New Tiny Sizing

60% Lighter and 75% smaller so you can fit it almost anywhere, we suspect it's probably the worlds smallest boost controller.

## Processing Power

Gizzmo's IBCR2 is over engineered with a 32mhz 16bit RISC Processor capable of processing almost one billion instructions per min.

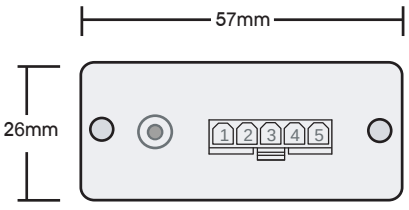
## Real Time Tach & Shiftlight

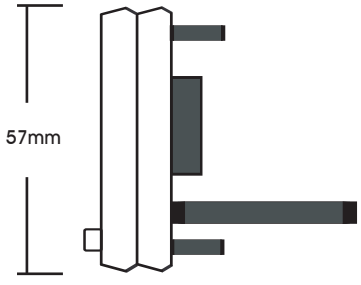
With the IBCR2 you get these extra features meaning you dont need to clog up your dash with multiple accessories.

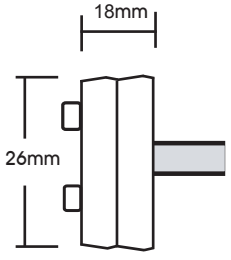
# Functions/Specifications

| | |
|---|---|
| Number of boost memories | 6 with individual gain settings |
| Maximum boost | 50psi (3.5bar) |
| Processing Power | 32mhz 16bitRISC |
| Active Over Boost | 5psi to 50psi |
| Boost Control | Closed or Open loop |
| Boost Offset RPM Range | 2000rpm ~ 9000 rpm |
| Boost Offset Duty | -50% ~ +50% |
| IBCR2 size | 117mm * 57mm * 26mm |
| Operating Voltage (v) | 11.8V - 21V |
| Operating Current | Less than 0.5A |
| Reverse Battery Protection | Yes |
| Overcharging Protection | Yes |
| Tach range | 200 to 9999RPM |
| Display | 3 * 7seg BLUE LED display KPA, |
| Pressure display options | PSI,BAR,DC,DUTY OFFSET,Tach |
| Wastegate Compatibility | Internal and External |
| Solenoid | High Performance Single |

## IBCR2 Specifications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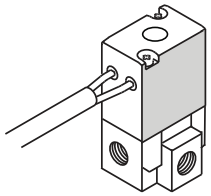
# IBCR2 Parts List

IBCR2 Module
x1



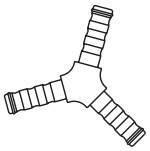
Solenoid Valve
x1


Instruction Manual
x1


IBCR2
Harness x1

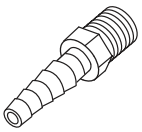
1mx5mm Nitrile
Tubing x1

1.2mx2.8mm
Vacuum Tubing x1



5mm ‘Y’ Piece
Connector x1

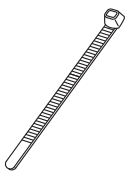
3mm ‘Y’ Piece
Connector x1



Tail 5mm
x2

Bracket and
Accessories

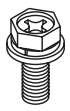
4 X screws
1 X stand off
2 X brackets



Cable Tie
x8

3mm Flat
Washer x2

3mm Nut
x2

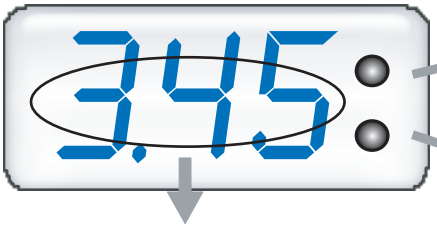


3mm Bolt
x2

# Warning/Caution

Always connect the wiring exactly as described in the instruction manual.
Disconnect the negative terminal of the battery before proceeding with installation.
Do not drop or expose this unit to excessive shock.
Installation should only be performed by an experienced automotive electrician.
Keep this unit away from moisture.
Never disassemble, modify, or tamper with this unit.
Never operate this unit while driving.
Securely mount this unit away from any area that may effect driving.
This unit is only designed for 12V DC type vehicles with a negative ground supply.

# Operating Instructions




**Button 1**

**Button 2**

**Blue 7 Segment LED Display Area**


**LED OFF**

**LED ON**


**LED Flashing**

**LED ON**

**Notes:**

**By pressing both buttons at the same time you can toggle between bright and dim display settings.**

**Glossary of terms:**

**Hold:** Push Button down for over 1 sec.

**Activate:** Push Button down for less than 0.5 sec.

## Units of Pressure

Please refer to Display SetUp On Display setup for more information on how to change between these units.

e.g:

BAR Display


LB Display


KPA Display


**Caution:**

**All readings in this Manual are in BAR unless otherwise stated.**

## Start Up Sequence

Every time the ignition is turned on the Solenoid will click briefly and Display Area will:

1. Display the memory option that was last in use.
2. Display the boost pressure for the memory option.

Then will go to the real time boost display. (Running Mode)

e.g:

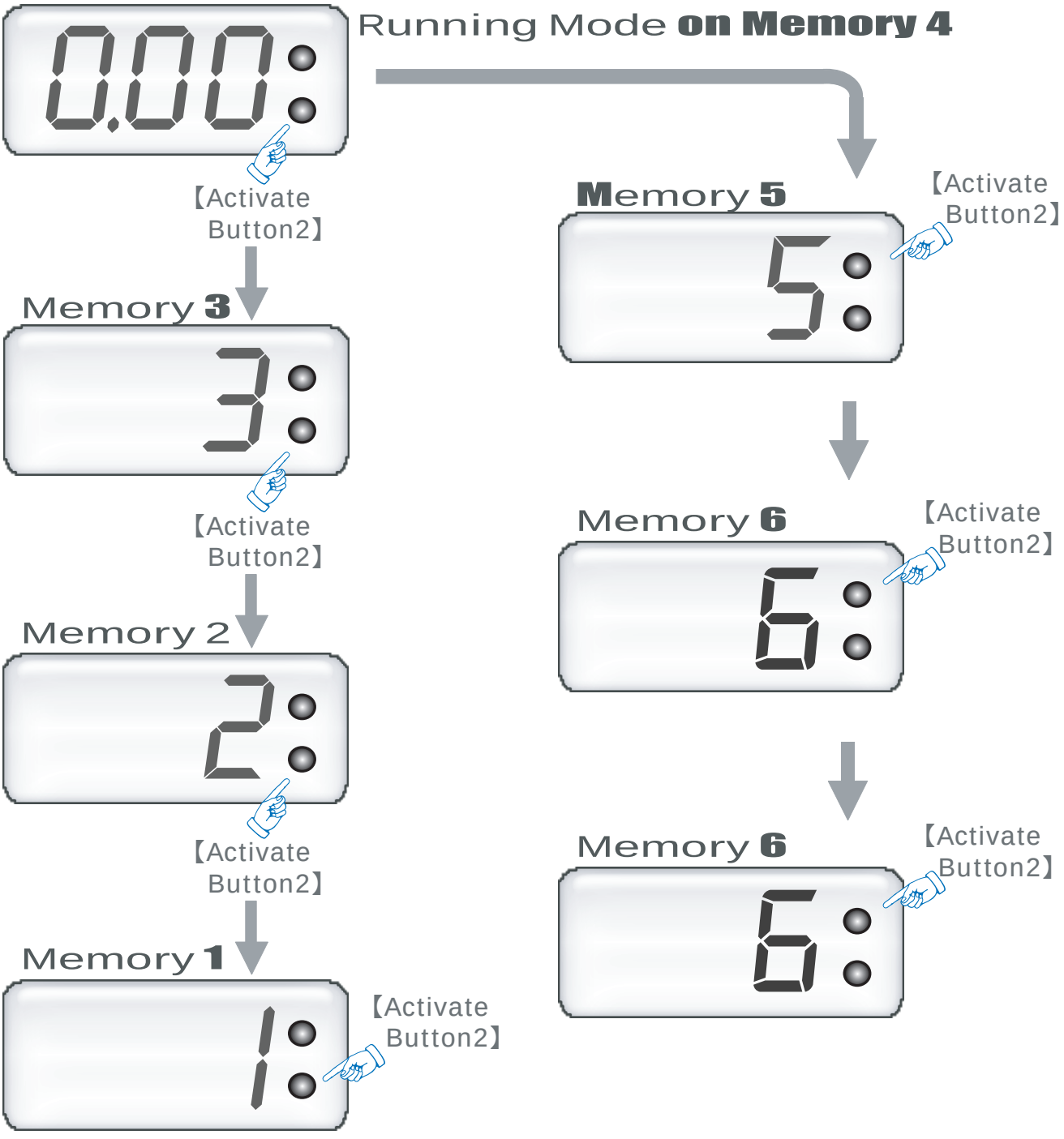
Memory Option


Boost Pressure


Running Mode

# To Change Boost Memories

The screen will display ‘ 1: ’ which stands for Memory1 Option and then it will display the boost pressure for that memory option e.g: ‘ 1.20: ’.



# Quick Setup Page I

1) Fit Unit as per instructions

2) Start car and allow engine to warm up thoroughly whilst doing the next few steps

3) Press the bottom button on the IBCR2 until the no. "1" is shown on the display. It will flash 3 things: "1(The boost level)", "Target Boost(whatever that is)", "0.00(Real time boost level)".

4) Press and hold the top button, go through and select what units you want, what maximum boost cut you want etc according to instructions and then exit to the main screen

5) Press and hold the bottom button until it shows "Open" or "Closed". Put it on closed, then press both buttons together.

6) It will now show a number (The "duty cycle") and "Duty" comes up on the screen. Set this to 10 (the minimum).

7) You may now drive the car after/while adjusting the duty (starting at 10% e.g. minimum to be safe) under full throttle to get an indication of what the boost will be for the duty you have set. Keep increasing the duty in conservative steps until the desired boost is reached. This should ideally be carried out in 3rd gear at sufficient revs and it is recommended to try this several times times until you are happy that the boost is consistent

NOTE: If you get duty cycle over 50 and the boost level is not increasing, then you have either not plugged in the solenoid or you have not plumbed it in correctly!

8) Press and hold both buttons and it will show a number (The "gain") and "Gain comes up on the screen. Set this to 0 (the minimum).

9) Press and hold both buttons and it will return to the "real time" boost level

10) Drive the car again at full throttle in 3rd or 4th gear so the IBCR2 can record the new boost setting

11) Pull over to the side of the road in a safe place, then either turn off the ignition then turn it back on again, OR, Press the top or bottom button change the memory setting and then return back to setting 1. Either way you do this you will be informed what the highest stable boost pressure achieved was by way of the pressure flashing at you on the screen and doing this also locks in the new boost target.

# Quick Setup Page II

12) Press and hold the bottom button and cycle through as before until you enter the "Gain" setting menu. Gain is How hard/fast the boost is brought in. It should NEVER be higher than duty cycle. In fact we have found the best setting is below 10. If gain is too high the boost will either overshoot, or the maximum stable (Target) boost will be unstable.If boost starts to creep of spikes too much, drop the gain back.

13) You may need to drop the duty setting slightly if the stable boost level ends up being a bit higher than you wanted.

14) Repeat steps 5-12 on boost levels 2 to 6 to achieve the boost levels you require.

16) Try going flat out, quickly changing gear and stabbing the throttle again. If the boost overswings more than you would like, press and hold the top button, scroll through to "Spike Stop" and increase this by 10.
Repeat process until you are happy with lack of spiking.

**Footnotes:**
Please ensure you drive the car on boost after altering the duty.

If you turn off the ignition or switch to a different boost memory, the unit will not longer "learn" the boost for the set memory.

If you do accidentally switch off or flick to a different memory, simply go back in, alter the duty by 1%, then drive it straight away.

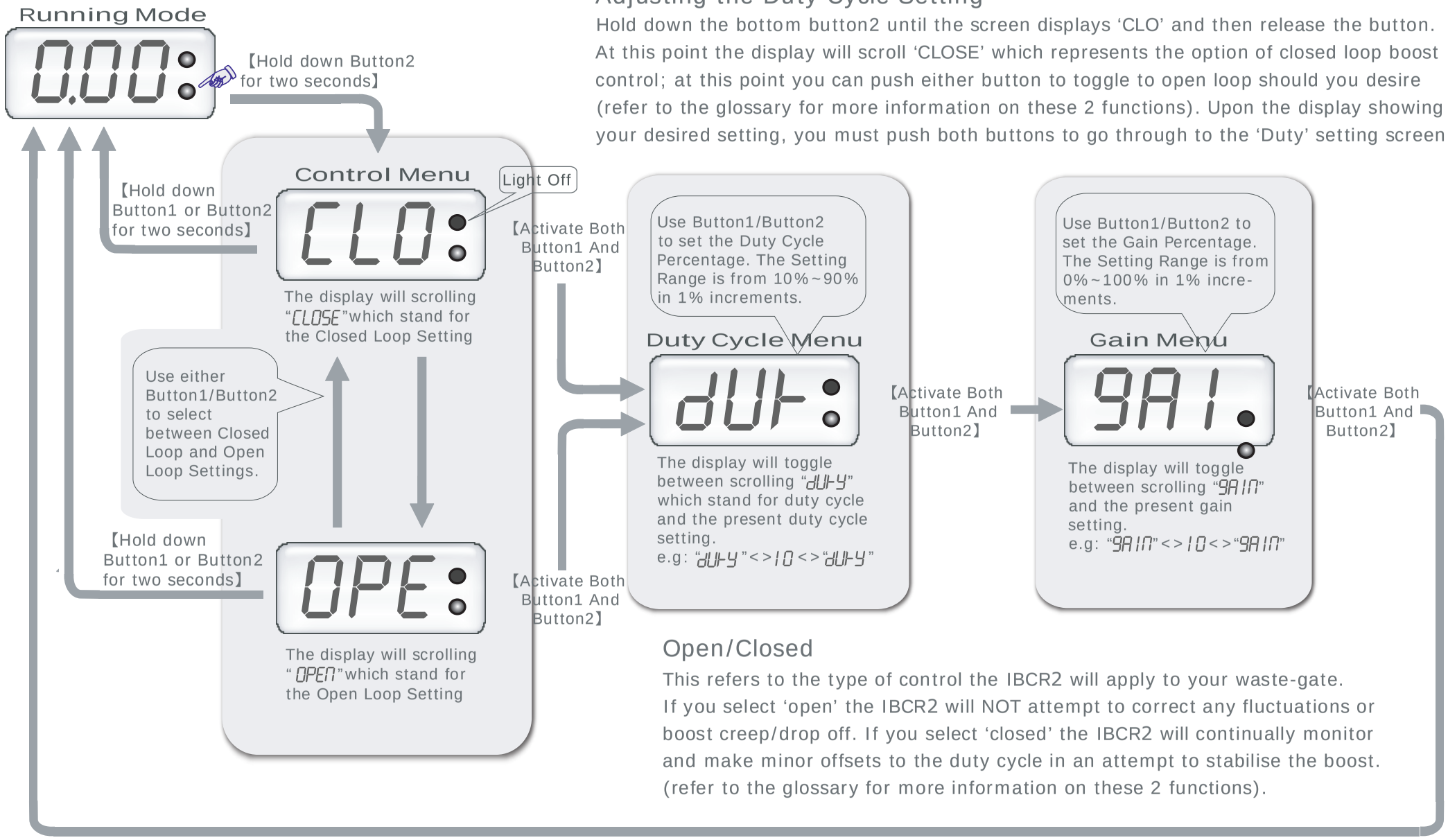
Do 2 or 3 flat out runs, then check what it has achieved.

If you get duty cycle over 50 and the boost level is not increasing, then you have either not plugged in the solenoid, not plumbed it in correctly or have a mechanical setup not able to achieve the desired pressure.

## QUICK TIP

If you are utilising the IBCR2's Tach function, make sure you calibrate the RPM in the OFFSET menu as you would do for the RPM dependency

# Adjusting the Duty Cycle Setting




## Adjusting the Duty Cycle Setting

Hold down the bottom button2 until the screen displays 'CLO' and then release the button. At this point the display will scroll 'CLOSE' which represents the option of closed loop boost control; at this point you can push either button to toggle to open loop should you desire (refer to the glossary for more information on these 2 functions). Upon the display showing your desired setting, you must push both buttons to go through to the 'Duty' setting screen.

## Open/Closed

This refers to the type of control the IBCR2 will apply to your waste-gate. If you select 'open' the IBCR2 will NOT attempt to correct any fluctuations or boost creep/drop off. If you select 'closed' the IBCR2 will continually monitor and make minor offsets to the duty cycle in an attempt to stabilise the boost. (refer to the glossary for more information on these 2 functions).

# Setup Menu

Running Mode


【Hold down Button1 for two seconds】

**If you want to EXIT from the setup menu, just hold button 1 OR 2 for 2sec**

## Setup Menus

The display will scroll "OFF SEt" which stands for Duty Cycle Offset setting menu.


The display will scroll "SHIFT" which stands for Shift light setting.


The display will scroll "SPIKE StOP" which stands for Spike Stop.

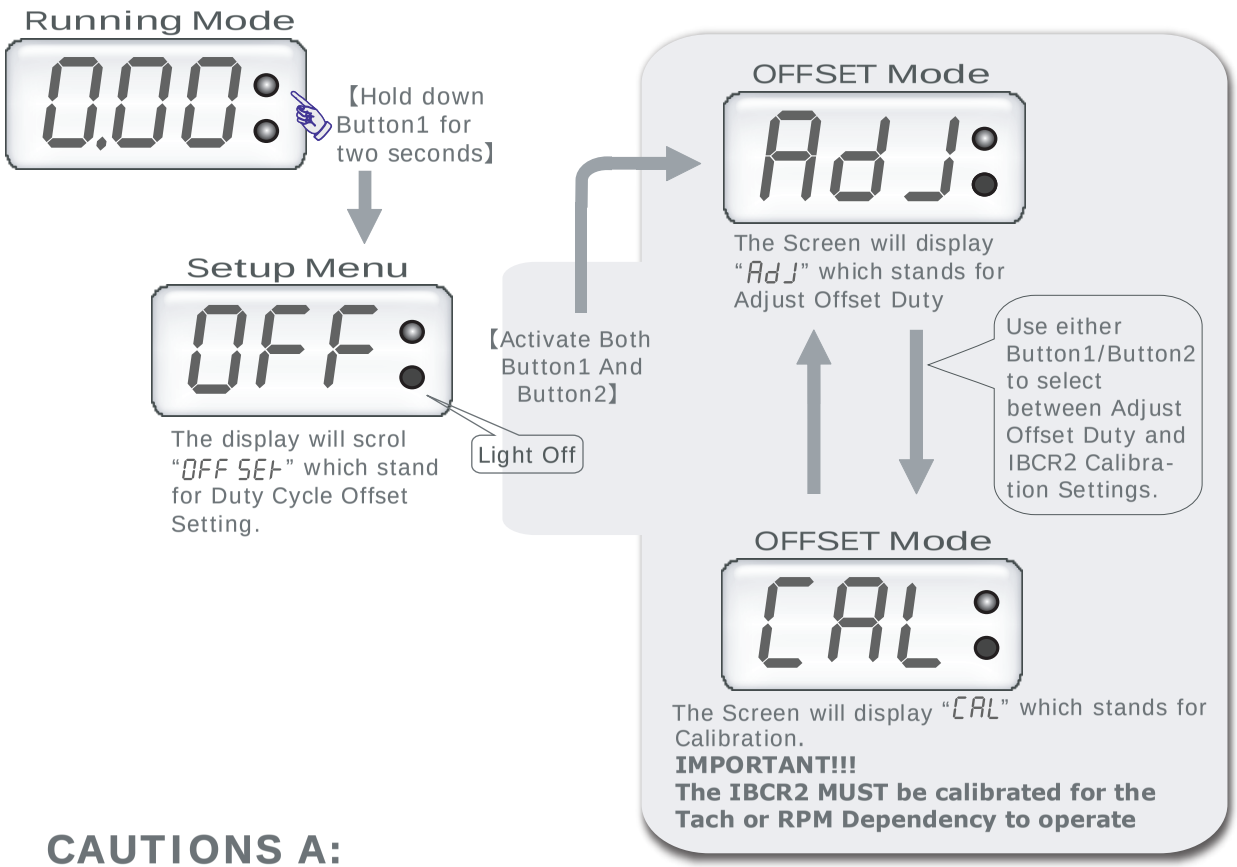

The display will scroll "SOL TEST" which stands for solenoid test setting .


The display will scroll "OUEr bSt" which stands for Over boost setting.


The display will scroll "dISP" which stands for Display setting menu.


Upon entering the setup menu you may use buttons 1 and 2 to toggle up and down through the menus in the order outlined on the left. All these functions are outlined on their own pages later in this manual

# OFFSET Menu I




## Brief description of the OFFEST adjustment process:

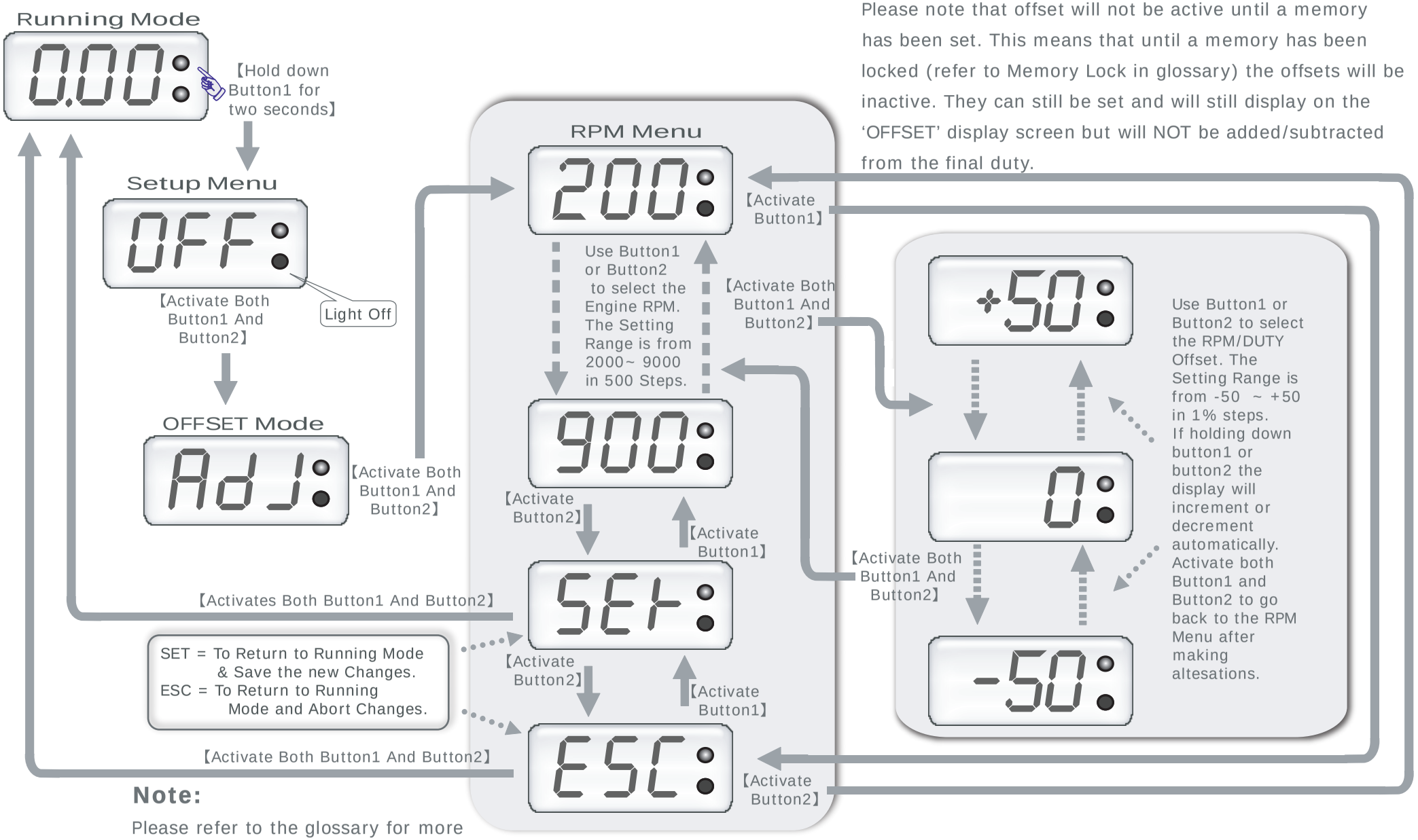
When entering the 'OFFSET > ADJUST' mode you will be presented with your RPM zones from '2000 – 9000' in addition to a 'SET' and 'ESC' option. At any of the RPM zones you can push both buttons to enter these to adjust the offset. When you enter a zone the display will show the offset for that zone and may be adjusted from -50 to +50. The IBCR2 will interpolate (average out) from between zones e.g. if you set +5 at 6500RPM and 0 at 6000RPM the duty will be +2 at 6200RPM. Upon having set your offset duty you must again press both buttons to exit out back to the RPM zones. This process can be repeated to make whatever adjustment you need to do prior to saving. Having finished making your adjustments you must press the top button to scroll up to either 'SAVE' (should you wish to make your adjustments permanent) or 'ESC' (should you wish to abort without saving the adjustments you have just made).

## CAUTIONS A:

Before utilizing the offset features of the IBCR2 you must calibrate the IBCR2's RPM to the engine RPM. This is a simple procedure…

1. Hold down the top button until the display reads 'OFFSET'
2. Push both buttons to enter. The display should now read 'ADJUST'
3. Push the bottom button once. The display should now read 'CAL'
4. Bring your engine to 2000RPM and push both buttons to enter
5. The display should now return to normal running mode and you IBCR2 is now calibrated

# OFFSET Menu II



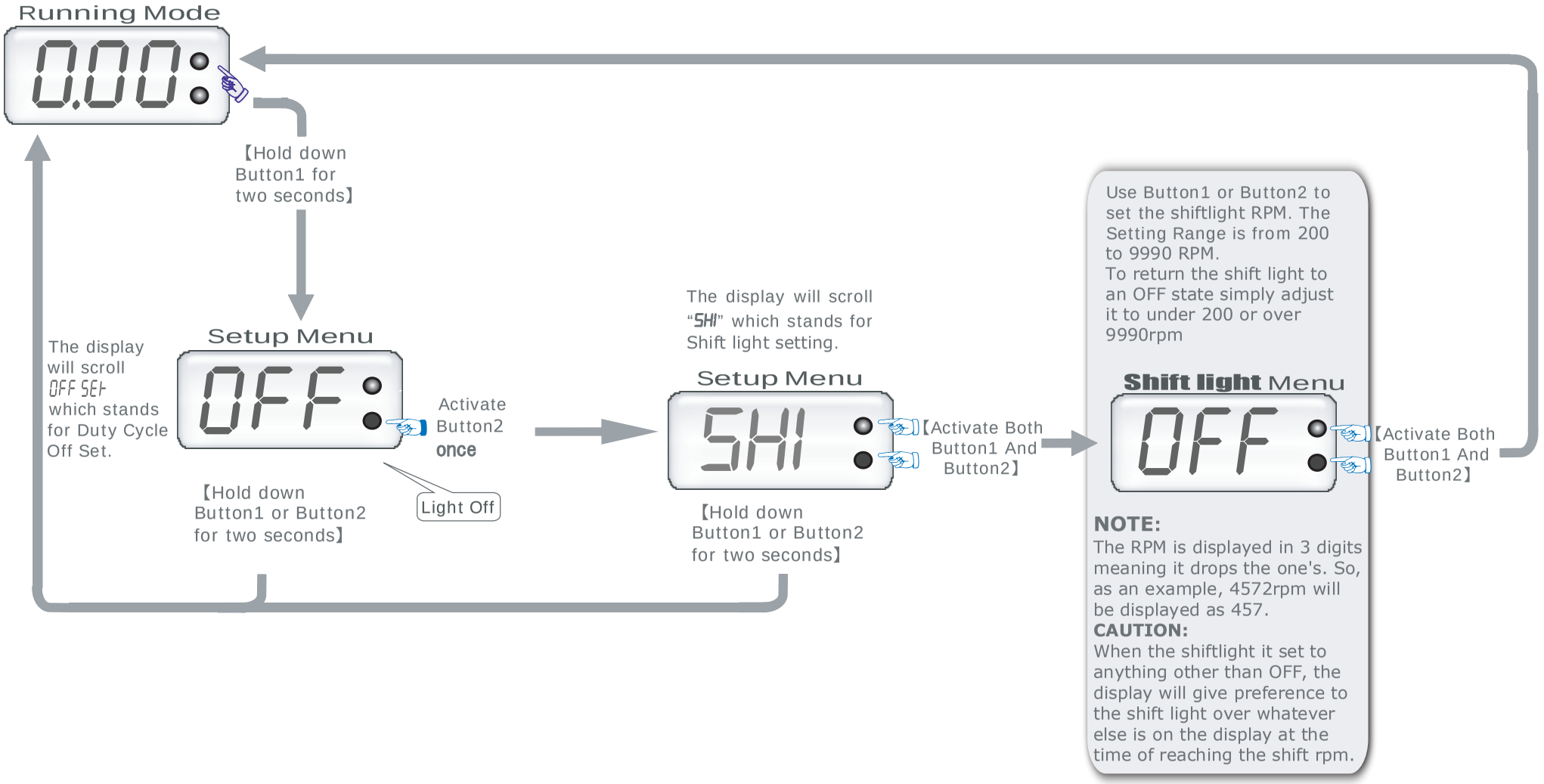

## CAUTIONS B:

Please note that offset will not be active until a memory has been set. This means that until a memory has been locked (refer to Memory Lock in glossary) the offsets will be inactive. They can still be set and will still display on the 'OFFSET' display screen but will NOT be added/subtracted from the final duty.

## Note:

Please refer to the glossary for more information on this function.

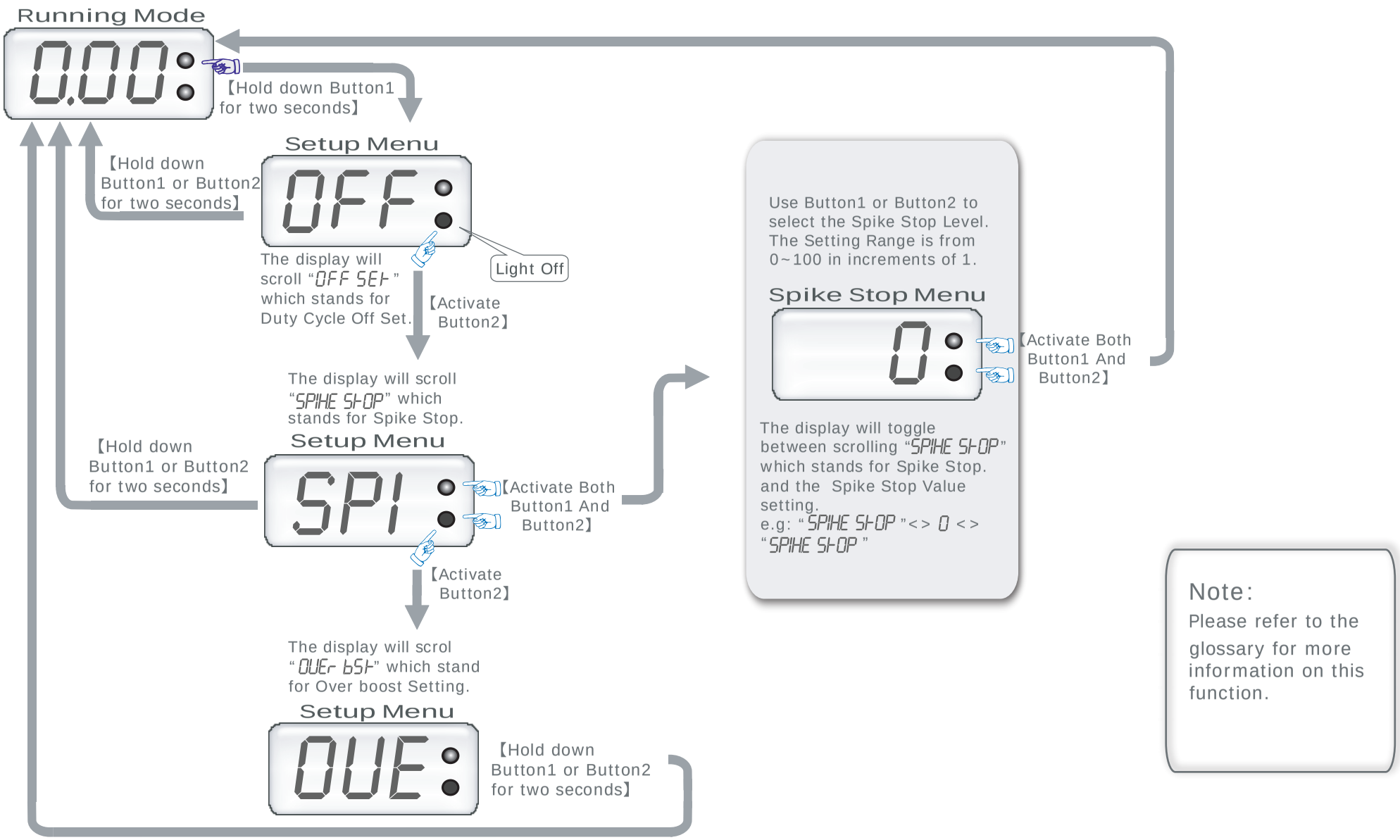
# Shift light Setup




**NOTE:**
The RPM is displayed in 3 digits meaning it drops the one's. So, as an example, 4572rpm will be displayed as 457.

**CAUTION:**
When the shiftlight it set to anything other than OFF, the display will give preference to the shift light over whatever else is on the display at the time of reaching the shift rpm.

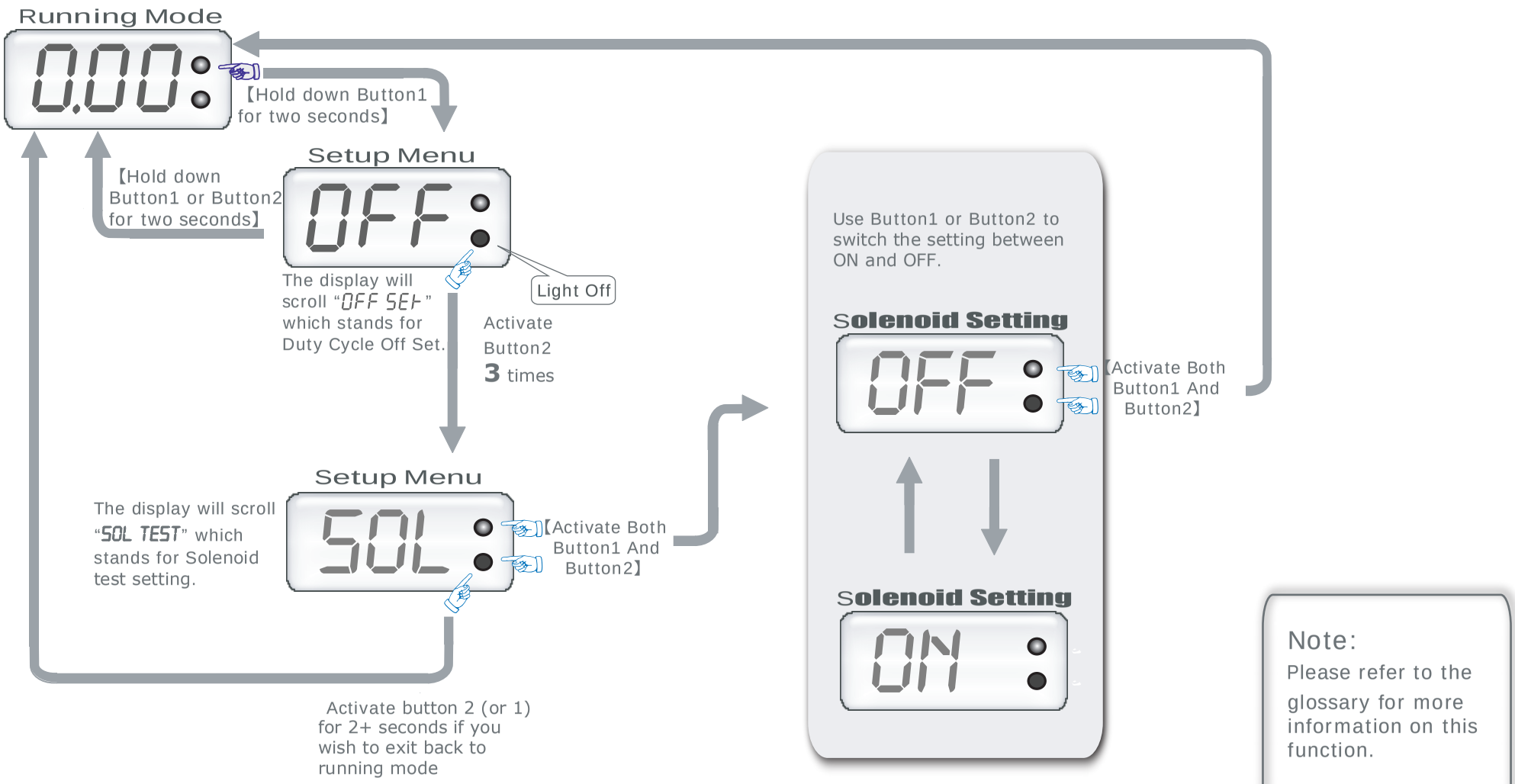
# Spike Stop Setup




**Note:**

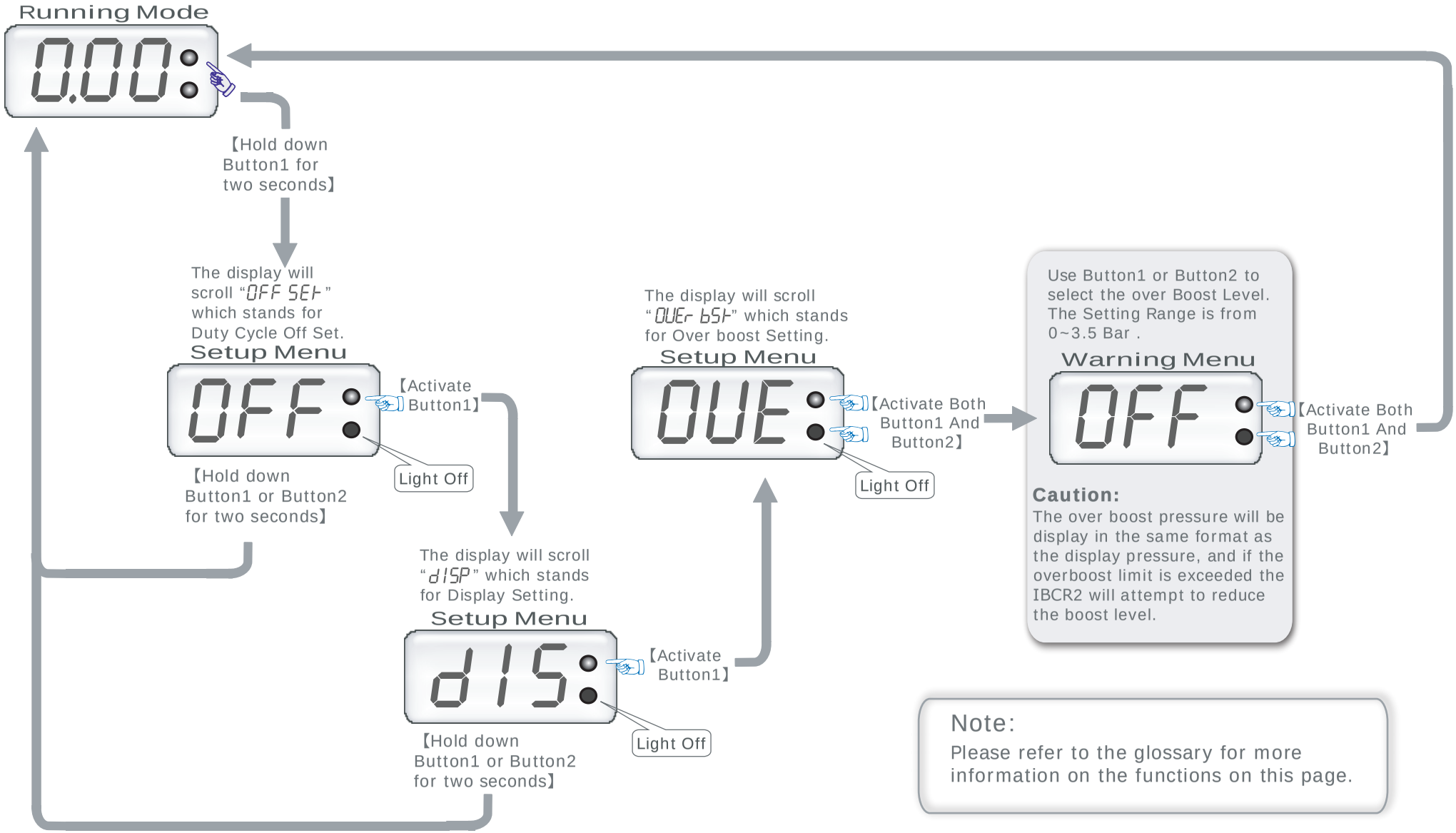
Please refer to the glossary for more information on this function.

# Solenoid setting on/off




Note:
Please refer to the glossary for more information on this function.

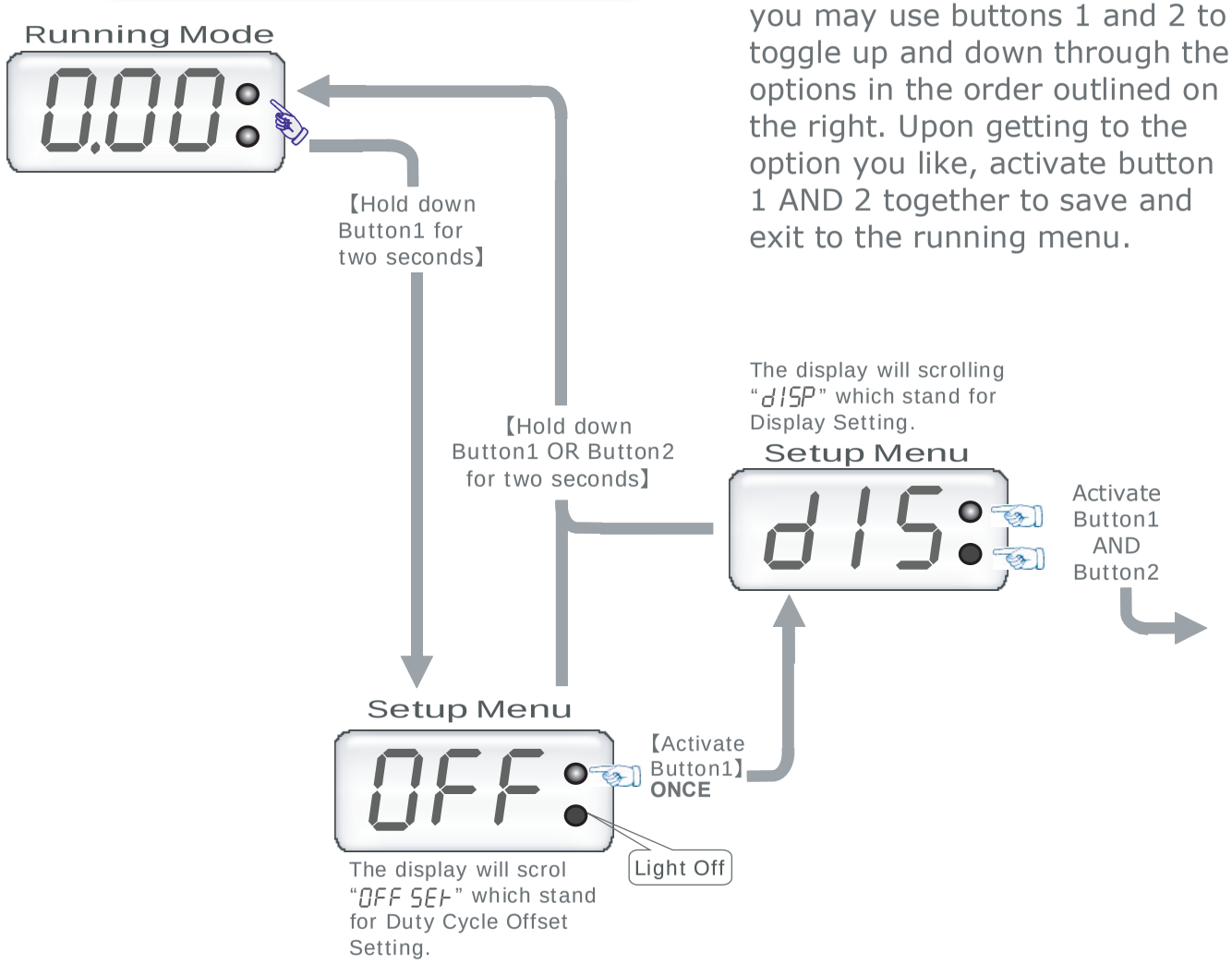
# Over Boost Warning Setup




**Note:**
Please refer to the glossary for more information on the functions on this page.

# Display Setup

Upon entering the Display menu you may use buttons 1 and 2 to toggle up and down through the options in the order outlined on the right. Upon getting to the option you like, activate button 1 AND 2 together to save and exit to the running menu.




## Display Menus


The Screen will display "dC" which stands for DUTY CYCLE


The Screen will display "H.PA" which stands for KPA.


The Screen will display "LB" which stands for LB


The Screen will display "bAr" which stands for BAR.


The screen will display "TAC" which stands for TACHOMETER. NOTE: The Tach will not display correctly until the IBCR2 has been calibrated in the OFFSET menu.

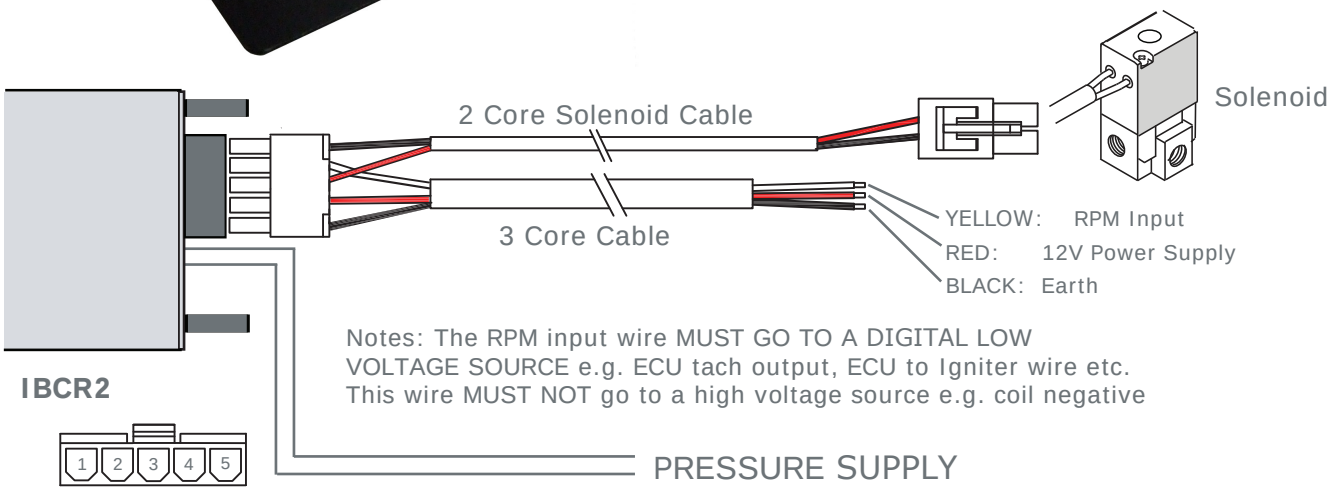

The display will scroll "OFF SEt" which stands for Duty Cycle Offset

**Note:**
Please refer to the glossary for more information on this function.

# Wiring/Bracket Diagram

Disconnect the negative terminal of the battery BEFORE proceeding with the installation.

Please ensure you follow the image on the left re the assembly of your bracket




**Loom side of IBCR2 Plug looking INTO plug from IBCR2 side**

1: BLACK Ground supply input
2: RED 12V+ Power Supply input
3: RED 12V+ Supply output from IBCR2 to Solenoid
4: YELLOW RPM signal input to IBCR2
5: BLACK Switching Ground output to Solenoid

1. The Pressure port is to be connected to a direct pressure source at an inlet manifold e.g. Fuel Press Regulator. Do not connect this to any other device such as a solenoid valve or blow off valve. A 3mm Y connector is provided to assist plumbing.

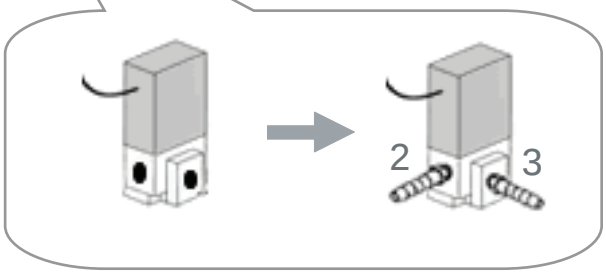
2. Mount the solenoid with the un-used port facing downwards. Connect the hoses as per the correct application (actuator or external wastegate).

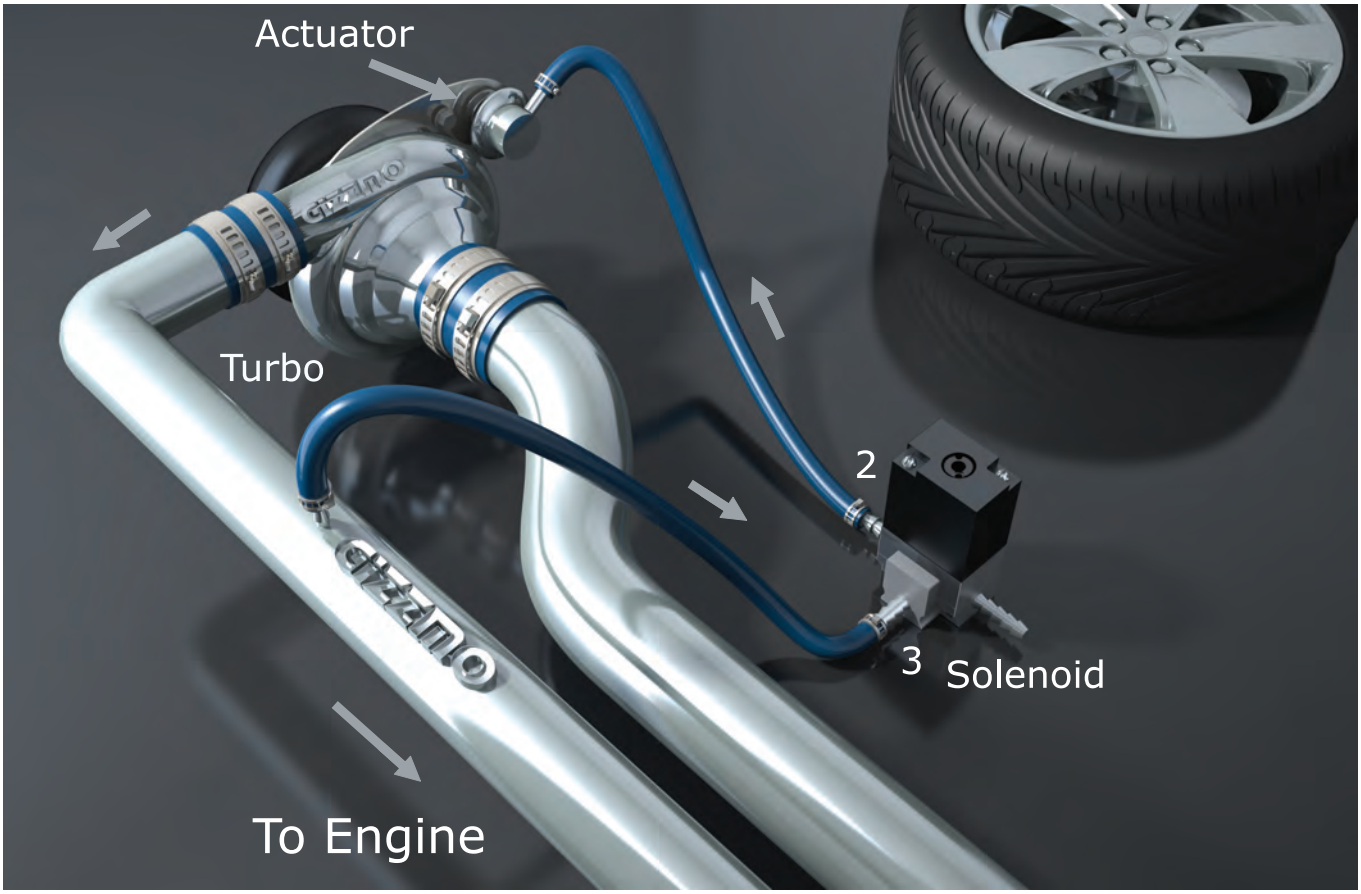
3. Connect the Red wire to a good fused power source that is live only when the ignition switch is in the on position.

4. Connected the Black wire to a good clean chassis earth.

# Installation for an Internal Wastegate

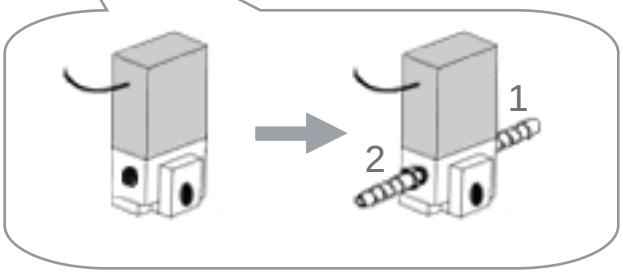
Connect the tails to Port 2 and Port 3 of the Solenoid Valve.

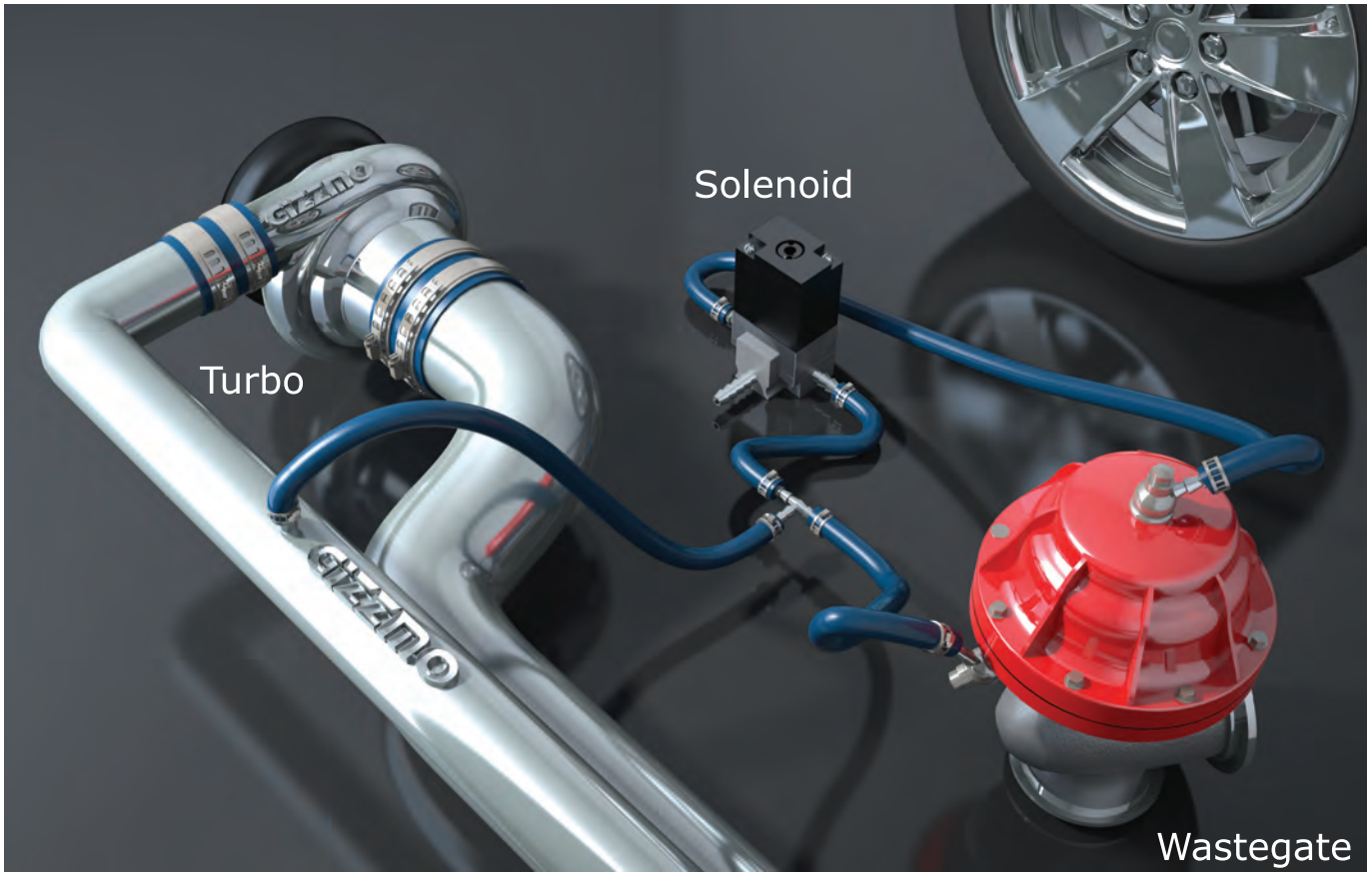


# Installation for an External Wastegate

Connect the tails to Port 1 and Port 2 of the Solenoid Valve.



# Glossary

## Display Settings

The IBCR2 can display real time boost in Pounds, Bar, Kpa or can display the real time Offset Duty, Tachometer OR Solenoid Duty Cycle. All this can be set in the display menu. Example: 1bar equals 14.5lb which equals 100kpa.

## Duty

This duty cycle, also referred to as the 'Base duty' can be adjusted from 10% to 90% to adjust the boost level. Every vehicle has a different response to duty cycle and essentially the only way to work out your duty cycle vs boost relationship is via trial and error starting from a low duty cycle. A lower duty cycle equals lower boost and typically your boost won't start to rise till at least 20%.

## Duty Offset

Offsets are expressed as a percentage and are offset from the final duty. As an example let's assume your duty is set to 20% and you are achieving 16lb and at 25% you have 18lb. If you have '+5' as an offset at the 6500 RPM zone you should have 18lb at 6500RPM. It is also worth noting that at 6250RPM and 6750RPM you should have 17lb as the IBCR2 will interpolate (average out) from 6000RPM to 7000RPM.

## Gain

Gain effects how quickly the turbo comes on boost. Ideally this would be set as high as possible; however, if this is set too high overshooting and boost instability can occur so there will be an ideal setting for this that will be different from vehicle to vehicle.

# Glossary II

## Memories

The IBCR2 has 6 memories in total and can fast switch between these. This means that when you select the next memory the boost will change immediately which is an advantage when changing memories whilst racing. Each memory has its own gain setting (refer to 'gain' in this glossary) and control strategy setting (refer to Open/Closed in this glossary).

## Memory Lock

This is a new and important feature for the IBCR2. Once you have adjusted a memory setting be it duty or gain and have then driven the car under load for the IBCR2 to record the boost to associate to that duty, the memory will not be locked until you either change the memory or turn off and restart the vehicle. The memory lock is important as until it is locked the duty offset will not become active. The reasoning behind this is that if the duty offset was set to '+10' for example, the boost will be higher and as such we do not want the IBCR2 to associate this higher boost setting to the lower duty that the +10 offset was added to.

## Closed Loop

This refers to the type of control strategy that the IBCR2 will have on your waste-gate.

Closed loop means that the IBCR2 will continually monitor and make minor offsets to the duty cycle in an attempt to stabilise the boost.

# Glossary III

## Over Boost warning

Via the menus, you can set an over boost pressure to flash the display and attempt to drop the boost should your vehicle exceed this set pressure limit.

## Spike Stop

A unique feature of the IBCR2 is ‘Spike stop’.
As with everything, wastegates take time to open and in a situation where they are required to react quickly (flat shifting gears at high revs, off/on throttle quickly whilst on boost at high rpm) this sometimes results in a boost spike. Spike stop largely eliminates this and can be adjusted from 0 to 100 with 100 being suitable for vehicles with a large amount of boost spiking and 0 suiting cars with no spiking issues. Ideally you want to keep this setting as low as possible because the higher this is, the longer it will take to return to your desired boost setting.

## Solenoid Supervisor

The IBCR2 constantly monitors the boost controller solenoid output channel to ensure that there are no malfunctions and should anything go wrong the IBCR2 IMMEDIATELY displays ‘SOL’ to warn you of a fault with your solenoid, solenoid loom or output driver. The IBCR2 will also briefly pulse the solenoid whenever the key is turned on in order to ensure it is fully operational. If for any reason the 'SOL' displays without having a solenoid/loom fault it can be switched off via the SOL TEST in the setup menu

# About The Warranty

Gizzmo Electronics Limited
Limited Warranties Statement
Effective 1 January 2003

All Products manufactured or distributed by Gizzmo Electronics are subject to the following Limited Express Warranties, and no others:

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