Syvecs Limited

Syvecs S6-I

Pinouts and Wiring Info

Support Team
03-02-2014

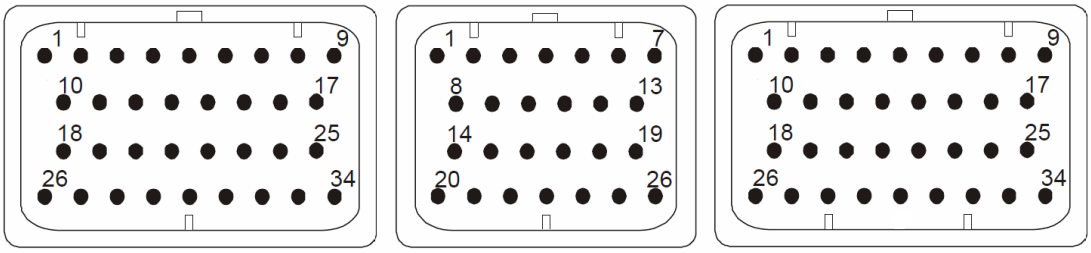
This document intended for use by a technical audience and describes a number of procedures that are potentially hazardous. Installations should be carried out by competent persons only.

Syvecs and the author accept no liability for any damage caused by the incorrect installation or configuration of the equipment.

Please Note that due to frequent firmware changes certain windows might not be the same as the manual illustrates. If so please contact the Syvecs Tech Team for Assistance.

Support@Syvecs.co.uk

Syvecs S6-I Pinouts



A	DESCRIPTION	CONNECTOR A	
	PART NUMBER	4-1437290-0	
	NOTES:	34 Way - Key1	

Syvecs Description	*S6-I Pinout*	*Function*	*Notes*
PWR CTR OUT	A1	MAIN RELAY OUTPUT	**PULLS TO GROUND AS DEFAULT WHEN ACTIVED VIA MAIN RELAY SWITCH C28**
H-Bridge1 / SlaveOut1	A2	H-Bridge1	**H-BRIDGE OUTPUTS, CAN BE DRIVEN HIGH OR LOW. USED GENERALLY FOR MOTOR CONTROL, PWM OUTPUT, VANOS ……**
H-Bridge2/ SlaveOut2	A3	H-Bridge2	
N/A	A4	N/A	
N/A	A5	N/A	
N/A	A6	N/A	
N/A	A7	N/A	
N/A	A8	N/A	
N/A	A9	N/A	
FUEL1	A10	INJECTOR or PWM OUTPUT	**FUEL INJECTOR OUTPUTS CAPABLE OF HIGH IMPENDANCE INJECTORS ONLY OR USED AS OUTPUTS FOR DEVICES, SUPPORTS PWM AND CAN HANDLE 10AMP MAX**
FUEL2	A11	INJECTOR or PWM OUTPUT	
FUEL3	A12	INJECTOR or PWM OUTPUT	
FUEL4	A13	INJECTOR or PWM OUTPUT	
FUEL5	A14	INJECTOR or PWM OUTPUT	
FUEL6	A15	INJECTOR or PWM OUTPUT	
FUEL7	A16	INJECTOR or PWM OUTPUT	
FUEL8	A17	INJECTOR or PWM OUTPUT	
FUEL9/PWM1	A18	INJECTOR or PWM OUTPUT	**FUEL/ PWM OUTPUTS CAPABLE OF UP TO 10AMPS MAX, HAVE OPTION VIA HARDWARE JUMPER TO APPLY 12V PULLUP USED FOR SOME TACHOS**
FUEL10/PWM2	A19	INJECTOR or PWM OUTPUT	
FUEL11/PWM3	A20	INJECTOR or PWM OUTPUT	**FUEL/ PWM OUTPUTS CAPABLE OF UP TO 10AMPS MAX, HAVE OPTION VIA HARDWARE JUMPER TO APPLY 5V PULLUP USED FOR OEM FUEL PUMP CONTROLLERS**
FUEL12/PWM4	A21	INJECTOR or PWM OUTPUT	
FUEL13/PWM5	A22	INJECTOR or PWM OUTPUT	**FUEL/ PWM OUTPUTS CAPABLE OF UP TO 10AMPS MAX, HAVE OPTION VIA HARDWARE JUMPER TO FLYBACK DIODE, WISE TO USE WITH VARIABLE VALVE SOLENOIDS**
FUEL14/PWM6	A23	INJECTOR or PWM OUTPUT	
FUEL15/PWM7	A24	INJECTOR or PWM OUTPUT	
FUEL16/PWM8	A25	INJECTOR or PWM OUTPUT	
IGN1	A26	CYL 1 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
IGN2	A27	CYL 2 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
IGN3	A28	CYL 3 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
IGN4	A29	CYL 4 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
IGN5	A30	CYL 5 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
IGN6	A31	CYL 6 IGNITION OUTPUT	**TTL 5V IGNITION OUTPUTS**
PWRGND	A32	POWER GROUND	**LINKED POWER GROUND**
PWRGND	A33	POWER GROUND	**LINKED POWER GROUND**
PWRGND	A34	POWER GROUND	**LINKED POWER GROUND**

B	DESCRIPTION	CONNECTOR B	
	PART NUMBER	3-1437290-7	
	NOTES:	26 Way - Key1	

PWRGND	B1	POWER GROUND	**LINKED POWER GROUND**
EGT2 +	B2	K - TYPE THERMO	
EGT2 -	B3	K - TYPE THERMO	
KNOCK	B4	KNOCK	
N/A	B5	N/A	
PVBAT	B6	CONSTANT 12V	**CONSTANT 12V POWER SUPPLY - REQUIRED For Main Relay control, NOT REQUIRED if not using Main Relay Control**
VBAT	B7	12v	**12V SUPPLY, All IVBAT PINS ARE JOINED ON BOARD**
LAM1A	B8	Lamv / LamD1+/ LamLun1	**Set Appropriate Solder Bridge Settings (SB) for desired setup NTK/ DENSO / BOSCH LSU –** **See Lambda Wiring – Page 17**
LAM1B	B9	Lami / LamD1- /LamIP1	
LAM1C	B10	LamLIA1	
LAM1D	B11	LamGND / LamLVM1	
N/A	B12	N/A	
VBAT	B13	12V	**12V SUPPLY, All IVBAT PINS ARE JOINED ON BOARD**
N/A	B14	N/A	
N/A	B15	N/A	
N/A	B16	N/A	
N/A	B17	N/A	
N/A	B18	N/A	
VBAT	B19	12V	**12V SUPPLY, All IVBAT PINS ARE JOINED ON BOARD**
KLINE	B20	Kline	**KLINE INTERFACE FOR OBDII**
RS232RX / Can2 L	B21	RS232RX / Can2L	**Adjust Solder Bridge SB42 to enable Can2, As Default it is Rs232, IMPORTANT: PCB Track Needs Cutting**
RS232TX / Can2 H	B22	RS232TX / Can2H	**Adjust Solder Bridge SB41 to enable Can2, As Default it is Rs232, IMPORTANT: PCB Track Needs Cutting**
LANRX-	B23	Cat5 Pin2	**Orange/White**
LANRX+	B24	Cat5 Pin1	**White/Orange**
LANTX-	B25	Cat5 Pin6	**Green/White**
LANTX+	B26	Cat5 Pin3	**White/Green**

C	DESCRIPTION	CONNECTOR C	
	PART NUMBER	4-1437290-1	
	NOTES:	34 Way - Key2	

KNOCK GROUNDS	C1	KNOCK GROUND	**KNOCK GROUNDS**
ANGND	C2	SENSOR GND	**SENSOR GROUND CIRCUIT**
ANGND	C3	SENSOR GND	**SENSOR GROUND CIRCUIT**
N/A	C4	N/A	**N/A**
5V OUT	C5	5V OUT	**5V OUT CIRCUIT**
5V OUT	C6	5V OUT	**5V OUT CIRCUIT**
N/A	C7	N/A	**N/A**
CAN L	C8	Can Low	
CAN H	C9	Can High	
AN01	C10	BI-POLAR INPUTS	**0-5V or SPEED, FREQUENCY INPUT - Pull Up Available in Software**
AN02	C11	BI-POLAR INPUTS	**0-5V or SPEED, FREQUENCY INPUT - Pull Up Available in Software**
AN03	C12	BI-POLAR INPUTS	**0-5V or SPEED, FREQUENCY INPUT - Pull Up Available in Software**
AN04	C13	BI-POLAR INPUTS	**0-5V or SPEED, FREQUENCY INPUT - Pull Up Available in Software**
AN05	C14	UNI-POLAR INPUTS	**0-5V or FREQUENCY INPUT with Fixed Thresholds - Pull Up Available in Software**
AN06	C15	UNI-POLAR INPUTS	**0-5V or FREQUENCY INPUT with Fixed Thresholds - Pull Up Available in Software**
AN07	C16	UNI-POLAR INPUTS	**0-5V or FREQUENCY INPUT with Fixed Thresholds - Pull Up Available in Software**
AN08	C17	UNI-POLAR INPUTS	**0-5V or FREQUENCY INPUT with Fixed Thresholds - Pull Up Available in Software**
AN09	C18	VOLT-INPUTS	**0-5V INPUT No Pull Up**
AN10	C19	VOLT-INPUTS	**0-5V INPUT No Pull Up**
AN11	C20	VOLT-INPUTS	**0-5V INPUT No Pull Up**
AN12	C21	VOLT-INPUTS	**0-5V INPUT No Pull Up**
AN13	C22	RESISTIVE INPUTS	**RESISTIVE 0-5V INPUTS WITH 5V PULLUP BUILT IN**
AN14	C23	RESISTIVE INPUTS	**RESISTIVE 0-5V INPUTS WITH 5V PULLUP BUILT IN**
AN15	C24	RESISTIVE INPUTS	**RESISTIVE 0-5V INPUTS WITH 5V PULLUP BUILT IN**
AN16	C25	RESISTIVE INPUTS	**RESISTIVE 0-5V INPUTS WITH 5V PULLUP BUILT IN**
EGT1-	C26	EGT1 -	
EGT1+	C27	EGT1 +	
PWR CTR IN	C28	MAIN RELAY INPUT SW	**MAIN RELAY CONTROL SWITCH, 12V SUPPLIED TO THIS PIN TURNS ON MAIN RELAY OUTPUT A1, PVBAT (B6) REQUIRES A 12V CONSTANT POWER ALSO FOR MAIN RELAY CONTROL TO WORK**
N/A	C29	N/A	
N/A	C30	N/A	
N/A	C31	N/A	
N/A	C32	N/A	
N/A	C33	N/A	
N/A	C34	N/A	

General Connections

Connecting Power

The ECU has three power feeds, which can either be used to provide a redundant multiple feeds, or as a way of providing switched power to additional loads through the loom.

Example Schematic

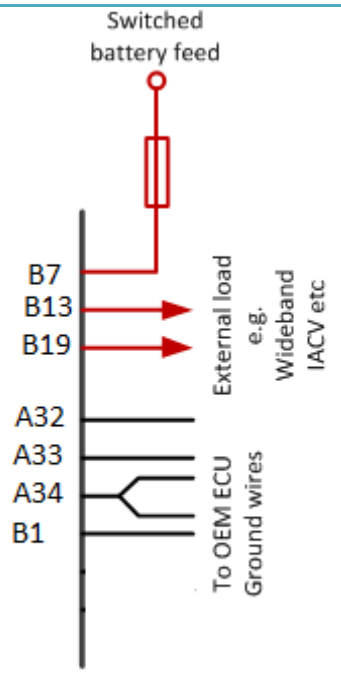


Figure 0-1 - Redundant Power Feeds and a Common grounding point.

Pin Schedule

Pin Number	Function	Notes
B7	VBAT	Use a fused Switched feed.
B13	VBAT	Use a fused Switched feed.
B19	VBAT	Use a fused Switched feed.
B6	PVBAT	Constant Power - Used for Main Relay Control Only
A32	Power Ground	Up to 2 ground wires can be paired to this pin.
A33	Power Ground	Up to 2 ground wires can be connected to this pin.
A34	Power Ground	Up to 2 ground wires can be paired to this pin.
B1	Power Ground	Up to 2 ground wires can be paired to this pin.

NOTE! Power Grounds are designed to conduct High Current loads – Do not mix Power Grounds with Analogue (AN) Grounds.

LAN Connection

Connection from the S6-I to a Laptop/PC uses a Male RJ45 plug, wired in cross over configuration.

Example Schematic

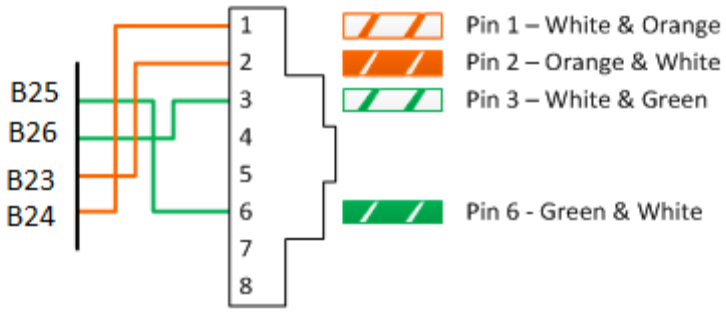


Figure 0-2 RJ45 Wiring

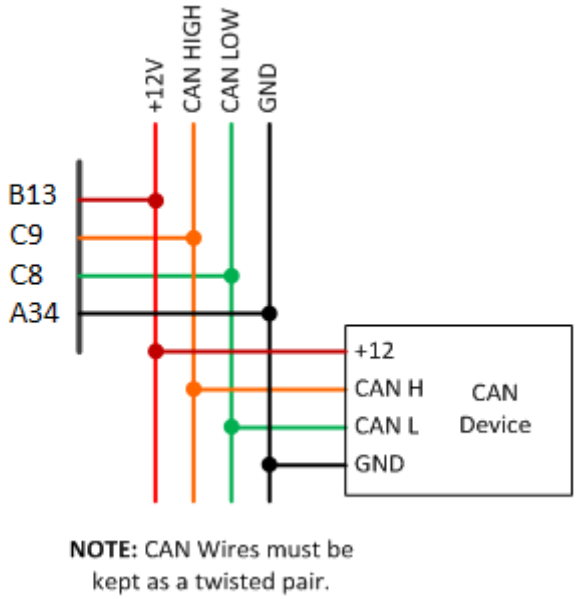
Pin Schedule

Pin Number	Function	Notes
B25	LAN Transmit -	RJ45 Pin 6 – Green & White wire
B26	LAN Transmit +	RJ45 Pin 3 – White & Green wire
B23	LAN Receive -	RJ45 Pin 2 – Orange & White wire
B24	LAN Receive +	RJ45 Pin 1 – White & Orange wire

CAN Bus

Common **A**rea **N**etwork Bus (CAN Bus) is a widely used data interface common used in many cars and aftermarket accessories (such as Stack Data loggers and Dashes). Data is sent using the High and Low wires, which are maintained as a twisted pair.

Example Schematic



NOTE: CAN Wires must be kept as a twisted pair.

Pin Number	Function	Notes
C9	CAN HIGH	Check OEM Colour pairing.
C8	CAN LOW	Ensure wires are twisted pair.

RS232

Telemetry can data can be provided via RS232.

Example Schematic

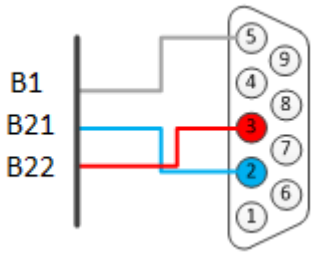


Figure 0-3 RS232 Connection

Pin Schedule

Pin Number	Function	Notes
B1	Pwr GND	DB-9 pin 5
B21	Rx	DB-9 pin 2
B22	Tx	DB-9 pin 3

Input Connections

Sensor/ Analogue Grounds (AN Grounds)

Sensors and miscellaneous analogue inputs have their own Ground pins; these grounds must be kept separate from the Power grounds shown in the first section. As there are four ground pins you may have to connect multiple grounds to some of the pins if you have more than four sensors.

Pin Schedule

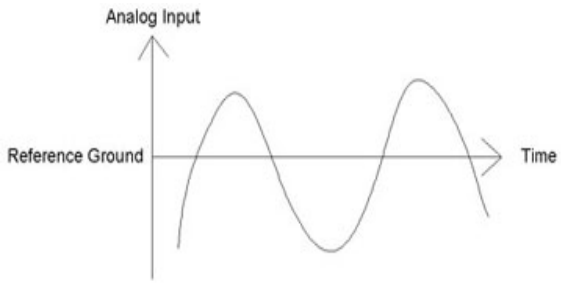
Pin Number	Function	Notes
C2	ANGND1	
C3	ANGND1	
C4	ANGND2	

Assigning Inputs

The Syvecs S6GP has 24 programmable inputs available and although they are fully configurable in Scal, they are not all the same type of input which means sensors that for example require a pull up, have to assigned to different types….. Listed below are the 4 types which are available.

Bipolar Inputs

These Inputs are able to swing above and below the reference ground meaning they can see Positive Voltage as well as Negative.



Bipolar Input

Example of sensors normally used on these Inputs are:

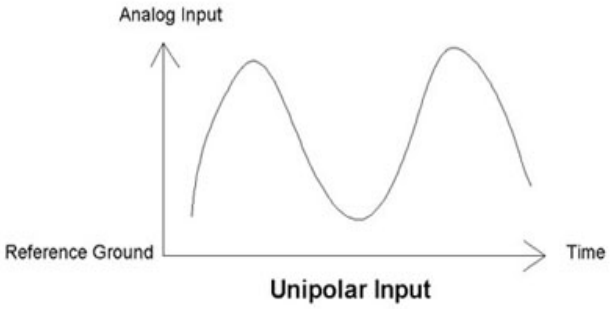
- Reluctor Crank and Cam Sensors
- ABS Sensors for wheel speed

Bipolar inputs are not just limited to the above they can also be used for any sensor that outputs 0-5volts. They are also able to provide a Pull-up through Scal

Pin Number	Scal Assignment	Notes
C10	An01	
C11	An02	
C12	An03	
C13	An04	

Unipolar Inputs -

These Inputs are only able to swing above the reference ground meaning they can only see Positive Voltages. When used in Frequency based signals have fixed thresholds of 1.25vL and 3.75vH



Unipolar Input

Example of sensors normally used on these Inputs are:

- Hall Effect Crank and Cam Sensors
- Gearbox speed sensors

Unipolar inputs are not just limited to the above they can also be used for any sensors which outputs 0-5volts. They are also able to provide a Pull-up through Scal.

Pin Number	Scal Assignment	Notes
C14	An05	
C15	An06	
C16	An07	
C17	An08	

Voltage Inputs

These Inputs are able to sense a Voltage level which is linear and does not swing

Example of sensors normally used on these Inputs are:

- Manifold Pressure sensors
- Throttle Positions
- Oil Pressures

Voltage Inputs are not just limited to the above then can also be used for any sensor which outputs a 0-5volt signal but NOT able to provide a pull up.

Pin Number	Scal Assignment	Notes
C18	An09	
C19	An10	
C20	An11	
C21	An12	

Resistive Inputs

These Inputs are the same as voltage inputs in which they can accept a 0-5v but they have a fixed 3.3k 5v Pull up fitted

.Example of Sensors normally used on these Inputs are:

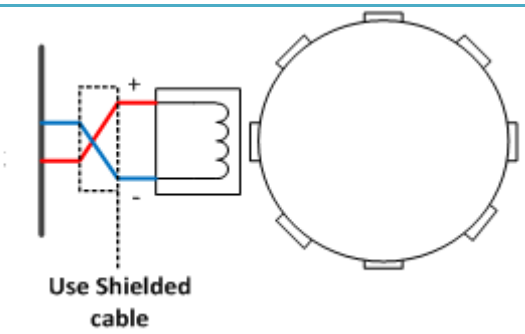
- Temperature sensors
- Calibration switches

Pin Number	Scal Assignment	Notes
C22	An13	
C23	An14	
C24	An15	
C25	An16	

Sensor Schematics - Examples

Crank Sensor – Magnetic Type

Example Schematic

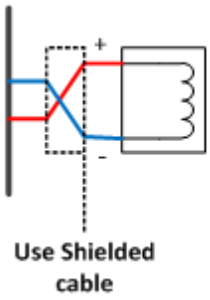


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	Crank Sensor – (Shared with Cam Sensor)
C10, C11, C12, C13	Bipolar Input	Crank Sensor+

Cam Sensors – Magnetic Type

Example Schematic

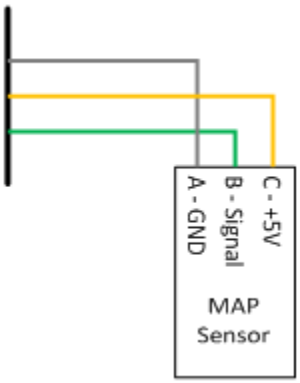


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	Cam Sensor – (Shared with Crank Sensor)
C10, C11, C12, C13	Bipolar input	Cam Sensor +

Manifold Pressure Sensor (MAP)

Example Schematic

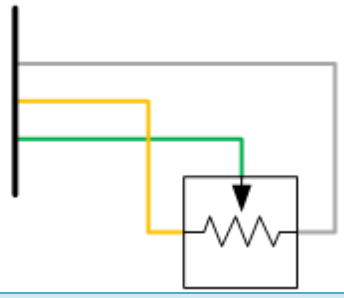


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	May be shared with multiple sensors
C5	5VOUT1	Regulated sensor power supply
C18	Voltage Input	Can use Bipolar, Unipolar or Voltage inputs

Throttle Position Sensor (TPS)

Example Schematic

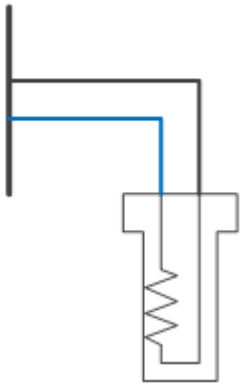


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	May be shared with multiple sensors
C5	5VOUT1	Regulated sensor power supply
C19	Voltage Input	Can use Bipolar, Unipolar or Voltage inputs

Coolant Temperature Sensor (CTS)

Example Schematic

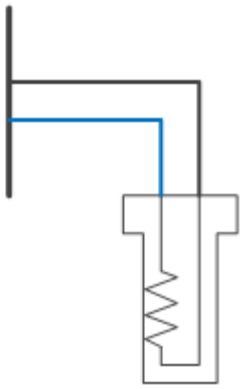


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	May be shared with multiple sensors
C22	Resistive Input	Can use Resistive inputs #1 to #4 (pins 63 to 66)

Inlet Air Temperature Sensor (IAT)

Example Schematic

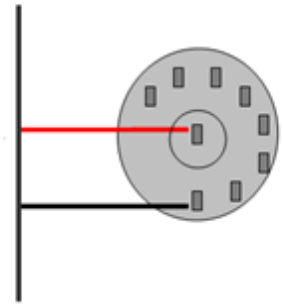


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	May be shared with multiple sensors
C23	Resistive Input	Can use Resistive inputs #1 to #4 (pins 63 to 66)

Calibration Switches

Example Schematic

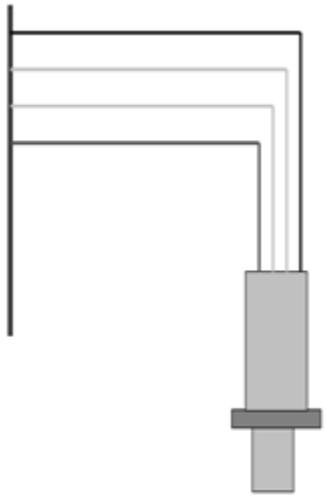


Pin Schedule

Pin Number	Function	Notes
C2	ANGND1	May be shared with multiple sensors
C24	AN15	Can use Resistive inputs #1 to #4 (pins 63 to 66) Cal Switches Require Pull Up to be On

Narrowband Lambda Sensor

Example Schematic



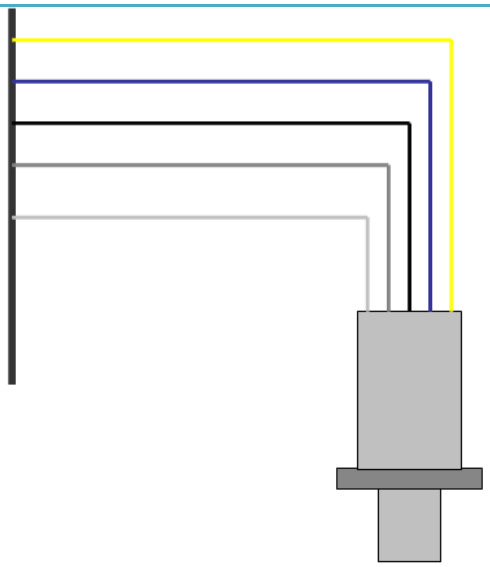
Pin Schedule

Wire Colour	Function	Pins Usable on S6-I
White	Heater	C7, C13, C19
White	Heater Drive	Any FUEL Output – Needs to be assigned in Scal on I/O Configuration
Black	Signal Ground	A34
Grey	Lambda Signal	Can use Bipolar, Unipolar or Voltage inputs

Wideband Lambda Sensor

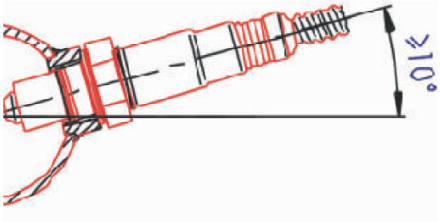
The Syvecs S6-I has the ability to drive a NTK Wideband

Example Schematic

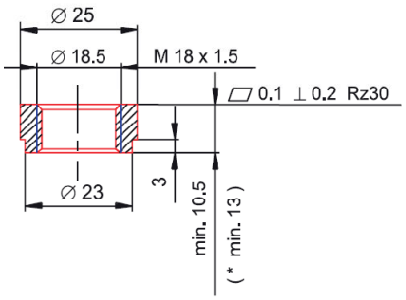


WARNING

Mounting recommendation



Recommended materials for the mating thread in the exhaust pipe
*: THexagon > 600°C or
TGas > 930°C



NTK L1H1

Lambda Sensor Input in Scal - Pin assignments needs to be Set to Lam1V, Lambda Heater Needs to be assigned to the assigned fuel output

Lambda Pin Number	Colour	Name	S6-I Pin
1	Yellow	Heater	B7 or B13 or B19
2	Orange	Heater Drive	Any Fuel or Pwm
6	Red	Nernst Cell Voltage	B8
7	White	Ion Pump Current	B9
8	Black	Signal Ground	B11

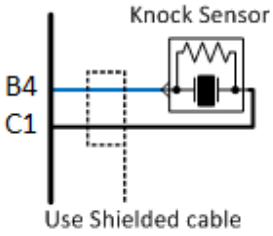
NTK L2H2

Lambda Sensor Input in Scal - Pin assignments needs to be Set to Lam1V, Lambda Heater Needs to be assigned to the assigned fuel output

Lambda Pin Number	Colour	Name	S6-I Pin
1	Yellow	Heater	B7 or B13 or B19
2	Blue	Heater Drive	Any Fuel or Pwm
6	Grey	Nernst Cell Voltage	B8
7	White	Ion Pump Current	B9
8	Black	Signal Ground	B11

Knock Sensor

Syvecs S6-I has 1 Knock inputs for a piezoelectric Example Schematic



Pin Schedule

Pin Number	Function	Notes
B4	Knock 1 Signal	
C1	Knock Grounds	

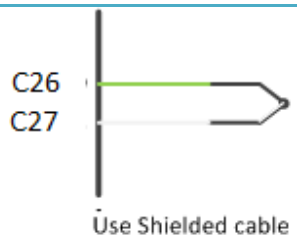
NOTE: Shield wires should be connected only at one end, common practice is to join shielding wires at the ECU end of the loom and connect them to a Power Ground wire.

EGT/Thermocouple

Syvecs has 2 K-type thermocouple inputs.

EGT1 is Selected in Scal - Pin Assignments as Thermo1+, EGT2 is Selected as Slave1An7

Example Schematic



Pin Schedule

Pin Number	Function	Notes
C27	THER+	Green wire (K-type)
C26	THER-	White wire (K-type)

Driven/Output Connections

Ignition

The ignition channels are logic level outputs designed to control ignition coils via an additional igniter (Power transistor).

These as standard output a 5V Signal but can be raised to 12v with a Jumper change on board. Speak to Syvecs more about this directly if required.

Pin Schedule

Pin Number	Function	Notes
A26	IGN1	Logic Level (5V) output
A27	IGN2	Logic Level (5V) output
A28	IGN3	Logic Level (5V) output
A29	IGN4	Logic Level (5V) output
A30	IGN5	Logic Level (5V) output
A31	IGN6	Logic Level (5V) output

NOTE: Do not connect IGN pins directly to a IGBT coil; the low coil resistance will draw a current greater than 40ma that will damage the ECU.

Fuel Outputs

The Injection channels are only able to drive high impendence injectors. The use of Low Impendence injectors with the S6 requires a Ballast pack/resistor pack. For more information on this e-mail support@syvecs.co.uk

Fuel Outputs also have full pulse width modulation available. These outputs can be used to drive up to 10A Peak / 5A Continuous and can only pull to ground.

Pin Schedule

Pin Number	Function	Notes
A10	Fuel1	Injector Output or PWM
A11	Fuel2	Injector Output or PWM
A12	Fuel3	Injector Output or PWM
A13	Fuel4	Injector Output or PWM
A14	Fuel5	Injector Output or PWM
A15	Fuel6	Injector Output or PWM
A16	Fuel7	Injector Output or PWM
A17	Fuel8	Injector Output or PWM
A18	Fuel9	Injector Output or PWM
A19	Fuel10	Injector Output or PWM
A20	Fuel11	Injector Output or PWM
A21	Fuel12	Injector Output or PWM
A22	Fuel13	Injector Output or PWM
A23	Fuel14	Injector Output or PWM
A24	Fuel15	Injector Output or PWM
A25	Fuel16	Injector Output or PWM

Half Bridge Outputs

An **H bridge** is an electronic circuit that enables a voltage to be applied across a load in either direction. These circuits are often used to drive Electronic Throttle bodies applications to allow DC motors to run forwards and backwards.

Half Bridge Outputs also have full pulse width modulation available and can be driven to 12v or Ground These outputs can be used to drive up to 10A Peak / 5A Continuous.

Pin Schedule

Pin Number	Function	Notes
A2	H-Bridge1	Can be driven to 12v or Ground
A3	H-Bridge2	Can be driven to 12v or Ground

Main Relay Control

The S6-I has a Main Relay control circuit which takes a 12v ignition switched feed and then turns on a Main relay output pin (Pulls to Ground) to power the electronics on some vehicles.

In order for this to work a constant 12v feed is required to the S6-I so it can monitor the state of the Main relay.

Pin Schedule

Pin Number	Function	Notes
A1	Main Relay Output	Pulls to Ground when Circuit active
B6	IVBAT	Constant 12v Supply pin
C28	Main Relay Input	Activates Main relay control when 12v is sent to this Pin

S6-I Solder Bridge settings

The Syvecs S6-I is built to cater for many applications, with this in mind some of the advanced hardware can only be activated via Solder Joins/Solder Blobs. The use of conventional Jumpers inside an ecu designed to cater with the harshest environments is not wise where vibrations can cause loose connections. We use a Solder Bridges which is designed to take that out of the question.

The Solder Bridges on the S6-I are either on a 2 position pad or 3 position, and easily found on the bottom board of the Ecu. They are easy to access by removing the front panel of the Ecu followed by the bottom panel shown below.

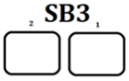
By taking a small soldering iron and placing a small amount of solder on each pad and swiping the solder iron over the pads you can easily join pads to gain a connection.

The Default Setting which a Generic Board comes with are shown Below - Designed for use with Single NTK

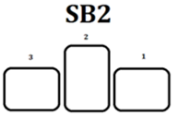
IMPORTANT!! - Some of the Default Solder Bridge Settings are done via a PCB Track in between, Check carefully if adjusting Default settings that a track is not still in place, if so it needs cutting with a small blade to remove. An Example of this is on SB41 and SB42 that are set with a Track as Default to 1-2 so will need the track cutting to set on 2-3

Default Setting

SB3



SB2



Driver Fly-Back Settings

SB27	PWM5	Fly-Back Diode
SB29	PWM6	Fly-Back Diode
SB32	PWM7	Fly-Back Diode
SB35	PWM8	Fly-Back Diode

Knock Setup

	S6 Single
SB15	Off
SB44	1-2
SB68	OFF

RS232 Pin Selection

	RS232	Slave-Can
SB41	1-2	2-3
SB42	1-2	2-3

Driver Pull-Up Settings

SB20	PWM1	12V PullUp (470 Ohm)
SB23	PWM2	12V PullUp (470 Ohm)
SB24	PWM3	5V PullUp (470 Ohm)
SB26	PWM4	5V PullUp (470 Ohm)