

KEYENCE

High-Accuracy Digital Contact Sensor
GT2 Series

EtherNet/IP™

DeviceNet™

EtherCAT™

PROFI[®]
BUS

PROFI[®]
NET

USB TCP/IP



TOUGH
ACCURATE
EASY

Ultra-compact



GT2 Series

HIGH QUALITY & RELIABILITY



History of KEYENCE Digital Contact Sensors

Since launching in 1990, KEYENCE digital contact sensors have incorporated advanced technology and continuously claimed a position as industry leaders with every model. KEYENCE's unique measurement principle results in higher accuracies and greater on-site usability. In addition, continuous improvements to the structure have provided the sensors with unparalleled durability.

With products being introduced around the world, KEYENCE's digital contact sensors are used by a large number of customers all over the globe.

HISTORY

1990

1992

SERIES

AT1 Series

AT2 Series

SENSOR LINEUP

3

7

DETECTION SYSTEM

LVDT

ENCLOSURE RATING

DURABILITY

RELEASE COUNTRIES

1



HIGH ACCURACY

- Indicated accuracy: 1 μm
- Resolution: 0.1 μm
- High accuracy throughout the entire measuring range



TOUGH & RUGGED CONSTRUCTION

- Dustproof, watertight, and oil-resistant
- Over 200 million cycles
- Flexible free-cut robot cable



EASY TO USE

- Simple, easy-to-use PC application software
- Varied lineup of sensor heads capable of handling a variety of installation environments and tight spaces
- Wide range of options, including mounting adapters to reduce labor during installation



SERVICE & SUPPORT

- Fast shipping -Keep downtime to a minimum with same day shipping-
- Direct Sales Network
- Global Service Network



1997 2002 2004 2006 2008 2012 2014 2016 NOW

AT3 Series

ATV Series

GT Series

GT2 Series

GT2 Series
Flange type

GT2 Series
Pencil type

GT2 Series
Short-range type

10

18

24

37

41

51

53

Scale Shot System

Scale Shot System II

IP67

IP67G

10 million

20 million

100 million

200 million

2

5

25

31

Connect to Anything, Anywhere

Inline automatic machines: Automatic conveyance

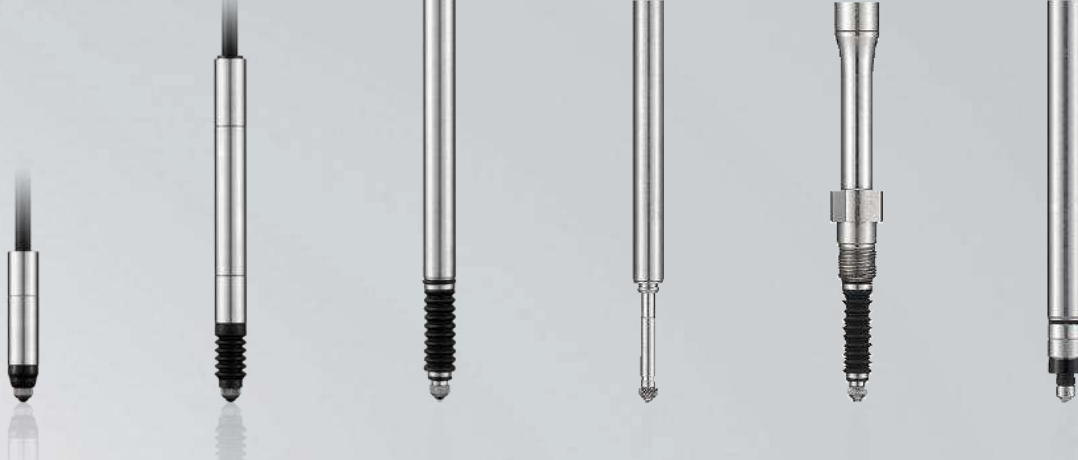


Semi-automatic machines: Manual conveyance



Offline inspection equipment/stations: Manual conveyance





■ HIGH ACCURACY WITH DETECTION PRINCIPLES GUARANTEED TO PREVENT TRACKING ERRORS

The GT2 Series adopts the new Scale Shot System II detection principle. This provides users with peace of mind even when used on equipment with short cycle times.

■ EXCELLENT ENVIRONMENTAL RESISTANCE AND LONG SERVICE LIFE

Thanks to a NEMA Type 13/IP67G enclosure rating, there's no need to worry about the installation environment. In addition, the long service life with a detecting durability of over 200 million cycles reduces maintenance work resulting from sensor head damage.



■ FLEXIBLE FREE-CUT ROBOT CABLE & OIL-RESISTANT RELAY CONNECTOR

The cable between the relay connector and amplifier unit uses a flexible free-cut robot cable. An oil-resistant cable is also available.

■ SUPPORT FOR A VARIETY OF OPEN FIELD NETWORKS

The GT2 Series' lineup of communication units allow communication with PLCs from various manufacturers.



TCP/IP

RS-232C

BCD



■ EASILY CUSTOMIZABLE

Using the dedicated application software (GT-Monitor 2), data can be obtained in accordance with the inspection target. The software also allows for easy configuration of settings for various calculations.

■ EASY CONNECTION TO PCs

The GT2 Series includes USB-type devices for easy connection to PCs at inspection stations and other locations.

■ SIMPLE SYSTEM CONFIGURATION

The GT2 Series makes it possible to use trigger inputs and judgment result outputs through a USB connection. Simple inspection systems can be created quickly and easily.



Scale Shot System II:

A new detection principle completely free of tracking errors

The absolute value scale, with different slit patterns engraved according to position, is captured at high speed with a high-resolution CMOS sensor. This world's first detection principle delivers the highest accuracy in its class with no tracking errors during high-speed movement.

Highest accuracy in its class

RESOLUTION

0.1 μm

INDICATED ACCURACY

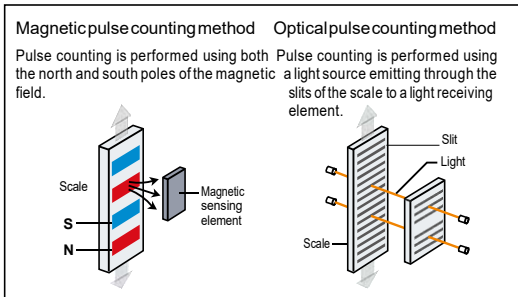
1 μm



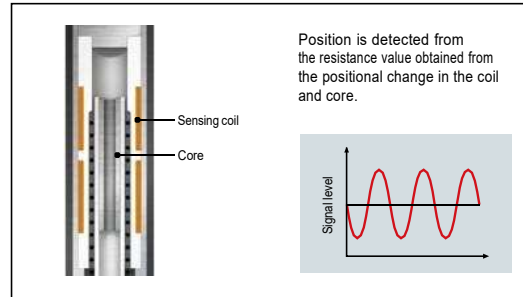
CMOS sensor detects the position of the absolute value scale.

PROBLEMS WITH CONVENTIONAL TYPES

SCALE (PULSE-COUNT) METHOD



DIFFERENTIAL TRANSFORMER METHOD



Tracking errors

Origin position unknown

Unstable accuracy throughout entire measuring range

Poor temperature characteristics

RESOLVED WITH THE SCALE SHOT SYSTEM II

No tracking error

Origin position recorded

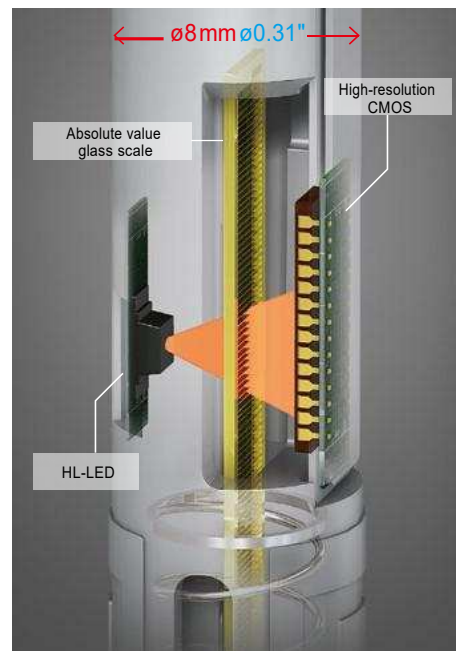
Full-range high accuracy

Stable temperature characteristics

Technology of the Scale Shot System II

This innovative system was created based on KEYENCE's newly developed technology. High-intensity illumination from HL-LEDs reliably emits light through the absolute value scale to a high resolution CMOS. Output signals are calculated by the I-Processor, which allows for constant position recognition. All these features are integrated into a slim 8 mm 0.31" diameter body.

HL-LED	These newly developed point light source LEDs provide even, high-intensity illumination which is 9 times more intense than conventional models. *HL: High Luminance
HIGH-RESOLUTION CMOS	With high sensitivity, this imaging element receives the LED light that passes through the absolute value glass scale and generates output signals with resolution twice that of conventional models.
I-PROCESSOR	This customized IC is equipped with a new algorithm that performs high-speed, high-resolution calculation of the output signals transmitted from the CMOS sensor.



USABLE IN OILY ENVIRONMENTS

*GT2-P12K (F)/P12 (F)

First in class

NEMA Type 13/IP67G

The sensor head, including the connector and cable section, complies with two standards - NEMA Type 13 and IP67G. The sensor head can be mounted almost anywhere, even in environments with splashing water or oil.

Oil-resistant connector and cable

Both the sensor head and connector comply with NEMA Type 13/IP67G. Extremely oil-resistant PUR (polyurethane) is used for the GT2-sensor cable to reduce the risk of oil penetration.

Seamless construction

The sensor body is cast in one piece for seamless outer construction. Corrosion from water and oil is reduced due to the fully enclosed structure.

NEMA Type 13

NEMA (National Electrical Manufacturers Association) specifies the classification and description of enclosures for electrical equipment. The classification is represented as the "Type", and NEMA Type 13 is designed to provide a degree of protection against the ingress of oil.

IP67G

IP67G represents the enclosure rating for electronic devices as defined by the JIS (Japanese Industrial Standards). IP67G represents "IP67" as defined by the IEC (International Electrotechnical Commission) with "G" added for its oil resistance.



EXTRAORDINARY DETECTING DURABILITY

*GT2-P12K (L/F)/P12 (L/F)

OVER 200 million cycles

Due to new high-strength linear ball bearings in the spindle, the detecting durability has been increased to over 200 million cycles. This can greatly reduce maintenance costs and replacement efforts.

■ Long lasting linear ball bearings

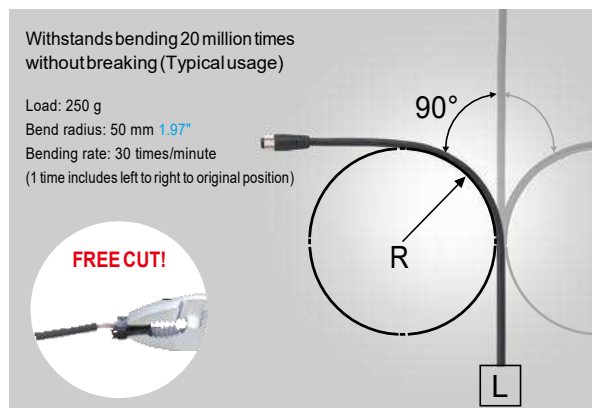
The all stainless steel construction of the spindle structure (shaft & bearings) reduced the weight of the GT2. Through these weight savings, wear due to friction inside the spindle has been minimized. This has dramatically increased endurance.



FLEXIBLE FREE-CUT ROBOT CABLE & OIL-RESISTANT RELAY CONNECTOR

The cable between the relay connector and amplifier unit uses a flexible free-cut robot cable that withstands continuous bending. This allows the sensor to be installed on moving equipment. A detachable relay connector system is also used. This can greatly reduce replacement work during maintenance.

■ Flexible free-cut robot cable



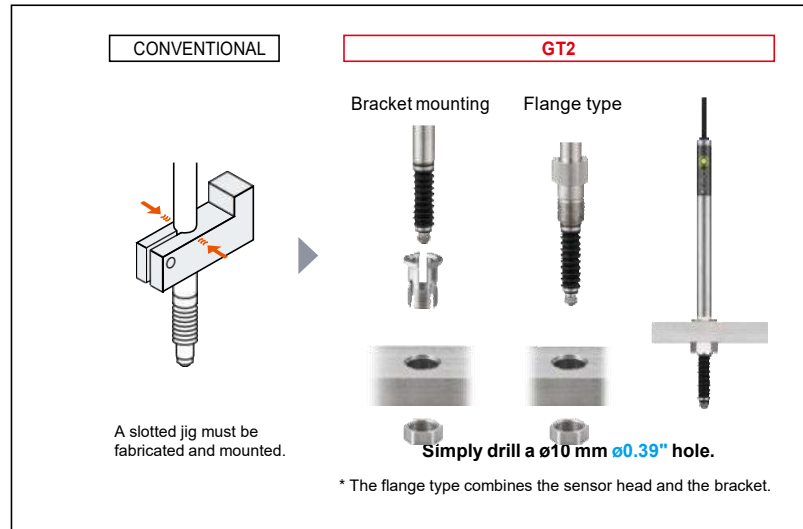
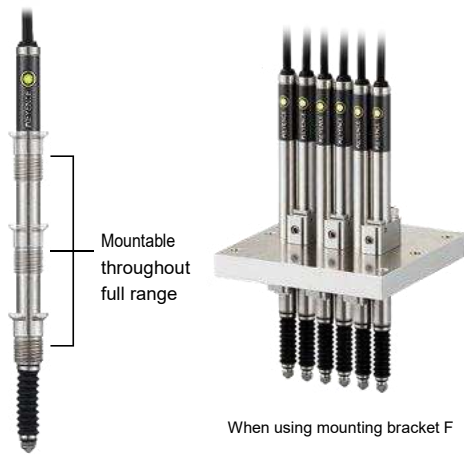
■ Detachable sensor head cable



COST REDUCING MOUNTING METHODS

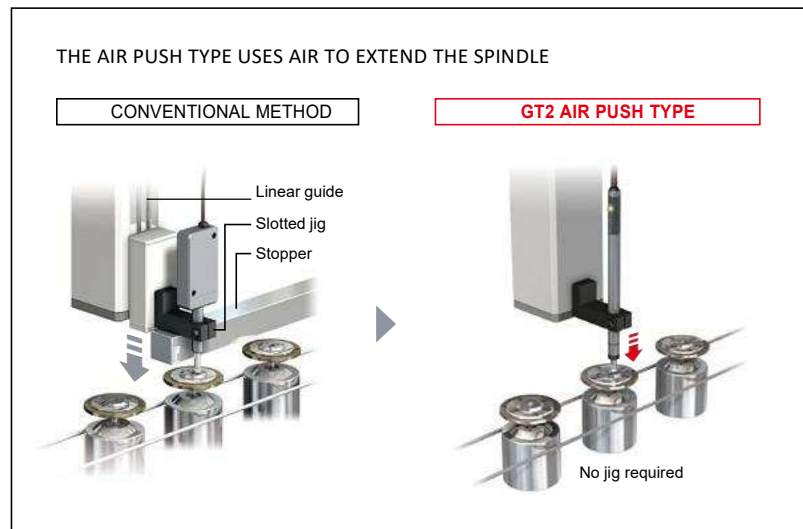
■ Greatly reduces design and fabrication time

The sensor can be mounted almost anywhere thanks to $\varnothing 8$ mm $\varnothing 0.31$ " slim body that can be mounted anywhere along its body. If you use one of the dedicated brackets, you do not need to fabricate a slotted jig. The flange type can also be directly mounted by simply drilling a $\varnothing 10$ mm $\varnothing 0.39$ " hole.



■ Air push type requires no drive mechanism

Measurements can be performed with the sensor head secured in place, so no mechanism is required to move the sensor head itself. This allows for space-saving installation which can greatly reduce costs at initial setup. Plus any worries about variations in accuracy due to the jig are eliminated.



COMPACT SENSOR HEAD FOR SPACE-SAVING INSTALLATION

■ HIGH-ACCURACY DIFFERENTIAL TRANSFORMER METHOD

Using KEYENCE's proprietary QMC transformer method, both the waveform amplitude and phase displacement can be detected, canceling out individual variations and temperature characteristics in order to achieve higher accuracy.

*QMC = Quality Monitoring & Controlling

■ HIGHLY VISIBLE RELAY AMPLIFIER

The GT2 Series includes an operation indicator light that can display a judgment result or the operation status. This indicator makes it possible to view judgment results or operation statuses at a glance even from a distance.

■ POSITION INDICATOR

The position indicator lights up at the measurement center position, allowing for easy position adjustment even for types with a short measurement range.

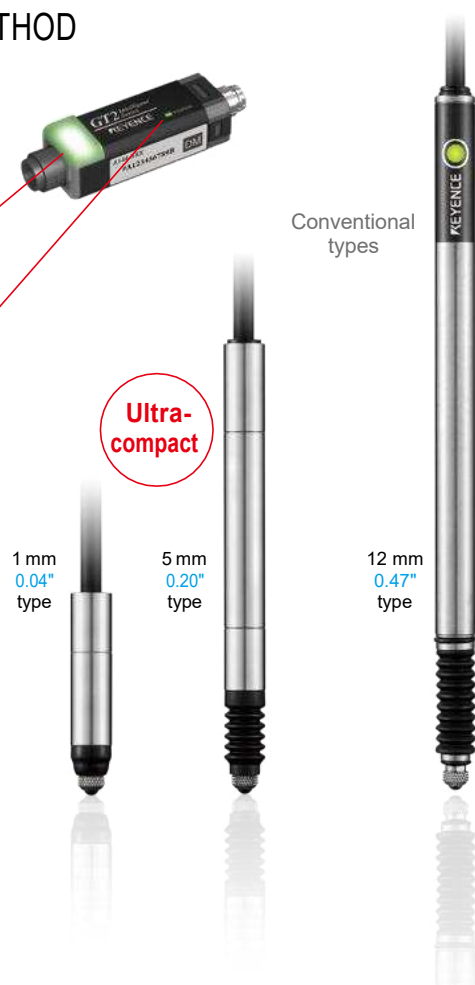
Highest accuracy in its class

RESOLUTION

0.1 μm

INDICATED ACCURACY

1 μm

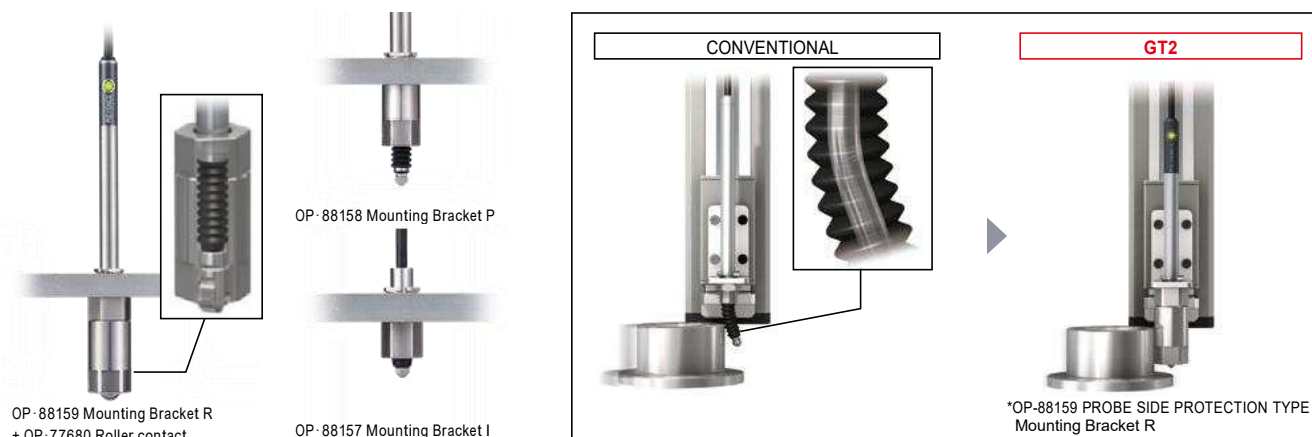


Excellent IP67G Environmental Resistance Rating

OVERLOAD SUPPORT

■ PROTECTION MOUNTING BRACKETS

KEYENCE provides mounting brackets designed to prevent damage when horizontal force is applied to the spindle and when force from the spindle indentation direction is applied to the sensorhead.



VARIOUS TYPES OF COMMUNICATION

PC CONNECTION

→ P13



USB
TCP/IP
RS-232C

PLC CONNECTION

→ P17



EtherNet/IP[®] DeviceNet[®]
CC-Link V2[®] RS-232C BCD
TCP/IP EtherCAT[®]



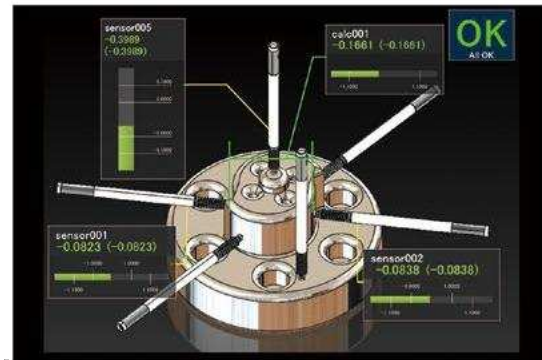
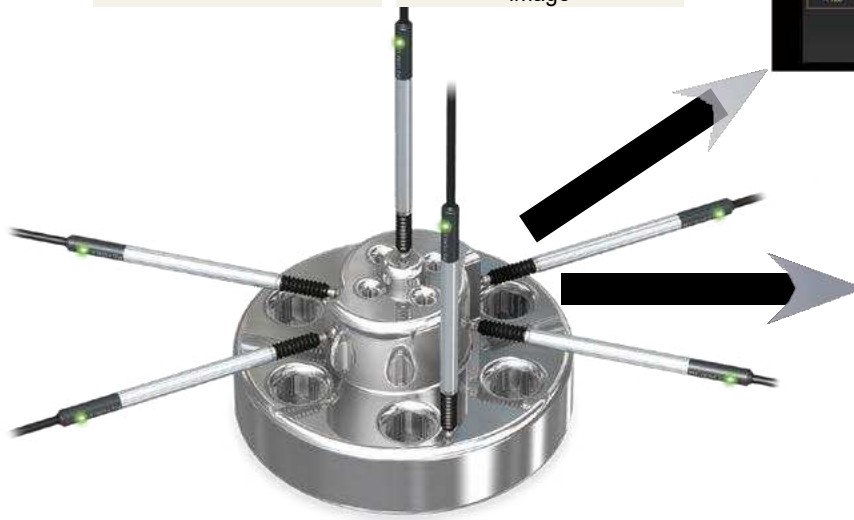
PC CONNECTION

PC APPLICATION: GT-Monitor 2 GT2-H2

Easy selection & customization

Displayable items

Measured values	Separate judgment results
Calculated values	Bar graphs
Total judgment result	Externally captured image



The PC software display can be customized freely and easily to match the inspection details. Using an image of the actual target in the display makes it possible to connect the measurement locations to each sensor at a glance, even for inspections that use multiple sensors. Even first-time users of this intuitive software can configure settings smoothly.

Simple set-up

After opening the software, simply select the equipment in order to identify connected sensor heads automatically. Monitoring of measured values and OK/NG judgments can be configured in just three steps.

STEP 1 Select device



STEP 2 Set tolerance



STEP 3 Start monitoring



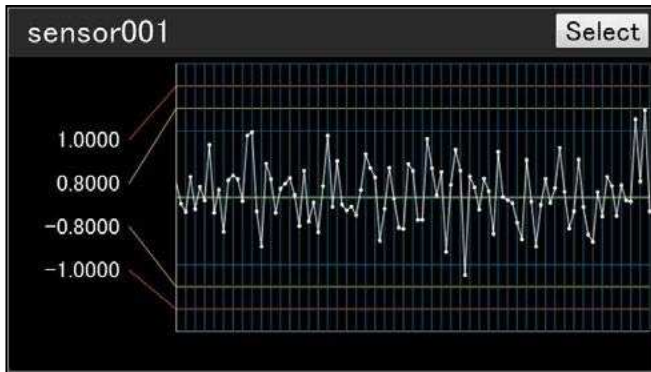
PC CONNECTION

FUNCTIONALITY

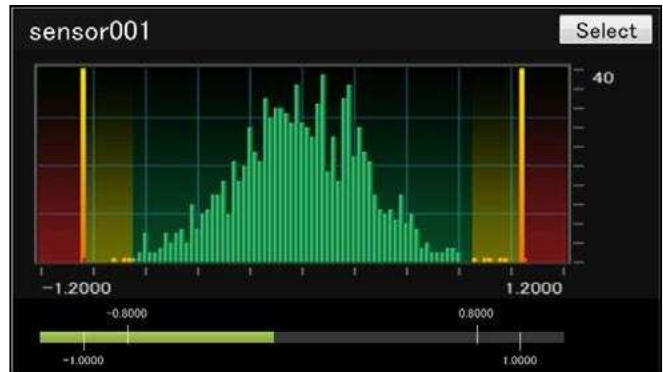
VARIOUS STATISTICAL FUNCTIONS

The GT-Monitor 2 dedicated software comes standard with graph display and histogram view functions. These functions allow the devices to not only be used for measurement and inspection but also the data to be analyzed and statuses to be viewed at certain times or per lot using software. In addition, test results can be visually confirmed immediately, making trend management and predictive maintenance easy.

Graph display function

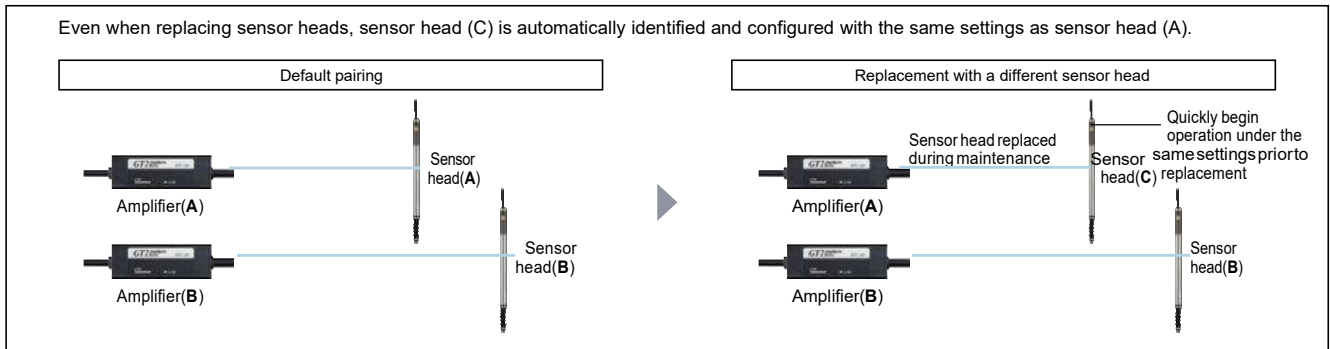


Histogram view function



AUTOMATIC SENSOR HEAD IDENTIFICATION Industry First

Once a sensor head is connected, it is automatically added to memory. This allows for automatic identification and thus eliminates the need to reconfigure settings during maintenance or tooling changes. In addition, in the event of an equipment failure, settings configured before replacement can be directly applied to the new sensor head, allowing operation to continue right away. *GT2-UB1 only.



USER-DEFINED OPERATIONS FUNCTION

Calculations can be performed freely using four arithmetic operations, the trigonometric function, and the inverse trigonometric function. This offers even more freedom to arrange the calculations to suit the measurement targets.

Users can also easily perform calculations that required creation of complex programs when using conventional models.



REAL-TIME AND Excel® TRANSMISSION FUNCTION

Real time data conversion, as well as live updating of Excel® worksheets is possible. Creating templates in advance makes creating reports simple.

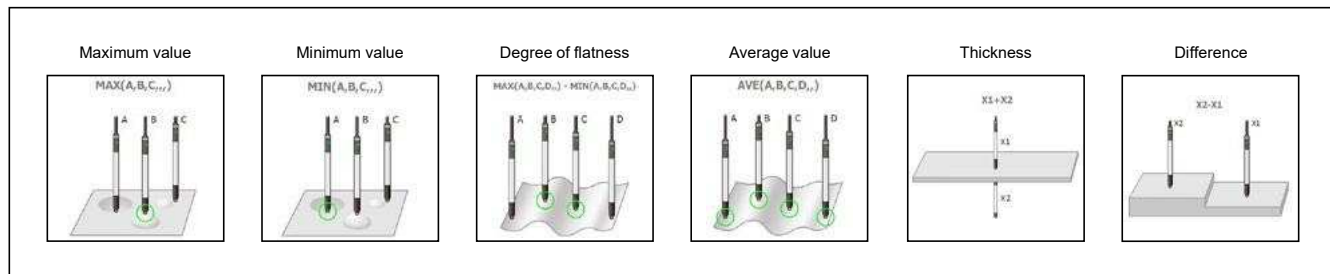
* CSV format is also supported.



* Excel is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

CALCULATION FUNCTIONS

Calculation functions—such as thickness, flatness, and subtraction—come standard. Calculations can also be performed using values calculated by multiple sensor heads, which was impossible with conventional sensor amplifiers.



SUPPORT FOR MULTIPLE LANGUAGES

The GT-Monitor2 dedicated software supports eight languages: English, German, Japanese, Chinese (simplified Chinese fonts), French, Italian, Spanish, and Portuguese.

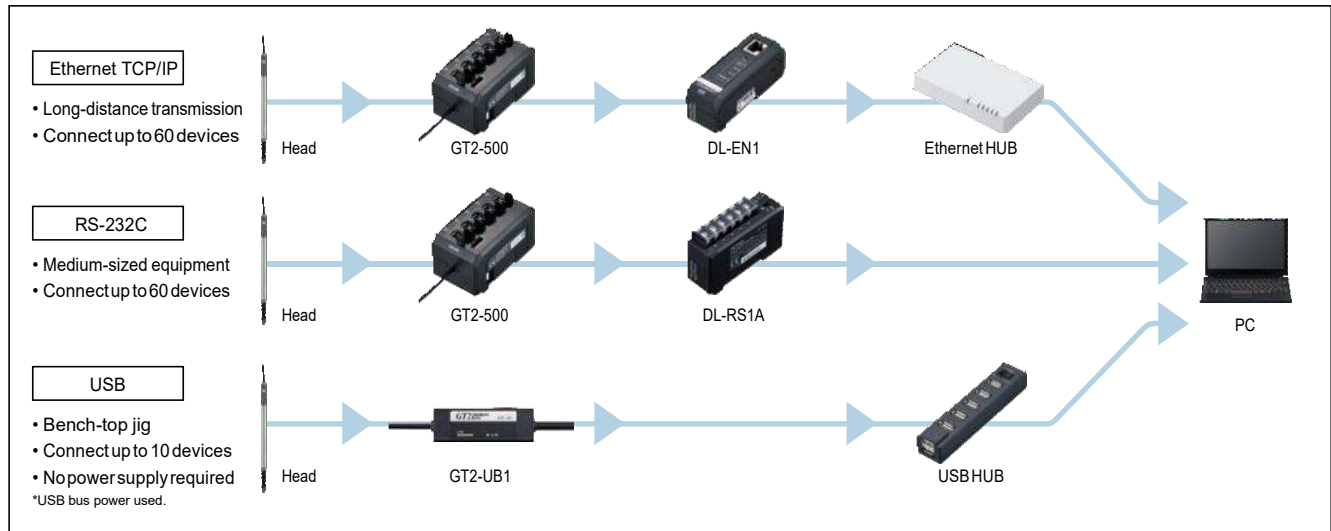
This allows the devices to be used in almost any country without worrying about the language.

PC CONNECTION

PC CONNECTION

EASY PC CONNECTION THROUGH A VARIETY OF CONNECTION METHODS

With the GT2 Series, the connection method can be chosen according to the number of connected devices and the transmission distance. In addition, using the dedicated software (GT-Monitor 2: GT2-H2) eliminates the need to create programs required for inspection.



USB Connection

The GT2 Series includes a USB input/output unit (DL-NS1) that makes creating small-scale systems easy. Push-button input for judgment timing and outputs for OK/NG determination can be done via USB, greatly reducing amount of time spent on system setup.

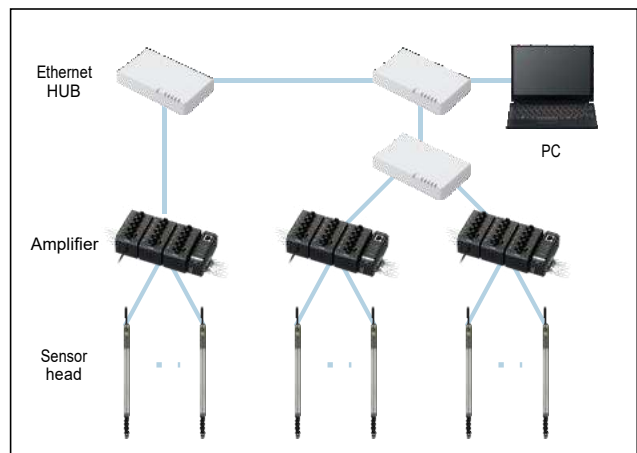
* When more than 10 units are connected, the connection could be limited depending on the PC's settings. Please contact your nearest KEYENCE office for further information.



TCP/IP (Ethernet) CONNECTION

Up to 60 sensor heads can be managed at once using just one PC.

Using TCP/IP (Ethernet) allows for greater freedom with long-range transmissions and branching using hubs, thus eliminating the need to worry about the layout of the system.



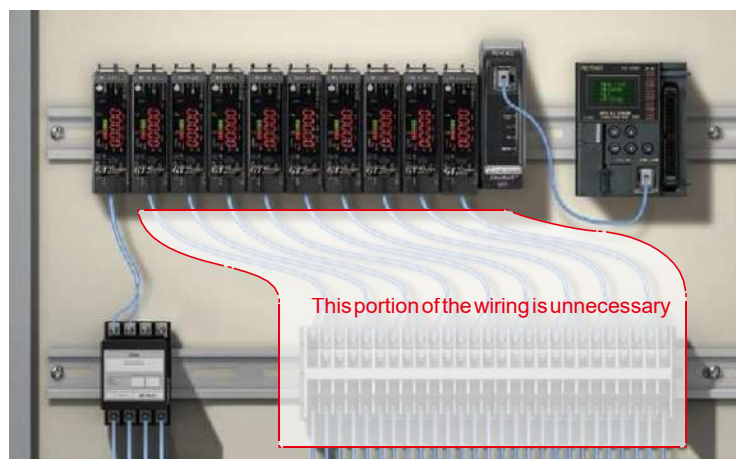
PLC CONNECTION

SAVE WIRING TIME WITH OPEN FIELD NETWORK SUPPORT

The DL Series of communication units includes a versatile lineup for communicating data with various equipment. Data communication offers not only setting bank switching at tooling changes but also supports a wider range of products through reading and writing of settings. Measurement data can also be communicated, making it possible to utilize constant data monitoring and product traceability management.

REDUCED LABOR SPENT ON WIRING AND INSTALLATION

Wiring work can be cumbersome. For example, importing five outputs (HH/High/Go/Low/LL) to a PLC from 10 amplifiers with main units paired with expansion units requires 52 individual wires (including power supply lines). Using the DL Series for communication, wiring can be completed with just three wires: main unit power supply wiring and the communication cable.



Reduce cable fabrication work

Reduce time wiring into terminal blocks

No terminal blocks required

CONVENTIONAL METHOD



With conventional models, the required wiring was directly related to the number of outputs, resulting in a large number of wires and making it difficult to ensure sufficient space for the terminal block.

DL Series



Using the DL Series, judgment results and measurement data can be handled via just one line. This allows not only for reduced time spent on wiring but also the ability to utilize data.

PLC CONNECTION

REDUCE COSTS WITH MULTI-FUNCTION AMPLIFIER UNITS

■ Batch read and change settings for multiple amplifier units

Batch transmit data for a maximum of 15 units.
Settings can also be changed from a PC or PLC which leads to reduced setup time.



■ Further wiring and space savings with the multi-sensor unit

Up to 5 sensor heads can be connected to 1 multi-sensor amplifier unit. Up to 3 units can be linked, which allows for a maximum of 15 connected sensor heads.



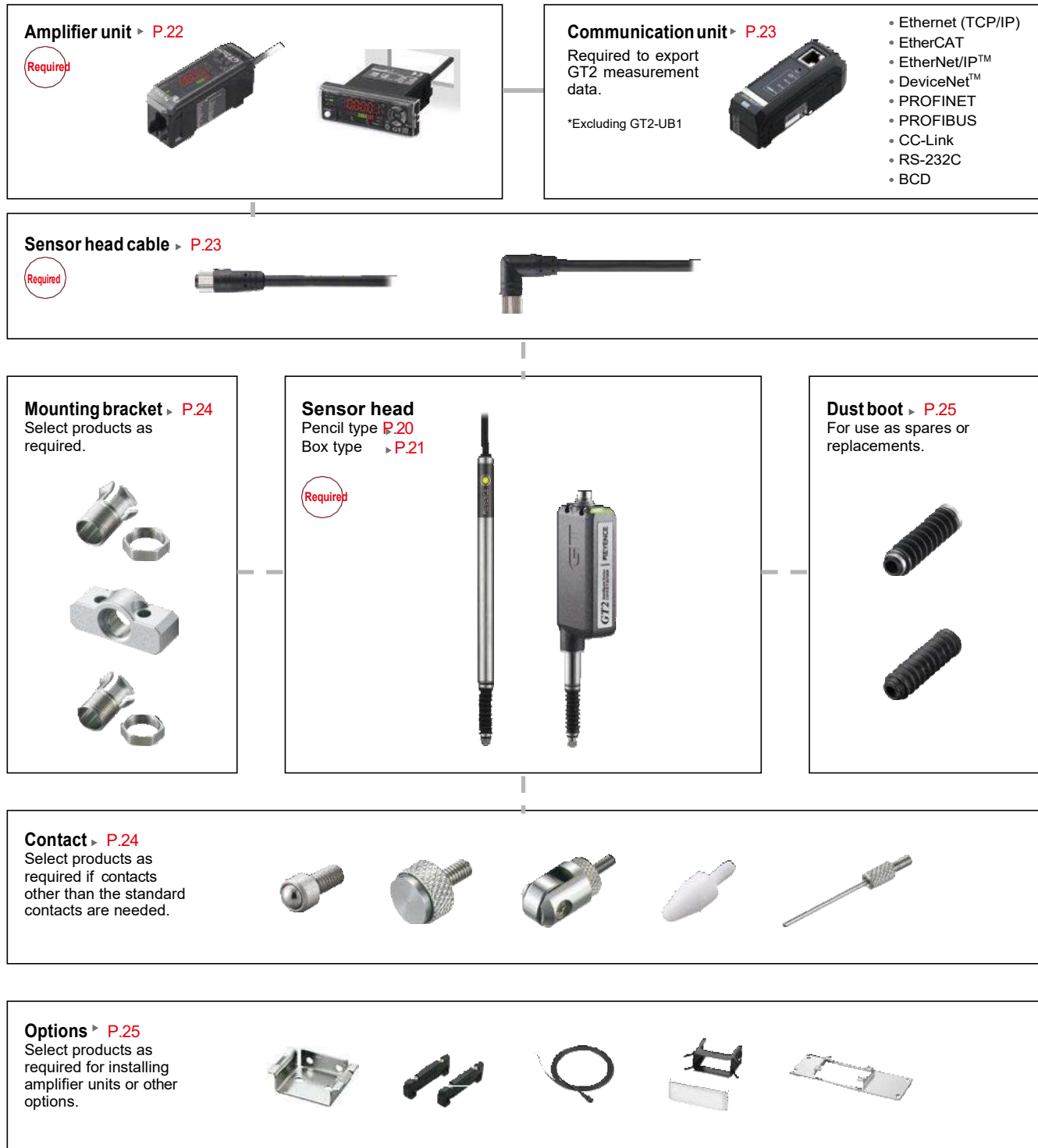
■ DL Series lineup

The GT2 Series supports various networks with its lineup of communication units.

COMMUNICATIONS	OPEN FIELD NETWORK	Ethernet (TCP/IP)		DL-EN1	TCP/IP
		EtherCAT		DL-EC1A	EtherCAT
		EtherNet/IP™		DL-EP1	EtherNet/IP
		PROFINET		DL-PN1	PROFINET
		PROFIBUS		DL-PD1	PROFIBUS
		DeviceNet™		DL-DN1	DeviceNet
		CC-Link		DL-CL1	CC-Link V2
		RS-232C communication		DL-RS1A	
		BCD output		DL-RB1A	

SYSTEM CONFIGURATION

The GT2 Series has a comprehensive lineup, allowing users to select those products that best suit their working environment.



SENSOR HEAD LINEUP

Select the sensor head by measuring range, appearance, resolution, accuracy, mounting method, and measuring force

Short-range pencil type

Measuring range	Model Accuracy	Standard	Measuring range	Model Accuracy	Standard
1 mm 0.04"	Resolution 0.1 μm Accuracy 1 μm (Any 0.1 mm 0.004" range of measurement center ± 0.15 mm ± 0.006 ")	GT2-S1 	5 mm 0.20"	Resolution 0.1 μm Accuracy 1 μm (Any 0.2 mm 0.008" range of measurement center ± 0.3 mm ± 0.012 ")	GT2-S5 

Pencil type

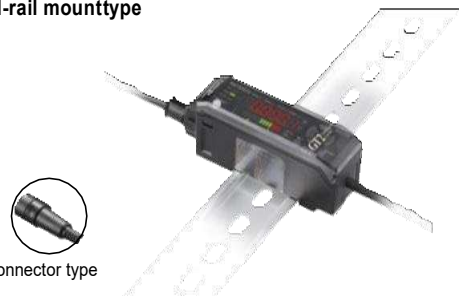
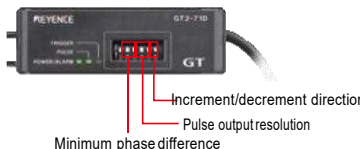
Measuring range	Model Accuracy	Standard		Flange	Air push	
		Standard	Low stress	Standard	Standard	Low stress
12 mm 0.47"	High-accuracy Resolution 0.1 μm Accuracy 1 μm	GT2-P12K 	GT2-P12KL 	GT2-P12KF 	GT2-PA12K 	GT2-PA12KL 
	General-purpose Resolution 0.5 μm Accuracy 2 μm	GT2-P12 	GT2-P12L 	GT2-P12F 	GT2-PA12 	GT2-PA12L 

Box type

Measuring range	Model Accuracy	Standard		Flange		Air push	
		Standard	Low stress	Standard	Low stress	Standard	Low stress
12 mm 0.47"	High-accuracy Resolution 0.1 μm Accuracy 1 μm	GT2-H12K 	GT2-H12KL 	GT2-H12KF 	GT2-H12KLF 	GT2-A12K 	GT2-A12KL 
	General-purpose Resolution 0.5 μm Accuracy 2 μm	GT2-H12 	GT2-H12L 	GT2-H12F 	GT2-H12LF 	GT2-A12 	GT2-A12L 
32 mm 1.26"	General-purpose Resolution 0.5 μm Accuracy 3 μm	GT2-H32 	GT2-H32L 	-	-	GT2-A32 	-
50 mm 1.97"	General-purpose Resolution 0.5 μm Accuracy 3.5 μm	GT2-H50 	-	-	-	GT2-A50 	-

AMPLIFIER UNIT LINEUP

Select according to the output method, mounting method, and number of connected units

Amplifier unit type	Appearance/model			
Judgment output (5 outputs)	DIN-rail mount type	Panel mount type	5-output function Judges the 5 statuses HH/High/Go/Low/LL Bank function Registers limit setting values and preset values in up to 4 different groups Calculation functions using expansion units Enables calculations such as maximum value, minimum value, and degree of flatness	
	 Connector type			
Analog output (4 to 20 mA)	DIN-rail mount type	 Connector type	3-output function Judges the 3 statuses High/Go/Low Bank function Registers limit setting values and preset values in up to 4 different groups Calculation functions using expansion units Enables calculations such as maximum value, minimum value, and degree of flatness	
Pulse output	DIN-rail mount type	 Increment/decrement direction Pulse output resolution Minimum phase difference	Minimum phase difference selection [0.5/2.5/5/25 μs] Capable of batch output of position information.	
Large display	Panel mount type		Easy operation with a large display and buttons. Up to 11 sensor heads can be connected using the expansion board. * With only the main body, up to 2 sensor heads can be connected	
Multi-sensor amplifier unit	DIN-rail mount type		Up to 5 sensor heads can be connected to 1 amplifier unit Up to 15 sensor heads can be connected by adding 2 expansion units * A communication unit (DL Series) is required for output.	
USB connection	USB connection type		Connects directly to the USB port of a PC. An inspection system can be constructed easily by using an I/O unit together with this amplifier.	

Sensor head cable Select by the distance between the sensor head and the amplifier unit, the environment, and the mounting method. (Cannot be used with GT2-UB1)

Oil-resistant cable (straight)*1		Standard cable (straight)		Standard cable (L-shaped)*2	
GT2-CHP2M	2 m 6.6'	GT2-CH2M	2 m 6.6'	GT2-CHL2M	2 m 6.6'
GT2-CHP5M	5 m 16.4'	GT2-CH5M	5 m 16.4'	GT2-CHL5M	5 m 16.4'
GT2-CHP10M	10 m 32.8'	GT2-CH10M	10 m 32.8'	GT2-CHL10M	10 m 32.8'
—	—	GT2-CH20M	20 m 65.6'	GT2-CHL20M	20 m 65.6'

Sensor head relay cable Select by distance between the sensor head and the amplifier unit. (For GT2-UB1)

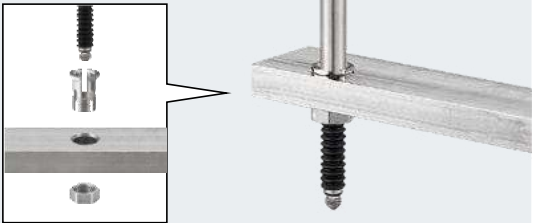
Oil-resistant cable (straight)*1		Standard cable (straight)		Standard cable (L-shaped)*2	
OP-88060	2 m 6.6'	OP-87716	0.5 m 1.6'	OP-88061	2 m 6.6'
—	—	OP-87431	3.5 m 11.5'	—	—
—	—	OP-87432	7.5 m 24.6'	—	—
—	—	OP-87433	9 m 29.5'	—	—

*1 To satisfy IP67G/NEMA Type 13 with the GT2-P12K(F)/P12(F) and IP67G with the GT2-S1/S5, the oil-resistant cable must be used. *2 Can only be used with the 12 mm 0.47", 5 mm 0.20", and 1 mm 0.04" models.

Communication method	Model	Appearance	Judgment result readout	Measurement value readout	Control input	Modify tolerance value	Remarks
Ethernet (TCP/IP)	DL-EN1		○	○	○	○	Uses TCP/IP communication. Communicate by creating a communication program.
EtherCAT	DL-EC1A		◎	◎	◎	○	Uses cyclic communication. A communication program does not need to be created. Change settings using mail box communication.
EtherNet/IP™	DL-EP1		◎	◎	◎	○	Uses cyclic communication. A communication program does not need to be created. Change settings using explicit message communication.
PROFINET	DL-PN1		◎	◎	◎	○	Uses data I/O communication. A communication program does not need to be created. Change settings using record data communication.
PROFIBUS	DL-PD1		◎	◎	◎	○	Uses cyclic transmissions. A communication program does not need to be created. Change settings using the DP-V1 service.
DeviceNet™	DL-DN1		◎	◎	◎	◎	Uses I/O communication. A communication program does not need to be created. Change settings using explicit message communication.
CC-Link	DL-CL1		◎	◎	◎	◎	Uses cyclic transmissions. A communication program does not need to be created. Change settings using handshake control.
RS-232C	DL-RS1A		○	○	○	○	Uses RS-232C communication. Communicate by creating a communication program.
BCD	DL-RB1A		×	○	×	×	Measurement values are synchronized and updated with the input terminal or automatically updated by timer. Values are synchronized and read by strobe output.

The ◎ symbol indicates wire savings and communication program creation is not required. ○=Can be accessed by creating a communication program. ×=Cannot be accessed.

Mounting brackets

 GENERAL PURPOSE TYPE Mounting bracket A / For 1 mm 0.04"/5 mm 0.20"/12 mm 0.47" type OP-76874	 SIDE MOUNTING TYPE Mounting bracket B / For 1 mm 0.04"/5 mm 0.20"/12 mm 0.47" type OP-76875	 Drill a $\phi 10$ $\phi 0.39$" hole, and secure the mounting bracket. For mounting bracket D, drill a $\phi 14$ $\phi 0.55$" hole, and secure the mounting bracket. * The mounting method is the same for mounting bracket A and mounting bracket C. * When using the GT2-H32L with the contact probe pointed up, use the mounting holes on the main body.	
 REINFORCED HOLDING FORCE TYPE Mounting bracket C / For 1 mm 0.04"/5 mm 0.20"/12 mm 0.47" type OP-84396 Vibration resistant	 SIDE MOUNTING TYPE Mounting bracket E / For 1 mm 0.04"/5 mm 0.20"/12 mm 0.47" type OP-87220 Reinforced holding force	 The sensor head mounting pitch is 10 mm 0.39" when the brackets are mounted to the same surface and 9 mm 0.35" when the brackets are mounted front and back.	
 COUPLED MOUNTING TYPE Mounting bracket F / For 1 mm 0.04"/5 mm 0.20"/12 mm 0.47" type OP-87863	 PROBE PUSH PROTECTION TYPE Mounting bracket I / For 1 mm 0.04" type OP-88157	 REINFORCED HOLDING FORCE TYPE Mounting bracket D / For 32 mm 1.26"/50 mm 1.97" type OP-84327 Vibration resistant	
 PROBE PUSH PROTECTION TYPE Mounting bracket P / For 5 mm 0.20"/12 mm 0.47" type OP-88158	 PROBE SIDE PROTECTION TYPE Mounting bracket R / For 5 mm 0.20"/12 mm 0.47" type OP-88159		

Contacts

 STANDARD^{*1} OP-77678 For standard measurements	 SUPER-TOUGH^{*2} OP-77682 Uses a super-tough alloy, for high-accuracy measurements	 STANDARD (small)^{*3} OP-77984 For standard measurements	 SUPER-TOUGH (small)^{*4} OP-87985 Uses a super-tough alloy, for high-accuracy measurements	 FLAT PLATE OP-77679 For objects with a curved or pointed surface	 ROLLER OP-77680 For moving objects
 FLUOROCARBON RESIN OP-80228 Made from material that is unlikely to damage the target's surface	 CERAMIC OP-81970 To electrically insulate the sensor from the target	 NEEDLE OP-77681 To measure in tight locations	 OFFSET OP-77683 For multiple measurements of a small object	 SPACER OP-77684 Extends the spindle 12.2 mm 0.48"	 ROLLER (HIGH-ACCURACY) OP-93332 For use when the roller eccentricity is a concern

*1 Standard on the GT2-P(A)12(L/F), GT2-H(A)12(L/F/LF), GT2-H(A)32(L), GT2-H(A)50

*2 Standard on the GT2-P(A)12K(L/F), GT2-H(A)12K(L/F/LF), GT2-S1, GT2-S5

*3 Standard on the GT2-PA12

*4 Standard on the GT2-PA12K

Dust boots/Dust seal

				
STANDARD DUST BOOT ^{*1} (material: NBR) OP-88063 For GT2-S1	STANDARD DUST BOOT ^{*2} (material: NBR) OP-88065 For GT2-S5	STANDARD DUST BOOT (material: NBR) For 12 mm 0.47" OP-84332 ^{*3} For 32 mm 1.26" OP-84459 ^{*4} For 50 mm 1.97" OP-84460 ^{*5} Cannot be used with the GT2-PA12K/PA12.	FLUOROCARBON RUBBER DUST BOOT (material: FKM) For 12 mm 0.47" OP-87859 Cannot be used with the GT2-PA12K/PA12.	REPLACEMENT DUST SEAL (material: SUS303) OP-87932 Dedicated for use with the GT2-PA12K/ PA12.

^{*1} Standard on the GT2-S1 ^{*2} Standard on the GT2-S5 ^{*3} Standard on GT2-P12(K/F), GT2-H12(K/F), GT2-A12(K/F) ^{*4} Standard on GT2-H(A)32 ^{*5} Standard on GT2-H(A)50

Amplifier unit options (for DIN-rail mount/panel mount types)

				
DIN-RAIL TYPE AMPLIFIER UNIT BRACKET OP-76877	END UNIT (2 count) OP-26751	SOCKET CABLE GT2-CA2M/CA10M Required with the connector type	PANEL MOUNT OP-84394 Included with the panel type	EXPANSION CABLE 300 mm 11.81" OP-35361 To connect panel types horizontally, and to connect the panel type and the DL

Amplifier unit options (for the GT2-100N/100P)

			
EXPANSION BOARD GT2-E3N/E3P Can expand 3 sensor heads per 1 board	BRACKET OP-84331 To mount on a rack	20-PIN MIL CONNECTOR OP-22185 For 1 to 2 sensor heads	30-PIN MIL CONNECTOR OP-84456 For the expansion board
			
CONTACTS for AWG24 to 22, 200 count OP-22186 For OP-22185/84456	CONTACTS for AWG28 to 26, 200 count OP-30594 For OP-22185/84456	SPECIAL CRIMPING TOOL OP-21734 For crimping OP-22186/30594	EXPANSION CABLE 300 mm 11.81" OP-35361 Use when connecting the DL

Others

			
IO UNIT CABLE For DL-NS1 OP-87564/OP-87565/OP-87566	SPEED CONTROLLER (LOW STRESS) OP-88062 For adjusting the air for GT2-PA12KL/PA12L	LIFT LEVER OP-84397 Manually lifts the spindle	SHORT-RANGE TYPE MOUNTING ADAPTER OP-88117 For GT2-S1/S5
			
COILING TUBE OP-87986 For air push type	SPEED CONTROLLER OP-87970 For adjusting the air for air push type Cannot be used with the GT2-PA12KL/PA12L	CONNECTORS Replacements for connecting to the amplifier unit OP-84338 (2 count) For the sensor head cable	

AUTOMOBILES



Inner and outer diameter measurement of components



Door beam deformation check



Disc assembly inspection



Camshaft runout measurement



Flatness measurement of engine block



Oil pan flatness measurement

METALS



Bearing assembly inspection



Mill roll gap management



Dimensional measurement during machining

EQUIPMENT



Machine tool stroke management



Assembly equipment press fitting inspection



Product chucking confirmation

ELECTRONICS



Battery flatness check



Smartphone chassis flatness inspection



Board assembly check



Hard disk frame assembly inspection



Hard disk clamp parallelism inspection

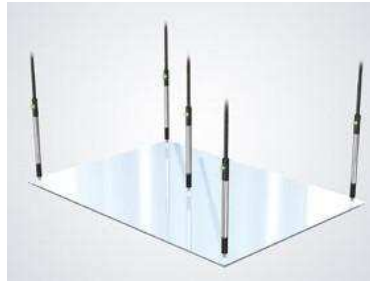


Chassis frame warpage inspection

SEMICONDUCTORS/LIQUID CRYSTALS



Polisher height control



Liquid crystal panel flatness inspection



Wafer thickness measurement

FOOD/PRINTING



Double label stickers detection



Workpiece suction check



Double feed detection

SPECIFICATIONS

Pencil type (short-range)

Model	GT2-S1	GT2-S5
Appearance		
Detection system	Differential transformer	
Measuring range ^{*1}	1 mm 0.04"	5 mm 0.20"
Operating range ^{*1}	2 mm 0.08"	7 mm 0.28"
Resolution	0.1 µm	
Indicated accuracy ^{*2-4}	1 µm (P-P)	
Measuring force ^{*3}	Downward mounting	1.12 N
	Side mounting	1.1 N
	Upward mounting	1.08 N
Sampling cycle	1 ms	
Mechanical response ^{*4}	40 Hz	20 Hz
Operation indicator light	2-color LED (red, green)	
Environmental resistance	Enclosure rating	IP67G(JIS) ⁵ IP67(IEC)
	Ambient temperature	-10 to +55°C 14 to 131°F (No freezing)
	Relative humidity	10 to 85% RH (No condensation)
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours
	Impact resistance	1000 m/s ² (IEC60068-2-27)
Materials	Main body	Main body case: SUS440C (GT2-S1)/SUS430F (GT2-S5), Sensor head-relay connector cable: PUR, Relay amplifier: PPSU
	Dust boot	NBR
	Contact ^{*6}	SUS304, cemented tungsten carbide
Sensor head cable	Optional (connect to relay connector)	
Weight (not including cable) ^{*7}	Approx. 30 g	Approx. 40 g

*1 The measuring range represents the range at which measured values can be displayed. The operating range is the actual movable range of the spindle.

*2 GT2-S1: Within ±0.15 mm **0.006"** from the center of the measuring range, the width for any 0.1 mm **0.004"** is 1 µm. The entire area is 2 µm. GT2-S5: Within ±0.3 mm **0.012"** from the center of the measuring range, the width for any 0.2 mm **0.008"** is 1 µm. The entire area is 2 µm. The linearity for the entire measuring range is ±0.15% of F.S. (F.S. for GT2-S1: 1 mm **0.04"**, GT2-S5: 5 mm **0.20"**)

*3 Representative value at the center of the measuring range. Please note that the measuring force varies depending on the installation orientation of the dust boot.

*4 Value when the ambient temperature is 20°C **68°F**.

*5 When an M8 oil-resistant cable (GT2-CHP2M/CHP5M/CHP10M) is used for the sensor head cable.

*6 Contacts are available as options sold separately.

*7 Including the relay connector.

Note: You may not be able to connect the sensor head to the amplifier unit depending on when the amplifier unit was purchased. For details, contact your local sales office.

Pencil type

Model	GT2-P12K	GT2-P12KF	GT2-P12KL	GT2-P12	GT2-P12F	GT2-P12L
Appearance						
Detection system	Scale Shot System II, absolute (no tracking errors) type					
Measuring range	12 mm 0.47"					
Resolution	0.1 μm			0.5 μm		
Indicated accuracy ^{*1}	1 μm (P-P)			2 μm (P-P)		
Measuring force ^{*2}	Downward mounting	1.0 N	0.2 N	1.0 N	0.2 N	0.2 N
	Side mounting	0.95 N	0.15 N	0.95 N	0.15 N	0.15 N
	Upward mounting	0.9 N	0.1 N	0.9 N	0.1 N	0.1 N
Sampling cycle	4 ms					
Mechanical response ^{*1}	10 Hz		4 Hz	10 Hz	4 Hz	
Operation indicator light	2-color LED (red, green)					
Environmental resistance	Enclosure rating	IP67G (JIS) ³ IP67 (IEC) NEMA Type 13 ³		-	IP67G (JIS) ³ IP67 (IEC) NEMA Type 13 ³	
	Ambient temperature	-10 to +55°C 14 to 131°F (No freezing)				
	Relative humidity	35 to 85% RH (No condensation)				
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours				
	Impact resistance	1000 m/s ² (IEC60068-2-27)				
Materials	Main body	Main body case: SUS303, Status indicator: PET, Sensor head-relay connector cable: PUR, Relay connector: PBT				
	Dust boot	NBR	-	NBR	-	
	Contact ^{*4}	SUS304, cemented tungsten carbide			SUS304, SUS440C	
	Sensor head cable	Optional (connect to relay connector)				
Weight (not including cable) ^{*5}	Approx. 35 g	Approx. 45 g	Approx. 35 g	Approx. 35 g	Approx. 45 g	Approx. 35 g

*1 Value when the ambient temperature is 20°C **68°F**. Entire measuring range.

*2 Representative value at the center of the measuring range. Please note that the measuring force varies depending on whether a dust boot is installed. In addition, add 0.4 N to the above values for the measuring force when using OP-87859.

*3 When an M8 oil-resistant cable (GT2-CHP2M/CHP5M/CHP10M) is used for the sensor head cable.

*4 Contacts are available as options sold separately.

*5 Including the relay connector.

Note: You may not be able to connect the sensor head to the amplifier unit depending on when the amplifier unit was purchased. For details, contact your local sales office.

Pencil type

Model	GT2-PA12K	GT2-PA12KL	GT2-PA12	GT2-PA12L	
Appearance					
Detection system	Scale Shot System II, absolute (no tracking errors) type				
Measuring range	12 mm 0.47"				
Resolution	0.1 μm		0.5 μm		
Indicated accuracy ^{*1}	1 μm (P-P)		2 μm (P-P)		
Measuring force ^{*2}	Downward mounting	1.2 N	0.4 N	1.2 N	0.4 N
	Side mounting	1.15 N	0.35 N	1.15 N	0.35 N
	Upward mounting	1.1 N	0.3 N	1.1 N	0.3 N
Sampling cycle	4 ms				
Applied pressure range	0.24 MPa to 0.26 MPa	0.05 MPa to 0.07 MPa	0.24 MPa to 0.26 MPa	0.05 MPa to 0.07 MPa	
Pressure resistance	0.5 MPa				
Fluid used	Clean dry air				
Operation indicator light	2-color LED (red, green)				
Environmental resistance	Enclosure rating	IP67 (IEC)	-	IP67 (IEC)	-
	Ambient temperature	0 to +55°C 32 to 131°F (No freezing)			
	Relative humidity	35 to 85% RH (No condensation)			
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours			
	Impact resistance	1000 m/s ² (IEC60068-2-27)			
Materials	Main body	Main body case: SUS 303, Status indicator: PET, Sensor head-relay connector cable: PUR, Relay connector: PBT, Spindle of GT2-PA12K/PA12: SUS430 (Fluorine coating)			
	Spindle	SUS430 (Fluorine coating) Dust seal: SUS303/SUS304/ Aluminum (Alumite processing)/ Special polyester fiber	SUS430/SUS440C	SUS430 (Fluorine coating) Dust seal: SUS303/SUS304/ Aluminum (Alumite processing)/ Special polyester fiber	SUS430/SUS440C
	Contact ^{*3}	SUS304, cemented tungsten carbide		SUS304, SUS440C	
Sensor head cable	Optional (connect to relay connector)				
Weight (not including cable) ^{*4}	Approx. 35 g				

^{*1} Value when the ambient temperature is 20°C 68°F. Entire measuring range.

^{*2} Representative values when using GT2-PA12K/GT2-PA12 with a pressure of 0.25 MPa. The measuring force varies depending the air pressure used. For details, see table 1.
Representative values when using GT2-PA12KL/GT2-PA12L with a pressure of 0.06 MPa. The measuring force varies depending the air pressure used. For details, see table 2.

^{*3} Contacts are available as options sold separately.

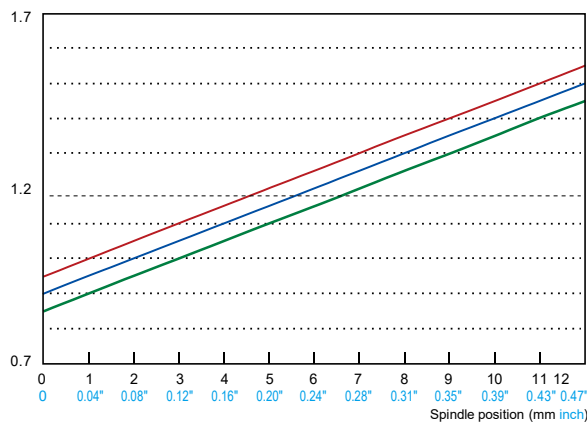
^{*4} Including the relay connector.

Note: You may not be able to connect the sensor head to the amplifier unit depending on when the amplifier unit was purchased. For details, contact your local sales office.

GT2-PA12K/PA12

Table 1. Relationship between spindle position and measuring force grouped according to used air pressure

Measuring force (N)



← Spindle extended

Spindle retracted →

Air pressure

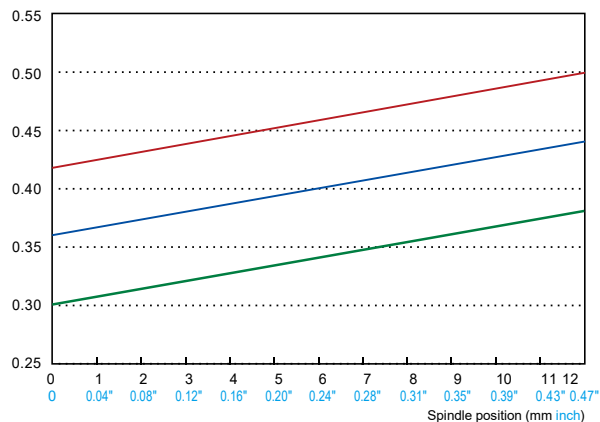
— 0.26 MPa — 0.25 MPa — 0.24 MPa

* The above graphs are for downward-mounted devices. When mounting sideways, the measuring force is -0.05 N. When mounting upwards, the measuring force is -0.1 N.

GT2-PA12KL/PA12L

Table 2. Relationship between spindle position and measuring force grouped according to used air pressure

Measuring force (N)



← Spindle extended

Spindle retracted →

Air pressure

— 0.07 MPa — 0.06 MPa — 0.05 MPa

* The above graphs are for downward-mounted devices. When mounting sideways, the measuring force is -0.05 N. When mounting upwards, the measuring force is -0.1 N.

SPECIFICATIONS

Box type

Model	GT2-H12K	GT2-H12KF	GT2-H12KL	GT2-H12KLF	GT2-H12	GT2-H12F	GT2-H12L	GT2-H12LF
Appearance								
Detection system	Scale Shot System, absolute (no tracking errors) type							
Measuring range	12 mm 0.47"							
Resolution	0.1 μm				0.5 μm			
Indicated accuracy ^{*1}	1 μm (P-P)				2 μm (P-P)			
Measuring force ^{*2}	Downward mounting	1.0 N		0.4 N		1.0 N		0.4 N
	Side mounting	0.9 N		0.3 N		0.9 N		0.3 N
	Upward mounting	0.8 N		0.2 N		0.8 N		0.2 N
Sampling cycle	1 ms							
Mechanical response ^{*1}	10 Hz		4 Hz		10 Hz		4 Hz	
Operation indicator light	2-color LED (red, green)							
Environmental resistance	Enclosure rating	IP67 (IEC)		-		IP67 (IEC)		-
	Ambient temperature	-10 to +55°C 14 to 131°F (No freezing)						
	Relative humidity	35 to 85% RH (No condensation)						
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours						
	Impact resistance	1000 m/s ² (IEC60068-2-27)						
Materials	Main body	Main body case: die-cast zinc, Indicator: polyarylate (PAR)						
	Dustboot	NBR		-		NBR		-
	Contact ^{*3}	SUS304, cemented tungsten carbide				SUS304, SUS440C		
Sensor head cable	Optional (connect to the M8 connector)							
Weight (not including cable)	Approx. 95 g	Approx. 100 g	Approx. 95 g	Approx. 100 g	Approx. 95 g	Approx. 100 g	Approx. 95 g	Approx. 100 g

*1 Value when the ambient temperature is 20°C 68°F. Entire measuring range.

*2 Representative value at the center of the measuring range. Please note that the measuring force varies by the installation state of the dust boot.

*3 Contacts are available as options sold separately.

Box type (long range type)

Model		GT2-H32	GT2-H32L	GT2-H50
Appearance				
		Scale Shot System, absolute (no tracking errors) type		
		32 mm 1.26"		50 mm 1.97"
		0.5 µm		
Indicated accuracy ¹		3 µm (P-P)		3.5 µm (P-P)
Measuring force ²	Downward mounting	2.1 N	1.2 N	3.2 N
	Side mounting	1.8 N	0.9 N	2.8 N
	Upward mounting	1.5 N	0.6 N	2.4 N
Sampling cycle		1 ms		
Mechanical response ¹		6 Hz	5 Hz	7 Hz
Operation indicator light		2-color LED (red, green)		
Environmental resistance	Enclosure rating	IP67 (IEC)	-	IP67 (IEC)
	Ambient temperature	-10 to +55°C 14 to 131°F (No freezing)		
	Relative humidity	35 to 85% RH (No condensation)		
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours		
Materials	Main body	Main body case: die-cast zinc, Indicator: polyarylate (PAR)		
	Dustboot	NBR	-	NBR
	Contact ³	SUS304, SUS440C		
	Sensor head cable	Optional (connect to the M8 connector)		
Weight (not including cable)		Approx. 270 g		Approx. 320 g

*1 Value when the ambient temperature is 20°C 68°F. Entire measuring range.

*2 Representative value at the center of the measuring range. Please note that the measuring force varies by the installation state of the dust boot.

*3 Contacts are available as options sold separately.

Box type (air push type)

Model	GT2-A12K		GT2-A12KL		GT2-A12		GT2-A12L		
Appearance									
Detection system	Scale Shot System, absolute (no tracking errors) type								
Measuring range	12 mm 0.47"								
Resolution	0.1 μm				0.5 μm				
Indicated accuracy ^{*1}	1 μm (P-P)				2 μm (P-P)				
Measuring force ^{*2}	Downward mounting	1.2 N	0.4 N	1.2 N	0.4 N				
	Side mounting	1.1 N	0.3 N	1.1 N	0.3 N				
	Upward mounting	1.0 N	0.2 N	1.0 N	0.2 N				
Sampling cycle	1 ms								
Applied pressure range	0.25 MPa to 0.50 MPa								
Pressure resistance	1 MPa								
Fluid used	Dry air								
Operation indicator light	2-color LED (red, green)								
Environmental resistance	Enclosure rating	IP67 (IEC) ³		-		IP67 (IEC) ³		-	
	Ambient temperature	0 to +55°C 32 to 131°F (No freezing)							
	Relative humidity	35 to 85% RH (No condensation)							
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours							
	Impact resistance	1000 m/s ² (IEC60068-2-27)							
Materials	Main body	Main body case: die-cast zinc, Cylinder section: aluminum alloy, Air joint resin: polyacetal, Air joint metal: nickel-plated brass, Indicator: polyarylate (PAR)							
	Dustboot	NBR		-		NBR		-	
	Contact ^{*4}	SUS304, cemented tungsten carbide				SUS304, SUS440C			
	Sensor head cable	Optional (connect to the M8 connector)							
Weight (not including cable)	Approx. 145 g								

^{*1} Value when the ambient temperature is 20°C 68°F. Entire measuring range.

^{*2} Representative value at the center of the measuring range. Please note that the measuring force varies by the installation state of the dust boot.

^{*3} Connect an exhaust joint to the air tube and ensure that foreign matter does not enter the tube from joint.

^{*4} Contacts are available as options sold separately.

Box type (air push type/long range type)

Model	GT2-A32	GT2-A50
Appearance		
Detection system	Scale Shot System, absolute (no tracking errors) type	
Measuring range	32 mm 1.26"	50 mm 1.97"
Resolution	0.5 µm	
Indicated accuracy ^{*1}	3 µm (P-P)	3.5 µm (P-P)
Measuring force ^{*2}	Downward mounting	2.1 N
	Side mounting	1.8 N
	Upward mounting	1.5 N
Sampling cycle	1 ms	
Applied pressure range	0.25 MPa to 0.50 MPa	
Pressure resistance	1 MPa	
Fluid used	Dry air	
Operation indicator light	2-color LED (red, green)	
Environmental resistance	Enclosure rating	IP67 (IEC) ^{*3}
	Ambient temperature	0 to +55°C 32 to 131°F (No freezing)
	Relative humidity	35 to 85% RH (No condensation)
	Vibration ^{*4}	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours
	Main body	Main body case: die-cast zinc, Cylinder section: aluminum alloy, Air joint resin: polyacetal, Air joint metal: nickel-plated brass, Indicator: polyarylate (PAR)
Materials	Dustboot	NBR
	Contact ^{*5}	SUS304, SUS440C
Sensor head cable	Optional (connect to the M8 connector)	
Weight (not including cable)	Approx. 340 g	Approx. 405 g

^{*1} Value when the ambient temperature is 20°C 68°F. Entire measuring range.

^{*2} Representative value at the center of the measuring range. Please note that the measuring force varies by the installation state of the dust boot.

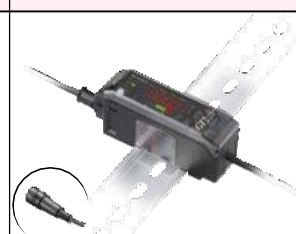
^{*3} Connect an exhaust joint to the air tube and ensure that foreign matter does not enter the tube from joint.

^{*4} When using mounting bracket D (OP-84327), the double amplitude is 0.75 mm 0.03".

^{*5} Contacts are available as options sold separately.

SPECIFICATIONS

Judgment output/analog output type

Model	NPN output	Main unit	GT2-71(C)N	GT2-75N	GT2-71MCN
		Expansion unit ^{*1}	GT2-72(C)N	GT2-76N	-
	PNP output	Main unit	GT2-71(C)P	GT2-75P	GT2-71MCP
		Expansion unit ^{*1}	GT2-72(C)P	GT2-76P	-
Appearance					
Mounting type ^{*2}		DIN-rail mount		Panel mount	DIN-rail mount
Number of expansion units ^{*1}		Up to 14 expansion units for 1 main unit			
Power supply voltage ^{*1}		10 to 30 VDC, including 10% ripple (P-P), Class 2			20to30VDC, including 10% ripple (P-P), Class2
Display range		-199.999.9 to 199.999.9			
Display resolution		0.1 μm			
Power consumption	Normal	2200 mW or less (73.3 mA or less at 30 V)			2700 mW or less (90.0 mA or less at 30 V)
	Power saving (Eco half)	1800 mW or less (60.0 mA or less at 30 V)			2300 mW or less (76.7 mA or less at 30 V)
	Power saving (Eco all)	1700 mW or less (56.7 mA or less at 30 V)			2200 mW or less (73.3 mA or less at 30 V)
Response time		hsp (3)/5/10/100/500/1000 ms (When using GT2-Pxxx, hsp (12)/20/40/400/2000/4000 ms)			
Control output (HH/HL/GO/LO/LL) ^{*3}	NPN output	NPN open collector, 40 V 50 mA or less, residual voltage 1 V or less ^{*1}			
	PNP output	PNP open collector, 30 V 50 mA or less, residual voltage 1 V or less ^{*1}			
Control input	Timing/preset/ reset/bank input	No-voltage input			
Analog output	Output range	-			4 to 20 mA with a max. load resistance of 350 Ω
	Response time	-			Set response time + 1 ms
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F (No freezing) ^{*1}			
	Relative humidity	35 to 85% RH (No condensation)			
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours			
Materials		Main body case/front cover: polycarbonate (PC), Key top: polyacetal (POM), Front sheet: polyethylene terephthalate (PET), Cable: polyvinyl chloride (PVC)			
Weight	GT2-71N(P)/72N(P)	Approx. 140 g (including power supply cable)			
	GT2-75N(P)/76N(P)	Approx. 140 g (including panel mount, front protective cover, power supply cable)			
	GT2-71MCN(P)/ 71CN(P)/72CN(P)	Approx. 70 g (not including the GT2-CA2M/CA5M/CA10M)			

^{*1} When adding expansion units, there are the following restrictions according to the number of connected units.

- When 2 to 8 units are connected including the main unit
 - Power supply voltage: 20 to 30 VDC
 - Control output current: 20 mA or less
 - (GT2-71MCN(P) only) Ambient temperature: -10 to +45°C 14 to 113°F
- When 9 to 15 units are connected including the main unit
 - Power supply voltage: 20 to 30 VDC
 - Control output current: 10 mA or less (including the DL-RB1A output current)
 - Residual voltage: 1.5 V or lower
 - (GT2-71MCN(P) only) Ambient temperature: -10 to +45°C 14 to 113°F

^{*2} When using the DIN-rail mount type, always mount it to a DIN-rail (mounted to a metal plate), and when adding expansion units, always use the end unit (OP-26751).

^{*3} The GT2-71MCN(P) does not have HH/LL.

Pulse output type

Model		GT2-71D
Appearance		
Mounting type		DIN-rail mount
Number of expansion units		Only 1 unit
Power supply voltage		10 to 30 VDC, including 10% ripple (P-P), Class 2
Power consumption		1600 mW or less (53.3 mA or less at 30 V)
Indicators		Power supply (green)/alarm (red) indicator, pulse output indicator (green), input indicator
Pulse resolution		Select from 0.1/0.5/1/10 μm (when shipped: 0.5 μm)
Minimum phase difference		Select from 0.5/2.5/5/25 μs (when shipped: 2.5 μs)
Control input	Origin return	No-voltage input (contact, non-contact)
Output signal		90° phase difference, differential square wave (EIA-422 compliant) 4× multiplier
Output signal level		+5 V
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F (No freezing)
	Relative humidity	35 to 85% RH (No condensation)
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours
Materials		Main body case/front cover: polycarbonate (PC), Cable: polyvinyl chloride (PVC)
Weight		Approx. 110 g (including power supply cable)

Large display type

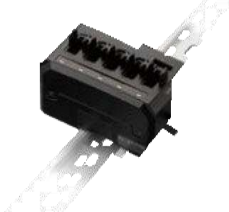
Model	NPN output	GT2-100N	GT2-E3N
	PNP output	GT2-100P	GT2-E3P
Appearance			
Mounting type	Panel mount		-
Number of connectable heads	2 heads with GT2-100N(P) alone + 3 heads per 1 head board expansion When expanded with a maximum of 3 head boards, 11 heads		-
Power supply voltage	10 to 30 VDC, including 10% ripple (P-P), Class 2		Supplied from the GT2-100N/100P
Display range	-199.999.9 to 199.999.9		-
Display resolution	0.1 μm		-
Power consumption	Normal	4500 mW or less (150.0 mA or less at 30 V)	4200 mW or less (140.0 mA or less at 30 V)
	Power saving (Eco half) *1	3700 mW or less (123.3 mA or less at 30 V)	4200 mW or less (140.0 mA or less at 30 V)
	Power saving (Eco all) *1	3600 mW or less (120.0 mA or less at 30 V)	4000 mW or less (133.3 mA or less at 30 V)
Response time	hsp (3)/5/10/100/500/1000 ms (When using GT2-Pxxx, hsp (12)/20/40/400/2000/4000 ms)		
Control output (HH/HL/GO/LO/LL)	NPN output	NPN open collector, 40 V 50 mA or less ³ , residual voltage 1 V or less	
	PNP output	PNP open collector, 30 V 50 mA or less ³ , residual voltage 1 V or less	
Control input	Timing/preset/ reset/bank input	No-voltage input	
Input/output connector *2	Power supply: Terminal block connection Input/output: 20-pin connector (MIL standard)		30-pin connector (MIL standard)
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F (No freezing)	
	Relative humidity	35 to 85% RH (No condensation)	
	Vibration	10 to 55 Hz Double amplitude 0.15 mm 0.01" in the X, Y, Z axis directions respectively, 2 hours	
Materials	Main body case/front cover: polycarbonate (PC), Key top: polyacetal (POM), Front sheet: polyethylene terephthalate (PET)		-
Weight	Approx. 380 g		Approx. 80 g

*1 When the maximum number of sensor heads is connected, and all devices are set to power saving settings

*2 The connector and cable are sold separately.

*3 When 2 or more sensor heads are connected, 20 mA or less.

Multi-head type

Model	Main unit	GT2-500
	Expansion unit	GT2-550
Appearance		
Mounting type *1	DIN-rail mount	
Number of expansion units *2	Maximum of 3 units including the main unit (Maximum of 15 sensor heads)	
Power supply voltage	20 to 30 VDC, including 10% ripple (P-P) (GT2-550 power supplied from the main unit), Class 2	
Consumption current	4800 mW 160.0 mA or less at 30 V	
Response time	hsp (3)/5/10/100/500/1000 ms (When using GT2-Pxxx, hsp (12)/20/40/400/2000/4000 ms)	
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F
	Relative humidity	35 to 85% RH (No condensation)
	Vibration	10 to 55 Hz Double amplitude 1.5 mm 0.06" in the X, Y, Z axis directions respectively, 2 hours
Materials	Main body case: polycarbonate, Cable: PVC	
Weight	GT2-500: Approx. 140 g, GT2-550: Approx. 95 g	

*1 When connecting the DL Series and expansion units, always connect them when the amplifier unit is connected to the DIN-rail and use the end unit (OP-26751 included with the DL Series).

*2 When using the DL-RB1A (for communication), ensure that the output current is 10 mA or less.

SPECIFICATIONS

USB connection unit

Model		GT2-UB1
Appearance		
Cable connector		M8 Female
USB connector		USB TypeA
USB Communication		USB2.0 Full Speed
Interface		USB-COM
OS		Windows 8.1 Update/Proudate (32 bit/64 bit) Windows 7 Home Premium/Professional/Ultimate (SP1 or better, 32 bit/ 64 bit) Windows XP Home Edition/Professional (SP3 or better 32 bit) One OS must be installed.
Power		USB bus power
Current consumption		200 mA max.*1
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F (No freezing)
	Ambient humidity	35 to 85%RH (No condensation)
	Vibration	10 to 55 Hz, Horizontal amplitude: 1.5 mm 0.06", 2 hours each in X, Y and Z axis
Material		Main unit: Polycarbonate (PC), Cable: PVC
Weight		Approx. 40 g (including the cable)

*1 Bus-power-type USB hubs cannot be used.

Software

Model		GT2-H2
Interface		Over USB2.0 or RS-232C (Serial) port or Ethernet (TCP/IP)
OS		Windows 8.1 Update/Proudate (32 bit/64 bit) Windows 7 Home Premium/Professional/Ultimate (SP1 or better, 32 bit/ 64 bit) Windows XP Home Edition/Professional (SP3 or better 32 bit) One OS must be installed.
Languages		Japanese/English/German/Spanish/Portuguese/Italian/French/Simplified Chinese
Processor		Windows 8.1/ Windows 7: Needs to be compliant with system requirements of OS. Windows XP: Pentium III or better Clock speed 1 GHz or faster
Memory capacity		Windows 8.1/ Windows 7: Needs to be compliant with system requirements of OS. Windows XP: 1 GB or more
Required capacity for installation		1 GB or more
Monitor		Resolution 1024 × 768 pixel or higher, display color High Color (16 bit) or higher
Operating conditions		.NET Framework 4.0 or 4.5 needs to be installed.*1

*1 If .NET Framework is not installed, .NET Framework 4.0 or 4.5 will be installed when GT2-H2 installed.

USB connection I/O unit

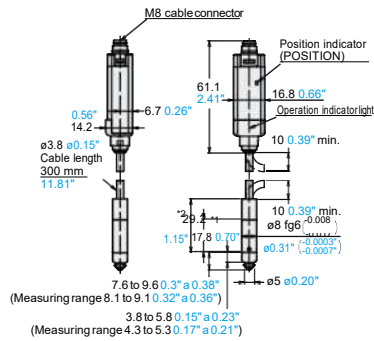
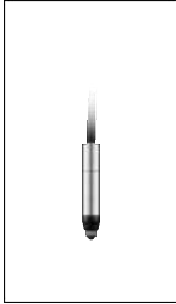
Model		DL-NS1
Appearance		
Cable connector		M12 Male
USB connector		USB TypeA
USB Communication		USB2.0 Full Speed
Interface		USB-COM
OS		Windows 8.1 Update/Proudate (32 bit/64 bit) Windows 7 Home Premium/Professional/Ultimate (SP1 or better, 32 bit/64 bit) Windows XP Home Edition/Professional (SP3 or better 32 bit) One OS must be installed.
Power		USB bus power
Current consumption		100 mA max.
Control input	Number of inputs	2
	Input type	Voltage input
	Maximum rating	26.4 V
	Minimum ON voltage	15 VDC
	Maximum OFF current	0.2 mA
Control output	Number of outputs	2
	Output type	Photo relay output
	Control output current	30 VDC 50 mA max. per output
	Maximum leak current	0.1 mA max.
	Maximum residual voltage	1 V max.
Switch input	Input type	No-voltage input
	Electrical Specification	Approx. 5 VDC/10 mA
Environmental resistance	Ambient temperature	-10 to +50°C 14 to 122°F (No freezing)
	Ambient humidity	35 to 85%RH (No condensation)
	Vibration	10 to 55 Hz, Horizontal amplitude: 1.5 mm 0.06", 2 hours each in X, Y and Z axis
Material		Main unit: Polycarbonate (PC), Cable: PVC
Weight		Approx. 45 g (including the cable)

DIMENSIONS

Unit: mm **inch**

Sensor head (Standard)

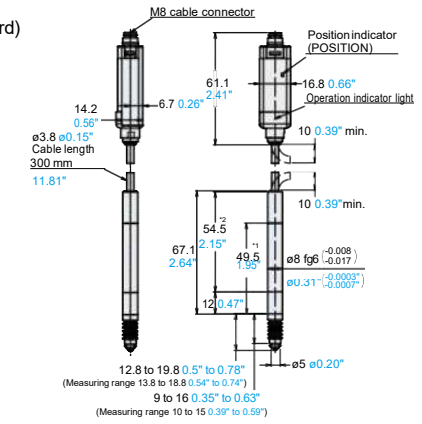
GT2-S1



*1 Mountable range for mounting bracket A, B, C, E
*2 Mountable range for mounting bracket F

Sensor head (Standard)

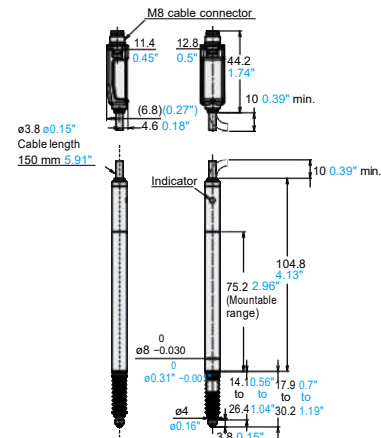
GT2-S5



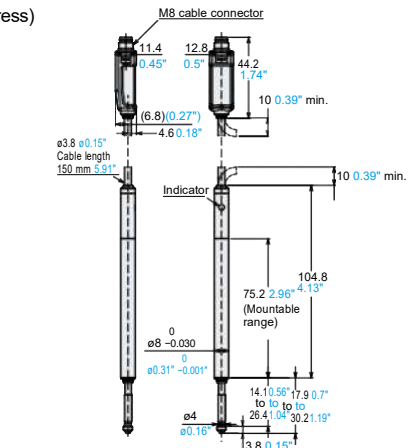
*1 Mountable range for mounting bracket A, B, C, E
*2 Mountable range for mounting bracket F

Sensor head (Standard)

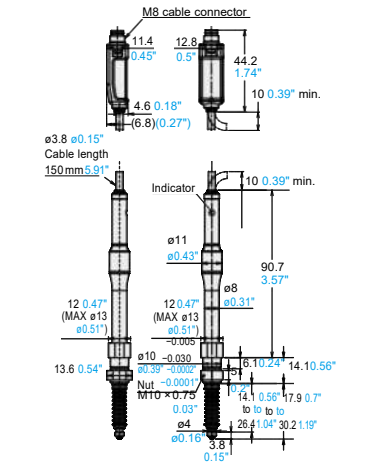
GT2-P12K/
GT2-P12



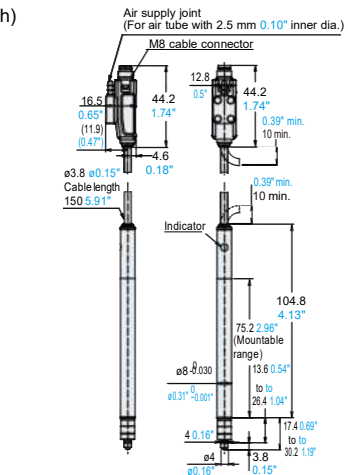
Sensor head (Low stress)

GT2-P12KL/
GT2-P12L

Sensor head (Flange)

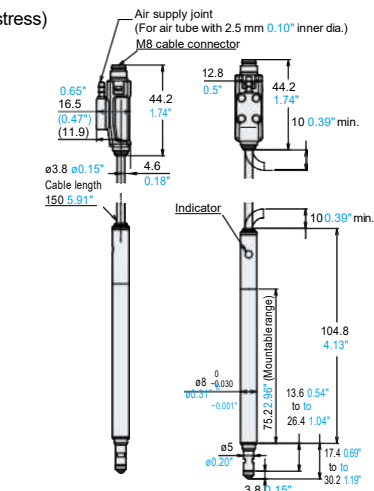
GT2-P12KF/
GT2-P12F

Sensor head (Air push)

GT2-PA12K
GT2-PA12

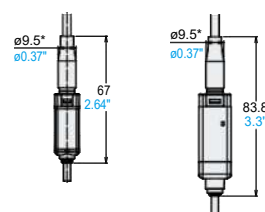
Sensor head (Air push low stress)

**GT2-PA12KL/
PA12L**



Sensor head - Sensor head cable
When attached

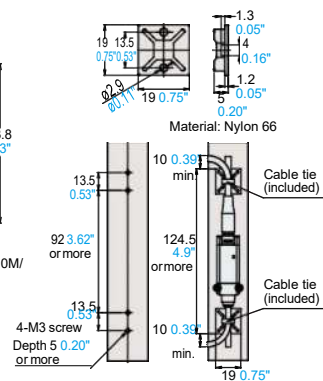
GT2-Pxxx GT2-S1/GT2-S5



* When using GT2-CHP2M/CHP5M/CHP10M/
OP-88060, $\varnothing 10$ 0.39"

Short-range type mounting adapter

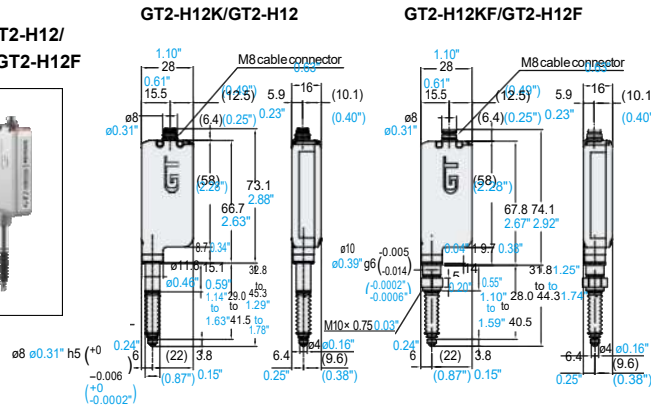
OP-88117

Applicable models: **GT2-S1/S5**

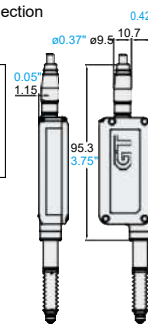
DIMENSIONS

Sensor head
(Standard)

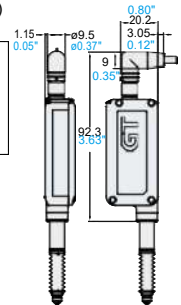
GT2-H12K/GT2-H12/
GT2-H12KF/GT2-H12F



Cable connection
(Straight)

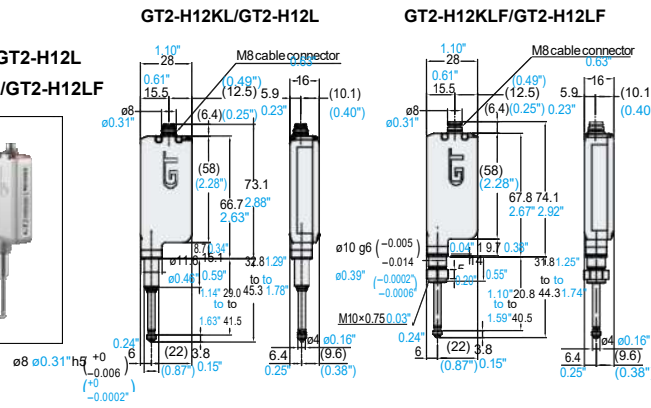


Cable connection
(L-shaped)

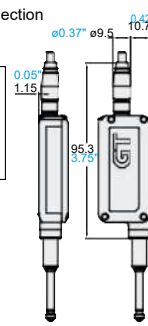


Sensor head
(Low stress)

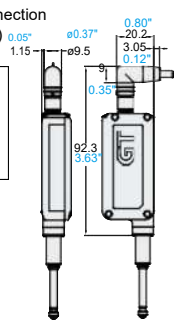
GT2-H12KL/GT2-H12L
GT2-H12KLF/GT2-H12LF



Cable connection
(Straight)

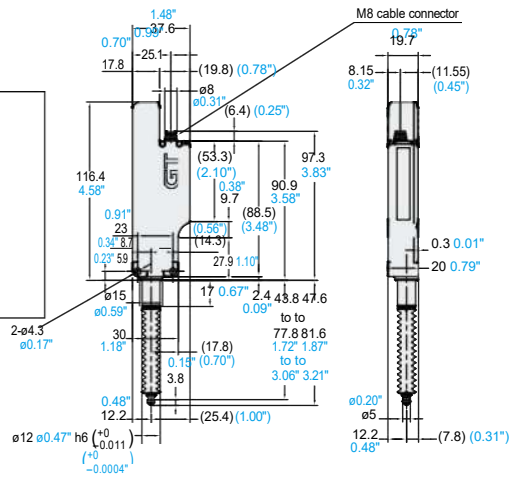


Cable connection
(L-shaped)

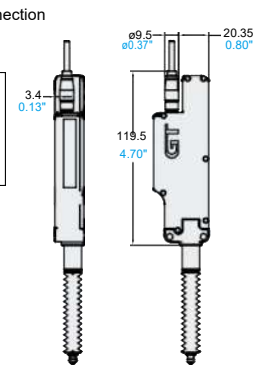


Sensor head
(Standard)

GT2-H32

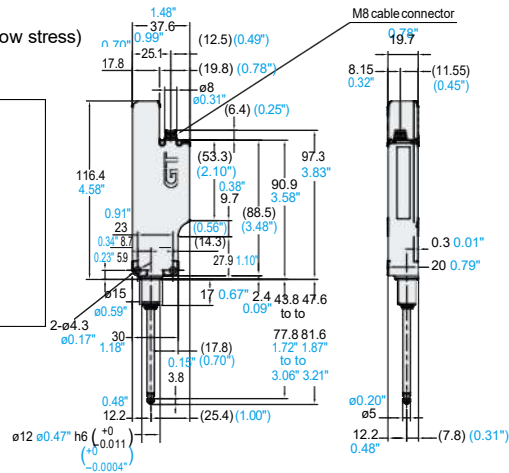


Cable connection
(Straight)

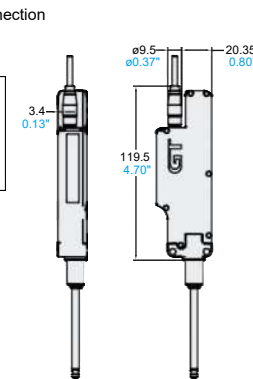


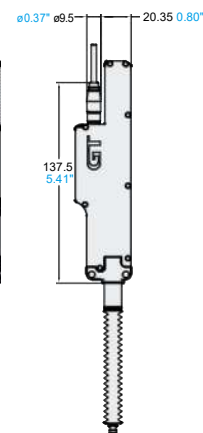
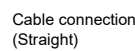
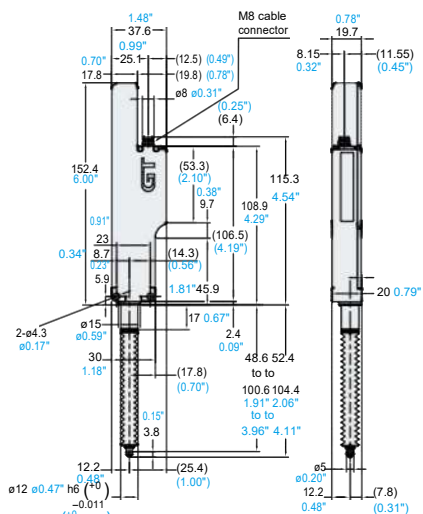
Sensor head (Low stress)

GT2-H32L



Cable connection
(Straight)

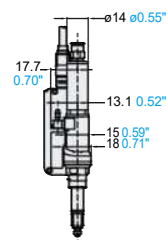
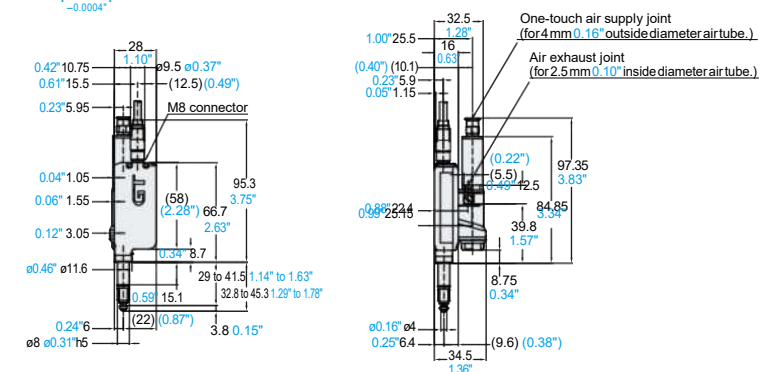




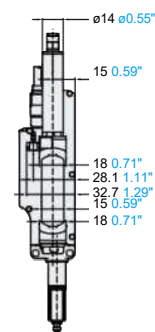
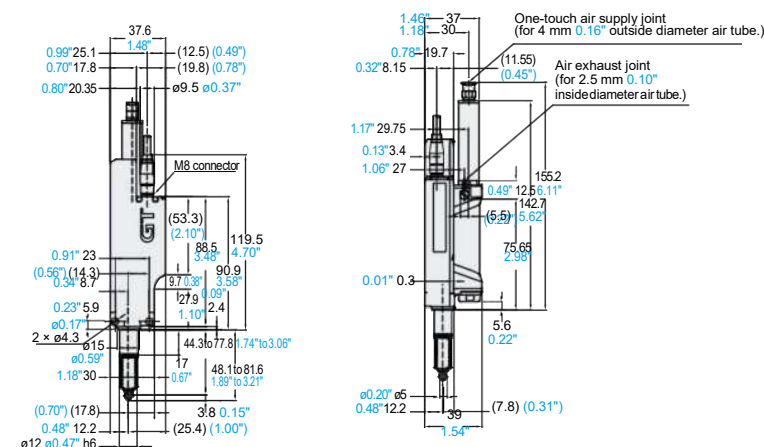
Sensor head
(Air push)
GT2-A12K/GT2-A12



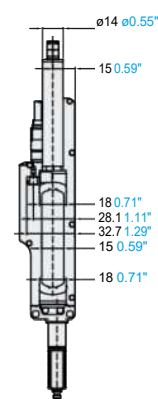
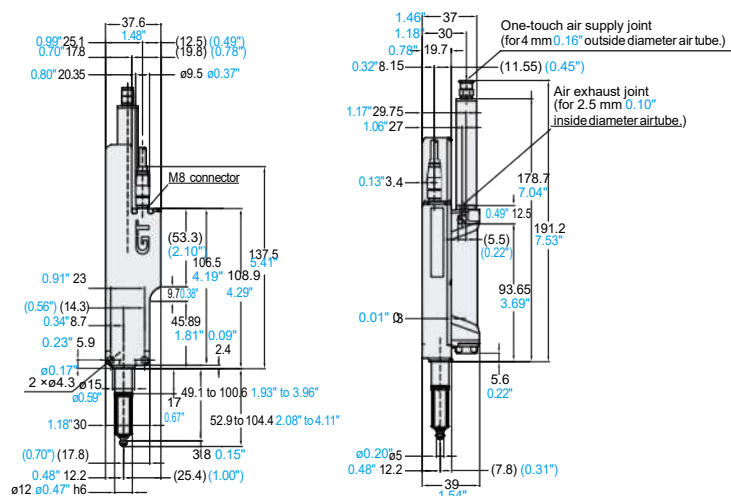
There are no dust boots on the low stress type GT2-A12L/A12KL



Sensor head
(Air push)
GT2-A32



Sensor head
(Air push)
GT2-A50

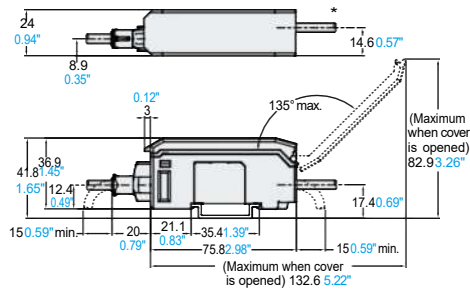


DIMENSIONS

Amplifier unit
DIN-rail mount type



GT2-71N/71P/71MCN/71MCP/71CN/71CP



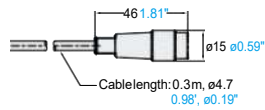
* Cable specifications

GT2-71N/71P: $\phi 4.7$, 12-core $\times$ Brown/Blue: 0.20 mm², Black/White/Gray/Orange/Green/Pink/Purple/Yellow/Red/Pink purple: 0.15 mm², Cable length: 2 m
GT2-72N/72P: $\phi 4.7$, 10-core $\times$ Black/White/Gray/Orange/Green/Pink/Purple/Yellow/Red/Pink purple: 0.15 mm², Cable length: 2 m

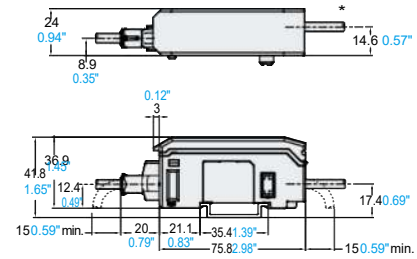
GT2-71MCN/71MCP/71CN/71CP/72CN/72CP

Connector

(connector type/analog output type amplifier unit)



GT2-72N/ 72P/ 72CN/ 72CP



GT2-CA2M/CA10M

Connection cable



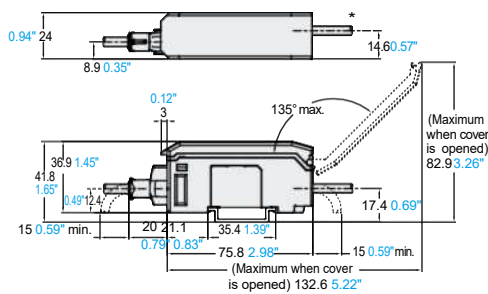
* Cable specifications

Outer diameter: $\phi 4.7$ mm $\phi 0.19$, Cable length: 2 m 6.6' (GT2-CA2M), 10 m 32.8' (GT2-CA10M), 12-core $\times$ Brown/Blue: 0.20 mm², Black/White/Gray/Orange/Green/Pink/Purple/Yellow/Red/Pink purple: 0.15 mm²

Amplifier unit
Pulse output



GT2-71D



* Cable specifications

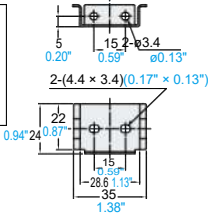
Outer diameter: $\phi 4.7$ mm $\phi 0.19$, Cable length: 2 m 6.6', 9-core $\times$ Brown/Blue/Purple/Pink/Orange/Green/Gray/White/Black: 0.15 mm²

Mounting bracket for DIN-rail mount type
amplifier (Optional)

OP-76877

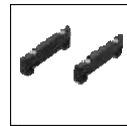


Material: SUS304

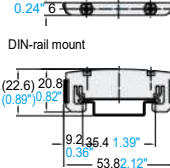


End unit (Optional) (2 pcs.)

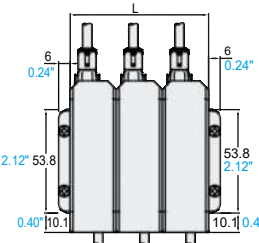
OP-26751



Material: Polycarbonate, Stainless steel

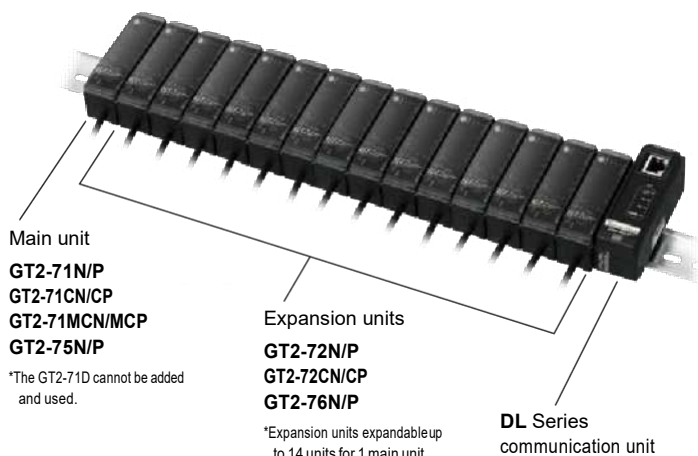


When several units are connected



Number of units	L
1	24 0.94"
2	48 1.89"
3	72 2.83"
4	96 3.78"
5	120 4.72"
6	144 5.67"
7	168 6.61"
8	192 7.56"
9	216 8.50"
10	240 9.45"
11	264 10.39"
12	288 11.34"
13	312 12.28"
14	336 13.23"
15	360 14.17"

SYSTEM CONFIGURATION



Main unit

GT2-71N/P
GT2-71CN/CP
GT2-71MCN/MCP
GT2-75N/P

*The GT2-71D cannot be added and used.

Expansion units

GT2-72N/P
GT2-72CN/CP
GT2-76N/P

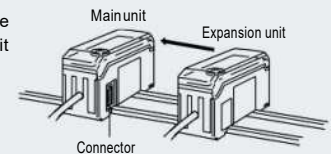
*Expansion units expandable up to 14 units for 1 main unit.

DL Series communication unit

Adding expansion units to the main unit

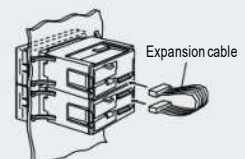
Expand with the side connector.

To add a unit, please use the separately available end unit (OP-26751).



Expand with the cable included with the expansion unit.

To add a unit, mount vertically with the main unit as the top unit.

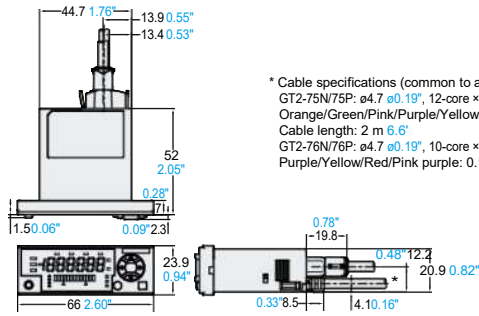


* To mount horizontally, the separately available OP-35361 (expansion cable 300 mm 11.81") is required.

Amplifier unit
Panel mount type



GT2-75N/75P/76N/76P

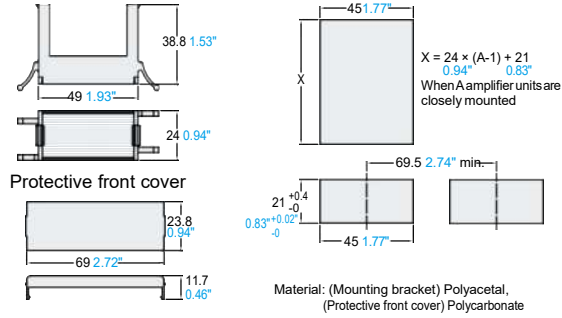


* Cable specifications (common to all amplifier units)
GT2-75N/75P: $\phi 4.7 \pm 0.19$, 12-core $\times$ Brown/Blue: 0.20 mm², Black/White/Gray/Orange/Green/Pink/Purple/Yellow/Red/Pink purple: 0.15 mm², Cable length: 2 m 6.6'
GT2-76N/76P: $\phi 4.7 \pm 0.19$, 10-core $\times$ Black/White/Gray/Orange/Green/Pink/Purple/Yellow/Red/Pink purple: 0.15 mm², Cable length: 2 m 6.6'

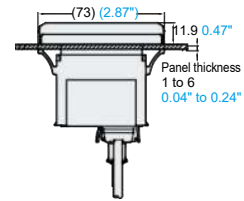
Panel mounting bracket
(Accessory)
OP-84394



Panel cutout



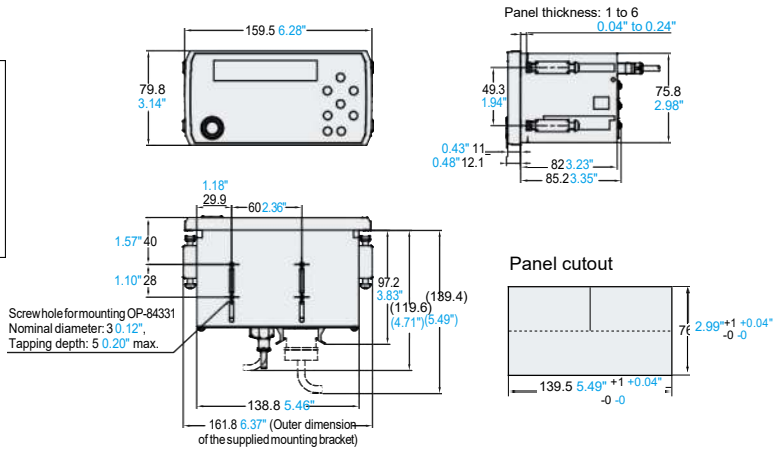
Panel mounting bracket



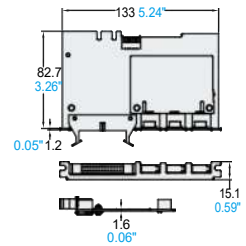
Amplifier unit
Large display
GT2-100N/100P



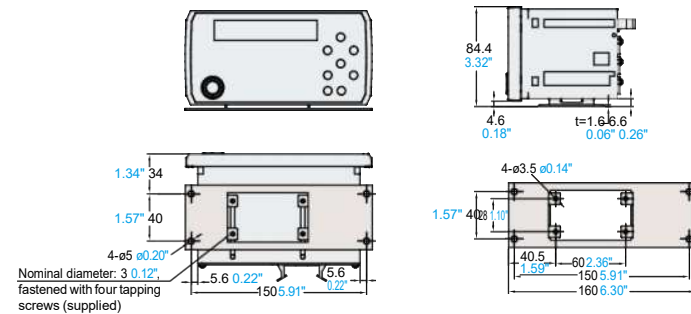
When the supplied mounting bracket is attached



GT2-E3N/E3P Expansion board

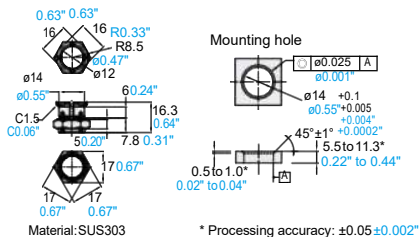


When the optional mounting bracket (OP-84331) is used



Sensor head
mounting bracket D
(Optional)

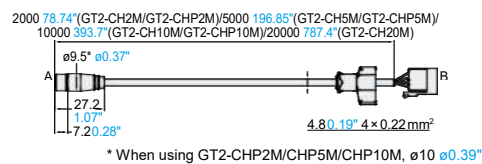
OP-84327



Sensor head cable (straight)/(oil-resistant straight)

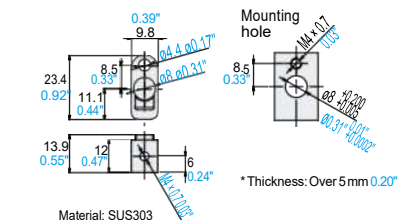
GT2-CH2M/5M/10M/20M (Optional)/

GT2-CHP2M/5M/10M (Optional)



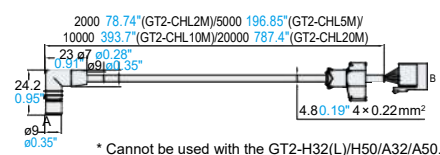
Sensor head
mounting bracket F
(Optional)

OP-87863



Sensor head cable (L-shaped)

GT2-CHL2M/5M/10M/20M (Optional)



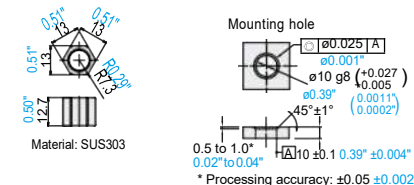
Pin arrangement

Sensor head cable (straight/L-shaped)

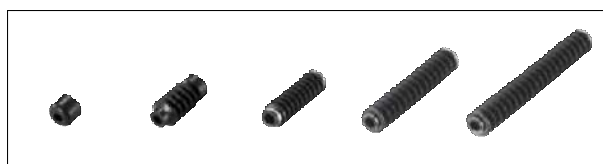
A	B	Casing cover
(1)	(1)	Brown
(2)	(3)	White
(3)	(4)	Blue
(4)	(2)	Black

Sensor head
mounting bracket I
(Optional)

OP-88157

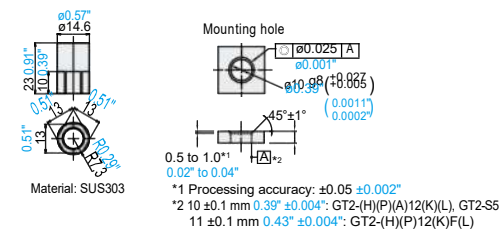


Dustboot



Sensor head
mounting bracket P
(Optional)

OP-88158



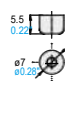
OP-88063

Applicable models

GT2-S1

Materials: NBR

* Attached to the sensor head.



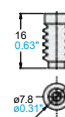
OP-88065

Applicable models

GT2-S5

Materials: NBR

* Attached to the sensor head.



OP-84332

Applicable models

GT2-P12K(F)/P12(F)

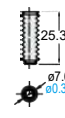
GT2-H12K(F)/H12(F)

GT2-A12K/A12

Materials: NBR, SUS304

* Attached to the sensor head.

(Excluding the low stress type)



OP-87859 (Optional)

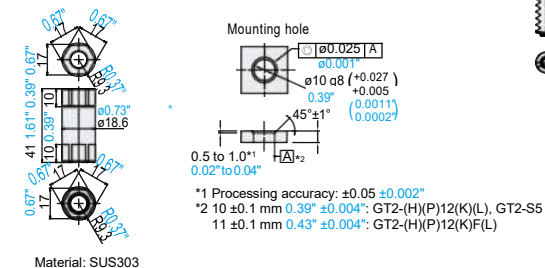
Applicable models

GT2-P12K(F)/P12(F)

Materials: Fluorocarbon rubber, SUS304

Sensor head
mounting bracket R
(Optional)

OP-88159



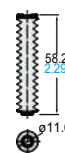
OP-84459

Applicable models

GT2-H32

GT2-A32

* Attached to the sensor head.



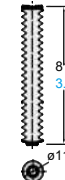
OP-84460

Applicable models

GT2-H50

GT2-A50

* Attached to the sensor head.



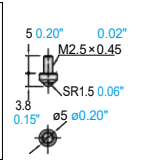
Contact

Standard
OP-77678



Material:
OP-77678
SUS304
SUS440C

Super-tough
OP-77682



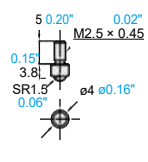
OP-77682
SUS304
Super-tough
tungsten alloy

Standard (small)
OP-87984



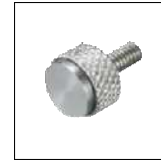
Material:
OP-87984
SUS304
SUS440C

Super-tough (small)
OP-87985

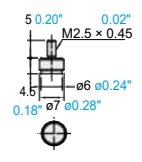


OP-87985
SUS304
Super-tough
tungsten alloy

Flat plate (Optional)
OP-77679



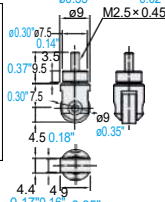
Material: SUS304
Super-tough
tungsten alloy



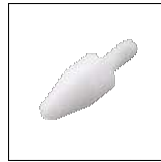
Roller (Optional)
OP-77680



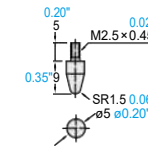
Material: SUS304
SUS440C



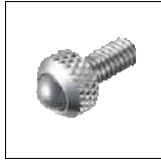
Fluorocarbon resin
(Optional)
OP-80228



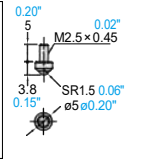
Material: Fluorocarbon resin (PTFE)



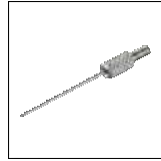
Ceramic
(Optional)
OP-81970



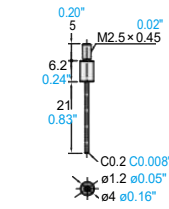
Material: SUS304, Ceramic



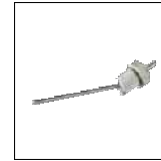
Needle
(Optional)
OP-77681



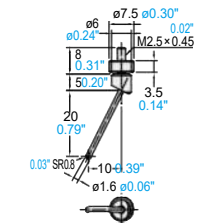
Material: SUS304
Super-tough
tungsten alloy



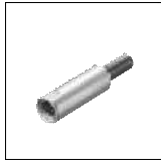
Offset
(Optional)
OP-77683



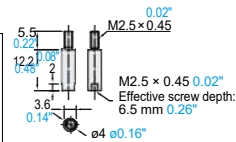
Material: SUS304
Super-tough
tungsten alloy



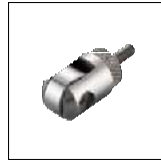
Spacer
(Optional)
OP-77684



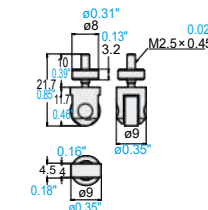
Material: SUS304



Roller (high-accuracy)
(Optional)
OP-93332



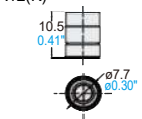
Material: SUS304
SUS303
SUS440C



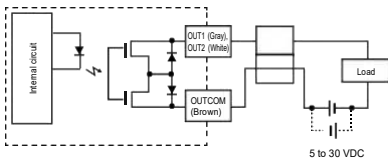
Replacement dust seal
Applicable models GT2-PA12(K)
OP-87932



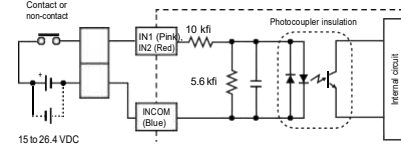
* Attached to the sensor head.



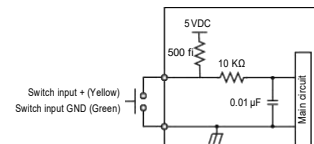
Output circuit of USB connection I/O unit
DL-NS1



Input circuit of USB connection I/O unit
DL-NS1



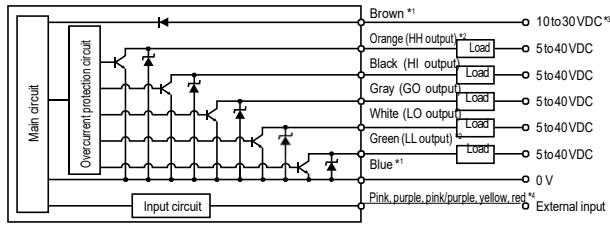
Switch input circuit of USB connection
I/O unit
DL-NS1



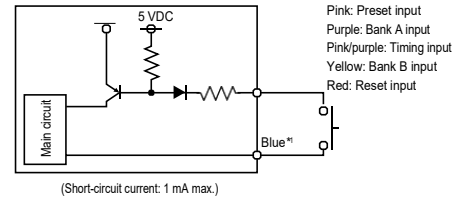
*Do not apply voltage between
switch input + and switch input GND.

INPUT/OUTPUT CIRCUIT DIAGRAMS

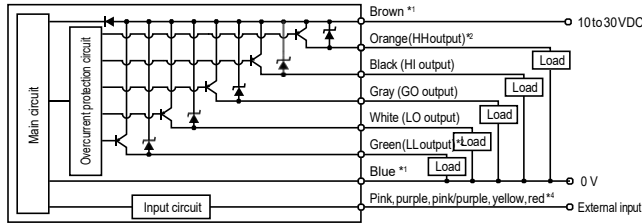
I/O circuit **GT2-71N/72N/71CN/72CN/71MCN/75N/76N**



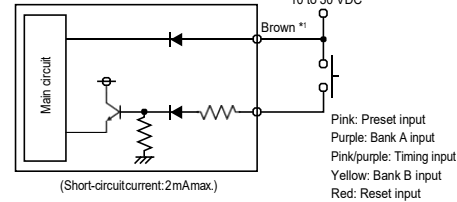
External input circuit



I/O circuit **GT2-71P/72P/71CP/72CP/71MCP/75P/76P**



External input circuit



*1 Brown and blue are applicable only to main units (GT2-71N/71P/71CN/71CP/71MCN/71MCP/75N/75P).

Not applicable to expansion units (GT2-72N/72P/72CN/72CP/76N/76P).

The connector type expansion unit (GT2-72CN/72CP) is not connected to the internal circuit.

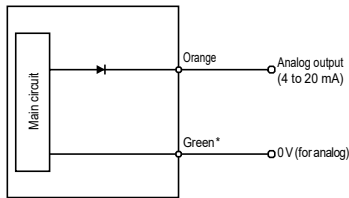
*2 The orange and green wires are used as analog output cables for the analog type amplifier unit (GT2-71MCN/71MCP).

For details, refer to the analog output circuit diagram.

*3 20 to 30 VDC when expansion unit is connected or for the analog type amplifier unit (GT2-71MCN/71MCP).

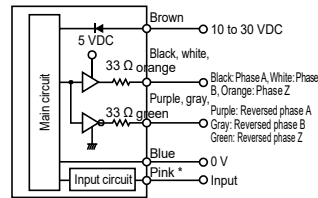
*4 For details on external input, refer to the external input circuit diagram.

Analog output circuit
GT2-71MCN/71MCP



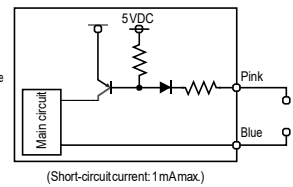
* The green and blue wires are common internally.

Pulse output amplifier unit **GT2-71D**
I/O circuit



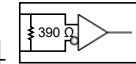
* For details of the external input, refer to the diagram of the external input circuit.

External input circuit

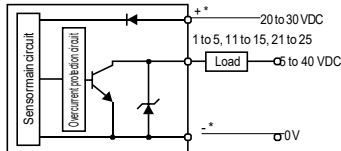


Recommended input device

AM26LS32 line receiver or equivalent device

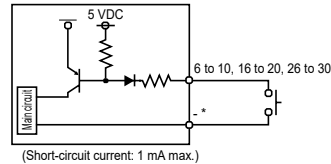


Output circuit of the large display amplifier unit
GT2-100N/GT2-E3N
(Pin Nos. 1 to 5, 11 to 15, 21 to 25)



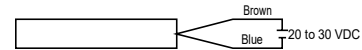
* The +/- terminals are provided in the GT2-100N only.
They are not provided in the GT2-E3N.

Input circuit of the large display amplifier unit
GT2-100N/GT2-E3N
(Pin Nos. 6 to 10, 16 to 20, 26 to 30)

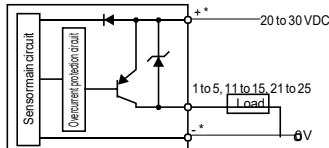


* The - terminal is provided in the GT2-100N only.
It is not provided in the GT2-E3N.

Multi-head amplifier unit **GT2-500** (main unit)
The power supply cable is as follows.

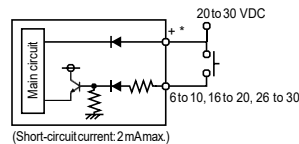


Output circuit of the large display amplifier unit
GT2-100P/GT2-E3P
(Pin Nos. 1 to 5, 11 to 15, 21 to 25)



* The +/- terminals are provided in the GT2-100P only.
They are not provided in the GT2-E3P.

Input circuit of the large display amplifier unit
GT2-100P/GT2-E3P
(Pin Nos. 6 to 10, 16 to 20, 26 to 30)



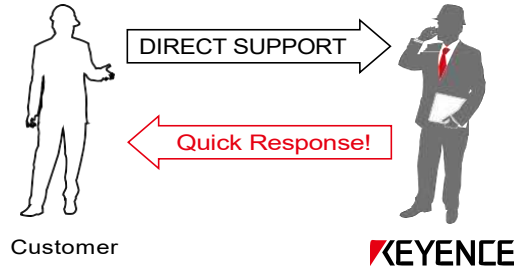
* The + terminal is provided in the GT2-100P only.
It is not provided in the GT2-E3P.

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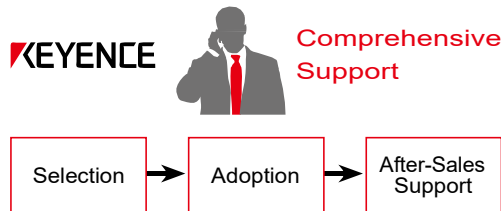
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KA1-1099

GT2Short-KA-C-US 2050-4

611C71