

## ■ Sensor Heads

| Item                                     | ZX-TDS01T                                                                                                        | ZX-TDS04T       | ZX-TDS04T-L    |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------|----------------|
| Measurement range                        | 1 mm                                                                                                             | 4 mm            |                |
| Maximum actuator travel distance         | Approx. 1.5 mm                                                                                                   | Approx. 5 mm    |                |
| Resolution (See note 1.)                 | 0.1 $\mu$ m                                                                                                      |                 |                |
| Linearity (See note 2.)                  | 0.3% F.S.                                                                                                        |                 |                |
| Operating force (See note 3.)            | Approx. 0.7 N                                                                                                    |                 | Approx. 0.25 N |
| Degree of protection (Sensor Head)       | IEC60529, IP67                                                                                                   |                 | IEC60529, IP54 |
| Mechanical durability                    | 10,000,000 operations min.                                                                                       |                 |                |
| Ambient temperature                      | Operating: 0°C to 50°C (with no icing or condensation)<br>Storage: -15°C to 60°C (with no icing or condensation) |                 |                |
| Ambient humidity                         | Operating and storage: 35% to 85% (with no icing or condensation)                                                |                 |                |
| Temperature characteristic (See note 4.) | Sensor Head                                                                                                      | 0.03% F.S./°C   |                |
|                                          | Preamplifier                                                                                                     | 0.01% F.S./°C   |                |
| Weight (packed state)                    | Approx. 100 g                                                                                                    |                 |                |
| Materials                                | Sensor Head                                                                                                      | Stainless steel |                |
|                                          | Preamplifier                                                                                                     | Polycarbonate   |                |
| Accessories                              | Instruction manual, Preamplifier Mounting Brackets (ZX-XBT1)                                                     |                 |                |

**Note 1.** The resolution is given as the minimum value that can be read when a ZX-TDA□1 Amplifier Unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.

**2.** The linearity is given as the error in an ideal straight line displacement output.

**3.** These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.

**4.** These figures are representative values that apply for the mid-point of the measurement range.

## ■ Sensor (Long-range Type)

| Item                                             | ZX-TDS10T                                                                                                       | ZX-TDS10T-V     | ZX-TDS10T-L     | ZX-TDS10T-VL           |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------------|
| Vacuum retract (VR) and air push (AP) compatible | No                                                                                                              | VR              | No              | VR/AP                  |
| Measurement range                                | 10 mm                                                                                                           |                 |                 |                        |
| Maximum actuator travel distance                 | 10.5 mm                                                                                                         |                 |                 |                        |
| Resolution (See notes 1 and 5.)                  | 0.4 $\mu$ m                                                                                                     |                 |                 |                        |
| Linearity (See notes 2 and 5.)                   | ±0.5% F.S.                                                                                                      |                 |                 |                        |
| Operating force (See note 3.)                    | Approx. 0.7 N                                                                                                   | Approx. 0.6 N   | Approx. 0.065 N | Approx. 0.09 to 1.41 N |
| Air pressure                                     | Vacuum retracting                                                                                               | ---             | ---             | -0.22 to -0.5 (bar)    |
|                                                  | Air push                                                                                                        | ---             |                 | 0.125 to 2 (bar)       |
| Degree of protection                             | Sensor Head                                                                                                     | IP65            | IP50            |                        |
|                                                  | Preamplifier                                                                                                    | IP40            |                 |                        |
| Mechanical durability                            | 10,000,000 operations min.                                                                                      |                 |                 |                        |
| Ambient temperature                              | Operating: 0 to 50°C (with no icing or condensation), Storage: -10 to 60°C (with no icing or condensation)      |                 |                 |                        |
| Ambient humidity                                 | Operating and storage: 35% to 85% (with no icing or condensation)                                               |                 |                 |                        |
| Temperature characteristic (See note 4.)         | Sensor Head                                                                                                     | ±0.01% F.S./°C  |                 |                        |
|                                                  | Preamplifier                                                                                                    | ±0.01% F.S./°C  |                 |                        |
| Vibration resistance                             | 0.35-mm single amplitude at 10 to 55 Hz for 50 min each in the X, Y, and Z directions                           |                 |                 |                        |
| Shock resistance                                 | 150 m/S <sup>2</sup> 3 times each in 6 directions (up/down, left/right, and forward/backward)                   |                 |                 |                        |
| Connection method                                | Prewired connector (2 m from the Sensor Head to the Preamplifier, 0.2 m from the Preamplifier to the connector) |                 |                 |                        |
| Weight (packed state)                            | Approx. 100 g                                                                                                   |                 |                 |                        |
| Materials                                        | Sensor Head                                                                                                     | Stainless steel |                 |                        |
|                                                  | Rubber sleeve                                                                                                   | Viton           | None            |                        |
|                                                  | Preamplifier                                                                                                    | Polycarbonate   |                 |                        |
|                                                  | Mounting Brackets                                                                                               | Stainless steel |                 |                        |
| Accessories                                      | Instruction manual, Preamplifier Mounting Brackets (ZX-XBT1), Right-angle Adapter (See note 6.)                 |                 |                 |                        |

**Note 1.** The resolution indicates the variation ( $\pm 3\sigma$ ) in the linear output (voltage output) when a ZX-TDA□1 Amplifier Unit is connected. This value is taken 30 minutes after turning ON the power with the average number of operations set to 1,024. The minimum value that can be read is 1  $\mu$ m.

**2.** The linearity is given as the error in an ideal straight line displacement output.

**3.** These figures are representative values that apply for the mid-point of the measurement range when the Actuator provided is secured facing downward.

- ZX-TDS10T and ZX-TDS10T-V: The operating force will be reduced if the Actuator is secured facing horizontally or upward.

- ZX-TDS10T-L and ZX-TDS10T-VL: The actuator can be installed only facing downward.

**4.** These figures are representative values that apply for the mid-point of the measurement range.

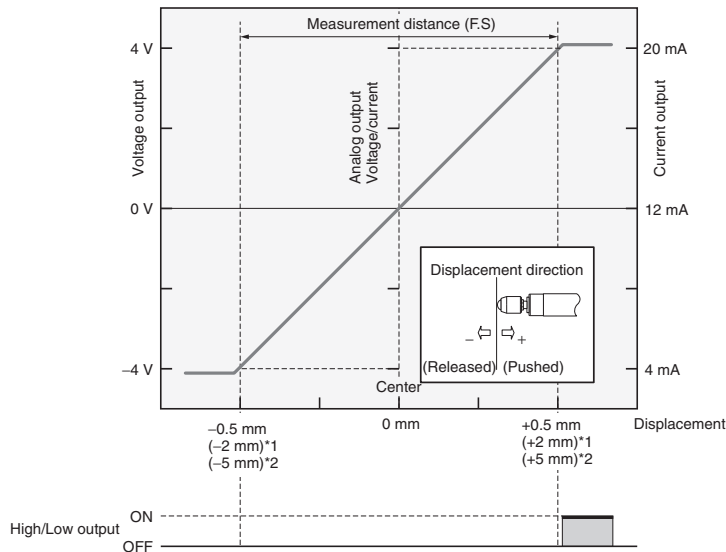
**5.** These values were measured at an ambient temperature of 23°C.

**6.** The ZX-TDS10T comes with a Right-angle Adapter.

# Characteristic Data

## Output Characteristics Voltage/Current Output

ZX-TDS01T/-TDS04T-□□/-TDS10T-□□

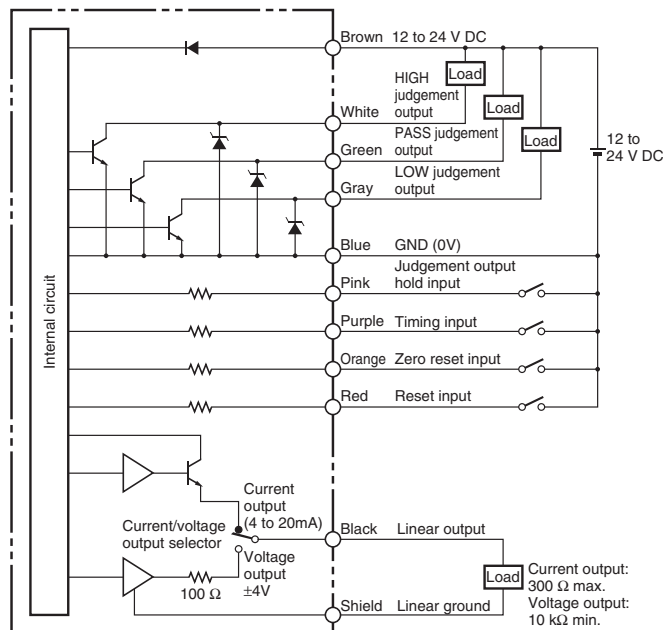


\*1: Values for the ZX-TDS04T/-TDS04T-□□.

\*2: Values for the ZX-TDS10T/-TDS10T-□□.

## I/O Circuit Diagrams

### NPN Amplifier Unit: ZX-TDA11



### PNP Amplifier Unit: ZX-TDA41

