



# OPERATING INSTRUCTIONS MODEL 400 SERIES CONTOUR PROBES

BULLETIN 235-AB  
AUG 2013

NONDESTRUCTIVE TEST METHODS, SYSTEMS, INSTRUMENTS

## PARKER RESEARCH CORP.

The **400 Series** Contour Probes are rugged high performance instruments designed for Magnetic Particle inspection to accepted Nondestructive testing standards.

**INSTRUMENT DESCRIPTION:** Basically, the Contour Probe is an electromagnet producing a strong magnetic field. Placement of the two poles (legs) upon ferrous metal provides a path for the intense magnetic field to pass from one pole to the other. The part completes the flux path and becomes highly magnetized. Models A410, A410S and A448 produce strong constant AC fields. Electronic circuitry contained within the molded housing of the DA400 and DA400S models permits selection of a strong constant AC field, or high intensity half wave rectified (DC) field. All Parker Contour Probes are designed with flexible legs that allow the field to be "focused" at a precise area of inspection. Maximum leg spacing is 12 in. (304.8mm). All 400 series Contour Probes come equipped with a 10' (3.048 m) power cord.

The DA400 and A410 are for use on 115VAC 50-60 Hz, single phase grounded power source. Using an approved GFCI is recommended.

The DA400S and A410S are for use on 230VAC 50-60 Hz, single phase grounded power source. The DA400S and A410S are sold without power cord plugs. Only locally approved plugs should be used and installed by certified personnel. Using an approved GFCI is recommended.

The A448 is for use on 42-48VAC 50-60 Hz, single phase grounded low voltage power source. The A448 is sold without a power cord plug. Only locally approved plugs should be used and installed by certified personnel. Using an approved GFCI is recommended.

### SPECIFICATIONS

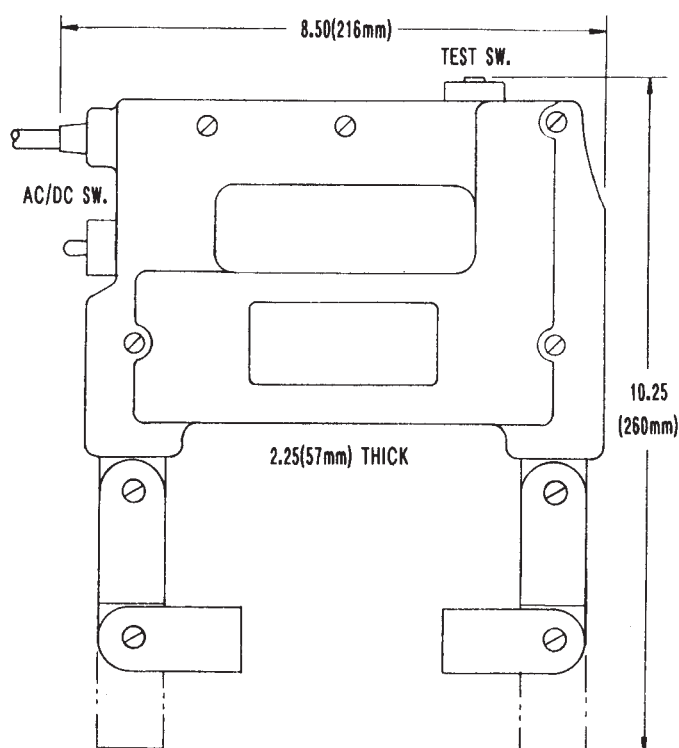


FIG. 1

| MODEL  | POWER REQUIREMENTS                       | FIELD    | WEIGHT           |
|--------|------------------------------------------|----------|------------------|
| DA400  | 115 VAC $\pm 10\%$<br>50-60 Hz<br>6 AMPS | AC OR DC | 8 lb<br>(3.6 kg) |
| DA400S | 230 VAC $\pm 10\%$<br>50-60 Hz<br>3 AMPS | AC OR DC | 9 lb<br>(4.1 kg) |
| A410   | 115 VAC $\pm 10\%$<br>50-60 Hz<br>6 AMPS | AC ONLY  | 8 lb<br>(3.6 kg) |
| A410S  | 230 VAC $\pm 10\%$<br>50-60 Hz<br>3 AMPS | AC ONLY  | 8 lb<br>(3.6 kg) |
| A448   | 42-48 VAC<br>50-60 Hz<br>6 AMPS          | AC ONLY  | 8 lb<br>(3.6 kg) |

**General safety rules.** Please read all instructions. Failure to follow all instructions listed below may result in injury. If the equipment is used in a manner other than as specified in these operating instructions, the protection provided by the equipment may be impaired.  
Always wear eye protection

**DO NOT OPERATE** unit from a DC power source.

 **Warning:** Do not change AC/DC selector switch with probe on.

Do not abuse the power cords. Never carry the instrument by the cord or attempt to unplug the instrument using the cord. Always operate the instrument with the standard installed cord. Changing or using a damaged cord can increase the risk of electrical shock. The cord should be checked periodically for any damage.

Do not position the instrument such that it would be difficult to operate the disconnect device (plug) on the end of the power cord.

The outside housing should remain intact and solid. Any damage, chipping, or separating exposing internal wires is a hazard. Instruments should not be used in this condition. The outside housing should be periodically checked for damage.

 **Duty Cycle:** The 400 series are designed for a 50% duty cycle, or approximately two minutes on and two minutes off. Continuous operation may cause overheating and damage the Contour Probe.

**Operating Environment:** Temperature: 32° to 104°F (0° to 40°C). Relative humidity: 10% to 95%, non-condensing.

**Shipping and Storage Environment:** Temperature: 40° to 140°F (4.44° to 60°C). Relative humidity: 5% to 95%.  
Vibration and shock: As encountered in normal shipping and handling with no degradation

### General Cleaning

The outside surface of the instrument can be periodically wiped with a clean cloth and a mild general purpose cleaner. Avoid using cleaners such as lacquer thinner, or mineral spirits that could damage the outside housing.

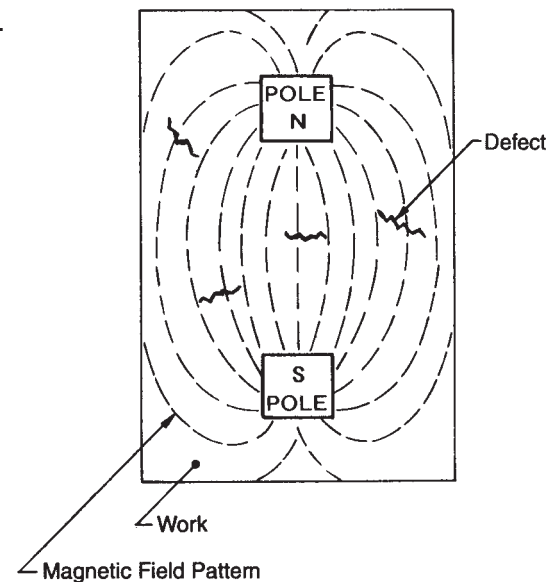


FIG. 2

Never attempt field service. All 400 series contour probes should be returned to the factory for repairs.

**OPERATION:** Connect the instrument plug into a Grounded power outlet of proper voltage.

Place the Contour Probe legs upon the work surface with the suspected defect at right angles to the legs (Good contact will produce the best results). Push the test switch to energize the instrument. Lightly dust or float dry magnetic inspection powder over the area being inspected. Defect indications will be revealed in a direction shown on figure 2. Turn the Probe 90 degrees from the first test and repeat the process. This method may also be utilized when applying a wet medium. Check all procedures and standards for further details involving inspection specifics.

**DEMAGNETIZATION:** Small pieces, which have become residually magnetized, may be easily demagnetized by the following procedure: Energize the Probe and pass small parts through the area between the leg ends “feet” and withdraw to a distance of approximately two feet. On large pieces, place the Probe in the same position as inspection, energize the Probe and lift from the work surface to a distance of approximately two feet. This procedure may need to be performed more than once to remove the residual field.

**AC MAGNETIZATION:** An AC magnetic field induced into a part is a “skin” or surface field and does not penetrate the cross section of the material. A by-product of AC is in the form of eddy currents. These eddy currents tend to guide or direct the magnetic field in a narrow pattern between the poles. Another by-product is a vibratory action, which adds mobility to the inspection particles to form a more highly defined powder build-up at the defect. For these reasons, an AC magnetic field is the most desirable for the detection of surface breaking defects.

**HALF WAVE RECTIFIED (DC) MAGNETIZATION:** A DC field induced into a small work piece penetrates a larger cross section of the part and is inclined to spread out of each side of the line between the poles. The field energy is dispersed over a greater area. Thus, DC provides greater penetration for the detection of near-surface defects in small parts.



**CAUTION:** Small parts may become magnetically saturated due to excessive field application. This may cause a masking effect to the point where it is impossible to define a defect.

**WARRANTY:** The Parker 400 series are warranted against malfunction due to defective material and or workmanship. The defective unit will be repaired or replaced (less incoming freight charges) for a period of one year from the date of sale. This repair warranty does not apply to altered units. Repair or replacement of the defective unit will be made at the discretion of Parker Research Corporation. Repaired or replacement unit(s) will be returned to the original customer prepaid.

The obligation of Parker Research Corporation is limited to the repair or replacement of the defective unit. No other obligation is expressed or implied. Parker Research Corporation assumes no liability from any claim arising from the use of this equipment.



**CAUTION:** For the correct and safe use of this equipment, training of operating personnel is required. Use of proper inspection procedures, standards compliance and safety requirements is the obligation of the user.

**ALWAYS WEAR SAFETY GLASSES WHEN USING THIS EQUIPMENT**