

Western Instruments

Established 1965

Western Instruments W-6CS AC Cavity Yoke Instruction Manual



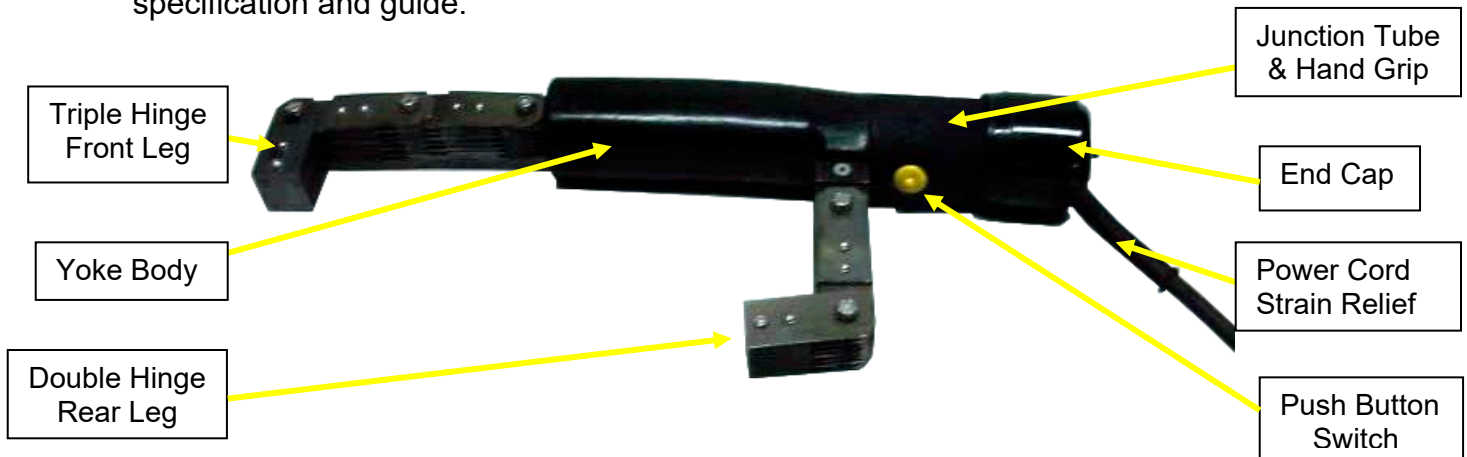
1. Application – The W-Series AC *Cavity* Yoke (W-6CS) is Western Instruments latest development in Portable Magnetic Particle Testing Equipment. This developed was due to customer requests for safer and faster Wet Method Inspection in tight spaces or unusual work piece configurations. The W-6CS has many of the unique features of both our WC and WE-Series Yokes, such as the unique Power Cord Strain Relief and Urethane Housing, ensuring Longevity, Safety, and Ruggedness.

When operators were inspecting tight cavities with an Active AC Field, they were filling this space with their Yoke and Hand to keep the Yoke energized while spraying Wet Method Media. The W-6CS permits the Yoke to be activated without the Hand (and the Switch) being in the confined space. This unique configuration of AC Yoke accomplishes several things;

- Reliable Pole Piece positioning, to ensure a beneficial inspection field.
- Better and Faster Access for directing the Wet Method Media to the Target Area. Allowing the operator to see where he is applying his bath.
- Removes the Switch from the Target Area, drastically reducing the potential for electrical shocks because the Switch area remains dry.

The W-6CS is intended to inspect; Triplex Pump Housings, Centrifugal Pump Housings, ID Threads (Box Ends), Cylinder Bores, Bores in Castings, Pressure Equipment Nozzles, and Complex Structural Steel for Stress Cracks or Weld Inspection.

The W-6CS is an AC Yoke which induces a magnetic field into the ferrous material being tested. The unit should be used within the parameters as set out below in this specification and guide.



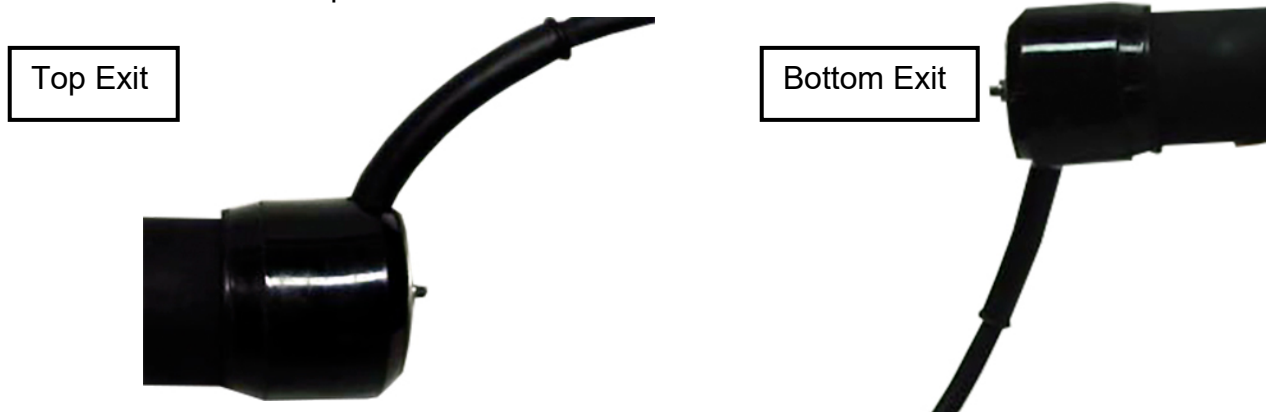
2. Pole Piece Configuration – The unique Pole Pieces (Legs) of the W-6CS are intended for tight spaces or difficult work piece configurations. The longer front leg, with 3 hinge points, permits the operator to reach inside a cavity. While the standard rear leg, permits contact with an outside surface. Above all, the unique position of the activation switch, ensures the operator's hand does not interfere with the application of Wet or Dry Method Particles.

3. Push Button Switch & Slip-In Switch Cover – The W-6CS uses a Lycon (#11-304) Micro-Switch and is the type used in all Standard Yokes (WE-Series). Depressed, the switch delivers power (AC) to the coil encapsulated in the Yoke housing.

To remove the cover, simply *pinch* the cover and pull it out. While the Slip-In Switch Cover provides good resistance to moisture ingress, if the operator is not mindful to avoid spraying the switch with Wet Method Media, Dielectric Silicone Grease should be used to fill the Junction Tube Cavity. However this does not negate the need to regularly disassemble the components, within this area, to clean and inspect them.

To reinstall the Switch Cover, it is coaxed into the special hole prepared in the Junction Tube. The groove cast into the Switch Cover must fit into the hole, ensuring the inside flange of the Switch Cover is not folded, thus inhibiting the seal. Bend the cover longitudinally, and slip one end into position. The remaining inner flange is coaxed gently into place with a small screw driver or other blunt instrument.

- 4. End Cap Rotation –** The End Cap may be rotated to reposition the Cord Protector (Strain Relief), for operator convenience, within the Bottom 120° or Top 120° of the Junction tube. This is accomplished by carefully removing of the End Cap and the internal Cross Bar, and then repositioning of the power wires. Reinstall the Internal Cross Bar, ensuring any insulation is replaced, and to avoid any possible contact between ground points and any of the power wires. The End Cape is then placed over the Junction Tube, ensuring care is taken not to twist or ‘pinch’ wires, with either the Cross Bar or End Cap.



- 5. Power Cord –** The Power Cord and the integral GFCI (Ground Fault Circuit Interrupter) should be inspected regularly, for any damage that may cause a short circuit. A Short can occur, and is not limited to, the Yoke Legs and the cord or the work piece and the cord. 115 VAC/60 Hz models have a *Woodhead Safe-T-Chek* GFCI (Part No. 15054), or equivalent, installed at the Mains end of the Power Cord. Hubble offer a similar product (Part No. GFP515M or GFP5266C), which is also a Manual Reset configuration. Western Instruments recommends the Manual Reset style, due to the inherent safety requiring operator acknowledgment.

230VAC/50Hz models must have a Residual Current Device (RCD) installed by the Distributor or Customer, or Western Instruments will install a *Woodhead Super-Safeway* Plug/Connector Cord assembly (Similar to Part No. 20054), at extra cost. Here again, a Manual Reset style is recommended. If there is any question as to the suitability of a GFCI/RCD device, Western Instruments should be forwarded the OEM's data to evaluate its suitability. In any case, an appropriate AC Mains Plug (Grounded) must be

installed prior to use. Furthermore, the OEM's GFCI / RCD instructions and guidelines should be reviewed, followed, and adhered to.

6. Operational Parameters – The Operational Parameters or Duty Cycle for the operation is set to avoid damage to the internal coil or the Output Module, and must be observed.

AC Operation: It is recommended that the operator does not keep the Yoke on for more than 5 minutes at a time, as with accumulated use of this type 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 for inspection and repositioning the Yoke to the target area.

If the Yoke is used for prolonged periods of time such as 2 to 3 hours of continuous cycling, as outline above, the Yoke will get warm. If the W-6CS is used in this manner the operator must provide time for a sufficient cooling period.

7. Field Characteristics – AC Magnetic Fields are sensitive to surface and near surface defects due to the 'Skin Effect' as the magnetic field travels from one Pole Piece to the other. The Inspection Media (Dry Powder or Wet Method Particles) has a tendency to migrate toward interruptions (or defects) in the magnetic 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 when the Media is applied.

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 as 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.

8. Operation – 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 surfaces, as possible, are 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 Target 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 will tend to form immediately, and will take slightly longer with Wet Method Particles. If the typical direction of defects is not known, rotate the Yoke through 90° and repeat the inspection of the target area.

The W-6CS produces a standard amount of Field Blow as other AC Yokes. Field Blow is a collection of Inspection Media between the Pole Pieces, transverse to the centerline

between the Pole Pieces, and may cause a masking of indications. Field Blow can be minimized by extending the Pole Pieces farther apart, If work piece configuration does not permit extending Pole Pieces, reduce the contact area of the Pole Pieces on the work piece. Follow the Operational Parameters outlined in these instructions.

- 9. 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 hole in the Junction Tube. Furthermore, the Power Plug, GFCI, Power Cord, and the End Cap/Cord Protector should be in a good state of repair. Before performing maintenance, cleaning, or repositioning the End Cap, 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.

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. W-6CSK), are shipped without an AC Power Plug or an integral GFCI as there is no international standardization. When installing appropriate GFCI and 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 a integral GFCI and AC Power Plug, and if there is any question, contact your distributor or Western Instruments. If an appropriate GFCI and/or a Grounded AC Plug in not installed before use, any warranty is void.

10. Pull Test / Calibration

When performing a 10 Pound (4.5Kg) Pull Test, ensure the contact feet are flat as possible to the Pull Test Bar (W-PT®), which ensures as much magnetic attraction as possible. While not particularly important on Standard configurations of Yokes (WE and WC Series units), it is may be necessary on the W-6CS due to the irregularity of the test piece. For increased lift, one of the Front Leg Hinge Poles may be removed, to increase lift. If a Yoke fails a pull test, it should be sent to an authorized repair facility for Contact Foot Dressing or replacement.

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 its 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:

Model: W-6CS or W-6CSK

Voltage: 115VAC @ 60 Hz or 230VAC @ 50 Hz

Current: AC – 4.0 Amps @ 115 Volts or 2 Amps @ 230 Volts

Capacity: <10 Pounds (4.5 Kg)

Pole Spacing: 0 – 15" (0 – 380mm)

Weight: 7 Pounds (3.2 kg)

