

# AZ/EL/AZ Positioners - Light Duty

AL-4555-1 • AL-4557-1 • AL-4580-1 • AL-4581-1 • AL-4582-LP

These 3-axis positioners provide accurate, balanced rotation, and controllable velocity in the positioning of light-duty antennas under test. Their compact and low-profile design optimizes space in test configurations as well as high operational performance, yielding the best size and weight/performance ratio.

Typically, the unit includes the body, precise bearings, DC motor, gear reducer, encoder and limit switch assemblies. The turntable surface is designed with a threaded mounting-hole pattern for ease of use.

AL-4581-1



## Applications

- General purpose positioning subsystems
- Far-field & near-field antenna measurements
- Small antenna testing
- Indoor use

## Product Highlights

- Compact, low profile design
- High angular positioning
- Adjustable travel in all axes
- Rotary joint 18/40 GHz (Optional)
- Upper AZ through hole (Optional)
- Vertical loads ranging from 13-1000 lbs (6-2200 kg)
- Turntable diameters ranging from 3.7-12.5 in (95-318 mm)
- Excellent angular position accuracy
- Low backlash design
- Precision bearings
- Closed loop servo control
- Industry-standard wiring
- Encoders for optimum speed regulation & control
- Fully enclosed design of drive gear train & data take-off

Specifications - Compact Series AZ/EL/AZ Light Duty Positioners

| PARAMETER                                                                       |               | UNITS   | POSITIONER MODELS |           |                  |                  |            |
|---------------------------------------------------------------------------------|---------------|---------|-------------------|-----------|------------------|------------------|------------|
|                                                                                 |               |         | AL-4555-1         | AL-4557-1 | AL-4580-1        | AL-4581-1        | AL-4582-LP |
| Dimensional Drawing Number                                                      |               | DCD     | 220-1196          | 220-1207  | 212-0960         | 214-0630         | 221-0999   |
| OPERATIONAL                                                                     |               |         |                   |           |                  |                  |            |
| Bending moment (max)                                                            |               | kg-m    | 2                 | 10        | 35               | 80               | 138        |
|                                                                                 |               | ft-lbs  | 14.5              | 72.3      | 250              | 580              | 1000       |
| Vertical load (max)                                                             |               | kg      | 6                 | 25        | 60               | 273              | 1000       |
|                                                                                 |               | lbs     | 13.2              | 55.1      | 132              | 600              | 2200       |
| Delivered torque                                                                | Upper azimuth | kg-m    | 1                 | 7         | 12               | 20               | 70         |
|                                                                                 |               | ft-lbs  | 7.2               | 50.6      | 90               | 150              | 500        |
|                                                                                 | Elevation     | kg-m    | 1                 | 7         | 38               | 60               | 140        |
|                                                                                 |               | ft-lbs  | 7.2               | 50.6      | 273              | 435              | 1000       |
|                                                                                 | Lower azimuth | kg-m    | 1                 | 7         | 12               | 20               | 70         |
|                                                                                 |               | ft-lbs  | 7.2               | 50.6      | 90               | 150              | 500        |
| Withstand torque                                                                | Upper azimuth | kg-m    | 3                 | 10        | 20               | 30               | 83         |
|                                                                                 |               | ft-lbs  | 21.7              | 72.3      | 150              | 210              | 600        |
|                                                                                 | Elevation     | kg-m    | 3                 | 10        | 58               | 80               | 166        |
|                                                                                 |               | ft-lbs  | 21.7              | 72.3      | 420              | 580              | 1200       |
|                                                                                 | Lower azimuth | kg-m    | 3                 | 10        | 20               | 30               | 83         |
|                                                                                 |               | ft-lbs  | 21.7              | 72.3      | 150              | 210              | 600        |
| Drive power                                                                     | Upper azimuth | hp      | 1/30              | 1/20      | 1/8              | 1/8              | 1/3        |
|                                                                                 | Elevation     | hp      | 1/30              | 1/20      | 1/8              | 1/4              | 1/3        |
|                                                                                 | Lower azimuth | hp      | 1/30              | 1/20      | 1/8              | 1/8              | 1/3        |
| Nominal speed                                                                   | Upper azimuth | rpm     | 1                 | 0.7       | 2.4              | 2.4              | 1.5        |
|                                                                                 | Elevation     | deg/min | 360               | 250       | 360              | 360              | 0.7        |
|                                                                                 | Lower azimuth | rpm     | 1                 | 0.7       | 2.4              | 2.4              | 1.5        |
| Position accuracy<br>Std. encoder /<br>High accuracy encoder <sup>1, 2, 3</sup> | Upper azimuth | deg     | ± 0.04            | ± 0.04    | ± 0.04 / ± 0.005 | ± 0.04 / ± 0.005 | ± 0.03     |
|                                                                                 | Elevation     | deg     | ± 0.04            | ± 0.04    | ± 0.04 / ± 0.005 | ± 0.04 / ± 0.005 | ± 0.04     |
|                                                                                 | Lower azimuth | deg     | ± 0.04            | ± 0.04    | ± 0.04 / ± 0.005 | ± 0.04 / ± 0.005 | ± 0.03     |
| Maximum backlash                                                                | Upper azimuth | deg     | 0.05              | 0.05      | 0.05             | 0.05             | ± 0.04     |
|                                                                                 | Elevation     | deg     | 0.05              | 0.05      | 0.05             | 0.05             | ± 0.03     |
|                                                                                 | Lower azimuth | deg     | 0.05              | 0.05      | 0.05             | 0.05             | ± 0.04     |
| Travel <sup>1, 2, 3, 4</sup>                                                    | Upper azimuth | deg     | ± 200             | ± 200     | ± 200            | ± 200            | ± 200      |
|                                                                                 | Elevation     | deg     | ± 92              | ± 92      | ± 92             | ± 92             | ± 92       |
|                                                                                 | Lower azimuth | deg     | ± 200             | ± 92      | ± 200            | ± 200            | ± 200      |
| Counterweight option                                                            |               | kg-m    | -                 | -         | -                | -                | 150        |
|                                                                                 |               | ft-lbs  | -                 | -         | -                | -                | -          |
| Balanced EL torque (maximum) <sup>2, 5</sup>                                    |               | ft-lbs  | -                 | -         | -                | -                | 1080       |
|                                                                                 |               | in      | -                 | -         | -                | -                | 2,3        |

PHYSICAL

|                                     |     |      |      |      |      |       |
|-------------------------------------|-----|------|------|------|------|-------|
| Height at 0° elevation <sup>6</sup> | mm  | 317  | 475  | 674  | 715  | 923.5 |
|                                     | in  | 12.5 | 18.7 | 26.5 | 28.1 | 36.3  |
| Weight                              | kg  | 16   | 25   | 84   | 130  | 260   |
|                                     | lbs | 35   | 55   | 185  | 286  | 573   |
| Turntable diameter                  | mm  | 95   | 150  | 261  | 318  | 319.5 |
|                                     | in  | 3.7  | 5.9  | 10.3 | 12.5 | 12.5  |

ENVIRONMENTAL

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | - 4° F to 140° F (- 20° C to 60° C) |
|-----------------------|-------------------------------------|

| PARAMETER | UNITS | POSITIONER MODELS |           |           |           |            |
|-----------|-------|-------------------|-----------|-----------|-----------|------------|
|           |       | AL-4555-1         | AL-4557-1 | AL-4580-1 | AL-4581-1 | AL-4582-LP |

## OPTIONS

|       |                                         |     |                                  |                                  |                                  |                                  |                                           |
|-------|-----------------------------------------|-----|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------------------|
| EN001 | Incremental encoder (standard accuracy) |     | S                                | S                                | S                                | S                                | Opt                                       |
|       | Accuracy – upper azimuth                | deg | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.03                                    |
|       | Accuracy – elevation                    | deg | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.05                           | ± 0.04                                    |
|       | Accuracy – lower azimuth                | deg | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.04                                    |
| EN002 | Absolute encoder (standard accuracy)    |     | -                                | -                                | -                                | -                                | Opt                                       |
|       | Accuracy – upper azimuth                | deg | -                                | -                                | -                                | -                                | ± 0.05                                    |
|       | Accuracy – elevation                    | deg | -                                | -                                | -                                | -                                | ± 0.05                                    |
|       | Accuracy – lower azimuth                | deg | -                                | -                                | -                                | -                                | ± 0.04                                    |
| EN003 | Absolute encoder (standard accuracy)    |     | -                                | -                                | -                                | -                                | Opt                                       |
|       | Accuracy – upper azimuth                | deg | -                                | -                                | -                                | -                                | ± 0.005                                   |
|       | Accuracy – elevation                    | deg | -                                | -                                | -                                | -                                | ± 0.005                                   |
|       | Accuracy – lower azimuth                | deg | -                                | -                                | -                                | -                                | ± 0.04                                    |
| EN004 | Absolute encoder (standard accuracy)    |     | Opt.                             | Opt.                             | Opt.                             | Opt.                             | Opt                                       |
|       | Accuracy – upper azimuth                | deg | NA                               | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.03                                    |
|       | Accuracy – elevation                    | deg | NA                               | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.04                                    |
|       | Accuracy – lower azimuth                | deg | NA                               | ± 0.04                           | ± 0.04                           | ± 0.04                           | ± 0.04                                    |
| SR    | Slip ring <sup>3, 10</sup>              |     | -                                | -                                | SR051U<br>SR101U<br>SR201U       | SR051U<br>SR101U<br>SR201U       | SR051U<br>SR101U<br>SR201U                |
| RJ    | Rotary joint <sup>3, 10</sup>           |     | RJ18L<br>RJ26L<br>RJ40L<br>RJ50L | RJ18L<br>RJ26L<br>RJ40L<br>RJ50L | RJ18L<br>RJ26L<br>RJ40L<br>RJ50L | RJ18L<br>RJ26L<br>RJ40L<br>RJ50L | RJ12U<br>RJ18L<br>RJ26L<br>RJ40L<br>RJ50L |
| TH    | Central thru-hole inner diameter        |     | S                                | S                                | TH002<br>TH003                   | TH002<br>TH003                   | TH002-U-E                                 |
|       |                                         | in  | 0.75                             | 1.6                              | 1.5                              | 2.5                              | 2.4                                       |
|       |                                         | mm  | 20                               | 40                               | 38                               | 63                               | 60                                        |
| EX    | Internal harnessing                     |     | -                                | -                                | -                                | -                                | EX002                                     |
| CF    | Connector format                        |     | -                                | -                                | -                                | -                                | -                                         |
| LS    | Leveling screw (set)                    |     | -                                | -                                | -                                | -                                | -                                         |
| ST    | Stow lock                               |     | -                                | -                                | -                                | -                                | ST002U<br>ST002E                          |
| MM    | Mounting thread (MM Std.)               |     | -                                | -                                | MM002<br>MM003                   | MM002<br>MM003                   | MM002                                     |
| IC    | Interlock circuit                       |     | -                                | -                                | -                                | -                                | IC002                                     |
| WG    | Wedge                                   |     | -                                | -                                | -                                | -                                | WG001                                     |

(-) N/A    S Standard    Opt Optional

## Supplied Accessories

### Digital Documentation Set

User manual (installation, setup, operation & maintenance)

### Technical Notes

- 1** With direct-drive encoder option implementation, the accuracy will be ± 0.005° and positioner dimensions might change slightly. (Only for AL-4580/1).
- 2** Direct drive high accuracy options are not available for the small models, AL-4555-1 and AL-4557-1 due to size. For required enhanced accuracy contact factory.
- 3** Incremental encoder pour AL-5832-LP
- 4** Pre-adjusted at factory to ± 200° or according to customer order specifications.
- 5** Base riser shall be applied with counter-weight option to avoid collision with the floor ( options BR and CW001).
- 6** Height of positioner AL-4555-1 and AL-4557-1 can be reduced to approx. 60 mm when positioners are installed with cables hanging below.
- 7** All accuracy data is based on no-load conditions. Contact MVG-ORBIT/FR for accuracy under load conditions.

- 8** AL-4580-1 & AL-4581-1 are equipped with adjustable limit switches capable of approx. 20° to 400° total travel. When rotary joint and slip ring options are specified, limit switches remain but are electrically disabled. Multi-axis positioners are factory-set at:
  - Azimuth Axis: ± 200°    • Elevation Axis: ± 92°
- 9** AL-4555 & AL-4557 are equipped with adjustable limit for coarse adjustments only.
- 10** Slip ring & rotary joint option notes:
  - Certain slip ring options may require an extension cap that protrudes above the turntable surface. Positioner height may increase. Consult MVG-ORBIT/FR.
  - Slip ring contacts for customer use are provided with dedicated connectors.
  - When rotary joint and/or slip ring options are specified, no central thru-hole is available to the user. Option TH002 and TH003 are available in lieu of rotary joint and/or slip ring options.
- 11** For slip ring option in AL-4555-1 and AL-4557-1 consult factory. Synchro and direct-drive encoders are not applicable for these models due to their compact size.
- 12** For outdoor applications, contact factory.
- 13** DD Encoder option cannot be combined with TH option
- 14** SR option cannot be combined with TH option

