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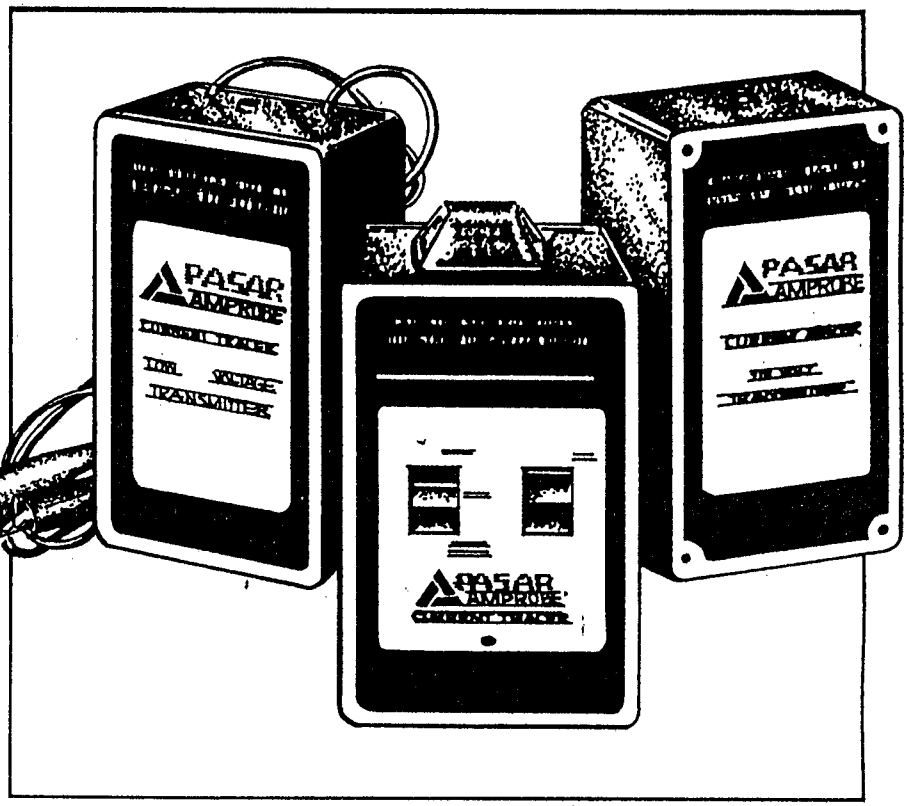

CT23-10B

Current Tracer

Instruction Manual

PASAR AMPROBE
DIVISION OF CORE INDUSTRIES INC. LYNBROOK, NEW YORK 11563
630 MERRICK ROAD, P.O. BOX 329
Area Code 516-593-5600
FAX (516) 593-5602

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Made in USA

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INTRODUCTION

THEORY OF OPERATION

The Amprobe Pasar Current Tracer allows fast, safe and easy location or tracing of energized conductors, on 9-600V circuits, without turning off power or interrupting sensitive electronic equipment. The Current Tracer consists of two Transmitters, a high and a low voltage model, and a Probe. The Transmitters draw short bursts of high frequency current from the power line. The Probe senses the resulting magnetic field surrounding the conductors that supply power to the Transmitter.

To operate, simply plug in or attach the Transmitter to the conductor to be identified. The Transmitter draws a 1/4 amp peak load signal at a frequency one hundred times higher (6 KHz) than the power line (60 Hz). The hand held Probe containing custom hybrid filtering and signal conditioning networks will visually and audibly indicate which circuit is carrying the high frequency load signal.

The Transmitter's signal is current drawn from the power source. Therefore, the signal will travel from the Transmitter to the source of power (the power generating station) and back on the neutral, totally unaffected by distance. It's quick, easy, and safe to use!

With the Current Tracer, you can trace any energized conductor, neutral line or ground line from any location in a facility back through main distribution panels, through transformers and switch gear. Without interrupting power, you can locate:

Circuit breakers	**Short circuits**
Feeder lines	**Conduit**
Panel boxes	**Utility Boxes**
Neutral and ground lines	**Branch lines**

COMPONENTS

Your Current Tracer Carrying Case contains a T10 and/or a T23 Transmitter, a Probe (with battery), a pigtail connector, and optional voltage converter.

T23 Transmitter

The T23 Transmitter is designed for tracing 50-140 volt AC or DC circuits. To operate, plug the Transmitter into any standard 110/120 volt electrical outlet. If there isn't a convenient standard outlet, just use the pigtail connector provided in your carrying case.

When connected properly, the red light located on the top of the Transmitter will begin to blink. This indicates that the Transmitter is drawing the high frequency load signal from the conductor.

HINTS: The T23 Transmitter may be used on 140-280 volt AC or DC circuits. Utilizing the pigtail connector, the Transmitter can be connected from one hot side on the line to the neutral or ground. This should provide the T23 Transmitter with approximately 110/120 volts. Always check the voltage with a voltmeter first to be sure.

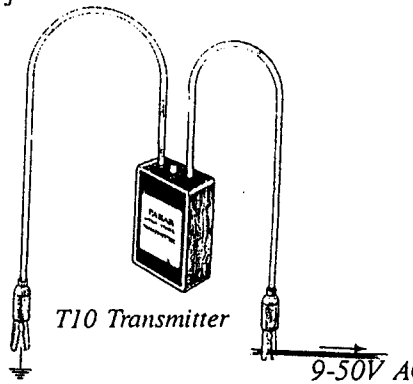
T23 Transmitter

T10 Transmitter

The T10 Transmitter is designed for tracing 9-50 volt AC or DC circuits. It is equipped with two leads. To operate the Transmitter, clip the first lead to a non-adjacent ground. Clip the second lead to the conductor in question.

When connected properly, the red LED located on the top of the Transmitter will begin to blink. This indicates that the Transmitter is drawing the high frequency load signal from the conductor.

Both Transmitters house a digital crystal controlled circuit that will never need adjustment.



T10 Transmitter

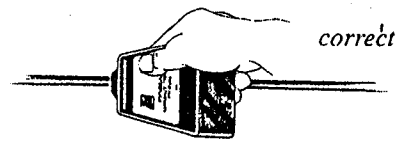
9-50V AC/DC

P23 Probe

The P23 Probe is a tuned, magnetic field strength meter. When waved over conductors or circuit breakers, the magnetic sensor in the Probe's tip identifies the conductor supplying power to the Amprobe Pasar Transmitter.

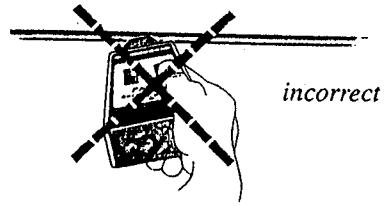
The Probe is tuned to the 6.25KHz frequency on that conductor. So, as the Probe gets closer to the appropriate conductor, the 10-position LED display will light in sequence from left to right. At the same time, the beeping sound will increase. This is called signal strength. The stronger the signal, the more lighted LEDs and beeping sounds.

For best results, always hold the Probe's tip perpendicular to the conductor. And remember to set the Range Switch in the appropriate position as indicated in this manual.



correct

P23 Probe



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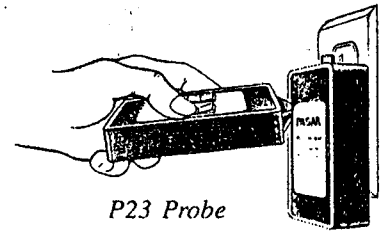
Test Position



P23 Probe

T23 Transmitter

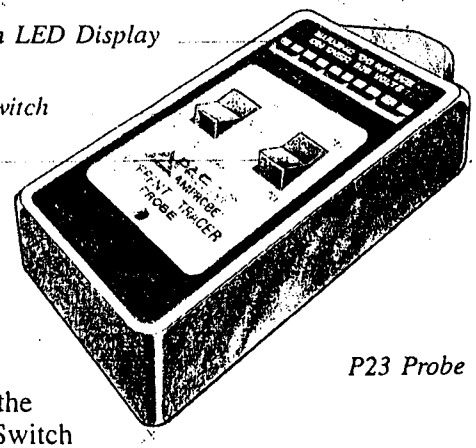
To test the Probe, press the ON/OFF switch to ON. Then touch the tip to the front/center of the T10 or T23 Transmitter. In the SCAN position 10 LEDs will light indicating that the Probe is working correctly.

Probe Tip

10 Position LED Display

Range Switch

ON/OFF Switch

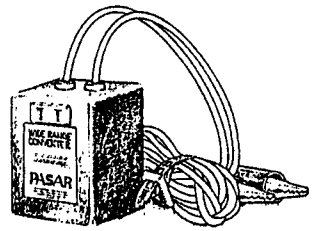


P23 Probe

The following chart describes the Probe's Range Switch

RANGE SWITCH	APPLICATION	RELATIVE GAIN
Wires	Locate conductor in bundle Locate conductor entering a breaker switch	Most selective X1 Gain
Circuit Breakers	Locate individual circuit breaker switches	X2 Gain
Scan	Locate conductors in walls, floors and conduit Locate correct breaker box	Most sensitive X25 Gain 10 LEDs light in test position

600CK Wide Range Converter



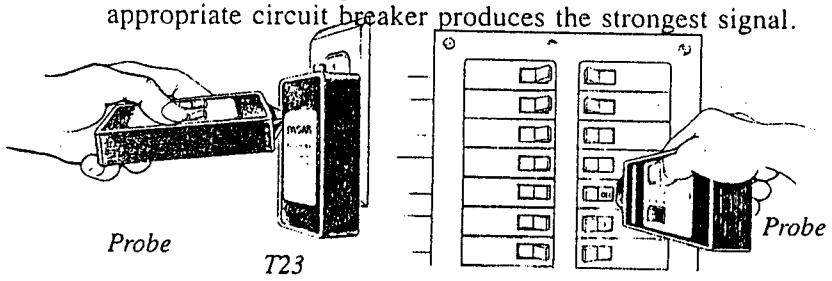
Do not connect the T23 Transmitter to voltages above 140 volts AC or DC. For applications 140-600 volts AC, use the Wide Range Converter with the T23 Transmitter. The Wide Range Converter is a hybrid transformer system which is specially designed to eliminate reduction of the Transmitter's signal while operating at high voltages. It is equipped with a receptacle for plugging the T23 Transmitter into two leads for attachment to conductors, and a switch for selecting either 140-300 VAC or 300-600 VAC.

APPLICATIONS

LOCATING CIRCUIT BREAKERS

In areas where loss of power to a circuit will not cause damage, you can locate a circuit breaker without removing the panel cover.

1. Plug the T23 Transmitter into an outlet. Or, attach with the pigtail connector to the conductors you need to identify.
2. Press the Probe's Range Switch to SCAN.
3. Hold the Probe's ON/OFF Switch ON.
4. Ensure that the Probe is operational by holding it perpendicular to the Transmitter and observing the LEDs blink.
5. Hold the Probe's tip to each box and observe the probe's signal strength. The appropriate box produces the strongest signal.
6. Open the circuit breaker box door.
7. Press the Probe's Range Switch to CIRCUIT BREAKER.
8. Hold the Probe's ON/OFF Switch ON.
9. Hold the Probe's tip to each circuit breaker as shown. The appropriate circuit breaker produces the strongest signal.



Locating Circuit Breakers

If you are working in a hospital, industrial setting, around computers, or sensitive electronic equipment, you can locate the appropriate circuit breaker without turning off power to the other circuits.

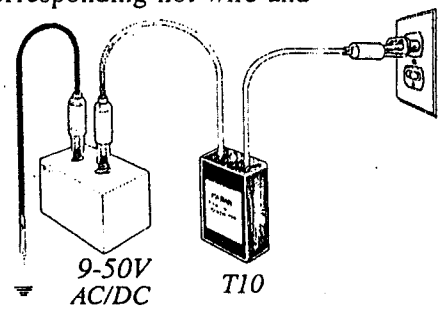
1. Follow steps 1 through 5 above.
2. Remove the cover of the circuit breaker box.
3. Press the Probe's Range Switch to WIRES.
4. Hold the ON/OFF Switch ON.
5. Hold the Probe's tip to the wires leading to each circuit breaker. The appropriate wire produces the strongest signal.
6. Visually follow the wire to the appropriate circuit breaker.

HINTS: The Probe actually detects the electromagnetic field surrounding the conductors which supply power to the Transmitter. This is caused by the high frequency load signal the Transmitter draws. The circuit breaker itself does not cause the signal.

LOCATING OPEN BREAKERS

1. Clip one of the T10 Transmitter leads to the neutral conductor at a location that does not have power.
2. Clip the other lead to a 9-50 volt AC or DC power source.
3. Using your own dual alligator clip, ground the power source.
5. Press the Probe's Range Switch to WIRES.
6. Hold the Probe's ON/OFF Switch ON.
7. Hold the Probe and trace the neutral wire to the appropriate circuit box.
8. Remove the panel cover.
9. Visually locate the neutral's corresponding hot wire and circuit breaker.

Use a voltmeter to determine which breaker is open if there is more than one hot line in the conduit.



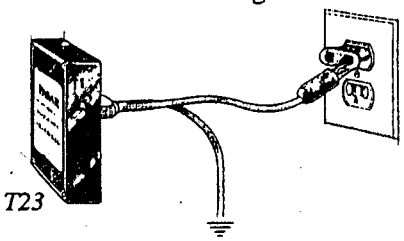
Locating Open Breakers

LOCATING WIRES IN WALLS

1. Plug the pigtail connector into the T23 Transmitter.
2. Clip one lead to a separate earth ground such as a water pipe.
3. Clip the other lead to the hot conductor.
4. Press the Probe's Range Switch to SCAN.
5. Hold the ON/OFF Switch ON.
6. Hold the Probe's tip close to the wall or floor where you suspect the conductor is located.
7. Sweep the Probe across large areas until the Probe's signal locates the conductor.

HINTS: The same procedure may be used for tracing individual wires in bundles, etc.

CAUTION: Always connect the Transmitter to ground first to avoid getting "shocked".

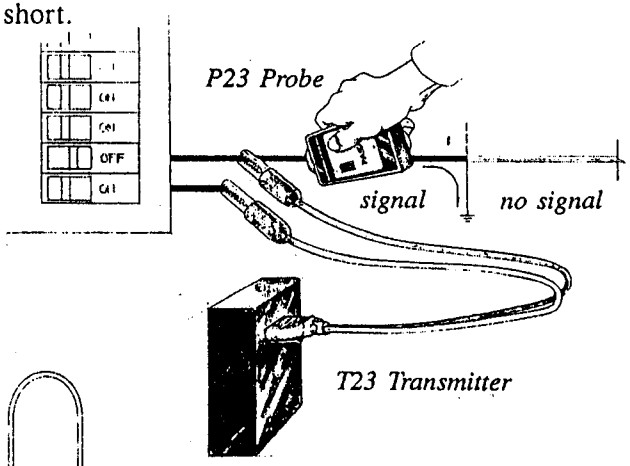


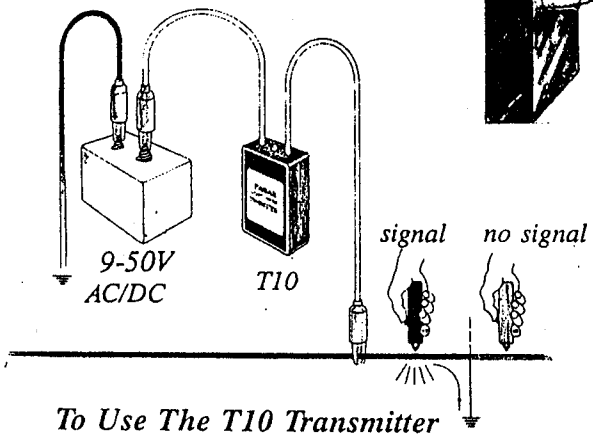
Locating Wires in Walls

LOCATING SHORTS

To Use The T23 Transmitter

1. Find the affected breaker panel and make sure the switch is in the OFF position.
2. Plug the pigtail connector into the T23 Transmitter.
3. Clip one lead to the shorted power line.
4. Clip the other lead to the hot conductor of an adjacent breaker.
5. Press the Probe's Range Switch to SCAN.
6. Hold the ON/OFF Switch ON.
7. Hold the Probe's tip close to the shorted wire.
8. Trace the wire until the signal suddenly stops. This is the location of the short.





Locating Shorts

To Use The T10 Transmitter

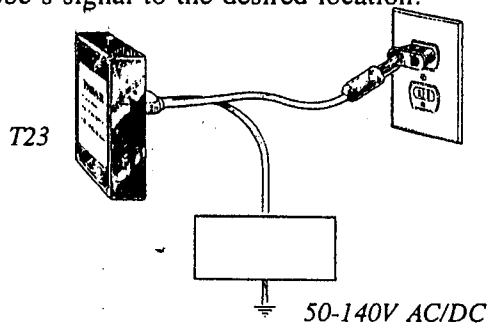
1. Clip one of the T10 Transmitter's leads to the shorted power line.
2. Clip the other lead to a grounded 9-50 volt AC or DC power source.
3. Follow steps 5 through 8 above.

HINTS: Since the signal should be fairly constant until you locate the short, you may have to adjust the Range Switch to a more selective gain level setting such as WIRES.

LOCATING GROUND OR NEUTRAL WIRES

To Use The T23 Transmitter

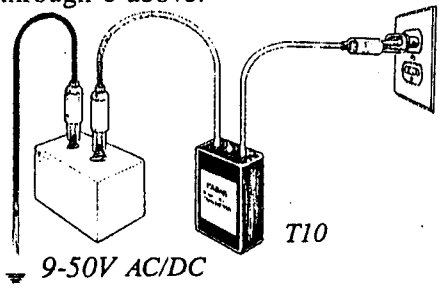
1. Plug the pigtail connector into the T23 Transmitter.
2. Clip one lead to the outlet ground or neutral.
3. Clip the other lead to the hot side of a grounded 50-140 volt power source. An extension cord that is plugged into a powered outlet works well. The Transmitter's LED should blink to indicate that it is operational.
4. Press the Probe's Range Switch to SCAN.
5. Hold the ON/OFF Switch ON.
6. Follow the Probe's signal to the desired location.



Locating Ground or Neutral Wires

To Use The T10 Transmitter

1. Clip one of the T10 Transmitter's leads to the outlet ground or neutral.
2. Clip the other lead to a grounded 9-50 volt AC or DC power source.
3. Follow steps 4 through 6 above.

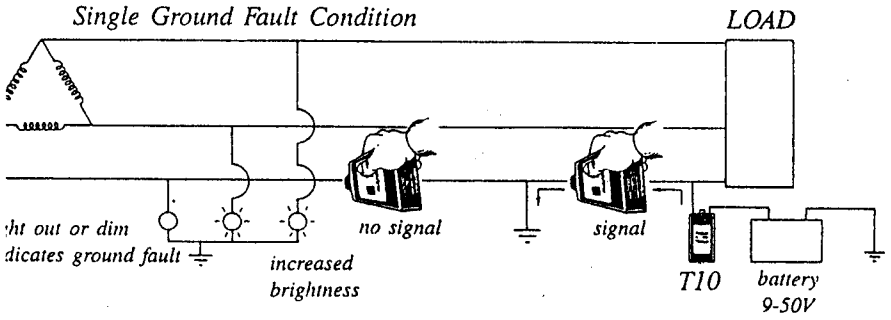


LOCATING SHORTS TO GROUND ON POWER SYSTEMS

1. Clip one lead of the T10 Transmitter to the shorted conductor at some point in the system or power line.
2. Clip the other lead to a grounded 9-50 volt AC or DC power source.
3. Press the Probe's Range Switch to SCAN.
4. Hold the ON/OFF Switch ON.
5. Trace the Probe's signal along the wire in both directions from the T10 Transmitter. The signal will go directly to the short.

HINTS: Connect the ground path far enough away from the shorted conductor so that it does not interfere with the signal. For example, when tracing a signal inside conduit, you would not want to use the conduit as a ground path.

CAUTION: High voltage may exist, exercise extreme caution.

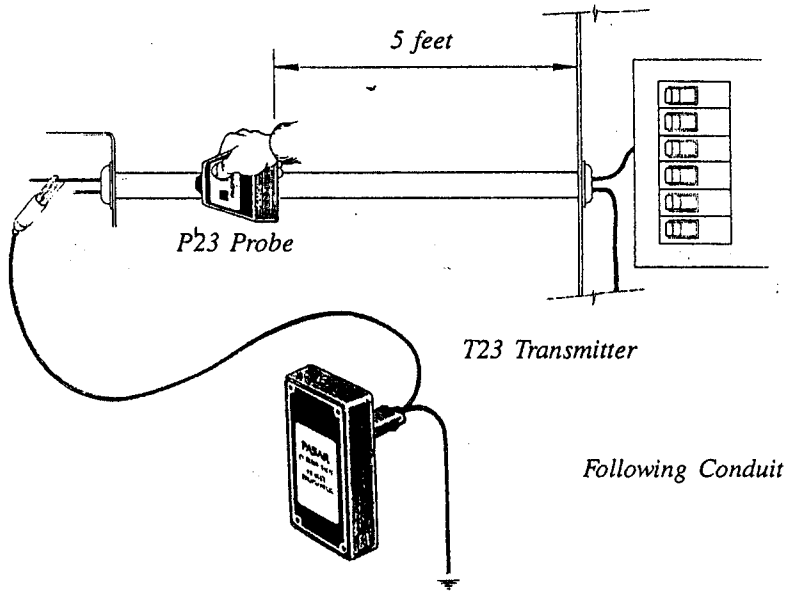


Locating Shorts to Ground on Power Systems

FOLLOWING CONDUIT

1. Plug the pigtail connector into the T23 Transmitter.
2. Clip one lead to a separate earth ground such as a water pipe or sprinkler system.
3. Clip the other lead to the hot conductor.
4. Follow the Transmitter's signal as explained in the LOCATING WIRES IN WALLS section.

HINTS: Since the feeder panel may radiate a magnetic signal to nearby conduit, make sure the Probe is always more than 5 feet from the circuit breaker box.
Also, although plastic and aluminum conduit do not affect the signal, thick steel conduit may reduce the signal strength.

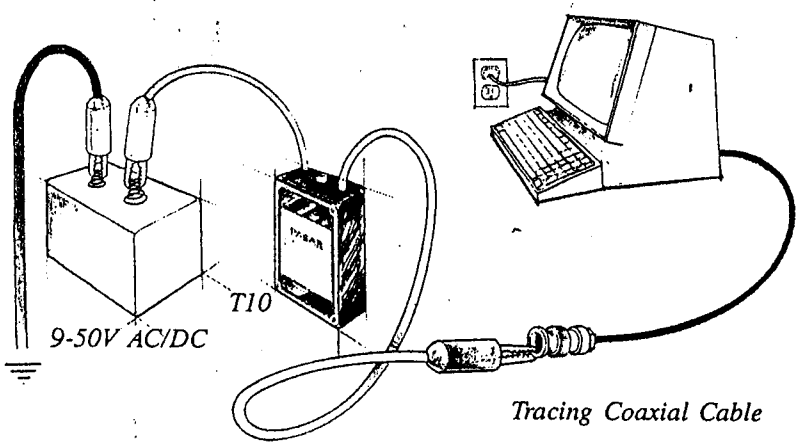


Following Conduit

TRACING COAXIAL CABLE

1. Clip one lead of the T10 Transmitter to the shield on the coaxial cable.
2. Clip the other lead to a grounded 9-50 volt AC or DC power source.
3. Follow the Transmitter's signal as explained in the LOCATING WIRES IN WALLS Section.

HINTS: Make sure the shield on the coaxial cable is at ground potential.



Tracing Coaxial Cable

TRACING PLUMBING

1. Clip one lead of the T10 Transmitter to the pipe you want to trace.
2. Clip the other lead to a grounded 9-50 volt AC or DC power source.
3. Press the Probe's Range Switch to SCAN.
4. Hold the Probe's ON/OFF Switch ON.
5. Hold the Probe's tip to each pipe. The appropriate pipe will produce the strongest signal.

HINTS: Remember you are tracing the current path to ground. If the pipe has many ground connections, the signal may be confusing.

HIGH VOLTAGE APPLICATION

1. Measure the voltage between phases with a voltmeter.
2. Switch the 600CK Wide Range Converter to the appropriate voltage range.
3. Plug the T23 Transmitter into the 600CK Converter.
4. Clip the Converter's leads between any two of the phases.
5. Follow the Transmitter's signal as explained in the LOCATING CIRCUIT BREAKERS or LOCATING WIRES IN WALLS Section.

APPENDIX

QUESTIONS & ANSWERS

What type of power does the Transmitter require to operate?
There are two models of Transmitters available. The T-23 Transmitter will operate from 50 to 140 volts AC or DC. The T-10 Transmitter will operate from 9 to 50 volts AC or DC. Both Transmitters will operate at any line frequency up to and including 400 Hz.

What happens if I connect the Transmitter to the wrong voltage?
There is a fuse that will protect the Transmitter from damage.

Why not put a battery in the Transmitter so that it could be used without power to the line?
If the Transmitter were battery operated, it would be injecting a signal into the line instead of drawing the signal from the line. An injected signal travels throughout the system making it difficult to locate a particular circuit breaker or line.

How far will the signal travel?
The Transmitter signal is current drawn from the power line. Therefore, it will travel from the Transmitter to the source of power and back on the neutral, totally unaffected by distance.

What about neutral lines?
Neutral lines may also be traced since the magnetic signal normally returns to the Transmitter on the neutral line.

Is the Transmitter signal affected by transformers?
The Transmitter signal can pass through transformers, and is affected only by the step-up or step-down ratio of the transformer. For example, if the signal passes through a 2 to 1 step-down transformer, the signal will be reduced by one half.

Will the Transmitter signal affect any sensitive electronic equipment?
No. This signal is only one quarter amp peak and produces less noise than a home dimmer switch. Only the Current Tracer Probe can detect this signal.

How do I trace 208V or 240V 3 phase power lines?
The 140 to 600 Volt Converter can be used with the 50 to 140 volt Transmitter. Or, with the pigtail connector provided, the Transmitter can be connected from one hot side on the line to the neutral or ground. This should provide the T23 Transmitter with approximately 110/120 volts. Always check the voltage with a voltmeter first to be sure.

Why do I have to make a separate ground connection to the Transmitter when tracing conductors through walls, floors or conduit?
The Transmitter causes current to flow in the "hot"conductor and the neutral or ground conductor. These two currents are alike but flow in opposite directions, and therefore they create opposing electromagnetic fields. When the two conductors are within close proximity, their electromagnetic fields tend to cancel each other. This reduces the field strength and decreases the Probe's ability to detect either conductor.

Will the Current Tracer trip a ground fault detector?
Ground fault detectors will trip when the Transmitter is connected to ground.

What if I get the same reading on two different breakers?
Due to differing designs of circuit breakers the panel cover may need to be removed to accurately locate the correct breaker. The Probe actually detects the electromagnetic field surrounding the conductor which supplies power to the Transmitter. This is caused by the high frequency load signal the Transmitter draws. The circuit breaker itself does not actually cause the signal.

Is the Probe sensitive to noise?
Noise on the power lines will have little effect on the Current Tracer. However, under extreme conditions noise may cause LEDs to light. This will not interfere with use of the Probe because the Transmitter's signal will continue to pulse at its normal rate while noise will remain at a constant level or a flicker without a pulse. In rare situations, you may have to turn off the equipment causing the noise.

Can I connect the Transmitter at the fuse or breaker panel and identify the receptacle for that circuit?
No, the Transmitter draws current from the source of power, the signal will only exist on the conductors between the source of power and the Transmitter.

What is the maximum distance from a conductor that the Probe can detect a signal?
In the most sensitive position (SCAN), the LEDs will begin to illuminate approximately 2-3 feet from the conductor. A full scale LED reading will be achieved at approximately 4-5 inches from the conductor. An audio indication will begin prior to the illumination.

What is the life expectancy of this unit?
The Current Tracer is made with only high quality components. This unit should last well over ten years with normal use.

Is the Current Tracer a quality product?
- Digital design
- Crystal controlled Transmitter
- Special proprietary hybrid circuit
- Advanced signal filtering circuits
- High noise rejection
- Top quality components (Switches, ICs, LEDs, etc.)
- Trim, durable design with laminated plastic label printed under plastic to eliminate wear
- Transmitter circuit thermal fuse protected
- Probe incorporates 3 levels of insulation to protect the user.
- Manufactured in USA

MAINTENANCE

To replace the 9 volt battery in the Probe, the 250 volt 1/16 amp slow blow fuse in the T23 Transmitter, or the 250 volt 1/4 amp normal blow fuse in the T10 Transmitter:
1. Disconnect the Transmitter from the power source. Always do this before opening the case.
2. Remove the four cover screws on the appropriate device.
3. Remove the cover and change the battery or fuse.
   CAUTION: Always use a fuse of the same voltage and current ratings.
4. Replace the cover and reinstall the four screws.

The T23 Transmitter is protected by a 250 volt 1/16 amp slow blow fuse. The T10 Transmitter is protected by a 250 volt 1/4 amp normal blow fuse. When the Transmitter is connected to power, the LED will blink with a pulse rate of 1.3 seconds. If the LED does not blink there are three possible problems:
1. There is improper voltage on the line.
2. The fuse is open due to over voltage.
3. The transmitter is not operating properly. Send it to Amprobe Pasar for repair.

LIMITED WARRANTY

Your AMPROBE PASAR instrument has a limited warranty against defective materials and/or workmanship for two years from date of purchase, provided in the opinion of the factory, the instrument has not been tampered with or taken apart. Should your instrument fail due to defective materials and/or workmanship during the two year period, return it along with a copy of your dated bill of sale which must identify your instrument by model number and serial number.

Above limited warranty covers repair and replacement of the instrument only and no other obligation is stated or implied. AMPROBE PASAR shall not be liable for any loss or damage arising out of the use or misuse of this product.

For your protection, please use this instrument as soon as possible. If the unit is damaged or is ever in need of repair, please call Pasar, Inc. at (303) 337-6300 to obtain a Return of Materials Authorization (RMA) number. The unit must then be securely wrapped to prevent further damage in transit, insured and sent along with a proof of purchase to:

AMPROBE PASAR
Service Division
2422 South Trenton Way
Denver, CO 80231

Outside of the U.S.A., your AMPROBE PASAR representative will assist you.

SPECIFICATIONS

GENERAL

Operating Frequency	6.25 KHz
Operating Temperature	0°F to +120°F
Storage Temperature	−40°F to +150°F

TRANSMITTER T23

Duty Cycle	Will Transmit for .164 Second Every 1.3 Seconds Digital Crystal Controlled Circuit
Operating Voltage	50-140 Volts AC or DC
Operating Frequency	6.25 KHz
Maximum Load	1/4 Amp Peak at 110 Volts
Fuse	1/16 Amp Slow Blow Type
Case	Flame Resistant ABS Plastic

PROBE P23

60 Hz Rejection	150 db
400 Hz Rejection	100 db
Power	9 Volt Alkaline Battery
Battery Life	100 Hours (with normal use)
Case	Flame Resistant ABS Plastic

GAIN SETTINGS ON PROBE

Range Switch	Relative Gain
Wires	x1
Circuit Breakers	x2
Scan	x25

TRANSMITTER T10

Duty Cycle	Will Transmit for .164 Second Every 1.3 Seconds Digital Crystal Controlled Circuit
Operating Voltage	9-50 Volts AC or DC
Operating Frequency	6.25 KHz
Maximum Load	1/4 Amp Peak at 9-50 Volts
Fuse	1/4 Amp Normal Blow
Case	Flame Resistant ABS Plastic