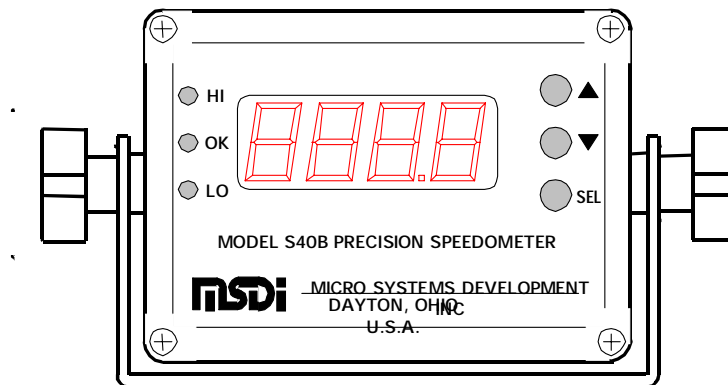


Instruction Manual...

MODEL S40B PRECISION SPEEDOMETER
Version 3.0



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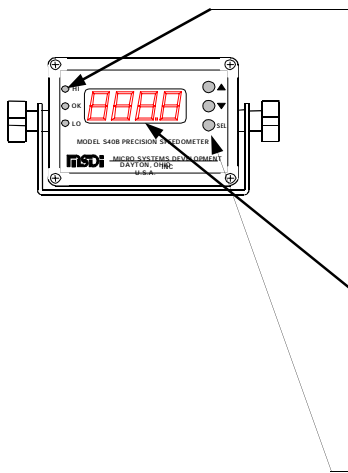
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Introduction

The S40B Precision Speedometer is designed for any vehicle used to dispense materials, especially those where the quality of work is dependent on vehicle speed. The S40B is especially useful on highway line-marking trucks, trucks used for weed control spraying, and bituminous seal coating trucks among others.

The S40B reads the speed of the truck by monitoring any of several different speed-dependent electrical signals. On highway painting trucks, the most convenient signal is the signal used to operate the line marking controller (the “Skip Timer”). On other trucks, the signal may be derived from the transmission-mounted electronic speedometer sender, or from a small generator mounted to the transmission, or from a fifth-wheel pickup riding on a vehicle tire.

A unique feature that adds greatly to the value of the S40B is the programmable limit detector. If the speed of the truck is within the preset limits, a green light comes on. If the speed exceeds the upper limit, the green light goes off and a red light comes on, along with a buzzer. If the truck slows down below the lower limit, a yellow light comes on, along with an intermittent buzzer. (The buzzer may easily be turned off if desired). The upper and lower limits are both programmable to any speed.



A large digital display indicates the speed in tenths of miles-per-hour or tenths of kilometers per hour.

An Odometer keeps track of miles (or kilometers) traveled up to 9999. The Odometer reading momentarily replaces the speed indication at a touch of a button.

All of the functions of the S40B are accessed by just three pushbuttons. The **SEL**ect button chooses the function, while the **▲** and **▼** buttons adjust the values. The values are stored away in a permanent memory, so they will still be there when you turn the power on the next time.

As with all MSDI products, the S40B is programmable for either English (miles) or Metric (kilometers) units.

The S40B automatically performs an internal self-test when power is applied. As a part of this test, all of the display segments are turned on to verify that all are operating, along with the three warning lamps and the buzzer. The stored speed limits are then displayed, first the upper limit, then the lower limit. Occasionally verify that the display indicates “8888” and that the three lamps all come on when power is applied.

Installation

SENDER INSTALLATION

There are several options available for senders. If your truck has an electronic speedometer, check with your dealer to see if the sender that is built into the transmission will provide at least 5.1 pulses per foot (26928 pulses per mile) or, if metric, at least 5.1 pulses per meter. If so, you can connect the Model SA1 Speedometer Adapter to the existing speedometer wires from your transmission. The SA1 allows the S40B to read the signals from the transmission without in any way interfering with the regular truck speedometer. Refer to Fig. 1 for a wiring diagram for the SA1 installation. The SA1 may be mounted anywhere it is convenient.

WARNING: NEVER use anti-lock brake speed signals with the SA1.

If you have a highway marking truck equipped with an MSDI Skipline Controller, you may connect the S40B Speedometer to the existing sender connected the the Skipline Controller. See Fig. 2 for a wiring diagram for this installation.

If neither of the above apply, MSDI has available a transmission mounted generator. This generator mounts on the 7/8-18 threaded hub where the speedometer cable screws on. The generator provides a pass-through hub where you will re-connect the existing speedometer cable. See Fig. 3 for wiring. You can also use a magnetic drive shaft wrapper and pickup. The wiring is the same as the generator wiring, so use Fig. 3 for this also.

WARNING: For safety, be sure to install fuses as shown in the diagrams!

MOUNTING

The S40B Precision Speedometer is intended to be mounted in the cab of the truck, within easy reach and sight of the driver. A good place is centered on top of the instrument panel, where it will not obstruct the driver's vision. Also, keep safety in mind. Don't install the speedometer where the it could cause injury to the driver or passenger in the event of a collision.

When installing the wire, be sure to tie it away from the exhaust system and any moving parts. Use cable ties liberally.

WIRING

The S40B wire has four conductors. They are color coded as Red for +12V, Black for ground, Green for the sender signal, and White for the sender return wire. See the appropriate wiring chart for the actual hook-up.

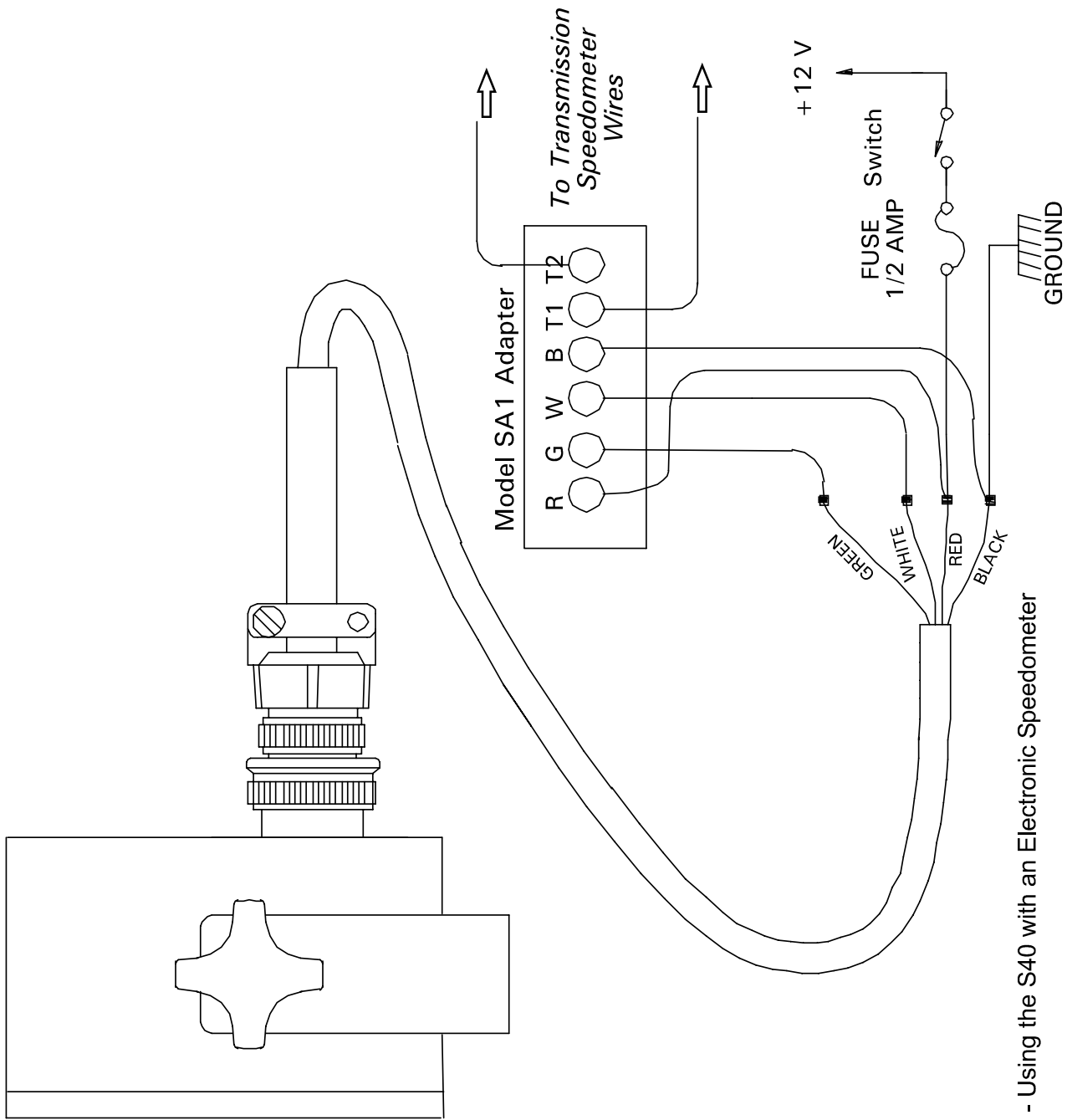


Fig. 1 - Using the S40 with an Electronic Speedometer

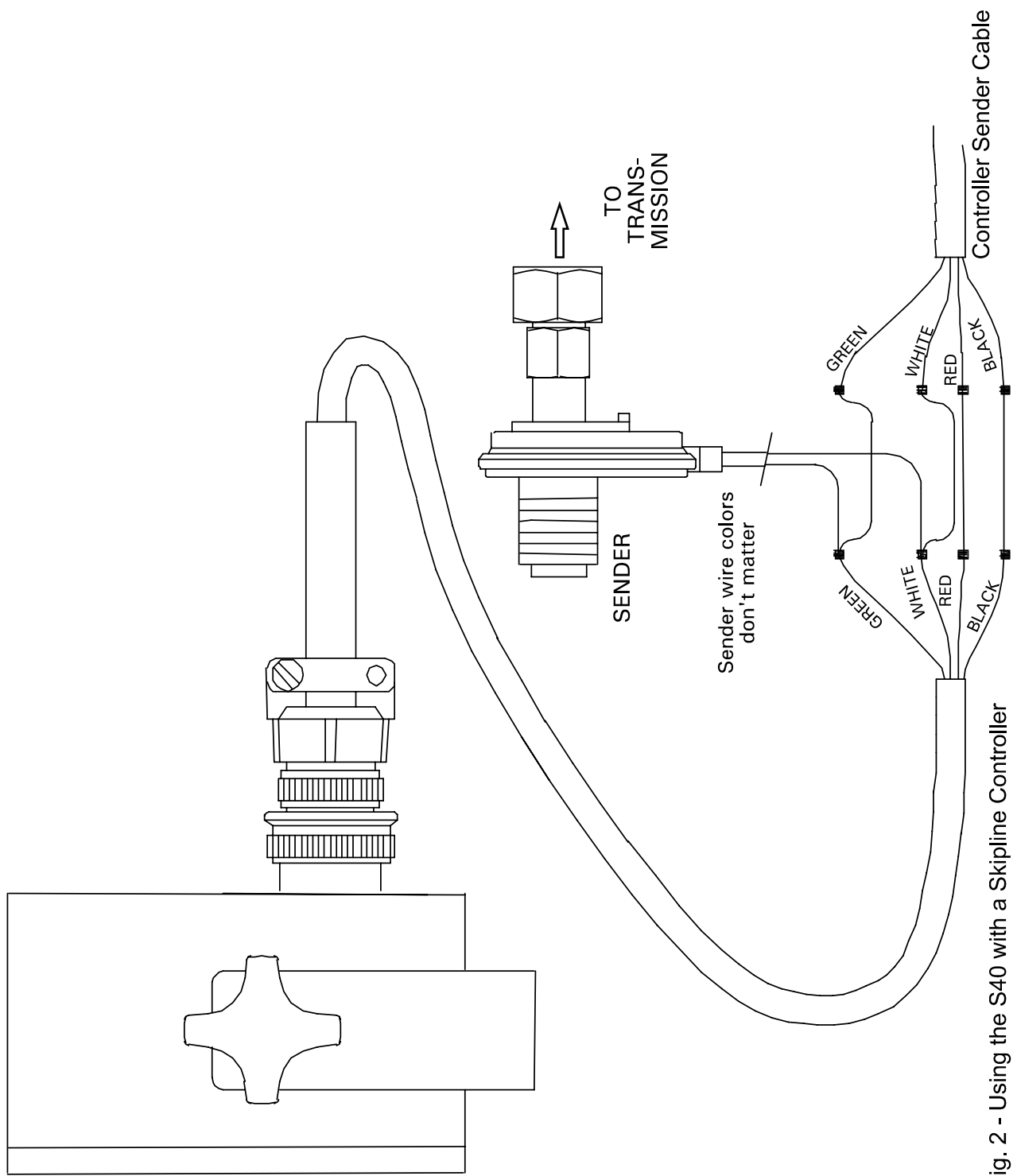


Fig. 2 - Using the S40 with a Skipline Controller

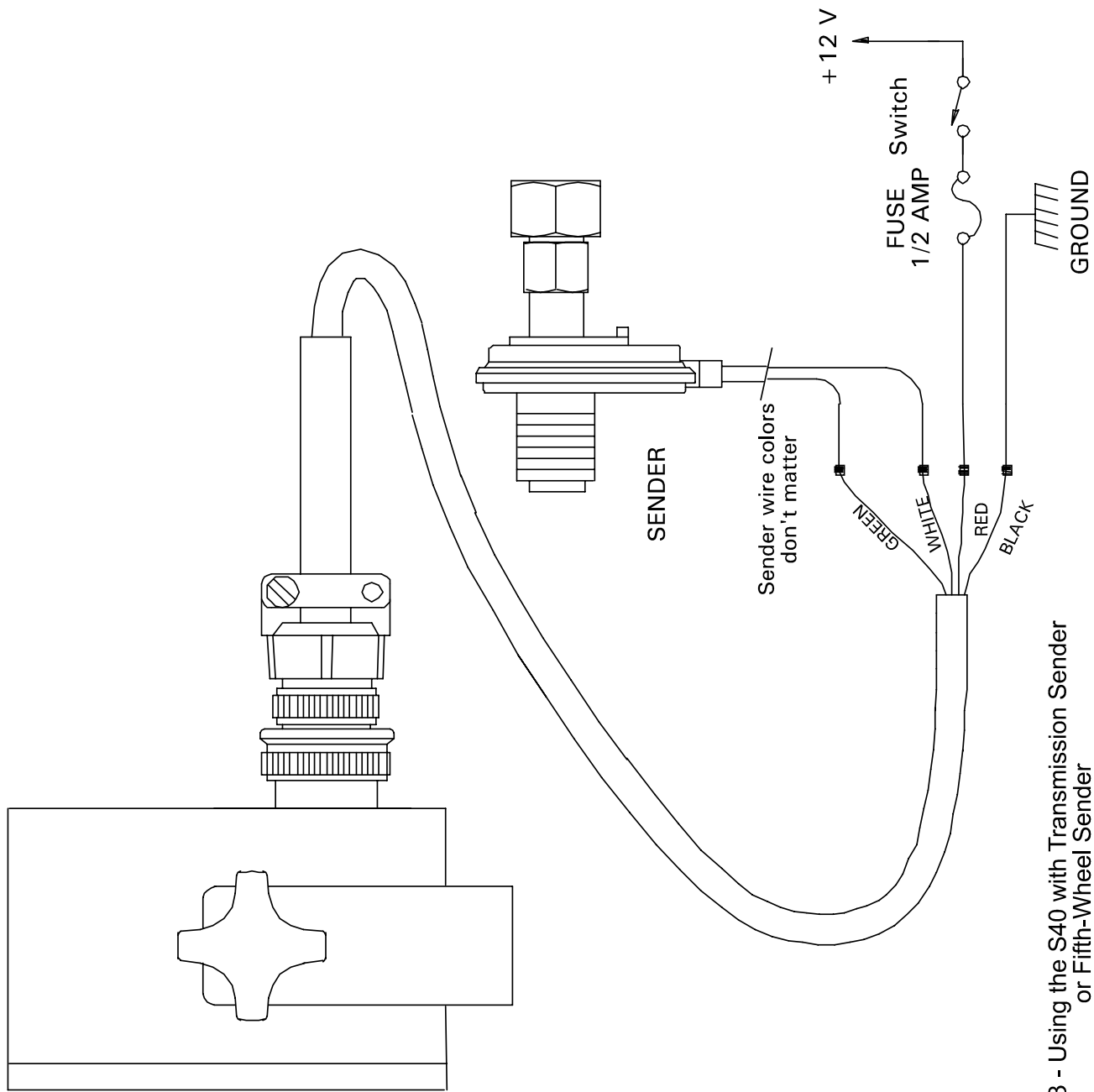
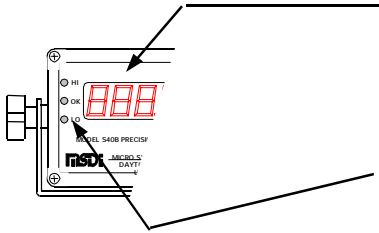


Fig. 3 - Using the S40 with Transmission Sender or Fifth-Wheel Sender

THE DISPLAYS



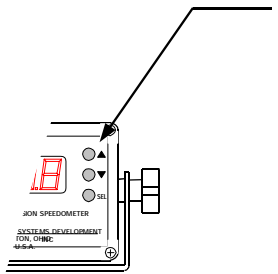
The S40 digit display screen normally indicates the current vehicle speed. When commanded, it also indicates the total distance traveled, the upper and lower speed limit settings, and the current calibration pulse count.

The three light emitting diodes (LEDs) indicate whether the current speed is above, below or within the preset limits.

The buzzer is mounted in the rear of the cabinet. It indicates that the speed is above the preset upper limit by a continuous tone and that the current speed is below the preset lower limit by an intermittent tone.

The limit LEDs and the buzzer are automatically turned off if the current speed is below half of the lower limit or if it is more than 10 MPH (20 KPH) above the upper limit.

THE BUTTONS



There are three buttons on the S40 panel, one marked **SElect**, one marked with a up-arrow (Δ) and one marked with a down-arrow (∇).

Assuming that the speed is displayed, the first push of the **SElect** button will display the odometer. The next push will display the upper (**HI**) limit, the next push will display the lower (**LO**) limit and the next push will display the calibration count. We will use the calibration count reading in the next section.

If the odometer or either of the limits are being displayed, the S40 will automatically return to the speed display after a few seconds. If the calibration count is being displayed, it will be locked on until **SElect** is pressed once again.

Using the buttons will be discussed in more detail in the Operation section.

Calibration

SETTING ENGLISH OR METRIC UNITS

The S40B Precision Speedometer can be set to indicate either Miles per Hour or Kilometers per Hour. The Odometer will always indicate total travel distance in the same units.

To set English units (miles), press both the **SE**Lect and the ∇ buttons at the same time while turning the power on. The display will indicate “8888”, then “USA”, showing that speed and distance will be measured in miles.

To set Metric units (kilometers), press both the **SE**Lect and the Δ buttons at the same time while turning the power on. The display will indicate “8888”, then “Euro”, indicating that speed and distance will be measured in kilometers.

The units that you set up here will be “remembered” by the S40B, so that the next time you turn it on, it will automatically set itself to the same units.

WARNING: When you change units from Metric to English or from English to Metric, the current limit settings and Odometer reading are reset. If you need to remember these numbers, write them down before you change the units. If you have previously calibrated your speedometer, you will need to recalibrate it to the newly selected units.

THE 100 FOOT (or METER) RUN

The S40B will automatically calibrate itself to any sender which provides at least 0.08 pulses per foot and less than 15 pulses per foot. The following procedure will read the number of pulses in 100 feet, and store the resulting calibration information in the S40B. Once the S40B is calibrated, it is ready to use.

Calibration requires that the vehicle be rolled over a carefully measured 100 foot or 100 meter path unless you are already using a Micro Systems Skipline Controller. If you are, see the next section on using the MSDI controller calibration to set the S40B.

First, select the units of measure as described above. Then, assuming that you are not using an MSDI controller, move the vehicle to the beginning of the 100 foot/meter measured path.

Press the **SE**Lect button four times so that the current calibration number appears on the display.

Press the Δ button once. The display will reset to **0000**. The S40B is now ready to count sender pulses. Roll the vehicle to the other end of the measured path and press the ∇ button. The display will indicate the total counts received from the sender. Press **SE**Lect, and the display will momentarily show “**CHA**” for CHAnge. The Δ and ∇ buttons will now allow you to adjust the count. For now, press **SE**Lect to store the new calibration data. The display will

momentarily show “**ACCP**” for ACCEPT, and the data will be stored. The S40B is now calibrated.

You can perhaps increase the accuracy of calibration by making several runs over the measured path and averaging the readings. Then, when the display indicates “**CHA**”, use the Δ and ∇ buttons to set the count to the average of the readings, and then press **SElect** to store this average.

When the 100 foot or meter run is complete, the count displayed must be over 510 and less than 5000, corresponding to 5.1 to 50 pulses per foot or meter. If the count is outside this range, the S40B will force the count to a legal value, and you will have to revise the sender arrangement so that it will produce an acceptable number of pulses.

USING MSDI SKIPLINE CONTROL NUMBERS

If you are using an MSDI Skipline Controller, you can avoid the 100 foot/meter run. Instead, simply enter the calibration value from Models CS10, CS11, CS22 or CS33 controllers. If you are using the Model SC88B, divide the controller calibration number by 10, and enter the result. To retrieve the calibration number from the controller, press **PREV** or **NEXT** until you see the “**SET UP MACHINE**” menu, press **UP**, then press **NEXT** until you see the “**CALIBRATE SENDER**” question. Press **UP** for “**YES**”. Press **UP** again to “**ADJUST VALUE**” and then read the count that is displayed. Just allow the menu to time out. Then enter the number (the number divided by 10 if you have an SC88B) into the speedometer by pressing **SElect**, then the ∇ button, then **SElect** again (display will momentarily show “**CHA**”), then use the Δ and ∇ buttons to set the value. When the value is correct, press **SElect** to store it. Note that if you have set the Sender Ratio in the MSDI skipline controller to X2 to X64, you must set the “**SF:**” value in the S40B to the same number.

CALIBRATING BY THE NUMBERS

If you are sure you know the number of pulses per foot/meter provided by your sender, you can multiply the number of pulses per foot/meter by 100, and enter the number directly as described above for the MSDI Skipline Controllers.

Operation

CONTROLLING THE BUZZER

The buzzer may be turned off when the speed is displayed by pressing the ∇ button, and may be turned on by pressing the Δ button. Note that these buttons serve other functions when the speed is not displayed. The buzzer can be controlled only when speed is shown. When the buzzer is turned on or off, the display will momentarily show “Horn”, then “On” or “Horn”, then “OFF”. Even when you turn the buzzer off, there will be a short “beep”, indicating that the new buzzer status is being stored in the S40B memory. In fact, any time you make a change in a setting or read the odometer, the buzzer will beep as the data is stored.

READING AND RESETTING THE ODOMETER

To read the odometer, press **SELECT**. The current odometer reading will be displayed for a few seconds, and will be stored in memory.

To reset the odometer, first press **SELECT** to display the odometer, then simultaneously press Δ and ∇ . The odometer will immediately be reset to zero and stored in memory.

If you must keep track of your mileage, be sure to read the odometer before turning the S40B off, so that the current odometer reading will be stored for later recall when you turn the S40B on again. Reading the odometer automatically stores the current reading in the S40B memory.

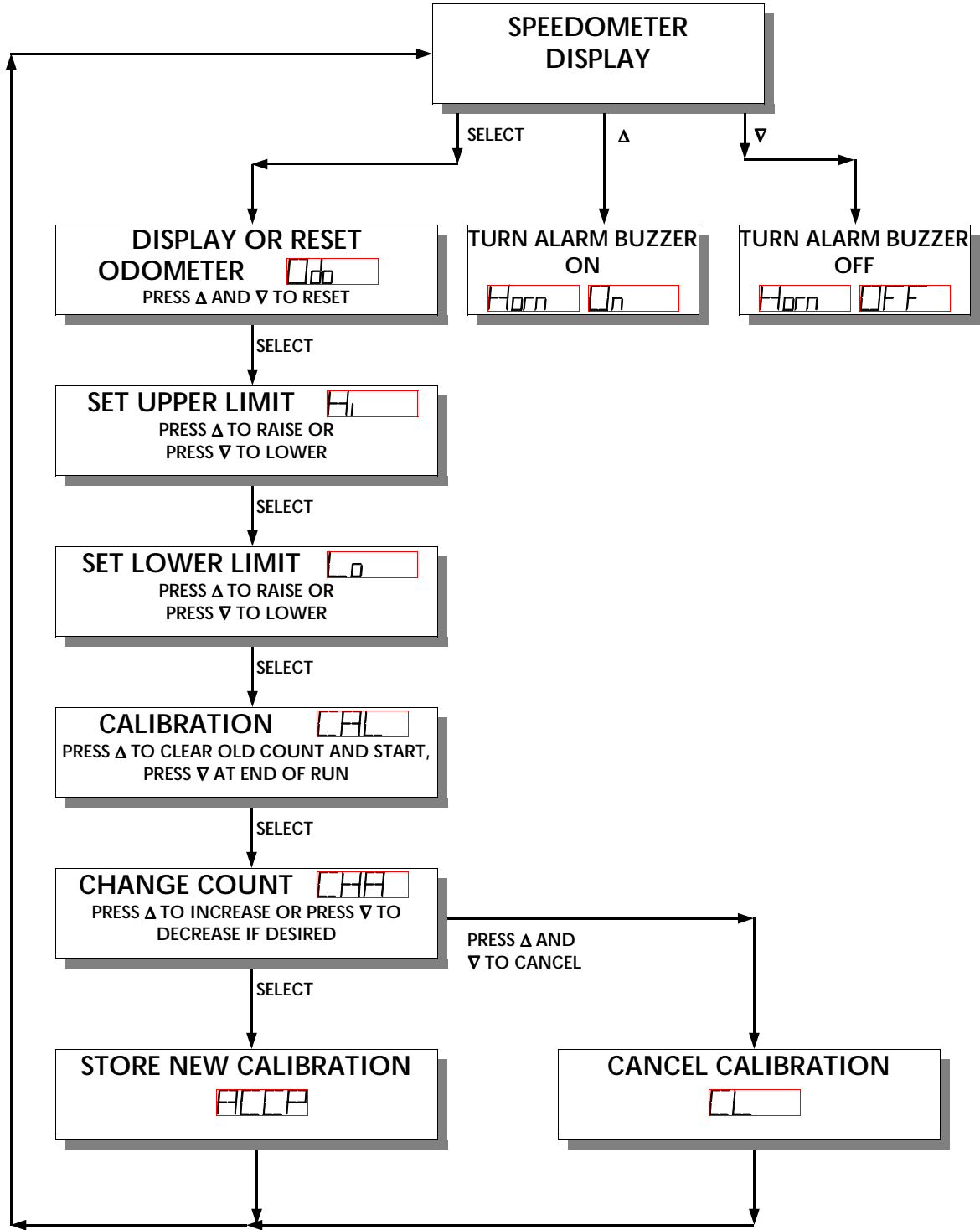
SETTING UPPER AND LOWER SPEED LIMITS

To set the upper limit, press **SELECT** once to show the odometer, then press once again. The display will show “HI” and the “OVER” LED will come on. The display will then show the current high limit setting. Press Δ to increase the value or press ∇ to decrease the value. Note that you cannot set the upper limit to a value that is less than the lower limit. If you can't set the upper limit as low as you would like, you may have to reduce the lower limit first.

To set the lower limit, press **SELECT** twice. The display will show “L0” and the “UNDER” LED will come on. Adjust the value as you did for the upper limit. As with the upper limit, you can't set the lower limit to a value above the upper limit, so if you are increasing the limits, you may have to raise the upper limit first.

After the limits are set, the buzzer will beep once as the new values are stored in memory.

Menu Chart



In Case of Difficulty

RESTORING DEFAULT SETTINGS

If necessary, the factory default settings can be restored by holding both the Δ and ∇ buttons simultaneously while turning the power on. This will not change the English or Metric units, but it will reset the limits, zero the odometer, and set the calibration number to 1000 for English units or 3281 for Metric units.

CHECKING THE SENDER

The sender must supply pulses to the S40B at a rate of from 0.08 pulses per foot/meter to 15 pulses per foot/meter. If you are using an electronic speedometer adapter connected to your transmission, you may find that you can't get enough pulses. Most large trucks will provide around 10 pulses per foot, but pick-up trucks often provide less than one pulse per foot. In this case, you may have to install a separate sender for the S40B. A fifth-wheel sender may be installed to ride on a vehicle tire, but must be mechanically disengaged for speeds of over 30 MPH or 48 KM/HR. A driveshaft wrapper is also available, and has no practical speed limit. This metal or plastic ring has a number of magnets installed in it and a small magnetic pickup senses the magnets as the driveshaft revolves. You can also install magnets on a brake drum, and use a similar pickup to sense them.

ROUTINE MAINTENANCE

The S40B Precision Speedometer is all solid state and contains no user serviceable parts. No routine maintenance is necessary. Refer all necessary service work to your dealer or to the factory.

WARNING

MSDI does NOT recommend modifications to brake drums or discs such as drilling holes or milling slots which could result in brake failure.

MSDI does NOT recommend using Anti-Lock Brake speed signals with the S40B Speedometer either with or without the SAI adapter as this can cause interference with the ABS self-test system and could result in brake failure.



Warranty

Products manufactured by MICRO SYSTEMS DEVELOPMENT INC. (MSDI) are warranted against defects in material and workmanship for a period of ONE YEAR from date of delivery. During the warranty period, MSDI will, at its option, either repair or replace products which prove to be defective. Defective equipment must be returned prepaid. Repaired equipment will be returned to purchaser shipping charges collect. Accessories supplied by MSDI but manufactured by others are covered by their respective manufacturers' warranties. This warranty excludes normal consumables such as printer ribbons and paper.

LIMITATION OF WARRANTY

Damage caused by Acts of God, improper application of the equipment, improper or reversed power supplies, or incorrect wiring is excluded from warranty coverage.

Inasmuch as the application of this equipment is beyond the control of MSDI, all warranties as to performance, merchantability, or fitness for any particular purpose, whether expressed or implied, are hereby disclaimed. The proper application of this equipment is the sole responsibility of the user. IN NO EVENT SHALL MSDI BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR

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