

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

TRICONEX

3664

DUAL DIGITAL OUTPUT MODULE

Selected official pages follow this cover with source pagination retained.

REFERENCE PACKAGE

OFFICIAL MANUFACTURER DOCUMENT

Source: Planning and Installation Guide for Tricon v9-v10 Systems

Assembly 9700077-012

Digital Output Modules

This section describes the Digital Output Modules available for use with Tricon v9–v10 systems, which include TMR and Single (non-triplicated) modules. For field wiring information, see [Digital Output Field Wiring Precautions on page 192](#).

Table 30 Digital Output Modules

Model	Voltage	Type
3601E/T	115 VAC	16-point TMR, Non-Commoned
3603B	120 VDC	16-point TMR, Non-Commoned
3603E/T	120 VDC	16-point TMR, Commoned
3604E	24 VDC	16-point TMR, Non-Commoned
3607E	48 VDC	16-point TMR, Non-Commoned
3611E	115 VAC	8-point TMR Supervised, Commoned
3613E	120 VDC	8-point TMR Supervised, Commoned
3614E	24 VDC	8-point TMR Supervised, Commoned
3615E	24 VDC	8-point TMR Supervised, Low Power, Commoned
3617E	48 VDC	8-point TMR Supervised, Commoned
3623/T	120 VDC	16-point TMR Supervised, Commoned
3624	24 VDC	16-point TMR Supervised, Commoned
3625 ¹	24 VDC	32-point TMR Supervised/Non-Supervised, Commoned
3636R/T	Relay, NO	32-point Non-Triplicated, Non-Commoned
3664	24 VDC	32-point Dual Output, Commoned
3674	24 VDC	32-point Dual Output, Commoned

1. The 3625 module can be installed only in Tricon v10.2 and later systems.

Each Digital Output Module houses the circuitry for three identical, isolated channels. Each channel includes an I/O microprocessor which receives its output table from the I/O communication processor on its corresponding Main Processor. All the Digital Output Modules, except the dual DC modules, use special quadruplicated output circuitry which votes on the individual output signals just before they are applied to the load. This voter circuitry is based on parallel-series paths which pass power if the drivers for Channels A and B, or Channels B and C, or Channels A and C command them to close – in other words, 2-out-of-3 drivers voted On. The dual Digital Output Modules provide a single parallel or series path, with the 2-out-of-3 voting process applied individually to each switch.

The quadruplicated output circuitry provides multiple redundancy for all critical signal paths, guaranteeing safety and maximum availability. The dual output module provides just enough redundancy to ensure safe operation. Dual modules are optimized for those safety-critical applications where low cost is more important than maximum availability.

24 VDC Dual Digital Output Modules

This figure is a simplified schematic for models 3664 and 3674, which are Digital Output Modules.

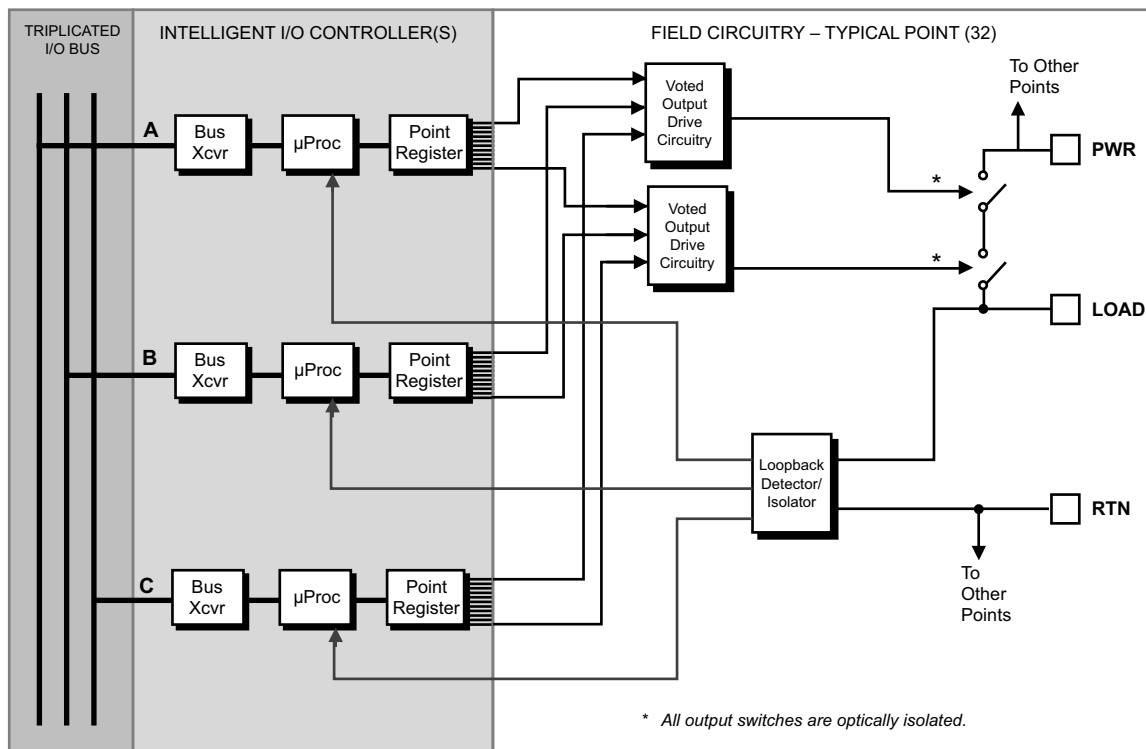


Figure 50 3664 and 3674 Simplified Schematic

This figure shows the front panels of models 3664 and 3674.

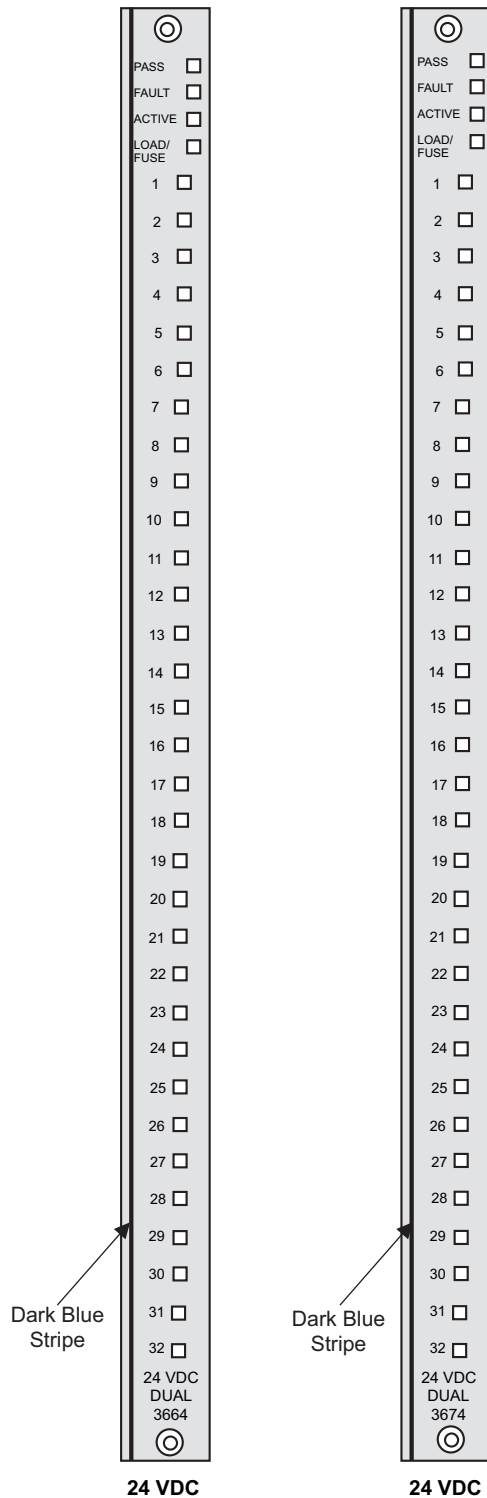


Figure 51 3664 and 3674 Front Panels

3664 and 3674 Specifications

This table lists the specifications for models 3664 and 3674, which are Dual Digital Output Modules with a nominal voltage range of 24 VDC.

Note Models 3664 and 3674 are not recommended for use in energize-to-trip applications because specific hardware faults may cause its outputs to be stuck-Off (de-energized).

Table 45 3664 and 3674 Dual Digital Output Specifications

Feature	Specification
Color code	Dark blue
Number of output signals	32, commoned
Output Configuration	Dual, serial
Recommended voltage range	16–30 VDC
Maximum voltage	36 VDC
Logic power	< 10 watts
Current ratings, maximum	2 amps/point, 10 amps surge/10 ms
Leakage current to load	2 mA, maximum
Fuses (field termination)	Not required; output switches are self-protected against over-voltage, over-temperature, and over-current
Status indicator: On or Off state	1 per point
Status indicator: Module status	Pass, Fault, Active
Status indicator: Field alarm ¹	Load/fuse
Point isolation	1500 VDC minimum
Diagnostic glitch duration ²	2 ms maximum, 500 μ s typical
Output diagnostic fault coverage ³ :	
Maximum output toggle rate	Every 100 ms plus one scan
Minimum output toggle rate	Not required
Output behavior under <i>fault</i> conditions ⁴ :	
Output value before fault	Commanded state—On or Off
Output value after stuck-On fault	Commanded state—On or Off
Output value after stuck-Off fault ⁵	Off (de-energized)
Output value after all other faults	Commanded state—On or Off
Output behavior under <i>field fault</i> conditions:	
Load alarm, output stuck-On: (model 3664)	Stuck point On, all others commanded state—On or Off
Load alarm, output stuck-On: (model 3674)	Stuck point On, all others Off (de-energized)

Table 45 3664 and 3674 Dual Digital Output Specifications (*continued*)

Feature	Specification
Load alarm, output stuck-Off: (models 3664 and 3674)	Stuck point Off, all others commanded state – On or Off
On-state voltage drop: At backplane	< 0.5 VDC typical @ 500mA < 0.5 VDC maximum @ 2A
On-state voltage drop: With external termination, 10-foot cable	< 1.5 VDC typical @ 500mA < 2.5 VDC maximum @ 2A
On-state voltage drop: With external termination, 99-foot cable	< 3.5 VDC typical @ 500mA < 8.5 VDC maximum @ 2A
Inductive kick-back protection (reverse EMF)	Output switches are self-protected

1. Power must be supplied to all points, including unused points on non-commoned panels.
2. Diagnostic glitching can be disabled by using the OVD disable function.
3. The maximum output toggle rate enables proper operation of I/O diagnostics and detection of all normally detectable faults. The minimum toggle rate provides fault coverage of normally undetectable faults within 10% of the calculated mean-time-between-faults (MTBF) for the module.
4. The Dual DO module performs a complete set of diagnostics on each output point periodically. All faults are 100% detectable and are independently reported to the Main Processor by each channel. Specific faults in the output circuitry can force the output to the Off (de-energized) state.
5. A stuck-Off fault results in both a Load/Fuse alarm and a fault in the Dual DO Module. If a Load/Fuse alarm is detected by the Dual DO Module, normal switch-over to a hot-spare module is disabled. This action prevents the output from being forced Off by a stuck-Off fault and then forced back On after the switch-over a few seconds later. To allow switch-over to a healthy module, re-seat the spare module.

Table 74 I/O and Communication Module Slot Keys *(continued)*

Model	Module Name	Top Key	Bottom Key
3624	24 VDC Supervised Digital Output (TMR)	005	004
3625	24 VDC Supervised or Non-Supervised Digital Output (TMR)	006	007
3664/3674	24 VDC Digital Output (Dual)	006	007
3636R	Relay Output, N0 (SIMPLEX)	006	002
3700	0-5 VDC Analog Input (TMR)	003	004
3700A	0-5 VDC Analog Input (TMR)	003	006
3701	0-10 VDC Analog Input (TMR)	003	003
3703E	0-5, 0-10 VDC Isolated Analog Input (TMR)	005	006
3704E	0-5, 0-10 VDC High Density Analog Input (TMR)	006	008
3706A	Non-Isolated Thermocouple Input (TMR)	003	002
3708E	Isolated Thermocouple Input (TMR)	005	007
3720	0-5 VDC Single-Ended Analog Input (TMR)	006	008
3721	0 to 5 or -5 to +5 VDC Differential Analog Input (TMR)	003	004
3805E/H	4-20 mA Analog Output (TMR)	003	008
3806	6 outputs @ 4-20mA, 2 outputs @ 8-320 mA, Analog Output (TMR)	003	008
3807	-60 to +60 mA BiPolar Analog Output (TMR)	003	008
4119	Enhanced Intelligent Communication (EICM)	001	003
4119A	Enhanced Intelligent Communication (EICM)	001	003
4200-3	Primary RXM Multi-Mode Fiber-Optic Module Set	002	003
4201-3	Remote RXM Multi-Mode Fiber-Optic Module Set	002	003
4210-3	Primary SRXM Single-Mode Fiber-Optic Module Set	002	003
4211-3	Remote SRXM Single-Mode Fiber-Optic Module Set	002	003
4329, 4329G	Network Communication (NCM) and NCMG (GPS)	001	003
4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, 4354	Tricon Communication Module (TCM)	001	003
4409	Safety Manager Module (SMM)	001	003
4509E	Hiway Interface Module (HIM)	001	004
4609	Advanced Communication Module (ACM)	001	003