

# Western Instruments

Established 1965

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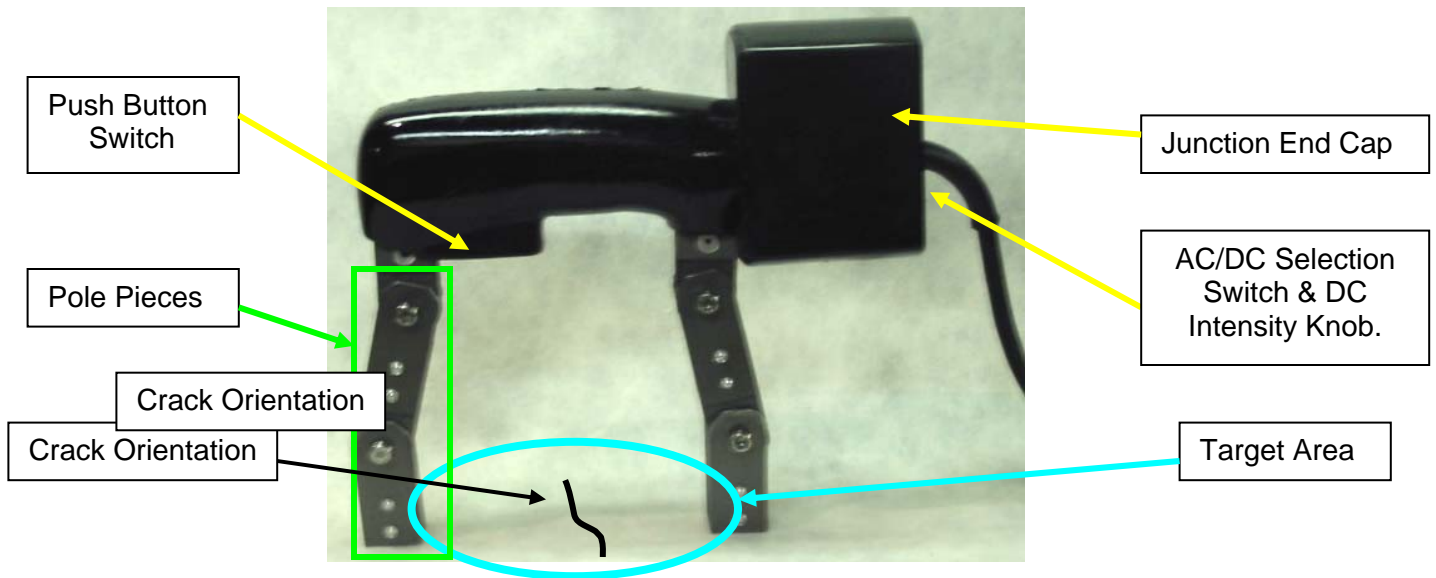
## Operating Instructions



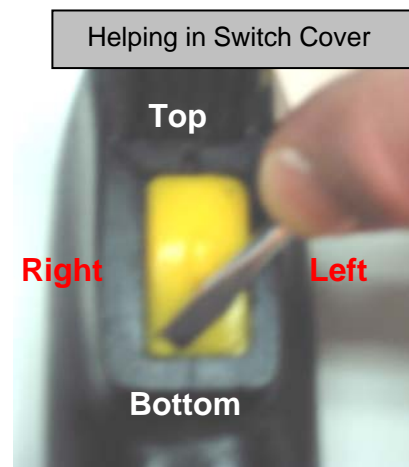
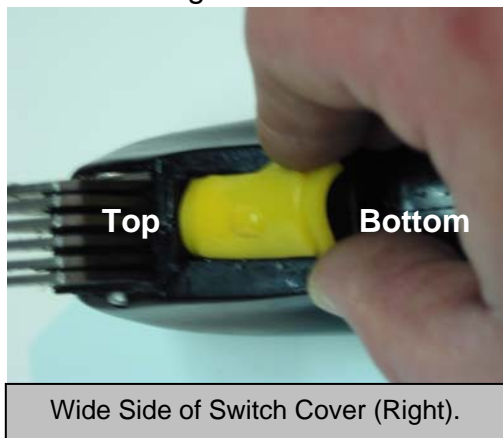
# WE-7

## Compact AC/DC Yoke

The WE-7 allows the Operator to induce an AC or a pulsed DC field into the ferrous material being tested. The device should be utilized within the parameters set by the operational specifications within this guide.



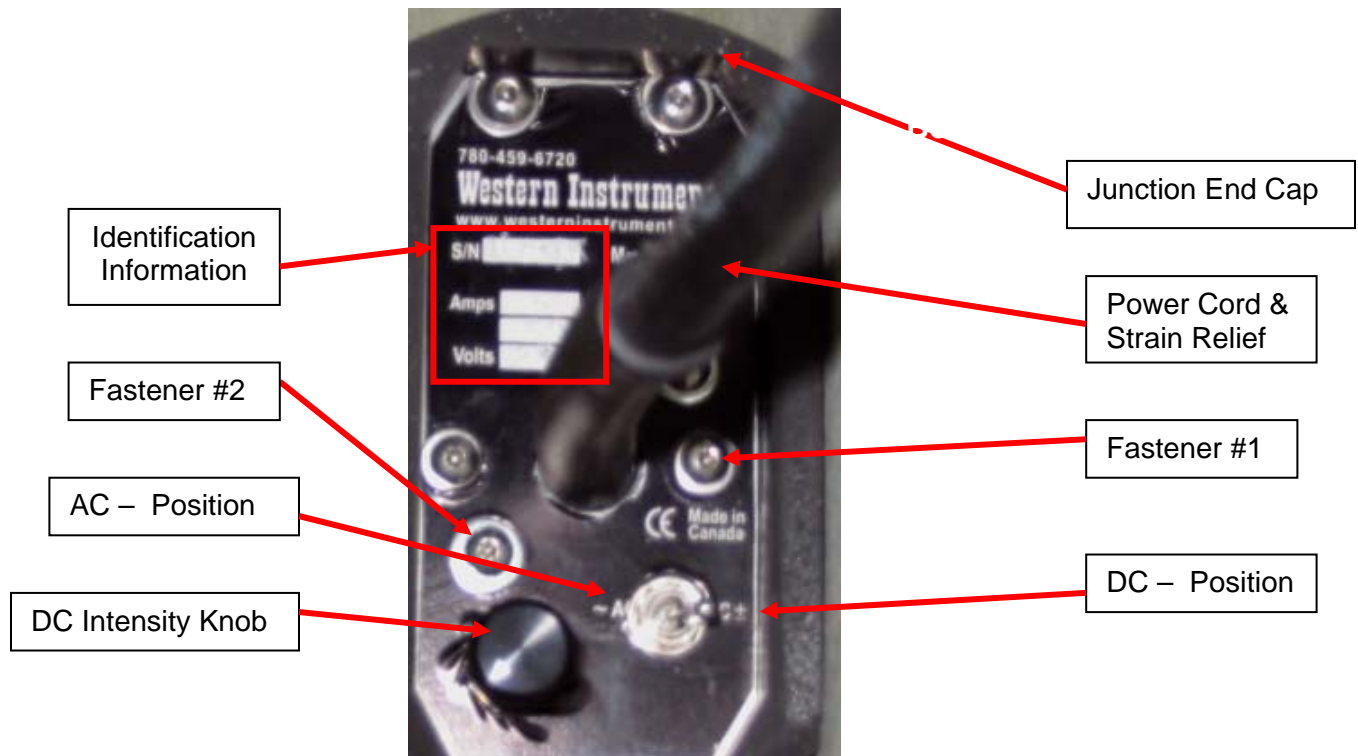
- 1. Push Button Switch** – The Lycon (#11-304) Micro-Switch is the same style of switch used in all Standard Yokes (WE-Series and Competitive units). This style of switch has no grounding provision, so care must be taken by the operator while performing Wet Method Inspection. The Switch Housings on WE-Series Products were designed for comfort and safety. While depressed, the switch delivers power (AC) to the coil encapsulated in the Yoke housing. Review the instructions in this guide, for switch replacement.
- 2. Slip-In Switch Cover** – The Slip-In Switch Cover is exclusive to WE-Series Yokes. To remove the cover, simply *pinch* the cover and pull it out. While the Slip-In Switch Cover provides superior resistance to moisture ingress, than mechanically fastened switch membranes, it must be regularly removed to clean the Switch and Housing, during wet method inspection, This cleaning will aid in the avoidance of operator shocks.



The cover is designed to fit best into the cast groove with the wide side to the right (as illustrated) of the Yoke body. Furthermore, the feeler button, on the raised portion of the switch cover is farthest away from the switch connections. To insert the Switch Cover, bend the cover longitudinally, and slip the top of the cover into the groove. Use a small screwdriver to *help* the bottom of the cover into the groove after the top is in place. During factory assembly, the cover is slightly lubricated/moistened. Ensure the lubricant does not dry, and create a vacuum in the Switch Cavity, which causes the Switch to stick.

**3. Field Selection** – The WE-7 provides the operator with either an AC or DC Field, simply by changing the position of the AC/DC switch on the Control Panel. While in DC mode, the Field Intensity is Infinitely Variable, with the use of the Intensity Knob, which is also located on the Control Panel. An illustration of the Control Panel is show bellow.

**DO NOT CHANGE THE FIELD WITH THE PUSH BUTTON DEPRESSED**



Mounted to the rear of the Control Panel, and inside the Junction End Cap, are the Control Board and Heat Sink. To remove the Control Panel and Junction End Cap, Fasteners #1 and #2 are the only ones to be removed. The Control Printed Circuit Board directs AC voltage directly into the Yoke's Coil (AC Mode) or Converts it to DC and again directs it into the Coil (DC Mode). The DC Intensity Controls are contained on the same Printed Circuit Board, and adjusts the DC Voltage and thus the lifting power of the Yoke.

Adjusting the DC Intensity Knob while the Yoke is activated is completely acceptable. However, the Field Selection Switch (AC/DC) should not be touched while Yoke is turned on. If the Field Selection Switch is changed when the Yoke is on, an overload may occur. When overloaded, the Control Printed Circuit Board may fail, resulting in a partial or complete failure to this component, and/or the electrical breaker the Yoke is supplied from (Mains) may be tripped.

**DO NOT CHANGE THE FIELD WITH THE PUSH BUTTON DEPRESSED.**

- 4. Operational Parameters** – The Operational Parameters or Duty Cycle for the WE-7 operation is set to avoid damage to the internal coil or the Control Printed Circuit Board, and must be observed.

**AC Operation:** It is recommended that the operator does not keep the Yoke on for more than ½ hour at a time, as the Yoke housing may get too warm to hold. However, the basic design of any Yoke inherently produces heat. Typical operation is 5 - 15 seconds on, while applying inspection media, followed by 5 - 15 seconds off repositioning the yoke to the target area.

**DC Operation:** At the maximum setting, the Yoke should not be kept on for more than 10 minutes at a time, and should be followed by an equal cool down time. Typical operation is 5 - 15 seconds on, while applying inspection media, followed by 5 - 15 seconds off repositioning the yoke to the target area. In this typical operation the unit can be operated for extended periods of time, however the Yoke housing may get to warm to hold.

If the Yoke is used for prolonged periods of time of continuous cycling, such as 2 to 3 hours in AC mode or 60 to 90 minutes in DC mode, as outline above, the Yoke may get hot. If the WE-7 is used in this manner the operator must provide time for a sufficient cooling period, or components in the Electronic Control Module may fail.

**Do not change the FIELD SETTING while the unit is activated.**

- 5. Field Characteristics**

**AC Field** – AC Magnetic Fields are sensitive to surface and near surface defects due to the ‘Skin Effect’ as the field travels from one Pole Piece to another. The Inspection Media (Dry Powder or Wet Method Particles) has a tendency to migrate toward interruptions (or defects) in the field. The direction and intensity of an AC Field, by it’s nature, alternates causing high particle mobility, so defects tend to be revealed immediately.

**DC Field** – The Pulsed DC Magnetic Field is stronger than an AC Field and tends to penetrate the work piece more deeply, however DC is still sensitive to surface defects. Inspection media tends to adhere to the entire target area of the work piece, due to the reduced particle mobility, and may need to be ‘blown off’ to fully reveal an indication. The intensity of a DC Field, by it’s nature, is fixed but

the Yoke does Pulse the field providing some stimulus for the particles to migrate to defects.

**Demagnetization** – Small Parts may be demagnetized by positioning the contact surfaces of the Pole Pieces together, activating an AC Field and pass the part through the opening formed between the Legs and Yoke Housing. Larger Work Pieces can be demagnetized by placing the Yoke on the surface, in a similar manner used during inspection, activating an AC Field and pull the Yoke off the surface. The work piece can be tested with a Magnetic Field Indicator, such as the W-Series W-PT®, to ensure it is fully demagnetized.

## 6. Operation:

Select the desired field on the WE-7, and position the Pole Pieces (Feet) on the work piece. The area between the pole pieces is your target area, which also extends laterally out, approximately 1.5" (38mm), from either edge of the pole pieces. The Field will expose defects that are transverse to the centerline between the Pole Pieces. The Pole Pieces should be positioned, so that as much of their contact surface as possible is in contact with the work piece. The Yoke is then energized, by pressing the Push Button Switch, and Magnetic particles are applied. Dry Method Particles are dusted between the Pole Pieces and over the target area, while Wet Method Particles are sprayed in a similar manner.

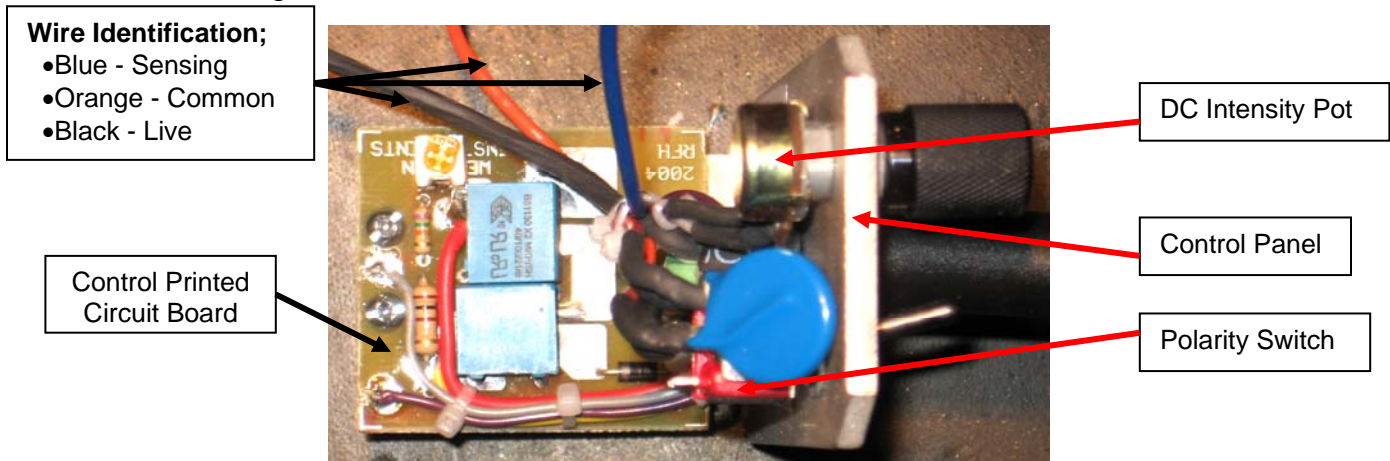
The area is then inspected visually for a collection of Particles around defects. A Black Light is used to aid visual inspection when Fluorescent Particles are used. Indications found with Dry Powder and an AC Field will tend to form immediately, and will take slightly longer with Wet Method Particles. While using a DC Field, Dry Method particles behave similar to AC, but Wet Method Particles tend to flow far slower requiring a longer activation time. If the typical direction of defects is not known, rotate the Yoke through 90° and repeat the inspection of the target area. Follow the Operational Parameters outlined in these instructions, and again;

**Do not change the FIELD SETTING while the unit is activated.**

## 7. Maintenance

After extended use the Yoke should be cleaned with a mild soap solution and thoroughly dried. The unit should be visually inspected for any damage that could cause harm to the operator, or the material being inspected. Special attention should be paid to the Push Button Switch Cover, to ensure it is fully inserted to the groove cast in the Switch Cavity. Furthermore, the Power Plug, Power Cord, Strain Relief, and the Junction End Cap should be in a good state of repair. Before performing maintenance or the Yoke should be disconnected from any power source, with safe industrial practices employed. Any potential problems to these assemblies must be reported to the Distributor or Western Instruments for instructions on corrective action.

If there is a failure in the Control Printed Circuit Board, the Control Panel may be removed. Repairs to this component are not a field fix (as illustrated bellow), even if an extra Board is on hand. Replacement requires fine tools, and furthermore there are adjustments on the Board that require a Clip-on Amp Meter and a Digital Multimeter.



Whether industrial specifications are being observed or not, the Yoke should be tested periodically, using a certified Pull Test Bar such as the W-Series W-PT®, to ensure it continues to lift the specified amount of weight. If the unit fails such a test, first inspect the Pole Pieces to ensure they fully contact the test weight. If the unit continues to fail, contact the Distributor or Western Instruments for instructions on corrective action.

### Wiring

W-Series 230 Volt Models, are designated by a “K” placed after the Serial Number and the Model number (e.g. WE-7K), are shipped without an AC Power Plug as there is no international standardization. When installing an AC Power Plug onto the AWG 18-3 Power Cord, the following is the identity of the 3 Color Coded Conductors;

- Green – Ground
- White - Neutral
- Black – Live

Care must be taken to insure the proper installation of an AC Power Plug, and if there is any question, contact your distributor or Western Instruments. If an AC Plug in not installed before use, any warranty is void.

## 8. Warranty

Western Instruments warrants its products, against defects in materials and workmanship for a period of 1 year from receipt by the end user. If Western Instruments receives notice of such defects during the warranty period, Western Instruments will either, at it’s option, repair, replace, or condemn products that prove to be defective. Consumable items, such as Batteries are warranted for 30 days, from receipt by the end user.

Any warranty is void if the unit has been modified in any way, or if it has been repaired by an unauthorized agency. The end user agrees that any equipment's disposition, when returned for warranty work, is at the full discretion of Western Instruments as to whether a claim is under warranty, or due to misuse. Western Instruments warranty shall overlook normal wear, however does not include operation outside the environmental specification of the product. All warranty work is FOB Western Instruments, and any returned units shall include a written description, by the end user, of the fault.

Western Instruments makes no other warranty, either expressed or implied, with respect to this product. Western Instruments specifically disclaims any liability arising from the use of this equipment. For the correct use of the product, refer to the Operating Instructions, furthermore we recommend instructional training to CGSB, ASNT, or other regulatory authority qualifications. Western Instruments highly recommends the end user exercise all possible safety precautions, including use of protective equipment, while operating this or other industrial equipment.

**Specifications:**

Models WE-7 or WE-7K  
Voltage: 115VAC or 230VAC  
Frequency: 50 or 60 Hz  
Current: 4 Amps @ 115 Volts, 2 Amps @ 230 Volts  
Capacity: AC - <10 Pounds (4.6 kg)  
                  DC - <50 Pounds (23 kg)  
Pole Spacing: 0 – 11" (0 – 280mm)  
Weight: 7.5 Pounds (3.4 kg)



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