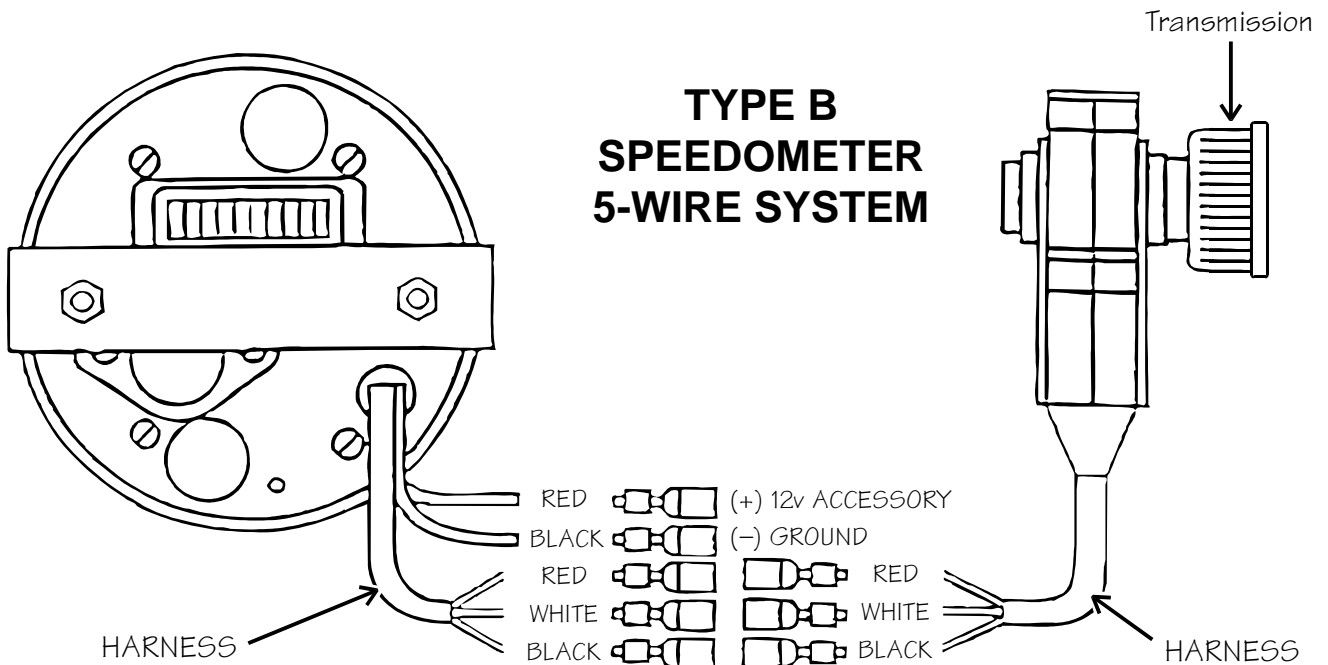
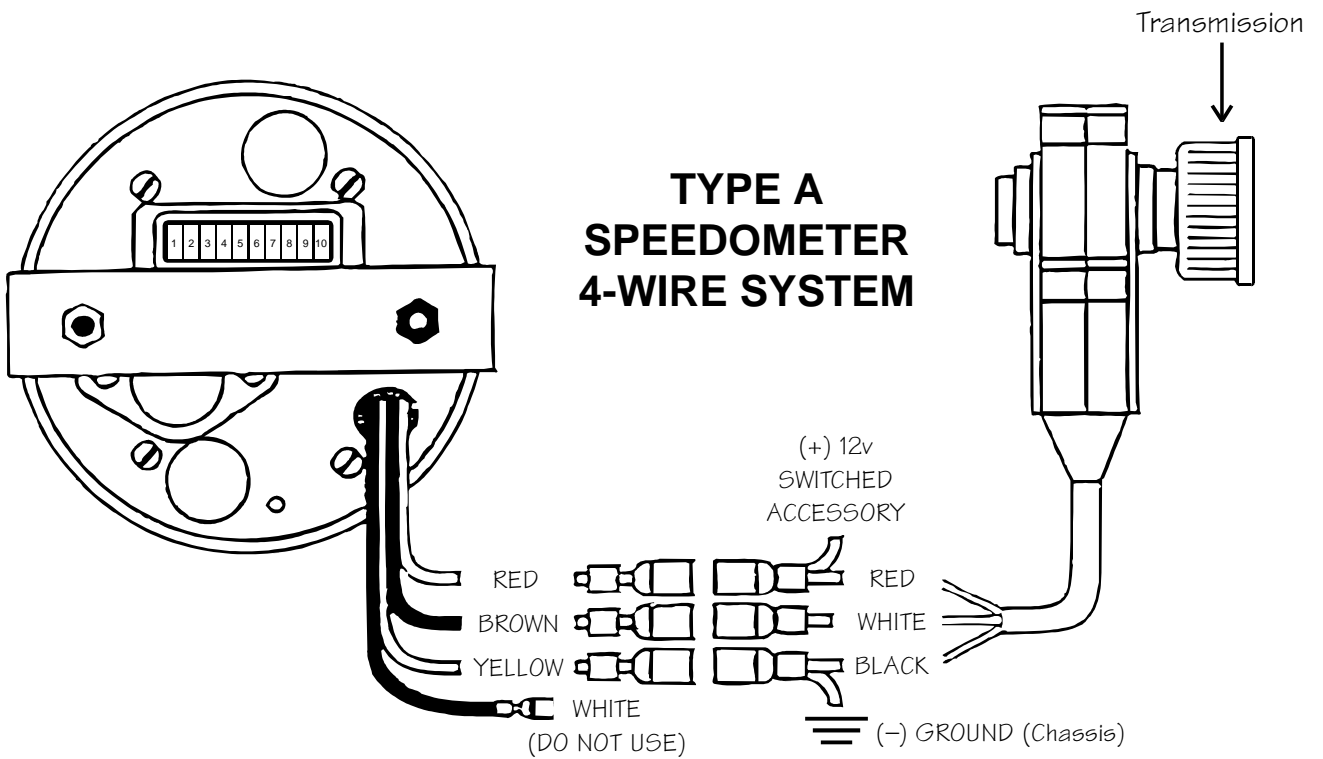


# VDO®

## ELECTRONIC SPEEDOMETER HALL EFFECT SENDER INSTALLATION INSTRUCTIONS AND WIRING DIAGRAM



# VDO® Programmable Speedometer

## Calibration Instructions

<i>Mph Models 12 Volt *</i>	Catalog Part Number
85 mph/130 Km/h	437 001, 437 301, 437 501 and 502
120 mph/200 Km/h	437 002, 437 302, 437 701
160 mph	437 003, 437 303

<i>Km/h Models 12 Volt *</i>	Catalog Part Number
130 Km/h/85 mph	437 081, 437 381, 437 581 and 582
200 Km/h/120 mph	437 082, 437 382, 437 781
260 Km/h	437 083, 437 383

<i>24 Volt Models *</i>	Catalog Part Number
85 mph/130Km/h	437 004, 437 503 and 504
130 Km/h/85 mph	437 085, 437 583 and 584

*\*(Some models may not be in production at the time of printing of these installation and calibration instructions).\**

### 1. General

Please read these instructions completely before attempting to install or calibrate this instrument!

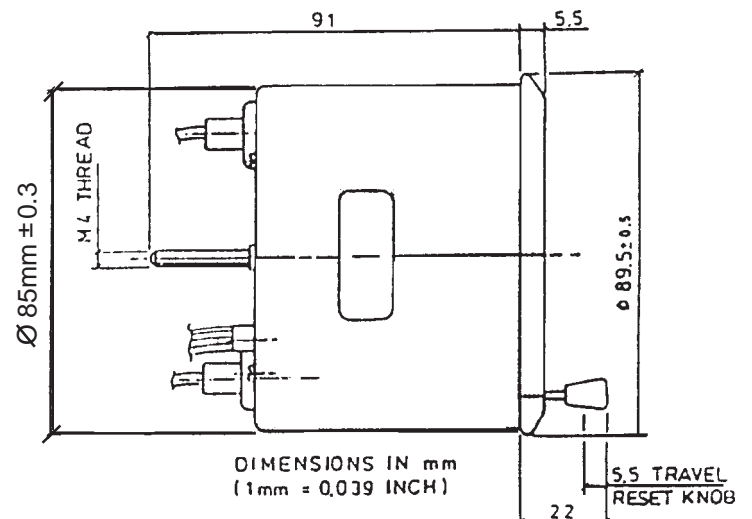
The VDO Programmable Speedometer is an electronic unit which indicates the speed that the vehicle is travelling and records cumulative miles with a million mile odometer. A resettable trip odometer displays up to 999.9 miles to monitor short distances.

This unit is designed to be used in conjunction with an electrical speed sensor which generates a signal impulse range of 4000 to 103,000 pulses per mile. Note: there must be a minimum signal voltage of at least 1 volt (peak to peak).

The signal pulses can be generated by magnetic pickups, pulse generators, frequency generators, Reed-Contact sensors or Hall-Effect sensors. Other electronic modules which generate pulses proportional to the speed can be used (as long as the pulses are within the specified ranges described above). A cruise control sender should not be used due to low signal strength between 0-30 MPH. This could cause annoying pointer oscillation. VDO senders, P/Nos. 340 001, 340 011, 340 020 and 021 are best suited for use with the VDO Programmable Speedometer.

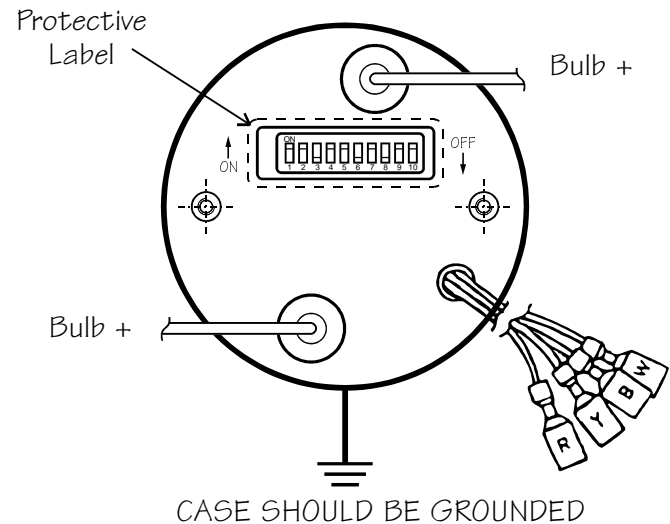
### 2. Installation

Diameter of the panel hole should be no more than 85 mm or 3 3/8" dia.  
Installation depth is 100mm or 3 7/8" deep.



### 3. Wiring Connections

Red: +12 volts (+24 volts where applicable)  
Yellow: Negative Ground  
Brown: Sensor +  
White: Sensor -



### 4. Calibration

#### **Warning:**

*Do not program speedometer with battery connected or the key switch in the "ON" position. If an erratic reading occurs, go back and retrace the calibration process to be sure that the sensor is providing enough pulses per mile to give an accurate sensor signal to the speedometer as described in Section 1.*

The speedometer comes with a 10 position DIP-switch on the back of the unit. All switches are preset to "ON" (ON=1; OFF=0). If you already know how many pulses your vehicle or sender will generate, please see the Calibration Table. Using the binary code (ones and zeros), set the DIP-switches and mount the speedometer in the dash panel. Test drive to verify accuracy.

If you have all the physical data about your vehicle, such as pulses per revolution that the sender produces, axle ratio, tire size, and the tire slip, you may be able to compute the pulses per mile and consult the Calibration Table for the programming code. If you don't know how many pulses will be generated, two additional methods of measuring pulses per mile are listed below.

#### **A**

If you have access to a mobile frequency counter, drive the vehicle behind another and measure the signal frequency at a predetermined speed. Multiply the signal frequency indicated on the meter by 3600 and divide by the speed at which the frequency was noted. The result is the pulses per mile. Consult the Calibration Table for the DIP-switch settings and to program the instrument with the prescribed binary code.

#### **B**

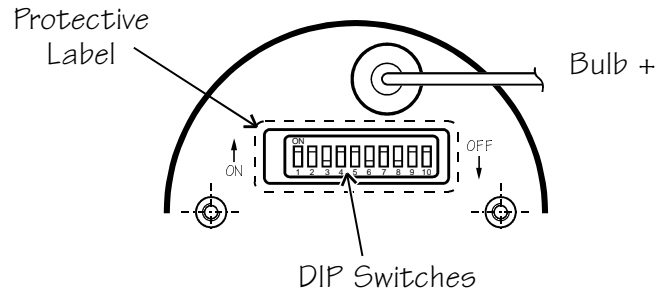
Finally, there is a method which uses the speedometer's trip odometer as a pulse counter.

1. Set all DIP-switches to the "ON" (#1) position. Install and wire the speedometer as shown earlier.
2. Drive a known course with a distance of up to 10 miles. Be sure the speedometer pointer DOES NOT exceed the maximum speed of the speedometer while traveling the course. Reducing your speed may be necessary to prevent damage to the speedometer.
3. As you pass the start point, reset the trip odometer to "000.0". Note the exact trip odometer mileage at the end of the course. Using the following formula, compute the pulses per mile and consult the Calibration Table to determine the appropriate DIP-switch settings:  
$$\frac{\text{Trip Odometer Reading (TR)}}{\text{True Distance Driven (TDD)}} \times 3921 = \text{Pulses Per Mile (P/M)}$$

## Calibration Example

$$\frac{16.8 \text{ Miles (TR)}}{10 \text{ Miles (TDD)}} \times 3921 = 6,587 \text{ (P/M)}$$

Consult the Calibration Table on the next few pages to locate 6,587 pulses/mile. You will see that the table indicates that the DIP-switch position code is 1110110101. The illustration shows where the DIP-switches are located. Switches should be set from left to right, with the "UP" or "TOP" position being the "ON" or "1" position. The bottom position is "OFF" or "0" [zero].



4. Remove the speedometer from the dash panel. Use the tip of a ball point pen or similar object to move the switches into the indicated position for your vehicle. When you are finished programming, travel the course again to verify the trip odometer reading and time the distance to verify the speed reading. When you are finished, place the protective label over the DIP-switch opening and replace the speedometer in the dash panel according to the instructions.

**NOTE: The Calibration Table begins on the next page.**

## VDO Limited Warranty

VDO North America, LLC. warrants all merchandise against defects in factory workmanship and materials for a period of 24 months after purchase. This warranty applies to the first retail purchaser and covers only those products exposed to normal use or service. Provisions of this warranty shall not apply to a VDO product used for a purpose for which it is not designed, or which has been altered in any way that would be detrimental to the performance or life of the product, or misapplication, misuse, negligence or accident. On any part or product found to be defective after examination by VDO North America, VDO North America will only

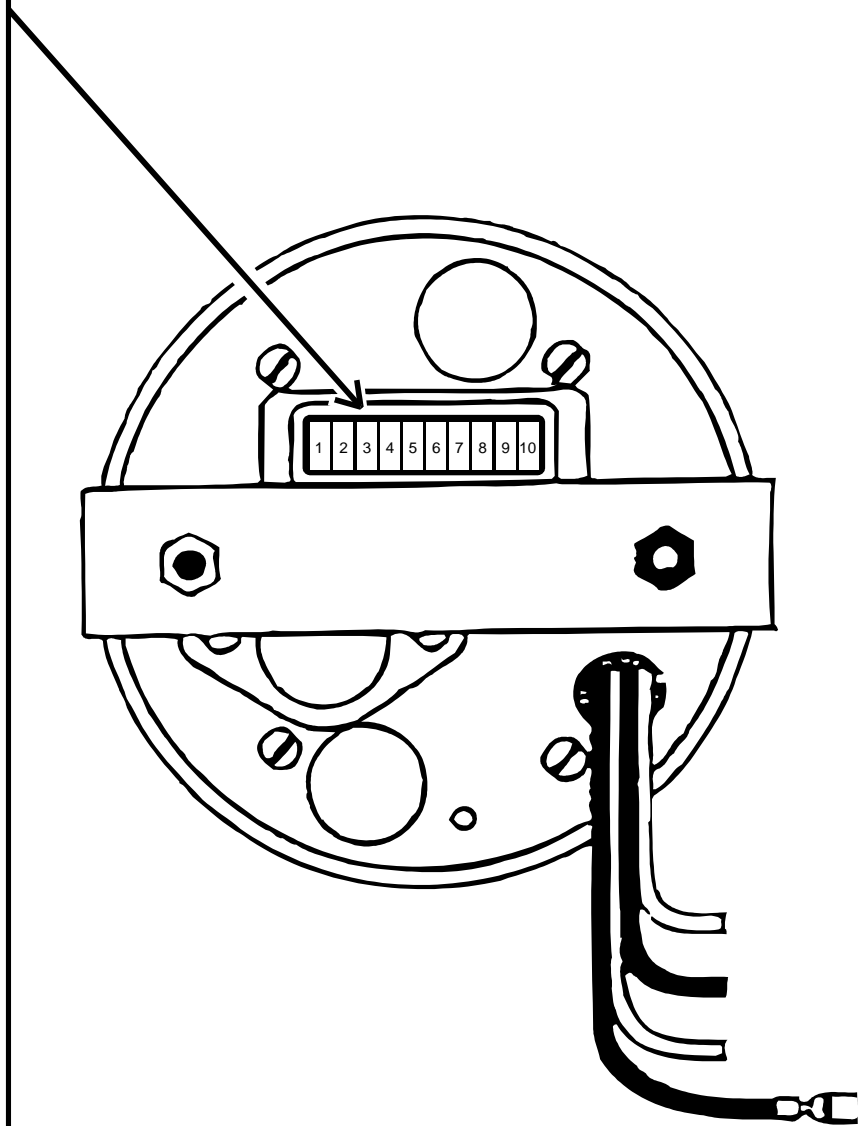
repair or replace the merchandise through the original selling dealer or on a direct basis. VDO North America assumes no responsibility for diagnosis, removal and/or installation labor, loss of vehicle use, loss of time, inconvenience or any other consequential expenses. The warranties herein are in lieu of any other expressed or implied warranties, including any implied warranty of merchantability or fitness, and any other obligation on the part of VDO North America, or selling dealer. (NOTE: This is a "Limited Warranty" as defined by the Magnuson-Moss Warranty Act of 1975.)

# Calibration Table

Number 0630 010 020

Pulses/Miles	Switch
3906 - 3927	1111111111
3928 - 3949	1111111110
3950 - 3971	1111111101
3972 - 3993	1111111100
3994 - 4015	1111111011
4016 - 4038	1111111010
4039 - 4061	1111111001
4062 - 4084	1111111000
4085 - 4107	1111110111
4108 - 4131	1111110110
4132 - 4155	1111110101
4156 - 4179	1111110100
4180 - 4204	1111110011
4205 - 4228	1111110010
4229 - 4254	1111110001
4255 - 4279	1111110000
4280 - 4305	1111101111
4306 - 4331	1111101110
4332 - 4357	1111101101
4358 - 4384	1111101100
4385 - 4411	1111101011
4412 - 4438	1111101010
4439 - 4466	1111101001
4467 - 4494	1111101000
4495 - 4522	1111100111
4523 - 4551	1111100110
4552 - 4580	1111100101
4581 - 4609	1111100100
4610 - 4639	1111100011
4640 - 4669	1111100010
4670 - 4700	1111100001
4701 - 4731	1111100000
4732 - 4762	1111011111
4763 - 4794	1111011110
4795 - 4826	1111011101
4827 - 4859	1111011100
4860 - 4892	1111011011
4893 - 4926	1111011010
4927 - 4960	1111011001
4961 - 4995	1111011000
4996 - 5030	1111010111
5031 - 5065	1111010110
5066 - 5101	1111010101
5102 - 5138	1111010100
5139 - 5175	1111010011
5176 - 5213	1111010010
5214 - 5251	1111010001
5252 - 5290	1111010000
5291 - 5329	1111001111
5330 - 5369	1111001110
5370 - 5409	1111001101
5410 - 5450	1111001100
5451 - 5492	1111001011
5493 - 5535	1111001010
5536 - 5578	1111001001
5579 - 5621	1111001000
5622 - 5666	1111000111
5667 - 5711	1111000110
5712 - 5757	1111000101
5758 - 5804	1111000100

1 = ON position  
0 = OFF position



# Calibration Table

Number 0630 010 020

Pulses/Miles	Switch
5805 - 5851	1111000011
5852 - 5899	1111000010
5900 - 5948	1111000001
5949 - 5998	1111000000
5999 - 6048	1110111111
6049 - 6100	1110111110
6101 - 6152	1110111101
6153 - 6206	1110111100
6207 - 6260	1110111011
6261 - 6315	1110111010
6316 - 6371	1110111001
6372 - 6428	1110111000
6429 - 6486	1110110111
6487 - 6545	1110110110
6547 - 6606	1110110101
6607 - 6667	1110110100
6668 - 6730	1110110011
6731 - 6794	1110110010
6795 - 6859	1110110001
6860 - 6925	1110110000
6926 - 6993	1110101111
6994 - 7062	1110101110
7063 - 7132	1110101101
7133 - 7204	1110101100
7205 - 7277	1110101011
7278 - 7351	1110101010
7352 - 7427	1110101001
7428 - 7505	1110101000
7506 - 7585	1110100111
7586 - 7666	1110100110
7667 - 7749	1110100101
7750 - 7833	1110100100
7834 - 7920	1110100011
7921 - 8008	1110100010
8009 - 8099	1110100001
8100 - 8192	1110100000
8193 - 8286	1110011111
8287 - 8383	1110011110
8384 - 8482	1110011101
8483 - 8584	1110011100
8585 - 8688	1110011011
8689 - 8795	1110011010
8796 - 8904	1110011001
8905 - 9016	1110011000
9017 - 9131	1110010111
9132 - 9249	1110010110
9250 - 9369	1110010101
9370 - 9494	1110010100
9495 - 9621	1110010011
9622 - 9752	1110010010
9753 - 9886	1110010001
9887 - 10025	1110010000
10026 - 10167	1110001111
10168 - 10313	1110001110
10314 - 10464	1110001101
10465 - 10619	1110001100
10620 - 10778	1110001011
10779 - 10943	1110001010
10944 - 11113	1110001001
11114 - 11288	1110001000

1= ON position  
0=OFF position

Pulses/Miles	Switch
11289 - 11468	1110000111
11469 - 11653	1110000110
11656 - 11847	1110000101
11848 - 12047	1110000100
12048 - 12252	1110000011
12253 - 12466	1110000010
12467 - 12686	1110000001
12687 - 12915	1110000000
12858 - 12973	0110110111
12974 - 13092	0110110110
13093 - 13212	0110110101
13213 - 13335	0110110100
13336 - 13461	0110110011
13462 - 13588	0110110010
13589 - 13718	0110110001
13719 - 13851	0110110000
13852 - 13986	0110101111
13987 - 14124	0110101110
14125 - 14264	0110101101
14265 - 14408	0110101100
14409 - 14554	0110101011
14555 - 14703	0110101010
14704 - 14855	0110101001
14856 - 15011	0110101000
15012 - 15170	0110100111
15171 - 15332	0110100110
15333 - 15498	0110100101
15499 - 15667	0110100100
15668 - 15840	0110100011
15841 - 16017	0110100010
16018 - 16198	0110100001
16199 - 16384	0110100000
16385 - 16573	0110011111
16574 - 16767	0110011110
16768 - 16965	0110011101
16966 - 17168	0110011100
17169 - 17376	0110011011
17377 - 17590	0110011010
17591 - 17808	0110011001
17809 - 18032	0110011000
18033 - 18262	0110010111
18263 - 18498	0110010110
18499 - 18739	0110010101
18740 - 18988	0110010100
18989 - 19242	0110010011
19243 - 19504	0110010010
19505 - 19773	0110010001
19774 - 20050	0110010000
20051 - 20334	0110001111
20335 - 20627	0110001110
20628 - 20928	0110001101
20929 - 21238	0110001100
21239 - 21557	0110001011
21558 - 21887	0110001010
21888 - 22226	0110001001
22227 - 22576	0110001000
22577 - 22937	0110000111
22938 - 23310	0110000110
23311 - 23695	0110000101
23696 - 24094	0110000100

# Calibration Table

Number 0630 010 020

Pulses/Miles	Switch
24075 - 24505	0110000011
24506 - 24932	0110000010
24933 - 25373	0110000001
25374 - 25830	0110000000
25831 - 25947	0010110111
25948 - 26184	0010110110
26185 - 26425	0010110101
26426 - 26671	0010110100
26672 - 26922	0010110011
26923 - 27177	0010110010
27178 - 27437	0010110001
27438 - 27702	0010110000
27703 - 27972	0010101111
27973 - 28248	0010101110
28249 - 28529	0010101101
28530 - 28816	0010101100
28817 - 29108	0010101011
29109 - 29407	0010101010
29408 - 29711	0010101001
29712 - 30023	0010101000
30024 - 30340	0010100111
30341 - 30665	0010100110
30666 - 30996	0010100101
30997 - 31335	0010100100
31336 - 31681	0010100011
31682 - 32035	0010100010
32036 - 32397	0010100001
32398 - 32768	0010100000
32769 - 33146	0010011111
33147 - 33534	0010011110
33535 - 33931	0010011101
33932 - 34337	0010011100
34338 - 34753	0010011011
34754 - 35180	0010011010
35181 - 35617	0010011001
35618 - 36065	0010011000
36066 - 36524	0010010111
36525 - 36996	0010010110
36997 - 37479	0010010101
37480 - 37976	0010010100
37977 - 38485	0010010011
38486 - 39009	0010010010
39010 - 39547	0010010001
39548 - 40100	0010010000
40101 - 40669	0010001111
40670 - 41254	0010001110
41255 - 41856	0010001101
41857 - 42477	0010001100
42478 - 43115	0010001011
43116 - 43774	0010001010
43775 - 44452	0010001001
44453 - 45152	0010001000
45153 - 45875	0010000111
45876 - 46621	0010000110
46622 - 47391	0010000101
47392 - 48188	0010000100
48189 - 49011	0010000011
49012 - 49864	0010000010
49865 - 50746	0010000001
50747 - 51661	0010000000

1 = ON position  
0 = OFF position

Pulses/Miles	Switch
51430 - 51895	0000110111
51896 - 52368	0000110110
52369 - 52851	0000110101
52852 - 53343	0000110100
53344 - 53844	0000110011
53845 - 54354	0000110010
54355 - 54874	0000110001
54875 - 55404	0000110000
55405 - 55945	0000101111
55946 - 56496	0000101110
56497 - 57058	0000101101
57059 - 57632	0000101100
57633 - 58217	0000101011
58218 - 58814	0000101010
58815 - 59423	0000101001
59424 - 60046	0000101000
60047 - 60681	0000100111
60682 - 61330	0000100110
61331 - 61993	0000100101
61994 - 62671	0000100100
62672 - 63363	0000100011
63364 - 64071	0000100010
64072 - 64795	0000100001
64796 - 65536	0000100000
65537 - 66293	0000011111
66294 - 67069	0000011110
67070 - 67862	0000011101
67863 - 68675	0000011100
68676 - 69507	0000011011
69508 - 70360	0000011010
70361 - 71234	0000011001
71235 - 72130	0000011000
72131 - 73049	0000010111
73050 - 73992	0000010110
73993 - 74959	0000010101
74960 - 75952	0000010100
75953 - 76971	0000010011
76972 - 78019	0000010010
78020 - 79095	0000010001
79096 - 80201	0000010000
80202 - 81339	0000001111
81340 - 82509	0000001110
82510 - 83713	0000001101
83714 - 84954	0000001100
84955 - 86231	0000001011
86232 - 87548	0000001010
87549 - 88905	0000001001
88906 - 90305	0000001000
90306 - 91750	0000000111
91751 - 93242	0000000110
93243 - 94783	0000000101
94784 - 96376	0000000100
96377 - 98023	0000000011
98024 - 99723	0000000010
99729 - 101493	0000000001
101494 - 103322	0000000000