Features

- **Industrial Intrinsically Safe I/O Module**
  - AUS Ex / ATEX Approved
  - Fibre Optic Network Isolation
  - Single I.S. 12VDC Supply
  - 8 x Proportional Solenoid Outputs
  - 2 x Resolver Inputs - Litton or Siemens.
  - 12 x 12VDC Digital Inputs
  - 12 x 4-20mA Analog Inputs
  - 4 x 0..2.8V Analog Inputs
  - 4 x Frequency Counters (to 5KHz)
  - Industrial Keyed Connectors

- **Embedded Industrial Microcontroller x 2**
  - Intel 51
  - Integral Flash / RAM
  - Site Programmable

- **CAN 2.0B Network**
  - Fibre Optic Interface
  - Multi-Master
  - 500Kbits/s

- **Operates -20°C to +85°C**
  - All industrial components

- **Heavy Duty Enclosure**
  - Electroless Nickel Plated
  - Rugged Construction

Description

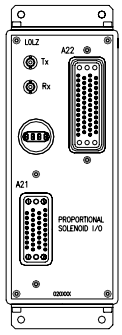
The L0LZ Intrinsically Safe Input / Output Module is an industrial I/O module of the Obelix genus designed to support Intrinsically Safe solenoids and a multitude of Intrinsically Safe discrete and analog transducer inputs.

Note: all electronic components are potted in a high temperature silicone compound maximising failure-to-safe characteristics.

Obelix

Intrinsically Safe I/O Module

Type L0LZ



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Typical Applications

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

Ordering Information

Part Number	Description
L0LZ0401	I.S. Dual Resolver I/O Module
H0LZ0101	Connector Assembly A21 (2.2 metres)
H0LZ0201	Connector Assembly A22 (2.2 metres)

Interface Description

The Type L0LZ I/O Module utilizes industrial connectors that are unique when configured for use with the Obelix Control System via type, gender or keying physically preventing improper installation.

Wiring Assignments

	Connector A21 V35 Female 34 Way	
PIN	**Description**	**Signal**
A21-A	Link 1 – 1 Link with A21-C for 900mA Coil	Optional Link
A21-B	Proportional Output 1	12VDC PWM Output
A21-C	Link 1 – 2 Link with A21-A for 900mA Coil	Optional Link
A21-D	Proportional Output 1 Return	12VDC PWM Return
A21-E	Link 2 – 1 Link with A21-H for 900mA Coil	Optional Link
A21-F	Proportional Output 2	12VDC PWM Output
A21-H	Link 2 – 2 Link with A21-E for 900mA Coil	Optional Link
A21-J	Proportional Output 2 Return	12VDC PWM Return
A21-K	Link 3 – 1 Link with A21-P for 900mA Coil	Optional Link
A21-L	Proportional Output 3	12VDC PWM Output
A21-M	Module Select Input 1[1]	12VDC Input
A21-N	Proportional Output 3 Return	12VDC PWM Return
A21-P	Link 3 – 2 Link with A21-K for 900mA Coil	Optional Link
A21-R	Proportional Output 4	12VDC PWM Output
A21-S	Module Select Input 2	12VDC Input
A21-T	Proportional Output 4 Return	12VDC PWM Return
A21-U	No Connection	-
A21-V	Proportional Output 5	12VDC PWM Output
A21-W	Module Select Input 3	12VDC Input
A21-X	Proportional Output 5 Return	12VDC PWM Return
A21-Y	No Connection	-
A21-Z	Proportional Output 6	12VDC PWM Output
A21-AA	Module Select Input 4	12VDC Input
A21-BB	Proportional Output 6 Return	12VDC PWM Return
A21-CC	No Connection	-
A21-DD	Proportional Output 7	12VDC PWM Output
A21-EE	No Connection	-
A21-FF	Proportional Output 7 Return	12VDC PWM Return
A21-HH	No Connection	-
A21-JJ	Proportional Output 8	12VDC PWM Output
A21-KK	No Connection	-
A21-LL	Proportional Output 8 Return	12VDC PWM Return
A21-MM	0VIS Supply Input	0VDC Supply
A21-NN	12VIS Supply Input	12VDC Supply

[1] Module Select Inputs are used to determine the CAN address

Wiring Assignments Continued

	Connector A22 GAPL 50 Female 50 Way	
PIN	**Description**	**Signal**
A22-A	Counter Input 1	12VDC Input
A22-B	Counter Input 2	12VDC Input
A22-C	Counter Input 3	12VDC Input
A22-D	Counter Input 4	12VDC Input
A22-E	Analog Input 16	4-20mA Input
A22-F	Resolver #1 Reference 2	Resolver Reference
A22-H	Analog Input 15	4-20mA Input
A22-J	Analog Input 14	4-20mA Input
A22-K	Analog Input 13	4-20mA Input
A22-L	Resolver #1 Reference 1	Resolver Reference
A22-M	Analog Input 12	4-20mA Input
A22-N	Analog Input 11	4-20mA Input
A22-P	Analog Input 10	4-20mA Input
A22-R	Resolver #1 Ground COSINE	0VDC Resolver Return
A22-S	Analog Input 9	4-20mA Input
A22-T	Analog Input 8	4-20mA Input
A22-U	Analog Input 7	4-20mA Input
A22-V	Resolver #1 COSINE	Resolver Signal
A22-W	Analog Input 6	4-20mA Input
A22-X	Analog Input 5	4-20mA Input
A22-Y	Analog Input 4	4-20mA Input
A22-Z	Resolver #1 SIN	Resolver Signal
A22-a	Analog Input 3	4-20mA Input
A22-b	Analog Input 2	4-20mA Input
A22-c	Analog Input 1	4-20mA Input
A22-d	Resolver #1 Ground SIN	0VDC Resolver Return
A22-e	Digital Input 12	12VDC Input
A22-f	Digital Input 11	12VDC Input
A22-h	Digital Input 10	12VDC Input
A22-j	Resolver #2 Reference 2	Resolver Reference
A22-k	Digital Input 9	12VDC Input
A22-m	Digital Input 8	12VDC Input
A22-n	Digital Input 7	12VDC Input
A22-p	Resolver #2 Reference 1	Resolver Reference
A22-r	Module Select #3	12VDC Input
A22-s	Digital Input 6	12VDC Input
A22-t	Digital Input 5	12VDC Input
A22-u	Resolver #2 Ground COSINE	0VDC Resolver Return
A22-v	Module Select #4	12VDC Input
A22-w	Digital Input 4	12VDC Input
A22-x	Digital Input 3	12VDC Input
A22-y	Resolver #2 COSINE	Resolver Signal
A22-z	Module Select #1	12VDC Input
A22-AA	Digital Input 2	12VDC Input
A22-BB	Digital Input 1	12VDC Input
A22-CC	Resolver #2 SIN	Resolver Signal
A22-DD	Module Select #2	12VDC Input
A22-EE	Resolver #2 Ground SIN	0VDC Resolver Return
A22-FF	0VIS	0VDC Supply Input
A22-HH	No Connection	-

CAN Definitions

RX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x06C0[2]	1	UINT8	N/A	Proportional Solenoid 1 Output (0-255 = 0-300mA)
	2	UINT8	N/A	Proportional Solenoid 2 Output (0-255 = 0-300mA)
	3	UINT8	N/A	Proportional Solenoid 3 Output (0-255 = 0-300mA)
	4	UINT8	N/A	Proportional Solenoid 4 Output (0-255 = 0-300mA)
	5	UINT8	N/A	Proportional Solenoid 5 Output (0-255 = 0-300mA)
	6	UINT8	N/A	Proportional Solenoid 6 Output (0-255 = 0-300mA)
	7	UINT8	N/A	Proportional Solenoid 7 Output (0-255 = 0-300mA)
	8	UINT8	N/A	Proportional Solenoid 8 Output (0-255 = 0-300mA)

RX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x0760[3]	1	UINT8	N/A	Resolver Selection (0x05 = Littons, 0x07 = Siemens)
	2	UINT8	N/A	Pulse Counter Periods (0 = OFF, 1 = 250ms, 2 = 500ms…)
	3	UINT8	N/A	-
	4	UINT8	N/A	-
	5	UINT8	N/A	-
	6	UINT8	N/A	-
	7	UINT8	N/A	-
	8	UINT8	N/A	-

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x01D0[4]	1	UINT8	N/A	Software Revision PCB Solenoid PCB
	2	UINT8	N/A	Board Status
	3	INT8	N/A	Temperature -55˚C (-67˚F)..+125˚C(+257˚F)
	4	UINT8	0x01	Solenoid 1 Feedback (1 = ON, 0 = OFF)
			0x02	Solenoid 2 Feedback (1 = ON, 0 = OFF)
			0x04	Solenoid 3 Feedback (1 = ON, 0 = OFF)
			0x08	Solenoid 4 Feedback (1 = ON, 0 = OFF)
			0x10	Solenoid 5 Feedback (1 = ON, 0 = OFF)
			0x20	Solenoid 6 Feedback (1 = ON, 0 = OFF)
			0x40	Solenoid 7 Feedback (1 = ON, 0 = OFF)
			0x80	Solenoid 8 Feedback (1 = ON, 0 = OFF)
	5	UINT8	N/A	PCB ID Number
	6	UINT8	N/A	Scaling Factor for Solenoids
	7	UINT8	N/A	Total Solenoid Current mA (LSB)
	8	UINT8	N/A	Total Solenoid Current mA (MSB)

[2] Plus Internal PCB ID
[3] Plus Internal PCB ID
[4] Plus Internal PCB ID

CAN Definitions Continued

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x01D8[5]	1	UINT8	N/A	Solenoid 1 Current (0-255 = 0-300mA)
	2	UINT8	N/A	Solenoid 2 Current (0-255 = 0-300mA)
	3	UINT8	N/A	Solenoid 3 Current (0-255 = 0-300mA)
	4	UINT8	N/A	Solenoid 4 Current (0-255 = 0-300mA)
	5	UINT8	N/A	Solenoid 5 Current (0-255 = 0-300mA)
	6	UINT8	N/A	Solenoid 6 Current (0-255 = 0-300mA)
	7	UINT8	N/A	Solenoid 7 Current (0-255 = 0-300mA)
	8	UINT8	N/A	Solenoid 8 Current (0-255 = 0-300mA)

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x0200[6]	1	UINT8	N/A	Software Revision Resolver PCB
	2	UINT8	N/A	Temperature -55˚C (-67˚F)..+125˚C(+257˚F)
	3	UINT8	0x01	Digital Input 1
			0x02	Digital Input 2
			0x04	Digital Input 3
			0x08	Digital Input 4
			0x10	Digital Input 5
			0x20	Digital Input 6
			0x40	Digital Input 7
			0x80	Digital Input 8
	4	UINT8	0x01	Digital Input 9
			0x02	Digital Input 10
			0x04	Digital Input 11
			0x08	Digital Input 12
			0x10	-
			0x20	-
			0x40	-
			0x80	-
	5	UINT8	N/A	Resolver 1 in radians*1000 LSB (0- 2*Pi) * 1000
	6	UINT8	N/A	Resolver 1 in radians*1000 MSB (0- 2*Pi) * 1000
	7	UINT8	N/A	Resolver 2 in radians*1000 LSB (0- 2*Pi) * 1000
	8	UINT8	N/A	Resolver 2 in radians*1000 MSB (0- 2*Pi) * 1000

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x0208[7]	1	UINT8	N/A	Analog Input 1 (0-255 = 0-26mA)
	2	UINT8	N/A	Analog Input 2 (0-255 = 0-26mA)
	3	UINT8	N/A	Analog Input 3 (0-255 = 0-26mA)
	4	UINT8	N/A	Analog Input 4 (0-255 = 0-26mA)
	5	UINT8	N/A	Analog Input 5 (0-255 = 0-26mA)
	6	UINT8	N/A	Analog Input 6 (0-255 = 0-26mA)
	7	UINT8	N/A	Analog Input 7 (0-255 = 0-26mA)
	8	UINT8	N/A	Analog Input 8 (0-255 = 0-26mA)

[5] Plus Internal PCB ID
[6] Plus Internal PCB ID
[7] Plus Internal PCB ID

CAN Definitions Continued

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x0210[8]	1	UINT8	N/A	Analog Input 9 (0-255 = 0-26mA)
	2	UINT8	N/A	Analog Input 10 (0-255 = 0-26mA)
	3	UINT8	N/A	Analog Input 11 (0-255 = 0-26mA)
	4	UINT8	N/A	Analog Input 12 (0-255 = 0-26mA)
	5	UINT8	N/A	Analog Input 13 (0-255 = 0-26mA)
	6	UINT8	N/A	Analog Input 14 (0-255 = 0-26mA)
	7	UINT8	N/A	Analog Input 15 (0-255 = 0-26mA)
	8	UINT8	N/A	Analog Input 16 (0-255 = 0-26mA)

TX				
Message	**Byte**	**Type**	**Mask**	**Description**
0x0218[9]	1	UINT8	N/A	Pulse Counter 1 (LSB)
	2	UINT8	N/A	Pulse Counter 1 (MSB)
	3	UINT8	N/A	Pulse Counter 2 (LSB)
	4	UINT8	N/A	Pulse Counter 2 (MSB)
	5	UINT8	N/A	Pulse Counter 3 (LSB)
	6	UINT8	N/A	Pulse Counter 3 (MSB)
	7	UINT8	N/A	Pulse Counter 4 (LSB)
	8	UINT8	N/A	Pulse Counter 4 (MSB)

[8] Plus Internal PCB ID
[9] Plus Internal PCB ID

Display Diagnostics

The integral 4 character LED Matrix display provides the end user with some basic diagnostics as to the operation of the module. These messages are as follows:

Message	Explanation	Result
ON ▯ Omni Flashing	Indicates nominal operation and signifies that CAN communications has been established with a host.	Normal Operation Permitted
CAN	Indicates CAN Communication has not been established or has been lost.	Outputs Disabled
FDBK	Indicates that internal inputs are NOT congruent with requested outputs. This typically occurs when an output has been requested but has failed to operate indicating a supply failure or wiring error.	Outputs Disabled
SHRT	Indicates that a short-circuit condition has been detected a requested output. This short-circuit could be external (most probable) or internal.	Outputs Disabled
OPEN	Indicates that the requested output is not drawing sufficient current to operate as expected indicating that the solenoid coil is open circuit.	Outputs Disabled
LOAD	Indicates that the requested output is not drawing current as requested when commanded to operate proportionally.	Outputs Disabled

Electrical Characteristics

Supply	
Voltage	12VDC Nominal
Wattage MIN	T.B.A.
Wattage MAX	T.B.A.

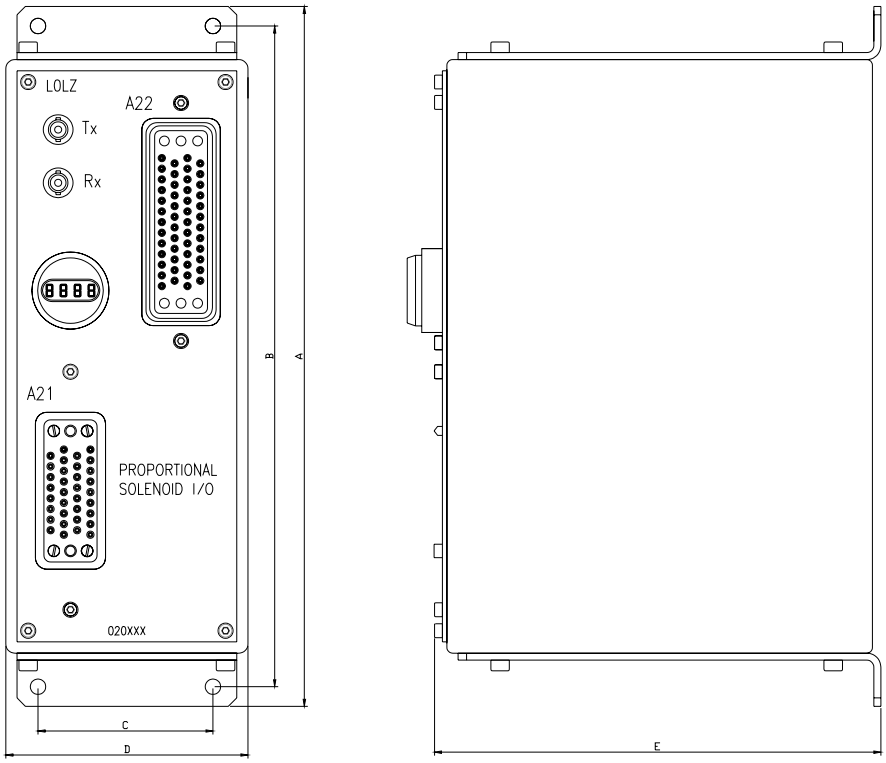
Digital Inputs	
Installed	12
Voltage	12VDC
Minimum Load	2mA

Analog Inputs	
Installed	16
Type	4-20mA
Resolution	10 bits (1024 units)

Communications	
Interface	CAN 2.0B
Throughput	500kbs (Supports Autobaud)
Protocol(s)	Message Oriented
Medium	Fibre Optic ST/ST Duplex 62.5µm

Environmental	
Operating Temperature	Minus 20°C to +85°C
Humidity	T.B.A.
MTBF	12,000 hours

Mechanical Characteristics



Dimension	Measurement	Description
A	250	Height
B	236	Height Mounting Centre
C	62.5	Width Mounting Centre
D	86.5	Width
E	159.5	Depth

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 8
- M3 x 10mm x 8

Mass
- 6.5kg (14.3lb) (Potted)