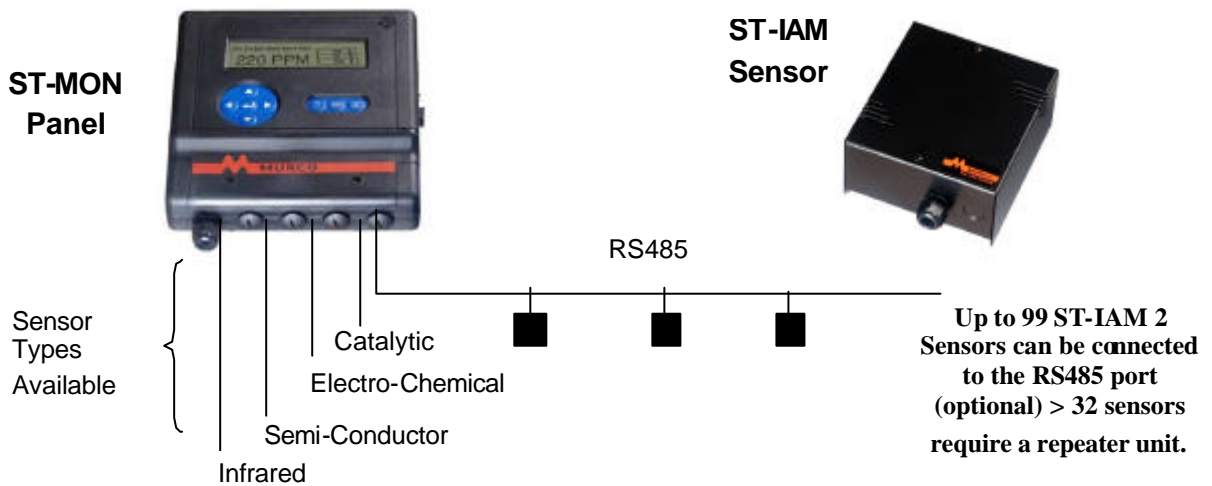


# MURCO

## SENSOR TRANSMITTER MANUAL



Murco Limited

August 2003

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## Introduction

The Murco Sensor Transmitter range consists of:

ST-IAM 1 - Sensor Transmitter Integrated Area Monitor – Model 1

ST-IAM 2 - Sensor Transmitter Integrated Area Monitor – Model 2

## Specification ST-IAM 1 & ST-IAM 2

Murco sensor transmitters have linearised outputs proportional to the gas concentration, the ST-IAM 1 has 0-5V, 0-10V, 4-20mA outputs and one on board relay, whereas the ST-IAM 2 has 0-5V, 0-10V, 4-20mA, RS485 and two on board relays with selectable delayed response and manual or auto reset.

They utilise semi-conductor, electro-chemical, catalytic, and infrared sensors. The ST-IAM is also available in an explosion proof -EExd format (with the exception of the Infrared sensor model).

Murco sensor transmitters can function independently as stand alone units and can report to most alarm and building management systems using their linearised outputs or onboard relay.

Up to 99 ST-IAM sensors can also be monitored using the Murco Sensor Transmitter Monitor panel (ST-MON), which is a powerful monitoring, data storage, retrieval, and alarm system complete with LCD graphic display.

	<b>ST-IAM 1</b>	<b>ST-IAM 2</b>
Description	The ST-IAM 1 consists of an enclosure incorporating a combined sensor and monitor board.	The ST-IAM 2 consists of an enclosure incorporating an interchangeable pre-calibrated sensor board and a monitor board.
Output	0-5, 0-10 or 4-20mA	0-5, 0-10, 4-20mA, RS485
Relays	One	Two relays with jumper selectable NO/NC State, automatic or manual reset, delayed response 0, 1, 5 or 10 minutes.
Digital Display	Optional	Optional
Input	12 or 24V AC or 10 to 30V DC	
Range	PPM up to LEL levels, varies with gas, see selected list	
Response	T90, see sample list below	
Dims / Weight	155 x 140 x 90mm. 900g	

The ST-IAM allows for full compliance with EN2037/2000 and standard EN387 (Europe), ASHRAE 15-1994 (USA), and all other International Standards.

The ST-IAM is available with a range of different sensor technologies to monitor most industrial gases, a brief selection of which are shown below.

<b><u>SENSOR TYPE</u></b>			<b>Sample Range PPM or %</b>	<b>Response TIME</b>
<b>Semi-Conductor</b>	Refrigerants	CFC, HCFC, HFC	0-1000	< 150Secs
	NH <sub>3</sub>	Ammonia	0-1000	< 60Secs
	VOC	Volatile Organic Compounds	0-5000	< 30Secs
	HC's	Hydrocarbons	0-10000	< 30Secs
	CO	Carbon Monoxide	0-5000	< 30Secs
<b>Electro-Chemical</b>	Cl <sub>2</sub>	Chlorine	0-20	< 60 Secs
	H <sub>2</sub> S	Hydrogen Sulphide	0-100	< 30Secs
	CO	Carbon Monoxide	0-500	< 20Secs
	O <sub>2</sub>	Oxygen	25%	< 15Secs
	O <sub>3</sub>	Ozone	0-5	< 150Secs
	NH <sub>3</sub>	Ammonia	0-1000	< 150Secs
<b>Infra-Red</b>	CO <sub>2</sub>	Carbon-Dioxide	0-10000	< 60 Secs
<b>Catalytic</b>	NH <sub>3</sub> , Hydrocarbons and most flammable gases / vapours		0-100% LEL	< 10Secs
Available Shortly				
<b>Infra-red</b>	Refrigerants	HFC	0-1000	< 60 Secs

### **Explosion Proof – Murco Sensor Transmitter (ST-IAM 1 & 2 EExd)**

The Murco EExd sensor consists of a: **Sensor head** (stainless steel) for Semi-conductor or electro chemical sensors. Approval - EExd II C + H2 T6 and **Enclosure** (Cast Iron) - IP66, flameproof, explosion proof, weatherproof, circular terminal enclosure, ATEX certified: EExd II C H2 T6:



Sensor type: Electrochemical, Semiconductor and Catalytic

Both the ST-IAM 1 and ST-IAM 2, can be connected to the Murco Sensor Transmitter Monitor ST-MON which can be configured to facilitate up to 99 sensors. The ST-IAM 1 using its 4-20mA output and 16 channel remote slave units and the ST-IAM 2 is connected via its RS485 and a two-core cable. (Repeater required for >32 sensors). Better value can be obtained using the ST-IAM 2 for larger systems (greater than 16 sensors) due to its ease of cabling via the RS485.

## Sensor Transmitter Housings Available



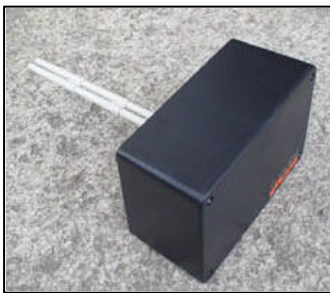
Standard Sensor  
Transmitter  
(Machinery Rooms)



Digital Display  
(ST-IAM 2)



Low Temperature / High Airflow  
/ Enhanced Protection



Duct Mount Housing



Pressure Relief Valve  
Monitoring  
(Tee'd off vent pipe)



IP65



EExd



Remote Sensor Element /  
Choice of Decorative  
Housings Available

## Sensor Transmitter Monitor (ST-MON)

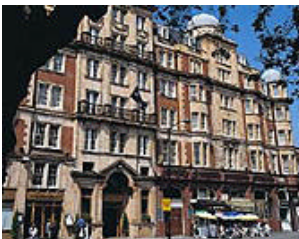
The ST-MON features available include: -

- Visual and audible alarms, with graphic display in % or PPM.
- Repeat alarm and dial out relay
- Modem or connection to a PC to activate call outs etc.
- Printouts of data logs, graphs printed to A4 printer (Optional).
- Historical data is stored within the system and may be viewed or printed on a regular basis.
- PC interface with on, or, off site interrogation with long-term data storage (Windows based software).
- Volt free relay.
- Mains failure alarm with battery backup.
- Each sensor can be individually programmed for one or more levels of alarm with different alarm actions for each warning level and a response delay, which serves to eliminate false alarms.
- Authorised personnel may make adjustments on site (password protected).



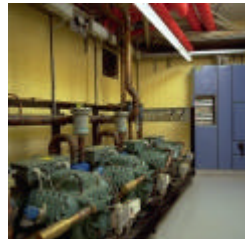
On alarm the panel display flashes red and the alarming channel is displayed showing the detected gas level. Users can examine the history and see if it is a sudden leak or if it has been building gradually, and print out the history in numerical or graphical form.

### Typical Applications



#### Air Conditioning

Hotels  
Apartments  
Office Blocks  
Leisure Clubs  
Restaurants



#### Refrigeration

Machinery Rooms  
Factories  
Cold Stores  
Supermarkets  
Distribution Centres  
General Industrial &

## **Installation and Operation**

### **Sensor Transmitter – Integrated Area Monitor ONE**

#### **ST-IAM 1**

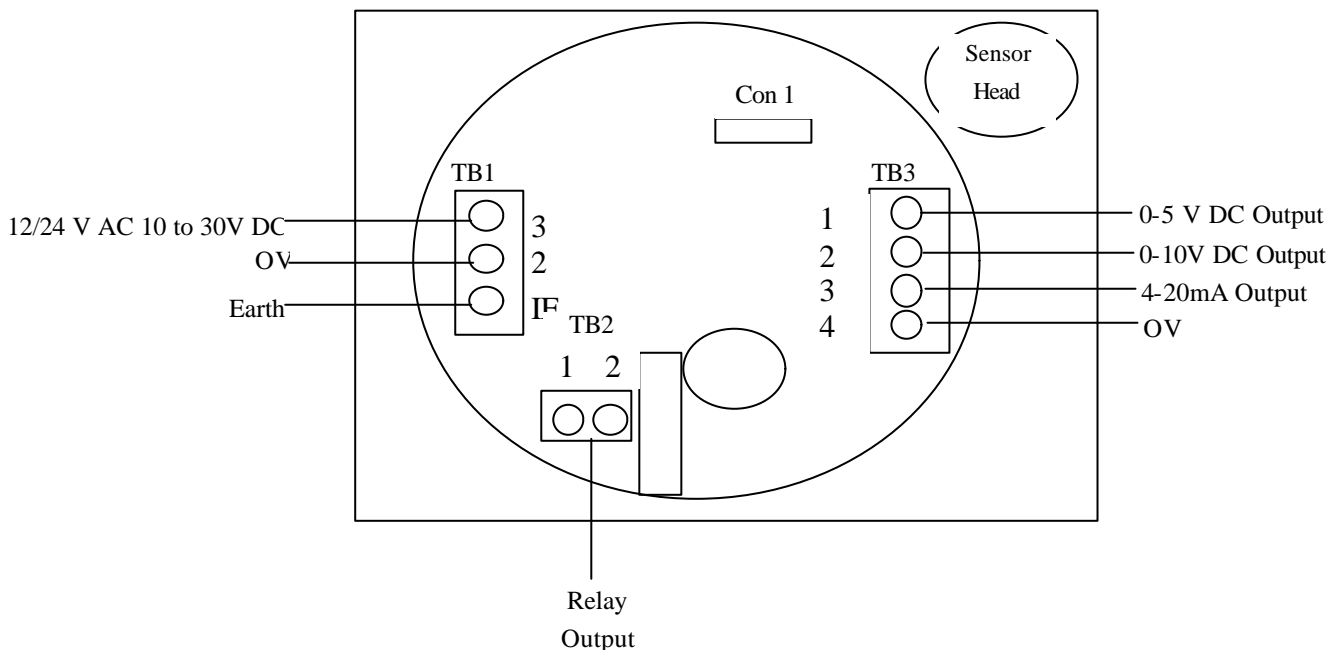
**Please see Installation and Operation on page 16 for model ST-IAM 2**

## Sensor Transmitter – Integrated Area Monitor 1 (ST-IAM 1) Connection Instructions

Earth connection is not necessary for operation of circuitry but must be made when using the ST-IAM vented metal enclosure or EExd enclosure

1. Power supply is 12 or 24 V AC or 10-30V DC. The 0V on the power supply terminal block (TB1) is not isolated from the 0V on the output terminal block (TB3). Therefore when an AC supply is used it is recommended that it be provided from a winding that is isolated from the 0V or common of any panel monitoring the output signals from TB3.  
Cable requirements – please see note below with each connection diagram (differs slightly with each model)
2. The 4-20mA output is designed to work with an output resistance less than 400 ohms. The output wiring from the ST-MON unit to each Sensor is low voltage and can use alarm cable type spec, typically 7/0.2mm for 100 M runs (8.8 ohm resistance per core). If cabling to a higher specification is required or when cabling is to be installed alongside mains cable, then use screened cables to DEF, Standard 61-12 parts 4 and 5; these should be of 7/0.2mm conductor size for cable runs up to 100 metres and for runs of greater than 100 metres screened cables to the above standards with a 16/0.2 conductor size should be used.
3. If you wish to use the on board relay 10 Amp @ 230V, it has to be activated by snipping/cutting the link at either position JP1 or JP2. These are either side of the relay terminal block at position D. For normally closed operation JP1 must be intact and you should snip/cut JP2. For normally open operation snip/cut JP1 and leave JP2 intact. If you are switching mains 230v a separate cable must be used, rather than two cores of the multi-core carrying the power supply and the analogue outputs.

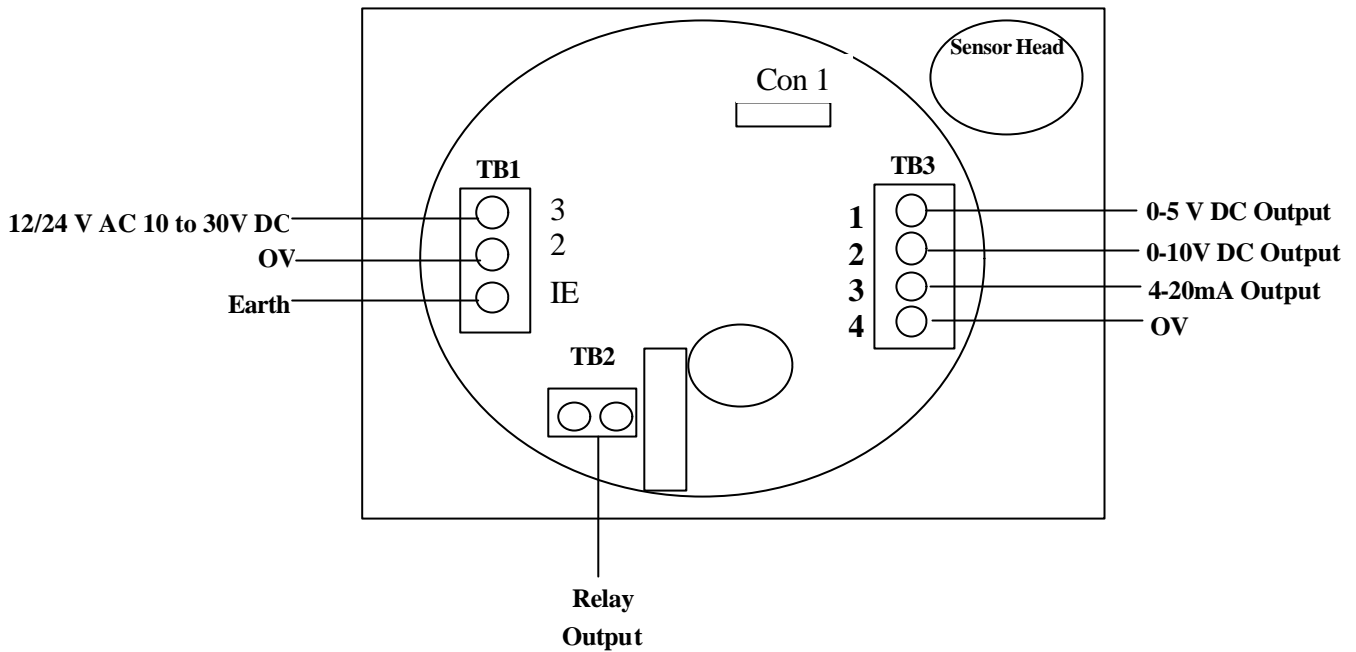
### Connection Diagram ST-IAM 1 Semi-conductor



On the power supply side 10V is the minimum at the terminals. Power consumption is 4W max. It can draw 0.4 amp at 10V, so voltage drop along the supply cable should be considered when selecting cable supply voltage and cable type and length. For example, for cable resistance 10 ohms/100m allowing for the flow and return total cable resistance for 100m is 20 ohms and voltage drop along the cable is 8V. Minimum DC supply then should be 18V



### Connection Diagram – ST-IAM 1 Electrochemical

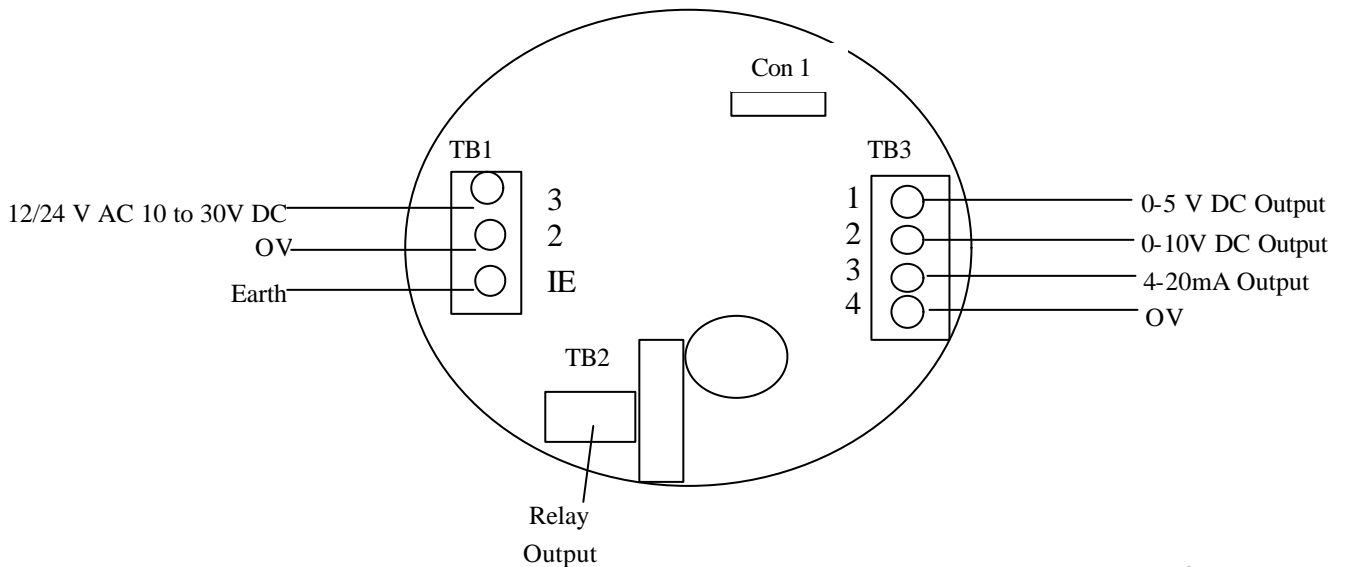


On the power supply side 10V is the minimum at the terminals. Power consumption is 3W max. It can draw 0.3 amp at 10V, so voltage drop along the supply cable should be considered when selecting cable supply voltage and cable type and length. For example, for cable resistance 10 ohms/100m allowing for the flow and return total cable resistance for 100m is 20 ohms and voltage drop along the cable is 6V. Minimum DC supply then should be 16V

### Connection Diagram Explosion Proof -EExd Sensor Transmitter IAM (ST-IAM-1)

The GD210 stainless steel sensor head female connector on the 4-wire cable connects to the male connection at Con 1.

Cable specification i.e. power consumption varies slightly depending on the sensing



technology used i.e. Semi-Conductor or Electrochemical. Please see specification with each connection diagram. Cable Glands and wiring for explosion proof models must comply with local Ex certification requirements.

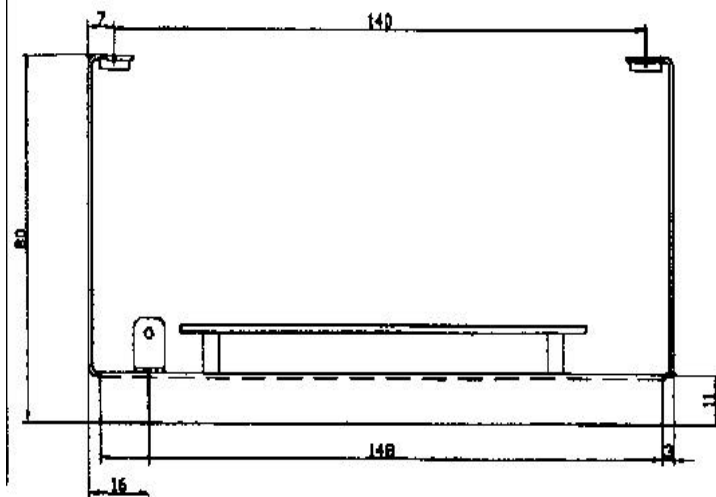
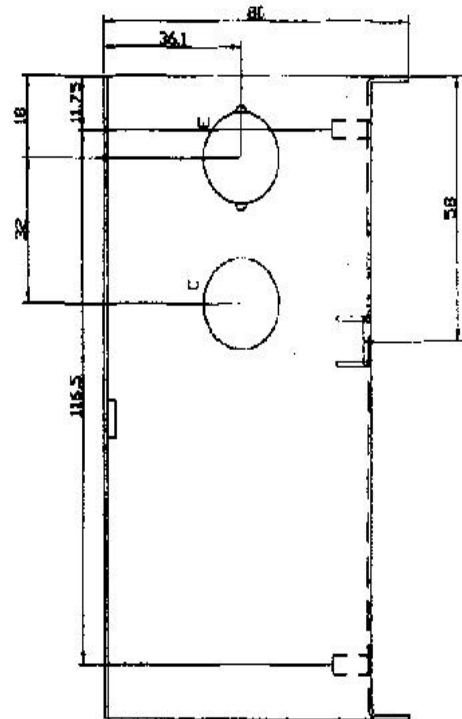
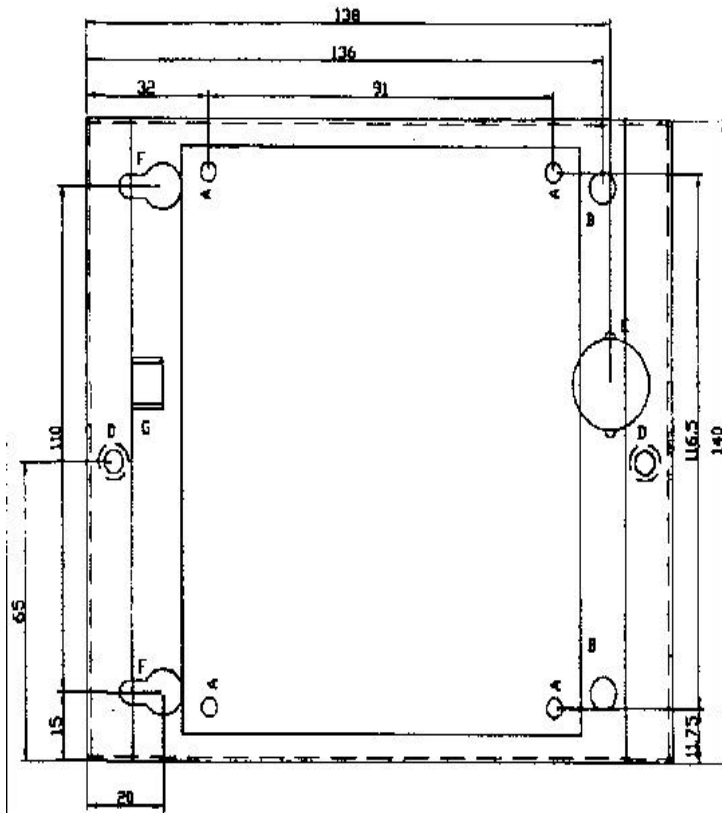
### **On-Site Test & Commissioning**

All ST-IAM sensors are calibrated prior to despatch, on installation they require only to be tested. This can be done by exposing the sensor briefly to the target calibration gas and monitoring for a response at connector block TB3.

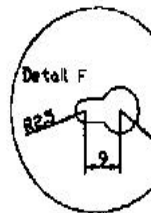
Place the positive probe of a voltmeter (on the 0-10V scale) on the terminal block position 2 and the negative probe on TB3 position 4. This monitors the 0-10V output signal and you will observe an increasing voltage output.

Contact us for full annual calibration instructions.

### ST-IAM Housing Dimensions



Item	Ø	Description	Qty
A	4.2	BSD-M3-10	4
B	7		2
C	20		1
D	5.4	S-M4-1	2
E	20	Knockout	1
F		Key Hole	2
G		Double earth tag	1



Customer: Murca ST/IAM  
 Description: ST Enclosure Base  
 Material: 1mm cr4  
 Finish: Black powder paint texture er1582stg  
 Date: 03-01-01

**Installation and Operation**  
**Sensor Transmitter – ST-IAM 1 Infrared CO<sub>2</sub>**  
**Carbon Dioxide**

## Features



- Monitors CO2 over range 0-10,000PPM
- NDIR single beam
- 5 Year Calibration Interval
- Optional on board relay with field adjustable trip point.
- Available as wall or duct mount versions
- Choice of two field adjustable analogue output signals, linearized over full range.
- Easy to calibrate in the field.

<b>CO2 Detector</b>	
<b>SPECIFICATIONS</b>	
<b>Gas Detected</b>	Carbon Dioxide (CO2)
<b>Range</b>	0-2000 ppm standard default, programmable from 1500 up to 10,000 ppm in 500ppm increments
<b>Standard Accuracy</b>	+/- 75ppm or 3% of reading (whichever is greater), 15-32 C, for 0-2000 ppm range +/- 5% of reading for 2000-10,000 ppm
<b>Sensing Element</b>	Non-Dispersive Infrared (NDIR)
<b>Operation Conditions</b>	0-50C, 0-95% RH non-condensing
<b>Repeatability</b>	+/- 20ppm
<b>Stability</b>	+/- 20ppm typical, 5 year calibration interval
<b>Manufacturing Process</b>	ISO9002 Certified
<b>Output Signal</b>	4-20mA, 0-5V dc, jumper selectable
<b>Output Drive Capability</b>	550 ohm max for current output, 10K ohm min for voltage output
<b>Output Resolution</b>	10 bit PWM
<b>LCD Display (optional)</b>	LCD for displaying ppm level (required for field programming) 1ppm resolution, 28 x 13 mm, alpha-numeric 2 line, 8 characters Contact us for Instructions
<b>Field Calibration</b>	Contact us for Instructions
<b>External Dimensions</b>	Decorative Space (mm) 91W x 127H x 43D Duct ABS, NEMA 1, IP23 rated (mm) 163 x 108 x 64
<b>Pressure Dependence</b>	0.13% of reading per mm Hg
<b>Altitude Correction</b>	Programmable from 0-5000 ft in 500 ft increments
<b>Response Time</b>	< 60 seconds for 90% step change
<b>Warm-up Time</b>	< Two (2) Minutes
<b>Power Supply</b>	20-30 V ac/dc (non-isolated half-wave rectified)
<b>Consumption</b>	80mA max @ 24 V dc, 35mA avg @ 24Vdc
<b>Input Voltage Effect</b>	Negligible over specified operating range
<b>Protected Circuitry</b>	Reverse voltage protected and output limited
<b>Optional Relay Output</b>	One form C contact (N.O and N.C) status LED, 5 amps @ 250Vac Relay Trip Point – Programmable 500-1500 ppm in 50ppm increments Relay Hysteresis – Programmable in 25-200ppm increments
<b>Programming and Selection</b>	Via internal push-buttons and jumper
<b>Wiring Connections</b>	Screw terminal block 0.34-2.5mm sq (14-22 AWG)

## Installation Instruction

The Decorative type room sensor has mounting provisions to install directly on a standard electrical box and should be mounted at a height about five feet from the floor of the area to be controlled. For best operation, do not mount the sensor near doors, opening windows, supply air diffusers or other known air disturbances.

The duct sensor should be mounted on the outside of a return air duct with the air sampling tube inserted into the duct. Mount the sensor in an easily accessible location in a straight section of duct at least five feet from corners and other items that may cause disturbances in the airflow. Avoid areas where the transmitter would be exposed to vibrations or rapid temperature changes.

## Wiring Instruction

The transmitter has standard screw block connectors and easy wire access to facilitate wiring. It is recommended that shielded twisted pair wiring at least 22 AWG be used for all connections and that the device wires not be run in the same conduit with wiring used to supply inductive loads such as motors.

The device power (20-30 VAC/DC) is connected to the terminal marked **POWER**. This terminal is used for the positive DC voltage or the hot side of the ac voltage. The device is reverse voltage protected and as such will not operate if connected backwards.

The common of the power supply is connected to the terminal marked **COMMON**. Note that this device has a half-wave type power supply, which means the power supply common is the same as the output signal common. Therefore, several devices may be connected to one power supply and the output signals all share the same signal common. Use caution when grounding the secondary of an AC transformer or when wiring multiple devices to ensure that the circuit ground point is the same on all devices and the controller.

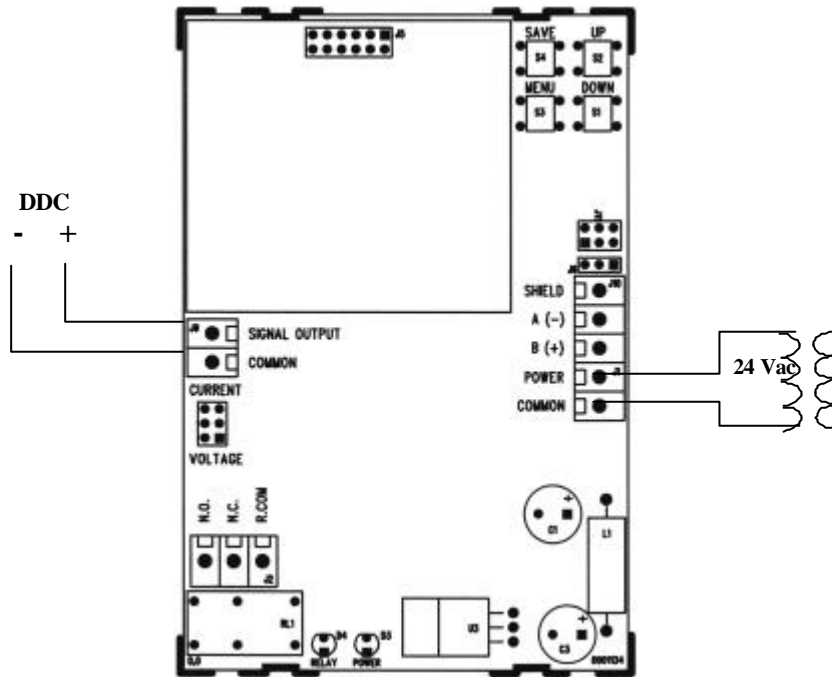
The analogue output signal is available on the **SIGNAL OUTPUT** terminal. This signal is jumper selectable for either a voltage output or a standard 4-20 mA active output signal type. When voltage mode is selected, the output is 0-5 VDC. These options are clearly indicated on the device circuit board. The 4-20 mA current output signal operates in the Active mode and does not require a loop power supply. *This means that the signal current is generated by the Carbon Dioxide Transmitter and must not be connected to a powered input or device damage will result. Check the controller Analogue Input to determine the proper connection before applying power. Both the current and voltage signals are referenced to the COMMON terminal. The analogue output signal is typically connected directly to the Building Automation System (B.A.S.) and used as a control parameter or for logging purposes.*

An optional signal is the relay output available on the **NO**, **R.COM** and **NC** terminals. Note that the Relay COM terminal is NOT connected to the signal or power supply COMMON terminal. The relay output is completely isolated and has both Normally Open (NO) and Normally Closed (NC) signals. This signal can be used to directly control an alarm, a ventilation fan or may be connected to a digital input of the B.A.S. for status monitoring.

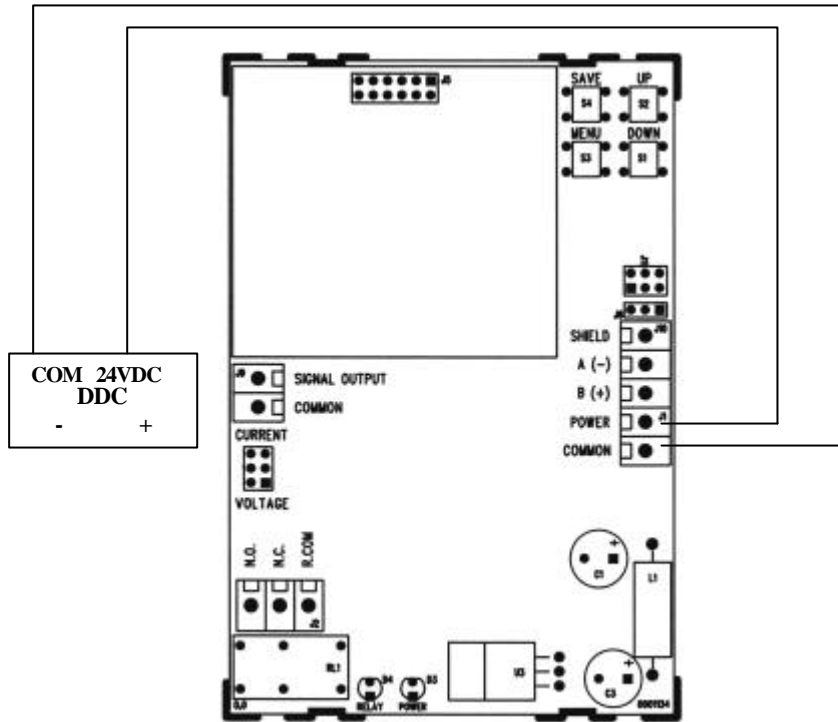
### Power Up Instruction

Verify that the Carbon Dioxide Transmitter is properly wired and all connections are tight. Apply power to the device and note that the CO2 sensor chamber light will flash on and off. If an LCD is installed it will indicate the software version number (Version CO2 1.00) and then begin a 30 second warm-up period. During this period the output is fixed at 4 mA or 0 VDC and the relay is held off. After the warm-up period, the sensor will begin reading the CO2 levels, output the correct analogue signal and also display the value on the LCD. The sensor operates on a 5 second interval and will update the output and display every 5 seconds.

### Wiring Diagrams



24 VAC supply, 4-20mA or 0-5VDC Output, 4-wire



24 VDC Supply, 4-20mA Output, 3-Wire



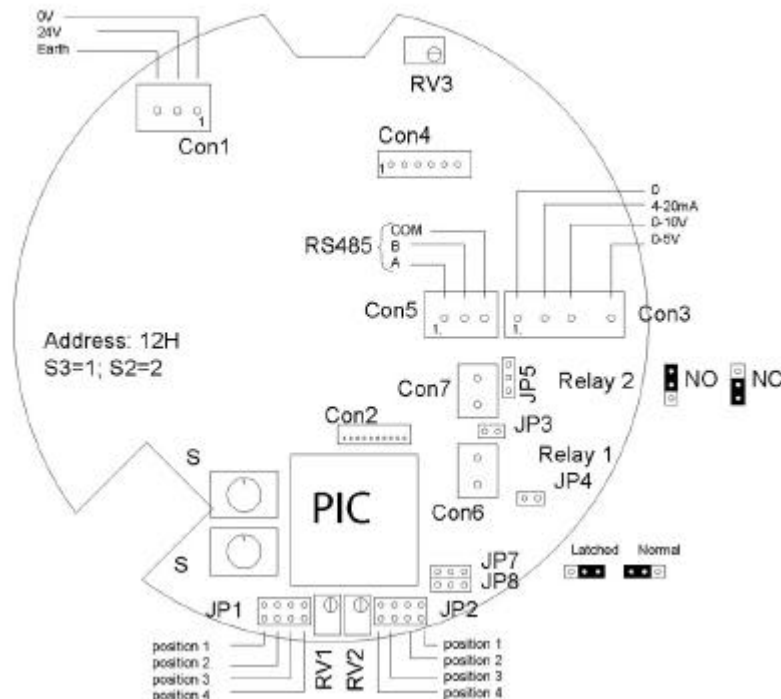
## **Installation & Operation**

### **Sensor Transmitter – Integrated Area Monitor TWO**

#### **ST-IAM 2**

**Please see Installation & Operation on page 6 for model ST-IAM 1**

All external connections are made to the motherboard. The connectors are Weidmuller plug in 10amp 3.5mm Pitch type and will accept wire of 0.5-1.5mm sq.



**Diagram.1**

Earth connection is not necessary for operation of circuitry but must be made when using the ST-IAM vented metal enclosure or Exd enclosure. On power up the sensor may take some time (minutes up to hours) to fully normalize. You can monitor this by checking the 0-10V output as it falls towards zero. If during this normalisation period the red led activates indicating the high level relay has switched then the reset button on the sensor in alarm must be pushed after normalisation is complete.

**Power supply is connected at Con 1**

Green LED on shows power connected.

Pin 1 = 0V, Pin 2 = 12 to 24 VAC or 12 to 30VDC, Pin 3 = Earth.

**The 0V (pin 1) on the power supply terminal block (CON 1) can withstand 50V AC or DC with respect to the 0V (Pin 1) on the output terminal block (CON 3). If this is likely to be exceeded use an isolated power supply.**

On the power supply side 12V is the minimum at the terminals. Power consumption is 4W max. It can draw 0.33Amp at 12V, so voltage drop along the supply cable should be considered when selecting cable supply voltage and cable type and length. For example, for cable resistance 10ohm/100m allowing for the flow and return total cable resistance

for 100m is 20ohm and voltage drop along the cable is 6.6V. Minimum DC supply then should be 19V.

If you need to use a cable of greater diameter than 1.5 mm sq, you can use a terminal block at each sensor position capable of taking the larger cable and connect from that into the CON1 terminal block using 1mm sq wire. Alternatively use local power supplies to reduce cable runs and voltage loss.

### **Analogue Outputs are at Con 3**

You need to use a two-core communication cable; screen is not required for analogue outputs, connecting the zero and the particular output required to the monitor or device being used.

Pin 1 = 0

Pin 2 = 4-20mA. Load resistance must be less than 400ohm

Pin 3 = 0-10V. Load resistance must be greater than 10Kohm

Pin 4 = 0-5 V. Load resistance must be greater than 10Kohm

When connecting the 4-20mA to the ST-MON Control Panel Pin 2, CON 3 is connected to a location between 1 to 16 on the ST-MON connector strip. Pin 1 (0) CON 3 is connected to the nearest C terminal, which is common for each 4-signal connector positions. For 4-20mA we suggest using Beldon type cable specified for the RS485 below or alternatively an alarm type cable of 7/0.2mm, which has a resistance of 8.8 ohms for 100m.

### **RS485 interface Con 5 connector**

Pin 1 = A, Pin 2 = B, Pin 3 = Com (common)

You need minimum 2 cores with a common drain wire (screen) communications cable (We suggest Beldon 8723 twisted pair, or equivalent).

It is suggested that the sensors be looped together. The common drain wire (screen) connects to the COM position.

When connecting to the ST-MON panel the same terminals are connected to each other i.e. A-A, B-B, Com – Com. On the last sensor you fit an 180ohm resistor across terminal positions AB so as to terminate the communications cable.

After you connect 31 sensors to the ST-MON panel you then need to insert a GNRII signal repeater in the cable (See diagram). This has two further sets of input terminals, each of which are connected up to 32 sensors each thereby giving a total of 95 sensors and the ST-MON panel in the network. You may go up to 99 sensors under certain circumstances. The 180ohm resistor must be fitted to the sensor terminals AB on the last sensor at the end of each spur.

Each sensor must have its address set up so the ST-MON panel can identify it. A maximum of 99 addresses are possible. The sensor address is set by S2 and S3, adjusting these dials between 0 and F will give the sensor its own address (as shown on Diagram 1). A conversion chart between ST-MON channel numbers and the hexadecimal address of the ST-IAM 2 is attached. We suggest that you note the physical location of each sensor so alarms can be easily located.

## **Relay Contacts**

There are two relays rated up to 1 Amp at 24V DC/AC. The status of the relays is jumper selectable.

### **Relay 1 at Con 6. Low-level alarm. Yellow LED on when in alarm.**

Normally closed when JP4 link inserted

Normally open when JP3 link inserted

Latching (manual reset by push button at CON 7) - Not latching (automatic reset) set by JP8 see diagram for link position

Alarm Threshold level is set by pot RV1.

Delayed response time is set at JP1 by inserting the link in the required position.

Default settings are:

Position 1     0 Minutes

Position 2     1 Minute

Position 3     5 Minutes

Position 4     10 Minutes

### **Relay 2 at Con 7. High-level alarm. Red LED on when in alarm.**

Normally open/closed when JP5 link inserted, as shown on Diagram1.

Latching (manual reset by push button at con 7)/ Not latching (automatic reset) set by JP7 see diagram for link position.

Alarm threshold level is set by pot RV2.

Delayed response time is set at JP2 by inserting the link in the required position.

Default settings are:

Position 1     0 Minutes

Position 2     1 Minute

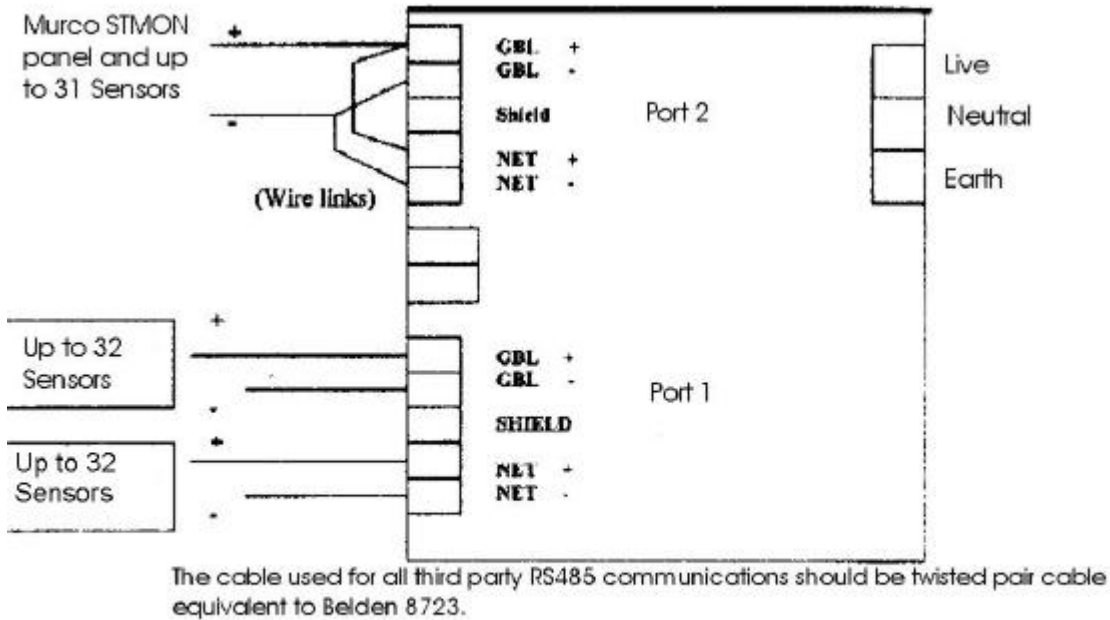
Position 3     5 Minutes

Position 4     10 Minutes

**Daughter boards** for Semiconductor, Catalytic, and electrochemical sensors plug in at CON 4.

**CON 2** is an internal connection not required for installation.

GEN II repeater connections are shown diagrammatically below



Terminals on the Sensor and the STIMON Panel

+ = A    - = B    Screen = Com

The detailed specification on the repeater is available for download on the suppliers Website reference: <http://www.innotech.com.au/products/pdf/dsrptr.pdf>

Gas Detection Range and default settings vary with model and set up, see below for sample settings.

<b>Gas</b>	Ammonia NH3
<b>Range</b>	0-1000 PPM

Standard default settings:

- Relay 1      Low-level relay set at 500 PPM, NO, Auto reset mode
  - Relay 2      High-level relay set at 950 PPM, NO, latched mode requiring manual reset.
- Delays on both relays 10 minutes.

## ST-IAM 2 Connections at a Glance

- CON 1:** Power Supply input  
Power on indicated by Green LED.  
Supply voltages to be either 12V or 24V AC or 12 to 30V DC  
Power consumption is 4watts max at 12V.  
The connectors are Weidmuller type Plug In 10amp 3.5mm Pitch type and will accept wire of 0.5-1.5mm<sup>2</sup> (keep wire run to a minimum)
- CON2:** Display Connection
- CON3:** Analogue Output  
Pin 1: 0V  
Pin 2: 4-20mA. Load resistance < 400Ω  
Pin 3: 0-10V. Load resistance > 10KΩ  
Pin 4: 0-5V. Load resistance > 10KΩ
- CON4:** Daughter board plug-in connection
- CON 5:** RS485 Interface  
Pin 1 = A (A connects to A of ST-MON Panel, B to B, etc)  
Pin 2 = B  
Pin 3 = Common (connect to RS485 cable shield)
- CON 6:** Relay 1 contacts (1Amp 24V AC/DC)  
Low-level alarm. Indicated by Yellow LED.  
Normally closed when *JP4* link inserted  
Normally open when *JP3* link inserted  
Latching/Not Latching set by *JP8* (see diagram 1 in Connection Instructions)  
Threshold level set by *RV1*  
Delay time set by *JP1* link (see diagram 1 in Connection Instructions)  
Position 1=0 min  
Position 2=1 min  
Position 3=5 min  
Position 4=10 min
- CON 7:** Relay 2 contacts (1Amp 24V AC/DC)  
High-level alarm. Indicated by Red LED.  
Normally open/closed when *JP5* link inserted, as shown on diagram 1.  
Latching/Not Latching set by *JP7* (as above)  
Threshold level set by *RV2*  
Delay time set by *JP2* link (as above)

**Motherboard addresses are Hexadecimal and the ST-MON addresses decimal.**

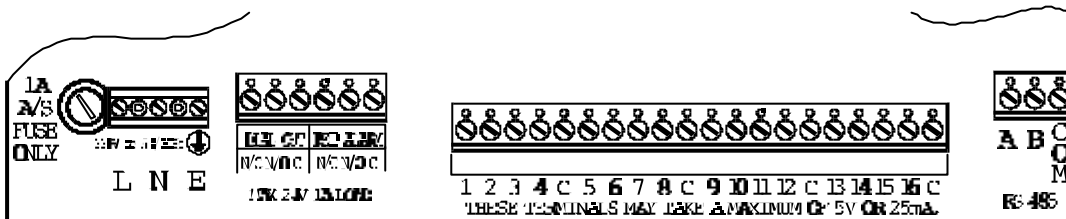
Channel on St-Mon	SW3	SW2	Channel on St-Mon	SW3	SW2	Channel on ST-MON	SW3	SW2
1	0	1	34	2	2	67	4	3
2	0	2	35	2	3	68	4	4
3	0	3	36	2	4	69	4	5
4	0	4	37	2	5	70	4	6
5	0	5	38	2	6	71	4	7
6	0	6	39	2	7	72	4	8
7	0	7	40	2	8	73	4	9
8	0	8	41	2	9	74	4	A
9	0	9	42	2	A	75	4	B
10	0	A	43	2	B	76	4	C
11	0	B	44	2	C	77	4	D
12	0	C	45	2	D	78	4	E
13	0	D	46	2	E	79	4	F
14	0	E	47	2	F	80	5	0
15	0	F	48	3	0	81	5	1
16	1	0	49	3	1	82	5	2
17	1	1	50	3	2	83	5	3
18	1	2	51	3	3	84	5	4
19	1	3	52	3	4	85	5	5
20	1	4	53	3	5	86	5	6
21	1	5	54	3	6	87	5	7
22	1	6	55	3	7	88	5	8
23	1	7	56	3	8	89	5	9
24	1	8	57	3	9	90	5	A
25	1	9	58	3	A	91	5	B
26	1	A	59	3	B	92	5	C
27	1	B	60	3	C	93	5	D
28	1	C	61	3	D	94	5	E
29	1	D	62	3	E	95	5	F
30	1	E	63	3	F	96	6	0
31	1	F	64	4	0	97	6	1
32	2	0	65	4	1	98	6	2
33	2	1	66	4	2	99	6	3

## Connections to ST-MON Panel

Murco Sensor Transmitter to the ST-MON panel, 8 or 16 Sensor Models.

1. Connect the VAC/DC power supply to the sensor transmitter as per the sensor transmitter installation sheet.
2. Connect the 4-20mA output from the sensor transmitter to the ST-MON. The 0V connects to the C position (one for every 4 channels) and the 4-20mA output connects to positions 1 through 8 or 16 (16 shown)
3. Connect mains to the ST-MON at the LNE positions shown.
4. If using the RS485, connect A to A, B to B COM to COM terminal of the ST-MON.
5. The ST-MON will be set by us so that all low alarms on each channel are fed to the “rep alarm” relay shown and all high alarms will be fed to the “dial out” relay shown. Should you require these may be programmed differently. Normally for refrigerants the range is set at 0-1000ppm (0-100%), the low alarm is set at 500ppm (50%) and the high at 950ppm (95%). These relays may be used to activate sirens, beacons, fans, switch off plant, as required by the particular installation.

They are rated 1Amp at 24V:



## Internal Connection Terminals

