

nexen

WEB CONTROL PRODUCTS

User Manual



Electro-Pneumatic Transducer EN40

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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DANGER

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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TABLE OF CONTENTS

Introduction	4
Installation	4
Electrical Connections	5
Air Line Connections	6
Adjustment	7
Maintenance	8
Troubleshooting	8
Parts List	8
Product Numbers	9
Warranty	10

INTRODUCTION

Nexen's EN40 Electro-Pneumatic Converter converts current input signals into corresponding pneumatic signals. Normally the "EN40" is used as part of a Nexen Tension Control System, or as an independent Electro-Pneumatic Converter, controlled by an external signal from a Process Controller.

EN40 is designed to balance the force of a moving coil with the force of a poppet valve, and amplify the air flow and pneumatic pressure passing through a fixed orifice by means of the booster relay. Pneumatic pressure proportional to the electric signal is thus obtained.

When current flows through the moving coil, a downward force is induced proportional to the current value. This reduces the clearance between the poppet and seat, and back pressure rises. Since back pressure force must balance with the moving coil force, a back pressure proportional to the current value results (See Figure 1).

This back pressure is too low to be used as an output, but, is used as the pilot pressure for the Booster Section, which increases both pressure and volume to provide a usable output.

Read this manual carefully. Make use of its instructions and explanations. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. The "Know How" of safe, continuous, trouble-free operation depends on the degree of your understanding of the system, and on your willingness to keep all parts in proper operating condition.

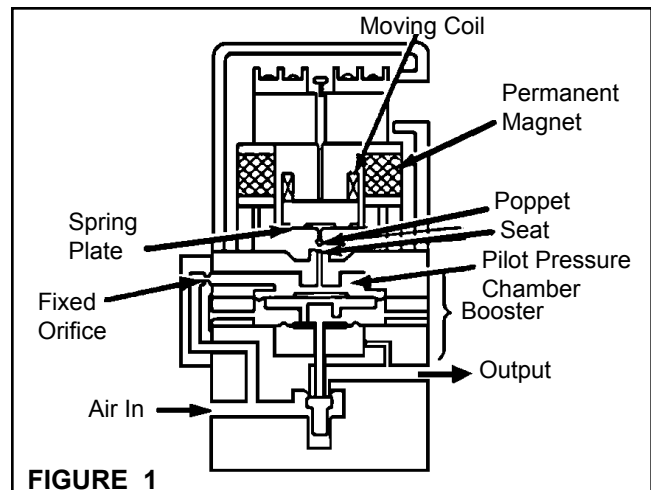


FIGURE 1

INSTALLATION

NOTE: "EN40" must be mounted vertically within $\pm 15^\circ$ in a shock and vibration free area. Locate "EN40" as close to controlled element as possible to guarantee quick precise control (See Figure 2).

WALL MOUNTING

1. Drill two 9/32 diameter holes 4.57 inches (166mm) apart in mounting panel.
2. Secure "EN40" to mounting panel using Cap Screws provided in parts bag.

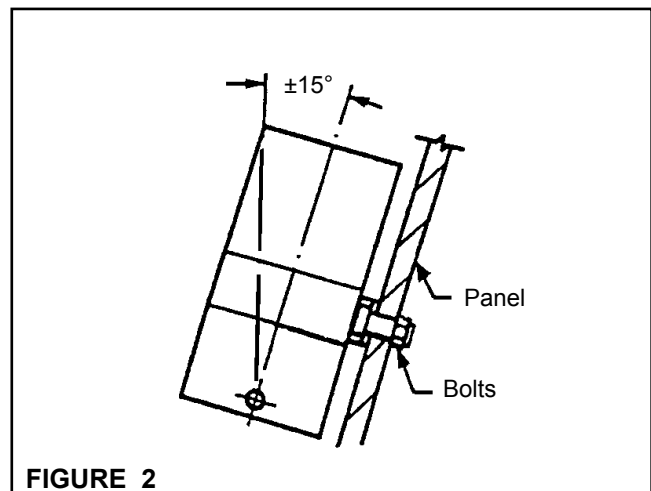


FIGURE 2

BASE MOUNTING

1. Remove "EN40" Wall Mounting Bracket.
2. Secure "EN40" to base using Brackets and M5 Cap Screws provided in parts bag (See Figure 3.)

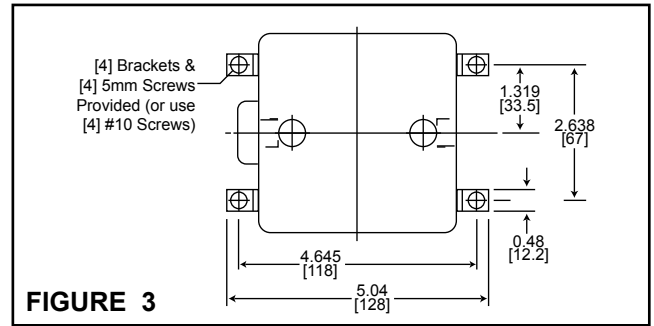


FIGURE 3

MANIFOLD MOUNTING

1. Remove "EN40" Wall Mounting Bracket.
2. Plug "INLET" and "OUTLET" ports with Plugs provided in parts bag.
3. Remove Plugs from underside of EN40 and install O-rings provided in parts bag (See Figure 4).
4. Secure "EN40" to Manifold using Brackets and M5 Cap Screws provided in parts bag (See Figure 5 & 6).

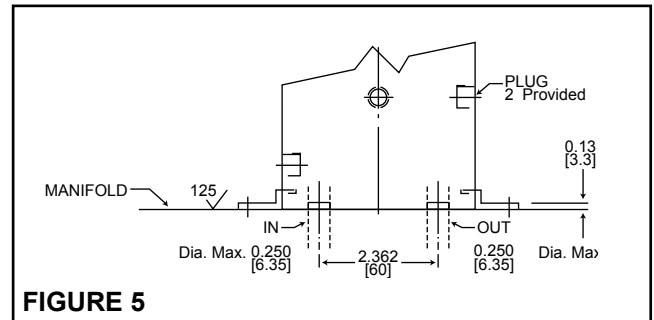


FIGURE 5

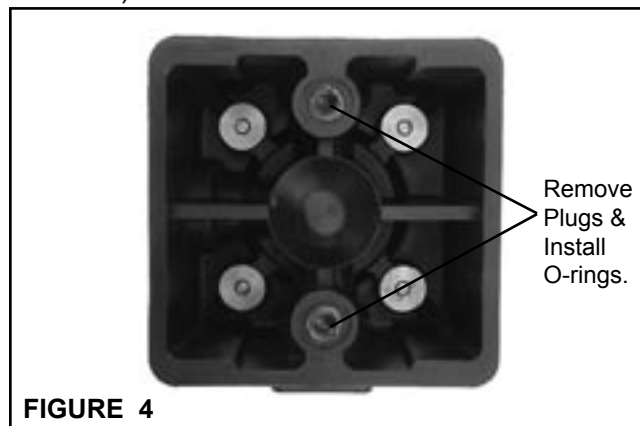


FIGURE 4

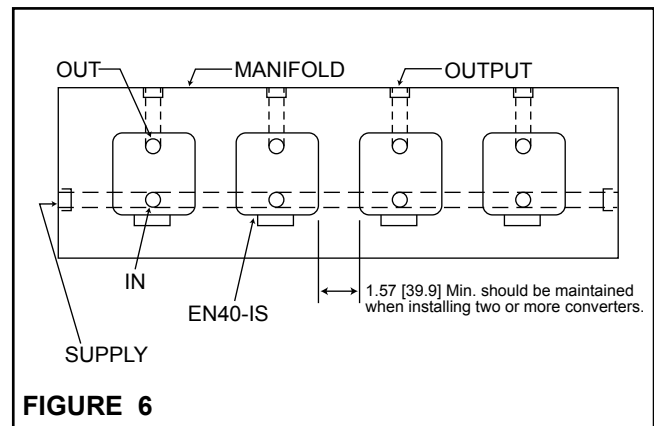


FIGURE 6

ELECTRICAL CONNECTIONS

1. Remove cover from EN40, then remove WARNING Tag "INPUT" terminals (See Figure 7.)

CAUTION
 Always short "INPUT" terminals when transporting or storing "EN40."

2. Using customer supplied 18AWG wire, connect EN40 to controller (See Figure 8), routing wire through threaded conduit hole on side of "EN40."

CAUTION
 Always observe polarity of terminals.

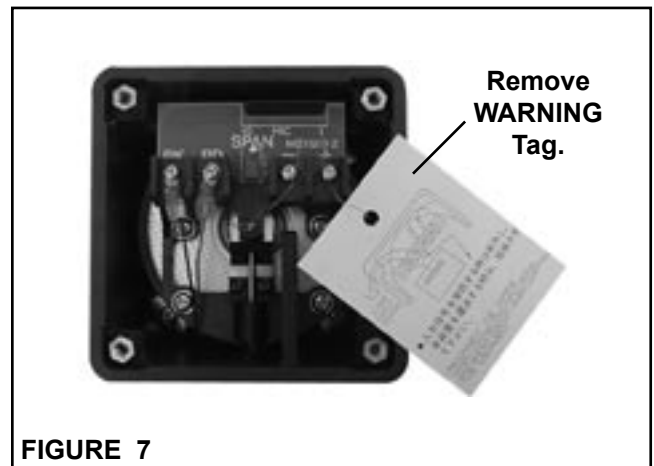


FIGURE 7

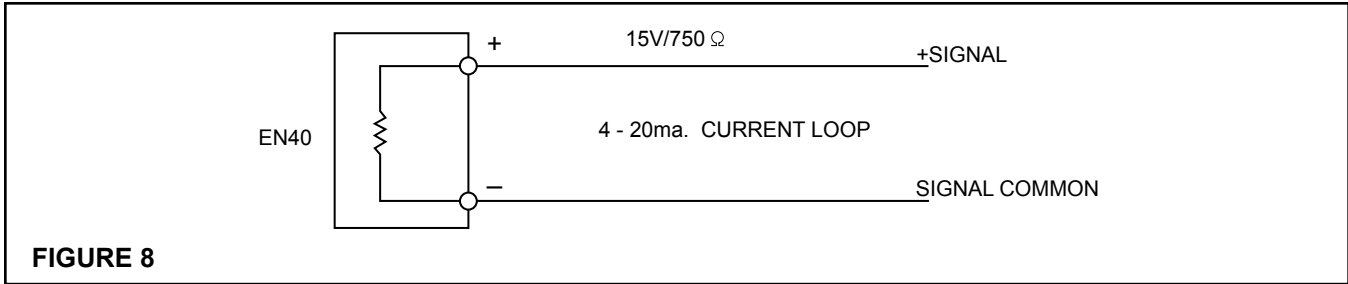


FIGURE 8

AIR LINE CONNECTIONS

Nexen's EN40 requires clean, pressure regulated air for maximum performance and long life. Nexen offers a filter that is ideally suited for the needs of the EN40 (See PRODUCT NUMBERS section).

A pre-filter, rated at 5.0 micron or less is used to remove large particles from the air supply. The coalescing filter, rated at .1 micron or less, is then used to final filter the air before it enters the EN40 (See Figure 9).

NOTE: Airline lubricators must be installed after EN40.

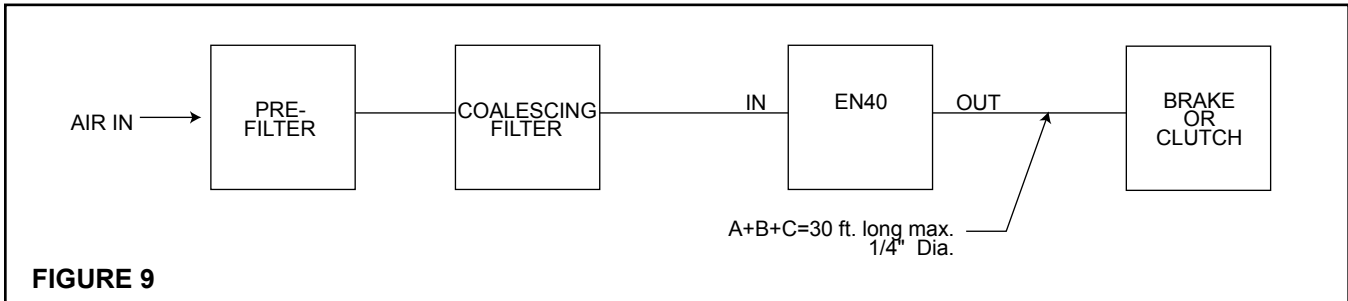


FIGURE 9



ADJUSTMENT

Nexen's EN40 has been factory adjusted and should not require further adjustment with appropriate supply pressure (See Table 1).

NOTE: If less than rated pressure is available for "Psup," the output of the EN40 will be proportionately lower.

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

TABLE 1

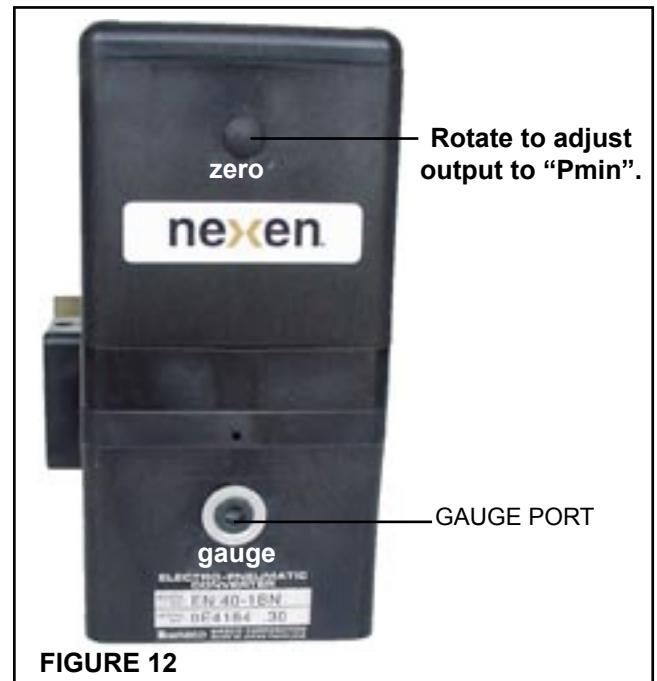
Model	EN40-1B	EN40-2B	EN40-1A	EN40-1D
Imin (mADC)	4	10	4	4
Imax (mADC)	20	50	20	20
Pmin (psi)	1.5	1.5	1.5	1.5
Pmax (psi)	85	85	57	15
Psup (psi)	100	100	71	20

ZERO ADJUSTMENT

1. Remove Gauge Port Plug and install a suitable air pressure gauge.
2. Apply Imin input signal (See Table 1).
3. Remove **Zero Adj.** cover from "EN40."
4. Using a screwdriver, adjust "EN40" 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.

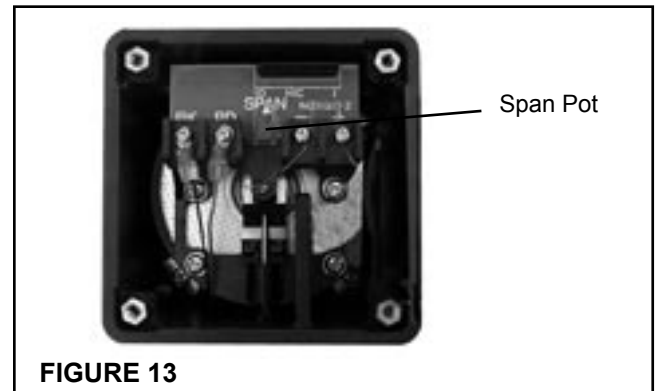
5. Replace **Zero Adj.** cover.



SPAN ADJUSTMENT

NOTE: Supply pressure must be Psup.

1. Perform ZERO ADJUSTMENT (previous section).
2. Apply Imax input signal (See Table 1).
3. Remove Top Cover from "EN40."
4. Using a screwdriver, adjust Span Pot to obtain Pmax output (See Figure 13).



NOTE: Repeat "ZERO ADJUSTMENT" & "SPAN ADJUSTMENT" to ensure settings have not drifted during calibration.

5. Remove air pressure gauge and install plug.
6. Replace Top Cover.

MAINTENANCE

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

TROUBLESHOOTING

OPERATIONAL CHECK

1. Remove Gauge Port Plug, and install a suitable air pressure gauge.
2. Apply P_{sup} to inlet port (See Table 1).
3. Vary electrical signal to "EN40" within the range of 4-20mA, DC.
 - a) If pressure does not vary directly with signal, reverse electrical leads.
 - b) If pressure is slow to react to changes in signal, clean Fixed Orifice.

CLEANING FIXED ORIFICE

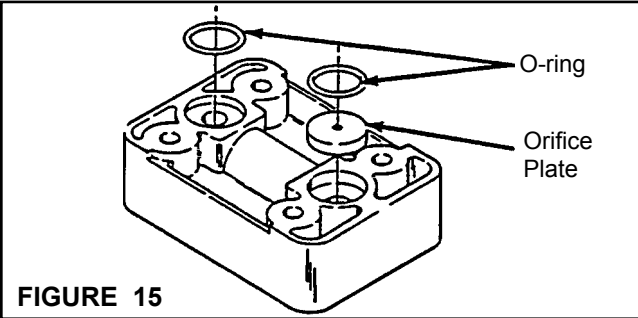
NOTE: If dirt or foreign particles are present in Fixed Orifice, check condition of Pre-filter and Coalescing filter. These filters must be kept clean and properly maintained to prevent clogging of Fixed Orifice.

1. Remove Fixed Orifice Housing (See Figure 14).
2. Remove O-ring and Orifice Plate (See Figure 15).
3. Clean Fixed Orifice Housing Air Passage.
4. Passing a thin wire through hole in Orifice Plate, clean 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 Orifice Plate and clean O-rings into Fixed Orifice Housing.
6. Install Orifice Housing onto EN40.



PARTS LIST

Item	Description	EN40-1A	EN40-1B	EN40-2B	EN40-1D
1	Upper Diaphragm Assembly	2720	2720	2720	2720
2	Lower Diaphragm Assembly	2721	2722	2722	2723
3	Orifice Plate	2662	2662	2662	2662
4	Coil Assembly with Poppet	2666	2666	2666	2666



PRODUCT NUMBERS

EN40

Model	Product Numbers	Output Pressure	Input Signal
EN40-1D	912001	10–100 kPa [1.5–15 psi]	4–20 mA
EN40-2B	912004	10–586 kPa [1.5–85 psi]	10–50 mA
EN40-1B	912028	10–586 kPa [1.5–85 psi]	4–20 mA
EN40-1A	912035	10–393 kPa [1.5–57 psi]	4–20 mA

FILTER

Description	Product Number
3 Micron and .1 Micron combination filter	912142



WARRANTY

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.

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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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