WABCO C TYPE (P38 NRR) - System Overview

This family of ABS ECU's, denoted C type, have common characteristic in the diagnostic element of their design. This is that once they have been communicated with diagnostically and then put to sleep they inhibit the communication with other ECUs sharing the same data bus and even with themselves. To re-establish diagnostic communication, the ignition must be turned off for approximately five seconds.

It is only possible to communicate with the ABS ECU when the system is in its idle state, that is with the ignition on and the engine running or not. Once the ECU has detected a signal from all sensors that indicates each one has exceeded 2km/h the ECU turns off the dash lamp and exits diagnostic mode. All ECU resources are then used to monitor the sensors and diagnostic communication is no longer possible until the ignition supply has been disconnected and then re-connected.
Despite sharing a common communication standard which means they all start communicating the same, and share some very basic features, these ECU's are actually laid out very differently in respect of their memory usage meaning codes read from one ECU with the wrong program may give incorrect meaning and other codes may not be shown. Also some of them actually require each memory location used for the fault code storage to be re programmed to 0 individually. This means that using the wrong module on an ECU can alter the ECU and make it non functional, re using the right module after will not correct this. So although the ECU's look identical to that used in other vehicles of the same age and can be plugged in, they are NOT diagnostically interchangeable.

WABCO C TYPE (P38 NRR) - Known Fitments

Vehicle makes models and variants known or believed to be using this vehicle system, required diagnostic lead and degree of known compatibility.

Vehicle Make	Vehicle Model	Vehicle Variant	Diagnostic Lead	Compatibility Level
Land Rover	Range Rover P38	1994 - 1999	Green OBD lead	Verified

WABCO C TYPE (P38 NRR) - Pin Outs

Details of the pin usage for the ECU connector.

	
1	ABS Load Relay
2	ETC Valve Block
3	Instrument Cluster
4	ABS Booster Unit Right Rear
5	ABS Booster Unit Right Rear
6	ABS Booster Unit Right Front
7	ABS Booster Unit Right Front
8	ABS Load Relay (coil)
9	Satellite Fuse box
10	Stop Lamp Switch
11	Isolation
12	Isolation
13	ABS Diagnostic Connector
14	ABS Diagnostic Connector
15	Left Front Wheel Speed Sensor
16	Right Rear Wheel Speed Sensor
17	Right Front Wheel Speed Sensor
18	Left Rear Wheel Speed Sensor
19	ABS Load Relay
20	ETC Valve Block
21	ABS Booster Unit Left Rear
22	ABS Booster Unit Left Rear
23	ABS Booster Unit Left Front
24	ABS Booster Unit Left Front
25	Stop Lamp Switch and Suppressor
26	Instrument Cluster
27	ABS Diagnostic Connector and Ground

28 - 29	Not Used
30	ABS Pressure Switch Unit
31	Brake Fluid Level Switch
32	Left Front Wheel Speed Sensor
33	Right Front Wheel Speed Sensor
34	Right Front Wheel Speed Sensor
35	Left Rear Wheel Speed Sensor

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (Read Fault Codes)

This ABS system can self-detect up to 88 faults. These are an even mix of major faults which are safety related, causing full system shutdown and the warning light to illuminate and minor faults caused by flat batteries, power having been temporarily lost.

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (Clear Fault Codes)

This function first reads the fault code memory to ensure that there are faults to clear and if there are completely erases and clears the fault code memory. Having deleted the faults it then re-checks the fault memory to check that it is clear, reporting success if it is. Failure to clear the fault memory successfully is usually due to the system re-logging the fault the moment the fault memory is clear. This indicates that the fault has not been rectified properly and as far as the system is concerned still exists. A re-check for successful clearing of the fault code memory may be successful but then the system may re-log the fault shortly after.

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (Settings)

Values, configuration settings, and other stored information which can be read from the ECU, edited and then rewritten back. Read settings can also be stored as a standard HTML page for reference. These pages can then later be re loaded and re written back to the ECU. Please note that some values may be read only due to the fact that they are supplied from the ECU's ROM or are internally calculated.

- Manufacturer: The manufacturer of the ABS /ETC ECU.
- Serial number: This function obtains the electronic identity of ECU's for record keeping purposes. This number is also printed on a label on the top of the ECU.
- ETC: This shows if Electronic Traction Control is fitted or not fitted to the ABS system.

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (Inputs)

Real time live display of the information the electronic control unit of the selected vehicle system is currently deriving from its input sensors. The ECU will stop communicating at a speed over 1.6mph (2km/h).

- Wheel speed sensor (km/h): This value allows you to monitor wheel speed in Km/h, which is determined by the ABS ECU measuring the wheel rotation sensor's output. Since the basic principle of ABS relies on comparison between the rotations of all the vehicle's wheels, it is important to be able to see what the system is detecting from the wheels. Jacking up a wheel and rotating it by hand whilst someone prods and moves the associated sensors, connectors and cabling will soon show if a sensor is not working or is intermittent.
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- ABS option code: This value is obtained depending on which valves are fitted to the ECU. It will change if a normal valve is absent or if ETC function valves have been omitted. It can be used to help determine if a vehicle has Traction Control or not.
- Pressure valve: This value, whilst no direct comparison to known pressure units, is however, derived from the pressure in the ABS systems fluid reservoir.
- Brake switch 1: This shows the state of the upper-most of the two switches that are actuated by motion of the brake pedal. Normally it should indicate low, changing to high as soon as motion is applied through depressing the brake pedal.
- Brake switch 2: This shows the state of the lower-most of the two switches that are actuated by motion of the brake pedal. Normally it should indicate high, changing to low towards the bottom of the brake pedal's travel.
- Pressure switch 1:
- Pressure switch 2:

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (Outputs)

Choice of outputs that can be tested.

Valves
These functions give direct control over the inlet and outlet valves which control the fluid flow to and from all wheels, the ETC, the de manual valve and the isolation valves.

- Front right inlet: This test engages the inlet solenoid control valve for this wheel, allowing fluid pressure from the accumulator to flow into the caliper, thus applying the brake. If the wheel is rotated by hand before and during the test it should apply brake and then be freed.
- Front right Outlet: This test engages the outlet solenoid control valve for these wheels, allowing fluid pressure from the caliper to release and flow back to the reservoir, thus releasing an applied brake. To test correct operation of the valve, jack the corner of the vehicle until the wheel is free, and check that it does not rotate when the brake is applied; whilst continuing to apply the brake, run the test. The brake should release and the wheel should become free to rotate by hand.
- Front left inlet: This test engages the inlet solenoid control valve for this wheel, allowing fluid pressure from the accumulator to flow into the caliper, thus applying the brake. If the wheel is rotated by hand before and during the test it should apply brake and then be freed.
- Front left Outlet: This test engages the outlet solenoid control valve for these wheels, allowing fluid pressure from the caliper to release and flow back to the reservoir, thus releasing an applied brake. To test correct operation of the valve, jack the corner of the vehicle until the wheel is free, and check that it does not rotate when the brake is applied; whilst continuing to apply the brake, run the test. The brake should release and the wheel should become free to rotate by hand.
- Rear right inlet: This test engages the inlet solenoid control valve for this wheel, allowing fluid pressure from the accumulator to flow into the caliper, thus applying the brake. If the wheel is rotated by hand before and during the test it should apply brake and then be freed.
- Rear right Outlet: This test engages the outlet solenoid control valve for these wheels, allowing fluid pressure from the caliper to release and flow back to the reservoir, thus releasing an applied brake. To test correct operation of the valve, jack the corner of the vehicle until the wheel is free, and check that it does not rotate when the brake is applied; whilst continuing to apply the brake, run the test. The brake should release and the wheel should become free to rotate by hand.
- Rear left inlet: This test engages the inlet solenoid control valve for this wheel, allowing fluid pressure from the accumulator to flow into the caliper, thus applying the brake. If the wheel is rotated by hand before and during the test it should apply brake and then be freed.
- Rear left Outlet: This test engages the outlet solenoid control valve for these wheels, allowing fluid pressure from the caliper to release and flow back to the reservoir, thus releasing an applied brake. To test correct operation of the valve, jack the corner of the vehicle until the wheel is free, and check that it does not rotate when the brake is applied; whilst continuing to apply the brake, run the test. The brake should release and the wheel should become free to rotate by hand.
- Traction control:

WABCO C TYPE (P38 NRR) - Diagnostic Capabilities (UTILITY)

Choice of functions that can be performed.

- Speedo: This drives the speedometer output to simulate 100 Miles per hour.
- Valve Demanual: This test works only when performed on vehicles fitted with Electronic
- Traction Control (ETC). The test is engaging the demanual valve which blocks from the rest of the system any pressure generated from depressing the brake pedal, effectively blocking the manual braking element from the system prior to engaging the computer controlled element. If pressure is applied on the pedal during the test it should be possible to feel the action of the valve feed back on pedal pressure.
- Isolate ABS inlet: This test engages the inlet-isolating valve, in conjunction with the outlet isolating valve and controls flow between the master cylinder, the servo cylinders and the reservoir return. If pressure is applied to the brake pedal during the test the pedal should be felt dropping in stages.
- Isolate ABS outlet: This test engages the outlet-isolating valve, in conjunction with the inlet isolating valve and controls flow between the master cylinder, the servo cylinders and the reservoir return. If pressure is applied to the brake pedal during the test the pedal should be felt dropping in stages.