

### Miniature Sensors with Separate Amplifiers Fit Tight Spaces

- Fast, 1 ms response time
- Light incident indicator on sensor
- Dust-resistant flat lens surface
- New, thin side view model
- Prewired sensors have 2 m (6.56 ft) cable
- Amplifier with built-in ON-, OFF- and one-shot delays available
- New prewired DC amplifier designed for track mounting has alarm output to signal unstable sensing conditions



## Ordering Information

### ■ SENSORS

#### Through-beam Type

|                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |               |
|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------|
| Shape            |  |  |  |  |  |  |               |
| Sensing distance | 10 cm (3.94 in)                                                                     | 20 cm (7.87 in)                                                                     | 30 cm (11.81 in)                                                                    |                                                                                     | 50 cm (19.69 in)                                                                      | 1 m (3.28 ft)                                                                         | 2 m (6.56 ft) |
| Part number      | E3C-S10                                                                             | E3C-S20W                                                                            | E3C-S30W                                                                            | E3C-S30T                                                                            | E3C-S50                                                                               | E3C-1                                                                                 | E3C-2         |

#### Diffuse Reflective Type

|                  |                                                                                     |                                                                                     |  |
|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| Shape            |  |  |  |
| Sensing distance | 5 cm (1.97 in)                                                                      | 10 cm (3.94 in)                                                                     |  |
| Part number      | E3C-DS5W                                                                            | E3C-DS10                                                                            |  |

### ■ AMPLIFIERS

|                 |                                                                                                                |                                   |                                                                                                         |                                                                                               |                 |                                                                                                      |          |
|-----------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------|----------|
| Shape           |  Fits 1/16 DIN panel cutout |                                   |  For S3D8 controller |  Miniature |                 |  Slim, prewired |          |
| Supply voltage  | 100 to 240 VAC, 50/60 Hz                                                                                       |                                   | 12 to 24 VDC                                                                                            |                                                                                               |                 |                                                                                                      |          |
| Output          | Relay and NPN solid-state                                                                                      |                                   | NPN and PNP solid-state                                                                                 | NPN solid-state                                                                               | PNP solid-state | NPN                                                                                                  | PNP      |
| Timer functions | —                                                                                                              | ON-delay<br>OFF-delay<br>One-shot | —                                                                                                       | —                                                                                             |                 | 40 ms OFF-delay                                                                                      |          |
| Mounting style  | Socket (included)                                                                                              |                                   | Track                                                                                                   | Socket Track (order separately)                                                               |                 |                                                                                                      |          |
| Part number     | E3C-A                                                                                                          | E3C-C                             | E3C-WH4F                                                                                                | E3C-GE4                                                                                       | E3C-GF4         | E3C-JC4P                                                                                             | E3C-JB4P |

## ■ ACCESSORIES

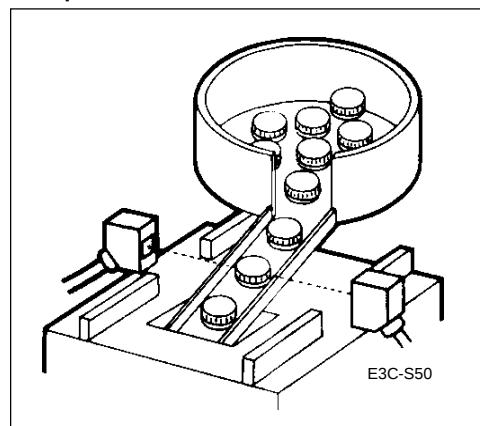
| Description                            | Part number                                                       |          |
|----------------------------------------|-------------------------------------------------------------------|----------|
| Mounting brackets                      | U-shaped, for E3C-S10, with 10 mm (0.394 in) sensing distance gap | OAC-T1   |
|                                        | U-shaped, for E3C-S10, with 20 mm (0.787 in) sensing distance gap | OAC-T2   |
|                                        | U-shaped, for E3C-S10, with 30 mm (1.181 in) sensing distance gap | OAC-T3   |
|                                        | L-shaped, for E3C-DS10                                            | E39-L42  |
|                                        | L-shaped, for E3C-S50                                             | E39-L31  |
| Sockets required for E3C-G□4 amplifier | Bottom surface mount socket                                       | PYF08M   |
|                                        | Combination bottom surface and track-mount socket                 | PYF08A-E |
| Mounting track                         | DIN rail, 50 cm (1.64 ft) length                                  | PFP-50N  |
|                                        | DIN rail, 1 m (3.28 ft) length                                    | PFP-100N |
|                                        | End plate                                                         | PFP-M    |
|                                        | Spacer                                                            | PFP-S    |

## ■ REPLACEMENT PARTS

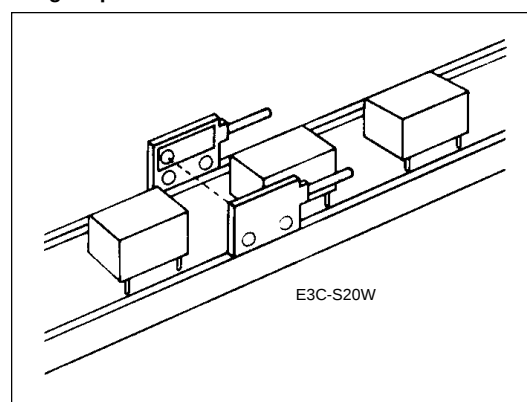
| Description                                       | Part number |
|---------------------------------------------------|-------------|
| Track-mount socket for E3C-A and E3C-C amplifiers | PF113A-E    |
| Mounting bracket for E3C-1                        | E39-L41     |
| Mounting bracket for E3C-2                        | E39-L42     |
| Mounting bracket for E3C-J□4P                     | E39-L48     |

## ■ TYPICAL APPLICATIONS

Detect parts coming from a bowl feeder in a space-confined location



Space-saving flat sensors can detect small parts in tight spaces



# Specifications

## ■ THROUGH-BEAM TYPE

|                     |                                                              |                                                                                                       |                                      |                                                                                |                                                                             |                                                                             |
|---------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Part number         | E3C-S10                                                      | E3C-S20W                                                                                              | E3C-S30□                             | E3C-S50                                                                        | E3C-1                                                                       | E3C-2                                                                       |
| Sensing distance    | 10 cm (3.94 in)                                              | 20 cm (7.87 in)                                                                                       | 50 cm (1.64 ft)                      |                                                                                | 1 m (3.28 ft)                                                               | 2 m (3.28 ft)                                                               |
| Light source        | Pulse modulated infrared LED                                 |                                                                                                       |                                      |                                                                                |                                                                             |                                                                             |
| Detectable object   | Type                                                         | Opaque materials                                                                                      |                                      |                                                                                |                                                                             |                                                                             |
|                     | Size                                                         | 2 mm (0.08 in) min. dimension                                                                         | 2 mm (0.09 in) min. dimension        | 3 mm (1.18 in) min. dimension                                                  | 4 mm (0.16 in) min. dimension                                               | 8 mm (0.32 in) min. dimension                                               |
| Required amplifier  | E3C-A, E3C-C, E3C-GE4, E3C-GF4, E3C-JC4P, E3C-JB4P, E3C-WH4F |                                                                                                       |                                      |                                                                                |                                                                             |                                                                             |
| Indicators          | Emitter                                                      | Light Incident (red LED)                                                                              |                                      |                                                                                |                                                                             |                                                                             |
|                     | Receiver                                                     | None                                                                                                  |                                      |                                                                                |                                                                             |                                                                             |
| Materials           | Lens                                                         | Plastic, polycarbonate                                                                                |                                      |                                                                                |                                                                             |                                                                             |
|                     | Case                                                         | Plastic, polycarbonate                                                                                |                                      |                                                                                |                                                                             | Zinc die-cast                                                               |
|                     | Cable sheath                                                 | Plastic, polyethylene                                                                                 |                                      |                                                                                |                                                                             |                                                                             |
| Mounting            |                                                              | Side surface with two through holes. Brackets OAC-T1, OAC-T2, OAC-T3 optional, see Accessories        | Side surface with two through holes. | Side surface with two through holes. Bracket E39-L31 optional, see Accessories | Side surface with two through holes. Bracket E39-L41 and hardware included. | Side surface with two through holes. Bracket E39-L42 and hardware included. |
| Connections         | Prewired                                                     | Emitter: 2-conductor cable, 2 m (6.56 ft) length<br>Receiver: 2-conductor cable, 2 m (6.56 ft) length |                                      |                                                                                |                                                                             |                                                                             |
| Weight              | Emitter                                                      | 25 g (0.9 oz.)                                                                                        |                                      |                                                                                | 30 g (1.1 oz.)                                                              | 60 g (2.2 oz.)                                                              |
|                     | Receiver                                                     | 25 g (0.9 oz.)                                                                                        |                                      |                                                                                | 30 g (1.1 oz.)                                                              | 60 g (2.2 oz.)                                                              |
| Enclosure ratings   | UL                                                           | —                                                                                                     |                                      |                                                                                |                                                                             |                                                                             |
|                     | NEMA                                                         | 1, 2, 12                                                                                              | 1                                    | 1                                                                              | 1, 2, 12                                                                    | 1, 2, 4, 4X, 12                                                             |
|                     | IEC 144                                                      | IP64                                                                                                  | IP50                                 | IP60                                                                           | IP64                                                                        | IP66                                                                        |
| Approvals           | UL                                                           | —                                                                                                     |                                      |                                                                                |                                                                             |                                                                             |
|                     | CSA                                                          | —                                                                                                     |                                      |                                                                                |                                                                             |                                                                             |
| Ambient temperature | Operating                                                    | -25° to 70°C (-13° to 158°F)                                                                          |                                      |                                                                                |                                                                             |                                                                             |
|                     | Storage                                                      | -25° to 70°C (-13° to 158°F)                                                                          |                                      |                                                                                |                                                                             |                                                                             |

## ■ DIFFUSE REFLECTIVE TYPE

|                        |              |                                                                          |                                                                                    |
|------------------------|--------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Part number            |              | E3C-DS5W                                                                 | E3C-DS10                                                                           |
| Sensing distance       |              | 5 cm (1.97 in) with 10 X 10 cm (3.94 in) 90% reflectance white mat paper | 10 cm (3.94 in) with 5 X 5 cm (1.97 in) 90% reflectance white mat paper            |
| Detectable object type |              | Opaque and transparent materials                                         |                                                                                    |
| Required amplifier     |              | E3C-A, E3C-C, E3C-GE4, E3C-GF4, E3C-JC4P, E3C-JB4P, E3C-WH4F             |                                                                                    |
| Indicators             |              | Light Incident (red LED)                                                 |                                                                                    |
| Materials              | Lens         | Plastic, polycarbonate                                                   |                                                                                    |
|                        | Case         | Plastic, polycarbonate                                                   |                                                                                    |
|                        | Cable sheath | Plastic, polyethylene                                                    |                                                                                    |
| Mounting               |              | Side surface with two through holes.                                     | Side surface with two through holes.<br>Bracket E39-L42 optional, see Accessories. |
| Connections            | Prewired     | 4-conductor cable, 2 m (6.56 ft) length                                  |                                                                                    |
| Weight                 |              | 50 g (1.8 oz.)                                                           |                                                                                    |
| Enclosure ratings      | UL           | —                                                                        |                                                                                    |
|                        | NEMA         | 1                                                                        | 1, 2, 12                                                                           |
|                        | IEC 144      | IP50                                                                     | IP64                                                                               |
| Approvals              | UL           | —                                                                        |                                                                                    |
|                        | CSA          | —                                                                        |                                                                                    |
| Ambient temperature    | Operating    | -25° to 70°C (-13° to 158°F)                                             |                                                                                    |
|                        | Storage      | -25° to 70°C (-13° to 158°F)                                             |                                                                                    |

## ■ AMPLIFIERS

### AC Powered

|                     |                |                            |                                                                                    |                                                       |
|---------------------|----------------|----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------|
| Part number         |                |                            | E3C-A                                                                              | E3C-C                                                 |
| Supply voltage      |                |                            | 100 to 240 VAC, 50/60 Hz                                                           |                                                       |
| Power consumption   |                |                            | 3 VA max.                                                                          |                                                       |
| Operation mode      |                |                            | Light-ON/Dark-ON, switch selectable                                                |                                                       |
| Sensitivity         |                |                            | Adjustable                                                                         |                                                       |
| Control output      | Relay          | Type                       | SPDT                                                                               |                                                       |
|                     |                | Max. load                  | 1 A, 240 VAC (p.f. = 1)                                                            |                                                       |
|                     |                | Min. load                  | 1 mA, 5 VDC                                                                        |                                                       |
|                     | DC solid-state | Type                       | NPN-SPST with constant current source                                              |                                                       |
|                     |                | Max. load                  | Load (relay, sink) logic, 80 mA, 24 VDC<br>Voltage logic (source): 1.5 to 4 mA     |                                                       |
|                     |                | Max. on-state voltage drop | 1.0 VDC                                                                            |                                                       |
| Response time       | ON             | Solid-state                | 1 ms or 2 ms max., switch selectable                                               |                                                       |
|                     |                | Contact                    | 20 ms max.                                                                         |                                                       |
|                     | OFF            | Solid-state                | 1 ms or 2 ms max., switch selectable                                               |                                                       |
|                     |                | Contact                    | 20 ms max.                                                                         |                                                       |
| Timer functions     |                | Type                       | —                                                                                  | ON-delay, OFF-delay, one-shot, switch selectable      |
|                     |                | Range                      | —                                                                                  | 0.1 to 1 second or 1 to 10 seconds, switch selectable |
| Circuit protection  |                | Output short-circuit       | Not available                                                                      |                                                       |
| Indicators          |                |                            | Light Incident (red LED), Output Stability (green LED), Output Operation (red LED) |                                                       |
| Materials           |                | Case                       | Plastic                                                                            |                                                       |
| Mounting            |                |                            | Requires PF113A-E socket (included); socket mount to DIN rail track                |                                                       |
| Connections         |                |                            | Terminal screws on socket                                                          |                                                       |
| Weight              |                |                            | 220 g (7.8 oz.), including socket                                                  |                                                       |
| Enclosure ratings   | UL             |                            | —                                                                                  |                                                       |
|                     | NEMA           |                            | 1                                                                                  |                                                       |
|                     | IEC144         |                            | IP20                                                                               |                                                       |
| Approvals           | UL             |                            | —                                                                                  |                                                       |
|                     | CSA            |                            | —                                                                                  |                                                       |
| Ambient temperature | Operating      |                            | -10° to 55°C (14° to 131°F)                                                        |                                                       |
|                     | Storage        |                            | -25° to 70°C (-13° to 158°F)                                                       |                                                       |

### DC Powered

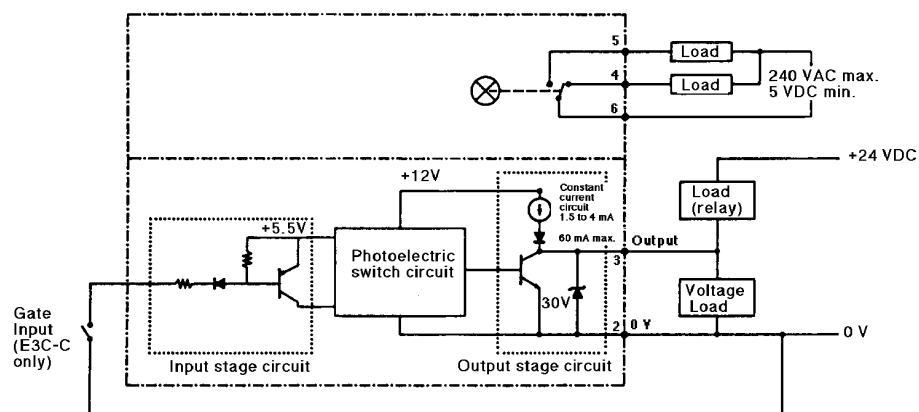
|                     |                |                                  |                                                             |                    |                                                                                |                    |                                     |
|---------------------|----------------|----------------------------------|-------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------|--------------------|-------------------------------------|
| Part number         |                |                                  | E3C-JB4P                                                    | E3C-JC4P           | E3C-GE4                                                                        | E3C-GF4            | E3C-WH4F                            |
| Supply voltage      |                |                                  | 12 to 24 VDC ±10%; 1 V max. permissible ripple peak-to-peak |                    |                                                                                |                    |                                     |
| Current consumption |                |                                  | 50 mA                                                       |                    |                                                                                |                    |                                     |
| Operation mode      |                |                                  | Light-ON/Dark-ON switch selectable                          |                    | Light-ON/Dark-ON, jumper selectable                                            |                    | Light-ON/Dark-ON switch selectable  |
| Sensitivity         |                |                                  | Adjustable                                                  |                    |                                                                                |                    |                                     |
| Control output      | DC solid-state | Type                             | PNP output                                                  | NPN output         | NPN output with constant current source                                        | PNP output         | NPN and PNP open collector outputs  |
|                     |                | Max. load                        | 100 mA max. 24 VDC                                          | 100 mA max. 24 VDC | Load (relay, sink) logic: 80 mA, 24 VDC<br>Voltage logic (source): 1.5 to 4 mA | 100 mA max. 24 VDC | 100 mA, 40 VDC (each output)        |
|                     |                | Max. on-state voltage drop       | 0.7 VDC                                                     | 0.7 VDC            | 1.2 VDC                                                                        |                    | 0.7 VDC                             |
| Alarm output        |                | Type                             | PNP                                                         | NPN                | —                                                                              |                    |                                     |
|                     |                | Max. load                        | 50 mA, 24 VDC                                               | 50 mA, 24 VDC      | —                                                                              |                    |                                     |
| Response time       |                | ON                               | 1 ms                                                        |                    | 1 ms or 2 ms max., selectable                                                  |                    | 1 ms or 2 ms max. switch selectable |
|                     |                | OFF                              | 1 ms or 40 ms, selectable                                   |                    | 1 ms or 2 ms max., selectable                                                  |                    | 1 ms or 2 ms max. switch selectable |
| Circuit protection  |                | Output short-circuit             | Yes                                                         |                    | Yes                                                                            |                    | Yes                                 |
|                     |                | DC power supply reverse polarity | Yes                                                         |                    | Yes                                                                            |                    | Yes                                 |

## DC Amplifiers, continued

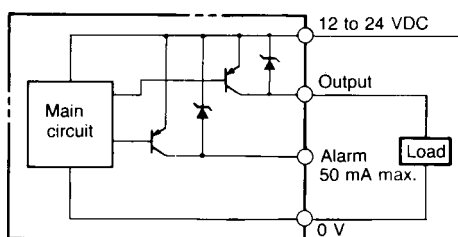
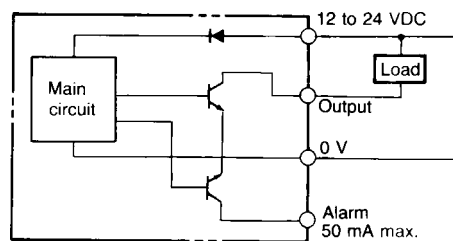
| Part number         |           | E3C-JB4P                                                                                     | E3C-JC4P | E3C-GE4                                                                               | E3C-GF4 | E3C-WH4F                                                                                        |
|---------------------|-----------|----------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------|
| Indicators          |           | Light Incident (red LED), Output Stability (green LED)                                       |          |                                                                                       |         |                                                                                                 |
| Materials           | Case      | Plastic                                                                                      |          |                                                                                       |         |                                                                                                 |
| Mounting            |           | DIN rail track or mounting bracket E39-L48 (included) or side surface with two through holes |          | Requires PYF08A-E or PYF08M socket (not included). Order separately from Accessories. |         | DIN rail track or bottom surface with two through holes.                                        |
| Connections         |           | Prewired with 5 conductor cable, 2 m (6.56 ft) length                                        |          | Terminal screws on socket                                                             |         | Terminal screws or direct connection to S3D8 Sensor Controller with E99-C connector (included). |
| Weight              |           | 80 g (2.8 oz.)                                                                               |          | 15 g (0.5 oz.)                                                                        |         | 100 g (3.5 oz.)                                                                                 |
| Enclosure           | UL        | —                                                                                            |          | —                                                                                     |         |                                                                                                 |
|                     | NEMA      | 1, 2                                                                                         |          | 1                                                                                     |         |                                                                                                 |
|                     | IEC 144   | IP50                                                                                         |          | IP20                                                                                  |         |                                                                                                 |
| Approvals           | UL        | —                                                                                            |          |                                                                                       |         |                                                                                                 |
|                     | CSA       | —                                                                                            |          |                                                                                       |         |                                                                                                 |
| Ambient temperature | Operating | -10° to 55°C (14° to 131°F)                                                                  |          |                                                                                       |         |                                                                                                 |
|                     | Storage   | -25° to 70°C (-13° to 158°F)                                                                 |          |                                                                                       |         |                                                                                                 |

## ■ OUTPUT CIRCUIT DIAGRAMS

## Amplifiers E3C-A, E3C-C

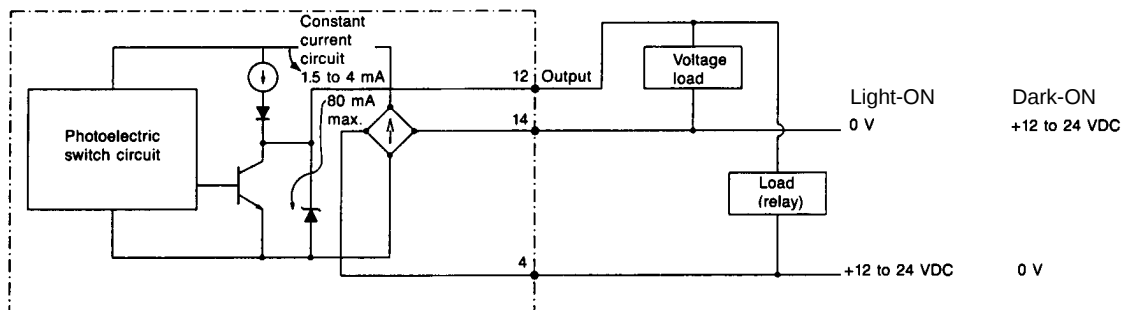


## Amplifiers E3C-J□4P

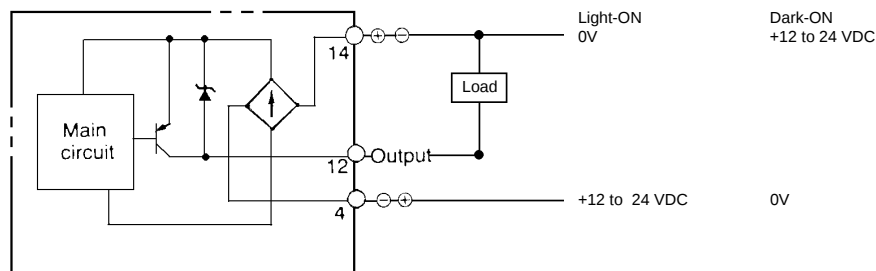
PNP output type  
E3C-JB4PNPN output type  
E3C-JC4P

## OUTPUT CIRCUIT DIAGRAMS, continued

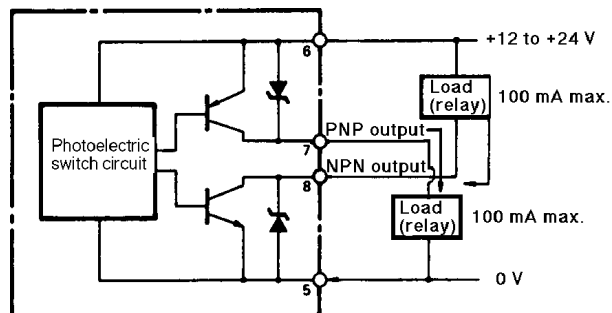
### Amplifier E3C-GE4



### PNP Output E3C-GF4



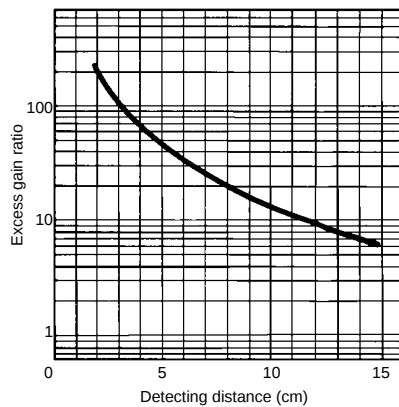
### Amplifier E3C-WH4F



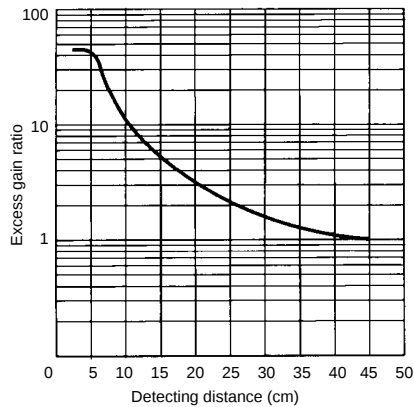
## Engineering Data

### ■ EXCESS GAIN RATIO

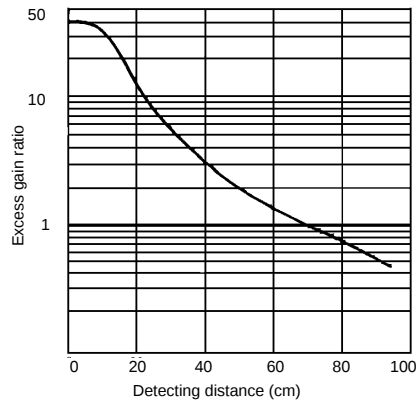
#### E3C-S10



#### E3C-S20W

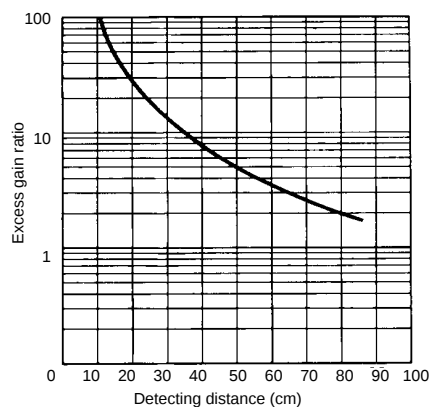


#### E3C-S30T, E3C-S30W

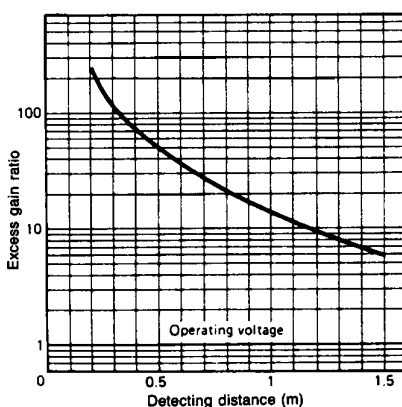


## EXCESS GAIN RATIO, continued

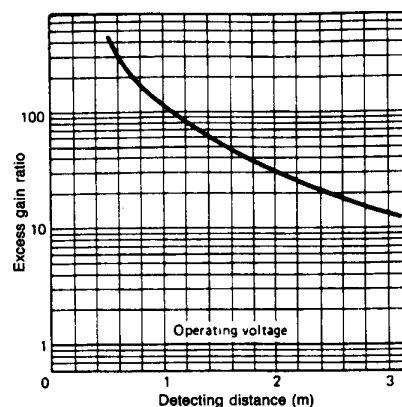
E3C-S50



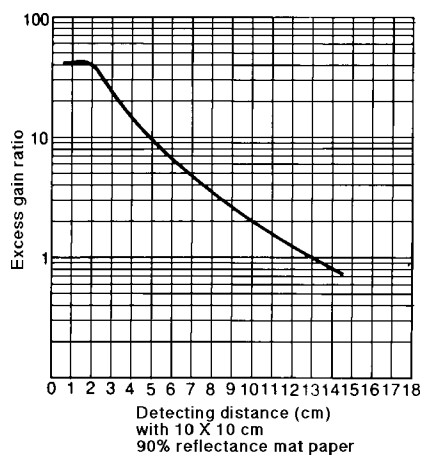
E3C-1



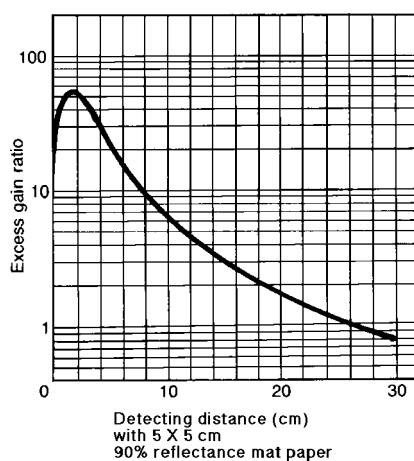
E3C-2



E3C-DS5W



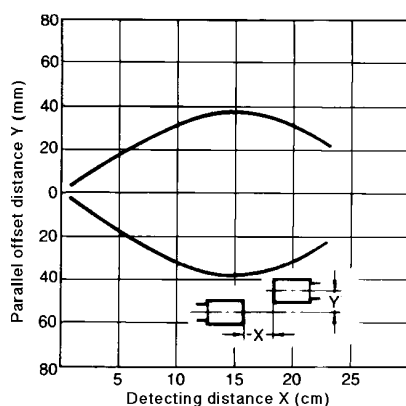
E3C-DS10



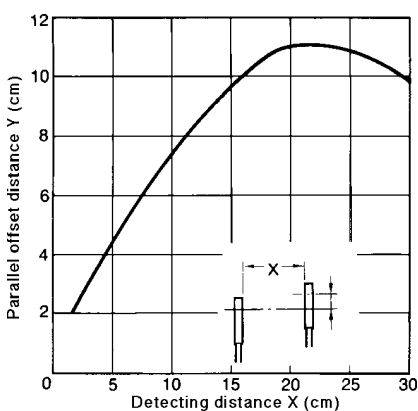
## ■ LIGHT SOURCE/RECEIVER SETTING RANGE

Separate type

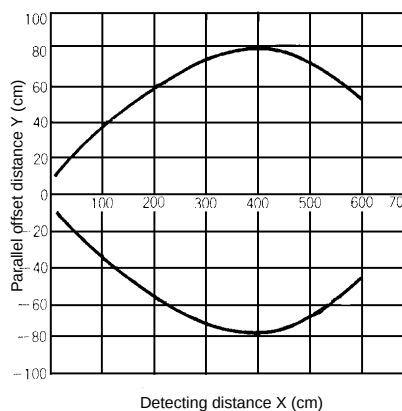
E3C-S10



E3C-S20W

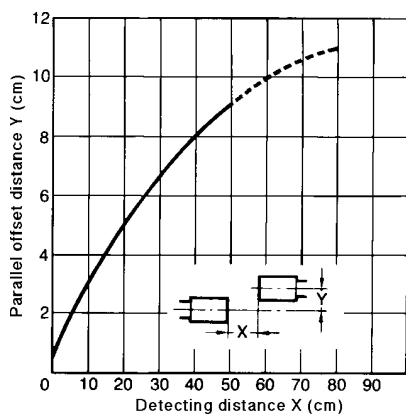


E3C-S30T, E3C-S30W

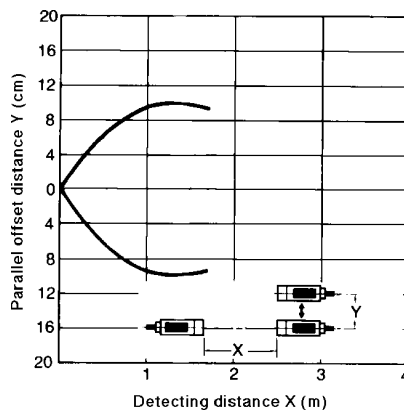


## LIGHT SOURCE/RECEIVER SETTING RANGE, continued

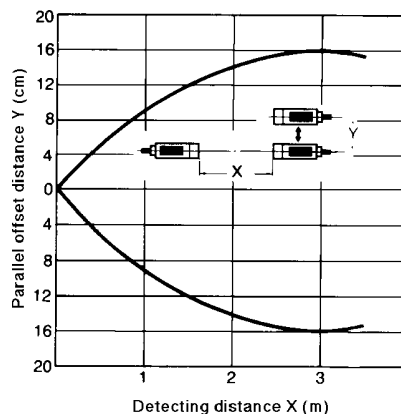
E3C-S50



E3C-1



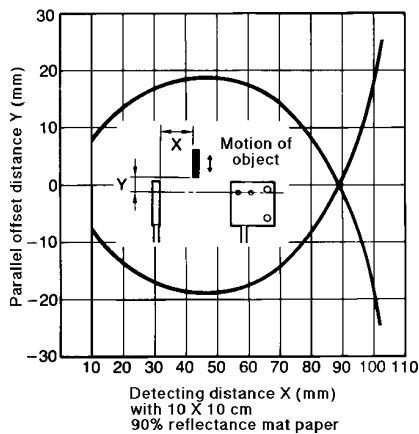
E3C-2



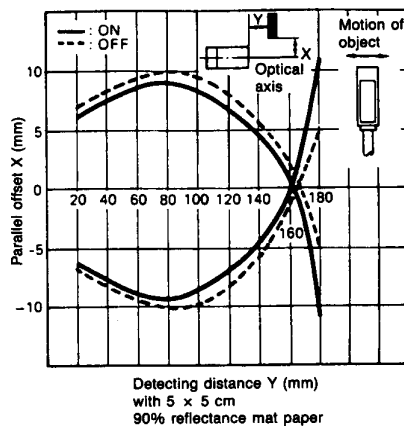
## ■ OPERATING RANGE

## Diffuse Reflective Type

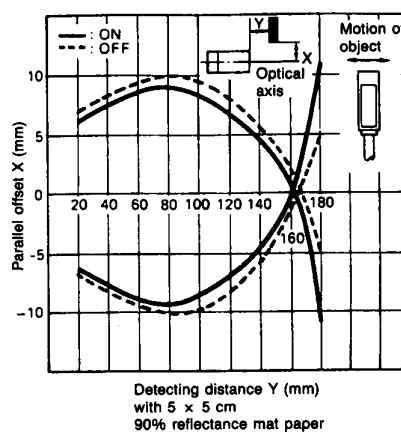
E3C-DS5W



E3C-DS10 (Example 1)



E3C-DS10 (Example 2)

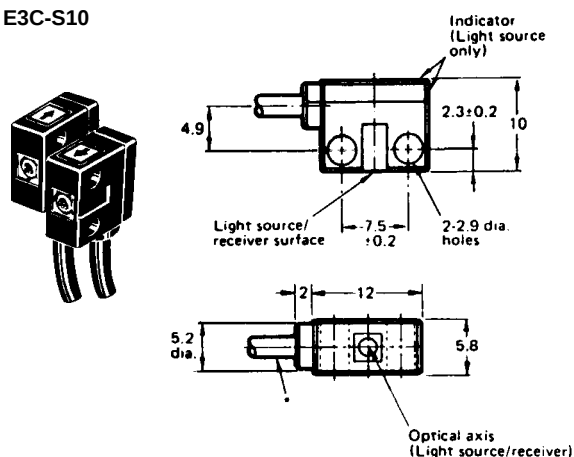


## Dimensions

Unit: mm

## ■ SENSORS

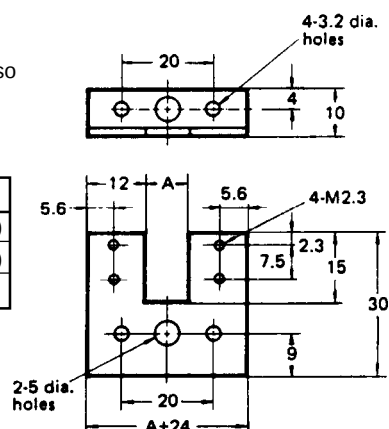
E3C-S10



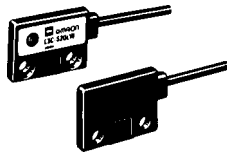
## Mounting Brackets for E3C-S10

Mount the emitter and receiver on the legs of the U-shaped bracket so they face each other. Dimension "A" shows the fixed sensing distance.

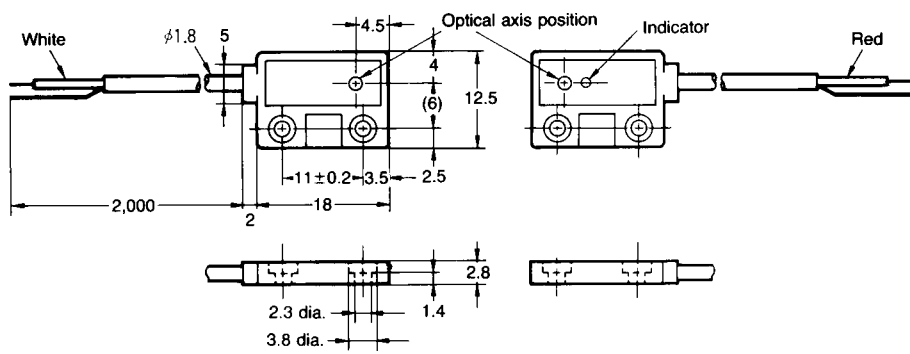
| Part number | Dimension A      |
|-------------|------------------|
| OAC-T1      | 10 mm (0.394 in) |
| OAC-T1      | 20 mm (0.787 in) |
| OAC-T3      | 30 mm (1.81 in)  |



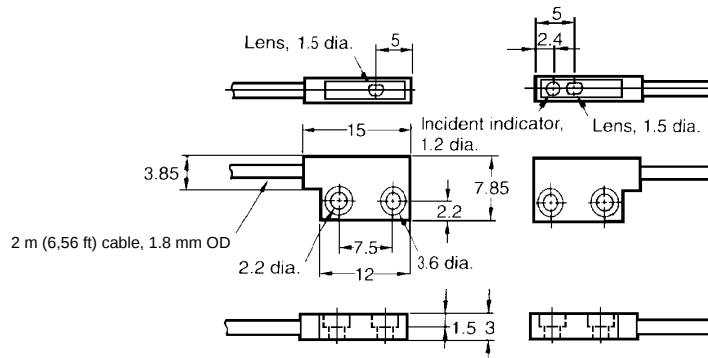
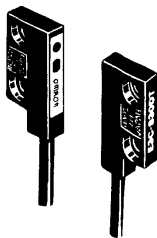
## E3C-S20W



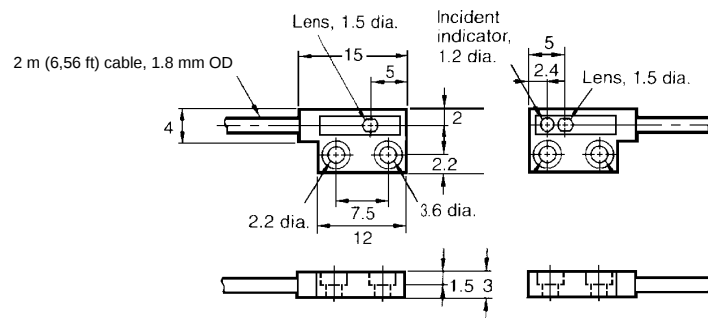
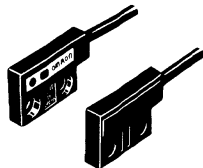
## Light source



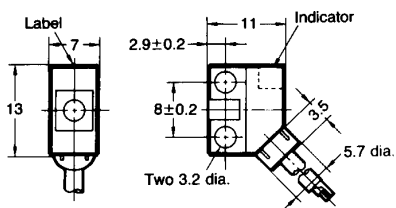
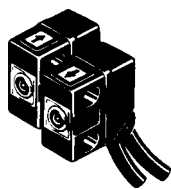
## E3C-S30T



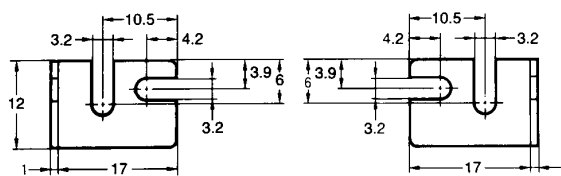
## E3C-S30W



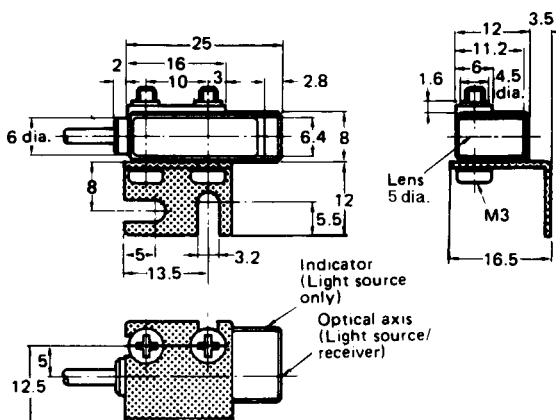
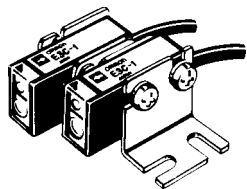
## E3C-S50



## E39-L31 Optional Mounting Bracket

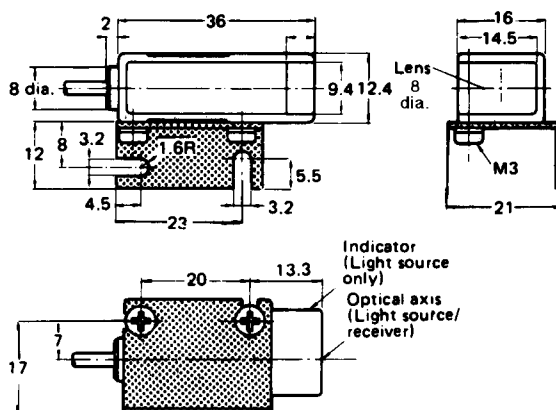
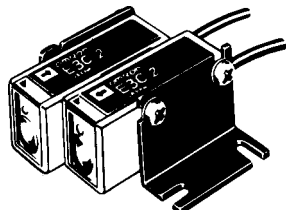


## E3C-1



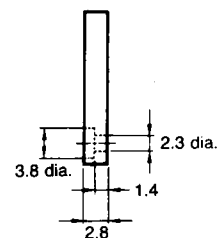
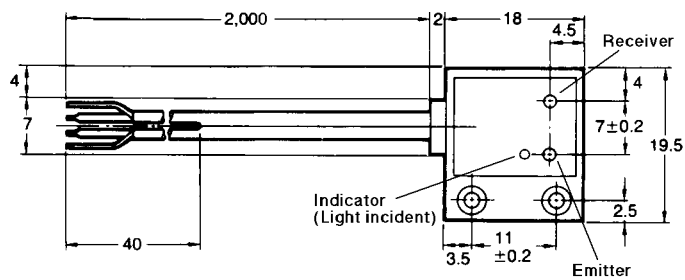
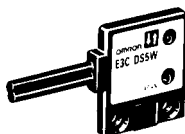
NOTE:  
E3C-1 is shown  
mounted in E39-L41  
bracket supplied with  
each sensor.

## E3C-2

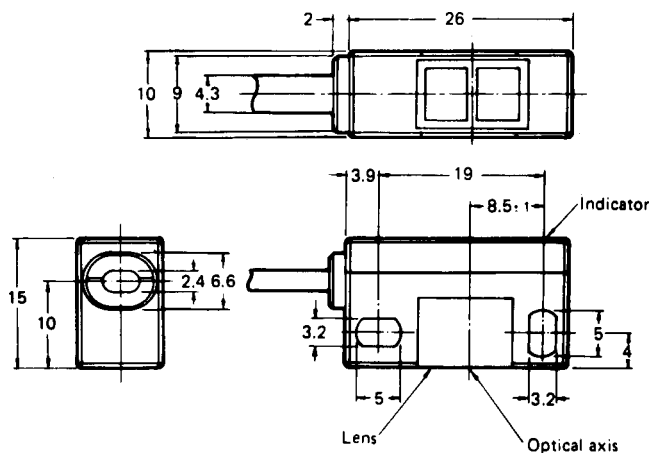
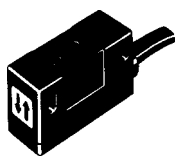


NOTE:  
E3C-2 is shown  
mounted in E39-L42  
bracket supplied with  
each sensor.

## E3C-DS5W



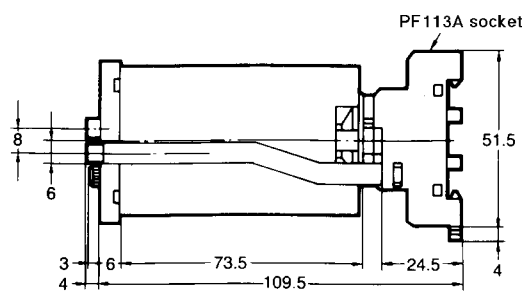
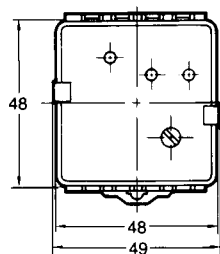
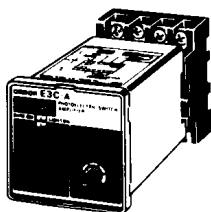
## E3C-DS10



NOTE:  
Use mounting bracket  
E39-L42, shown on  
E3C-2; order separately  
from Accessories.

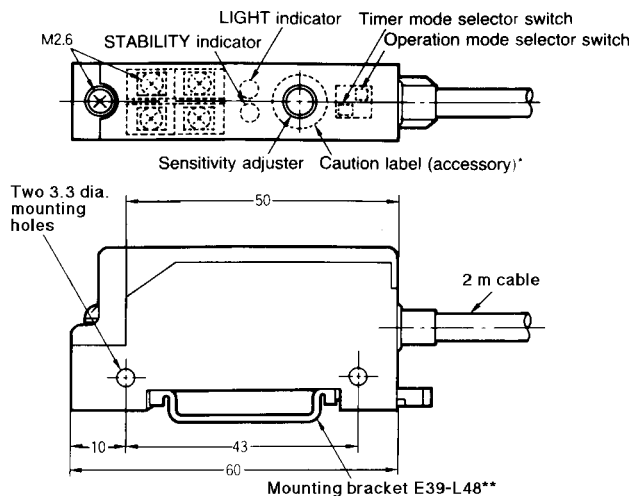
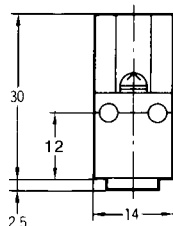
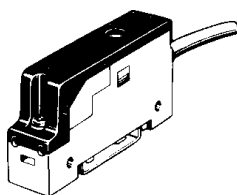
## ■ AMPLIFIERS

## E3C-A, E3C-C



NOTE: Socket PF113A-E and two hold-down clips are included with these amplifiers.

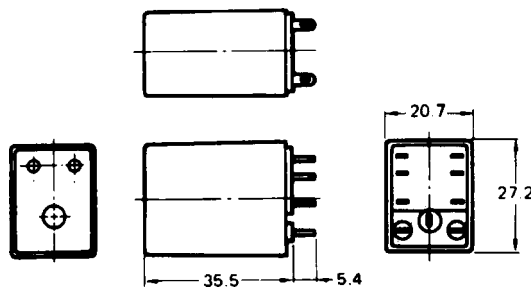
## E3C-JB4P, E3C-JC4P



\* Attach the caution label after adjusting the sensitivity adjuster.

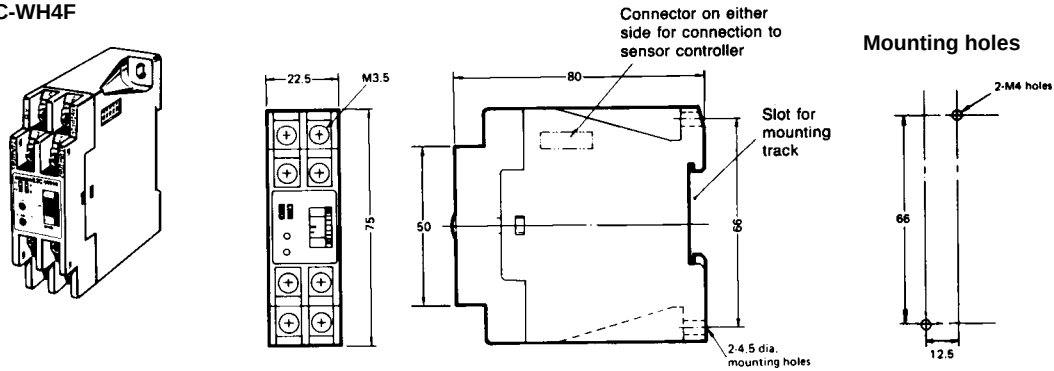
\*\* This is not necessary when mounting the amplifier  
on DIN rail track.

## E3C-GE4, E3C-GF4



NOTE:  
Order required socket  
PYF08A-E or PYF08M from  
Accessories section.

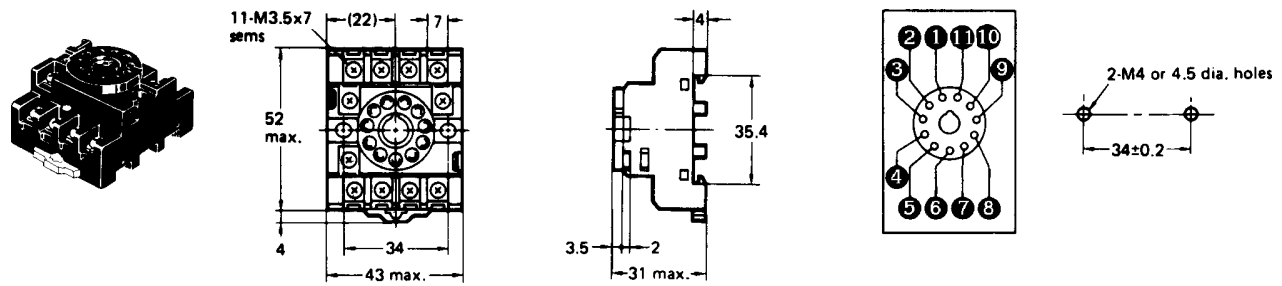
## E3C-WH4F



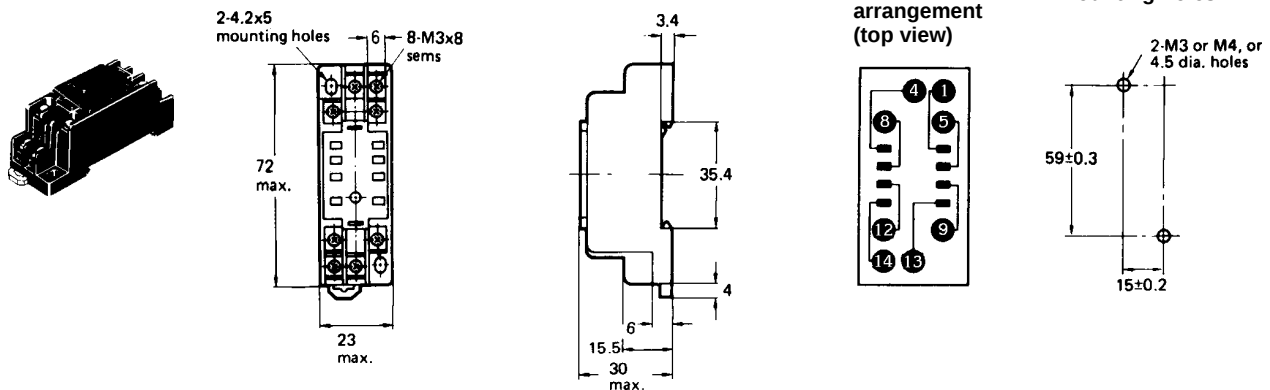
## SOCKETS

### PF113A-E Track-Mount Socket

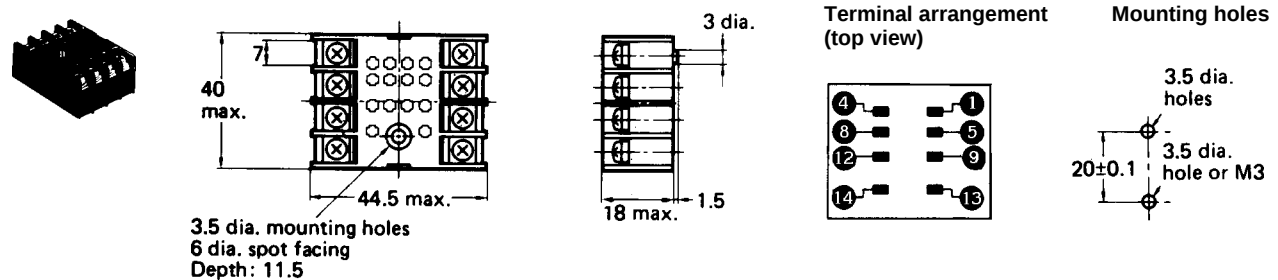
Socket PF113A-E and two hold-down clips are supplied with E3C-A and E3C-C amplifiers.



### PYF08A-E Combination Track and Bottom Mount Socket for E3C-GE4, E3C-GF4

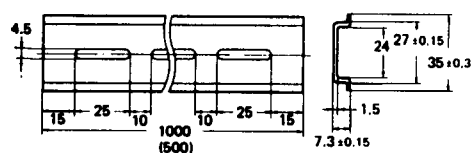


### PYF08M Bottom Surface Mount Socket for E3C-GE4, E3C-GF4

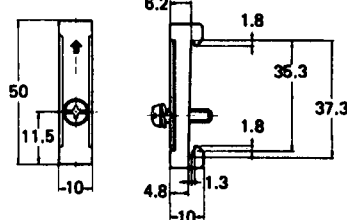


## ■ MOUNTING TRACK AND ACCESSORIES

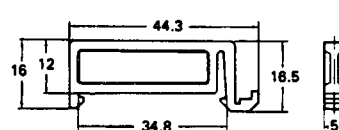
PFP-100N/PFP-50N DIN Rail



PFP-M End Plate



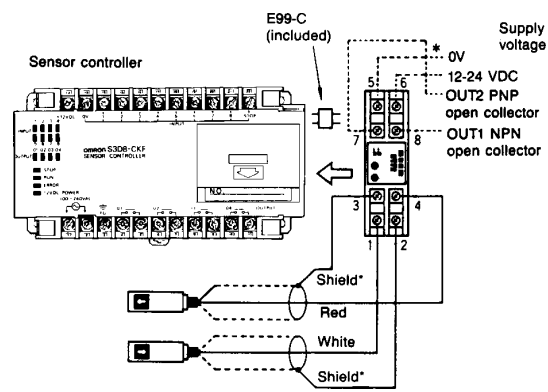
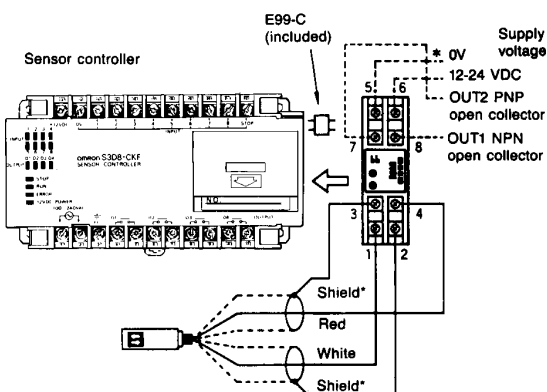
PFP-S Spacer



## Connections

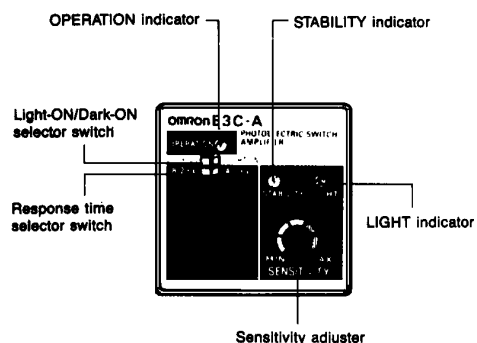
| Amplifier model       | Sensors                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Through-beam type                                                                                                                                                                                                                                                                                                        | Diffuse reflective type                                                                                                                                                                                                                    |
|                       | E3C-S10, E3C-S20W, E3C-S30□, E3C-S50, E3C-1, E3C-2                                                                                                                                                                                                                                                                       | E3C-DS5W, E3C-DS10                                                                                                                                                                                                                         |
| E3C-A, E3C-C          |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                            |
| E3C-JB4P and E3C-JC4P |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                            |
| E3C-GE4               |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                            |
| Notes                 | <p>*Shielded wires must not be peeled in excess of 2 cm (0.787 in) for receiver (white lead) and 5 cm (1.969 in) for the light source (red lead).</p> <p>**Response time is 1 ms when terminal 8 is left open and 2 ms when terminal 8 is short-circuited with the 0 V terminal of the power supply (negative side).</p> | <p>*Shielded wires must not be peeled in excess of 2 cm (0.787 in).</p> <p>**Response time is 1 ms when terminal 8 is left open and 2 ms when terminal 8 is short-circuited with the 0 V terminal of the power supply (negative side).</p> |

## Connections, continued

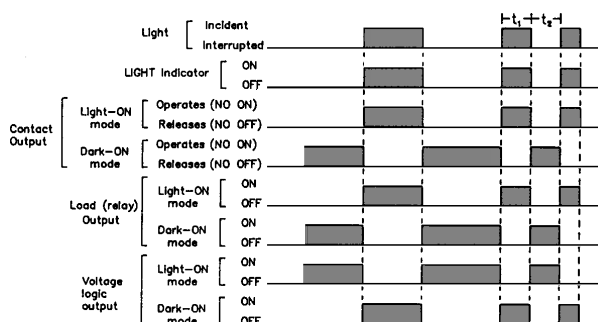
| Amplifier model | Sensors                                                                                                                                                                                   |                                                                                                                                                                                            |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | Through-beam type                                                                                                                                                                         | Diffuse reflective type                                                                                                                                                                    |
|                 | E3C-S10, E3C-S20W, E3C-S30□, E3C-S50, E3C-1, E3C-2                                                                                                                                        | E3C-DS5W, E3C-DS10                                                                                                                                                                         |
| E3C-WH4F        |  <p>NOTE: Terminals 5, 6, 7, and 8 are not used when connected to S3DB8 or S3D-F sensor controllers.</p> |  <p>NOTE: Terminals 5, 6, 7, and 8 are not used when connected to S3DB8 or S3D-F sensor controllers.</p> |
| Notes           | *Shielded wires must not be peeled in excess of 2 cm (0.787 in) for the receiver (white lead) and 5 cm (1.969 in) for the light source (red lead).                                        | *Shielded wires must not be peeled in excess of 2 cm (0.787 in).                                                                                                                           |

## Operation

## ■ E3C-A Amplifier



## ■ E3C-A Timing Chart



## Selection of operation mode

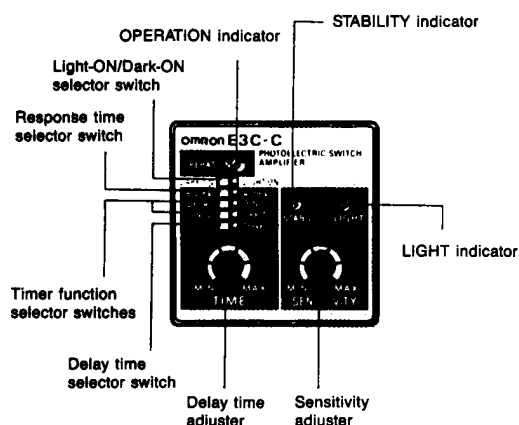
- DARK ON** ☐ **LIGHT ON** When light is incident, the output relay operates and solid-state output becomes high (H).
- DARK ON** ☐ **LIGHT ON** When light is interrupted, the output relay operates and the solid-state output becomes high (H).

NOTE: 1. Control output is produced only during the input time.  
2. When  $t$  exceeds 1 ms or 2 ms, solid-state output is produced. To produce relay contact output,  $t$  must be longer than 20 ms.

## Selection of response time

- 2 msec (B) ☐ 1 msec (A) The response time is set to 2 ms.
- 2 msec (B) ☐ 1 msec (A) The response time is set to 1 ms.

## ■ E3C-C AMPLIFIER



### Gate input operation

When the gate input terminal 9 is opened at HIGH level (6 to 30 VDC), the output relay performs the timer operation according to the input signal (light incident or light interrupted).

When the gate input terminal 9 is short-circuited with the 0 V terminal 2 at LOW level (0 to 2 VDC), the output relay releases without regard to the input signal or output state. The terminal generates an inhibit signal.

### Selection of operation mode

DARK ON ☐ LIGHT ON ☒ When light is incident, the output relay operates and solid-state output becomes high (H).

DARK ON ☒ LIGHT ON ☐ When light is interrupted, the output relay operates the solid-state output becomes high (H).

### Selection of response time

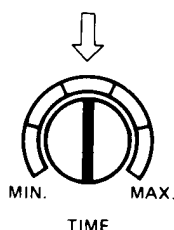
2msec (B) ☐ 1msec (A) ☒ The response time is set to 2 ms.

2msec (B) ☒ 1msec (A) ☐ The response time is set to 1 ms.

### Setting the delay time

1sec ☐ 10sec ☒ The delay time can be set within a range of 0.1 to 1 second.

1sec ☒ 10sec ☐ The delay time can be set within a range of 1 to 10 seconds.

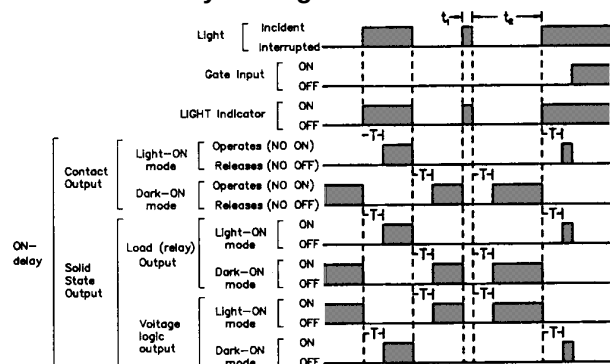


After selecting the delay time range by slide switch, set the delay time adjuster to the specific value. Turn the adjuster clockwise to increase the delay time.

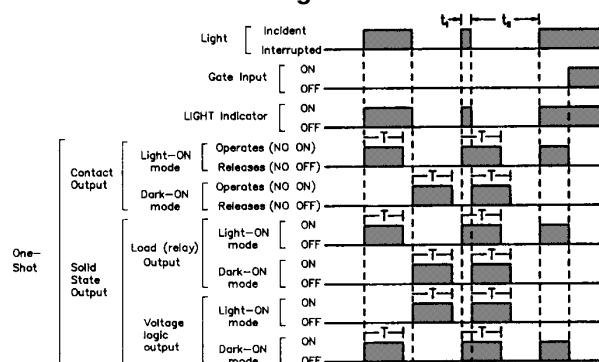
### Selecting timer function

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON D.<br>(ON-delay)<br>operation           | <p>DARK ON <input type="checkbox"/> LIGHT ON <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>2ms (B) <input type="checkbox"/> 1ms (A) <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>DELAY <input checked="" type="checkbox"/> O.S.D. <input type="checkbox"/></p> <p>ON D <input checked="" type="checkbox"/> OFF D <input type="checkbox"/></p> <p>1sec <input type="checkbox"/> 10sec <input checked="" type="checkbox"/> → Set to either position as desired.</p>                                                             |
| OFF D.<br>(OFF-delay)<br>operation         | <p>DARK ON <input type="checkbox"/> LIGHT ON <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>2ms (B) <input type="checkbox"/> 1ms (A) <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>DELAY <input checked="" type="checkbox"/> O.S.D. <input type="checkbox"/></p> <p>ON D <input type="checkbox"/> OFF D <input checked="" type="checkbox"/></p> <p>1sec <input type="checkbox"/> 10sec <input checked="" type="checkbox"/> → Set to either position as desired.</p>                                                             |
| O.S.D.<br>(One-shot<br>delay)<br>operation | <p>DARK ON <input type="checkbox"/> LIGHT ON <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>2ms (B) <input type="checkbox"/> 1ms (A) <input checked="" type="checkbox"/> → Set to either position as desired.</p> <p>DELAY <input type="checkbox"/> O.S.D. <input checked="" type="checkbox"/></p> <p>ON D <input type="checkbox"/> OFF D <input checked="" type="checkbox"/> → Position of this switch is independent of this operation.</p> <p>1sec <input type="checkbox"/> 10sec <input checked="" type="checkbox"/> → Set to either position as desired.</p> |

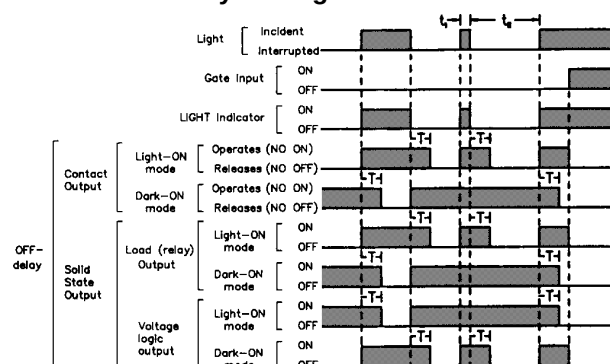
## E3C-C ON-Delay Timing Chart



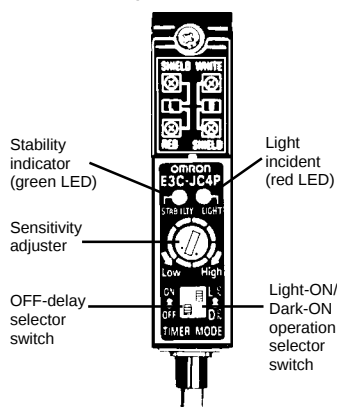
## E3C-C One-Shot Timing Chart



## E3C-C OFF-Delay Timing Chart

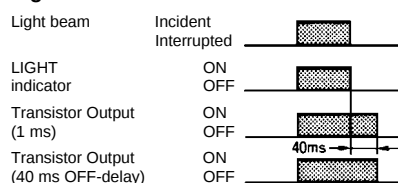


## ■ E3C-JB4P, E3C-JC4P AMPLIFIERS

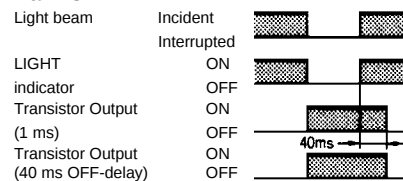


## Timing Charts

## Light-ON



## Dark-ON

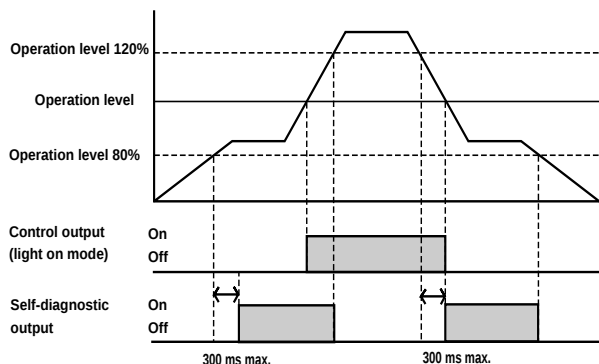


## Alarm Output Timing Chart

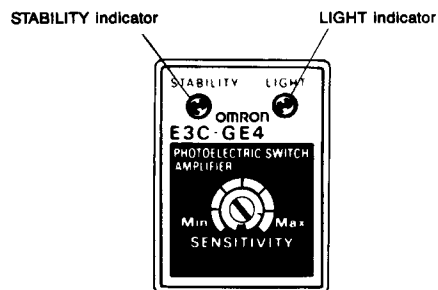
The alarm output operates when the control output approaches critical OFF or ON state for more than 300 ms. An unstable state occurs when the amount of light incident upon the receiving element is within 20% of the amount of light needed to change the control output state.

The alarm output feature is designed to indicate gradual changes in sensor/reflector position, atmosphere, temperature or ambient light which result in an unstable control output. A change occurring less than 300 ms will not cause the alarm output to operate.

A 300 ms time delay is built into the alarm output circuit. This prevents false triggering of the alarm output as the leading and trailing edges of the object to be detected are sensed. The time can be extended by using an ON-delay timer in the circuit.



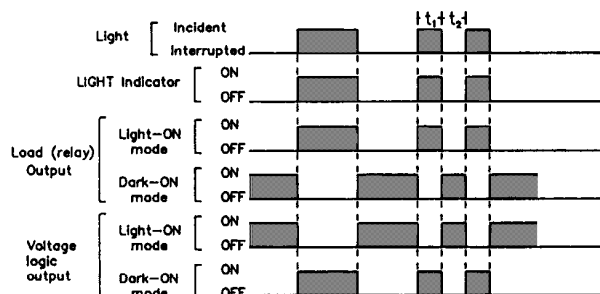
## ■ E3C-GE4 , E3C-GF4 AMPLIFIER



### Selection of response time

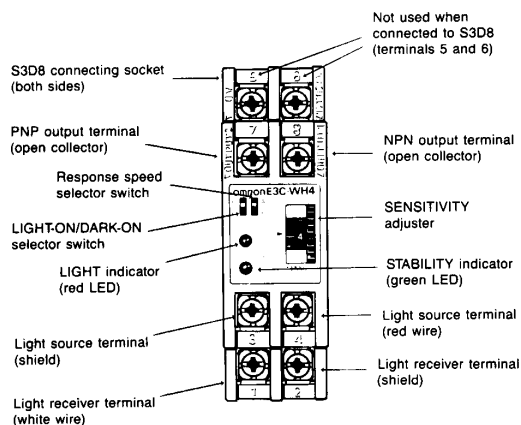
| Response | Wiring                                   |
|----------|------------------------------------------|
| 1 ms     | Terminal 8 open                          |
| 2 ms     | Terminal 8 shorted with terminal 4 (0 V) |

### E3C-GF4 Timing Chart

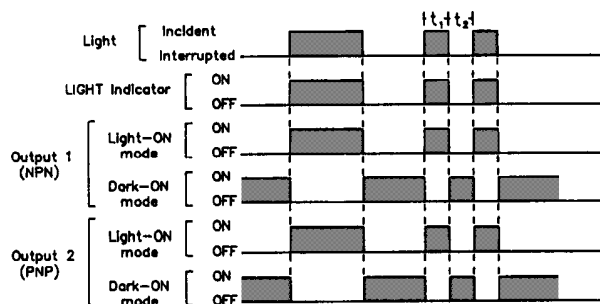


NOTE:  $t_1$  and  $t_2$  must exceed selected response time (1 or 2 ms) before solid-state output states will change.

## ■ E3C-WH4F AMPLIFIER

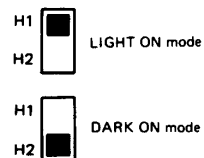


### E3C-WH4F Timing Chart

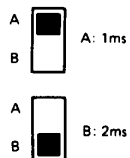


NOTE:  $t_1$  and  $t_2$  must exceed selected response time (1 or 2 ms) before solid-state output states will change.

### Selection of operation mode



### Selection of response time



NOTE: DIMENSIONS ARE SHOWN IN MILLIMETERS. To convert millimeters to inches divide by 25.4.



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