



An expert on the other end of this telephone line can detect the trouble on 99 percent of the electric tractor problems that demand hotline service, says a spokesman for General Electric.

Tractor Troubleshooting by phone

The introduction of electric tractors for lawn, garden and grounds tasks has brought a new technology into some maintenance shops serving this market. Described here is the manner in which the electronic technology of these machines permits use of telephone for long-distance troubleshooting to shorten repair time.

*"HOTLINE. Lee Freeman."
 "This is Bob Abbey at All Seasons Equipment, Lee. We need your help on an E-15 I've got here. The owner says the acceleration is a little funny."
 "OK, Bob. Is the tractor set up the way we requested for hotline service?"
 "Yes. I've pulled the tractor panels and I'm ready to go."*

All Seasons is only a few miles away but it could be 2,000 miles away from General Electric's Elec-Trak headquarters in Scotia, New York. They are using GE's unique "service hotline." The electric tractor, in for service, is driven close to the phone and the upper control panel and control cabinet cover are removed, exposing coded wires, relays and other circuitry. The phone is held close to this nerve center, and Bob turns

the key and pushes the dashboard speed control forward.

"I'm in neutral, so listen," Bob says.

Since the tractor is electric, Lee Freeman can actually hear the switches, contactors and relays click in and out over the phone as the tractor's controls go through their acceleration mode.

"OK, Bob, you're missing a speed in there. Take your volt-ohm meter and measure the voltage on that plug you see between the two stud terminals on the drive motor. Use your service jumper on the seat safety switch so the motor will run without you on the seat." (Normally a driver must be on the seat for the motor to run).

"I've got the measuring prongs in that plug, Lee."

"Move the speed control forward. Here's the voltage progression you should be getting", and Lee reads off a series of numbers.

"Nope. Lee, it looks like I'm missing fourth speed."

"I know. Take out the three screws holding the speed control, unplug it from the wire harness and check the switches."

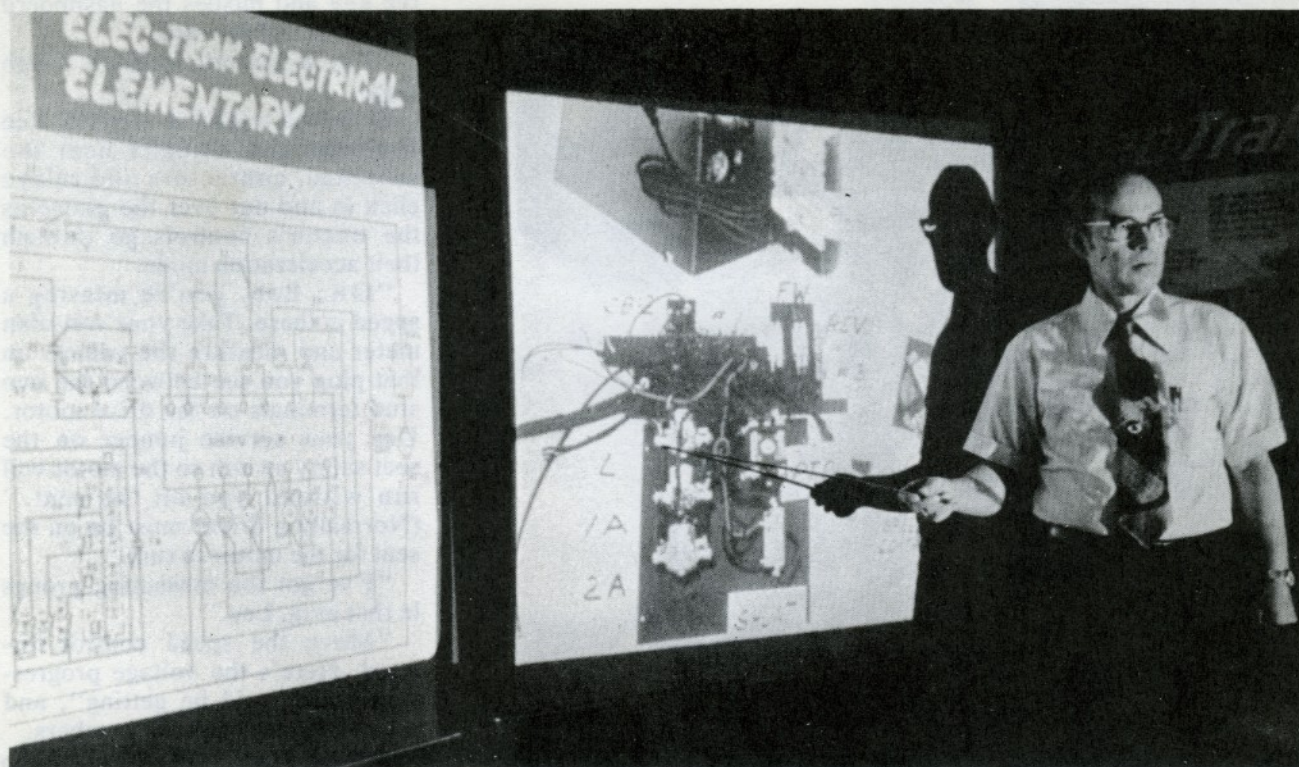
"Yup. It's the fourth switch. Thanks, Lee."

Ten minutes later, Bob Abbey has replaced the switch, plugged it into the harness, replaced the three screws, reinserted the dropped panels. His hands are clean, and the whole job probably took less than 40 minutes. The E-15 tractor's owner now has all seven speeds forward in each of four ranges (28 all told).

General Electric's service hotline puts all franchised Elec-Trak tractor dealers in direct and immediate contact with a service expert at GE's Outdoor Power Equipment Operation, makers of six totally electric tractors and equipment.

Actually, however, the short dialogue in the beginning is not a typical hotline conversation. Why? Missing a speed in a tractor could be diagnosed immediately by any trained dealer, certainly Bob Abbey of All Seasons, an Elec-Trak veteran. The hotline call would have been unnecessary. Before the hotline service is used at all, the dealer taps his own considerable troubleshooting resources: a

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Twin screen slide shows help ease Elec-Trak tractor familiarization. Veteran Product Service Specialist Lee Freeman explains the role of the "L" contactor while on the accompanying screen in the foreground a schematic diagram for the tractor's circuitry is shown.

comprehensive service school thoroughly familiarizes both new and seasoned dealers with the operating characteristics of the tractors; a continually updated product service manual, complete with diagrams, photos and trouble-shooting checklists; product service bulletins, which pass along the latest information gathered in the field and on the hotline.

The heaviest training responsibility is placed on the service schools. Held throughout the United States, these specialized sessions are almost as unique as the hotline because they open up a whole new area of knowledge for dealer service men—that of electrical circuitry.

A typical school runs a very full day starting early in the morning. A short session on paperwork, how to submit it, etc., and the service training begins. A slide presentation describes, in general, the operation of the Elec-Trak tractors, with specific circuit diagrams for older dealers to review, a more simplified overview in the case of the new dealers. Then the work-

shop begins.

The workshop is based on problem solving, and the fastest way to learn is to solve a problem on real equipment. As most of the problems occur in the "nerve center" control cabinet, actual Elec-Trak cabinets detached from tractors are used as the teaching aids. Their lack of noise, lack of grease, and their light weight allow them to be taken and set up almost anywhere.

Eight to ten of these control cabinets are brought to each meeting and placed at stations around the meeting room. Each set of controls has been bugged by the GE representative. Normal Elec-Trak kits are used, and the dealers group around each station, analyzing, locating and solving the problem. Then, on to the next station, to solve the next problem. With this background, reinforced by the product service manual, the wires and circuits become simply and easily identified.

What is typical of the hotline phone conversation is the way in

which it speeds the trouble-shooting and repair. The tractor is designed with electric modules, with most parts of the plug-in type. Unplug the offending part "holder", unscrew it, install the new part, plug it back in: this is the formula that applies to a great many of the control parts.

There are other service features that are unique to the totally electric tractor. Most parts, except the traction motor, batteries, and transaxle, are small and light. They can be easily carried, if necessary for on-site repairs. And they are clean, without residues of crankcase oil, gasoline or grease.

According to GE's dealer surveys, 99 percent of the problems that crop up and demand hotline service are fixed via the phone, a company spokesman said. Obviously, dealers, especially new ones, find it a real asset.

"The service hotline is not inexpensive, but the value to our dealers and customers far outweighs the costs", says Bruce R. Laumeister, general manager. □