

THE FCA-Series
FLEXIBLE CURRENT PROBES

OPERATING MANUAL

OM-FCA-FLEX-051022

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1.0 INTRODUCTION

This manual includes operating instructions for the FCA-Series flexible current probes.

2.0 WARRANTY

The AYA-Instruments products are warranted against defects in workmanship and material for a one-year period after the date of purchase. During this period, AYA-Instruments will repair or replace, at its own option, any components found to be defective under normal use. AYA's obligation under this warranty is limited only to repairing any such instrument, which, in AYA's opinion, is found to be defective within the scope of the warranty when returned to the factory or to an AYA authorized service center. Transportation to and from the main office or the service center will be paid by the purchaser. Buyer shall pay all duties and taxes for products returned to AYA or to its service center from another country. Shipment can be made only after receiving a **Returned Material Authorization** from AYA.

This warranty will not apply to products repaired or modified by persons not authorized by AYA or not in accordance with instructions furnished by AYA. If the product is found to be defective as a result of misuse, improper repair or abnormal operating conditions, operation outside the environmental specifications of the product, or improper installation or maintenance, repairs will be billed at cost. AYA assumes no liability for secondary charges or consequential damages associated with the misuse of its products. **DISASSEMBLY OF THE CURRENT PROBE AUTOMATICALLY VOIDS IT WARRANTY.**

3.0 GENERAL DESCRIPTION

The FCA-Series sensing heads are Rogowski-type flexible current sensors that measure AC currents in ranges from 0-30 to 0-20,000 Amperes AC. They are ideally suited for use in electrical installations where current carrying cables and bus-bars are hard to reach and are located closely to each other or closely to other conductors. They provide an analog AC voltage which is directly proportional to the current being measured. The FCA sensing heads are powered by a hand-held battery operated amplifier. An optional external power supply is available for powering the amplifier.

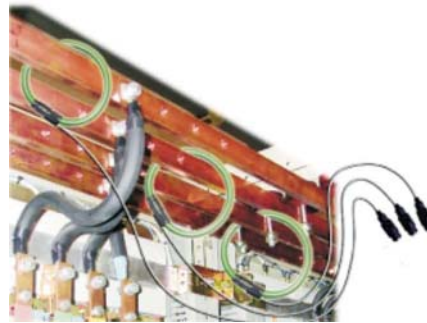
The amplifier unit provides an output signal of 2 Volts AC at full scale for each sensor. Two versions of the amplifier are available:

- The standard Amplifier has three flexible sensors that are hard-wired to the amplifier. This version is designed for use on three-phase installations, but can also be used on a single phase. An output signal is provided for each phase separately.
- An optional Amplifier is also available with three connectors for use with one, two or three plug-in flexible sensors.

Flexible sensors are available in three standard sizes: 18-Inch, 30-Inch and 48-Inches. Custom sizes can be provided to meet specific customer requirements.



Three FCA-Flex sensors with Amplifier.



Three FCA-Flex sensors on three bass-bars



18-Inch FCA Sensor.



30-Inch FCA Sensor.



48-Inch FCA Sensor.



The FCA-20K Amplifier has a keypad with four key:

- The **200A/ON** key is used to turn ON the Amplifier power. The initial current range is 200 Amperes at full scale.
- The **2kA** key is used to change the current range to 2,000 Amperes at full scale.
- The **20kA** key is used to change the current range to 20,000 Amperes at full scale.
- The **OFF** key is used to turn OFF the Amplifier power.

The output mating connector has three cables with color coded terminals:

- **BLACK** is L1 Phase
- **WHITE** is L2 Phase
- **YELLOW** is L3 Phase

4.0 SPECIFICATIONS

Measuring ranges:	FCA-20K:	TRIPLE-RANGE 200A/ 2,000A/ 20,000A AAC
Output Ratio:	FCA-20K:	10mV/Ampere, 1mV/Ampere, 0.1mV/Ampere
Output Signal:		0 to 2 Volts AC on all range
Accuracy (at 25°C):		\pm 1% of range (45-65 Hz)
Linearity:		\pm 0.2% (From 10% to 95% of Range)
Frequency Range:		10 Hz to 20 kHz (-3 dB)
Phase Error:		$< \pm$ 1° (45 – 65 Hz), \pm 10° (at 20 kHz)
Output Impedance:		1k Ω
Operating temperature:		-10°C to +55°C
Power Supply		Two AA MN 1500 LR6 alkaline batteries or External power supply Model FCA-PS-12V
Battery life:		150 hours typical
Low Battery:		Indicated by a red LED being off.
Amplifier Dimensions:		4.7" x 2.5" x 0.9"
	Weight:	0.5 Lb.
Output connector:	DB-9	Female
Weight:		0.5 lb

SENSING HEAD OPTIONS:

Sensor Size:	18-Inch:	0.3 Lb.
	30-Inch:	0.55 Lb.
	48-Inch:	0.84 Lb.
Sensor Diameter:		0.56 Inch
Output cable:		78.7" (2 meters)
Material:		TPE rubber, Polypropylene, UL94-V0 rated
Operating temperature:		-10°C to +90°C (-4°F to 194°F)
Max. Relative Humidity:		85%
Weight:		0.4 LB (0.18kg)
Safety Standard:		Double Insulation. IEC 1010-600V-CAT III Contamination Degree 2
Test Voltage:		5550 V AC for 1 minute, double insulation
Sensor Protection:		IP65

5.0 SAFETY PRECAUTIONS

The FCA Current probes are designed for operation in the field and in laboratory environments. Care must be taken to operate them according to the instructions described in this manual. Disassembly of the probe should not be attempted. The high voltage present in the field when the probe is located around a current carrying conductor is dangerous and could cause injury or death.

AYA-Instruments, Inc. assumes no responsibility for any damage to any equipment or personal injury or death resulting from misuse or deviation from the specified instructions.

CAUTION:

The probe and amplifier will be damaged if any voltage is applied to its output terminals.

6.0 PREPARATION FOR USE OF THE FCA PROBES

CAUTION: Read all instructions completely before using the flexible probes.

Placing any probe around a current carrying cable or a bus-bar is dangerous. High voltages and currents could cause injuries or death. Installation of the probe should be done only by electricians or by individuals who are trained to operate in an electrical system environment.

To avoid electric shock:

- Use well insulated gloves and protective clothes.
- Always inspect the probe to insure that it is clean and in good working condition. **NEVER USE** a damaged probe.
- Always connect the output cable of the flexible probe to the external measuring instrument or to the display unit **BEFORE INSTALLATION. NEVER** install the sensing cable of the probe before connecting the probe to the external meter or display unit.
- Conductors should not be energized during the installation of the flexible probe sensing head.
- **NEVER** change batteries while measurement head is installed on conductor.
- **NEVER** connect or disconnect the external power supply of the probe while the measurement head is installed on a conductor.

6.1 BATTERY INSTALLATION

The status of the batteries is indicated by an LED on the front panel of the Amplifier. The LOW BATTERY indicator is turned **ON** when the battery is low.

Never replace batteries with flexible measuring head installed on a conductor or when the probe is connected to a display device. Never operate the unit without the battery cover.

The FCA Amplifier requires two AA MN 1500 LR6 alkaline batteries for operation. The battery compartment is at the back of the amplifier. Ensure that the flexible current probe is away from any current carrying conductor and the output is disconnected from any other equipment.

The battery cover can now be easily removed. Install the batteries, ensuring that correct polarity is observed. Replace the battery cover and close it.

6.2 EXTERNAL POWER SUPPLY

An optional external power supply can be used with the FCA flexible current probes. The power supply Model FCA-PS-12V provides a 12-Volt DC output for powering the three FCA sensors. (When an external power supply is used, the BATTERY LOW indicator is ON).

Never connect or disconnect the external power supply when the flexible sensing head are installed on the conductor or with the output connected to a display device.

6.3 MEASURING CURRENT WITH THE FCA-FLEX PROBES

Read the safety the instructions before using the probe.

The FCA probes should not be used on conductors operating on voltages above 600 Volts. It is recommended that the current to be measured is disconnected during the installation of the probe on a conductor.

Connect the output of the probe amplifier to the input of an external instrument, power analyzer, oscilloscope or data logger.

Wrap the flexible sensing head around the conductor to be tested, and close the coupling. Reconnect the current to the conductor under test. Place the coupling of the probe away from any adjacent conductors.

Do not use the flexible current probe to measure bare conductors without wearing protective clothing suitable for high voltage work. Always use appropriate equipment for personal protection.

7.0 OPERATION OF THE PROBE

To activate the FCA-FLEX probe, press the ON key located on the Amplifier. The DEFAULT current range is 200 Amperes. Press the 2kA key to change the range to 2,000 Amperes, or the 20kA key to change the current range to 20,000 Amperes.

8.0 MAINTENANCE

The maintenance of the current probe is simple and straight forward. The probe must be kept clean and dusted periodically. Depending on the frequency of usage and on the environment where the instrument is located, it is recommended to clean the probe periodically using isopropyl alcohol, to visually inspect it and to remove any accumulation of dust and dirt using an air pressure blower. INSPECT THE SENSING HEAD, THE CONNECTING CABLE AND THE AMPLIFIER ENCLOSURE TO INSURE THAT THEY ARE DRY PRIOR TO USING THEM.

Do not use the flexible probe if it is damaged.