# Application

## Module Configuration

There is no configuration required to the physical Output Module. All configurable characteristics of the Module are performed using tools on the Engineering Workstation (EWS) and become part of the application or System.INI file that is loaded into the TMR Processor. The TMR Processor automatically configures the Output Module after applications are downloaded and during Active/Standby changeover.

The IEC 61131 TOOLSET provides the main interface to configure the Output Module. Details of the configuration tools and configuration sequence are provided Trusted Toolset Suite Product Description, publication ICSTT-RM249 (PD-T8082). There are three procedures necessary to configure the Output Module:

1. Define the necessary I/O variables for the field output data and Module status data using the Dictionary Editor of the IEC 61131 TOOLSET.
2. Create an I/O Module definition in the I/O Connection Editor for each I/O Module. The I/O Module definition defines physical information, for example, Chassis and Slot location, and allows variables to be connected to the I/O channels of the Module.
3. Using the Trusted® System Configuration Manager, define custom LED indicator modes, per-channel default or fail-safe states, and other Module settings.

## T8461 Complex Equipment Definition

The T8461 I/O Complex Equipment Definition includes eight I/O boards, referenced numerically by Rack number:

**Table 3 Complex Equipment Definition**

| Rack | I/O Board | Description | Data Type | Direction | No. of Channels |
|---|---|---|---|---|---|
| 1 | DI | OEM Parameters | - | - | - |
| | | Field Output Status | Boolean | Out | 40 |
| 2 | STATE | Field Output State | Integer | In | 40 |
| 3 | AI | Output voltage | Integer | In | 40 |
| 4 | CI | Output current | Integer | In | 40 |
| 5 | LINE_FLT | Line Fault Status | Boolean | In | 40 |
| 6 | DISCREP | Channel Discrepancy | Integer | In | 3 |
| 7 | HKEEPING | Housekeeping Registers | Integer | In | 57 |
| 8 | INFO | I/O Module Information | Integer | In | 11 |

There are two OEM parameters that are included in the first rack (DO Board). These OEM parameters define the primary Module position; declaring the

Module's chassis and slot location. There is no need to define the secondary Module position within the IEC 61131 TOOLSET. Where systems may be required to start up with Modules in the secondary position as the Active Module, for example, primary Module is not installed when application is started, the secondary Module's position should be declared in the Module definition of the System Configuration Manager.

**Table 4 OEM Parameters**

| OEM Parameter | Description | Notes |
|---|---|---|
| TICS_CHASSIS | The number of the Trusted Chassis where the primary I/O Module is installed | The Trusted Controller Chassis is 1, and Trusted Expander Chassis are 2 to 15. |
| TICS_SLOT | The slot number in the Chassis where the primary I/O Module is installed | The I/O Module slots in the Trusted Controller Chassis are numbered from 1 to 8.<br>The I/O Module slots in the Trusted Expander Chassis are numbered from 1 to 12. |

This board provides the connection to the logical output control signal for each of the field outputs.

**Table 5 Rack 1: DO descriptions**

| Channel | Description |
|---|---|
| 1 | Field output channel 1 logical state |
| 2 | Field output channel 2 logical state |
| | |
| 40 | Field output channel 40 logical state |

The user application should set the output control signal to true (logic '1') to turn ON or energize an output, and false (logic 'o') to turn OFF or de-energize an output.

This board provides the majority voted numerical output state. This indicates the operational status of the output channel and associated field connection.

**Table 6 Rack 2: STATE bit Descriptions**

| Channel | Description |
|---|---|
| 1 | Field output channel 1 state |
| 2 | Field output channel 2 state |
| | |
| 40 | Field output channel 40 state |

**Table 7 Rack 2: State Output Descriptions**

| Channel | Description |
|---|---|
| 7 | Channel fault |

**Table 7 Rack 2: State Output Descriptions**

| Channel | Description |
|---|---|
| 6 | Field fault (for example, field leakage to 0V or 24V) |
| 5 | Short circuit in field wiring or load |
| 4 | Output energized (ON) |
| 3 | Open circuit in field wiring or load |
| 2 | Output de-energized (OFF) |
| 1 | No field supply voltage |
| 0 | Unused |

## Rack 3: AI

The AI board returns the field loop voltage at the output.

**Table 8 Rack 3: AI Descriptions**

| Channel | Description |
|---|---|
| 1 | Field output channel 1 voltage |
| 2 | Field output channel 2 voltage |
| | |
| 40 | Field output channel 40 voltage |

The voltage is the median value that is taken from the triplicated Module. The voltage level is reported as an integer, with the units being 1/500V. This may be used directly, scaled arithmetically, or scaled using the IEC 61131 TOOLSET conversion tables.

To scale the value arithmetically, simply divide the returned 'integer' by 500 to return the voltage as either a REAL or INTEGER as required.

The IEC 61131 TOOLSET conversion tables may be used to convert the value to engineering units, in this case voltage. The full-scale range for this number format is decimal ±64, corresponding to physical range –32000 to +32000.

## Rack 4: CI

The CI board returns the field loop current at the output.

**Table 9 Rack 4: CI Descriptions**

| Channel | Description |
|---|---|
| 1 | Field output channel 1 current |
| 2 | Field output channel 2 current |
| | |
| 40 | Field output channel 40 current |

The current is the sum value that is taken from the triplicated Module. The current level is reported as an integer, with the units being 1/1000A. This may be used directly, scaled arithmetically or scaled using the IEC 61131 TOOLSET conversion tables.

To scale the value arithmetically, simply divide the returned 'integer' by 1000 to return the current as either a REAL or INTEGER as required.

The IEC 61131 TOOLSET conversion tables may be used to convert the value to engineering units, in this case current. The full-scale range for this number format is decimal ±32, corresponding to physical range –32000 to +32000.

## Rack 5: LINE_FLT

This table describes Rack 5: LINE_FLT:

**Table 10 Rack 5: LINE_FLT Descriptions**

| Channel | Description |
|---|---|
| 1 | Field output channel 1 line fault |
| 2 | Field output channel 2 line fault |
| | |
| 40 | Field output channel 40 line fault |

The line fault input state is reported as true (logic '1') for a line fault condition (open circuit, short circuit, and no field supply voltage). The logic state is the majority voted value.

## Rack 6: DISCREP

This table describes Rack 6: DISCREP:

**Table 11 Rack 6: DISCREP bit Descriptions**

| Channel | Description |
|---|---|
| 1 | Discrepancy status outputs 1 to 16 (output 1 is LSB) |
| 2 | Discrepancy status outputs 17 to 32 (output 17 is LSB) |
| 3 | Discrepancy status outputs 33 to 40 (output 33 is LSB) |

Each of the words reports the discrepancy status of 16 output channels. The corresponding bit within the word is set to '1' when a discrepancy condition is detected on that output channel's output state (rack 2).

## Rack 7: HKEEPING

This table describes Rack 7: HKEEPING.

**Table 12 Rack 7: Housekeeping Descriptions**

| Channel | Description | | | | |
|---|---|---|---|---|---|
| | FCR | | Units (Full Scale Range) | | |
| 1 | A | 24V2 Output Voltage | -32768 | 32767 | mV |
| 2 | B | | | | |
| 3 | C | | | | |
| 4 | A | Internal supply voltage (post regulator) | -32768 | 32767 | mV |
| 5 | B | | | | |
| 6 | C | | | | |
| 7 | A | Internal supply current (post regulator) | -32768 | 32767 | mA |
| 8 | B | | | | |
| 9 | C | | | | |
| 10 | A | Output voltage (post isolation) | -32768 | 32767 | mV |
| 11 | B | | | | |
| 12 | C | | | | |
| 13 | A | 24V1 Output Voltage | -32768 | 32767 | mV |
| 14 | B | | | | |
| 15 | C | | | | |
| 16 | A | HIU Board Temperature (Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 17 | B | | | | |
| 18 | C | | | | |
| 19 | A | Front Panel Load Current | -32768 | 32767 | mA |
| 20 | B | | | | |
| 21 | C | | | | |
| 22 | A | SmartSlot Link Voltage | -32768 | 32767 | mV |
| 23 | B | | | | |
| 24 | C | | | | |
| 25 | A | FIU Output Group 1 Field Supply Voltage | -32768 | 32767 | 1/500V |
| 26 | B | | | | |
| 27 | C | | | | |
| 28 | A | FIU Board Temperature, Output Group 1 (Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 29 | B | | | | |
| 30 | C | | | | |
| 31 | A | FIU Output Group 2 Field Supply Voltage | -32768 | 32767 | 1/500V |
| 32 | B | | | | |
| 33 | C | | | | |
| 34 | A | FIU Board Temperature, Output Group 2 (Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 35 | B | | | | |
| 36 | C | | | | |
| 37 | A | FIU Output Group 3 Field Supply Voltage | -32768 | 32767 | 1/500V |
| 38 | B | | | | |
| 39 | C | | | | |
| 40 | A | FIU Board Temperature, Output Group 3 (Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 41 | B | | | | |
| 42 | C | | | | |
| 43 | A | FIU Output Group 4 Field Supply Voltage | -32768 | 32767 | 1/500V |
| 44 | B | | | | |
| 45 | C | | | | |
| 46 | A | FIU Board Temperature, Output Group 4 (Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 47 | B | | | | |
| 48 | C | | | | |
| 49 | A | FIU Output Group 5 Field Supply Voltage | -32768 | 32767 | 1/500V |

| Channel | Description | | | | |
|---|---|---|---|---|---|
| | FCR | | Units (Full Scale Range) | | |
| 50 | B | | | | |
| 51 | C | | | | |
| 52 | A | FIU Board Temperature, Output Group 5<br>(Note: Temperature, °C = input value / 256) | -32768 | 32767 | - |
| 53 | B | | | | |
| 54 | C | | | | |
| 55 | A | Diagnostic error code | | | |
| 56 | B | | | | |
| 57 | C | | | | |

Each input within the housekeeping rack is reported as an integer. In general, the application engineer does not normally require these inputs. They are provided to aid fault finding and diagnosis and may be used for reporting and display purposes. If a slice is Fatal, then all reported housekeeping inputs are set to zero.

## Rack 8: INFO

This table describes Rack 8: INFO:

**Table 13 Rack 8: INFO Descriptions**

| Channel | Description |
|---|---|
| 1 | Active Module chassis number |
| 2 | Active Module slot number |
| 3 | Active Module healthy |
| 4 | Active Module mode |
| 5 | Standby Module chassis number |
| 6 | Standby Module slot number |
| 7 | Standby Module healthy |
| 8 | Standby Module mode |
| 9 | FCR status |
| 10 | Primary Module is active |
| 11 | Active Module is simulated |

The Active Module chassis and slot numbers indicate the position of the currently Active Module. These values change to match the primary or secondary Module position, depending on their Active status, that is, Active/Standby changeover “swaps” the values for the Active Module chassis and slot number channels with those in the Standby Module chassis and slot number channels. The chassis and slot numbers are set to zero if the Module is not present.

The Active and Standby Module healthy channel is returned as an integer, however only the least significant bit is used. A value of 0 indicates that a fault has been detected, a nonzero value indicates that the Module is healthy.

The Active and Standby Module Mode is an integer indicating the current operating mode of the associated Module. The value indicates the current internal operating mode of the Module.

**Table 14 Rack 8: INFO bit Descriptions**

| Channel | Description |
|---|---|
| 5 | Shutdown |
| 4 | Maintain |
| 3 | Active |
| 2 | Standby |
| 1 | Configuration |
| 0 | Unknown, no Module present |

The FCR Status channel reports the fault status of the Active and Standby Modules. The value is bit-packed as shown below, the least significant byte is used with the most significant 8-bits set to zero:

**Table 15 Rack 8: FCR bit Descriptions**

| Bit | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Standby Module | | | | Active Module | | | |
| Ejectors open | FCR C Healthy | FCR B Healthy | FCR A Healthy | Ejectors open | FCR C Healthy | FCR B Healthy | FCR A Healthy |

The 'Primary Module is active' channel is set to nonzero if the primary Module is the current Active Module, that is, the Active Module is in the chassis and slot numbers defined within the OEM parameters.

The 'Active Module is simulated' channel is set to nonzero if the Active Module is being simulated, this is only set if the Module is not present or the simulation enable has been set within the Module's configuration in the System.INI file.

## Sequence of Events Configuration

Each Boolean Output Variable can be configured for automatic Sequence of Events (SOE) logging. This applies to the Output Status and Line Fault Status variables. A Boolean variable is configured for SOE during the variable definition in the Data Dictionary Editor. To select SOE, press the Extended Button in the Boolean Variable Definition Dialog Box to open the Extended Definition Dialog. Then check the box for Sequence of Events to enable the variable for automatic SOE logging.

During operation, the Output Module automatically reports time-stamped change of state information for the output data. The TMR Processor automatically logs change of state for configured SOE variables into the system SOE Log. The SOE Log can be monitored and retrieved using the SOE and Process Historian Package running on the EWS. This software package is described in Trusted Sequence of Events and Process Historian Package Product Description, publication ICSTT-RM243 (PD-T8013).

# Operation

## Front Panel

Status indicators on the Front Panel of the Module provide visual indications of the Module's operational status and field output status. Each indicator is a bicolor LED. At the top and bottom of each Module is an ejector lever that is used to remove the Module from the Chassis. Limit switches detect the open/closed position of the ejector levers. The ejector levers are normally latched closed when the Module is firmly seated into the Controller or Expander Chassis.

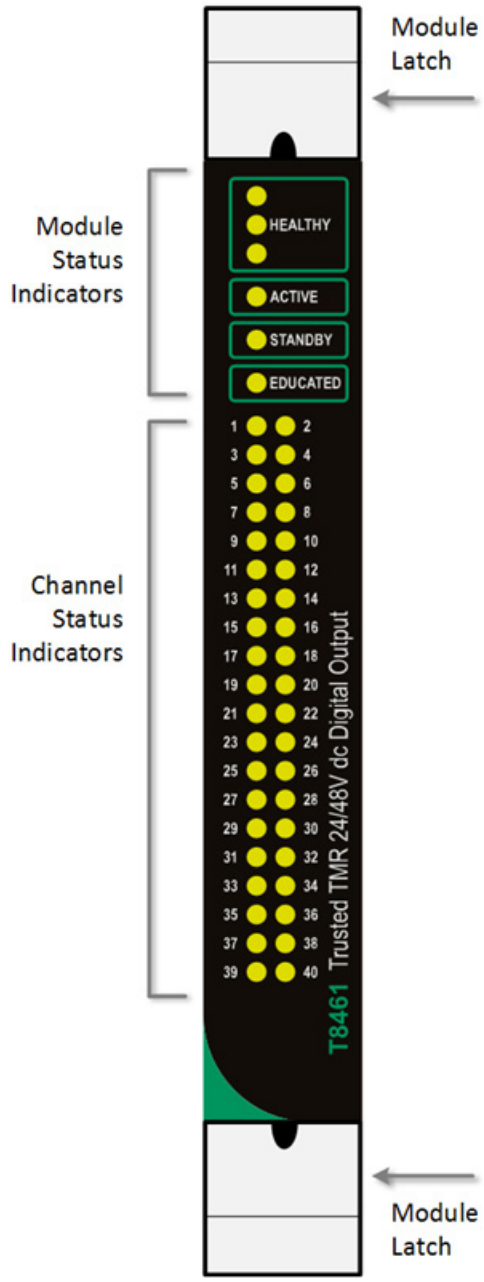


*Figure 6: Module Front Panel*

## Module Status LEDs

There are six Module status indicators on the Module Front Panel: three Healthy, one Active, one Standby, and one Educated. The Healthy indicators are controlled directly by each Module slice. The Active, Standby, and Educated indicators are controlled by the FPU. The FPU receives data from each of the Module slices. It performs a 2003 vote on each data bit from the slices and sets the indicators accordingly.

The Module status indicator modes and their meanings are described as follows:

**Table 16 Module Status LEDs**

| Indicator | State | Description |
|---|---|---|
| Healthy | Off | No power applied to the Module. |
| | Amber | Slice is in the startup state (momentary after installation or power-up). |
| | Green | Slice is healthy. |
| | Red – flashing | Fault present on the associated slice but the slice is still operational. |
| | Red (momentary) | On installation – power applied to the associated slice. |
| | Red | The associated slice is in the fatal state. A critical fault has been detected and the slice disabled. |
| Active | Off | Module is not in the Active state. |
| | Green | Module is in the Active (or Maintain) state. |
| | Red – flashing | Module is in the shutdown state if the Standby LED is off. |
| | | Module is in the fatal state if the Standby LED is also flashing. |
| | Red – flashing | |
| Standby | Off | Module is not in the Standby state. |
| | Green | Module is in the Standby state. |
| | Red – flashing | Module is in the fatal state. The Active LED is also flashing red. |
| Educated | Off | Module is not educated. |
| | Green | Module is educated. |
| | Green – flashing | Module is recognized by the Processor but education is not complete. |
| | Amber - Flashing | Active/Standby changeover in progress. |

## I/O Status Indicators

There are 40 output channel status indicators on the Module Front Panel, one for each field output. These indicators are controlled by the FPU. The FPU receives data from each of the Module slices. The FPU performs a 2003 vote on each data bit from the slices and sets the indicators accordingly.

The output status indicator mode is dependent upon the numerical state of the output channel. Each output state can be defined to have a particular indicator mode: off, green, red, flashing green, or flashing red.

The configurable indicator modes allow users to customize the output status indications to suit individual application requirements. Without customization, the default indicator modes are suitable for line-monitored digital output devices as described here:

**Table 17 I/O Status LEDs**

| Channel | Description |
|---|---|
| Off | Output is Off. |
| Green | Output is On. |
| Green – flashing | No Load, output open circuit. |
| Red | Field short circuit, output over current protection triggered and output channel is latched off. |
| Red-flashing | Channel fault, or no field supply voltage. |

Tip: The LEDs indicating channel status may be configured to suit user requirements by implementing the procedure for configuring the System.INI file detailed in Trusted Toolset Suite Product Description, publication ICSTT-RM249 (PD-T8082).

# Fault Finding and Maintenance

## Fault Reporting

Output Module faults are reported to the user through visual indicators on the Front Panel of the Module and through status variables, which may be automatically monitored in the application programs and external system communications interfaces. There are generally two types of faults that must be remedied by the user: external wiring and Module faults. External wiring faults require corrective action in the field to repair the fault condition. Module faults require replacement of the Output Module.

## Field Wiring Faults

By measuring the output channel voltage and current, the Module automatically detects field-wiring and load faults. When a field signal fails open circuit, short circuit or there is no field supply voltage connected, the output status indicator displays the configured LED mode, the corresponding output state is reported and the line fault status for that channel is set to '1'. All other output channels are unaffected, except in the case of common cause wiring and supply voltage faults in the field.

The field output voltage and current variables can be monitored to determine the actual operating conditions of each output channel. This additional information assists the user in determining the specific type of wiring fault.

Once the specific field-wiring fault has been identified and corrected, the output status variables and output status indicator display the normal on/off status of the field device.

## Module Faults

Extensive diagnostics provide the automatic detection of Module faults. The TMR architecture of the Output Module and the diagnostics performed verify the validity of all critical circuits. Using the TMR architecture provides a Fault Tolerant method to withstand the first fault occurrence on the Module and continue normal output controls without interruption in the system or process. Faults are reported to the user through the Healthy status indicators on the Front Panel of the Module and through the INFO and HKEEPING variables. Under normal operations, all three Healthy Indicators are green. When a fault occurs, one of the Healthy Indicators is flashing red. It is recommended that this condition is investigated and if the fault is within the Module, it should be replaced.

Module replacement activities depend on the type of spare Module configuration that is chosen when the system was configured and installed. The Module may be configured with a Dedicated Standby Slot or with a SmartSlot for a spare replacement Module.

## Companion Slot

For a Companion Slot configuration, two adjacent slots in a Trusted Chassis are configured for the same Module function. One slot is the primary slot and the other a unique secondary (or spare) slot. The two slots are joined at the rear of the Trusted Chassis with a double-wide I/O Interface Cable that connects both slots to common field wiring terminations. During normal operations, the primary slot contains the Active Module as indicated by the Active indicator on the Front Panel of the Module. The secondary slot is available for a spare Module that is normally the Standby Module as indicated by the Standby indicator on the Front Panel of the Module.

Depending on the installation, a hot-spare Module may already be installed, or a Module blank is installed in the Standby slot. If a hot-spare Module is already installed, transfer to the Standby Module occurs automatically when a Module fault is detected in the Active Module. If a hot-spare is not installed, the system continues operating from the Active Module until a spare Module is installed.

## SmartSlot

For a SmartSlot configuration, the secondary slot is not unique to each primary slot. Instead, a secondary slot is shared among many primary slots. This technique provides the highest density of Modules to be fitted in a given physical space. At the rear of the Trusted Chassis, a single-wide I/O Cable connects the secondary slot directly to the I/O Cable connected to the failed primary Module. With a spare Module installed in the SmartSlot and the SmartSlot I/O Cable connected to the failed primary Module, the SmartSlot can be used to replace the failed primary Module.

Output Module Smart Slot jumper cable TC-308-02

Smart Slot between Chassis can be performed if the Chassis are version 2 (or higher). These have the connector fitted to enable connection of a TC-006 that verifies that the 0 Volt of each Chassis is at the same potential.

## Cold Start

If an I/O Module has shut down (due, for example, to two existing faults), the three Healthy LEDs becomes red, the Active and Standby LEDs are flashing red and the Educated LED is flashing amber. The I/O functions that are provided by this Module are lost if a hot swap partner has not taken over control. The Module can only be restarted by removing it from its slot and reinserting it.

If an I/O Module is inserted into a functional system slot that previously had no Active Module (for example, removing and reinserting as above), then the Processor educates the Module once it has booted. Once educated, the Educated LED becomes steady green and the Active LED becomes red flashing.

Input Modules are now reading and reporting their inputs. Output Modules have not yet energized their outputs. To activate outputs and to set the

Module's Active LED and the Processor's System Healthy LED steady green, press the Processor Reset push button.

## Transfer between Active and Standby Modules

The TMR Processor is responsible for managing a pair of I/O Modules through an Active/Standby changeover. The following rules apply to Active/Standby changeovers, though the TMR Processor and not the I/O Module enforces them:

- The user must define the primary, and optionally the secondary, I/O Module location for each I/O Module pair. Each primary Module location must be unique and is defined as part of the complex equipment definition within the IEC 61131 TOOLSET. Secondary Module locations can be unique or shared between multiple secondary Modules and are defined within the Module's section within the System.INI file. The system automatically determines the secondary Module position if the primary Module is installed and is operable.
- On initial startup, if the primary Module is installed, it becomes the Active Module by default. If the secondary Module has been defined within the System.INI file and no primary Module is present, and if the secondary Module location is unique, the secondary Module becomes the Active Module by default. If the secondary Module is installed with no primary Module present, and the secondary Module location is not unique (as in a SmartSlot configuration), then NO Module for that Module pair becomes Active.
- In order for a Module to become the Active Module, the TMR Processor verifies that the Module is the correct I/O Module type and that both Module Removal switches are closed. At this point, the I/O Module is configured and eventually placed in the Active state.
- A Module in the Active state should never be removed.
- When a fault occurs on the Active Module, the TMR Processor is informed. Once it becomes aware of the fault, the TMR Processor attempts an Active/Standby changeover.
  - An Active/Standby changeover starts with the TMR Processor checking to see if a Standby I/O Module is installed. If no Standby I/O Module is available, the TMR Processor continues to use the Active Module and continues to check for an available Standby I/O Module. Once a Standby Module is found, the TMR Processor verifies that the I/O Module is of the correct type, that both Module Removal switches are closed, and that the I/O Module is a part of the correct Module pair by using the SmartSlot link. At this point, the TMR Processor configures the Standby I/O Module with the same configuration information as the currently Active I/O Module and place the Standby I/O Module into the Standby state. The Active Module is then placed in the Maintain state (which suspends field loop testing), and any Module-specific changeover data is transferred. The educated light flashes amber before the

Active/Standby changeover takes place, to indicate transfer of dynamic change over data (COD). The previous Standby Module then becomes the Active Module and the original Module becomes Standby. If the currently Active Module does not successfully complete the self-tests, the TMR Processor reverts it to the Standby state, and the Module in the Maintain state reverts to the Active state.

- When both Module Removal switches are opened on an Active Module, regardless of the Module fault status, the TMR Processor treats it as a request to perform an Active/Standby changeover.

Under normal conditions, an Active/Standby changeover only occurs if the new Active Module is fault free. Under some circumstances, it is desirable to be able to force a changeover to a known faulted Module. This can be accomplished by opening the Module Removal switches on the currently Active Module and pressing the reset push button on the TMR Processor. This forces the changeover to proceed even if the new Active Module is not fault free.

# Specifications

This table lists the module specifications:

| Item | Description |
|---|---|
| Backplane (IMB) Supply | |
| Voltage | 20V DC to 32V DC |
| Power | 26 W |
| Field Supply | |
| Voltage | 18V DC to 58V DC |
| Maximum Current | 30 A |
| Power Dissipation | |
| Field Supply at maximum power group current. | 36 W |
| System Supply | 26 W |
| Module Location | T8100, T8300 I/O Module Slot |
| Isolation | |
| Power Group to Power Group | 50V Reinforced (continuous)[4]<br>[Type tested at 1411V DC for 60 s]. |
| Field Common | 50V Reinforced (continuous)[5]<br>250V Basic (fault)[6]<br>[Type tested at 2436V DC for 60 s]. |
| Channel to Channel | None |
| Fusing | Not user serviceable |
| Number of Outputs | 40 |
| Number of Power Groups | 5<br>Each Power Group comprises 8 channels |
| Output | |
| Output On State resistance | 1.6 Ω |
| Maximum Current Rating (Continuous) | 0.75 A per channel |
| Minimum On State Load Current | 25 mA |
| Current Measurement Range | 0 A to 1.35 A ±5% / ±5 mA[7] |
| Voltage Measurement Range | 0V DC to +58V DC ±2V DC |
| Maximum Withstanding | -1V DC to +60V DC |
| Channel to Channel Crosstalk | < 1% |
| Maximum Load Capacitance | 500 µF |
| Output Short Circuit Protection | Electronic latching |
| Sequence of Events | |
| Event Resolution (LSB) | 1 ms |
| Time stamp Accuracy | ±10 ms |

[4] 50 Vrms Secondary circuit derived from Mains, OVC II up to 300V.

[5] 50 Vrms Secondary circuit derived from Mains, OVC II up to 300V.

[6] 250 Vrms Mains circuit, OVC II up to 300V. Exposure to voltages at these levels shall be temporally constrained consistent with the system MTTR.

[7] Tolerance is ±5 mA up to 0.9 A, thereafter is ±5%.