

Electromotive drive module (EDM-i)

Application: Tumble valve regulation

Vehicle: Daimler Chrysler	Product:	Electromotive Drive Module (EDM-i)	
Model: E 320 CDI / E 320 T CDI / S 320 CDI	Replacement Part No. 7.22644.23.0	Pierburg No. 7.22644.01.0 7.22644.05.0 7.22644.08.0 7.22644.12.0 7.22644.15.0	O.E. No.* A 613 150 01 94 A 613 150 00 94 A 613 150 02 94 A 613 150 03 94 A 613 150 04 94
C 200 CDI / C 220 CDI / C 270 CDI C 200 T CDI / C 220 T CDI E 270 CDI 112 CDI 2.2 VITO V 220 CDI	7.22644.24.0	7.22644.00.0 7.22644.04.0 7.22644.07.0 7.22644.11.0 7.22644.14.0	A 611 150 00 94 A 611 150 01 94 A 611 150 02 94 A 611 150 03 94 A 611 150 04 94 A 611 150 06 94



Overview of product

Function

In order to burn the fuel/air mixture optimally in the CDI-Motor as fast as possible, the air is "tumbled" through two separate intake ducts for each piston.

Each of these intake ducts is also equipped with an adjustable tumble valve that is activated by an EDM-i linkage.

Description

Electromotive drive modules (EDM) are used wherever the travel or angle needs to be quickly and exactly adjusted.

EDM-i stands for Electromotive Drive Module with integrated "intelligence". It not only allows for continuous adjustment between the two end positions, but also allows for positioning at any specific point within the operating angle.

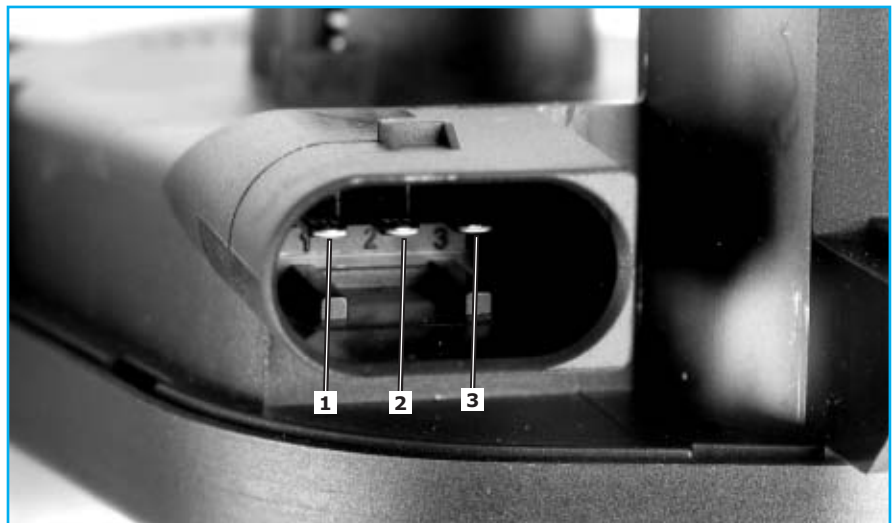
A pulsed control voltage is required to control the EDM-i using the motor control unit ("pulse-width modulation" or PWM). The duty factor of an impulse is also referred to as the pulse-width repetition rate.

The set angle is transmitted by the motor control unit to the drive module as a PWM signal. This signal is converted to the corresponding set angle by the integrated electronics and the electromotive drive.

An integrated angle sensor determines the current position. When it differs from the set position, an error is sent to the motor control unit.



Intake pipe with EDM-i (highlighted)



Contacts
1 Ground (-)
2 Battery voltage (+)
3 PWM signal (+)

Technical data		
Rated voltage	[V]	12
Operating voltage	[V]	10 - 16
Temperature range	[°C]	-30 ... +130
PWM frequency	[Hz]	140 ± 10%
Protection type		IP 5K9K



Joints between EDM-i and tumble valves

Troubleshooting

If a malfunction occurs, the error lamp (MIL, "Malfunction Indication Lamp") in the dashboard lights up. The vehicle goes into the emergency operating mode.

An EDM-i can be monitored electrically with OBD systems.

Possible error codes in this case are:

- P1189 Intake duct shutdown
- short-circuit
- P1189 Intake duct shutdown
- open circuit
- P1189 Intake duct shutdown
- The valves are stuck in the closed state
- P1189 Intake duct shutdown
- The valves are stuck in the open state
- P1189 Intake duct shutdown
- M55 (motor intake duct shutdown)

The list of the causes of the malfunction can be limited using a suitable read-out tool (e.g. a scan tool).

Please note:

The cause of a malfunction whose error code points to an EDM-i is not necessarily due to the malfunction of the EDM-i. The cause is often a tumble valve that is sticking or is completely stuck.

 Check the connection ("linkage") between the adjusting lever of the EDM-i and the tumble valves (see → Fig. above).

- Check the tumble valves to ensure they operate smoothly. The adjusting lever must swing back to its start position within a period of about 1-2 seconds after making an adjustment. If this period is exceeded, an error is stored.
 - Check the intake pipe for tumble valves that may be stuck. Deposits on the tumble valves can cause them to become difficult to move. The cause of the deposit may be a malfunction in the injection system or too much oil in the charging air, among others. When the tumble valves are sticking, the intake pipe and AGR mixing valve must be cleaned.
 - Check the supply voltage on the contacts of the connector.
-  **Safety information:** When the ignition is on, no connectors may be plugged or unplugged. The voltage spikes resulting from this can destroy electronic components.
- The EDM-i's can be activated by a read-out device when performing actuator diagnostics. It makes sense to read out the error memory first and then perform the actuator diagnostics according to the manufacturer's specifications.
 - An EDM-i activated during the actuator diagnostics is controlled in intervals so that you can see it switching. If the EDM-i switches and reaches its end position (valve is open/closed), then the supply voltage and the electronics of the EDM-i are OK.
-  If the tumble valves are always open, then the soot values will increase in the exhaust at low speeds. If the tumble valves are always closed, then the soot values will increase in the exhaust at high speeds.
- If a fuse is burnt out in the fuse box, check if the EDM-i is protected by this fuse by checking the electrical diagram (e.g. Relay Module K40: Fuse "F3 - Diesel Motor Control Unit Supply Voltage"). Find out which devices are also protected by this fuse and then check them (e.g. the preheater).
 - Check with an oscilloscope if the control signal from the motor control unit reaches the EDM-i. The signal is a ground-controlled square wave signal. If you press down on the gas pedal when idling, the width of the square wave signal should change.
 - Possible causes of the malfunction may be incorrect regulation of the EDM-i by the motor control unit due to an incorrect input signal. For this reason, check to make sure the sensors such as the air mass sensor or temperature sensor are functioning properly.

 After checking the function and replacing the sensor (if necessary), the error memory must be cleared.