MICROSYS 3200 ET

System Hardware Elements

MicroVerse automation pvt.ltd.

30 Years of Innovation In Automation

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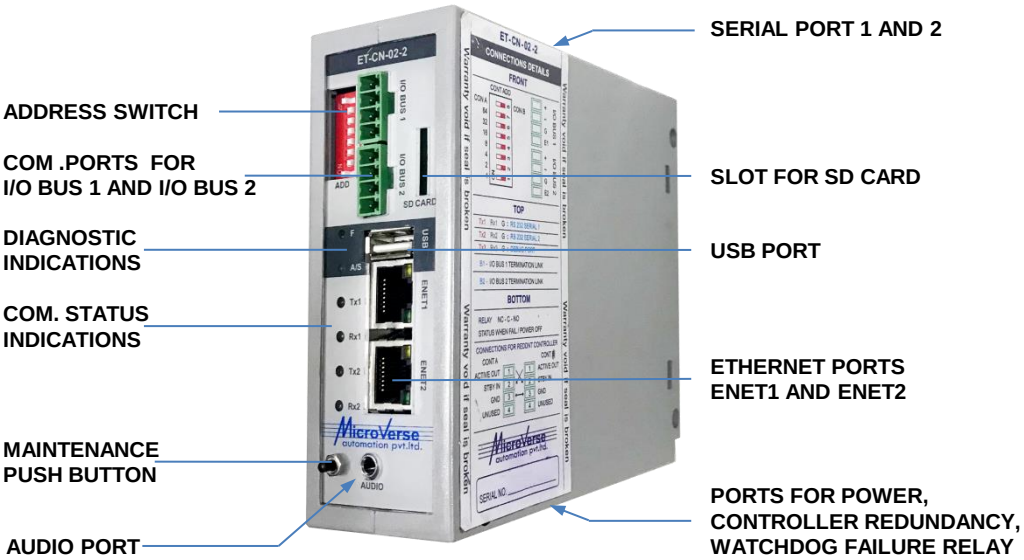
MicroVerse
automation pvt.ltd.

CONTROLLER TYPE ET-CN-02-2 (720 MHz, 512 MB +512 MB)

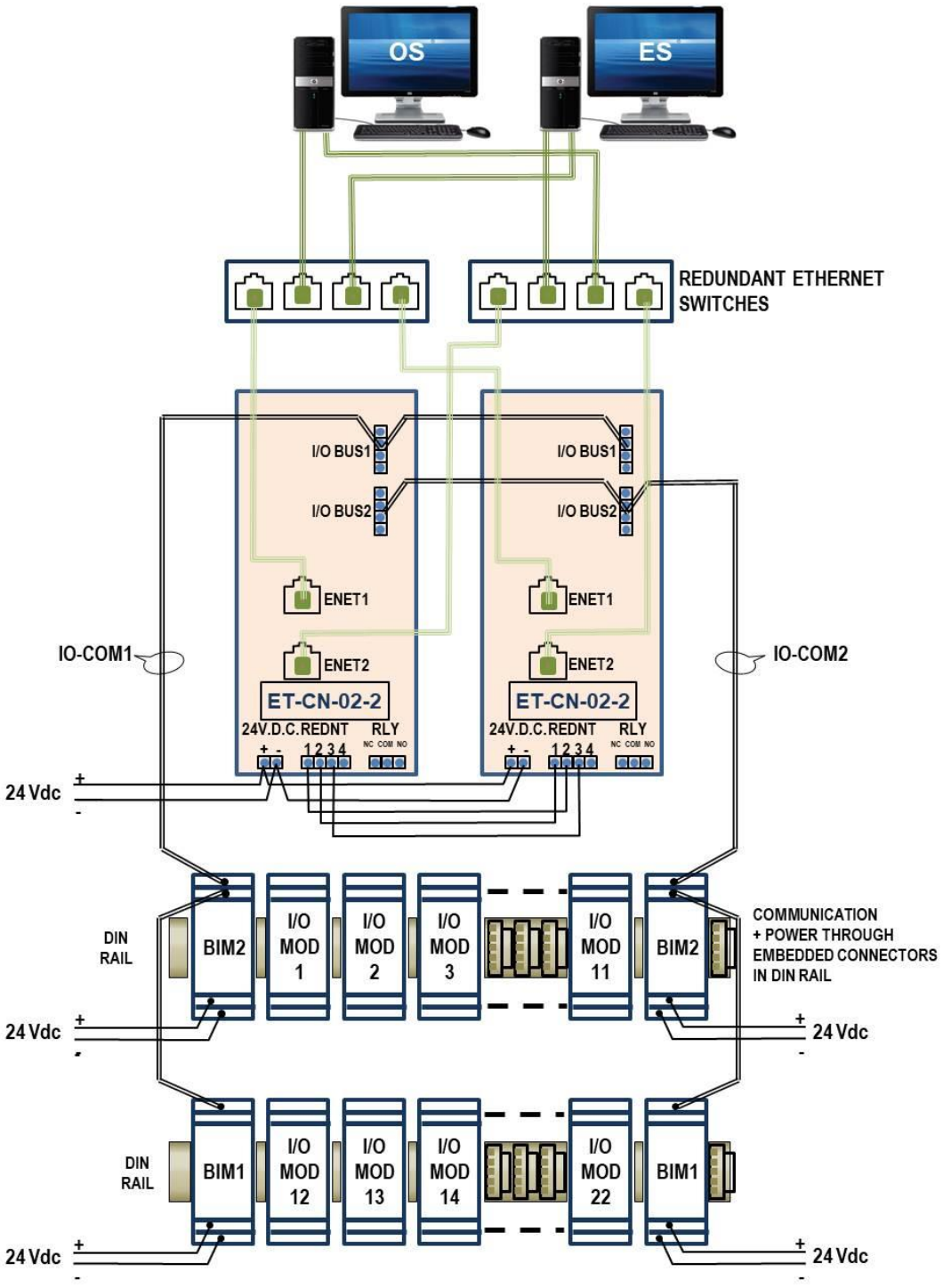


Specifications

Processor	:	High Performance 32 bit Arm Cortex A8
Clock Speed	:	720 MHz
Memory	:	Non-volatile Memory (Flash) 512 MB, expandable to 4 GB RAM 512 MB, DDR3 Facility for SD Card
Communication Ports	:	Ethernet Ports: 2 Nos. 100 MBPS Serial Ports: 2 Nos. RS 232 USB 2.0: 1 No. Ports for communication with I/O Modules: 2 Nos.
Third Party Interfaces	:	Built-in MODBUS RTU, MODBUS IP Other protocols like PROFIBUS, PROFINET provided through protocol converters connected to USB Port
Number of I/O Modules Controller can access	:	32
Maximum Number of Controllers on a Single Sub-net	:	32
Indications	:	I/O Bus Selection Controller status: Active / Standby, Fail Tx, Rx of Serial Communications Ethernet Port status Indications
Fault Output	:	Potential-free Relay Contact to signal controller failure
Dimensions	:	Please refer Family Data Sheets

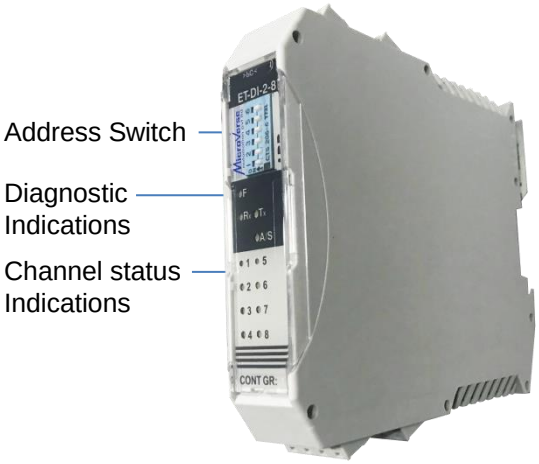
CONTROLLER TYPE ET-CN-02-2 (720 MHz , 512 MB +512 MB)

Typical Connection Scheme

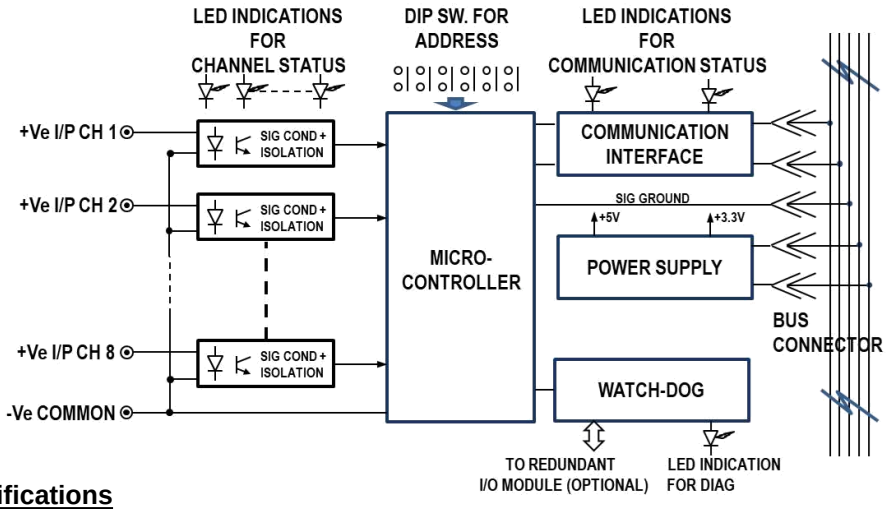


Notes

1. The connection scheme shown above provides Controller redundancy, I/O Bus redundancy, Communication redundancy with OS / ES. Redundancies may be omitted depending upon application requirements and criticality.
2. It is recommended to use factory-supplied interconnecting cables IO-COM1 and IO-COM2.



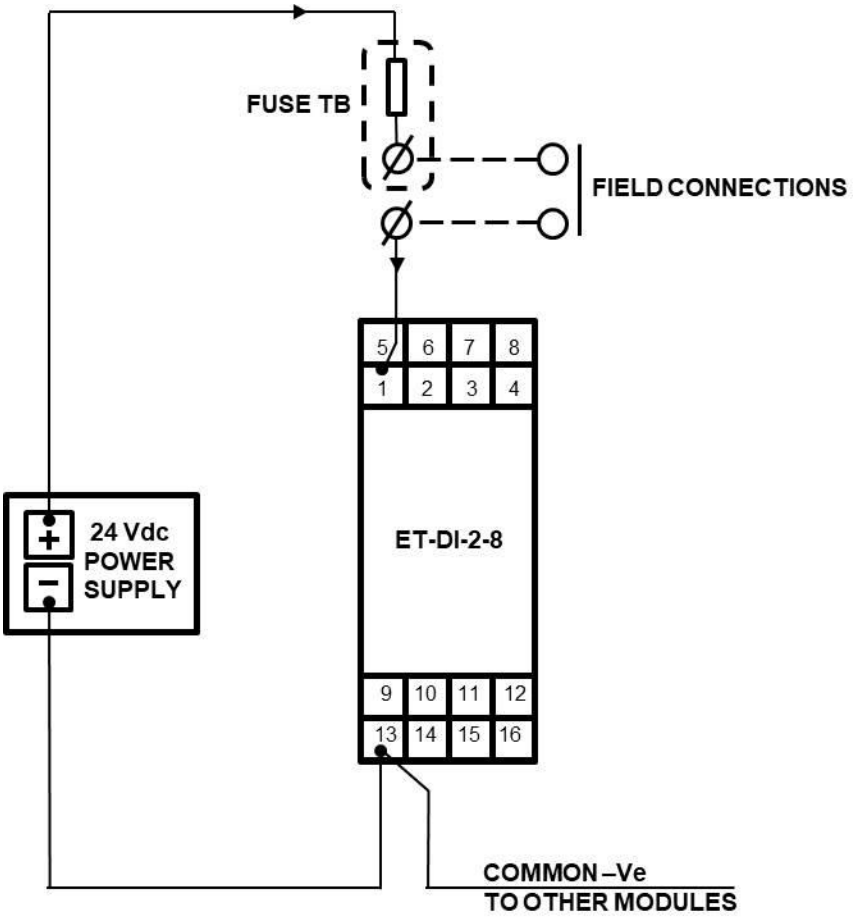
Block Schematic



Specifications

No. Of Channels	:	8
Input Signal level	:	0 to 5 Vdc - Digital Low 17 to 27 Vdc - Digital High
Input Signal Current	:	10 mA @ 24 Vdc
Signal Type	:	Sinking
Input Connection	:	Common -Ve for group of 8 channels
Isolation	:	Optical, 1000 Vac+Vdc Peak Between inputs and system
Input Filter	:	40 ms
Indications	:	Channel status for individual channel - Green when input High - Off when input Low Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Single-width (Please refer Family Data Sheet)

Typical Connection Scheme

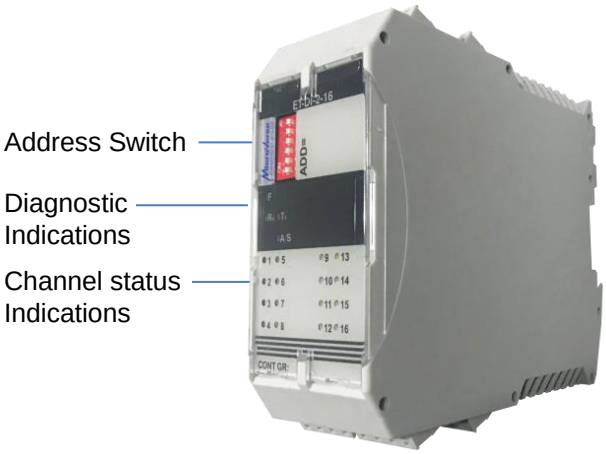


Notes

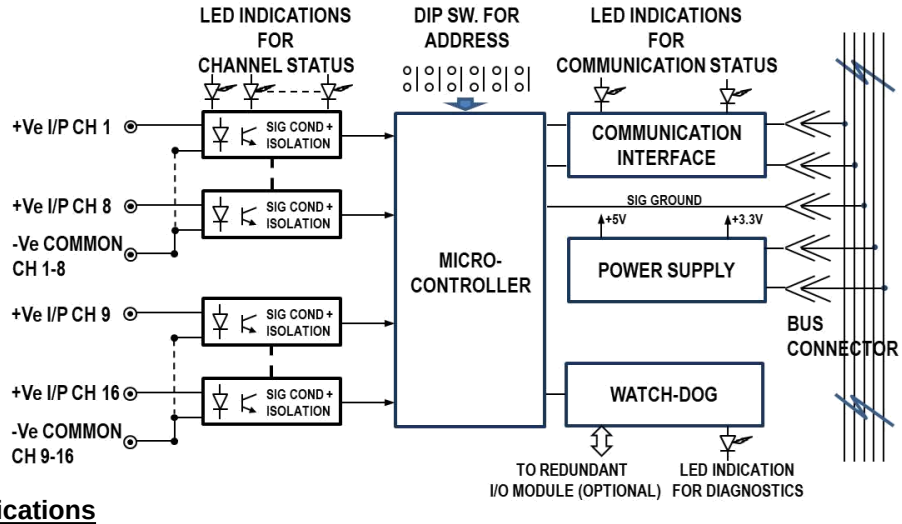
1. Field connections shown for one channel only. (Channel No.1)
2. Channel Nos. 2 to 8 to be connected to Terminal Nos. 2 to 8 respectively
3. Terminal 13 to 16 are shorted internally for 24V –Ve supply
4. Other accessories are available to terminate Digital Input signals. These include:

   a. Digital Input Termination Module (DITM) for 8 / 16 / 24 Channels:
   DITM is typically used for terminating signals coming from auxiliary contacts of MCC. This offers protection against fault to 230 / 415 Vac circuits and eliminates need for any interposing relays.
   DITM may be connected to ET-DI-2-8 with a pre-fab cable.

   b . I/O Protect Terminals
   These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic

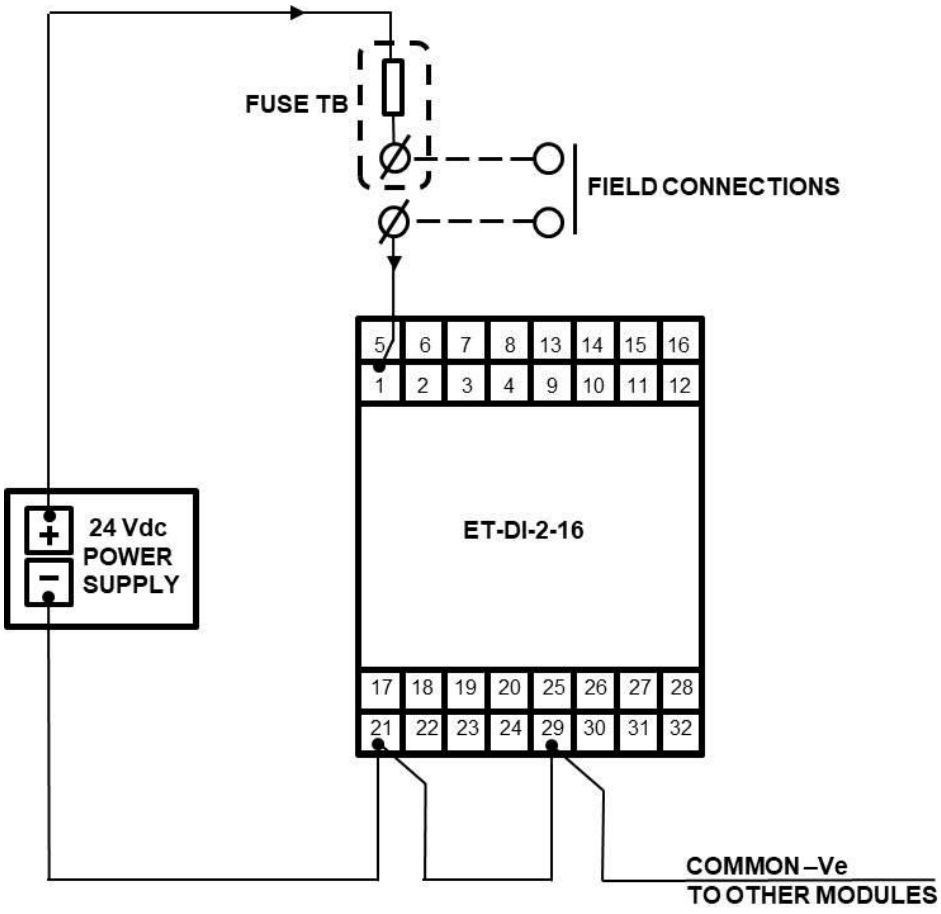


Specifications

No. Of Channels	:	16
Input Signal level	:	0 to 5 Vdc - Digital Low 17 to 27 Vdc - Digital High
Input Signal Current	:	10 mA @ 24 Vdc
Signal Type	:	Sinking
Input Connection	:	Common -Ve for group of 8 channels
Isolation	:	1000 Vac+Vdc . Peak Between Inputs and System
Input Filter	:	40 ms
Indications	:	Channel status for individual channel - Green when input High Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Double-width (Please refer Family Data Sheet)

MODULE TYPE ET-DI-2-16 16 CHANNEL DIGITAL INPUTS

Typical Connection Scheme

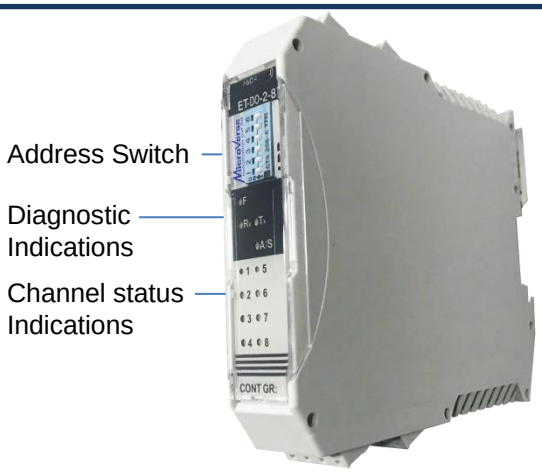


Notes:

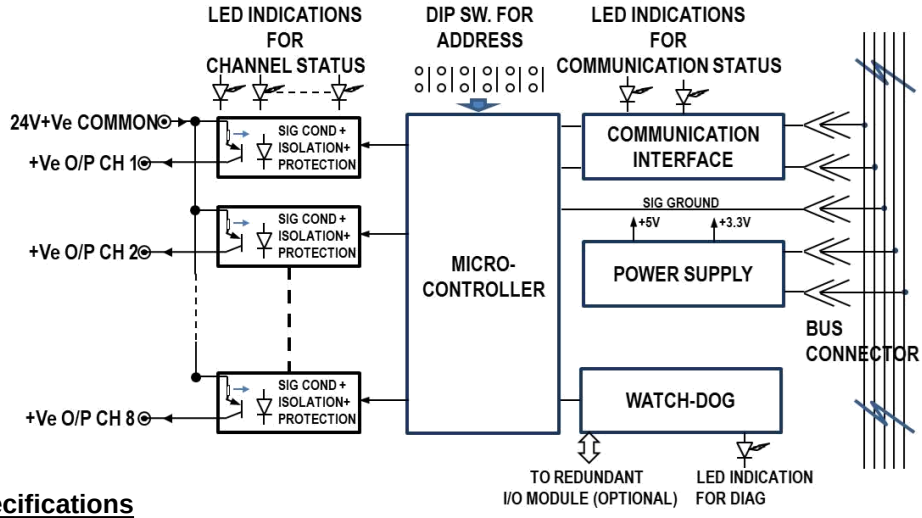
1. Field connections shown for 1 channel only. (Channel No.1)
2. Channel Nos. 2 to 16 to be connected to Terminal Nos. 2 to 16 respectively
3. Terminal 17 to 24 and 25 to 32 are shorted internally for 24V –Ve supply
4. Other accessories are available to terminate Digital Input signals. These include:

   a. Digital Input Termination Module (DITM) for 8 / 16 / 24 Channels
   DITM is typically used for terminating signals coming from auxiliary contacts of MCC. This offers protection against fault to 230 / 415 Vac. circuits and eliminates need for any interposing relays.
   DITM may be connected to ET-DI-2-16 with a pre-fab cable

   b. I/O Protect Terminals
   These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic

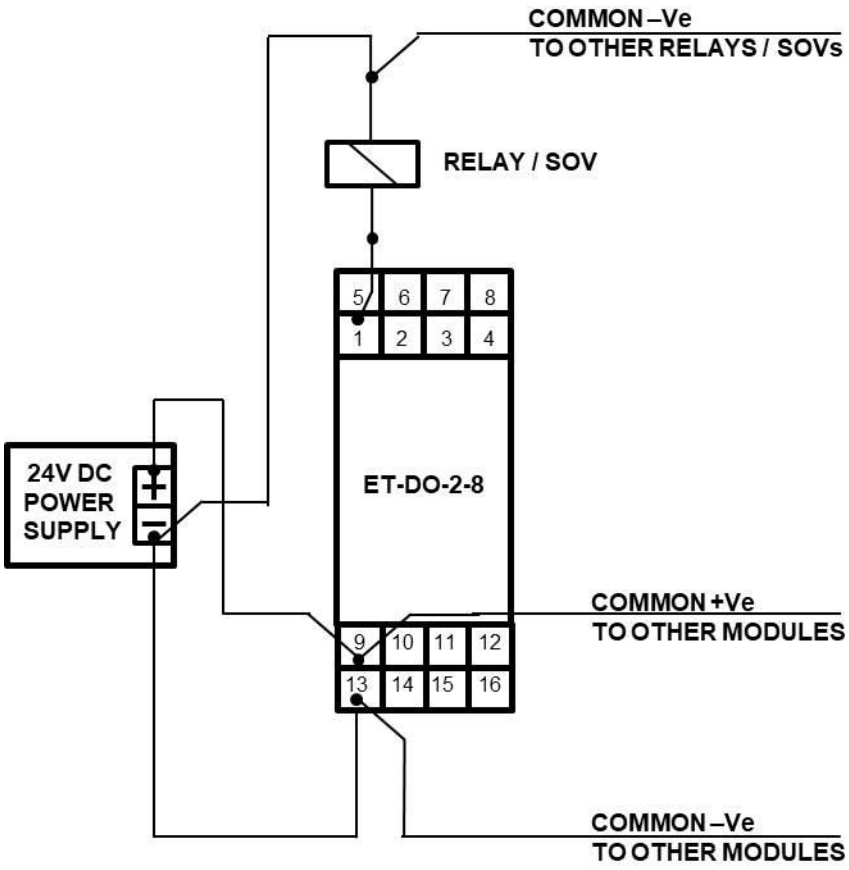


Specifications

No. Of Channels	:	8
Output	:	24 Vdc P-Channel Mosfet - Sourcing Type
Maximum Output Current	:	300 mA per channel Suitable for driving relay / low power SOV
Off-State Leakage Current	:	700 µA typical
Connection Type		Common supply for group of 8 channels
Isolation	:	500 Vac+Vdc. peak. Between channels-to-system
Protections	:	Against Overload and Short circuit Auto reset upon fault recovery Built-in free-wheeling diode for driving inductive loads
Indications	:	Channel status for individual channel - Green when channel healthy and output high - Off when channel output low - Red when channel under fault Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Single-width (Please refer Family Data Sheet)

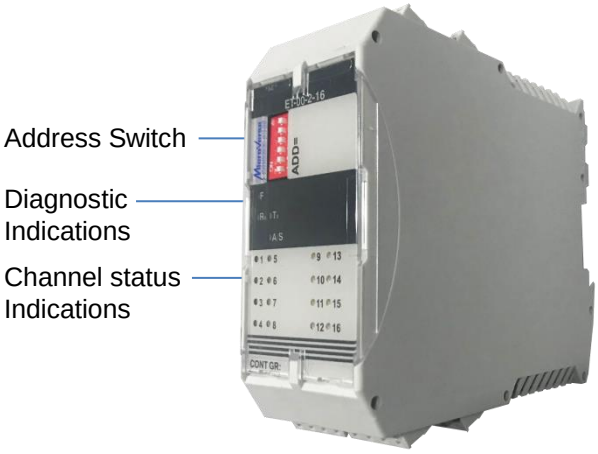
MODULE TYPE ET-DO-2-8 8 CHANNEL DIGITAL OUTPUTS

Typical Connection Scheme

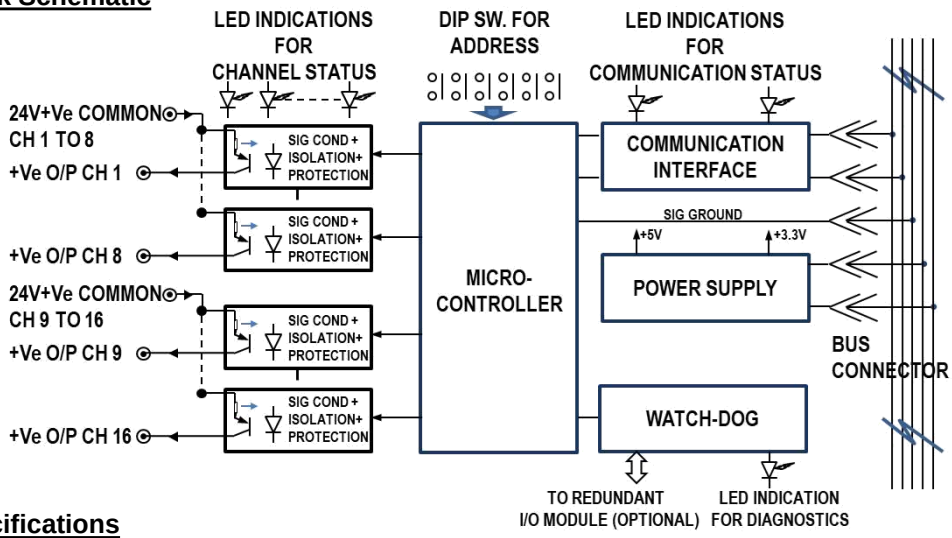


Notes:

1. Field connections shown for 1 channel only. (Channel No.1)
2. Channel Nos. 2 to 8 to be connected to Terminal Nos. 2 to 8 respectively
3. Terminal 9 to 12 are shorted internally for 24V +Ve supply
4. Terminal 13 to 16 are shorted internally for 24V -Ve supply
5. Individual relays can be wired as shown above. Alternatively, Digital Output Termination Module with 8 Relays - 'DOTM' is available. DOTM may be connected to ET-DO-2-8 using a pre-fab cable.
6. Each relay of DOTM has one change-over contact rated at 10 Amp resistive load. Following protections are provided for the relay contacts:
   - A fuse in series with Pole
   - RC Snubber +MOV. This circuit can be connected across N/C or N/O contact through link selection. This suppresses contact arcing due to inductive loads.



Block Schematic

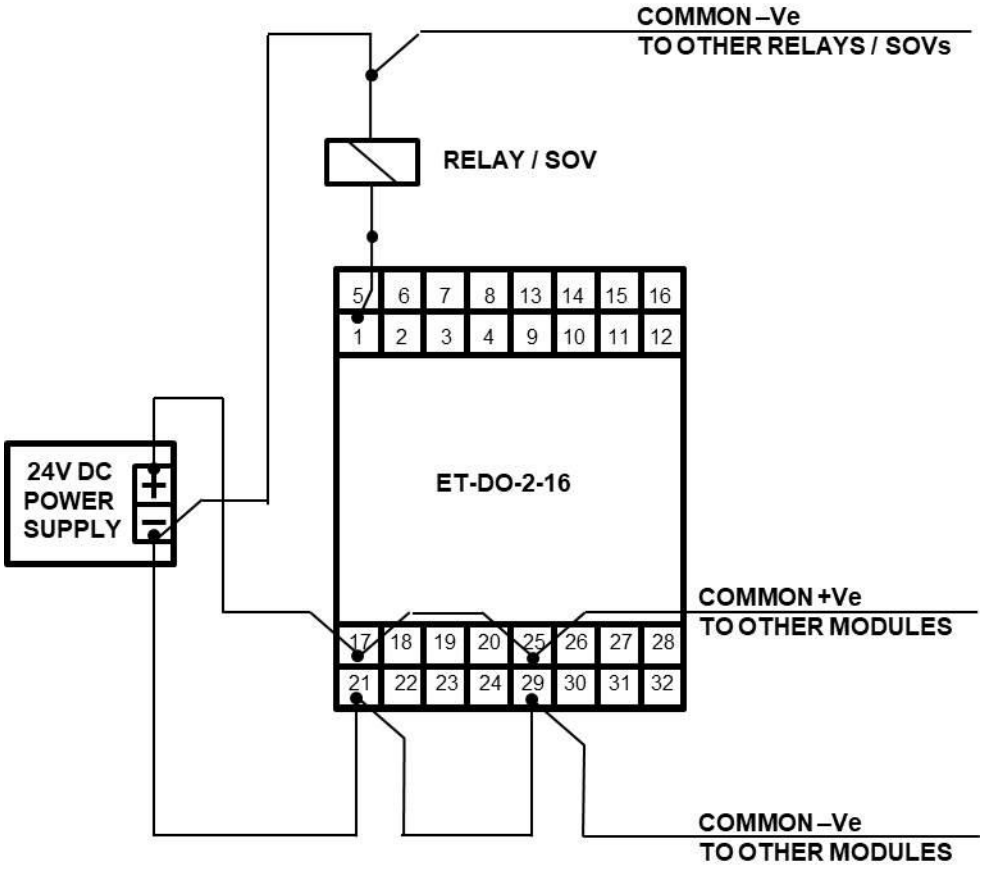


Specifications

No. Of Channels	:	16
Output	:	24 Vdc P-Channel Mosfet - Sourcing Type
Maximum Output Current	:	300 mA per channel Suitable for driving relay / low power SOV
Off-State Leakage Current	:	700 µA typical
Connection Type		Common supply for group of 8 channels
Isolation	:	500 Vac+Vdc peak. Between channels-to-system
Protections	:	Against Overload and Short circuit Auto reset upon fault recovery Built-in free-wheeling diode for driving inductive loads
Indications	:	Channel status for individual channel - Green when channel healthy and output high - Off when channel output low - Red when channel under fault Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Double-width (Please refer Family Data Sheet)

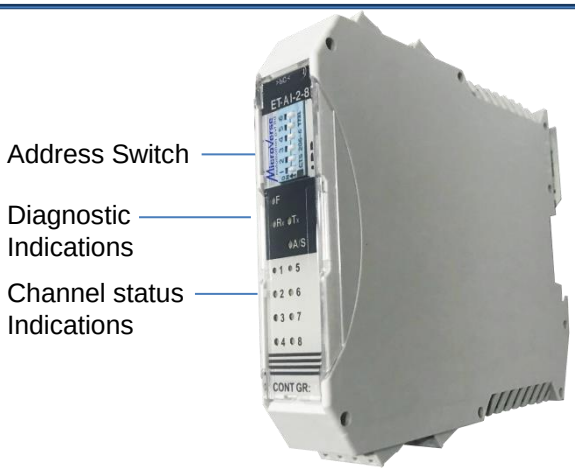
MODULE TYPE ET-DO-2-16 16 CHANNEL DIGITAL OUTPUTS

Typical Connection Scheme

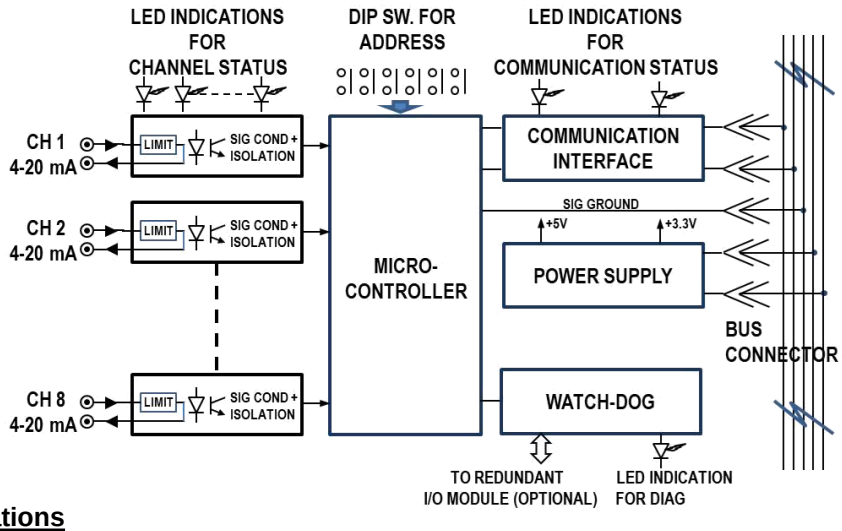


Notes:

1. Field connections shown for 1 channel only. (Channel No.1)
2. Channel Nos. 2 to 16 to be connected to Terminal Nos. 2 to 16 respectively
3. Terminal 17 to 20 and 25 to 28 are shorted internally for 24V +Ve supply
4. Terminal 21 to 24 and 29 to 32 are shorted internally for 24V -Ve supply
5. Individual relays can be wired as shown above. Alternatively, Digital Output Termination Module with 8 Relays - 'DOTM' is available. DOTM may be connected to ET-DO-2-16 using a pre-fab cable.
6. Each relay of DOTM has one change-over contact rated at 10 Amp resistive load. Following protections are provided for the relay contacts:
   - A fuse in series with Pole
   - RC Snubber +MOV. This circuit can be connected across N/C or N/O contact through link selection. This suppresses contact arcing due to inductive loads.



Block Schematic:

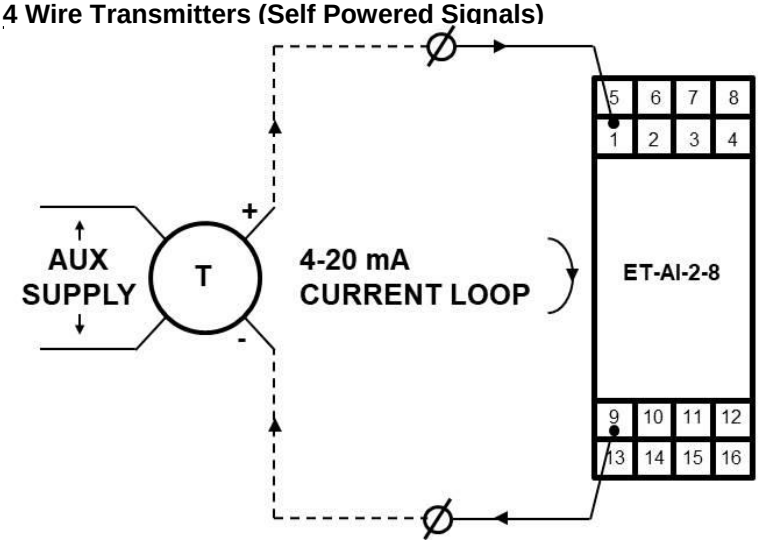


Specifications

No. Of Channels	: 8
Input Signal	: 4-20 mA D.C.
Voltage drop across Input Terminals	: 6.3 V @ 20 mA
Input Connection	: Individually isolated current loop
Isolation	: 500 Vac+Vdc. peak. Channel -to-channel and channel-to-system
Protection against sensor failure	: Loop current electronically limited to 30 mA
ADC Resolution	: 16 Bit
Measurement Accuracy	: ±0.1%
Indications	: Channel status for individual channel - Green when channel current between 3 to 21 mA - Red when below 3 or above 21 mA Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	: Single Width (Please refer Family Data Sheet)

MODULE TYPE ET-AI-2-8 8 CHANNEL ANALOG INPUTS

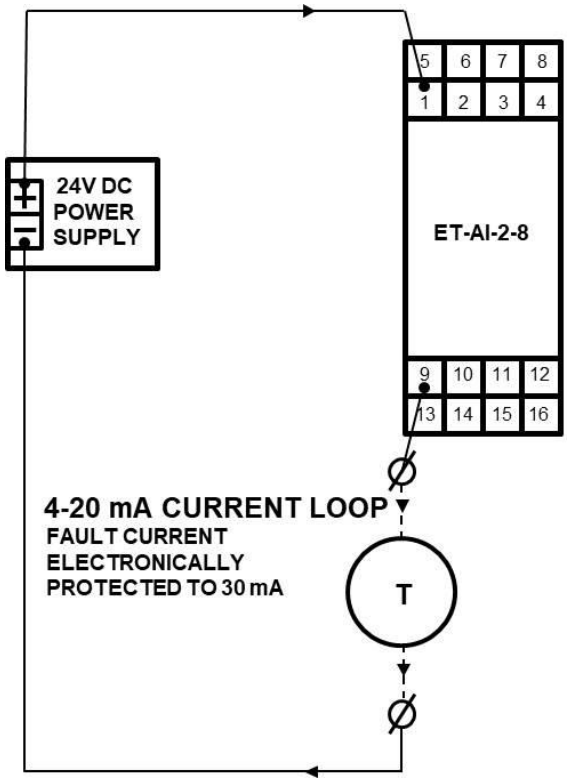
Typical Connection Scheme
4 Wire Transmitters (Self Powered Signals)



Channel Pin Assignment

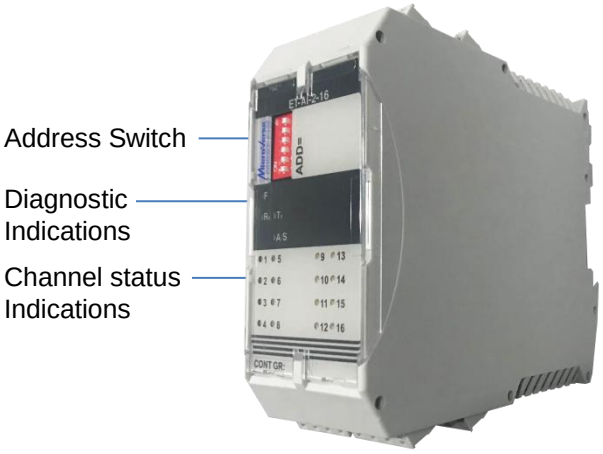
Ch. No.	+ Ter	- Ter
1	1	9
2	2	10
3	3	11
4	4	12
5	5	13
6	6	14
7	7	15
8	8	16

Typical Connection Scheme
2 Wire Transmitters (Loop Powered Signals)

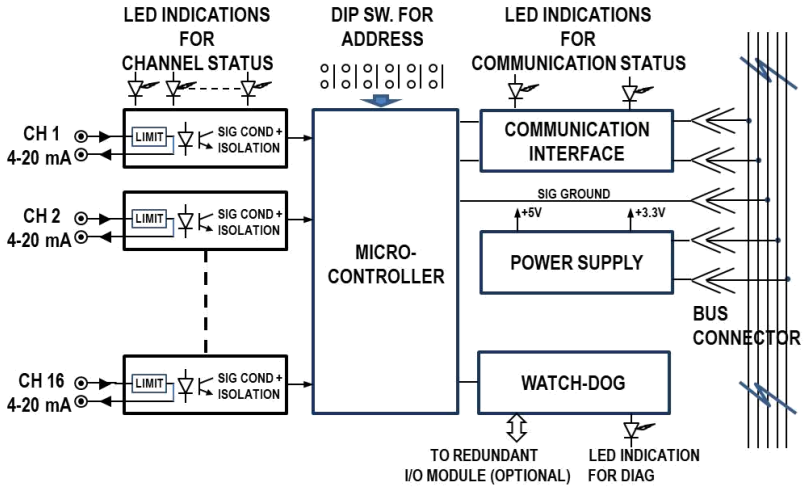


Notes

1. The wiring schemes shown above are with typical schemes with external bulk power supplies. Isolated power supplies for individual channels can be provided using 'Analog Input Termination Modules'. (AITM). AITM may be connected to ET-AI-2-8 with a pre-fab cable
2. AITM has plug-in signal conditioning modules for powering self / loop powered transmitters, Interfacing RTDs, Thermocouples etc.
3. 'IO Protect' Terminals may be used for terminating field signals. These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic

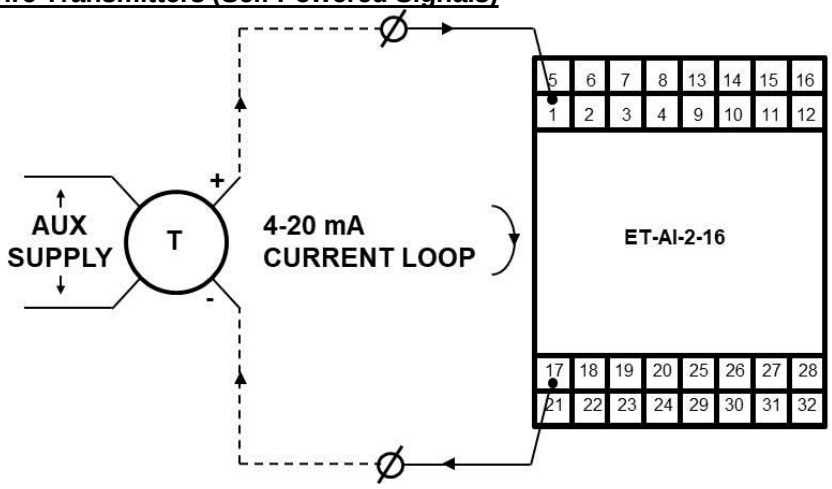


Specifications

No. Of Channels	: 16
Input Signal	: 4-20 mA D.C.
Voltage drop across Input Terminals	: 6.3 V @ 20 mA
Input Connection	: Individually isolated current loop
Isolation	: 500 Vac+Vdc peak. Channel -to-channel and channel-to-system
Protection against sensor failure	: Loop current electronically limited to 30 mA
ADC Resolution	: 16 Bit
Measurement Accuracy	: ±0.1%
Indications	: Channel status for individual channel - Green when channel current between 3 to 21 mA - Red when below 3 or above 21 mA Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	: Double-width (Please refer Family Data Sheet)

MODULE TYPE ET-AI-2-16 16 CHANNEL ANALOG INPUTS

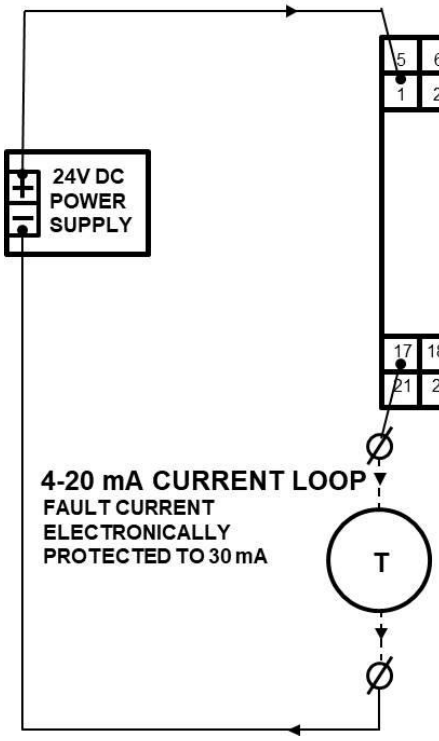
Typical Connection Scheme
4 Wire Transmitters (Self Powered Signals)



Channel Pin Assignment

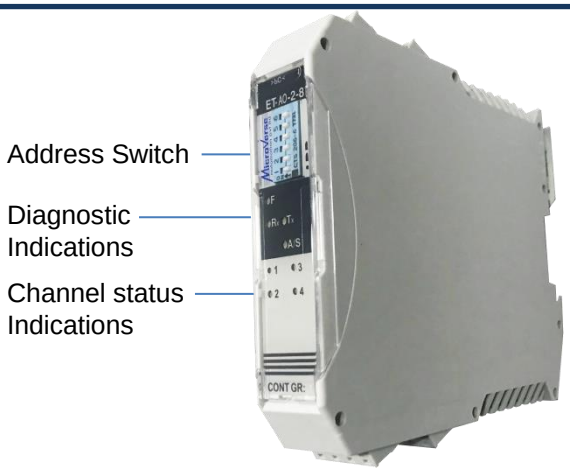
Ch. No.	+ Ter	- Ter
1	1	17
2	2	18
3	3	19
4	4	20
5	5	21
6	6	22
7	7	23
8	8	24
9	9	25
10	10	26
11	11	27
12	12	28
13	13	29
14	14	30
15	15	31
16	16	32

Typical Connection Scheme
2 Wire Transmitters (Loop Powered Signals)

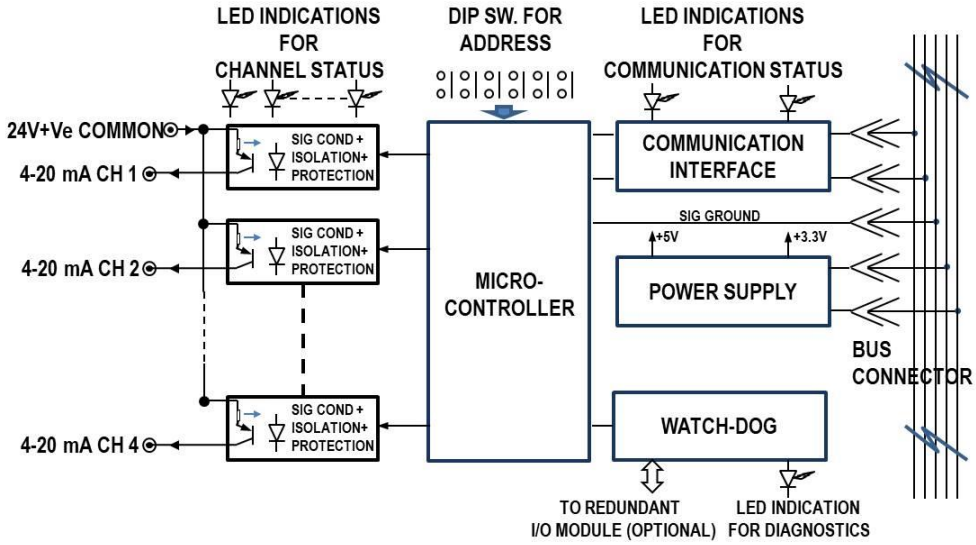


Notes

1. The wiring schemes shown above are with typical schemes with external bulk power supplies. Isolated power supplies for individual channels can be provided using 'Analog Input Termination Modules'. (AITM). AITM may be connected to ET-AI-2-16 with a pre-fab cable.
2. AITM has plug-in signal conditioning modules for powering self / loop powered transmitters, Interfacing RTDs, Thermocouples etc.
3. 'IO Protect' Terminals may be used for terminating field signals. These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic

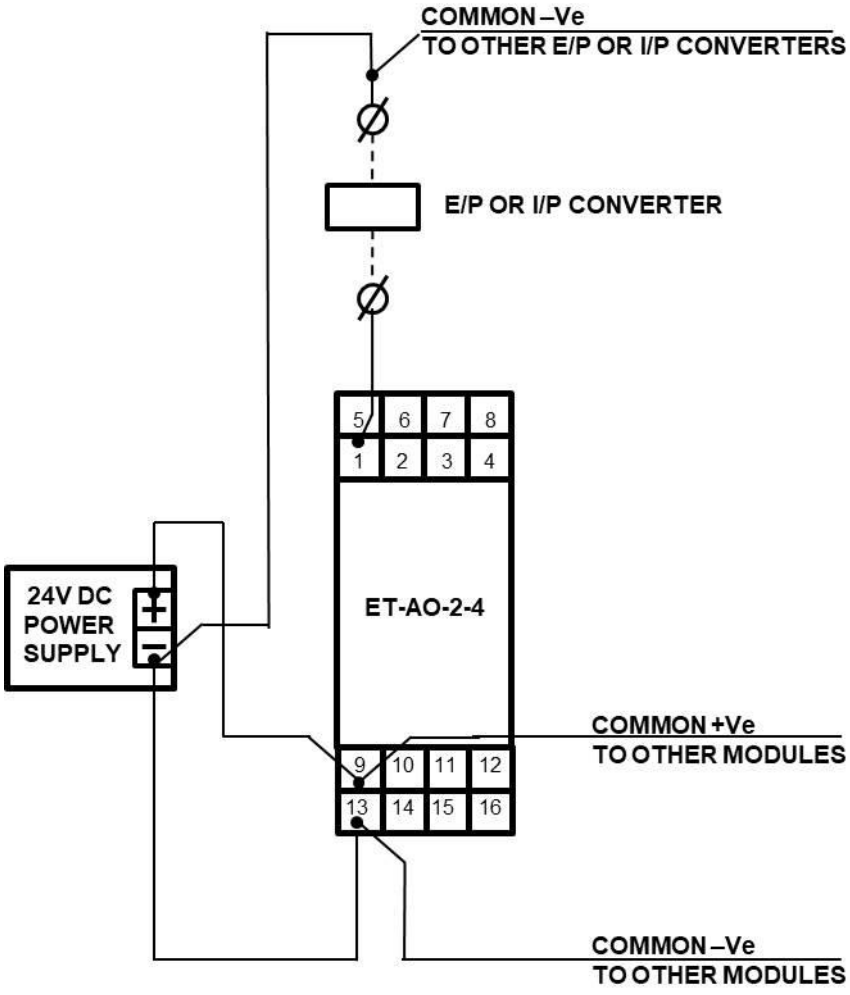


Specifications

No. Of Channels	:	4
Output	:	4-20 mA P-Channel Mosfet - Sourcing Type
Maximum Load Resistance	:	800 ohms
Connection Type	:	Common supply rail for group of 4 channels
Isolation	:	500 Vac+Vdc. peak. Between channels-to-system
Indications	:	Channel status for individual channel - Green when loop current > 3 mA - Red when loop open / current < 3 Ma Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Single-width (Please refer Family Data Sheet)

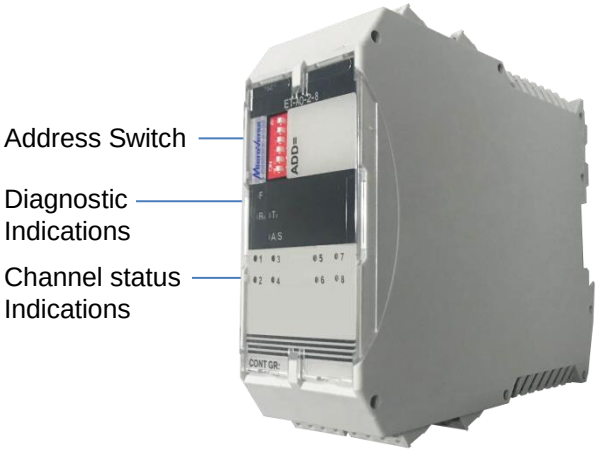
MODULE TYPE ET-AO-2-4 4 CHANNEL ANALOG OUTPUTS

Typical Connection Scheme

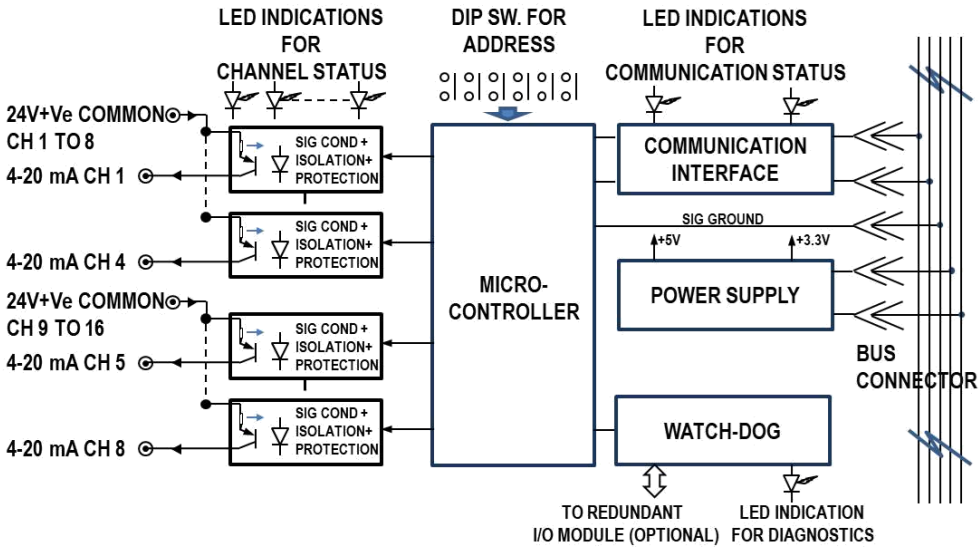


Notes

1. Field connections shown for 1 channel only. (Channel No.1)
2. Channel Nos. 2 to 4 to be connected to Terminal Nos. 2 to 4 respectively
3. Terminal 9 to 12 are shorted internally for 24V +Ve supply
4. Terminal 13 to 16 are shorted internally for 24V -Ve supply
5. 'IO Protect' Terminals may be used for terminating field signals. These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic

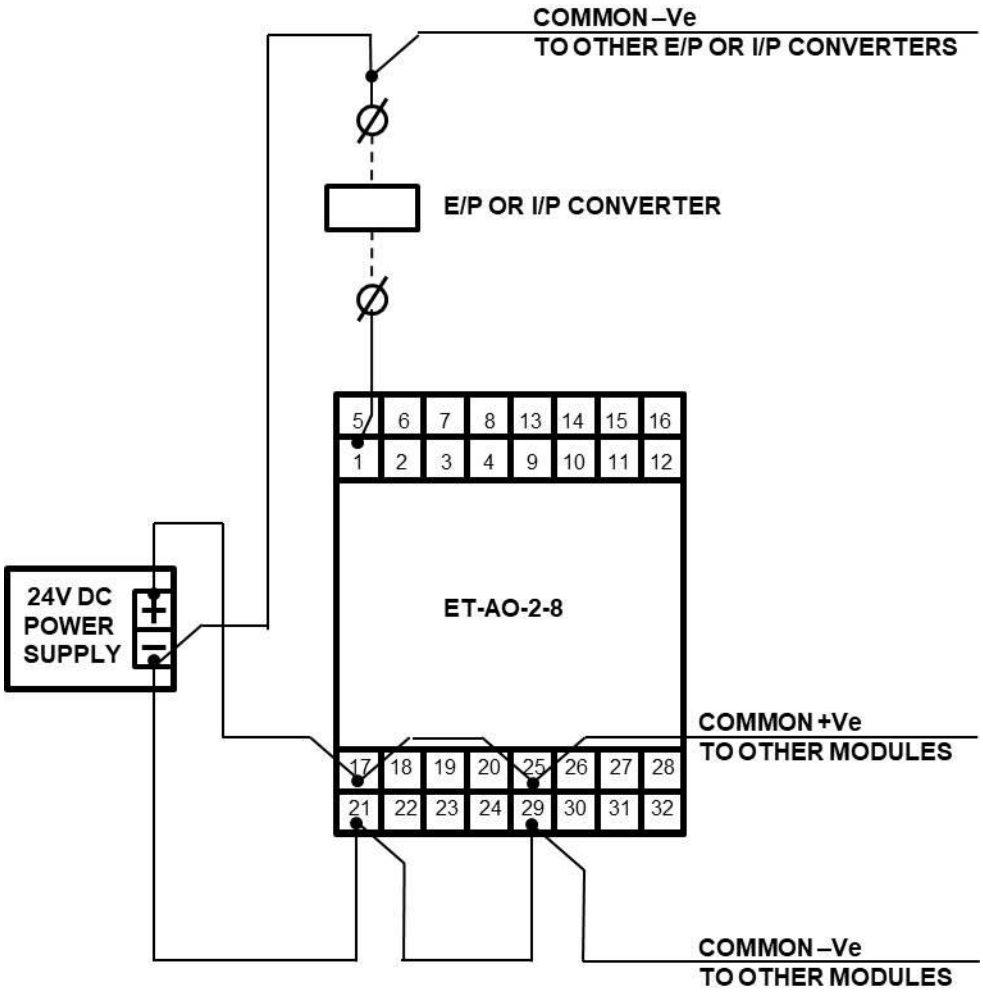


Specifications

No. Of Channels	:	8
Output	:	4-20 mA P-Channel Mosfet - Sourcing Type
Maximum Load Resistance	:	800 ohms
Connection Type	:	Common supply rail for group of 4 channels
Isolation	:	500 Vac+Vdc. peak. Between channels-to-system
Indications	:	Channel status for individual channel - Green when loop current > 3 mA - Red when loop open / current < 3 Ma Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Double-width (Please refer Family Data Sheet)

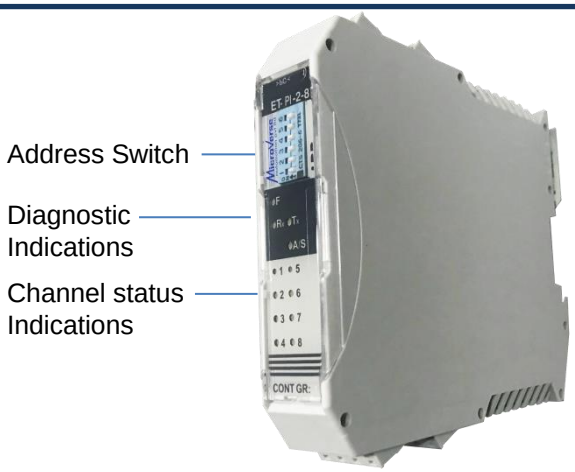
MODULE TYPE ET-AO-2-8 8 CHANNEL ANALOG OUTPUTS

Typical Connection Scheme

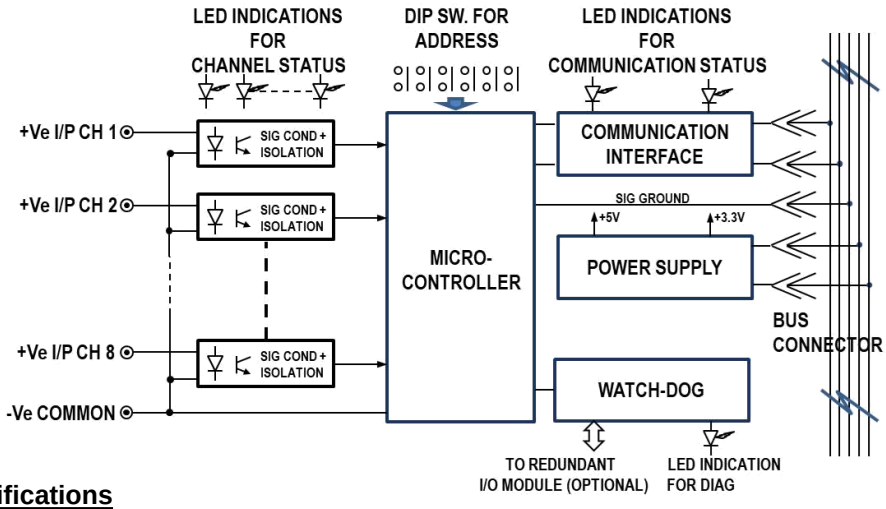


Notes

1. Field connections shown for one channel only. (Channel No.1)
2. Channel Nos. 2 to 8 to be connected to Terminal Nos. 2,3,4,9,10,11,12 respectively
3. Terminal 17 to 20 and 25 to 28 are shorted internally for 24V +Ve supply
4. Terminal 21 to 24 and 29 to 32 are shorted internally for 24V -Ve supply
5. 'IO Protect' Terminals may be used for terminating field signals. These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic



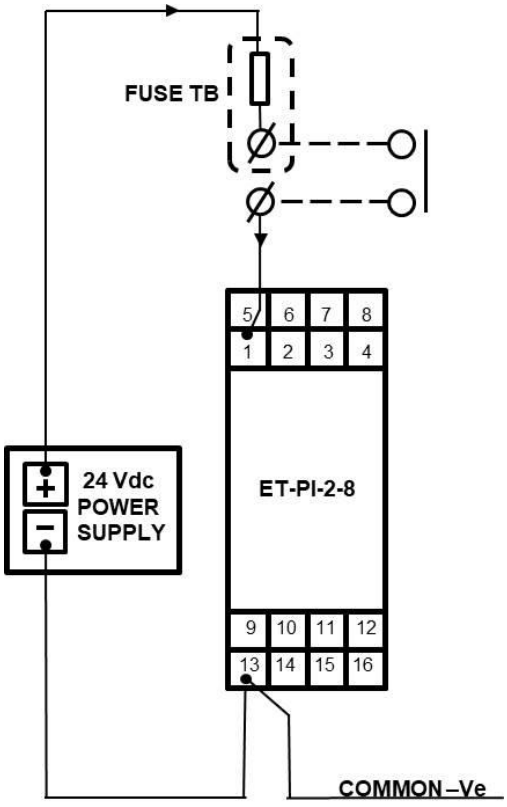
Specifications

No. Of Channels	:	8
Input Signal level	:	0 to 5 Vdc - Digital Low 17 to 27 Vdc - Digital High
Input Signal Current	:	10 mA @ 24 Vdc
Signal Type	:	Sinking
Input Connection	:	Common -Ve for group of 8 channels
Isolation	:	Optical, 1000 Vac+Vdc Peak Between inputs and system
Max Pulse Frequency	:	10 kHz
Indications	:	Channel status for individual channel - Green when input High - Off when input Low Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Single-width (Please refer Family Data Sheet)

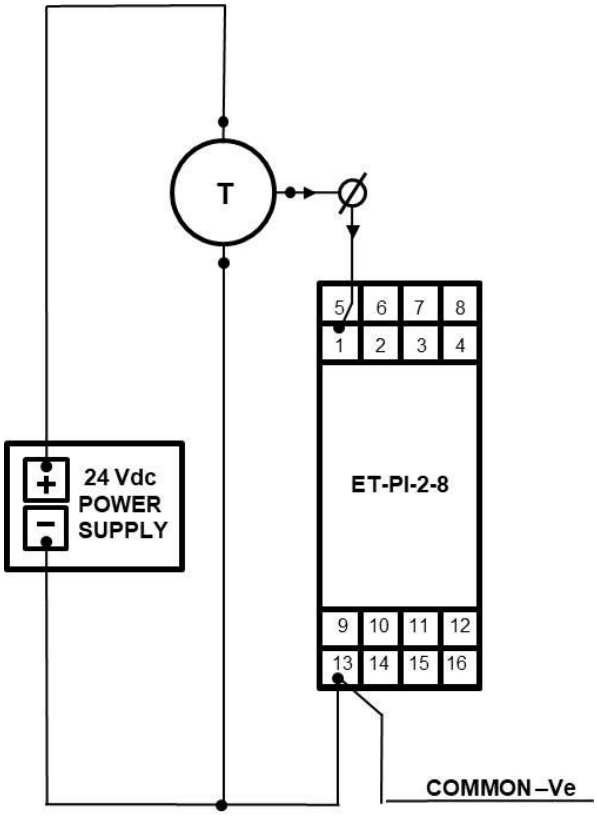
MODULE TYPE ET-PI-2-8 8 CHANNEL PULSE INPUTS

Typical Connection Scheme

Potential-free contact input



3-Wire Transmitter with sourcing (PNP) output



Notes

1. Field connections shown for one channel only. (Channel No.1)
2. Channel Nos. 2 to 8 to be connected to Terminal Nos. 2 to 8 respectively
3. Terminal 13 to 16 are shorted internally for 24V –Ve supply
4. Other accessories are available to terminate Pulse Input signals. These include:

   a. Digital Input Termination Module (DITM) for 8 / 16 / 24 Channels:
   DITM is typically used for terminating signals coming from auxiliary contacts of MCC. This offers protection against fault to 230 / 415 Vac circuits and eliminates need for any interposing relays.
   DITM may be connected to ET-PI-2-8 with a pre-fab cable.

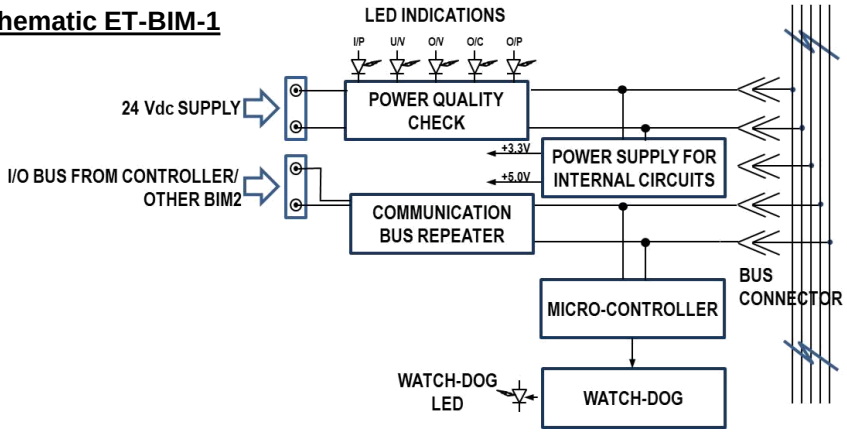
   b. I/O Protect Terminals
   These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.

BIM-1 BIM-2

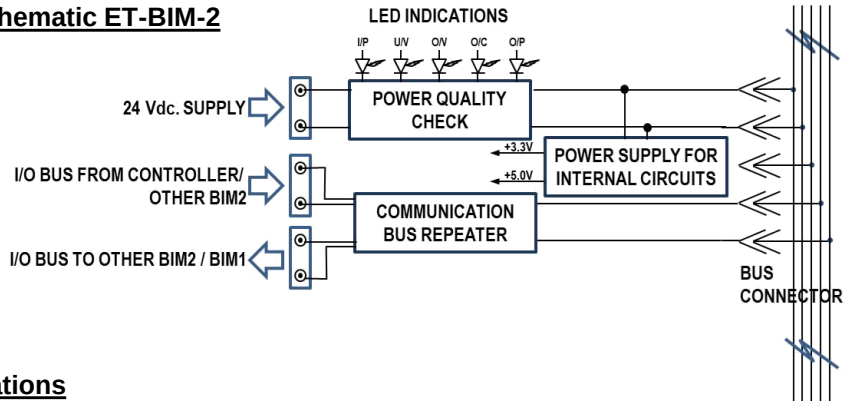
Indications for
Watch Dog (BIM-1 Only)
Over Current

Indications for
Input On, Output Ok,
Under Voltage,
Over Voltage

Block Schematic ET-BIM-1



Block Schematic ET-BIM-2



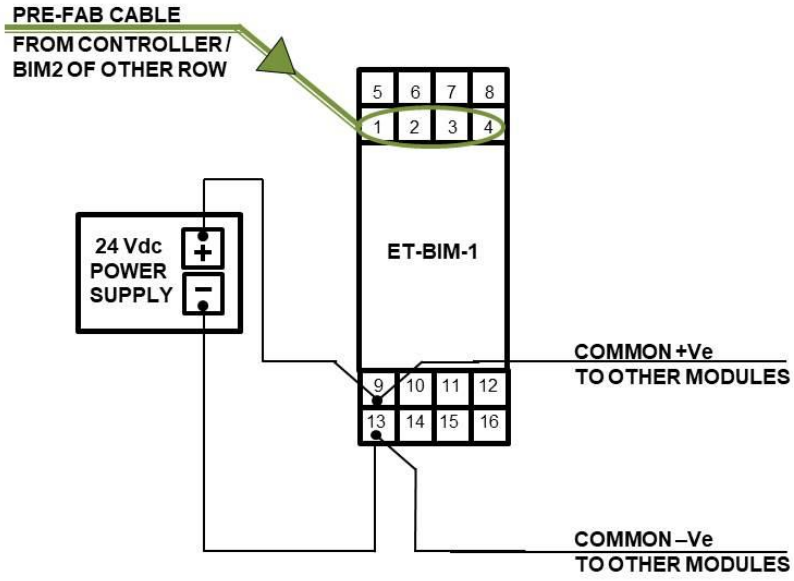
Specifications

Input Supply Voltage	: 16 to 27 Vdc
Voltage Protection Limits	: Under Voltage V<16 Vdc Over Voltage V>27 Vdc
Over Current Limit	: Bus Current > 2.8 Amp
Recommended number of I/O Modules in a row	: 11
Indications	: Power Supply related Input Power On, Under Voltage, Over Voltage, Over Current Output Voltage Ok Diagnostic indication (for BIM1 only) Watch-dog healthy
Dimensions	: Single-width (Please refer Family Data Sheet)

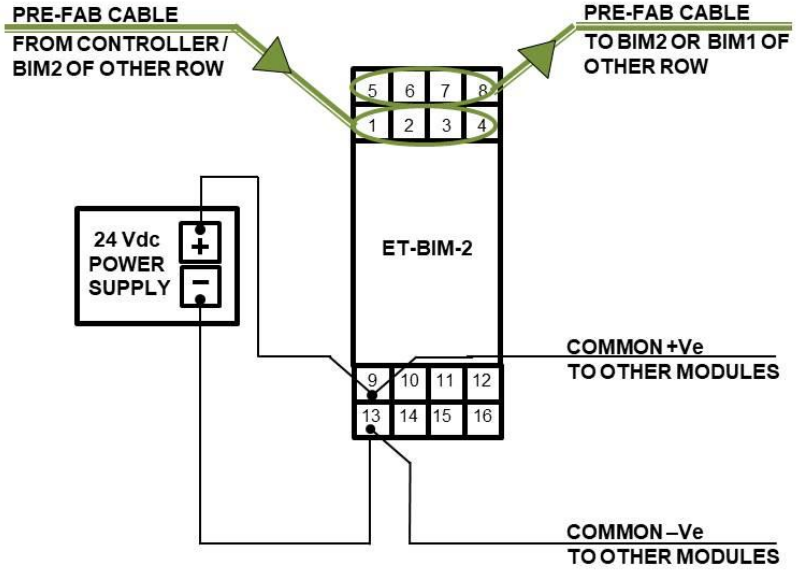
Functional Description

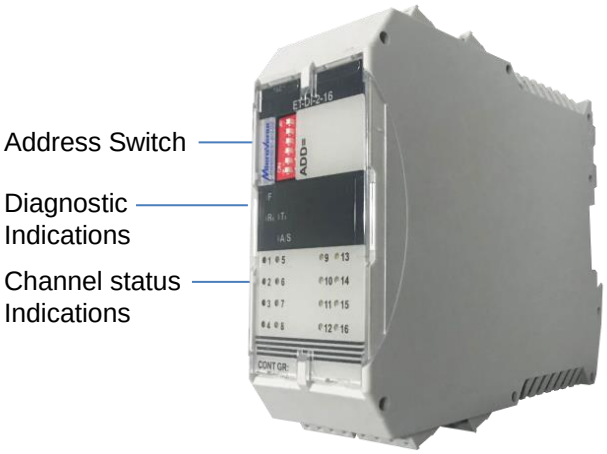
Bus Interface Modules Type ET-BIM-1 and -2 are intended for feeding power to I/O Modules and connecting communication bus to Controller/s
24 Vdc Power and communication signals are connected to detachable connectors of ET-BIM-1 and -2. Power and communication is in-turn connected to I/O Modules through Bus-Connectors embedded in DIN-Rail.
ET-BIM-1 and -2 check the quality of power and connect to I/O Modules only if it is within acceptable limits. Similarly, bus current is monitored and supply is shut-off in case of over-load or short circuit on the bus.
ET-BIM-1 is equipped with a micro-controller to monitor communication link with the controller. ET-BIM-1 is therefore to be installed at last row of I/O Modules. ET-BIM-1 communicates with the Controller and informs status of healthiness of communication link. Please refer to recommended System Architecture Schemes.

Typical connection scheme ET-BIM-1

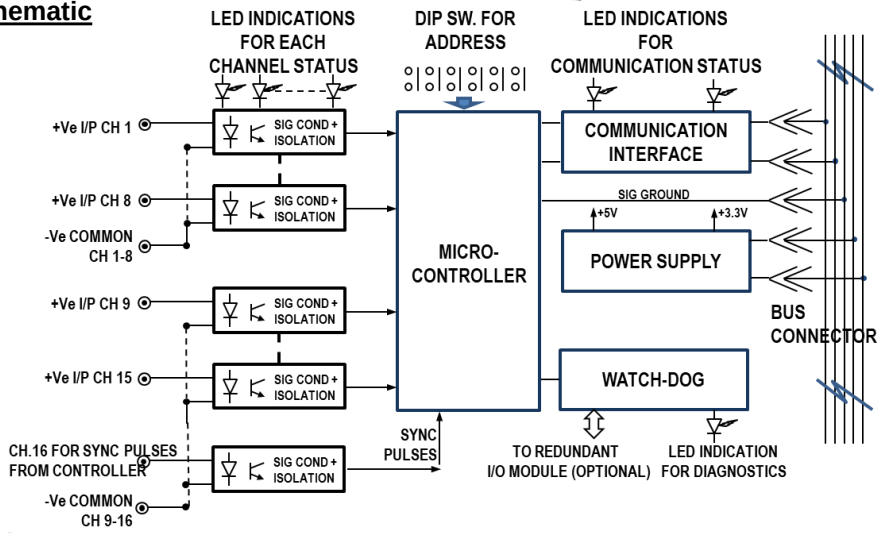


Typical connection scheme ET-BIM-2





Block Schematic



Specifications

No. Of Channels	:	15
Input Signal level	:	0 to 5 Vdc - Digital Low 17 to 27 Vdc - Digital High
Input Signal Current	:	10 mA @ 24 Vdc
Signal Type	:	Sinking
Input Connection	:	Common -Ve for group of 8 channels
Isolation	:	1000 Vac+Vdc . Peak Between Inputs and System
Input Filter	:	0.2 ms
Reporting Resolution	:	0.5 mSec
Indications	:	Channel status for individual channel - Green when input High Module diagnostics - Active / Standby (If Redundant) - Ok / Fail Communications - Tx, Rx
Enclosure Dimensions	:	Double-width (Please refer Family Data Sheet)

SPECIAL FUNCTION MODULE TYPE ET-SE-2-15 15 CH. SOE

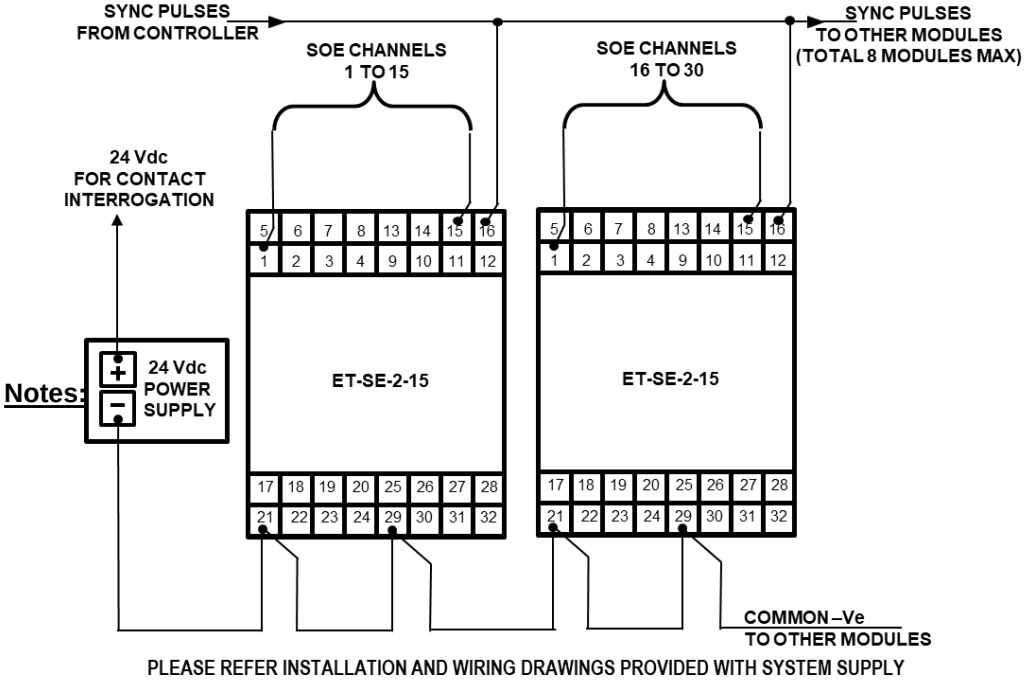
Functional Description

Module Type ET-SE-2-15 is meant for Sequence Of Event Recording of digital inputs. Transition of each digital input either from Low to High or High to Low is sensed and stored as an event in the module with a time-stamp. Resolution of time stamp is 0.5 mSec. Time-stamped events are communicated to the Controller. Controller forwards this information to Engineering / Operator station having 'SOE Analyzer' Package. SOE Analyzer generates customized reports with time-stamp resolution of 1 mSec. Clock of Operator / Engineering Station having SOE Analyzer package is treated as reference clock for time stamps. This clock may be suitably synchronized with other system / plant clock.

Each Module Type ET-SE-2-15 can handle 15 Digital Input channels to be monitored for event recording with 1 mSec resolution. Maximum of 8 nos. of such modules can be connected to a controller to make 120 channel Sequence Of Event Recorder system.

Digital input signals acquired by Type ET-SE-2-15 and communicated to Controller can be used for control and interlocking functions like normal conventional digital inputs as well.

Typical Connection Scheme

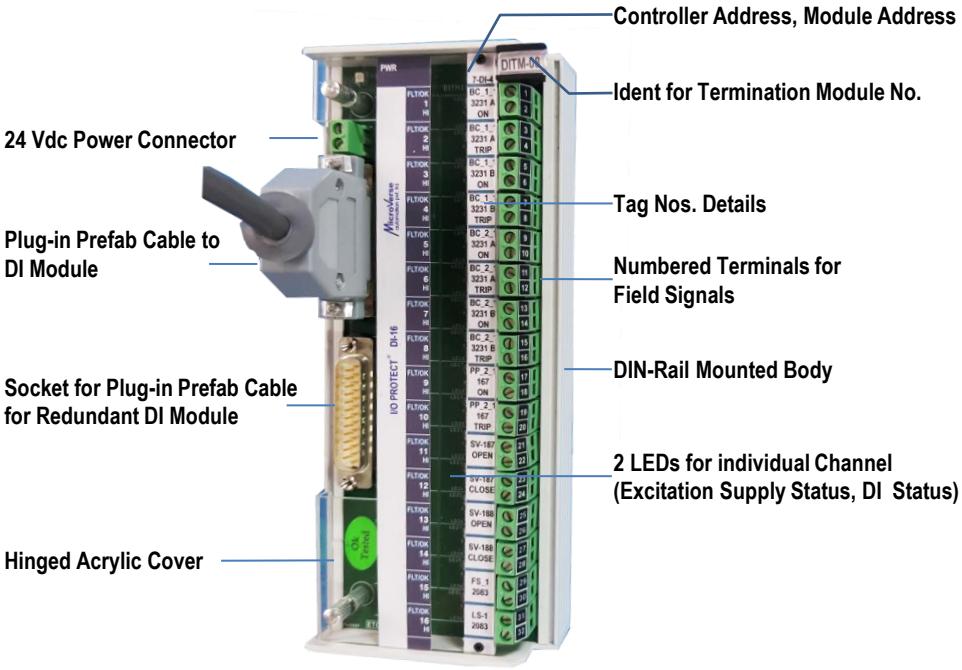


PLEASE REFER INSTALLATION AND WIRING DRAWINGS PROVIDED WITH SYSTEM SUPPLY

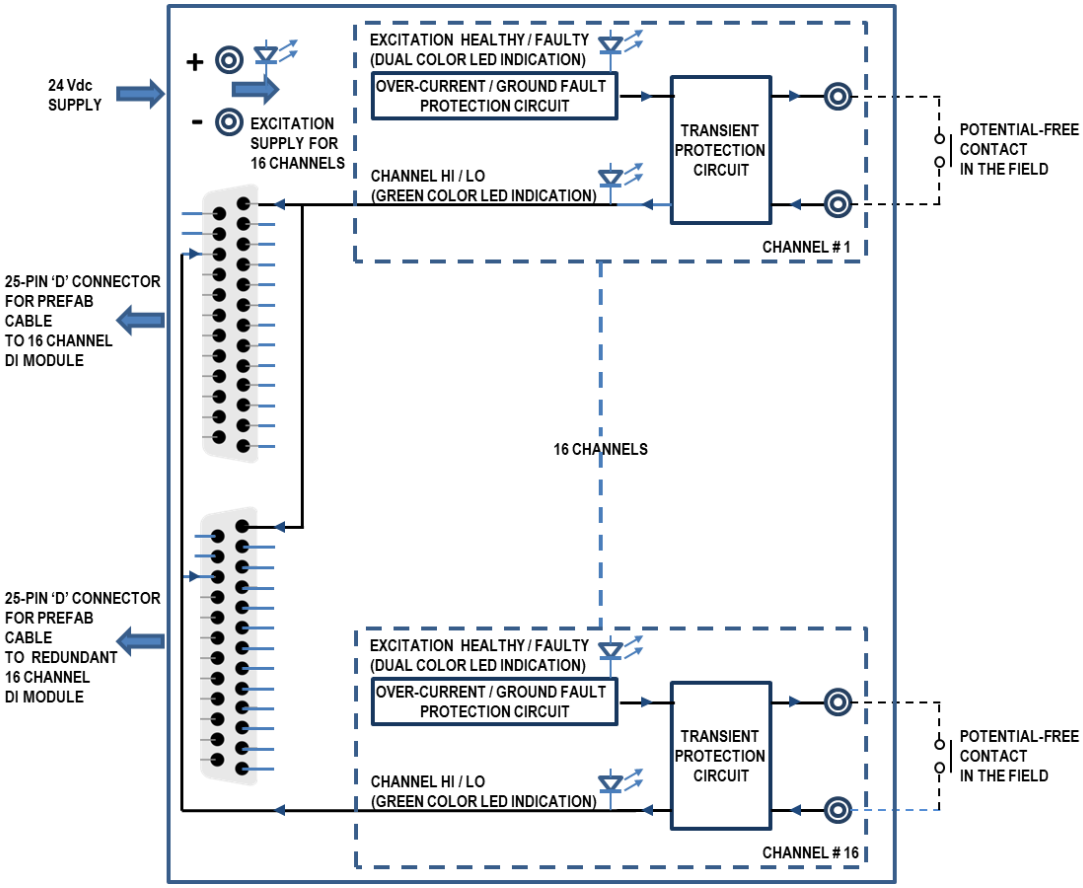
1. Field connections shown for 1 channel only. (Channel No.1)
2. Channel Nos. 2 to 15 to be connected to Terminal Nos. 2 to 15 respectively
3. Terminal 17 to 24 and 25 to 32 are shorted internally for 24V –Ve supply
4. Other accessories are available to terminate Digital Input signals. These include:

   a. Digital Input Termination Module (DITM) for 8 / 16 / 24 Channels
   DITM is typically used for terminating signals coming from auxiliary contacts of MCC. This offers protection against fault to 230 / 415 Vac. circuits and eliminates need for any interposing relays.
   DITM may be connected to ET-DI-2-16 with a pre-fab cable

   b. I/O Protect Terminals
   These Terminals contain a transient protection circuit and are particularly useful for signals originating in the field which are likely to pick up transients riding on the signal lines.



Block Schematic



TERMINATION MODULE TYPE I/O PROTECT – DI 16

Functional Description

Termination Module Type 'I/O Protect – DI 16' facilitates termination of field cables for digital input signals and connects the signals to Digital Input Module through pre-fab cable. The module provides 24 Vdc interrogation supply for potential-free contacts in the field.

24 Vdc interrogation supplies for individual channels are protected against over-current / ground fault by electronic resettable fuses. Dual-colour LEDs are provided to indicate the status of fuses. LED turns red upon over-current / short-circuit. LED turns green upon automatic resetting of the fuse after the fault is cleared.

Status indication LED is provided for individual channel. LED turns green when external contact closes and turns off when external contact opens.

Interrogation supply and digital input signal passes through a transient protection circuit. This prevents high voltage spikes entering the system and I/O Module.

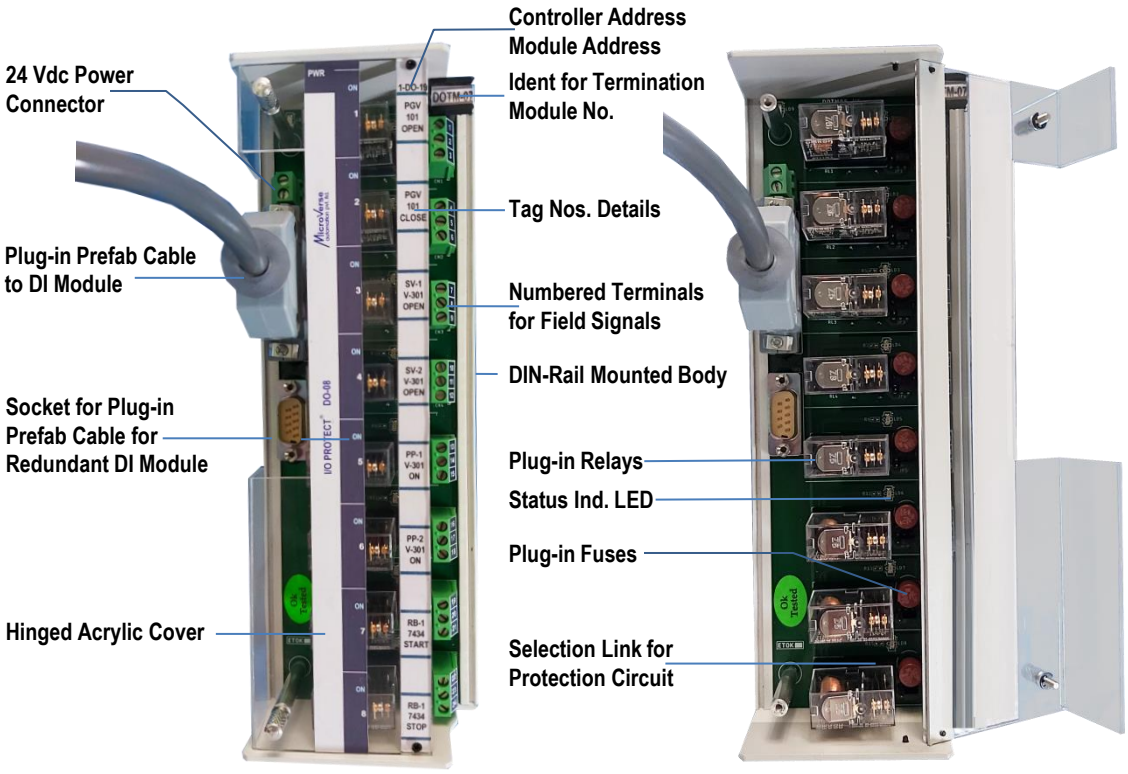
Several facilities are provided for tagging the signals, that simplify maintenance tasks. These include:

- User replaceable Tag Number Strip. The strip bears Tag Number of individual channel. In addition, information related to the module address and controller address are also provided.
- Identification Tag for Termination Module Number
- Serial numbers of terminals.

Two 25-pin male 'D' Connectors are provided for connecting pre-fab cables. These are wired in parallel, so as to connect to a redundant Digital Input Module, if installed.

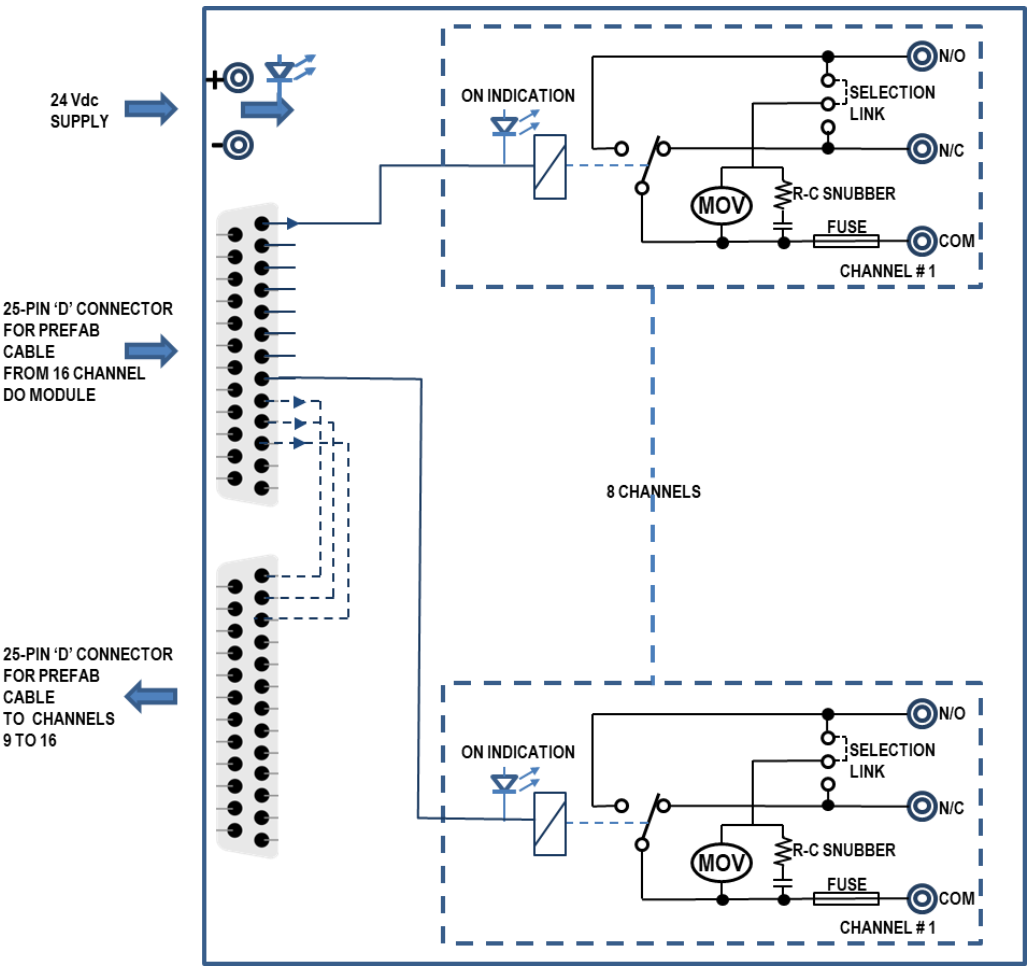
Specifications

Number of Channels	: 16
Input Supply Voltage	: 16 to 27 Vdc
Over-current / Short circuit protection	: Electronic self-resettable fuses rated at 30 mA for each channel
Transient Protection	: As per IEC 61000-4-4, 1 kV Surges
Field Signal Connection Type	: Screw-cage type terminal blocks
Maximum conductor size for field signal cable	: 2.5 mm^2
Dimensions	: 84 (W) X 205 (L) mm
Mounting	: Standard 35 mm Top-Hat DIN-Rail



(View: Hinged Cover Closed) (View: Hinged Cover Open)

Block Schematic



TERMINATION MODULE TYPE I/O PROTECT – DO 16

Functional Description

Termination Module Type 'I/O Protect – DO 16' facilitates termination of field cables for digital output signals. The module has plug-in relays driven by digital outputs from Digital Output Module. The interconnection between termination module and Digital Output Module is through pre-fab cable.

'Termination Module Type 'I/O Protect – DO 16' has 8 relay circuits. To cater to 16 Channel Digital Output Module, two such termination modules are required. Channel nos. 1 to 8 of Digital Output Module have corresponding relays on the first termination module. Channel nos. 9 to 16 of Digital Output Module are routed to second identical termination module through an interconnecting pre-fab cable.

The relays are 1-changeover, plug-in type with contact rating of 10 Amp (Resistive load at 230 Vac). Normally-close, Normally-open and Common (Pole) connections of the relays are brought upto screw-cage terminals for field wiring.

Each contact is provided following protections:
- A fuse in series with the common (Pole) rated at 10 Amp
- MOV Rated at 270 Vac
- RC Snubber Circuit

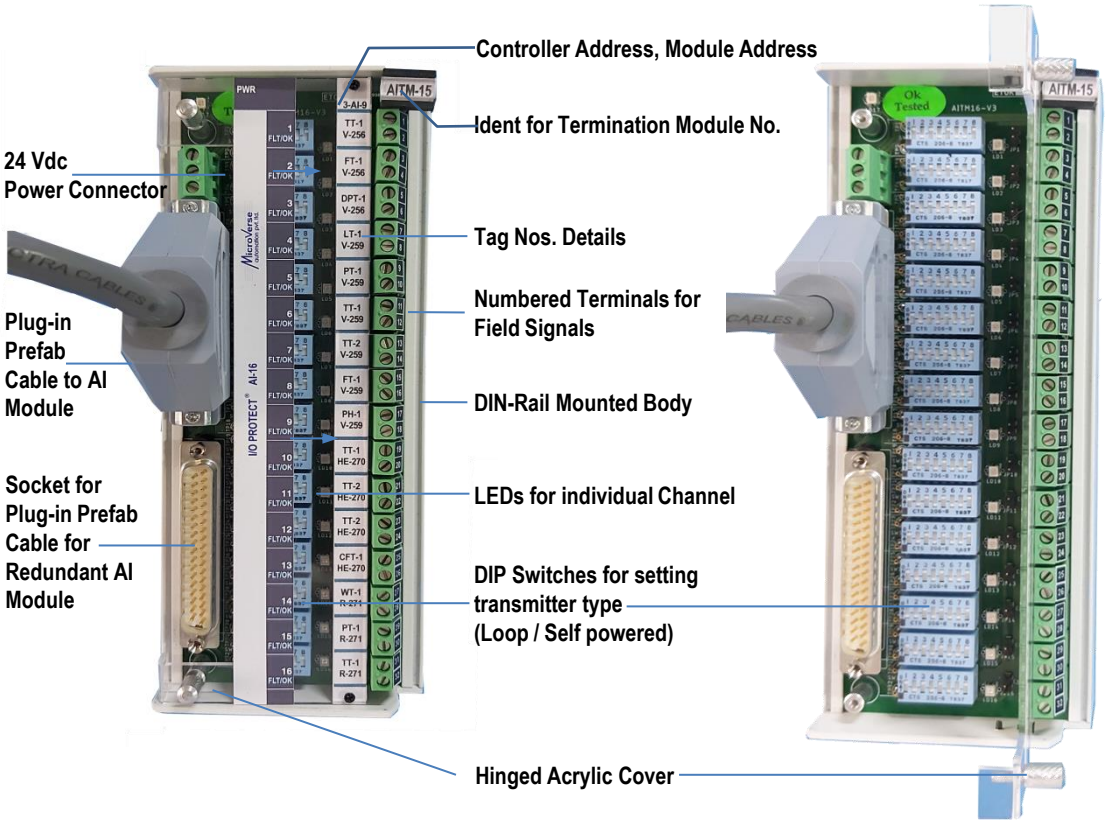
MOV and RC Snubber circuit can be connected either across Common and Normally Open or Common and Normally Close contact or can be left unconnected through user-selectable link.

Status indication LED is provided for each realy to indicate actuation status.

Several facilities are provided for tagging the signals that simplify maintenance tasks. These include:
- User replaceable Tag Number Strip. The strip bears Tag Number of individual channel. In addition, information related to the module address and controller address are also provided.
- Identification Tag for Termination Module Number
- Serial numbers of terminals.

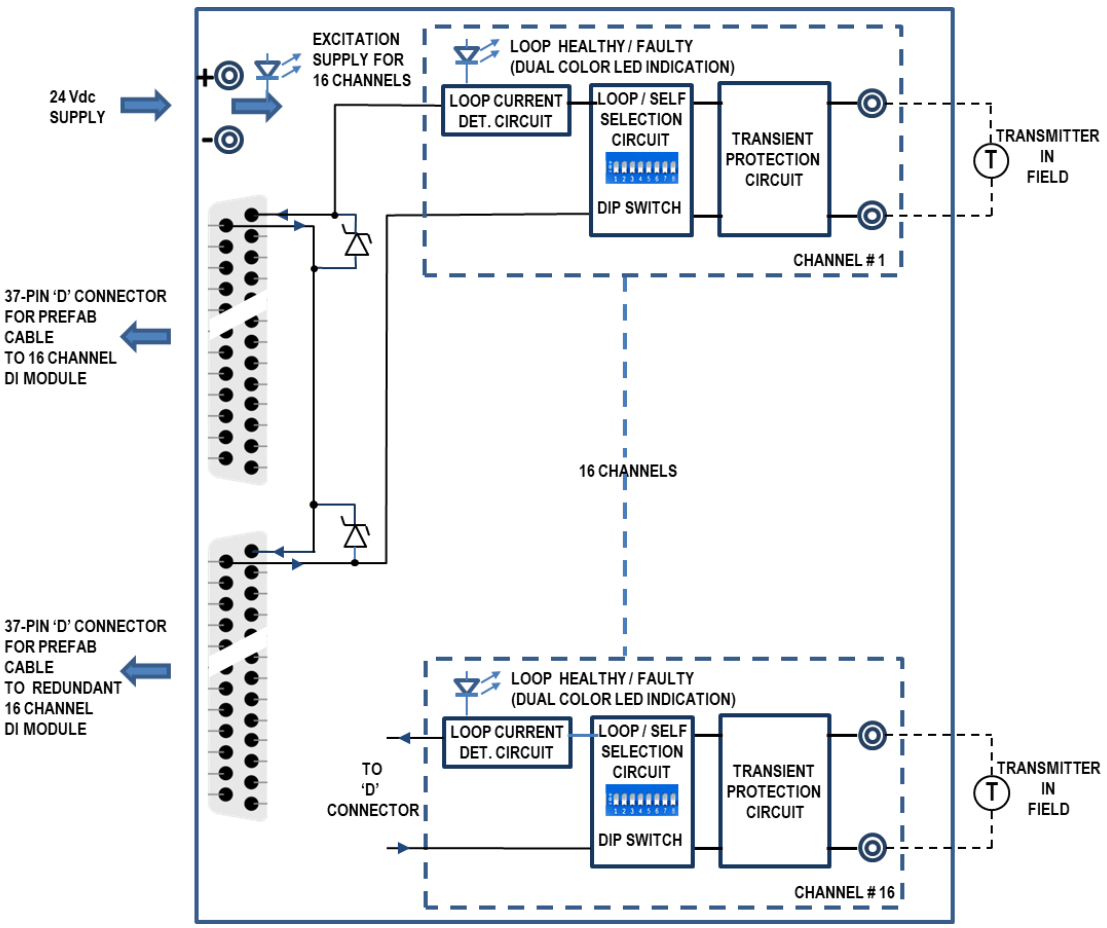
Specifications

Number of Channels	: 8
Input Supply Voltage	: 16 to 27 Vdc
Contact Rating	: 10 Amp – Resistive load at 230 Vac 7.5 Amp – Inductive load with cos ∅ of 0.4 at 230 Vac Contact rating for inductive loads further enhanced by use of RC snubber and MOV
Field Signal Connection Type	: Screw-cage type terminal blocks
Maximum conductor size for field signal cable	: 2.5 mm^2
Dimensions	: 84 (W) X 233 (L) mm
Mounting	: Standard 35 mm Top-Hat DIN-Rail



(View: Hinged Cover Closed) (View: Hinged Cover Open)

Block Schematic



TERMINATION MODULE TYPE I/O PROTECT – AI 16

Functional Description

Termination Module Type 'I/O Protect – AI 16' facilitates termination of field cables for analog input signals and connects the signals to Analog Input Module through pre-fab cable. The module provides 24 Vdc interrogation supply for loop powered transmitters in the field.

Signals from field transmitters pass through transient protection circuits. This prevents high voltage spikes from entering the system and I/O Module.

A circuit configured around DIP switches is used to select type of transmitter i.e. self or loop.

Two 37-pin male 'D' Connectors are provided for connecting pre-fab cables. These are wired in series, so as to connect to a redundant Analog Input Module if installed. In the event of disconnection of redundant module, the 4-20 mA loop current path gets automatically bypassed, so that no discontinuity takes place in current loop.

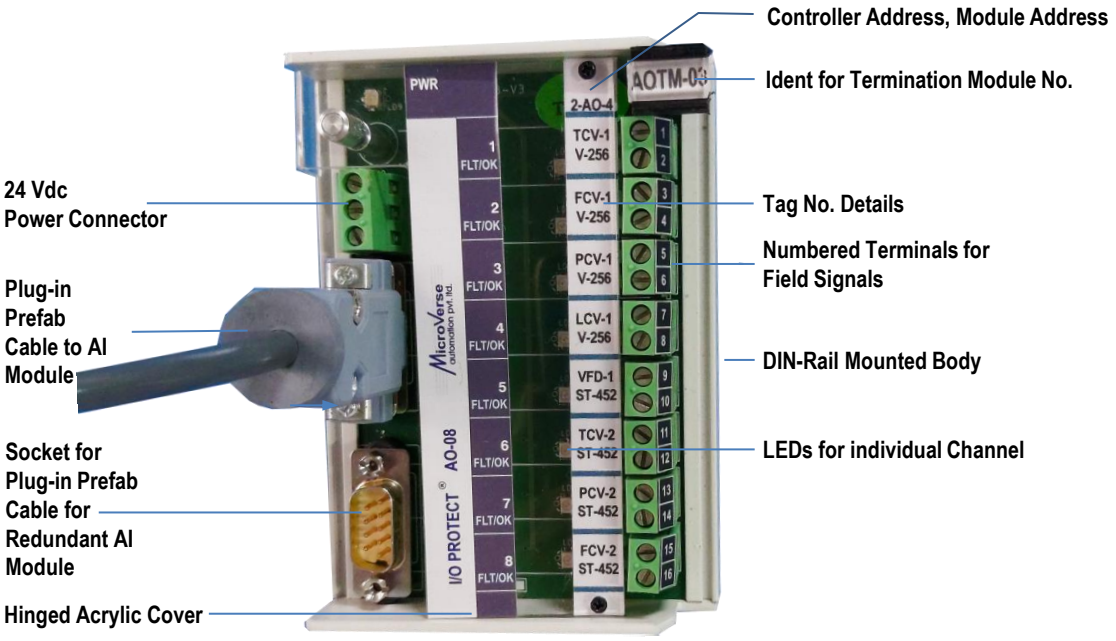
Several facilities are provided for tagging the signals that simplifies maintenance tasks. These include:

- User replaceable Tag Number Strip. The strip bears Tag Number of individual channel. In addition, information related to the module address and controller address are also provided.
- Identification Tag for Termination Module Number
- Serial numbers of terminals

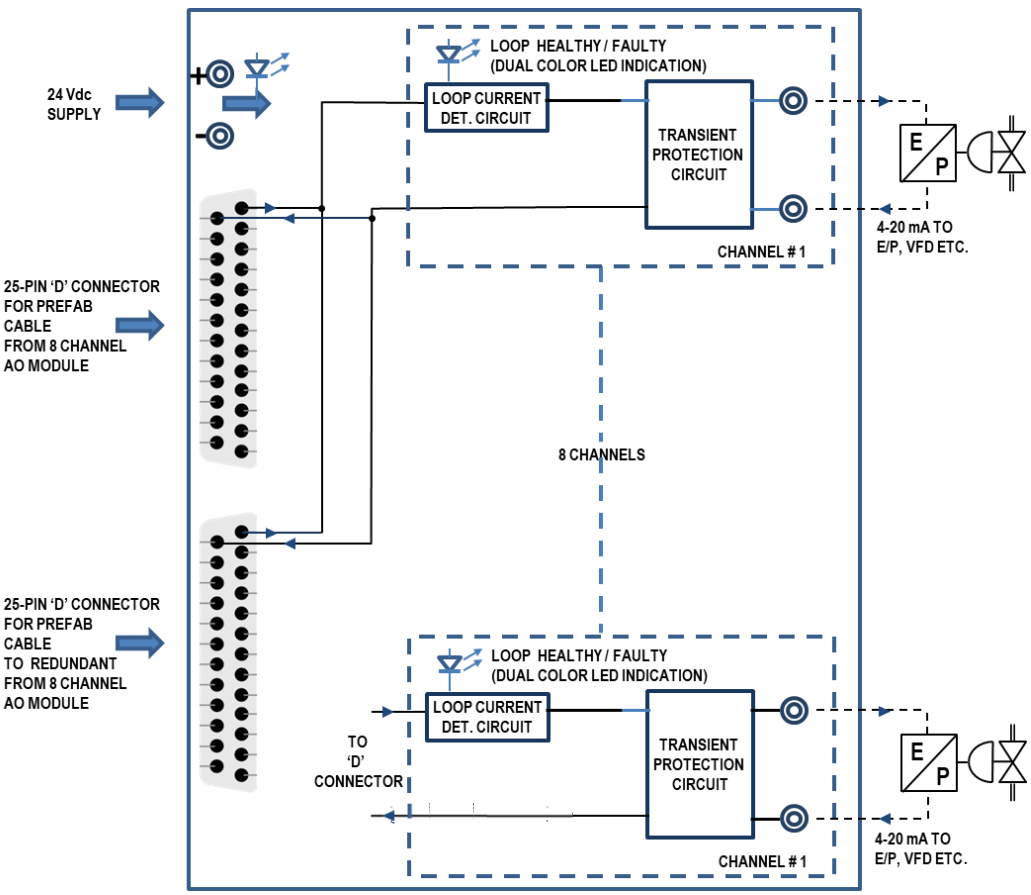
Facility is provided for measuring loop current without opening the loop. Terminals are available for plugging-in HART configurator.

Specifications

Number of Channels	: 16
Input Supply Voltage	: 16 to 27 Vdc
Over-current / Short circuit protection	: Analog Input Module has built-in electronic current limiting feature to limit fault current to 30 mA max.
Transient Protection	: As per IEC 61000-4-4, 1 kV Surges
Field Signal Connection Type	: Screw-cage type terminal blocks
Maximum conductor size for field signal cable	: 2.5 mm^2
Dimensions	: 84 (W) X 205 (L) mm
Mounting	: Standard 35 mm Top-Hat DIN-Rail



Block Schematic



TERMINATION MODULE TYPE I/O PROTECT – AO 8

Functional Description

Termination Module Type 'I/O Protect – AO 8' facilitates termination of field cables for analog output signals and connects the signals to Analog Output Module through pre-fab cable.

Signals from Analog Output Module pass through transient protection circuits. This prevents high voltage spikes from entering the system and I/O Module.

4-20 mA loop current passes through a current detection circuit. Dual color LEDs are provided for individual channels to indicate loop healthy (green light) or loop open (red light).

Two 25-pin male 'D' Connectors are provided for connecting pre-fab cables. These are wired in parallel, so as to connect to a redundant Analog Output Module if installed.

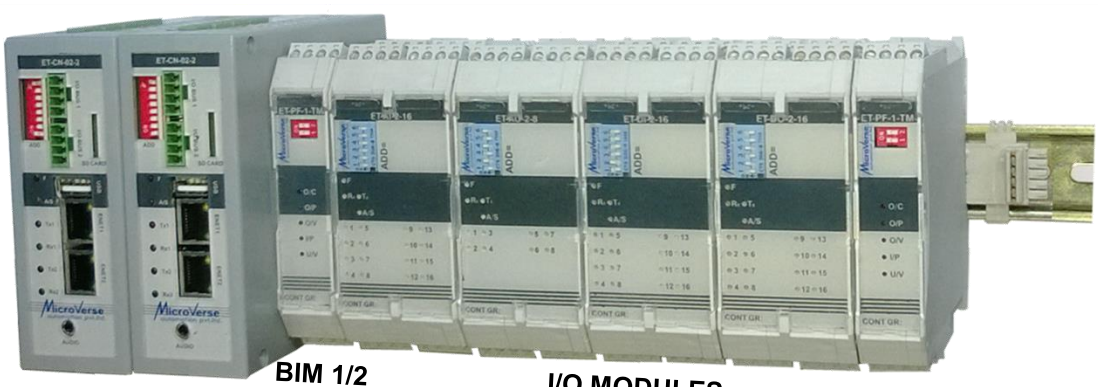
Several facilities are provided for tagging the signals. This simplifies maintenance task. This includes:

- User replaceable Tag Number Strip. The strip bears Tag Number of individual channel. In addition, information related to the module address and controller address are also provided.
- Identification Tag for Termination Module Number
- Serial numbers of terminals

Facility is provided for measuring loop current without opening the loop.

Specifications

Number of Channels	: 16
Input Supply Voltage	: 16 to 27 Vdc
Over-current / Short circuit protection	: Analog Outut Module has built-in electronic current limiting feature to limit fault current to 30 mA max.
Transient Protection	: As per IEC 61000-4-4, 1 kV Surges
Field Signal Connection Type	: Screw-cage type terminal blocks
Maximum conductor size for field signal cable	: 2.5 mm^2
Dimensions	: 84 (W) X 114 (L) mm
Mounting	: Standard 35 mm Top-Hat DIN-Rail

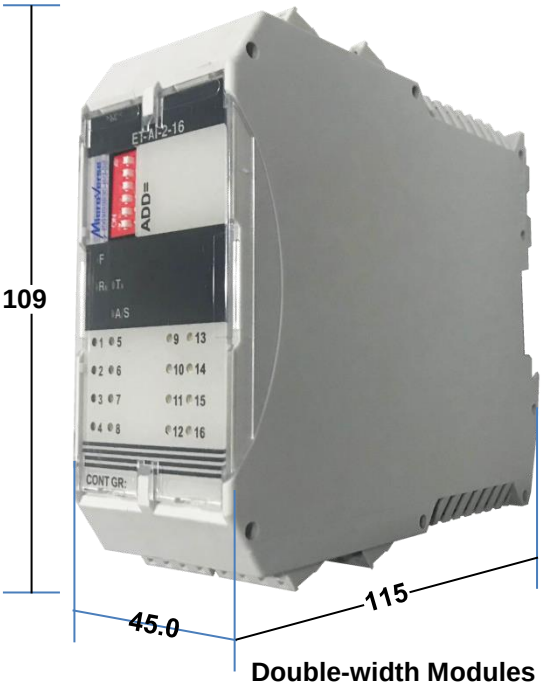


Specifications

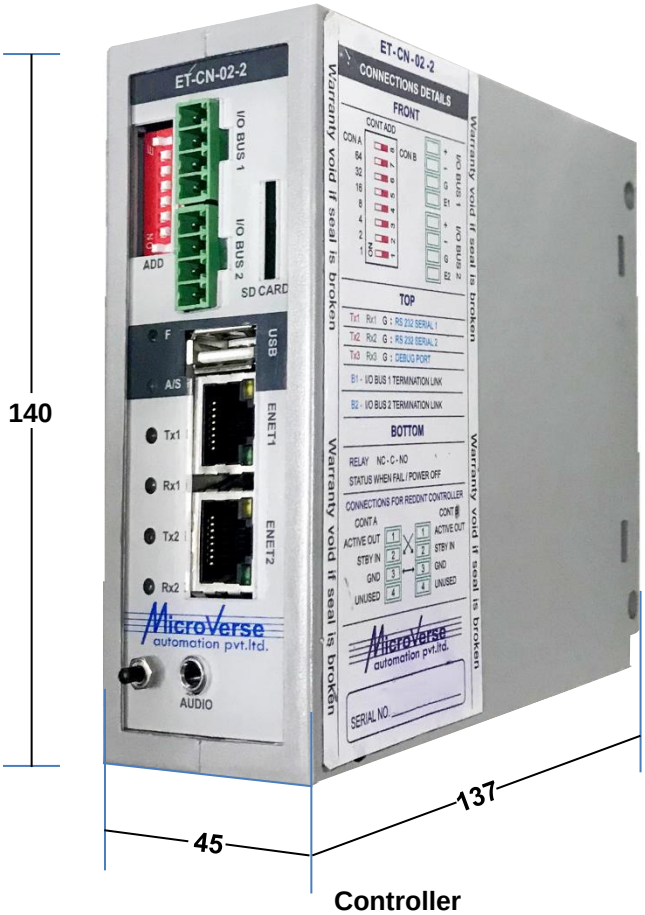
Recommended supply voltage	: 18 to 27 Vdc.
Operating Temperature range	: 0°C to 60°C
Storage Temperature range	: -20 °C to 75°C
Max Relative Humidity	: 90% RH; Non-condensing
Cyclic Dry Heat / Damp Heat Test	: 55°C / 95% RH; 2 Cycles of 12 Hrs.
Conformal Coating on PCBs	: As per ISA 71.04 Class G3
EMI / EMC Compatibility	: IEC 61000-4-2 (ESD Immunity) IEC 61000-4-4 (Fast Transients: 1kV on signal lines and 2 kV on supply lines) IEC 61000-4-5 (Combination wave 2 kV) IEC 61000-4-20 (Radiated Emission)
Power Requirement	: Controller: 15 Watt max I/O Modules: Typically less than 2 Watt each
Hot insertaion / removal capability	: All sub-systems are hot removable / hot insertible
Mounting	: Standard DIN Rail 35 X 7.5 for all I/O Modules, Controllers, Interface Modules
Connections	: All connections to Controllers, I/O Modules with two part detachable connectors Protection insertion of incorrect type of connector provided
Degree of protection for enclosure	: IP-20
Enclosure Material	: Industrial Grade Polyamide
Approximate Weight	: Controller: 350 gm each Double-width I/O Modules 270 gm each Single-width I/O Modules 180 gm each
Dimensions	: Please refer next sheet

Dimensional Details

Single-width Modules



Double-width Modules



Controller