**CAN Messages**

Incomplete, expect errors, work in progress!  
Method: CAN sniffing and/or ROM disassembly.  
Models: Specifically MY 2009/2010 Impreza 2.0 Turbo Diesel EDM (Euro 4). MY2011 (Euro 5) Impreza and other models seem to share many of these.

**OVERVIEW**

There are 15 CAN-IDs to be found on the high-speed bus (500 kbps, easily available via [OBD-II connection](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/boxer-diesel/obd-ii-connection/)), excluding any communication with a tester device.

| **CAN-ID** | **Interval [ms]** | **Source** | **Read by** | **Comment** |
| --- | --- | --- | --- | --- |
| [0x2](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x2) | 10 | Steering Sensor | VDC/ABS | ??? |
| 0x70 | 20 | Yaw/G Sensor | VDC/ABS | ??? |
| 0x75 | 20 | Yaw/G Sensor | VDC/ABS | ??? |
| 0x80 | 20 | Yaw/G Sensor | VDC/ABS | ??? |
| [0x410](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x410) | 10 | ECU | (TCU), … | Engine speed, accelerator, torque … |
| [0x411](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x411) | 10 | ECU |  | Gear, flags, … |
| [0x501](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x501) | 20 | VDC/ABS | ECU | Torque, flags |
| [0x511](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x511) | 20 | VDC/ABS |  | Steering wheel angle |
| [0x512](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x512) | 20 | VDC/ABS | ECU | Vehicle speed, flags |
| [0x513](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x513) | 20 | VDC/ABS | ECU | Individual wheel speeds |
| [0x514](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x514) | 20 | BIU | ECU | Ambient temp, fuel level, switches,… |
| [0x550](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x550) | 50 | Electric Power Steering | ECU | Electric current |
| 0x576 | 20 |  |  |  |
| [0x600](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x600) | 50 | ECU |  | Coolant temperature, indication lights, … |
| [0x620](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/ecu-analysis/can-messages/#x620) | 20 | BIU or A/C | ECU | A/C flags… |

**STEERING SENSOR CAN-ID 0X2**

Sent every 1/100 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 & 1 | Steering Wheel Angle, int16 |

**ECU CAN-ID 0X410**

Sent every 1/100 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | const 0 |
| 1 | Transmission Torque ??? (x\*1.6 [Nm]) (0 when idling} |
| 2 | Engine Torque ??? (x\*1.6 [Nm]) |
| 3 | Torque Loss ??? (x\*1.6 [Nm]) |
| 4 | Accelerator Position (x\*100/255 [%]) |
| 5 & 6 | Engine Speed, uint16, little endian (x [1/min]) {Ex: 20 03 = 0x0320 = 800 [1/min]} Petrol ECUs and TCUs also write/read this one, respectively. |
| 7 | bit 0: ??? (const 1)  bit 2: A/C Compressor Signal (clutch engaged)  (all other bits unused) |

**ECU CAN-ID 0X411**

Sent every 1/100 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 1 & 2 | ??? uint16, little endian |
| 3 | const 00 ??? |
| 4 | Gear (0 – 6) |
| 5 | Memorized Cruise Speed (x [km/h]) {0x25 = 37 km/h} |
| 6 | Flags bit 7: [CC](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/generic/glossary-of-terms/#cc) SET Light CC Set Light bit 6: CC CRUISE Light CC Cruise Light bit 4: Brake SW |
| 7 | bit 0: [MIL](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/generic/glossary-of-terms/#mil) MIL |

**VDC/ABS CAN-ID 0X501**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 |  |
| 1 |  |
| 2 | Torque Reduction ??? (x\*1.6 [Nm]) |
| 3 | Torque Allowed ??? (x\*1.6 [Nm]) |
| 4 | bit 2: ??? bit 1: ??? bit 0: Request Torque Down |
| 5 | msg counter |
| 6 |  |
| 7 |  |

**VDC/ABS CAN-ID 0X511**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 & 1 | Steering Wheel Angle (x [deg]), int16, little endian, negative = left, positive = right |
| 2 & 3 | Steering Torque ??? |
| 4 | Brake Percentage (1-100%) ??? (x\*0.4 [%]) ??? |

**VDC/ABS CAN-ID 0X512**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | Flags bit 4: VDC Switch (ON/OFF) |
| 1 | Flags ? |
| 2 & 3 | Vehicle Speed, uint16, little endian (x\*0.05625 [km/h])   * average of front wheel speeds * lowest non-zero value seen: 0x0021 |
| 4 | Flags bit 4: Brake Switch |
| 5 | msg counter |
| 6 & 7 | latest f-code, uint16, little endian |

**VDC/ABS CAN-ID 0X513**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 & 1 | Wheel Speed Front Left, uint16, little endian (x\*0.05625 [km/h])   * lowest non-zero value seen: 0x0022 = 1.9 km/h |
| 2 & 3 | Wheel Speed Front Right |
| 4 & 5 | Wheel Speed Rear Left |
| 6 & 7 | Wheel Speed Rear Right |

**BIU CAN-ID 0X514**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | bit 2: Reverse Gear Switch ? |
| 1 | (Error-) flags |
| 2 | Ambient Temperature (x/2-40 [°C])   * 0xFE means no data yet * digitized by combination meter which also commands the primitive center display (clock, temperature, [fuel consumption](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/10/01/fuel-consumption/)) * not read by diesel ECU as it has inlet air temperature |
| 3 | bit 6: Wiper SW bit 3: High Beam ? bit 2: Low Beam ? bit 1: Light SW (parking/clearance/DRL lights already) bit 0: Defogger SW |
| 4 | bits 7 & 6: Fuel Level Resistance, bits 1 & 0 bits 0 & 1: Blower Fan ON (bit 0: low output, bit 1: high output) |
| 5 | [Fuel Level](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/06/10/fuel-level/) Resistance, bits 9-2 of total 10 bits (x/10 [Ω])   * raw, fluctuates a lot when moving, needs damping algorithm |
| 6 | msg counter (low nibble, odd values only?) |
| 7 | Flags, not read by ECU? bit 7: Handbrake/Parking Brake SW Brake Light |

**POWER STEERING CAN-ID 0X550**

Sent every 50 ms = 1/20 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | Status flags? |
| 1 & 2 | Electric Power Steering Current, uint16, big endian (x/10 [A])   * 0xFFFF when engine off |
| 7 | msg counter |

**ECU CAN-ID 0X600**

Sent every 50 ms = 1/20 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | bit 0: Glow Light Glow Light bit 1: [DPF Light](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/03/21/dpf-light/) https://web.archive.org/web/20151220002254im_/https:/subdiesel.files.wordpress.com/2011/03/dpf-light.png?w=41&h=30 (ECU also does the flashing mode by turning on/off repeatedly; used in [Diesel ECU Patch v1](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/06/30/diesel-ecu-patch-v1/)) bit 2: ??? bit 3: ??? |
| 1 & 2 | [Fuel Consumption](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/10/01/fuel-consumption/), uint16, little endian, (x [mm³/s]) |
| 3 | [Coolant Temperature](https://web.archive.org/web/20151220002254/https:/subdiesel.wordpress.com/2011/07/28/coolant-temperature/) (x-40 [°C])   * 0xFF in case of sensor trouble |
| 4 | msg counter |
| 5 | const 0xA2 (from data segment) |
| 6 | bit 2: Clutch SW |
| 7 | const 0xFF |

**BIU (A/C) CAN-ID 0X620**

Sent every 20 ms = 1/50 second.

| **Byte# (0-7)** | **Description** |
| --- | --- |
| 0 | bit 7: Two interior heaters ON bit 6: One interior heater ON bit 4: ??? |
| 1 | bit 2: Radiator Fan Request ??? bit 1: A/C Compressor ON Request bit 0: A/C Switch |