Panasonic
ideas for life

ORIGINAL POLARIZED ACTUATOR CONSTRUCTION

WA OPTICAL SWITCHES (AWAP)

Compliance with RoHS Directive

FEATURES

1. Small size, Low height
L: 31 mm × W: 16 mm × H: 9 mm L: 1.220 inch × W: .630 inch × H: .354 inch

2. Low Insertion Loss
Achieved 1dB max. insertion loss (Typ. 0.5dB)

3. Latching Operation
Latching operation is realized by "Polarized actuator construction"

4. Conforms to Telcordia GR-1221-core
At the PEW everything is produced under one roof from internal mechanical relays to optical products. We ensure high reliability by harnessing our powerful production technology that has been cultivated over many years.

APPLICATIONS

- **Optical ADM equipment**
- **Protection switching (WDM, CATV, FTTH)**
- **Optical measuring instrument**

ORDERING INFORMATION

AWAP □ □ □ □ □

WA Optical Switch

Switch type
0: 1 × 2
1: 2 × 2

Fiber type and wavelength

Fiber type \ Wavelength	1310 nm	1550 nm	1310/1550 nm
Single mode (9/125/900)	0	1	2

Fiber type \ Wavelength	850 nm	1310 nm	850/1310 nm
Multi mode (50/125/900)	3	4	5
Multi mode (62.5/125/900)	6	7	8

Operation type
1: 1-coil latching
2: 2-coil latching

Connector type
(For other connector types, please contact us.)

Connector type	SC/AdPC	MU/AdPC	FC/AdPC
	2	3	5

Nominal operating voltage
1: 3 VDC
6: 4.5 VDC
9: 5 VDC

TYPES

1. 1 × 2 type (single mode)

Wavelength	Nominal operating voltage	1-coil latching type		2-coil latching type	
		SC/AdPC connector	MU/AdPC connector	SC/AdPC connector	MU/AdPC connector
1310±20nm	3V	AWAP00121	AWAP00131	AWAP00221	AWAP00231
	4.5V	AWAP00126	AWAP00136	AWAP00226	AWAP00236
	5V	AWAP00129	AWAP00139	AWAP00229	AWAP00239
1550±20nm	3V	AWAP01121	AWAP01131	AWAP01221	AWAP01231
	4.5V	AWAP01126	AWAP01136	AWAP01226	AWAP01236
	5V	AWAP01129	AWAP01139	AWAP01229	AWAP01239
1310/1550nm	3V	AWAP02121	AWAP02131	AWAP02221	AWAP02231
	4.5V	AWAP02126	AWAP02136	AWAP02226	AWAP02236
	5V	AWAP02129	AWAP02139	AWAP02229	AWAP02239

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2. 1 × 2 type (multi mode)

Fiber type	Wavelength	Nominal operating voltage	1-coil latching type			2-coil latching type		
			SC/AdPC connector	MU/AdPC connector	FC/AdPC connector	SC/AdPC connector	MU/AdPC connector	FC/AdPC connector
Multi mode (50/125/900)	850±20nm	3V	AWAP03121	AWAP03131	AWAP03151	AWAP03221	AWAP03231	AWAP03251
		4.5V	AWAP03126	AWAP03136	AWAP03156	AWAP03226	AWAP03236	AWAP03256
		5V	AWAP03129	AWAP03139	AWAP03159	AWAP03229	AWAP03239	AWAP03259
	1310±20nm	3V	AWAP04121	AWAP04131	AWAP04151	AWAP04221	AWAP04231	AWAP04251
		4.5V	AWAP04126	AWAP04136	AWAP04156	AWAP04226	AWAP04236	AWAP04256
		5V	AWAP04129	AWAP04139	AWAP04159	AWAP04229	AWAP04239	AWAP04259
	850/1310nm	3V	AWAP05121	AWAP05131	AWAP05151	AWAP05221	AWAP05231	AWAP05251
		4.5V	AWAP05126	AWAP05136	AWAP05156	AWAP05226	AWAP05236	AWAP05256
		5V	AWAP05129	AWAP05139	AWAP05159	AWAP05229	AWAP05239	AWAP05259
Multi mode (62.5/125/900)	850±20nm	3V	AWAP06121	AWAP06131	AWAP06151	AWAP06221	AWAP06231	AWAP06251
		4.5V	AWAP06126	AWAP06136	AWAP06156	AWAP06226	AWAP06236	AWAP06256
		5V	AWAP06129	AWAP06139	AWAP06159	AWAP06229	AWAP06239	AWAP06259
	1310±20nm	3V	AWAP07121	AWAP07131	AWAP07151	AWAP07221	AWAP07231	AWAP07251
		4.5V	AWAP07126	AWAP07136	AWAP07156	AWAP07226	AWAP07236	AWAP07256
		5V	AWAP07129	AWAP07139	AWAP07159	AWAP07229	AWAP07239	AWAP07259
	850/1310nm	3V	AWAP08121	AWAP08131	AWAP08151	AWAP08221	AWAP08231	AWAP08251
		4.5V	AWAP08126	AWAP08136	AWAP08156	AWAP08226	AWAP08236	AWAP08256
		5V	AWAP08129	AWAP08139	AWAP08159	AWAP08229	AWAP08239	AWAP08259

3. 2 × 2 type (single mode)

Wavelength	Nominal operating voltage	1-coil latching type		2-coil latching type	
		SC/AdPC connector	MU/AdPC connector	SC/AdPC connector	MU/AdPC connector
1310±20nm	3V	AWAP10121	AWAP10131	AWAP10221	AWAP10231
	4.5V	AWAP10126	AWAP10136	AWAP10226	AWAP10236
	5V	AWAP10129	AWAP10139	AWAP10229	AWAP10239
1550±20nm	3V	AWAP11121	AWAP11131	AWAP11221	AWAP11231
	4.5V	AWAP11126	AWAP11136	AWAP11226	AWAP11236
	5V	AWAP11129	AWAP11139	AWAP11229	AWAP11239
1310/1550nm	3V	AWAP12121	AWAP12131	AWAP12221	AWAP12231
	4.5V	AWAP12126	AWAP12136	AWAP12226	AWAP12236
	5V	AWAP12129	AWAP12139	AWAP12229	AWAP12239

4. 2 × 2 type (multi mode)

Fiber type	Wavelength	Nominal operating voltage	1-coil latching type			2-coil latching type		
			SC/AdPC connector	MU/AdPC connector	FC/AdPC connector	SC/AdPC connector	MU/AdPC connector	FC/AdPC connector
Multi mode (50/125/900)	850±20nm	3V	AWAP13121	AWAP13131	AWAP13151	AWAP13221	AWAP13231	AWAP13251
		4.5V	AWAP13126	AWAP13136	AWAP13156	AWAP13226	AWAP13236	AWAP13256
		5V	AWAP13129	AWAP13139	AWAP13159	AWAP13229	AWAP13239	AWAP13259
	1310±20nm	3V	AWAP14121	AWAP14131	AWAP14151	AWAP14221	AWAP14231	AWAP14251
		4.5V	AWAP14126	AWAP14136	AWAP14156	AWAP14226	AWAP14236	AWAP14256
		5V	AWAP14129	AWAP14139	AWAP14159	AWAP14229	AWAP14239	AWAP14259
	850/1310nm	3V	AWAP15121	AWAP15131	AWAP15151	AWAP15221	AWAP15231	AWAP15251
		4.5V	AWAP15126	AWAP15136	AWAP15156	AWAP15226	AWAP15236	AWAP15256
		5V	AWAP15129	AWAP15139	AWAP15159	AWAP15229	AWAP15239	AWAP15259
Multi mode (62.5/125/900)	850±20nm	3V	AWAP16121	AWAP16131	AWAP16151	AWAP16221	AWAP16231	AWAP16251
		4.5V	AWAP16126	AWAP16136	AWAP16156	AWAP16226	AWAP16236	AWAP16256
		5V	AWAP16129	AWAP16139	AWAP16159	AWAP16229	AWAP16239	AWAP16259
	1310±20nm	3V	AWAP17121	AWAP17131	AWAP17151	AWAP17221	AWAP17231	AWAP17251
		4.5V	AWAP17126	AWAP17136	AWAP17156	AWAP17226	AWAP17236	AWAP17256
		5V	AWAP17129	AWAP17139	AWAP17159	AWAP17229	AWAP17239	AWAP17259
	850/1310nm	3V	AWAP18121	AWAP18131	AWAP18151	AWAP18221	AWAP18231	AWAP18251
		4.5V	AWAP18126	AWAP18136	AWAP18156	AWAP18226	AWAP18236	AWAP18256
		5V	AWAP18129	AWAP18139	AWAP18159	AWAP18229	AWAP18239	AWAP18259

Note: For other connector types, please contact us.

RATING

1. Coil data (at 20°C 68°F)

1) 1-coil latching type

Nominal operating voltage	Nominal operating current (±10%)	Coil resistance (±10%)	Nominal operating power	Max. allowable voltage
3 V DC	50 mA	60Ω	150 mW	130% V DC of the nominal operating voltage
4.5 V DC	33.3 mA	135Ω		
5 V DC	30.0 mA	166.7Ω		

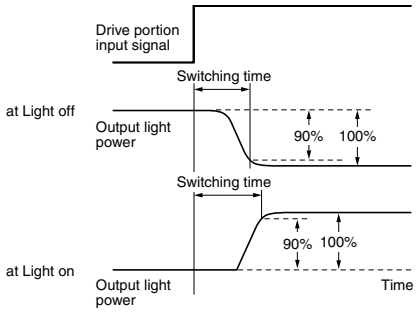
2) 2- coil latching type

Nominal operating voltage	Nominal operating current (±10%)	Coil resistance (±10%)	Nominal operating power	Max. allowable voltage
3 V DC	66.7 mA	45Ω	200 mW	130% V DC of the nominal operating voltage
4.5 V DC	44.4 mA	101.3Ω		
5 V DC	40.0 mA	125Ω		

2. Specifications

Item			Specifications	
			Single mode	Multi mode
Optical characteristics	Insertion loss*1		Max. 1.0 dB	Max. 1.0 dB
	Isolation		Min. 60 dB	Min. 50 dB
	Return loss*1		Min. 50 dB	Min. 20 dB
	P.D.L.*1		Max. 0.1 dB	—
	Optical input power		Max. 100 mW (20 dBm)	Max. 100 mW (20 dBm)
Expected life	Mechanical life		Min. 10^7 (at 20°C 68°F, at 180 cpm)	
Mechanical characteristics	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 0.75 mm (Optical power fluctuation: within 20%)	
		Destructive	10 to 55 Hz at double amplitude of 1.52 mm	
	Shock resistance (Half-wave pulse of sine wave: 11 ms)	Functional	Min. 200 m/s² (Optical power fluctuation: within 20%)	
		Destructive	Min. 500 m/s²	
Electrical characteristics	Switching time (at 20°C 68°F)*2		Max. 10 ms (applied nominal operating voltage)	
Conditions	Conditions for operation, transport and storage		Ambient temperature –40 to +70°C –40 to +158°F, Humidity 5 to 85% R.H. (Not freezing and condensing at low temperature)	
Unit weight			Approx. 11 g .388 oz	

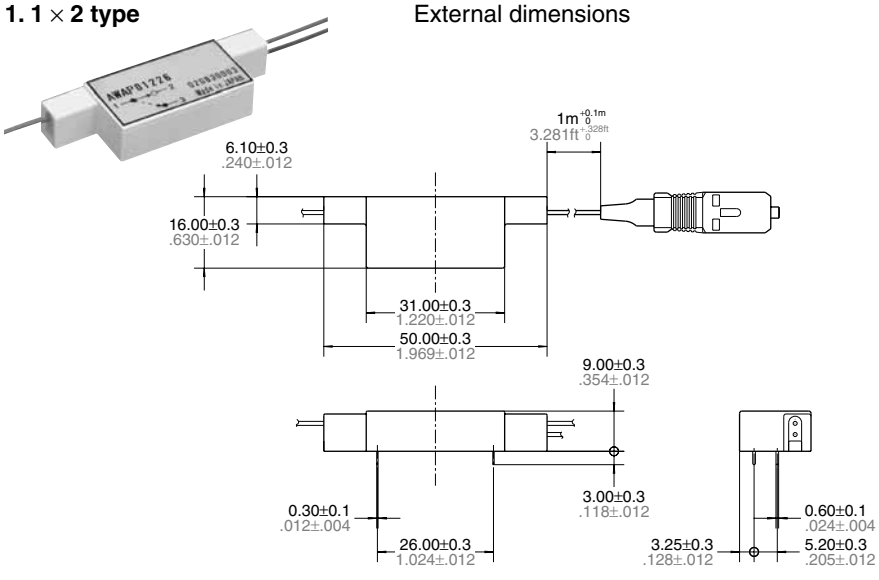
Notes: 1. Without connectors' loss. Insertion loss is approx. 0.2 dB per connector. Return loss at connector parts is approx. 50 dB.
2. Oscilloscope waveform of switching characteristic.



DIMENSIONS (Unit: mm inch)

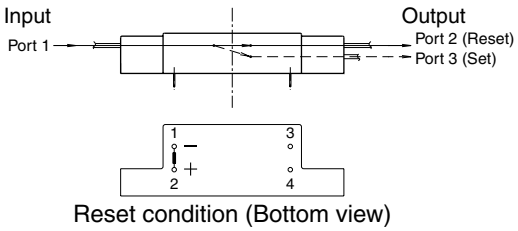
1. 1 × 2 type

External dimensions



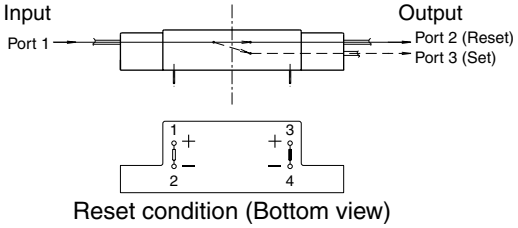
Optical signal I/O and coil impress direction indication diagram

1 × 2, 1-coil latching type



Reset condition (Bottom view)

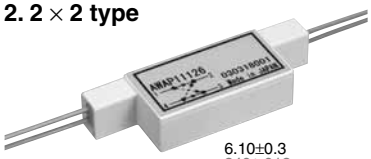
1 × 2, 2-coil latching type



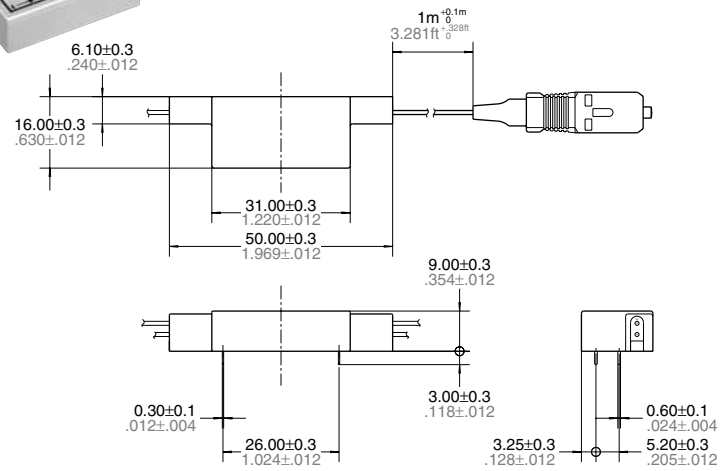
Reset condition (Bottom view)

WA (AWAP)

2. 2 × 2 type

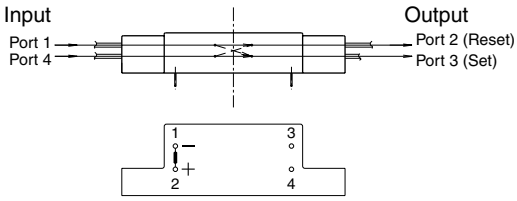


External dimensions



Optical signal I/O and coil impress direction indication diagram

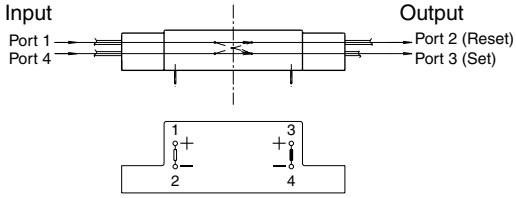
2 × 2, 1-coil latching type



Reset condition (Bottom view)

Reset	Port 1 → Port 2 Port 4 → Port 3
Set	Port 1 → Port 3 Port 4 → Port 2

2 × 2, 2-coil latching type

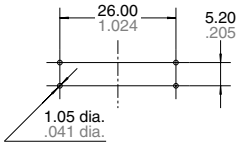


Reset condition (Bottom view)

Reset	Port 1 → Port 2 Port 4 → Port 3
Set	Port 1 → Port 3 Port 4 → Port 2

PC board pattern

(Tolerance: ±0.1 ±.004)



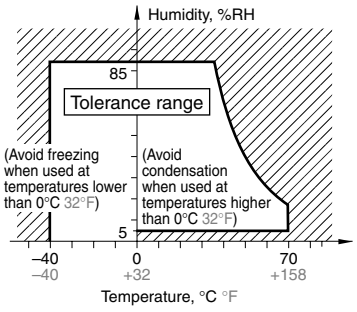
Coil drive direction

	Terminal No.	1- coil latching type	2- coil latching type
To Set	1	+V	+V
	2	GND	GND
	3	–	–
	4	–	–
To Reset	1	GND	–
	2	+V	–
	3	–	+V
	4	–	GND

NOTES

1. Operation, transport and storage conditions

1) Temperature:
–40 to +70°C –40 to +158°F
2) Humidity: 5 to 85% RH
(Avoid freezing and condensation.)
The humidity range varies with the temperature. Use within the range indicated in the graph below.
3) Atmospheric pressure: 86 to 106 kPa
Temperature and humidity range for usage, transport, and storage



2. Solder and cleaning conditions

1) Adhere to the conditions below when soldering this switch.
Solder iron tip temperature:
300°C 572°F min.
Soldering iron: 60 to 100 W
Soldering time: within 5 seconds
The effect on the switch will differ depending on the type of PC board used. For this reason, please verify using the actual PC board to be worked on.
2) This switch cannot be washed.

3. Precautions for use

1) Since this switch is polarized, reversing the coil + and – terminals will cause reverse operation. Be sure to connect following the attached product specification diagram.
2) Keep the ripple rate of the nominal coil voltage below 5%.
3) Avoid exceeding the specification ranges such as those for coil nominal voltage, contact rating and optical input power. Exceeding specifications can cause abnormal heating or deterioration of performance.
4) For fiber, avoid bending to a radius smaller than 30 mm as doing so can cause breakage.
5) If a switch has been subjected to a strong shock such as dropping, do not use it.
6) Considering the possible change in ambient temperature and other conditions, it is recommended that the coil impress set and reset pulse width be at the nominal operation voltage and at least 20 ms to make certain of operation.
7) This switch is shipped from the factory in the reset state. A shock to the switch during shipping or installation may cause it to change to the set state. Therefore, it is recommended that the switch be used in a circuit which initializes it to the required state (set or reset) whenever the power is turned on.

For Cautions for Use, see Relay Technical Information.