Panasonic

NEW

DPM

2D Code Reader

LP-ABR10 SERIES

CE
Conforming to
EMC Directive

Certified

Stable Reading Performance
by Ultimate Lighting System

DPM
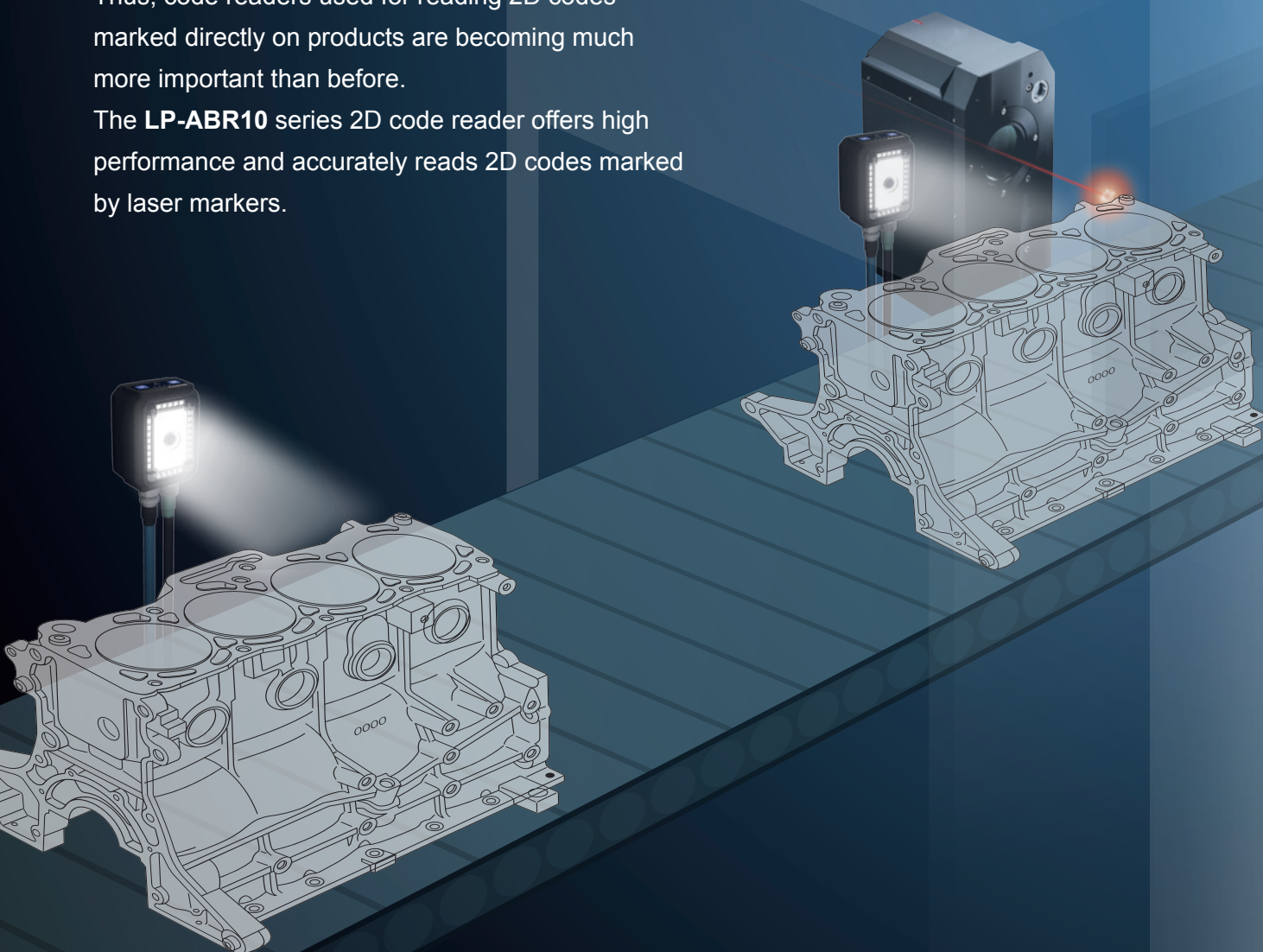
DPM (Direct Part Marking) is widely used for production management and quality control. Thus, code readers used for reading 2D codes marked directly on products are becoming much more important than before.
The **LP-ABR10** series 2D code reader offers high performance and accurately reads 2D codes marked by laser markers.

■**Examples of DPM codes**

Engine block	Camshaft	Connecting rod	Piston ring

Stable Reading Performance Backed by Advanced Features

Code readers used in production lines are required to stably read 2D codes marked on parts of diverse shapes and with various surface conditions.

The **LP-ABR10** series code reader is equipped with three advanced features that dramatically improve reading accuracy and ensure stable reading of 2D codes.

Advanced Feature 1

Lighting ► *Page 4*

High-brightness LED & lighting variations

Advanced Feature 2

High Resolution ► *Page 5*

1.2-Megapixel image sensor

Advanced Feature 3

Image Processing ► *Page 5*

Proprietary algorithm for DPM

DPM 2D Code Reader

LP-ABR10 SERIES

Three Advanced Features

Lighting

Lighting variations allow selection of optimal lighting condition.

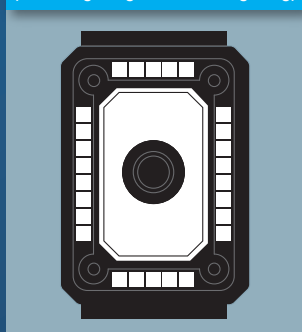DPM is a process used to directly mark parts with product information.
The DPM process adds codes directly on parts made of metals, resins or other materials. Unlike codes printed on paper or labels, DPM codes can be affected by the part shape and surface condition. Thus, the ordinary lighting system of a code reader may not be able to read DPM codes properly in some cases.

The **LP-ABR10** series code reader is built in with a diffused lighting block (center block) and four direct lighting blocks (top, bottom, left and right blocks). Each of these lighting blocks can be independently turned on/off, and the brightness can be adjusted in 100 steps. By setting an optimal lighting condition, the **LP-ABR10** series code reader reads DPM codes accurately.
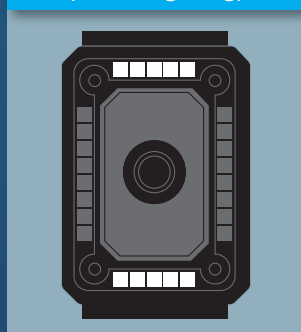
High-brightness white color LED

All blocks ON (Direct lighting + Diffused lighting)	**Two blocks ON** (Direct lighting)	**One block ON** (Direct lighting)	**One block ON** (Diffused lighting)
Suitable for reading from a distance	Suitable for cylindrical workpieces	Suitable for workpieces with a step	Suitable for clear workpieces
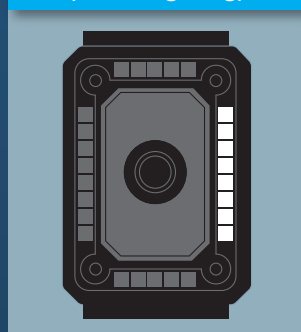
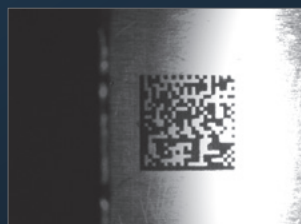## Accurately Reads DPM Codes on Workpieces of Various Types

■**Problems with ordinary lighting**

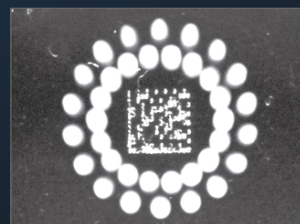| Insufficient light intensity (too dark)	Glare due to regular reflection	Shadow of workpiece	Reflection of light sources

Advanced Feature 2

High Resolution

1.2-megapixel image sensor captures clear image.

The **LP-ABR10** series code reader is equipped with a high-resolution, 1.2-megapixel CMOS image sensor. It is capable of reading a small cell-size code that is difficult to be read by an ordinary 0.3-megapixel image sensor and a 2D code on a workpiece that generates a lot of noise in code reading.

> The large number of pixels ensures acquisition of clear and detailed image!

Advanced Feature 3

Image Processing

## Proprietary algorithm maintains stable reading.

Since DPM codes are directly marked on parts, they can result in the generation of a large amount of noise due to surface irregularities or insufficient contrast against the background. This makes it difficult for an ordinary code reader to read the codes accurately. Codes can also become scratched or covered with oil, and they may be exposed to harsh conditions such as washing and chemical treatment. The **LP-ABR10** series code reader is provided with a proprietary code reading algorithm developed exclusively for DPM codes. This enables the **LP-ABR10** series code reader to read codes that are difficult for an ordinary code reader to read and ensures stable reading. This contributes to the improvement of production management and traceability of various products.
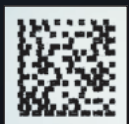
Base material noise

Low contrast
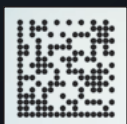
Dot matrix mark

Distortion

Marking misalignment

Thickening
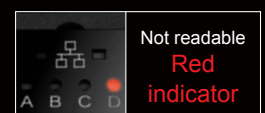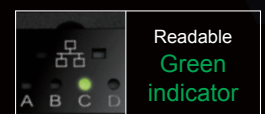
Thinning

Scratch / dirt

Proprietary image processing algorithm

Stable reading

Whether the code is readable or not is indicated by the color for easy, at-a-glance confirmation.

Readable
Green indicator

Not readable
Red indicator

Versatile Functions Useful on the Production Floor

2D Code Marking Quality Verification Function

The **LP-ABR10** series code reader supports 2D code marking quality verification in compliance with ISO/IEC 15415 and AIM DPM-1-2006. This enables management of 2D code marking quality using quality items in compliance with the international standards.
Management of changes in the 2D code marking quality is useful for preventive maintenance of production lines.

Overall score: 4.0

■ Verification items

4: **CON** (Contrast)
4: **MOD** (Modulation)
4: **FPD** (Fixed Pattern Damage)
4: **DEC** (Decode)

4: **ANU** (Axial Non-Uniformity)
4: **GNU** (Grid Non-Uniformity)
4: **UEC** (Unused Error Correction)

* The overall score can be added to the reading result data.
  It is also possible to select only necessary items from seven verification items and output the overall score.
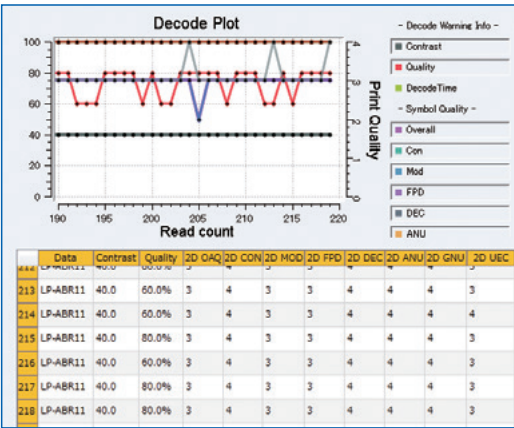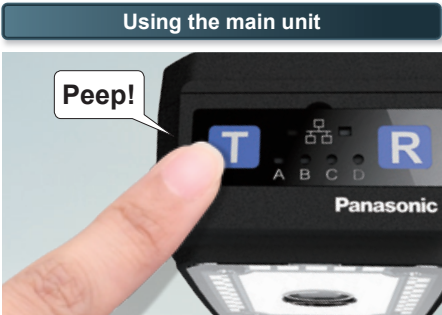

Verification results include a graph and numerical data for easy understanding.

Auto Teaching Function

The auto teaching function automatically sets the most suitable 2D code reading condition. This function allows easy and convenient setting of optimal reading condition for various types of parts.

Using the main unit	Using the PC software
Peep!	Click!

Auto teaching function for easy setting of reading condition for various types of parts

| Aluminum	Copper	Cast metal	Substrate	Resin	Glass	Ceramic	Rubber

Table Function

The code reader unit can be registered with up to eight sets of conditions. Even when 2D codes with different marking quality levels must be read, the setting automatically changes to an appropriate registered setting. This helps reduce the production line from stopping due to a read error.

When the code cannot be read, the code reader automatically changes the Table No. in use.

Table No. 1	Table No. 2	Table No. 8
Normal	Black-and-white reversal	Low contrast
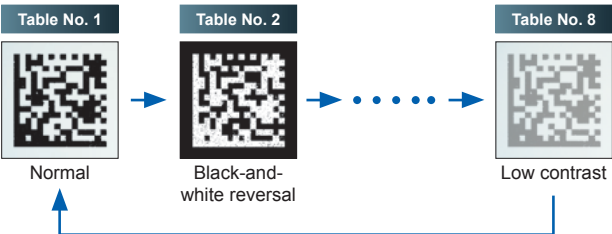
Data Check Function (Preset Mode)

With this function enabled, the code reader compares the 2D code to read with preregistered data and reads it only when the 2D code matches the preset condition. The function has two types of setting, "Perfect match" and "Partial match." This function helps prevent defect products from mixing with good products.

| When set to "Perfect match" ABC123	ABC123 **Match**	ABCD **Unmatch**	BBC189 **Unmatch**
	▲ Comparison	▲ Comparison	▲ Comparison
Registered data	2D code data		
ABC123	ABC123	ABCD	BBC189
	▼ Comparison	▼ Comparison	▼ Comparison
When set to "Partial match" (Comparison of 2 to 4 characters) ABC123	ABC123 **Match**	ABCD **Unmatch**	BBC189 **Match**

IP65 Rating

The code reader boasts an IP65 rating (IEC), and prevents entry of dust particles and resists the effect of water droplets.

Ethernet Compatibility

The Ethernet compatibility enables the transmission of not only the read data but also images and quality verification data. The **LP-ABR10** series code reader is also equipped with a PLC link function for easy configuration of a network.

LP-ABR10 series   Laser marker, etc.
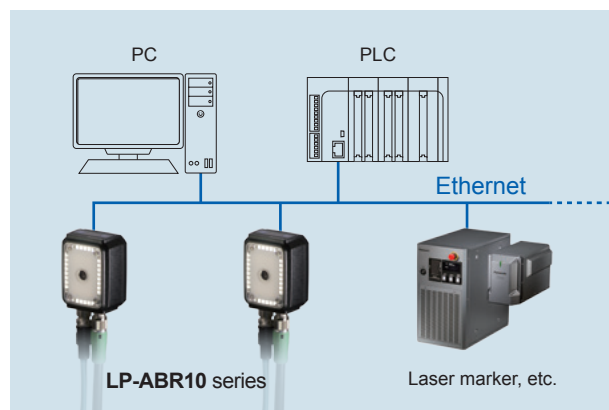
■ SPECIFICATIONS

Specifications of 2D code reader unit

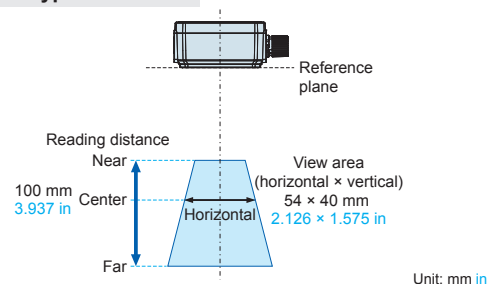|	Type	Standard type	Long-distance type
Item	Model No.	**LP-ABR11**	**LP-ABR12**
Image sensor		1/3 inches CMOS monochrome	
Effective pixels		1,280 × 960 (1.2 million pixels approx.)	
Internal illumination source		White LED	
Reading angle		PITCH: ±35°, SKEW: ±35°, TILT: 360°	
Supply voltage		24 V DC ±10 %	
Power consumption		Command (SYNC) standby: 140 mA approx., During reading operation: 400 mA approx.	
Interface	Ethernet	10Base-T, 100Base-T, 1000Base-T	
	RS-232C	1200 bps to 115.2 kbps	
Digital input		Photo-coupler isolation × 1 (Input resistance: 1 kΩ, OFF voltage: 0 to 0.8 V, ON voltage: 6 to 28 V)	
Digital output		Photo-coupler isolation × 4 (Maximum rating: 30 V DC, 50 mA)	
Environmental resistance	Protection	IP65 (IEC)	
	Ambient temperature	0 to +40 °C +32 to +104 °F, Storage: -20 to +65 °C -4 to +149 °F	
	Ambient humidity	35 to 85 % RH (No dew condensation allowed), Storage: 35 to 85 % RH (No dew condensation allowed)	
	Vibration resistance	10 to 55 Hz amplitude 1.5 mm 0.059 in (total width) in X, Y, Z directions for two hours each	
Weight		Net weight: 200 g approx.	

Specifications of read function

	Type	Standard type	Long-distance type
Item	Model No.	**LP-ABR11**	**LP-ABR12**
Supported symbols (2D)		Data Matrix (ECC200), QR Code	
Minimum resolution		0.167 mm 0.007 in	
Read center distance		100 mm 3.937 in	200 mm 7.874 in
View area (horizontal × vertical)		54 × 40 mm 2.126 × 1.575 in (at read center distance)	44 × 33 mm 1.732 × 1.299 in (at read center distance)
Reading distance (typical)		<Data Matrix (ECC200), QR Code> • For cell size of 0.167 mm 0.007 in: 85 to 125 mm 3.346 to 4.921 in • For cell size of 0.25 mm 0.010 in: 70 to 150 mm 2.756 to 5.906 in	<Data Matrix (ECC200)> • For cell size of 0.167 mm 0.007 in: 185 to 220 mm 7.283 to 8.661 in • For cell size of 0.25 mm 0.010 in: 175 to 230 mm 6.89 to 9.055 in <QR Code> • For cell size of 0.167 mm 0.007 in: 190 to 215 mm 7.48 to 8.465 in • For cell size of 0.25 mm 0.010 in: 180 to 225 mm 7.087 to 8.858 in

* Cell size of 0.25 mm 0.010 in or larger is recommended (horizontal direction) when the 2D code print quality verification function is used.
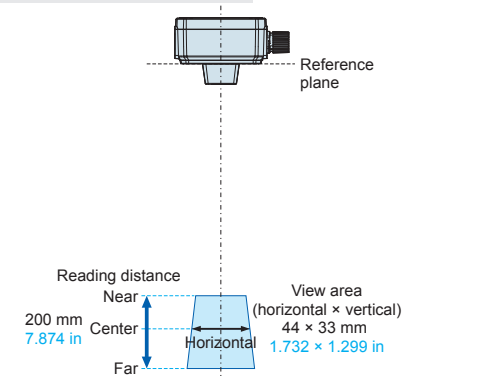
Reading distance – View area (typical)

Standard type LP-ABR11

Reference plane

Reading distance
Near

100 mm 3.937 in Center Horizontal

Far

View area (horizontal × vertical) 54 × 40 mm 2.126 × 1.575 in

Unit: mm in

Supported symbols (2D)		Data Matrix (ECC200), QR Code	
Cell size		0.167 0.007	0.25 0.010
Near	Reading distance	85 3.346	70 2.756
	View area (horizontal × vertical)	46 × 34 1.811 × 1.339	38 × 29 1.496 × 1.142
Center	Reading distance	100 3.937	
	View area (horizontal × vertical)	54 × 40 2.126 × 1.575	
Far	Reading distance	125 4.921	150 5.906
	View area (horizontal × vertical)	66 × 50 2.598 × 1.969	79 × 60 3.11 × 2.362

Long-distance type LP-ABR12

Reference plane

Reading distance
Near

200 mm 7.874 in Center Horizontal

Far

View area (horizontal × vertical) 44 × 33 mm 1.732 × 1.299 in

Unit: mm in

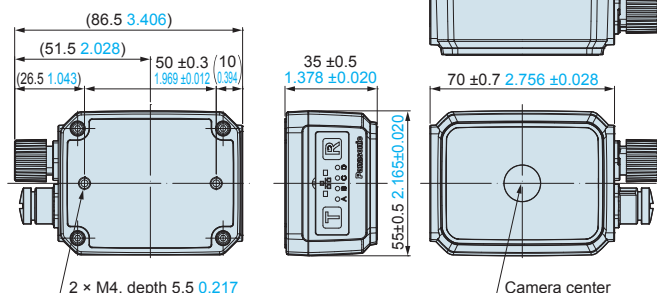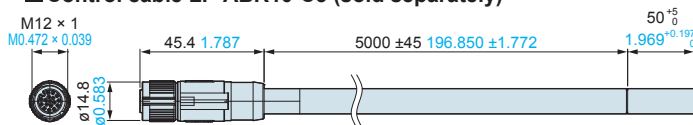| Supported symbols (2D)		Data Matrix (ECC200)		QR Code	
Cell size		0.167 0.007	0.25 0.010	0.167 0.007	0.25 0.010
Near	Reading distance	185 7.283	175 6.890	190 7.480	180 7.087
	View area (horizontal × vertical)	40 × 30 1.575 × 1.181	38 × 28 1.496 × 1.102	42 × 31 1.654 × 1.220	39 × 29 1.535 × 1.142
Center	Reading distance	200 7.874		200 7.874	
	View area (horizontal × vertical)	44 × 33 1.732 × 1.299		44 × 33 1.732 × 1.299	
Far	Reading distance	220 8.661	230 9.055	215 8.465	225 8.858
	View area (horizontal × vertical)	49 × 37 1.929 × 1.457	51 × 38 2.008 × 1.496	48 × 36 1.890 × 1.417	50 × 37 1.969 × 1.457

LP-ABR10

■ DIMENSIONS (Unit: mm in)

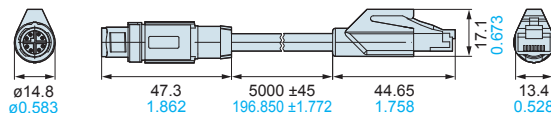The CAD data can be downloaded from our website.

■ 2D code reader

Standard type LP-ABR11

(86.5 3.406)
(51.5 2.028)
(26.5 1.043)
50 ±0.3 1.969 ±0.012
(10 0.394)
35 ±0.5 1.378 ±0.020
55±0.5 2.165±0.020
70 ±0.7 2.756 ±0.028

2 × M4, depth 5.5 0.217
Camera center

Long-distance type LP-ABR12

(86.5 3.406)
(51.5 2.028)
(26.5 1.043)
50 ±0.3 1.969 ±0.012
(10 0.394)
35 ±0.5 1.378 ±0.020
15.5 ±0.4 0.610 ±0.016
55±0.5 2.165±0.020
70 ±0.7 2.756 ±0.028

2 × M4, depth 5.5 0.217
Camera center

■ Control cable LP-ABR10-C5 (sold separately)

M12 × 1
M0.472 × 0.039
ø14.8 ø0.583
45.4 1.787
5000 ±45 196.850 ±1.772
50 +5/0 1.969 +0.197/0

■ LAN cable LP-ABR10-L5 (sold separately)

ø14.8 ø0.583
47.3 1.862
5000 ±45 196.850 ±1.772
44.65 1.758
13.4 0.528
17.1 0.673
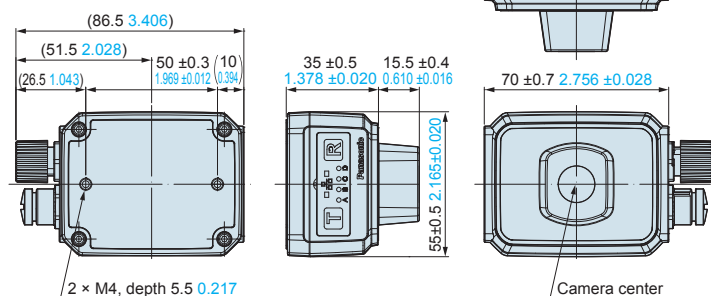
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