

SL10

Digital Speed Log

Contains:

- General Information
- Performance Specifications
- Operation
- Installation
- Maintenance
- Drawings
- Parts Lists

Owner's Manual



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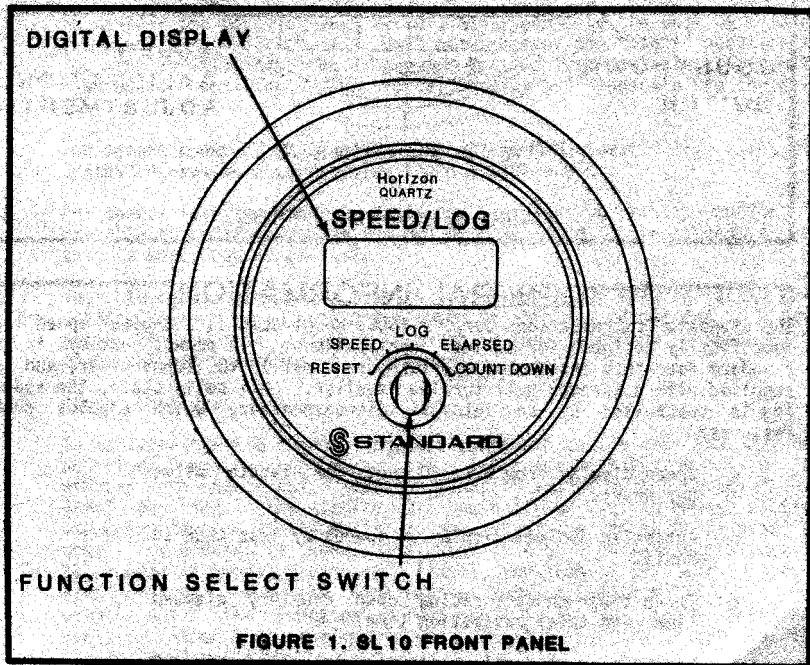
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PERFORMANCE

PERFORMANCE SPECIFICATIONS

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

Speed Range	0 to 40 knots or mph
Accuracy	+10%
Log Mode Range	0 to 999 nautical or statute miles
Elapsed Mode Range	0 to 999 hours
Count Down Settings	5 to 10 minutes
Input Voltage (12 volt battery system)	± 13.8 VDC $\pm 20\%$
Current Drain	
Nominal	50 mA
Max. Brightness	300 mA
Temperature Range	0 to 50 degrees C
Impeller (supplied)	Through-hull, low drag turbine
Display	0.6 in. liquid crystal with internal backlight
Dimensions	5 face x 4 body x 4 deep in.
Weight	1 lb



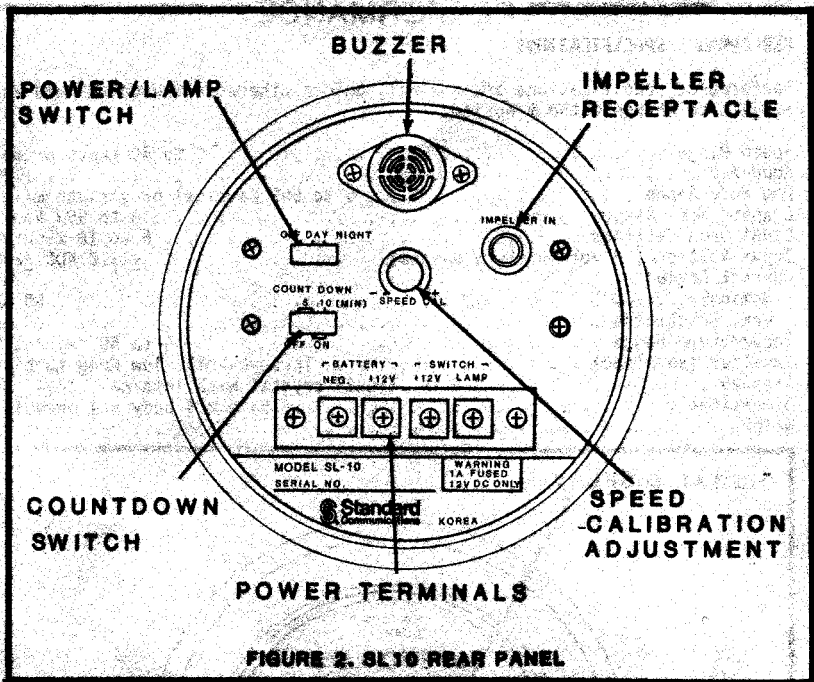


FIGURE 2. SL10 REAR PANEL

GENERAL INFORMATION

The Standard Communications Corp. (SCC) Model SL10 is a digital speed log specifically designed for marine applications. It mounts easily in a standard four-inch instrument aperture, requires 12 VDC input power, and is supplied with a through-hull turbine impeller. All solid-state, the speed log is controlled by an internal microprocessor, which enables such features:

- o Speed display from 0 to 40 knots (or statute miles per hour).
- o Automatic decimal display at speeds of less than 10 knots.
- o Three timer modes - racing down counter, elapsed time, and total navigation time.
- o Log mode which displays distance travelled, from 0 to 999 nautical or statute miles.

- Large liquid crystal display (LCD) for maximum visibility, even in direct sunlight. Backlit for night use.

This Owner's Operating and Maintenance Manual will assist you in the installation and operation of the SL10, and provide guidelines for maintenance should it ever be required. We urge you to read this manual carefully to obtain optimum performance from your speed log.

We at SCC thank you for buying Standard, and are sure you will be impressed with the accuracy, reliability, and durability of your Standard Communications equipment for many years to come.

OPERATION

For location of controls described in the following paragraphs, refer to Figures 1 and 2.

1. Speed Reading

To monitor the speed of your vessel, apply power to the unit by sliding the power/lamp switch to the "Day" position (or the "Night" position if you wish to illuminate the display). Set the function select switch to the "Speed" position. The digital display will indicate the speed in knots.

For speeds under 10 knots, the display will automatically scale in tenths to provide accurate slow speed measurements.

For speeds over ten knots, continuous display in tenths option is possible by modification on the MPU display board. The procedure for this is described on page 17.

The SL10 can be altered to display a miles-per-hour reading rather than a knots reading by adjusting the speed calibration adjustment. A full explanation of this procedure is given in the alignment procedure of the maintenance section in this manual.

2. Racing Countdown

To activate the timer mode, set the countdown switch to the desired position (5 minutes with buzzer off, 5 minutes with buzzer on, or 10 minutes with buzzer on). Set the function select switch to the "Count Down" position. The display will begin at the desired amount of time and count down. If the buzzer is on, it will sound at 3 minutes (3 tones), 2 minutes (2 tones), 1 minutes (1 tone), 30 seconds (3 tones), 20 seconds (2 tones), 10 seconds (tone), and each of the last 5 seconds (1 tone each). When the timer reaches zero, it will blink a "0:00" display until the function select switch is set to a different position, then begin the countdown again if the switch is set to the "Count Down" position.

3. Distance Log

The log will accumulate distance travelled any time power is applied to the unit by the power/lamp switch. There are two sub-modes within the log mode. The resettable sub-mode begins accumulating distance when the power/lamp switch is turned on. It will continue to do so unless you set the function select switch to the "Reset" position, or allow the racing countdown to countdown to zero; in either of these instances it will reset to zero and begin accumulating again. The accumulative sub-mode also begins accumulating distance when the power/lamp switch is turned on. It will not be reset unless you turn off the main power source for the speed log (see the installation section for special requirements for this feature). Both sub-modes stop accumulating distance (but are not reset) when you turn the power/lamp switch to the "Off" position.

The display will indicate the resettable sub-mode distance when the power/lamp switch is in the "Day" or "Night" position, and the accumulative sub-mode distance when the switch is in the "Off" position. The resettable log is displayed in tenths up to 99.9, then whole numbers up to 999, at which time it automatically resets to zero. The accumulative log is always displayed in whole numbers, also from 0 to 999. The unit of measure will be the same as calibrated for the speed (nautical or statute miles).

4. Elapsed Timer

The timer will accumulate time whenever power is applied to the unit by the power/lamp switch. As with the log, there are two sub-modes; resettable and accumulative. These sub-modes operate in the same manner as the distance log sub-modes. Refer back to those paragraphs for details, simply substituting "time" for "distance".

The resettable sub-mode is displayed in hours and minutes up to 9:59, then it automatically reverts to zero. The accumulative sub-mode is displayed in hours only, from 0 to 999.

NOTE

Basically, the accumulative sub-modes of the distance log and elapsed timer serve to measure total distance or time during a trip, in case you switch to other functions during the trip which reset the resettable sub-modes. Keep in mind that although you must turn the power/lamp switch to the "Off" position to display the accumulative sub-mode distance or time, you must switch it back to the "Day" or "Night" position to continue accumulating distance or time.

INSTALLATION

For location of connections described in the following paragraphs, refer to Figures 1 and 2.

1. General

When selecting the location for mounting the speed log, keep in mind that the controls must be accessible to the user, and the electrical connections should be routed to their connections as directly as possible. To preserve the life of the speed log, mount the instrument in a location that provides as much protection from the elements as possible.

2. Mechanical

With the mounting bracket (001V, Figure F) removed from the speed log, insert the unit into a standard 4-inch instrument aperture until the back of the face is flush with the outside mounting wall. Slide the bracket over the body of the speed log, then tighten it with the hex head bolt (002V, Figure F). Secure the bracket to the inside mounting wall with the supplied hardware.

3. Electrical

Connect the power cord to the unit. The black lead connects to the "Battery" terminal marked "Neg" (negative) on the back of the unit, and the red lead connects to the terminal marked "Switch, +12V". Connect the other end of the power cable to a switched 12 volt supply which is active whenever the ignition switch is on. For operation of the display lamp, connect the terminal marked "Lamp" to the "Switch, +12V" terminal with a jumper.

For display of the accumulative sub-modes of the distance log and the elapsed timer features when the power/lamp is off, connect the "Battery, +12V" to the "Switch, +12V" terminal with a jumper.

Obtain the power from a switched +12V source as directly as possible, avoiding power circuits which share loads with ignition, alternators, radio transmitters, etc. Excessive electrical noise associated with such devices may prevent the speed log from operating properly.

For proper impeller operation, the RCA plug on the end of the impeller cable must be inserted into the impeller receptacle.

4. Impeller

Correct installation of the impeller is essential for optimum operation of the speed log. Select a location for the impeller using the following guidelines:

- a. Mount as close as possible to the centerline to insure contact with water at all times (however, avoid location at the centerline to prevent damage to the impeller in case of grounding).
- b. Generally, a location approximately 2/3 aft is best. However, this may vary depending upon the hull of your boat.

Once a location is established, install the impeller in a thru-hull fashion, insuring that the end marked "Front" is facing the front of the boat (the impeller need not be installed facing directly downward). A good underwater sealing compound should be used to secure the impeller and seal all cracks. Take care not to apply sealing compound on the impeller wheel, and insure that the impeller wheel is always free to rotate. See Figure 3 for an impeller installation aid.

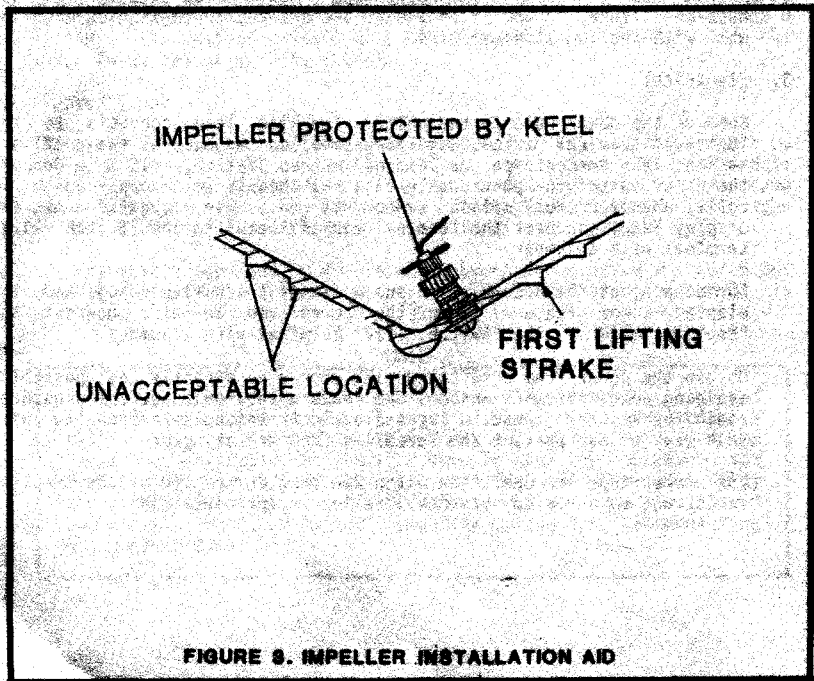


FIGURE 8. IMPELLER INSTALLATION AID

The following steps provide a detailed explanation of impeller installation:

1. Remove the impeller assembly from the impeller housing.
2. Unscrew the stopper from the impeller housing.
3. Place sealing compound around the mounting hole in the hull.
4. Reassemble the impeller as shown in Figure 4, making sure that sealing compound and a washer is on both sides of the hull.
5. If you need to remove the impeller assembly for any reason, use the dummy impeller in its place to seal the hull. To do this, simply remove the springs and shaft from the impeller housing, remove the impeller assembly, and replace it with the dummy impeller. Be sure to reinstall the springs and shaft onto the dummy impeller, thus locking it in place. Refer to Figure F at rear for part numbers.

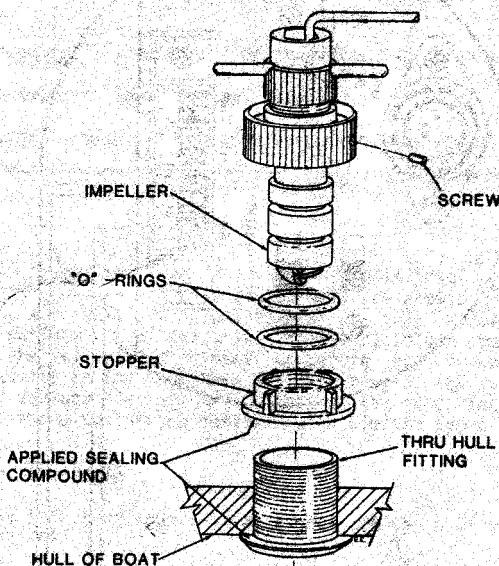


FIGURE 4. IMPELLER EXPLODED PARTS VIEW

SHORT TERMINAL FOR
ACCUMULATIVE
SUB-MODES

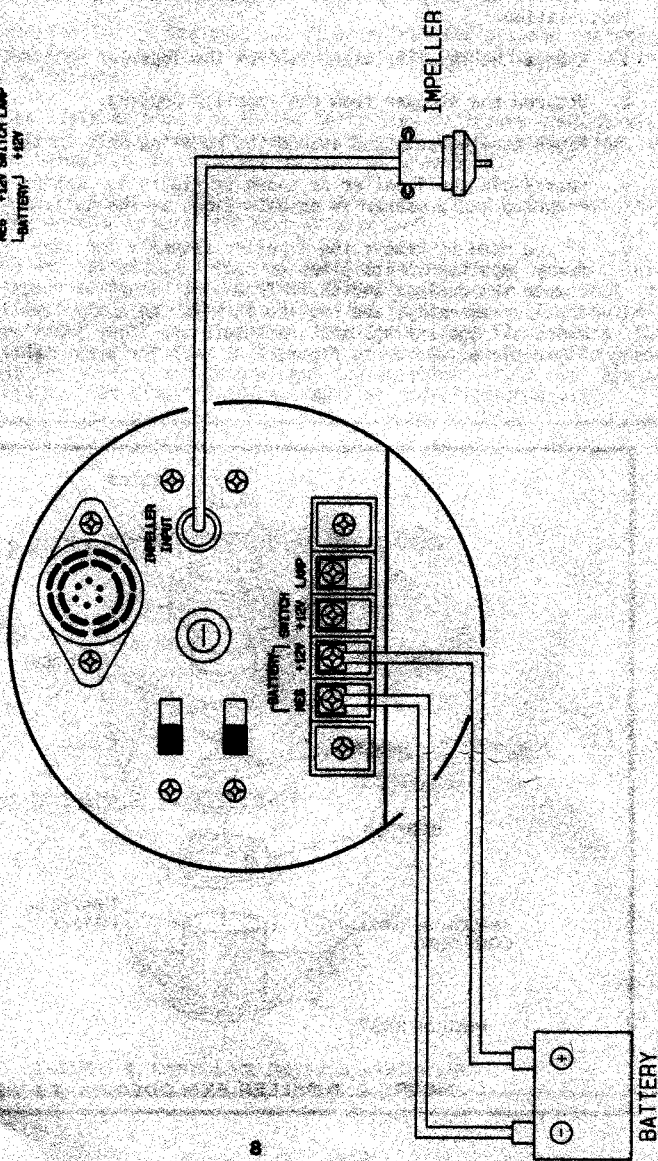
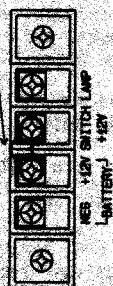


FIGURE 5. SL10 CONNECTING DIAGRAM

THEORY OF OPERATION

Operation of the speed log is accomplished through the following stages, as illustrated in Figure 4.

1. Impeller Assembly: An AC voltage is generated across a Hall device when an alternating magnetic field is applied to it. The voltage is amplified by a comparator, which then switches on and off a switch to generate a 2 V p-p pulse signal. The reference voltage (9 V) is added to the pulse signal and output to the speed log, which operates when the level of the input pulse is 2 V p-p or more.
2. Differentiating Circuit: Shapes the waveform of the pulse signal from the impeller to generate the trigger pulse signal (10 V p-p).
3. Gate Timing Circuit: Generates the signal which opens the gate circuit to allow a trigger pulse to be input to the microcomputer every 2 seconds.
4. Gate Circuit: Opens according to the gate timing signal.
5. Divider: Divides the 32,768 kHz signal into a 54 Hz signal (5 V p-p) for the built-in clock (the microcomputer uses 1/64 second as its time unit).
6. Microcomputer: The "heart" of the speed log, drives the LCD directly.
7. LCD: 7-segment liquid crystal display.
8. Oscillator: Supplies the reference frequency to the microcomputer.

MAINTENANCE

1. General

Your SL10 is designed for years of trouble-free operation assuming proper installation and care of the unit are provided. Following the operation and installation guidelines in this manual should insure optimum performance of the unit. However, should operational problems occur, the following alignment procedure and troubleshooting guide should assist in the isolation and repairing of any such problems. SCC strongly advises that any maintenance of the speed log be performed by an experienced technician familiar with similar types of equipment.

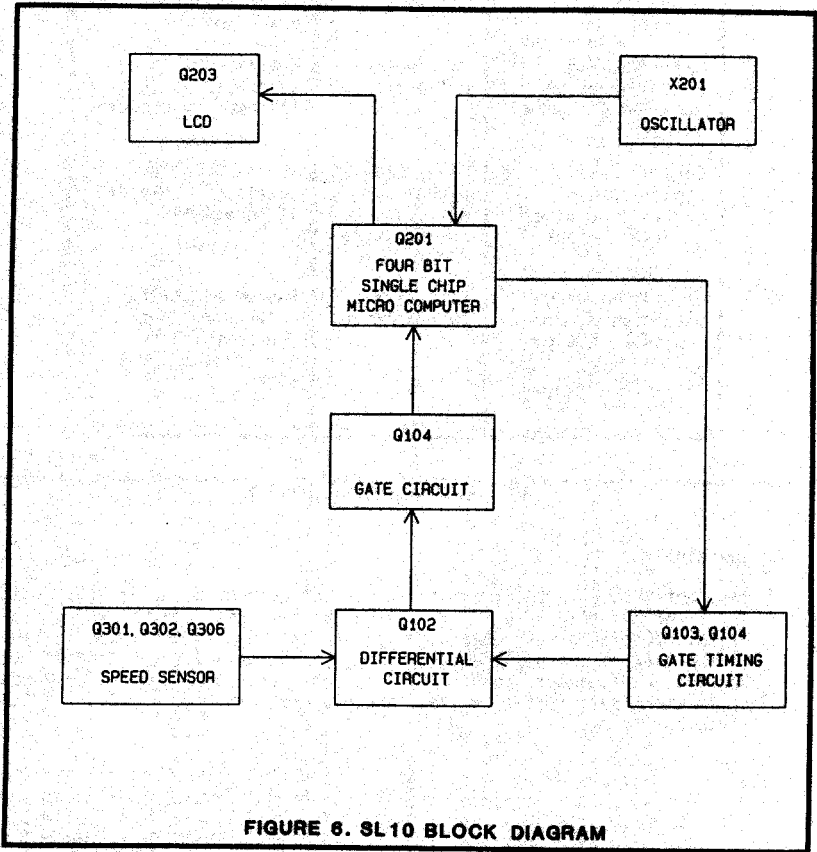
2. Alignment Procedure

- a. Apply a 37.5 Hz square wave signal (4 V p-p) to the impeller receptacle.

- c. Confirm that the display reads in tenths when the function select switch is in the "Audible" position.
- d. Confirm that the display starts with 5 or 10 minutes, as selected, when the function select switch is in the "Count Down" position. Compare the countdown time with actual time.
- e. Set the function select switch to the "Speed" position, then the "Audible" position, and verify that the buzzer sounds when you vary the input signal to the speed log (resulting in a speed reading different from the pre-set one).
- f. Set the function select switch to the "Speed" position, then set the speed calibration adjustment so that 15 knots is indicated on the display with an input signal of 37.5 Hz. Confirm that 30 knots is indicated with an input signal of 75 Hz.
- g. If you desire to change the speed log to display miles per hour instead of knots, perform Step f, then vary the signal generator input to obtain a display of 7 knots. Without further varying the input, adjust the speed calibration adjustment to obtain a display of 8.1 miles per hour.
- h. With the unit calibrated for knots, connect the impeller to the speed log, connect an oscilloscope to J101, then rotate the paddle wheel one turn and confirm a reading of 2 pulse cycles and 2 V p-p or more.

3. Troubleshooting

Conventional signal tracing techniques can be utilized to isolate a faulty circuit or component. However, it is always a good idea, if the speed log is not operating properly, to check closely all installation requirements for good connections before opening the unit. In addition, the following chart may help solve simple operational problems.



SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Blank display at all settings.	No power.	Check input voltage fuse, power cord interconnection, and power switch.
Speed reading erroneous using measured distance as test.	Unit needs calibration.	Recalibrate using instructions in alignment procedure.
Erratic readings at higher speeds only. Reliable readings at lower speeds.	Cavitation at higher speeds affecting impeller operation.	Review impeller location. Relocate if necessary.
Erratic readings when engines or auxiliary equipment is operating. Reliable readings with quiet boat.	Electrical interference.	Review electrical interconnections. Consider filter for noise suppression.

MISCELLANEOUS

1. Revisions

The parts lists in this manual are for the current build of the unit, as of the printing date. If a different part was used in a previous build, details of the parts changes are included in the revision table on the back of the applicable drawing, enabling you to determine the correct replacement part (if the new part is the recommended replacement part for all units, the old part is not listed in the revision table).

SPEED CALIBRATION CHART (Given Distance and Time)

DISTANCE	TIME	SPEED (MPH)	DISTANCE	TIME	SPEED (MPH)
1 mile	10 mins.	6.0	2 miles	10 mins.	12.0
1 mile	11 mins.	5.5	2 miles	11 mins.	10.9
1 mile	12 mins.	5.0	2 miles	12 mins.	10.0
1 mile	13 mins.	4.6	2 miles	13 mins.	9.2
1 mile	14 mins.	4.3	2 miles	14 mins.	8.6
1 mile	15 mins.	4.0	2 miles	15 mins.	8.0
1 mile	16 mins.	3.8	2 miles	16 mins.	7.5
1 mile	17 mins.	3.5	2 miles	17 mins.	7.1
1 mile	18 mins.	3.3	2 miles	18 mins.	6.7
1 mile	19 mins.	3.2	2 miles	19 mins.	6.3
1 mile	20 mins.	3.0	2 miles	20 mins.	6.0
1 mile	21 mins.	2.9	2 miles	21 mins.	5.7
1 mile	22 mins.	2.7	2 miles	22 mins.	5.5
1 mile	23 mins.	2.6	2 miles	23 mins.	5.2
1 mile	24 mins.	2.5	2 miles	24 mins.	5.0
1 mile	25 mins.	2.4	2 miles	25 mins.	4.8
1 mile	26 mins.	2.3	2 miles	26 mins.	4.6
1 mile	27 mins.	2.2	2 miles	27 mins.	4.4
1 mile	28 mins.	2.1	2 miles	28 mins.	4.3
1 mile	29 mins.	2.1	2 miles	29 mins.	4.1
1 mile	30 mins.	2.0	2 miles	30 mins.	4.0
3 miles	10 mins.	18.0	4 miles	10 mins.	24.0
3 miles	11 mins.	16.4	4 miles	11 mins.	21.8
3 miles	12 mins.	15.0	4 miles	12 mins.	20.0
3 miles	13 mins.	13.8	4 miles	13 mins.	18.5
3 miles	14 mins.	12.9	4 miles	14 mins.	17.1
3 miles	15 mins.	12.0	4 miles	15 mins.	16.0
3 miles	16 mins.	11.3	4 miles	16 mins.	15.0
3 miles	17 mins.	10.6	4 miles	17 mins.	14.1
3 miles	18 mins.	10.0	4 miles	18 mins.	13.3
3 miles	19 mins.	9.5	4 miles	19 mins.	12.6
3 miles	20 mins.	9.0	4 miles	20 mins.	12.0
3 miles	21 mins.	8.6	4 miles	21 mins.	11.4
3 miles	22 mins.	8.2	4 miles	22 mins.	10.9
3 miles	23 mins.	7.8	4 miles	23 mins.	10.4
3 miles	24 mins.	7.5	4 miles	24 mins.	10.0
3 miles	25 mins.	7.2	4 miles	25 mins.	9.6
3 miles	26 mins.	6.9	4 miles	26 mins.	9.2
3 miles	27 mins.	6.7	4 miles	27 mins.	8.9
3 miles	28 mins.	6.4	4 miles	28 mins.	8.6
3 miles	29 mins.	6.2	4 miles	29 mins.	8.3
3 miles	30 mins.	6.0	4 miles	30 mins.	8.0

FIGURE 7. SPEED CALIBRATION CHART