

SEMI E24-92 (Withdrawn 0710) CLUSTER TOOL MODULE INTERFACE: ISOLATION VALVE INTERLOCKS STANDARD

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NOTICE: This document was balloted and approved for withdrawal in 2010.

1 Purpose

1.1 The purpose of this standard is to prevent any opening or closing of the isolation valve(s) which would result in an unsafe condition or possible damage to material or equipment.

1.2 *Impact* — This standard requires cluster tool module suppliers to implement the interlock and to define the conditions that trip the interlock.

2 Scope

2.1 This standard requires hardware inter-locks that govern the opening and closing of the environmental isolation valve(s) at the interface planes of a cluster tool. This standard applies to all modules of a cluster tool (as defined in SEMI E21).

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents

3.1 SEMI Standard

SEMI E21 — Cluster Tool Module Interface: Mechanical Interface and Wafer Transport Standard

3.2 Other Documents

MIL-C-26500E¹ — General Specification for Connectors – General Purpose, Electrical, Miniature, Circular, Environmental Resisting

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Requirements

4.1 *Interlock Provision and Use* — Each module joined to another module, across a common interface plane (as defined in SEMI E21), must provide a fail-safe interlock that enables opening and closing of the isolation valve of the other module. Each module that has an isolation valve must use the interlock provided by the module it is joined to across their common interface plane.

4.2 *Interlock Trip* — Conditions that trip the interlock must be defined by the module supplier. (See § R1-1.)

4.3 *Interlock Logic* — The interlock is to consist of two normally open relays and associated actuation circuitry in each module. (See § R1-2.)

4.3.1 *First Relay* — One relay enables opening of the isolation valve of the attached module. Contact closure indicates a safe condition, enabling valve opening. Contact opening disables valve opening if the valve is closed. Contact opening does not cause the valve to close if the valve is open. (See § R1-3.)

4.3.2 *Second Relay* — The other relay enables closure of the isolation valve of the attached module. Contact closure indicates a safe condition, enabling valve closure. Contact opening disables valve closure if the valve is open. Contact opening does not cause the valve to open if the valve is closed.

1 United States Military Standards, Available through the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099, USA. Telephone: 215.697.3321

4.3.3 *Monitoring* — Situations can arise where the module A interlock inhibits an operation of the valve on module B, when that valve is already in the inhibited condition. This potential conflict must be detected and resolved within module B. (See § R1-3.)

4.4 *Contact Rating* — The relay contacts shall be rated for a minimum of 1 A at 24 VDC.

4.5 *Wiring* — Copper wire used in the interlock circuit shall be 0.82 mm² cross section (18 AWG) or larger.

4.6 *Interlock Connectors* — Metal shell bayonet-type connectors are specified per MIL-C-26500E as follows: MS24265R18B11SN panel mounted receptacles on each of the modules and MS24266R18B11PN plugs terminating each end of the cable which interconnects the interlock receptacles of two connected modules.

4.7 *Interlock Connector Pinouts*

4.7.1 *Receptacle* — Pins 2 and 3 of the receptacle are connected across the contacts of the relay specified in § 4.3.1. Pins 5 and 6 are connected to the circuit which enables opening of the module's isolation valve at that interface. Pins 7 and 8 are connected across the contacts of the relay specified in § 4.3.2. Pins 9 and 10 are connected to the circuit which enables closure of the module's isolation valve at that interface.

4.7.2 *Cable and Plugs* — Pins 2 and 3 of each plug on the interlock cable are connected to pins 5 and 6 respectively of the other plug. Pins 7 and 8 of each plug on the interlock cable are connected to pins 9 and 10 respectively of the other plug. The resulting interlock cable is symmetric.