

Western Instruments

Established 1965

Operating Instructions

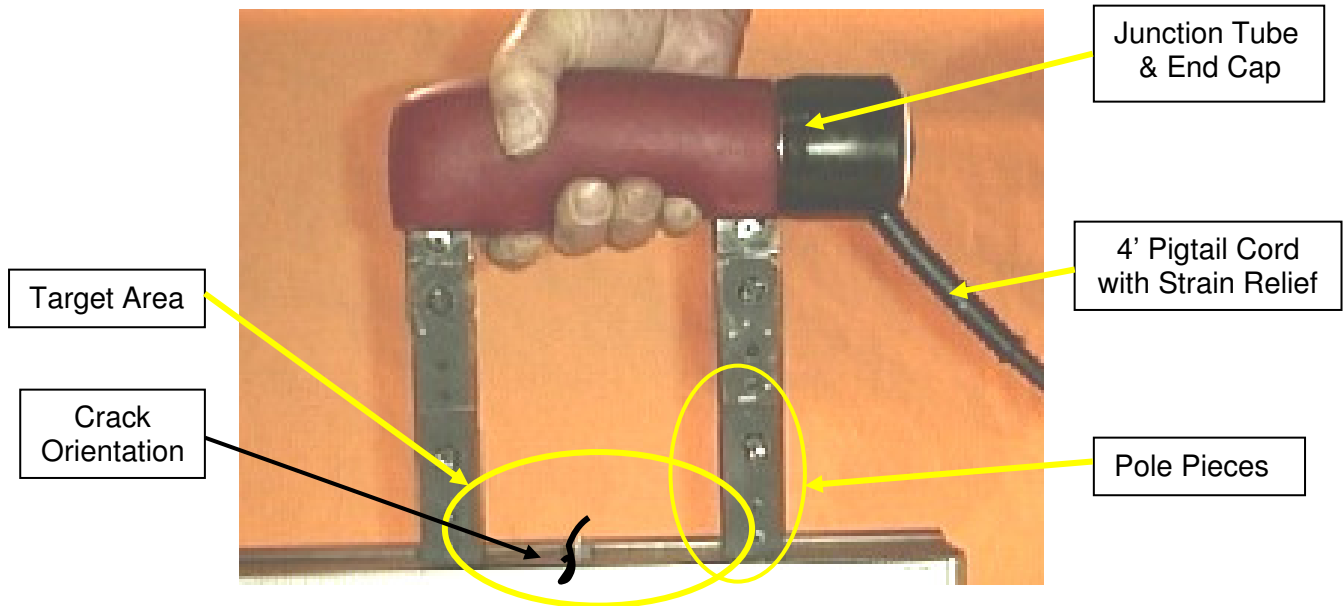
March 2014



WC-6UW

Underwater AC Yoke

The WC-6UW is an AC Yoke designed for Underwater Magnetic Particle Inspection. The WC-6UW induces a magnetic field into the ferrous material being tested from an external power supply. This power supply can be either 115VAC (or 230VAC K Models) or 12VDC, but must be fully grounded and equipped with a GFI. The unit should be used within the parameters as set out in the specifications within this guide.



1. Power Supply – The WC-6UW is supplied power from the end-user's 115VAC (or 230VAC K Models) Grounded Power Supply or a 12 VDC Power Supply. The amperage draw for either power source is outlined at the end of this manual. No matter the type of electrical power supplied, full cautionary measures should be employed such as complete grounding and the use of a GFCI (Ground Fault Circuit Interrupter).

2. End Cap/Strain Relief – The End Cap/Strain Relief on the WC-6UW looks identical to the rotatable End Cap used on many other Western Instruments' WC-Series Yokes, however it is filled with Urethane and bonded to the Yoke Body. Therefore if an end user wants a particular orientation of this assembly, it must be specified when ordering.

The WC-6UW is manufactured with a 4' of 3-16 Urethane *Pig Tail* Cord, which in turn is connected to the end-user's approved underwater cable. However, the customer may order the WC-6UW with up to 250' (76m) of 3-16 Urethane Cable at extra cost.

3. Operational Parameters – As the WC-6UW is not equipped with a switch, it is turned on and off via the *Top Side* remote power supply, or by an approved underwater switching device. The Operational Parameters or Duty Cycle for the WC-6UW is 100%, due to the water cooling effect of the operational environment. If this Yoke is used in air, the following parameters must be adhered to;

AC Operation: It is recommended that the operator does not keep the Yoke on for more than 5 minutes at a time, as the Yoke housing may get to 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.

DC Operation: When operated from 12 Volts DC (115 Volt Model or 230 Volt Model), the duty cycle is 100%. Typical operation is 15-30 seconds on, while applying inspection media, followed by 15 to 30 seconds off for inspection and 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 warm.

Note: The WC-6UW can be used at higher DC Voltages (18VDC) on 230 Volt models) however they will draw more amperage and create more heat. In these higher voltage cases the Yokes will also provide about twice the lifting power (100 pound/45 kilograms). In these cases, the warranty is void but the Yoke should not be kept on for more than 5 minutes at a time, and should be followed by an equal cool down time.

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 warm. If the WC-6UW is used in this manner the operator should be mindful of heat build up in the Yoke.

4. Field Characteristics;

AC Field – 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 another. The Underwater Inspection Media has a tendency to migrate toward interruptions (or defects) in the magnetic field. The direction and intensity of an AC Field, by its nature, alternates causing high particle mobility, so defects tend to be revealed immediately when the Media is applied.

DC Field – A 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 ‘waved off’ to fully reveal an indication.

Demagnetization – This operation can only be performed if the WC-6UW is connected to an AC Power Supply as outlined above. With the Yoke positioned on the surface, in a similar manner as used during inspection, the AC Field is activated and the Yoke is pulled off of the surface. The work piece can be tested with a Magnetic Field Indicator, such as the W-Series W-FI®, to ensure it is fully demagnetized. Before a W-FI is taken underwater, a small hole should be made in the housing to allow pressure to equalize.

- 5. 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 on the work piece. The Yoke is then energized and Magnetic particles applied.

The Target Area is then inspected visually for a collection of Particles around defects. If the typical direction of defects is not known, rotate the Yoke through 90° and repeat the inspection of the target area.

- 6. Maintenance** - After every underwater use the Yoke should be cleaned with a mild soap solution and thoroughly dried, to avoid a corrosion ‘bloom’. After a thorough drying,

the legs and feel should have a liberal coating of corrosion inhibitor. The unit should be visually inspected for any damage that could cause harm to the operator, or the material being inspected. Before performing maintenance 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.

The WC-6UW is manufactured for full submergence to 300' (91m), thus it is exposed to high static heads. To counteract this pressure, each lamination within the Iron Lamination Frame is sealed to prevent the ingress of water. To prolong the life of a WC-6UW it is recommended to remove the Hinged Legs and Contact Feet after each dive, and used compressed air to blow out the area between the laminations on the frame. Furthermore, place the Leg/Foot assemblies in an oven set to 250°F (115°C) for about 1 hour, to evaporate the moisture between the laminations in these assemblies. When reassembling the Legs to the Yoke frame, we recommend the use of a corrosion inhibitor for protection and lubrication.

The neoprene *Pig Tail* Cord is encapsulated within the End Cap assembly to also prevent the ingress of water. The Pig Tail and any connection made to it should be checked before and after every use. If available, we highly recommend a high voltage test (1200VAC or 1000VDC) between each of the power connections and from these to ground.

Wiring:

W-Series 230 Volt Models, are designated by a "K" placed after the Serial Number and the Model number (e.g. WC-6UWK), while standard models (115VAC) do not have any other suffix after the Model Number. When installing an appropriate underwater connection (or splice) onto the AWG 18-3 *Pig Tail*, the following is the identity of the 3 Color Coded Conductors;

- Red – 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 fully grounded AC Plug is not installed, before use, any warranty is void.

7. Pull Test / Calibration

When performing a 10 Pound (4.5kg) Pull Test in AC Operation or a 50 Pound (23kg) Pull Test in DC Operation, ensure the contact feet are flat as possible to the Pull Test Bar (W PT®), which ensures as much magnetic attraction as possible. If a Yoke fails a pull test, it should be sent to an authorized repair facility for Contact Foot Dressing.

- 8. Warranty** - Western Instruments warrants its products, against defects in materials and workmanship for a period of 3 months 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.

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Specifications:

Model: WC-6UW or WC-6UWK
Voltage: 115VAC or 230VAC
Frequency: 60Hz or 50 Hz
Current: 4.0 Amps @ 115VAC, or 4 Amps @ 12VDC
 2 Amps @ 230VAC, or 2 Amps @ 12VDC
Controls: Top Side or approved underwater device.
Capacity: <10 Pounds (4.5kg) in AC
 <50 Pound (23kg) in DC
Pole Spacing: 0 – 11" (0 – 280mm)
Pole Cross Section 1" (5mm)
Weight: 6.5 Pounds (3.0 Kg)



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