

Product Specifications

Digital Output Modules

Each TMR Digital Output Module has three isolated sets of electronics, called channels, which independently accept data from the MP associated with each channel. The channels use the patented Quad Voter circuitry to vote on individual output signals as they are applied to the load.

This voter circuitry is based on parallel-series paths which pass power if two out of three switches (channels A and B, or channels B and C, or channels A and C) command them to close. The

Quad Voter circuitry has multiple redundancy on all critical signal paths, guaranteeing safety and maximum availability.

For each point, the DO Module periodically executes the Output Voter Diagnostic (OVD) routine. To allow unrestricted safe operation under a variety of multiple-fault scenarios, OVD detects and alarms these types of faults:

- Points—all stuck-on and stuck-offs are detected.

- Switches—all stuck-on or stuck-off switches or their associated drive circuitry are detected.

DO Modules include complete, ongoing diagnostics for each channel. If the diagnostics detect a failure on any channel, the Fault indicator turns on and activates the system alarm. The Fault indicator identifies a channel fault, not a complete module failure. DO Modules are guaranteed to operate properly in the presence of a single fault and may continue to operate properly with certain multiple faults.

Digital Output Module Specifications

Model Number	3401S2	3411S2
Points	16, commoned	16, commoned
Nominal output voltage	24 VDC	24 VDC
Specified operational voltage range	19 to 30 VDC	19 to 30 VDC
Absolute maximum output voltage	33 VDC	45 VDC
Absolute maximum reverse input voltage	– 0.6 VDC	– 0.6 VDC
Minimum required field load	n/a	30 mA
Output current		
Switching	<4.8 A, self-limiting 3.0 A, typical	<4.8 A, self-limiting 3.0 A, typical
Carry	700 mA maximum, self limiting	700 mA maximum, self limiting (See the <i>Planning and Installation Guide for Triconex General Purpose v2-v3 Systems</i> for extended carry current limits and conditions.)
Field alarms	Loss of field power, output point shorted On or Off	Loss of field power, output point shorted On or Off
Loop-back thresholds	0–5 VDC = Off region 6–14 VDC = transition region 15–30 VDC = On region	0–5 VDC = Off region 6–14 VDC = transition region 15–30 VDC = On region
Leakage to load (Off state)	<1 mA	<1 mA
Diagnostic glitch duration	<2 ms, maximum 500 μ s, typical	<2 ms, maximum 500 μ s, typical
Diagnostic fault coverage		
Maximum toggle rate	>20 ms	>20 ms
Minimum toggle rate	Not applicable	Not applicable
On state voltage drop	<1.0 VDC @ 1.5 A	<1.6 VDC @ 1.6 A
Loop-back scan time	<1.0 ms for all 16 points	<8.0 ms for all 16 points
Functional earth to protective earth isolation	500 VDC, minimum	500 VDC, minimum
Functional earth to functional earth (logic) isolation	800 VDC, minimum	800 VDC, minimum