■ WIRE MAPPER PRO
LAN CABLE TESTER

CA7028

ENGLISH **User Manual**

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Statement of Compliance

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments certifies that this instrument has been calibrated using standards and instruments traceable to international standards.

We guarantee that at the time of shipping your instrument has met its published specifications.

The recommended calibration interval for this instrument is 12 months and begins on the date of receipt by the customer. For recalibration, please use our calibration services. Refer to our repair and calibration section at www.aemc.com.

Serial #: _____

Catalog #: 2127.82

Model #: CA7028

Please fill in the appropriate date as indicated:

Date Received: _____

Date Calibration Due: _____

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Chauvin Arnoux®, Inc.
d.b.a AEMC® Instruments
www.aemc.com

Table of Contents

INTRODUCTION

⚠ Warning ⚠

- This instrument meets the safety requirements of IEC61010-1.
- The Model CA7028 is designed for use on de-energized circuits only.
- Connection to line voltages will damage the instrument and could be hazardous to the operator.
- This instrument is protected against connection to telecom network voltages according to EN 61326-1.
- Safety is the responsibility of the operator.

1.1 International Electrical Symbols

This symbol signifies that the instrument is protected by double or reinforced insulation. Use only specified replacement parts when servicing the instrument.

This symbol on the instrument indicates a WARNING and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.

Risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.

1.2 Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. Notify your distributor of any missing items. If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once, giving a detailed description of any damage. Save the damaged packing container to substantiate your claim.

1.3 Ordering Information

Wire Mapper Pro Model CA7028 ***(Discontinued)***..... **Cat. #2127.82**

No Longer Available for Purchase - No Replacement

Includes meter, carrying case, remote ID (#1), 2 patch cords, 4 x 1.5 AA batteries and a user manual.

PRODUCT FEATURES

2.1 Description

The Wire Mapper Pro is a hand-held structured cable tester and trouble-shooter designed for use on UTP, STP, FTP & SSTP cabling equipped with RJ45 connectors and wired to either TIA 568A/B (ISO11801 & EN50137), USOC or ISDN specifications. It detects open circuit pairs, shorts, crossed wires, crossed pairs, reversed pairs, shield faults and split pairs.

In the event of opens and shorts, the Wire Mapper Pro uses TDR technology to indicate if the fault is at the near end of the cable, the remote end, or if it is somewhere in between. It will then indicate the distance to the fault.

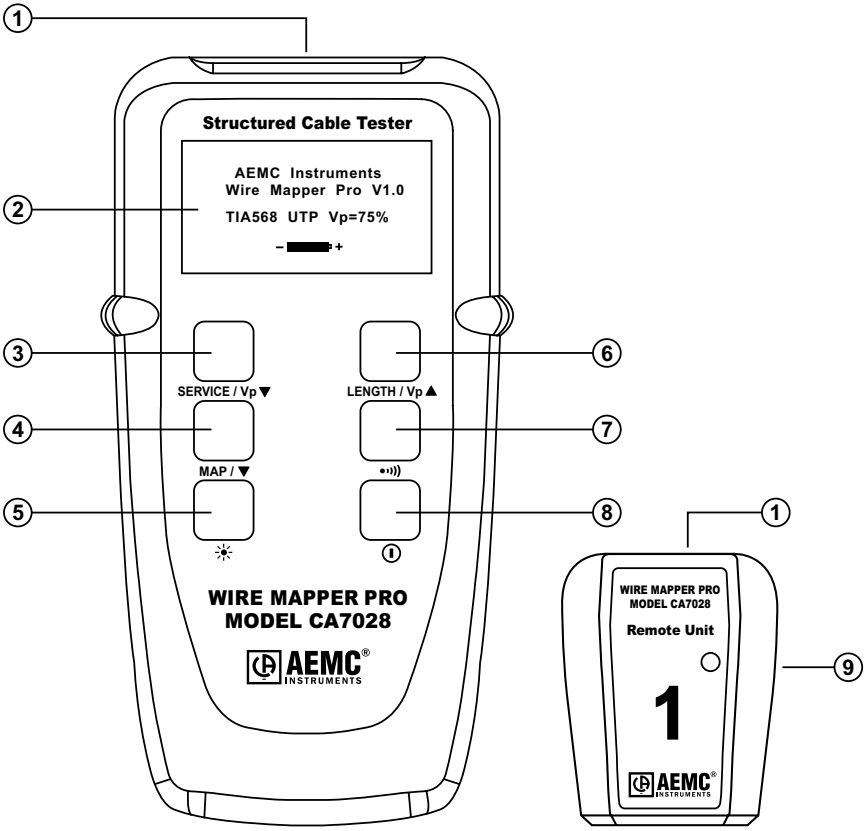
The Wire Mapper Pro has the ability to measure and indicate the length of the cable under test, using a Vp (Velocity of Propagation), set by the user. It will measure and report the length of all 4 pairs of wires in the cable under test. It also generates an audible tone that is transmitted into all 4 pairs on the cable under test. This can be used for cable tracing and identification.

This instrument also has the ability to identify telephone and data lines. If the main unit is plugged into an operational RJ45 socket, it will give a continuous warning tone and appropriate display if a telephone voltage is present on any of the pins. If the Service Detect key is pressed, it will give a display distinguishing 10base-T, Token Ring and 100Mbit+ connections.

Features:

- Hand-held cable and troubleshooting tester
- Designed for use on UTP, STP, FTP & SSTP cabling equipped with RJ45 connectors and wired to either TIA568A/B (ISO11801 & EN50137), USOC or ISDN specifications.
- Detects open circuit pair, shorts, crossed wires, crossed pairs, reversed pairs, shield faults and split pairs.
- Indicates location of the fault
- Measures and indicates the length of the cable under test
- Emits an audible tone, used to trace a cable and identify the type of fault
- Identifies telephone and data lines
- Up to 16 Remote IDs identified

2.2 Wire Mapper Pro Features



1. RJ-45 input connector
2. Graphical LCD
3. Service Test/Vp (Velocity of Propogation) decrement button
4. Wire map test/function select button
5. Backlight button
6. Cable Length Test/Vp (Velocity of Propogation) increment button
7. Tone generator select button
8. Power ON/OFF button
9. Remote ID Unit

SPECIFICATIONS

Range:	500 ft (150m)
Accuracy:	±5%
Cable Types:	UTP, STP, FTP & SSTP
Faults Indicated:	Short Circuit Pair Open Circuit Wire Short Between Pairs Split / Cross Pairs Pair Reversals Shield Continuity
Fault Location:	Near end, remote end, or distance if midway
Wiring Schemes:	TIA 568A/B, USOC & ISDN
Service Indication:	Telephone, 10BaseT, 100Mbit+, Token Ring
Voltage Warning:	Warns of TNV (Telecom Network Voltage) presence
Test Inhibit:	Inhibits testing in the presence of live voltages
Tone Generator:	Tone generator (oscillating) 810 to 1110Hz
Main Unit Display:	128 x 64 pixel Graphical LCD
Fault Display:	All fault and setting info displayed textually and graphically
Display Backlight:	Electroluminescent
Remote Display:	Green/Red LED
Languages:	English (USA and UK), German, French, Spanish, Portuguese, Italian
Power Source:	4 x 1.5V AA alkaline batteries

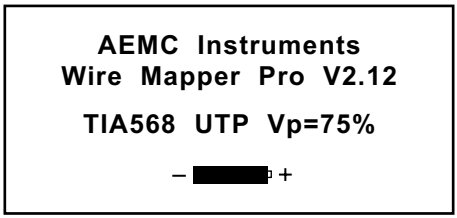
Auto Power Off:	after 3 minutes
Battery Life:	Standby mode >4000hrs Continuous testing >7.5hrs
Storage Temperature:	-4 to 158°F (-20 to 70°C) 5 to 95% RH non-condensing
Operating Temperature:	32 to 112°F (0 to 40°C) 5 to 95% RH non-condensing
Main Unit Weight:	12 oz (350g)
Main Unit Dimensions:	6.5 x 3.5 x 1.5" (165 x 90 x 37mm)
Remote Weight:	1.5 oz (40g)
Remote Dimensions:	2.5 x 2.0 x 1.0" (65 x 52 x 25mm)
Safety:	IEC 61010-1
EMC:	EN 61326-1
CE:	Compliant with current EU directives
ESD:	EN 61000-4-2
EM:	EN 61000-4-3
Burst:	EN 61000-4-4
Conducted RF:	EN 61000-4-6

All specifications are subject to change without notice.

OPERATION

4.1 Getting Started

The instrument is switched on and off using the green power button ⏻ found on the lower right side of the front panel.



When the unit is first switched on, it will display the opening screen giving the software version and remaining battery capacity.

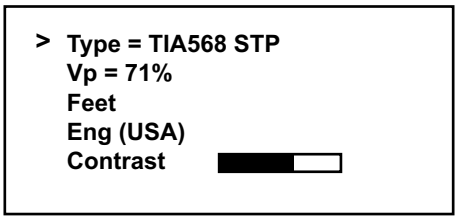
The wire type (TIA568, STP...) and the Vp (Velocity of Propogation) is also displayed. To change these settings, see § 4.2 below.

4.2 Cable/Network Type and General Setup

To enter a menu for Cable and Network selection:

- Press down on the •)))) button, then press the **MAP / ▼** button.

Typical display:



The **>** (line selector) is moved by pressing the **MAP / ▼** button. When the appropriate line is selected, the **SERVICE / Vp ▼** and **LENGTH / Vp ▲** buttons may be pressed to increment or decrement through the alternative options for the selected item.

- Under **Type**, the following selections can be made:

TIA568 STP TIA568 UTP ISDN USOC UTP USOC STP

NOTE: For testing of wiremap in accordance with ISO11801 & EN50137 the product should be set to TIA568 which is the equivalent standard.

For FTP and SSTP cables use the STP setting.

- Vp is selectable in the range 20% to 100%.
  (see § 4.3 if the Vp is not known)
- The Wire Mapper Pro may be set to measure cable length in feet or meters.
- The instrument may be set to operate in English (USA or UK), French, German, Italian, Spanish or Portuguese.
- The display contrast may be set by selecting **Contrast** and then pressing the **SERVICE / Vp▼** button to **decrease** the contrast or the **LENGTH / Vp▲** button to **increase** the contrast and optimize the display to the ambient lighting conditions. The unit also has a display backlight.
- To exit set up mode, press the •ı)) button.

4.3 Determining and Measuring Vp Values

Vp, or Velocity of Propagation, values are characteristic of each cable type and brand. The Vp is used to measure the length of a cable and to measure a fault location. The more accurate the Vp, the more accurate the measurement result will be.

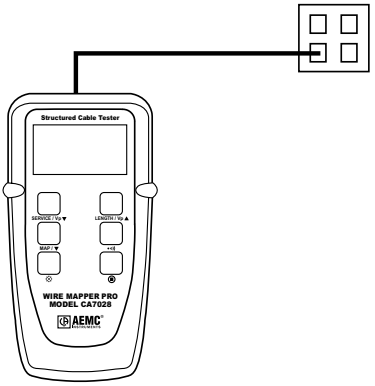
The cable manufacturer may list the Vp on their specification sheet or may be able to provide it when asked. Sometimes this value is not readily available, or the user may wish to determine it specifically to compensate for cable batch variations, or for special cable applications. This is quite easy:

1. Take a cable sample of exact length increments (ft or m) longer than 60ft (20m).
2. Measure the exact length of the cable using a tape measure.
3. Connect one end of the cable to the Wire Mapper Pro (see § 4.11). Leave the end un-terminated and make sure the wires do not short to each other.
4. Measure the length and adjust the Vp until the exact length is displayed.
5. When the exact length is displayed, Vp is established.

4.4 TNV (Telecom Network Voltage) Testing and Warning

The Wire Mapper Pro is designed to work on non-energized circuits only. Make sure that the circuit to be tested is not live before mapping.

Turn the unit on and plug it into the port to be tested with a short patch cord.



If a Telecom Network Voltage is present, the unit will give a continuous audible warning, and display the following:

! ! ! !
Telephone Voltage
detected on
Pin X
! ! ! !

NOTE: The pin on the RJ45 connection, on which the voltage is detected, is displayed.

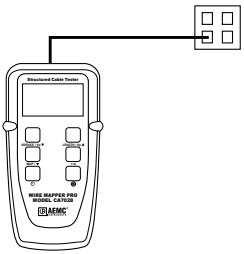
In the event of a TNV (Telecom Network Voltage) Warning, the unit should immediately be disconnected and testing stopped, since it is not designed for testing on live networks.

4.5 Service Detection

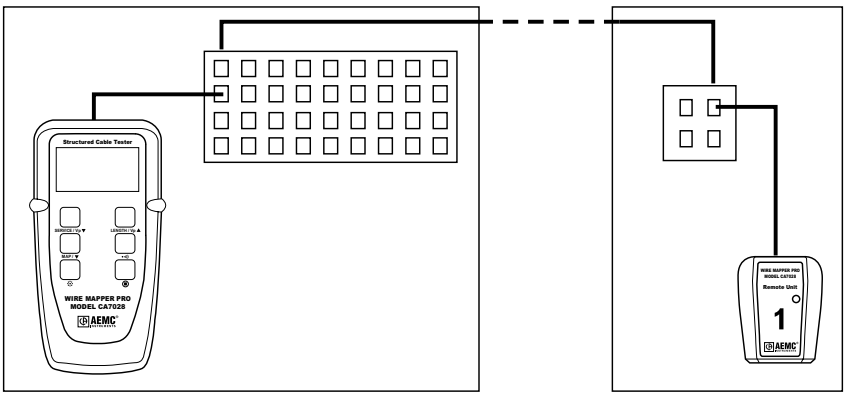
To detect an active data port, plug the unit into the port to be tested using a short patch cable and press the **SERVICE / Vp ▼** button.

The display will show the type of data connection or service present from the following list:

Token Ring	10base T
100Mbit+	No Service
Unknown Service	



4.6 General Operation



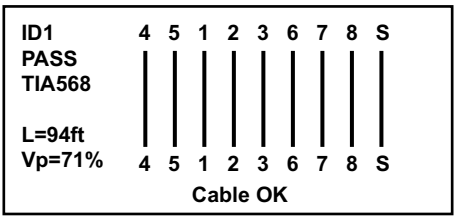
- Set the instrument to the desired cable type and wiring scheme (see § 4.2).
- Make sure no Telecom Network Voltages or other services are detected (see § 4.4).
- Attach the instrument to one end of the cable to be tested
- Attach the remote unit to the other end of the same cable
- Press the **MAP / ▼** button.

The display will briefly show the following message while testing is being performed:

This screen is quickly followed by the test results screen.

- Test Pass/OK Screen
- Test Failed Screen

4.7 Test Pass/OK Screen



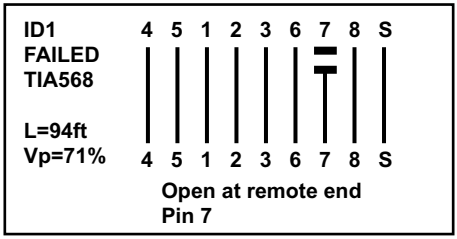
When testing ISDN wiring, any resistive terminators should be switched out of the circuit or disconnected. Failure to do so could lead to erroneous test results.

- The left side of the display shows information about the test performed and the status of the test result.
- The first line shows the unique identity of the active remote unit connected to the far end (in this case, ID1). There are 15 additional active remote units available as optional accessories (ID#2 to ID#16).
- The test status, **PASS** is indicated on the second line. A test PASS is confirmed by a double beep from the main unit and a double green flash on the LED of the active remote unit.
- Next, information about the test type selected, along with a measured value of the cable length, and an indication of the current VP setting is displayed.
- If a fault is found an appropriate message will be displayed, along with a warning tone on the main unit, and a red flashing LED on the remote unit.

4.8 Test Failed Screen

4.8.1 Open and Short Fault

In the event of an **Open** fault, the following is displayed:

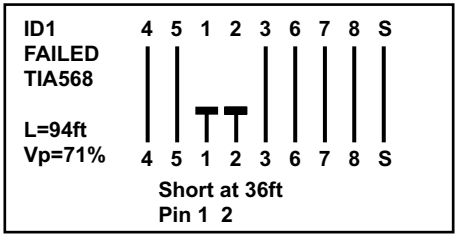


Notice the word **FAILED** under the cable ID1 and also the detailed message at the bottom of the display.

The graphical portion of the display also shows that the fault is an open on pin 7 at the remote end by showing a break in the line at this point.

> **NOTE:** In the event that an open or short circuit fault occurs at either end of a cable or link under test, the unit will show the fault as at the near end or the remote end. These faults are the most common and are mainly due to termination problems.
>
> If the fault occurs some way along the cable or link under test, then a display similar to the one shown below will occur. Notice, that on this occasion the actual measured distance to the fault is given.

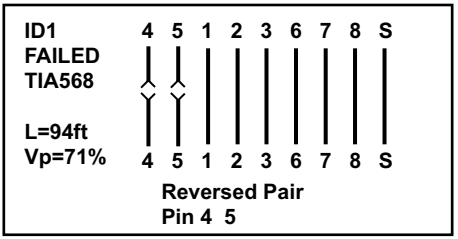
In the event of a **Short** fault, the following is displayed:



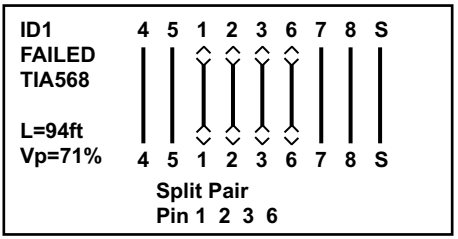
In this situation, the graphical portion of the display also shows that the fault is a short between pins 1 and 2 and the short is drawn at an approximation to the distance along the cable or link under test, at which it occurs.

4.8.2 Reversed and Split Pair Fault

In the event of a **Reversed Pair** fault, the following is displayed:



In the event of a **Split Pair** fault, the following is displayed:



NOTE: For cables less than 6 ft (2m) in length the tester is unable to distinguish a Split Pair condition.

In this event (cable too short), the following screen is displayed briefly, before the screen to warn the user that a Split Pair test has not been carried out.

4.9 Multiple Faults

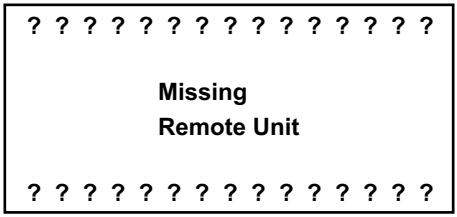
In the event of a multiple fault, or a cable or link with more than one fault on it, the tester will report the faults in the following order of priority.

- Shorts
- Reversals
- Opens

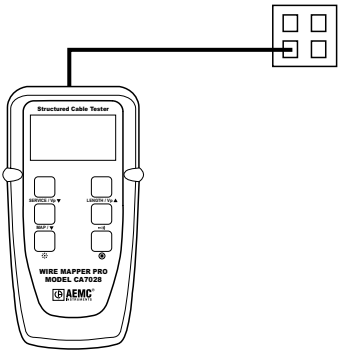
For example, on a cable with an Open on pin 3 and a Short between pins 7 and 8, only the Short in pins 7 and 8 will be reported.

4.10 Missing Remote

If a wire map test is performed without a remote unit connected at the far end, the following screen will be displayed:



4.11 Cable Length Measurement



> **The remote unit does not need to be attached for this test to be performed. Although it does not matter if it is attached, any terminators on ISDN wiring or sockets should be switched out of the circuit or disconnected.**

Attach the main unit to one end of the cable and press the **LENGTH / Vp▲** button.

The length of all four pairs in the cable are measured, and the results displayed simultaneously, as shown below.

Pr.	**4-5**	**64ft**
Pr.	**1-2**	**64ft**
Pr.	**3-6**	**-----**
Pr.	**7-8**	**64ft**

TIA568 UTP Vp=71%

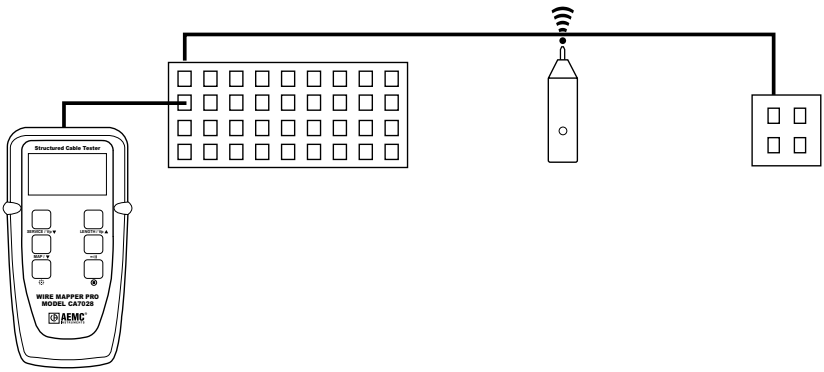
In this example, the length of pair 3 - 6 is missing, as there is a fault on the pair which is preventing the TDR circuit from measuring the length.

Length will be displayed in the selected units, either meters or feet, and the Vp and cable testing standard will also be displayed. Length measurement accuracy depends on the correct setting of the Vp (Velocity of Propagation) for the cable under test.

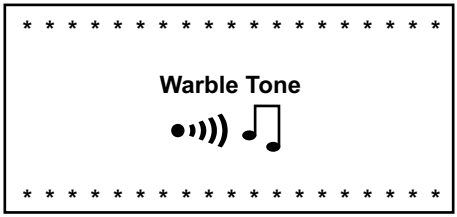
If the Vp is not known for a particular cable, then a known length of that cable (at least 60ft or 20m long) may be connected to the instrument and the Vp adjusted until the correct length reading is obtained (see § 4.3).

4.12 Tone Generator

The Wire Mapper Pro may also be used as a tone generator, to trace and identify cables and wires. The user will need a cable tone tracer, such as the AEMC Tone Receiver/Cable Tracer Model TR03 (Cat. #2127.76).



Pressing the •)))) key will inject a warbling (oscillating) tone into the cable or link under test. When set, the following will be displayed:



The injected signal oscillates between 810Hz and 1110Hz, six times per second.

NOTE: The auto-off function is disabled in Tone Generator mode, so that the tone can be injected into a cable for an extended period of time while tracing takes place.

4.13 Backlight

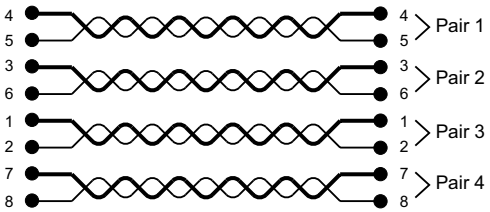
The display backlight is switched on and off with the ☀ button.

WIRE PROTOCOL

The following drawings are examples depicting cable faults:

CABLE OK (OK)

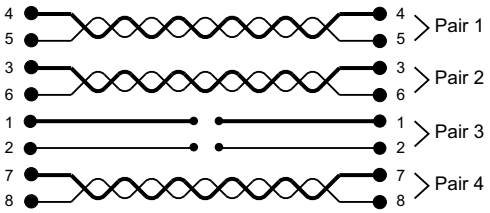
Cable is good.



Message: Cable OK

OPEN PAIR (OP)

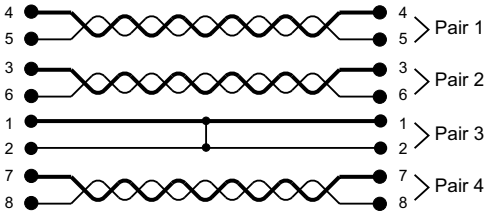
One specific pair is open. It may be one or two wires in the same pair. One or more pairs may also be opened in the same cable.



Message:
Open at Near End or Remote End
Pin 1 2

SHORTED PAIR (SH)

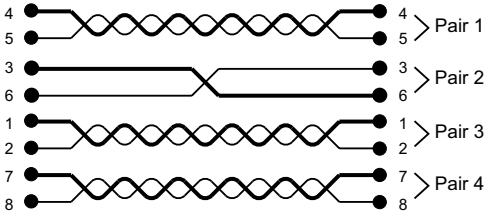
One specific pair is shorted.



Message:
Short at Remote End or Near End
Pin 1 2

REVERSED PAIR (RP)

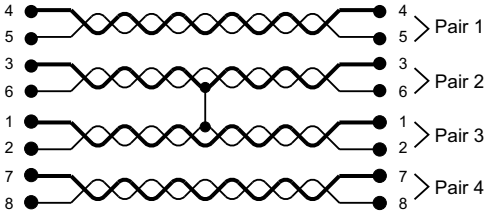
The wires in one specific pair are reversed at one end.
One or more pairs may be reversed in the same cable.



Message:
Reversed Pair
Pin 3 6

SHORTED WIRES (SW)

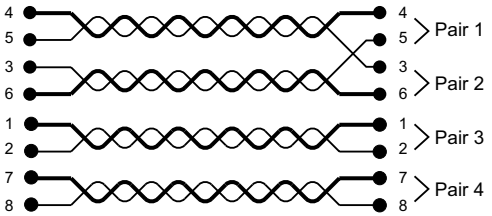
Two wires from different pairs are shorted.
Two or more wires and pairs may be affected in the same cable.



Message:
Short at Remote End or Near End
Pin 2 3

CROSSED WIRES (CW)

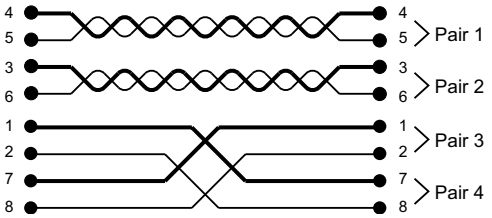
Two wires from different pairs are crossed at one end.
Two or more pairs may have wires crossed with another pair.



Message:
Crossed Wires
Pin 3 5 at Remote End or Near End

CROSSED PAIRS (CP)

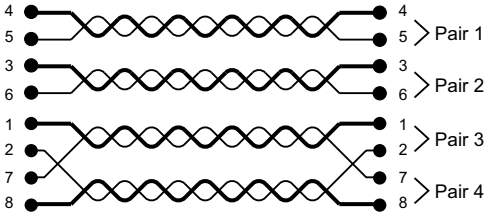
Two pairs are crossed at one end.
Two or more pairs may be crossed in the same cable.



Message:
Crossed Pairs
Pin 1 2 7 8

SPLIT PAIRS (SP)

One pair uses one wire from another pair. The cable will work, but cross-talk may occur. Two or more pairs in the same cable may be split.



Message:
Split Pairs
Pin 2 7

MAINTENANCE

Use only factory specified replacement parts. AEMC® will not be held responsible for any accident, incident, or malfunction following a repair done other than by its service center or by an approved repair center.

6.1 Changing the Battery

⚠ **Disconnect the instrument from any cable or network link.**

1. Turn the instrument OFF.
2. Loosen the 2 screws and remove the battery compartment cover.
3. Replace the batteries with 4 x 1.5V AA alkaline cells, observing the polarities.
4. Reattach the battery compartment cover.

6.2 Cleaning

⚠ **Disconnect the instrument from any source of electricity.**

- Use a soft cloth lightly dampened with soapy water.
- Rinse with a damp cloth and then dry with a dry cloth.
- Do not splash water directly on the instrument.
- Do not use alcohol, solvents or hydrocarbons.

6.3 Storage

If the instrument is not used for a period of more than 60 days, it is recommended to remove the batteries and store them separately.

Repair and Calibration

To ensure that your instrument meets factory specifications, we recommend that it be scheduled back to our factory Service Center at one-year intervals for recalibration, or as required by other standards or internal procedures.

For instrument repair and calibration:

You must contact our Service Center for a Customer Service Authorization Number (CSA#). This will ensure that when your instrument arrives, it will be tracked and processed promptly. Please write the CSA# on the outside of the shipping container.

Ship To: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
15 Faraday Drive
Dover, NH 03820 USA
Phone: (800) 945-2362 (Ext. 360)
(603) 749-6434 (Ext. 360)
Fax: (603) 742-2346 or (603) 749-6309
E-mail: repair@aemc.com

(Or contact your authorized distributor)

Costs for repair and standard calibration are available.

NOTE: You must obtain a CSA# before returning any instrument.

Technical and Sales Assistance

If you are experiencing any technical problems, or require any assistance with the proper operation or application of your instrument, please call, mail, fax or e-mail our technical support team:

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
200 Foxborough Boulevard
Foxborough, MA 02035 USA
Phone: (800) 343-1391
(508) 698-2115
Fax: (508) 698-2118
E-mail: techsupport@aemc.com
www.aemc.com

NOTE: Do not ship Instruments to our Foxborough, MA address.

Limited Warranty

The Wire Mapper Pro Model CA7028 is warranted to the owner for a period of two years from the date of original purchase against defects in manufacture. This limited warranty is given by AEMC® Instruments, not by the distributor from whom it was purchased. This warranty is void if the unit has been tampered with, abused or if the defect is related to service not performed by AEMC® Instruments.

Full warranty coverage and product registration is available on our website at www.aemc.com/warranty.html.

Please print the online Warranty Coverage Information for your records.

What AEMC® Instruments will do:

If a malfunction occurs within the warranty period, you may return the instrument to us for repair, provided we have your warranty registration information on file or a proof of purchase. AEMC® Instruments will, at its option, repair or replace the faulty material.

REGISTER ONLINE AT:
www.aemc.com

Warranty Repairs

What you must do to return an Instrument for Warranty Repair:

First, request a Customer Service Authorization Number (CSA#) by phone or by fax from our Service Department (see address below), then return the instrument along with the signed CSA Form. Please write the CSA# on the outside of the shipping container. Return the instrument, postage or shipment pre-paid to:

Ship To: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
15 Faraday Drive • Dover, NH 03820 USA
Phone: (800) 945-2362 (Ext. 360)
(603) 749-6434 (Ext. 360)
Fax: (603) 742-2346 or (603) 749-6309
E-mail: repair@aemc.com

Caution: To protect yourself against in-transit loss, we recommend you insure your returned material.

NOTE: You must obtain a CSA# before returning any instrument.

NOTES:

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