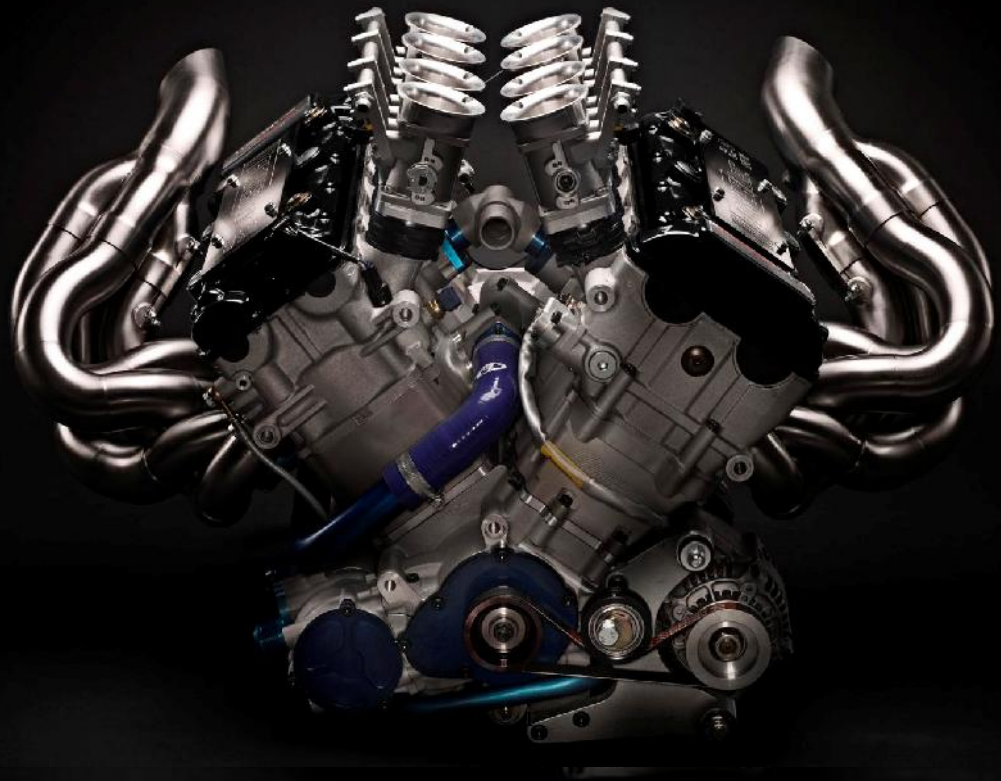
Radical Performance Engines SR8 V8 Engine Handbook



Version 4 – 18.12.14

Contents

Specifications

Picture 1

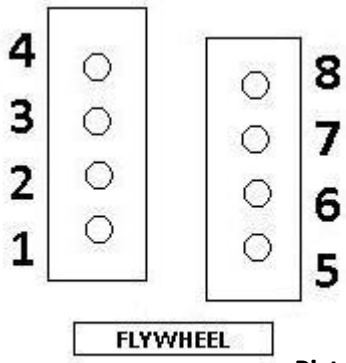
Radical Performance Engines RP Series V8 Engine's are available in capacities from 2700cc to 3200cc.

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.



Picture 2

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.

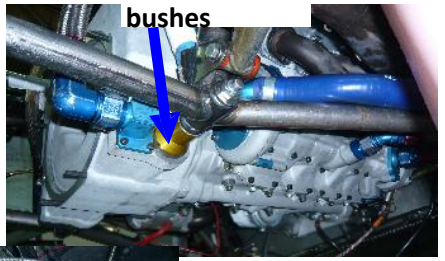
All sensors should be connected correctly and in working order, including:

- Air charge temperature
- Oil pressure
- Coolant temperature
- Oil temperature
- Barometric sensor
- Cam Phase Sensor
- Crank Position Sensor
- Fuel Pressure
- Throttle Position 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.

Picture 3

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.

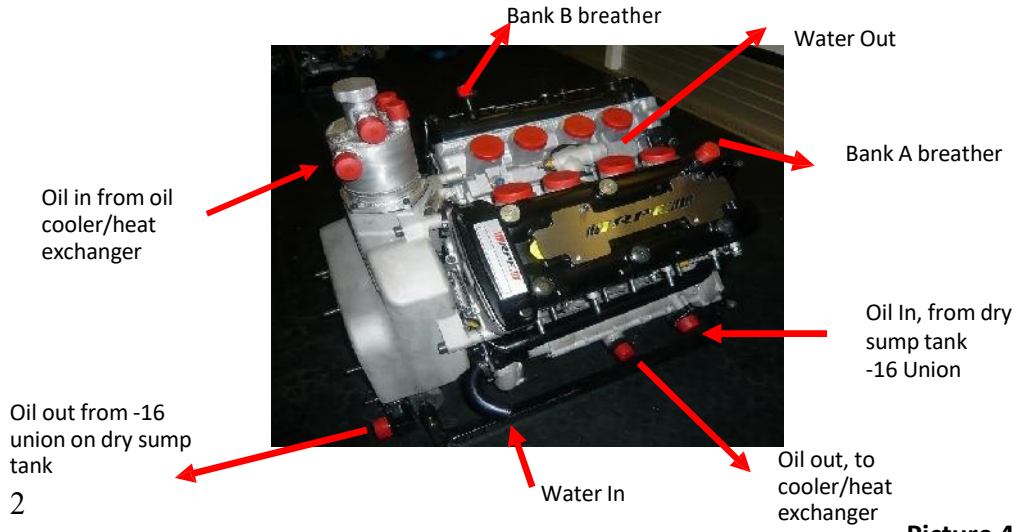
Octane Boosters
If fuel of the correct octane level is not available, octane boosters can be used, although please contact RPE before using octane boosters in fuel.

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.

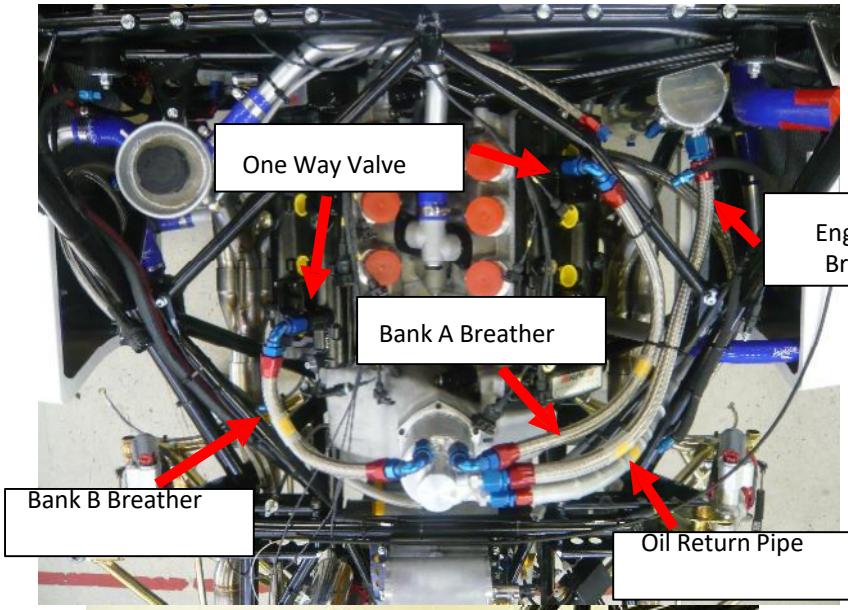
The oil swirl pot has three extra unions on it. There is a -12 and two -10 fittings. These are for the engine/tank breathers. The -12 one should be connected to oil catch tank. The -10 unions are for the Bank A and B breathers. They should be connected to the -10 unions on each cam cover, as shown below. 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.



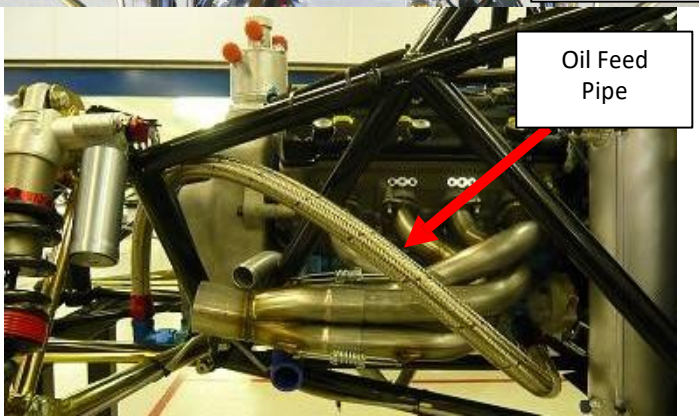
Picture 4

Oil Hoses

Picture 5 shows the engine breather system, oil feed and return pipes viewed from above.



Picture 5



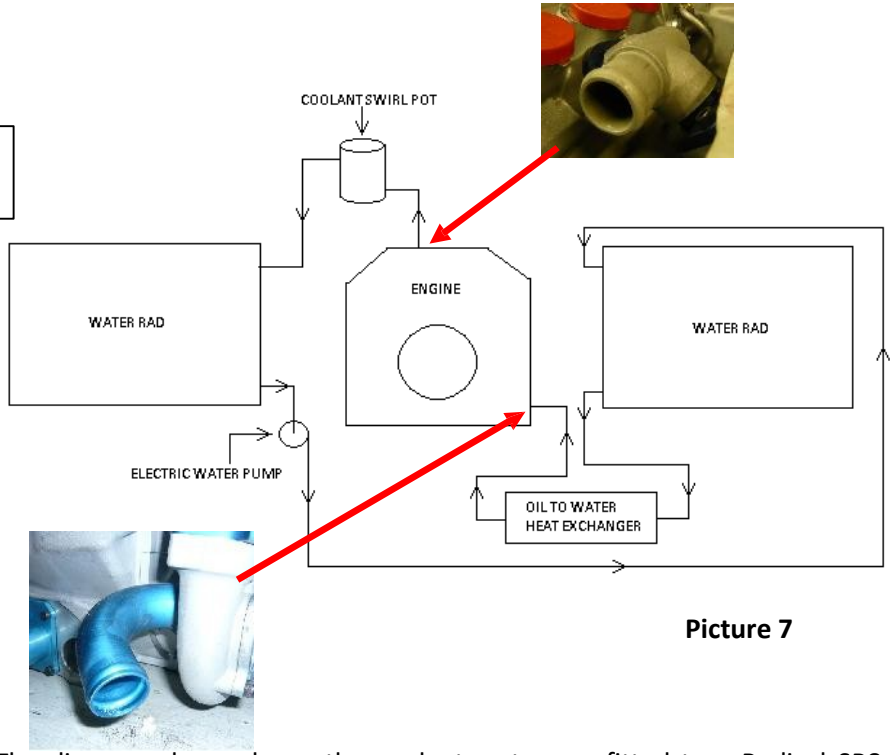
Picture 6

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.

Coolant System Schematic

The picture below shows the coolant system connections.

A typical RPE RP Series V8 Cooling System



Picture 7

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.

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

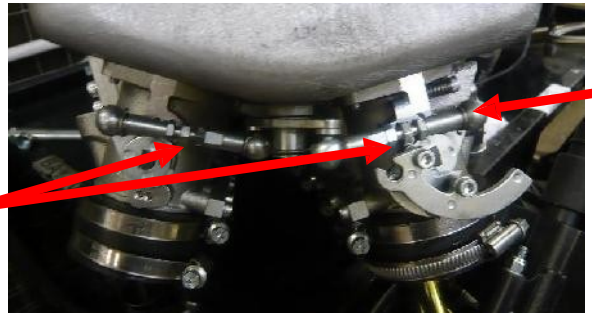
To set up the individual throttle bodies RPE V8, please follow these rules:

When the engine is idling at around 1600 – 1800rpm, the syncrometer reading needs to be 7 on each of the individual throttle bodes 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.



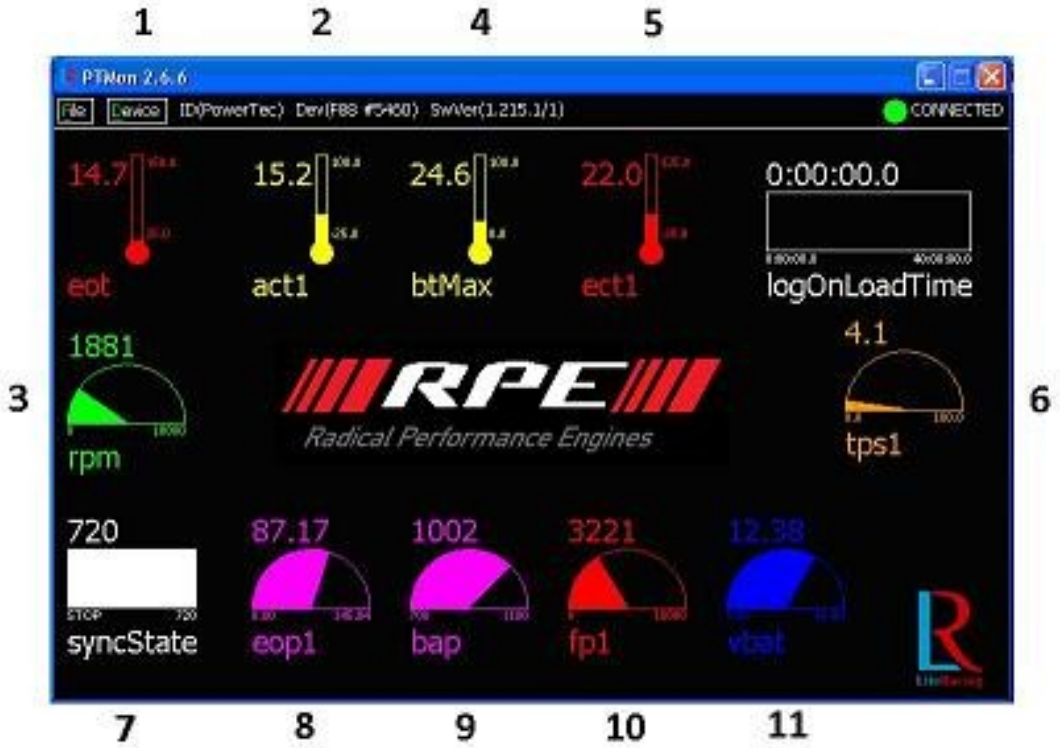
Picture 8

Picture 9

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 10

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.

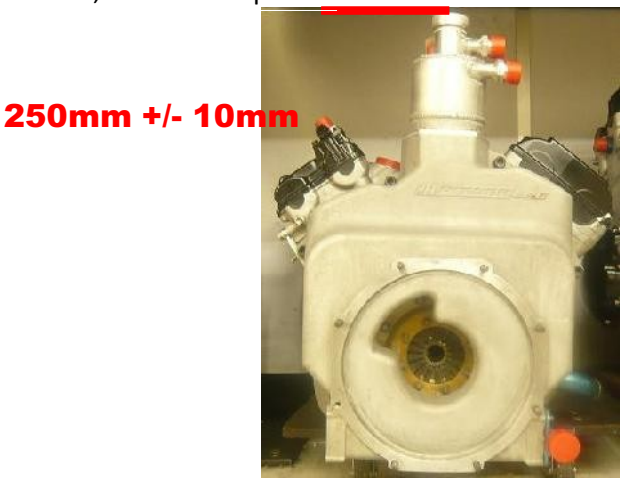
c. The engine should be dry cranked, as some oil will have drained back into the engine if it has been previously run. This will return to the tank once the engine is started. To dry crank the engine, disconnect the ignition coils and turn the engine over, until it produces oil pressure and oil is returning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



Picture 11

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.

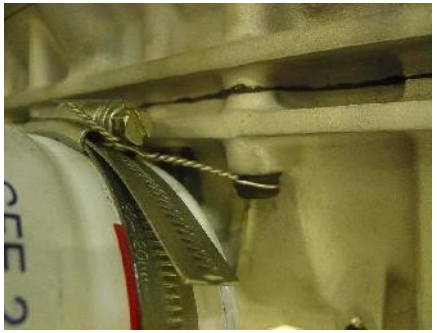
Please be aware that when fitting an oil filter to a V8 it must be tightened using the correct procedure and have a jubilee clip fitted around it. This jubilee clip must then be lock wired to the bolt in the crank cases as per picture 12 opposite.

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.



Picture 12

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

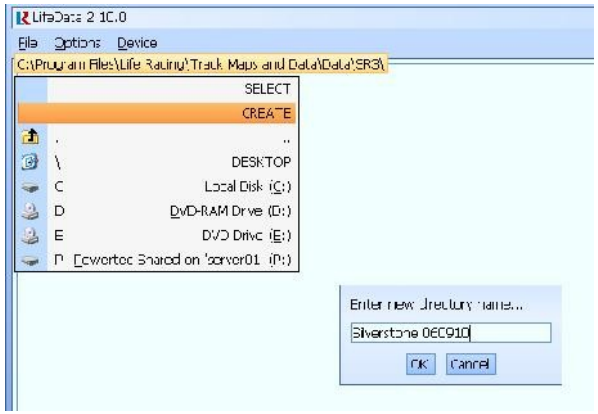
1. Connect a computer to ECU/car, turn both the ignition and master switches on to power up the ECU.

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.



Picture 13

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.

6. Highlight "select" & press return.

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 7,000rpm
- 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.

- All braking wherever possible should be done in a straight line, along with down changes. If excessive brake pressure is on whilst increasing steering lock this will unsettle the car and possibly cause the car to spin
- The car should be in a straight as possible position before the throttle is Applied, especially in the lower gears with minimal steering lock on. If excessive steering lock is on whilst applying throttle, this will unsettle the car and possibly cause the car to spin.
- It is important, not to change gear, while experiencing wheel spin.

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 1st and 2nd 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 overevved if the clutch is depressed when downshifting.

MAINTENANCE

EVERY 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

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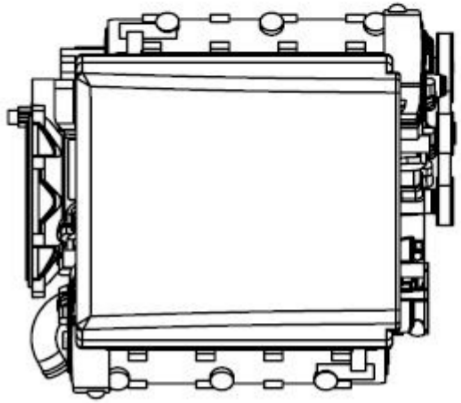

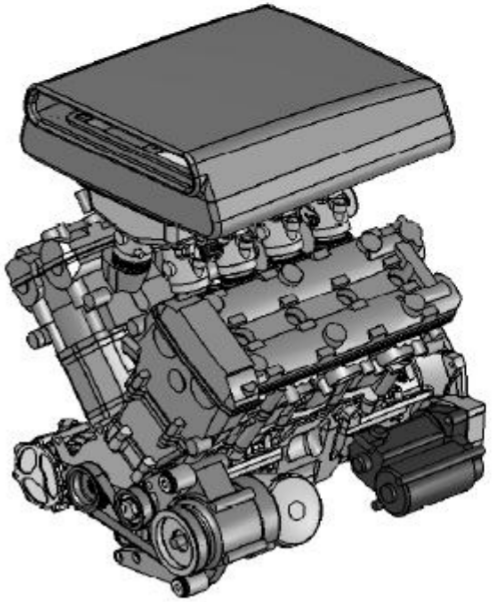

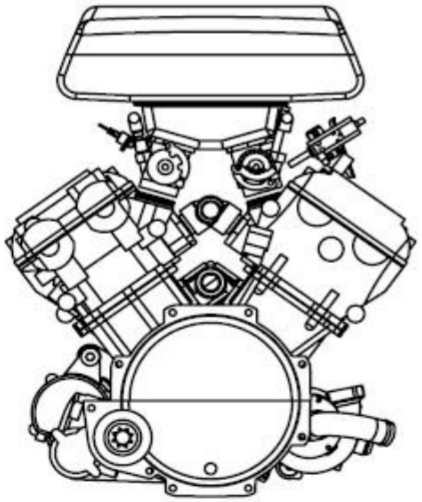

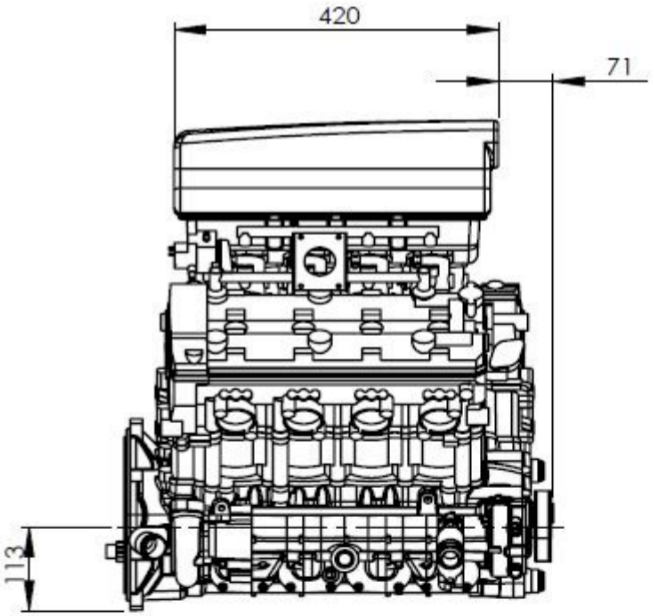
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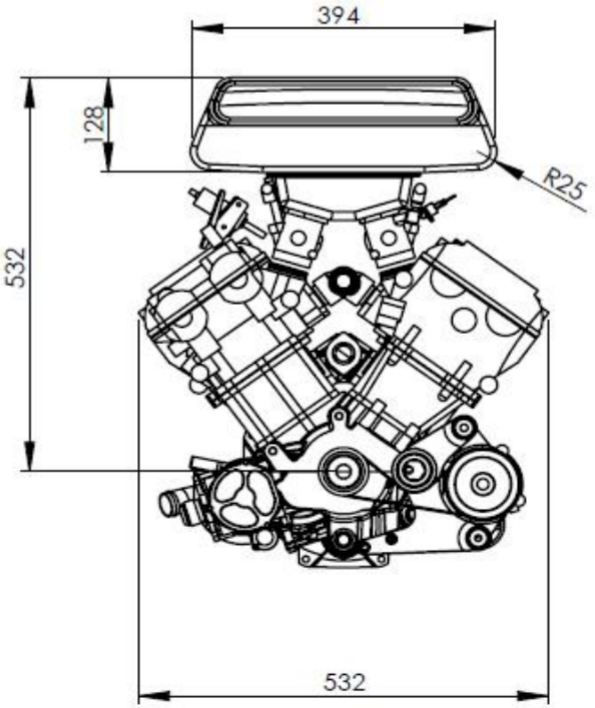
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128
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APPENDIX

WIRING LOOM AND ECU PIN OUTS

	CUSTOMER	RADICAL	DATE	27/09/2010
	DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T
	PART NUMBER	HA0-0216-20T	BOARD No	
20/07/2011 08:00			JOB No	
WIRE TYPE:	TYPE 55	NOTE:		
SLV TYPE:	CGPT			

1

	DESCRIPTION	ECU
	LABEL	NONE
	PART NUMBER	BOSCH 88 WAY
	TERMINAL	MICRO AND JUNIOR TIMER
	BOOT	BOSCH 88 WAY BOOT
	NOTES:	
18		ENG GND
22		INJ 1 SIG
22		INJ 2 SIG
22		INJ 3 SIG
22		INJ 4 SIG
22		INJ 6 SIG
22		INJ 8 SIG
18		ENG GND
		E/NETT SCREEN
18		CYL 1 & 4
22		ECU IGNITION #1 TACHO
18		CYL 2 & 3
RESISTOR 22		ECU IGNITION #2 TACHO **RESISTOR**
18		CYL 6 & 7
18		CYL 5 & 8
22		INJ 5 SIG
22		INJ 7 SIG
26		TX-
26		TX+
26		RX-
26		RX+
22		CAN 1 H
22		CAN 1 L
22		RS 232 TX
22		BLIP VALVE
22		COMPRESSOR RELAY CONTROL
22		DOWN SHIFT SW
22		UP SHIFT SW
22		LAMBDA 1 I
22		LAMBDA 1 V
22		LAMBDA 2 V
22		LAMBDA 2 I
		R47K DO NOT USE
22		EOT SIG
22		ACT SIG
22		GEAR POT SIG
22		ECT SIG
22		REVERSE DETENT BUTTON
22		OIL PRESS SIG
22		GEAR SYSTEM PRESSURE SIG
22		TPS SIG
22		CRANK SIG
22		SENSOR GND
22		CAM SIG
22		SPARE INPUT2
22		WHEEL SPEED SIG
22		SPARE INPUT1
22		SENSOR GND
22		FUEL PRESS SIG
22		BAP SIG
22		GEAR CUT
22		BAP 5V+
22		GEAR POT +5V SUPPLY
22		CAM 5V+
22		TPS 5V+
22		SPARE 5V+
22		GEAR SYSTEM PRESSURE +12V
22		FUEL PRESS 12V+
22		OIL PRESS 12V+
IS ONE 22		SPARE 12V+
CE 22		ECU +12V SUPPLY
22		WHEEL SPEED 12V+
22		LAMBDA 1 HEATER
22		FUEL PUMP
22		RAD FAN
22		UP SHIFT VALVE
22		DOWN SHIFT VALVE
18		ENG GND
22		LAMBDA 2 HEATER
18		ENG GND

CUSTOMER	RADICAL	DATE	27/09/2010
VEHICLE	SR8 V8	SERIAL No	
DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T
PART NUMBER	HA0-0216-20T	BOARD No	
20/07/2011 08:00		JOB No	

2

DESCRIPTION	E/NET
LABEL	ECU//COMMS
PART NUMBER	PFG.1B.308.CLMD52Z
TERMINAL	EGG.1B.655.ZZM (8X)
BOOT	GMA.1B.045.RD (RED)
NOTES:	

26	RX+	RX+
26	RX-	RX-
26	TX+	TX+
26		
26		
26	TX-	TX-
26		
26		
	E/NETT SCREEN	

3

DESCRIPTION	BAP
LABEL	BAP
PART NUMBER	3 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22	BAP SIG
2	22	BAP GND
3	22	BAP 5V+

4

DESCRIPTION	RADIATOR FAN
LABEL	RAD//FAN
PART NUMBER	T FORM POSILOCK (F)
TERMINAL	POSILOCK
BOOT	BLACK
NOTES:	12V+ TOP OF T

16	RAD FAN SUPPLY
16	RAD FAN GND

5

DESCRIPTION	BATTERY SPLICE
LABEL	BATTERY SPLICE
PART NUMBER	BATTERY SPLICE
TERMINAL	BUTT SPLICE
BOOT	HTAT
NOTES:	

1	6MM	BATTERY SUPPLY
	22	ECU +12V SUPPLY
	18	12V+ SUPPLY TO FUEL PUMP RELAY
	16	12V+ SUPPLY TO RAD FAN RELAY
	18	INJ SUPPLY
	22	LAMBDA 12 V +
	22	LAMBDA 12 V +

6

DESCRIPTION	FUEL PUMP RELAY
LABEL	FUEL PUMP//RELAY
PART NUMBER	RSI + R30BT FROM VEHICLE WIRING PRODUCTS
TERMINAL	RS 245-1719
BOOT	NONE
NOTES:	

18	12V+ SUPPLY TO FUEL PUMP RELAY
22	FP/RCOIL +
18	FUEL PUMP SUPPLY
20	EXT FEED 12V+
22	FUEL PUMP
22	FP/RCOIL +

7

DESCRIPTION	RADIATOR FAN RELAY
LABEL	RAD FAN//RELAY
PART NUMBER	RSI + R30BT FROM VEHICLE WIRING PRODUCTS
TERMINAL	RS 245-1719
BOOT	NONE
NOTES:	

16	12V+ SUPPLY TO RAD FAN RELAY
22	RF/RCOIL +
16	RAD FAN SUPPLY
16	WATER PUMP +12V
22	RAD FAN
22	RF/RCOIL +

8

DESCRIPTION	LAMBDA 1
LABEL	LAMBDA//1
PART NUMBER	DTM06-6S + W6S
TERMINAL	0462-201-20141
BOOT	HTAT
NOTES:	

1	22	LAMBDA 12 V +
2	22	LAMBDA 1 HEATER
3	22	LAM 1 GND
4	22	LAMBDA 1 I
5	22	LAMBDA 1 V

9

DESCRIPTION	LAMBDA 2
LABEL	LAMBDA//2
PART NUMBER	DTM06-6S + W6S
TERMINAL	0462-201-20141
BOOT	HTAT
NOTES:	

1	22	LAMBDA 12 V +
2	22	LAMBDA 2 HEATER
3	22	LAM 2 GND
4	22	LAMBDA 2 I
5	22	LAMBDA 2 V

	CUSTOMER	RADICAL	DATE	27/09/2010	
	VEHICLE	SR8 V8	SERIAL No		
	DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T	
	PART NUMBER	HA0-0216-20T	BOARD No		
20/07/2011 08:00			JOB No		
WIRE TYPE:	TYPE 55	NOTE:			
SLV TYPE:	CGPT				

10

	DESCRIPTION					
	LABEL					CRANK
	PART NUMBER					ITT 120-8551-000 RS 167-9461 SURESEAL 2WAY (F)
	TERMINAL					ITT 330-8672-001 RS 167-9499 (F) ITT 031-8703-001 RS 167-9506 (M)
	BOOT					HTAT
	NOTES:					
1	22					CRANK GND
2	22					CRANK SIG

11

	DESCRIPTION					
	LABEL					PUMP OUT
	PART NUMBER					PUMP//OUT
	TERMINAL					120-8552-000 RS 167-9411 SURESEAL 2 WAY (M)
	BOOT					ITT 330-8672-001 RS 167-9499 (F) ITT 031-8703-001 RS 167-9506 (M)
	NOTES:					HTAT
1	20					EXT FEED GND
2	20					EXT FEED 12V+

12

	DESCRIPTION					ENGINE GROUND
	LABEL					GND
	PART NUMBER					M6 RING
	TERMINAL					
	BOOT					HTAT
	NOTES:					
	18					ENG GND
	18					ENG GND
	18					ENG GND
	18					ENG GND

13

	DESCRIPTION					
	LABEL					FUEL PUMP
	PART NUMBER					FUEL//PUMP
	TERMINAL					DT06-2S + W2S
	BOOT					DT SKT
	NOTES:					HTAT
1	18					FUEL P GND
2	18					FUEL PUMP SUPPLY

14

	DESCRIPTION					
	LABEL					COIL 1
	PART NUMBER					COIL//1
	TERMINAL					4 WAY JUNIOR TIMER
	BOOT					JUNIOR TIMER 927779-1
	NOTES:					HTAT
1	18					CYL 2 & 3
2	18					CYL 1 & 4
3	18					IGN 12V+
4	18					IGN 12V+

15

	DESCRIPTION					
	LABEL					COIL 2
	PART NUMBER					COIL//2
	TERMINAL					4 WAY JUNIOR TIMER
	BOOT					JUNIOR TIMER 927779-1
	NOTES:					HTAT
1	18					CYL 6 & 7
2	18					CYL 5 & 8
3	18					IGN 12V+
4	18					IGN 12V+

16

	DESCRIPTION					
	LABEL					PADDLE SHIFT
	PART NUMBER					PADDLE//SHIFT
	TERMINAL					DTM06-12S + WM12S
	BOOT					DTM SKTS
	NOTES:					HTAT
1	22					UP SHIFT VALVE
2	22					DOWN SHIFT VALVE
3	22					BLIP VALVE
4	22					COMPRESSOR RELAY CONTROL
5	22					DOWN SHIFT SW
6	22					UP SHIFT SW
7	22					REVERSE DETENT BUTTON
8	22					ECU SENSOR GND (UP, DOWN, REVERSE SW)
9	22					GEAR SYSTEM PRESSURE SIG
10	22					GEAR SYSTEM PRESSURE +12V
11						
12						

17

	DESCRIPTION					
	LABEL					OIL PRESSURE
	PART NUMBER					OIL//PRESS
	TERMINAL					PACHARD WEATHER SEAL
	BOOT					PULL TO SEAT
	NOTES:					NONE
A	22					OIL PRESS GND
B	22					OIL PRESS 12V+
C	22					OIL PRESS SIG

	CUSTOMER	RADICAL	DATE	27/09/2010
	VEHICLE	SR8 V8	SERIAL No	
	DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T
	PART NUMBER	HA0-0216-20T	BOARD No	
20/07/2011 08:00			JOB No	

WIRE TYPE: TYPE 55 NOTE:
SLV TYPE: CGPT

18

DESCRIPTION	12V+
LABEL	12V+
PART NUMBER	M10 RING
TERMINAL	
BOOT	HTAT
NOTES:	

	6MM		5/ 1		BATTERY SUPPLY

19

DESCRIPTION	ACT
LABEL	AIR//TEMP
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

	22				ACT SIG
	22				ACT GND

20

DESCRIPTION	EOT
LABEL	OIL//TEMP
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

	22				EOT SIG
	22				EOT GND

21

DESCRIPTION	ECT
LABEL	WATER//TEMP
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22				ECT SIG
2	22				ECT GND

22

DESCRIPTION	TPS
LABEL	TPS
PART NUMBER	3 WAY ECNOSEAL (RS 247-481)
TERMINAL	ECONOSEAL SKT(RS 247-4526)
BOOT	HTAT
NOTES:	

1	22				TPS SIG
2	22				TPS GND
3	22				TPS 5V+

23

DESCRIPTION	INJECTOR 1
LABEL	INJ//1
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22				INJ 1 12V+
2	22				INJ 1 SIG

24

DESCRIPTION	INJECTOR 2
LABEL	INJ//2
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22				INJ 2 12V+
2	22				INJ 2 SIG

25

DESCRIPTION	INJECTOR 3
LABEL	INJ//3
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22				INJ 3 12V+
2	22				INJ 3 SIG

26

DESCRIPTION	INJECTOR 4
LABEL	INJ//4
PART NUMBER	2 WAY JUNIOR TIMER
TERMINAL	JUNIOR TIMER 927779-1
BOOT	HTAT
NOTES:	

1	22				INJ 4 12V+
2	22				INJ 4 SIG

	CUSTOMER	RADICAL	DATE	27/09/2010
	VEHICLE	SR8 V8	SERIAL No	
	DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T
	PART NUMBER	HA0-0216-20T	BOARD No	
20/07/2011 08:00			JOB No	

WIRE TYPE: TYPE 55 NOTE:
SLV TYPE: CGPT

27

	DESCRIPTION					
	LABEL					INJ//5
	PART NUMBER					2 WAY JUNIOR TIMER
	TERMINAL					JUNIOR TIMER 927779-1
	BOOT					HTAT
	NOTES:					
1	22					INJ 5 12V+
2	22					INJ 5 SIG

28

	DESCRIPTION					
	LABEL					INJ//6
	PART NUMBER					2 WAY JUNIOR TIMER
	TERMINAL					JUNIOR TIMER 927779-1
	BOOT					HTAT
	NOTES:					
1	22					INJ 6 12V+
2	22					INJ 6 SIG

29

	DESCRIPTION					
	LABEL					INJ//7
	PART NUMBER					2 WAY JUNIOR TIMER
	TERMINAL					JUNIOR TIMER 927779-1
	BOOT					HTAT
	NOTES:					
1	22					INJ 7 12V+
2	22					INJ 7 SIG

30

	DESCRIPTION					
	LABEL					INJ//8
	PART NUMBER					2 WAY JUNIOR TIMER
	TERMINAL					JUNIOR TIMER 927779-1
	BOOT					HTAT
	NOTES:					
1	22					INJ 8 12V+
2	22					INJ 8 SIG

32

	DESCRIPTION					
	LABEL					SPARE
	PART NUMBER					DTM06-6S + W6S
	TERMINAL					0462-201-20141
	BOOT					HTAT
	NOTES:					
1	22					SPARE 12V+
2	22					SPARE 5V+
3	22					SPARE INPUT1
4	22					SPARE GND1
5	22					SPARE INPUT2
6	22					SPARE GND 2

33

	DESCRIPTION					
	LABEL					WHEEL SPEED
	PART NUMBER					WHEEL//SPEED
	TERMINAL					RS 848-925
	BOOT					RS 849-091
	NOTES:					HTAT
1	22					WHEEL SPEED 12V+
2	22					WHEEL SPEED SIG
3	22					WHEEL SPEED GND

34

	DESCRIPTION					
	LABEL					PADDLE SHIFT TACHO & GEAR CUT SIGNAL
	PART NUMBER					PADDLE//SHIFT
	TERMINAL					DTM06-2S + W2S
	BOOT					0462-201-20141
	NOTES:					HTAT
1	22					TACHO SIG FOR PS
2	22					GEAR CUT

35

	DESCRIPTION					
	LABEL					CAM
	PART NUMBER					CAM
	TERMINAL					3 WAY SUMITOMO (F)
	BOOT					SUPPLIED
	NOTES:					NONE
	22					CAM 5V+
	22					CAM SIG
	22					CAM GND

	CUSTOMER	RADICAL	DATE	27/09/2010	
	VEHICLE	SR8 V8	SERIAL No		
	DESCRIPTION	F88RX (1.6) ENGINE HARNESS	ISSUE No	20T	
	PART NUMBER	HA0-0216-20T	BOARD No		
20/07/2011 08:00			JOB No		
WIRE TYPE:	TYPE 55	NOTE:			
SLV TYPE:	CGPT				

36

	DESCRIPTION				
	LABEL				FP
	PART NUMBER				FUEL//PRESS
	TERMINAL				PACHARD WEATHER SEAL
	BOOT				PULL TO SEAT
	NOTES:				NONE
A	22				FUEL PRESS GND
B	22				FUEL PRESS 12V+
C	22				FUEL PRESS SIG

37

	DESCRIPTION				
	LABEL				10,000 OHM SERIES RESISTOR IN HAIRBRUSH
	PART NUMBER				NONE
	TERMINAL				10K RESISTOR
	BOOT				SPLICE
	NOTES:				SPLICE
1	22				TACHO SIG FOR PS
2	22				ECU IGNITION #2 TACHO

38

	DESCRIPTION				
	LABEL				
	PART NUMBER				
	TERMINAL				
	BOOT				
	NOTES:				
1					
2					

39

	DESCRIPTION				
	LABEL				
	PART NUMBER				
	TERMINAL				
	BOOT				
	NOTES:				

40

	DESCRIPTION				
	LABEL				GEAR POT
	PART NUMBER				GEAR//POT
	TERMINAL				DTM06-3S +WM3S
	BOOT				0462-201-20141
	NOTES:				202A111
1	22				GEAR POT +5V SUPPLY
2	22				GEAR POT SIG
3	22				GEAR POT GND

41

	DESCRIPTION				
	LABEL				WATER PUMP
	PART NUMBER				WATER//PUMP
	TERMINAL				T FORM POSILOCK (F)
	BOOT				POSILOCK
					BLACK
1					
2	16				WATER PUMP GND

42

	LABEL				
	PART NUMBER				
	TERMINAL				
	BOOT				
1					
2					

43

	DESCRIPTION				
	LABEL				CHASSIS SPLIT
	PART NUMBER				CHASSIS // SPLIT
	TERMINAL				DT04-6P
	BOOT				
	NOTES:				HTAT
	18				IGN 12V+
	18				IGN 12V+
	18				IGN 12V+
	18				IGN 12V+
	22				CAN 1 H
	22				CAN 1 L
	22				TACHO
	22				RS 232 TX

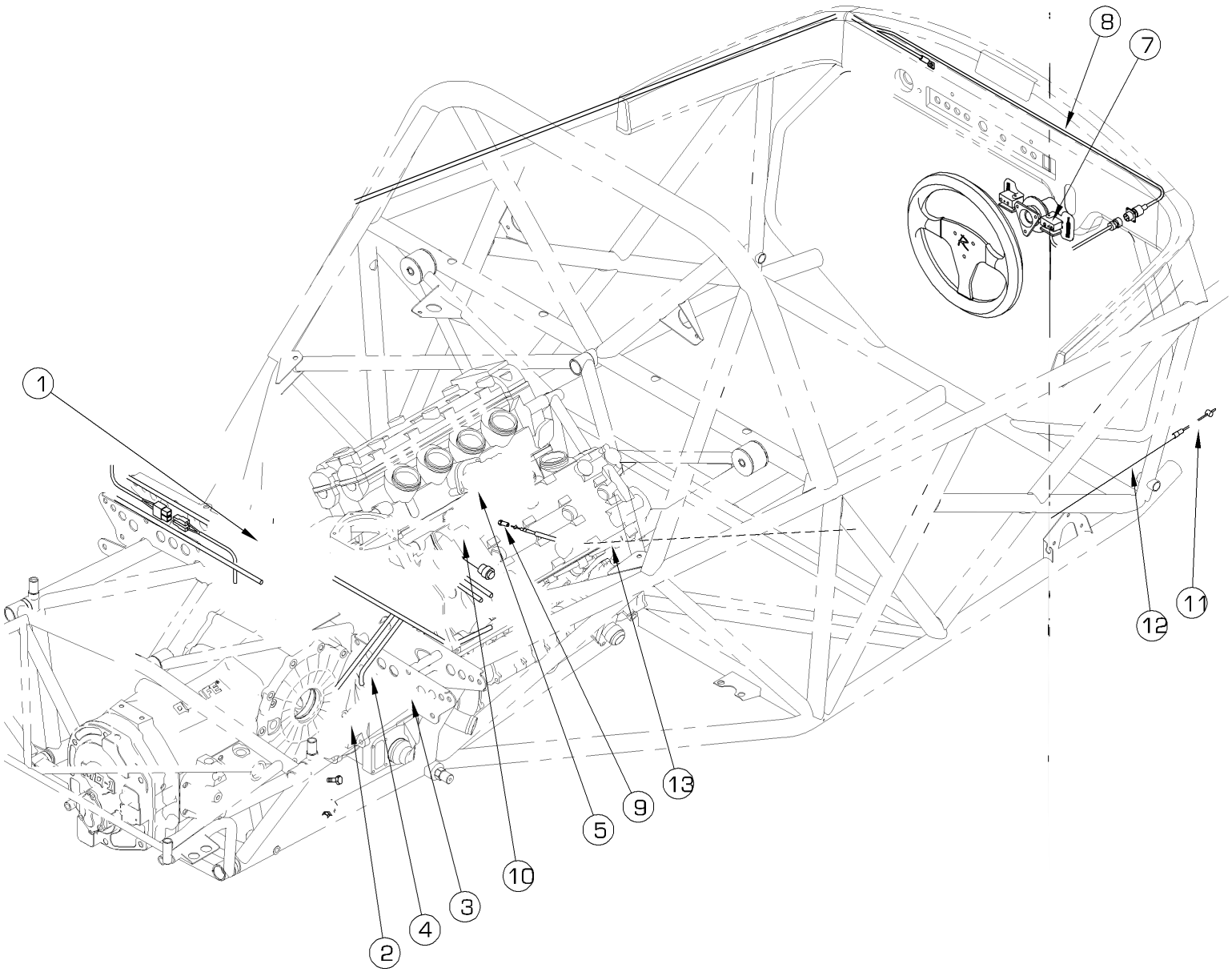
CUSTOMER	**RADICAL**
VEHICLE	**SR8 V8**
DESCRIPTION	**F88RX (1.6) ENGINE HARNESS**
PART NUMBER	**HA0-0216-20T**
DATE	**27/09/2010**
SERIAL NUMBER	**0**

17	INPUT #1 ANA V/(R47K) NonBi/NonHz	R47K DO NOT USE
44	INPUT #2 ANA V/R NonBi/NonHz	EOT SIG
16	INPUT #3 ANA V/R NonBi/NonHz	ACT SIG
43	INPUT #4 ANA V/R NonBi/NonHz	ECT SIG
15	INPUT #5 ANA V/R NonBi/NonHz	REVERSE DETENT BUTTON
42	INPUT #6 ANA V/R NonBi/NonHz	OIL PRESS SIG
14	INPUT #7 ANA V/R NonBi/NonHz	GEAR SYSTEM PRESSURE SIG
41	INPUT #8 ANA V/R NonBi/NonHz	TPS SIG
39	INPUT #9 DIG V/R/Bi/Hz	CRANK SIG
11	INPUT #10 DIG V/R/Bi/Hz	CAM SIG
38	INPUT #11 DIG V/R/Bi/Hz	SPARE INPUT2
10	INPUT #12 DIG V/R/Bi/Hz	WHEEL SPEED SIG
37	INPUT #13 DIG V/R NonBi/NonHz	SPARE INPUT1
9	INPUT #14 DIG V/R NonBi/NonHz	FUEL PRESS SIG
36	INPUT #15 DIG V/R NonBi/NonHz	BAP SIG
8	INPUT #16 DIG V/R NonBi/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
7		
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 & 8
4		
3		
2		
21	RS232 TX #1	RS 232 TX
82	CAN HI #1	CAN 1 H
80	CAN HI #2	
81	CAN LO #1	CAN 1 L
79	CAN LO #2	

APPENDIX

PS1 Powershift Diagram

SR8 Paddle Shift System/Throttle Blip 2011



Date issued: 1/7/2011