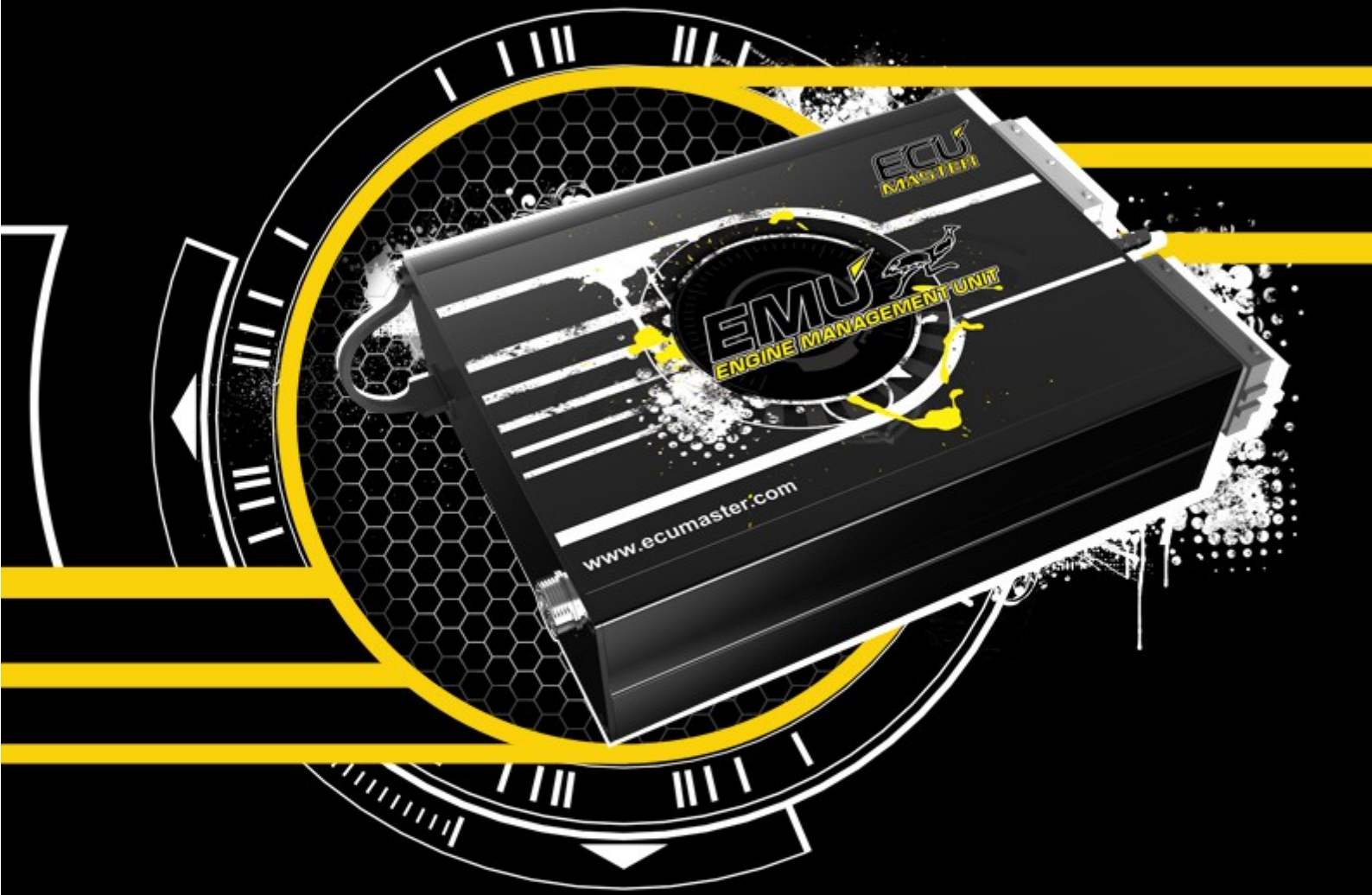
EMU
ENGINE MANAGEMENT UNIT



USER MANUAL

ECU MASTER

www.ecumaster.com

ATTENTION !

- **The ECUMASTER EMU is designed for motorsport applications only and cannot be used on public roads!**
- **Electronic throttle modules are only to be used for operating stationary engines (generators, test benches). For safety reasons, do not use electronic throttle modules in vehicular applications!!!**
- **The installation of this device should be performed only by trained specialists. Installation by untrained individuals may cause damage to both the device and the engine!**
- **Incorrect tuning with the ECUMASTER EMU can cause serious engine damage!**
- **Never modify the device's settings while the vehicle is moving as it may cause an accident!**
- **ECUMaster assumes no responsibility for damage caused by incorrect installation and/or tuning of the device!**
- **To ensure proper use of ECUMASTER EMU and to prevent risk of damage to your vehicle, you must read these instructions and understand them thoroughly before attempting to install this unit.**

IMPORTANT !

- **The manual below refers to the firmware version 1.1 of the ECUMASTER EMU**
- **Modification of the tables and parameters should be performed only by people who understand the operation of the device and operation of modern fuel injection and ignition systems.**
- **Never short-circuit the wires of the engine's wiring loom or the outputs of the ECUMASTER EMU.**
- **All modifications to the engine's wiring loom must be performed with the negative terminal of the battery disconnected.**
- **It is critical that all connections in the wiring loom are properly insulated.**
- **All signals from the variable reluctant sensors and knock sensors should be connected using shielded cables.**
- **The device must be disconnected before performing any welding on the vehicle!**

Introduction

P&P adapter Nissan SR20DET EU

Plug and Play connector allows to connect EMU standalone engine management system to stock engine wiring harness without any cutting and soldering. Calibration file if it is available, is already prepared for factory sensors, injectors, coils, actuators and solenoids.

Disclaimer

We put all our effort for proper p&p connector preparation. Hardware and software was tested with stock cars. But wiring could be changed during years and different models. It's highly advised to check engine wiring before connecting p&p connector for EMU standalone. Due to electronical and mechanical component wear, additional control is required.

Company do not take responsibility for engine and wiring damages.

Technical support

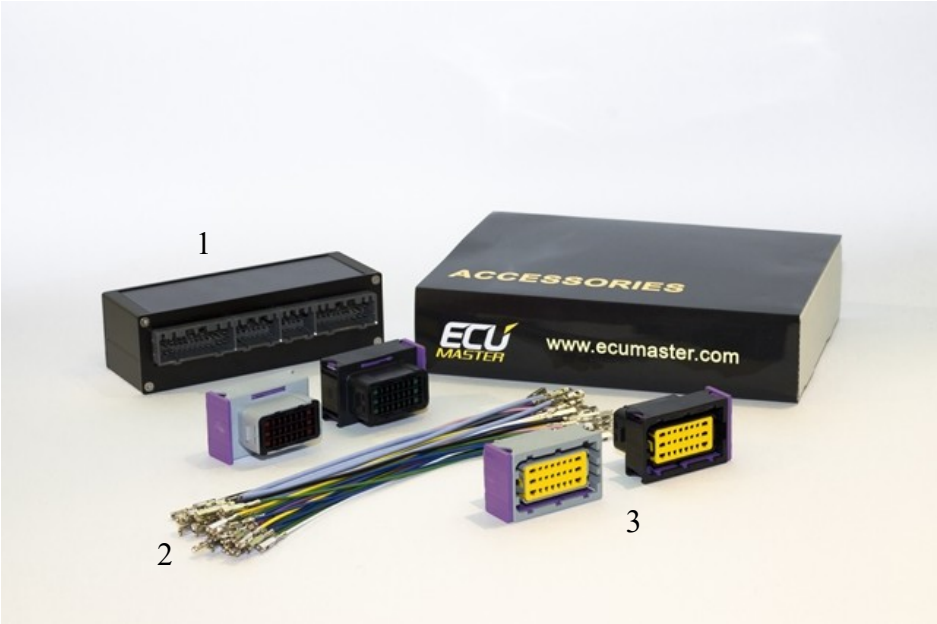
Most answers to questions can be found in manual, or in EMU software help file.
With any concerns please contact our customer support or our nearest dealer.
Check for latest firmware at *www.ecumaster.com/en/download*

Technical support email: tech@ecumaster.com
Technical support phone: +48 12 3565336

P&P adapter Nissan SR20DET EU

Plug and play connector installation

Box content



(Interconnector Example photo)

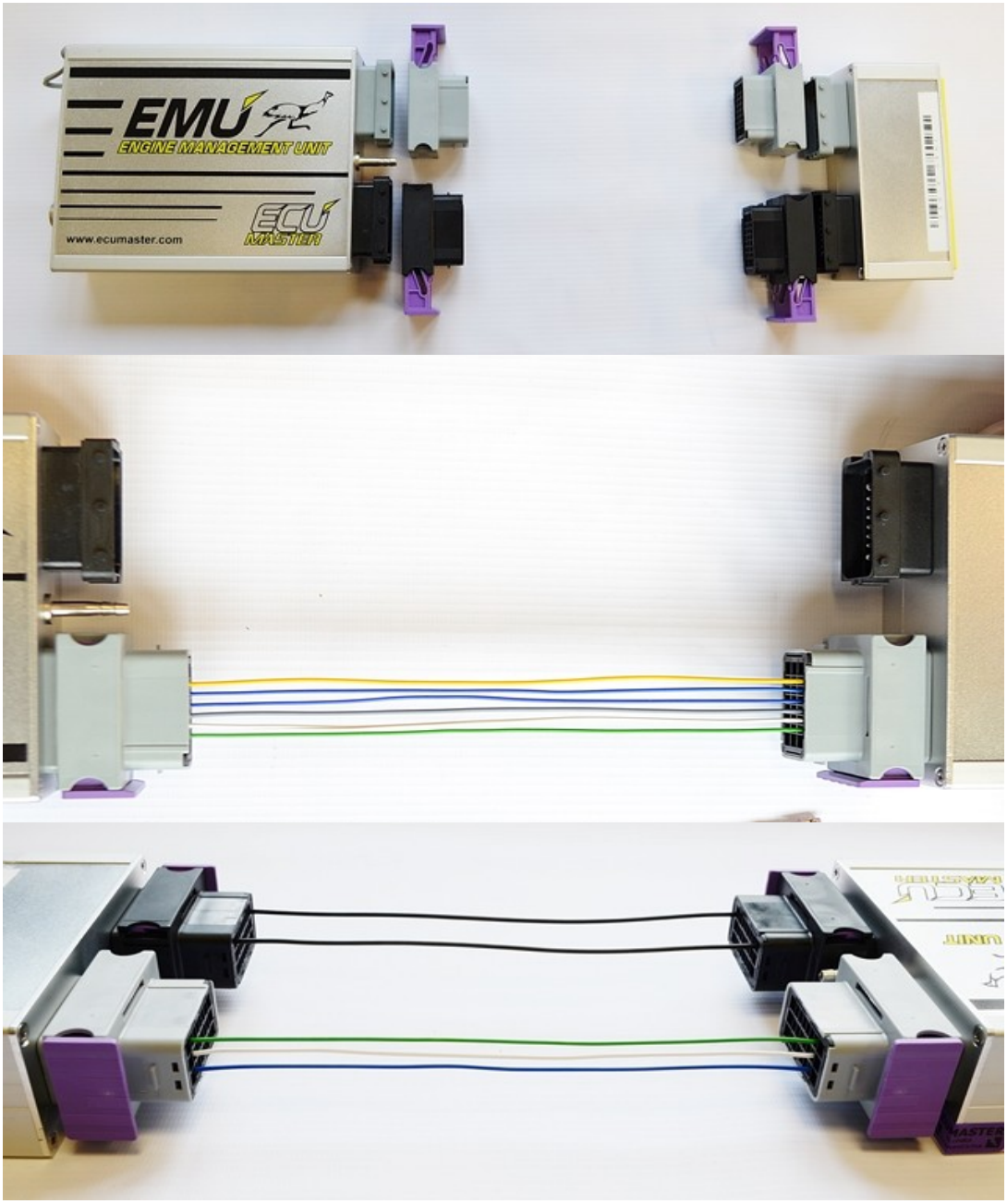
1) Plug and play adapter PCB board
2) Wire harness
3) Plugs

Wiring

One set of connector fit to EMU ECU and other to p&p adapter. Violet connector locker must face outside as in picture.

Connectors pin out in adapter is mirrored to EMU. Outputs in connectors must be connected directly to each other. Wires goes in straight line without crossing.
Wires set contain 6 wires dedicated for ignition outputs and 4 wires for grounding. Those wires has pins in different size. Usually not all inputs and outputs are in use. Unused slots in connectors can be left empty.

P&P adapter Nissan SR20DET EU

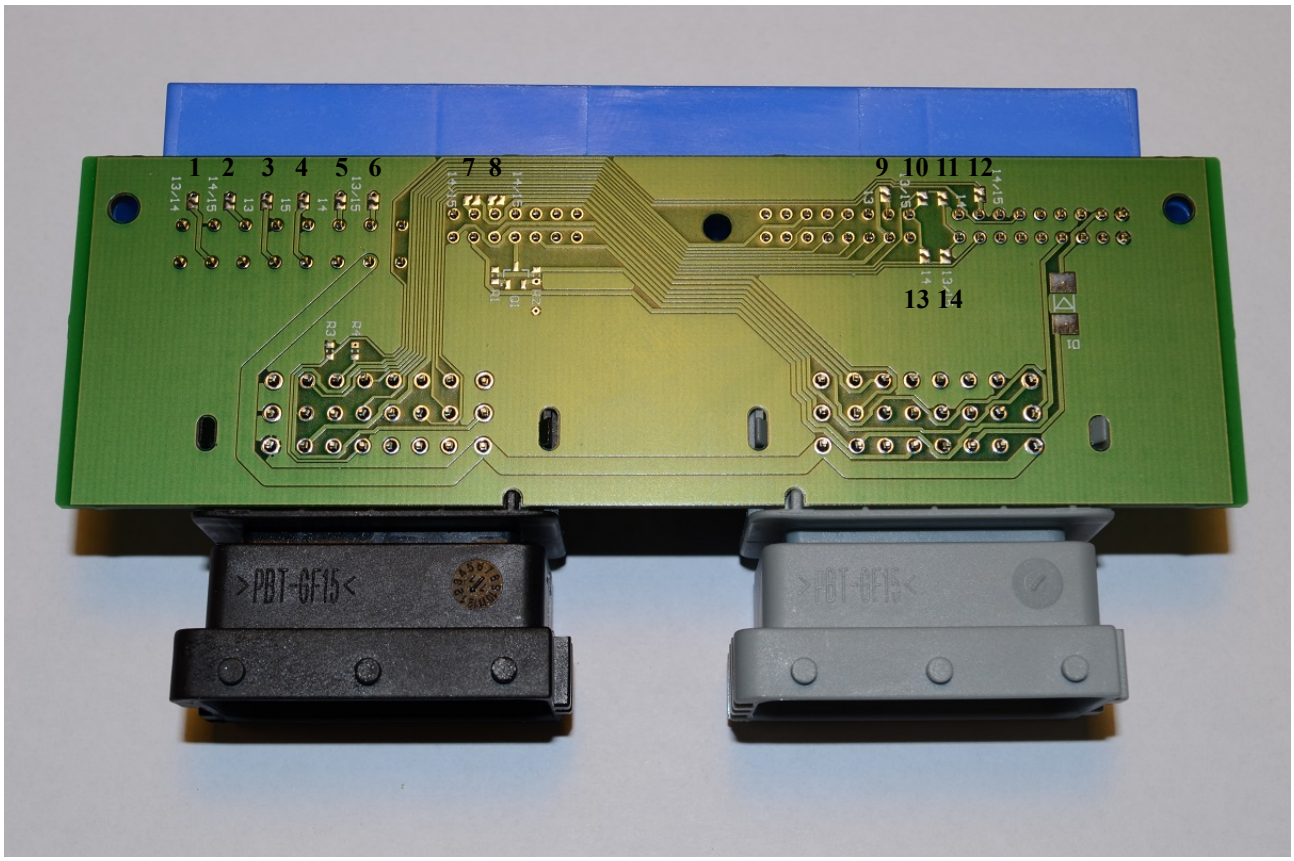


P&P adapter Nissan SR20DET EU

Configuration

It is universal adapter for SR20DET EU and Japan domestic market engines, but require additional internal configuration.

1) Disassemble adapter enclosure and remove PCB board.
2) Turn PCB board upside down. 14 jumpers pad should be visible.
3) Depending on to which engine adapter must fit, solder proper jumpers, marked with engine symbols.



S13 SR20DET	configuration jumpers - 1 3 6 9 10 14
S14 SR20DET	configuration jumpers - 1 2 5 6 7 8 11 12 13
S15 SR20DET	configuration jumpers - 2 4 6 7 8 10 12 14

4) Check continuity with multi meter between pins.
5) Assemble adapter.

P&P adapter Nissan SR20DET EU

Installation

IMPORTANT !

Before installation please disconnect negative terminal of battery!

1) Disconnect stock ECU and remove it.
2) Connect P&P adapter to stock wiring loom.
3) Connect EMU ECU with prepared wiring looms to adapter
4) Connect negative terminal of the battery.

IMPORTANT !

SR20SET are missing IAT sensor which is crucial for fuel mixture calculation. It requires installation of an additional sensor in the intake manifold.

Description	EMU TERM.
Sensor ground	B17
Intake air temperature signal	B21

Pre starting configuration and checks

All new EMU units have latest official firmware versions. Factory default configuration is present without any base maps and outputs assigned.

Connecting to ECUMASTER EMU EMS

Install software to computer and open windows client. Connect computer to EMU device using USB cable supplied with the device.

During first connection to the EMU device, window with the device name will appear.
By default there will be device unique serial number which can be changed for any name. Based on this name there will be sub-directory created in directory *My Documents / EMU*. In this sub-directory, the configuration for the given EMU, projects and logs will be saved.

Base calibration maps (for stock unmodified engines) are on the included CD.
Upload calibration map and save it in memory by pressing F2 button or by pressing processor icon on task bar.

Additional sensors

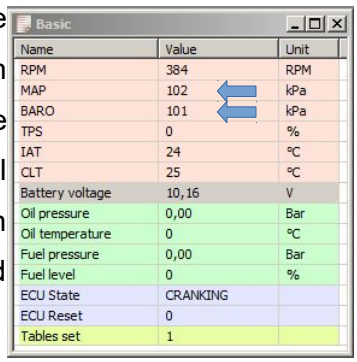
EMU ECU offers various option for additional sensors installation and devices. Additional sensors and extension modules must be connected directly to EMU not to p&p adapter (exp. WBO sensor, EGT sensor, fuel pressure sensor, DBW module …)

For additional information's about connecting and configuring sensors please see manual and EMU client software help file.

Sensors

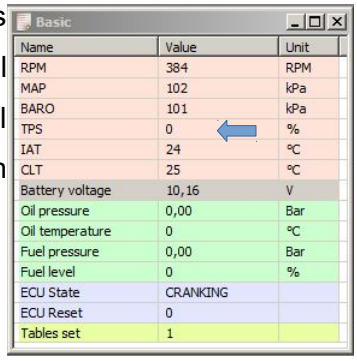
MAP sensor check

Manifold absolute pressure sensor is used to measure pressure in the engine's intake manifold. Proper calibration is crucial for proper ignition timing and mixture preparation in speed density load calculation. Before first engine start, compare values of MAP sensor to actual local barometric pressure, they should match. The pressure could be read in Basic Group Log. When the engine is not running the pressure should be around 100kPa (current barometric pressure).



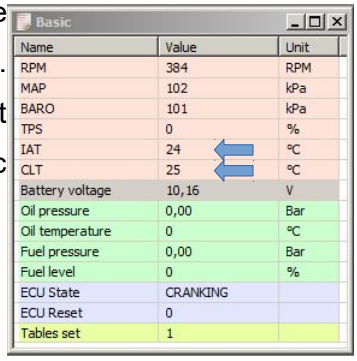
TPS

Throttle position sensor is taking part in various ECU calculations (acceleration enrichment, load alpha-n algorithm boost correction, fuel cut, idle). It is important that TPS readings should match to actual throttle position. 0% means closed throttle and 100% means fully open throttle.



CLT, IAT

Coolant temperature sensor and intake temperature sensor also take part in calculations for mixture preparation and proper ignition timing. Readings from sensor should match to actual temperature of coolant and air in intake manifold. These reading could be checked in Basic Group Log window.



Outputs

Base configuration for P&P adapter has dedicated outputs to certain devices. Fuel pump, coolant fan, boost solenoid, etc. The proper work of the devices connected to the EMU outputs should be checked before engine first start.

Fuel Pump

Open window *Outputs / Fuel pump* and select invert output option. The fuel pump should start to work (its sound should be hear-able)

Coolant Fan

For low speed coolant fan operation, open window *Outputs / Coolant fan* and select invert output option. The coolant fan should start to work with the low speed and the power steering fan should start to work.

Wide band oxygen sensor (WBO)

The factory narrow band sensor Is used but we strongly recommend using wide band oxygen sensor.

For proper WBO sensor calibration sensor Rcal value must be measured between terminals 2 and 6 of LSU 4.2 connector.

P&P adapter Nissan SR20DET EU

First Engine startup

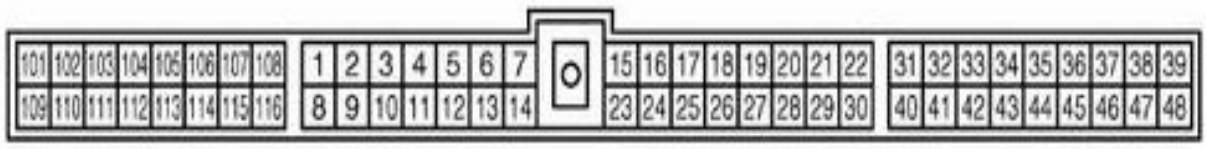
After all necessary checks and adjustments engine is ready to start.
Factory engine, with correct configuration and correct ECU to p&p adapter wiring should start after couple of crank rotation. Additional throttle opening may be required during first start.

Please let the engine to warm up coolant to working temperature. Check coolant temperature through whole warming up process to avoid engine damage caused by overheat.

Check log file for information about any trigger errors. If any errors appears control wiring and condition of crank and camshaft sensors. Save log file and send it to technical support at tech@ecumaster.com. Don't try to tune engine with trigger errors it can cause serious engine damage.

After all verification's have been completed, performance tuning can be done.

Interconnector pinout Name: Nissan SR20DET EU



EMU PIN	EMU DESCRIPTION	Name:	DESCRIPTION	WIRE SIZE
B17	EMU GROUND	39,48	Ecu ground	0,75mm
G17	POWER GROUND	6, 13,107,108,116	Power ground	0,75mm
G24	POWER GROUND	6,13,107,108,116	Power ground	0,75mm
B24	POWER GROUND	6,13,107,108,116	Power ground	0,75mm
G18	POWER +12V	36	+12V supply	0,5mm
B18	SENSOR GROUND	21	Sensor ground	0,5mm
G8	IGNITION COIL 1	1	IGN 1	0,75mm
G16	IGNITION COIL 2	3	IGN 2	0,75mm
G9	IGNITION COIL 3	5	IGN 3	0,75mm
B16	IGNITION COIL 4	25	IGN 4	0,75mm
G7	INJECTOR 1	101	INJ 1	0,75mm

P&P adapter Nissan SR20DET EU

G15	**INJECTOR 2**	**110**	**INJ 2**	**0,75mm**
G23	**INJECTOR 3**	**103**	**INJ 3**	**0,75mm**
G6	**INJECTOR 4**	**112**	**INJ4**	**0,75mm**
G14	**INJECTOR 5**	**113**	**Idle control valve**	**0,5mm**
G22	**INJECTOR 6**	**114**	**VTC solenoid (jumper !!!!)**	**0,5mm**
G21	**AUX1**	**24**	**MIL lamp**	**0,5mm**
G5	**AUX3**	**102**	**Boost (jumper!!!!)**	**0,5mm**
G20	**AUX4**	**2**	**Tacho**	**0,5mm**
G4	**AUX6**	**106**	**Fuel pump**	**0,5mm**
G2	**STEPPER MOTOR #1A**	**9**	**Coolant fan low (jumper!!!!)**	**0,5mm**
G10	**STEPPER MOTOR #1B**	**10**	**Coolant fan high (jumper!!!!)**	**0,5mm**
G3	**STEPPER MOTOR #2A**	**11**	**AC relay**	**0,5mm**
G19	**WBO HEATER**	**111**	**NBO heater (jumper!!!!)***	**0,5mm**
B5	**WBO VS**	**19**	**NBO signal***	**0,5mm**
B4	**CLT**	**18**	**Coolant temp sensor**	**0,5mm**
B21	**IAT**		**External IAT sensor**	**0,5mm**
B12	**TPS IN**	**20**	**Throttle position sensor**	**0,5mm**
B2	**KS #1**	**27**	**Knock sensor**	**0,5mm**
B23	**+5V**	**37**	**+5V supply**	**0,5mm**
B14	**VSS IN**	**32**	**Vehicle speed signal**	**0,5mm**
B7	**PRIMARY TRIGGER**	**30**	**1 degree (jumper!!!!)**	**0,5mm**
B15	**CAMSYNC #1**	**31**	**180 degree (jumper!!!!)**	**0,5mm**
B20	**ANALOG #1**	**41**	**A/C switch (jumper!!!!)**	**0,5mm**
B3	**ANALOG #2**	**43**	**Power steering valve**	**0,5mm**

1) * For wire harness without LSU 4.2 connector

2) jumper – signals requires jumpers soldering

Free inputs / outputs

EMU Terminal	EMU side
B8	**IGNITION 5**
G1	**IGNITION 6**
G13	**AUX 2**
G12	**AUX 5**
B9	**EGT 2**
B2	**EGT 1**
B6	**CAM #2 input**
G11	**STEPPER 2B**
B11	**ANALOG IN #3**
B19	**ANALOG IN #4**

P&P adapter Nissan SR20DET EU

Output assignment

Output	Function	Assigned
Aux 1 (5A, G21)	Other/ Check Engine	Yes
Aux 2 (5A, G13)		No
Aux 3 (5A, G5)	Boost/Solenoid output	Yes
Aux 4 (5A, G20)	Outputs/Tacho	Yes
Aux 5 (5A, G12)		No
Aux 6 (5A, G4)	Outputs/Fuel Pump	Yes
Injector 1 (5A, G7)	Injector	Yes
Injector 2 (5A, G15)	Injector	Yes
Injector 3 (5A, G23)	Injector	Yes
Injector 4 (5A, G6)	Injector	Yes
Injector 5 (5A, G14)	Idle/idle PWM	Yes
Injector 6 (5A, G22)	VVT/VTEC output	Yes
Stepper 1A (0.25A, G2)	Outputs/AC fan output	Yes
Stepper 1B (0.25A, G10)	Outputs/Fuel Pump	Yes
Stepper 2A (0.25A, G3)	Outputs/AC clutch	Yes
Stepper 2B (0.25A, G11)		
ignition out 1 (10A, G8)	Ignition event	Yes
ignition out 2 (10A, G16)	Ignition event	Yes
ignition out 3 (10A, G9)	Ignition event	Yes
ignition out 4 (10A, B16)	Ignition event	Yes
ignition out 5 (10A, B8)		
ignition out 6 (10A, G1)		

Fuse description

1 – aux 3 boost control s14, s13 J4/J5
2 – wbo heater s14, s15
3 – stepper 2B fuel pump s13
4 – AUX 5 boost control for s15
5 – injector6 VTC for s14
6 – injector6 output for boost control s15
7 – coolant fan high signal s14, low signal s15
8 – coolant fan high s15
9 – sensor ground for s13
10 – cam 1 signal for s13/s15
11 – cam 1 signal for s14
12 – A/C switch signal
13 – primary trigger for s14
14 – primary trigger for s13/s15