



Botron Dual Wire Workstation Monitor



Botron **B920724** Work station monitor is designed to monitor the operation of two dual wire wrist straps grounding systems and work surfaces. This product has been designed and tested for use with dual conductor wrist straps and properly grounded work surfaces.

Incorrect grounding of an operator may cause electrostatic discharge damage to components or

assemblies being handled. For proper grounding of the operator when using the work station monitor please refer to diagram (Fig 6)

Verify that the electrical ground point is suitable. If you are not sure what a suitable ground is, contact a licensed electrician before installation.

Theory of Operation The **B920724** dual wire work station monitor is designed to monitor the operation of the wrist strap grounding systems of two operators. To accomplish this, it uses a DC current source to measure a loop electrical resistance. The system uses a dual wire wrist band and ground cord that contain two independent elements. The **B920724** monitor employs two selectable test voltages (9 and 16 volts) and resistance limits (10 Megohms and 35 Megohms) It also monitors the grounding of up to two work surfaces. (see drawing)

The model **B920724** monitor performs a resistance measurement by applying an electrical current of less than 3 uA approximately every 2.0 seconds for 0.2 of a second in duration. The path for the current is through one conductor of the ground cord that contains a current-limiting resistor, through one side of the wrist band, through the skin of the wearer under the band, through the second side of the wrist band, through the second conductor of the ground cord that contains a current-limiting resistor, and finally back to the monitor.



Fig#1

B920733 Fig#2



B920732 optional Fig#3



Botron **B920724** with B920733 remote included
B920732 (not included)

Selection of Test Voltage and Resistance limit



Fig#4

Resistance/Voltage switch selection

The model B920724 monitor allows for the selection of test voltages (9v or 16v) and resistance limits (10 Megohms or 35 Megohms). The additional ranges have been added to accommodate global Electrical Static Discharge requirements. Selection of the operating parameters is left up to the user's discretion..

Operator Monitoring-Single and Dual

The wrist strap monitoring function is activated by plugging a wrist strap dual conductor ground cord into either one of the jacks on the Botron remotes (**B920733**) (**B920732**) models. If the resistance of wrist strap loop is within the limits of the selected range (1.5 Megohms to 10 Megohms or 1.5 Megohms to 35 Megohms) on the Model B920724 monitor, the cord, the wrist band, and the contact to the arm of the wearer, it is considered to be functioning correctly. At this time, one of the (OK) green lamps (1 or 2) will be illuminated on the front of the monitor.

If the resistance of the wrist strap loop is higher than the selected range (10 Megohms or 35 Megohms) on the B920724 monitor, an (OK) wrist strap green lamp (1 or 2) extinguishes, and a high wrist strap red lamp (H) illuminates with an audible alarm. This is an indication of a high resistance in the cord band, or poor contact between arm and band. If the resistance in the loop is under 1.5 Megohms, it is an indication of a low resistance meaning one or both current-limiting resistors are bypassed. The low yellow lamp (L) will flash and an (OK) green lamp (1 or 2) will remain illuminated.

Caution

A low resistance condition can also be caused by touching a grounded object or by standing on a conductive surface.

The wrist strap of a second operator is measured in the same way. Operators are identified by the two (OK) green lamps (1 & 2). However, the same high wrist strap red lamp (H) and low yellow (L) lamps illuminate when a fault is detected.

The green lamp that extinguishes identifies the operator that is experiencing the fault condition.

Voltage on Operator When Connected to the

Model B920724 Monitor

There is a concern about the voltage that is applied to an operator while they are connected to a monitor. Some of today's electronic components are extremely sensitive to electrostatic discharge from a person (less than 10 volts). The following chart for the Model B920724 monitor illustrates the level of voltage that will appear on the operator under various resistance conditions.

Voltage on Operator when connected to the Model **B920724** monitor

Condition	9v-10 Megohms	9v-35 Megohms	16v-10v Megohms	16v-35 Megohms
No skin resistance	0.9V	0.9V	1.6V	1.6V
200 K ohm skin resistance	1.0V	1.0V	1.8V	1.8V
Likely case before Alarm	2.5V	3.6V	4.4V	6.4V
Worst Case before Alarm	4.5V	7.1V	8.0V	12.6V
Absolute Worst case	9.0V	9.0V	16.0V	16.0V

Audible Alarm Tones

For wrist strap malfunctions the model **B920724** monitor indicates a different tone for each operator-a continuous tone for #1 operator and a fast chirping beep for # 2 operator. The volume of the wrist strap alarm is adjusted by selection of the internal DIP switch #1. For work surface malfunctions; a slow chirping beep is made. This alarm sound is turned on or off by selection of DIP switches #2.

Switch #1 and #2 are accessible through a **slot** located in the bottom of the chassis.

Audible alarm tones can be adjusted upon request

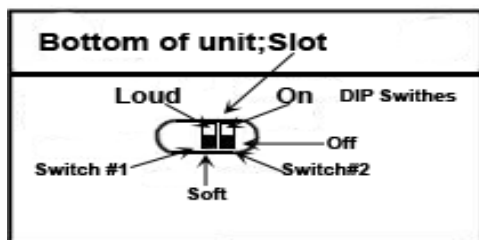


Fig #5

Work Surface Monitoring The Model **B920724** monitors its connection to ground and the grounding of a ESD work surface. A loop resistance is measured from the monitor, through a Monitor/Table mat cord to the work surface, across the conductive layer of the work surface mat, through the grounding wire of the work surface to an electrical ground and finally back to the monitor through the grounding wire. If the resistance of the loop exceeds 3.7 Megohms, the work surface high red lamp (M) will illuminate and all green lamps will be extinguished. If DIP switch #2 is in the ON position, the audible alarm will activate. If no ESD work surface is to be monitored, the Monitor/Table Mat Cord and the ground wire of the **B920724** must be connected to an electrical ground. This is done to ensure that the **B920724** is providing a ground connection for the operators. Again, if the loop resistance exceeds 3.7 Megohms the work surface high red lamp (M) will illuminate and the alarm will activate if selected.

Caution:

The grounding wire from the work surface and the ground wire from the mode **B920724** monitor must be attached to separate electrical ground. The work surface monitoring function is active any time that the power supply for the monitor is plugged in.

How to Use

- Mount or position the Model **B920723** monitor so that the lamps are easily viewed by the operator. Mount the Model **B920724** monitor to the underside of a work bench top or shelf through the two holes located at the top rear of the case using the two screws supplied. We have also enclosed two brackets and screws to attach to underside of bench. If using the screws is not possible, apply an appropriate amount of durable, double-sided adhesive foam type tape to the case.
 - Locate the Model **B920733** Dual Conductor Remote Input Jack so that it is convenient for the operators to attach their wrist strap ground cord. Mount the remote with the screws provided.
- C. Plug the AC adapter into the grounded outlet. .The **B920724** is ready for use.

Specifications:

B920724 Monitor size:4" x 5" x 1.5"

B920733 Remote Input Jack size: 2.73" x 1" x 1" (not including mounting)

Power supply requirements:

Input: Output:25V dc @200mA rated load

Output Plug polarization: Center Negative

Accuracy:+/-15%

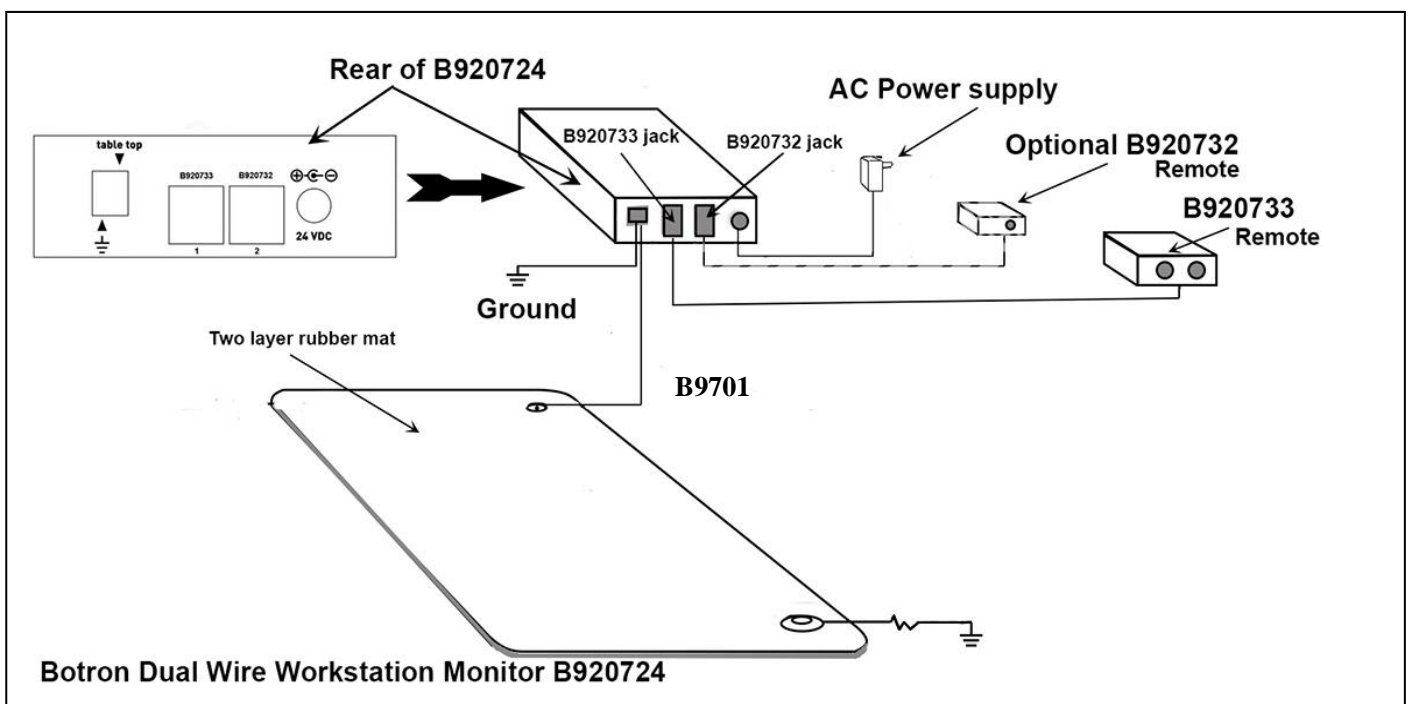
Test Voltage:9V DC / 16V DC Open circuit

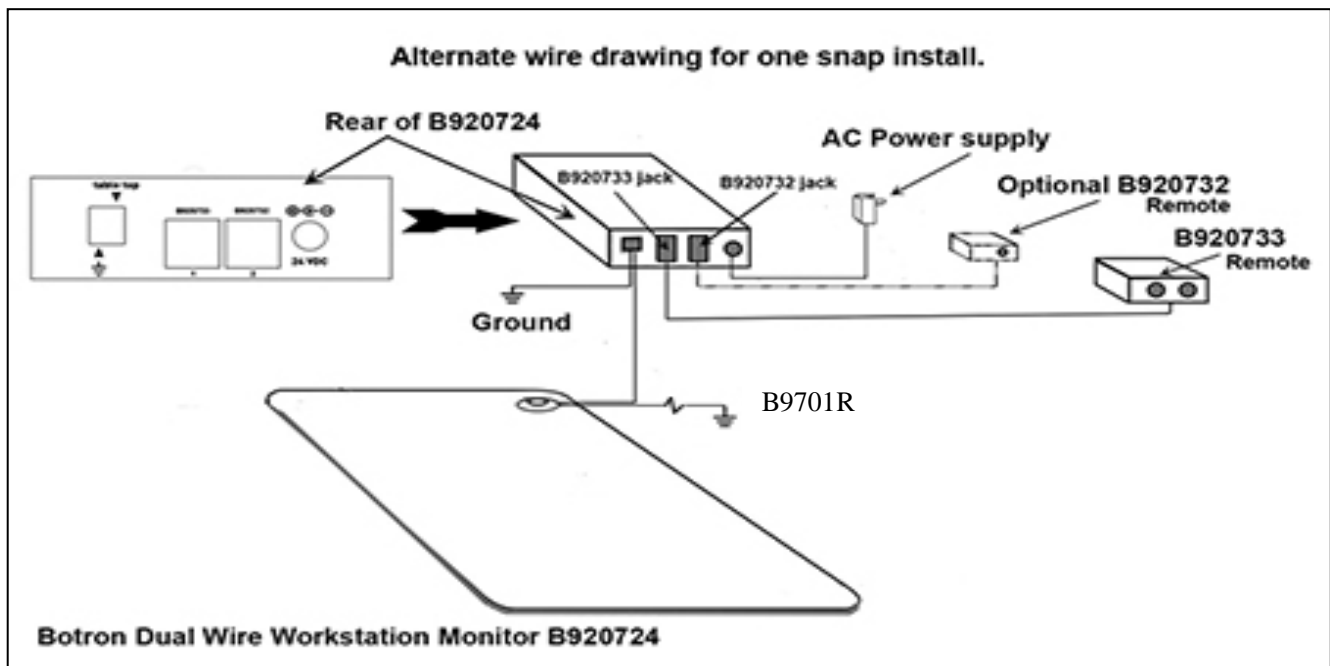
Test Current: Less than 3 microamps

Temperature:Max:43°C Min:10°C

Humidity: Max :75%RH

Fig #6





Fig#7

Install Fig #1

- a) Use our supplied B9701-R ground wire, Ground to snap and to a known good ground per drawing.
- b) With a small screwdriver or tool move the DIP switch (**Fig#5**) to the ON position to turn on the ground audible alarm. (See : **Audible Alarm Tones**) You may deactivate the alarm workstation ground with the DIP switch #2 in the off position.).
- c) Install the green two wire connector with small screwdriver the ground wire to a known good ground per Fig #1 (Should be two wires from Green connector one going to ground and the other going to the mat).(B9701) no resistor
- d) Mount the Remote B920733 as needed with supplied screws, plug supplied RJ-45 cable to back of remote and other end into back of B920724.(Fig 6)
- e) If needed, two brackets are supplied with machine screws. Attach to sides of B920724 monitor and with wood screws attach to underside of bench.
- f) If you want to activate the second remote B920732(sold separately) you must first plug the #2 operator jack of the B920733. The Remote B920732 mounted as needed install the RJ-45 cable in back with the other end plug in back of B920724 of labeled B920732 RJ-45 jack. Per (Fig 6)
- g) If an Alternate grounding method is needed, please fowling the Fig #2 drawing.

Worksurface Adjustments:

- a) Locate DIP switches slot on bottom of B920724 Adjust SW1 to the loud position and SW2 to the On position.

- b) Plug in AC power supply to wall and other end to back of B920724 table mat will be illuminated sounding the audible alarm (slow chirping).
- c) To lower the loudness of the alarm adjust SW1 to the soft position the alarm will decrease.
- d) If you want to silence the alarm adjust switch SW2 to the off position.

What's in the package:

- 1. B920724 workstation monitor.
- 1. B920733 Operator remote.
- 1. RJ-45 cable 7ft.
- 1. AC 120v power supply.
- 1. Ground wire (2 wire connector to grd)
- 1. B9701 10ft grd (mat to 2 wire connector)
- 1. B9701R 10ft grd. (mat to ground)
- 2. Green 2 wire connector.
- 3. Mounting brackets.
- 4. Machine screws.
- 4. Wood screws.
- 2. Small wire clips.

B9701R



RING GRD



CONNECTOR ASSEMBLY



BACK OF B920724

