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ISSPRO 3 3/8" DIA. Programmable Tachometer
High Performance EV Line
Part Numbers R5535M, R6535M

General Information:

Operating Voltage:

11-30VDC (12V or 24V system configurable): NOTE-Instrument comes equipped with 12 volt lamps. Replace lamps with ones supplied when installing instrument into 24V system.

Input Signal:

Magnetic Gear tooth sensor, AC generator, Alternator tap, 5 volt signal from computer.

Programming Range:

1 TO 280 Pulses per engine revolution (gear teeth, magnets, etc.).

Transient Protection:

Conforms to SAE J1113 specifications for steady state and electrical transient testing.

This part is reverse polarity protected.

Calibration:

The tachometer is configured by setting a 10 position dip-switch to the calibration number. The switch is located under a plate on the rear of the unit and is accessible by removing two screws.
Note: Power must be cycled OFF to ON before the tachometer will accept a change in calibration.

Calibration Number:

Calibration number is the number of pulses per engine revolution from the alternator, magnetic sensor or signal generator.

Alternator Input:

The tachometer is connected to the "w" terminal (stator tap) on the alternator. Note that some alternators may use "S" or "T" to indicate the tachometer tap. Some alternators do not have a connection to the stator to give a tachometer output. These alternator types must be modified or replaced for use with this tachometer.

Calibration number for an alternator application is:

$$\text{Calibration number} = \frac{\#\text{ Poles of Alternator}}{2} \times \frac{\text{Dia. of crank pulley}}{\text{Dia of alternator pulley}}$$

Note: The poles of an alternator are the metal fingers around the rotating field winding in the center of the alternator.

Magnetic Sensor Input:

(Variable Reluctance type)

These sensors give a voltage pulse whenever a gear tooth is detected. If a flywheel is used, the calibration number is number of teeth on the flywheel. If a different gear is used, it is important to know how fast the gear rotates in relation to the engine. If the gear runs half the speed of the engine, the calibration number is half the number of teeth. On these types of sensors, it is important that the sensing portion of the sensor (round or square portion in the middle of the sensing end) be smaller than the distance between the gear teeth for adequate output. Installation requires that the sensor be set as close to the gear teeth as possible. Usually (with engine OFF) screw the sensor in until it touches the gear then back off ½ turn.

Proximity Sensor Input:

There are a number of different types of these sensors. The simplest is two magnets glued to the vibration damper with the sensor mounted near the magnets. Calibration number is determined the same way as the magnetic sensors. The two-magnet device gives a calibration number of two.

Signal Generator Input:

Generator is installed on tachometer cable drive of engine.
These come in a number of different configurations and styles. The ISSPRO R8940 and R8970 are typical sensors and give 30 pulses per their revolution. To determine calibration number, multiply the pulses per turn times the

drive ratio. Example: Cam drive of 0.5 revolutions per engine revolution and an R8970 give a calibration number of 15.
It is important to use a sensor that gives a whole calibration number. Fractions will make the tachometer inaccurate.

If it is not possible to determine the calibration number by any method described above, it is possible to use an optical tachometer to get the actual RPM . Use the following method to set the tachometer:

$$\text{New calibration number} = \frac{\text{switch setting number X Correct RPM reading}}{\text{Indicated tachometer reading}}$$

Setting the Tachometer:
Remove the switch access cover, located at the rear of the unit, by removing the two hold down screws. (See illustration)

Locate the calibration number on the Calibration Chart to determine switch position. Example: For a 3500RPM FSD (Full Scale Deflection) tachometer, a calibration number of 45 gives a switch setting of 2,3,4,5 and 8 ON. All other switches are OFF.

Note that the switch setting will only be accepted when power is cycled from OFF to ON.

Replace the switch access cover and screws. Do not over tighten screws.

Installation:
Make all connections to the supplied plug before connecting to the tachometer. When mounting, the recommended hole size is 3.32" diameter.

Connect the tachometer wiring as follows:

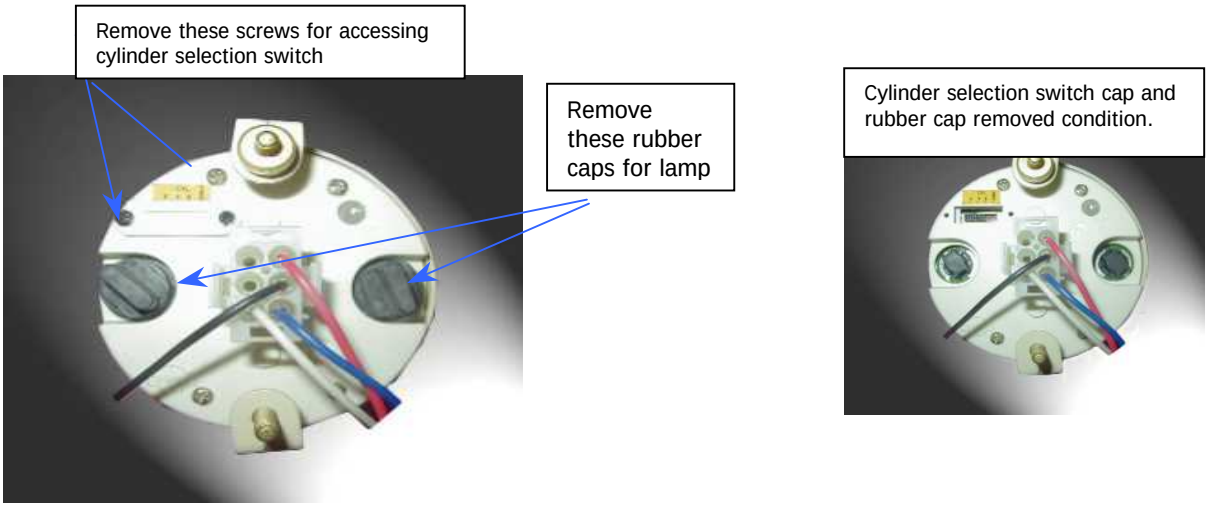
Red wire:	Battery positive. (Does not lose power with ignition OFF).
Black wire:	Ground wire and one sensor wire.
Blue wire:	Ignition voltage (Only has power when ignition switch is ON).
Green wire:	Tach signal from sensor or alternator.
White wire:	Dashboard illumination.

WARNING: Gauge has 12V light bulbs installed, 24V applications need to follow lamp replacement instruction

Mount the tachometer into the dash panel.

Testing:
Confirm operation of the tachometer by starting the engine. When the ignition is "OFF" the pointer is free to move to any position. When ignition is applied, the pointer will move to its appropriate position.

Lamp Replacement:
Remove the two rubber caps by pulling while gently rotating. Remove the lamp holders by rotating counter clockwise. The lamp can be removed from the holder by pulling it.



Dip Switch Settings for Programmable Tachometers
Full Scale Deflection 3500 RPM

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
1	58	0	0	1	0	0	0	0	0	0	0
2	117	1	1	1	0	0	0	0	0	0	0
3	175	1	1	0	1	0	0	0	0	0	0
4	233	0	1	1	1	0	0	0	0	0	0
5	292	0	1	0	0	1	0	0	0	0	0
6	350	1	0	1	0	1	0	0	0	0	0
7	408	1	0	0	1	1	0	0	0	0	0
8	467	0	0	1	1	1	0	0	0	0	0
9	525	0	0	0	0	0	1	0	0	0	0
10	583	1	1	0	0	0	1	0	0	0	0
11	642	1	1	1	0	0	1	0	0	0	0
12	700	0	1	0	1	0	1	0	0	0	0
13	758	0	1	1	1	0	1	0	0	0	0
14	817	1	0	0	0	1	1	0	0	0	0
15	875	1	0	1	0	1	1	0	0	0	0
16	933	0	0	0	1	1	1	0	0	0	0
17	992	0	0	1	1	1	1	0	0	0	0
18	1050	1	1	1	1	1	1	0	0	0	0
19	1108	1	1	0	0	0	0	1	0	0	0
20	1167	0	1	1	0	0	0	1	0	0	0
21	1225	0	1	0	1	0	0	1	0	0	0
22	1283	1	0	1	1	0	0	1	0	0	0
23	1342	1	0	0	0	1	0	1	0	0	0
24	1400	0	0	1	0	1	0	1	0	0	0
25	1458	0	0	0	1	1	0	1	0	0	0
26	1517	1	1	0	1	1	0	1	0	0	0
27	1575	1	1	1	1	1	0	1	0	0	0
28	1633	0	1	0	0	0	1	1	0	0	0
29	1692	0	1	1	0	0	1	1	0	0	0
30	1750	1	0	0	1	0	1	1	0	0	0
31	1808	1	0	1	1	0	1	1	0	0	0
32	1867	0	0	0	0	1	1	1	0	0	0
33	1925	0	0	1	0	1	1	1	0	0	0
34	1983	1	1	1	0	1	1	1	0	0	0
35	2042	1	1	0	1	1	1	1	0	0	0
36	2100	0	1	1	1	1	1	1	0	0	0
37	2158	0	1	0	0	0	0	0	1	0	0
38	2217	1	0	1	0	0	0	0	1	0	0
39	2275	1	0	0	1	0	0	0	1	0	0
40	2333	0	0	1	1	0	0	0	1	0	0
41	2392	0	0	0	0	1	0	0	1	0	0
42	2450	1	1	0	0	1	0	0	1	0	0
43	2508	1	1	1	0	1	0	0	1	0	0
44	2567	0	1	0	1	1	0	0	1	0	0
45	2625	0	1	1	1	1	0	0	1	0	0
46	3683	1	0	0	0	0	1	0	1	0	0
47	2742	1	0	1	0	0	1	0	1	0	0
48	2800	0	0	0	1	0	1	0	1	0	0
49	2858	0	0	1	1	0	1	0	1	0	0
50	2917	1	1	1	1	0	1	0	1	0	0
51	2975	1	1	0	0	1	1	0	1	0	0
52	3033	0	1	1	0	1	1	0	1	0	0
53	3092	0	1	0	1	1	1	0	1	0	0
54	3150	1	0	1	1	1	1	0	1	0	0
55	3208	1	0	0	0	0	0	1	1	0	0
56	3267	0	0	1	0	0	0	1	1	0	0
57	3325	0	0	0	1	0	0	1	1	0	0
58	3383	1	1	0	1	0	0	1	1	0	0
59	3442	1	1	1	1	0	0	1	1	0	0
60	3500	0	1	0	0	1	0	1	1	0	0

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
61	3558	0	1	1	0	1	0	1	1	0	0
62	3617	1	0	0	1	1	0	1	1	0	0
63	3675	1	0	1	1	1	0	1	1	0	0
64	3733	0	0	0	0	0	1	1	1	0	0
65	3792	0	0	1	0	0	1	1	1	0	0
66	3850	1	1	1	0	0	1	1	1	0	0
67	3908	1	1	0	1	0	1	1	1	0	0
68	3967	0	1	1	1	0	1	1	1	0	0
69	4025	0	1	0	0	1	1	1	1	0	0
70	4083	1	0	1	0	1	1	1	1	0	0
71	4142	1	0	0	1	1	1	1	1	0	0
72	4200	0	0	1	1	1	1	1	1	0	0
73	4258	0	0	0	0	0	0	0	0	1	0
74	4317	1	1	0	0	0	0	0	0	1	0
75	4375	1	1	1	0	0	0	0	0	1	0
76	4433	0	1	0	1	0	0	0	0	1	0
77	4492	0	1	1	1	0	0	0	0	1	0
78	4550	1	0	0	0	1	0	0	0	1	0
79	4608	1	0	1	0	1	0	0	0	1	0
80	4667	0	0	0	1	1	0	0	0	1	0
81	4725	0	0	1	1	1	0	0	0	1	0
82	4783	1	1	1	1	1	0	0	0	1	0
83	4842	1	1	0	0	0	1	0	0	1	0
84	4900	0	1	1	0	0	1	0	0	1	0
85	4958	1	1	0	1	0	1	0	0	1	0
86	5017	1	0	1	1	0	1	0	0	1	0
87	5075	1	0	0	0	1	1	0	0	1	0
88	5133	0	0	1	0	1	1	0	0	1	0
89	5192	0	0	0	1	1	1	0	0	1	0
90	5250	1	1	0	1	1	1	0	0	1	0
91	5308	1	1	1	1	1	1	0	0	1	0
92	5367	0	1	0	0	0	0	1	0	1	0
93	5425	0	1	1	0	0	0	1	0	1	0
94	5483	1	0	0	1	0	0	1	0	1	0
95	5542	1	0	1	1	0	0	1	0	1	0
96	5600	0	0	0	0	1	0	1	0	1	0
97	5658	0	0	1	0	1	0	1	0	1	0
98	5717	1	1	1	0	1	0	1	0	1	0
99	5775	1	1	0	1	1	0	1	0	1	0
100	5834	0	1	1	1	1	0	1	0	1	0
101	5892	0	1	0	0	0	1	1	0	1	0
102	5950	1	0	1	0	0	1	1	0	1	0
103	6009	1	0	0	1	0	1	1	0	1	0
104	6067	0	0	1	1	0	1	1	0	1	0
105	6125	0	0	0	0	1	1	1	0	1	0
106	6184	1	1	0	0	1	1	1	0	1	0
107	6242	1	1	1	0	1	1	1	0	1	0
108	6300	0	1	0	1	1	1	1	0	1	0
109	5359	0	1	1	1	1	1	1	0	1	0
110	6417	1	0	0	0	0	0	0	1	1	0
111	6475	1	0	1	0	0	0	0	1	1	0
112	6534	0	0	0	1	0	0	0	1	1	0
113	6592	0	0	1	1	0	0	0	1	1	0
114	6650	1	1	1	1	0	0	0	1	1	0
115	6709	1	1	0	0	1	0	0	1	1	0
116	6767	0	1	1	0	1	0	0	1	1	0
117	6825	0	1	0	1	1	0	0	1	1	0
118	6684	1	0	1	1	1	0	0	1	1	0
119	6942	1	0	0	0	0	1	0	1	1	0
120	7000	0	0	1	0	0	1	0	1	1	0

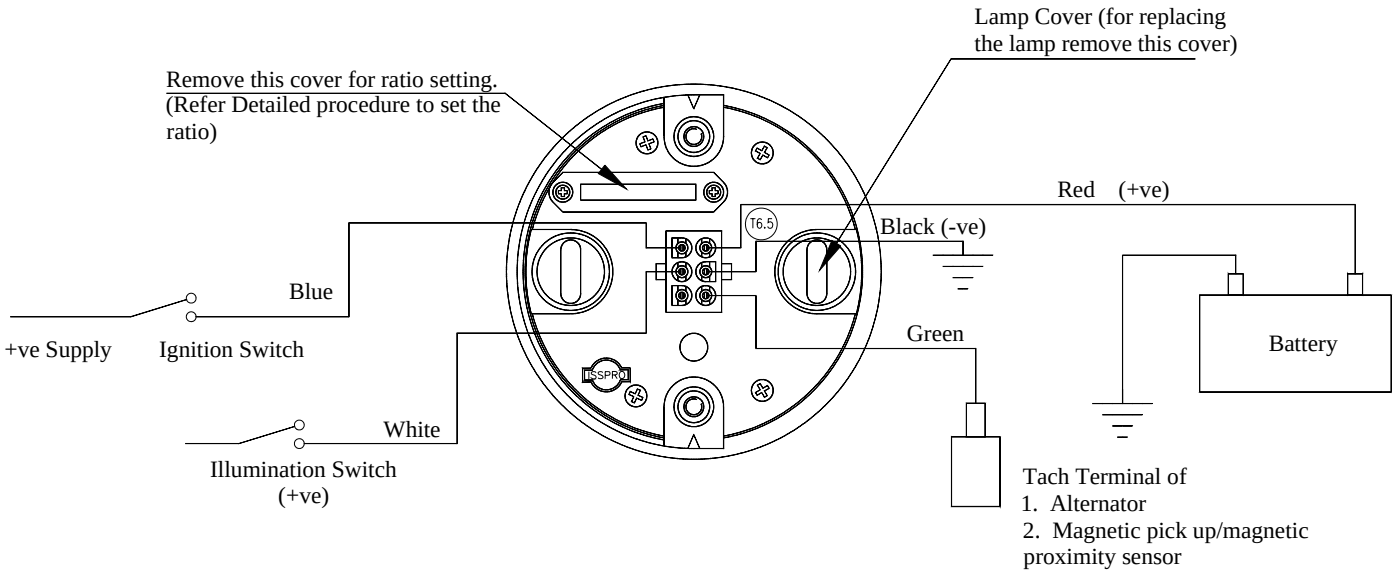
Dip Switch Settings for Programmable Tachometers
Full Scale Deflection 3500 RPM

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
121	7259	0	0	0	1	0	1	0	1	1	0
122	7117	1	1	0	1	0	1	0	1	1	0
123	7175	1	1	1	1	0	1	0	1	1	0
124	7234	0	1	0	0	1	1	0	1	1	0
125	7292	0	1	1	0	1	1	0	1	1	0
126	7350	1	0	0	1	1	1	0	1	1	0
127	7409	1	0	1	1	1	1	0	1	1	0
128	7467	0	0	0	0	0	0	0	1	1	0
129	7525	0	0	1	0	0	0	1	1	1	0
130	7584	1	1	1	0	0	0	1	1	1	0
131	7642	1	1	0	1	0	0	1	1	1	0
132	7700	0	1	1	1	0	0	1	1	1	0
133	7759	0	1	0	0	1	0	1	1	1	0
134	7817	1	0	1	0	1	0	1	1	1	0
135	7875	1	0	0	1	1	0	1	1	1	0
136	7934	0	0	1	1	1	0	1	1	1	0
137	7992	0	0	0	0	0	1	1	1	1	0
138	8050	1	1	0	0	0	1	1	1	1	0
139	8109	1	1	1	0	0	1	1	1	1	0
140	8167	0	1	0	1	0	1	1	1	1	0
141	8225	0	1	1	1	0	1	1	1	1	0
142	8284	1	0	0	0	1	1	1	1	1	0
143	8342	1	0	1	0	1	1	1	1	1	0
144	8400	0	0	0	1	1	1	1	1	1	0
145	8459	0	0	1	1	1	1	1	1	1	0
146	8517	1	1	1	1	1	1	1	1	1	0
147	8575	1	1	0	0	0	0	0	0	0	1
148	8634	0	1	1	0	0	0	0	0	0	1
149	8692	0	1	0	1	0	0	0	0	0	1
150	8751	1	0	1	1	0	0	0	0	0	1
151	8808	1	0	0	0	1	0	0	0	0	1
152	8867	0	0	1	0	1	0	0	0	0	1
153	8925	0	0	0	1	1	0	0	0	0	1
154	8983	1	1	0	1	1	0	0	0	0	1
155	9042	1	1	1	1	1	0	0	0	0	1
156	9100	0	1	0	0	0	1	0	0	0	1
157	9158	0	1	1	0	0	1	0	0	0	1
158	9217	1	0	0	1	0	1	0	0	0	1
159	9275	1	0	1	1	0	1	0	0	0	1
160	9333	0	0	0	0	1	1	0	0	0	1
161	9392	0	0	1	0	1	1	0	0	0	1
162	9450	1	1	1	0	1	1	0	0	0	1
163	9508	1	1	0	1	1	1	0	0	0	1
164	9567	0	1	1	1	1	1	0	0	0	1
165	9625	0	1	0	0	0	0	1	0	0	1
166	9683	1	0	1	0	0	0	1	0	0	1
167	9742	1	0	0	1	0	0	1	0	0	1
168	9800	0	0	1	1	0	0	1	0	0	1
169	9858	0	0	0	0	1	0	1	0	0	1
170	9917	1	1	0	0	1	0	1	0	0	1
171	9975	1	1	1	0	1	0	1	0	0	1
172	10033	0	1	0	1	1	0	1	0	0	1
173	10092	0	1	1	1	1	0	1	0	0	1
174	10150	1	0	0	0	0	1	1	0	0	1
175	10208	1	0	1	0	0	1	1	0	0	1
176	10267	0	0	0	1	0	1	1	0	0	1
177	10325	0	0	1	1	0	1	1	0	0	1
178	10383	1	1	1	1	0	1	1	0	0	1
179	10442	1	1	0	0	1	1	1	0	0	1
180	10500	0	1	1	0	1	1	1	0	0	1

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
181	10558	0	1	0	1	1	1	1	0	0	1
182	10617	1	0	1	1	1	1	1	0	0	1
183	10675	1	0	0	0	0	0	0	1	0	1
184	10733	0	0	1	0	0	0	0	1	0	1
185	10792	0	0	0	1	0	0	0	1	0	1
186	10850	1	1	0	1	0	0	0	1	0	1
187	10908	1	1	1	1	0	0	0	1	0	1
188	10967	0	1	0	0	1	0	0	1	0	1
189	11025	0	1	1	0	1	0	0	1	0	1
190	11083	1	0	0	1	1	0	0	1	0	1
191	11142	1	0	1	1	1	0	0	1	0	1
192	11200	0	0	0	0	0	1	0	1	0	1
193	11258	0	0	1	0	0	1	0	1	0	1
194	11317	1	1	1	0	0	1	0	1	0	1
195	11375	1	1	0	1	0	1	0	1	0	1
196	11433	0	1	1	1	0	1	0	1	0	1
197	11492	0	1	0	0	1	1	0	1	0	1
198	11550	1	0	1	0	1	1	0	1	0	1
199	11608	1	0	0	1	1	1	0	1	0	1
200	11667	0	0	1	1	1	1	0	1	0	1
201	11725	0	0	0	0	0	0	1	1	0	1
202	11783	1	1	0	0	0	0	1	1	0	1
203	11842	1	1	1	0	0	0	1	1	0	1
204	11900	0	1	0	1	0	0	1	1	0	1
205	11958	0	1	1	1	0	0	1	1	0	1
206	12017	1	0	0	0	1	0	1	1	0	1
207	12075	1	0	1	0	1	0	1	1	0	1
208	12133	0	0	0	1	1	0	1	1	0	1
209	12192	0	0	1	1	1	0	1	1	0	1
210	12250	1	1	1	1	1	0	1	1	0	1
211	12308	1	1	0	0	0	1	1	1	0	1
212	12367	0	1	1	0	0	1	1	1	0	1
213	12425	0	1	0	1	0	1	1	1	0	1
214	12483	1	0	1	1	0	1	1	1	0	1
215	12542	1	0	0	0	1	1	1	1	0	1
216	12600	0	0	1	0	1	1	1	1	0	1
217	12658	0	0	0	1	1	1	1	1	0	1
218	12717	1	1	0	1	1	1	1	1	0	1
219	12775	1	1	1	1	1	1	1	1	0	1
220	12833	0	1	0	0	0	0	0	0	1	1
221	12892	0	1	1	0	0	0	0	0	1	1
222	12950	1	0	0	1	0	0	0	0	1	1
223	13008	1	0	1	1	0	0	0	0	1	1
224	13067	0	0	0	0	1	0	0	0	1	1
225	13125	0	0	1	0	1	0	0	0	1	1
226	13183	1	1	1	0	1	0	0	0	1	1
227	13242	1	1	0	1	1	0	0	0	1	1
228	13300	0	1	1	1	1	0	0	0	1	1
229	13358	0	1	0	0	0	1	0	0	1	1
230	13417	1	0	1	0	0	1	0	0	1	1
231	13475	1	0	0	1	0	1	0	0	1	1
232	13533	0	0	1	1	0	1	0	0	1	1
233	13592	0	0	0	0	1	1	0	0	1	1
234	13650	1	1	0	0	1	1	0	0	1	1
235	13708	1	1	1	0	1	1	0	0	1	1
236	13767	0	1	0	1	1	1	0	0	1	1
237	13825	0	1	1	1	1	1	0	0	1	1
238	13883	1	0	0	0	0	0	1	0	1	1
239	13942	1	0	1	0	0	0	1	0	1	1
240	14000	0	0	0	1	0	0	1	0	1	1

Dip Switch Settings for Programmable Tachometers
Full Scale Deflection 3500 RPM

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
241	14058	0	0	1	1	0	0	1	0	1	1
242	14117	1	1	1	1	0	0	1	0	1	1
243	14175	1	1	0	0	1	0	1	0	1	1
244	14233	0	1	1	0	1	0	1	0	1	1
245	14292	0	1	0	1	1	0	1	0	1	1
246	14350	1	0	1	1	1	0	1	0	1	1
247	14408	1	0	0	0	0	1	1	0	1	1
248	14467	0	0	1	0	0	1	1	0	1	1
249	14525	0	0	0	1	0	1	1	0	1	1
250	14583	1	1	0	1	0	1	1	0	1	1
251	14642	1	1	1	1	0	1	1	0	1	1
252	14700	0	1	0	0	1	1	1	0	1	1
253	14758	0	1	1	0	1	1	1	0	1	1
254	14817	1	0	0	1	1	1	1	0	1	1
255	14875	1	0	1	1	1	1	1	0	1	1
256	14933	0	0	0	0	0	0	0	1	1	1
257	14992	0	0	1	0	0	0	0	1	1	1
258	15050	1	1	1	0	0	0	0	1	1	1
259	15108	1	1	0	1	0	0	0	1	1	1
260	15167	0	1	1	1	0	0	0	1	1	1

Pulses/ Rotation	FSD Freq @ 3500RPM(HZ)	Dip Switch Settings									
		1	2	3	4	5	6	7	8	9	10
261	15225	0	1	0	0	1	0	0	1	1	1
262	15283	1	0	1	0	1	0	0	1	1	1
263	15342	1	0	0	1	1	0	0	1	1	1
264	15400	0	0	1	1	1	0	0	1	1	1
265	15458	0	0	0	0	0	1	0	1	1	1
266	15517	1	1	0	0	0	1	0	1	1	1
267	15575	1	1	1	0	0	1	0	1	1	1
268	15633	0	1	0	1	0	1	0	1	1	1
269	15692	0	1	1	1	0	1	0	1	1	1
270	15750	1	0	0	0	1	1	0	1	1	1
271	15808	1	0	1	0	1	1	0	1	1	1
272	15867	0	0	0	1	1	1	0	1	1	1
273	15925	0	0	1	1	1	1	0	1	1	1
274	15983	1	1	1	1	1	1	0	1	1	1
275	16042	1	1	0	0	0	0	1	1	1	1
276	16100	0	1	1	0	0	0	1	1	1	1
277	16158	0	1	0	1	0	0	1	1	1	1
278	16217	1	0	1	1	0	0	1	1	1	1
279	16275	1	0	0	0	1	0	1	1	1	1
280	16333	0	0	1	0	1	0	1	1	1	1

Wiring Diagram
3 3/8" Electrical Tachometer (Diesel)