Dear Customer, Please DO NOT THROW THIS AWAY, READ CAREFULLY

VEMS GenBoard v3.x is very flexible, with room for customization. It is possible to get a working system relatively fast, but there are important things to consider even for an assembled, cased unit. **Important Warnings - failing these will result in damage**:

- **connect all grounds** 1 GND and 4 GND5-s from Econoseal-36 (GND5 is sometimes marked as powerGND or PGND) before applying power. GND and GND5 should meet 10 .. 15cm (5 inch) from the ECM. Use strong wires (0.75-1 mm2) and don't let any chance for disconnection during operation.
- there must be a **fuse** (usually 10A, or 15A for multi-injector lowZ setups) **between injector_common and +supply**
- connect the **flyback connection** directly (no fuse) to the injector_common signal. There must be no fuse between injector_common and (EC36-pin 23) flyback pin.
- **Flyback** pin (EC36-pin 23) must be connected with airwire or 30V transient diode to onboard flyback trace. This must be done on the non-assembled unit (already done on the assembled controller).
- with DVM in diode mode, **all injector outputs should measure max 1.4V between injector output (+) to injector_common (-)** , (even with injectors disconnected). With the 30V flyback, reference (connect DVM-) to the internal flyback trace (verified for the assembled controller).
- use **separate fuses for each ignition channel: 3-4A during testing, upgrade to 5A only after successful tests. 5A (RMS value!) fuse allows appr 9A peak current. Anything higher does not provide sufficient protection.**
- use a 3-5A **fuse for the WBO2 heater channel,** and 1-3A **fuse for the board supply**
- PWM-ing MUST be disabled (injector-pwm-duty=100%, injector full duty time=25.5msec. Use highZ injectors or lowZ with current-limiting "ballast" power-resistors connected in series.

Rescue1 kit

- **0805 SMD resistors**: appr 15 values, 4..6 pieces of each. 104 (means 10*10^4) = 1003 (100*10^3)=100kOhm
- **ES2J/ER2J 2A 600V fast SMB** (surface mount, rather big) **diodes** (optional) Normally not needed
- 3x1n4007 1A throughole diode. Used across iac valve, relay, solenoid, **cathode (stripe-marked) to +12V**.
- optional: unidirectional transient suppression diode (black is , bigger than 1n4007) 1k5E30 is 30V, 1k5E18 is 18V (across supply. Cathode to +12V). Must NOT be put in the flyback path with controller that already has 30V flyback internally: 30V+30V would kill the FETs!
- red,yellow,black,brown,brown striped throughole resistor is 2.4kOhm. Pullup (or between LCD contrast and GND)

Warning: **Wheel speed in, Analog in CHn** is for **0-5V only**. Connecting 12V causes serious damage. Connecting a solenoid, relay, injector or ignition coil kills the controller immediately because it applies +12V to the input. Switch these pins to EC36/26 GND. When no pullup inside, apply 2k4 pullup towards EC36/**29** (+5V) for ALS/launch/shiftcut activation switch/button. Only experts may use EC36/28 for pullup, only for precise analog signals, like oilpressure sensor.

"Analog in Chn" is same as mcp3208 Chn.Protection is for minor static electricity only(no misconnection!). Typical pinout:

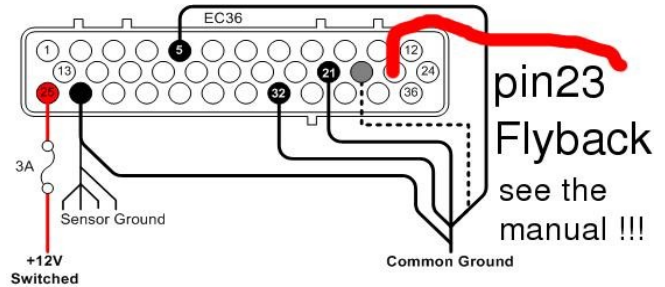| Econoseal 18 pin	Function	Pullup	Protection	Note
1	Knock 1		●	Analog in CH0 if no Knock
2	Analog in CH5	●	●	
3	Analog in CH2	●	●	
4	Stepper A			
5	Stepper C			
6	Analog in CH6	●		MAP input when offboard MAP.
7	WBO2 Pump(-)			
8	Wheel speed in	●	●	Unprotected Analog in CH1 when PS2 option
9	WBO2 Pump(+)			
10	Stepper B			
11	Stepper D			
12	Analog in CH7	●		Sec. Trig VR when auditrigger
13	WBO2 Nernst			
14	RS-232 RX			Connect to PC's TX
15	RS-232 TX			Connect to PC's RX
16	Analog in CH1		●	Optionally One-wire input.
17	GND			
18	WBO2 Heater(-)			

Rescue2 - capacitors and 2 zener diodes

Capacitors don't have text on them, so -if ever needed- ways to tell their value:

- measure with DVM that can measure capacitance
- measure by applying 50..60 Hz sinewave with 10k limiting resistor and measure AC voltage across the resistor, than calc.
- **keying by size, number, tape-material** examine the cap size (0805 is the smallest we use, 1206 is medium and 1210 is huge), the number of caps and the tape-material (trans is transparent plastic, paper is paper) will tell you the value according to a table below:
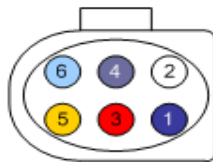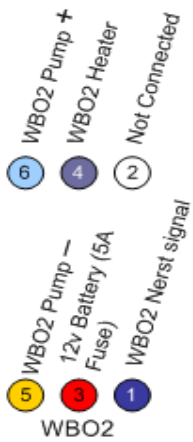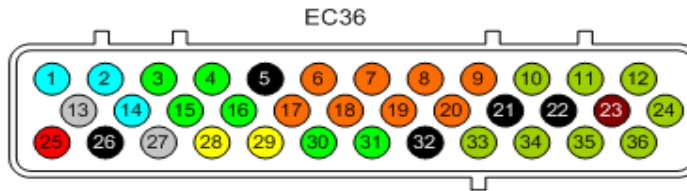
Rescue2 v0.07:
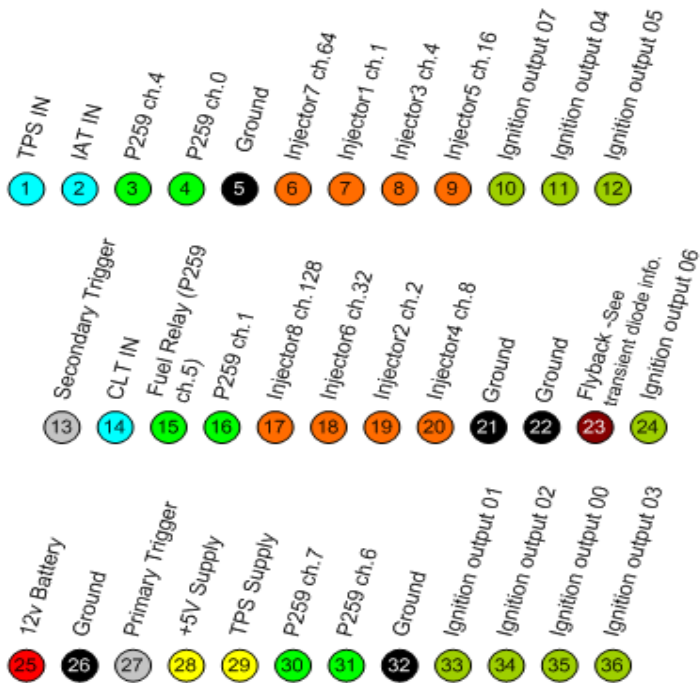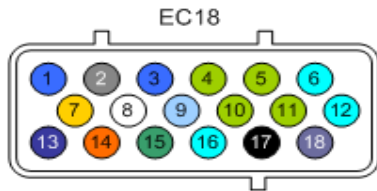
- 3*1n 0805 50V paper
- 5*10n 0805 50V paper
- 4*100n 0805 50V paper
- 6*220n 0805 50V paper
- 2*1u 0805 25V paper (tall)
- 2*2.2u 0805 16V trans (tall)
- 1*10u 1206 25V trans
- 2*1u 1206 50V trans

EC36

pin23 Flyback see the manual !!!

3A
Sensor Ground
+12V Switched
Common Ground

Econoseal 36 pin	Function	Note
1	TPS in	
2	MAT in	
3	P259 CH4	
4	P259 CH0	Tachometer (1k Pullup to +5V)
5	GND	
6	Inj G	
7	Inj A	
8	Inj C	
9	Inj E	
10	Ign CH7	Logic level out on 2+6 and 0
11	Ign CH4	Logic level out on 6+2, 4+4, 2+6 and 0
12	Ign CH5	Logic level out on 6+2, 4+4, 2+6 and 0
13	Secondary trigger	Hall or VR, CAM hall when auditrigger
14	CLT in	
15	P259 CH5	Fuel Relay
16	P259 CH1	
17	Inj H	
18	Inj F	
19	Inj B	
20	Inj D	
21	GND	
22	GND	
23	Flyback	
24	Ign CH6	Logic level out on 2+6 and 0
25	Supply +12V	
26	GND	
27	Primary trigger	VR or Hall
28	Supply +5V	
29	+5V for sensors	
30	P259 CH7	
31	P259 CH6	
32	GND	
33	Ign CH1	Logic level out on 4+4, 2+6 and 0
34	Ign CH2	Logic level out on 0
35	Ign CH0	Logic level out on 4+4, 2+6 and 0
36	Ign CH3	Logic level out on 0

VEMS V3.6 ECU Pin outs

View from back of Econoseal plugs

EC18 connector (top section):

Row 1 (pins 1–6):
- 1 — Analog ch.0/Knock1 (dep. on spec)
- 2 — Analog ch.5
- 3 — Analog ch.2
- 4 — Stepper A
- 5 — Stepper C
- 6 — Analog ch.6/MAP IN (dep. on spec)

Row 2 (pins 7–12):
- 7 — WBO2 Pump −
- 8 — Wheel Speed Input
- 9 — WBO2 Pump +
- 10 — Stepper B
- 11 — Stepper D
- 12 — Analog ch.7/2ND VR (dep. on spec)

Row 3 (pins 13–18):
- 13 — WBO2 Nerst signal
- 14 — RS232 DSUB9 pin 3
- 15 — RS232 DSUB9 pin 2
- 16 — Analog ch.1/1Wire In (dep. on spec)
- 17 — Ground
- 18 — WBO2 Heater

EC18

EC36 connector:

Row 1 (pins 1–12):
- 1 — TPS IN
- 2 — IAT IN
- 3 — P259 ch.4
- 4 — P259 ch.0
- 5 — Ground
- 6 — Injector7 ch.64
- 7 — Injector1 ch.1
- 8 — Injector3 ch.4
- 9 — Injector5 ch.16
- 10 — Ignition output 07
- 11 — Ignition output 04
- 12 — Ignition output 05

Row 2 (pins 13–24):
- 13 — Secondary Trigger
- 14 — CLT IN
- 15 — Fuel Relay (P259 ch.5)
- 16 — P259 ch.1
- 17 — Injector8 ch.128
- 18 — Injector6 ch.32
- 19 — Injector2 ch.2
- 20 — Injector4 ch.8
- 21 — Ground
- 22 — Ground
- 23 — Flyback -See transient diode info.
- 24 — Ignition output 06

Row 3 (pins 25–36):
- 25 — 12v Battery
- 26 — Ground
- 27 — Primary Trigger
- 28 — +5V Supply
- 29 — TPS Supply
- 30 — P259 ch.7
- 31 — P259 ch.6
- 32 — Ground
- 33 — Ignition output 01
- 34 — Ignition output 02
- 35 — Ignition output 00
- 36 — Ignition output 03

EC36

WBO2 connector:

- 6 — WBO2 Pump +
- 4 — WBO2 Heater
- 2 — Not Connected
- 5 — WBO2 Pump −
- 3 — 12v Battery (5A Fuse)
- 1 — WBO2 Nerst signal

WBO2

Update your printed list if you use some capacitors, so you can keep track. www.vems.hu/wiki/ for more info