# iMAC RO4
# Relay Output Module


## 1. Description

The iMAC-RO4 Output Module is designed to provide Relay output control when connected to an iMAC Communication System. When programmed to the same address as an Input Module the RO4 output relays will follow the respective input of the Input Module. The RO4 can also be controlled directly by the iMAC controller.

The iMAC-RO4 Output Module is DIN rail mounted and is powered with 24V. The Module has four (4) normally open 240V 500mA rated contacts. Each iMAC-RO4 Module connected to the communication line is given a single unique address and is programmable from the Controller. Multiple modules can have the same address without causing an address clash.
Loss of power opens the relay contacts. Relays state on loss of communications is programmable.

The iMAC RO4 is NOT intrinsically safe and cannot be directly connected to an intrinsically safe communications line. It must be connected prior to the Master Barrier or following a Slave Barrier in IS systems.

Free wheeling diodes are required when the RO4 outputs are used to control the DC coils of slave relays, a snubber is required for AC coils.

## 2. Features

- 16 Bit data Word
- On line configuration from iMAC Controller
- 4 x Relay contact outputs
- Relays open on loss of power
- Low cost installation
- DIN rail mount
- LED Indication to aid fault finding

## 3. LED Indication

There are five (5) LEDs visible from the front of the module to indicate the output and communication status:

*OK LED (Green)*

Slow flash *(one every 1.2s)* if the module is communicating to the Controller over the L1 line.
Two flashes *(two flashes 0.3s apart then 0.6s blank)* when module is being roll called.
Three flashes *(three flashes 0.3s apart then 0.3s blank)* if there is an address clash.
Fast flash *(continuous 0.3s apart)* if the L1 line is open or short-circuited. Or polarity to module is incorrect.
Intermittent flash *(at least 5 flashes)* indicates a checksum error or an intermittent short or open circuit.

*Four Output LEDs (Red)*

LEDs indicate the status of the output contacts. LEDs are illuminated when corresponding relay is energised.

## 4. iMAC-RO4 Data Address

The iMAC-RO4 Output Module reads one 16 bit address from the iMAC two-wire communication line and can be programmed from 0 to 255.

| Bit | | | | | | | | | | | | | | | Bit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | | | | | | | | | | | | | | | 0 |
| X | X | X | X | X | X | X | X | X | X | X | X | R4 | R3 | R2 | R1 |

The output is inverted according to the invert status (relay contact is either N/O or N/C) and is driven by the data in the least significant 4 bits of the iMAC Address. The output relays can be programmed to open or close after a specified time delay following a loss of communications.

## 5. Programmable Parameters

Parameter 1: XXX – 'iMAC address' (0-255 decimal)

Parameter 2: XXXX - 'Invert Status' (hexadecimal).
Relays can be programmed as normally open or normally closed contacts.
The least significant 4 bits are used to invert the data before writing to the relay outputs.
0 = normally open (de-energised), 1 = normally closed (energised).
Example:

| Hexadecimal | Relays set as NC |
|---|---|
| 0008 | 4 |
| 0006 | 2, 3 |

Parameter 3: XXXX – 'Open Relay' (hexadecimal).
It sets the Open Relay status on loss of communications. The most significant byte specifies a delay period from 200ms to 51s.
The least significant byte specifies the relays to open when the delay timer expires (0 = no effect, 1 = open relay).
Example:

| Hexadecimal | Time delay | Relays to open |
|---|---|---|
| 0A03 | 2s | 1, 2 |
| 3201 | 10s | 1 |

Parameter 4: XXXX – 'Close Relay' (hexadecimal).
It sets the Close Relay status on loss of communications. The most significant byte specifies a delay period from 200ms to 51s.
The least significant byte specifies the relays to close when the delay timer expires (0 = no effect, 1 = close relay).
Example:

| Hexadecimal | Time delay | Relays to close |
|---|---|---|
| 0A03 | 2s | 1, 2 |
| 3201 | 10s | 1 |

The delay timer is triggered on any communication error and is decremented every 200ms. It can give a starting value of 01 to FF hexadecimal (1 to 255 decimal) giving a range of 200ms to 51s.
Examples:

| Hexadecimal | Decimal | Time (s) |
|---|---|---|
| 01 | 1 | 0.20 |
| FF | 255 | 51 |

Note: If the delay timer is set to 00h for Parameter 3 or Parameter 4, the relays will remain in last known state.

## 6. Module Programming Procedure

For programming information see IMACB005 - IMAC Modules Programming Procedure Tech Data Sheet.

## 7. Specifications

### *Power Requirements*

24 VDC ± 15% (+24 VDC input is diode protected)
Typical current consumption:

| | |
|---|---|
| No relays energised | 20mA |
| 1 relay energised | 35mA |
| 2 relays energised | 50mA |
| 3 relays energised | 65mA |
| 4 relays energised | 80mA |

### *Outputs*

Four independent normally open relay contacts.
Rated at 500mA, 240 VAC

### *Communication*

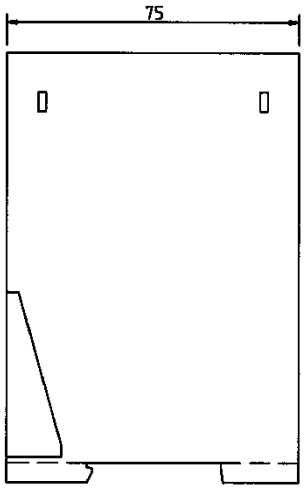
iMAC 2 wire Line
300 to 1000 baud
Current consumption: 1.32mA

### *Operating Environment:*

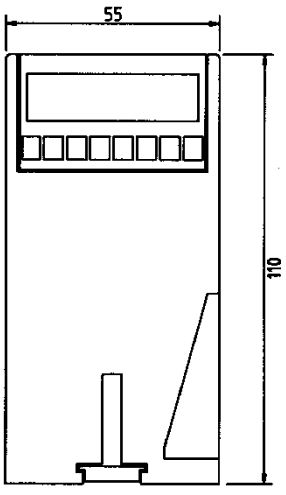
0 to 50°C

## 7. Equipment List

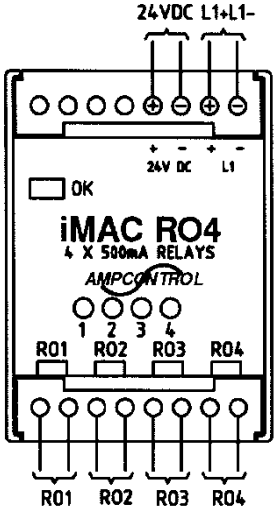
101498 iMAC – RO4 4 Relay Output Module
101538 iMAC - PSA 240/110VAC/24VDC Power Supply



SIDE VIEW



FRONT VIEW



RO4 CONNECTIONS