

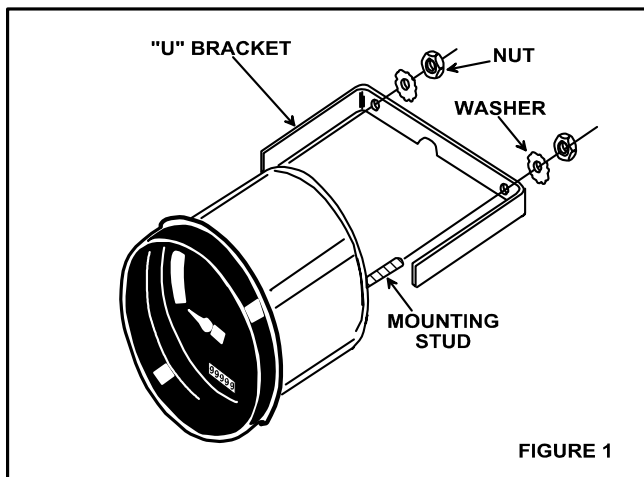


FIGURE 1

The following are instructions for installing, wiring and programming the Veethree Electrical Programmable Tachometer/Hourmeter.

CAUTION

READ THESE INSTRUCTIONS THOROUGHLY BEFORE PROCEEDING DO NOT DEVIATE FROM WIRING INSTRUCTIONS. INCORRECT WIRING COULD CAUSE ELECTRICAL SHORT AND POSSIBLE FIRE. ALWAYS DISCONNECT BATTERY BEFORE MAKING ANY ELECTRICAL CONNECTIONS.

PREPARATION FOR INSTALLATION

1. Select a mounting location for gauge which provides easy readability from the operating position. Check behind mounting panel for sufficient installation clearance.
2. Depending on Tachometer model, cut either a 3.406" +.032" (86mm) or a 4.625" +.032" (118mm) diameter hole through the panel at the desired location.
3. Insert gauge into mounting hole and check for proper fit.
4. Fit 'U' bracket from hardware package over mounting studs on back of gauge. Trim bracket length as necessary for proper mounting.
5. **Temporarily** remove gauge and bracket from panel.

IMPORTANT

BEFORE PROCEEDING WITH FINAL INSTALLATION AND WIRING, TACHOMETER MUST BE PROGRAMMED TO OPERATE WITH YOUR EQUIPMENT. REFER TO THE PROGRAMMING SECTION OF THESE INSTRUCTIONS.

PROGRAMMING/CALIBRATION

The Tachometer/Hourmeter is accurate on any system having a full scale frequency of 133.3 Hz to 1248 Hz which uses either an alternator, pulse generator, magnetic proximity sensor, or electrical coil as a sending unit. In pulse generator type sender applications, consult your engine manufacturer's manual for sending unit take-off

ratio. Also, determine the number of pulses for each revolution of the pulse generator. In either case the Tachometer/Hourmeter programming is accomplished in three easy steps:

1. Calculate the Full Scale Frequency
2. Determine the program, divide, and filter numbers.
3. Set the program DIP switches.

Use the following formulas to calculate the Full Scale Frequency (**FSF**) for your application for the application: (NOTE - for 3500 rpm tachometers, use 4000 as full scale rpm.) ►

► ALTERNATOR TYPE SIGNAL

$$\frac{\# \text{ of poles} \times \text{pulley ratio} \times \text{full scale rpm}}{2} = \text{FSF}$$

60

► PULSE GENERATOR TYPE SENDER

$$\frac{\# \text{ pulses/rev} \times \text{take-off ratio} \times \text{full scale rpm}}{60} = \text{FSF}$$

► MAGNETIC PROXIMITY TYPE SENSOR

$$\frac{\# \text{ of slots (or teeth)} \times \text{full scale rpm}}{60} = \text{FSF}$$

► STANDARD IGNITION COIL SIGNAL

$$\frac{\# \text{ of cylinders} \times \text{full scale rpm}}{2} = \text{FSF}$$

60

PROGRAM DIP SWITCHES

On the rear of the tachometer there is an oval shaped black plug. Upon removal of the plug, two DIP switches will be visible. Also, on the rear of the tachometer, under the plug, there is a blue label denoting the function of each switch position. The label is divided into three sections: Programming, where program and divide number are entered; type sender (switch 10); and filter. The program switches will be set first.

Once the **FSF** has been calculated, refer to Table 1 for the Program, Divide, and Filter Numbers.

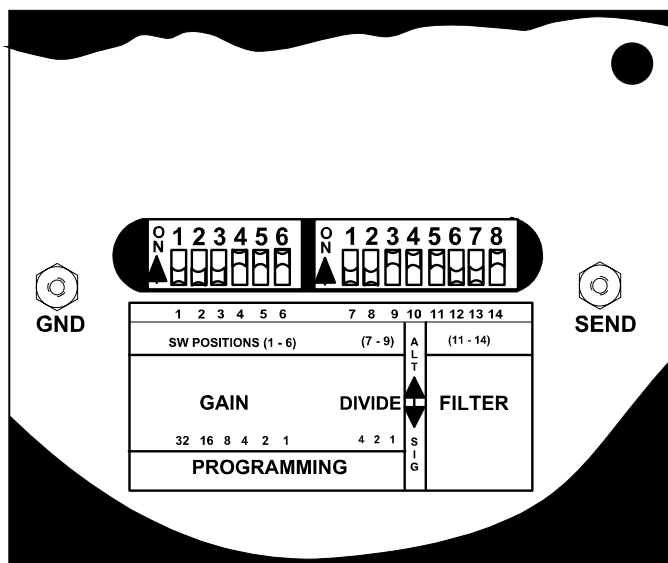
Example: **FSF** is 141.7 Hz. Locate this frequency in the first column of Table One, as highlighted. Column two shows the Program Numbers as 000111. Column Three shows the Divide Number as 001. Column Four shows the Filter Number as 1001.

The program number must be entered from left to right, i.e., switch position 1 is the leftmost digit of the program number. The program numbers represent on and off positions. A zero represents an OFF (down) position and

TABLE 1

GAIN PROGRAMMING

FREQUENCY IN Hz.	PROGRAM NO.	DIVIDE NO.	FILTER NO.	FREQUENCY IN Hz.	PROGRAM NO.	DIVIDE NO.	FILTER NO.
133.3 TO 133.9	000000	001	1001	410.2 TO 416.0	100111	010	1100
133.9 TO 135.2	000001	001	1001	416.0 TO 422.0	101000	010	1101
135.2 TO 136.4	000010	001	1001	422.0 TO 428.2	101001	010	1101
136.4 TO 137.7	000011	001	1001	428.2 TO 434.5	101010	010	1101
137.7 TO 139.0	000100	001	1001	434.5 TO 441.1	101011	010	1101
139.0 TO 140.3	000101	001	1001	441.1 TO 447.8	101100	010	1101
140.3 TO 141.7	000110	001	1001	447.8 TO 454.7	101101	010	1101
141.7 TO 143.1	000111	001	1001	454.7 TO 461.9	101110	010	1101
143.1 TO 144.5	001000	001	1001	461.9 TO 469.3	101111	010	1101
144.5 TO 145.9	001001	001	1001	469.3 TO 476.9	110000	010	1101
145.9 TO 147.4	001010	001	1001	476.9 TO 484.8	110001	010	1101
147.4 TO 148.9	001011	001	1001	484.8 TO 492.9	110010	010	1110
148.9 TO 150.4	001100	001	1001	492.9 TO 501.4	110011	010	1110
150.4 TO 152.0	001101	001	1001	501.4 TO 510.1	110100	010	1110
152.0 TO 153.6	001110	001	1001	510.1 TO 519.1	110101	010	1110
153.6 TO 155.2	001111	001	1011	519.1 TO 528.4	110110	010	1110
155.2 TO 156.9	010000	001	1011	528.4 TO 533.3	110111	010	1110
156.9 TO 158.6	010001	001	1011	533.3 TO 535.8	000000	100	1110
158.6 TO 160.3	010010	001	1011	535.8 TO 540.7	000001	100	1110
160.3 TO 162.1	010011	001	1011	540.7 TO 545.7	000010	100	1110
162.1 TO 163.9	010100	001	1011	545.7 TO 550.8	000011	100	1110
163.9 TO 165.7	010101	001	1011	550.8 TO 556.1	000100	100	1110
165.7 TO 167.6	010110	001	1011	556.1 TO 561.4	000101	100	1110
167.6 TO 169.5	010111	001	1011	561.4 TO 566.8	000110	100	1110
169.5 TO 171.5	011000	001	1011	566.8 TO 572.3	000111	100	1110
171.5 TO 173.6	011001	001	1011	572.3 TO 578.0	001000	100	1110
173.6 TO 175.6	011010	001	1011	578.0 TO 583.7	001001	100	1110
175.6 TO 177.8	011011	001	1011	583.7 TO 589.6	001010	100	1110
177.8 TO 179.9	011100	001	1011	589.6 TO 595.6	001011	100	1110
179.9 TO 182.2	011101	001	1011	595.6 TO 601.7	001100	100	1110
182.2 TO 184.5	011110	001	1011	601.7 TO 607.9	001101	100	1110
184.5 TO 186.8	011111	001	1011	607.9 TO 614.3	001110	100	1110
186.8 TO 189.2	100000	001	1011	614.3 TO 620.8	001111	100	1110
189.2 TO 191.7	100001	001	1011	620.8 TO 627.4	010000	100	1111
191.7 TO 194.2	100010	001	1011	627.4 TO 634.2	010001	100	1111
194.2 TO 196.9	100011	001	1011	634.2 TO 641.1	010010	100	1111
196.9 TO 199.5	100100	001	1011	641.1 TO 648.2	010011	100	1111
199.5 TO 202.3	100101	001	1011	648.2 TO 655.5	010100	100	1111
202.3 TO 205.1	100110	001	1011	655.5 TO 662.9	010101	100	1111
205.1 TO 208.0	100111	001	0000	662.9 TO 670.4	010110	100	1111
208.0 TO 211.0	101000	001	0000	670.4 TO 678.2	010111	100	1111
211.0 TO 214.1	101001	001	0000	678.2 TO 686.1	011000	100	1111
214.1 TO 217.3	101010	001	0000	686.1 TO 694.2	011001	100	1111
217.3 TO 220.5	101011	001	0000	694.2 TO 702.5	011010	100	1111
220.5 TO 223.9	101100	001	0000	702.5 TO 711.1	011011	100	0100
223.9 TO 227.4	101101	001	0000	711.1 TO 719.8	011100	100	0100
227.4 TO 230.9	101110	001	0000	719.8 TO 728.7	011101	100	0100
230.9 TO 234.6	101111	001	0000	728.7 TO 737.9	011110	100	0100
234.6 TO 238.5	110000	001	0000	737.9 TO 747.3	011111	100	0100
238.5 TO 242.4	110001	001	0000	747.3 TO 756.9	100000	100	0100
242.4 TO 246.5	110010	001	0000	756.9 TO 766.8	100001	100	0100
246.5 TO 250.7	110011	001	0000	766.8 TO 777.0	100010	100	0100
250.7 TO 255.0	110100	001	0000	777.0 TO 787.4	100011	100	0101
255.0 TO 259.5	110101	001	0000	787.4 TO 798.1	100100	100	0101
259.5 TO 264.2	110110	001	0000	798.1 TO 809.1	100101	100	0101
264.2 TO 266.7	110111	001	0000	809.1 TO 820.4	100110	100	0101
266.7 TO 267.9	000000	010	0000	820.4 TO 832.1	100111	100	0101
267.9 TO 270.3	000001	010	0010	832.1 TO 844.0	101000	100	0101
270.3 TO 272.9	000010	010	0010	844.0 TO 856.4	101001	100	0101
272.9 TO 275.4	000011	010	0010	856.4 TO 869.0	101010	100	0101
275.4 TO 278.0	000100	010	0010	869.0 TO 882.1	101011	100	0101
278.0 TO 280.7	000101	010	0010	882.1 TO 895.6	101100	100	0101
280.7 TO 283.4	000110	010	0010	895.6 TO 909.5	101101	100	0101
283.4 TO 286.2	000111	010	0010	909.5 TO 923.8	101110	100	0101
286.2 TO 289.0	001000	010	0010	923.8 TO 938.5	101111	100	0101
289.0 TO 292.9	001001	010	0010	938.5 TO 953.8	110000	100	0101
292.9 TO 294.8	001010	010	0010	953.8 TO 969.6	110001	100	0101
294.8 TO 297.8	001011	010	0010	969.6 TO 985.9	110010	100	0110
297.8 TO 300.8	001100	010	0010	985.9 TO 1002.7	110011	100	0110
300.8 TO 304.0	001101	010	0010	1002.7 TO 1020.1	110100	100	0110
304.0 TO 307.1	001110	010	0010	1020.1 TO 1038.2	110101	100	0110
307.1 TO 310.4	001111	010	1100	1038.2 TO 1056.9	110110	100	0110
310.4 TO 313.7	010000	010	1100	1056.9 TO 1076.3	110111	100	0110
313.7 TO 317.1	010001	010	1100	1076.3 TO 1096.4	111000	100	0110
317.1 TO 320.6	010010	010	1100	1096.4 TO 1117.3	111001	100	0110
320.6 TO 324.1	010011	010	1100	1117.3 TO 1139.0	111010	100	0110
324.1 TO 327.7	010100	010	1100	1139.0 TO 1161.5	111011	100	0110
327.7 TO 331.4	010101	010	1100	1161.5 TO 1185.0	111100	100	0110
331.4 TO 335.2	010110	010	1100	1185.0 TO 1209.4	111101	100	0110
335.2 TO 339.1	010111	010	1100	1209.4 TO 1234.8	111110	100	0110
339.1 TO 343.1	011000	010	1100	1234.8 TO 1248.0	111111	100	0110
343.1 TO 347.1	011001	010	1100				
347.1 TO 351.3	011010	010	1100				
351.3 TO 355.5	011011	010	1100				
355.5 TO 359.9	011100	010	1100				
359.9 TO 364.4	011101	010	1100				
364.4 TO 368.9	011110	010	1100				
368.9 TO 373.6	011111	010	1100				
373.6 TO 378.5	100000	010	1100				
378.5 TO 383.4	100001	010	1100				
383.4 TO 388.5	100010	010	1100				
388.5 TO 393.7	100011	010	1100				
393.7 TO 399.1	100100	010	1100				
399.1 TO 404.6	100101	010	1100				
404.6 TO 410.2	100110	010	1100				



The type of sender is entered by moving Switch 10 UP for an alternator or electrical coil, and DOWN for a pulse generator or magnetic proximity type sender.

The Filter program number is likewise set from left to right.

Example: Filter program number of 1001. Switch position 11 is ON. Switch positions 12 and 13 are OFF. Switch position 14 is ON.

Replace the black plug. The Tachometer/Hourmeter is now fully programmed, and can be used for your application without further adjustment.

FINAL INSTALLATION

CAUTION

MAKE SURE THAT ALL WIRING IS DRESSED AWAY FROM MOVING OR HOT ENGINE COMPONENTS.

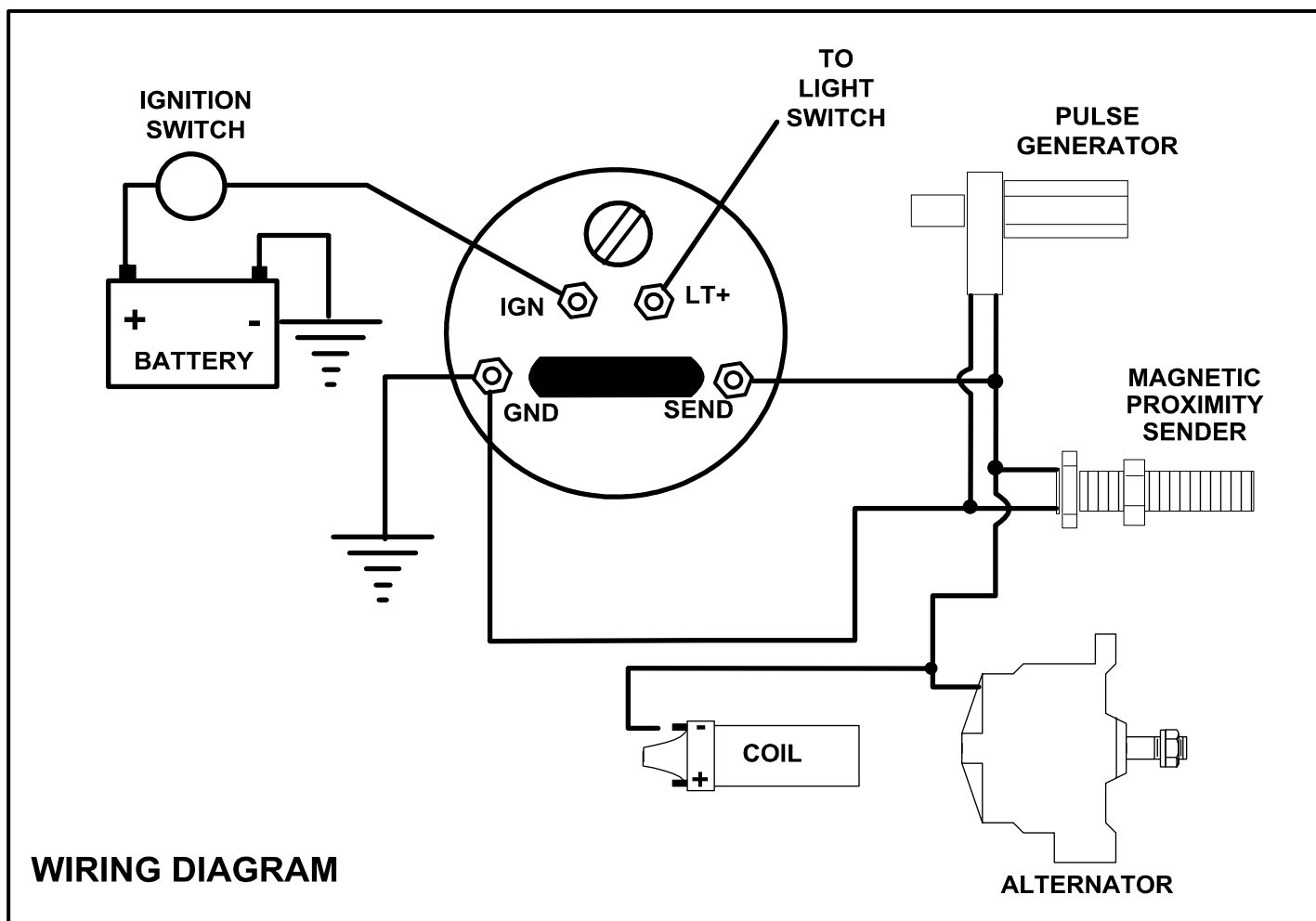
1. Insert gauge into panel and install bracket over mounting studs. Install a nut and washer on each mounting stud as shown in Figure 1.
2. Tighten washers and nuts on studs until gauge can no longer be rotated by hand. CAUTION: OVERTORQUING OF NUTS MAY CRACK GAUGE HOUSING OR MOUNTING PANEL.

a one represents an ON (up) position.

Example: Program number of 000111. Switch positions 1 through 3 are OFF (in the down position). Switch positions 4 through 6 are ON (in the up position).

The Divide number can now be entered. The divide number is also set from left to right.

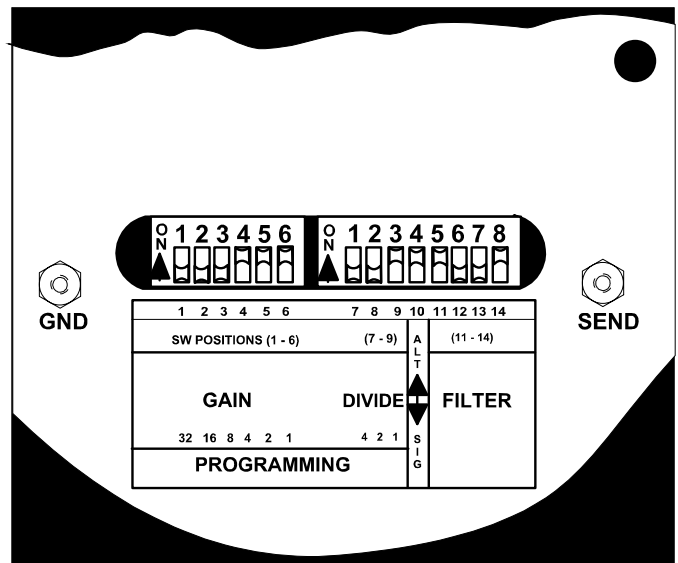
Example: Divide number of 001. Switch positions 7 and 8 are OFF. Switch position 9 is ON.



3. Connect wiring to gauge terminals using washers and nuts supplied. Use wire colors conforming to existing/required color codes.
4. Using either black or white wire (to conform to previous wiring) run a lead from the 'GND' (Ground) terminal on the gauge to the electrical system ground.
5. Run a lead from the 'LT' (light) terminal on the gauge to the panel light switch or the 'L' terminal of another Veetree gauge.
6. Run a lead from the 'IGN' terminal on the gauge to a convenient 12vdc positive source, that switches On and Off as the engine is running/not running.
7. For Tachometers using an alternator type sender, run a lead from the 'SEND' terminal on the gauge to the terminal on the alternator marked 'R', 'W', or 'AC'.
8. For tachometers using a pulse generator or magnetic proximity type sender, run a lead from the 'SEND' terminal on the gauge to one terminal on the sender. Run a lead from 'GND' terminal on the gauge (there will be two leads on this terminal) to the other terminal of the sender. The 'SEND' can be connected to either wire of the sender as long as ground is connected to the other one.
9. For tachometers using the electric coil as a sender, run a lead from the 'SEND' terminal on the gauge to the negative (-) side of the coil.

CAUTION

BEFORE RECONNECTING BATTERY TO ELECTRICAL SYSTEM, RECHECK WIRING TO ENSURE ALL CONNECTIONS ARE PROPERLY MADE. INCORRECT CONNECTIONS OR ELECTRICAL SHORTS COULD CAUSE DAMAGE OR FIRE IN SYSTEM. ELEMENTS OF ELECTRICAL SYSTEMS SHOULD HAVE PROPER FUSES INSTALLED.



When wiring is complete, connect battery. Start engine and check gauge for proper operation.

CORRECTION FORMULA - PROGRAMMABLE TACH/HOURS (LOW FREQUENCY MODELS)

Multiply incorrect RPM reading by the the switch setting (Full Scale Frequency), and divide the result by the actual RPM. This will give you a new Full Scale Frequency. Change the switches to the new frequency and re-test the Tach/Hourmeter.

A typical example:

Actual RPM is 2000, indicated RPM is 1800, with switches set for 208 Hz. F.S.F.

$$1800 \times 208 = 374,400$$

$$\text{Divide } 374,400 \text{ by } 2000 = 187.2$$

187.2 is the new frequency.

Refer to Figure above , and the Table 1 on page 2, and set switches 1-6 for this new frequency.

You may have to reset the Divide Number Switches (7-9) and/or the Filter Number Switches (11-14) as well.

The Tachometer should now read correctly.

From the example above, the Chart shows:

Frequency in Hz.	Program No.	Divide No.	↕	Filter No.
205.1 TO 208.0	100111	001		0000
Reset to: Frequency in Hz.	Program No.	Divide No.	↕	Filter No.
186.8 TO 189.2	100000	001		1011