

**NEW EASY FAST ECU
WITH OBD
COMMUNICATION**

PRELIMINARY

Introduction:

The OBD ECU has been created not for managing the entire calibration process with only OBD but using read information K or CAN lines allowing to OBD ECU to self adjusting itself during the over time (within established limits) following modified conditions of installed system.

Main Characteristics:

This ECU has been created on the base of Easy Fast control unit adding the possibility to manage OBD communication on K or CAN line.

It has the same functions of present Easy Fast ECU.

Pin-out compatible with current Easy Fast ECU, have been added only three wires for OBD communication (one for line-k and the others for CAN line)

Possibility to display petrol fuel trims (without using OBD scan tool)

Self adaptivity can be enable or disable

Full compatibility with currently used calibrations

Self-recognizing of connection type:

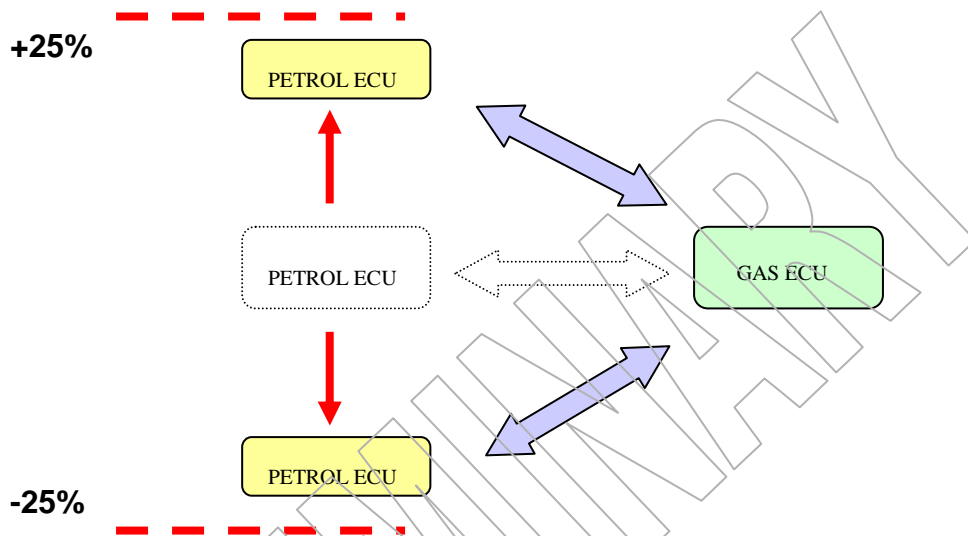
- | | |
|---------------------------|----------------------------------|
| • ISO9141 | K-line pin7 (type 1) |
| • KWP – 2000 Fast Init | K-line pin7 (type 2) |
| • KWP – 2000 Slow Init | K-line pin7 (type 3) |
| • CAN standard - 250 kbps | CAN-H pin6, CAN-L pin14 (type 6) |
| • CAN extended - 250 kbps | CAN-H pin6, CAN-L pin14 (type 7) |
| • CAN standard - 500 kbps | CAN-H pin6, CAN-L pin14 (type 8) |
| • CAN extended - 500 kbps | CAN-H pin6, CAN-L pin14 (type 9) |

Applicability:

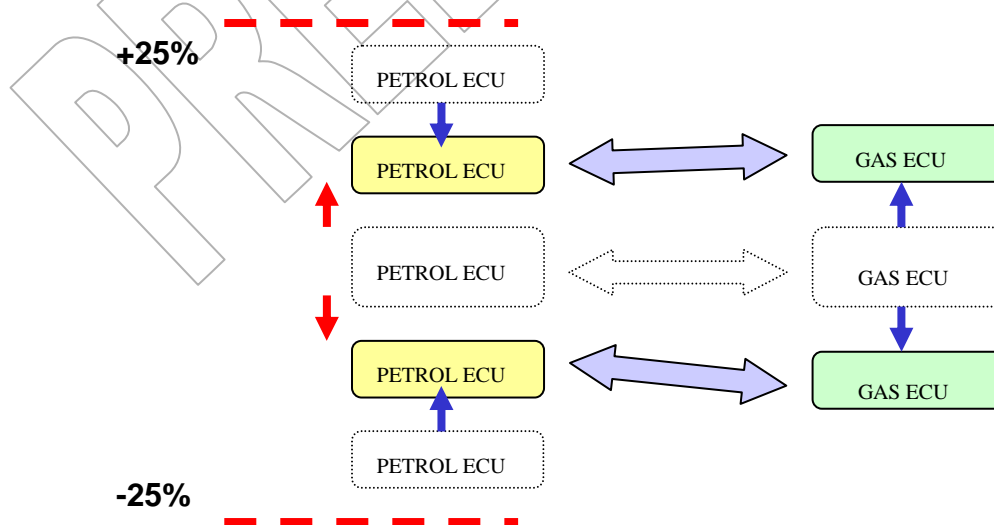
At the moment is compatible with petrol ECU in which Fast and Slow integrators are the following (for different types of correctors please contact LOVATO GAS S.p.A.)

- ± 25%
- ± 50%
- "rights" or "inverted"


FUNCTIONING PRINCIPLES: ADJUSTEMENT OF ECU PARAMETERS



SELF ADAPTATIVITY STRATEGY CALCULATE GAS COEFFICIENT OF CORRECTION AND PETROL ECU ADJUSTEMENTS WILL DECREASE



OBD ADAPTIVITY WINDOW

F1 Configuration	F2 Switching	F3 Sensors	F4 Map	F5 Adjustments	F6 OBD adaptivity	F7 Diagnosys	ESC
REVS <input type="text" value="1667"/> rpm	GAS time <input type="text" value="0,00"/> ms	G. PRES. <input type="text" value="1,05"/> bar	<input checked="" type="checkbox"/> Active adaptivity Type of PETROL trimmers		MAP <input type="text" value="0,37"/> bar		
T. GAS <input type="text" value="19"/> °C	PETROL time <input type="text" value="7,02"/> ms	EXTRA-INJ. <input type="checkbox"/>	Gas trim <input type="text" value="0%"/>	λ 1 <input type="text" value="n.d."/> λ 2 <input type="text" value="n.d."/>	CUT-OFF <input type="checkbox"/>	DIAGNOSTICS <input type="checkbox"/>	
T. RED. <input type="text" value="65"/> °C	<input type="radio"/> max \pm 25% <input type="radio"/> max \pm 50% <input type="radio"/> max \pm 100%		<input type="radio"/> Riath <small>Lean carburetion with positive trimmers</small>		<input checked="" type="radio"/> Inverted <small>Lean carburetion with negative trimmers</small>		

In F6 window is it previously possible to enable or disable self-adaptivity setting the right type of petrol fuel trims.

Gas correction coefficient and slow/fast fuel trims are visible in window F4 (see following example)

When ECU is communicating PC, the visualization of slow/fast fuel trims starts after about a minute: this for giving priority to an eventual OBD scan tool that may be connected on the vehicle.

In case an OBD scan tool has been connected it is not possible to read correctors.

Control units are working with software version 1.3.9 or higher.

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C λ_1 λ_2

EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

PETROL

Times inj	Revs											
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
2,00	163	163	167	160	160	165	170	170	162	162	162	162
2,50	163	163	167	160	160	165	170	170	162	162	162	162
3,00	160	160	167	155	158	165	166	163	156	152	152	152
3,50	151	151	155	151	151	154	159	157	153	151	151	151
4,50	141	141	145	142	142	150	151	148	145	149	149	149
6,00	128	128	135	132	129	134	132	132	129	141	141	141
8,00	118	118	123	120	122	124	124	124	121	130	130	130
10,00	115	115	114	111	115	119	116	116	115	129	129	129
11,00	113	113	110	110	112	114	115	115	112	126	126	126
12,00	110	110	111	111	111	113	115	115	112	109	109	109
14,00	100	100	109	109	110	110	110	110	107	107	107	107
16,00	94	94	96	96	100	101	98	96	95	95	93	92

TARGET bank 1
 ms

Fuel trim bank 1 Slow 0,8% Fast -1,6%

ON PETROL MODE

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C λ_1 λ_2

EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

GAS

Times inj	Revs											
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
2,00	163	163	167	160	160	165	170	170	162	162	162	162
2,50	163	163	167	160	160	165	170	170	162	162	162	162
3,00	160	160	167	155	158	165	166	163	156	152	152	152
3,50	151	151	155	151	151	154	159	157	153	151	151	151
4,50	141	141	145	142	142	150	151	148	145	149	149	149
6,00	128	128	135	132	129	134	132	132	129	141	141	141
8,00	118	118	123	120	122	124	124	124	121	130	130	130
10,00	115	115	114	111	115	119	116	116	115	129	129	129
11,00	113	113	110	110	112	114	115	115	112	126	126	126
12,00	110	110	111	111	111	113	115	115	112	109	109	109
14,00	100	100	109	109	110	110	110	110	107	107	107	107
16,00	94	94	96	96	100	101	98	96	95	95	93	92

TARGET bank 1
 ms

Fuel trim bank 1 Slow 0,8% Fast 1,6%

ON GAS MODE WITH SELF-ADAPTATIVITY DISABLED

Optimum for calibration: slow and fast fuel trims are working with similar values to petrol mode condition.

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C $\lambda 1$ $\lambda 2$ EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

GAS

Times inj	Revs												
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	
2,00	148	163	167	160	160	165	170	170	162	162	162	162	
2,50	148	163	167	160	160	165	170	170	162	162	162	162	
3,00	145	160	167	155	158	165	166	163	156	152	152	152	
3,50	126	151	155	151	151	154	159	157	153	151	151	151	
4,50	126	141	145	142	142	150	151	148	145	149	149	149	
6,00	113	128	135	132	129	134	132	132	129	141	141	141	
8,00	103	118	123	120	122	124	124	124	121	130	130	130	
10,00	100	115	114	111	115	119	116	116	115	129	129	129	
11,00	98	113	110	110	112	114	115	115	112	126	126	126	
12,00	95	110	111	111	111	113	115	115	112	109	109	109	
14,00	85	100	109	109	110	110	110	110	107	107	107	107	
16,00	79	94	96	96	100	101	98	96	95	95	93	92	

Fuel trim bank 1 Slow 16,4% Fast 1,6%

TARGET bank 1 ms REC

ON GAS MODE WITH SELF ADAPTATIVITY DISABLED

Lean condition is simulated decreasing gas injection time (-15 K on minimum column)

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C Gas trim $\lambda 1$ $\lambda 2$ EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

GAS

Times inj	Revs												
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	
2,00	148	163	167	160	160	165	170	170	162	162	162	162	
2,50	148	163	167	160	160	165	170	170	162	162	162	162	
3,00	145	160	167	155	158	165	166	163	156	152	152	152	
3,50	126	151	155	151	151	154	159	157	153	151	151	151	
4,50	126	141	145	142	142	150	151	148	145	149	149	149	
6,00	113	128	135	132	129	134	132	132	129	141	141	141	
8,00	103	118	123	120	122	124	124	124	121	130	130	130	
10,00	100	115	114	111	115	119	116	116	115	129	129	129	
11,00	98	113	110	110	112	114	115	115	112	126	126	126	
12,00	95	110	111	111	111	113	115	115	112	109	109	109	
14,00	85	100	109	109	110	110	110	110	107	107	107	107	
16,00	79	94	96	96	100	101	98	96	95	95	93	92	

Fuel trim bank 1 Slow 4,7% Fast 0,0%

TARGET bank 1 ms REC

ON GAS MODE WITH SELF ADAPTATIVITY ENABLED

Gas corrector increase his value in order to increase gas injection time. Fast and slow trim fuels come back to values similar to starting ones.

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C $\lambda 1$ $\lambda 2$

EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

GAS

Times inj	Revs												
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	
2,00	178	163	167	160	160	165	170	170	162	162	162	162	
2,50	178	163	167	160	160	165	170	170	162	162	162	162	
3,00	175	160	167	155	158	165	166	163	156	152	152	152	
3,50	166	151	155	151	151	154	159	157	153	151	151	151	
4,50	156	141	145	142	142	150	151	148	145	149	149	149	
6,00	143	128	135	132	129	134	132	132	129	141	141	141	
8,00	133	118	123	120	122	124	124	121	130	130	130	130	
10,00	130	115	114	111	115	119	116	116	115	129	129	129	
11,00	128	113	110	110	112	114	115	115	112	126	126	126	
12,00	125	110	111	111	111	113	115	115	112	109	109	109	
14,00	115	100	109	109	110	110	110	110	107	107	107	107	
16,00	109	94	96	96	100	101	98	96	95	95	93	92	

Fuel trim bank 1 Slow -5,5% Fast -2,3%

TARGET bank 1
 ms

ON GAS MODE WITH SELF-ADAPTATIVITY DISABLED

Reach condition is simulated increasing gas injection time (+15 K on minimum column)

REVS rpm GAS time ms G. PRES. bar
 T. GAS °C PETROL time ms MAP bar
 T. RED. °C Gas trim $\lambda 1$ $\lambda 2$

EXTRA-INJ.
 CUT-OFF
 DIAGNOSTICS

GAS

Times inj	Revs												
	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	
2,00	178	163	167	160	160	165	170	170	162	162	162	162	
2,50	178	163	167	160	160	165	170	170	162	162	162	162	
3,00	175	160	167	155	158	165	166	163	156	152	152	152	
3,50	166	151	155	151	151	154	159	157	153	151	151	151	
4,50	156	141	145	142	142	150	151	148	145	149	149	149	
6,00	143	128	135	132	129	134	132	132	129	141	141	141	
8,00	133	118	123	120	122	124	124	121	130	130	130	130	
10,00	130	115	114	111	115	119	116	116	115	129	129	129	
11,00	128	113	110	110	112	114	115	115	112	126	126	126	
12,00	125	110	111	111	111	113	115	115	112	109	109	109	
14,00	115	100	109	109	110	110	110	110	107	107	107	107	
16,00	109	94	96	96	100	101	98	96	95	95	93	92	

Fuel trim bank 1 Slow -1,6% Fast 1,6%

TARGET bank 1
 ms

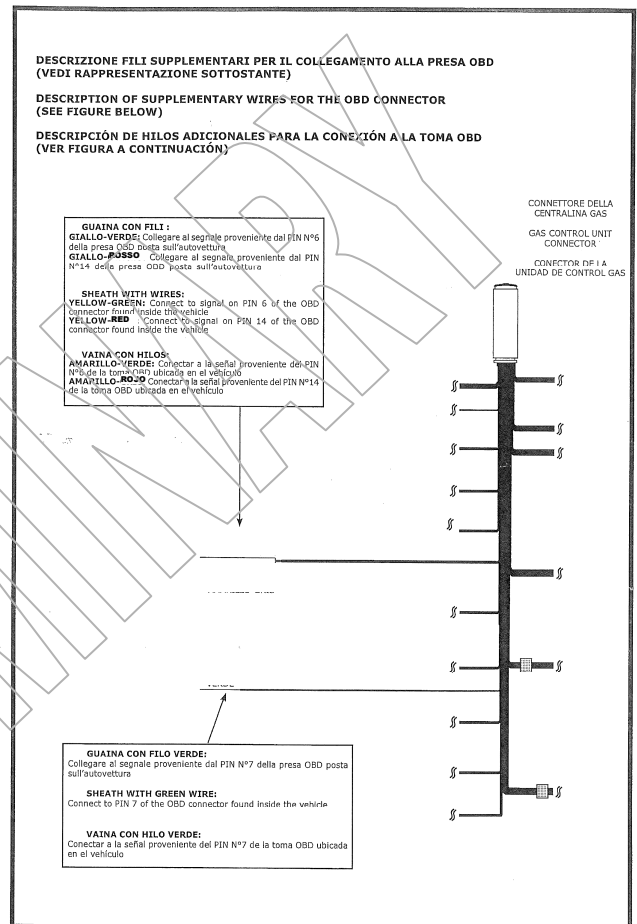
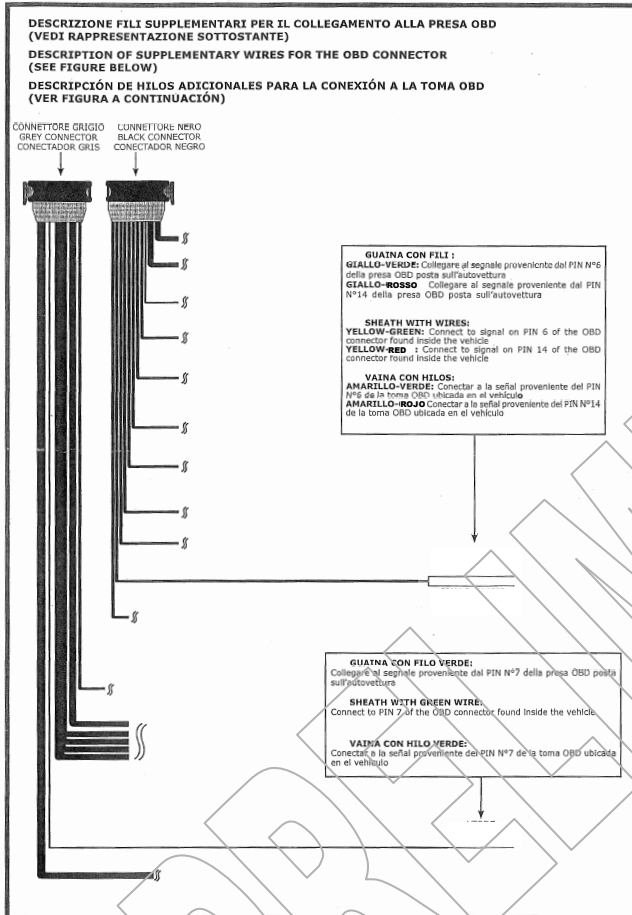
ON GAS MODE WITH SELF-ADAPTATIVITY ENABLED

Gas corrector decrease in order to decrease gas injection time. Fast and slow fuel trims come back to values similar to starting conditions.

CONNECTION SCHEMES:

4 CYLINDERS

8 CYLINDERS



K-LINE o ISO 9141-2

CAN

