Special
Multi-Band Vertical Antenna
UNUN
UNUN, UNUN Bracket and UNUN Retrofit Information

DXE-UN-43 / DXE-UN-BRKT / DXE-UN-43-R
(US Patent No. D597,086)

DXE-UN-43-INS Revision 4c

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Introduction

The DXE-UN-43 DX Engineering Multi-Band Vertical UNUN built with proven Maxi-Core® Technology is a matching device specifically designed for application with non-resonant 43 foot tall vertical multi-band antennas.

The DXE-UN-43 assures the best efficiency from your vertical multi-band antenna and transmission line/tuner installation. Using the DXE-UN-43 results in minimizing the additional transmission lines losses caused by SWR and allows your antenna to perform to its full potential. The DXE-UN-43 reduces the stresses on your equipment more efficiently than similar competitive products.
By allowing your wide-range tuner to easily match the antenna’s complex impedance, low frequency performance is improved over other devices currently available.

Note: TES-81343 Never-Seez® or DXE-NSBT8 Anti-Seize should be used on all clamps, bolts and stainless steel threaded hardware to prevent galling and to ensure proper tightening.

**DXE-UN-43 UNUN Features**

- Full band tunable coverage on 160-10 meters with an SWR under 1.5:1 (Customer supplied wide band tuner required)
- Impedance: 200 Ω to 50 Ω - optimized for 43 ft verticals
- Ratio: 4:1 Specifically designed for Multi-Band 43 foot Vertical Antennas
- Power Handling: 2 KW / 5 KW Peak - Handles rated power with minimal energy loss so there is no thermal related failure
- Silver / PTFE SO-239 input connector
- Two 1/4-20 feedpoint connection studs with Stainless Steel Flat Washers, Split Washers, Fender Washers & Wing Nuts
- High impact plastic, weather sealed NEMA-spec case: 2-1/2” x 4” x 4” inches (HxWxL)
- Shares the same mounting footprint as other similar competitive products, so it may be easily substituted in existing installations for superior performance

**Supplied Items:**

Depending on your application, The DXE-UN-43 comes in the following configurations:

<table>
<thead>
<tr>
<th>DX Engineering Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXE-UN-43</td>
<td>DXE-UN-43 only - no extra parts - ideal for replacing competitive UNUNs and Baluns for other homebrew or other manufacturers 43 foot vertical antenna systems on the market.</td>
</tr>
<tr>
<td>DXE-UN-43-R</td>
<td>Retrofit kit for DX Engineering Multi-Band Vertical Antenna Systems: DXE-MBVA/VE series. Includes DXE-UN-43 UNUN, DXE-UN-BRKT UNUN Mounting Bracket (US Patent No. D597,086) and all hardware. Also includes one DXE-TCB-UNFK Feedpoint Connection Kit. May also be used for other similar vertical multi-band antennas.</td>
</tr>
<tr>
<td>DXE-UN-BRKT</td>
<td>DXE-UN-43 Mounting Bracket with Custom 90 degree Stainless Steel Studded Clamps and all hardware. (US Patent No. D597,086)</td>
</tr>
<tr>
<td>DXE-TCB-UNFK</td>
<td>UNUN Feedpoint Connection Kit that contains two 1” wide x 9” long copper tinned braids soldered and drilled on each end with a 1/4” hole for easy connection to the DXE-UN-43 UNUN.</td>
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## DXE-UN-43

<table>
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<tr>
<td>1</td>
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## DXE-UN-43-R

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<td>Mounting Bracket for the DXE-UN-43 - (US Patent No. D597,086)</td>
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<tr>
<td>4</td>
<td># 6 x 3/4&quot; long Stainless Steel Hex Head Bolts</td>
</tr>
<tr>
<td>8</td>
<td># 6 Stainless Steel Flat Washer</td>
</tr>
<tr>
<td>4</td>
<td># 6 Stainless Steel Nyloc Nut</td>
</tr>
<tr>
<td>2</td>
<td>Custom Stainless Steel 90 degree studded Element Clamp</td>
</tr>
<tr>
<td>2</td>
<td>1/8&quot; thick Aluminum Spacer for #10 Hardware</td>
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<tr>
<td>2</td>
<td># 10 Stainless Steel Nyloc Nut</td>
</tr>
<tr>
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<td># 10 Stainless Steel Flat Washer</td>
</tr>
<tr>
<td>1</td>
<td>DXE-TCB-UNFK - 1/2&quot; x 9&quot; Soldered &amp; drilled Braided Feedpoint Straps (2)</td>
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## DXE-UN-BRKT  US Patent No. D597,086

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<td>1</td>
<td>1&quot; wide x 9&quot; long copper tinned braids (2) soldered and drilled on each end with a 1/4&quot; hole for easy connection to the DXE-UN-43 UNUN. Two per package.</td>
</tr>
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Installing the UNUN

When used with the optional **DXE-UN-BRKT**, the UNUN may be attached to the 2" OD base section of any non-resonant 43 foot tall vertical antenna system, including your own home-brew creation. It also shares the same mounting footprint as other similar competitive products, so it may be easily substituted in existing installations for superior performance. The **DXE-UN-43** may also be mounted on a wood post or other mounting scheme using your own hardware.

The optional **DXE-UN-BRKT** comes with: One UNUN Bracket, four #6 x 3/4" long Stainless Steel Hex Head Bolts, eight #6 Stainless Steel Flat Washers, four #6 Nyloc Nuts, two

Custom 90 degree Studded Element Clamps, two #10 Nyloc Nuts, two 1/8" thick Aluminum Spacers and four #10 flat washers.

The UNUN should be mounted with the SO-239 connector facing downward to allow drainage of any condensation from the weep holes in the high impact plastic, weather sealed NEMA-spec case.

Mount the UNUN to the UNUN Bracket using the hardware as shown. The custom studded element clamps are mounted to the UNUN Bracket as shown.

As with all coaxial cable connections, you should use **TES-2155 3M Temflex™ Rubber Splicing Tape**, with an overwrap of **TES-06132 Scotch® Super 33+ Vinyl Electrical Tape** for weatherproofing.

A good RF connection must be made from the UNUN to both the vertical radiator and the radial system. DX Engineering offers the optional **DXE-TCB-UNFK** UNUN Feedpoint Connection Kit that contains two 1” wide x 9” long copper tinned braids soldered and drilled on each end with a 1/4” hole for easy connection to the UNUN. If your application requires a different connection style or layout, DX Engineering can assist you. Call DX Engineering for suggestions.
The UNUN has two 1/4-20 connection points and have Wing Nuts and Flat Washers used for connecting braided feed wires to the antenna feedpoint and radial system. The antenna feedpoint must be connected to the positive phase terminal on the DXE-UN-43 UNUN closest to the Red "+" on the label. The radial system is connected to the negative terminal nearest the Black "—" on the label.

**DX Engineering Multi-Band Vertical Antenna Systems**

The DXE-UN-43 is an enhanced replacement for the 4:1 Balun on the DX Engineering Multi-Band vertical antenna systems.

Remove the coaxial cable connection from the 4:1 Balun and the two braided feed lines going from the Balun to the Radial Plate and the antenna feedpoint connection bolt.

Remove the Balun and Balun Shelf from the mounting pipe.

Loosen the Tilt Base bolts for lowering/raising the vertical antenna. Carefully tilt the antenna to the down position. Ensure you have some support system (table, saw horse, etc.) to support the antenna while in the down position.

**Repositioning the Feedpoint Connection Hardware**

Loosen the two 2" U-Bolt Saddle Clamps holding the base section to the insulated channel.

Loosen the element clamp located at the top of the base section and rotate the base section so the feedpoint is pointing to the left (as you look at the antenna from the front).

Also ensure there is 1-3/4" between the bottom of the U-Bolt and the antenna feedpoint hardware. Tighten the two 2" U-Bolt Saddle Clamps and the element clamp at the top of the base section.
Repositioning the Tilt Base on the Mounting Pipe

Loosen the two V-Clamps holding the Tilt Base to the Mounting Pipe.

Lower the Tilt Base so there is 4-1/2" clearance between the bottom of the Tilt Base and the Top of the Radial Plate.

Raise the antenna back to the vertical position. Tighten the Tilt Base bolts for lowering/raising the antenna.

Assembling the UNUN Mounting Bracket

Using the #6 hex head bolts, #6 flat washers and #6 Nyloc nuts, attach the UNUN to the UNUN Bracket with the SO-239 connector facing downward. Tighten the Nyloc Nuts so they are snug. Do not over tighten since the mounting tabs on the UNUN are plastic.

Attach the custom Stainless Steel 90 degree Studded Element Clamps to the patented UNUN Bracket using the Washers, Aluminum Spacers and #10 Nyloc Nuts as shown below. Snug the #10 Nyloc nuts just to the point that you can still rotate the custom studded element clamps. The #10 Nyloc Nuts will be tightened later.
Installation of UNUN Assembly to Antenna Lower Section

The completed UNUN and UNUN Mounting Bracket assembly is mounted to the 2" OD antenna lower base section. To allow easy installation of the UNUN Bracket to the lower base section, open the upper and lower custom studded element clamps by unscrewing the worm drive of the clamps as shown in Figure 1.

Figure 1

Position the UNUN Mounting Bracket so the bottom element clamp is located between the feedpoint hardware and the U-Bolt as shown in Figure 2.

A: Clamps open, Clamp Ends inserted to go around Base Section Element
B: Clamp Ends go behind Base Section Element

Figure 2

Once in position, re-insert the clamp ends into the worm drive of the clamps and using a flat blade screwdriver or nut driver, snug them up as shown in Figure 3. Note position of lower clamp is between the feedpoint hardware and the U-Bolt.
Position the UNUN so it faces forward as shown in Figure 4. Tighten the Upper and Lower Studded Clamps and tighten the Nyloc Nuts holding the bracket to the Upper and Lower Studded Clamps.

**Feedline Connections**

The DXE-UN-43 UNUN is attached to the antenna feedline connections using the DXE-TCB-UNFK UNUN Feed Point Connection Kit which contains two pre-drilled copper tinned braids. Both braids are 1" wide by 9" in length. Connect one braid from the antenna feedpoint located on the base section of the antenna to the terminal on the DXE-UN-43 UNUN closest to the Red "+" on the label as shown in Figure 5. Do not over tighten the wing nuts. Hand tighten them only, do not use pliers or other tools to over tighten the wing nuts.

Connect the other 9" braid from the terminal on the DXE-UN-43 UNUN closest to the Black "—" on the label to the closest radial wire bolt on the optional DXE-RADP-3 Radial Plate as shown in Figure 5. Route both braided cables as shown. Ensure the "+" connection is not shorting out to the "—" side.
The feedpoint on the antenna base section can be facing forward, or can be facing to the left (when looking at the front of the antenna).

**Note:** Ensure the "-" braid connection to the Radial Plate does not interfere with the tilting process. If this is a problem, then remove the braid from the UNUN when tilting the antenna. Remember to properly replace it when the antenna is in the upright position.

Figure 5
Your coaxial cable from the radio connects direct to the SO-239 connector on the **DXE-UN-43** UNUN. Weatherproof this coaxial connection using **TES-06132** - Scotch® Super 33+ and **TES-2155** - 3M Temflex™ 2155 Rubber Splicing Tape.

**Completed DX Engineering Vertical Antenna Base Assembly for Reference**

The feedpoint on the antenna bas section can be facing forward, or can be facing to the left (when looking at the front of the antenna).

**Other Manufacturer's Non-Resonant 43 ft Vertical Antenna systems**

The **DXE-UN-43** can also be used as a direct replacement UNUN for other manufacturer’s non-resonant 43 foot vertical multi-band antenna systems using the same NEMA style Balun/Unun case.

If you own a 43 foot non-resonant vertical antenna, the **DXE-UN-43** will help ensure the best efficiency from your vertical multi-band antenna and transmission line/tuner installation.

Using the **DXE-UN-43** results in minimizing the additional transmission line losses caused by SWR and allows your antenna to perform to its full potential. The **DXE-UN-43** reduces the stresses on your equipment more efficiently than similar competitive products.
Remove the old Balun or Unun and replace it with the **DXE-UN-43** Unun. Connect the antenna feedpoint to the terminal on the **DXE-UN-43** UNUN closest to the **Red "+"** on the label as shown below. Do not over tighten the wing nuts. Hand tighten them only, do not use pliers or other tools to over tighten the wing nuts. Connect the other terminal on the **DXE-UN-43** UNUN closest to the **Black "—"** on the label to the closest radial wire bolt on the optional **DXE-RADP-3** Radial Plate as shown below.

### Radial System

The use of a radial system is a key requirement for performance in a vertical antenna system. The radials are the second half of the antenna. The number of which contribute to the radiation efficiency of the entire vertical antenna system.

At a minimum, 20 radials, each 32 feet long, should be used. Using 32 radials at 65 feet long is preferred and highly recommended. The extra radials may help overcome unknown poor-soil conditions, improve efficiency, and ensure the best performance possible from the vertical antenna. Longer radials should be used for improved performance on the lowest frequency to be used if your plans call for 60 or more radials. **DXE-RADW** Radial Wire, a stranded 14 gauge copper wire with black relaxed PVC insulation, is suggested for the best results.

### Tuning the Vertical Antenna System

The performance of any non-resonant antenna is highly dependent on the ability of your tuner to deliver a low SWR when tuned. The use of a customer supplied, high quality, outboard tuner is required for any multi-band non-resonant vertical antenna system. The tuner should be capable of tuning the wide range of impedances presented by the antenna at the different operating frequencies.
Recommended wide range manual tuners generally have a good quality variable roller inductor for fine tuning. While there are also good automatic tuners on the market, one we have tested and recommend in low power applications is the **MFJ-993B IntelliTuner™**, now available from DX Engineering.

Longer lengths of coaxial cable aid in achieving best tuning results. For this application, 150 feet of RG-213/U is recommended for operation on all bands and is available from DX Engineering.

**Manual Updates**

Every effort is made to supply the latest manual revision with each product. Occasionally a manual will be updated between the time your DX Engineering product is shipped and when you receive it. Please check the DX Engineering web site ([www.dxengineering.com](http://www.dxengineering.com)) for the latest manual revision.

**Optional Items**

**PTX-81343, DXE-NSBT8 - Anti-Seize & Never-Seez®**
An Anti-seize compound MUST be used on any Stainless Steel nuts, bolts, clamps or other hardware to prevent galling and thread seizure. Any of these products can be used for this purpose.

<table>
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<tbody>
<tr>
<td>PTX-81343</td>
<td>Anti-Seize, 1 oz. Squeeze Tube</td>
</tr>
<tr>
<td>PTX-81464</td>
<td>Anti-Seize, 8.5 oz. Aerosol Can</td>
</tr>
<tr>
<td>DXE-NSBT8</td>
<td>Never-Seez®, 8 oz. Brush Top</td>
</tr>
<tr>
<td>DXE-NMBT8</td>
<td>Never-Seez®, 8 oz. Brush Top, Marine Grade</td>
</tr>
</tbody>
</table>

*These products are limited to domestic UPS Ground shipping only*

**TES-2155 - 3M Temflex™ 2155 Rubber Splicing Tape.**
Conformable self-fusing rubber electrical insulating tape. It is designed for low voltage electrical insulating and moisture sealing applications. For outdoor use, it should be protected from UV deterioration with an overwrap of **TRM-06132**.

**TES-06132 - Scotch® Super 33+.**
Highly conformable super stretchy tape for all weather applications. This tape provides flexibility and easy handling for all around performance. It also combines PVC backing with excellent electrical insulating properties to provide primary electrical insulation for splices up to 600V and protective jacketing.

**DXE-RADP-3 - Radial Plate, Stainless Steel with 20 Sets of SS Radial Attachment Hardware**
The patented DX Engineering Radial Plate is for those of you that have, or are building, a quarter wave vertical antenna and who want an easy, neat and effective way to connect those essential radial wires and the coax to your vertical antenna for the lowest takeoff angle and strongest signals. DX Engineering Radial Plate is laser cut from tough stainless steel so that it has smooth edges, will not corrode and will always look good. You will be proud of how good your installation looks. This plate will work perfectly with most commercially available vertical antennas such as the DX Engineering Vertical Antennas, Hustler BTV series (4-BTV thru the 6-BTV), the SteppIR (BiggIR or SmallIR) or one of your own construction.
DXE-RADW - 500K or 1000K Radial Wire Kits and Components
To achieve optimal performance with a ground-mounted vertical, install as many radials as possible. These bulk radial wire kits use insulated wire that is UV resistant, hard to see and lays down easily, unlike the wire that is commonly available at the big box stores. It will last much longer in contact with soil than bare wire.
The DXE-RADW- 500K or 1000K kit provide everything you will need to build the perfect radial system!
• 500/1000 ft. spool of 14 AWG, stranded copper wire with vinyl insulation
• 20/40 lugs
• 100/200 radial wire anchor pins- Eliminating the need to bury your radials!
• Build up to 20/40 radials, 25 feet long

| DXE-RADW-500K | Bulk Radial Wire Kit, 500 ft Spool of Wire, 20 Lugs, 100 Staples |
| DXE-RADW-1000K | Bulk Radial Wire Kit, 1000 ft Spool of Wire, 40 Lugs, 200 Staples |

DXE-RADW-500KBD or 1000KBD - Bulk Radial Wire Kits and Components
To achieve optimal performance with a ground-mounted vertical, install as many radials as possible. These bulk radial wire kit use insulated wire that is UV resistant, hard to see and lays down easily, unlike the wire that is commonly available at the big box stores. It will last much longer in contact with soil than bare wire. The biodegradable anchors allow easy installation of radial wires, and will degrade and disappear in a year or so when they are no longer needed. The DXE-RADW-500 or 1000KBD kit provide everything you will need to build the perfect radial system!
• 500/1000 ft. spool of 14 AWG, stranded copper wire with vinyl insulation
• 20/40 lugs
• 100/200 biodegradable radial wire anchor pins- Eliminating the need to bury your radials!
• Build up to 20/40 radials, 25 feet long

| DXE-RADW-500KBD | Bulk Radial Wire Kit, 500 ft Spool of Wire, 20 Lugs, 100 Biodegradable Staples |
| DXE-RADW-1000KBD | Bulk Radial Wire Kit, 1000 ft Spool of Wire, 40 Lugs, 200 Biodegradable Staples |

DXE-RADW-20RT/-32RT/-65RT Pre-Assembled, Radial Wire, w/ 1/4" ring Terminals, 20 Pack
The DXE-RADW Radial Wire Kits include the highest quality 14 gauge stranded copper wire with a relaxed black PVC insulation for easy installation of your radial system. They allow fast and easy installation of your radial ground system, and permit you to mix and match different length to fit the available space. The stranded wire and relaxed insulation mean that the wire will lay flat as you place it on the ground - easy to install! The twenty pre-cut radial wires include 1/4" ring terminals professionally crimped on one end for quick and easy attachment to the radial plate. These Radial Wire Kits are designed for users of vertical antenna systems which have the need for a high quality radial system for optimum antenna performance. The 1/4" ring terminals are machine crimped for maximum grip. Soldering is not required for strength, but is recommended if installed in corrosive environments such as salt spray.
• Packed 20 Radial Wires per package
• 14 gage, stranded copper wire
• Black relaxed PVC insulation
• 1/4" Ring Terminal professionally crimped on each Radial Wire
• 3 lengths to choose from: 20 Ft (-20RT), 32 Ft (-32RT), 65 Ft (-65RT)

| DXE-RADW-20RT | Package of 20 each 20 Ft Radials with 1/4" Ring Terminals |
| DXE-RADW-32RT | Package of 20 each 32 Ft Radials with 1/4" Ring Terminals |
| DXE-RADW-65RT | Package of 20 each 65 Ft Radials with 1/4" Ring Terminals |

DXE-STPL - Radial Wire Anchor Pins, 100/pack - No need to bury your radials!
DX Engineering Radial Wire Anchor Pins are perfect for fastenings radials below the grass line to eliminate the risk of damaging your radials during lawn maintenance.
• 100 count - 6" Pins
• 11-Gauge

| DXE-STPL-100P | Radial Wire Anchor Pins, 100/pack |
| DXE-STPL-300P | Radial Wire Anchor Pins, 300/pack |
DXE-STPL-100BD - Radial Wire Staple, Biodegradable, 3”, 100 pack
DX Engineering DXE-STPL-100BD is a 100-pack of 3” biodegradable anchors that are produced from recycled PLA (Poly lactide Resin). Depending on the weather conditions, they will degrade in about a year. They are easily installed and will hold radial wires in place until lawn roots overtake them - and then disappear. Ecologically friendly!

DXE-225RT-20 - Ring terminal 16-14 Wire Gauge, 1/4" hole/20-pk
This is a set of 20 ring terminals for AWG #14 to 16 wire with a clearance hole for a 1/4” bolt. These are the same crimp terminals supplied with the DXE Radial Wire Kits for #14 Radial and Antenna Wire.

DXE-RADP-1HWK - Radial Plate Wire Attachment Hardware Kit - Stainless Steel
20 Sets of ALL Stainless Steel Radial Hardware for use with the DX Engineering Stainless Steel Radial Plate.
- (20) 1/4” Bolts - (20) 1/4” Nuts - (20) 1/4” Flat Washers - (20) 1/4” Split Washers - (20) 1/4” Star Washers

SUM-900031 - Automatic Wire Stripper/Crimper/Cutter, 24-10 Ga.
Our DX Engineering wire stripper uses a spring-loaded design to make quick work of wires ranging from 24 to 10 gauge. Just insert the wire, squeeze the handle, and listen for the click. That’s the sound of another perfect wire stripping job performed in about 2-3 seconds- a fraction of the time it takes your pocket knife to do the same job. An adjustable wire length guide helps you make uniform strips, and a built-in wire cutter and crimper helps you complete your wiring job.
- Spring-loaded design
- Strips wires ranging from 24 to 10 gauge
- built-in wire cutter and crimper

DXE-SSVC-2P - Stainless Steel V-Clamp for steel pipe, 2 inch V-bolt
This V-Clamp is made in one size that fits Steel tubing or pipe from 1” to 2” OD as used in antenna construction. The supplied V-bolt is long enough to attach tubing to thick plates and is made with anti-corrosive properties. The special Stainless Steel saddle has serrated teeth will clamp to the pipe securely by biting into the surface. For this reason, it is not recommended for softer aluminum tubing or pipe. Ideal for fastening a radial plate and antenna mounting to a steel pipe.
- Used to clamp 1 to 2” (OD) steel tubing or pipe
- Designed for attachments that don't require resistance to torque
- V-bolt and saddle made from high-strength 18-8* stainless steel
*The use of an anti-seize compound is HIGHLY recommended to achieve proper torque and prevent galling.
Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at:

DXEngineering@DXEngineering.com

For best service, please take a few minutes to review this manual before you call.

Warranty

All products manufactured by DX Engineering are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. DX Engineering’s sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by DX Engineering. If DX Engineering’s products are claimed to be defective in material or workmanship, DX Engineering shall, upon prompt notice thereof, issue shipping instructions for return to DX Engineering (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer’s specifications. In addition, DX Engineering’s warranties do not extend to other equipment and parts manufactured by others except to the extent of the original manufacturer’s warranty to DX Engineering. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR DX ENGINEERING ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.

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