

| Voltage | Description | Type | Model No. | Points | For Details, See |
|------------------------------|--|------|-------------|---------|-------------------------|
| Analog Input Modules | | | | | |
| 0-5 VDC | Differential, DC Coupled | TMR | 3700A | 32 | page 43 |
| 0-10 VDC | Differential, DC Coupled | TMR | 3701 | 32 | page 43 |
| 0-5, 0-10 VDC | Differential, Isolated | TMR | 3703E | 16 | page 43 |
| 0-5, 0-10 VDC | High-Density, Differential, DC Coupled | TMR | 3704E | 64 | page 43 |
| Thermocouple | Differential, DC Coupled | TMR | 3706A | 32 | page 46 |
| Thermocouple | Differential, Isolated | TMR | 3708E | 16 | page 46 |
| 0-5 VDC | Single-Ended | TMR | 3720 | 64 | page 43 |
| 0 to 5 or -5 to +5 VDC | Differential, DC Coupled | TMR | 3721 | 32 | page 43 |
| Analog Output Modules | | | | | |
| 4-20 mA | Current Loop, DC Coupled | TMR | 3805E/3805H | 8 | page 44 |
| 4-20 mA and 20-320 mA | Current Loop, DC Coupled | TMR | 3806E | 6 and 2 | page 44 |
| -60 to 60 mA | BiPolar, Commoned Return, DC Coupled | TMR | 3807 | 4 | page 44 |

General Environmental and EMC Specifications

Other than the optional conformal coating of all PCB assemblies, the Tricon is not explicitly protected against dust, corrosive atmospheres or falling debris. Atmospheric and airborne-particle protection must be provided by housing the Tricon in an appropriate NEMA-rated enclosure.

| | |
|--------------------------------------|---|
| Operating Temperature | 32° to 140° F (0° to 60° C), ambient, as measured at the bottom of the chassis, per IEC 60068-2-1 Test Nb |
| Storage Temperature | -40° to 167° F (-40° to 75° C), per IEC 60068-2-14, Test Na |
| Relative Humidity | 5% to 95%, non-condensing, per IEC 60068-2-2, Test Bb, and IEC 60068-2-3 test Db |
| Sinusoidal Vibrations per Axis | 2 G @ 10 to 150 Hz, per IEC 60068-2-6, Test Fc |
| Shock | 15 G for 6-11 ms in each axis, per IEC 60068-2-27 |
| Electrostatic Discharge | IEC 61000-4-2, 8 kV air, 4 kV contact |
| Conducted Susceptibility | IEC 61000-4-4, Fast Transient/Burst, 2 kV power, 1 kV signal lines and IEC 61000-4-5, Surge Withstand, 2 kV CM AC power lines, etc. IEC 61000-4-6, RFI, 0.15-80 MHz, 10V |
| Radiated Susceptibility | IEC 61000-4-3, 26-1000 MHz, 10 V/m and IEC 61000-4-8, 50-60 Hz, 30 A/m |
| Conducted Emissions | CISPR 16, Class A, 0.15-30 MHz, 73-79 db when installed per the guidelines of the P&I Guide |
| Radiated Emissions | CISPR 11, Class A, 30-1000 MHz @ 10 m, 4-47 db when installed per the guidelines of P&I Guide |
| Cable Flame Test Rating ¹ | <p>Interface cables (connect external termination panels to I/O modules): FT4 Vertical Flame Test-Cables in Cable Trays per C.S.A. C22.2 No. 0.3-92 Para 4.11.4²</p> <p>I/O bus cables (connect chassis): FT6 Horizontal Flame & Smoke Test-per C.S.A. C22.2 No. 0.3-92 Appendix B³</p> |

1. Applies to cables shipped after April 1, 2009.

2. Cables will be marked with FT4 or CMG rating, but they all actually meet the more stringent FT4 rating.

3. Cables will be marked with FT6 or CMR rating, but they all actually meet the more stringent FT6 rating.

loads. It is fully compatible for use in all applications of the 3805E module.

The Model 3806E and Model 3807 modules are optimized for turbomachinery control.

The Model 3806E High Current AO Module has two 20 to 320 mA outputs to drive servo actuators.

The Model 3807 BiPolar AO Module has four -60 to + 60 mA outputs to drive servo coils in servo-control applications. The termination panel for the

Model 3807 contains four hard-wired coil diagnostic inputs. The Model 3807 is designed for control applications only, and should not be used in safety applications.

Analog Output Module Specifications

| Model Number | 3805E/3805H | 3806E | 3807 | |
|---|---|--|---|---|
| Type | TMR, AO | TMR, AO | TMR, AO | |
| Output current range | 4-20 mA output (+6% overrange) | 4-20 mA and 20-320 mA | -60 to 60 mA | |
| Number of points | 8 output | 6 (4-20 mA) output; 2 (20-320 mA) output | 4 bipolar output | |
| Isolated points | No, commoned return, DC coupled | No, commoned return, DC coupled | No, commoned return, DC coupled | |
| Resolution | 12 bits | 12 bits | 13 bits | |
| Output Accuracy | <0.25% (in range of 4-20 mA) of FSR (0-21.2 mA), from 32° to 140° F (0° to 60° C) | <0.25% (in range of 4-20 mA) of FSR (0-21.2 mA and 0-339.2 mA), from 32° to 140° F (0° to 60° C) | < 0.25% (in range of -60 to 60 mA) of Full Scale Range (FSR), from 0° to 60° C. FSR = 120 mA. | |
| External loop power (reverse voltage protected) | +42.5 VDC, maximum +24 VDC, nominal | +42.5 VDC, maximum +24 VDC, nominal | 24 VDC -15%/+20%, +5% ripple | |
| Output loop power requirements | | <u>Max. load vs. external loop voltage</u> | | |
| <u>Load (Ohms)</u> | <u>Loop power required</u> | <i>4-20 mA</i> | <i>16-320 mA</i> | Independent; For ± 60mA, maximum load is 150 ohms and is independent of variations in external loop power supply voltage. |
| 250 | > 20 VDC (1 amp minimum) | 20 VDC ≤ 275 | ≤ 15 | |
| 500 | > 25 VDC (1 amp minimum) | 24 VDC ≤ 475 | ≤ 25 | |
| 750 | > 30 VDC (1 amp minimum) | 28 VDC ≤ 650 | ≤ 40 | |
| 1000 | > 35 VDC (1 amp minimum) | 32 VDC ≤ 825 | ≤ 50 | |
| Over-range protection | +42.5 VDC, continuous | < +42.5 VDC | +36 VDC, continuous | |
| Switch time on leg failure | < 10 ms, typical | < 10 ms, typical | < 10 ms, typical | |
| Diagnostic Indicators | | | | |
| Module status (one each per module) | PASS, FAULT, ACTIVE, LOAD, PWR1, PWR2 | PASS, FAULT, ACTIVE, LOAD, PWR1, PWR2 | PASS, FAULT, ACTIVE, LOAD, PWR1, PWR2 | |
| Color code | Pea green | Light green | Light green | |

Product Specifications

HART Interface Modules

Highway Addressable Remote Transducer (HART) is an industry standard field bus protocol that superimposes a Frequency Key Shifted (FSK) signal onto the 4-20 mA loop. The Tricon Model 2071H HART Multiplexer Module that is incorporated into each of the HART Interface Modules capacitively couples the HART signal to the AI or AO signals. The HART signals are approximately ± 0.5 mA at 1,200

and 2,200 Hz. These frequencies are high enough that the low-bandwidth loop is unaffected and the HART electronics can impose and extract the HART signals easily.

HART communication through the HART multiplexer is separate from the Tricon system and is certified not to interfere with the 4-20 mA safety signals of the Analog Input and Analog Output Modules.

Only Tricon v10.4.x and later systems can use HART Interface Modules; earlier Tricon systems must upgrade to Tricon v10.4.x. The chassis requirements for using HART Interface Modules in a system upgraded to Tricon v10.4.x differ depending on the original system version, as described in the Tricon Chassis Usage for HART Communication table.

HART Interface Module Specifications

| Model Number | 2770H | 2870H |
|-----------------------------------|---|---|
| Type | HART Analog Input Interface | HART Analog Output Interface |
| Compatible Modules | 3700A, 3721 | 3805E, 3805H |
| Number of signals | 32 input | 8 output |
| Input/Output type | 4-20 mA, 0-5 VDC input | 4-20 mA, 0-5 VDC output |
| HART MUX module | 2071H (includes the Triconex 4850 HART Multiplexer) | 2071H (includes the Triconex 4850 HART Multiplexer) |
| Status indicator: HART MUX module | PWR, FAULT, HOST, HART | PWR, FAULT, HOST, HART |
| HART protocol | HART Field Communication Protocol, Revision 5.0–7.0 | HART Field Communication Protocol, Revision 5.0–7.0 |
| Logic power | < 5 Watts | < 5 Watts |

Tricon Chassis Usage for HART Communication

| If Your Original System Version is... | Upgrade to... | Install HART Interface Modules in Chassis... |
|--|----------------|--|
| Tricon v10.4.x or later (High-Density) | n/a | <ul style="list-style-type: none"> Model 8121 Enhanced Low-Density Expansion Chassis |
| Tricon v10.0.x – 10.3.x (High-Density) | Tricon v10.4.x | <ul style="list-style-type: none"> Model 8121 Enhanced Low-Density Expansion Chassis |
| Tricon v9.x (High-Density) | Tricon v10.4.x | <ul style="list-style-type: none"> Model 8121 Enhanced Low-Density Expansion Chassis |
| Tricon v6.x – v10.x (Low-Density) | Tricon v10.4.x | <ul style="list-style-type: none"> Model 8100-x Main Chassis Model 8101 Low-Density Expansion Chassis Model 8102 Low-Density RXM Chassis Model 8121 Enhanced Low-Density Expansion Chassis |