# Digital Amplifier Ultrasonic Sensor E4C-UDA Series

A Reflective Sensor That Handles All Types of Sensing Object Colors and Patterns OMRON

# realrzing



#### Compact with a Broad Selection of Side-view Heads

A wide range of Side-view Models are available in an M18 metal body - the smallest in its class.

This is the first multi-detection sensor that handles all types of sensing object.

The Head conforms to IP65, which means it can be used in environments exposed to dust and moisture (Sensor Head only).





Short body

ody Side view

Long range

### Free-cut Cable

The cable between the Sensor Head and amplifier uses clamp connectors that conform to OMRON original Econ specifications, which makes it easy to cut and adjust the cable length.







#### Side-by-side Mounting Possible



There is no mutual interference even with side-by-side

\*Mutual interference may occur under some conditions.

Note: The ultrasonic waves shown are an illustration only.

# Slim Amplifier with Useful Functions



feature of the E4C-UDA Series is the small error margin in the measurement values.



# **Easy-to-read Digital Distance Display**



### Simple Settings Using Key Operations

# **Variety of Applications**

#### •Detection of Transparent Trays



Inspection of Solvent Tank Levels



Detection of Sheet Sag



Detection of Tires



Control of Rubber Sheet Tension



 Detection of Position of Remaining Glass Substrates in Cassettes



Note: The E4C-UDA Series cannot be used in some circumstances, depending on the conditions.

# Digital Amplifier Ultrasonic Sensor E4C-UDA

CSM\_E4C-UDA\_DS\_E\_12\_1

## Compact, Cylindrical Reflective Ultrasonic Sensor with Easy Setting

- Stable operation for a variety of objects regardless of color, transparency, or material (metallic or non-metallic).
- Compact M18-sized cylindrical Head. Product lineup includes Side-view Heads.
- Check the sensing object distance and sensing position (i.e., threshold) on the digital display.
- Easily make settings for workpiece presence/absence and elimination of background influence by using teaching.
- Amplifiers include models with analog outputs.





### **Ordering Information**

### Sensor

Sensor Heads (Refer to Dimensions on page 4.)

| Shape | Model     | Measurement range | Model     |
|-------|-----------|-------------------|-----------|
| M18   | Straight  | 60 to 075 mm      | E4C-DS30  |
|       | Side view | 60 to 275 mm      | E4C-DS30L |
|       | Straight  | 95 to 725 mm      | E4C-DS80  |
|       | Side view | 65 to 735 mm      | E4C-DS80L |
|       | Straight  | 110 to 910 mm     | E4C-DS100 |

#### Amplifiers (Refer to Dimensions on page 4.)

| Shape  | Power supply | Output specifications | Model       |
|--|--------------|-----------------------|-------------|
| and the second sec | DC           | NPN output            | E4C-UDA11   |
|  |              |                       | E4C-UDA11AN |
|  |              | PNP output            | E4C-UDA41   |
|  |              |                       | E4C-UDA41AN |

#### Accessories (Order Separately)

Mounting Bracket (Refer to E39-L, E39-S, and E39-R.)

A Mounting Bracket is not provided with the Amplifier Unit. Order a Mounting Bracket separately if required.

| Appearance     | Model    | Quantity |  |
|----------------|----------|----------|--|
| and the second | E39-L143 | 1        |  |

End Plate (Refer to PFP-D.)

An End Plate is not provided with the Amplifier Unit. Order an End Plate separately if required.

| Appearance | Model | Quantity |
|------------|-------|----------|
| C S        | PFP-M | 1        |

## **Ratings and Specifications**

### **Sensor Heads**

| Item Model                       | E4C-DS30  | E4C-DS30L                          | E4C-DS80        | E4C-DS80L                                       | E4C-DS100     |
|----------------------------------|---|------------------------------------|-----------------|---|---------------|
| Measurement range                | 60 to 275 mm  |                                    | 85 to 735 mm    |   | 110 to 910 mm |
| Standard sensing object          | 100 × 100 mm SUS  | $100 \times 100$ mm SUS flat plate |                 |   |               |
| Near distance dead band          | 0 to 50 mm  |                                    | 0 to 70 mm      |   | 0 to 90 mm    |
| Ultrasonic oscillation frequency | Approx. 390 kHz   |                                    | Approx. 255 kHz |   |               |
| Response speed *                 | 30 ms   |                                    | 100 ms          |   | 125 ms        |
| Ambient temperature range        | Operating: -25 to +70°C, Storage: -40 to +85°C (with no icing or condensation)    |                                    |                 |   |               |
| Ambient humidity range           | Operating and storage: 35% to 85% (with no condensation)                          |                                    |                 |   |               |
| Enclosure rating                 | IP65  |                                    |                 |   |               |
| Indicator                        | (Yellow) Lit: Sensor within sensing range<br>(Green) Lit: Power indicator         |                                    |                 | (Yellow)<br>Lit: Sensor within<br>sensing range |               |
| Weight                           | Approx. 150 g Approx. 170 g   |                                    |                 | Approx. 170 g                                   |               |
| Materials                        | Case: Nickel-plated brass, Oscillator surface: Glass epoxy resin and polyurethane |                                    |                 |   |               |
| Accessories                      | Instruction Manual, XS2F-D523-D80-A (Cable length: 2 m), XN2A-1430                |                                    |                 |   |               |

\* This value is the average number of operations set to 256.

#### Amplifiers

|   | Model   | E4C-UDA11   | E4C-UDA41  | E4C-UDA11AN               | E4C-UDA41AN                 |  |
|---|---|---|------------|---------------------------|-----------------------------|--|
| Item  | Туре  | Twin Output Models  |            | Analog Output Models      |                             |  |
| Output configuration         NPN output         PNP output         NPN output |   |   | NPN output | PNP output                |                             |  |
| Connection metho  | bd  | Pre-wired   |            |                           | ·                           |  |
| Supply voltage  |   | 12 to 24 VDC ±10%, ripple 10% max.  |            |                           |                             |  |
| Current consump   | tion  | 80 mA max.  |            |                           |                             |  |
| Control output  |   | NPN open collector (26.4 VDC max.),<br>Load current: 50 mA max., Residual voltage: 1 V max. |            |                           |                             |  |
| Timer   |   | OFF/OFF-delay/ON-dela   | y/one-shot |                           |                             |  |
| Timer time  |   | 1 ms to 5 s   |            |                           |                             |  |
|   | Connected load  |   |            | Voltage output (1 to 5 VE | Voltage output (1 to 5 VDC) |  |
|   | Output form   | *   |            | 10 k $\Omega$ min.        |                             |  |
| Analog output   | Resolution  |   |            | 1.0% F.S.                 |                             |  |
|   | Temperature<br>characteristics  |   |            | 0.3% F.S./°C              |                             |  |
|   | Repeat accuracy   |   |            | 2.0% F.S. *               |                             |  |
|   | Linearity   |   |            | Within ±2% F.S.           |                             |  |
| Protective circuit  |   | Power supply reverse polarity protection, output short-circuit protection                   |            |                           |                             |  |
| Ambient temperat  | emperature range Operating: -25 to +55°C, Storage: -30 to +70°C (with no icing or condensation) |   |            | on)                       |                             |  |
| Ambient humidity  | range   | Operating and storage: 35% to 85% (with no condensation)                                    |            |                           |                             |  |
| Insulation resistant  | nce   | 50 MΩ min. (at 500 VDC)   |            |                           |                             |  |
| <b>Dialectic strength</b>   |   | 1,000 VAC, 50/60 Hz for 1 min   |            |                           |                             |  |
| Vibration resistance  |   | 10 to 150 Hz, 0.75-mm double amplitude, 80 min each in X, Y, and Z directions               |            |                           | ns                          |  |
| Shock resistance  |   | 500 m/s <sup>2</sup> , 3 times each in X, Y and Z directions                                |            |                           |                             |  |
| Enclosure rating  |   | IP 50   |            |                           |                             |  |
| Materials   | Case: PBT (polybutylene terephthalate), Cover: Polycarbonate                                    |   |            |                           |                             |  |
| Weight (packed st   | Weight (packed state) Approx. 150 g   |   |            |                           |                             |  |
| Accessories Instruction Manual  |   |   |            |                           |                             |  |

\* Value one hour after the product is turned ON. External disturbances, however, sometimes cause minute outputs.

## **Engineering Data (Reference Values)**

### **Operating Range**







## I/O Circuit Diagrams

#### E4C-UDA11 (NPN)



### E4C-UDA11AN (NPN)



### E4C-UDA41 (PNP)



#### E4C-UDA41AN (PNP)



### Safety precautions

#### Refer to Warranty and Limitations of Liability.

#### <u> WARNING</u>

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



### **Precautions for Correct Use**

Do not use the product in atmospheres or environmets that exceed product ratings.

- Separate the Sensor wiring from power supply and high-voltage lines. If Sensor wiring is placed together with or in the same duct as power supply or high-voltage lines, inductance may cause malfunction or damage to the Sensor.
- The extended cable length must be no more than 10 m. To extend the cable length, use 0.3  $\rm mm^2$  cable.
- Detection will be possible 200 ms or longer after the power supply is turned ON. If separate power supplies are used for the load and the Sensor, turn ON the power supply to the Sensor first.
- Make sure that the cover to the Amplifier is in place before using the Sensor.

- If a writing error occurs (ERR/EEP will flash on the display) due to noise resulting from turning OFF the power supply, static electricity, or other cause, initialize the settings using the SET switch on the Amplifier.
- Depending on the application environment, some time may be required for the displayed distance to stabilize after turning ON the power supply.
- Output pulses may be generated when the power supply to the Amplifier is turned OFF. Turn OFF the load or the power supply to the load before turning OFF the Sensor.
- Do not use thinners, benzine, acetone, kerosene, or any other petroleum solvents to clean the Sensor or Amplifier.
- Turn OFF the power supply before connecting or disconnecting the Sensor Head.
- Use only an E4C Sensor Head. The product may be damaged if any other Sensor Head is connected.
- The distance displayed on the Amplifier may be different from values obtained with tape measures or other devices.
   To adjust the displayed distance, use the scaling function.

### E4C-UDA

### **Dimensions**

(Unit: mm) Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.



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4-mm diameter vinyl-insulated round cable with 4 conductors

(cross-sectional of conductors: 0.2 mm<sup>2</sup>, insulation system: 1.1-mm diameter), Standard length: 2 m

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4-mm diameter vinyl-insulated round cable with 4 conductors

(cross-sectional of conductors: 0.2 mm<sup>2</sup>, insulation system: 1.1-mm diameter), Standard length: 2 m

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