

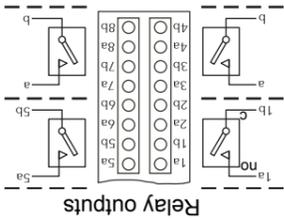
The module terminals accept wire sizes from 0.20 to 2.5mm² (14 to 24AWG). The screws should be tightened to 0.4Nm (5.3lb in) using a 3.5mm flat blade screwdriver.

IO MODULE TERMINATION DETAILS

Basic insulation 300V RMS or dc. This is defined as the insulation between conductive parts that is necessary only for the proper functioning of the equipment. This does not necessarily provide protection against electric shock. All I/O modules have double insulation, channel to system, 300V RMS or dc. This is defined as insulation between conductive parts, which provides protection against electric shock.

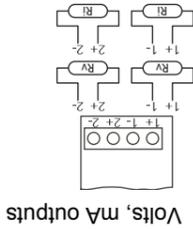
ISOLATION

Relays 1 and 5 shown; other relays similar. No internal snubber circuitry fitted. Basic isolation between all relays. Relays 1 and 5 shown; other relays similar. Basic insulation 300V RMS or dc. This is defined as the insulation between conductive parts that is necessary only for the proper functioning of the equipment. This does not necessarily provide protection against electric shock. All I/O modules have double insulation, channel to system, 300V RMS or dc. This is defined as insulation between conductive parts, which provides protection against electric shock.



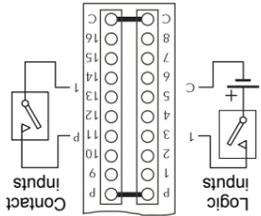
RLY8 RELAY o/P module

The standard voltage output range is 0V to 10 V with a minimum load resistance (RV) of 550Ω. This can be increased to -0.3V to +10.3V by increasing the minimum load resistance to 1500Ω. For mA outputs, the maximum load resistance (RI) is 550Ω.



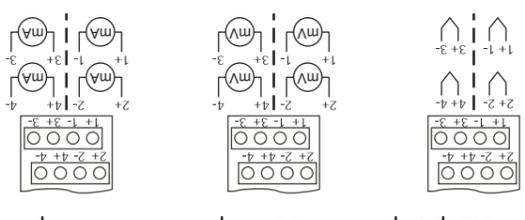
A02 ANALOGUE OUTPUT MODULE

Channel 1 shown; other channels similar. 'C' terminals internally connected; 'P' terminals internally connected.



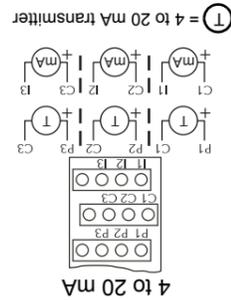
D16 DIGITAL I/P MODULE

Notes:
1. mV inputs can be converted to mA by placing 5Ω resistors across inputs.
2. mA variants have integral 5Ω resistor fitted.
3. '1-' is internally connected to '2-'.
3. '1+' is internally connected to '4+'.
3. '3-' is internally connected to '4+'.



A14 ANALOGUE INPUT MODULE

Use the C/I terminals for externally powered inputs. Use the P/C terminals when using the module's internal supply.



A13 ANALOGUE INPUT MODULE

Shunt resistors (5Ω) for the mA option are mounted on the terminal unit.

Table 1 terminals versus input ranges

Channel	Input range	Terminals
1	-150mV to +150mV -10Vdc to +10Vdc	A1(+) and C1 A2(+) and C2
2	150mV to +150mV 0 to 1.8Vdc -10Vdc to +10Vdc	A2(+) and C2 H2(+) and C2

Notes:
A12-TC Thermocouple, mV
A12-DC Volts, mV (table 1)
A12-MA mA (see note)
A12-DC RTD, Potentiometer

A12 ANALOGUE INPUT MODULE

ROHS

Restriction of Hazardous Substances (RoHS)

Product group: Versadac

Table listing restricted substances

Chinese: 限制使用材料一览表

产品	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬(Cr(VI))	多溴联苯(PBB)	多溴二苯醚(PBDE)
IOC	X	O	X	O	O	O
IO 模块	X	O	X	O	O	O
端子板件	X	O	X	O	O	O
基座	X	O	O	O	O	O

English: Restricted Materials Table

Product	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Versadac	X	O	X	O	O	O
IOC	X	O	X	O	O	O
IO Module	X	O	X	O	O	O
Terminal Unit	X	O	X	O	O	O
Base	X	O	O	O	O	O

Approval: Name: Martin Greenhalgh, Position: Quality Manager, Signature: Martin Greenhalgh, Date: 16 APR 2013



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E-mail: info.eurotherm.uk@invensys.com
Web: www.eurotherm.com

All Modules, including the IOC Modules comply with the 40 Year Environment Friendly Usage Period.

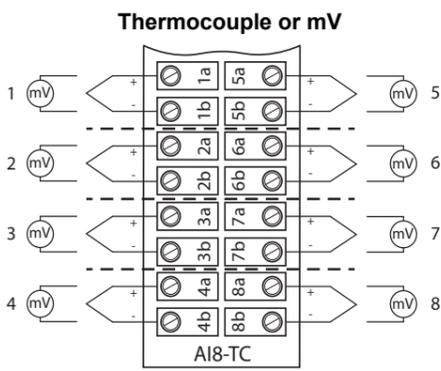
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The manufacturer pursues a policy of continuous development and product improvement. The specification in this document may therefore change without notice. The information in this document is given in good faith, but is intended for guidance only. No responsibility will be accepted for any losses arising from errors in this document.

A18 ANALOGUE INPUT MODULE

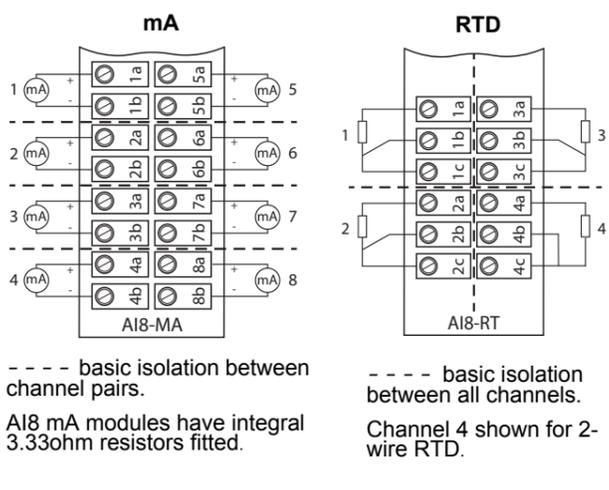
Three different terminal unit variants are available -
A18-TC: 8 x thermocouple inputs (with cold junction) or 8 x milli-volt inputs.
A18-MA: 8 x current inputs.
A18-RT: 4 x platinum resistance thermometer (RTD) inputs



basic isolation between channel pairs.

If thermocouple wiring needs to be extended, use the correct compensating cable and ensure that polarity is followed throughout.

If sensor break is enabled (see User Manual HA031352), it is not recommended to connect more than one input to a single source (e.g. thermocouple or mV) since this may compromise the measurement and sensor break action. Also, it is not recommended to connect additional instruments to a single input source.



INSTALLATION AND WIRING INSTRUCTIONS

The versadac is a modular system which can provide analogue and digital I/O data recording, signal conditioning and computational blocks using a variety of plug-in modules.

The instrument consists of a base unit, into which a number of terminal units are fitted, each of which has an associated module plugged into it. The base unit is fitted with an input/output controller (IOC) module and up to 16 input or output (I/O) modules.

The IOC module contains system configuration and communications support.

The terminal units, which are specific to module type provide connectors for the termination of user wiring. The terminal units also provide interconnections between I/O modules and the IOC.

The I/O Modules, which clip into the terminal units, are dedicated to specific analogue or digital, inputs or outputs.

A suitable Power Supply is the 2750P, available as 1.3, 2.1, 5, or 10 Amp units. Refer to the User Guide (HA031352) for power consumption figures.

MECHANICAL INSTALLATION

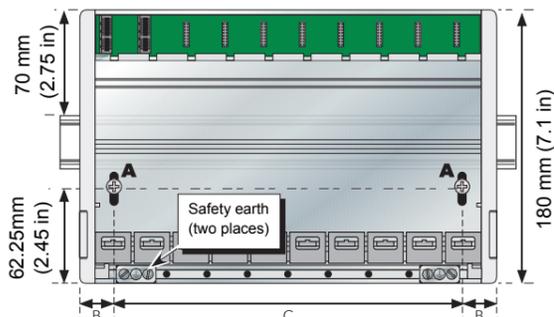


Figure 1 Base unit dimensions

Base type	Dimension 'B'	Dimension 'C'	Depth
0-modules	17.5mm(0.69in)	26mm (1.02in)	All base types: 132mm (5.2in) (Cover opening clearance: 160mm (6.3in))
4-modules	22.5mm (0.8in)	127.4mm (5.02in)	
8-modules	22.5mm (0.8in)	229mm (9.02in)	
16-modules	22.5mm (0.8in)	432.2mm (17.02in)	

DIN Rail mounting

Horizontally mounted symmetrical DIN rail to EN50022-35X7.5 or EN50022-35X15 should be used.

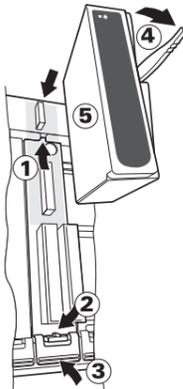
- Mount the DIN rail horizontally, ensuring that it makes good electrical contact with the enclosure. Use a safety earth strap if necessary.
- Using a suitable Pozidriv screwdriver, loosen screws ('A') in the base, and allow them, and their associated base retention clips to drop to the bottom of the screw slot.
- Fit the instrument onto the top edge of the DIN rail, and use the screwdriver, to slide the screws (A) and associated clips upwards, as far as they will go towards the top of the screw slots.
- Ensuring that the angled edge of the base retaining clips locate behind the bottom edge of the DIN rail, tighten screws 'A'.

Direct Panel Mounting

- Remove screws ('A') and their associated base retention clips.
- Hold the base horizontally on the panel and mark the position of the two holes on the panel (for centres, see figure 1, above).
- Drill two 5.2mm holes in the panel.
- Using M5 bolts, nuts and washers, secure the base to the panel, ensuring that it makes good electrical contact with the enclosure. Use a safety earth strap if necessary.

TERMINAL UNITS

- Locate the lug at the upper edge of the terminal unit into the slot in the base (1).
- Press on the lower end of the Terminal Unit until it 'clicks' into place. (2)
- To remove a terminal unit, press the retention clip (3) to release the Terminal Unit and withdraw it from the slot in the Base Unit.



I/O MODULES

- Open the Retaining lever on the face of the module (4).
- Insert the module (5), ensuring that it engages with the backplane and terminal unit connectors.
- Once secure, close the retaining lever.
- To remove a module, open the retaining clip and pull the module out of the base unit.

IOC MODULE

To insert the module, press it into place in the left-most slot, ensuring that it engages with the backplane and terminal unit connectors. Use a 3mm flat-blade screwdriver to rotate the 1/4 turn fastener clockwise. Use the opposite procedure to remove the module.

INSTALLATION CATEGORY AND POLLUTION DEGREE

This product conforms with UL61010 and BS EN61010 installation category II and pollution degree 2. These are defined as follows:

Installation category II: The rated impulse voltage for equipment on nominal 230V ac mains is 2500V.

Pollution degree 2: Normally, only non-conductive pollution occurs. However, occasionally a temporary conductivity caused by condensation shall be expected.

Personnel

Installation must be carried out only by qualified personnel.

Enclosure of live parts

To prevent hands or metal tools touching parts that may be electrically live, the unit must be installed in an enclosure.

Blank Terminal Unit

Base units are supplied to hold zero, or up to four, eight or 16 modules as specified at time of order. If the base unit is not fully populated a blank terminal unit must be fitted immediately to the right of the last module, in order to maintain IP20 rating.

WIRING

WARNING: LIVE SENSORS

The unit allows operation with temperature sensors connected directly to electrical heating elements. It must be ensured that nobody touches such connections whilst the connections are 'live'. Cables, connectors and switches for connecting 'live' sensors must be mains rated.

The unit must be connected in accordance with the wiring data given in this instruction sheet. Particular care must be taken not to connect AC supplies to low voltage inputs and outputs. Copper conductors must be used for all connections except thermocouples.

Wiring must comply with all local wiring regulations e.g. IEEE wiring regulations (BS7671) or NEC Class 1 wiring methods.

Power Isolation

The installation must include a power isolating switch or circuit breaker. This device should be in close proximity (<1 metre) to the unit, within easy reach of the operator and marked as the disconnecting device for the instrument.

Earth Leakage Current

Earth leakage currents of up to 3.5mA may exist due to RFI filtering. This may affect the design of an installation of multiple units protected by Residual Current Device (RCD) or Ground Fault Detector (GFD) circuit breakers.

Over current Protection

It is recommended that the DC power supply to the system is fused appropriately to protect the cabling to the unit. The instrument includes a fuse within the IOC module to protect the supply from a fault within the unit. Should this fuse rupture the IOC module must be returned to the supplier for repair.

Voltage Rating

The maximum continuous voltage applied between any of the following terminals must not exceed 300V RMS or dc:

- RLY8 relay output to logic, dc or sensor connections;
- Any connection to ground

The unit must not be wired to a three-phase supply with an unearthed star connection. Under fault conditions such a supply could rise above 300VRMS or dc with respect to ground and the unit would not be safe.

Conductive Pollution

Electrically conductive pollution must be excluded from the enclosure in which the unit is mounted. To secure a suitable atmosphere in conditions of conductive pollution, an air filter must be fitted to the air intake of the enclosure. Where condensation is likely, a thermostatically controlled heater should be installed in the enclosure.

Installation requirements for EMC

The earthing strip at the lower edge of the backplane also provides termination facilities for EMC, cable screens etc.

To ensure compliance with the European EMC directive observe the following precautions.

For either DIN rail or direct panel mounting the backplane must be in good electrical contact with a grounded metal (aluminium or steel) sheet which is part of the enclosure. If this contact is not possible, connect both ends of the DIN rail or both safety earth connections at the ends of the backplane to the enclosure by two substantial earth braids (10mm x 2mm) not more than 100mm in length.

If these connections are not practical, clip ferrite clamps over the input leads as near the terminal unit connector as possible. Several input pairs may be inserted through a single clamp. Clamps should have a minimum 200Ω impedance at 100 MHz. A suitable clamp is Richco MSFC-13K

For general guidance refer to EMC Installation Guide, Part no. HA025464. If using relay outputs it may be necessary to fit suitable filters depending on the type of load.

This unit should not be wired as part of a DC distribution network.

SYMBOLS

The following symbols may appear on the unit or its labelling.

	Refer to the user guide for instructions
	Protective conductor terminal (safety earth)
	Precautions against electrostatic discharge must be taken before handling this unit or any electronic component of it.
	Complies with the RoHS2 (2011/65/EU) directive
	For environmental reasons, this product must be recycled before its age exceeds the number of years shown in the circle
	Underwriters Laboratories listed mark for the United States and Canada
	This unit is CE compliant
	This unit is ACMA compliant
	Risk of electric shock

EARTHING

Safety (protective earth) conductor

The equipment must not be operated without a protective earth conductor first being connected to one of the earth terminals on the base unit. The earth cable should have at least the current rating of the largest power cable used to connect to the unit.

To connect the protective earth, a copper eyelet should be used with the screw and washer supplied with the base unit, tightened to a torque of 1.2Nm (10.6 lbin).

WEIGHT

0-way base unit with IOC module: 0.7 kg (1.54 lb)
 4-way base unit without modules: 0.7 kg (1.54 lb)
 4-way base unit with IOC module and four I/O modules: 1.65 kg (3.64 lb)
 8-way base unit without modules: 0.98kg (2.16 lb)
 8-way base unit with IOC module and eight I/O modules: 3.1kg (6.83 lb)
 16-way base unit without modules: 1.6kg (3.53 lb)
 16-way base unit with IOC module and 16 I/O modules: 5.24 kg (11.55 lb)

SETTING THE IP ADDRESS

As delivered, the IP address of the instrument is 192.168.111.222 with a subnet mask of 255.255.255.0.

EDITING NETWORK SETTINGS

The network settings can be edited using iTools. The instrument supports fixed IP and DHCP.

Note: Once the IP address is changed the connection to iTools will be lost until the instrument is rescanned.

Dynamic Host Configuration Protocol (DHCP)

DHCP is a network protocol used to configure devices such that they can communicate on an IP network. A DHCP 'Client' uses the DHCP protocol to obtain configuration information (such as an IP address) from a DHCP server. The client uses this information to configure its host and once configuration is complete, the host is able to communicate on the internet.

The DHCP server maintains a database of available IP addresses and configuration information. When it receives a request from a client, the DHCP server determines the network to which the DHCP client is connected, and then allocates an IP address or prefix that is appropriate to the client, and sends configuration information appropriate for that client.

Because the DHCP protocol must work correctly even before its clients have been configured, the server and the client(s) must be connected to the same network link. In larger networks, where this is not practical, each network link can contain one or more DHCP relay agent which receive messages from DHCP clients and forward them to DHCP servers. DHCP servers send responses back to the relay agent, and the relay agent then sends these responses to the DHCP client on the local network link.

DHCP servers typically grant IP addresses to clients only for a limited interval. DHCP clients are responsible for renewing their IP address before that interval has expired, and must stop using the address once the interval has expired, if they have not been able to renew it.

Specifically, for the Versadac, if DHCP is selected the instrument requests an IP address from a DHCP server at start-up but the request can be repeated during operation.

RECOVERY FROM UNKNOWN IP ADDRESS CONFIGURED

If the DE (debug enable) switch on the terminal unit is set to on and the instrument is power cycled the serial comms port on the terminal board becomes a debug port (38400 Baud, one stop, no parity)*. This presents a simple menu on a terminal emulator allowing the network settings to be viewed.

Once finished with the debug port the DE switch should be set to off and the instrument power cycled for normal operation to resume.

Note: The protocol used is EIA-485. A suitable converter for communicating with a PC is available (order code SUBVERSA.DEBUGCABLE)

IOC TERMINAL UNIT SWITCHES AND CONNECTORS

Supply wiring

Figure 2 shows wiring details for supply wiring.

POWER SUPPLY SPECIFICATION

Supply voltage: 24V dc ± 20%.
Reverse polarity protected.

Power consumption: 82W max, per base.

- The instrument will be damaged if a supply voltage exceeding 30V is applied.
- The power consumption value for each module type is given in the User Manual and also stated on the module label.

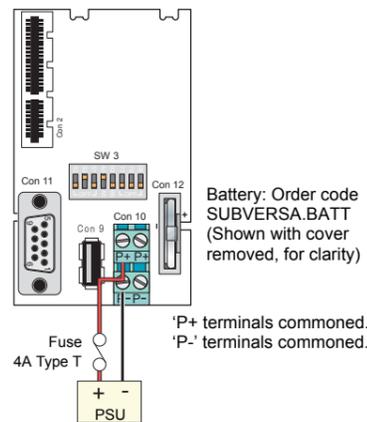


Figure 2 Supply wiring details

The supply terminals accept wire sizes from 0.25 to 2.5mm² (14 to 22AWG). The screws should be tightened to 0.6Nm (5.3lbin) using a 3mm flat blade screwdriver.

Setup switch

An 8-element setup switch is located on the IOC terminal unit (figure 3).

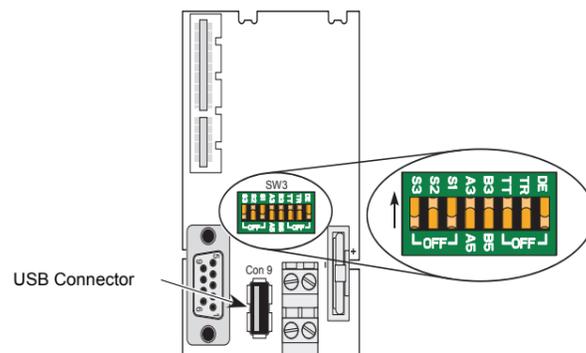


Figure 3 IOC switch locations

The eight switch segments are defined in Table 2:

1	Set to 'DE' to enable serial debug; set to 'OFF' to disable.
2	Set to 'TR' to terminate Rx line; set to 'OFF' to leave Rx unterminated.
3	Set to 'TT' to terminate Tx line; set to 'OFF' to leave Tx unterminated.
4	Set to 'B3' for 3-wire serial communications; set to 'B5' for 5-wire.
5	Set to 'A3' for 3-wire serial communications; set to 'A5' for 5-wire.
6	Reserved
7	Reserved
8	Reserved

Table 2 Setup switch settings

USB Connector (Con 9)

The USB connector is located between the power connectors and the 9-way D-Type connectors as shown in figure 3, above. USB hardware / Software status LEDs are located at the front of the IOC module.

Modbus connectors (Con 11)

This is a 9-way D-type female connector. If this is the last instrument on the communications link, the integral 150 Ohm terminators should be switched into the circuit, using elements two and three of the setup switch. Elements four and five of this 8-pole switch are used to select 3-wire or 5-wire operation.

PINOUT

The pinout for the Modbus communications connectors is given in table 3, below.

Pin	3-wire	5-wire
1	NC	NC
2	B	TxB
3	Reserved	RxA
4	Ground	Ground
5	Ground	Ground
6	Ground	Ground
7	A	TxA
8	Reserved	RxB
9	Ground	Ground

Table 3 Modbus communications pinout

Note: Pins 5 and 9 (Rx Enable and Tx Enable) are connected to ground at the terminal unit

IOC MODULE

Ethernet comms port

This RJ45 connector is located on the underside of the IOC module. Pinout is given in table 4, below. For this instrument, Ethernet communications is specified as 10/100 base-T.

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	NC
5	NC
6	Rx-
7	NC
8	NC

Table 4 Ethernet pinout

Status LEDs

A number of LEDs are located on the front of the IOC module. Brief details are given below; full details appear in section 2.3.1 of the user guide HA031352.

	'Power on' indicator		EtherNet/IP status
	Fault indicator.		USB activity and fault indicators
	Battery status		Ethernet speed and activity indicators

Table 5 IOC LEDs