Radical Performance Engines SR8 V8 Engine Handbook
Contents
Specifications ................................................................. 1
Installation ................................................................. 1
Fluids ........................................................................... 2
  Oil System ............................................................... 2
  Coolant System ....................................................... 2
  Fuel ......................................................................... 2
Oil and Coolant System Connections ......................... 2, 3
Coolant System Schematic ........................................... 3
Throttle and Airbox installation .................................. 4
Airbox ....................................................................... 4
  Throttle Body and Cable Set Up ................................ 4
Engine management .................................................... 5
  Life Racing ECU Software - PTMon ......................... 5
Fluid levels ................................................................. 6
  Oil Level .................................................................. 6
  Coolant Level .......................................................... 6
Starting Procedure ...................................................... 6
  Re-Starting .............................................................. 6
Service Intervals .......................................................... 7
  Fuel Filter .............................................................. 7
  Air Filter .................................................................. 7
  Engine Oil and Oil Filter .......................................... 7
  Service Parts .......................................................... 7
  Engine Returns ....................................................... 8
Instructions for Retrieving Data from Life ECU and Data logger .... 9
Driving Techniques for Cars with an RPE Engine .......... 10
  Paddle shift cars: ..................................................... 10
  Cars on stick shift: .................................................. 10
RPE PS1 Power Shift Instructions / Maintenance ........ 11
RPE PS1 Power Shift Troubleshooting ......................... 12
Contact Details .......................................................... 13
Engine Dimensions ...................................................... 14
**Specifications**

Radical Performance Engines RP Series V8 Engine’s are available in capacities from 2700cc to 3200cc.

- Rated Speed –10,000 rpm
- Firing Order – 1, 8, 2, 7, 4, 5, 3, 6
- Cylinders 1 to 4 is on Bank B.
- Cylinders 5 to 8 are on Bank A.

**Installation**

The engine should be mounted into the chassis by means of 5 M10 bolts into the front of the engine and an M12 bar through the bottom of the bell housing. The engine cannot be used as a stressed member. The engine must be mounted with poly bushes between the engine and the chassis. We recommend that the poly bushes are fitted the locations indicated in picture 3 below. The material we recommend for the poly bushes is: Black 90A EDPM for the front and Black Nylon 66 for the rear.

All sensors should be connected correctly and in working order, including:

- Air charge temperature
- Oil pressure
- Coolant temperature
- Oil temperature
- Barometric sensor

The oil system must be connected up as per the information in this pack. The coolant system must be connected up and capable of providing enough cooling for the engine to maintain correct operating temperature as outlined later in this pack.

Contact RPE if you have any doubts/questions.

Above: Frame attached to the front of the engine.

Right: Shows the frame attached to the front of the engine and mounted in the chassis.

Above: Shows the rear engine mount through the chassis and bell housing.
**Fluids**

**Oil System**

Recommended - Silkolene PRO R or PRO 4 15W-50

If this specific oil is not available to you, please use comparable oil.

**Coolant System**

50% water and 50% antifreeze/summer coolant.

**Fuel**

**RPX 2.7 and RPB 3.0**

All RPE engines should be run on a minimum of 98 RON fuel.

Where possible specific race fuel should be used, however pump fuel can be used as long as it is 98 RON or higher.

**RPC 3.2/RPY 3.0**

Please contact RPE for fuel specification.

**Octane Boosters**

If fuel of the correct octane level is not available, octane boosters can be used, although please contact RPE before using octane boosters in fuel.

**Oil and Coolant System Connections:**

The engine oil feed from the dry sump tank, uses a -16 pipe. It goes from the bottom of the dry sump tank (bell housing) to the -16 union on the oil pump bodies, which is located on the bottom right side of the engine.

The oil return (from the engine to the dry sump tank) uses a -12 pipe. It comes from the -12 union on the oil pump bodies, which is also located on the right hand side of the engine at the bottom. The other end of this pipe usually goes to the input of an oil cooler. The oil cooler could be either a radiator type, or a oil to water heat exchanger. The output of the oil cooler then connects to the lower of the two -12 unions on the top of the dry sump tank.

The oil swirl pot has three extra unions on it. There is a -12 and two -10 fittings. These are for the engine/tank breathers. The -12 one should be connected to oil catch tank. The -10 unions are for the Bank A and B breathers. They should be connected to the -10 unions on each cam cover, as shown below. There is one way valves built into these unions on top of each of the cam covers, which allow the engine to work with a vacuum, but with the ability to release pressure if required.

![Diagram of oil and coolant system connections](Image)
**Oil Hoses**
Picture 5 shows the engine breather system, oil feed and return pipes viewed from above.

**Coolant System Schematic**
The picture below shows the coolant system connections.

*A typical RPE RP Series V8 Cooling System*

The diagram above shows the coolant system as fitted to a Radical SR8. If you are fitting the engine into a Radical, this system should be used.
If the engine is going to be fitted into another vehicle, then the water system should be similar and be capable of providing adequate cooling efficiency.

---

**Picture 5**

One Way Valve  
Bank A Breather  
Engine/Oil tank Breather Pipe  
Bank B Breather  
Oil Return Pipe  
Oil Feed Pipe

---

**Picture 6**

Please note: Oil feed pipe comes up from the fitting and then back down again. This is so that the oil does not drain from the tank into the engine when the engine is not running.
Throttle and Airbox installation

Airbox
Ensure that all fixings on the air box are tight and there are no foreign bodies that could fall into the engine and cause damage internally, once the engine has been started. All bolts/screws in the airbox must be lock wired or fixed using thread lock.

Throttle Body and Cable Set Up
To set up the individual throttle bodies RPE V8, please follow these rules:

When the engine is idling at around 1600 – 1800rpm, the syncrometer reading needs to be 7 on each of the individual throttle bodies and the TPS should be between 3.8% and 4.2% The TPS value can be seen on a computer connected to the ECU, see picture 10 - item 6.

This is achieved by adjusting the idle speed screw, adjustment rods and throttle body adjusters.

Ensure that all eight of the bodies open fully and evenly.

DURING THIS PROCEDURE IT IS ESSENTIAL THAT YOU HAVE A LAPTOP CONNECTED, WITH PTMON DISPLAYED, CHECK THE ENGINE COOLANT TEMPERATURE IS A MINIMUM OF 50°C AND MAXIMUM OF 90°C WHILE THE ENGINE IS RUNNING.
**Engine Management**

When starting the engine, connect a laptop to the car and load up PTMon. This displays the vital engine parameters on the laptop’s screen (as shown in picture 10).

**Life Racing ECU Software – PTMon**

![Picture of PTMon application](image)

1) Engine oil temperature (eot) – will change from red to yellow when over 50°C.

2) Air charge temperature sensor (act1) – air inlet temperature

3) Engine rpm (rpm) – Engine should idle between 1500 and 1800rpm.

4) Engine ecu temperature (btMax) – temperature of the engine ecu

5) Engine coolant temperature (ect1) – this will change from red to yellow when over 50°C.

6) Throttle position sensor (tps1) – needs to be set to 4% at idle

7) Engine sync state – should be at 720 when engine is running

8) Engine oil pressure (eop1) – 70 psi when cold at idle / 20 psi when hot at idle

9) Baro sensor pressure (bap) – below 1030

10) Fuel pressure (fp1) – should read around 3000 mBar

11) Battery voltage (vbat) – above 12.5 volts
Fluid Levels

Oil Levels
Check that oil is visible in the oil tank / bell housing. The exact level can only be checked once the engine is warm – see starting procedure for correct level and method of checking.

Coolant Level
Fill the coolant system with a mix of 50% water and 50% anti freeze/summer coolant. When the system is fully bled, the coolant should swirl around the swirl pot. The coolant level should be 25mm from the top of the coolant swirl pot with the engine switched off.

Starting Procedure
a. Always start the engine with a laptop connected to the ECU so that all engine parameters can be monitored during warm-up. This also confirms all the sensors are working.

b. Check plenty of oil is visible in the oil tank and the coolant level is to the correct level.

c. The engine should be dry cranked, as some oil will have drained back into the engine if it has been previously run. This will return to the tank once the engine is started. To dry crank the engine, disconnect the ignition coils and turn the engine over, until it produces oil pressure and oil is returning to the oil tank.

d. Once it is producing oil pressure and oil is returning to the tank, re-connect the ignition coils and turn the ignition on. Start the engine with no throttle, and then increase the engine speed to approximately 2,000rpm – 3,000rpm. Check the oil pressure; it should be a minimum of 60 psi.

e. When the engine coolant temperature reaches 50°C, hold the revs at 4,000rpm for a few seconds (this allows the scavenge system to clear oil from the crankcases) and turn the engine off.

WARNING – RADIATOR COOLING FANS ARE NOT FITTED AS STANDARD. DO NOT LET THE WATER TEMPERATURE EXCEED 90°C WHEN WARMING THE ENGINE TO CHECK THE OIL LEVEL.

f. Immediately check the oil level, it must be 250mm +/- 10mm from the top of the filler neck, as shown in picture 11 below.

Re-Starting
a. Ideally, the engine should be started 45 minutes prior to going on track. Turn the engine off when the coolant temperature reaches 85°C and allow heat to soak into the engine. Restart 10 minutes before going on track and get the coolant temperature to 75°C.

b. The oil level should be checked after every hour of running, and it should be topped up to the level indicated above.
**Service Intervals**

**Fuel Filter**
The fuel filter should be cleaned after every 40 hours of running. Or visually inspected, especially if you have recently fitted a new fuel tank, is experiencing fuel starvation or a drop in fuel pressure.

**Air Filter**
The engines air filter should be inspected before every race. It should then be cleaned and oiled as per the manufacturer’s instructions and should be replaced as required.

**Engine Oil and Oil Filter**
The engine oil and filter should be changed after every 5 hours of running.

Please be aware that when fitting an oil filter to a V8 it must be tightened using the correct procedure and have a jubilee clip fitted around it. This jubilee clip must then be lock wired to the bolt in the crank cases as per picture 12 opposite.

**WARNING - THE OIL FILTER COULD COME LOOSE RESULTING IN A LOSS OF OIL PRESSURE AND SUBSEQUENT ENGINE DAMAGE IF THE ABOVE IS NOT CARRIED OUT CORRECTLY!**

**Tightening Procedure:**
Apply a thin film of engine oil to the oil filter’s O-Ring. Wind the oil filter onto the engine until it’s O-Ring touches the sealing face on the engines block. Then, tighten the filter a further 360°.

Please see picture 12 for correct fitting of jubilee clip and lock wire. It shows that the lock wire is fed through the bolt head and twisted. It is then fed down one side of the screw in the jubilee clip, around and back up the other side. It is then twisted to lock it off.

All V8 engines, both new and rebuilt leave the RPE workshop in this manner.

**Service Parts**

**Spark Plugs**
Recommended: Nippon Denso IU27D

Alternative: NGK CR9EiA-9

**Oil Filter**
Recommended: Comline EAS008

**Air Filter**
Recommended: K & N 33-2343
**Engine Returns**

When returning the engine to RPE for a refresh or repair, the engine should be removed from the vehicle and be externally clean. Please follow the procedure below.

- Flat packed metal crates can be collected from your local distributor, alternatively you can drop off your engine at your distributor and they will process the engine on your behalf.

- All engines must be drained of fuel, coolant and oil.

- Tilt the engine, so that the drain bung on the sump is the lowest point of the engine and leave for 3 to 5 hours.

- Bung all oil, water and fuel inlets and outlets.

- If possible shrink wrap or seal the bottom end of the engine to catch any residual fluids.

- Ensure no previous shipping details remain on the shipping container as this may cause delays with shipping and customs.

- Locate engine securely in crate.

- Add packaging to secure engine.

- Additional items (ECU, throttle bodies etc) must be packaged and secured.

- Secure lid and affix address labels to lid and side of crate (minimum of 2 labels)

To keep within the warranty rules, the ECU should always be returned to RPE with the engine. This is for two reasons:

- Data can be checked.
- Engine hours can be reset on the ECU.

In the event of an engine failure:

- RPE should be contacted and the ECU’s data should be downloaded and e-mailed to the RPE Technical department on the details below: (technical1@radicalperformanceengines.com).

- Debris may have transferred to the oil lines and cooler. An exchange oil cooler **MUST** be fitted and the oil lines flushed thoroughly with a non water based cleaner (Such as Petrol or Jizer cleaning fluid). The cooler can be purchased either from RPE or your local Radical distributor. Only flushing the oil cooler will not remove all of the debris.

Failure to carry out the above will result in your engine warranty being void and no claim can be made against it.

As soon as your original engine is repaired and fully refreshed you will be credited/invoiced for the work/parts required.

RPE do not cover the cost of removal and refitting of the engine, any third party costs or replacement of fluids.

RPE also recommend a range of optional services when having your engine rebuilt. These are all available through RPE. They are:

- Injector testing and cleaning
Instructions For Retrieving Data from Life ECU and Data logger

1. Connect a computer to ECU/car, turn both the ignition and master switches on to power up the ECU.

2. A working directory now needs to be created. This selects the folder in which the data will be stored once it has been downloaded, and sets a route to find the information. It contains the name of the driver and/or car number etc. For example C:\Program Files\Life Racing\Track Maps & Data\SR3 (SR5, SR8)\Customer\Track & Date.

3. Open the Life Data icon on your desktop.

4. Select F for file, then W for working directory.

5. At the top of the screen, below the toolbar will be C:\Program Files\Life Racing\Track maps & Data. If not, correct this part by selecting the full stop button... it goes back one section. Then by selecting “create”, a box comes up with “enter new directory name”. Enter the appropriate information, such as car type, chassis number, circuit and date. Once this is done, press Enter.

If on the other hand this has been set up the next part will be in the drop down box i.e. Track maps & Data, SR3 or SR5 or SR8, customer name, track & date.

All you then need to do is select the appropriate item until it is complete.


7. A box comes up with “there is no LR directories config file at: - Create one – select Yes.

8. Another box with “place shortcut on desktop” select No.

9. Then select D for device and R for read data.

10. In the next box select ok. If this data needs to be looked at, load up Life View, click on File, Load and then find as above the appropriate file. Once you have loaded up a data file, the channels will be listed down the right hand side of the screen, to display a channel highlight it using the arrows on the keyboard and press enter.

If the data needs to be e-mailed go through My computer, Program Files, Life Racing, Track maps & Data, SR3/SR5/SR8, customer, track & date select file or files to be e-mailed.
Driving Techniques for Cars with an RPE Engine

Paddle shift cars:

- The clutch is sharp, and needs to be let out slowly whilst the car is stationary
  To pull away, engage 1st gear, with the clutch fully depressed, raise the revs to 2500 rpm, and slowly release the clutch
- When the car is moving slowly, it is advisable to use the clutch on the way up and down the gearbox, and when changing up and down from 1st to 2nd at speed. However whilst on track, at racing speed the clutch is not needed, and you can keep the throttle open on up changes.
- Optimum revs to change up gears is between 9500, and 10,000 rpm
- To change down you should wait till the revs have dropped to around 7,000 rpm
- The slick tyres on the car, the brakes and the engine will take a few laps to warm up, and grip is greatly reduced on cold tyres, so it is important to take this into consideration, and slowly build up your pace
- The cars are at there best when driven smoothly, so gradual application of throttle, brakes and steering is best. Throttle and brakes must be applied separately, never together.

Cars on stick shift:

- All of the above applies, apart from the gear change technique
- To change up and down the revs at low revs the clutch must be used
- To change up the gears at racing pace, then the clutch is not necessary, but can be used if preferred. To change up the gears, you need to lift off the throttle, and pull back on the gearstick to engage the next gear. You can then let go of the gearstick and it will return back to its central position.
- To change down the gears whilst applying the brakes, you need to depress the clutch and push the gearstick forwards to engage a lower gear. As the gear is engaged you can release the clutch and let go of the gear stick, which will return to its central position. To come down multiple gears just repeat this process, making sure the clutch is depressed for each down change.

Should the car spin

It is important therefore that if the car is in a spin situation, the clutch is depressed as a matter of urgency, to reduce the risk of damaging the engine.
RPE PS1 Power Shifter

Instructions
The RPE paddle shift/auto-blipper system allows clutch less up shifts and
downshifts, minimizing lap times and significantly reducing the risk of an
over-revving of the engine.

The steering wheel mounted paddles require positivity to ensure correct
operation. Flicking of the paddles will give intermittent gear selection

It is advisable to use the clutch between 1\textsuperscript{st} and 2\textsuperscript{nd} when pulling away from
stationary.

The auto blipper software incorporates an engine over-rev protection. Down
changes are dis-allowed above a pre-set rpm.

WARNING
Should the driver ‘short shift’ on a low throttle position and below the
dis-allow rpm, then pull the ‘downshift’ paddle by mistake, it will
select the lower gear and potentially over-rev the engine. The engine
can also be overrevved if the clutch is depressed when downshifting.

MAINTENANCE
EVRY RACE (DURING PRE-RACE PREP)
Check compressor pressure (6 bar / 8bar for closed loop systems)
Check fittings and hoses for leaks or damage
Check actuator mounts and bearings
Check that the O-ring is in place behind the actuator mounting bearing
Check condition of wiring (no damage or chaffing)
Check throttle cable adjustment (blipper)

EVERY MEETING (DURING PRE-MEETING PREP)
As above plus –
Check actuator rod adjustment (should be in the middle of travel, approx
15mm each way)
Check actuator rod ends
Spray wiring with wd40 or similar do prevent water penetration
Spray actuating rods with wd40 or similar
Check mounting of compressor
Ensure correct blipper ECU is fitting to correct car. (Settings vary from model
to model)

EVERY 3 MONTHS
As above plus –
Remove end cap from compressor and drain water.
RPE PS1 Power Shifter

TROUBLESHOOTING

MIS-SHIFTS
Loose actuator mounting bracket
Incorrectly adjusted actuator rod
Drop link on the gearbox is worn or loose
(Tighten bolt, prior to tightening the securing nut as it is threaded into the drop link)
Low air pressure in tank is caused by
Faulty pressure switch
Air leak from plastic hose or fittings
Check that the gear cut wire is connected and engine is cutting (see up shifts below)
Operator error – tapping of paddle instead of full pull

NO DOWNSHIFTS
Loss of power to actuator solenoid
Check that there is power to the actuator terminal when the paddle is pulled
Check the other terminal for good earth
Faulty actuator solenoid
Check for continuity across terminals
Wiring to the paddles is broken or plug is loose
Switch on the paddles is faulty
Check for continuity when paddle is pulled
Faulty blipper ecu (if fitted)

NO UPShIFTS
Loss of power to actuator solenoid
Check that there is power to the actuator terminal when the paddle is pulled
Check the other terminal for good earth
Faulty actuator solenoid
Check for continuity across terminals
Wiring to the paddles is broken or plug is loose

Switch on the paddles is faulty
Check for continuity when paddle is pulled
Gear cut not connected/enabled
Check to ensure that the gear-cut wire is connected to the gear cut output on the ECU loom
Holds the engine rpm at above 2000 rpm with the clutch pedal DEPRESSED and pull the up shift paddle. A small dip in the engines rpm should be felt if the gear cut is working correctly

NO GEARSHIFTS
Check power supply to paddle shift loom
Check inline fuse (if fitted - early pre-blipper looms only)
Ensure battery terminal is tight and battery is charged
Check to ensure the earth cable is tight and making good contact.
Check to see if there is pressure in the tank.

IF ALL SYSTEMS WORKING OK, CONTACT RADICAL OR RPE FOR ADVISE

FAILURE TO DO SO MAY EFFECT ENGINE WARRANTY
Contact Details

Radical Performance Engines Ltd
Unit 24 Ivatt Way
Westwood
Peterborough
PE3 7PG

Tel (office): +44 (0) 1733 331919
Tel (technical support): +44 (0) 7795490850
Fax: +44 (0) 1733 333666

E-mail

Engine Rebuilds
service@radicalperformanceengines.com

RPE Technical Support
technical1@radicalperformanceengines.com
Technical2@radicalperformanceengines.com

RPE Parts Department
parts@radicalperformanceengines.com

RPE Sales
sales@radicalperformanceengines.com

Radical Sportscars
Unit 24 Ivatt Way
Westwood
Peterborough
PE3 7PG

Tel (office and parts): +44 (0) 1733 331616

E-mail

Radical Technical Support
technical@radicalsportscars.com

Radical Parts
stores@radicalsportscars.com
APPENDIX

WIRING LOOM AND ECU PIN OUTS
<table>
<thead>
<tr>
<th>Description</th>
<th>Label</th>
<th>Part Number</th>
<th>Terminal</th>
<th>Boot</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: Battery</td>
<td>BAP</td>
<td>01F 552113</td>
<td>1 2 3 4 5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3: Fuel Pump Relay</td>
<td>RSI + R5T From Vehicle Wiring Products</td>
<td>025-37139</td>
<td>1 2 3 4 5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4: Lambda 1</td>
<td>Lambda 1</td>
<td>035-592151</td>
<td>1 2 3 4 5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5: Lambda 2</td>
<td>Lambda 2</td>
<td>035-592159</td>
<td>1 2 3 4 5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- 20 = ut 8883
- V: T
- 333: 3
- T18 = 12V TOP OF T
- B: BAP 057
- P: BAP 054
- N: Number
- S: Switch
- T: Terminal
- U: Unit
- W: Wire
- X: EX
- Y: RA
- Z: Zone

**Terminal Diagrams:**
- 12V Top of T
- Battery Supply
- Fuel Pump Relay
- Lambda 1 & 2
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part Number</th>
<th>Wire Color/Type</th>
<th>REMARKS</th>
<th>Terminal</th>
<th>Boot</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Crank</td>
<td>1T 110-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>Orange GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crank</td>
<td>1T 110-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>Orange GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Pump Out</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>EXT GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump Out</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>EXT GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Engine Gnd</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>EXT GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engine Gnd</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>EXT GND</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Fuel Pump</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>Fuel Pump</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuel Pump</td>
<td>120-882/010 RS 1 5/8B S/1 5/8A 010 2002 I</td>
<td>22</td>
<td>Fuel Pump</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>-</td>
<td>COL 1</td>
<td>22</td>
<td>C1,2,4,6,10</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>COL 1</td>
<td>22</td>
<td>C1,2,4,6,10</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>-</td>
<td>COL 2</td>
<td>22</td>
<td>C1,2,4,6,10</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>COL 2</td>
<td>22</td>
<td>C1,2,4,6,10</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>-</td>
<td>DRIVER SHFT</td>
<td>22</td>
<td>UP SHFT VALVE</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>DRIVER SHFT</td>
<td>22</td>
<td>UP SHFT VALVE</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>-</td>
<td>OIL PRESS</td>
<td>22</td>
<td>Oil Press 12V</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>OIL PRESS</td>
<td>22</td>
<td>Oil Press 12V</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- COL: Control Line
- C1,2,4,6,10: Terminal Connections
- Boot: Type of boot for wire connection
- Color/GND: Wire color or ground reference
- REMARKS: Additional information about the wire or terminal connection
- Terminal: Number of the terminal on the harness or connector
- Notes: Additional notes or specifications for the connection.
<table>
<thead>
<tr>
<th>Description</th>
<th>52VH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>12CH</td>
</tr>
<tr>
<td>Part Number</td>
<td>M10 RING</td>
</tr>
<tr>
<td>Boot</td>
<td>52AT</td>
</tr>
<tr>
<td>Terminals</td>
<td>T1 TPE TBE PA</td>
</tr>
<tr>
<td>Notes</td>
<td>52 SIG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>ACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>AIRTEAR</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>ACT SIG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>ECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>WATER/TEMP</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>ECT SIG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>TPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>TPS</td>
</tr>
<tr>
<td>Part Number</td>
<td>3 WAY FEMALE (2S-267-481)</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>TPS 5V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>INJECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>1201</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>IN1 12V+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>INJECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>1202</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>IN2 12V+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>INJECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>1203</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>IN3 12V+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>INJECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>1204</td>
</tr>
<tr>
<td>Part Number</td>
<td>2 WAY JUNIOR TIMER</td>
</tr>
<tr>
<td>Terminal</td>
<td>JUNIOR TIMER 87777-1</td>
</tr>
<tr>
<td>Boot</td>
<td>HEAT</td>
</tr>
<tr>
<td>Notes</td>
<td>IN4 12V+</td>
</tr>
</tbody>
</table>
### Description 27
**Label:** INJECTOR 5  
**Part Number:** 2 WAY JUNIOR TABRE  
**Terminal:** JUNIOR TABRE 87777-1  
**Boot:** 5VAT  
1  
2

### Description 28
**Label:** INJECTOR 6  
**Part Number:** 2 WAY JUNIOR TABRE  
**Terminal:** JUNIOR TABRE 87777-1  
**Boot:** 5VAT  
1  
2

### Description 29
**Label:** INJECTOR 7  
**Part Number:** 2 WAY JUNIOR TABRE  
**Terminal:** JUNIOR TABRE 87777-1  
**Boot:** 5VAT  
1  
2

### Description 30
**Label:** SPARE  
**Part Number:** GMSKX-1000  
**Terminal:** 802007-20001  
**Boot:** 5VAT  
1  
2

### Description 31
**Label:** WHEEL SPEED  
**Part Number:** RS 485-525  
**Terminal:** RS 485-525  
**Boot:** 5VAT  
1  
2

### Description 32
**Label:** WHEEL SPEED  
**Part Number:** RS 485-525  
**Terminal:** RS 485-525  
**Boot:** 5VAT  
1  
2

### Description 33
**Label:** PADDLE SHIFT TACT & GEAR CUT SIGNAL  
**Part Number:** 2 WAY TABRE  
**Terminal:** GMSK-251-20141  
**Boot:** 5VAT  
1  
2

### Description 34
**Label:** CAM  
**Part Number:** 3 WAY TABRE  
**Terminal:** NONE  
**Boot:** 5VAT  
1  
2
<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>FUEL PRESS</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>FUEL SEAL GRP</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>D.C. FUEL</td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td>22</td>
<td>FUEL PRESS GRP</td>
</tr>
<tr>
<td>22</td>
<td>FUEL PRESS IGN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>10,000 OHM SERIES RESIST IN WARBURST</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>IGN RESIST GRP</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>SPICE</td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td>1</td>
<td>TACHO SIG FOR PI</td>
</tr>
<tr>
<td>2</td>
<td>TACHO SIG FOR PI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>GEAR POT</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>GEAR POT</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>GEAR POT GND</td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td>2</td>
<td>GEAR POT GND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>WATER PUMP</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>WATER PUMP</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>T-FORM FEMALE (2)</td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td>2</td>
<td>WATER PUMP GND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td>40-12V</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>40-12V</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>50-12V</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>50-12V</td>
<td>CHASSIS SPLIT</td>
</tr>
<tr>
<td>CUSTOMER</td>
<td>RADICAL</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>VEHICLE</td>
<td>SR8 V8</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>F88RX (1.6) ENGINE HARNESS</td>
</tr>
<tr>
<td>PART NUMBER</td>
<td>HA0-0216-20T</td>
</tr>
<tr>
<td>DATE</td>
<td>27/09/2010</td>
</tr>
<tr>
<td>SERIAL NUMBER</td>
<td>0</td>
</tr>
</tbody>
</table>

| 17 | INPUT #1 ANA V/I (R47/K) NonBr/NonHz | R47 K DO NOT USE |
| 44 | INPUT #2 ANA V/I NonBr/NonHz | ECT SIG |
| 16 | INPUT #3 ANA V/I NonBr/NonHz | ACT SIG |
| 43 | INPUT #4 ANA V/I NonBr/NonHz | ECT SIG |
| 15 | INPUT #5 ANA V/I NonBr/NonHz | REVERSE DETENT BUTTON |
| 42 | INPUT #6 ANA V/I NonBr/NonHz | OIL PRESS SIG |
| 14 | INPUT #7 ANA V/I NonBr/NonHz | GEAR SYSTEM PRESSURE SIG |
| 41 | INPUT #8 ANA V/I NonBr/NonHz | TPS SIG |
| 39 | INPUT #9 DIG V/R/Hz | CRANK SIG |
| 11 | INPUT #10 DIG V/R/Hz | CAM SIG |
| 38 | INPUT #11 DIG V/R/Hz | SPARE INPUT2 |
| 10 | INPUT #12 DIG V/R/Hz | WHEEL SPEED SIG |
| 37 | INPUT #13 DIG V/R NonBr/NonHz | SPARE INPUT1 |
| 9  | INPUT #14 DIG V/R NonBr/NonHz | FUEL PRESS SIG |
| 36 | INPUT #15 DIG V/R NonBr/NonHz | BAP SIG |
| 8  | INPUT #16 DIG V/R NonBr/NonHz | GEAR CUT |
| 73 | AN17 Voltage only | GEAR POT SIG |
| 71 | AN18 Voltage only | |
| 68 | AN19 Voltage only | |
| 66 | AN20 Voltage only | |
| 19 | AN21 Resistive only | DOWN SHIFT SW |
| 46 | AN22 Resistive only | UP SHIFT SW |
| 18 | LAMBDA V #1 | LAMBDA 1 V |
| 45 | LAMBDA 2 V | |
| 12 | | |
| 70 | | |
| 13 | | |
| 54 | OUT #1 | INJ 1 SIG |
| 53 | OUT #2 | INJ 2 SIG |
| 52 | OUT #3 | INJ 3 SIG |
| 51 | OUT #4 | INJ 4 SIG |
| 23 | OUT #5 | INJ 5 SIG |
| 50 | OUT #6 | INJ 6 SIG |
| 22 | OUT #7 | INJ 7 SIG |
| 49 | OUT #8 | INJ 8 SIG |
| 34 | OUT #9 | LAMBDA 1 HEATER |
| 6  | OUT #10 | LAMBDA 2 HEATER |
| 33 | OUT #11 | FUEL PUMP |
| 32 | OUT #12 | RAD FAN |
| 31 | OUT #13 | UP SHIFT VALVE |
| 30 | OUT #14 | DOWN SHIFT VALVE |
| 20 | OUT #15 | BLIP VALVE |
| 47 | OUT #16 | COMPRESSOR RELAY CONTROL |
| 27 | IGNITION #1 | CYL 1 & 4 |
| 26 | IGNITION #2 | CYL 2 & 3 |
| 25 | IGNITION #3 | CYL 6 & 7 |
| 24 | IGNITION #4 | CYL 5 & 6 |
| 4  | | |
| 3  | | |
| 2  | | |
| 21 | RS232 TX #1 | RS 232 TX |
| 82 | CAN HI #1 | CAN TH |
| 80 | CAN HI #2 | |
| 81 | CAN LO #1 | CAN 1 L |
| 79 | CAN LO #2 | |
APPENDIX

PS1 Powershift Diagram