

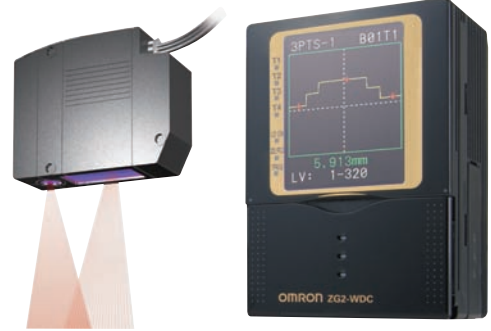
Smart Sensor 2D CMOS Laser Type ZG2

CSM_ZG2_DS_E_6_8

2D Laser for Shape Measurements. Achieving stable measurement through innovative technology



- Twelve times the sensitivity to stably measure surfaces with black coatings or black rubber.
- Two and half times more resistance to the influence of tilting for stable measurement of transparent and glossary surfaces.
- Ten times the speed for stable measurement even on high-speed lines.



Be sure to read "Safety Precautions" on page 4.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Ordering Information

Sensor Heads

Optical system	Measurement range		Resolution		Model	
	Height direction	Width direction	Height direction	Width direction	Cable length 2m	Cable length 0.5m
Regular reflective	22.3±0.5 mm	3 mm (typical)	0.25 µm	5 µm (3mm/631pixels)	ZG2-WDS3VT 2M	ZG2-WDS3VT 0.5M
Diffuse reflective	10.6±0.4 mm					
Diffuse reflective	50±3 mm	8 mm (typical)	1 µm	13 µm (8 mm/631 pixels)	ZG2-WDS8T 2M	ZG2-WDS8T 0.5M
Regular reflective	44±2 mm					
Diffuse reflective	100±12 mm	22 mm (typical)	2.5 µm	35 µm (22 mm/631 pixels)	ZG2-WDS22 2M	ZG2-WDS22 0.5M
Regular reflective	94±10 mm					
Diffuse reflective	210±48 mm	70 mm (typical)	6 µm	111 µm (70 mm/631 pixels)	ZG2-WDS70 2M	ZG2-WDS70 0.5M

Note: For details, see the Ratings and Specifications Table.

Sensor Controllers

Appearance	Power supply	Output type	Model
	24 VDC	NPN	ZG2-WDC11A *
			ZG2-WDC11
		PNP	ZG2-WDC41A *
			ZG2-WDC41

* Setup support software for PC is attached.

Data Storage Unit

Appearance	Power supply	Output type	Model
	24 VDC	NPN	ZG2-DSU11 *
		PNP	ZG2-DSU41 *

* Have been discontinued at the end of September 2024.

Accessories (Order Separately)

Real-time Parallel Output Unit

Appearance	Output type	Model
	NPN	ZG-RPD11-N
	PNP	ZG-RPD41-N

RS-232C Cable

Connecting device	Model	Qty
For PLC/PT connection (2 m)	ZS-XPT3	1
For personal computer connection (2 m)	ZS-XRS3	

Controller Link Unit

Appearance	Model
	ZS-XCN

Sensor Head Extension Cable (Robot Cable)

Appearance	Cable length	Model	Qty
	25 m	ZG2-XC25CR	1
	15 m	ZG2-XC15CR	
	8 m	ZG2-XC8CR	
	3 m	ZG2-XC3CR	

Parallel Mounting Adaptor

Appearance	Model
	ZS-XPM1 For 1 Unit
	ZS-XPM2 For 2 Units or more

Memory Card

Capacity	Model
256 MB	HMC-EF283
512 MB	HMC-EF583

Ratings and Specifications

Sensor Heads

Item		ZG2-WDS8T		ZG2-WDS22		ZG2-WDS70	ZG2-WDS3VT		
Optical system		Diffuse reflective	Regular reflective	Diffuse reflective	Regular reflective	Diffuse reflective	Regular reflective	Diffuse reflective	
Measurement range	Height direction	50±3 mm	44±2 mm	100±12 mm	94±10 mm	210±48 mm (In the high-precision mode)	22.3±0.5 mm	10.6±0.4 mm	
	Width direction *5	8 mm (typical)		22 mm (typical)		70 mm (typical)	3 mm (typical)		
Resolution	Height direction *1	1 µm		2.5 µm		6 µm	0.2 µm		
	Width direction	13 µm (8 mm / 631 pixels)		35 µm (22 mm / 631 pixels)		111 µm (70 mm / 631 pixels)	5 µm (3 mm / 631 pixels)		
Linearity (in the height direction) *2		±0.1 %F.S.							
Temperature characteristic *3		0.03 %F.S./°C			0.02 %F.S./°C		0.08 %F.S./°C		
Light source	Type	Visible semiconductor laser							
	Wavelength	658 nm					650 nm		
	Output	5 mW max. output, 1 mW max. exposure (without using optical instruments)						1 mW max	
	Laser class	Class 2M of EN60825-1 / IEC60825-1 Class IIIB of FDA (21CFR 1040.10 and 1040.11)					Class 2 of EN60825-1 / IEC60825-1 Class II of FDA (21CFR 1040.10 and 1040.11)		
Beam shape (at measurement center distance) *4		30 µm × 24 mm (typical)		60 µm × 45 mm (typical)		120 µm × 75 mm (typical)	25 µm × 4 mm (typical)		
LED		STANDBY : Lights when laser irradiation preparation is complete (indication color : green) LD_ON : Lights when the laser is irradiating (indication color : green)							
Measurement object		Surface of non-transparent / transparent objects				Surface of non-transparent objects	Surface of non-transparent / transparent objects		
Environmental resistance	Ambient light intensity	Illumination on the photo-receiving face 7,000 lx max. : Incandescent lamp							
	Ambient temperature	Operating : 0 to 50 °C, Storage : -15 to 60°C (with no icing or condensation)							
	Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)							
	Degree of protection *6	IP66 (IEC60529)					IP67 (IEC60529)		
	Vibration resistance (destruction)	10 to 150 Hz with 0.35 mm single amplitude for 80 min each in X, Y, and Z directions							
	Shock resistance (destruction)	150 m/s ² , 3 times each in 6 directions (up / down, right / left, forward / backward)							
Materials		Case: Aluminum diecast, Front cover : Glass, Cable insulation : Heat-resistive polyvinyl chloride (PVC), Connector : Zinc alloy or brass							
Cable length		0.5 m, 2 m (flexible cable)							
Minimum bending radius		68 mm							
Weight		Approx. 500 g		Approx. 500 g		Approx. 650 g	Approx. 300 g		
Accessories		Laser labels (English labels), Ferrite core (2), Instruction manual							

*1 Obtained by setting an OMRON standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields.

Model	CCD mode	Average No. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG2-WDS8T/ZG2-WDS22/ ZG2-WDS70	High-resolution mode	64	OMRON standard white alumina ceramic object	
ZG2-WDS3VT			OMRON standard mirrored object	OMRON standard diffuse reflective object

Note: The minimum resolution of the ZG2-WDS8T/WDS3VT is 0.25 µm, even when the average number of operations is increased. Resolution does not go any lower.

*2 The tolerance for an ideal straight line obtained by determining the average height of an OMRON standard measurement object for the beam line. The CCD high-resolution mode is used. Linearity varies depending on the measurement object.

Model	CCD mode	Average No. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG2-WDS8T/ZG2-WDS22/ ZG2-WDS70	High-resolution mode	1	OMRON standard white alumina ceramic object	
ZG2-WDS3VT			OMRON standard mirrored object	OMRON standard diffuse reflective object

*3 A value attained by using an aluminum jig to secure the distance between the Sensor Head and the measurement object. The CCD standard mode is used.

*4 Defined as 1/e² (13.5%) of the center light intensity.

This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

*5 A typical value of the measurement range (width direction) near the measurement center distance. This is not a guaranteed value.

*6 Protection structure of connector area is IP40.

Sensor Controllers

Item		ZG2-WDC11/WDC11A	ZG2-WDC41/WDC41A	
Input/output type		NPN	PNP	
No. of connectable Sensor Heads		1 per Controller		
No. of connectable Controllers		2		
Measurement cycle *1		16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)		
Min. display unit		10 nm		
Display range		-999.99999 to 999.99999		
Display	LCD monitor	2.2-inch TFT color LCD (557 x 234 pixels)		
	LEDs	<ul style="list-style-type: none"> Judgment indicators for each task (indication color : orange):T1, T2, T3, T4 Laser indicator (indication color : green): LD_ON Zero reset indicator (indication color : green): ZERO Trigger indicators (indication color : green): TRIG 		
External interface	Input/output signal lines	Analog outputs	Select voltage or current (using the sliding switch on the bottom surface) <ul style="list-style-type: none"> Voltage output : -10 to 10 V, output impedance : 40 Ω Current output : 4 to 20 mA, maximum load resistance : 300 Ω 	
		Judgment output (ALL-PASS/NG/ERROR)	NPN open collector 30 VDC, 50 mA max.	
		Trigger auxiliary output (ENABLE/GATE)	Residual voltage : 1.2 V max.	
		Laser stop input (LD-OFF)	ON : 0 V short or 1.5 V max. OFF : Open (leakage current : 0.1 mA max.)	
		Zero reset input (ZERO)		
		Measurement trigger input (TRIG)		
	Bank switching input (BANK A~D)	PNP open collector 50 mA max. Residual voltage : 1.2 V max.		
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Parallel output (when ZG-RPD is mounted)	Output	18 - terminal	
Main functions	No. of setting banks	16		
	Sensitivity adjustment	Multi, High-speed multi, Auto, Fixed		
	Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle, Intersection coordinates, Intersection angle, Sectional area, Calculations between tasks (up to eight items can be measured simultaneously)		
	Auxiliary functions	Filter, Laser power adjustment, Position correction (height, position, lope), Linked operation, Point of inflection measurement		
	Profiles saved	16 profiles (1 profile per bank)		
	Trigger modes	External trigger / continuous		
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple current)		
	Current consumption	0.8 A max. (per sensor head)		
	Insulation resistance	20 MΩ at 250 V between lead wires and Controller case		
	Dielectric strength	1,000 VAC, 50 / 60 Hz for 1 min between lead wires and Controller case		
Environmental resistance	Ambient temperature	Operating : 0 to 50°C, Storage : -15 to 60°C (with no icing or condensation)		
	Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)		
	Degree of protection	IP20 (IEC60529)		
	Vibration resistance (destruction)	Vibration frequency : 10 to 150 Hz, single amplitude : 0.35 mm, acceleration : 50 m/s ²		
Shock resistance (destruction)	150 m/s ² , 3 times each in 6 directions (up / down, right / left, forward / backward)			
Material	Case : Polycarbonate (PC), Cable insulation : Heat-resistive polyvinyl chloride (PCV)			
Cable length	2m			
Minimum bending radius	57 mm			
Weight	Approx. 300 g (including cable)(Packed state: Approx. 450 g)			
Accessories	ZG2-WDC_1 : Large Ferrite Core (1 piece), Insure Lock (1 piece), Instruction Manual ZG2-WDC_1A : Large Ferrite Core (1 piece), Small Ferrite Core(2 pieces), Insure Lock (1 piece), Instruction Manual, Smart Monitor ZG2 (exclusive PC software, CD-ROM) *2, USB cable			

*1 The measurement cycles stated here are values for FIXED/AUTO sensitivity modes. The measurement cycle increases when the MULTI sensitivity/high-speed MULTI sensitivity mode is selected and according to other settings. When the high power mode is set to ON, the shortest measurement cycle becomes 95 ms regardless of the CCD mode setting. Also, when gang-mounting Controllers and Data Storage Units, the measurement cycle increases approximately 22 ms. The actual measurement cycle can be checked by the ECO monitor in RUN mode.

*2 SmartMonitor ZG2

System Requirements

OS: Windows 10 (32-bit/64-bit version)
Windows 7 (32-bit/64-bit version)
Windows XP (Service Pack3 or higher, 32-bit version)

CPU: Intel Pentium III 1 GHz or faster (2 GHz min. recommended.)

Memory: 1 GB min.

Display screen: 1,024 × 768 dots min., 16 million colors min.

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Data Storage Unit

Item		ZG2-DSU11	ZG2-DSU41
Input/output type		NPN	PNP
No. of connectable Controllers		2 *1	
Connectable Controllers		ZG2-WDC11/WDC41	
External interface	Input/output signal lines	Inputting starting/terminating logging	ON : 0 V short or 1.5 V max. OFF : Open (leakage current : 0.1 mA max.)
		Judgment output (HIGH/PASS/LOW/ERROR)	ON : Power supply voltage short or power supply voltage -1.5 V max. OFF : Open (leakage current : 0.1 mA max.)
	Serial I/O	USB2.0	NPN open collector 30 VDC, 50 mA max. Residual voltage : 1.2 V max.
RS-232C		1 port, full speed (12 Mbps), MINI-B 1 port, 115,200 bps max.	
Functions	No. of logged data *2	Memory of the main unit	Profiles saved : 5,120 profiles Measurement values saved : 65,000 values max. *3
		Memory card (256 MB) *4	Profiles saved : 35,328 profiles max. (256 profiles x 138 files) Measurement values saved : 7,150,000 values max. (65,000 values x 110 files)
	Logging trigger functions		External triggers, data triggers (self-triggers), and time triggers
	External banks functions		4096
	Other functions		Alarm output functions
Ratings	Power supply voltage		21.6 to 26.4 VDC (including ripple current)
	Current consumption		0.5 A max.
Environmental resistance	Ambient temperature		Operating : 0 to 50°C, Storage: 0 to 60°C (with no icing or condensation)
	Ambient humidity		Operating and storage : 35 to 85% (with no condensation)
Degree of protection		IP20 (IEC60529)	
Material		Case : Polycarbonate (PC)	
Cable length		2 m	
Minimum bending radius		52 mm	
Weight		Approx. 280 g	
Accessories		Ferrite Core (1 piece), Instruction Manual	

- *1 The controller link unit is necessary for linking.
- *2 Data is saved in the memory of the main unit during logging. The data is automatically saved in a memory card after logging is completed. The maximum number of logging differs according to set conditions. For details, refer to the Users Manual.
- *3 Measurement values for 65,000 measurements can be saved even when two sensor controllers are connected and each performs eight tasks.
- *4 The value is the maximum number achieved in the following conditions.
 - One sensor controller performs one measurement task.
 - Either profiles or measurement values are logged.

Safety Precautions

 **WARNING**

This product is not designed or rated for ensuring safety of persons either directly or indirectly.


Do not use it for such purposes.

Do not expose your eyes to the laser radiation either directly or indirectly (i.e., after reflection from a mirror or shiny surface).


The laser radiation has a high power density and exposure may result in loss of sight.

The warning and explanatory label on the side of the Sensor Head in the ZG2 Series is in Japanese. Replace it with the English label that comes with the product.


Class2

 **WARNING**


LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT
MAXIMUM OUTPUT : 10mW
PULSE DURATION : 20msec
WAVE LENGTH : 650nm
EN 60825-1:1994
*A1:2002 *A2:2001



Class2M

 **WARNING**

LASER RADIATION
DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS (MAGNIFIERS)
CLASS 2M LASER PRODUCT
MAXIMUM OUTPUT : 5mW
MAXIMUM EXPOSURE (WITHOUT OPTICAL INSTRUMENTS) 1min
PULSE DURATION : 10msec
WAVE LENGTH : 650nm
MEDIUM POWER SEMICONDUCTOR LASER
EN 60825-1:1994 *A2:2001 *A1:2002



For details, including precautions for correct use, refer to the "ZG2 Smart Sensor User's manual" (Cat. No. Z288) on your OMRON website.

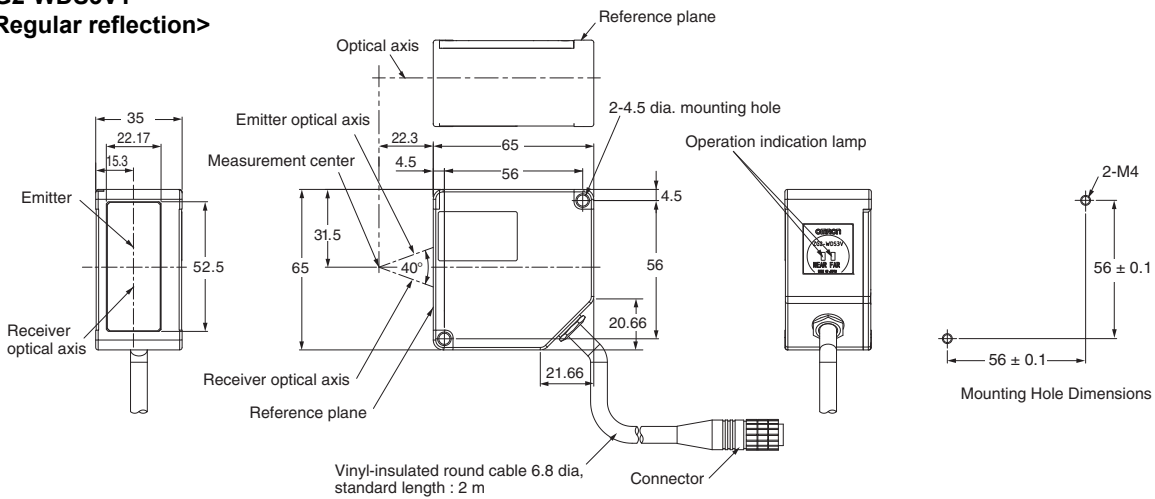
- For technical information and product FAQs, refer to the "Technical Guide" at your OMRON website.

Dimensions

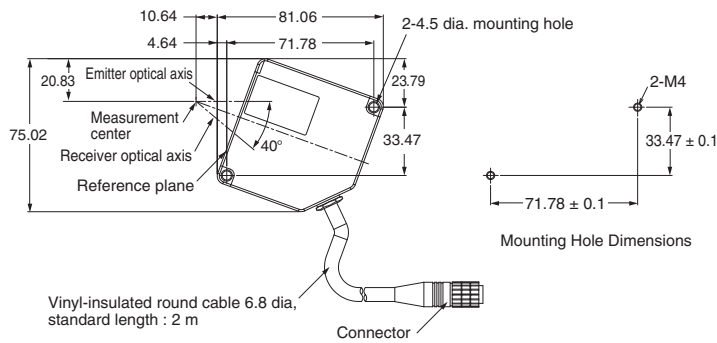
Sensor Heads

ZG2-WDS3VT

<Regular reflection>

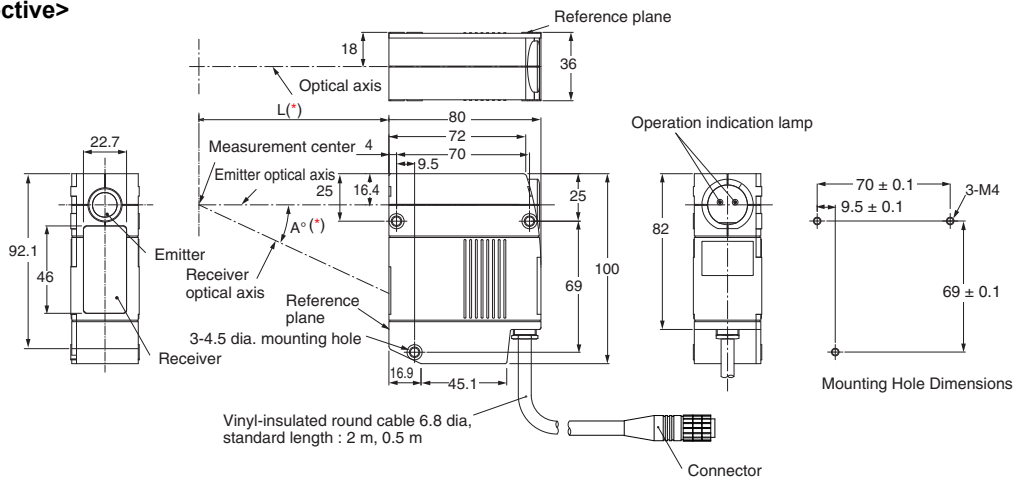


<Diffuse reflective>



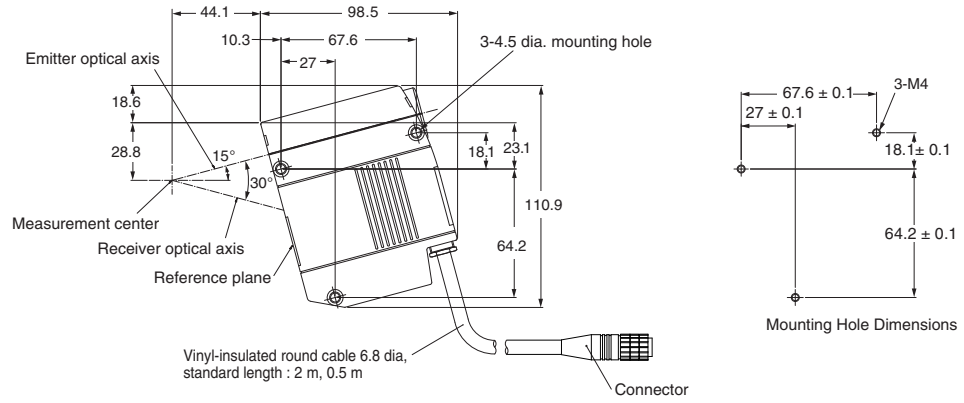
ZG2-WDS8T/WDS22

<Diffuse reflective>

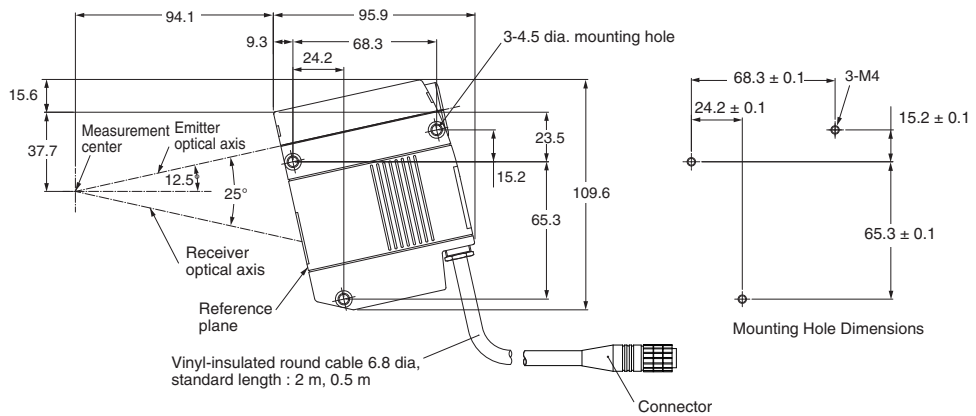


* ZG2-WDS8T L=50, A=30°
ZG2-WDS22 L=100, A=25°

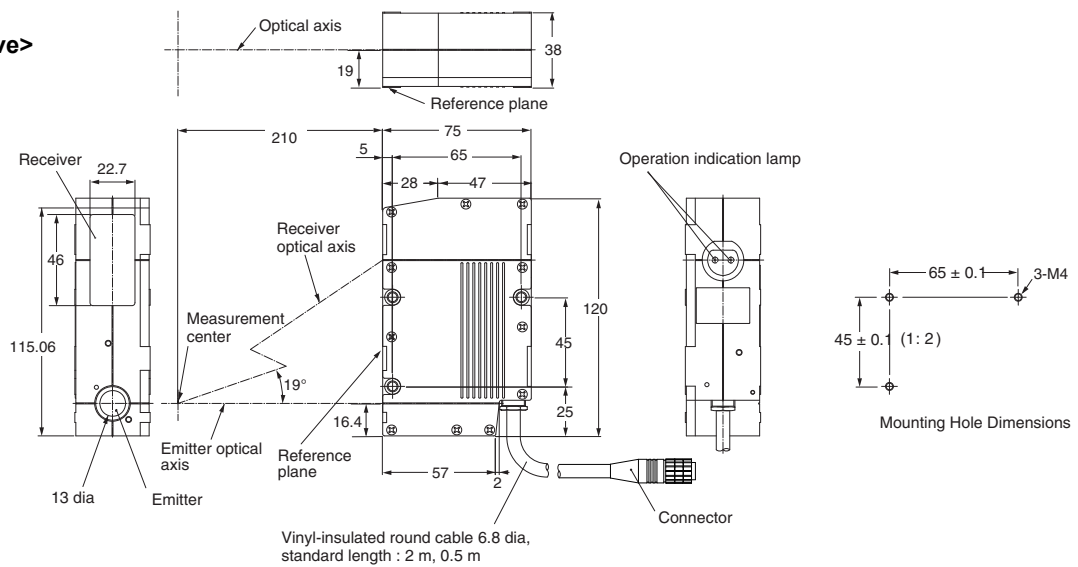
ZG2-WDS8T
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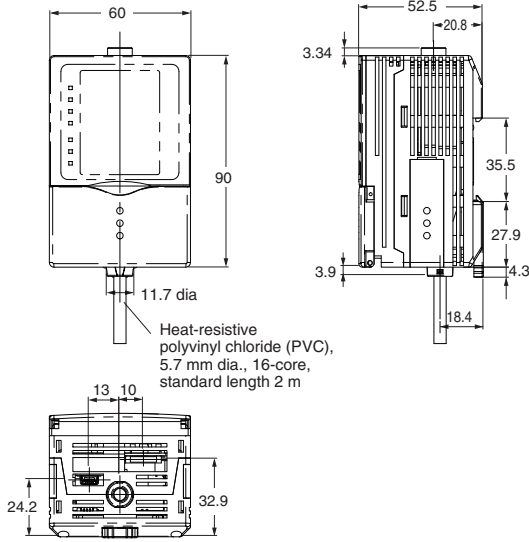
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<Regular reflection>



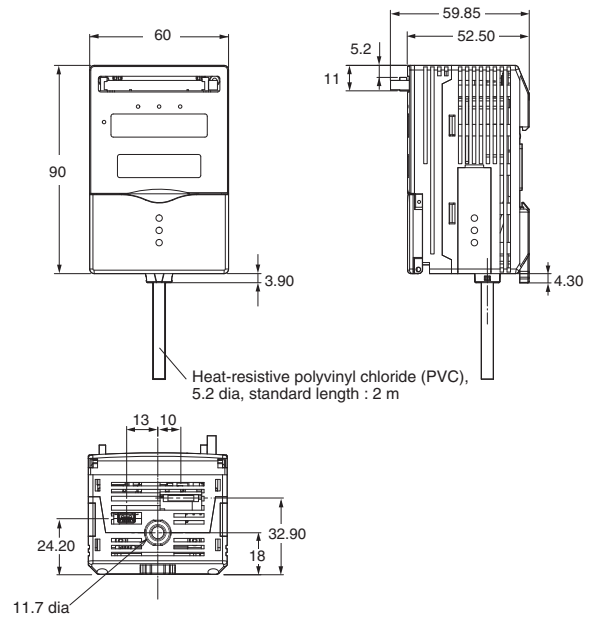
ZG2-WDS70
<Diffuse reflective>



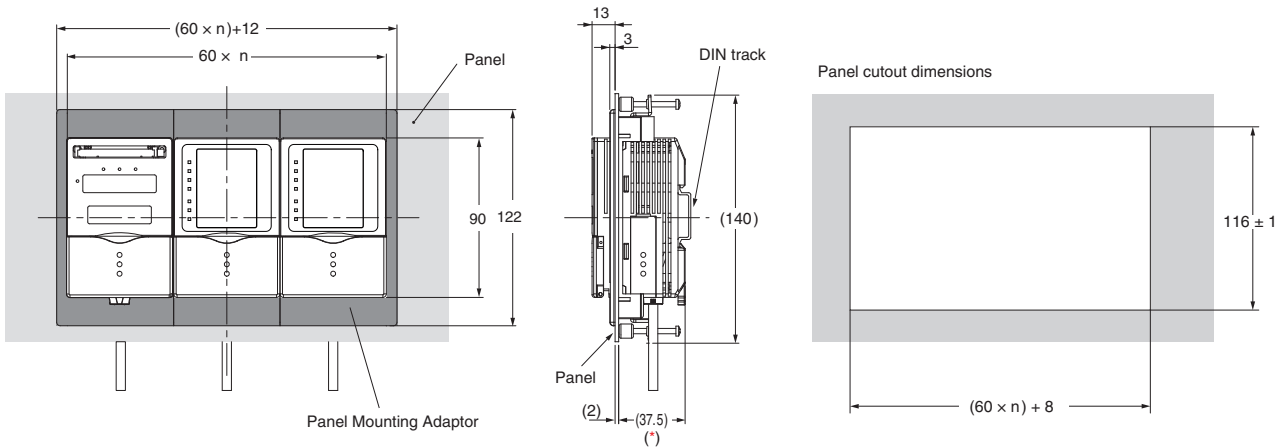
Sensor Controller
ZG2-WDC11/WDC41



Data Storage Unit
ZG2-DSU11/DSU41



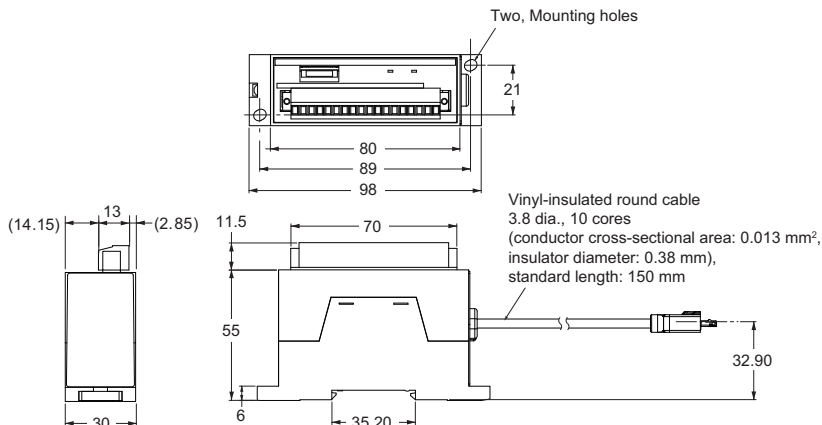
Panel Mounting Adaptor
ZS-XPM1/XPM2 (Dimensions for mounting on a control panel)



*When two or more units are aligned side-by-side.

* Dimensions are for a 2.0 mm thick panel.

Real-time Parallel Output Unit
ZG-RPD11-N/RPD41-N



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