

# Ultrasonic Transducers

XPS

Quick Start Manual • 12/2013



**SIEMENS**



# Echomax XPS Operation Manual

This manual outlines the essential features and functions of the Echomax XPS Series transducers. This manual, and the *Transducer Applications Manual*, are also available on our website: [www.siemens.com/processautomation](http://www.siemens.com/processautomation). Printed copies are available from your local Siemens Milltronics representative.

## Questions about the contents of this manual can be directed to:

Siemens Milltronics Process Instruments  
1954 Technology Drive, P.O. Box 4225  
Peterborough, Ontario, Canada, K9J 7B1  
Email: [techpubs.smpi@siemens.com](mailto:techpubs.smpi@siemens.com)

## European Authorized Representative

Siemens AG  
Industry Sector  
76181 Karlsruhe  
Deutschland

### Copyright Siemens Milltronics Process Instruments 2013. All Rights Reserved

### Disclaimer of Liability

We encourage users to purchase authorized bound manuals, or to view electronic versions as designed and authored by Siemens Milltronics Process Instruments. Siemens Milltronics Process Instruments will not be responsible for the contents of partial or whole reproductions of either bound or electronic versions.

While we have verified the contents of this manual for agreement with the instrumentation described, variations remain possible. Thus we cannot guarantee full agreement. The contents of this manual are regularly reviewed and corrections are included in subsequent editions. We welcome all suggestions for improvement.

Technical data subject to change.

MILLTRONICS is a registered trademark of Siemens Milltronics Process Instruments

## Safety Guidelines

Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.



**WARNING:** relates to a caution symbol on the product, and means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.



**WARNING:** means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

**CAUTION:** means that failure to observe the necessary precautions can result in considerable material damage.

**Note:** means important information about the product or that part of the operating manual.

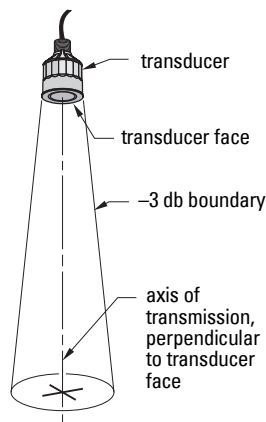
# Introduction

This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

The Echomax XPS series of transducers operate with Siemens Milltronics ultrasonic level monitoring products.

The transducer converts the electrical transmit pulse from the transceiver into acoustical energy. It then converts the acoustical energy of the echo back into electrical energy for the controller.

The transducer face emits acoustical energy radiating outward, decreasing in amplitude at a rate inversely proportional to the square of the distance. Maximum power radiates perpendicularly from the transducer face on the axis of transmission. Where power is reduced by half (-3 dB), a conical boundary centered around the axis of transmission defines the sound beam, the diameter of which is the beam angle.



The XPS transducers have an integrated temperature sensor that reports the air temperature at the transducer to the controller.

## General Guidelines



**WARNING:** Materials of construction are chosen based on their chemical compatibility (or inertness) for general purposes. For exposure to specific environments, check with chemical compatibility charts before installing.

## Product Marking

**Note:** Kynar® polyvinylidene flouride is resistant to attack from most chemicals under the described operating conditions. However, for exposure to specific environments, check with chemical compatibility charts prior to installation.

**WARNING:** This product is designated as a Pressure Accessory per Directive 97/23/EC and is not intended for use as a safety device.



# Pressure Application



## WARNINGS:

- **Never attempt to loosen, remove, or disassemble device housing while vessel contents are under pressure.**
- **Improper installation may result in loss of process pressure.**

## Notes:

- The process connection tag shall remain with the process pressure boundary assembly<sup>1</sup>.

## Pressure Equipment Directive, PED, 97/23/EC

Siemens Level Transmitters with threaded type process mounts have no pressure-bearing housing of their own and, therefore, do not come under the Pressure Equipment Directive as pressure or safety accessories (see EU Commission Guideline 1/8 and 1/20).<sup>1</sup>

## Wiring setups for hazardous area installations

Check the device nameplate, confirm the approval rating, and perform installation and wiring according to your local safety codes.

## Device nameplate

### XPS-10

<b>SIEMENS</b> XPS-10 ULTRASONIC TRANSDUCER Serial No: GYZ / A1034567 Ambient Temp.: -40°C to 95°C V in: 1.77 V r.m.s.; 250 V p I in: 44.2 mA r.m.s. Enclosure: IP66, IP68 Siemens Microtronics Process Instruments, Peterborough		 KCC-REM-549 Echomax	 0518	 II 2 G D Ex mb IIC T4 Gb Ex tb IIC T1.35°C Db SIR A 99ATEX5153X IECEX SIR 13.0009X	<b>Segurança</b>  Ex mb IIC T4 Gb Ex tb IIC T1.35°C Db DNV 12.0077 X	 Class I, Div 2, Group A, B, C, D Class II, Div 1, Group E, F, G Per Dwg.: 0-9650017Z-DI-A Max. Torque: 15 FT-LBS <b>WARNING:</b> Static Hazard, Do Not Rub With Dry Cloth. ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA - VEJA INSTRUÇÕES
--	--	----------------------------	----------	--	--	--

### XPS-15

<b>SIEMENS</b> XPS-15 ULTRASONIC TRANSDUCER Serial No: GYZ / A1034567 Ambient Temp.: -40°C to 95°C V in: 1.77 V r.m.s.; 250 V p I in: 44.2 mA r.m.s. Enclosure: IP66, IP68 Siemens Microtronics Process Instruments, Peterborough		 KCC-REM-549 Echomax	 0518	 II 2 G D Ex mb IIC T4 Gb Ex tb IIC T1.35°C Db SIR A 99ATEX5153X IECEX SIR 13.0009X	<b>Segurança</b>  Ex mb IIC T4 Gb Ex tb IIC T1.35°C Db DNV 12.0077 X	 Class I, Div 2, Group A, B, C, D Class II, Div 1, Group E, F, G Per Dwg.: 0-9650017Z-DI-A Max. Torque: 15 FT-LBS <b>WARNING:</b> Static Hazard, Do Not Rub With Dry Cloth. ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA - VEJA INSTRUÇÕES
--	--	----------------------------	----------	--	--	--

### XPS-30

<b>SIEMENS</b> XPS-30 ULTRASONIC TRANSDUCER Serial No: GYZ / A1034567 Ambient Temp.: -40°C to 95°C V in: 1.77 V r.m.s.; 250 V p I in: 44.2 mA r.m.s. Enclosure: IP66, IP68 Siemens Microtronics Process Instruments, Peterborough		 KCC-REM-549 Echomax	 0518	 II 2 G 1 D Ex mb IIC T4 Gb Ex ta IIC T1.35°C Da SIR A 99ATEX5153X IECEX SIR 13.0009X	<b>Segurança</b>  Ex mb IIC T4 Gb Ex ta IIC T1.35°C Da DNV 12.0077 X	 Class I, Div 2, Group A, B, C, D Class II, Div 1, Group E, F, G Per Dwg.: 0-9650017Z-DI-A Max. Torque: 15 FT-LBS (20 N-m) <b>WARNING:</b> Static Hazard, Do Not Rub With Dry Cloth. ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA - VEJA INSTRUÇÕES
--	--	----------------------------	----------	--	--	---

The ATEX certificate listed on the nameplate can be downloaded from the product page of our website at:

<https://www.automation.siemens.com/w1/automation-technology-transducers-18732.htm>.

Go to **Support > Approvals / Certificates**.

The IECEX certificate listed on the nameplate can be viewed on the IECEX website. Go to: <http://iecx.iec.ch> and click **Certified Equipment**, then search for the certificate number IECEX SIR 13.0009X.

- Refer to *Instructions specific to hazardous area installations (Reference European ATEX Directive 94/9/EC, Annex II, 1/0/6)* on page 4.

<sup>1</sup> The process pressure boundary assembly comprises the components that act as a barrier against pressure loss from the process vessel: that is, the combination of process connection body and emitter, but normally excluding the electrical enclosure.

## Instructions specific to hazardous area installations (Reference European ATEX Directive 94/9/EC, Annex II, 1/0/6)

The following instructions apply to equipment covered by certificate number SIRA 99ATEX5153X.

- 1) For use and assembly, refer to the main instructions.
- 2) The XPS-10 and XPS-15 are certified for use as Category 2GD while the XPS-30 is certified for use as Category 2G 1D per SIRA 99ATEX5153X.
- 3) The equipment may be used with flammable gases and vapors with apparatus group IIC, IIB, and IIA, and temperature classes T1, T2, T3 and T4.
- 4) The equipment has a degree of ingress protection of IP67 and a temperature class of T135 °C and may be used with flammable dusts.
- 5) The equipment is certified for use in an ambient temperature range of -40 °C to +95 °C.
- 6) The equipment has not been assessed as a safety related device (as referred to by Directive 94/9/EC Annex II, clause 1.5): see *Pressure Equipment Directive, PED, 97/23/EC* on page 3.
- 7) Installation and inspection of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (EN 60079-14 and EN 60079-17 in Europe).
- 8) The equipment is non-repairable.
- 9) The certificate numbers have an 'X' suffix, which indicates that special conditions for safe use apply. Those installing or inspecting this equipment must have access to the certificates.
- 10) If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
  - Aggressive substances: for example, acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.
  - Suitable precautions: for example, establishing from the material's data sheet that it is resistant to specific chemicals.

# Specifications

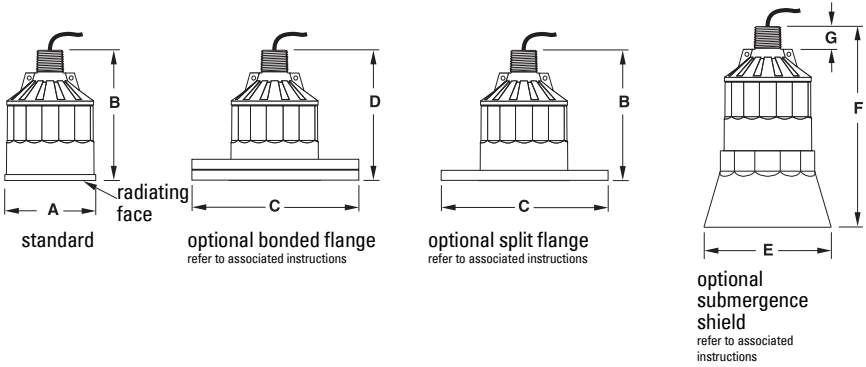
	XPS-10	XPS-15	XPS-30
Measurement Range	0.3 - 10 m (1 - 33 ft)	0.3 - 15 m (1 - 50 ft)	0.6 - 30 m (2 - 100 ft)
Frequency (kHz)	44	44	30
Beam Angle	12°	6°	6°
<b>Environmental</b>			
Location	indoor/outdoor	indoor/outdoor	indoor/outdoor
Maximum Altitude (m)	2000	2000	2000
Ambient Temperature	-40 to 95 °C (-40 to 203 °F)	-40 to 95 °C (-40 to 203 °F)	-40 to 95 °C (-40 to 203 °F)
Pressure	8 bar (120 psi)	8 bar (120 psi)	Europe: 0.5 bar N. America: 15 psi
Pollution Degree	4	4	4
<b>Construction</b>			
Housing	PVDF	PVDF	PVDF
Mounting	1" NPT or BSP conduit connection	1" NPT or BSP conduit connection	1-1/2" NPT or BSP conduit connection
Options	<ul style="list-style-type: none"> <li>factory bonded to suit ANSI, DIN, and JIS standards</li> <li>polyethylene foam facing for dusty or steamy environments</li> <li>submergence shield, where flooding can occur (available only for XPS-10, XPS-15)</li> <li>split flange for field mounting to suit ANSI, DIN, and JIS standards</li> </ul>		
Cable	2-wire twisted pair/braided and foil shielded, 0.5mm <sup>2</sup> (20 AWG), PVC jacket		<ul style="list-style-type: none"> <li>2-wire twisted pair/ braided and foil shielded, 0.5mm<sup>2</sup> (20 AWG), PVC jacket <b>Maximum separation:</b> 100 m (330 ft)</li> <li>RG-62 A/U coax <b>Maximum separation:</b> 365 m (1200 ft)</li> </ul>
Weight**	0.8 kg (1.7 lb)	1.3 kg (2.8 lb)	4.3 kg (9.5 lb)
Maximum Separation	365 m (1200 ft)	365 m (1200 ft)	365 m (1200 ft)
Supply Source	Transducers shall only be supplied by Siemens Milltronics certified controllers		
Approvals	CE***, CSA, FM, IECEx/ATEX, INMETRO: See nameplate or consult Siemens Milltronics for current approvals.		

\* Universal flange fits ANSI, DIN, and JIS standards.

\*\* Approximate shipping weight of transducer with standard cable length.

\*\*\* EMC performance available upon request.

# Outline and Dimensions



Dimension	XPS-10	XPS-15	XPS-30
A	88 mm (3.4")	121 mm (4.8")	175 mm (6.9")
B	122 mm (4.8")	132 mm (5.2")	198 mm (7.8")
C	to suit ANSI, DIN and JIS standards		
D*	128 mm (5.0")	138 mm (5.4")	204 mm (8.0")
E	124 mm (4.9")	158 mm (6.2")	n / a
F	152 mm (6.0")	198 mm (7.8")	n / a
G	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")

\* nominal



**WARNING:** Optional Split Flange, Bonded Flange, and Easy Aimer configurations are *not* suitable for pressure applications.



# Mounting

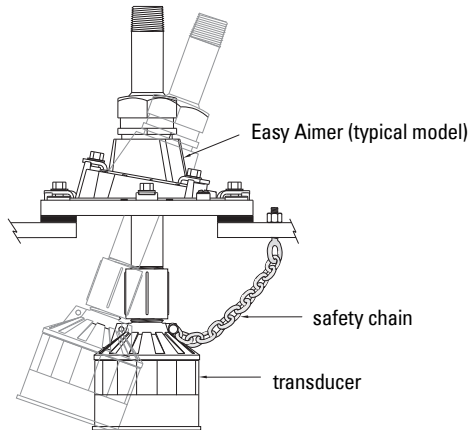


**WARNING:** Special handling precautions must be taken to protect the face of the transducer from any damage.

- Mount the transducer so that it is **above the maximum material level by at least the blanking value**. Refer to the associated controller manual.
- On liquid applications, mount the transducer face parallel to the liquid surface. On solids applications, use a Siemens Milltronics Easy Aimer to help aim the transducer.
- Do not overtighten. Most applications require only hand tightening of the mounting hardware. Connect a safety chain from the transducer to a structural member to secure installation. Consider using the optional **temperature sensor** when a flanged transducer is used, when a fast temperature response is required, or in high temperature vessels.

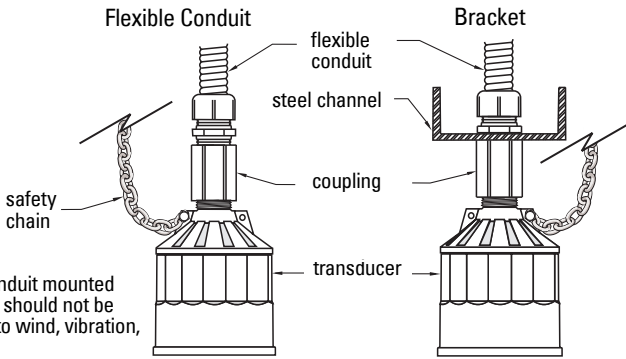
**Note:** For pressure tight applications, install transducers hand tight plus ½ turn to 1½ turns. PTFE tape or other appropriate sealant may be used to aid in sealing the threads for use in pressure applications.

## Mounting – Solids Applications

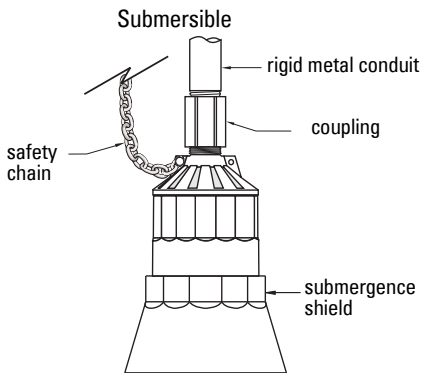


**WARNING:** Improper installation may result in loss of process pressure.

# Mounting – Liquid Applications



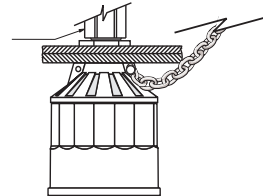
Flexible conduit mounted transducer should not be subjected to wind, vibration, or jarring.



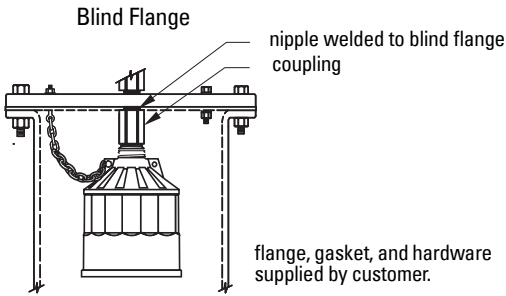
Transducer with submergence shield, used in applications where flooding is possible.

## Plywood

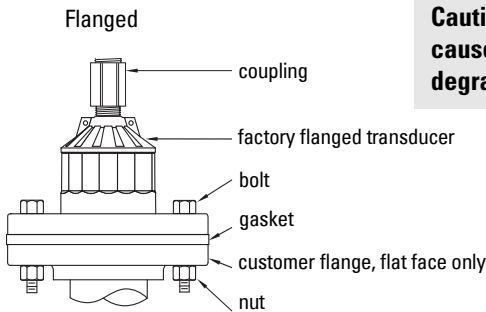
Plywood mounting provides excellent isolation, but must be rigid enough to avoid flexing if subjected to loading.



## Mounting – Liquid Applications (cont'd)



**Note:** Tighten the flange bolts evenly in order to ensure a good seal between the mating flanges.  
**Caution: Overtightening can cause performance degradation.**



Customer flanged standpipe. If a metal flange must be welded to pipe, refer to Liquid Applications - Standpipes in the *Transducer Applications Manual*.

## Installation

**Note:** Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

- Do not route cable openly. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.
- Do not run cable near high voltage or current runs, contactors, and SCR control drives. For pressure tight applications, install transducers hand tight plus  $\frac{1}{2}$  to  $1\frac{1}{2}$  turns.
- PTFE tape or other appropriate sealant may be used to aid in sealing the threads for use in pressure applications.

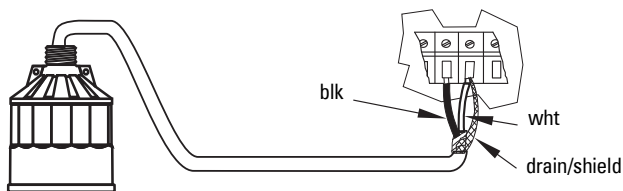


**WARNING:** Never attempt to loosen, remove, or disassemble process connection while vessel contents are under pressure.

# Interconnection

## Direct Connection

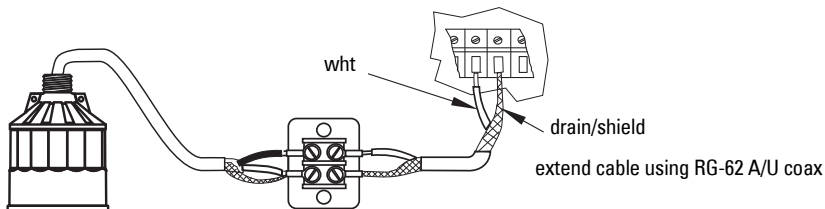
Connect the transducer directly to the Siemens Milltronics transceiver via the two conductor shielded cable.



**Note:** When connecting to a SITRANS LUT400, a SITRANS LUC500, a MultiRanger 100/200, or a HydroRanger 200, the white, black, and shield wires are all connected separately. DO NOT tie the white and shield wires together.

## Coaxial Connection

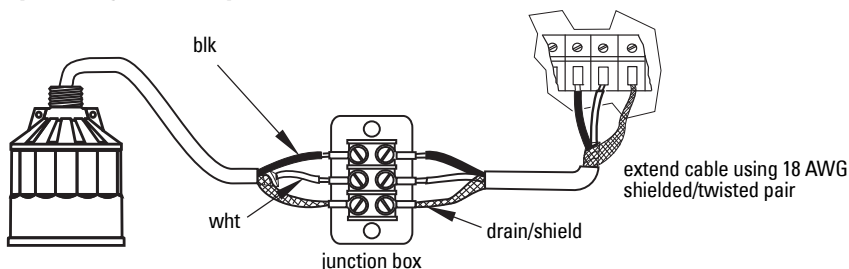
Connect the transducer to the Siemens Milltronics transceiver via a junction box and RG-62 A/U coaxial cable. This setup is effective for combined runs up to 365 m (1200 ft).



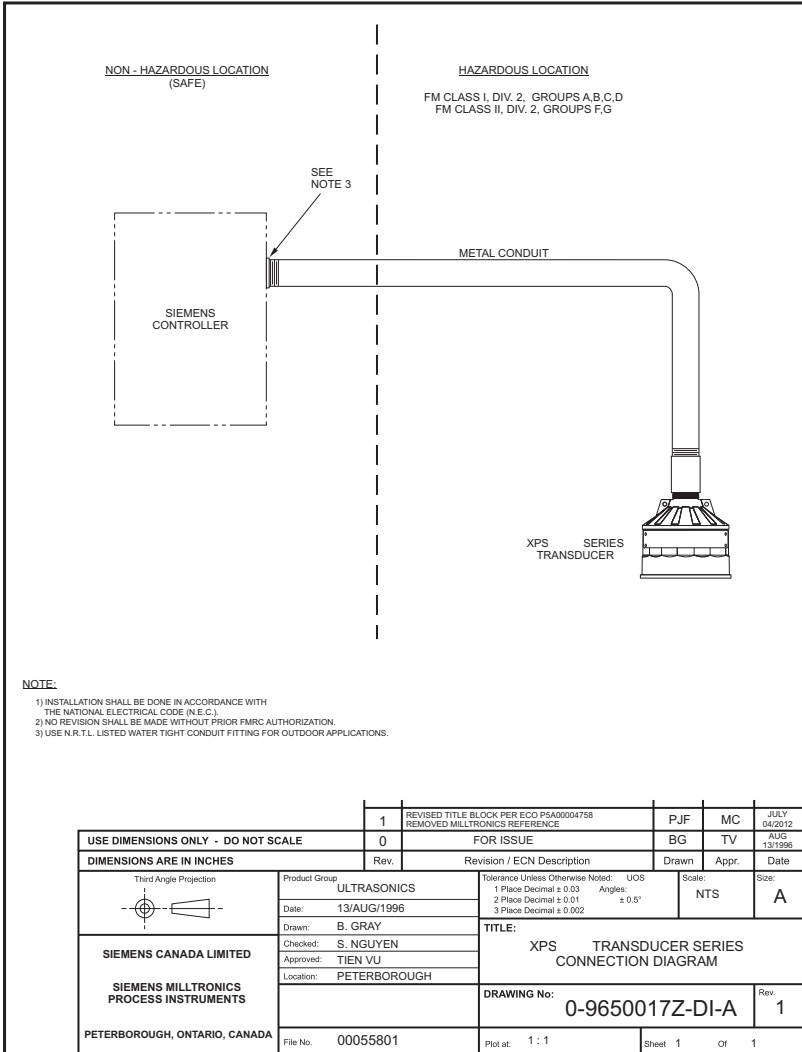
**Note:** When connecting to a SITRANS LUT400, a SITRANS LUC500, a MultiRanger 100/200, or a HydroRanger 200, do NOT use coaxial cable; see diagram below for proper procedure.

## 2-Wire Extension

(for SITRANS LUT400, SITRANS LUC500, MultiRanger 100/200, and HydroRanger 200 only)

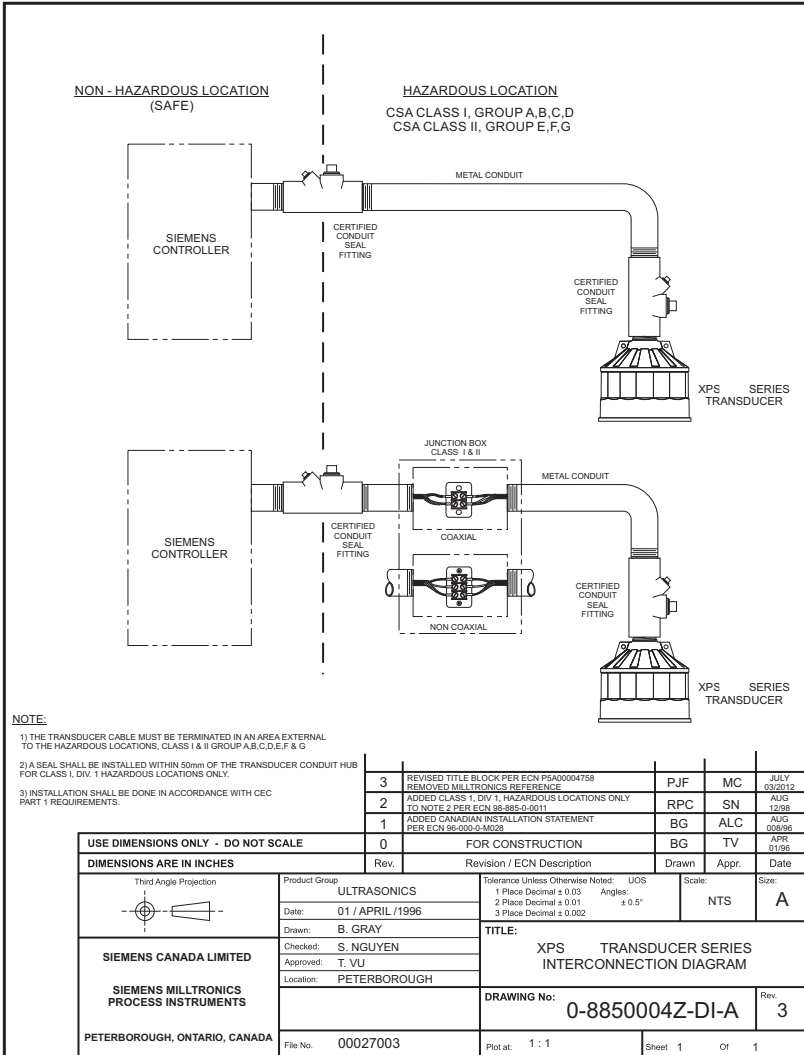


# Appendix A: Installation Diagrams



See Siemens Milltronics drawing number 0-9650017Z-DI-A for current drawing

# For Canadian Hazardous Installation Only



See Siemens Milltronics drawing number 0-8850004Z-DI-A for current drawing

## Unit Repair and Excluded Liability

All changes and repairs must be done by qualified personnel, and applicable safety regulations must be followed. Please note the following:

- The user is responsible for all changes and repairs made to the device.
- All new components must be provided by Siemens.
- Restrict repair to faulty components only.
- Do not re-use faulty components

## Reparation af enheden og ansvarsbegrænsning:

Alle ændringer og reparationer skal udføres af kvalificeret personale, og de gældende sikkerhedsbestemmelser skal overholdes.

Bemærk venligst følgende:

- Brugeren er ansvarlig for alle de på apparatet udførte ændringer og reparationer.
- Alle nye komponenter skal være leveret af Siemens.
- Reparer kun defekte komponenter.
- Defekte komponenter må ikke genbruges

## Geräte Reparatur und Haftungsausschluss:

Alle Änderungen und Reparaturen müssen von qualifiziertem Personal unter Beachtung der jeweiligen Sicherheitsbestimmungen vorgenommen werden. Bitte beachten Sie:

- Der Benutzer ist für alle Änderungen und Reparaturen am Gerät verantwortlich.
- Alle neuen Bestandteile sind von Siemens bereit zu stellen.
- Reparieren Sie lediglich defekte Bestandteile.
- Defekte Bestandteile dürfen nicht wiederverwendet werden.

## Επισκευή μονάδας και αποκλειόμενη ευθύνη:

Όλες οι αλλαγές και οι επισκευές πρέπει να πραγματοποιούνται από εξειδικευμένο προσωπικό, και πρέπει να τηρούνται όλοι οι σχετικοί κανόνες ασφαλείας. Σημειώστε τα παρακάτω:

- Ο χρήστης είναι υπεύθυνος για όλες τις αλλαγές και επισκευές που γίνονται στη συσκευή.
- Όλα τα καινούργια εξαρτήματα πρέπει να παρέχονται από τη Siemens.
- Περιορίστε τις επισκευές μόνο στα ελαττωματικά εξαρτήματα.
- Μην επαναχρησιμοποιείτε ελαττωματικά εξαρτήματα.

## Reparación del dispositivo y límite de responsabilidad:

Las modificaciones y reparaciones deberán ser efectuadas por personal calificado de acuerdo con las normas de seguridad aplicables. Notas importantes:

- El usuario es el único responsable de las modificaciones y reparaciones del dispositivo.
- Recomendamos utilizar sólo recambios originales Siemens.
- Reparar sólo los componentes defectuosos.
- Los componentes defectuosos no se deben reutilizar.

## Réparation de l'unité et limite de responsabilité :

Les modifications et réparations doivent être effectuées par un personnel qualifié en accord avec les consignes de sécurité applicables.

Remarques importantes :

- L'utilisateur est seul responsable des modifications et réparations effectuées sur l'unité.
- Utiliser seulement des composants fournis par Siemens.
- Réparer uniquement les composants défectueux.
- Les composants défectueux ne doivent pas être réutilisés.

## Riparazioni dell'apparecchiatura e limiti di responsabilità:

Le modifiche e le riparazioni devono essere effettuate solo da personale qualificato, rispettando le normative sulla sicurezza. Note importanti:

- L'utente è responsabile delle eventuali modifiche e riparazioni effettuate sull'apparecchiatura.
- Utilizzare solo pezzi di ricambio originali forniti da Siemens.
- Riparare solo i componenti difettosi.
- È importante non riutilizzare i componenti difettosi.

## Reparatie van apparatuur en uitsluiting van aansprakelijkheid:

Alle modificaties en reparaties moeten worden uitgevoerd door gekwalificeerd personeel en de geldende veiligheidsvoorschriften moeten worden aangehouden. Let op:

- De gebruiker is verantwoordelijk voor alle modificaties en reparaties die worden uitgevoerd aan het apparaat.
- Alle nieuwe onderdelen moeten zijn geleverd door Siemens.
- Beperk de reparatie uitsluitend tot de defecte componenten.
- Defecte componenten niet opnieuw gebruiken.

## Reparação da Unidade e Responsabilidade Excluída

Todas as alterações e reparações devem ser realizadas por pessoal qualificado e devem ser seguidas as regras de segurança aplicáveis. Por favor, note o seguinte:

- O usuário é responsável por todas as alterações e reparos efetuados no dispositivo.
- Todos os novos componentes devem ser fornecidos pela Siemens.
- Reparo restrito a apenas a componentes danificados.
- Não reutilize componentes danificados.

## Yksikön korjaaminen ja vastuuvapaus:

Muutos- ja korjaustyöt saa suorittaa ainoastaan pätevä henkilökunta, ja voimassa olevia turvallisuusmääräyksiä on noudatettava. Pyydämme ottamaan huomioon seuraavat seikat:

- Käyttäjän on vastuussa kaikista laitteeseen tehdyistä muutoksista ja korjauksista.
- Kaikki uudet osat on hankittava Siemens:iltä.
- Korjaukset on kohdistettava ainoastaan viallisiin osiin.
- Viallisia osia ei saa käyttää uudelleen.

## Reparation och ansvarfrihet:

Alla ändringar och reparationer måste utföras av kompetent personal och under iakttagande av gällande säkerhetsbestämmelser. Observera att:

- Användaren ansvarar för alla ändringar och reparationer som görs på enheten.
- Alla nya delar måste komma från Siemens.
- Reparera endast med fel behäftade delar.
- Delar behäftade med fel får ej återanvändas.

## For more information

[www.siemens.com/level](http://www.siemens.com/level)

[www.siemens.com/continuous-weighing](http://www.siemens.com/continuous-weighing)

Siemens AG  
Industry Sector  
1954 Technology Drive  
P.O. Box 4225  
Peterborough, ON  
Canada K9J 7B1

email: [techpubs.smpi@siemens.com](mailto:techpubs.smpi@siemens.com)

[www.siemens.com/processautomation](http://www.siemens.com/processautomation)

Subject to change without prior notice  
A5E3228289 Rev. AB

© Siemens AG 2013



A 5 E 3 2 2 8 2 8 8 9  
Printed in Canada