Dual Digital Output Module

Dual Digital Output (DDO) modules receive output signals from the Main Processors along a single parallel or series path, and applies a 2-out-of-3 voting process individually to each switch. The switches produce one output signal which is then passed to the field termination. While the quadruplicated output circuitry on TMR modules provides multiple redundancy for all critical signal paths, dual circuitry provides just enough redundancy to ensure safe operation. DDO modules are optimized for those safety-critical control programs where low cost is more important than maximum availability.

DDO modules have a voltage-loopback circuit which verifies the operation of each output switch independently of the presence of a load and determines whether latent faults exist. Failure of the detected field voltage to match the commanded state of the output point activates the LOAD/FUSE alarm indicator.

In addition, ongoing diagnostics are performed on each channel and circuit of a DDO module. Failure of any diagnostic on any channel activates the Fault indicator, which in turn activates the chassis alarm signal. A dual module operates properly in the presence of most single faults and may operate properly with some kinds of multiple faults, but stuck-Off faults are an exception. If one of the output switches has a stuck-Off fault, the output goes to the Off state and a glitch may occur during switch-over to a hot-spare module.

DDO modules support hot-spare capability, which allows online replacement of a faulty module. Each module is mechanically keyed to prevent improper installation in a configured chassis.

DDO modules require a separate external termination panel (ETP) with a cable interface to the Tricon backplane. Digital outputs are designed to source the current to field devices, so field power must be wired to each output point on the field termination.

Dual Digital Output Module Specifications

Model Number	3664/3674
Nominal Voltage	24 VDC
Type	Dual DO, serial (recommended for de-energize-to-trip control programs)
Output Signals	32, commoned
Voltage Range	16-30 VDC
Maximum Voltage	36 VDC
Voltage Drop	< 1.5 VDC, typical
Power Module Load	< 10 watts
Current Ratings, Maximum	2A per point 10A surge per 10 ms
Load Leakage	2 mA maximum
Fuses (on Field Termination)	n/a—self-protecting
Point Isolation	1,500 VDC minimum
Diagnostic Indicators	
On or Off State	1 per point
Module Status	PASS, FAULT, ACTIVE
Field Alarm	LOAD/FUSE
Load Alarm, output stuck-On	3664 — Stuck-On point, all others commanded state - On or Off 3674 — Stuck-On point, all others commanded Off (de-energized)
Load Alarm, output stuck-Off	3664 and 3674 — Stuck-Off point, all others commanded state — On or Off
Color Code	Dark blue