

Features

- **Industrial Intrinsically Safe Interface Module**
 - ANZEx / ATEX Approved
 - Fibre Optic Network Isolation
 - I.S. 12VDC Supply
- **Embedded Industrial Microcontroller x 2**
 - Intel 51 / PIC
 - Integral Flash / RAM
 - Site Programmable
- **CAN 2.0B Network (Interface)**
 - Fibre Optic Interface
 - Multi-Master
 - 500kbs
- **RS-485 Network (Pendent)**
 - 1.2kbs (9-Bit Frame)
 - Frame Oriented w/ CCITT CRC
- **Operates -20°C to +85°C**
 - All industrial components
- **Heavy Duty Enclosure**
 - Leather Bound Pendent Module
 - Electroless Nickel Plated Interface Module
 - Rugged Construction
 - IP66 Rating

Description

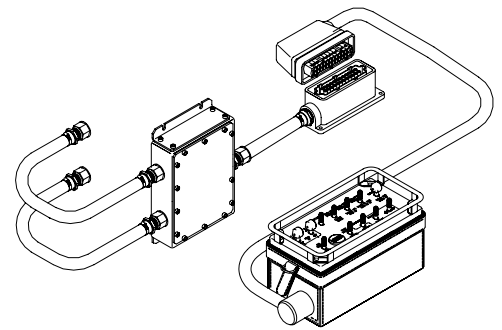
The L0MN / L0M9 Pendent Controller pairing is a rugged pendent control solution where full function control is required. Incorporating an industry standard CAN 2.0B compliant Fibre Optic Interface permits connection to any CAN enabled master device.



Obelix

Intrinsically Safe Full Function
Pendent Controller

Type L0MN & L0M9



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Typical Applications

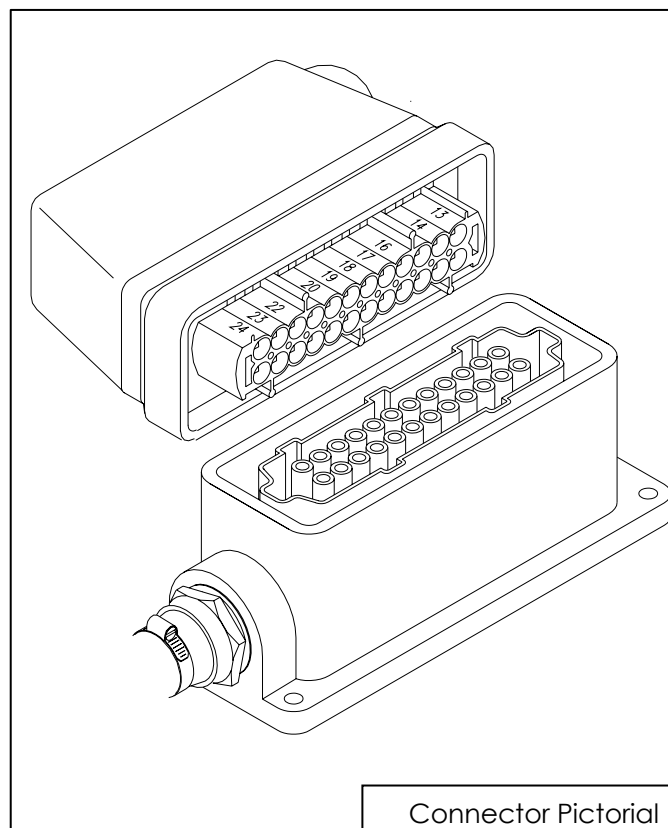
- Continuous Bolter/Miners
- Continuous Haulage
- Mobile Bolters
- Mobile Roof Supports
- Remote Control Scoops
- Remote Control Loaders

Ordering Information

| Part Number | Description |
|-------------|--|
| L0MN0101 | I.S. Interface Module |
| L0M90101 | I.S. Pendant Controller (10m Cable Length) |

Interface Description

The Type L0MN Interface Module incorporates gland entries for flameproof installation and a Wieland 24 Pin Socket for interconnection with the L0M9 Pendant Controller. The L0M9 Pendant Controller Module utilizes a Wieland 24 Pin Plug and water proof gland. The Wieland Plug & Socket combination is keyed preventing improper installation.





Wiring Assignments

| Connector Wieland | | |
|-------------------|----------------------|----------------|
| PIN | Description | Signal |
| 1 | I.S. 12VDC Supply | 12VDC Positive |
| 2 | I.S. 12VDC Supply | 0VDC Return |
| 3 | - | - |
| 4 | - | - |
| 5 | I.S. RS-485 Positive | Communications |
| 6 | I.S. RS-485 Negative | Communications |
| 7 | I.S. RS-485 Common | Communications |
| 8 | Cable Shield | Shield |
| 9 | - | - |
| 10 | - | - |
| 11 | - | - |
| 12 | - | - |
| 13 | - | - |
| 14 | - | - |
| 15 | - | - |
| 16 | - | - |
| 17 | - | - |
| 18 | - | - |
| 19 | - | - |
| 20 | - | - |
| 21 | - | - |
| 22 | - | - |
| 23 | - | - |
| 24 | - | - |



CAN Definitions

| TX | | | | |
|---------|------|-------|------|--------------------------------|
| Message | Byte | Type | Mask | Description |
| 0x02F8 | 1 | UINT8 | N/A | Software Revision |
| | 2 | INT8 | N/A | Temperature °C (-55°C..+125°C) |
| | 3 | - | - | - |
| | 4 | - | - | - |
| | 5 | - | - | - |
| | 6 | - | - | - |
| | 7 | - | - | - |
| | 8 | - | - | - |

| TX | | | | |
|---------|------|-------|------|---|
| Message | Byte | Type | Mask | Description |
| 0x02E8 | 1 | UINT8 | N/A | Start Flag (Value = 0xB0) |
| | 2 | UINT8 | N/A | Reserved (Value = 0x00) |
| | 3 | UINT8 | N/A | Reserved (Value = 0x00) |
| | 4 | UINT8 | N/A | Reserved (Value = 0x00) |
| | 5 | | 0x01 | Key 12A |
| | | | 0x02 | Key 11A |
| | | | 0x04 | Key 11B |
| | | | 0x08 | Key 12B |
| | | | 0x10 | Key 6A |
| | | | 0x20 | Key 8A |
| | | | 0x40 | Key 8B |
| | | | 0x80 | - |
| | 6 | UINT8 | 0x01 | Key 6B |
| | | | 0x02 | Key 3A |
| | | | 0x04 | Key 3B |
| | | | 0x08 | Key 5A |
| | | | 0x10 | Key 5B |
| | | | 0x20 | Key 1A |
| | | | 0x40 | Key 1B |
| | | | 0x80 | - |
| | 7 | UINT8 | 0x01 | Key 4A |
| | | | 0x02 | Key 4B |
| | | | 0x04 | Key 2B |
| | | | 0x08 | Key 2A |
| | | | 0x10 | Key 7A |
| | | | 0x20 | Key 7B |
| | | | 0x40 | - |
| | | | 0x80 | - |
| | 8 | UINT8 | 0x01 | Power Up (Active for the first minute of operation) |
| | | | 0x02 | - |
| | | | 0x04 | Key 9A or Key 9B |
| | | | 0x08 | Key 10A |
| | | | 0x10 | - |
| | | | 0x20 | - |
| | | | 0x40 | - |
| | | | 0x80 | - |

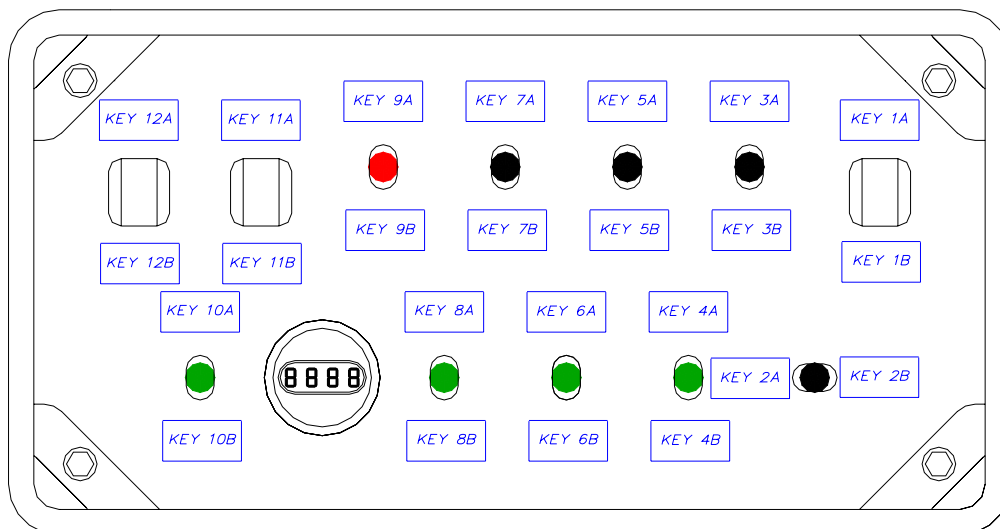
Note: Message 0x02E8 will NOT be issued if internal RS-485 communications are lost.



Key Translation

The CAN Message "0x02E8" includes several bytes of data that are directly translated into RAW key functions that are streamed from the L0M9 Pendant Console.

Figure 1 illustrates the logical key assignments relative to the physical layout of the Pendant Console.



Depending upon the type of L0M9 Pendant Console in use, these RAW functions may have different machine function allocations. It is left to the end-user's higher level software to manage the logical translation of these RAW functions.



Electrical Characteristics

| Supply | |
|-------------------------------|---------------|
| Voltage | 12VDC Nominal |
| Wattage ^{MIN} | 1.2W |
| Wattage ^{MAX} | 2.4W |

| Communications | |
|--------------------------------|-------------------------------------|
| Interface ^{#1} | CAN 2.0B (External) |
| Throughput | 500kbs (Supports Autobaud) |
| Protocol | Message Oriented |
| Medium | Fibre Optic, Wavelength 62.5µm |
| Interface ^{#2} | RS-485 (Internal) |
| Throughput | 1.2kbs |
| Protocol | Frame Oriented, CCITT CRC Protected |
| Medium | Copper |

| Environmental | |
|------------------------------|---------------------|
| Operating Temperature | Minus 20°C to +85°C |
| Humidity | T.B.A. |
| MTBF | T.B.A. |

| Certification | |
|------------------|----------------|
| Australia | ANZEx 06.3027x |
| Europe | T.B.A. |
| USA | - |



Functional Description

The L0MN / L0M9 (SY0090) Full Function Pendant is a pairing of two independent electronic components that can be connected to a fibre optic, CAN enabled control system.

L0M9 Pendant Controller

The L0M9 Pendant Controller is modelled on the L0KN series AS4240 compliant Remote Console and employs identical processing logic sans the radio modem interface. This determines that the L0M9 complies with the requirements set out by the Risk Assessment RA1150 previously undertaken on the L0KN design.

Characteristics

- All switches are MIL specification dual pole, cross over variants.
- Enclosure is 'ruggedised' machined nylon ala L0KN.
- Cable is screened 25-core low capacitance, low inductance.
- Communications interface is an industrial RS-485 differential interface.
- Communications protocol is frame oriented, 9-bit byte format with 16-bit CRC.
- Communications refresh rate is 100ms.

Functionally, the L0M9 Pendant Controller operates purely as a human machine interface allowing the operator to assert function requests as necessary. There is NO logic installed to prevent the operator from asserting specific functions e.g. cutter start. Function request processing is left to the master controller which is subsequently determined by the applicable system software specification.

L0MN Pendant Interface

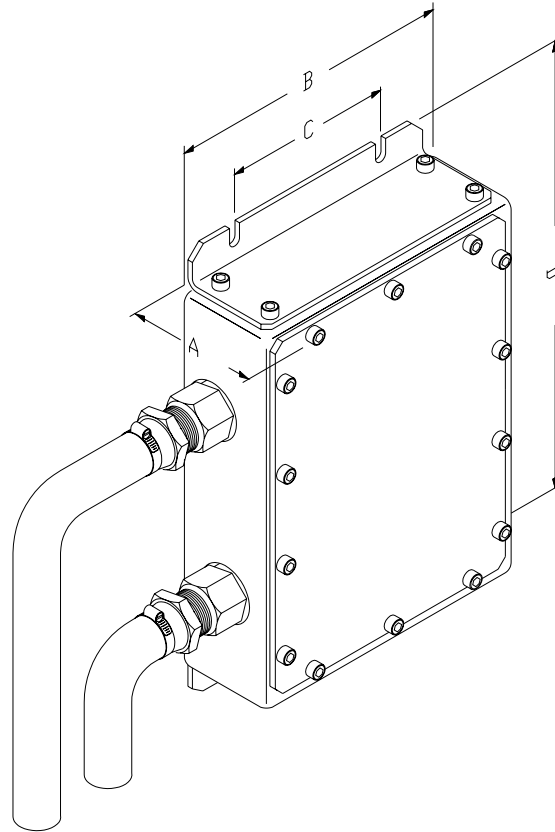
The L0MN Pendant Interface is an intelligent fibre optic CAN to RS-485 bridge module (bridge modules are typically classified as apparatus which move data from one medium and/or protocol to another).

This module continually listens for RS-485 communications (copper differential) and relays this data onto the fibre-optic CAN bus post validation. This data is reformed into CAN message 0x02E8 and forwarded on to the master controller as per the CAN packet specification listed previously.

If RS-485 communications is lost, indicating that either the pendant controller is not connected or damaged, this CAN message (0x02E8) is not issued forcing the master controller to take action as prescribed by its system software specification (which typically involves disabling machine control whilst in pendant mode).



Mechanical Characteristics Continued



| Dimension | Measurement | Description |
|-----------|-------------|-----------------------|
| A | 55 | Height |
| B | 130 | Depth |
| C | 80 | Mounting Centre Width |
| D | 213 | Width |

Notes

- All dimensions are in millimetres.

Material

- Enclosure is Electroless nickel plated mild steel.
- Facia is stainless steel.
- Mounting brackets are stainless steel.

Fasteners

- M5 x 10mm x 4
- M4 x 10mm x 14

Mass

- 2.5kg (5.5lbs)