When locating cable faults, don't forget that the X should mark the spot.

The X35

Above Ground Fault Locating of Underground Primary Feeders

Technology Enhancement Corporation

TEC

Above Ground Fault Pre-Locating

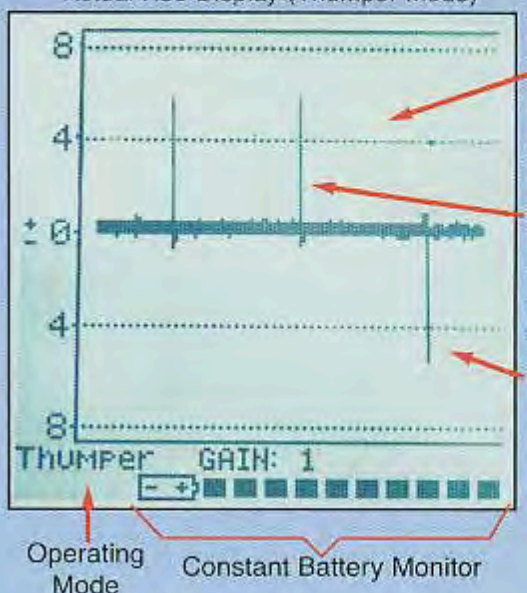
The X35 is a compact hand-held portable above ground met
tracing Test Set signals directly to the fault, entering manho

The X35 is designed to find cable faults from above ground on:

- **Ducted primary distribution systems with many Y, Tee, and transformer connections**
- **Direct buried "unjacketed" primary URD cable**

- *Stop* trying to decipher TDR readings on distribution cable with many branches and transformers...
- *Stop* going manhole to manhole searching for a fault...
- *Stop* trying to listen for faults in noisy environments and flooded manholes when not necessary...
- *Stop* pumping and containing possible manhole contaminants only to find the fault is a mile away...
- *Stop* blocking traffic and moving vehicles just to enter manholes to randomly search for a fault...
- *Stop* subjecting feeders to Test Set high voltage longer than they need to...
- ***Start using the X35.***

Actual X35 Display (Thumper Mode)



X35 Display from DC High-Pot source

Positive Test Set signal indicates you're traveling in the **correct** direction

Negative Test Set signal indicates you're traveling in the **wrong** direction

Operating Mode

Constant Battery Monitor

With good and frequent earth grounding of the feeder sheath, the X35 is designed to identify the manhole where the fault is or the two manholes that the fault lies between. Pin-pointing is possible with direct buried unjacketed URD cable.

Overview

The electric field detected by the X35 is analyzed using advanced state of the art digital signal processing techniques. This process is designed to eliminate background interference and produce an actual "picture" of the DC High Voltage Test Set signal on a high resolution LCD display, indicating amplitude and directional information. The X35 allows a field operator to detect the Test Set signal at street level, entering manholes only for confirmation of the fault location.

Through the use of digital technology, a clear and accurate display of the Test Set signal is presented to the operator. There are no flashing lights to watch, no more bouncing needles, and no cluster of radar reflections to decipher. The advanced processing distinguishes the difference between environmental noise and the Test Set signals and therefore can virtually eliminate false alarms. Over 20 seconds of Test Set signal history is displayed on the X35 (with the ability to freeze the display at anytime) giving an operator a complete understanding of the Test Set current flow (fault direction). Simply hold the X35 over the feeder (parallel and pointing toward the Test Set source) along its route and at branches, and the unit will indicate the direction of the fault.

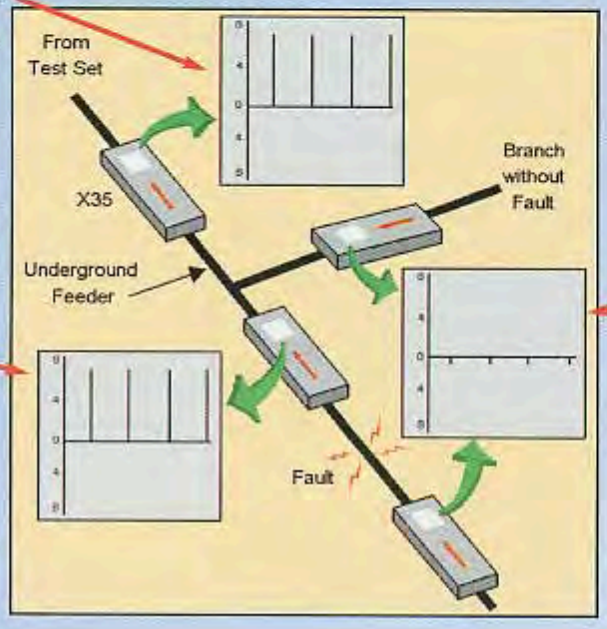
Flooded manholes or snow covered streets? Not a problem. The X35 is designed to pick up the Test Set signal through just about any environmental condition. There is no need to pump manholes or clear away snow. In fact, the X35 will display the Test Set signal from underwater cable in shallow lakes and bays and provide tracing of the feeder when its route is unknown.

r which enables field operators to pre-locate feeder faults by
es only for confirmation of the fault location.

Typical X35 Fault Locating Scenario with a Thumper...

1 Measurements are generally made with the X35 beginning near the Test Set and working outward. A positive Test Set (Thumper) signal displayed on the X35 indicates that the operator has still not reached the fault. A negative or near complete loss of the signal indicates that he has passed the fault or taken a wrong branch. When the operator encounters a Y or Tee in the feeder, a positive reading going in indicates that the fault is down one of those branches. A simple reading is then taken above each of the branches to determine which route to take to get to the fault.

2 When the X35 is held over the "faulted" branch of the feeder, a large positive reading will be displayed to the user indicating that he is going in the correct direction.



3 When the X35 is held over an "unfaulted" branch of the feeder, the display will indicate a near complete loss of the signal or a negative signal. The low level signal (when compared with the faulted branch signal) indicates that the operator is either not on the faulted branch of the feeder or past the fault.

Benefits

- **Designed to provide directional information along the cable route and at every Y and Tee to direct field operators to the faulted cable section**
- **Reduce the time to find faults, save money, reduce outage time, and reduce the risk of cascaded failures**
- **Reduce the opening and entering of manholes**
- **Reduce pumping**
- **Reduce environmental concerns**
- **Simple to use, no difficult lights, needles or sounds to interpret**
- **Minimize the time the feeder is subjected to high voltage discharges**
- **Pre-locate faults from above ground**

Flexibility

Regardless of the Test Set configuration you want to use, the X35 will support above ground tracing. Use the X35 with a standard Thumper to provide directional (polarized) information to the fault. Want to trace burn current? Just press the mode switch and select "Thyratron" operation. The X35 will display the sensed current pulse that you can follow to the fault. Want to simply use a High-pot (proof test)? Not a problem. A touch of a button and the X35 will allow you to trace a simple DC high voltage breakdown.

Speed Repairs

The X35 is the answer for today's fault locating needs on primary distribution systems with many Y, Tee, and transformer connections that demand fast and accurate repair. The X35 not only reduces the number of manholes that have to be entered, but also minimizes the time to localize the fault, which significantly limits the amount of time the feeder is subjected to high voltage discharges. The quick fault pre-locating time translates to significant cost savings and reduced cable stress.

Specifications

• **Supported Test Set**	Thumpers (12uF capacitor or greater suggested), Thyratron (burn current), High-Pot (DC high voltage proof test)
• **Operating Frequency**	50/60 cycles (Must specify when ordering)
• **Gain**	3 digital settings for optimal performance (does not affect display)
• **Diagnostics**	Built in One-Touch comprehensive diagnostics
• **Switches**	Large, rugged, high contrast, membrane switches with tactile feedback
• **Display Type**	Extended temperature, high resolution, 16384 pixel graphic LCD
• **Display History**	21 seconds of Test Set signal history
• **Display Illumination**	Transflective technology for direct sunlight viewing or night viewing with built-in backlight
• **Operating Temperature**	-4 to +122 degrees F (-20 to +50 C)
• **Moisture Rating**	NEMA 4 rated
• **Battery Type**	Four user replaceable AA Cells (LR6, Alkaline only)
• **Operating Current**	135mA (display light off)
• **Operating Time**	Approximately 10 hours in continuous operation (display light off)
• **Battery Check**	Continuous monitoring, bargraph displayed on LCD, auto shutdown
• **Dimensions**	9.9" L x 4.8" W x 2.0" H (25.2 cm x 121.9 cm x 5.1 cm)
• **Weight (w/batteries)**	1.75 lbs. (0.8 kg)

When ordering, please specify the configured output polarity of your DC High Voltage Test Set (positive or negative), and whether the X35 is to be used on a 50 or 60 cycle system.

Technology Enhancement Corp.
1115 Inman Avenue, Suite 332
Edison, New Jersey 08820

Corporate: (908) 757-5888
e-mail: sales@tecpower.com
web site: www.tecpower.com

on

ISO 9001 Compliant

Because Technology Enhancement Corporation has a policy of continuous product improvement, we reserve the right to change design and specifications without notice. Licensed under one or more of the following United States Patents: 5,570,028.

Printed in USA **July 1999**