nexen

WEB CONTROL PRODUCTS

User Manual

Electro-Pneumatic Converter

Model EN40-IS

FORM NO. L-20113-E-0501

In accordance with Nexen's established policy of constant product improvement, the specifications contained in this manual are subject to change without notice. Technical data listed in this manual are based on the latest information available at the time of printing and are also subject to change without notice.

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www.nexengroup.com

WARNING

Read this manual carefully before installation and operation.

Follow Nexen's instructions and integrate this unit into your system with care.

This unit should be installed, operated and maintained by qualified personnel ONLY.

Improper installation can damage your system or cause injury or death.

Comply with all applicable codes.

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ISO 9001 Certified

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INTRODUCTION

Read this manual carefully, making full use of its explanations and instructions. The “Know How” of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Nexen cannot possibly know or evaluate all conceivable methods in which service may be performed, or the possible hazardous consequences of each method. Accordingly, anyone who uses a procedure that is not recommended by Nexen must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

THEORY OF OPERATION

Nexen's EN40-IS Electro-Pneumatic Converter converts current input signals into corresponding pneumatic signals. Normally the EN40-IS is used as part of a Nexen-Nireco Intrinsically Safe Tension Control System, or as an independent Electo-Pneumatic Converter, controlled by an external signal from a Process Controller, using an appropriate Zenier Barrier.

EN40-IS balances the force of a moving coil with the force of a poppet valve, and amplifies the air flow and pneumatic pressure passing through a fixed orifice by means of the booster relay, resulting in a pneumatic pressure proportional to the electric signal.

When current flows through the moving coil, a downward force is induced proportionally to the current value. This reduces the clearance between the poppet and seat, causing back pressure to rise (See Figure 1).

Back pressure is too low to use as an output, but is used as the pilot pressure for the Booster Section, increasing both pressure and volume to provide a usable output.

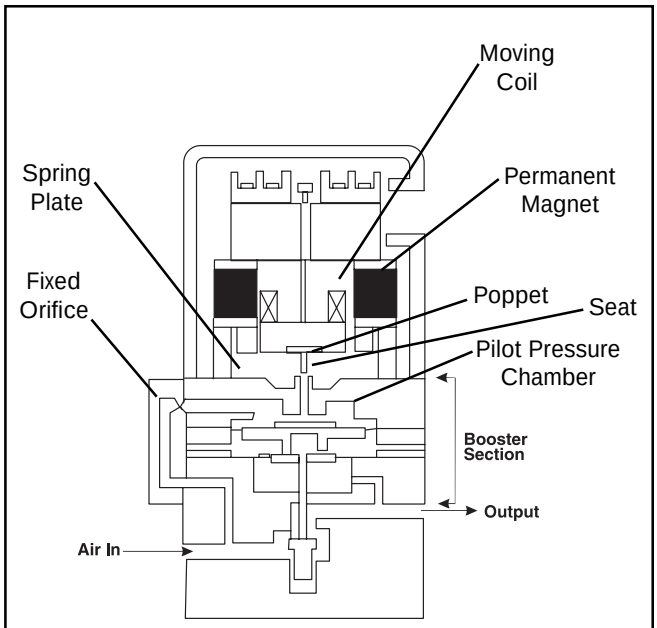

FIGURE 1

INSTALLATION

NOTE The EN40-IS must be mounted vertically within ± 15 degrees in a shock and vibration free area. Locate the EN40-IS as close as possible to the controlled element to guarantee quick precise control (See Figure 2).

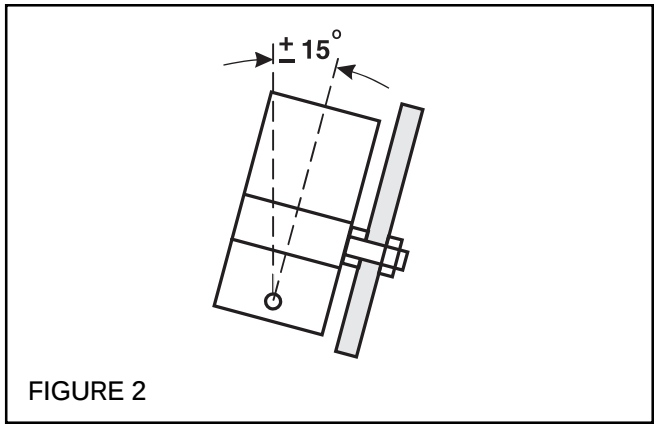

FIGURE 2

WALL MOUNTING

1. Drill two 0.28 In. [10 mm] diameter holes 4.57 In. [166 mm] apart in the Mounting Panel.
2. Secure the EN40-IS to the Mounting Panel using the cap screws provided in parts bag.

BASE MOUNTING

1. Remove the EN40-IS wall mounting bracket from the EN40-IS.

2. Secure the EN40-IS to the base using the Brackets and M5 cap screws provided (See Figure 3).

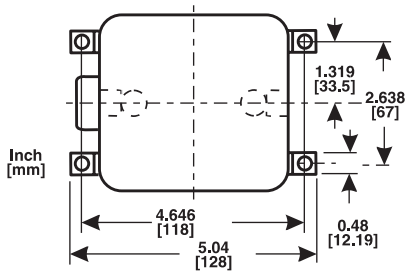

FIGURE 3

MANIFOLD MOUNTING

1. Remove the EN40-IS wall mounting bracket from the EN40-IS.

2. Plug the INLET and OUTLET ports with the provided Plugs.

3. Remove the Plugs from the underside of the EN40-IS and install the provided O-rings (See Figure 4).

4. Secure the EN40-IS to the Manifold using the provided Brackets and M5 cap screws (See Figures 5 and 6).

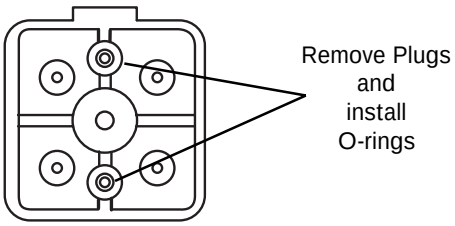

FIGURE 4

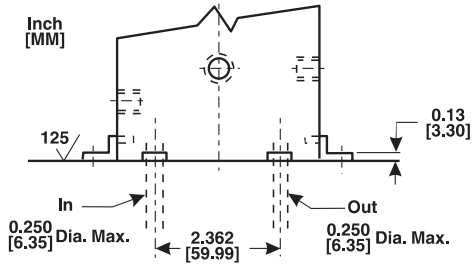

FIGURE 5

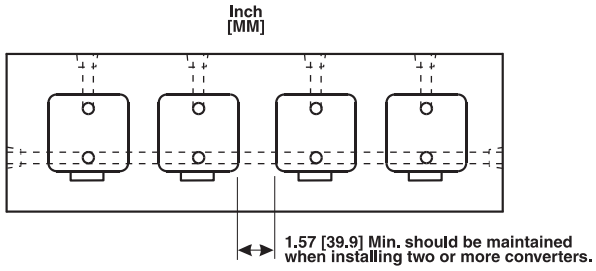

FIGURE 6

ELECTRICAL CONNECTIONS

1. Remove the cover from the EN40-IS and remove the WARNING Tag from the INPUT terminals (See Figure 7).

> **CAUTION**
> Always short the INPUT terminals when transporting or storing the EN40-IS.

2. Using customer supplied 18AWG wire, connect EN40-IS to Zenier Barrier, routing wire through threaded conduit hole on side of EN40-IS.

3. Connect the EN40-IS Ground to a suitable ground.

> **CAUTION**
> Always observe the polarity of the EN40-IS terminals. The Driving Design is the logic diagram used with the TC240-IS System (See Figure 8). If the TC240-IS is not used, refer to the Sinking Design (See Figure 9).

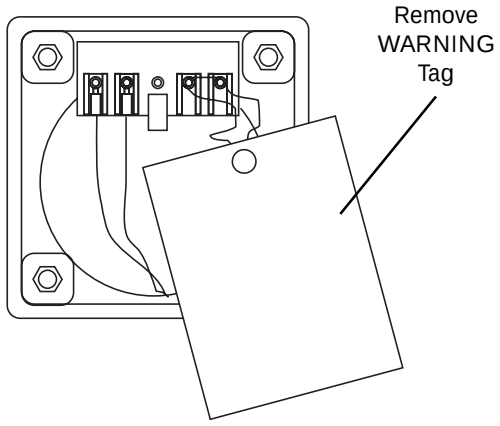

FIGURE 7

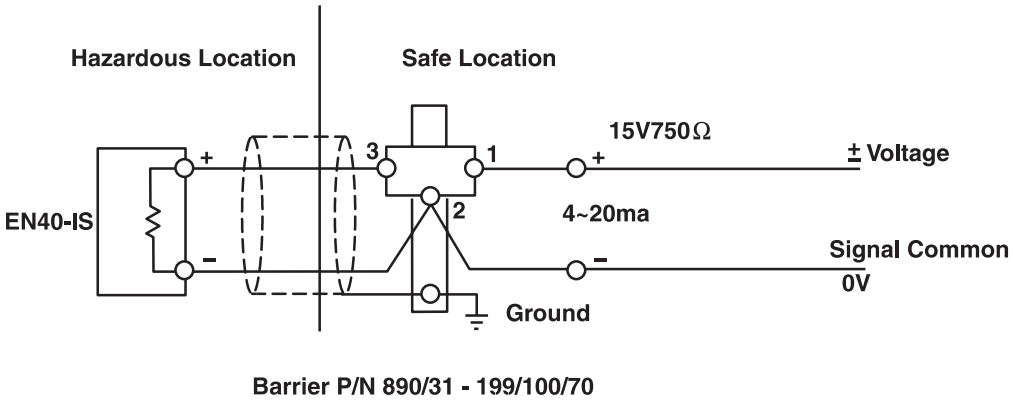

FIGURE 8
Driving Design

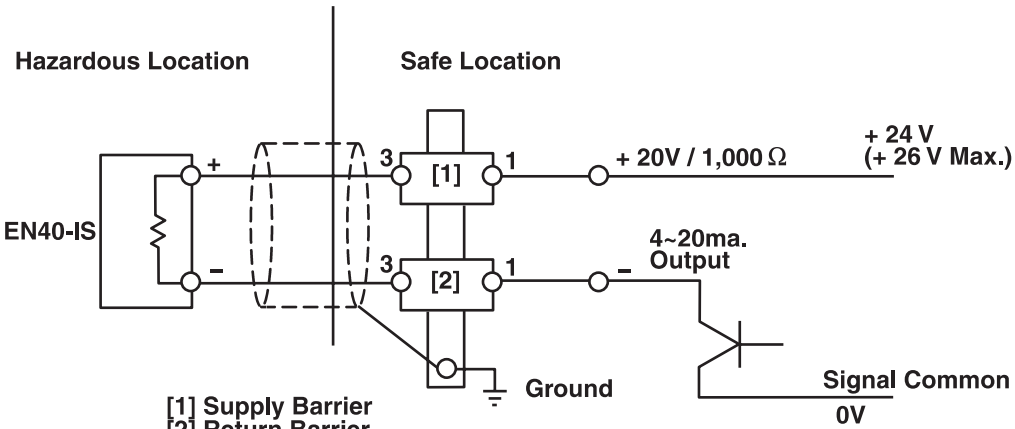

FIGURE 9
Sinking Design

AIR LINE CONNECTION

Nexen's EN40-IS requires clean, pressure regulated air for maximum performance and long life. Your Nexen Distributor carries filters and regulators specifically designed to operate with Nexen products.

A Pre-filter (rated at 5.0 micron) removes large particles from the air supply. The Coalescing Filter (0.04 micron or less) is then used to filter the air before it enters the EN40-IS (See Figures 10 and 11).

CAUTION

When lubrication is required for the final control element, a pilot operated regulator (or booster) must be used to segregate the EN40-IS from the lubricated air during exhaust or pressure reduction phases (See Figure 11).

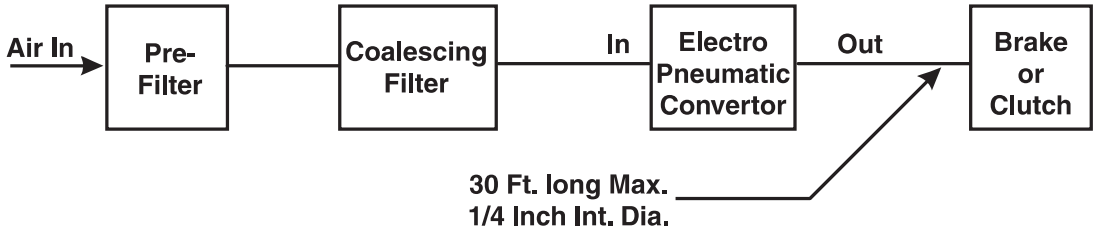

FIGURE 10

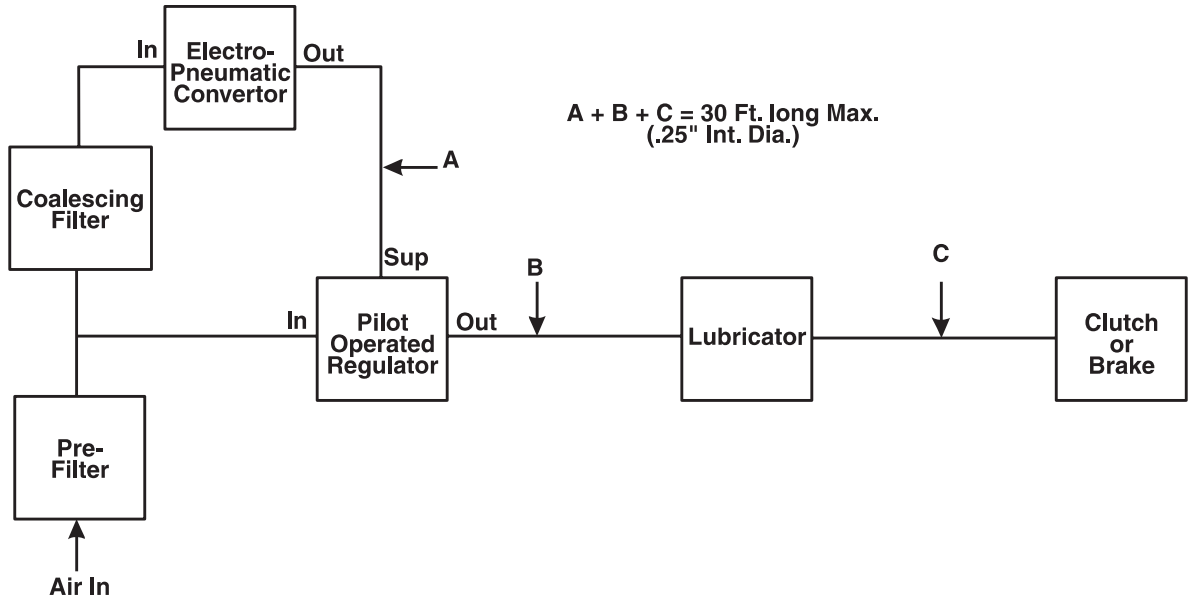

FIGURE 11

ADJUSTMENT

Nexen's EN40-IS has been factory adjusted and should not require further adjustment.

The EN40-IS is available in three models. The model designation can be found on the serial number tag, located on the front of the EN40-IS. If adjustments are required, determine the model and refer to Table 1 for the correct values called out in the adjustment procedure.

TABLE 1

MODEL	EN40-1AS	EN40-1BS	EN40-1DS
Imin (mADC)	4	4	4
Imax (mADC)	20	20	20
Pmin (psi)	1.5	1.5	3
Pmax (psi)	57	85	15
Psup (psi)	70	100	20

ZERO ADJUSTMENT

1. Remove the Gauge Port Plug and install a suitable air pressure gauge.
2. Set Controller Mode Switch to Manual.
3. Using the Manual Control Pot located on Controller, adjust the Controller output to Imin.
4. Remove the Zero Adj. Cover.
5. Using a screwdriver, adjust the EN40-IS output to Pmin (rotate clockwise to increase, counter clockwise to decrease) (See Figure 12).

   NOTE: Do not adjust pressure to 0 psi. There must be positive pressure at the Poppet and Seat.
6. Replace the Zero Adj. Cover.
7. Remove the air pressure gauge and reinstall the Gauge Port Plug.

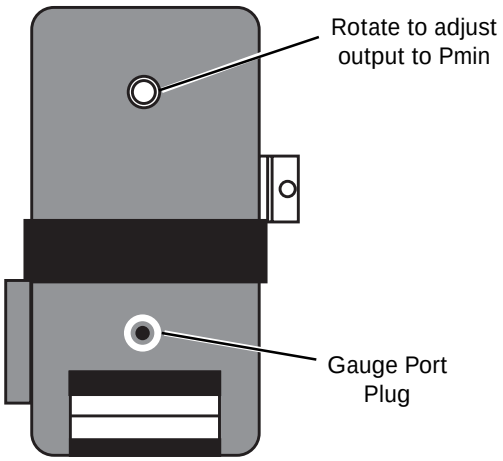

FIGURE 12

SPAN ADJUSTMENT

NOTE: Supply pressure must be Psup.

1. Perform Zero Adjustment.

   NOTE: Do not remove air pressure gauge.
2. Using the Manual Control Pot located on Controller, adjust the Controller output to Imax.
3. Remove the top cover.
4. Using a screwdriver, adjust the Span Pot to obtain Pmax output (See Figure 13).

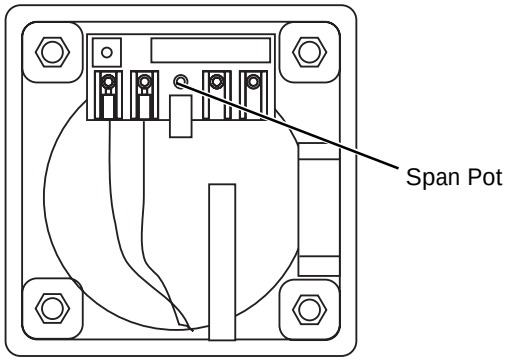

FIGURE 13

PARTS LIST

DESCRIPTION	EN40-1AS	EN40-1BS	EN40-1DS
Upper Diaphragm Assembly	2720	2720	2720
Lower Diaphragm Assembly	2721	2722	2723
Orifice Plate	2662	2662	2662
Coil Assembly with Poppet	2666	2666	2666

FIELD WIRING INTRINSIC SAFETY

This barrier effectively isolates the Sensors and Electro-Pneumatic Converter in the hazardous area from the Controller in the nonhazardous area. These components are used to build a tension control system for hazardous areas, as certified by Factory Mutual (FM) to meet requirements for Intrinsically Safe Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G, Nonincendive, Class I, Division 2, Group A, B, C, and D. Suitable for Class II, Division 2, Group G, when connected per Horton Drawing SC-1395 (See Figure 16).

MAINTENANCE

There is no scheduled maintenance required for Horton's EN40-IS Electro-Pneumatic Converter.

TROUBLESHOOTING

OPERATIONAL CHECK

1. Remove the Gauge Port Plug and install a suitable air pressure gauge.
2. Apply Psup to inlet port (See Table 1).
3. Vary the electrical signal to the EN40-IS within the range of 4-20mADC.

CLEANING FIXED ORIFICE

NOTE: If dirt particles are present in the Fixed Orifice, check the condition of Pre-filter and Coalescing Filter. These filters must be kept clean and properly maintained to prevent clogging of the Fixed Orifice.

1. Remove the Fixed Orifice Housing (See Figure 14).
2. Remove the O-ring and Orifice Plate (See Figure 15).
3. Clean the Fixed Orifice Housing air passage.
4. Passing a thin wire through the hole in Orifice Plate, clean the Orifice Plate air passage.

> CAUTION
> Do not use cleaning solvents to clean O-rings. Clean O-rings with a clean, dry cloth, then apply a thin coat of O-ring lubricant to the O-rings.

5. Install the Orifice Plate and clean O-rings into the Fixed Orifice Housing.
6. Install the Fixed Orifice Housing onto the EN40-IS.
   a. If the pressure does not vary directly with signal, reverse the electrical leads.
   b. If the pressure is slow to react to changes in signal, clean the Fixed Orifice.

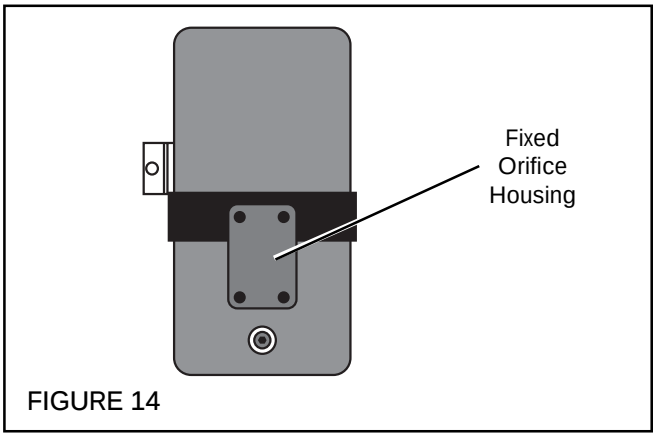

FIGURE 14

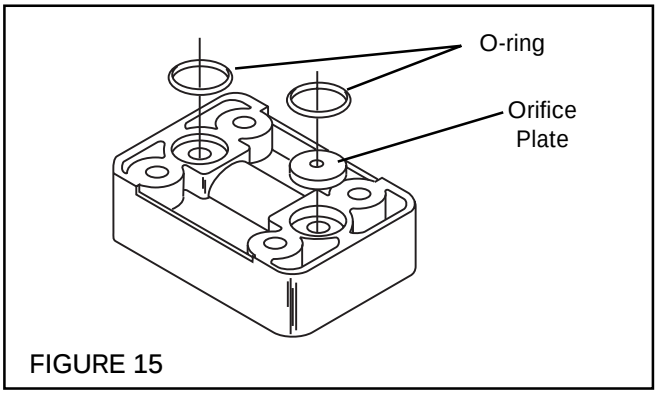

FIGURE 15

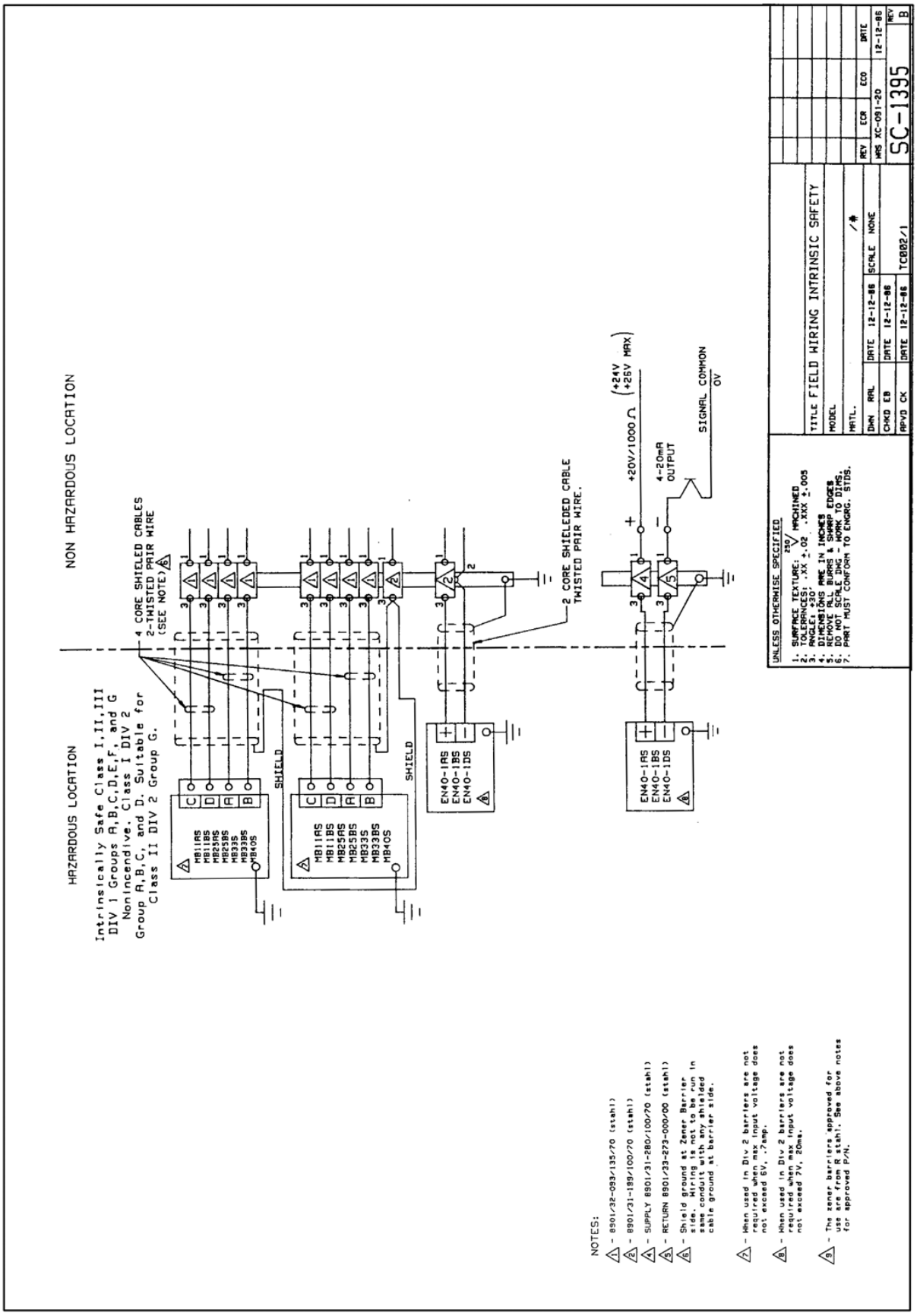

FIGURE 16
Field Wiring Intrinsic Safety (SC-1395)

WARRANTIES

Warranties

Nexen warrants that the Products will be free from any defects in material or workmanship for a period of 12 months from the date of shipment. NEXEN MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty applies only if (a) the Product has been installed, used and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused or used for purposes other than those for which it was intended; and (d) Buyer has given written notice of the alleged defect to Nexen, and delivered the allegedly defective Product to Nexen, within one year of the date of shipment.

Exclusive Remedy

The exclusive remedy of the Buyer for any breach of the warranties set out above will be, at the sole discretion of Nexen, a repair or replacement with new, serviceably used or reconditioned Product, or issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

Limitation of Nexen's Liability

TO THE EXTENT PERMITTED BY LAW NEXEN SHALL HAVE NO LIABILITY TO BUYER OR ANY OTHER PERSON FOR INCIDENTAL DAMAGES, SPECIAL DAMAGES, CONSEQUENTIAL DAMAGES OR OTHER DAMAGES OF ANY KIND OR NATURE WHATSOEVER, WHETHER ARISING OUT OF BREACH OF WARRANTY OR OTHER BREACH OF CONTRACT, NEGLIGENCE OR OTHER TORT, OR OTHERWISE, EVEN IF NEXEN SHALL HAVE BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH POTENTIAL LOSS OR DAMAGE. For all of the purposes hereof, the term "consequential damages" shall include lost profits, penalties, delay images, liquidated damages or other damages and liabilities which Buyer shall be obligated to pay or which Buyer may incur based upon, related to or arising out of its contracts with its customers or other third parties. In no event shall Nexen be liable for any amount of damages in excess of amounts paid by Buyer for Products or services as to which a breach of contract has been determined to exist. The parties expressly agree that the price for the Products and the services was determined in consideration of the limitation on damages set forth herein and such limitation has been specifically bargained for and constitutes an agreed allocation of risk which shall survive the determination of any court of competent jurisdiction that any remedy herein fails of its essential purpose.

Limitation of Damages

In no event shall Nexen be liable for any consequential, indirect, incidental, or special damages of any nature whatsoever, including without limitation, lost profits arising from the sale or use of the Products.

Warranty Claim Procedures

To make a claim under this warranty, the claimant must give written notice of the alleged defect to whom the Product was purchased from and deliver the Product to same within one year of the date on which the alleged defect first became apparent.

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