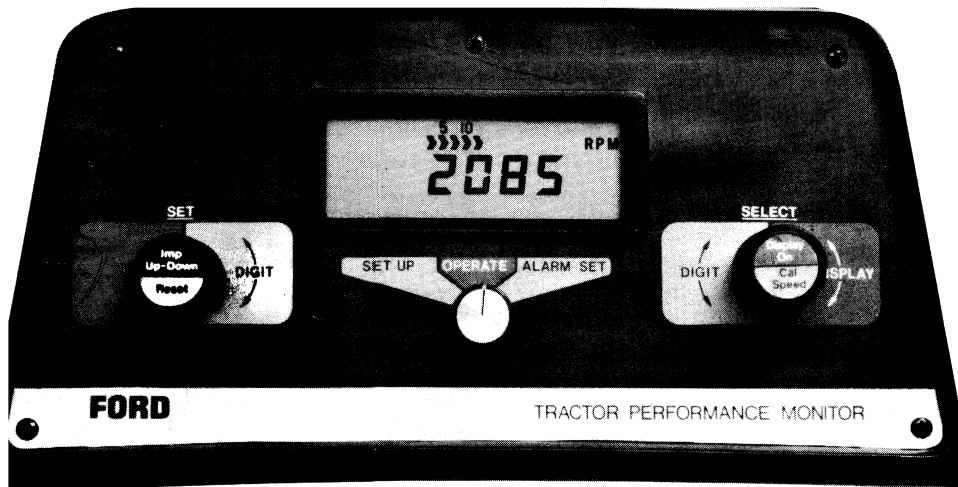


FORD

Tractor Performance Monitor



OPERATOR'S MANUAL

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FOREWORD

Congratulations! You have purchased one of the most accurate and technologically advanced tractor monitoring systems available today for farm tractors. The Ford Tractor Performance Monitor enables the tractor operator to maximize efficiency and performance by "reading out" a wealth of operating information on a console and adjusting the tractor and implement to field conditions.

The system consists of a control console with a read-out screen conveniently mounted above the instrument panel, a radar ground speed sensor mounted under the tractor, an implement status switch that mounts on the implement or three point hitch and provides up or down information, a wheel speed sensor in the transmission and an engine rpm sensor.

The Performance Monitor provides the following data:

1. Wheel Slip in Percent (Continuously Displayed)
2. Distance Traveled
3. Acres Covered in the Field
4. Total Acres Covered
5. Average Acres Per Hour Covered
6. Acres Per Hour Projected
7. True Ground Speed
8. Engine RPM
9. Implement Position (Up or Down)

COMPONENTS

CONTROL CONSOLE

The control console front panel, Figure 1, features a large, easy to read liquid crystal display which is backlit for night visibility. The front panel contains a volume control, three rotary controls and two pushbutton switches. These rotary controls and pushbutton switches are used in the SET UP MODE to enter constants into the console memory and in the OPERATE MODE to select the desired function to be displayed. The volume control adjusts the sound level of the alarm.

An additional feature of the console is an automatic ON-OFF function. The system will automatically turn on when the engine rpm sensor begins to sense rpm's and automatically turns off approximately 8 seconds after the loss of engine rpm's as long as the MODE SELECTOR is in the OPERATE position. If the MODE SELECTOR is in the SET UP or ALARM SET position the system will remain on, and the alarm will sound periodically to remind the operator that the system is "on" without the engine running.

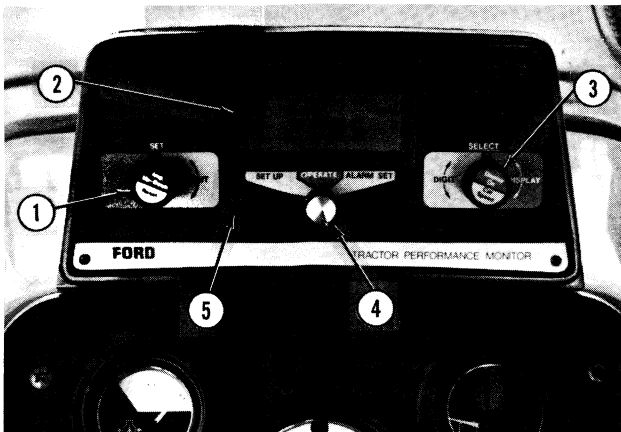


Figure 1
Control Console

- | | |
|-----------------------------------|--------------------------|
| 1. Set Control (Rotary & Push) | 4. Mode Selector Control |
| 2. Display | 5. Alarm Volume |
| 3. Select Control (Rotary & Push) | |

RADAR GROUND SPEED SENSOR

The radar ground speed sensor, Figure 2, is installed under the tractor at a location where the face of the sensor has an unobstructed view of the ground. This sensor functions independently from all tractor parts and provides a true ground speed input for the control console.

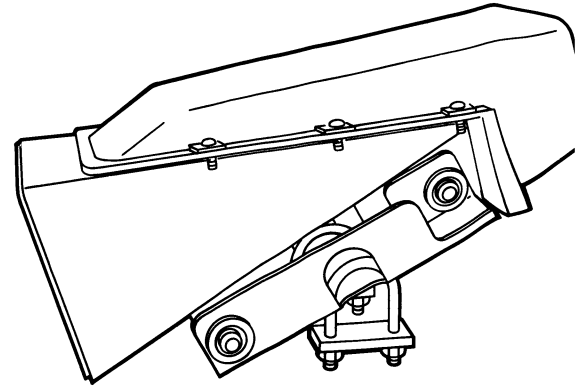


Figure 2
Radar Sensor

The radar sensor is factory installed so mounting instructions are not required, but the following precautions must be observed.

- (1) The face of the sensor must have an unobstructed view of the ground.
- (2) Do not allow oil to drip on the sensor.
- (3) The sensor must be kept away from all sources of heat.
- (4) The sensor housing must not touch the vehicle.



WARNING: The radar speed sensor emits a very low intensity microwave signal which will not cause ill effects from normal use. DO NOT, however, look directly into the face of the sensor during operation to avoid the possibility of eye damage.

IMPLEMENT STATUS SWITCH

The implement status switch, Figure 3, is installed near the three point hitch where it can indicate to the control console the position of the implement (raised or lowered).

NOTE: An extension cord is required when the switch is located on a towed implement.

ENGINE RPM SENSOR

The control console requires an input which is related to engine rpm. This input is obtained by installing an rpm sensor, Figure 4. The sensor is attached to the tachometer drive cable.

COMPONENTS

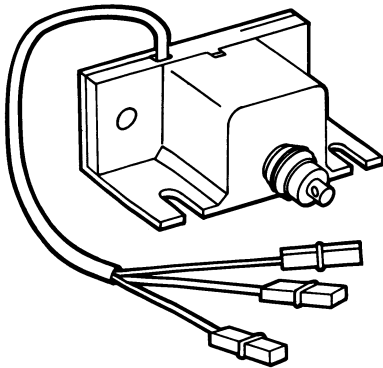


Figure 3
Implement Status Switch

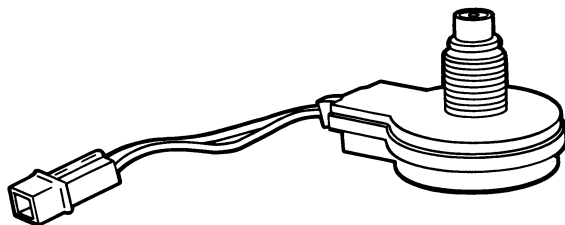


Figure 4
Engine RPM Sensor

WHEEL SPEED SENSOR

The wheel speed sensor is installed in the transmission and senses a gear which has a rotation proportional to wheel speed. This information allows the control console to compute and display percent of wheel slip.

IMPORTANT: *If an arc welder is used on the vehicle or anything connected to the vehicle, disconnect all power and ground leads which provide power to the system. Failure to do so may result in damaged electronic components and will void the warranty.*

GENERAL THEORY AND OPERATION

WHEEL SLIP (% SLIP)

Generally, both tire and equipment manufacturers recommend that there is between 10 and 15% wheel slippage on two wheel drive tractors and 8 to 12% on four wheel drive tractors when pulling a load, when tires get maximum traction and the drive train is not over stressed. If the wheel slippage rises above 15%, tire wear increases, more fuel per acre is consumed and field efficiency goes down. To obtain maximum field efficiency, it is desirable to maintain wheel slippage within the suggested percent slip range.

To obtain a wheel slip reading the control console must be calibrated to a "zero wheel slip condition." This is done by driving the tractor (preferably on a flat, dry surface with the implement raised) at normal operating speed and gear. The console receives the "true" ground speed and tractor wheel speed and calculates and stores a ratio between the two.

Both two wheel drive and four wheel drive tractors use a radar sensor to provide true ground speed for the

console. Both tractors use a sensing unit in the transmission to provide true wheel speed to the console.

After the console has been calibrated to "zero wheel slip condition", the console can determine the ratio between wheel speed and ground speed. This ratio is constantly displayed on the console as a percent of wheel slip.

NOTE: *It is recommended that the console be calibrated to a "zero wheel slip condition" in field conditions the same as where the tractor will be operated. When field conditions change, the console must be recalibrated.*

DISTANCE AND AREA

The Performance Monitor utilizes the radar ground speed sensor and implement status switch to measure distance.

The distance traveled in feet (meters) is gathered when the implement is down, or when the **IMP UP-DOWN** button is used to simulate the implement being

GENERAL THEORY AND OPERATION

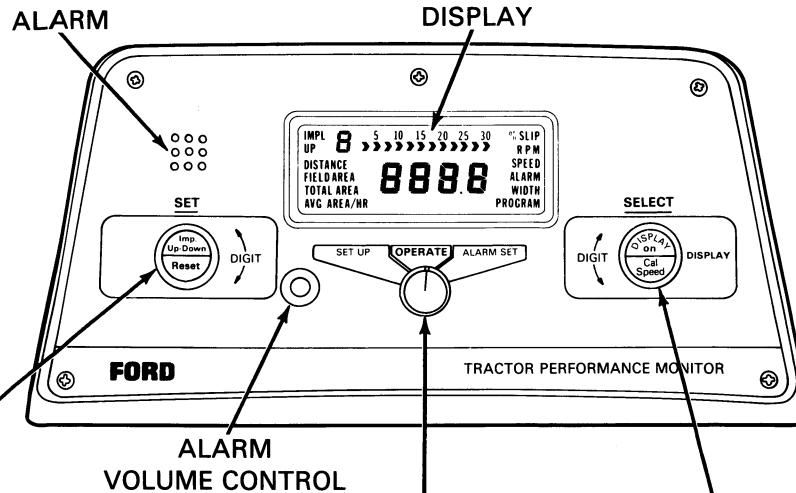
down. When the ground speed calibration is performed, the user measures a 400 ft. (150 meter) course as accurately as possible and the tractor is driven over the course. After this calibration is performed, the control console can measure and display the distance the vehicle travels in feet (meters).

The monitor uses the radar ground speed sensor, implement status switch and user-entered implement width to measure the area covered. When the implement is down, the control console will calculate and accumulate area covered. The console measures the distance traveled and multiplies it by the user-entered implement width. It will update the area displayed, when FIELD AREA is selected, every 5 seconds. The TOTAL AREA function is essentially the same, except

it indicates area covered to the acre instead of to the tenth of an acre.

The AVG. AREA/HR and AREA/HR functions work in the same manner as the other area functions, except the console utilizes an internal clock. The average area per hour is computed from the time the engine was started. The console monitors the area covered with the implement down and divides it by the time elapsed since the engine was started. The average will be displayed when the AVG. AREA/HR function is selected. When the AREA/HR function is selected, the console looks at the area covered in the last 5 seconds, with the implement down, and forecasts the area that will be covered within the next hour if the same speed is maintained.

OPERATOR CONTROLS



<p>ALARM</p> <p>DISPLAY</p> <p>SET CONTROL</p> <p>CENTER PUSHBUTTON (IMP UP-DOWN/RESET)</p>	<p>MODE SELECTOR</p> <p>OPERATE MODE</p> <p>SET UP MODE</p> <p>ALARM SET MODE</p>	<p>SELECT CONTROL</p> <p>CENTER PUSHBUTTON (DISPLAY ON/CAL SPEED)</p> <p>SELECT CONTROL selects the desired display function.</p> <p>CENTER PUSHBUTTON turns on display messages and will silence the out of limits alarm.</p> <p>CENTER PUSHBUTTON used to start and stop SPEED CALIBRATION.</p> <p>SELECT CONTROL positions the digit marker above the digit to be changed.</p> <p>CENTER PUSHBUTTON has no function.</p> <p>SELECT CONTROL positions the digit marker above the digit to be changed.</p>
<p>CENTER PUSHBUTTON controls IMP UP-DOWN function which starts and stops area and distance accumulation.</p> <p>CENTER PUSHBUTTON zeros four digit display.</p> <p>SET CONTROL sets the digit selected to the desired value.</p> <p>CENTER PUSHBUTTON zeros four digit display.</p> <p>SET CONTROL sets the digit selected to the desired value.</p>	<p>OPERATE MODE</p> <p>SET UP MODE</p> <p>ALARM SET MODE</p>	<p>SELECT CONTROL selects the desired display function.</p> <p>CENTER PUSHBUTTON turns on display messages and will silence the out of limits alarm.</p> <p>CENTER PUSHBUTTON used to start and stop SPEED CALIBRATION.</p> <p>SELECT CONTROL positions the digit marker above the digit to be changed.</p> <p>CENTER PUSHBUTTON has no function.</p> <p>SELECT CONTROL positions the digit marker above the digit to be changed.</p>

OPERATOR CONTROLS

DISPLAY MESSAGES (SET UP and ALARM SET MODE)

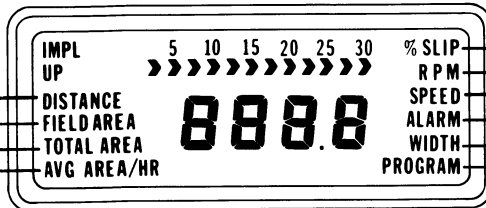
Displayed in the SET UP mode. Four digit display should be RESET to zero before measuring area.

Displayed in the SET UP mode. Four digit display should be RESET to zero before measuring distance.

Displayed in the ALARM SET mode. Two digits of the four digit display can be set to the desired alarm point.

Displayed in the ALARM SET mode. Four digit display indicates engine RPM alarm point in the ALARM SET mode. Display number is operator set.

Displayed in the SET UP mode and ALARM SET mode. Four digit display indicates SPEED calibration number in the SET UP mode and vehicle ground speed alarm point in the ALARM SET mode. Both displayed numbers are operator set.



Displayed in the SET UP mode. Four digit display should be RESET ZERO. **NOTE:** *This display message may be skipped in the initial SET UP sequence; this is not abnormal.*

Displayed in the ALARM SET mode.

Displayed in the SET UP mode. Four digit display indicates implement width (operator entered).

Displayed in the SET UP mode. Four digit display should be RESET to zero before measuring area.

Displayed in the SET UP mode.

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