Certification of

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No: AUS Ex 3214X

Issue 0: Original Issue 15/12/1995
Issue 1:

Date of Expiry: 15/12/1995

Certificate Holder:
Bramco Electronics
47 Orlando Road
LAMBTON NSW 2299

Electrical Equipment: Integrated Control and Monitoring System Type ICMS

Type of Protection and Marking Code:

Control Unit, IS Interface:	Ex (ib) I
SLC Relay, Remote Display:	Ex (ib) I
Sequence Node Semi Powered:	Ex (ib) I
Battery Powered Amplifier:	Ex ia I
Remainder of System :	Ex ib I

Manufactured By:
Bramco Electronics
47 Orlando Road
LAMBTON NSW 2299

Issued by:

WORKCOVER AUTHORITY

Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753
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This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

AS 2380.1-1989 Electrical Equipment for Explosive Atmospheres - Explosion-protection Techniques - General Requirements
AS 2380.7-1987 Electrical Equipment for Explosive Atmospheres - Explosion-protection Techniques - Intrinsic Safety 'i'

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No: LOSC 13611A

File Reference: LOSC 95/6797

K.J. Foley
Signed for and on behalf of issuing authority

Coordinator, Approvals & Certification
Position

15/12/1995
Date of issue

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This certificate is not transferable and remains the property of Standards Australia Quality Assurance Services and must be returned in the event of its being revoked or not renewed.

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Standards Australia Quality Assurance Services Pty Limited A.C.N. 050 611 642

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Schedule

Certificate No: AUS Ex 3214X Issue: 0 Date of Issue: 13/12/1995

Certified Equipment:

The Integrated Control and Monitoring System, Type ICMS, is designed for used in longwall and conveyor installations and includes:

a. A mains powered Control Unit, located in the safe area, and comprising:
- An ICMS Control Module comprising a power supply, relay interface, control board and input/output controller.
- A Display Module for indicating the status of the system.
- An Interface Module which provides an intrinsically safe interface to the electrical equipment connected to the data highway.

b. Any number of battery powered Amplifier Units located in the hazardous area and connected to the data highway. The Amplifier Unit incorporates an in-built battery pack, which is recharged from an intrinsically safe power supply located in the data highway cable, and provides the ability for voice communication over the installation.

c. Any number of Lanyard Nodes located in the hazardous zone and connected to the data highway. The Lanyard Node provides an interface between switch contacts in the lanyard and the Control Unit for monitoring the status of the switch.

d. Any number of Sequence Nodes, and associated terminator, which provides interfacing of sequencing signals between separate installations. The Sequence Node is either:
- A mains Powered type located in a safe area and used to switch non-intrinsically safe circuits of up to 110 Volts ac at up to 100VA.
- An Unpowered type which may be located in the hazardous area and used to used to switch intrinsically safe circuits having a source potential not exceeding 40 Volts.

e. An End Of Line Node to terminate the highway cable.

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Addendum to Certificate No. Ex: 3214X

Conditions of Certification:

1. It is a condition of safe use that the equipment be installed and maintained in accordance with the requirements of drawing SD002300.SCH issue F.

2. It is a condition of safe use that the ICMS Control Unit be housed in an enclosure providing a Degree of Protection at least equivalent to IP54.

3. It is a condition of safe use that the following electrical parameters of the cables connected to the output terminals of the IS Interface be taken into account during installation.

   Maximum Cable Capacitance (C_{max}) = 3 μF
   Maximum Cable Inductance (L_{max}) = 2 mH

4. It is a condition of safe use that the signal lives be connected to the input terminals of the Input/Output Card via one of the following methods:

   a. An appropriately certified IS circuit having the following electrical parameters:

      Maximum Output Voltage (U_o) = 27 Volts
      Maximum Output Current (I_o) = 0.4 Amperes

   b. The segregated potential-free contacts of a relay complying with the requirements of clause 2.8 of AS 2380.7-1987.

   c. An opto-coupler meeting the requirements of clause 3.2.9 of AS 2380.7.

5. It is a condition of safe use that the relay contacts of the Driver Relay Card of the Control Unit be used to switch circuits having a potential not exceeding 110 Volts ac at up to 100VA.

6. It is a condition of safe use that the relay output contact of the Sequence Node be used to switch circuits having a potential not exceeding the following:
   - Powered Type: 110 Volts ac at up to 100VA
   - Unpowered Type: 40 Volts

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Drawing Schedule

Drawing No	Drawing Title	Revision/ Issue	Dated
A027200	ICMS Enclosure Typical Wiring Details	B	25 Sep 1995
A027201	ICMS Enclosure Typical Layout	C	13 Nov 1995
A027202	ICMS Enclosure Wiring Details	C	25 Sep 1995
A027300.SCH	ICMS Interface	B	29 Aug 1995
A027302	ICMS Interface Top Overlay	original	24 Jul 1995
A027303	ICMS-IS Interface Bottom Layer	original	24 Jul 1995
A027304	ICMS-IS Interface Top Layer	original	24 Jul 1995
A027306	ICMS-IS Interface Assembly Details	B	14 Nov 1995
A027700.SCH	ICMS Sequence Node (Unpowered) Block	original	31 Jul 1995
A027702	ICMS Unpowered Sequence Top Layer	original	27 Jul 1995
A027703	ICMS-Unpowered Sequence - Overlay	original	27 Jul 1995
A027704	ICMS-Unpowered Sequence - Bottom	original	27 July 1995
A027705	ICMS-Sequence Node Assembly Details	A	15 Nov 1995
A027800.SCH	ICMS Data Repeater	A	15 Sep 1995
A027803	ICMS Data Repeater Assembly Details	A	13 Nov 1995
A028000.SCH	ICMS Communications Monitor Block Diagram	A	17 Aug 1995
A028002	ICMS-Comms Monitor Pcb	A	24 Jul 1995
A028003	ICMS-Comms Monitor Assembly Details	A	13 Nov 1995
A028400	ICMS Enclosure Base Details	B	13 Nov 1995
A028401	ICMS Enclosure Base Details	D	22 Nov 1995
A029100.SCH	ICMS Lanyard Node Block Diagram	original	8 Aug 1995
A029102	ICMS Lanyard Node Top Layer	original	1 Aug 1995
A029103	ICMS Lanyard Node Overlay	original	1 Aug 1995
A029104	ICMS Lanyard Node Bottom Layer	original	1 Aug 1995
A029105	ICMS Lanyard Node Assembly Details	A	13 Nov 1995
A029200.SCH	ICMS Communication Battery Amp	original	2 Aug 1995
A029202	ICMS Comms Pcb Bottom	original	25 Sep 1995
A029203	ICMS Comms Pcb Top Layer	original	25 Sep 1995
A029204	ICMS Comms Pcb Overlay	original	25 Sep 1995
A029209	ICMS Amplifier Assembly Detail	A	13 Nov 1995
B001100	Battery 9.6v Nicad Intrinsically Safe	A	21 May 1995

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Drawing Schedule (continued)

Drawing No	Drawing Title	Revision/Issue	Dated
A030200.SCH	ICMS-Slc Relay (Mains Powered)	C	8 Sep 1995
A030201	ICMS-Slc Mains Powered Overlay	original	2 Aug 1995
A030202	ICMS-Slc Mains Powered Top Layer	original	2 Aug 1995
A030203	ICMS-Slc Mains Powered Bottom Layer	original	2 Aug 1995
A030204	ICMS Powered Slc Assembly Details	A	13 Nov 1995
A031300.SCH	ICMS Sequence Node (Semi Powered)	original	17 Aug 1995
A031302	ICMS Semi Powered Sequence-Overlay	original	27 Jul 1995
A031303	ICMS Semi Powered Sequence - Top Layer	original	27 Jul 1995
A031304	ICMS Semi Powered Sequence - Bottom Layer	original	27 Jul 1995
A031305	ICMS Powered Sequence Assembly Details	A	13 Nov 1995
A031400.SCH	ICMS Slc Terminator Block Diagram	original	2 Aug 1995
A031402	ICMS-Slc Terminator Pcb	original	2 Aug 1995
A031403	ICMS Slc Terminator Assembly Details	A	15 Nov 1995
A032900.SCH	ICMS-Slc Relay (Barrier Powered)	A	22 Aug 1995
A032901	ICMS Slc Barrier Powered Pcb	original	2 Aug 1995
A032902	ICMS Slc Assembly Details	A	14 Nov 1995
B715400.SCH	ICMS Driver Relay Card	A	17 Aug 1995
B715402	ICMS-Relay Card Top Layer	A	24 Jul 1995
B715403	ICMS-Relay Card Bottom Layer	A	24 Jul 1995
B715404	ICMS-Relay Card Component Overlay	A	24 Jul 1995
B715500.SCH	ICMS Power Supply Card	B	8 Aug 1995
B715502	ICMS-Power Supply Bottom Layer	original	24 Jul 1995
B715503	ICMS-Power Supply Top Layer	original	24 Jul 1995
B715504	ICMS-Power Supply Component Overlay	original	24 Jul 1995
B715801.SCH	ICMS Input/Output Card Block Diagram	original	31 Jul 1995
SD002300.SCH	Bramco ICMS System Stage 1	F	10 Nov 1995
A026100.SCH	ICMS-Temperature Node Schematic	original	1 Aug 1995
A026106	ICMS Temperature Input Assembly Details	A	14 Nov 1995
A026300.SCH	ICMS End Of Line Node Block Diagram	original	28 Jul 1995
A026302	ICMS End Line Unit	original	25 Sep 1995

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Drawing Schedule (continued)

Drawing No	Drawing Title	Revision/Issue	Dated
A026303	ICMS End Of Line Unit Assembly Details	A	15 Nov 1995
L303001	Battery Amplifier Label	original	15 Nov 1995
L303101	ICMS Remote Display Label	original	15 Nov 1995
L303201	ICMS Temperature Node Labels	original	15 Nov 1995
L303301	ICMS End Of Line Node Label	original	15 Nov 1995
L303501	ICMS Controller Base Label	original	15 Nov 1995
L303601	ICMS Lanyard Node Label	original	15 Nov 1995
L304201	ICMS Unpowered Sequence Label	original	15 Nov 1995
L304301	ICMS Powered Sequence Labels	original	15 Nov 1995
L304601	ICMS Controller Front Label	original	15 Nov 1995
L304801	ICMS Data Repeater Label	original	15 Nov 1995
L304901	ICMS IS Interface Labels	A	15 Nov 1995
L305401	ICMS Slc Front Labels	original	15 Nov 1995
L305501	ICMS Slc Terminator Label	original	15 Nov 1995
L306801	ICMS Comms Monitor Label	original	15 Nov 1995
L306901	ICMS Comms Battery Label	original	15 Nov 1995

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