

Machine Clearance and Maintenance Accessibility Guidelines

Accessibility:

- Provide openings to components that need maintenance.
- Provide visual access to permit a view of the maintenance activity.
- Minimize the number of parts that must be removed to perform maintenance.
- Consider the physical clearance required for the operator, tool, and equipment components based on anthropometric constraints (See Figure (16) and Table (12) for criteria).
- Locate access on the front, rather than the back, of equipment.

Access Doors/Ports:

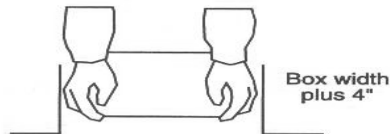
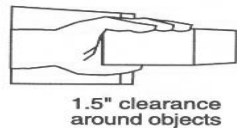
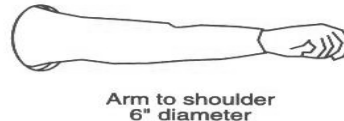
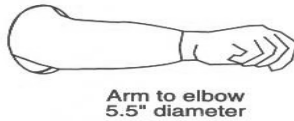
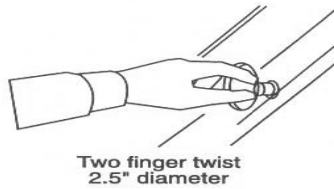
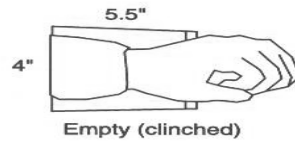
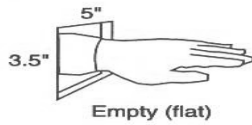
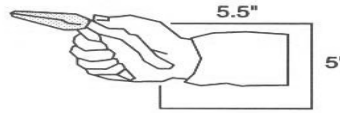
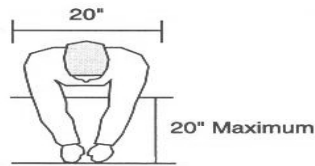
- Provide access ports that are easy to remove - if possible hinge the covers.
 - Ensure they do not expose maintenance operators to hot surfaces, electrical currents or sharp edges.
 - Place where the operator can monitor necessary display(s) while making adjustments.
 - Port doors should not be mounted so that the user's hand might be injured if he or she opens the door too far.
 - Never locate the handles of adjacent doors so that they could coincide during an opening procedure.
 - Provide stops on sliding doors so that people will not pinch their fingers as they slide a door against another part of the port. At least 1½ inches of clearance is needed to provide finger protection.
 - Design hinged covers to swing completely out of the way when open.
 - Provide props or locks to secure hinged covers in the open position.
 - Round the corners of covers if they present a hazard.

Fasteners:

- Use a minimum number of fasteners.
- Use a minimum number of standard fastener sizes to reduce tool needs and search times.
- Use quick-opening fasteners that open with (in order of preference):
 - Hand (wing nuts, cam latches)
 - Standard tools (nuts, screws)
 - Specialized tools
- Use captive fasteners. Avoid loose nuts and washers whenever possible.
- Use fasteners that release in fewer than 10 turns.
- Design fasteners for covers so that they are easily visible and accessible.
- Fasteners on access covers should be easy to operate with gloved hands.
- Use keyhole slots to release screw-type fasteners without completely removing the screw
- Use mounting bolts and screws that can be turned with either a screwdriver or a wrench.
- Design cases to be lifted off equipment, rather than equipment to be lifted out of cases.

Clearance Specifications for Maintenance

Illustration of Minimum Clearance Dimensions for Maintenance Tasks



Recommendations for Maintenance Accessibility

Machine Clearance Criteria	Specification
Standing Clearances <ul style="list-style-type: none"> • Width • Height 	Min. 24" Min. 80"
Prone Work Clearances <ul style="list-style-type: none"> • Horizontal • Vertical 	Min. 76" 18" to 32"
Horizontal Work Clearances <ul style="list-style-type: none"> • Horizontal • Vertical 	30" to 96" 18" to 80"

Accessibility for Maintenance

- Openings are large enough to permit access of both hands and offer visibility of components
- Access ports are located so that operators are not exposed to hot surfaces, sharp edges, or electrical currents
- Access ports are easy to remove, with visible and accessible cover fasteners
- Circular Hatch, Horizontal Clearance: Min. 30" diameter
- Horizontal Hatch Clearance: Min. 20" high x 24" wide