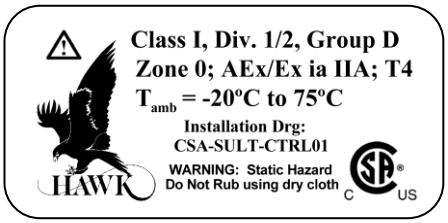
Safety instructions

HAWK SULTAN SERIES

Smart Universal Level Transmitter And Network

(RN)

CSA Class I, Division 1/2



Equipment types:

AWR series Remote Electronics
AWRT series Remote Transducer
AWRT Sonar series Transducer
OSIRT Sonar series Transducer

1. General

This document provides instructions for the installation of Intrinsically Safe equipment for Class I, Division 1 & 2 hazardous locations, according to CSA Certificate Of Conformity 2137731. CSA Product Classes are relevant in Canada and North America. Class I, Div 1 is similar to Zone 0.

The Hawk Sultan Series Acoustic Wave equipment uses high frequency acoustic waves to measure the distance from the sensor face to the material product surface. The equipment is available as an Integral Transmitter or as a Remote system, with various levels of Ex rating.

The Remote Sultan system is one where an AWRT or OSIRT (*) Sonar series Remote Transducer is mounted at the level measurement point, and an OSIR series Remote Electronics unit is installed in a safe area. * OSIRT Sonar series are identical to AWRT Sonar series transducers. Sonar transducers are rated to 1 metre submersion depth.

2. Equipment Identification

The CSA Class I, Division 1/2 marking label is shown above.

If Hawk Sultan Acoustic Wave equipment is installed and mounted in Class I hazardous areas, these User Manual Safety and Operating Instructions, the general Ex installation regulations and the general installation regulations for electrical equipment must all be observed. The installation of Ex instruments should only be made by trained personnel.

3. Putting Into Service

To put a Hawk Sultan Unit safely into service, the following steps must be taken:

a) To be compliant, the equipment must be installed with Intrinsic Barrier devices as described in Intrinsic Safe Installation. Cables from both hazardous and safe areas must be segregated from each other according to the appropriate Intrinsic Safe installation standards.

b) Follow the instructions in Typical Installations and Installation Guide, as well as the relevant conditions on the CSA Certificate Of Conformity:-
   - On units supplied with a permanently connected factory fitted cable, the free end of the cable shall be appropriately connected.
   - For installations, rigid conduit and fittings or cables approved for the hazardous location shall be used together with appropriate size adaptors to terminate the cable.
   - The units shall not be installed where they are subject to direct sunlight or concentrated light.
   - The equipment must not be installed in an acetic acid environment.
   - The equipment supply cable must be connected to a maximum voltage of 30V in a safe area **or** to an intrinsically safe supply.

c) Remote Electronics enclosure conduit entry locations for AWR series models are shown in Dimensions – Remote Enclosure. Remove the terminal cover by loosening the two captive screws. Use a flat blade screwdriver and a slight tap to remove the selected conduit entry openings in the front of the enclosure. Follow the installation instructions in the Installation Guide and Wiring Diagram sections. Be careful to seal any unused cable glands. When wiring is complete, ensure the cable glands are securely sealed against the enclosure and the cable, then seal the terminal cover by tightening the two screws.

d) Correct wiring. Follow the instructions in the Wiring Diagram sections. Wiring should be in accordance with relevant installation standards for hazardous area equipment or other local codes of practice.

e) Safe temperature. Temperature must not exceed the operating range of the Sultan unit. In particular, Ex rated equipment must not exceed the temperature limits shown on the marking label.

f) Safe power supply. Power supply values must be according to the Specifications.

g) It is advised to provide a cover for the unit to prevent damage that could happen due to environmental conditions.

h) Do not put into service where there is a possibility of contact with acetic acid.

4. Use

The instructions for safe use of the Sultan Unit is as follows:

a) The Sultan equipment must put into service safely. (see Putting Into Service, above).

b) This User Manual must be read and understood by any person involved with the unit.

c) Environment and installation conditions should be checked regularly.

d) When opening the cover of the any Sultan unit, prevent dust, liquids or chemical substances from getting inside the unit. Do not leave any cover open in rain or snow conditions.

e) The LCD display is visible through the clear lid of the AWR series Sultan Remote Electronics enclosure. To view the LCD display on the AWI series Sultan Integral Transmitter, open the visor by lifting up the front edge with a finger. Close and click into place again after viewing so that the display is protected from environmental effects.

f) Before making any wiring or hardware configuration changes, it is important to disconnect power from the equipment.

5. Assembling and dismantling

The user is able to reconfigure a Sultan '234' unit (2,3,4 wire operation) to that of a Sultan '2' unit (2 wire operation). This flexibility is unique to Sultan equipment.

To safely reconfigure a Sultan '234' model to that of a Sultan '2' model:

a) Make sure that the original unit is a Sultan '234' model (eg, AWI234 or AWR234). It is not possible to reconfigure a Sultan '2' model (eg, AWI2 or AWR2) as a Sultan 234 model. Only Sultan '234' models can be reconfigured to operate as Sultan '2' models, and this modification is reversible.

b) Disconnect the power to the Sultan '234' Unit.

c) To do the modification, follow the instructions in Wiring – Change Sultan 234 <=> Sultan 2.

d) Modify the wiring to suit the new output configuration as shown in Wiring Diagrams.

The sonar transducer cleaning system may require careful assembly. Refer to the user manual for details of the various cleaning systems. Eg, Floating Sonar Assembly, Sonar Bracket Nozzle Assembly, etc.

6. Installation and Wiring

Carefully follow Typical Installations, Installation Guide and Wiring Diagram sections. Follow all points listed in Putting Into Service, above. Wiring should be in accordance with relevant installation standards for hazardous area equipment (eg, NFPA-70) or other local codes of practice.

7. Adjustment

a) Sultan Remote Electronics AWR series models:

To access the user controls, unlock the clear cover using the lever on the right hand side of the clear lid. Press this lever in the direction of the arrow (towards the lid) to release the catch. The lid can then be swung open to gain access to the user control push buttons. Close the lid when finished. To lock the lid, press on the lower part of the lever, which moves the arrow symbol (in reverse) slightly away from the lid, locking the lid closed.

b) **Change of output configuration:**

The only other hardware adjustment that may be desired by the user is converting from the Sultan '234' output configuration to the Sultan '2' output configuration. Refer to Assembling and Dismantling, above.

c) **Software Adjustment:**

For software adjustment of Sultan unit parameter adjustment and data entry, refer to instructions in Entering Data, and all of the Setup sections. If *GosHawk II* software is to be used for parameter adjustment and data entering from a lap-top computer, read and fully understand the information in the *GosHawk II Manual* either supplied with the equipment or downloaded free from the Hawk web-site: http://www.hawklevel.com

8. Application Conditions

a) **Voltage Supply:**

Must be according to the voltage supplies given in Specifications.

b) **Temperature:**

Must not exceed the operating temperature range stated in Putting Into Service, above. To prevent inaccuracies due to extremes in temperature and the effect of long term UV exposure, it is recommended that transducers constructed with grey/beige polypropylene housing material be protected from direct sunlight. This does not apply to the blue/green and dark grey plastic enclosure parts. These parts have better UV stability.

c) **Cable Connection:**

Cables must only be replaced by the same cable type. If extending the cable, it must be protected in a junction box and terminated in an enclosure suitable for the environment. Refer to Wiring Diagrams – Transducer.

d) **Earthing:**

Hawk Sultan Acoustic Wave equipment must be earthed to ensure that shielded cabling is effective.

e) **Electrostatic Discharge:**

Hawk Sultan Acoustic Wave equipment has been certified safe to use in hazardous dust locations. The marking label warns not to rub the surface with a dry cloth if equipment is installed in hazardous gas locations.

f) **Industrial Conditions:**

This equipment is designed for use in normal industrial conditions relating to humidity, vibration, etc. If the user intends to operate the equipment in more severe environmental conditions, the manufacturer or local distributor should be consulted for advice.

9. List of CSA certified equipment types:

Sultan Acoustic Wave Remote Electronics – AWR series
Sultan Acoustic Wave Remote Transducer – AWRT series
Sultan Acoustic Wave Remote Sonar Transducer – AWRT Sonar Series
Sultan Sonar Wave Remote Transducer – OSIRT Sonar series
[Identical to AWRT Sonar series]

Flange, Cone and Accessory selection in any combination.

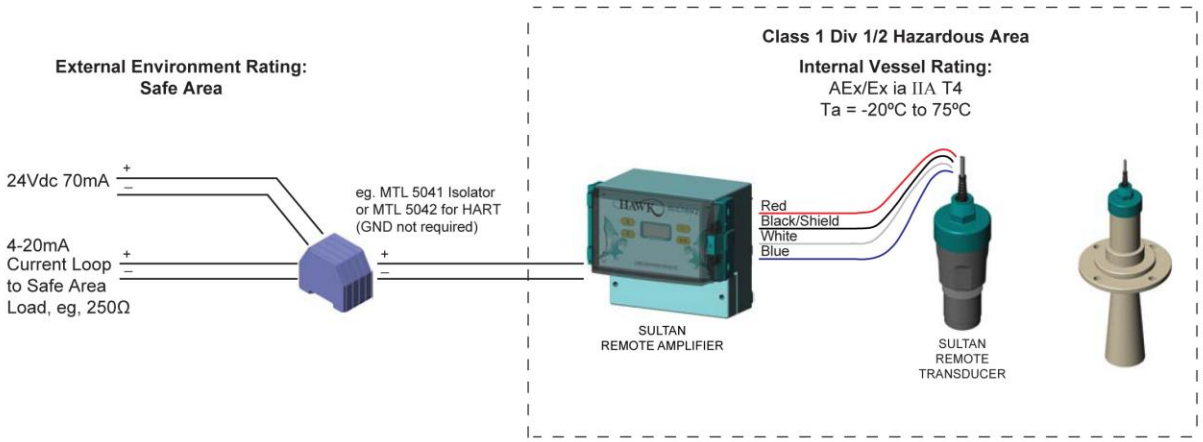
10. Intrinsic Safe configuration drawings:

Note: All equipment in Hazardous Areas must have appropriate certification.

HAW_RD_WIR-CSA-B1-A0_.jpg
HAW_RD_WIR-CSA-B2-A0_.jpg
HAW_RD_WIR-CSA-B3-A0_.jpg
HAW_RD_WIR-CSA-F2-A0_.jpg
HAW_RD_WIR-CSA-F3-A0_.jpg
HAW_RD_WIR-CSA-F4-A0_.jpg

B1. Wiring for CSA Class 1 Division 1/2 Group D
Sultan 2-Wire Remote Amplifier in Zone 0 Hazardous Area & Tranducer in Zone 0 Hazardous Area
I.S. Isolator connected between Transmitter & Control System

Note: All equipment in Hazardous area must have appropriate certification



Note 1. Wiring to conform to NFPA-70

Note 2. Current Loop Input:

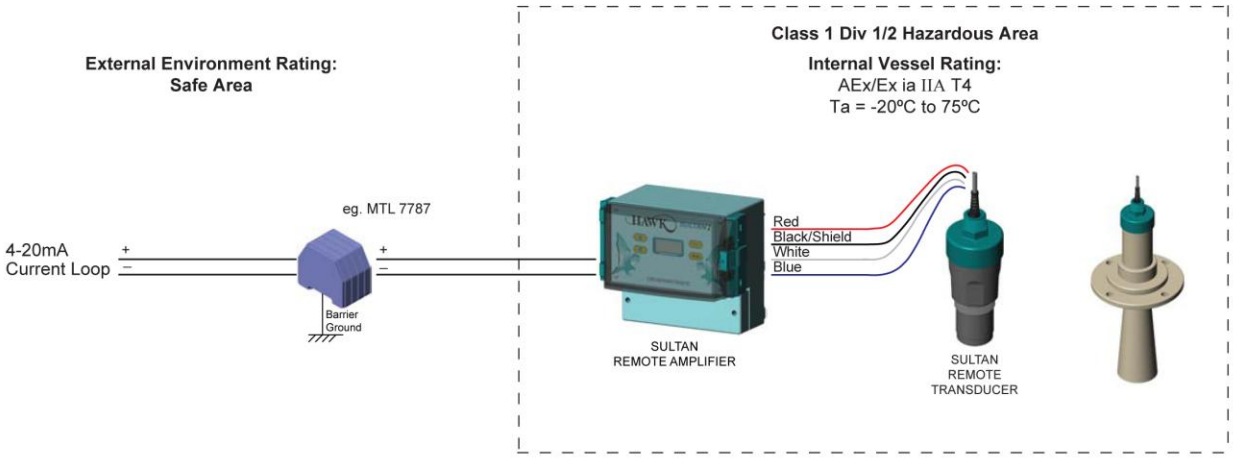
Ui = 28 Volts
Ii = 93 mA
Pi = 0.66 W
Ci = 0
Li = 0

Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:			NOT TO SCALE	ALL DIMENSIONS IN MM	
COMPANY:			HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131		
DRAWN: MT	DATE 15/12/2011				
CHECKED: CP	DATE 19/12/2011				
APRVD: CP	DATE 20/12/2011				
REF.			TITLE: Wiring for CSA Class 1, Div 1/2, Group D Sultan 2-wire Remote Amplifier in Zone 0 Hazardous Area & Transducer in Zone 0 Hazardous Area		A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS.REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED			DWG NO. HAW_RD_WIR-CSA-B1-A0	REVISION A01	SHEET 1-1

B2. Wiring for CSA Class 1 Division 1/2 Group D
Sultan 2-Wire Remote Amplifier in Zone 0 Hazardous Area & Tranducer in Zone 0 Hazardous Area
I.S. Barrier connected between Transmitter & Control System

Note: All equipment in Hazardous area must have appropriate certification



Note 1. Wiring to conform to NFPA-70

Note 2. Current Loop Input:

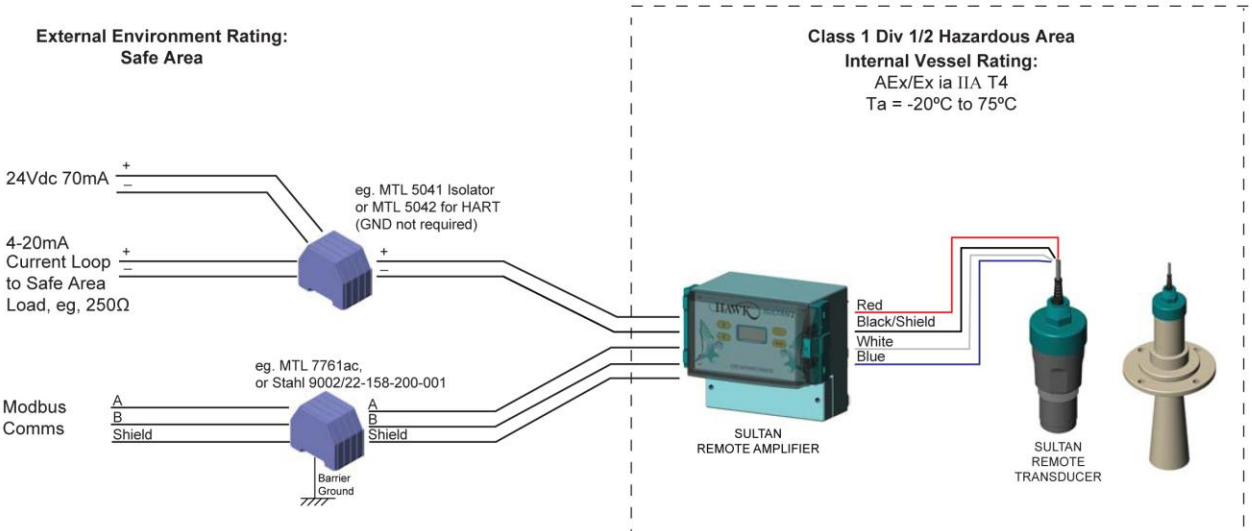
Ui = 28 Volts
Ii = 93 mA
Pi = 0.66 W
Ci = 0
Li = 0

Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:			NOT TO SCALE	ALL DIMENSIONS IN MM
COMPANY:			HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131	
DRAWN: MT	DATE 15/12/2011			
CHECKED: CP	DATE 19/12/2011			
APRVD: CP	DATE 20/12/2011			
REF.			TITLE: Wiring for ATEX Class 1 Div 1/2, Group D Sultan 2-wire Remote Amplifier in Zone 0 Hazardous Area & Transducer/s in Zone 0 Hazardous Area	A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS.REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED			DWG NO. HAW_RD_WIR-CSA-B2-A0	REVISION A01 / SHEET 1-1

B3. Wiring for CSA Class 1 Division 1/2 Group D
Sultan 2-Wire Remote Amplifier in Zone 0 Hazardous Area & Tranducer in Zone 0 Hazardous Area
I.S. Isolator & Barrier connected between Amplifier & Control System

Note: All equipment in Hazardous area must have appropriate certification



Note 1. Wiring to conform to NFPA-70

Note 2. Current Loop Input:
Ui = 28 Volts
Ii = 93 mA
Pi = 0.66 W
Ci = 0
Li = 0

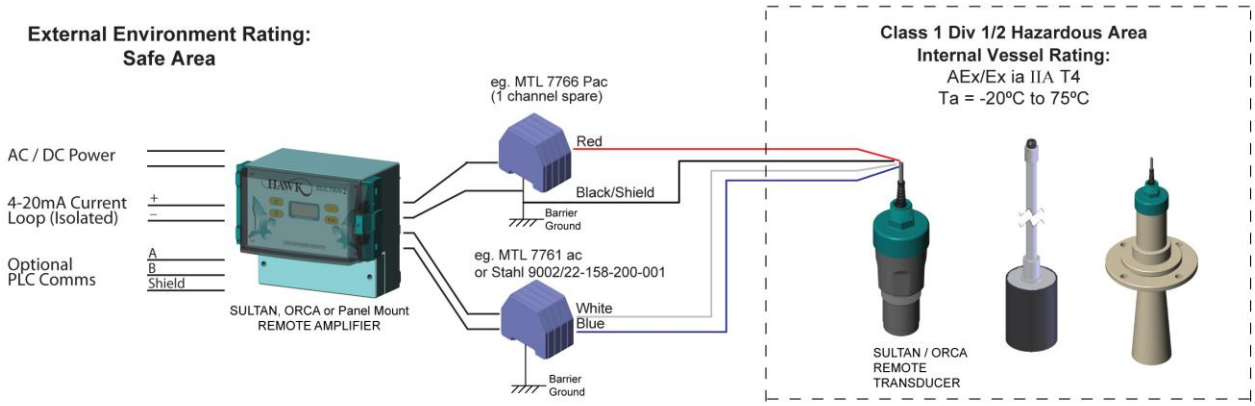
Note 3. Modbus Communication to PLC/DCS:
Ui = 9 Volts
Ii = 120 mA
Pi = 0.54 W
Ci = 0
Li = 0
Uo = 5.9 Volts
Io = 1.13 Amps
Po = 0.66 W
Co = 1000 µF
Lo = 223 µH
L/R Ratio = 170 µH/Ω

Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:			NOT TO SCALE	ALL DIMENSIONS IN MM	
COMPANY:			HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131		
DRAWN: MT	DATE 15/12/2011				
CHECKED: CP	DATE 19/12/2011				
APRVD: CP	DATE 20/12/2011				
REF.			TITLE: Wiring for CSA Class1 Div 1/2 Group D Sultan 2-wire Remote Amplifier in Zone 0 Hazardous Area & Transducer/s in Zone 0 Hazardous Area		A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS.REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED			DWG NO. HAW_RD_WIR-CSA-B3-A0	REVISION A01	SHEET 1-1

F2. Wiring for CSA Class 1 Division 1/2 Group D
Sultan 3&4-Wire Remote Amplifier in Safe Zone & Remote Transducer in Zone 0 Hazardous Area
I.S. Barriers connected between Transducer & Remote Amplifier

Note: All equipment in Hazardous area must have appropriate certification



Note 1. Wiring to conform to NFPA-70

Note 2. Transducer Power from Remote Amplifier:

Amplifier Output	Transducer Input
Uo = 12.6 Volts	Ui = 12.6 Volts
Io = 2.41 Amps	Ii = 333 mA
Po = 1.2 W	Pi = 0.66 W
Co = 13.5 µF	Ci = 0
Lo = 25 µH	Li = 0
L/R Ratio = 37.5 µH/Ω	

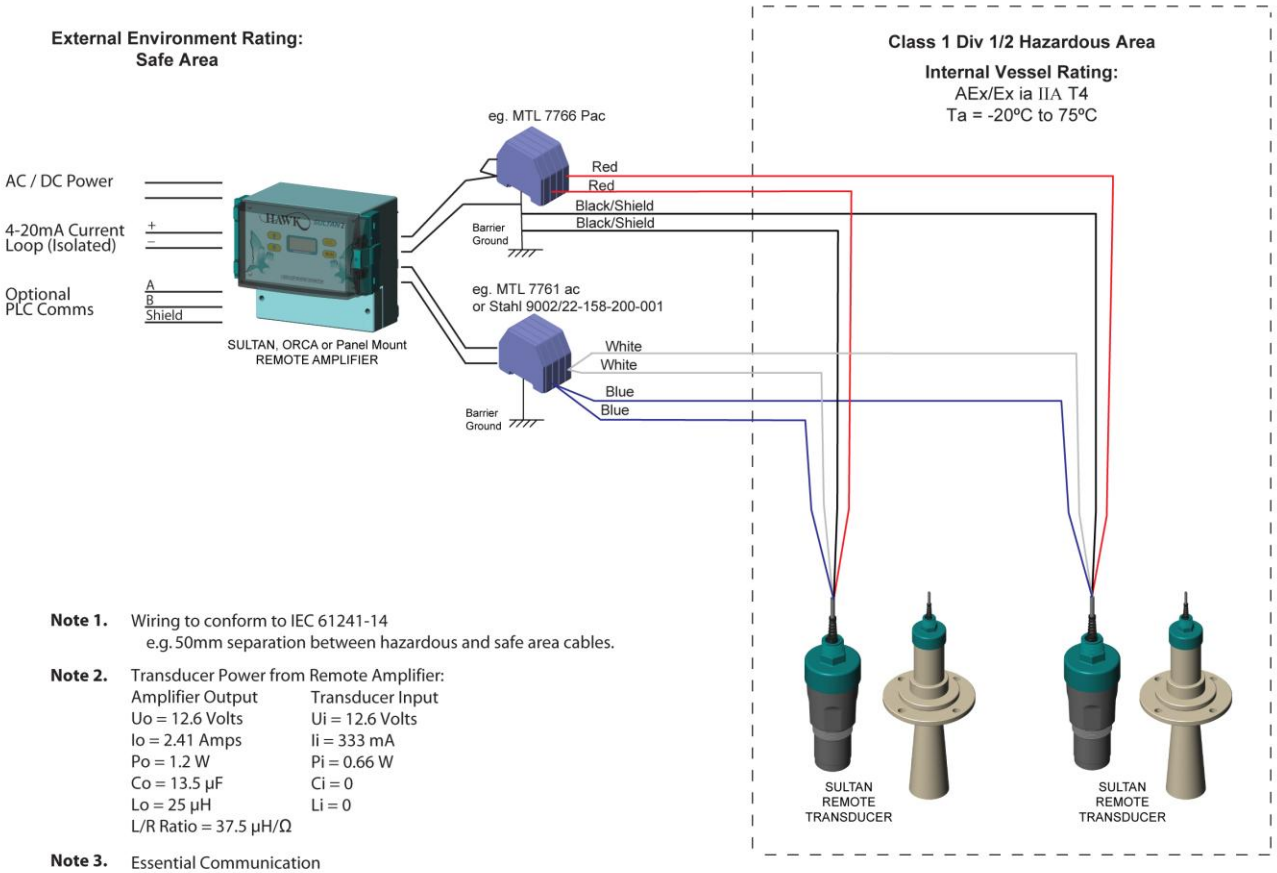
Note 3. Essential Communication To Transducer
Ui = 9 Volts
Ii = 120 mA
Pi = 0.54 W
Ci = 0
Li = 0
Uo = 5.9 Volts
Io = 1.13 Amps
Po = 0.66 W
Co = 1000 µF
Lo = 223 µH
L/R Ratio = 170 µH/Ω

Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:		NOT TO SCALE	ALL DIMENSIONS IN MM
COMPANY:		HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131	
DRAWN: MT	DATE 15/12/2011		
CHECKED: CP	DATE 19/12/2011		
APRVD: CP	DATE 20/12/2011		
REF.		TITLE: Wiring for CSA Class 1 Div 1/2, Group D Sultan 34-wire Remote Amplifier in Safe Area & Remote Transducer in Zone 0 Hazardous Area	A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS.REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED		DWG NO. HAW_RD_WIR-CSA-F2-A0	REVISION A01 / SHEET 1-1

F3. Wiring for CSA Class 1 Division 1/2 Group D
Sultan 3&4-Wire Remote Amplifier in Safe Zone & Remote Transducer/s in Zone 0 Hazardous Area
I.S. Barriers connected between Transducers & Remote Amplifier

Note: All equipment in Hazardous area must have appropriate certification



Note 1. Wiring to conform to IEC 61241-14
e.g. 50mm separation between hazardous and safe area cables.

Note 2. Transducer Power from Remote Amplifier:

Amplifier Output	Transducer Input
Uo = 12.6 Volts	Ui = 12.6 Volts
Io = 2.41 Amps	Ii = 333 mA
Po = 1.2 W	Pi = 0.66 W
Co = 13.5 µF	Ci = 0
Lo = 25 µH	Li = 0
L/R Ratio = 37.5 µH/Ω	

Note 3. Essential Communication
To Transducer
Ui = 9 Volts
Ii = 120 mA
Pi = 0.54 W
Ci = 0
Li = 0
Uo = 5.9 Volts
Io = 1.13 Amps
Po = 0.66 W
Co = 1000 µF
Lo = 223 µH
L/R Ratio = 170 µH/Ω

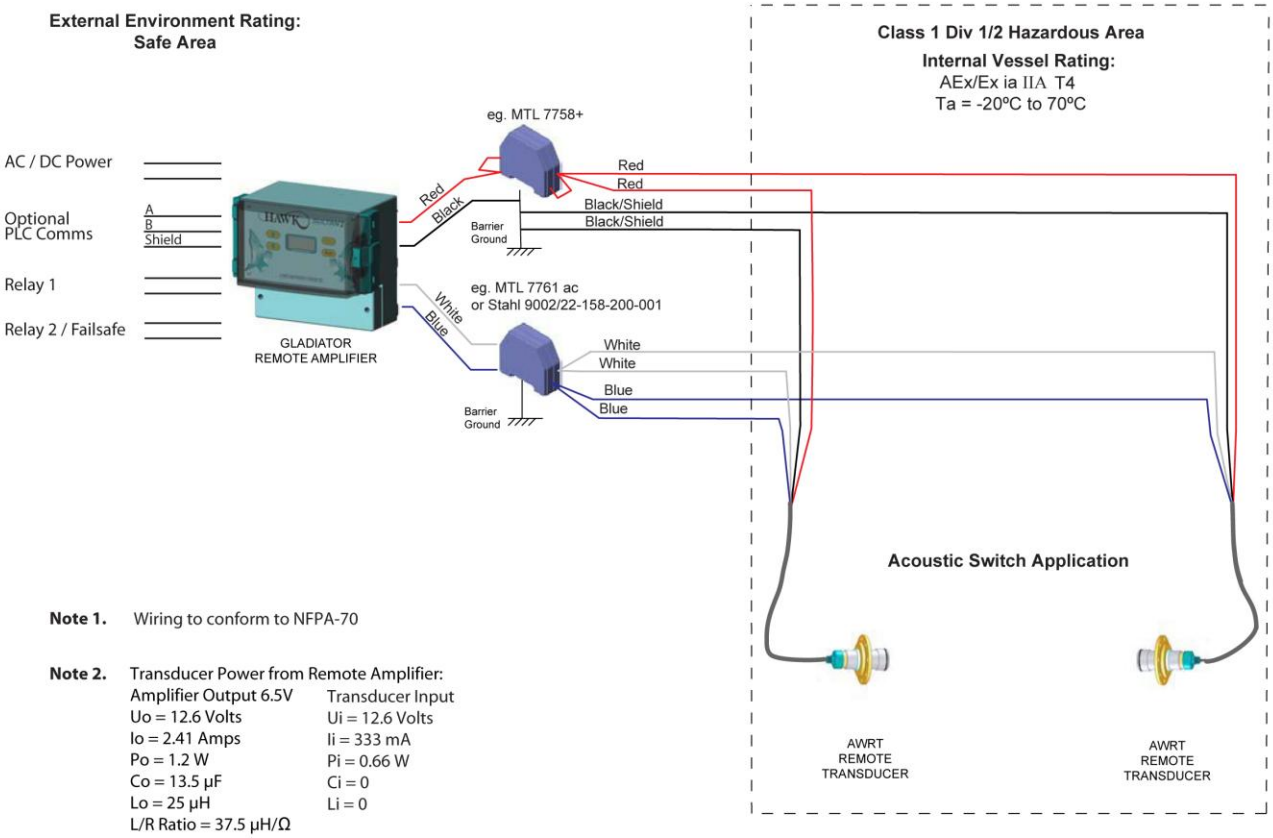
Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:		NOT TO SCALE	ALL DIMENSIONS IN MM
COMPANY:		HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131	
DRAWN: MT	DATE 15/12/2011		
CHECKED: CP	DATE 19/12/2011		
APRVD: CP	DATE 20/12/2011		
REF.		TITLE: Wiring for CSA Class 1 Div 1/2, Group D Sultan 34-wire Remote Amplifier in Safe Area & Transducer/s in Zone 0 Hazardous Area	A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS. REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED		DWG NO. HAW_RD_WIR-CSA-F3-A0	REVISION A01 / SHEET 1-1

F4. Wiring for AWRT Transducers in Class 1 Division 1/2 Group D Hazardous Area and Gladiator Remote Amplifier in Safe Area. I.S. Barriers connected between Transducers & Remote Amplifier

Note: All equipment in Hazardous area must have appropriate certification

CSA Certificate No.: 2137731



Note 1. Wiring to conform to NFPA-70

Note 2. Transducer Power from Remote Amplifier:

Amplifier Output 6.5V	Transducer Input
Uo = 12.6 Volts	Ui = 12.6 Volts
Io = 2.41 Amps	Ii = 333 mA
Po = 1.2 W	Pi = 0.66 W
Co = 13.5 µF	Ci = 0
Lo = 25 µH	Li = 0
L/R Ratio = 37.5 µH/Ω	

Note 3. Essential Communication To Transducer

Ui = 9 Volts
Ii = 120 mA
Pi = 0.54 W
Ci = 0
Li = 0
Uo = 5.9 Volts
Io = 1.13 Amps
Po = 0.66 W
Co = 1000 µF
Lo = 223 µH
L/R Ratio = 170 µH/Ω

Related Drawing
No modifications permitted without the approval of the Engineering Manager

DOC NO:		NOT TO SCALE / ALL DIMENSIONS IN MM	
COMPANY:		HAWK MEASUREMENT SYSTEMS 15-17 MAURICE COURT, NUNAWADING, VICTORIA, AUSTRALIA 3131	
DRAWN: MT	DATE 10/04/2012		
CHECKED:	DATE		
APRVD:	DATE		
REF.		TITLE: Wiring for AWRT Transducers in Class 1 Div 1/2 Grp D Hazardous Area and Gladiator Remote Amplifier in Safe Area	A4
THIS DRAWING AND THE CONTENTS THEREOF ARE THE PROPRIETARY PROPERTY OF HAWK MEASUREMENT SYSTEMS REPRODUCTION OR USE OF THIS INFORMATION WITHOUT PRIOR WRITTEN AUTHORISATION FROM HAWK MEASUREMENT IS PROHIBITED		DWG NO. HAW_RD_WIR-CSA-F4-A0	REVISION A01 / SHEET 1-1