

ISF Series Photoelectric Switch with Built-in Power Supply

| Detection Mode | Free-Voltage Type | DC Type |
|------------------------|-------------------|---------------|
| Through-Beam | ISF-T10M(T)TU | ISF-T10M(T)TU |
| Retro-Reflex | ISF-R05M(T)TU | ISF-R05M(T)TU |
| Polarized Retro-Reflex | ISF-P03M(T)TU | ISF-P03M(T)TU |
| Diffuse-Reflex | ISF-D50M(T)TU | ISF-D50M(T)TU |

INSTRUCTION MANUAL



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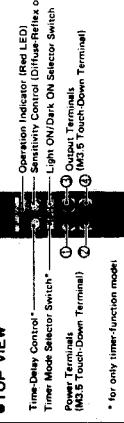
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All IDEC IZUMI products have been inspected before shipment and shipped in good conditions.
 "T" added to the Type No. represents the photoelectric switch with a timer function.

Safety Precautions

Read this instruction sheet to make sure of correct operation before starting installation, wiring, operation, maintenance, and inspection of the Photoelectric Switch. Do not use the ISF series Photoelectric Switch which human life is dependent on. Forward this instruction sheet to the final user of this photoelectric switch.

NAMES OF COMPONENTS



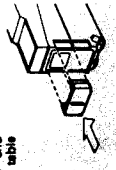
INSTALLATION

Tighten screws enough to ensure watertight characteristics. Note that excessive tightening may cause damage.

| Screw | Tightening Torque |
|--------------------|------------------------------------|
| Terminal Screw | 0.35 - 0.5 N·m (3.1 - 4.4 lb·in) |
| Gland | 0.58 - 1.2 N·m (5.1 - 10.6 lb·in) |
| Cover Fixing Screw | 0.62 - 0.78 N·m (5.5 - 6.9 lb·in) |
| Mounting Screw | 0.78 - 1.18 N·m (6.9 - 10.4 lb·in) |

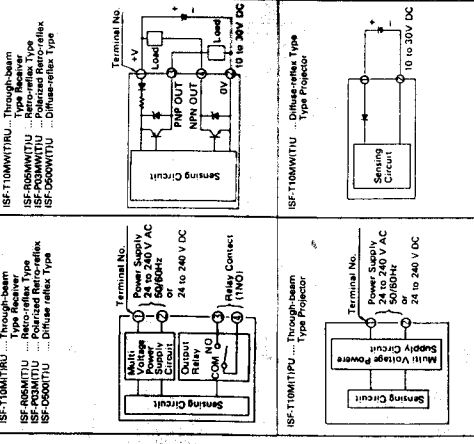
Installing The Sill (Optional to ISF-T10M(T)TU)
 Sills are used to detect small objects or to increase the size of detectable object and sensing distance are shown in the table below.

| Sill is attached to | Minimum Detectable Object (Sill Dia.) | Sensing Distance (Sill Dia.) |
|------------------------|---------------------------------------|------------------------------|
| Through-Beam | ø 3.0mm | As |
| Retro-Reflex | ø 3.0mm | As |
| Polarized Retro-Reflex | ø 3.0mm | As |
| Diffuse-Reflex | ø 3.0mm | As |



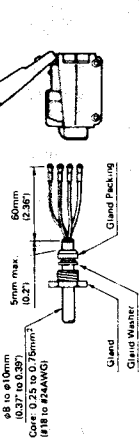
CONNECTION

INPUT & OUTPUT CIRCUITS



Note: When using the free-voltage type photoelectric switch in compliance with the European LVD, insert fuses into the L or + line of the power supply for the power and output circuits. Use fuses of EN-approved time-lag high-breaking type 2A.

Cable Connection



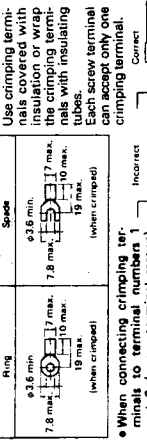
1. Use a cable with 8 to 10mm in diameter to ensure water- and dust-proof characteristics. Do not use soft cables because such cables are slipped off easily. Two gland packings are supplied; for packing and a gland washer, and tighten the gland firmly.

2. Keep the cable insulation within 5mm from the gland packing as shown. Make sure the gland washer is placed in the gland and packed correctly.

3. Connect wires to lower terminals 2 and 4 first, then upper terminals 1 and 3.

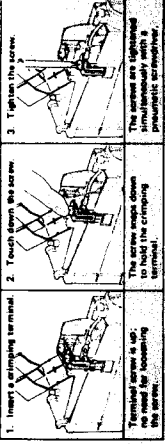
4. Extension is allowed up to 100m using a cable with cores of 0.3mm² or more.

Applicable Crimping Terminal Dimensions (mm)



When connecting crimping terminals to terminal numbers 1 and 3 (upper terminal screw), note the direction of the crimping part as shown.

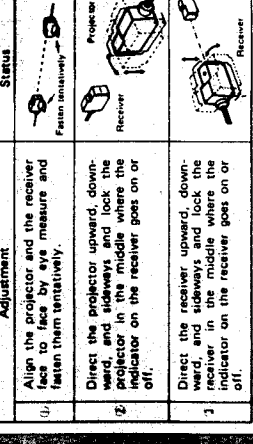
Terminals



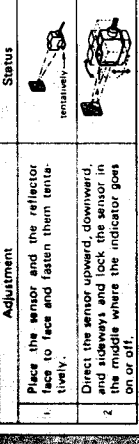
Optical Axis Alignment & Sensitivity Adjustment

Supply power to the photoelectric switch and make the necessary adjustment to the indicator. The indicator is a light ON or OFF indicator is on during receiving light in the Light ON mode. Make adjustments on the timer-function mode in the normal mode.

(1) Through Beam Type

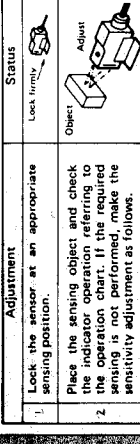


(2) Retro-Reflex & Polarized Retro-Reflex Types



Note: To detect glossy objects, use the polarized retro-reflex type (ISF-R05M(T)TU or ISF-P03M(T)TU). When using the retro-reflex type (ISF-R05M(T)TU or ISF-R05M(T)TU), skew the sensor to avoid direct reflection as shown.

(3) Diffuse Reflex Type



1. With the sensing object in place, turn the sensitivity adjusting control clockwise from MIN position until the indicator goes on (Point A).

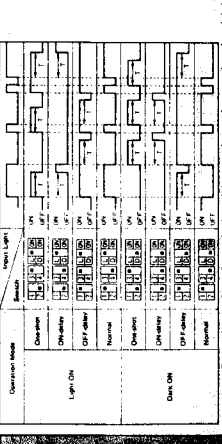
2. Remove the object, then the indicator goes off. Turn the sensitivity adjusting control further clockwise until the indicator goes on again by detecting the background (Point B).

3. Set this sensitivity adjusting control at Point C, the middle point between A and B. This point gives the best sensitivity.

Note 1: The above procedure is for the Light ON mode. The indicator operation is reversed in the Dark ON mode.

Note 2: Use the attached screwdriver to make adjustments. Avoid excessive force to the sensitivity adjusting control to prevent damage.

Operation Chart



Note 1: The photoelectric switch without timer has only the Light ON/Dark ON selector switch and operates in the normal mode.

Note 2: The operation indicator goes on when the output is on and goes off when the output is off.

Specifications

| Type No. | Detection Mode | Through-Beam | Retro-Reflex | Polarized Retro-Reflex | Diffuse-Reflex |
|-----------------------------|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| ISF-T10M(T)TU | Through-Beam | ISF-T10M(T)TU | ISF-R05M(T)TU | ISF-P03M(T)TU | ISF-D50M(T)TU |
| Sensing Range | 10m | 0.15 to 5m (using the reflector) | 0.15 to 5m (using the reflector) | 0.15 to 5m (using the reflector) | 0.15 to 5m (using the reflector) |
| Detectable Object | Opaque Specular (Minimum) | Opaque Specular (Minimum) | Opaque Specular (Minimum) | Opaque Specular (Minimum) | Opaque, Transparent (Minimum) |
| Hysteresis | — | — | — | — | 1% maximum (at 0.5Hz) |
| Light Source Element | Infrared LED (Modulation mode) | — | — | — | Red LED (Modulation mode) |
| Extended Light Immunity | Sunlight: 10,000 lx at receiver Incandescent lamp: 3,000 lx at receiver | — | — | — | — |
| Operating Temperature Range | Operating temperature: -10 to +60°C (no freezing) Storage temperature: -20 to +70°C | — | — | — | — |
| Operating Humidity | 35 to 85% RH (no condensation) | — | — | — | — |
| Degree of Protection | IP66 JIS C 0920 (weather-tight) | — | — | — | — |
| Time Delay (Range) | 0.1 to 5 s (adjustable) | — | — | — | — |
| Power Voltage | 24 to 240V AC (24 to 264V AC/50/60Hz 2W DC (24 to 264V DC compatible (Operating voltage range)) | — | — | — | — |
| Power Consumption | 3VA max. 3VA max. | — | — | — | — |
| Output | Electromechanical relay: N/O contact Relay load: 250V AC/1A, 30V DC/2A (resistive load) Minimum applicable load: 5V DC, 1mA (reference value) Electrical life: 500,000 operations minimum (DC: fixed load) Mechanical life: 50,000,000 operations minimum | — | — | — | — |
| Response Time | 20 ms. maximum | — | — | — | — |
| Power Voltage | 12, 24V DC (10 to 30V DC) | — | — | — | — |
| Current Draw | Projector: 30mA maximum Receiver: 20mA max. | — | — | — | — |
| Output | NPN and PNP transistor open collector Load current: 100mA maximum with a short-circuit protection Residual voltage: 2.4V maximum (PNP output) | — | — | — | — |
| Response Time | 3 ms. maximum | — | — | — | — |

Safety Precautions

- When installing the photoelectric switches adjacently, keep them apart from each other, or install a light barrier to prevent light interference. And pay attention to reflected light from the floor or ceiling.
- Make sure that fluorescent light does not enter into the receiver of the photoelectric switch. Fluorescent lamps may affect the photoelectric switch operation depending on its location.
- Do not strike the photoelectric switches with a hammer when installing, otherwise the waterproof characteristics will be impaired.
- For preventing the constant state when turning power ON, a circuit breaker (MCB) must be installed in the power supply line. The MCB starts when the output is released from the OFF state. Take care of the operation when turning power ON.
- The cable should not be run in the same wire duct with other power supply, motor, or electromagnetic lines because induction noise will cause malfunction or damage to the photoelectric switch.
- Do not use the photoelectric switch with a hammer when cleaning the lens or acrylic resin. Clean the lens with alcohol or a dry soft cloth.
- Do not use the photoelectric switch under conditions exceeding the rated operating temperature, vibration resistance and shock resistance.
- Use the photoelectric switch within the rated power voltage.
- When using a switching power supply, connect the FG (frame ground) terminal to the ground.
- Requirements for Compliance with European LVD
 - Use an EN-approved fuse outside the power terminal on the free-voltage type photoelectric switch.
 - Use an EN-approved fuse outside the output terminal on the free-voltage type photoelectric switch.
- When installing the cover on the housing, make sure that the cover gasket is in place to ensure the watertight characteristics.
- The cover for the through-beam type projector is installed on the projector and receiver is damaged. Install correct covers on the projector and receiver.
- The relay output circuit is not protected against short-circuit. Connect a load and make sure the load is not short-circuited.