



< Actual Size >



The World's Smallest Pressure Sensor



Built-in
Amplifier type
AP-C30W Series



Separate
Amplifier type
AP-C40W Series



Separate Thin
Amplifier type
AP-V40AW Series



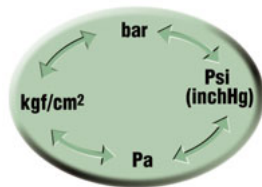
COMPACT PRESSURE SENSOR

THE IDEAL SIZE FOR EASY INSTALLATION AND OPERABILITY

World's Smallest Model with the Largest Character Height

The world's most compact pressure sensor with a width of 30 mm, height of 25 mm and the largest character height in its class of 11 mm.

Furthermore, the AP-C30W Series incorporates a very easy-to-see 2-color LED display



Unit conversion function

The pressure can be displayed in any of the four pressure units enabling it to be used worldwide.



Subminiature Digital Pressure Sensor AP-C30W Series

HIGHEST PERFORMANCE IN ITS CLASS

Highest in Class

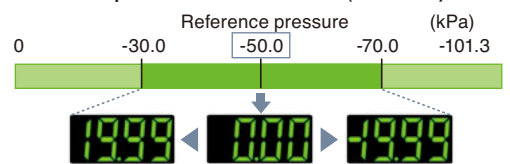
High Resolution: 10x

Area Focus Function (AP-C31W and AP-C33W)

Based on the set reference pressure, the detected pressure can be precisely displayed within a $\pm 20\%$ pressure range. The AP-C30W Series ensures a resolution of 0.01 kPa*, which is the highest in its class. The AP-C30W also features a zero-shift function.

* When the AP-C31W is used in focus mode.

Reference pressure set to -50.0 kPa (AP-C31W)



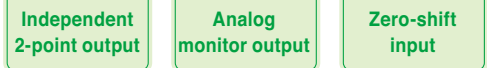
A range between -30.01 kPa and -69.99 kPa is displayed as shown above. "FFF" or "-FFF" will be displayed in excess of the focus range.

Industry's First

All-in-one I/O Function

Independent 2-point output, analog monitor output, and a zero-shift input are incorporated as standard functions. There is no need to have multiple sensors to solve your pressure application.

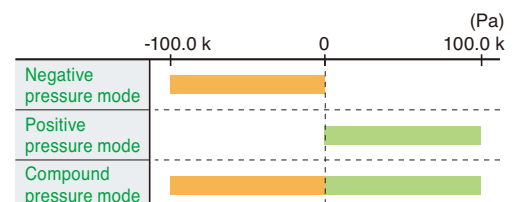
* Either the analog output or zero-shift input is selectable.



Industry's First

A Multi-range Model Playing Three Roles (AP-C30W)

A new multi-range model is available, which supports a number of applications. By making setting changes, the AP-C30W can be used as a negative pressure model, positive pressure model, or a compound pressure model. Therefore, there is no need to keep a variety of models in stock.

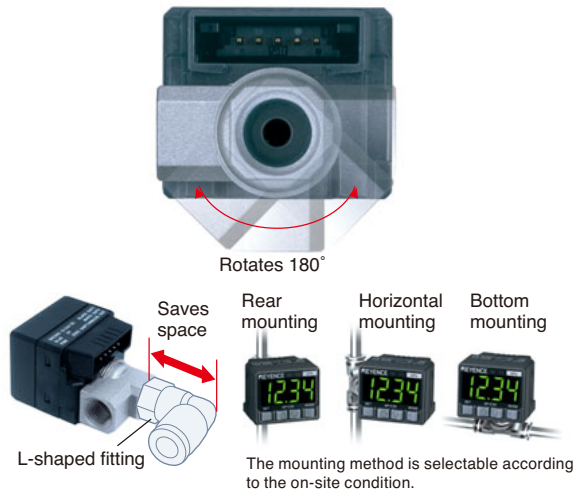


FLEXIBLE MOUNTING

World's First

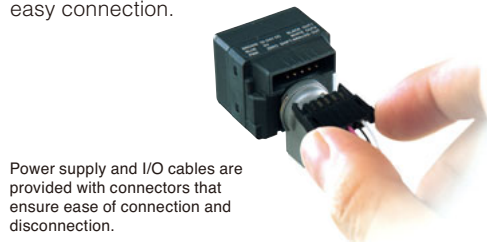
Rotary Pressure Port

The unit incorporates a pressure port that rotates 180°, which directly connects to pipes in any direction. The pressure port is of non-slip structure. Therefore, the connection angle will not shift due to vibration. Furthermore, in the case of horizontal mounting, the unit does not require any L-shaped fittings, thus saving the space behind the rear panel. (Patent pending)



Connector-type Wiring Ensures Ease of Installation and Maintenance

The wiring cables are provided with connectors for easy connection.



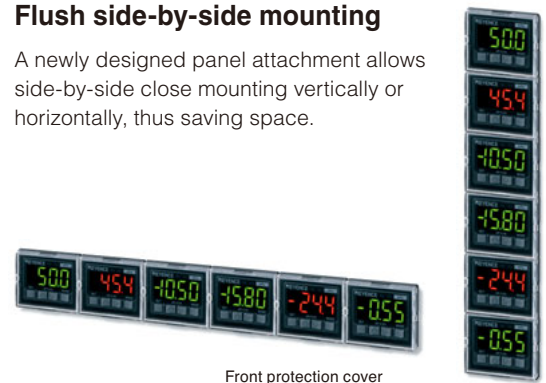
Versatile Mounting using a variety of brackets

Four types of brackets allow mounting of the sensor up to 13 different ways, including a nameplate attachment type and a slanted type.



Flush side-by-side mounting

A newly designed panel attachment allows side-by-side close mounting vertically or horizontally, thus saving space.



UNRIVALED EASE OF USE

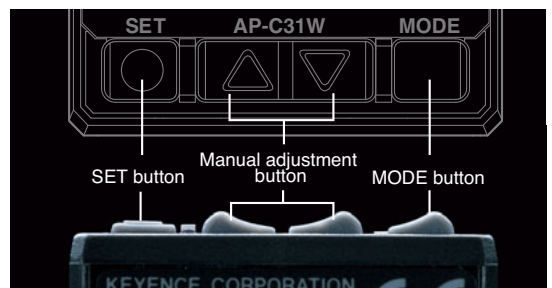
As Easy as Fiberoptic Sensors

The button arrangement of the AP-C30W models is the same as fiberoptic sensors. Auto tuning is possible by just pressing the SET button. Furthermore, it allows manual threshold value adjustments, thus making it possible to operate the unit just like fiberoptic sensors.



Button Layout Based on Human Ergonomics

The buttons are laid out with importance attached to operability. For example, the SET button is placed at a lower level to prevent operational mistakes, such as pressing more than one button simultaneously.



HIGH-SPEED, HIGH-PRECISION, SEPARATE AMPLIFIER TYPE WITH NO PNEUMATIC TUBING LAYOUT REQUIRED

Separate Sensor Head and Amplifier

The subminiature sensor head can be mounted right next to the detection point. As a result, loss of response time due to the air tube length is eliminated.

Subminiature sensor head
AP-41M (Negative pressure type)

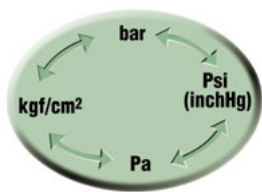
Super-tough Electrical Cable

The cable is highly flexible, thus allowing easy routing and handling compared to urethane tubing.



Compact snap-on connector
with free-cut cable

One-line connection
for saving mounting
space and wiring.



Unit conversion function

The pressure can be displayed in any of the four pressure units enabling it to be used worldwide.

Digital Pressure Sensor Saves Wiring Effort AP-V40AW Series

HIGHEST SPECIFICATIONS

Highest in Class High resolution: 10x

The AP-41M and AP-41 can achieve a resolution of 0.01 inchHg. A minute difference in pressure can be stably detected.

* High-resolution mode

Normal mode



High resolution mode



The unit displays the present value down to 1/100 of a digit, thus allowing fine settings.

Highest in Class 1 ms High-speed Response

The AP-V40AW Series ensures a response time as low as 1 ms. The AP-V40AW Series has an analog monitor output without any delay, because the processing time is only 1 ms.

Conventional
model
AP-V40AW
Series



Industry's First All-in-one I/O Function (AP-V41AW)

Independent 2-point output, analog monitor output, and a zero-shift input are incorporated as standard functions. There is no need to select multiple sensors to solve your applications.

* Either the analog output or zero-shift input is selectable.

Independent
2-point output

Analog
monitor output

Zero-shift
input

World's First New AI (Artificial Intelligence) Tuning Function Incorporated (Patent Pending)

The pressure change is sampled while the system is in operation, and the optimum zero-shift timing and threshold values are automatically set. Suction check can be easily done.



NEW-STYLE AMPLIFIER

Operation is Just Like Fiberoptic Sensors

Auto tuning of the AP-V40AW Series is possible by just pressing the SET button. Furthermore, manual threshold value adjustment is made possible with a simple rocker switch. The AP-V40AW Series operates just like our fiberoptic sensors.



DIRECT ACCESS

Direct access to threshold values



Industry's First Space-saving Design

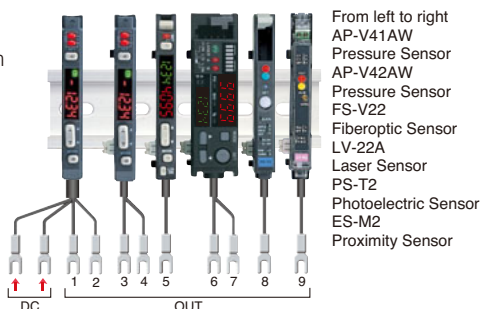
The amplifier is only 9 mm wide, which is the industry's thinnest model. A number of units can be coupled and installed side-by-side, minimizing the required mounting space.

Industry's First The Industry's First Wire-saving Pressure Sensor

The one-line system supplies power through the connector to the expansion units on the side of the main amplifier. This eliminates two wires from each expansion unit. KEYENCE's Fiberoptic Sensors and Laser Sensors can be used in combination.

(If only AP-VAW amplifiers are used, a maximum of eight expansion units can be coupled.)

Main unit: AP-V41AW
Expansion unit: AP-V42AW



The High-precision, Separate Amplifier Cube Models



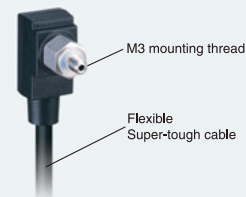
- Industry's most compact amplifier
- Easy-to-see, large, two-color LED display
- High-resolution (10x), area focus function
- Fast response time of 1 ms
- Supports zero-shift input
- Zero-shift timer incorporated
- Analog output function incorporated
- Active two-point tuning function incorporated



Separate Amplifier Type
Subminiature Digital Pressure Sensor
AP-C40W Series

Versatile head variations for every application

Subminiature Sensor Head AP-41M (Negative Pressure Type)



Half the size of the Conventional Model and Ultra-light Weight at 4.8 g

The head is 17.3 (L) x 10.3 (W) x 6.8 (H) mm in size, the volume of which is half the size of conventional ones. Furthermore, the head weighs only 4.8 g and is ideal for compact, high-speed suction devices.

Compact Sensor Head

- AP-41 (Negative pressure model)
- AP-43 (Positive pressure model)
- AP-44 (Compound pressure model)



Multi-purpose Sensor Supporting Most Pressure Applications

Negative pressure, positive pressure, and compound pressure models are all available. The AP-41, AP-43, and AP-44 are compact and suitable for most applications, including suction checks, base pressure control and leak testing.

Pressure Difference Sensor Head AP-48



Detects the Difference between Two Ports

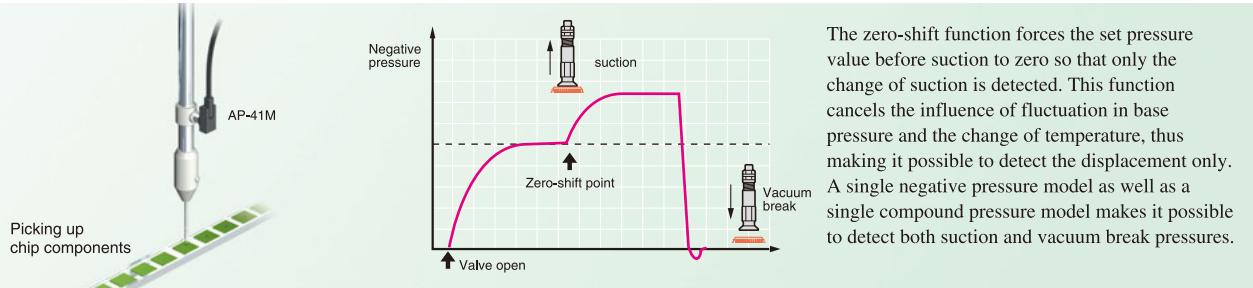
The AP-48 detects the difference in pressure between high and low ports. The difference in normal air pressure is detectable at a wide range of 100 kPa. It is ideal for a variety of leak tests.

Versatile Application Solving Functions

Suction Check

[F-1 mode] [A-1 mode] Recommended models AP-C30W/C31W
AP-41(M)/44

[Point 1] **Zero-shift Ensures Pressure Change is only Monitored During Suction.**

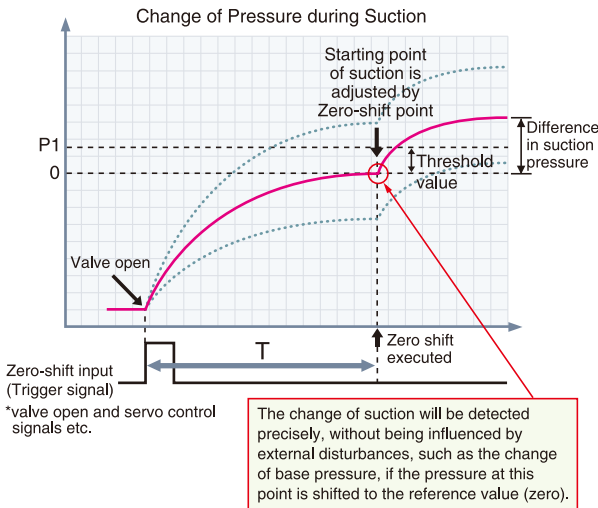


[Point 2] **Dedicated Suction Check Mode to Ensure Stable Detection**

AP-CW/VW models incorporate the A-1 mode (a dedicated suction check mode). In order to make stable suction checks, it is necessary to make a zero shift at a point as close as possible to the starting port of suction. AP-CW/VW models incorporate a zero-shift timer which can set in 1-ms increments the time between the input of the zero-shift signal and the moment a zero shift is executed.

AI Tuning Sets All Values Automatically

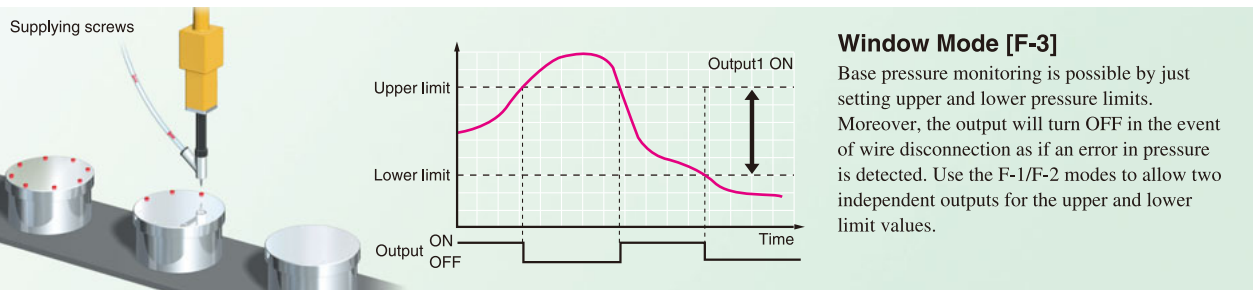
AI tuning samples the difference in pressure of equipment during continuous operation, and calculates the optimum zero-shift timer value (T) and the threshold value (P1), thus making ideal settings automatically. (AP-VW model only)



Base Pressure Control

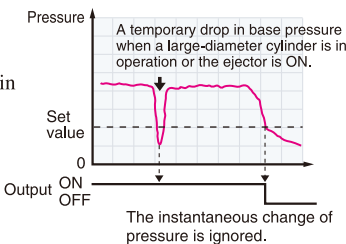
[F-3 mode] Recommended models AP-C33W
AP-43

[Point 1] **Upper and Lower “Window” Tolerances are easily set.**



[Point 2] **Chatter Prevention**

The chatter prevention function is incorporated so that instantaneous changes in pressure can be ignored.



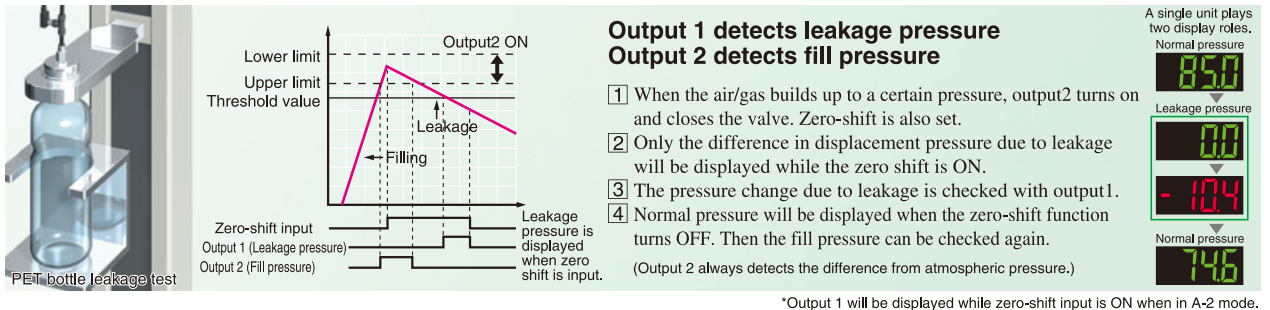
[Point 3] **Easy-to-see 2-color LED Display**

Using two colors (green while in normal operation and red when pressure is in excess of the upper or lower limit) allows an error to be instantly recognized.

Leakage Test

[A-2 mode] Recommended models AP-C30W/C33W
AP-43/44

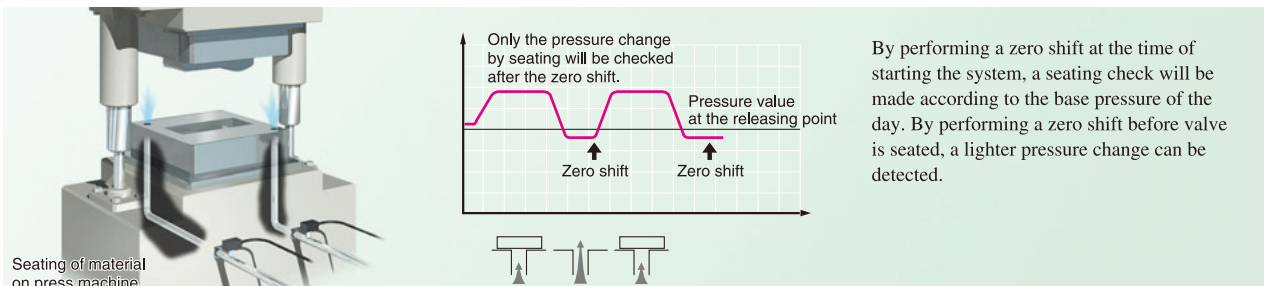
[Point 1] Detects Both Fill and Leakage Pressure



Seating Check

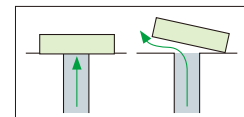
[F-1 mode] Recommended models AP-C30W/C33W
AP-43/44

[Point 1] Zero-shift Function Cancels Base Pressure Fluctuation




[Point 2] Resolution: 10x

If the high-resolution mode (on the AP-V40AW Series) or the area focus mode (excluding the AP-C30W) is used, not only the existence of the workpiece but also check the delicate difference in pressure caused by positioning of the workpiece can be detected precisely.



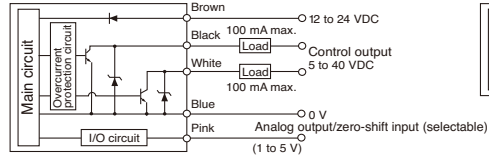
Specifications

Type		Multi range			Negative pressure	Positive pressure
Model	NPN	AP-C30W			AP-C31W	AP-C33W
	PNP	AP-C30WP			AP-C31WP	AP-C33WP
						
Rated pressure range		Negative pressure mode 0 to -101.3kPa	Positive pressure mode 0 to -100.0kPa	Compound pressure mode +101.3 to -101.3kPa	0 to -101.3kPa	0 to +1.000MPa
Proof pressure		500kPa				1.5MPa
Fluid type		Air or non-corrosive gases				
Pressure type		Gauge pressure				
Electrical rating	Power supply voltage	12 to 24 VDC ±10% with ripple (p-p) of 10% max.				
	Power consumption		12 V		24 V	
		Normal	720 mW (60 mA) max.		960 mW (40 mA) max.	
		Economical mode	480 mW (40 mA) max.		720 mW (30 mA) max.	
Display		3 1/2-digit, 2-color, 7-segment LED (Character height: 11 mm) Display cycle: 10 times/s				
Set and display range ¹ .		-10 to +110% of F.S.			-15 to +110% of F.S.	
Operation indicator		Red LED x 2 (corresponding to control output 1 and 2)				
Resolution	Multi range	Negative 0.1kPa	Positive 0.1kPa	Compound 0.2kPa	—	
	Normal mode	—			0.1kPa	0.001MPa
	Focus mode				0.01kPa	0.1kPa
Repetitive precision		±0.2% of F.S.				
Hysteresis ² .		Variable (Standard: 0.5% of F.S.)				
Display temperature characteristic		±1% of F.S. max.				
Response time (chatter prevention function)		2.5, 5, 100, or 500 ms (selectable)				
Zero-shift input		Input time: 2 ms or more. (or analog output selectable)				
Control output		NPN open collector 100 mA max. (at 40 V or below) with max. residual voltage of 1 V, 2 outputs (NO or NC selectable)				
Analog output		1 to 5 V with load impedance of 1 kΩ max. (or zero-shift input selectable)				
Ambient temperature		0 to 50° C, No condensation				
Ambient humidity		35 to 85%, No condensation				
Vibration		10 to 55 Hz, 1.5 mm double amplitude in X, Y, and Z directions, 2 hours respectively				
Pressure port		Rc (PT) 1/8 180° rotation				
Material		Front housing: Polysulfone, Rear housing: PBT, Front seat: Polycarbonate, Pressure port: Zinc die-casting				
Weight		Approx. 30 g (without cable) Approx. 85 g (with 2-m cable)				
Accessory		Power supply cord (2-m with connector), Unit seal ³ .				

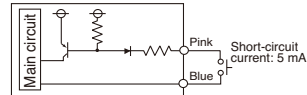
1. The focus range applies while in focus mode only. 2. A standard of 0.2% of FS applies while in focus mode. 3. The seal is provided with the AP-C33W only.

Connection Diagrams

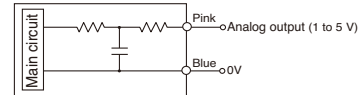
I/O Circuit Diagram (AP-C30W/C31W/C33W)



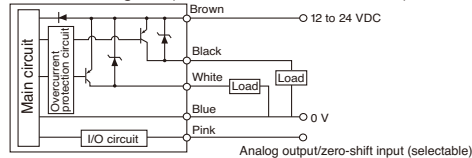
Zero-shift Input Circuit (AP-C30W/C31W/C33W)



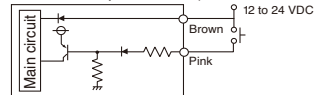
Analog Output Circuit



I/O Circuit Diagram (AP-C30WP/C31WP/C33WP)



Zero-shift Input Circuit (AP-C30WP/C31WP/C33WP)



Display Unit Selection Chart

Display unit can be changed by setting as shown below.

AP-C30W Series

Setting	Model	Multi range AP-C30W	Negative pressure AP-C31W	Positive pressure AP-C33W
PA		kPa	kPa	MPa (kPa)
GF		kg/cm ²	—	kg/cm ²
nnH		mmHg	mmHg	—
inH		inHg	inHg	—
Psi		psi	psi	psi
Bar		bar	bar (mbar)	bar

() shows the data in Focus mode.

AP-C40W/V40AW Series

Setting	Model	Negative pressure AP-41	Positive pressure AP-43	Multi range AP-44	Positive pressure AP-47	Multi range AP-48
PA		kPa	Mpa (kPa)	kPa	kPa	kPa
GF		—	kgf/cm ²	—	—	kg/cm ²
nnH		mmHg	—	mmHg	mmHg	—
inH		inHg	—	inHg	inHg	—
Psi		psi	psi	psi	—	psi
Bar		bar (mbar)	bar	bar (mbar)	mbar	bar (mbar)

() shows the data in Focus (AP-C40) or High-Resolution mode (using AP-V40AW).

Sensor Head Variations

Shape	Rated pressure range*	Pressure type	Major applications	-100 k	0	100 k	1M (Pa)	Model
	0 to -101.3 kPa	Negative pressure	Suction check					AP-41M
	0 to -101.3 kPa	Negative pressure	Suction check					AP-41
	0 to 1 MPa	Positive pressure	Base pressure control and leakage test					AP-43
	101.3 to -101.3 kPa	Compound pressure	Suction check and vacuum break check					AP-44
	-101.3 to +101.3 kPa	Pressure difference	Comparison leakage test					AP-48

*The set pressure range is between -15% and +110% of the rated pressure range.

Specifications

Sensor Head

Model	AP-41M	AP-41	AP-43	AP-44	AP-48
Rated pressure range	0 to -101.3 kPa		0 to +1.000 MPa	+101.3 to -101.3 kPa	-101.3 to +101.3 kPa
Proof pressure	500 kPa		1.5 MPa	500 kPa	
Fluid type	Air or non-corrosive gases				
Pressure type	Gauge pressure				
Temperature characteristic	±2% of F.S. max.				
Pressure port	M5 (M3) male screw (AP-41M is M3)				R1/8
Ambient temperature	0 to 50°C, No condensation				
Ambient humidity	35 to 85%, No condensation				
Vibration	10 to 55 Hz, 1.5 mm double amplitude in X, Y, and Z directions, 4 hours respectively				
Shock	1,000 m/s2 in X, Y, and Z directions 10 times respectively (60 times in total)				
Material	Housing: PBT, Screw: Stainless steel				
Weight	7 g (without cable) 70 g (with 3-m cable) (41 M: 4.8 g / 67.8 g)				35 g (without cable) 98 g (with 3-m cable)

Amplifier Unit

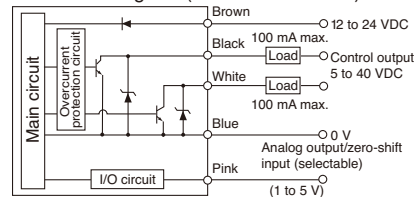
Model	NPN	AP-V41AW/V42AW/C40W									
	PNP	AP-V41AWP/V42AWP/C40WP									
Applicable sensor head		AP-41M/41		AP-43		AP-44		AP-48			
Power supply		12 to 24 VDC ±10% with ripple (p-p) of 10% max.									
Current consumption		AP-V41AW/V42AW	12 V		24 V		AP-C40W	12 V		24 V	
		Normal	720 mW (60 mA) max.		960 mW (40 mA) max.		Normal	780 mW (65 mA) max.		1080 mW (45 mA) max.	
		Economical mode	480 mW (40 mA) max.		720 mW (30 mA) max.		Economical mode	540 mW (45 mA) max.		840 mW (35 mA) max.	
Display	AP-V41AW(P)/V42AW(P)	4 1/2-digit, 2-color, 7-segment LED (Character height: 4.5 mm) AI indicator (green) Display cycle: 10 times/s									
	AP-C40W(P)	3 1/2-digit, 2-color, 7-segment LED (Character height: 11 mm) Display cycle: 10 times/s									
Set and display range		-15 to +110% of F.S. ²									
Operation indicator		Red LED x 2 (corresponding to control output 1 and 2)									
Resolution	Standard mode	0.1 kPa			0.001 MPa			0.1 kPa			
	High-resolution/ Focus mode	0.01 kPa			0.1 kPa			0.02 kPa			
Repetitive precision		±0.2% of F.S.									
Hysteresis		Variable (Standard: 0.5% of FS; high-resolution/focus mode: 0.1% of F.S.)									
Display temperature characteristics		±1% of F.S. max.									
Response time (chattering prevention function)		1 (in high-speed mode only), 2.5, 5, 100, or 500 ms (selectable)									
Zero-shift input		Input time: 2 ms or more (or analog output selectable)									
Control output		NPN open collector 100 mA max. (at 40 V or below) ³ with max. residual voltage of 1 V, 2 outputs (NO or NC selectable) PNP open collector 100 mA max. (at 30 V or below) ³ with max. residual voltage of 1 V, 2 outputs (NO or NC selectable)									
Analog voltage output ¹		1 to 5 V with load impedance of 1 kW max. (or zero-shift input selectable)									
Ambient temperature		0 to 50°C, No condensation									
Ambient humidity		35 to 85%, No condensation									
Vibration		10 to 55 Hz, 1.5 mm double amplitude in X, Y, and Z directions, 2 hours respectively									
Material	AP-V41AW(P)/V42AW(P)	Polycarbonate									
	AP-C40W(P)	Front housing: Polysulfone, Rear housing: PBT, Front seat: Polycarbonate									
Weight		AP-V41AW(P) and AP-V42AW(P): Approx. 80 g (with 2-m cable) AP-C40W(P): Approx. 74 g (with 2-m cable)									
Accessory	AP-V41AW(P)/V42AW(P)	Mounting Bracket (AP-V41AW(P)), End Unit (AP-V42AW(P)), Head Connector, and Expansion Seal (AP-V42AW(P))									
	AP-C40W(P)	Power supply code (2-m cable with connector), head connector, and unit seal									

1. Only the AP-V41AW(P) (Main unit) and AP-C40W(P) apply. 2. The focus range applies while in focus mode only.

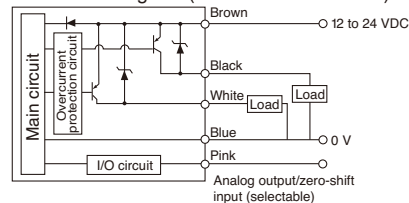
3. The maximum current is 20 mA if the AP-V42AW as an expansion unit is installed.

Connection Diagrams

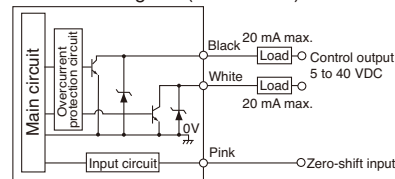
I/O Circuit Diagram (AP-V41AW/C40W)



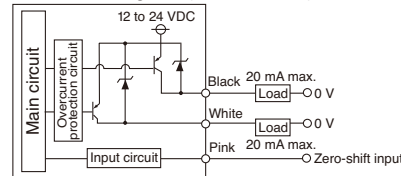
I/O Circuit Diagram (AP-V41AWP/C40WP)



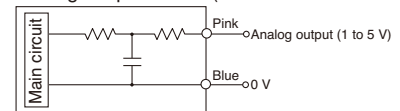
I/O Circuit Diagram (AP-V42AW)



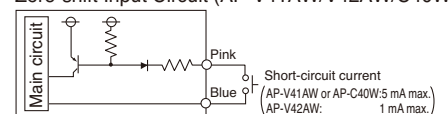
I/O Circuit Diagram (AP-V42AWP)



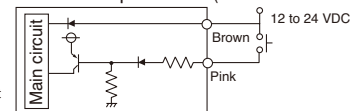
Analog Output Circuit (AP-V41AW/V41AWP/C40W)



Zero-shift Input Circuit (AP-V41AW/V42AW/C40W)



Zero-shift Input Circuit (AP-V41AWP/V42AWP/C40WP)



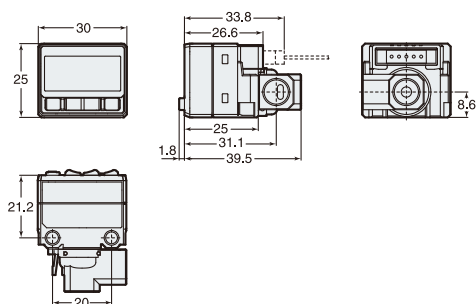
AP-C30W/C40W

Unit: mm

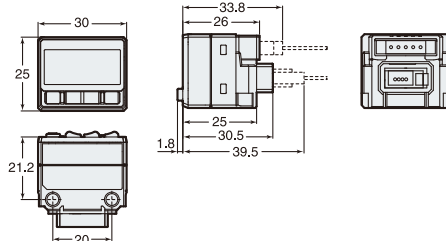
Dimensions

Amplifier Unit

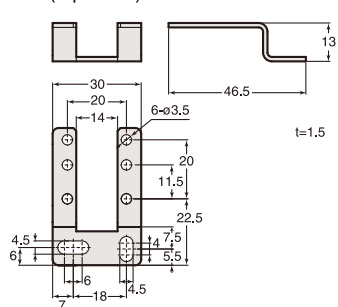
AP-C30W Series



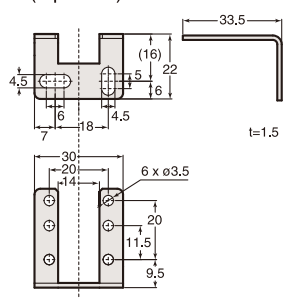
AP-C40W Series



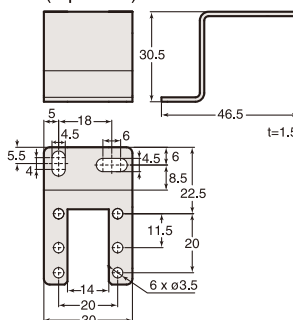
AP-B01 Mounting Bracket (Optional)



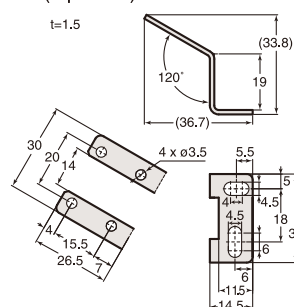
AP-B02 Mounting Bracket (Optional)



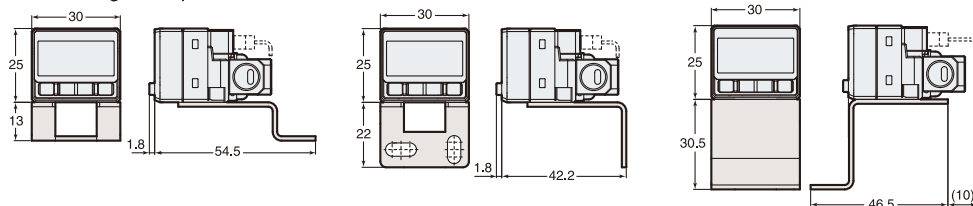
AP-B03 Mounting Bracket (Optional)



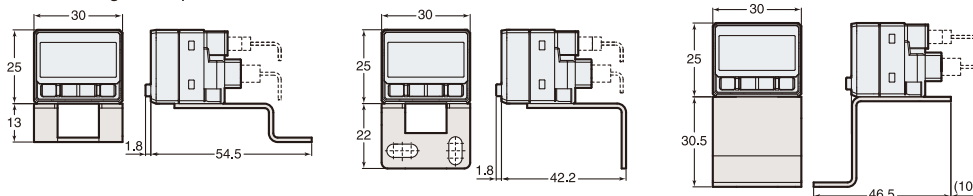
AP-B04 Mounting Bracket (Optional)



Mounting Examples of AP-C30W Series

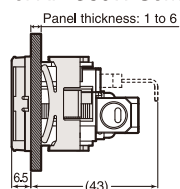


Mounting Examples of AP-C40W Series

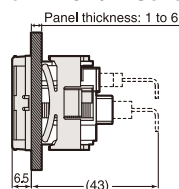


AP-A01 Panel Mounting Bracket (Optional)

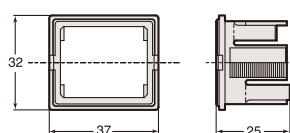
Mounting Examples of AP-C30W Series



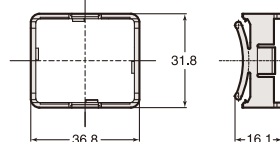
Mounting Examples of AP-C40W Series



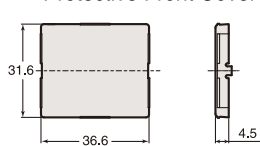
Panel Mounting Bracket



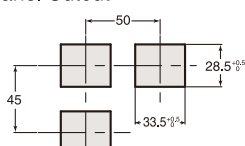
Panel Mounting Ring



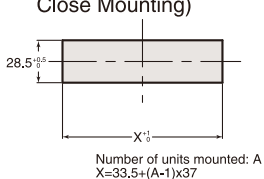
Protective Front Cover



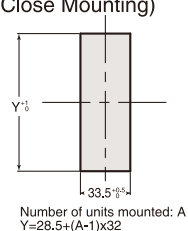
Panel Cutout



(Horizontal Side-by-side Close Mounting)



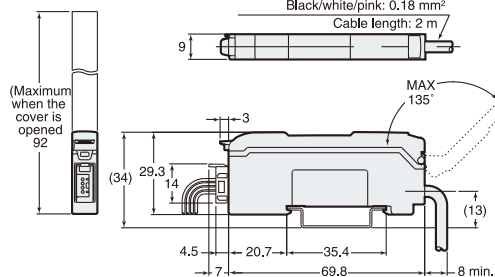
(Vertical Side-by-side Close Mounting)



Unit: mm

AP-V41AW Series

Cable length: 2 m /



Technical drawing of a 2x2 array of 2x0.4 mm spot-facings. The drawing includes a top view and a side view.

Top View Dimensions:

- Overall width: 31 mm
- Overall height: 9 mm
- Spot-facing pitch (center-to-center): 15 mm
- Spot-facing diameter: $\phi 0.6$ mm
- Spot-facing depth: $d = 2.7$ mm

Side View Dimensions:

- Overall height: 37.4 mm
- Spot-facing depth: 2.7 mm
- Spot-facing diameter: $\phi 0.6$ mm

A diagram of a 6x6 grid of cells. The grid is composed of 36 cells arranged in 6 rows and 6 columns. On the left and right sides of the grid, there are vertical bars labeled "End Unit". Each "End Unit" has two circular symbols, one near the top and one near the bottom. The grid is flanked by these end units, making the total width 8 units. The height is 6 units. The grid is labeled with "6" at the bottom left and bottom right corners, indicating the number of rows and columns respectively.

* When using expansion units, be sure to use the end unit.

[illegible]

DIN-rail mounting

6

20.8

(22.6)

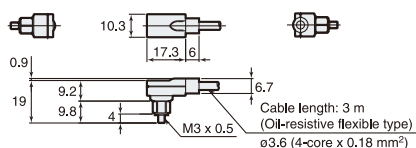
9.2

35.4

53.8

No. of expansion units	L (mm)
1	18
2	27
3	36
4	45
5	54
6	63
7	72
8	81

AP-41M



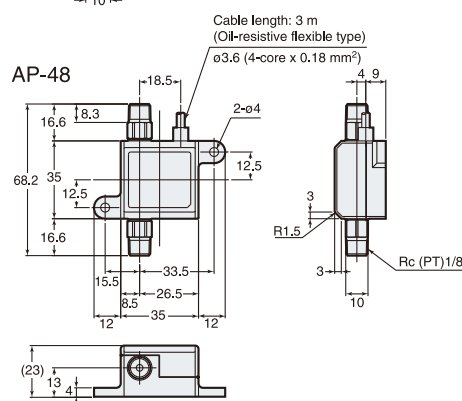
Technical drawing of the cable gland assembly showing front, side, and isometric views with dimensions and specifications.

Dimensions (mm):

- Front view: 20, 5.5, 10, 12, 9, 5, 10.6
- Side view: 13
- Thread: M5

Specifications:

- Cable length: 3 m (Oil-resistant flexible type)
- Cable: ø3.6 (4 conductors x 0.18 mm²)




AP-C30W and AP-C40W Use

Wall Mounting Bracket
AP-B02



Mounting example



Mounting example



The image shows two digital pressure transmitters mounted on a metal plate. The left unit displays 45.80 and the right unit displays 5.00. Both units have a green LCD screen and a metal mounting bracket with two screws.


Mounting example



Mounting example

Two digital force gauges are shown, each mounted on a metal bracket. The gauge on the left displays '500' and the gauge on the right displays '1050'. Both gauges have a green LCD screen and a silver-colored metal body. The brackets are made of polished metal and are designed to hold the gauges in a specific orientation.

Mounting example



Bourdon Replacement Joint
OP-35423



T-type Snap-on Joint
ø4 Use OP-33156
ø6 Use OP-33157



M5(Female)

M5 (Female)

M5(Male)

Rc (PT) 1/8

M5(Female)

1/8-conversion Joint

OP-35388

High-functional Type Suitable for Any Fluids and Environments



AP-V80W Series

Separate Amplifier Type

Features

- Full stainless steel structure
- 7 models of head variations for a wide range of applications
- Dual digital display amplifiers

Application



Base pressure control



High-pressure cleaning



AP-50 Series

Compact Built-in Amplifier type

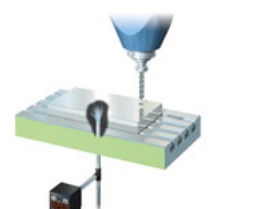
Features

- Stainless diaphragm is adopted
- Subminiature, environment-resistant type for water oil
- IP-67 enclosure rating in consideration of protection from dust and fluid drops

Application



Suction check on the LCD glass at washing stage



Workpiece seating check on cutting machine or pressing machine



Please visit: www.keyence.com

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SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

