

SEMI E20-0697 (Withdrawn 1110) CLUSTER TOOL MODULE INTERFACE: ELECTRICAL POWER AND EMERGENCY OFF STANDARD

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

1 Purpose

1.1 The purpose of the standard is to specify the Emergency Off capability to the modules of a cluster tool; to allow module Emergency Off disconnect and reconnect in a safe manner without removing power from the rest of the tool; and to prevent power from being applied to a module when its Emergency Off is non-functional.

2 Scope

2.1 The standard deals with the delivery and emergency interruption of electrical power to the modules of a cluster tool.

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 Impact

3.1 The standard requires that power can be delivered to an individual module only if its Emergency Off is functional. This does not preclude removal of power from the module by non-emergency means.

3.2 The standard specifies the Emergency Off circuit functions that must be provided at the Emergency Off interfaces of a cluster tool, including the plug, momentary bypass switch and bypass jumper plug. Pinouts for the Emergency Off plug and bypass jumper plug are specified.

4 Referenced Standards and Documents

4.1 SEMI Standard

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

4.2 Military Standard¹

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

5 Terminology

5.1 Definitions

5.1.1 *daisy-chained* — connected so that the removal of one component causes the interruption of the circuit to another component.

5.1.2 *emergency off (EMO)* — fail-safe control switch or circuit which, when de-energized, will stop the operation of associated equipment and will shut off all potential hazards outside the main power enclosure.

5.1.3 *EMO interface* — the location at which a process or cassette module EMO cable is connected into the cluster tool circuit.

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

6 Requirements

6.1 Power Distribution

6.1.1 *Mains* — Each cluster tool (as defined in SEMI E21) shall have its power provided by one or more contactors enabled by the EMO. The power is to be delivered to one or more power distribution enclosures, where voltage transformation may take place before distribution to the module (as defined in SEMI E21).

6.1.2 *Module Power Distribution* — The power distribution to each module is provided through a dedicated circuit breaker in the power distribution enclosure. The rated current and voltage in each circuit is determined by the tool configuration. A discussion of how this standard may be implemented is given in Related Information R1-1.

6.1.3 *Operation of the EMO* — Activation of the EMO shall not cause or allow an unsafe condition to exist (see Related Information R1-2).

6.2 EMO Circuit

6.2.1 *Description* — Each module attached to the cluster tool is to have at least one EMO button operating an EMO switch (see Related Information R1-3). The switches are daisy chained into a circuit, or circuits, that disconnect the main power and any backup power sources. The 24 VAC power to energize this circuit is provided from within a main power enclosure, so that the EMO circuit is independent of module power. Each module EMO is connected to the chain at its EMO interface. A momentary bypass switch, also located at each module EMO interface, allows separation of the module from the cluster tool without tripping the EMO, provided that electrical power is removed from the module by turning off the dedicated circuit breaker (see Related Information R1-4). Jumpers in the bypass jumper plug connect the EMO circuit in series with contacts that open if the dedicated circuit breaker is turned on.

6.2.2 *Wiring* — Copper wire used in the EMO circuits shall be 0.82 mm² cross-section (#18 AWG) or larger.

6.2.3 *Labeling* — A label with the following legend is to be affixed to the power distribution enclosure near each module circuit breaker: **CAUTION:** Energizing this circuit with the associated EMO bypass jumper plug installed will interrupt power to the entire cluster tool.

6.3 Connection at EMO Interface

6.3.1 *EMO Connector* — The connector at the EMO interface is reserved for EMO functions only. Metal shell bayonet-type connectors are specified per MIL-C-26500E as follows: MS24265R16B10SN on the panel, and MS24266R16B10PN on the cable and on the EMO bypass jumper plug. The receptacle is panel mounted at the EMO interface and the plug is mounted on the module EMO cable.

6.3.2 *Module EMO Connector Pinouts* — Pins 1 and 2 of the EMO cable plug connect across contacts in the module EMO switch. In the receptacle, pins 1 and 2 connect to the EMO circuit and pins 3 and 4 connect across the contacts specified in § 6.2.1.

6.3.3 *EMO Bypass Jumper Plug* — Pin 1 is jumpered to pin 4 and pin 2 is jumpered to pin 3 in the plug. This will result in placing the contacts specified in § 6.2.1 into the EMO circuit when the plug is installed.