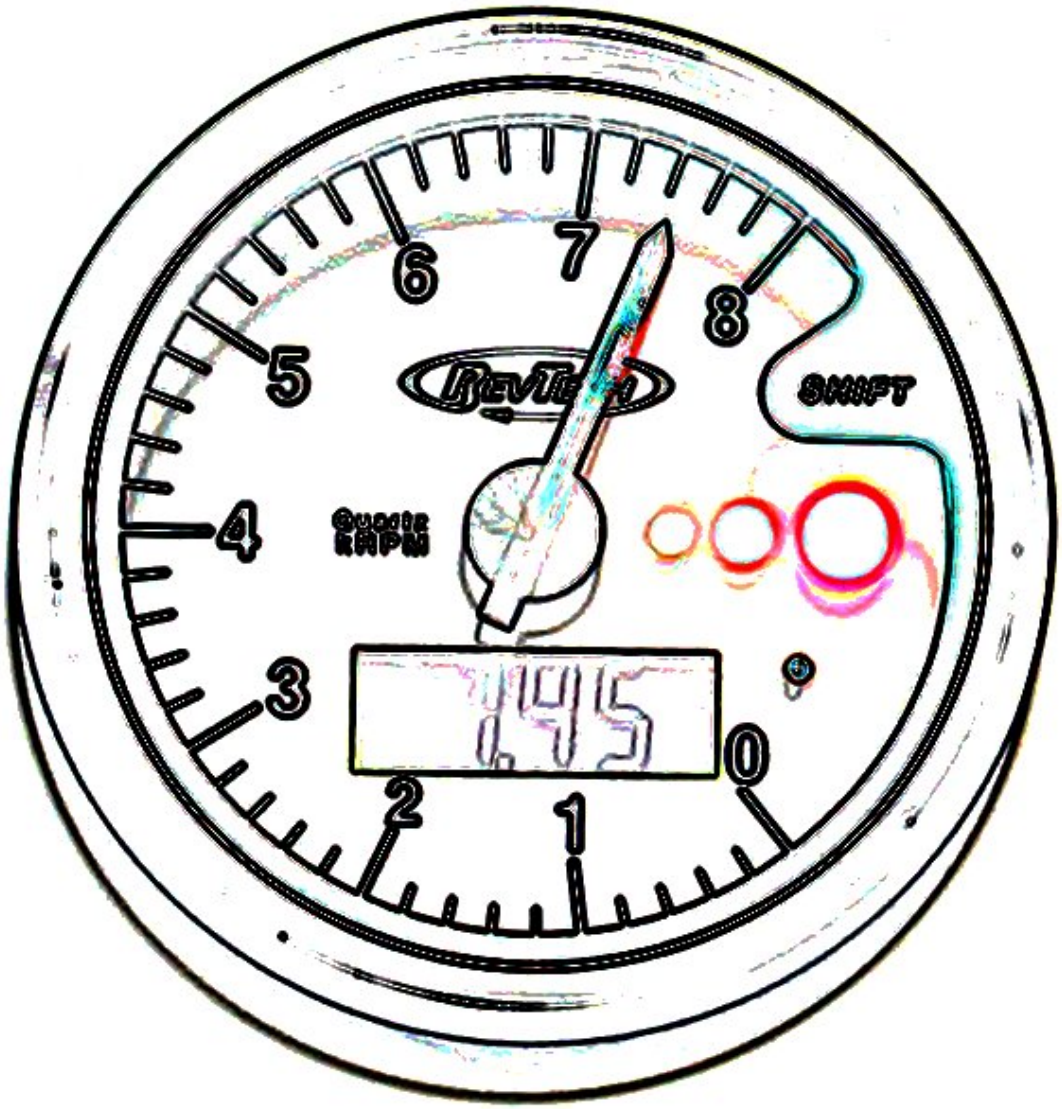

6
7
8
5
SHIFT
4
QUICK
RPM
3
0
2
1

IMPORTANT NOTICE:

READ ALL INSTRUCTIONS COMPLETELY BEFORE ATTEMPTING INSTALLATION.

REMOVE THE BATTERY GROUND (-) CABLE BEFORE INSTALLATION.

THE REVTECH TACHO/SPEEDO COMES COMPLETE WITH A CUSTOM WIRING HARNESS FOR EASE OF INSTALLATION.

INSTALLATION SHOULD ONLY BE ATTEMPTED BY A TRAINED, QUALIFIED TECHNICIAN.

THE HARNESS SHOULD BE ROUTED AND ALL CONNECTIONS MADE BEFORE POWER IS APPLIED.

THE HARNESS SHOULD NOT BE CONNECTED TO THE TACHO/SPEEDO BEFORE ALL CONNECTIONS ARE MADE.

WE DO NOT RECOMMEND MAKING ANY ALTERATION TO THE HARNESS.

THE TACHOMETER CONNECTION SHOULD FIRST BE TRIED BY CONNECTING THE RED WIRE IN THE TACH CABLE TO THE IGNITION TACH SIGNAL WIRE OR THE COIL (-) TERMINAL. THE BLACK AND GREEN WIRES SHOULD BE GROUNDED TOGETHER. IF THIS CONNECTION PRODUCES UNACCEPTABLE RESULTS, REFER TO THE INSTRUCTIONS FOR ALTERNATE CONNECTION CONFIGURATIONS.

THE SPEEDOMETER SENSOR CABLE IS PRE TERMINATED WITH THE CORRECT DEUTSCH SOCKETS FOR EASE OF CONNECTION TO OEM OR AFTERMARKET SPEEDOMETER SENSORS. WE DO NOT RECOMMEND MODIFICATION OF THIS CABLE.

THE FUSE IN THE +12V POWER LEAD SHOULD ONLY BE REPLACED WITH A 20MM GLASS 500MA FAST BLOW FUSE, OR EQUIVELENT. USE OF A FUSE WITH HIGHER AMPERAGE OR OTHER THAN FAST BLOW RATINGS MAY CAUSE THE INTERNAL FUSE TO BLOW, RESULTING IN NON-OPERATION OF THE TACHO/SPEEDO UNIT.

Disclaimer

Every effort has been made to manufacture a quality product and, in this document, fully describe its capabilities.

Those capabilities include the ability to measure things (such as drag racing times and speeds) that are flat out illegal on the public highway and highly dangerous, even on the racetrack. If you do illegal and/or dangerous things because you can now measure them, that is by your choice.

By fitting this tach/speedo you have made a conscious decision to modify your motorcycle. If you don't agree that you are responsible for your own actions, please return this unit for a full refund.

Setup Menu

There is some setup work to be done before you can use your new tach/speedo unit.

This involves making some choices in a menu system:

Option	Function
bon	backlight on/off
bri	backlight brightness
rtP	reset peak values
St4	standing ¼ mile measurement
SSP	acceleration timer start speed
FSP	acceleration timer finish speed
ACC	acceleration timer routine
CyL	number of spark pulses
AvE	needle idle smoothing
LCd	speedo update rate
SF1	green shift light
SF2	yellow shift light
SF3	red shift light
Fon	filter on/off
tot	odometer, total mileage
tr	trigger setting
CAL	tire size / final drive ratio calibration
rEA	speed and distance display units
ton	trip meter on/off
Eng	engineering access only
ret	exit menu, return to normal operation

In the following pages, we describe each of these options in detail.

Backlighting

Your first choice to be made in the setup menu is whether or not to have the backlight on. The factory default is on.

If you decide you want to switch the backlight off, press and hold down the setting button. After 2 seconds, the digital panel will change to from **bon** to **b--** and you'll see the light itself switch off. Compare the two pictures on the left to see this. If you decide you don't like it turned off, hold down the switch again for 2 seconds and your tach will toggle back to **bon**.

Please be aware that the backlight has its own feed wire. Depending on how you choose to connect this will affect when the backlight comes on, regardless of how you configure the unit. We've done it this way so that you have the option of controlling your backlighting with an external switch or (and this would be typical) having it come on only when you turn the headlight on.

Backlight Brightness

Next option on the menu is choosing the backlight brightness. If you can see **bri** on the digital panel, like in the picture on the left, you're there.

Hold down the button for 2 seconds and the display will toggle to display a number between **001** and **063**. These numbers represent the backlighting's brightness value with **063** being the highest and **001** the lowest.

Momentary touches on the switch will increment the brightness up one value. If and when you try to go past 063, it resets to 001. You'll see the backlight intensity change as you go. Chances are, you'll need a few trips around the block to find the level you like.

The lower two pictures on the left show how the display will look at the extremes of the brightness spectrum.

When you're happy, leaving the switch for 4 seconds will cause the display to toggle itself back to **bri**. If this happens by accident, just press and hold the switch again and it will go right back in to the setting screen.

Reset Peaks

Your tach/speedo unit records the peak values it has seen. If you want to reset these peak values (for instance before a pass down the drag strip), get yourself to the **rtP** screen (see the photo) and press and hold the button. After 2 seconds, the display will change to **---** and you're done.

Note that the ability to display peak values is affected by your decision on setting up the trip odometer function. Please be sure you understand the consequences of the choices you are making.

Standing ¼ Mile ET, Terminal Speed and Revs

One of the really powerful features of your new tach/speedo unit is its ability to record standing quarter times and speeds. You access this from the **St4** screen.

To start a new measurement, press and hold the button to display the current standing quarter time. Release it momentarily and press and hold again and the display will reset to **---**. When you see this, release the button and the digital panel will revert to the regular speed display. At this point, you're ready to start recording: as soon as you begin moving, the standing quarter timer will start and a **REC** legend will appear at the top right of the display. As soon as you've traveled ¼ mile, the **REC** symbol will go out and your new standing quarter time will be displayed. Press the button momentarily and you can view your terminal speed and rpm. Press again and you will revert to the **St4** screen.

It's important to understand the limitations of this process. Your tach/speedo unit measures distance by keeping count of the number of times the rear wheel goes round: it doesn't know if you're digging in or getting a load of wheelspin. Any wheelspin you do get will make the unit display a quicker SS ¼ time than you really did. Please keep this in mind when you see an unbelievably good time.

Acceleration Timer

Your tach/speedo unit includes a second, independent acceleration timer that can be configured to record the time taken to accelerate between your choice of speed thresholds. A common choice would be 0 to 60 mph but you might equally well choose 30 to 90. Whatever you do choose, you can always change your mind later.

The picture directly to the left, showing **SSP** on the digital panel, is where you enter the Start Speed. Hold down the button and the display will switch to numbers. Tap the button until you get the speed you want. If you overshoot, simply keep going – when you get to 200, it will roll over back to zero. When you're happy, simply stop tapping the button and after 4 seconds the display will toggle back to **SSP**.

From **SSP**, tap the button once to get to **FSP**. As you would expect, **FSP** is the finish speed for the acceleration timer. Set it in exactly the same way as the start speed: hold down the button to get into the routine, tap the button until you get the number you want, leave the button for 4 seconds to exit .

To actually measure an acceleration time, you need to get into the **ACC** routine. This is one step further through the menu from **FSP**. When you get there, the digital panel will look like the photo down to the left.

The **ACC** routine is used both to display the currently stored acceleration time and to measure and store new ones. To enter it, hold down the button for 2 seconds: the display will show the currently stored acceleration time. Release the button and hold it down for a further 2 seconds and the display will change to **---**, indicating it is ready to take a new reading. Start moving, and as soon as your speed reaches the SSP threshold, a **REC** (meaning, the unit is recording) legend will appear in the top right of the digital panel. When you reach the FSP speed, the REC symbol will go out and the display will read your new acceleration time. You can have fun with this – it's a really good tool to work on different launch techniques.

Set Cylinders

CyL is the next menu item to configure. Cylinders is actually a bit of a misnomer: the number you want here is the number of ignition pulses per two revolutions of the engine.

For single fire ignitions, set to 2; for dual fire, set to 4.

Needle Idle Smoothing

AvE sets the needle smoothing at idle speeds. It's a fact of life that your engine speed fluctuates at idle. At 500rpm, the engine will rotate 500 times a minute but, second by second, the revs may vary between, say, 400 and 600. Without smoothing, the tach needle would wobble to reflect this. We've built in adjustable smoothing so you can set it how you like.

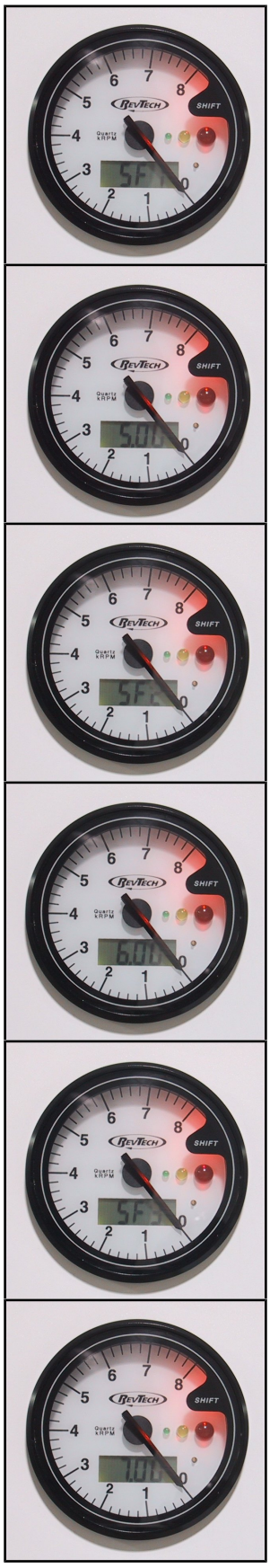
Setting choices are 1 (lowest smoothing) to 4 (highest smoothing). The factory default is 2.

To change the value, hold down the button and the current smoothing value will be displayed. Tap the button and the value will increment by 1. Leave the button for 4 seconds and the display will revert to AvE.

Speedo Update Rate

Your digital speedo display is updated at fixed time intervals. We've done it like this to prevent the last digit being a blur when you're accelerating and to prevent annoying flickering when cruising.

LCd is where you set the update rate. The choices are 1 – 4 where 1 represents 0.1s updates and 4 represents 0.4s. Factory default is 2 which we like but our experience is that everybody likes something different so don't be afraid to experiment.



Shift Lights

The three lights to the right center of your tach/speedo unit are shift lights. Their purpose is to give a visual cue of when to prepare for and when to actually shift gear. They're especially advantageous when revs are changing very quickly: they're easier to see than a rapidly swinging needle and you don't need to be looking right at them to register what they're telling you. What's more, they're fun to experiment with and they look cool.

OK, there are three of them, they're individually programmable and so there are three lots of setting up to do.

One tap of the button past **ACC** is **SF1** (see the uppermost picture on the left). Hold down the button and after 2 seconds the display panel will switch to numbers. The numbers represent the engine revs multiplied by 1000 so 4.20 is 4,200 rpm. Tap the button and the number will increment by 0.1 (equivalent to 100 rpm). In the second picture down on the left, it's been set to 5.00 or 5000 rpm. This is the revs at which the first shift light (the green one) will come on.

Don't worry if you overshoot – the numbers will increment up to 39.90 (39,900 rpm!) and then roll over to 0.10 (100 rpm).

Let go of the button for 4 seconds or more and the display will toggle back to **SF1**. Tap it once and you'll see **SF2** which controls the second, amber, shift light. In the example below left, this has been set to 6.00 or 6,000 rpm.

To set the third and last light, release the button, wait for it to revert to **SF2** and then increment through the menu to **SF3**. Repeat the procedure to set the revs for the last, biggest and brightest light to come on. In our example, we've set it to 7.00 or 7,000 rpm.

Keep in mind that the increments between lights don't have to be the same and nor do they need to be exactly 1,000 rpm. Subject to the 100 rpm steps, it's your choice. Keep in mind also that you might need to allow for your own reaction time so that if you actually want to shift at 7,100 you might need the last light to come on at, say, 6,800. Whatever you decide, it's up to you and it costs nothing to experiment.

The array of three pictures below show what happens as revs increase and the shift lights come on. We've used the same 5, 6 and 7,000 points and in the setting photos on the left.

Filter

Next item on the setup menu is the Filter. This is to do with configuring the tach to respond to the signal it receives. Normally this is set to **Fon** (filter on) meaning the tach tends to reject unwanted signals. CDI type ignitions tend to have very short ignition pulses and you may have to set this option to **Foff** for the tach to "see" the signal.

To change filtering, hold down the button and the display will toggle between settings.

No harm will come to the tach whichever option you choose so feel free to experiment.

Odometer

Next step round the setup menu is the odometer function. This is where your tach counts up and retains the total mileage your motorcycle has covered since the unit was installed. If your display says **tot** like the picture on the left, you're there.

Because of the restricted number of characters on the digital panel, it's not possible to display, to give a random example, 13,456 miles. To get around this, we display on the first page the number of thousands of miles (13 in our example) and on a second page the remainder (456).

Hold down the red button and after 2 seconds the display will change to display the thousands. To use our example, you would see 13. Hold down the button again and the display will switch to read, in our example, 456.

Please keep in mind the odometer reading will be in miles or km, depending on the speedo readout units you've chosen. Please refer to the **rEA** section below for more information.

To return to the menu at any point, simply tap the red button.

Speed and Distance Calibration

There are two parts to setting up your tach/speedo to correctly register speed and distance: trigger counts and tire circumference. Basically, you need to tell the gauge how many signal pulses it's going to see for a given distance traveled. Then, by keeping track of the total number of pulses, it knows how far you've gone and pulse rate tells it how fast you're going.

This would be simple if the speed sensor read the wheel directly but since it's on the gearbox, the picture is complicated by the drive belt ratio. No worries, though, it's just a matter of getting the numbers right.

Set Trigger Count

Use the **tr** routine to set the number of teeth on the gear seen by the factory speed sensor. Each tooth passing the sensor sends a pulse to the tach unit.

Press and hold down the button and the display will change to show a number between 01 and 40. Tap the button to increment the trigger count by one. When it gets to 40, it resets to 01.

For OEM 5 speed transmissions, set to 29; for Revtech 6 speed, set to 26; for Revtech 6 speed with alternate 0.860 ratio, set to 27.

Release the button for 4 seconds and the display will return to the menu.

Tire Circumference

The **CAL** routine is where you compensate for tire circumference and final drive ratio. The accuracy of the speed and odometer hinge on this setting.

There are two ways of going about this – use trial and error or use mathematics. Either way is fine.

If you're going to go trial and error, we recommend starting with a setting of 1.030.

To do this, press and hold down the button. After 2 seconds the display will change to display the current setting. Momentarily pressing the button will increment the value by 0.1. Set to 1.0. Don't worry if you go too far: when the display reaches 4.0, it rolls back over to 0.1.

After 4 seconds, the decimal point will shift to the left. Momentary taps on the red button will increment the value by .001. Set to .030. If you overshoot, don't worry: the display will roll over back from .999 to .000 .

To exit this routine, release the button for 4 seconds and the gauge will return to the menu.

Ok, here's where the trial and error bit comes in. While the 1.03 calibration number is a good place to start, we don't know your tire size and/or final drive ratio. Variations in either of these will affect your speedo and odometer accuracy and you might need to trim the CAL value for your own installation.

For example, if you're riding at 50mph and the gauge reads 55, it's reading 10% high and you'll need to reduce the CAL value by 10% to compensate. In this case, our initial value of 1.030 would need to be changed to 0.927.

Retest after any changes and you'll soon find the required number.

If you fancy your chances the scientific way, here's what you do:

The **CAL** routine is where you set the tire circumference corrected for the belt drive ratio. An important point here is that the tire size needs to be in meters. To get to meters (mm) from inches, multiply by 25.4 and divide by 1000.

You might want to view this as an equation:

$$CAL = \frac{TireCircumference \times 25.4 \times GearboxSprocketTeeth}{1000 \times WheelSprocketTeeth}$$

To give an example, suppose your tire circumference is 58" and your belt sprockets have 28 teeth at the gearbox and 87 on the wheel. Putting these numbers into the equation, you get:

$$CAL = \frac{58 \times 25.4 \times 28}{1000 \times 87} = \frac{41249}{87000} = 0.474$$

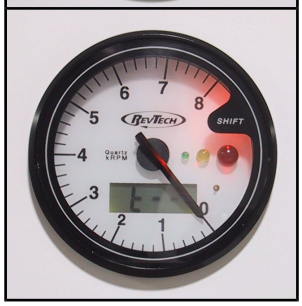
OK, in this example you would need to enter 0.474 into the tach to get the speedo and odometer functions to work right. This is how you do it:

From the **CAL** screen as shown in the photo, press and hold down the red button. After 2 seconds the display will change to display 2 digits in the format **N.n** where N represents meters and **n** tenths of meters. Tapping the red button will increment this screen 0.1 at a time so 4 taps will get you to the 0.4 required in our example. Leave the button alone for 4 seconds and the display will toggle to display 3 digits in the format **.nnn**. The first digit to the left of the decimal point should already say, in the case of our example, 4 and the remaining two 00. Tap the button until the two rightmost digits say, again using the example, 74. Leave the button for 4 seconds, the display will reset and you're ready for the next menu item.

Set Readout

After setting the speedo calibration, the next task is to choose the distance and speed units you want. Your choice is American (miles and miles per hour) and Metric (kilometers and kilometers per hour) or engine rpm.

Get yourself to the **rEA** screen and hold down the red button. After 2 seconds the display units (on the bottom right of the LCD screen) toggle sequentially through KPH, MPH and blank. Blank means that engine revs instead of speed will be displayed on the screen.



Trip Mileage

Under normal running conditions, a single press of the red button can be set to display either peak rpm and speed value or trip mileage.

ton means the trip meter is on. Pressing the red button while you're riding will display the distance run since the last reset. To reset to zero (for instance when filling up with fuel), hold the button down for 5 seconds.

t-- means the trip meter is off. In this mode, pressing the red button while riding will display the peak speed on the LCD panel.

Peak RPM will display in either mode (the tach needle will move to display the peak reading seen).

In the setup mode, you can toggle between **ton** and **t--** by holding down the red button for 2 seconds.

Engineering Access

The **Eng** routine is for manufacturing purposes only. It is code locked.

Return

rET is used to exit the setup menu routine and restart the instrument for normal operation. Press and hold down the red button. After 2 seconds the display will go blank. When you release the button, the instrument will restart.

Speed Sensor Wiring

Your tach speedo is designed to work with the OEM gearbox mounted speed sensor. We have left off the mating connector to make it easy to thread the wires through. After you've run the wires, you'll need to fit the terminals into the connector body. As you would expect, this needs to be done right to work properly.

If you look at the connector body supplied with your tach/speedo unit just below the molded ridge, you'll see the letters A, B and C on the corners.

Insert the wires into the plug according to the table below:

PIN	TACH/SPEEDO WIRE	SENSOR WIRE
A	Red	Red
B	Black	White
C	Green	Black

The pins go in through the molded rubber gland. They go in easily – keep pushing until you hear a click which means the tab inside the plug has gripped the pin. You can inspect this by looking in to the other end of the plug: done right, the entry end of the pins should be nearly flush with the end of the housing.

When you're sure it's right, insert the orange plastic keeper into the plug body. This makes sure the pins are locked.

Once you're finished, just push the tach/speedo and sensor plugs together.

Installation Dos and Don’ts

DO ensure the back of the instrument and the plug are protected from water. If water gets inside the tach, it will stop working. If you have to leave them open and want to ride in the rain, please use some kind of silicone sealant.

DO ensure the wires carrying the ignition and speed signals to the tach are not run parallel to any spark plug wires or next to each other.

DO NOT run cables through sharp edged apertures without protection

DO NOT fix cables to any surface that is likely to run hotter than 80°C

DO NOT connect the tach signal wires to the high tension side of the ignition system.

Tach Ignition Connection

Please use a tach output from the management, ECU or ignition box if this is available. Nearly all modern engines have tach outputs and this may be the only workable option on some ignition systems.

The tach can take its signal from the low tension side of the ignition coil. It can easily withstand short CDI type pulses up to about 500V but NOT connection to the high tension leads or spark plugs.

If you do not have a tach output, please work through these suggestions:

If you find it doesn’t work as you first connect it, try reversing the connections on the coil or connecting one signal wire to the frame and the other to one of the coil terminals. Work through different combinations until you find one that works. You cannot damage the tach by doing this.

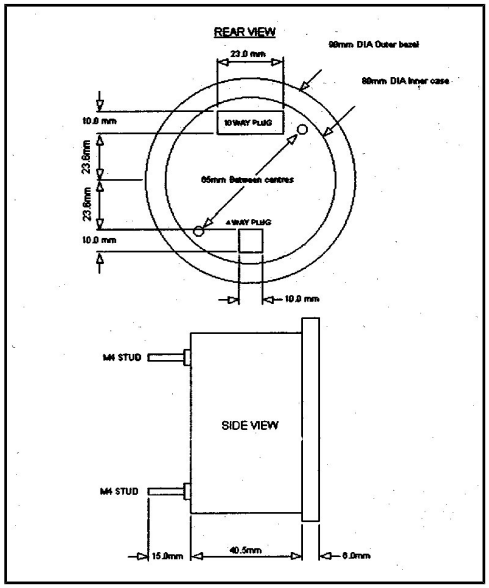
External Shift Lamps

If you wish to drive external shift lamps in addition to the internal array, you can use either the SPA 3-stage shift light box or discrete LEDs. which must be of the 12V type and draw no more than 100mA. If you need brighter lamps, you can use the tach to drive a relay but this must also draw no more than 100mA coil current and MUST be fitted with a protection diode (eg 1N4001) across the coil.

Specifications

Input Voltage	8-26V (working)
Current Consumption	150mA (max) @ 12V
Fuse	20mm Glass 500mA Fast Blow
Tach Accuracy	0.05%
Speedo Accuracy	0.05% typical
Acceleration Timer	0.1s typical
Standing ¼ Mile Timer	0.1s typical
Data Storage	EEPROM
Weight	400g
Absolute Maximum Voltage	28V
Absolute Maximum RPM	39,900
Absolute Maximum Speed	999 MPH/KMH
Absolute Maximum Odometer	999,999 Miles/Km
Instrument Temperature	0 – 50 °C

Installation Drawing



Ignition Wiring