

ELECTRONIC RATIO BOX**P/no. ERB203 - Installation Instructions for 12/24vdc module****GENERAL**

The Electronic Ratio Box is designed to give a permanent fixed ratio signal output from a continuously varying input signal. This could be any variable frequency signal in an automotive, marine or industrial environment, eg/ Speedo - hall effect or transducer, Tachometer – magnetic pick up, alternator or hall effect.

The ratio is extremely easy to adjust and may even be performed, if necessary, without workshop instruments by a trial and error method explained in the settings section.

Standard output is a square wave with ~ 50% duty cycle and 0–10v p-p signal. An option available on the unit is a square wave output set to a peak to peak voltage matching the supply line. Some 24volt systems are looking for signals at this level.

Maximum output frequency is ~ 500 Hz regardless of ratio.

Minimum output frequency is ≤ 5 Hz regardless of ratio.

For setting ratios outside these parameters contact the manufacturer for availability of a special build.

Inputs are designed for standard hall effect at 0–10vp-p or standard magnetic pickup (inductive) from minimum of ~ 2.5v to 50v.

NOTE: This module is designed as a universal unit to suit as many automotive type applications as possible. However there may be some systems where the input or output signals are not compatible with this unit. The manufacturer is not responsible for incorrect fitting or damage caused by or during the fitting of this module.

FITTING INSTRUCTIONS

1. Locate a convenient mounting place in the instrument panel or under the dash near the fuse panel and mount the ERB203 Electronic Ratio Box. Screws (3/16" or 5mm), double sided tape, or silicon are all acceptable. Orientation is not critical.
2. Connect the "+" terminal (Term. No. 1) to your positive source or ignition switch via a 3 amp fuse.
3. Connect the "-" terminal (Term. No. 2) to a good earth or ground connection.
4. Connect the output terminal (Term No. 3, 4 or 6) as required (usually to a speedo or tacho input). Maximum output is normally set for 0-10volts. For an output with p-p voltage at V+supply levels then move the link on the PCB to be closer to the middle of the circuit board. Refer to the Connections and Wiring Diagram sections.
5. Connect terminal no. 5 to your input signal. Set the Input DIP Switch as required.
6. Adjust the ratio setting as required. Refer to Setting section.

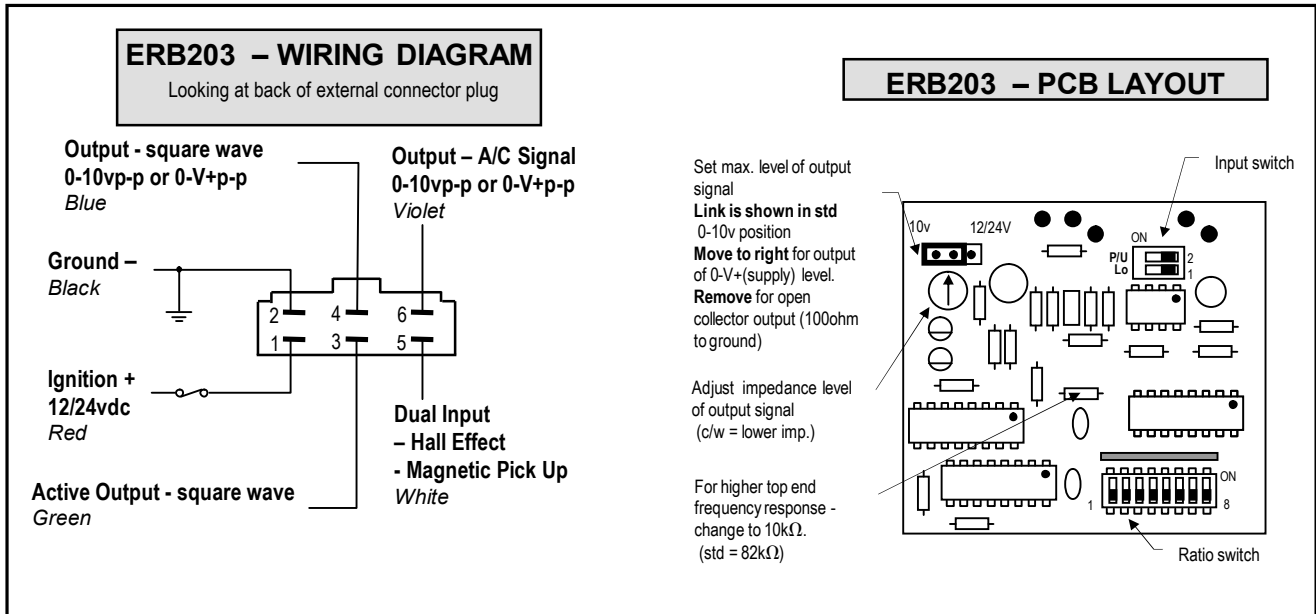
CONNECTIONS

Terminal connections are as follows...

Term no. 1	= Positive 12/24 VDC Supply
Term no. 2	= Negative or Ground
Term no. 3	= Output Signal, Square wave – Push-pull active drive
Term no. 4	= Output Signal, Square wave, Pull down, or open collector, 0 – 10v, or 0 – V+
Term no. 5	= Input Signal - Hall Effect or Magnetic Pick up (See below)
Term no. 6	= Output Signal, A/C signal, Pull down, or open collector, 0 – 10v, or 0 – V+

Input Switch No. →	1	2
ON	Lo level input signal	Pull up resistor on input circuit
OFF	Hi level input signal	No pull up resistor

WIRING DIAGRAM



SETTING

1. Measure the frequency or speedo reading currently being received from your signal source.
2. Calculate the ratio change desired. This is worked out by taking the desired frequency reading and dividing it by the actual frequency reading obtained in point 1. The frequency units are not important as long as they are consistent and linear.
Eg/ Tachometer signal frequency reads 250Hz. Desired reading is 400Hz. Ratio = 400/250 = 1.6
Eg/ Speedo reads 80kmh. Desired reading is 70kmh. Ratio = 70/80 = 0.875
3. Select this ratio from the attached chart and read off the switch setting from the column headed "binary".
4. Turn off power to the ERB203 and using a small bladed screwdriver remove the cover from the module.
5. Adjust the ratio switch to the setting calculated in point 3. Note that a "0" means off or down, and a "1" means on or up.
6. Reassemble the module and test. The unit is now set.

ALTERNATE SETTING PROCEDURE

1. Set all switches OFF (down). Set switch 1 ON (up).
Note the coarsest setting is at switch 1 & the finest setting at switch 8.
2. Run the engine and see if you are above or below the desired reading
 - 2.1. If reading is above, set switch 1 OFF, set switch 2 ON, and go to point 3.
 - 2.2. If reading is below, leave switch 1 ON, set switch 2 ON, and go to point 3.
3. Run the engine again and see if you are above or below the desired reading
 - 3.1. If reading is above, set switch 2 OFF, set switch 3 ON, and go to point 4.
 - 3.2. If reading is below, leave switch 2 ON, set switch 3 ON, and go to point 4.
4. Follow the above procedure down all the switch numbers until you have the desired reading.
Note that if a new setting reads too high then set the last switch OFF and set the next switch ON.
Alternately, if the new setting still reads too low then leave the last switch ON and set the next switch ON.

SPECIFICATIONS

- Dimensions: 68 x 30 x 73mm deep, overall box dimensions.
- Mounting: Hole centres...83mm, Mounted Height...35mm. Box with plug & wiring allow 110+mm depth.
- Voltage: 12/24vdc negative ground, 30mA typical current draw.
- Range: Approx 5 – 500 Hz. May be modified to approx 30 – 3 kHz (see Wiring Diagram)
- Adjustment: F_{OUT} / F_{IN} = adjustable between 0.025 (divide by 40) & 3.1875 (multiply by 3.1875)
- Output rating: 0–10vp-p (=Hall Effect) or 0-V+ square wave at ~50% duty cycle. **Select by internal link.**
for Open Collector to Ground – **Remove internal Link**
Alternative = Active output (*link must remain in position for 10V*)

Note: Ratio = F_{out}/F_{in} , Steps are at 1.25% increments of input frequency.

P/No. ERB203 - Ratio Switch Settings

n.	n= binary	ratio	n.	n= binary	ratio	n.	n= binary	ratio	n.	n= binary	ratio	n.	n= binary	ratio
0	00000000	N/A	54	00110110	0.6750	108	01101100	1.3500	162	10100010	2.0250	216	11011000	2.7000
1	00000001	N/A	55	00110111	0.6875	109	01101101	1.3625	163	10100011	2.0375	217	11011001	2.7125
2	00000010	0.0250	56	00111000	0.7000	110	01101110	1.3750	164	10100100	2.0500	218	11011010	2.7250
3	00000011	0.0375	57	00111001	0.7125	111	01101111	1.3875	165	10100101	2.0625	219	11011011	2.7375
4	00000100	0.0500	58	00111010	0.7250	112	01110000	1.4000	166	10100110	2.0750	220	11011100	2.7500
5	00000101	0.0625	59	00111011	0.7375	113	01110001	1.4125	167	10100111	2.0875	221	11011101	2.7625
6	00000110	0.0750	60	00111100	0.7500	114	01110010	1.4250	168	10101000	2.1000	222	11011110	2.7750
7	00000111	0.0875	61	00111101	0.7625	115	01110011	1.4375	169	10101001	2.1125	223	11011111	2.7875
8	00001000	0.1000	62	00111110	0.7750	116	01110100	1.4500	170	10101010	2.1250	224	11100000	2.8000
9	00001001	0.1125	63	00111111	0.7875	117	01110101	1.4625	171	10101011	2.1375	225	11100001	2.8125
10	00001010	0.1250	64	01000000	0.8000	118	01110110	1.4750	172	10101100	2.1500	226	11100010	2.8250
11	00001011	0.1375	65	01000001	0.8125	119	01110111	1.4875	173	10101101	2.1625	227	11100011	2.8375
12	00001100	0.1500	66	01000010	0.8250	120	01111000	1.5000	174	10101110	2.1750	228	11100100	2.8500
13	00001101	0.1625	67	01000011	0.8375	121	01111001	1.5125	175	10101111	2.1875	229	11100101	2.8625
14	00001110	0.1750	68	01000100	0.8500	122	01111010	1.5250	176	10110000	2.2000	230	11100110	2.8750
15	00001111	0.1875	69	01000101	0.8625	123	01111011	1.5375	177	10110001	2.2125	231	11100111	2.8875
16	00010000	0.2000	70	01000110	0.8750	124	01111100	1.5500	178	10110010	2.2250	232	11101000	2.9000
17	00010001	0.2125	71	01000111	0.8875	125	01111101	1.5625	179	10110011	2.2375	233	11101001	2.9125
18	00010010	0.2250	72	01001000	0.9000	126	01111110	1.5750	180	10110100	2.2500	234	11101010	2.9250
19	00010011	0.2375	73	01001001	0.9125	127	01111111	1.5875	181	10110101	2.2625	235	11101011	2.9375
20	00010100	0.2500	74	01001010	0.9250	128	10000000	1.6000	182	10110110	2.2750	236	11101100	2.9500
21	00010101	0.2625	75	01001011	0.9375	129	10000001	1.6125	183	10110111	2.2875	237	11101101	2.9625
22	00010110	0.2750	76	01001100	0.9500	130	10000010	1.6250	184	10111000	2.3000	238	11101110	2.9750
23	00010111	0.2875	77	01001101	0.9625	131	10000011	1.6375	185	10111001	2.3125	239	11101111	2.9875
24	00011000	0.3000	78	01001110	0.9750	132	10000100	1.6500	186	10111010	2.3250	240	11110000	3.0000
25	00011001	0.3125	79	01001111	0.9875	133	10000101	1.6625	187	10111011	2.3375	241	11110001	3.0125
26	00011010	0.3250	80	01010000	1.0000	134	10000110	1.6750	188	10111100	2.3500	242	11110010	3.0250
27	00011011	0.3375	81	01010001	1.0125	135	10000111	1.6875	189	10111101	2.3625	243	11110011	3.0375
28	00011100	0.3500	82	01010010	1.0250	136	10001000	1.7000	190	10111110	2.3750	244	11110100	3.0500
29	00011101	0.3625	83	01010011	1.0375	137	10001001	1.7125	191	10111111	2.3875	245	11110101	3.0625
30	00011110	0.3750	84	01010100	1.0500	138	10001010	1.7250	192	11000000	2.4000	246	11110110	3.0750
31	00011111	0.3875	85	01010101	1.0625	139	10001011	1.7375	193	11000001	2.4125	247	11110111	3.0875
32	00100000	0.4000	86	01010110	1.0750	140	10001100	1.7500	194	11000010	2.4250	248	11111000	3.1000
33	00100001	0.4125	87	01010111	1.0875	141	10001101	1.7625	195	11000011	2.4375	249	11111001	3.1125
34	00100010	0.4250	88	01011000	1.1000	142	10001110	1.7750	196	11000100	2.4500	250	11111010	3.1250
35	00100011	0.4375	89	01011001	1.1125	143	10001111	1.7875	197	11000101	2.4625	251	11111011	3.1375
36	00100100	0.4500	90	01011010	1.1250	144	10010000	1.8000	198	11000110	2.4750	252	11111100	3.1500
37	00100101	0.4625	91	01011011	1.1375	145	10010001	1.8125	199	11000111	2.4875	253	11111101	3.1625
38	00100110	0.4750	92	01011100	1.1500	146	10010010	1.8250	200	11001000	2.5000	254	11111110	3.1750
39	00100111	0.4875	93	01011101	1.1625	147	10010011	1.8375	201	11001001	2.5125	255	11111111	3.1875
40	00101000	0.5000	94	01011110	1.1750	148	10010100	1.8500	202	11001010	2.5250			
41	00101001	0.5125	95	01011111	1.1875	149	10010101	1.8625	203	11001011	2.5375			
42	00101010	0.5250	96	01100000	1.2000	150	10010110	1.8750	204	11001100	2.5500			
43	00101011	0.5375	97	01100001	1.2125	151	10010111	1.8875	205	11001101	2.5625			
44	00101100	0.5500	98	01100010	1.2250	152	10011000	1.9000	206	11001110	2.5750			
45	00101101	0.5625	99	01100011	1.2375	153	10011001	1.9125	207	11001111	2.5875			
46	00101110	0.5750	100	01100100	1.2500	154	10011010	1.9250	208	11010000	2.6000			
47	00101111	0.5875	101	01100101	1.2625	155	10011011	1.9375	209	11010001	2.6125			
48	00110000	0.6000	102	01100110	1.2750	156	10011100	1.9500	210	11010010	2.6250			
49	00110001	0.6125	103	01100111	1.2875	157	10011101	1.9625	211	11010011	2.6375			
50	00110010	0.6250	104	01101000	1.3000	158	10011110	1.9750	212	11010100	2.6500			
51	00110011	0.6375	105	01101001	1.3125	159	10011111	1.9875	213	11010101	2.6625			
52	00110100	0.6500	106	01101010	1.3250	160	10100000	2.0000	214	11010110	2.6750			
53	00110101	0.6625	107	01101011	1.3375	161	10100001	2.0125	215	11010111	2.6875			

NOTE:
Binary switch settings are made with 0's representing the "off" position on the switch and 1's representing the "on" position on the switch.
Switch is viewed when at the bottom of the PCB and terminal block at the top.