Tricon I/O Modules

Voltage	Description	Type	Model No.	Points	For Details, See
Digital Input Modules					
115 VAC/VDC	Opto-Isolated, Non-Commoned	TMR	3501E/3501T	32	page 33
48 VAC/VDC	Commoned in Groups of 8, Self-Test	TMR	3502E	32	page 33
24 VAC/VDC	Commoned in Groups of 8, Self-Test	TMR	3503E	32	page 33
24/48 VDC	High Density, DC Coupled	TMR	3504E	64	page 34
24 VDC	Low Threshold with Self-test, Commoned	TMR	3505E	32	page 33
24 VDC	Single, Opto-Isolated, Commoned	Single	3564	64	page 34
Pulse Input	Differential, AC Coupled	TMR	3511	8	page 35
Pulse Totalizer	Opto-isolated, Non-commoned	TMR	3515	32	page 36
Digital Output Modules					
115 VAC	Opto-Isolated, Non-commoned	TMR	3601E/3601T	16	page 37
120 VDC	Opto-Isolated, Non-commoned Opto-Isolated, Commoned	TMR	3603B, 3603E/3603T	16	page 37
24 VDC	Opto-Isolated, Non-commoned	TMR	3604E	16	page 37
48 VDC	Opto-Isolated, Non-commoned	TMR	3607E	16	page 37
115 VAC	Galvanically Isolated, Commoned., Supv.	TMR	3611E	8	page 39
48 VDC	Galvanically Isolated, Commoned, Supv.	TMR	3617E	8	page 39
120 VDC	Opto-Isolated, Commoned, Supervised	TMR	3623/3623T	16	page 38
24 VDC	Opto-Isolated, Commoned, Supervised	TMR	3624	16	page 38
24 VDC	Supervised/Non-Supervised, Commoned	TMR	3625	32	page 38
24 VDC	Opto-Isolated, Commoned	Dual	3664	32	page 40
24 VDC	Opto-Isolated, Commoned	Dual	3674	32	page 40
Relay Output	Non-triplicated, Normally Open	Non-triplicated	3636R/3636T	32	page 35
Analog Input Modules					
0-5 VDC	Differential, DC Coupled	TMR	3700A	32	page 41
0-10 VDC	Differential, DC Coupled	TMR	3701	32	page 41
0-5, 0-10 VDC	Differential, Isolated	TMR	3703E	16	page 41
0-5, 0-10 VDC	High-Density, Differential, DC Coupled	TMR	3704E	64	page 41
Thermocouple	Differential, DC Coupled	TMR	3706A	32	page 44
Thermocouple	Differential, Isolated	TMR	3708E	16	page 44
0–5 VDC	Single-Ended	TMR	3720	64	page 41
0 to 5 or –5 to +5 VDC	Differential, DC Coupled	TMR	3721	32	page 41
Analog Output Modules					
4-20 mA	Current Loop, DC Coupled	TMR	3805E	8	page 43
4-20 mA and 20-320 mA	Current Loop, DC Coupled	TMR	3806E	6 and 2	page 43

TMR Digital Output Modules

A TMR digital output (DO) module receives output signals from the main processors on each of three channels. Each set of three signals is then voted by special quadruplicated output circuitry on the module. The circuitry produces one voted output signal and passes it to the field termination. The quadruplicated voter circuitry provides multiple redundancy for all critical signal paths, guaranteeing safety and maximum availability.

Each TMR digital output module has 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 TMR digital output module. Failure of any diagnostic on any channel activates the Fault indicator, which in turn activates the chassis alarm signal. The Fault indicator merely indicates a channel fault, *not* a module failure. The module is guaranteed to operate properly in the presence of a single fault and may continue to operate properly with certain kinds of multiple faults.

All TMR digital output modules support hot-spare capability, and require a separate external termination panel (ETP) with a cable interface to the Tricon backplane. Each module is mechanically keyed to prevent improper installation in a configured chassis.

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.

Model Number	3601E/3601T	3603B/3603E/3603T	3607E	3604E
Nominal Voltage	115 VAC	120 VDC	48 VDC	24 VDC
Type	TMR	TMR	TMR	TMR
Output Signals	16, non-commoned	16, commoned (3603E/T 16, non-commoned (3603B	16, non-commoned	16, non-commoned
Voltage Range	80-155 VAC	90-150 VDC	44-80 VDC	22-45 VDC
Voltage Drop[1]	< 3V, typical	< 1.5V, typical	< 3V, typical	< 4V, typical
Frequency Range	47-63 Hz	n/a	n/a	n/a
Current Ratings, Maximum	2A per point 12A surge/cycle	0.8A per point 4A surge/10 ms	1A per point 5A surge/10 ms	2A per point 10A surge/10 ms
Load Leakage	2 mA maximum @ 60 Hz	2 mA maximum	2 mA maximum	2 mA maximum
Chassis Leakage	4 mA maximum @ 60 Hz	n/a	n/a	n/a
Fuses (on Field Termination)	1 per output, 3A fast-acting	1 per output, 1.0A fast-acting	1 per output, 1.25A fast-acting	1 per output, 2.5A fast-acting
Point Isolation	1500 VDC/ 2500 VDC[2]	1500 VDC/ 2500 VDC[3]	1500 VDC	1500 VDC
Diagnostic Indicators				
ON or OFF state	1 per point	1 per point	1 per point	1 per point
Module Status	PASS, FAULT, ACTIVE	PASS, FAULT, ACTIVE	PASS, FAULT, ACTIVE	PASS, FAULT, ACTIVE
Field Alarm	LOAD/FUSE	LOAD/FUSE	LOAD/FUSE	LOAD/FUSE
Color Code	Green	Blue	Light Blue	Dark Blue

1. **WARNING**: The voltage drop may be significantly higher in some applications.
2. For 3601T.
3. For 3603T.

Field Termination Options

Match your I/O module number in the first column with termination options on the right. An I/O module can be wired to a maximum of two termination panels, which may be of two different types—for example, commoned and non-commoned.

Module Part #	Module Description	Commoned Term Panels	Non-Common. Term Panels	Basic Term Panels	Nonincendive Term Panels	Fanned-out Cables	Bypass Panels	ERT Loop-Back Cables/Panels
3501E 3501T	DI, 115 VAC/VDC, 32 pts.	9561-810	9561-110	9551-110	n/a	9101-010	n/a	9141-010
3502E	DI, 48 VAC/VDC, 32 pts.	9562-810	n/a	9552-610	n/a	9101-010	n/a	9142-010
3503E	DI, 24 VAC/VDC, 32 pts.	9563-810	n/a	9553-610	9572-610	9101-010	BP9228-010	9143-010
3504E	DI, 24/48 VDC, non-isolated, 64 pts.	9566-810, 24V 9565-810, 48V	n/a n/a	9750-310, 24V 9750-410, 48V	9570-610, 24V n/a	n/a n/a	BP9229-010 n/a	n/a n/a
3505E	DI, 24 VDC, low threshold, 32 pts.	9563-810	n/a	9553-610	9572-610	9101-010	BP9228-010	9143-010
3510	PI, 20-20,000 Hz, 8 pts.	n/a	n/a	9753-110	n/a	n/a	n/a	n/a
3511	PI, 20-20,000 Hz, 8 pts.	n/a	n/a	9753-110	9793-110	n/a	n/a	n/a
3515	Pulse totalizer, 24 VDC, 32 pts.	n/a	n/a	9753-110	9572-610	n/a	n/a	n/a
3564	DI, 24 VDC, single, 64 pts.	9566-710	n/a	9553-610	9571-610	9101-010	n/a	n/a
3601E	DO, 115 VAC, 16 pts.	9661-610 9663-610	9661-110 9664-110	9651-110	n/a	9101-010	n/a	9670-110 9670-610
3601T	DO, 115 VAC, 16 pts.	9663-610	9664-110	n/a	n/a	n/a	n/a	n/a
3603B	DO, 120 VDC, 16 pts.	n/a	9251–210	n/a	n/a	n/a	n/a	n/a
3603E	DO, 120 VDC, 16 pts.	9661-910 9664-810	n/a	9651-110	n/a	9101-010	n/a	9673-810
3603T	DO, 120 VDC, 16 pts.	9664-810	n/a	n/a	n/a	n/a	n/a	9673-810
3604E	DO, 24 VDC, 16 pts.	9662-810	9662-110	9653-610	9671-610	9101-010	n/a	9671-810
3607E	DO, 48 VDC, 16 pts.	9667-810	9667-110	9652-610	n/a	9101-010	n/a	9672-810
3611E	DO, 115 VAC, 8 pts.	9661-510	n/a	n/a	n/a	n/a	n/a	n/a
3613E	DO, 120 VDC, 8 pts.	9661-810	n/a	n/a	n/a	n/a	n/a	n/a
3614E	DO, 24 VDC, 8 pts.	9662-910	n/a	n/a	n/a	n/a	n/a	n/a
3615E	DO, 24 VDC, low power, 8 pts.	9662-710	n/a	n/a	n/a	n/a	n/a	n/a
3617E	DO, 48 VDC, 8 pts.	9667-910	n/a	n/a	n/a	n/a	n/a	n/a
3623	DO, 120 VDC, 16 pts.	9661-910	n/a	9651-110	n/a	9101-010	n/a	n/a
3623T	DO, 120 VDC, 16 pts.	9664-810	n/a	n/a	n/a	n/a	n/a	n/a
3624	DO, 24 VDC, 16 pts.	9662-610	n/a	9653-610	9671-610	9101-010	n/a	n/a
3625	DO, 24 VDC, 32 pts.	9662-610	n/a	9653-610	9671-610	9101-010	n/a	n/a
3636R 3636T	Relay output (non-triplicated), 32 pts.	n/a	9668-110	9651-110	n/a	9101-010	n/a	n/a
3664	Dual DO, 24 VDC, self-protected, 32 pts.	9662-610	n/a	9653-610	9671-610	9101-010	n/a	9671-810
3674	Dual DO, 24 VDC, self-protected, 32 pts.	9662-610	n/a	9653-610	9671-610	9101-010	n/a	9671-810
3805E	AO, 4–20 mA, 8 pts.	n/a	n/a	9853-610	9861-610	n/a	n/a	n/a
3806E	AO, 6 4–20 mA outputs, 2 20–320 mA outputs	n/a	n/a	9863-710 (special panel)	n/a	n/a	n/a	n/a