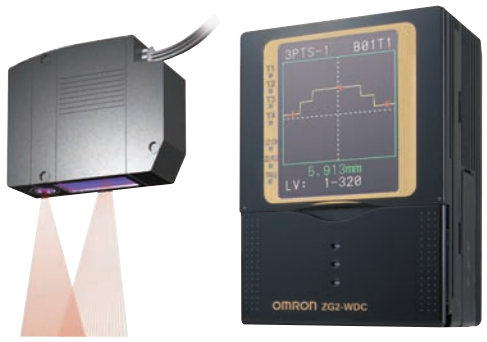
Smart Sensor 2D CMOS Laser Type
ZG2

CSM_ZG2_DS_E_6_9

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**

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**	

RS-232C Cable

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

Parallel Mounting Adaptor

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

Controller Link Unit

Appearance	Model
	**ZS-XCN**

Memory Card

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

Ratings and Specifications

Sensor Heads

Item	Model	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. output	
	Laser class	Class 2 (JIS, IEC/EN, GB/T) Class 3B (FDA)					Class 2 (JIS, IEC/EN, FDA, GB/T)	
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 (EN: 2, FDA: 3, GB: 2), Ferrite core (2), Instruction manual					Laser labels (EN: 1, FDA: 3, GB: 1), Ferrite core (Large and Small size : each 1pcs), 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 e 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 and ideal straight line obtained by determining the average height of and 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	• 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) • 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. Residual voltage : 1.2 V max.	PNP open collector 50 mA max. Residual voltage : 1.2 V max.
		Trigger auxiliary output (ENABLE/GATE)		
		Laser stop input (LD-OFF)	ON : 0 V short or 1.5 V max. OFF : Open (leakage current : 0.1 mA max.)	ON : Power supply voltage short or power supply voltage -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)		
	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.

- Window is registered trademarks of Microsoft Corporation in the USA and other countries.
- Other company names and product names in this document are the trademarks or registered trademarks or their respective companies.

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 : O V short or 1.5 V max. OFF : Open (leakage current : 0.1 mA max.)	ON : Power supply voltage short or power supply voltage -1.5 V max. OFF : Open (leakage current : 0.1 mA max.)
		Judgment output (HIGH/PASS/LOW/ERROR)	NPN open collector 30 VDC, 50 mA max. Residual voltage : 1.2 V max.	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.	
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.

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.**

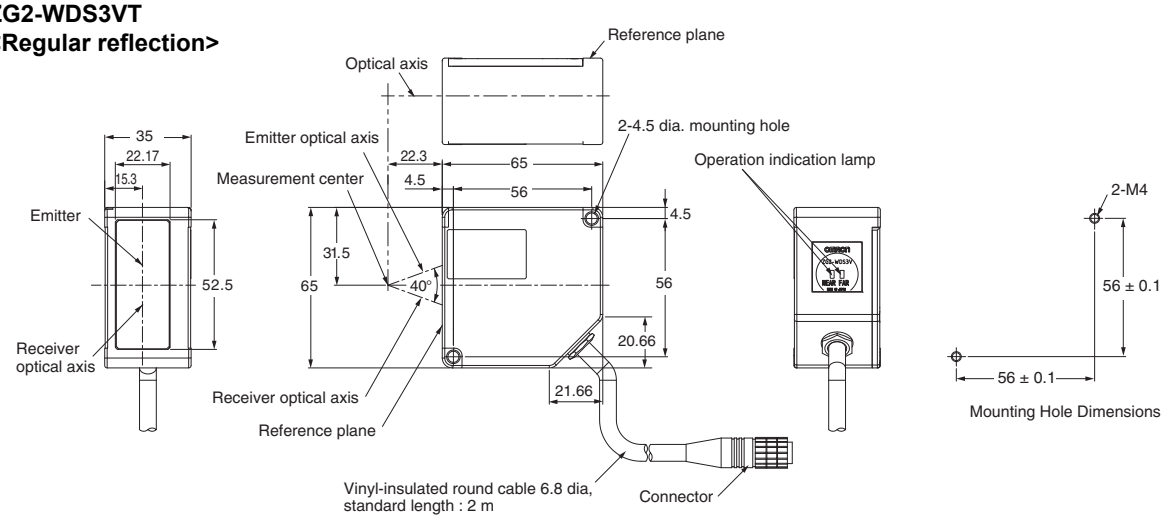
Dimensions

(Unit: mm)

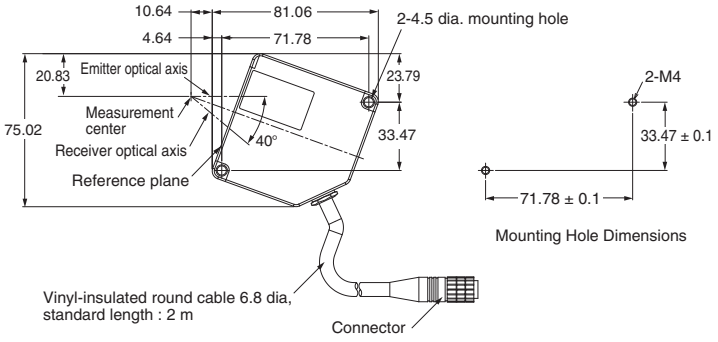
Sensor Heads

ZG2-WDS3VT

<Regular reflection>

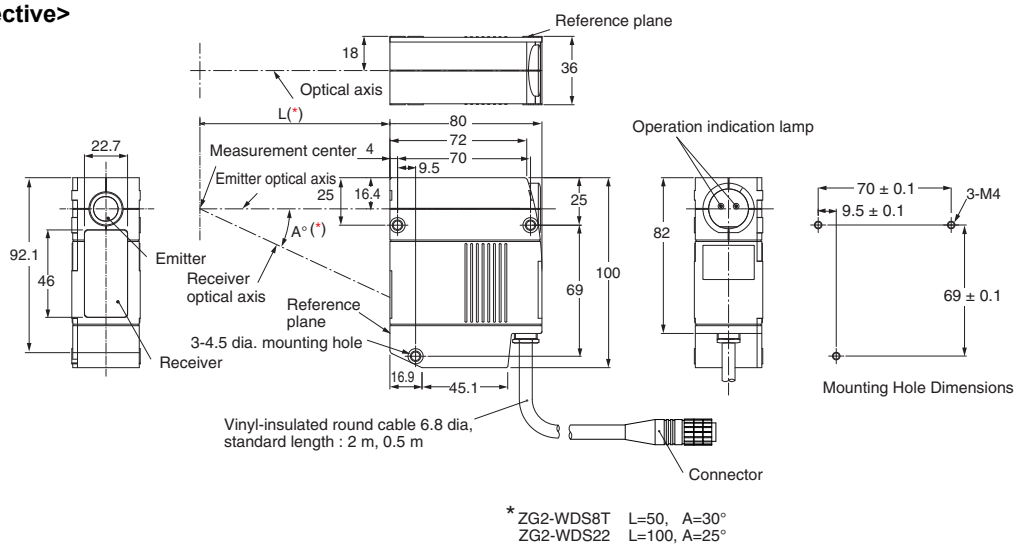


<Diffuse reflective>



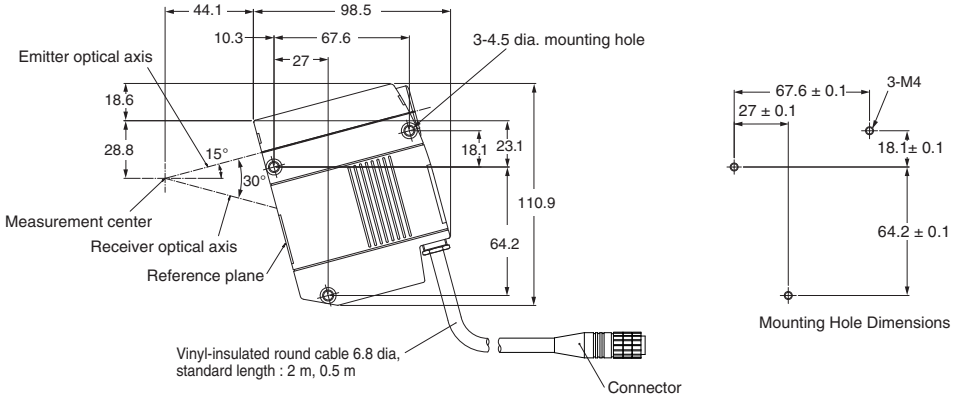
ZG2-WDS8T/WDS22

<Diffuse reflective>

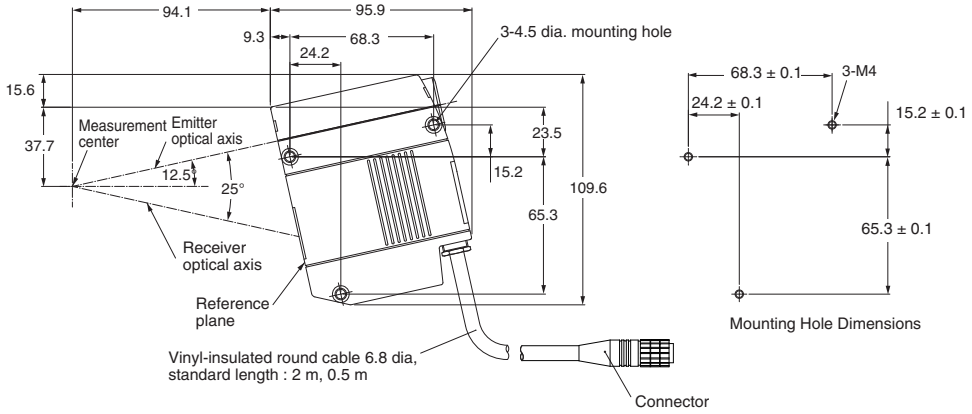


* ZG2-WDS8T L=50, A=30°
ZG2-WDS22 L=100, A=25°

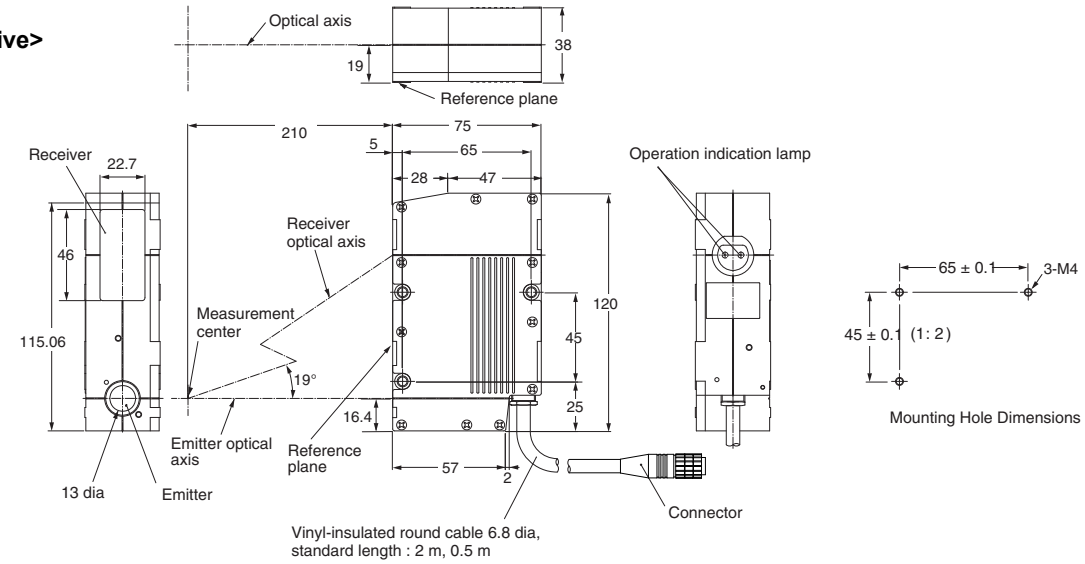
ZG2-WDS8T
<Regular reflection>



ZG2-WDS22
<Regular reflection>

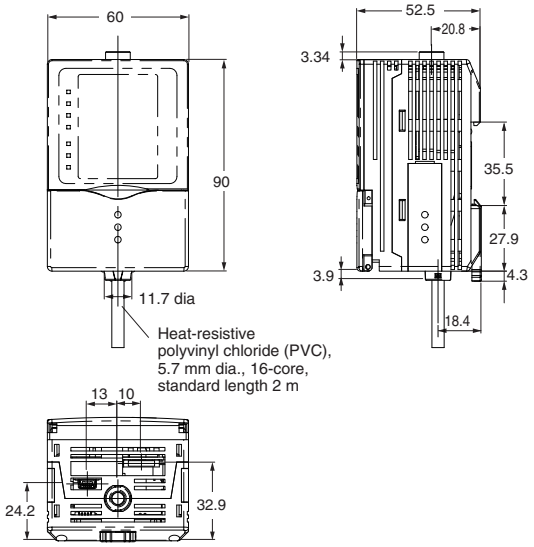


ZG2-WDS70
<Diffuse reflective>



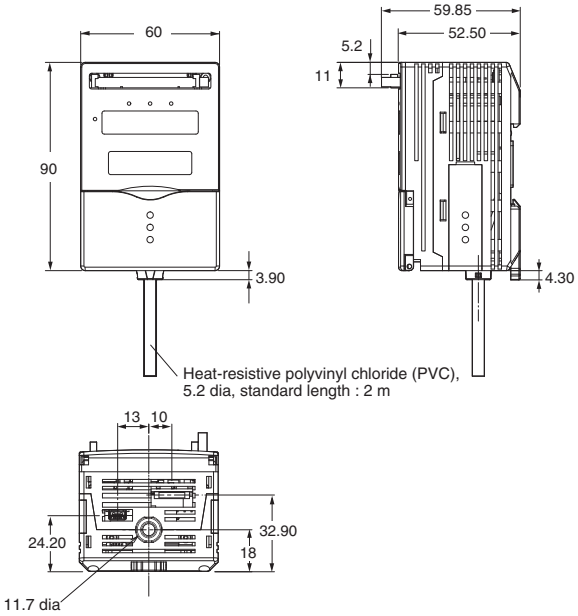
Sensor Controller

ZG2-WDC11/WDC41



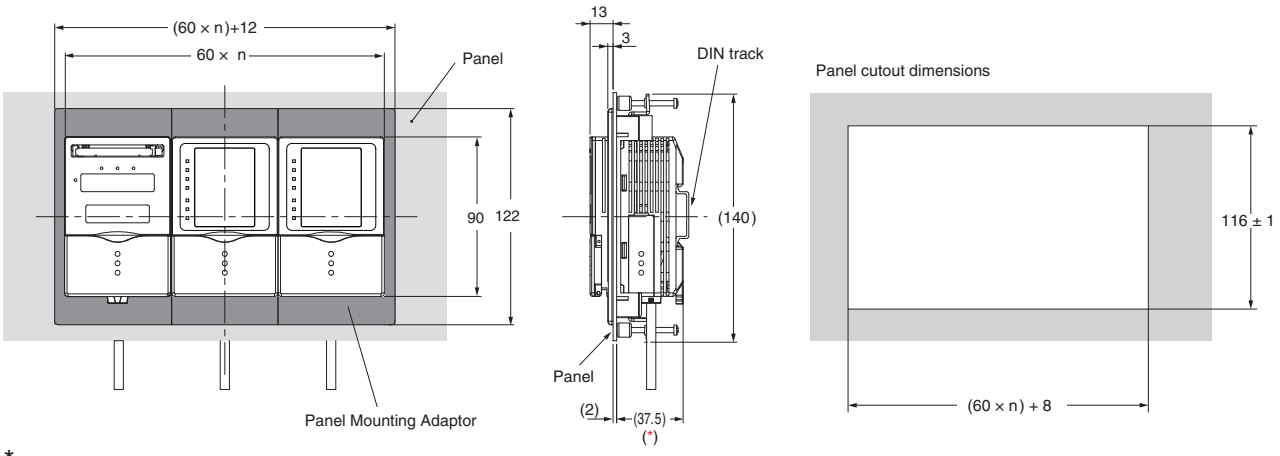
Data Storage Unit

ZG2-DSU11/DSU41



Panel Mounting Adaptor

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

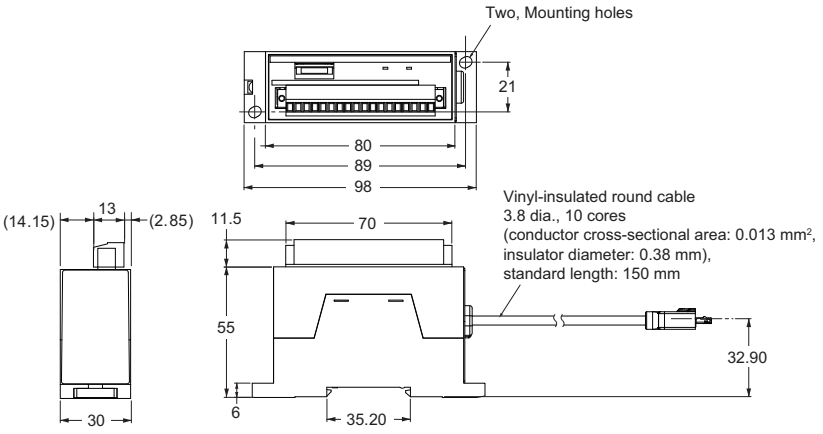


*When two or more units are aligned side-by-side.

* Dimensions are for a 2.0 mm thick panel.

Real-time Parallel Output Unit

ZG-RPD11-N/RPD41-N



Terms and Conditions Agreement

Read and understand this catalog.
Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.
(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE
PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.
Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.
See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation on Liability; Etc.
OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.
Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.
Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.
NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.
Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.
Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.
Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.
Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2025.5

In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation
Industrial Automation Company

http://www.ia.omron.com/

(c)Copyright OMRON Corporation 2025 All Right Reserved.