

# SeBCON-Micro®

**Air-mass boost controller for Redblocks - Volvo's famous turbo engine**

***SeBCON-Micro - the most advanced replacement° unit for the Turbo Plus Kit***

<b>B230FT</b>	<b>121 KW (165PS)</b>	Volvo 700/900 Series 1990-1998 with Bosch LH 2.4 Jetronic System
<b>B230FK</b>	<b>99 KW (135PS)</b>	Volvo 900 Series 1995-1998 with Bosch LH 2.4 Jetronic System
<b>B230FT</b>	<b>114 KW (155PS)</b>	Volvo 700 Series 1985-1989 with Bosch LH 2.2 Jetronic System
<b>B23FT</b>	<b>117 KW (160PS)</b>	Volvo 700 Series 1983-1984 with Bosch LH 2.0 Jetronic System
<b>B21FT</b>	<b>91 KW (127PS)</b>	Volvo 240 Series 1981-1985 with Bosch LH 2.0 Jetronic System

## SeBCON's Guide

Version 1.01 (Firmware 1.20)

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# 1 Introduction & Product Features

**SeBCON-Micro** is an electronic boost pressure controller developed for LH-Jetronic injection systems with conventional mechanical turbocharger control.

With the SeBCON-Micro, the charging pressure can be controlled cleanly from the serial pressure to the maximum possible charging pressure and thus a higher motor power can be achieved. The charging pressure is controlled by means of the air mass meter.

The SeBCON-Micro is the most advanced replacement unit for the Volvo TurboPlus Kit.

## ***Advantages by using the AMM signal for boost control:***

- better throttle control
- better fuel economy
- boost proportional to throttle position
- cruise control compatible

## ***More features:***

- Preprogrammed, Plug-n-Drive
- Powered by a AVR® Atmega32 Micro controller
- Easy to install
- Auto boost for good driveability on part load
- Customized for the LH-Jetronic 2.0/2.2/2.4 fuel injection system
- Optimized for Stonis LH2.4 tuning chip
- Interface for optional programming: Atmel ISP
- Compact size (110mm x 52mm x 25mm), PCB is only 50mm x 63mm

## 2 Basics

### 2.1.1 SeBCON's location

It is recommended to install SeBCON-Micro in the passenger compartment.

### 2.1.2 Tested turbocharger and other equipment

SeBCON-Micro is already tested with the following equipment:

- ✓ Bosch LH-Jetronic 563, 932, 937, 962, 967, 977, 984
- ✓ Bosch EZK 148, 207, 219, EZK 148 chipped with Volvo 219 binary
- ✓ Chips from Stoni and BSR
- ✓ 2.5" air mass meter Bosch 0280 213 016
- ✓ 3.0" air mass meter Bosch 0280 213 012 ; A 0986 280 110
- ✓ Bosch injectors 0280 150 804 315cc/min
- ✓ Bosch injectors 0280 156 280 470cc/min
- ✓ Siemens injectors 107961 60's 630cc/min
- ✓ Volvo 850, S/C/V70, S60, S80, XC90 Solenoid
- ✓ Pierburg Solenoid n. 7.22240.11 (Volvo Nr. 30670448)
- ✓ Volvo Turbo-Plus-Kit Solenoid Pierburg n. 7.21559.00 (Volvo Nr. 3517757)
- ✓ Garrett T2543
- ✓ Garrett T3- 42/48AR
- ✓ MHI TD04H-13C-6
- ✓ MHI TD04HL-15G-7
- ✓ MHI 16T

### 2.1.3 Requirements

- Gasoline with 98 Octane
- Best results with Bosch 3" Air-mass meter and matching injectors.
- Adjust the wastegate actuator to **~5-7psi without SeBCON-Micro**

## 3 Solenoid Valves

SeBCON-Micro is programmed to fit best with the advised solenoid valves:

**3-Way-Valve (default device)**  
**Pierburg** 7.22240.13.0 12V resp.  
 Volvo Part Nr.: **30670448** (7.22240.11) -  
 Volvo 850, S/C/V70, S60, S80 and XC90 turbo



### recommended solenoid

Valve connections are marked as follows:

- **red** : from the turbocharger
- **yellow** : to the wastegate
- **blue** : drain

**Boost pressure control valve**  
**Skandix** 1016708 (referred to Volvo 30670448)

<http://www.skandix.de/en/search/?q=1016708>



### alternative solenoid

Valve connections are marked as follows:

unknown

## Important:

When installing, make sure that:

- The drain port of the solenoids is not blocked
- The connecting hoses used are not buckled
- The connecting hoses are kept as short as possible
- The connecting hoses inner diameter correspond to the solenoid
- In case you insert the drain hose into the air filter box, ensure that the hose does not touch the filter element and so blocks the drain port.

**Any of the above points will lead to an insufficient boost height/behavior.**

## 4 Wiring

All necessary signals can be tapped directly at the LH-Jetronic control unit connector.

### 4.1.1 SeBCON to Bosch LH-Jetronic

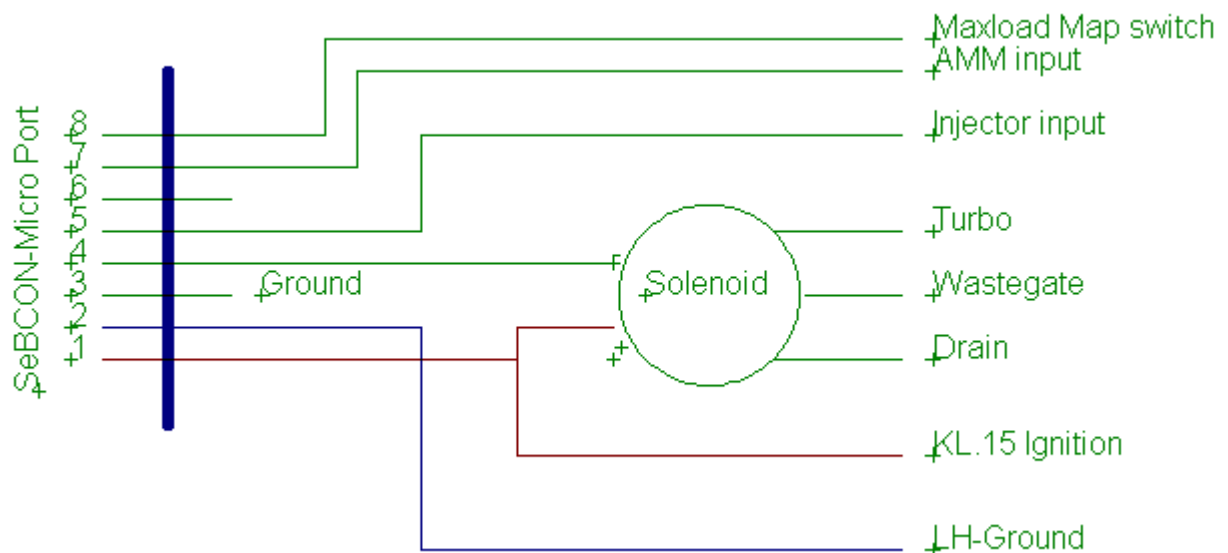
Function Signal	SeBCON-Micro		LH 2.4		LH 2.2		LH 2.0	
	Port	description	pin	cable	pin	cable	pin	cable
Power +12V	1	<b>KL.15 Ignition !!</b>	35	BL	9	BL-Y	?	?
Ground	2	LH-Jetronic ground	17	SB	11	SB	?	?
Ground	3	LH-Jetronic ground	-	-	-	-	-	-
Solenoid GND	4	Solenoid ground	-	-	-	-	-	-
Injector in	5	Injector signal	18	GR	13	GR	13	GN-W
--	6		-	-	-	-	-	-
Air-mass meter	7	AMM signal	7	BL-R	7	BL-R	7	W-R
Map-Switch	8	Switch to Ground Port3	-	-	-	-	-	-

• necessary signal      \* recommended signal      \* additional function

**::> This configuration sheet is only valid for original Turbo Versions!**

Use **max. 0.5mm<sup>2</sup>** cables

### 4.1.2 Connection diagram



## 5 Flash signals

The additional LED connection on the board can be used for an external LED. For this purpose, an LED can be connected **without** resistance to the port.

SeBCON-Micro status LED / external LED port	
Flash signs	description
1 flash	at boot up, box is alive
flashing ~ 10 seconds	boost decreasing - engine knocks

## 6 Adjustment

### Potentiometer

The height of the charge pressure (air mass) is adjusted with the potentiometer.

Increase boost:                   clockwise  
Decrease boost:           counterclockwise

Adjustment range: 0-110%

0-99%:           decrease the AMM signal  
100%:           put the AMM signal through  
100-110% :   increase the AMM signal

### Maxload Map Switch

With this switch it's possible to switch to a additional Maxload Map. This is a fast way to switch between e.g. Eco and Sport Mode or whatever is programmed. Map2 provides by default additional Mid-Range power. If you don't want to use this function, leave port 3+8 unconnected.

### *Where can i intervene?*

- Potentiometer, adjust the maximum air-mass (boost)
- AMM-linearization map (advanced users)
- Maxload map (advanced users)

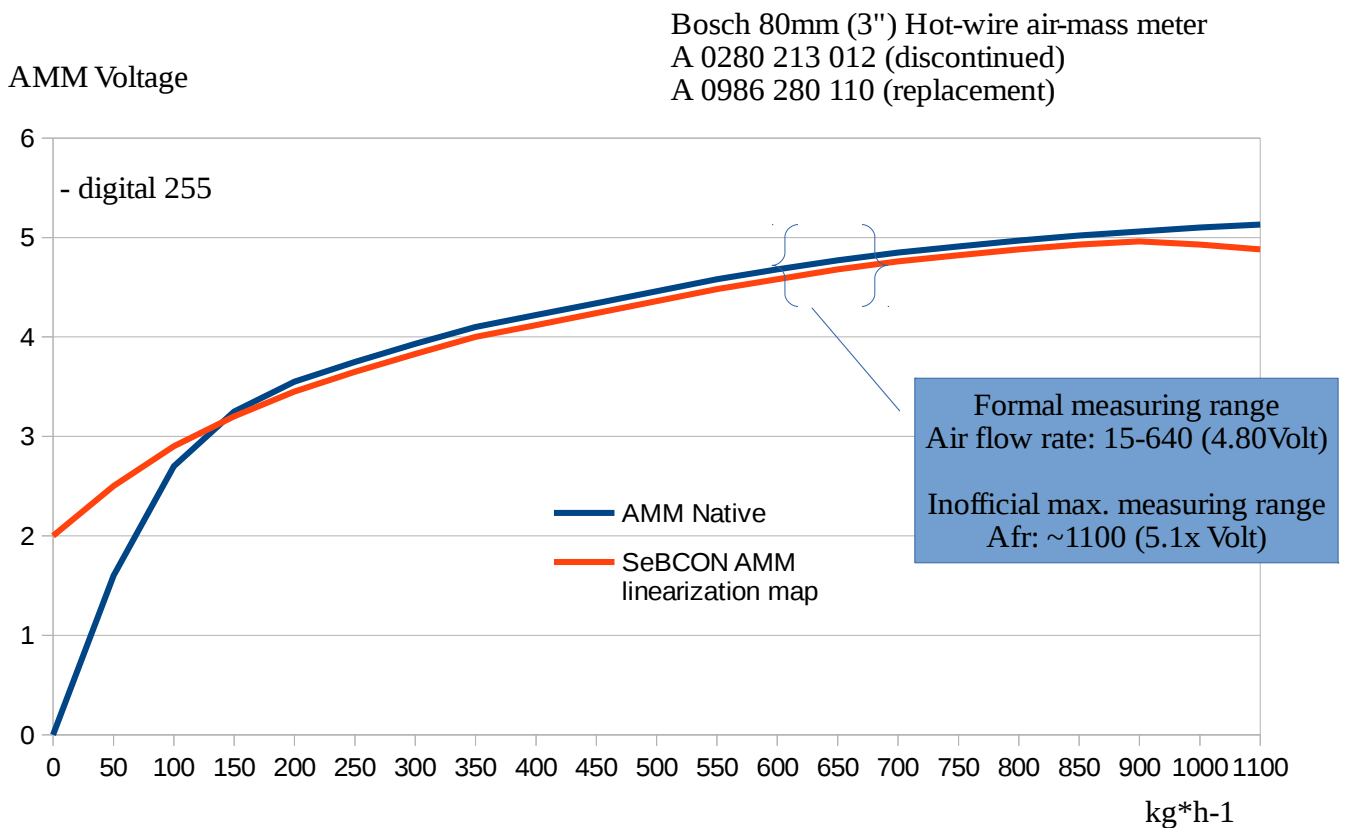
### *I'm a advanced user and want to modify the internal maps, what do I need?*

- Windows
- USBasp Controller (6-Pin) for the ISP-Interface  
<https://startpage.com/do/search?q=usbasp>
- eXtreme Burner - AVR 1.4.2 or higher; to write the new eprom data  
<http://extremeelectronics.co.in/>

## 7 SeBCON Internals

### How does SeBCON calculates the Solenoid values?

- Reading the LMM value, converting the analog to a digital value 0-255
- Correction of the digital LMM value using the AMM-linearization map
- Set the relative height of the curve using the potentiometer, range 0-110%
- Check whether the calculated value is higher than the value for the current speed stored in the maxload map; If so, the calculated value is replaced by the value of the maxload map.
- Check whether a lower value is stored for the current speed (knocking)
- Limit calculated value to digital 232 (if higher) to limit solenoids to 90% cycle time (component protection).
- Convert the final value to a 30Hz PWM signal between 0 and 90% and pass to the power amplifier of the solenoids.



### 7.1.1 New Maps

Using the eXtreme Burner software, read out the eeprom, Make the desired changes and re-write the changed data.

	00	01	02	03	04	05	06	07	Text/ASCII View
0000F0	EE	EE	EE	EE	EE	EE	EE	EE	ïïïïïïïï
0000F8	EE	EE	EE	EE	EE	EE	EE	EE	ïïïïïïïï
000100	00	00	00	00	00	00	00	00	
000108	00	00	00	00	00	00	00	00	
000110	00	00	00	64	6E	78	82	8C	
000118	96	96	96	96	96	96	96	96	□□□□□□□□
000120	96	96	96	96	96	96	96	96	□□□□□□□□
000128	96	96	96	96	96	9B	A0	A6	□□□□□□ !
000130	A8	AA	AC	AE	B0	B2	B4	B6	¨ ¸ ¸ ¸ ¸ ¸ ¸ ¸ ¸
000138	B8	BA	BC	BE	C0	C2	C4	C6	¸ ¸ ¸ ¸ ¸ ¸ ¸ ¸
000140	CA	CC	CE	D0	D2	D4	D6	D8	É Ì Ï Ò Ô Ö Ø
000148	DA	DC	DE	E1	E6	EB	F1	F7	Ú Û Þ á æ ã ñ ÷
000150	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000158	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000160	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000168	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000170	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000178	F7	F7	F7	F7	F7	F7	F7	F7	÷ ÷ ÷ ÷ ÷ ÷ ÷ ÷
000180	FF	FF	FF	FF	FF	FF	FF	FF	ÿÿÿÿÿÿÿÿ

000000 - 0000F8 : AMM Linearization Map  
**000100 - 000178 : Maxload Map 1 - default Map**  
**000180 - 0001F8 : Maxload Map 2 - activate/switch to this Map via SeBCON-Port 8**

Every Maxload map field correlates to 60 rpm (RPM = field.n.\* 60)  
 field 1 : 60 rpm  
 field 25 : 1500 rpm  
 field 128 : 7680 rpm

With the Maxload Map you can generate your own full-load curve.



## 8 Technical Data

### 8.1.1 10-Pin Header CON1 & CON2

SeBCON-Micro		AVR Port	
Connector	description	Port	Type
1-1	LCD DB4	PA4	ADC4
1-2	LCD DB5	PA5	ADC5
1-3	LCD DB6	PA6	ADC6
1-4	LCD DB7	PA7	ADC7
1-5	LCD E	PC6	I/O
1-6	LCD Rs	PC7	I/O
1-7	LCD BL	PB3	I/O
1-8	LCD Pushbutton	PA2	ADC2
1-9	LCD Ground	-	-
1-10	n.a	-	-
2-1	free	PC0	I/O
2-2	free	PC1	I/O
2-3	free	PC2	I/O
2-4	free	PC3	I/O
2-5	free	PC4	I/O
2-6	free	PC5	I/O
2-7	free	PD6	I/O
2-8	free	PD7	I/O
2-9	free	-	-
2-10	n.a	-	-

Power supply:

- 7-15Volt
- 100mA

Microprocessor:

- ATMEGA32-16AU
- 14.7456 MHz

Interfaces:

- ISP - In System Programming Interface
- 2x 10-Pin header

## 9 Dezimal to Hexadezimal Table

Dezimal	Hex	Dezimal	Hex	Dezimal	Hex	Dezimal	Hex	Dezimal	Hex	Dezimal	Hex
0	0	50	32	100	64	150	96	200	C8	250	FA
1	1	51	33	101	65	151	97	201	C9	251	FB
2	2	52	34	102	66	152	98	202	CA	252	FC
3	3	53	35	103	67	153	99	203	CB	253	FD
4	4	54	36	104	68	154	9A	204	CC	254	FE
5	5	55	37	105	69	155	9B	205	CD	255	FF
6	6	56	38	106	6A	156	9C	206	CE		
7	7	57	39	107	6B	157	9D	207	CF		
8	8	58	3A	108	6C	158	9E	208	D0		
9	9	59	3B	109	6D	159	9F	209	D1		
10	0A	60	3C	110	6E	160	A0	210	D2		
11	0B	61	3D	111	6F	161	A1	211	D3		
12	0C	62	3E	112	70	162	A2	212	D4		
13	0D	63	3F	113	71	163	A3	213	D5		
14	0E	64	40	114	72	164	A4	214	D6		
15	0F	65	41	115	73	165	A5	215	D7		
16	10	66	42	116	74	166	A6	216	D8		
17	11	67	43	117	75	167	A7	217	D9		
18	12	68	44	118	76	168	A8	218	DA		
19	13	69	45	119	77	169	A9	219	DB		
20	14	70	46	120	78	170	AA	220	DC		
21	15	71	47	121	79	171	AB	221	DD		
22	16	72	48	122	7A	172	AC	222	DE		
23	17	73	49	123	7B	173	AD	223	DF		
24	18	74	4A	124	7C	174	AE	224	E0		
25	19	75	4B	125	7D	175	AF	225	E1		
26	1A	76	4C	126	7E	176	B0	226	E2		
27	1B	77	4D	127	7F	177	B1	227	E3		
28	1C	78	4E	128	80	178	B2	228	E4		
29	1D	79	4F	129	81	179	B3	229	E5		
30	1E	80	50	130	82	180	B4	230	E6		
31	1F	81	51	131	83	181	B5	231	E7		
32	20	82	52	132	84	182	B6	232	E8		
33	21	83	53	133	85	183	B7	233	E9		
34	22	84	54	134	86	184	B8	234	EA		
35	23	85	55	135	87	185	B9	235	EB		
36	24	86	56	136	88	186	BA	236	EC		
37	25	87	57	137	89	187	BB	237	ED		
38	26	88	58	138	8A	188	BC	238	EE		
39	27	89	59	139	8B	189	BD	239	EF		
40	28	90	5A	140	8C	190	BE	240	F0		
41	29	91	5B	141	8D	191	BF	241	F1		
42	2A	92	5C	142	8E	192	C0	242	F2		
43	2B	93	5D	143	8F	193	C1	243	F3		
44	2C	94	5E	144	90	194	C2	244	F4		
45	2D	95	5F	145	91	195	C3	245	F5		
46	2E	96	60	146	92	196	C4	246	F6		
47	2F	97	61	147	93	197	C5	247	F7		
48	30	98	62	148	94	198	C6	248	F8		
49	31	99	63	149	95	199	C7	249	F9		