PCA-4125
POWER COMMUNICATIONS ANALYZER

DATA SHEET

All-In-One Instrument for Power Line Carrier & Audio Tone Testing

FUNCTIONS

- Selective Level Meter
- Signal Generator
- VSWR Meter
- Impedance Analyzer
- Frequency Response Analyzer
- Oscilloscope

APPLICATIONS

- Power Line Carrier Alignment & Maintenance
- Line Trap Alignment & Test
- Line Tuner Alignment & Test
- PLC Transmitter & Receiver Test & Set-up
- Audio Tone Protective Relay Channel Test & Set-up

INTRODUCTION

The PCA-4125 was designed to provide a single instrument solution for the Electric Utility System Protection Engineer and Relay/Communications Technician responsible for the alignment and maintenance of Power Line Carrier and Audio Tone Communications Systems. This multifunction instrument replaces all 4 existing Power Line Carrier Instruments in one for a fraction of the cost, all in a compact lightweight package.

APPLICATION HIGHLIGHTS

LINE TRAP TESTING

The PCA-4125's Impedance Analyzer provides the technician a frequency versus impedance curve directly on the display. The technician can view the curve representing the resonant frequency and adjust the trap and tuning packs while viewing the changes in a real time environment, without having to adjust the meter. Since the PCA-4125 is also a LCR Meter, test lead length and separation is no longer a concern. Now the technician can attach long leads to the mounted trap and perform testing while still on the ground, by simply compensating for the capacitance in the leads with the press of a button.

LINE TUNER TESTING

The PCA-4125 provides a single instrument solution for adjusting the Tuner's Series inductor and Impedance Matching transformer for minimum reflected power. The 4125 uses an impedance comparison to provide this accurate measurement. In SWR mode, a single screen displays the frequency under test, the forward power level, the reflected power level and the % reflected power. The 4125's VSWR functionality is a significant improvement over the previous 3 instrument solution.

TRANSMITTER/RECEIVER TESTING

The PCA-4125's wide frequency range (5Hz to 5MHz) is ideal for setting transmitters and receivers on Power Line Carrier, Audio Tone or Analog Baseband Microwave systems. The high level output provides up to 2 watts into 50 Ohms for Power Line Carrier applications, while the low level output is ideal for work on audio tone and microwave systems. The PCA-4125 is equipped with multiple inputs providing solutions for many applications. For the Power Line Carrier user, a high level, high impedance input capable of up to 150Vrms can handle any standard transmitter output in the field today with no external attenuator required. A terminated 18W (50 or 75 Ohm) input is ideal for setting most transmitters and it can also serve as a dummy load.

KEY FEATURES

DATA & EVENT RECORDING

Many of the PCA-4125's test functions will provide the technician invaluable information that can be used for future reference in verifying the state in which the equipment was tested and aligned. An internal 1 Gigabyte of storage and external USB memory stick compatibility provides the user a versatile solution for storing and retrieving field data. Internal time and date stamping used in conjunction with standard PowerComm Solutions forms will help your company document the characteristics of your individual Power Line Carrier elements system wide.

FIELD READY

Designed for the substation environment, the PCA-4125 is manufactured in a rugged aluminum housing and equipped with a rotating handle. This provides for easy transport and table top angle viewing. The PCA-4125 uses a state of the art 5.7" Color Display to maximize visibility in all conditions, including full sunlight. A welcome alternative to the present multi-unit bulky solutions, the PCA-4125's tablet size (12"x9"x1.75") and relatively light weight (5lbs) provides a compact solution that can become the technician's primary diagnostic tool. In addition to operating off internal rechargeable batteries and an AC adapter, the PCA-4125 is also designed to operate off of an external supply or 12V vehicle battery standard.

SPECIFICATIONS

SELECTIVE LEVEL METER	
Frequency Range	5Hz to 5MHz
Frequency Accuracy	±5ppm over all temperature range
Magnitude Accuracy	±0.05% range ± 0.05% reading ± 1%/MHz
Inputs (Unbalanced) Type & Connection	differentially isolated & isolated BNC
Measurement Bandwidths	25Hz 100Hz 600Hz 1.95kHz 3.1kHz Wideband
HIGH VOLTAGE INPUT	
Max Input	150V rms
Input Impedance	1MΩ ±5% // 30pF
50Ω INPUT (select 50 or 75 Ohm)	
Max Input	18W (30V rms)
Input Impedance	50Ω ±1% // 30pF
75Ω INPUT (select 50 or 75 Ohm)	
Max Input	18W (37V rms)
Input Impedance	75Ω ±1% // 30pF
LOW LEVEL UNBALANCED INPUT	
Max Input	5V rms
Input Impedance	50Ω ±1% // 30pF 75Ω ±1% // 30pF 600Ω ±1% // 30pF 1MΩ ±5% // 30pF
CH2 INPUT (same as Low level)	
BALANCED INPUT	
Max Input	5V rms
Input Impedance	50Ω ±1% // 30pF 75Ω ±1% // 30pF 600Ω ±1% // 30pF 1MΩ ±5% // 30pF
Input Type	differential
Input Connection	3 x 4mm connectors - positive, negative, and ground

SIGNAL GENERATOR	
Generator Type	Direct Digital Synthesis (DDS), single frequency or sweep
Generator Waveforms	sinewave, square, triangle, white noise
Frequency Accuracy	±5ppm over all temperature range
Magnitude Accuracy	±1% ±1%/MHz
HI LEVEL OUTPUT (select 50 or 75 Ohm)	
Frequency Range	10kHz to 5MHz
Output Level	2W into 50Ω (10V rms)
Output Impedance	50Ω ±2% 75Ω ±2%
LO LEVEL OUTPUT	
Frequency Range	5Hz to 5MHz
Output Level	7V rms into high impedance
Output Impedance	50Ω +/-2% max +18 dBm 75Ω +/-2% max +16 dBm 600Ω +/-2% max +7 dBm
Frequency Shift Delay Timer	0 to 1s (1ms steps)

IMPEDANCE ANALYZER	
Impedance Range	100 milliOhm to 100 kiloOhm
Accuracy	+/- 0.2% + 2%/MHz
Features	LCR Measurements (Inductance, Capacitance, Resistance, tan delta, QF)
	Lead compensation (zero lead function)
	Frequency versus Impedance Curve

OSCILLOSCOPE	
Sample Rate	5 Msamples/s
Timebase	5µs/div to 5s/div
Trigger	auto, normal or single shot
Pretrigger	none, 25%, 50%, 75%
Inputs Ranges	as per Selective Level Meter

VSWR METER	
Accuracy	1% of reading up to 1MHz 5% of reading above 1MHz to 5MHz for power measurements (forward and reflected) at VSWR = 3.
Features	Forward Power, Reflected Power, % Reflected Power, & Frequency under test visible on one screen.

GENERAL SPECIFICATIONS	
Interface	USB, RS232, LAN
Set-up and Data Storage	Up to 100 analyzer set-ups or readings can be stored
Real time clock	Time and Date Stamp for data stores
Data Storage	Internal 1Gb flash memory, external USB memory stick
Display Type	5.7" ¼VGA color high brightness backlight
Display Resolution	6 digit frequency, 5 digit voltage, 4 digit dBm
Size	approx 12" x 9" x 1.75" "tablet" style
Power source	9 – 18V ~1A @ 12V + charge current AC adapter or 12V dc from car or external batteries
Battery type	10 x AA size NiMH
Battery life	approx 2 hours
Temperature range	-5 to +50°C

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