GP2D150A

Optoelectronic Device

FEATURES

- Factory set trigger point: 15°
- Digital Output
- Range: 4 to 30 cm
- Typical response time: 39 ms
- Typical start up delay: 46 ms
- Average current consumption: 33 mA

DESCRIPTION

The GP2D150A is a distance measuring sensor with digital output.

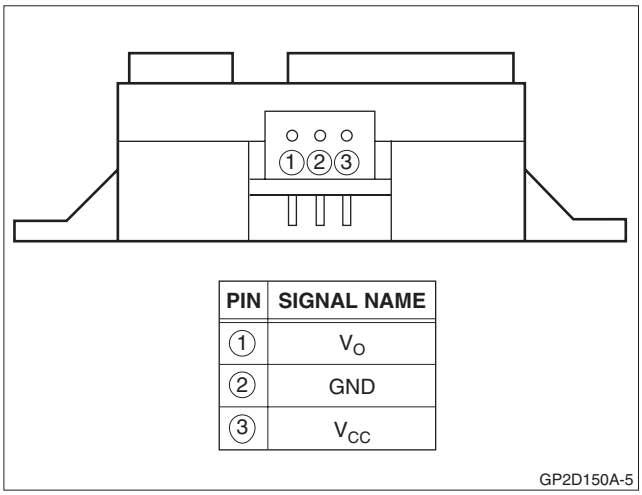


Figure 1. Pinout

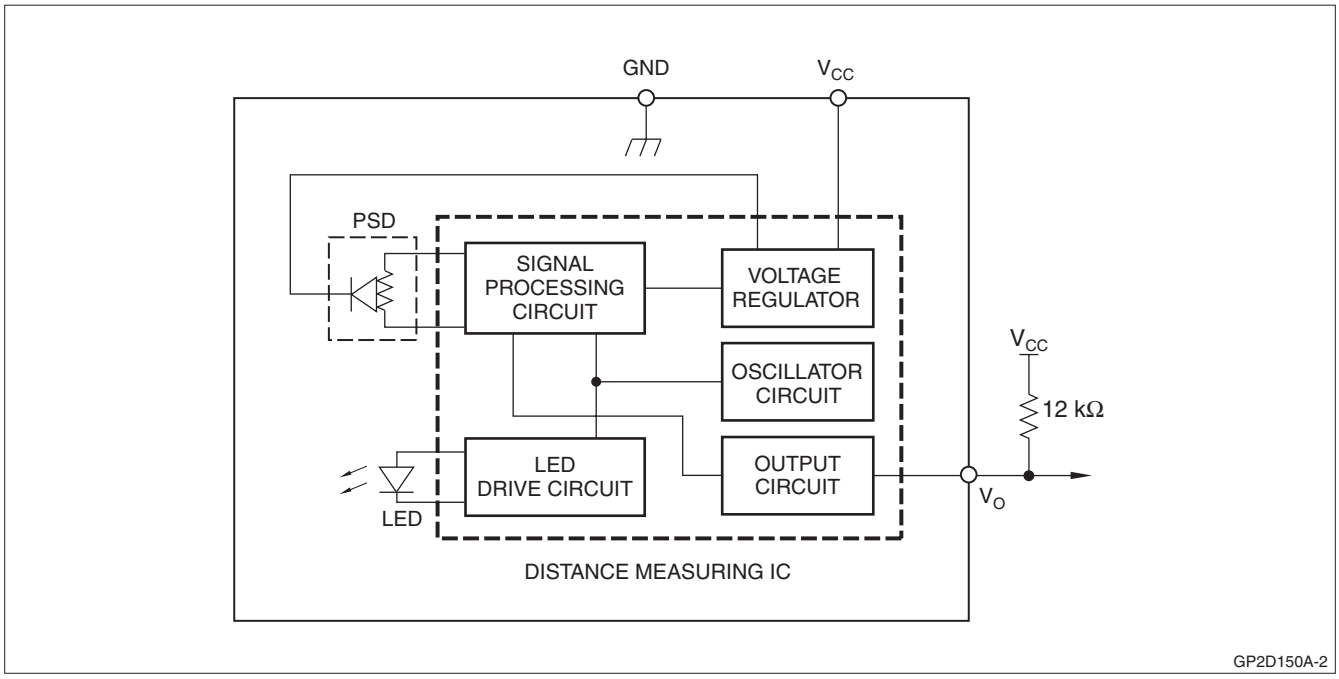


Figure 2. Block Diagram

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Ta = 25°C, V_{CC} = 5 VDC

PARAMETER	SYMBOL	RATING	UNIT	REMARKS
Supply Voltage	V_{CC}	-0.3 to +7.0	V	
Output Terminal Voltage	V_O	-0.3 to (V_{CC} + 0.3)	V	Open collector output
Operating Temperature	Topr	-10 to +60	°C	
Storage Temperature	Tstg	-40 to +70	°C	

Operating Supply Voltage

PARAMETER	SYMBOL	RATING	UNIT
Operating Supply Voltage	V_{CC}	4.5 to 5.5	V

Electro-optical Characteristics

Ta = 25°C, V_{CC} = 5 VDC

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	NOTES
Measuring Distance Range	ΔL		3	—	30	cm	1, 3
Output Terminal Voltage	V_{OH}	Output voltage at high level	V_{CC} -0.3	—	—	V	1
	V_{OL}	Output voltage at low level	—	—	0.6	V	1
Output Distance Characteristics	V_O		12.5	15	17.5	cm	1, 2, 4
Average Supply Current	I_{CC}		—	33	50	mA	

NOTES:
1. Measurements made with Kodak R-27 Gray Card, using the white side, (90% reflectivity).
2. Each device is factory set for output switching at L = 15 cm ±2.5 cm.
3. Distance measuring range of the sensor optics.
4. Output switching has hysteresis. The distance specified by V_O is the distance at which the output switches from LOW to HIGH.
5. L = Distance to reflective object.

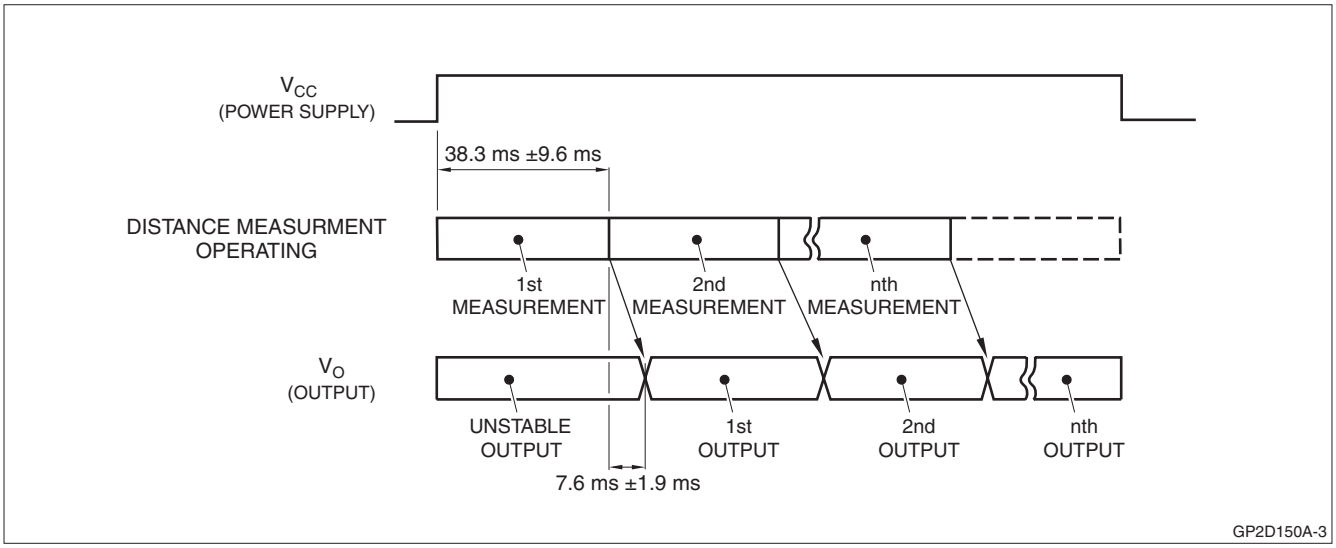


Figure 3. Timing Diagram

REALIABILITY

The reliability of requirements of this device are listed in Table 1.

Table 1. Reliability

TEST ITEMS	TEST CONDITIONS	FAILURE JUDGEMENT CRITERIA	SAMPLES (n), DEFECTIVE (C)
Temperature Cycling	One cycle -40°C (30 min.) to +70°C in 30 minutes, repeated 25 times	Initial × 0.8 > V_O V_O > Initial × 1.2	n = 11, C = 0
High Temperature and High Humidity Storage	+40°C, 90% RH, 500h		n = 11, C = 0
High Temperature Storage	+70°C, 500h		n = 11, C = 0
Low Temperature Storage	-40°C, 500h		n = 11, C = 0
Operational Life (High Temperature)	+60°C, V_{CC} = 5 V, 500h		n = 11, C = 0
Mechanical Shock	100 m/s², 6.0 ms 3 times/±X, ±Y, ±Z direction		n = 6, C = 0
Variable Frequency Vibration	10-to-55-to-10 Hz in 1 minute Amplitude: 1.5 mm 2h in each X, Y, Z direction		n = 6, C = 0

NOTES:
1. Test conditions are according to Electro-optical Characteristics, shown on page 2.
2. At completion of the test, allow device to remain at nominal room temperature and humidity (non-condensing) for two hours.
3. Confidence level: 90%, Lot Tolerance Percent Defect (LTPD): 20%/40%.

INCOMING INSPECTION

Inspection Lot

Inspection shall be carried out per each delivery lot.

Inspection Method

A single sampling plan, normal inspection level II based on ISO 2859 shall be adopted.

Table 2. Quality Level

DEFECT	INSPECTION ITEM/TEST METHOD	AQL (%)
Major Defect	Electro-optical characteristics defect	0.4
Minor Defect	Defect to appearance or dimensions (crack, split, chip, scratch, stain)*	1.0

NOTE: Any one of these that affects the Electro-optical Characteristics shall be considered a defect.

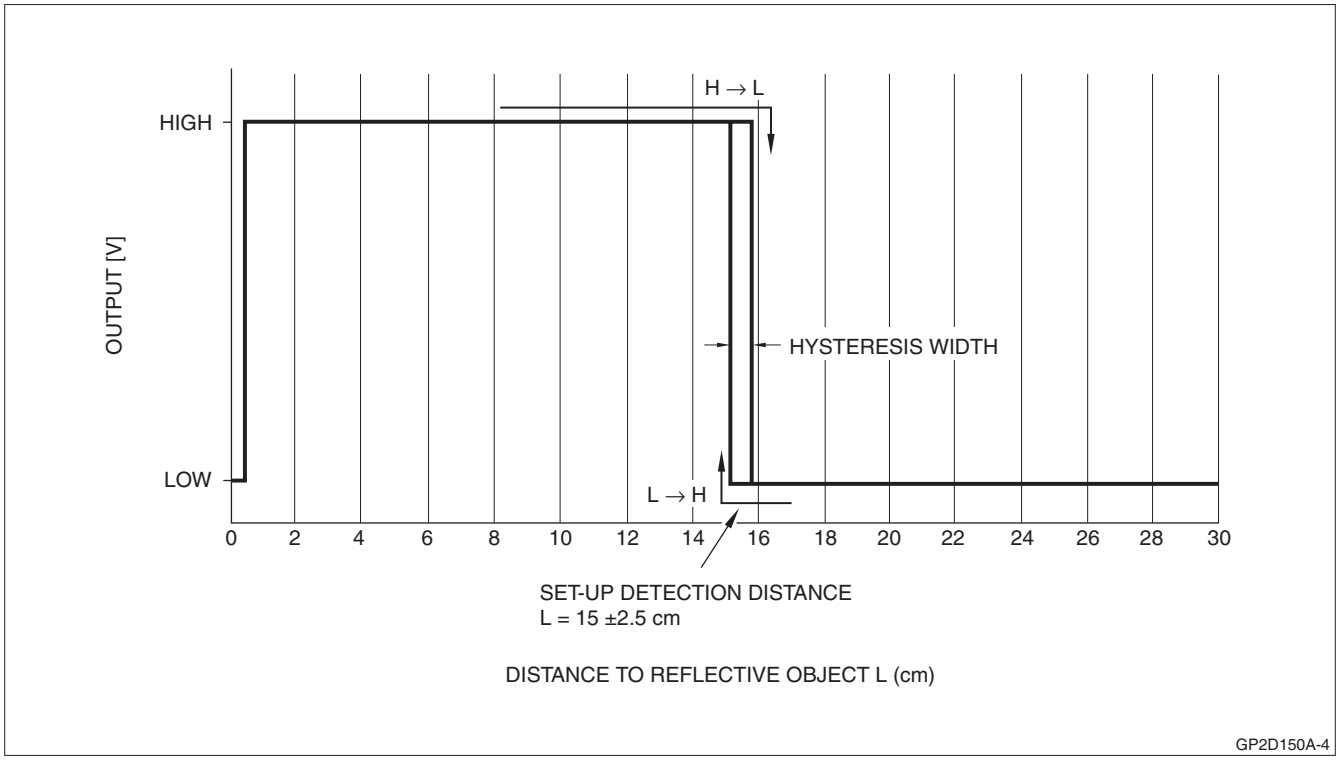
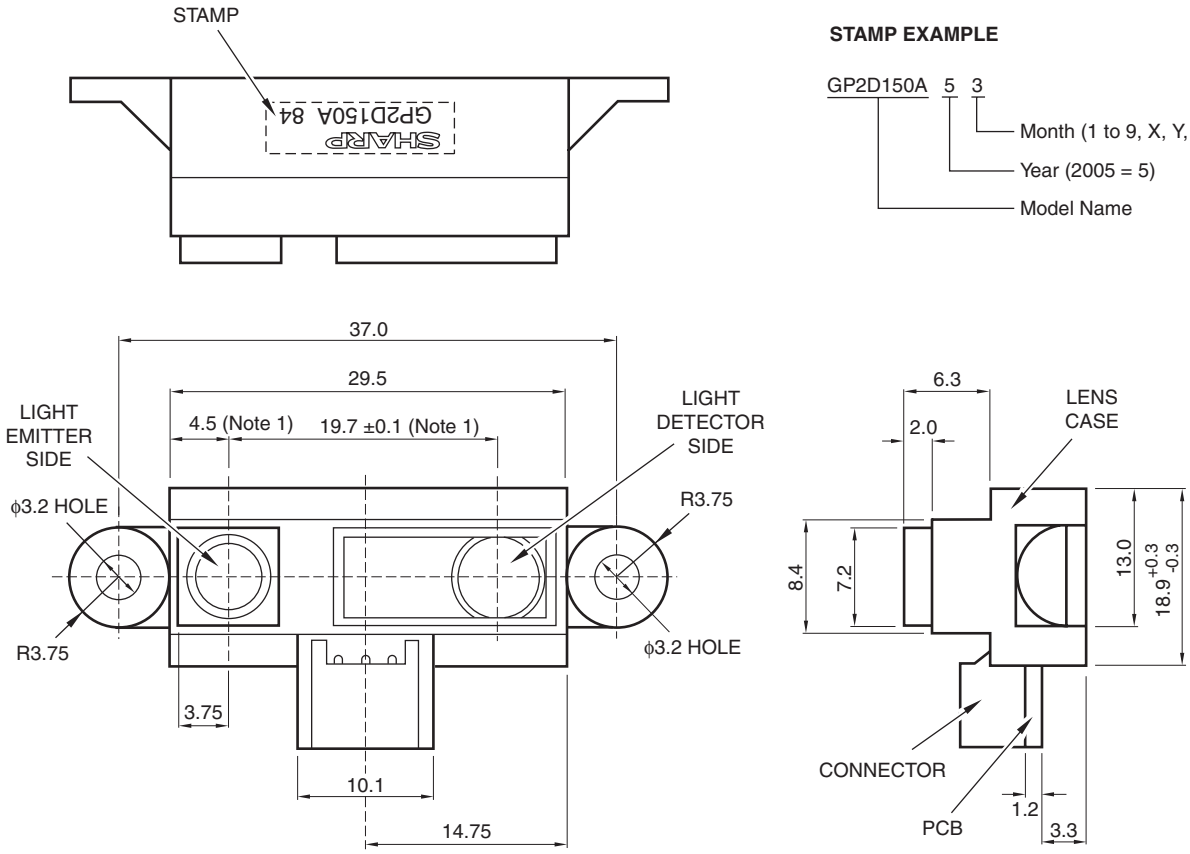


Figure 4. GP2D150A Example of Output Distance Characteristics

PACKAGE SPECIFICATIONS



STAMP EXAMPLE

GP2D150A 5 3

- 3: Month (1 to 9, X, Y, Z)
- 5: Year (2005 = 5)
- GP2D150A: Model Name

MATERIAL

Lens: Acrylic acid resin
(Visible light cut-off resin)
Case: Carbonic ABS
(Electro-conductive resin)
PCB: Paper phenol

CONNECTOR SIGNAL

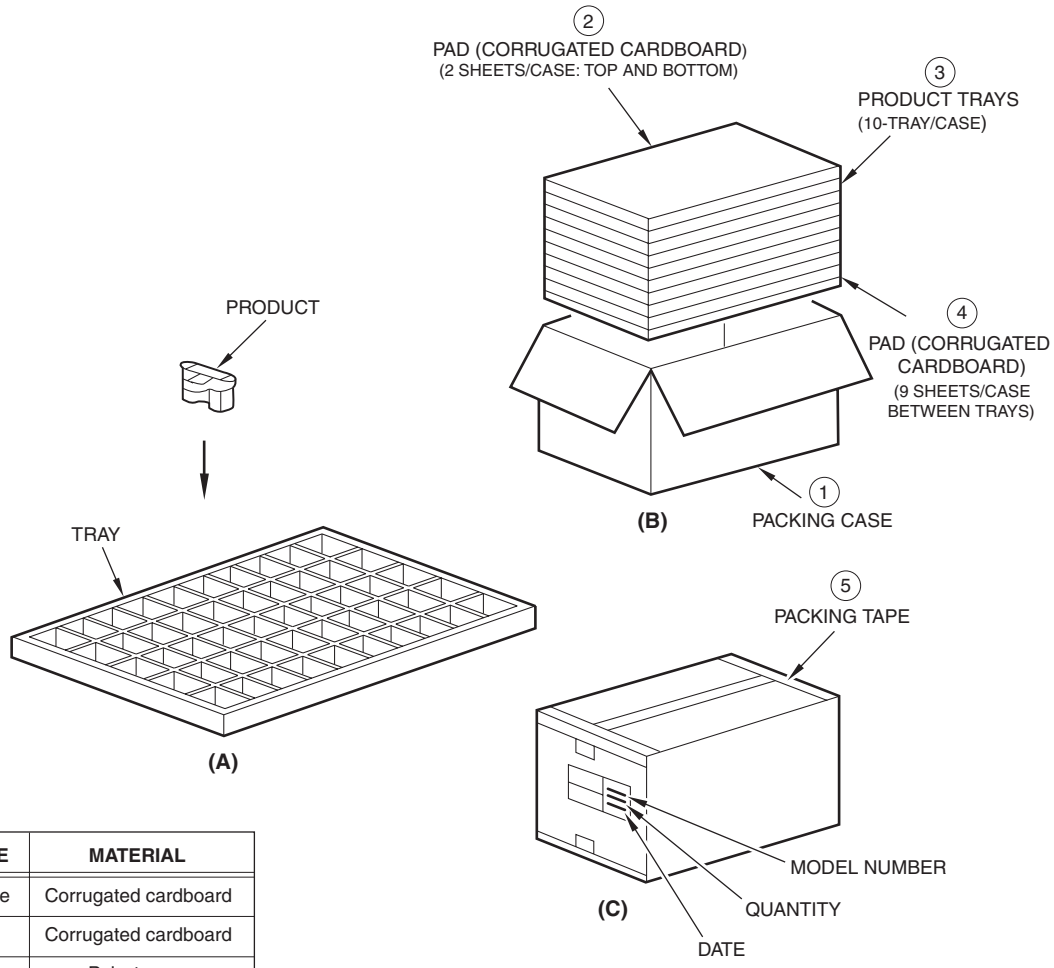
PIN	SIGNAL NAME
①	V_O
②	GND
③	V_{CC}

Connector: J.S.T. Trading Company, LTD
S3B-PH

NOTES:
1. Dimensions reference lens center.
2. Unspecified tolerances are ±0.3 mm.
3. Dimensions are in mm.

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PACKING SPECIFICATION



PART NAME	MATERIAL
Packing case	Corrugated cardboard
Pad	Corrugated cardboard
Tray	Polystyrene

PACKING METHOD

1. Each tray holds 50 pieces. Packing methods are shown in (A).
2. Each box holds 10 trays. Pads are added to top and bottom, and between layers, as in (B).
   top and bottom. Put pads between each tray (9 pads total) see above drawing (B).
3. The box is sealed with packing tape. (C) shows the location of the Model number, Quantity, and Inspection date.
4. Package weight: Approximately 4 kg.

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NOTES

- Keep the sensor lens clean. Dust, water, oil, and other contaminants can deteriorate the characteristics of this device. Applications should be designed to eliminate sources of lens contamination.
- When using a protective cover over the emitter and detector, ensure the cover efficiently transmits light throughout the wavelength range of the LED (λ = 850 nm ± 70 nm). Both sides of the protective cover should be highly polished. Use of a protective cover may decrease the effective distance over which the sensor operates. Ensure that any cover does not negatively affect the operation over the intended application range.
- Objects in proximity to the sensor may cause reflections that can affect the operation of the sensor.
- Sources of high ambient light (the sun or strong artificial light) may affect measurement. For best results, the application should be designed to prevent interference from direct sunlight or artificial light.
- Using the sensor with a mirror can induce measurement errors. Often, changing the incident angle on the mirror can correct this problem.
- If a prominent boundary line exists in the surface being measured, it should be aligned vertically to avoid measurement error. See Figure 5 for further details.
- When measuring the distance to objects in motion, align the sensor so that the motion is in the horizontal direction instead of vertical. Figure 6 illustrates the preferred alignment.
- A 10 µF (or larger) bypass capacitor between V_{CC} and GND near the sensor is recommended.
- To clean the sensor, use a dry cloth. Use of any liquid to clean the device may result in decreased sensitivity or complete failure.
- Excessive mechanical stress can damage the internal sensor or lens.

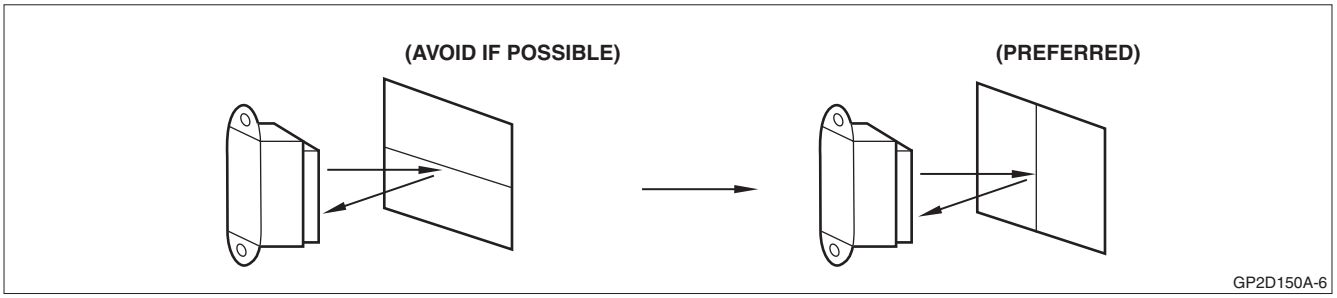


Figure 5. Proper Alignment to Surface Being Measured

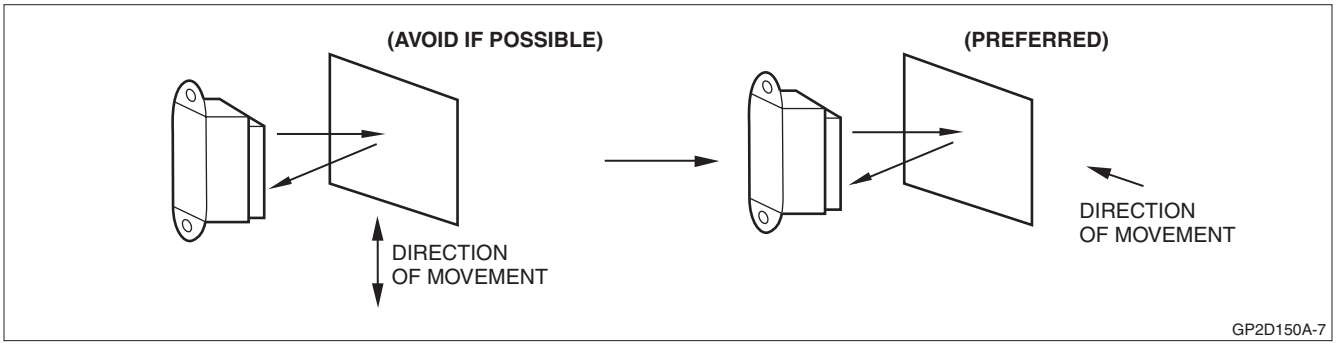


Figure 6. Proper Alignment to Moving Surfaces

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