Trademarks and Registrations

Registrations and trademarks used in this document include:

- ® Delrin Registered trademark of E.I. DuPont de Nemours Company, Incorporated
- ® Lexan Registered trademark of General Electric Company, GE Plastics Division
- ® Valox Registered trademark of General Electric Company, GE Plastics Division

**WARNING** notices as used in this manual apply to hazards or unsafe practices which could result in personal injury or death.

**CAUTION** notices apply to hazards or unsafe practices which could result in property damage.

**NOTES** highlight procedures and contain information which assist the operator in understanding the information contained in this manual.

All software, including design, appearance, algorithms and source codes, is copyrighted by ABB Automation Inc. and is owned by ABB Automation Inc. or its suppliers.

---

**WARNING**

Possible process upsets. Maintenance must be performed only by qualified personnel and only after securing equipment controlled by this product. Adjusting or removing this product while it is in the system may upset the process being controlled. Some process upsets may cause injury or damage.

---

**NOTICE**

The information contained in this document is subject to change without notice.

ABB Automation Inc., its affiliates, employees, and agents, and the authors and contributors to this publication specifically disclaim all liabilities and warranties, express and implied (including warranties of merchantability and fitness for a particular purpose), for the accuracy, currency, completeness, and/or reliability of the information contained herein and/or for the fitness for any particular use and/or for the performance of any material and/or equipment selected in whole or part with the user of/or in reliance upon information contained herein. Selection of materials and/or equipment is at the sole risk of the user of this publication.

This document contains proprietary information of ABB Automation Inc., and is issued in strict confidence. Its use, or reproduction for use, for the reverse engineering, development or manufacture of hardware or software described herein is prohibited. No part of this document may be photocopied or reproduced without the prior written consent of ABB Automation Inc.
# Table of Contents

**SAFETY SUMMARY** .......................................................................................................................... I

**READ FIRST** ..................................................................................................................................... III

**SECTION 1 - INTRODUCTION** ........................................................................................................... 1-1
  - DESCRIPTION ................................................................................................................................. 1-1
  - NEMA 4X Option .............................................................................................................................. 1-1
  - FEATURES ........................................................................................................................................ 1-1
  - HOW TO USE THIS INSTRUCTION .................................................................................................. 1-1
  - MODELS .......................................................................................................................................... 1-2
  - SPECIFICATIONS .............................................................................................................................. 1-2

**SECTION 2 - DESCRIPTION AND OPERATION** ............................................................................... 2-1
  - GENERAL ......................................................................................................................................... 2-1
  - DESCRIPTION ................................................................................................................................. 2-1

**SECTION 3 - INSTALLATION** ............................................................................................................ 3-1
  - UNPACKING AND INSPECTION ........................................................................................................ 3-1
  - ENCLOSURE CLASSIFICATION .......................................................................................................... 3-1
  - MOUNTING CONSIDERATIONS ........................................................................................................ 3-3
  - MOUNTING TYPE AVPT POSITION TRANSMITTER ....................................................................... 3-3
  - WIRING TYPE AVPT POSITION TRANSMITTER ............................................................................. 3-5
  - RADIO FREQUENCY INTERFERENCE ................................................................................................. 3-6

**SECTION 4 - CALIBRATION** ............................................................................................................... 4-1
  - CALIBRATING THE POSITION TRANSMITTER .................................................................................. 4-1

**SECTION 5 - PARTS** ......................................................................................................................... 5-1
  - GENERAL .......................................................................................................................................... 5-1
  - PARTS .............................................................................................................................................. 5-1
  - MOUNTING KITS ............................................................................................................................... 5-4
LIST OF FIGURES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 3-1.</td>
<td>External and Mounting Dimensions For AVPT Position Transmitter</td>
<td>3-2</td>
</tr>
<tr>
<td>Figure 3-2.</td>
<td>Drive Arm Connections</td>
<td>3-3</td>
</tr>
<tr>
<td>Figure 3-3.</td>
<td>Mounting Using Linkage (Typical)</td>
<td>3-5</td>
</tr>
<tr>
<td>Figure 3-4.</td>
<td>Mounting Using Direct Coupling (Typical)</td>
<td>3-6</td>
</tr>
<tr>
<td>Figure 4-1.</td>
<td>Calibration Features for 4 to 20-mA Position Transmitter</td>
<td>4-1</td>
</tr>
<tr>
<td>Figure 4-2.</td>
<td>4 to 20-mA Position Transmitter (Exploded View)</td>
<td>4-2</td>
</tr>
<tr>
<td>Figure 5-1.</td>
<td>Type AVPT Position Transmitter</td>
<td>5-2</td>
</tr>
<tr>
<td>Figure 5-2.</td>
<td>Mounting Kits</td>
<td>5-4</td>
</tr>
</tbody>
</table>

LIST OF TABLES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1-1.</td>
<td>Agency Approvals</td>
<td>1-3</td>
</tr>
<tr>
<td>Table 1-2.</td>
<td>Accessories</td>
<td>1-3</td>
</tr>
<tr>
<td>Table 3-1.</td>
<td>Power Connections</td>
<td>3-6</td>
</tr>
<tr>
<td>Table 5-1.</td>
<td>Type AVPT Position Transmitter Parts List for Figure 5-1</td>
<td>5-3</td>
</tr>
<tr>
<td>Table 5-2.</td>
<td>Position Transmitter Mounting Kit Number 5327321?12</td>
<td>5-4</td>
</tr>
<tr>
<td>Table 5-3.</td>
<td>Position Transmitter Mounting Kit Number 5327321?13</td>
<td>5-5</td>
</tr>
<tr>
<td>Table 5-4.</td>
<td>Position Transmitter Mounting Kit Number 5327321?14 (for use on Fisher Actuators)</td>
<td>5-5</td>
</tr>
</tbody>
</table>
## Safety Summary

### GENERAL WARNINGS

**RADIO FREQUENCY INTERFERENCE.** Most electronic equipment is influenced by radio frequency interference (RFI). Caution should be exercised with regard to the use of portable communications equipment in the area around such equipment. Prudent practice dictates that signs should be posted in the vicinity of the equipment cautioning against the use of portable communications equipment.

**POSSIBLE PROCESS UPSETS.** Maintenance must be performed only by qualified personnel and only after securing equipment controlled by this product. Adjusting or removing this product while it is in the system may upset the process being controlled. Some process upsets may cause injury or damage.

**RETURN OF EQUIPMENT.** All equipment being returned to Fischer & Porter for repair must be free of any hazardous materials (acids, alkalis, solvents, etc.). A Material Safety Data Sheet (MSDS) for all process liquids must accompany returned equipment. Contact Fischer & Porter for authorization prior to returning equipment.

**INSTRUCTION MANUALS.** Do not install, maintain or operate this equipment without reading, understanding and following the proper Fischer & Porter instructions and manuals; otherwise injury or damage may result.

### SPECIFIC WARNINGS

Before mounting or installing the Position Transmitter, check nameplate data to make certain the Position Transmitter is suitable for the application desired. **DO NOT AT ANY TIME EXCEED THE RATINGS LISTED ON THE NAMEPLATE.**
GÉNÉRAUX
AVERTISSEMENTS

PERTURBATIONS DE LA FREQUENCE RADIOPHONIQUE. La plupart des équipements électroniques sont sensibles aux perturbations de la fréquence radio. Dès précautions devront être prises lors de l'utilisation de matériel de communication portatif. La prudence exige que les précautions aient été prises dans ces cas soient signalees aux endroits voulus dans votre usine.

PROBLÈMES POTENTIELS. La maintenance doit être réalisée par du personnel qualifié et seulement après avoir sécurisé les équipements contrôlés par ce produit. L'ajustement ou le démontage de ce produit lorsqu'il est lié au système peut entraîner des dysfonctionnements dans le procédé qu'il contrôle. Ces dysfonctionnements peuvent entraîner des blessures ou des dommages.

RETOUR D'ÉQUIPEMENT. Tout débitmètre et(ou) convertisseur retourné à Fischer & Porter pour réparation doit être exempt de toute trace de produit dangereux (acide, base, solvant, Â…). Un certificat de sécurité matériel doit être joint pour tous les liquides utilisés dans le procédé. Contacter Fischer & Porter pour autorisation avant renvoi du matériel.

MANUEL DE MISE EN ROUTE. Ne pas installer, maintenir ou utiliser cet équipement sans avoir lu, compris et suivi les instructions et manuels de Fischer & Porter, dans le cas contraire il y a risque d'entraîner blessures ou dommages.

SPÉCIFIQUES
AVERTISSEMENTS

Avant le support ou le positionneur d'installation, les données de plaque signalétique de contrôle pour assurer le positionneur conviennent à l'application désirée. N'EXCÉDEZ PAS À TOUT MOMENT LES ESTIMATIONS ÉNUMÉRÉES SUR LA PLAQUE SIGNALÉTIQUE.
The information in this publication provides technical personnel with installation, operation, calibration, repair and replacement, and maintenance information about Type AVPT Position Transmitters.

Throughout this instruction, the term actuator is used to describe the device to which the Position Transmitter interfaces (i.e., valve or diaphragm).

It is important for safety reasons that this instruction be read and understood before attempting anything related to installation, calibration, operation, maintenance or repair.

### WARNING

**INSTRUCTION MANUALS**

Do not install, maintain or operate this equipment without reading, understanding and following the proper ABB - Fischer & Porter instructions and manuals, otherwise injury or damage may result.

**RETURN OF EQUIPMENT**

All equipment being returned to ABB - Fischer & Porter for repair must be free of any hazardous materials (acids, alkalis, solvents, etc.). A Material Safety Data Sheet (MSDS) for all process liquids must accompany returned equipment. Contact ABB - Fischer & Porter for authorization prior to returning equipment.

*Read these instructions before starting installation; save these instructions for future reference.*
SECTION 1 - INTRODUCTION

DESCRIPTION

Type AVPT Electronic Position Transmitters provide fast and accurate position indication of single or double acting actuators (i.e. cylinders, valves, etc.). Refer to Specifications Section for Position Transmitter performance specifications. The AVPT Position Transmitters use the same housing and mounting dimensions as Type AV Position Transmitters.

The mechanical input to the AVPT is supplied by an adjustable linkage from the actuator. As the actuator changes position, the linkage rotates the transmitter’s drive arm and set of gears which provide input to the 4-20 mA Position Transmitter Assembly. This assembly, in turn, produces a 4-20 mA DC signal output proportional to position.

NEMA 4X Option

The Type AVPT2020N Position Transmitter is furnished with a NEMA 4X housing. To maintain the NEMA 4X classification, the Position Transmitter shall be installed per drawing C258567 and the conduit connection shall be suitable for a NEMA 4X rating.

FEATURES

- *Compact Rugged Design.* Die cast aluminum housing provides long life and maximum environmental protection. The compact housing increases mounting flexibility.

- *Highly Visible Position Status Indicator.* A fluorescent orange position indicator is visible through a polycarbonate window, providing fast indication of actuator position.

- *Adaptable Usage.* The Position Transmitter can indicate the position of both single and double acting, linear and rotary type actuators.

HOW TO USE THIS INSTRUCTION

For safety reasons, read and completely understand this instruction before completing any tasks or procedures associated with installation, calibration, operation, maintenance or repair.

The section arrangement of this instruction is sequential. After initial start-up and calibration, store this instruction in a safe place for future reference.
MODELS

AVPT20200: Standard
AVPT2020N: NEMA4X Enclosure Rating

SPECIFICATIONS

Enclosure Classification

AVPT20200: Standard (NEMA 3R)
AVPT2020N: NEMA 4X when installed per drawing C258567.

Input
Mechanical Position

Stroke
25.4 to 101.6 mm (1 to 4 in.) linear; 45° to 100° rotary.

Power Supply Voltage
16 to 34 VDC

Output Signal
4 to 20 mA

Output Loading
500 Ω at 24 VDC, 1000 Ω at 34 VDC

Accuracy
<0.6% of span (maximum)

Hysteresis
<0.5% of span (maximum)

Ambient temperature effect
<0.063% per °C (<0.035% per °F)

EMI/RFI effect
<1.5% maximum at 10 V/m field strength, 20 to 450 MHz

Temperature limits

Operating: -40°C to 82°C (-40°F to 180°F)

Storage: -40°C to 93°C (-40°F to 200°F)

Materials:

Enclosure
Aluminum and <0.5%magnesium

Window
Lexan® (polycarbonate)

Enclosure Screws
Stainless Steel

Fasteners
Steel / Stainless Steel

Gasket/O-Ring
Buna-N

Indicator
Valox

Gears
Delrin

Gear Hub
Brass
Cam Shaft  Stainless Steel
Bearings  Bronze
Drive Arm  Aluminum

Table 1-1. Agency Approvals

<table>
<thead>
<tr>
<th>Approval/Certification²</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory Mutual Research (FM):</td>
<td>Canadian Standards Association (CSA):</td>
</tr>
<tr>
<td>Approved as nonincendive for:</td>
<td>Certified as:</td>
</tr>
<tr>
<td>Class I, Division 2, Groups A, B, C and D</td>
<td>Class I, Division 2, Groups A, B, C and D</td>
</tr>
<tr>
<td>Class II, Division 2, Groups F and G</td>
<td>Class II, Division 2, Groups E, F and G</td>
</tr>
<tr>
<td>Class III, Division 2</td>
<td>Class III, Division 2</td>
</tr>
<tr>
<td>Approved as intrinsically safe for:</td>
<td>Certified as intrinsically safe for:</td>
</tr>
<tr>
<td>Class I, Division 1, Groups A, B, C and D</td>
<td>Class I, Division 1, Groups A, B, C and D</td>
</tr>
<tr>
<td>Class II, Division 1, Groups E, F and G</td>
<td>Class II, Division 1, Groups E, F and G</td>
</tr>
<tr>
<td>Class III, Division 1</td>
<td>Class III, Division 1</td>
</tr>
</tbody>
</table>

This product complies with all applicable European Community product requirements, and specifically with those required to display the CE marking on the product nameplate.

NOTES:

1. Hazardous locations approvals for use in flammable atmospheres are for ambient conditions of -25°C to 40°C (-13°F to 104°F), 86 to 106 kPa (12.5 to 15.7 psig) with a maximum oxygen concentration of 21%.

2. For installing the Position Transmitter in a hazardous location, refer to Product Application Guide, Installing a Type AV Position Transmitter in a Hazardous Location.

Table 1-2. Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting kits</td>
<td>Dependent on valve stem size (Figure 5-2, kit number 5327321??).</td>
</tr>
</tbody>
</table>

NOTE:

1. For recommended spare parts and additional spare parts, refer to Section 5.
SECTION 2 - DESCRIPTION AND OPERATION

GENERAL

Two versions of the AVPT Position Transmitter are available:

- AVPT20200 - Standard (NEMA 3R)
- AVPT2020N - NEMA 4X Enclosure

DESCRIPTION

Position transmitters sense the position of the input shaft. This information is supplied by an adjustable linkage from an actuator. As the actuator changes position, the linkage rotates the transmitter’s drive arm which is geared to the potentiometer shaft. The resistive change of the potentiometer is sensed by a bridge circuit, producing a voltage proportional to shaft position. EMI/RFI protected circuitry converts the bridge voltage to a 4 to 20 mA DC output signal which is directly proportional to the position of the actuator.

Terminals TB1-1(+) and TB1-2(-) provide customer access to the 4 to 20 mA output signal. A jumper position provides control over direct or reverse-acting operation. Test jacks are available for in-line current monitoring.
SECTION 3 - INSTALLATION

UNPACKING AND INSPECTION

1. Check for obvious damage to the shipping carton.

2. Open the carton and remove all loose packing.

3. Carefully remove the Position Transmitter from the carton and inspect for any physical damage that may have occurred during shipping.

4. Remove the two cover screws and the Position Transmitter cover and examine the interior for any loose components such as nuts, screws, etc. Check the data on the nameplate to be certain the Position Transmitter type ordered for the application was received.

5. If the Position Transmitter is suitable for the application and appears undamaged, install the cover and proceed with the installation instructions.

6. If storing the Position Transmitter prior to installation, leave it in the original carton, if possible. Store in an area free from corrosive vapors and extremes in temperature and humidity.

7. Do not store the Position Transmitter in an area that would violate the specifications listed in SECTION 1 - SPECIFICATIONS.

ENCLOSURE CLASSIFICATION

The standard enclosure for the Type AVPT20200 Position Transmitters conform to NEMA 3R which meets the extended corrosion resistance requirements of NEMA 250.

A NEMA 4X version is available as an option (Type AVPT2020N Position Transmitters). To maintain the NEMA 4X classification, the Position Transmitter shall be installed per drawing C258567 and the conduit connections shall be suitable for a NEMA 4X rating.
Figure 3-1. External and Mounting Dimensions For AVPT Position Transmitter
MOUNTING CONSIDERATIONS

Choose a location for the Position Transmitter based on the following factors:

- Access to the internal Position Transmitter adjustments — the mounting location should provide enough room to remove the cover in order to perform calibration and repair and replacement procedures inside the Position Transmitter. Refer to Figure 3-1 for Position Transmitter dimensions. Figure shows the electrical connections and Figure 3-2 shows the dimensions of the drive arm connections.

- Allow room for linkage to the actuator — the mounting position should be such that a practical linkage arrangement can be made between the Position Transmitter and the actuator for full range travel.

![Figure 3-2. Drive Arm Connections](image)

MOUNTING TYPE AVPT POSITION TRANSMITTERS

- The Type AVPT Position Transmitter can be used with double acting or single acting actuators. External dimensions are shown in Figure 3-1. Figure 3-3 shows a typical mounting arrangement using a Fischer & Porter mounting kit. Refer to Figure 5-2 for an exploded view and complete parts list of the kit.

**NOTE:** If the actuator is equipped with a Type AVPT Position Transmitter as ordered, verify that all the connections are secure and make any adjustments as required.
Figure 3-3. Mounting Using Linkage (Typical)

Figure 3-4. Mounting Using Direct Coupling (Typical)
Due to the wide range of applications that the Type AVPT Position Transmitter is suited for, we can only provide general information about mounting. Use the following procedure to mount the Position Transmitter.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before mounting or installing the Position Transmitter, check nameplate data to make certain the Position Transmitter is suitable for the application desired. DO NOT AT ANY TIME EXCEED THE RATINGS LISTED ON THE NAMEPLATE.</td>
</tr>
</tbody>
</table>

1. Set the actuator at the zero position. Connect the adjustable linkage to the drive arm. The drive arm holes correspond to stroke length of the actuator. Refer to Figure 3-1 for the stroke length for each drive arm hole.

2. Adjust the connecting linkage so that the output current is equal to 4 mA.

3. Lock all linkage components in place

**WIRING TYPE AVPT Position Transmitter**

Use the following procedure to wire the Type AVPT Position Transmitter:

1. Connect a 24-VDC power supply in series with the required output load (refer to SECTION 1-SPECIFICATIONS) to terminals TB1-1(+) and TB1-2(-) (Refer to Table 3-1 and Figure 3-1).

   **NOTE:** If using a twisted shielded pair for signal wiring, ground one end of the shielded pair at the source. Trim the other end of the pair, located inside the enclosure, so that bare wires are not exposed.

   **NOTE:** Route the wiring inside the Position Transmitter so it does not become entangled with moving parts. A cable clamp (Figure 3-1) is provided inside the Position Transmitter so entanglement can be avoided.

2. Grounding the Position Transmitters should be done in accordance with local electrical codes (in U.S. National Electrical Code, ANSI/NFPA 70. In Canada, Canadian Electrical Code, CSA c22.1). A grounding screw is provided inside the enclosure for grounding, denoted by "<>".

   **NOTES:**
   1. The grounding screw located inside the enclosure is a safety ground and should not be used to ground the shielded pair.
   2. The Position Transmitter must be grounded to avoid ground loop conditions.
Table 3-1. Power Connections

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TB1 CONNECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVPT2020_</td>
<td>+</td>
</tr>
</tbody>
</table>

RADIO FREQUENCY INTERFERENCE

Most electronic equipment is influenced by radio frequency interference (RFI). Caution should be exercised with regard to the use of portable communications equipment in the area.

Fischer & Porter recommends posting appropriate signs in the plant. Refer to the site-planning instructions for additional information on RFI.

Under ideal conditions, the use of conduit and shielded wire may not be required. However, to avoid noise problems, it is recommended that wiring be enclosed in conduit. Just prior to entering the housing, rigid conduit should be terminated and a short length of flexible conduit should be installed to reduce any stress.
SECTION 4 - CALIBRATION

CALIBRATING THE POSITION TRANSMITTER

Labels located inside the Position Transmitter cover show the location of jumpers, test points, calibration potentiometers and field connection terminals for the position transmitter (Figure 4-1).

Figure 4-1. Calibration Features for 4 to 20-mA Position Transmitter

1. Remove the FOR/REV jumpers, and place the CAL/OPER jumpers in the calibrate (CAL) position (Fig. 4-1).

2. Move the actuator to the 50% output position.

3. Insert ohmmeter leads into test jacks TP1 (-) and TP2 (+). If the resistance value is between 940 and 1060 Ω, remove the ohmmeter leads and proceed to Step 4. Otherwise continue with Step 3.
   a. Loosen the set screw on the hub of the small gear using a ½-in. Allen wrench (Figure 5-1).
   b. Use a screwdriver to adjust the shaft on the potentiometer until the ohmmeter reads 1000, ±10 Ω. While adjusting the resistance, hold the gears and cam shaft stationary so rotation does not occur. Only the potentiometer shaft should move while adjusting the resistance.

   NOTE: If the mesh between the large and small gears is not tight, adjust the position of the potentiometer mounting bracket (Figure 5-1) so that backlash is eliminated.

   c. Tighten the set screw on the small gear hub.

   d. Remove the ohmmeter from TB1-1 and TB1-2. Install the screw, flag, nut and washer (Figure 5-1).
4. Place the CAL/OPER jumpers into the operate (OPER) position (Figure 4-1). For direct-acting, place the FOR/REV jumpers in the FOR position. For reverse-acting, place the jumpers in the REV position (Figure 4-1).

5. Connect a 24-VDC external power supply across TB1-1 and TB1-2.

6. Insert ammeter leads into TP2(+) and TP1(-).

7. Move the actuator to the 0% position. Adjust the zero potentiometer to 4.00 mA. Refer to Figure 4-1 for the location of the zero potentiometer.

8. Move the actuator to the 100% position. Adjust the span potentiometer to 20.00 mA. Refer to Figure 4-1 for the location of the span potentiometer.

9. Repeat Steps 7 and 8 until the indicated current readings are obtained.

10. Refer to Section 5 - for list of parts.
SECTION 5 - PARTS

GENERAL

This section provides parts information for the following purposes:

- stocking for spare parts inventory
- replacement purposes.

Should a problem occur with the AVPT Position Transmitter, use Figures 5-1 and 5-2 to locate the parts required for repair or replacement.

Figure 5-1 shows a breakdown of parts for the overall AVPT Position Transmitter.

Figure 5-2 shows the parts supplied with the Mounting Kits for the AVPT Position Transmitter.
Figure 5-1. Type AVPT Position Transmitter
### Table 5-1. Type AVPT Position Transmitter Parts List for Figure 5-1

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5402531?3</td>
<td>Housing</td>
<td>57</td>
<td>Form MP432-889</td>
<td>Label, Indicator</td>
</tr>
<tr>
<td>2</td>
<td>540028?1</td>
<td>Cover assembly</td>
<td>58</td>
<td>197893A1</td>
<td>Thread forming screw (12 req)</td>
</tr>
<tr>
<td>13</td>
<td>085A816531</td>
<td>1/2 in. Plain SAE Washer</td>
<td>59</td>
<td>663955A1</td>
<td>Termination Assembly</td>
</tr>
<tr>
<td>14</td>
<td>540287A1</td>
<td>Cam shaft</td>
<td>61</td>
<td>MP409-393</td>
<td>Label, Terminal Block</td>
</tr>
<tr>
<td>18</td>
<td>193214A1</td>
<td>Bearing</td>
<td>62</td>
<td>1963318A10</td>
<td>Nameplate, Universal</td>
</tr>
<tr>
<td>19</td>
<td>540286A1</td>
<td>Indicator</td>
<td>63</td>
<td>5327445A1</td>
<td>Drive arm</td>
</tr>
<tr>
<td>21</td>
<td>6639540A1</td>
<td>Potentiometer assembly</td>
<td>72</td>
<td>114B094U01</td>
<td>Button, Plug</td>
</tr>
<tr>
<td>25</td>
<td>540295A1</td>
<td>Diaphragm cover</td>
<td>75</td>
<td>NTMHA13000</td>
<td>Lock Washer, Internal Tooth</td>
</tr>
<tr>
<td>27</td>
<td>193243B1</td>
<td>Large position transmitter gear</td>
<td></td>
<td>6639479A1</td>
<td>Ass’y, Position Transmitter</td>
</tr>
<tr>
<td>29</td>
<td>114B095U01</td>
<td>Plug button, Standard</td>
<td>77</td>
<td>1951755A1</td>
<td>Bumper Grommet</td>
</tr>
<tr>
<td></td>
<td>1943573A1</td>
<td>Plug button, NEMA4X</td>
<td>81</td>
<td>1951755A2</td>
<td>Bumper Grommet</td>
</tr>
<tr>
<td>30</td>
<td>197120A28</td>
<td>Cam nut</td>
<td>82</td>
<td>1951755A2</td>
<td>Bumper Grommet</td>
</tr>
<tr>
<td>31</td>
<td>19734A45</td>
<td>Washers</td>
<td>83</td>
<td>5400268B2</td>
<td>Potentiometer Mtg. Bracket</td>
</tr>
<tr>
<td>32</td>
<td>197777A50</td>
<td>Retaining ring, cam (2 req)</td>
<td>84</td>
<td>193242A1</td>
<td>Gear, Non-Metallic</td>
</tr>
<tr>
<td>34</td>
<td>197227A1</td>
<td>Special hex head sems screw</td>
<td>86</td>
<td>1943187A1</td>
<td>Cable clip, Nylon</td>
</tr>
<tr>
<td>40</td>
<td>NBH2A1014</td>
<td>Cover screw</td>
<td>89</td>
<td>5400317A1</td>
<td>Gear Adaptor</td>
</tr>
<tr>
<td>41</td>
<td>NBH2A1040</td>
<td>Cover screw</td>
<td>90</td>
<td>NKJHA13004</td>
<td>Socket Set Screw, Cup</td>
</tr>
<tr>
<td>45</td>
<td>NBH2A13006</td>
<td>Diaphragm cover screw (4 req)</td>
<td>93</td>
<td>1951631A206</td>
<td>Seal, O-Ring</td>
</tr>
<tr>
<td>47</td>
<td>197865A1</td>
<td>Stroke adjustment screw</td>
<td>94</td>
<td>NKJHA23006</td>
<td>Socket Set Screw, Cup</td>
</tr>
<tr>
<td>51</td>
<td>NIDHA13005</td>
<td>Indicator screw</td>
<td>95</td>
<td>258567A1</td>
<td>Kit, NEMA-4X Mtg. (not shown)</td>
</tr>
<tr>
<td>55</td>
<td>NTGHA10000</td>
<td>Cam washer</td>
<td>96</td>
<td>1951041A1</td>
<td>Pipe plug</td>
</tr>
</tbody>
</table>

**NOTES (Refer to Figure 5-1):**
1. For NEMA 4X version, Item 94 is used; For STANDARD version, Item 82 is used.
2. Item 95 is not shown. It is placed inside Position Transmitter package for the NEMA 4X version.
Figure 5-2. Mounting Kits

Table 5-2. Position Transmitter Mounting Kit Number 5327321?12

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5400266?1</td>
<td>Position Transmitter mounting bracket</td>
<td>12</td>
<td>197120?5</td>
<td>Nut, elastic stop (2 req)</td>
</tr>
<tr>
<td>2</td>
<td>0.250-20 x 0.750</td>
<td>Screw, socket head (3 req)</td>
<td>13</td>
<td>5311690?1</td>
<td>Adjustable stud, 2.69 in.</td>
</tr>
<tr>
<td>3</td>
<td>0.250</td>
<td>Lock washer, reg spring (3 req)</td>
<td>14</td>
<td>5311690?2</td>
<td>Adjustable stud, 3.43 in.</td>
</tr>
<tr>
<td>5</td>
<td>0.312-18 x 0.625</td>
<td>Cap screw, hex socket head (2 req)</td>
<td>21</td>
<td>0.375</td>
<td>Lock washer, med spring (3 req)</td>
</tr>
<tr>
<td>6</td>
<td>0.312</td>
<td>Lock washer, reg spring (2 req)</td>
<td>22</td>
<td>0.375-24</td>
<td>Nut, hex jam</td>
</tr>
<tr>
<td>7</td>
<td>R6440-005</td>
<td>Type 347 stainless steel wire, 0.300 diameter, 6-in. length</td>
<td>23</td>
<td>5311687?2</td>
<td>Stem clamp, 0.375 - 0.750-in. dia</td>
</tr>
<tr>
<td>8²</td>
<td>19934?248</td>
<td>Spacer</td>
<td>25</td>
<td>5311691?1</td>
<td>Clamp plate, 0.375 - 0.750-in. dia</td>
</tr>
</tbody>
</table>
### Table 5-2. Position Transmitter Mounting Kit Number 5327321?12 (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9²</td>
<td>0.190-32 x 1.125</td>
<td>Screw, pan head machine</td>
<td>27</td>
<td>0.375-16 x 1.50</td>
<td>Screw, hex skt head cap (2 req)</td>
</tr>
<tr>
<td>10</td>
<td>5312449?4</td>
<td>Connecting link, 12-in. length (cut to fit)</td>
<td>28</td>
<td>0.375-16</td>
<td>Nut, hex jam (2 req)</td>
</tr>
<tr>
<td>11²</td>
<td>0.190-32 x 0.875</td>
<td>Screw, pan head machine (2 req)</td>
<td>29</td>
<td>0.125 dia x 0.750</td>
<td>Groove pin, type 1</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Position Transmitter mounting kits for direct or reverse acting diaphragm actuators and single or double acting piston actuators with linear (reciprocating) motion.
2. When fastening item 10 to the drive arm at the first hole (nearest the drive shaft), use items 8 and 9 and omit one of item 11.

### Table 5-3. Position Transmitter Mounting Kit Number 5327321?13

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5400266?1</td>
<td>Position Transmitter mounting bracket</td>
<td>11²</td>
<td>0.190-32 x 0.875</td>
<td>Screw, pan head machine (2 req)</td>
</tr>
<tr>
<td>2</td>
<td>0.250-20 x 0.750</td>
<td>Screw, socket head (3 req)</td>
<td>12</td>
<td>197120?5</td>
<td>Nut, elastic stop (2 req)</td>
</tr>
<tr>
<td>3</td>
<td>0.250</td>
<td>Lock washer, reg spring (3 req)</td>
<td>14</td>
<td>5311690?2</td>
<td>Adjustable stud, 3.43 in.</td>
</tr>
<tr>
<td>5</td>
<td>0.312-18 x 0.625</td>
<td>Cap screw, hex socket head (2 req)</td>
<td>21</td>
<td>0.375</td>
<td>Lock washer, med spring (3 req)</td>
</tr>
<tr>
<td>6</td>
<td>0.312</td>
<td>Lock washer, reg spring (2 req)</td>
<td>22</td>
<td>0.375-24</td>
<td>Nut, hex jam</td>
</tr>
<tr>
<td>7</td>
<td>R6440-005</td>
<td>Type 347 stainless steel wire, 0.300 diameter, 6-in. length</td>
<td>24</td>
<td>5312483?1</td>
<td>Stem clamp, 0.750 - 1.00-in. dia</td>
</tr>
<tr>
<td>8²</td>
<td>19934?248</td>
<td>Spacer</td>
<td>26</td>
<td>5312471?1</td>
<td>Clamp plate, 0.750 - 1.00-in. dia</td>
</tr>
<tr>
<td>9²</td>
<td>0.190-32 x 1.125</td>
<td>Screw, pan head machine</td>
<td>27</td>
<td>0.375-16 x 1.50</td>
<td>Screw, hex skt head cap (2 req)</td>
</tr>
<tr>
<td>10</td>
<td>5312449?4</td>
<td>Connecting link, 12-in. length (cut to fit)</td>
<td>29</td>
<td>0.125 dia x 0.750</td>
<td>Groove pin, type 1</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Position Transmitter mounting kits for direct or reverse acting diaphragm actuators and single or double acting piston actuators with linear (reciprocating) motion.
2. When fastening item 10 to the drive arm at the first hole (nearest the drive shaft), use items 8 and 9 and omit one of item 11.

### Table 5-4. Position Transmitter Mounting Kit Number 5327321 ?14 (for use on Fisher Actuators)

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5400266?1</td>
<td>Position Transmitter mounting bracket</td>
<td>11²</td>
<td>0.190-32 x 0.875</td>
<td>Screw, pan head machine (2 req)</td>
</tr>
<tr>
<td>2</td>
<td>0.250-20 x 0.750</td>
<td>Screw, socket head (3 req)</td>
<td>12</td>
<td>197120?5</td>
<td>Nut, elastic stop (2 req)</td>
</tr>
<tr>
<td>3</td>
<td>0.250</td>
<td>Lock washer, reg spring (3 req)</td>
<td>15</td>
<td>5319500?11</td>
<td>Drive stud, 4.59 in.</td>
</tr>
<tr>
<td>5</td>
<td>0.312-18 x 0.625</td>
<td>Cap screw, hex socket head (2 req)</td>
<td>16</td>
<td>5319500?1</td>
<td>Drive stud, 3.43 in.</td>
</tr>
<tr>
<td>6</td>
<td>0.312</td>
<td>Lock washer, reg spring (2 req)</td>
<td>17</td>
<td>5328155?1</td>
<td>Stud bracket</td>
</tr>
<tr>
<td>7</td>
<td>R6440-005</td>
<td>Type 347 stainless steel wire, 0.300 diameter, 6-in. length</td>
<td>18</td>
<td>0.312-18 x 0.500</td>
<td>Screw, hex head cap (2 req)</td>
</tr>
<tr>
<td>8²</td>
<td>19934?248</td>
<td>Spacer</td>
<td>19</td>
<td>1218-00</td>
<td>Lock washer, shakeproof (2 req)</td>
</tr>
<tr>
<td>9²</td>
<td>0.190-32 x 1.125</td>
<td>Screw, pan head machine</td>
<td>20</td>
<td>5319524?1</td>
<td>Lock washer, star</td>
</tr>
<tr>
<td>10</td>
<td>5312449?4</td>
<td>Connecting link, 12-in. length (cut to fit)</td>
<td>21</td>
<td>5319524?1</td>
<td>Lock washer, star</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Position Transmitter mounting kits for direct or reverse acting diaphragm actuators and single or double acting piston actuators with linear (reciprocating) motion.
2. When fastening item 10 to the drive arm at the first hole (nearest the drive shaft), use items 8 and 9 and omit one of item 11.