

iMAC[®] iMAC2 CONTROLLER

Integrated Monitoring and Control System

Description

The iMAC2 Controller forms part of the iMAC Integrated Monitoring and Control System, designed specifically for long line distributed monitoring and control in harsh hazardous areas such as mining and heavy industry.

The Controller uses a patented signalling system to communicate with modules connected to the iMAC fieldbus. This signalling technique utilises a robust combination of pulse width modulation and current loop techniques to provide reliable fail safe communications in the harshest of mining environments.

The iMAC system is IECEx Ex ia Group I certified allowing use in intrinsically safe applications. The controller must be installed in the safe area, the iMAC intrinsically safe Master Line Barrier (MLB) allows the fieldbus and certified iMAC I/O modules to be installed in hazardous areas.

A typical installation of an iMAC System comprises a Controller that drives a 2-wire or 3-wire iMAC fieldbus to which I/O modules are simply multi-drop connected, the fieldbus is terminated with an End of Line Module (iMAC EOL) which maintains the integrity of the communication line.

The iMAC2 Controller is backwards compatible with the original iMAC Controller (except for power supply current consumption, SIL metrics and larger enclosure depth). The iMAC2 controller adds an Ethernet port, long life battery backed real time clock and a SD memory card for data and event logging.

The Ethernet port supports Modbus TCP/IP protocol for PLC/SCADA integration, it also provides a webserver for configuration and diagnostic functions. The webserver allows iMAC system data to be viewed in real time using a web browser. In addition to live data, the iMAC2 Controller stores extensive, real time-stamped, event and data logs on its SD Card. Event and data log information can be viewed dynamically and downloaded via the webserver, providing invaluable system status and maintenance information.



Key Features:

- Backwards compatibility with existing iMAC Installations
- Flexible monitoring and control using a large range of I/O iMAC module types
- Fault tolerant fieldbus with high electrical noise immunity
- Configurable RS232/RS422/RS485 serial communications port
- Ethernet TCP/IP RJ45 Communications Port
- Supports Modbus TCP/IP
- Web server for advanced fieldbus diagnostics and live system status
- Real time clock with NTP protocol support allowing accurate event and data logging
- SIL Rated Safety Control Relay Output for E/stop function
- Intrinsically Safe Monitoring and Control System

Typical Applications:

- Emergency Stop Systems
- Bulk material conveyors (E/stop, Pullkey monitoring, belt drift/wander, belt tear, blocked chute, sequencing and remote isolation controls)
- Mine wide gas monitoring systems (NERZ/ERZ systems, CH₄, CO, CO₂, O₂, H₂S, NO, and NO₂ monitoring)
- Longwall monitoring and control (E/stop, remote isolation controls)
- Coal preparation plant/washery monitoring
- Rail network traffic monitoring
- Any application that requires reliable monitoring and control of fieldbus I/O distributed over large distances. Up to 10km and beyond can be achieved, subject to system configuration and cable type.

Certification / Approvals

QPS	
File Number	LR1527
Model	171571 CONTROLLER IMAC2 STD 24VDC 173552 CONTROLLER IMAC2 LNG 24VDC
Environment	Indoor use (or must be installed in a suitable outdoor enclosure with minimum IP54 rating) Altitude up to 2000m Mains supply fluctuations up to 15% of the nominal voltage Transient overvoltage's up to the levels of Overvoltage Category II Pollution Degree 2
Relay Output (1 C/O)	150VAC @ 8A or 30VDC @ 5A
The specified values approved by these standards may differ from the general specifications detailed elsewhere in this datasheet.	

Specifications

Supply Voltage (+, -, E Terminals)		
Voltage	24VDC ($\pm 20\%$)	
Power Consumption	< 15VA	
In Rush Current	2.6A for 175ms	
Operating Temperature	0 to +60°C	
Storage Temperature	-20 to +80°C	
L1 Fieldbus (L1+, L1- Terminals)		
Surge Protection	90V Lightning Arrestor	
Maximum Series Resistance to EOL	800Ω	
Minimum Shunt (Insulation) Resistance	1000Ω	
Minimum Baud Rate	300	
Maximum Baud Rate	1000 (dependant on cable type/length and module quantity/type/distribution)	
L2 Fieldbus (L2+, L2- Terminals)		
Optically Isolated	10kV _{rms}	
Minimum Baud Rate	300	
Maximum Baud Rate	1000	
Switches & Selectors		
Type	Location	Function
16 Position Selector	Access via right side of enclosure	Application software (SLP) dependent
4x DIP Switches	Access via right side of enclosure	Application software (SLP) dependent
Ethernet Reset Switch	Access via left side of enclosure	Reset IP settings to defaults
General Purpose Inputs (SW1+ & SW1-, SW2+ & SW2-, SW3+ & SW3- Terminals)		
Quantity	3 (Self Wetting)	
Sensing Voltage	12V (Nominal)	
Sensing Current	10mA (Nominal)	
Wiring	Twisted pair, <20m (per input)	
Function	Application software (SLP) dependant	
Optically Isolated	1kV	
Output Relay Contacts (CR, AR Terminals)		
Contacts	1 x NO Control Relay (CR) Contact 1 x NO Auxiliary Relay (AR) Contact	
Ratings	10A, 250VAC, 30VDC (min 10mA, 5VDC)	
Serial Communications Port (COMMON, Rx/T-, Tx/T+, CTS/R-, RTS/R+ Terminals)		
Available Interfaces	RS232 / RS422-RS485 (Selectable)	
Supported Protocols	Modbus RTU Slave Protocol, Ampcontrol IP2/L1/L2 Maintenance Protocols	
Baud Rate	2400, 4800, 9600	
Optically Isolated	2.5kV	
Ethernet TCP/IP Port		
Interface	RJ45 10/100Mbps Auto Negotiation	
Standards	IEEE 802.3u, IEEE 802.3x	
Supported Protocols	MODBUS TCP/IP (Port 502) NTP (for time synchronisation) Webserver (for configuration, data viewing and diagnostic functions)	

IMAC2B006 iMAC2 CONTROLLER TECHNICAL DATASHEET
Version: 3, Date 02 December 2021

<i>Cable Requirements</i>	10BASE-T: UTP Category 3, 4, 5 cable (maximum 100m) 100BASE-TX: UTP Category 5, 5E cable (maximum 100m)
Real Time Clock	
<i>Accuracy</i>	±3 mins per year (typical)
<i>Battery Life</i>	10 Years (typical)
<i>Battery Certification</i>	Ex ia I IECEx TSA 11.0064X
Mechanical	
<i>Dimensions (mm)</i>	Overall 155H x 155W x 155D with connector plugs (x 140D excluding connector plugs) Panel Mount Cut-Out 135H x 135W
<i>Weight</i>	1.8 kg
<i>IP Rating</i>	IP55 (when correctly panel mounted using supplied gasket)
Find Out More	
For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or customerservice@ampcontrolgroup.com or visit the Ampcontrol website: www.ampcontrolgroup.com	

Equipment List

Item Numbers	
171571	CONTROLLER IMAC2 STD 24VDC
173552	CONTROLLER IMAC2 LNG 24VDC

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