



**ESD Sensing & Process Monitoring**  
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# Workstation Monitoring

## NOVX OPERATOR/GROUND MONITOR M200/M220/M224

The Novx Operator and Ground Monitors M200, M220, and M224 provide real-time detection and alarm. These digital, small-footprint monitors feature dual-channel/dual-wire body voltage (wrist-strap or garment) plus multi-channel ground (GND) monitoring with proprietary detection and alarm. Programmable with manual push-button alarm threshold set and zeroing, all three models feature individual red/green LEDs for channel status. Different audible alarm tones per channel disseminate alarm types.

Ionizer balance monitoring (proximity) is available on the M224 Monitor only.

### Features and Benefits

- Body voltage detection
- High and low resistance GND monitoring
- Proximity detection option (M224 only)
- Two wrist-strap inputs
- Audible alarm tone per channel
- Alarm output (M220 only)
- Configurable hard and soft grounds (M224 only)
- Red/green LED per channel
- Digital architecture
- Modular construction
- Direct connection to garment or coil cords
- Hard ground and table mat
- Cleanroom compatible
- Quick change consumable parts (normal wear)

# Specifications

Body Voltage Detection	M200	M220	M224
Wrist-strap monitoring channels	2	2	2
Wrist-strap setpoint	1-4.5V	1-4.5V	1-10V
Wrist-strap alarm accuracy	±0.5V	±0.5V	±0.5V
Wrist-strap open circuit voltage	<0.5V	<0.5V	<0.05V
Wrist-strap short circuit current	<0.001 mA	<0.001 mA	<0.001 mA
Front-panel wrist-strap	Yes	Optional	No
Remote box wrist-strap	No	Optional	Yes
Ground (GND) Monitoring			
GND monitoring channels	2	2	4
GND configuration	1 soft GND, 1 hard GND	1 soft GND, 1 hard GND	4 hard GND or 2 soft GND and 2 hard GND or 3 hard GND and 1 soft GND
Soft GND alarm setpoint range	500 kΩ-20 MΩ	500 kΩ-50 MΩ	500 kΩ-1 GΩ
Soft GND alarm accuracy	Value ±20%	Value ±20%	Value ±20%
Soft GND short circuit current	<0.002 mA	<0.002 mA	<1 μA
Soft GND open circuit voltage	<1.25V	<1.25V	<0.05V
Hard GND alarm setpoint	1-50Ω	1-50Ω	1-50Ω
Hard GND alarm accuracy	±0.5Ω, ±10% above 50Ω	±0.5Ω, ±10% above 50Ω	±0.5Ω, ±10% above 50Ω
Hard GND short circuit current	<5 mA	<5 mA	<0.5 mA
Hard GND open circuit voltage	<5V	<5V	<0.05V
General			
Voltage input power supply	5 VDC, ±5%	5 VDC, ±5%	24 VDC, ±10%
Current input power supply	50-150 mA	50-150 mA	50-150 mA
Open collector alarm output (max)	N/A	24V, 25 mA	N/A
Dimensions	1.3"H x 2.8"W x 2.8"D (3.3 x 7.1 x 7.1 cm)	1.3"H x 2.8"W x 3.0"D 3.3 x 7.1 x 7.6 cm)	1.5"H x 4.6"W x 4.3"D (3.8 x 11.7 x 10.9 cm)
Weight	5 oz (142g)	5 oz (142g)	11 oz (312g)
Data output	No	Open Collector	No
Enclosure	Stainless steel	Stainless steel	Stainless steel
Power Supply AC	100-240 VAC, 50/60 Hz	100-240 VAC, 50/60 Hz	100-240 VAC, 50/60 Hz

## Flexible Monitoring Options

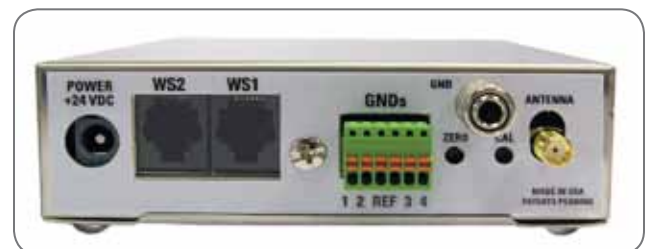
The **M200** features two operator monitor channels (front-panel only mini-jack connectors) and two channel ground monitors (<0.5V open circuit voltage).

The **M220** features two operator monitor channels (remote box mini-jack connectors) and two channel ground monitors including an open collector alarm status output (<0.5V open circuit voltage).

The **M224** is a low voltage instrument with two operator monitor channels, four selectable grounds (several combinations of hard or soft), EMI detection on grounds, and optional ionizer balance monitoring (<0.05V open circuit voltage).

## Body Voltage and Ground Monitoring

The operator may plug a wrist-strap directly into the M200 only or choose the optional Remote Wrist-strap Box (M220 and M224 only). These instruments will also support connection to any monitored garment technology that eliminates the wrist-strap requirement. The mini-jack assembly is a plug-in module to minimize down time when the mini-jacks need to be replaced over time.



Novx M224 rear panel.



Novx M200 rear panel.



Novx M220 rear panel.



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