

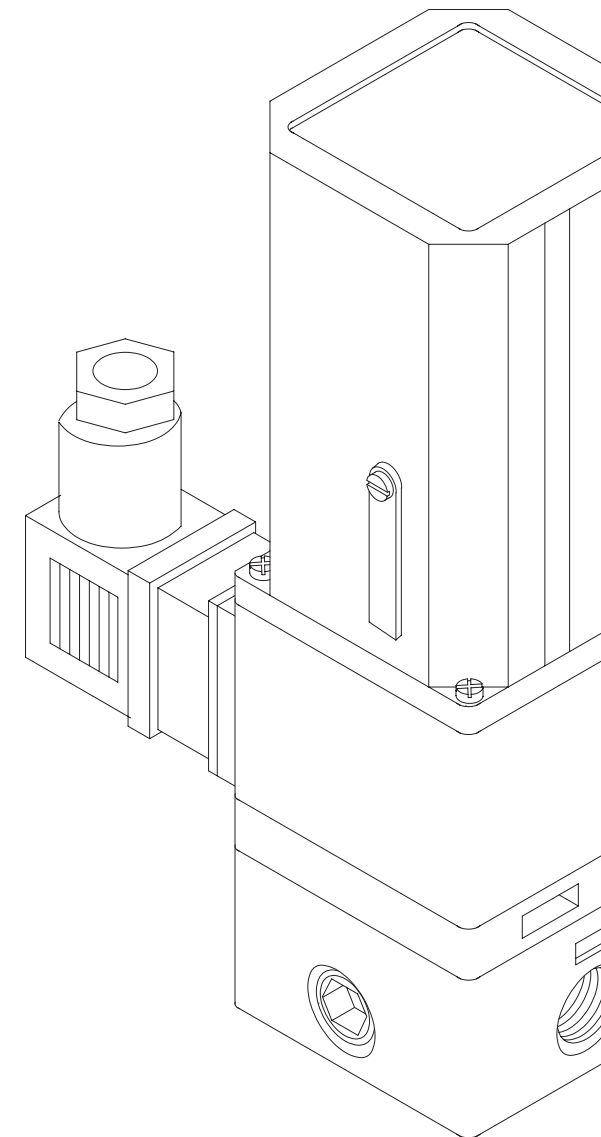
Norgren Ltd.
Cross Chancellor Street
Leeds LS6 2RT United Kingdom

Tel No: +44 (0) 113 245 7587
Fax No: +44 (0) 113 246 5735

Email: enquiries@norgren.com
Website: <http://www.norgren.com/watsonsmith>

INSTRUMENT MANUAL

TYPE 422 FAIL FREEZE
ELECTRONIC I/P CONVERTER



Model Variations

The Type 422 I/P Converter is available in a variety of pressure ranges and other user specified configurations. Performance parameters specified in this handbook generally relate to the 0.2-1 bar (3-15psi) version and may differ for other pressure ranges.

This handbook describes the most common configurations, and to avoid confusion, detailed descriptions of minor variations are omitted.

The relevant features of the specific model in use should be clear from examination of the unit and its label.

IMPORTANT SAFETY WARNING

Please read these instructions carefully BEFORE this instrument is installed or maintained.

To conform with the Health and Safety at Work Act 1974 our product should be installed, used and maintained in accordance with :-

1. Normal safety procedures.
2. The installation and operating instructions provided for each instrument.
3. BS6739 for general applications.
4. BSEN 60079 for hazardous area applications.

If for any reason local conditions dictate non-compliance with the above, we should be consulted.

These converters are intended for use in industrial compressed air systems only. Ensure that adequate pressure relief provision is installed if application of system supply pressure could cause downstream equipment to malfunction. Installation should be in accordance with local and national compressed air and instrumentation codes. Products certified for use as intrinsically safe or Type 'n' installation, MUST:

- a) Be installed in accordance with local and national codes for hazardous area installations
- b) Only be used in situations which comply with the certification conditions stated in this handbook.
- c) Only be maintained by qualified personnel with adequate training on hazardous area instrumentation.

Before using these products with fluids other than air, for non-industrial applications, or for life-support systems consult Norgren.

LIMITED WARRANTY, DISCLAIMER & LIMITATION OF REMEDIES

Items sold by Norgren are warranted to be free from defects in materials and workmanship for a period of two years from the date of manufacture, provided said items are used according to Norgren's recommended usages. Norgren's liability is limited to the repair of, refund of purchase price paid for, or replacement in kind of, at Norgren's sole option, any items proved defective, provided the allegedly defective items are returned to Norgren prepaid. The warranties expressed above are in lieu of and exclusive of all other warranties.

There are no other warranties, expressed or implied, except as stated herein. There are no implied warranties of merchantability or fitness for a particular purpose, which are specifically disclaimed. NORGREN'S liability for breach of warranty as herein stated is the exclusive remedy, and in no event shall NORGREN be liable or responsible for incidental or consequential damages, even if the possibility of such incidental or consequential damages has been made known to NORGREN.

Norgren reserve the right to discontinue manufacture of any product or change product materials, design, or specifications without notice.

Our policy is one of continuous research and development. We therefore reserve the right to amend without notice the specifications given in this document. Customers are responsible for ensuring that the product is used only for the purpose of which it is intended. In case of doubt Norgren will be pleased to advise.

CONTENTS

Brief User Guide 2

General Description 3

Instrument Mounting 4

Pneumatic Installation 6

Electrical Installation 7

Connector Wiring 8

Hazardous Area Versions 9

Calibration 11

Maintenance 12-13

Description of Operation 14-15

Spare Parts 16

Troubleshooting Guide 17

Specifications & Typical Performance Figures 18

Special Conditions for Safe Use 19-23

EC Declarations 24-25

DIAGRAMS

Diagram 1 - General Installation 2

Diagram 2 - Response Times 3

Diagram 3 - Dimensional Drawing 4

Diagram 4 - Pipe Bracket and Connector Block 5

Diagram 5 - Input Equivalent Circuit 7

Diagram 6 - Connector Wiring 2 & 8

Diagram 7 - Intrinsically Safe Control Drawing (SIRA) 10

Diagram 8 - Operation Schematic 14

Diagram 9 - Exploded View 16

BRIEF USER GUIDE

This is a quick guide to connecting the instrument for the convenience of engineers who are familiar with this type of instrument. More comprehensive instructions are contained in the section on installation.

1. Connect a clean air supply of about 2 bar (30psi) to the IN port. (1/4" NPT)
2. Connect a pressure gauge or actuator to the OUT port. (1/4" NPT)

Caution: Do NOT use PTFE tape or similar to seal the ports. Use a minimum amount of a soft setting anaerobic hydraulic seal, eg. Loctite Hydraulic Seal 542.

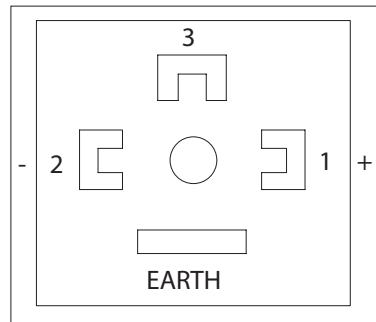
3. Connect a 4-20mA loop controller. Check that it can supply at least 6 volts at 20mA. Observe correct polarity.

Caution: Do NOT use a voltage source.

4. Switch on the controller and the instrument should operate. It has been factory calibrated so no further adjustment should be necessary.

NOTE: There may be a delay of a few seconds before the instrument stabilises when power is first applied.

If the instrument fails to operate refer to the Troubleshooting guide.



View looking at pins

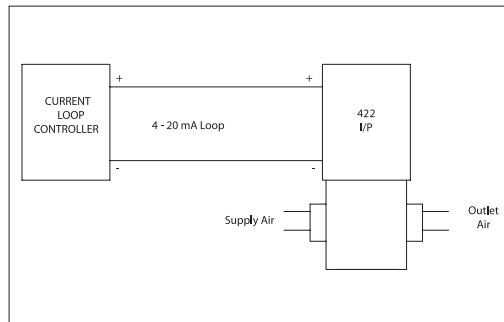


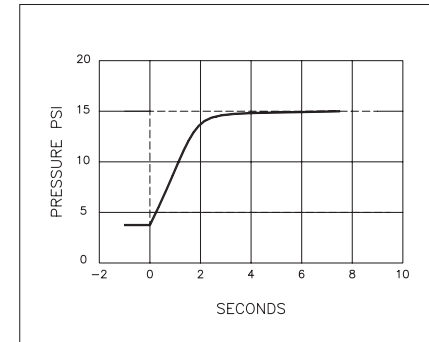
Diagram 1: General Installation

GENERAL DESCRIPTION

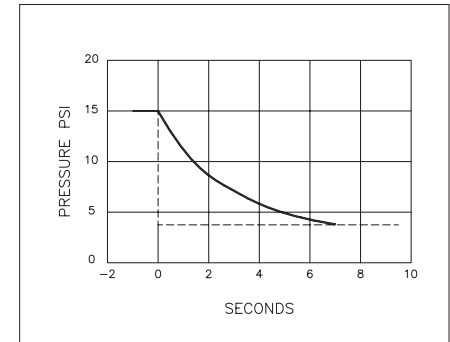
The Type 422 Converter is a specific design of electronic I/P converter for field mount process applications. It features failfreeze operation, i.e. the pneumatic output is maintained at its existing level if the electrical input is suddenly interrupted.

These converters are precision electronic pressure controllers designed for continuous process control applications. They use internal closed loop feedback, in which outlet pressure is continuously monitored by a pressure transducer, to give high performance and long term stability.

The instrument response has been optimised for process control applications, and gives a controlled slew rate in both forward and relief conditions, avoiding the pneumatic inrush effects which can destabilise some control systems.



100% Up Step



100% Down Step

Diagram 2: Response Times

High forward and relief flow are obtained by suitable valve sizing within the instrument, giving approximately equal fill and empty times for the actuator control volume. The graphs show the response into a typical 5 litre volume; the response is very similar into loads up to 10 litres.

The instrument is inherently insensitive to shock and positional effects, and may be mounted directly upon a control valve if desired.

A mounting bracket is provided for surface mounting, or the instrument may be fixed directly to rigid pipework, or may be 2" (50mm) yoke mounted.

The electronics are enclosed within a watertight housing with seals for the span and zero adjustments.

INSTRUMENT MOUNTING

The converter would normally be mounted onto a suitable surface using the mounting bracket provided. A yoke mounting set for 50mm (2") pipe is available. A dimensional drawing is supplied.

These converters can be used mounted in any orientation, although an upright position would usually be most suitable. They are relatively unaffected by shock although severe vibration environments should be avoided.

These instruments are protected against environmental effects to a level of IP65. Sensible positioning should be used if the local environment is severe.

The instruments are compensated against temperature changes and will operate within the range -10 to +60°C. To obtain maximum life they should be mounted in a position where excessive temperature variations are avoided if possible.

NOTE: The pneumatic exhaust is routed through slots/holes in the side of the instrument. These should not be blocked.

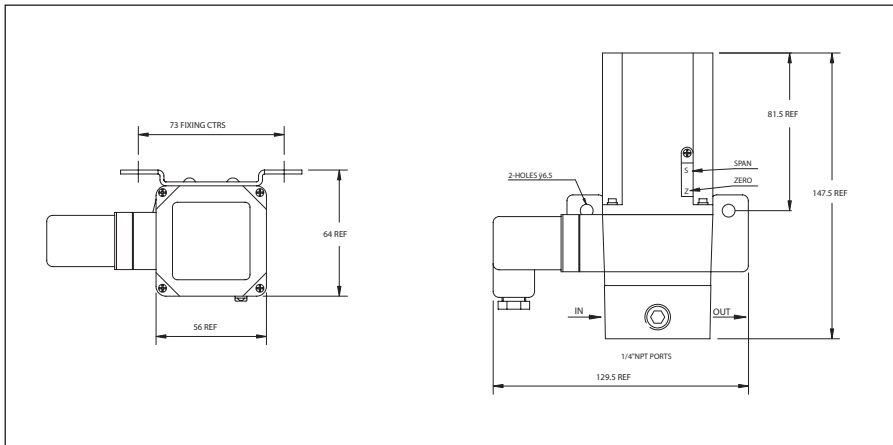


Diagram 3: Dimensional Drawing

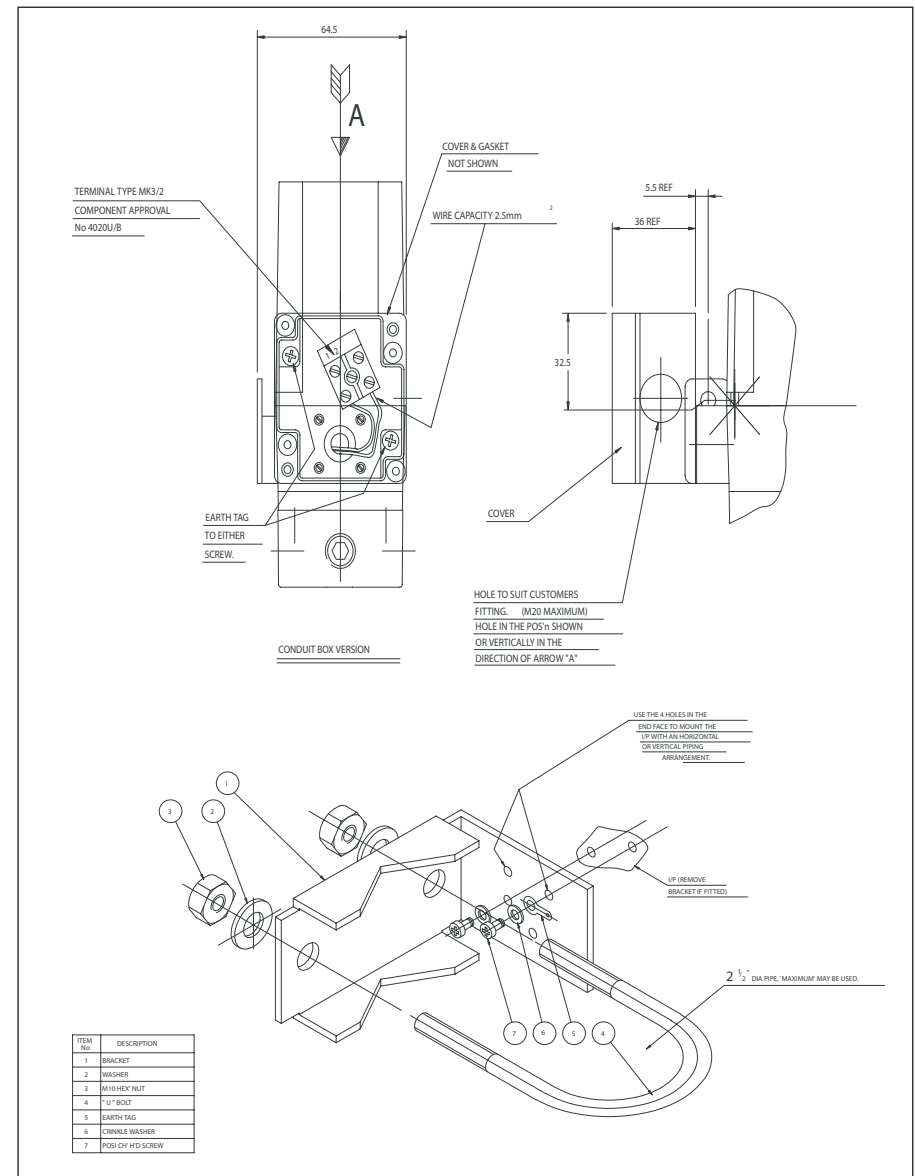


Diagram 4: Pipe Bracket and Connector Block

| ITEM NO. | DESCRIPTION |
|----------|------------------|
| 1 | BRACKET |
| 2 | WASHER |
| 3 | M10 HEX NUT |
| 4 | 1/2\"/> |
| 5 | EARTH TAG |
| 6 | CRINKLE WASHER |
| 7 | POSI CH HD SCREW |

PNEUMATIC INSTALLATION

These instruments are designed to operate only with clean, dry, oil free instrument grade air to BS6739:1986 or ANSI/ASA-57.3 1975.

| | |
|--------------|---|
| Dew Point: | At least 10°C below minimum anticipated ambient temperature |
| Dust: | Filtered to below 5 micron. |
| Oil Content: | Not to exceed 1 ppm mass. |

The supply pressure to the instrument should normally be set to 2 bar (30 psig) $\pm 10\%$ for the low pressure version and 9 bar (135 psig) $\pm 10\%$ for the high pressure version.

Operation is possible with input pressure between 25 and 100 psig (low pressure) and 125 to 150 psig (high pressure).

The inlet and outlet ports are threaded 1/4" NPT female and suitable fittings should be used. For most installations 6mm (1/4") pipe will be adequate. If a large actuator, high flow rates or long pipework is necessary then a larger diameter should be used.

Plastic tubing e.g Nylon, is preferable where circumstances permit, since it is normally very clean internally.

Two gauge ports are provided to facilitate direct mounting of a pressure gauge. To use one of these ports remove the plug (1/4" Hexagon Key) and connect the gauge. These ports are also threaded 1/4" NPT female.

Under no circumstances should PTFE tape be used for sealing the fittings as this tends to shred small particles which find their way into the instruments causing malfunctions.

The use of a soft setting anaerobic hydraulic seal is recommended, (eg. Loctite-Hydraulic Seal 542). Follow the manufacturer's recommendations. In particular do not use an excessive amount as this will not set and could find its way into the instrument.

If the air supply is not adequate quality this can normally be achieved by the use of Norgren air regulator/filter set. Contact Norgren Leeds for details.

These types can be supplied in a variety of arrangements; contact your local Norgren distributor to determine suitable configurations and order numbers. Suitable pipe fittings can also be supplied from the same source.

ELECTRICAL INSTALLATION

The electrical connections should be made as shown in the General Installation Diagram. The instrument is protected against reverse polarity, however no operation is possible in this condition.

The Type 422 Converter approximates to a constant voltage load of approximately 6 Volts across the loop terminals, ie. it is equivalent to a 6V zener diode. For a closer representation of the load see the Input Equivalent Circuit.

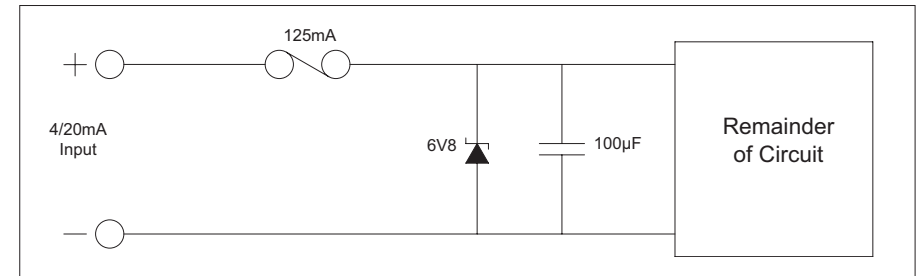


Diagram 5: Input Equivalent Circuit

It is essential that the loop controller be capable of providing a constant current in the range 4-20mA with an output voltage of a least 6 volts.

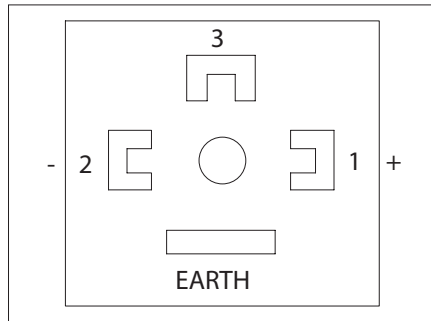
Voltage output controllers are entirely unsuitable for the 422 converter and could severely damage the electronic circuits.

The available output voltage of a current loop controller will be reduced by the effects of the loop cable resistance. If in doubt connect a resistor of value $(300\Omega + \text{Loop Resistance})$ across the output of the controller and measure the current with a suitable milliammeter. At the 100% setting of the controller a current of 20mA should be available.

The connector provided with the instrument conforms to DIN 43650 standards and is suitable for cable diameters of 6-10mm. It is weather protected to IP65 if correctly installed; a sealing gasket and retaining screw are available and should be used.

Alternative options (which should have been specified at the time of order) include an external junction box with 1/2" NPT conduit connection, 20mm (M20) threaded hole, or PG11 or PG13.5 trumpet type connections.

CONNECTOR WIRING



View looking at Pins of Instrument

Diagram 6: Connector Wiring

To install the cable remove the central fixing screw and pull the connector off the instrument. The centre block of the connector can now be released by pushing the clip which can be seen in the retaining screw hole.

Connect the two wires as show in the installation diagram and reassemble. Note that the cover may be replaced in one of four orientations to suit local installation requirements.

Tighten up the cable clamp fully, ensuring that the sealing washer compresses adequately onto the cable sheath.

The connector can now be pushed onto the instrument terminals with the gasket between the connector and instrument. Insert the retaining screw and tighten sufficiently to make the gasket seal. **DO NOT OVER TIGHTEN.**

Type 422 Converters are fully isolated and earthing is not necessary, however, it is recommended that any screen or cable sheath be connected to the connector earth terminal to achieve maximum RFI immunity. If earth bonding is required to meet local installation practice, an Earth tag is provided on the mounting bracket.

HAZARDOUS AREA VERSIONS

The instrument is available in versions suitable for use in hazardous areas. The hazardous area versions carry information on their certification on a special label. This gives an indication to the correct areas of use.

Installation of any hazardous area equipment should be made in accordance with BSEN60079-14 and also of course to the installation and operating instructions provided for each instrument. Norgren cannot be held responsible for incorrect installation. If a certified instrument should fail, no attempt should be made by the user to affect repair. The unit should be returned to the factory. Norgren cannot be held responsible for any modifications to or repair of a certified instrument as this may invalidate the certified design.

Intrinsic Safety

The Type 422 is available in versions designed to intrinsic safety specifications (EN50020). It is flexible in terms of the systems it can be connected into; that is which barriers/interface units may be used within the variations allowed on the systems certificate. The unit is certified to intrinsic safety standard 'ia', for use in gas group IIC, and has a temperature class of T4

Type 'nL'

The Type 422 has also been designed to Type 'nL' specification. The unit can be commissioned and adjusted without the need for disassembly. Adjustments and connections should only be made under flammable gas free conditions. Any attempt to disassemble the unit may invalidate the Type 'nL' specification.

The unit is certified to EN50021 (Type 'nL') for use in group IIC has a temperature classification of T6.

CALIBRATION

The Type 422 series instruments are designed for continuous operation without the necessity for routine maintenance. The main source of failure has been found to be inadequate air quality, allowing contaminants to block internal orifices. Air filtering is included within the instrument but cannot cope with sustained poor air quality which will always ultimately lead to failure.

The recommendations in the Pneumatic Installation section should be rigorously observed.

Calibration

A pull-off plastic cover allows access to the span and zero trimpots without the removal of the instrument cover. An accurate source of 4-20mA and pressure gauge are required. These should be good quality with an accuracy of 0.1% or better. The current source should be checked to ensure that it has at least 6V output compliance. Air supply pressure should be set between 20-100 psig (1.5-7 bar) preferably about 30 psi (2 bar). Connect the instrument as described in the Installation section.

a) Standard range instrument:

- Set the current to the minimum e.g 4.00mA – the instrument outlet should be at the minimum e.g 3.00 ±0.05 psig (0.200 ±0.003 bar). Adjust the Zero trimpot if necessary.
- Set the current source to the maximum 20.00mA – the instrument outlet should be at the maximum e.g 15.00 ±0.05 psig (1.00 ±0.003 bar). Adjust the span trimpot if necessary.

If either Span or Zero controls are adjusted it will be necessary to repeat the above steps until both ends are within the calibration limits.

When changing between 4mA and 20mA the response time can be observed and should be approximately 6 seconds in either direction if the load volume does not exceed a few litres.

b) Reverse action models:

This option is available on special order, field alteration is not possible. Calibration is the reverse of the above procedure.

c) High pressure models:

As above procedure with supply pressure between 8.7 to 10 bar (125-150 psi) and adjustment limits 0.2 and 8 bar (3-120 psi).

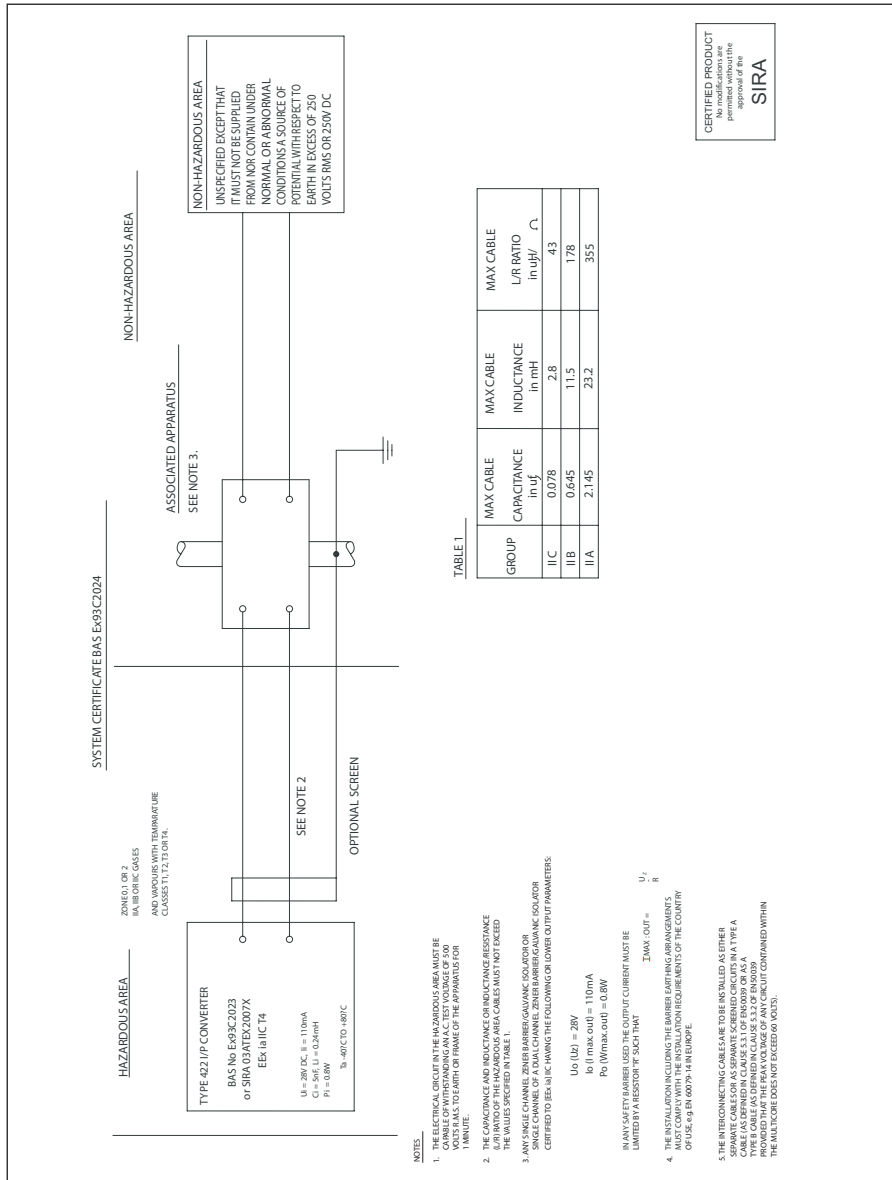


Diagram 7: Intrinsically Safe Control Drawing (SIRA)

MAINTENANCE

Norgren operates an efficient repair service for defective instruments. In all cases repair should only be attempted by skilled, qualified personnel who are familiar with this type of instrument.

User maintenance is generally not to be recommended for the following reasons:-

- The instrument uses surface mount electronics which cannot easily be repaired without specialised equipment.
- Air leaks may be introduced which could upset the performance of the instrument.
- Any foreign matter introduced into the pneumatics, particularly the Reedex valves, may cause malfunction. This may not be immediately apparent, only occurring later in the life of the instrument.

Access to the electronics compartment is by removal of the top cover by means of the four screws located in the lower corners of the body.

It is possible to replace Reedex valves and surface mount PCB with transducer. Reference should be made to the Exploded View Diagram on page 16.

NOTE: The order of dis-assembly and assembly of the PCB is important if damage to the transducer is to be avoided. Excess stress on the transducer connections may cause its failure.

Dis-assembly

The electronics assembly consists of 2 PCB's; the main PCB with most components including the transducer and the small interconnections PCB attached to it. The two PCB's are joined by a 7 way strip plug/socket and two snap-on pillars.

To separate the PCB's, separate the pillars and the plug/socket. The main PCB is held in a plastic bracket, which also clamps the pressure transducer and supports the Reedex valves. This bracket can be removed by unscrewing the two fixing screws through the access holes in its top, after removing the plastic tube to the supply Reedex valve. Both Reedex valves can now be removed, desoldering their leads if replacement is required. The PCB can be removed from the bracket by slightly springing apart the retaining clamps and pulling it out away from the bracket.

Assembly

This is the reverse of Dis-assembly. First spring apart the bracket clips and insert the main PCB. Next position the Reedex valves, ensuring that they are the right way up and the seals are inserted in their corresponding ports in the converter body casing. Position the bracket so that the Reedex valves protrude through their respective holes, and the pressure transducer is correctly located onto the casting. Replace the two fixing screws through the access holes in the bracket; these must be sufficiently tight to prevent leakage around the transducer 'O' ring. Replace the plastic pipe onto the supply Reedex valve. Finally reconnect the small PCB by inserting the socket into the corresponding lug and reinserting the spacing pillars.

Fuse

An internal fuse, 125mA rating, type TR5 series is fitted to protect the electronics against severe overload, which can only occur if the converter has been connected to a low impedance voltage source. If it is suspected that the fuse is blown, test for continuity with a resistance meter; the fuse is soldered in position and must be replaced with care. The fuse is replaced with a wire link on intrinsically safe certified instruments. If the supply is connected in reverse, the fuse will not blow for a 4-20 mA signal, and the instrument will not be damaged.

If the lower, pneumatic, portion of the instrument is dis-assembled take careful note of the orientation of the parts. There are internal air transfer passages which will be obstructed if correct orientation is not observed.

The spacer (6) includes a filter to avoid contamination of the Reedex valve (4).

Problems with the electronic circuitry are difficult to diagnose apart from obvious continuity failures of the interconnections. Other electric faults will probably require board replacement. A circuit diagram is included for use if suitable test facilities and personnel are available.

Quick check for Leaks and Blockages

With the unit operating normally at 100% output, remove the signal input and observe the outlet pressure reading. The outlet pressure should remain constant.

If the outlet pressure rises then there is a leak from the inlet to the control volume. This is most likely to be caused by contamination in the Reedex.

If the pressure falls there is a leak from the control volume and could be due to contamination of the exhaust Reedex.

The normal performance of the instrument will not be seriously affected by leaks in either direction of a few percent per second although the failfreeze function will not be usable. However, leaks approaching this limit should be investigated as they may indicate an incipient problem.

DESCRIPTION OF OPERATION

The principle of operation is shown in the schematic. Control of outlet pressure is achieved by variation of pressure in the control volume.

The steady state position of the pistons is such that both valves are closed, thus minimising the air consumption. (The diagram shows both valves open for clarity).

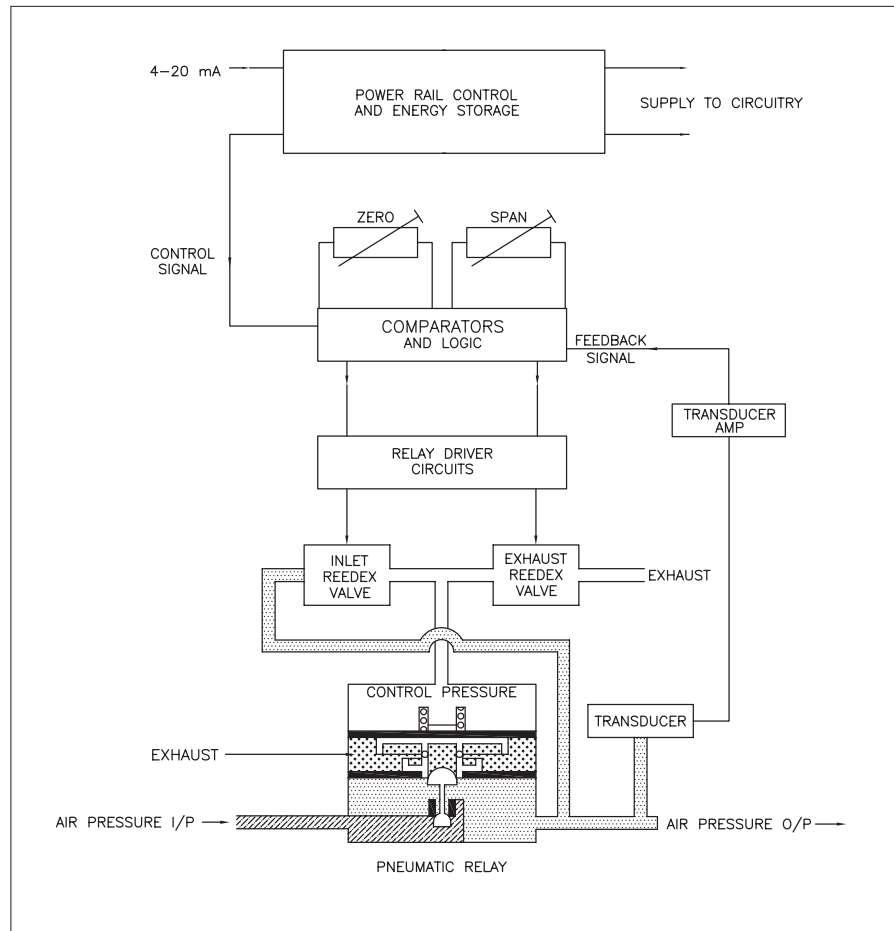


Diagram 8: Operation Schematic

Increasing the control volume pressure causes the pistons to move downwards, opening the inlet valve. Supply air flows to the outlet and the outlet pressure starts to increase. This increases the force on the bottom of the pistons. The inlet valve returns to the closed position when a state of pressure balance has been re-established.

Reducing the control volume pressure causes the pistons to rise and open the relief valve to allow the outlet pressure to decrease. When pressure balance is once more achieved the relief valve is closed.

Pressure control is achieved by the use of two Reedex precision high speed solenoid valves. These valves operate similarly to an electrical reed relay in which a flexible reed can be deflected by a magnetic field generated in a coil. In the Reedex the reed has a small orifice which is normally closed by a seal. Deflection of the reed causes the orifice to be opened.

In the steady state condition, both the inlet and outlet Reedex valves are closed. Thus a constant average pressure is maintained in the control volume and hence at the outlet port.

The outlet pressure is constantly monitored by the electronics via the transducer. The pressure signal produced is compared with the demand current signal to produce an error signal. The width of the pulse sent to the Reedex is proportional to this error signal.

If the outlet pressure changes or the signal current alters then the length of the pulse sent to the appropriate Reedex valve changes causing the average pressure in the control volume to rise or fall as required. This causes air to be supplied or exhausted to the control volume with a subsequent change in the outlet pressure.

In order to obtain enough power to operate the Reedex, the signal current is stored in a capacitor during the period between pulses. Excess current is dumped through a zener diode. When a signal current is first applied to the instrument there may be a short delay (a few seconds), whilst the capacitor charges, before control of pressure is achieved.

When the signal current fails neither Reedex valve is able to open and the pressure remains at the last set point value, thus ensuring fail-free operation.

SPARE PARTS

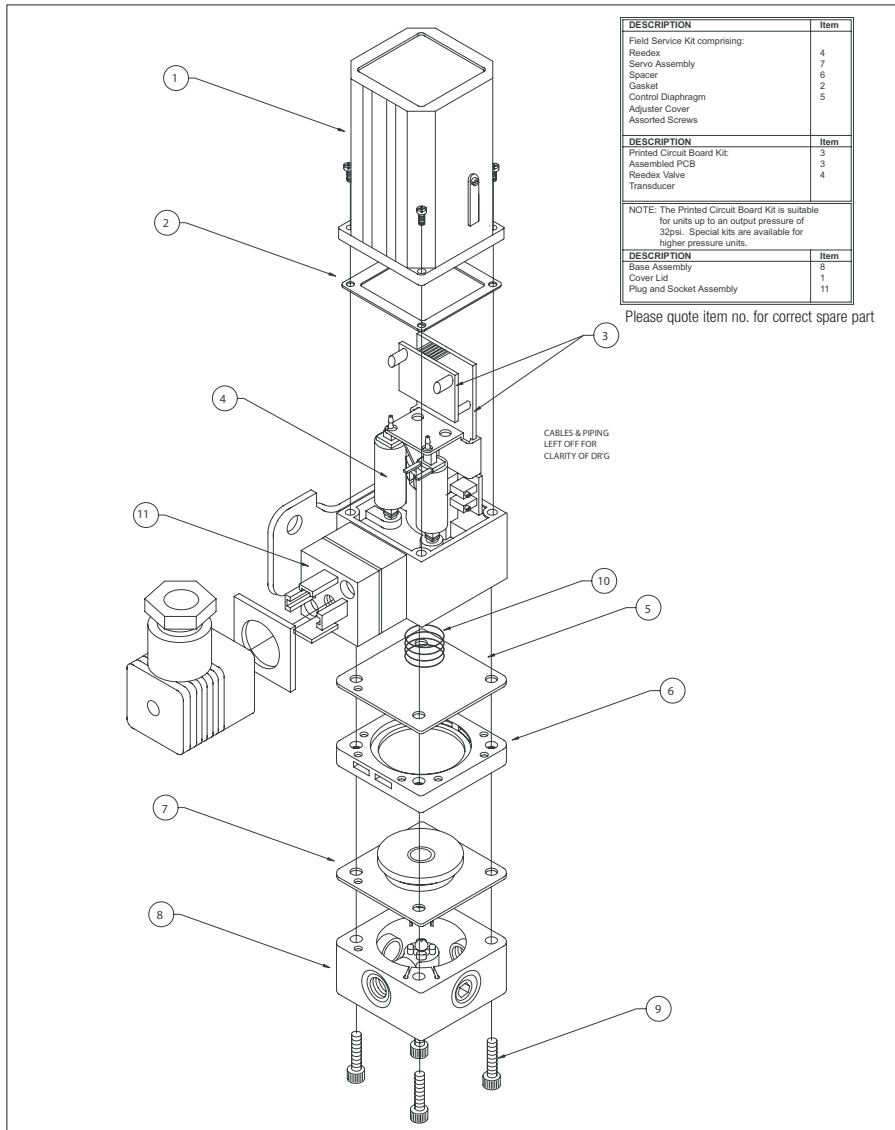


Diagram 9: Exploded View

Note: This is a typical assembly; some parts may alter for specific product variations.

TROUBLESHOOTING GUIDE

| Problem | Possible Causes | Suggested Action |
|--|---|--|
| No outlet pressure Reedex not clicking. | Reversed current polarity or faulty connections. | Check signal with milliammeter. (No current if input reversed). |
| | Faulty internal wiring | Repair |
| | Faulty Reedex | Replace |
| | Insufficient voltage | Check for approx 6V across terminals. |
| | Blown fuse | Replace |
| No Outlet pressure (Reedex Clicking) | No air supply. | Check pneumatic installation |
| | Blocked internal filter | Replace spacer assembly. |
| Continuous full output | Incorrect electrical signal | Check with milliammeter |
| Maximum output not available. | Supply pressure too low | Check and adjust supply |
| | Calibration error | Re-calibrate. |
| Delay on start-up | A delay on a few seconds is normal. | None |
| Erratic operation at low pressures. | Signal currents below 4mA are insufficient for normal operation | Increase current. May need re-calibration. |
| Erratic at all pressures. | Controller cannot provide 6V continuously. | Reduce loop resistance or change controller. |
| Constant output pressure | The instrument may be in fail-freeze mode | Check electrical continuity Check that current source can supply 6V |

SPECIFICATIONS

| | |
|------------------------|--|
| Media | Oil free dry air filtered to 5 micron |
| Input Signal | 4-20mA, Two Wire |
| Output Signal | 0.2-1 bar (3-15 psi) low pressure 0.2-8 bar (3-120 psi) high pressure |
| Control Characteristic | Linear, Pressure Proportional to signal Reverse action model to special order |
| Supply Pressure Range | 1.5-7 bar (20 to 100 psi) low pressure 8.7-10 bar (125-150 psi) high pressure |

| | |
|------------------------------------|----------------------------|
| Preferred Range (low pressure) | 1.7-2.2 bar (25 to 35 psi) |
| Operating Temperature Range | -20°C to +70°C |
| Compensated Temperature Range | -10°C to +60°C |
| Environment Protection | IP65 |
| RFI/EMI Protection is Incorporated | |

TYPICAL PERFORMANCE FIGURES

| | |
|------------------------------|---|
| Accuracy | ±0.5% span (low pressure) ±1.0% span (high pressure) |
| Supply Pressure Effect | Negligible |
| Temperature Effect | Typically < ± 1% fs over compensated range, span and zero |
| Response Time (10-90%) | 6 seconds (0.2-1 bar version) |
| Flow Capacity | up to 300nL/min (10 scfm) |
| Minimum outlet Pressure | < 140 mbar (2psi) |
| Air Consumption (typical) | 200cc/min (low pressure) 400cc/min (high pressure) |
| Start Up Time from Power up | < 6 seconds into 5 Litres |
| Loop Voltage Drop | 6 Volts ± 0.5V |
| Electrical Isolation | Tested to 500V DC |
| Reverse Protection | 125 mA |
| Over Current Protection | 125 mA |
| Long Term Stability | < 0.5% Span pa |
| Rangeability | < ± 20% on Zero & Span Trim pots |
| Life | Better than 1,000,000 f.s. cycles |
| Vibration / Shock Resistance | Negligible effect for vibration level up to 3g, 5-500Hz |

SPECIAL CONDITIONS FOR SAFE USE

Instructions specific to Hazardous Area Installations (reference European ATEX Directive 94.9.EC, Annex II, 1.0.6)

The following instructions apply to the intrinsically safe **Type 422 I/P Converter** covered by **Certificate Numbers** :-

Sira 03ATEX2007X
Sira 03ATEX4103X

1. Certification marking is as follows :-



CERTIFICATION MARKING LABEL
FOR I.S. Sira03ATEX2007X



CERTIFICATION MARKING LABEL
FOR Type nL Sira03ATEX4103X

2. The intrinsically safe version of the equipment may be used in zones 0, 1 and 2 with flammable gases and vapours with apparatus groups IIA, IIB & IIC and with temperature classes T1, T2, T3 and T4.
3. The type n version of the equipment may be used in zone 2 only with flammable gases and vapour with apparatus groups IIA, IIB & IIC and with all temperature classes.
4. The equipment should not be used outside the stated ambient range.
5. **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after Certificate Number)
The 'X' suffix to the certificate number indicates that the certificate contains one or more special conditions for safe use. Those installing or inspecting the equipment should have access to this section of the certificate. The equipment has not been assessed as a safety-related device (as referred to by Director 94/9/EC Annex II, clause 1.5)

Certificate Sira 03ATEX 2007X

5.1 Under certain extreme circumstances, the non-metallic cover may generate an ignition-capable level of electrostatic charge. Therefore, when it is used for applications that specifically require group II, category 1 equipment, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment shall only be cleaned with a damp cloth.

Certificate Sira 03ATEX 4103X

5.2 The installer shall take steps to ensure that the rated voltage is not exceeded in service.

5.3 The plug-and-socket interface gasket must be correctly secured in place before the equipment is energised.

5.4 The conductors of the external cable fitted to the connector shall be terminated with ferrules.

6. Installation of this equipment shall be carried out by suitably-trained personnel in accordance with the applicable code of practice.
7. Repair of this equipment shall be carried out by the manufacturer or in accordance with the applicable code of practice.

SPECIAL CONDITIONS FOR SAFE USE

Instructions spécifiques aux installations des zones dangereuses (reference: Directive ATEX Européenne 94/9/EC, Annexe II, 1.0.6)

Les instructions suivantes s'appliquent aux Convertisseurs Intrinsèquement Sûr de Type 422 I/P couverts par les numéros de certificats : _

Sira 03ATEX 2007X
Sira 03ATEX 4103X

- Les Etiquettes de Certification sont les suivantes:



CERTIFICATION MARKING LABEL
FOR I.S. Sira03ATEX2007X



CERTIFICATION MARKING LABEL
FOR Type nL Sira03ATEX4103X

- La version intrinsèquement sûre du matériel peut être utilisée dans les zones 0, 1 et 2 avec de gaz et des vapeurs inflammables et des appareils de groupes IIA, IIB et IIC et à de niveaux de températures T1, T2, T3 et T4.
- Le Type version n du matériel peut être utilisé dans la zone 2 uniquement avec des gaz et de vapeurs inflammables des groupes IIA, AAB et IIC et à tous les niveaux de température.
- Le matériel ne doit pas être utilisé hors de la température ambiante désignée.
- CONDITIONS SPECIALES POUR UNE UTILISATION SURE (indiquées par un X après le Numéro du Certificat). Le suffixe 'X' apposé au numéro de certificat indique que le certificat contient une ou plusieurs conditions spéciales pour une utilisation sûre. Les personnes installant ou inspectant ce matériel doivent avoir accès à cette partie du certificat. Ce matériel n'est pas considéré comme une installation liée à la sécurité (comme la directive 94/9/EC, Annexe UU, clause 1.5 y fait référence).

Certificat Sira 03ATEX 2007X

5.1 Dans certaines circonstances extrêmes, le couvercle non métallique peut générer un niveau de charge électrostatique susceptible de s'enflammer. Par conséquent, lorsqu'il est utilisé pour des applications qui nécessitent spécifiquement un équipement de groupe II, catégorie 1, le matériel ne doit pas être installé dans un endroit où les conditions externes sont conductrices de la formation d'une charge électrostatique sur ces surfaces. De plus, le matériel ne peut être nettoyé qu'avec un tissu humide.

Certificat Sira 03 ATEX 4103X

- L'installateur doit prendre des mesures pour garantir que la tension estimée n'est pas dépassée lors de l'utilisation.
- L'interface prise-douille doit être correctement sécurisée sur place avant de mettre le matériel sous tension.
- Les conducteurs du câble externe monté sur le connecteur doivent être terminés par des viroles.
- L'installation de ce matériel doit être effectuée par un personnel qualifié de manière appropriée conformément au code de pratiques applicable.
- Les réparations sur ce matériel doivent être effectuées par le fabricant ou conformément au code de pratiques applicable.

SPECIAL CONDITIONS FOR SAFE USE

Spezielle Anweisungen Für Installationen in gefährlichen Bereichen (siehe europäische ATEX-Richtlinie 94.9.EG, Anhang II, 1.0.6.)

Die nachfolgenden Anweisungen gelten für den in sich sicheren Umrichter, **Modell 422 I/P**, für die folgenden **Urkundennummern** gelten:

Sira 03ATEX 2007X
Sira 03ATEX 4103X

- Das Markierungsschild der Zertifizierung sieht wie folgt aus:



CERTIFICATION MARKING LABEL
FOR I.S. Sira03ATEX2007X



CERTIFICATION MARKING LABEL
FOR Type nL Sira03ATEX4103X

- Die in sich sichere Ausführung der Maschine darf in Zonen 0, 1 und 2 mit leicht entzündlichen Dünsten mit den Apparategruppen IIA, IIB & IIC und mit Temperaturklassen T1, T2, T3 und T4 betrieben werden.
- Die Type n- Ausführung der Maschine darf nur mit leicht entzündlichen Gasen und Dünsten mit den Apparategruppen IIA, IIB & IIC und mit Temperaturklassen in Zone 2 eingesetzt werden.
- Die Maschine sollte nicht außerhalb des angegebenen Umgebungstemperaturbereichs betrieben werden.
- BESONDERE BEDINGUNGEN FÜR DEN SICHEREN EINSATZ (gekennzeichnet durch ein X nach der Urkundennummer)

Ein X als Suffix der Urkundennummer zeigt, dass die Urkunde eine oder mehrere besondere Bedingungen für den sicheren Gebrauch beinhaltet. Die Maschine wurde nicht als sicherheitsbezogenes Gerät definiert (nach Richtlinie 94/9/EG Anhang II, Abschnitt 1.5).

Urkunde für Sira 03ATEX 2007X

5.1 Unter gewissen extremen Bedingungen kann die nicht-metallische Abdeckung ein zündfähiges Level der elektrostatischen Ladung hervorrufen. Daher, wenn sie bei Anwendungen eingesetzt wird, für die speziell Maschinen der Gruppe II, Kategorie 1 benötigt werden, darf die Maschine nicht an einem Standort aufgestellt werden, wo die äußeren Bedingungen den Aufbau einer elektrostatischen Ladung auf solchen Flächen fördern. Des Weiteren ist die Maschine nur mit einem feuchten Tuch zu reinigen.

Urkunde für Sira 03ATEX 4103X

- Der Installateur wird Maßnahmen einleiten, um sicherzustellen, dass die Nennspannung beim Betrieb nicht überschritten wird.
- Die Schnittstellendichtung mit Steckverbindung muss richtig an Ort und Stelle befestigt sein, bevor die Maschine stromführend gemacht wird.
- Die Stromleiter des am Verbindungsstück angeschlossenen externen Kabels werden mit Pressklammern abgeschlossen.
- Die Installation dieser Maschine wird vom geeigneten geschulten Personal nach den anwendbaren üblichen Praktiken durchgeführt.
- Die Reparatur dieser Maschine wird vom Hersteller bzw. nach den anwendbaren üblichen Praktiken durchgeführt.

SPECIAL CONDITIONS FOR SAFE USE

Istruzioni specifiche per installazioni in zone a rischio
(secondo la Direttiva Europea ATEX 94/9/CEE, Allegato II, 1.0.6.)

Le istruzioni seguenti si riferiscono al **Convertitore Tipe 422 I/P** intrinsecamente sicuro coperto dai **certificati numero:-**

Sira 03ATEX 2007X
Sira 03ATEX 4103X

1. Il Marchio di certificazione è il seguente:



CERTIFICATION MARKING LABEL
FOR I.S. Sira03ATEX2007X



CERTIFICATION MARKING LABEL
FOR Type nL Sira03ATEX4103X

2. La versione dell'apparecchiatura intrinsecamente sicura può essere utilizzata nelle zone 1, 1 e 2 cc gas infiammabili e vapori con apparecchiature dei gruppi IIA, IIB & IIC e con temperature di classe T1, T2, T3 e T4
3. La versione dell'apparecchiatura di Tipo n può venire utilizzata solo nella zona 2 con gas infiammabili e vapori con apparecchiature dei gruppi IIA, IIB & IIC e con temperature di ogni classe
4. L'apparecchiatura non deve essere utilizzata al di fuori del tipo di ambiente stabilito.
5. **SPECIAL CONDIZIONI PER UN USO SICURO** (indicati da una X dopo il Numero di Certificato)

Il suffisso 'X' al numero di certificato indica che il certificato contiene una o più condizioni speciali per un uso sicuro. Chi installa o ispeziona l'apparecchiatura deve aver accesso a questa sezione del certificato. L'apparecchiatura non è stata accertata come dispositivo di sicurezza (come indicato dalla Direttiva 94/9/CEE Allegato II, clausola 1.5)

Certificato Sira 03ATEX 2007X

- 5.1 In certe circostanze estreme, la copertura non metallica può generare un livello di carica elettrostatica capace di autoaccensione. Quindi, quando viene utilizzata per applicazioni che richiedono specificamente il gruppo II, apparecchiatura categoria 1, questa non dovrà essere installata in luoghi dove le condizioni esterne facilitano il generarsi di cariche elettrostatiche su tali superfici. Inoltre, l'apparecchiatura non dovrà essere pulita con uno straccio bagnato.

Certificato Sira 03ATEX 4103X

- 5.2 L'installatore prenderà gli opportuni passi per assicurarsi che il voltaggio stabilito non venga superato durante il servizio.
- 5.3 L'interfaccia delle prese di corrente e delle spine deve essere protetta in modo corretto prima di collegare l'apparecchiatura alla rete.
- 5.4 Il conduttore del cavo esterno montato al connettore dovrà terminare con delle bocche.
6. L'installazione e la manutenzione di questa apparecchiatura sarà eseguita da personale opportunamente addestrato secondo il relativo codice di comportamento.
7. La riparazioni di questa apparecchiatura verranno indicate dal relativo codice di comportamento.

SPECIAL CONDITIONS FOR SAFE USE

Instrucciones específicas a las instalaciones peligrosas del area
(referencia ATEX Europeo 94/9/EC Directiva, Anexo II, 1.0.6.)

Las instrucciones siguientes se aplican al Convertidor intrínseco seguro del **Tipo 422 I/P** indicado por los números del certificado:

Sira 03ATEX 2007X
Sira 03ATEX 4103X

1. La Etiqueta de Certificación es como sigue:



CERTIFICATION MARKING LABEL
FOR I.S. Sira03ATEX2007X



CERTIFICATION MARKING LABEL
FOR Type nL Sira03ATEX4103X

2. La versión intrínseco segura del equipo se puede utilizar en las zonas 0, 1 y 2 con los gases y los vapores inflamables de los grupos IIA, IIB y IIC del aparato y con los tipos de temperatura T1, T2, T3 y T4
3. La versión del tipo n del equipo se puede utilizar en la zona 2 solamente con los gases y los vapores inflamables de los grupos IIA, IIB y IIC del aparato y en todos los tipos de temperatura
4. El equipo no se debe utilizar fuera de la gama ambiente indicada
5. **CONDICIONES ESPECIALES PARA SU USO SEGURO** (señalado con una X después del Número del Certificado) El sufijo 'X' con el número del certificado indica que el certificado contiene una o más condiciones especiales para su uso seguro. Los técnicos que instalan o que examinan el equipo deben tener acceso a esta sección del certificado. El equipo no se ha determinado como dispositivo relativo a la seguridad (según lo referido por el anexo II Directivo 94/9/EC, clausula 1.5)

Certificado Sira 03ATEX 2007X

- 5.1 Bajo ciertas circunstancias extremas, la cubierta no metálica puede generar un nivel de ignición capaz de provocar una carga electrostática. Por lo tanto, cuando se utiliza para los usos que requieren específicamente al grupo II, el equipo de la categoría 1, el equipo no será instalado en una localización donde por las condiciones externas se pudiese producir una acumulación de carga electrostática en tales superficies. Además, el equipo se limpiará solamente con un paño húmedo.

Certificado Sira 03ATEX 4103X

- 5.2 El instalador tomarán medidas para asegurarse de que el voltaje clasificado no está excedido en servicio.
- 5.3 La junta del interfaz de la caja del enchufe se debe asegurar correctamente en su lugar antes de que se energice el equipo.
- 5.4 Los conductores del cable externo conectado al conector serán rematados con férulas.
6. La instalación de este equipo será realizada por personal formado y especializado de acuerdo con código de práctica aplicable.
7. La reparación de este equipo será realizada por el fabricante o de acuerdo con el código de práctica aplicable.

EC DECLARATIONS

EC DIRECTIVE 89/336/EEC (EMC)

DECLARATION OF CONFORMITY

Watson Smith declares under our sole responsibility that the product listed below (and its derivatives listed in the report EMC 42201)

Product: Type 422 I/P Converter
Manufactured by: Watson Smith Instrumentation
 Norgren Ltd.
 Cross Chancellor Street.
 Leeds, LS6 2RT
 England

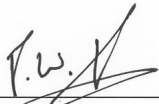
Conforms with the protection requirements of Council Directive 89/336/EEC (amendments 92/31/EEC and 93/68/EEC) on the approximation of the laws of the Member State relating to electromagnetic compatibility SI 2372 : 1992 (amendment SI 3080 : 1994).

Representative samples of the Type 422 I/P Converter have been tested and evaluated (Report EMC 42201) in accordance with:

BS EN 50081-2 : 1994 Electromagnetic Compatibility
 Generic Emission Standard
 Part 2: Industrial Environment

BS EN 50082-2 : 1995 Electromagnetic Compatibility
 Generic Immunity Standard
 Part 2: Industrial Environment

to demonstrate compliance with Council Directive 89/336/EEC (amendments 92/31/EEC and 93/68/EEC).

Signed:  _____ **Date:** 11/05/05

Name: P. Hartley

Position: Managing Director

Document No. 2005-039A
 Date 25 Oct 96
 Re-issued: 04 May 05

EC DECLARATIONS

EC DIRECTIVE 94/9/EC (ATEX)

DECLARATION OF CONFORMITY

Watson Smith declares under our sole responsibility that the product listed below complies with the relevant provisions of Directive 94/9/EC of 23 March 1994.

Product: Type 422 I/P Converter
Manufactured by: Watson Smith Instrumentation
 Norgren Ltd.
 Cross Chancellor Street
 Leeds, LS6 2RT
 England
Notified Body: Sira Certification Service (0518)
 Rake Lane
 Ecclestone
 Chester, CH4 9JN
 England

Conformity has been demonstrated with reference to the following documentation:

EC Type Examination Certificate: **Sira 03ATEX2007X** dated 2nd Aug 2003
Sira 03ATEX4103X dated 2nd Aug 2003
 Quality Assurance Notification: **Sira 02ATEX M189** dated 9th Aug 2002

Compliance with the Essential Health & Safety Requirements has been assessed by reference to the following standards:

EN 50014: 1997 (plus amendments A1&A2)
EN 50020: 2002
EN 50021: 1999
EN 50284: 1999

Signed:  _____ **Date:** 11/05/05

Name: P. Hartley

Position: Managing Director

Document No. 2005-038A
 Date 01 Aug 03
 Re-issued 04 May 05