

Getting the most out of your ATS Scope:



The Compact ATS scope as shown is one of a range of scopes that AECS supply which can be used in analysing SAE J1939 Truck, Tractor & Trailer live data. Scopes range from \$3,795+gst.

Analysing SAE J1939 Truck and Tractor live data with the ATS scope.

WHAT IS J1939?

J1939 is a CAN communication protocol defined by the Society of Automotive Engineers (SAE). The SAE J1939 protocol defines the recommended practise for a Serial Control and Communication Vehicle Network applicable to **Medium and Heavy Duty diesel systems**. This is not limited to trucks and busses but is also expanded into construction, agricultural equipment and stationary power systems.

scope will expand your target business market! The protocol description defines the bit rate (AECS Scan1 training), the identifier bytes within the communication and the gain and offset used to convert the raw HEX value to a human readable term. The engineers at TiePie have built all this information into the Multichannel software under the IOs in the tool ribbon.

WHAT IS COVERED?

The following screen shot (picture 1) shows some of the information that is covered by the J1939 protocol.

SPN	Name	Unit
4275	Engine_Cylinder_24_Knock_Level	%
PGN 61466: TFAC		
633	Engine_Fuel_Actuator_1_Control_Command	%
1244	Engine_Fuel_Actuator_2_Control_Command	%
3454	Engine_Throttle_Actuator_1_Control_Command	%
3455	Engine_Throttle_Actuator_2_Control_Command	%
PGN 61468: RGAAC		
2306	Requested_Generator_Average_Line_Line_AC_RMS_Voltage	V
PGN 61469: SAS		
3693	Steering_Wheel_Angle	deg
3694	Steering_Wheel_Angle_Flange_Counter	range
3695	Steering_Wheel_Angle_Flange_Counter_Type	bit
3696	Steering_Wheel_Angle_Range	deg
3697	Steering_Angle_Sensor_Active_Mode	bit
3698	Steering_Angle_Sensor_Calibrated	bit
3699	Message_Counter	count
3690	Message_Checksum	count
PGN 61470: GC2		
7938	Generator_Governing_Bias	%
PGN 61473: ESS1		
723	Engine_Speed_2	rpm
4201	Engine_Speed_1	rpm
4202	Engine_Speed_3	rpm
4203	Engine_Speed_Sensor_1_Testing_Pattern_Status	bit
4204	Engine_Speed_Sensor_2_Testing_Pattern_Status	bit
4205	Engine_Speed_Sensor_3_Testing_Pattern_Status	bit
PGN 61474: M55		

Figure 1. Screen shot of part of the J1939 descriptors.

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We no longer believe in the fact that the Capricorn society serves our industry as it was intended and have withdrawn as preferred suppliers from the Capricorn group effective from the end of July 2013.

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We have recently added the **Jaltest Scantool** to our demonstration collection and we are thrilled with its performance & features. If you are interested in having the **Jaltest Scantool** demonstrated to you for your:

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The software allows you to select the IDs/datalines that you want to listen to. Similarities can be drawn between this scope function and a scantool. But, a scantool builds a question answer type communication with the specific ECU that you want to read live data lines from. This system listens in a parallel fashion to **ALL** communication between **ALL** ECUs connected to the particular CAN bus that you have your scope connected to, also during starting. The data that you are reading will not be subject to ECU priority delays commonly experienced with scan tools.

As a down side this means that you will not be able to read "live

data" values that are inherent only to one ECU. As communication technology increases in speed and complexity and as the costs and size of ECUs reduces you will find more small ECUs in vehicles, performing dedicated tasks. All connected via a CAN data bus to multiple other small dedicated ECUs. For example, the J1939 protocol contains more than 40 lines of data related to just the Turbo control. Information such as Variable Geometry Turbo actuator control is now controlled autonomously by a separate ECU mounted on the Turbo such as on this late model Nissan Turbo.

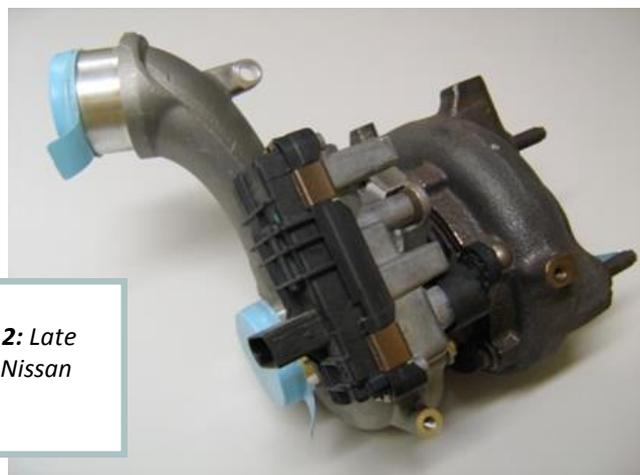


Figure 2: Late model Nissan turbo

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The J1939 protocol covers Turbo Actuator Position as well as Turbo Charger Actuator Control Command hence allowing you to measure the Duty Cycle (control command) and the Position (Actuator Position). Since there are no control motor or position sensor wires to connect to on this standalone VNT controller, how are you going to measure and diagnose if this unit is for example moving freely as intended?

The J1939 protocol also covers non-engine related data such as Joystick_X-Axis_Position, Transmission_Requested_Gear_Feedback, Front_PTO_Output_Shaft_Speed_Set_Point_Command just to name a few.

The ATS5000 scope is recognised and sold in Scandinavia as the Volvo Dealer tool. Therefore the engineers at TiePie have developed the J1939 protocol with some additional Volvo specific data lines which in particular relate to Volvo HD Hybrid Vehicles.



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HOW TO.

Those that are familiar with the ATS scope software will have been exposed to the IO block list in the tool ribbon on the left hand side of the oscilloscope screen.

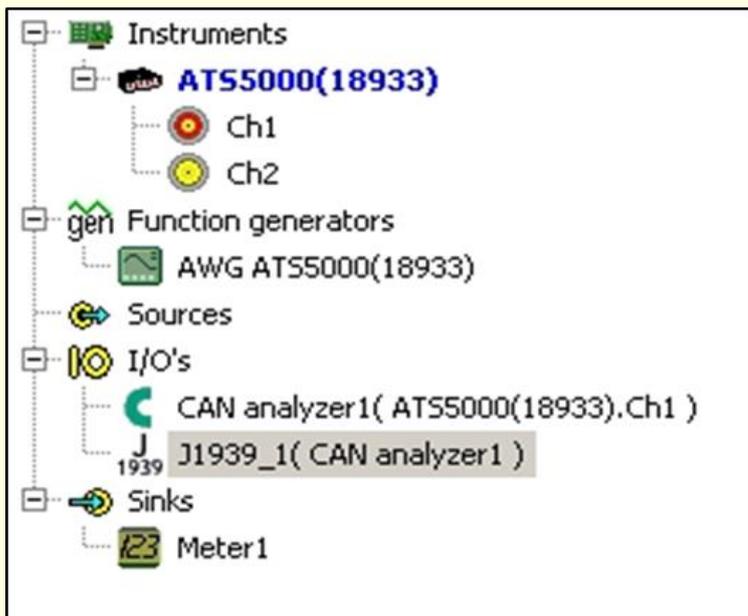


Figure 3: ATS tool ribbon J1939 analyser.

Step 1: Create a CAN analyzer block, in this block you will be able to set the mid-level and bitrate of the CAN communication. This is done by right-clicking on the block. If you are measuring CAN high signals the mid-level should be set to for example 3.7 V on an ordinary CAN system.

Step 2: Drag Ch1 into the CAN analyzer block. This links the signals measured by channel one of the oscilloscope to the CAN analyzer block.

Step 3: Create a J1939 block and drag the CAN analyzer into this block as shown in Figure 3.

Step 4: Measure with Ch2 any sensor or actuator signal.

You can now right click on the J1939 block to add outputs, the pop-up window shown in figure 1 will appear and you can select (by ticking the check box on the left-hand side of each data line) the data lines that you want to analyze. If you have not started measuring the list will be empty because the "Only show observed IDs" check box is checked by default. If you start measuring the list will populate itself with all the data lines that have been transmitted on the CAN during the measurement.

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.....that since August 2012 there has been an increase in RUC rates and new weight bands have also been introduced for Heavy Vehicles.

If you have a small truck - check that you are on the vehicle type coding. Getting it wrong will cost you extra money!

For our service truck we used to pay around \$500 RUC per 10,000 km's, but with our truck in the wrong vehicle coding, that bill went up to nearly \$1,500 for the same distance !

We challenged NZTA about this massive increase and got an admission that this had gone wrong with a number of trucks on the wrong vehicle coding band.

We received a refund and are now paying around \$870 for the same distance.

A shipment of Breakout leads ([case 1](#)) & Scope test leads ([case 2](#)) for scope diagnostics is due to arrive in NZ in September. Did you miss out last time?

Ring us and we can put you on the pre-order list. For more details see scope accessories on our website www.aecs.net.

When you start measuring the scope will automatically analyse the data. The data lines can be dragged into a meter for a digital representation of the data or they can be dragged into the scope screen for an analogue representation of the data. Figure 5 shows the final set-up of the oscilloscope with analogue and graphical representation of the Fuel_Usage data lines

WHAT DO YOU NEED?

Existing ATS5000, ATS 500XM or ATS5004 owners with ATIS version 5.04 will not need anything extra as the J1939 protocol is already included in the ATS software.

If you do own an ATS5000 or ATS5004 scope but don't have ATIS 5.04 please inquire about a software upgrade, please note that an additional dongle may need to be purchased in

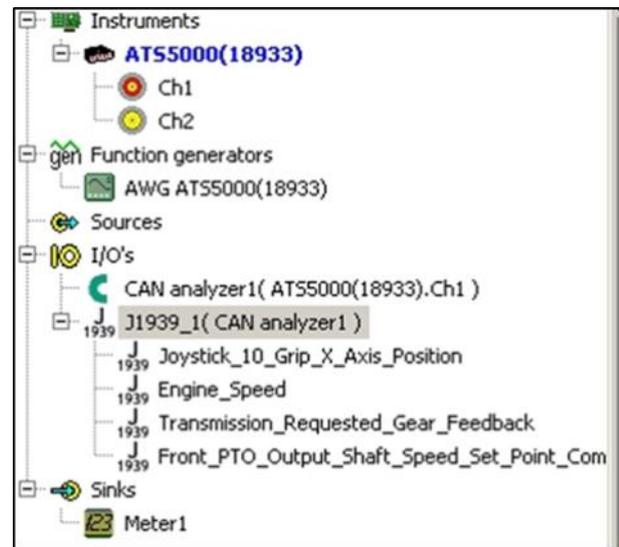


Figure 4: some selected data lines.



Figure 5. Fuel usage dateline complete scope setup showing both meter and analogue representation of the data

order to activate the newer software version Those that do not own an ATS scope please inquire today! What other tool than the ATS scope offers such versatility? What other company can

assist in the application of your equipment and diagnostics like how **A ECS** Ltd can? This is not the future, this is today's technology.

