MA Series Miniature Control Units

Super bright LED for AC/DC
Square-, rectangular-, and round-body, miniature control units

Features

- Compact and space-saving (unibody: 22 mm)
- Super-bright LED unit
- Gold plated silver contacts for low-level signal switching integrity
- Also available with silver contacts
- High-performance contact mechanism
- Light-touch operation
- Built-in current limiting resistor and diode (LED)
- Quick installation into panel (front mounting)
- Optional barrier, switch guard, and socket
- UL/cUL-recognized, EN compliant

- See website for details on approvals and standards.

MA Series

Item	MA2 (Square)	MA3 (Rectangular)	MA8 (Round)
Bezel Size	☐18 mm	18H × 24W mm	ø23.8 mm
Illumination Face Size	☐13 mm	13H × 19W mm	ø19 mm
Light Source	LED		
Illumination Face Division (Note)	One-color Full, Two-way Split, Two-color Full Alternate		
Contact	Microswitch (Gold plated silver, Silver)		
No. of Contacts	SPDT or DPDT		
Operation Type	Momentary, maintained, pilot light		
Terminal Style	Solder/tab terminal #110		
Housing Color	Black		

Note: Two-way split illumination is available for MA3 (rectangular type) only.
Two-color alternate illumination is available for MA2 and MA3 only.

Contact Ratings

Gold Contact (Switch Base: Blue)

Rated Insulation Voltage	250V	
Rated Current	3A	
Rated Voltage	30V DC	125V AC
Rated Operating Current (Resistive Load)	0.1A	0.1A
Contact Material	Gold plated silver	

- Minimum applicable load (reference value): 5V AC/DC, 1mA

Silver Contact (switch base: gray)

Rated Insulation Voltage				250V		
Rated Operating Voltage				30V	125V	250V
Rated Operating Current	Specification 1*	AC 50/60Hz	Resistive load	—	5A	5A
			Inductive load	—	3A	1.5A
		DC	Resistive load	5A	1.1A	—
			Inductive load	2.5A	0.55A	—
	Specification 2*	AC 50/60Hz	Resistive load	—	5A	3A
			Inductive load	—	3A	1.5A
		DC	Resistive load	3A	0.6A	—
			Inductive load	1A	0.22A	—
Rated Thermal Current				5A		
Contact Material				Silver		

- AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.
* See Specifications for electrical life.

Illumination Ratings

Item	One-color Full/Two-way Split			Two-color Full Alternate
Operating Voltage	5V DC ±5%	12V AC/DC ±5%	24V AC/DC ±5%	24V AC/DC ±5%
Rated Voltage	5V DC	12V AC/DC	24V AC/DC	24V AC/DC
Rated Current	See the circuit of the LED unit.			
Life (Reference Value)	Approx. 30,000 hours (The luminance reduces to 50% of the initial intensity when used on complete DC.)			

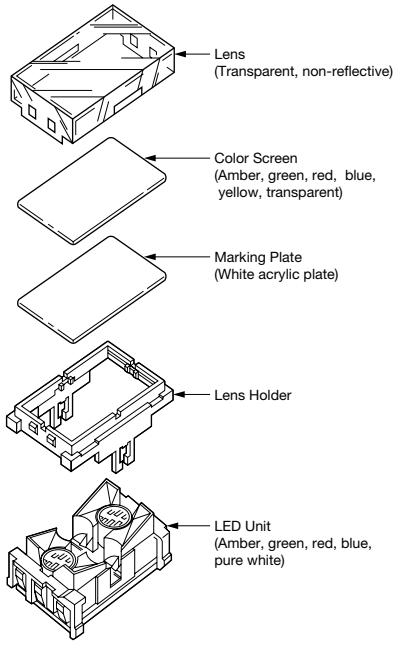
Note: Built-in current limiting resistor and diode are supplied.

Specifications

Operating Temperature		–25 to +55°C (no freezing)
Storage Temperature		–40 to +80°C (no freezing)
Relative Humidity		35 to 85% RH (no condensation)
Contact Resistance		50 mΩ maximum (initial value)
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	Switch	Between live and dead parts: 2000V AC, 1 minute Between terminals of different poles: 2000V AC, 1 minute Between contact terminals of the same pole: 1000V AC, 1 minute Between contact terminal and lamp terminal: 2000V AC, 1 minute
	Illumination Unit	Between live part and ground: 2000V AC, 1 minute
Vibration Resistance		Operating extremes: 10 to 55 Hz, amplitude 0.75 mm
Shock Resistance		Damage limits: 500 m/s^2 Operating extremes: 200 m/s^2
Mechanical Life		Momentary: 1,000,000 operations minimum Maintained: 200,000 operations minimum
Electrical Life		50,000 operations minimum (rated operating current: specification 1) 100,000 operations minimum (rated operating current: specification 2) *50,000 operations minimum when using silver contacts at 125V/5A resistance load (UL rating)
Degree of Protection		IP40 (IEC 60529)

One-color Full Illumination

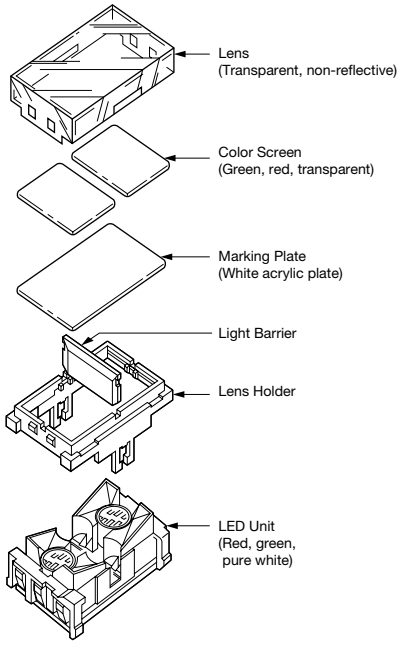
Amber, green, red, blue, yellow, pure white



Note: The above figure shows MA3. MA2 also has the same configuration.

Two-way Split Illumination

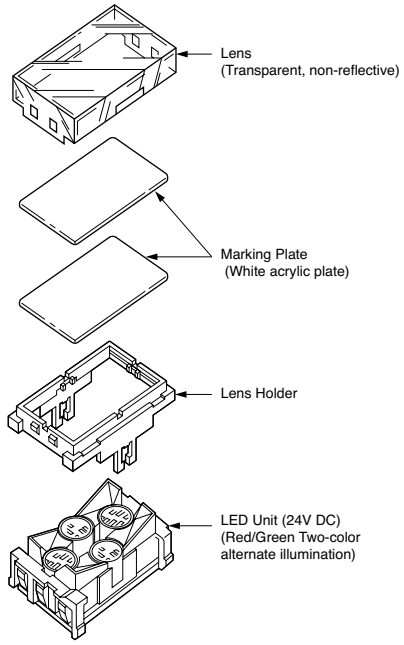
Green, red (MA3 only)



Note: The above figure shows the short two-way split type. The long two-way split type also has the same configuration.

Two-color Full Alternate Illumination

Red ⇆ Green



Note: The above figure shows MA3. MA2 also has the same configuration.

MA2 (Square)

MA3 (Rectangular)

MA8 (Round)

Ordering Information

When ordering the MA series, specify the Part No.

1. The color plate, marking plate and LED unit are contained within the MA series.
2. Optional accessories (barrier, switch guard, socket, etc.) are available. When ordering, specify the Part No.
3. Use a PW (pure white) LED unit for yellow illumination.

Part No. Development

MA **3** **L** - **M** **1** **3** **4** **1** **R**

Bezel/Illumination Face Size	
2	Square (18 × 18) 13 × 13
3	Rectangular (18 × 24) 13 × 19
8	Round (ø23.8) ø19

Operation	
M	Momentary
A	Maintained
blank	Pilot light

Housing (Black)	
1	MA2/MA8
3	MA3

Illumination Face Division	
1	Full
2	Long Two-way Split
3	Short Two-way Split
4	Two-color Alternate
9	Non-illuminated

- MA2 provides “Full Illumination” and “Two-color Alternate” illumination only.
- MA8 provides “Full Illumination” only.

Lens/Button Color	
A	Amber
B	Black
G	Green
PW	Pure White
R	Red
S	Blue
W	White
Y	Yellow

- “B” and “W” apply to pushbuttons only.
- “A” and “PW” apply to illuminated pushbuttons and pilot lights only.

Function	
L	Illuminated pushbutton
B	Pushbutton
P	Pilot light

Contacts	
1	SPDT (gold)
2	DPDT (gold)
5	SPDT (silver)
6	DPDT (silver)
blank	No contact

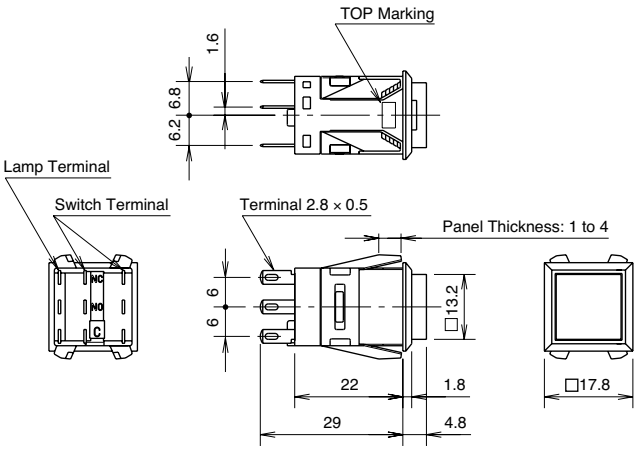
Rated Operating Voltage	
1	5V DC
3	12V AC/DC
4	24V AC/DC
blank	Non-illuminated

MA2 Illuminated Pushbuttons / Pilot Lights

Package Quantity: 1

Shape	Operation	Contact Material	Operating Voltage	Con-tact	Part No.	Illumination Color Code
MA2 (Square) One-color Full 	Momentary	Gold	24V AC/DC ±5%	SPDT	**MA2L-M1141** ∗	Specify an illumination color code in place of ∗ in the Part No. A: amber G: green PW: pure white R: red S: blue Y: yellow
				DPDT	**MA2L-M2141** ∗	
			12V AC/DC ±5%	SPDT	**MA2L-M1131** ∗	
				DPDT	**MA2L-M2131** ∗	
			5V DC ±5%	SPDT	**MA2L-M1111** ∗	
				DPDT	**MA2L-M2111** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA2L-M5141** ∗	
				DPDT	**MA2L-M6141** ∗	
			12V AC/DC ±5%	SPDT	**MA2L-M5131** ∗	
				DPDT	**MA2L-M6131** ∗	
			5V DC ±5%	SPDT	**MA2L-M5111** ∗	
				DPDT	**MA2L-M6111** ∗	
	Maintained	Gold	24V AC/DC ±5%	SPDT	**MA2L-A1141** ∗	
				DPDT	**MA2L-A2141** ∗	
			12V AC/DC ±5%	SPDT	**MA2L-A1131** ∗	
				DPDT	**MA2L-A2131** ∗	
			5V DC ±5%	SPDT	**MA2L-A1111** ∗	
				DPDT	**MA2L-A2111** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA2L-A5141** ∗	
				DPDT	**MA2L-A6141** ∗	
			12V AC/DC ±5%	SPDT	**MA2L-A5131** ∗	
				DPDT	**MA2L-A6131** ∗	
			5V DC ±5%	SPDT	**MA2L-A5111** ∗	
				DPDT	**MA2L-A6111** ∗	
	Pilot Light	—	24V AC/DC ±5%	—	**MA2P-141** ∗	
			12V AC/DC ±5%	—	**MA2P-131** ∗	
			5V DC ±5%	—	**MA2P-111** ∗	
MA2 (Square) Two-color Alternate 	Momentary	Gold	24V AC/DC ±5%	SPDT	**MA2L-M1144RG**	Red (R) ↔ Green (G) alternate illumination
				DPDT	**MA2L-M2144RG**	
		Silver	24V AC/DC ±5%	SPDT	**MA2L-M5144RG**	
				DPDT	**MA2L-M6144RG**	
	Maintained	Gold	24V AC/DC ±5%	SPDT	**MA2L-A1144RG**	
				DPDT	**MA2L-A2144RG**	
		Silver	24V AC/DC ±5%	SPDT	**MA2L-A5144RG**	
				DPDT	**MA2L-A6144RG**	
	Pilot Light	—	24V AC/DC ±5%	—	**MA2P-144RG**	

Dimensions

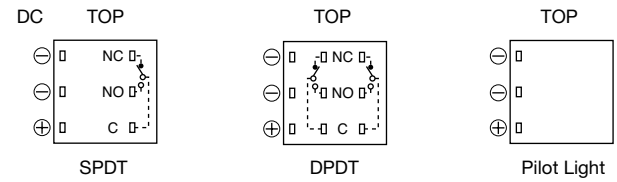


All dimensions in mm.

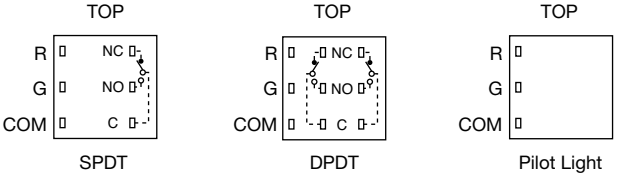
Terminal Arrangement (Bottom View)

For internal circuit, see page 16.

Full Illumination



Two-color Alternate Illumination



MA3 Illuminated Pushbuttons / Pilot Lights

Package Quantity: 1

Shape	Operation	Contact Material	Operating Voltage	Con-tact	Part No.	Illumination Color Code
MA3 (Rectangular) One-color Full 	Momentary	Gold	24V AC/DC ±5%	SPDT	**MA3L-M1341** ∗	Specify an illumination color code in place of ∗ in the Part No. A: amber G: green PW: pure white R: red S: blue Y: yellow
				DPDT	**MA3L-M2341** ∗	
			12V AC/DC ±5%	SPDT	**MA3L-M1331** ∗	
				DPDT	**MA3L-M2331** ∗	
			5V DC ±5%	SPDT	**MA3L-M1311** ∗	
				DPDT	**MA3L-M2311** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA3L-M5341** ∗	
				DPDT	**MA3L-M6341** ∗	
			12V AC/DC ±5%	SPDT	**MA3L-M5331** ∗	
				DPDT	**MA3L-M6331** ∗	
			5V DC ±5%	SPDT	**MA3L-M5311** ∗	
				DPDT	**MA3L-M6311** ∗	
	Maintained	Gold	24V AC/DC ±5%	SPDT	**MA3L-A1341** ∗	
				DPDT	**MA3L-A2341** ∗	
			12V AC/DC ±5%	SPDT	**MA3L-A1331** ∗	
				DPDT	**MA3L-A2331** ∗	
			5V DC ±5%	SPDT	**MA3L-A1311** ∗	
				DPDT	**MA3L-A2311** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA3L-A5341** ∗	
				DPDT	**MA3L-A6341** ∗	
			12V AC/DC ±5%	SPDT	**MA3L-A5331** ∗	
				DPDT	**MA3L-A6331** ∗	
			5V DC ±5%	SPDT	**MA3L-A5311** ∗	
				DPDT	**MA3L-A6311** ∗	
	Pilot Light	—	24V AC/DC ±5%	—	**MA3P-341** ∗	
			12V AC/DC ±5%	—	**MA3P-331** ∗	
			5V DC ±5%	—	**MA3P-311** ∗	
MA3 (Rectangular) Short Two-way Split  [Standard Color] TOP Marking Side ↓ ∗1 PW ∗2 PW / ∗1 R ∗2 G / ∗1 R ∗2 PW / ∗1 G ∗2 PW	Momentary	Gold	24V AC/DC ±5%	SPDT	**MA3L-M1343** ∗1 ∗2	Specify illumination color codes for left and right sides in place of ∗1 and ∗2, respectively. G: green PW: pure white R: red Choose the color codes from the standard color arrangement shown below the photo on the left.
				DPDT	**MA3L-M2343** ∗1 ∗2	
			12V AC/DC ±5%	SPDT	**MA3L-M1333** ∗1 ∗2	
				DPDT	**MA3L-M2333** ∗1 ∗2	
			5V DC ±5%	SPDT	**MA3L-M1313** ∗1 ∗2	
				DPDT	**MA3L-M2313** ∗1 ∗2	
		Silver	24V AC/DC ±5%	SPDT	**MA3L-M5343** ∗1 ∗2	
				DPDT	**MA3L-M6343** ∗1 ∗2	
			12V AC/DC ±5%	SPDT	**MA3L-M5333** ∗1 ∗2	
				DPDT	**MA3L-M6333** ∗1 ∗2	
			5V DC ±5%	SPDT	**MA3L-M5313** ∗1 ∗2	
				DPDT	**MA3L-M6313** ∗1 ∗2	
	Maintained	Gold	24V AC/DC ±5%	SPDT	**MA3L-A1343** ∗1 ∗2	
				DPDT	**MA3L-A2343** ∗1 ∗2	
			12V AC/DC ±5%	SPDT	**MA3L-A1333** ∗1 ∗2	
				DPDT	**MA3L-A2333** ∗1 ∗2	
			5V DC ±5%	SPDT	**MA3L-A1313** ∗1 ∗2	
				DPDT	**MA3L-A2313** ∗1 ∗2	
		Silver	24V AC/DC ±5%	SPDT	**MA3L-A5343** ∗1 ∗2	
				DPDT	**MA3L-A6343** ∗1 ∗2	
			12V AC/DC ±5%	SPDT	**MA3L-A5333** ∗1 ∗2	
				DPDT	**MA3L-A6333** ∗1 ∗2	
			5V DC ±5%	SPDT	**MA3L-A5313** ∗1 ∗2	
				DPDT	**MA3L-A6313** ∗1 ∗2	
	Pilot Light	—	24V AC/DC ±5%	—	**MA3P-343** ∗1 ∗2	
			12V AC/DC ±5%	—	**MA3P-333** ∗1 ∗2	
			5V DC ±5%	—	**MA3P-313** ∗1 ∗2	

- To mount the horizontal rectangular unit vertically, use the optional vertical leaf spring (MA9Z-T3: 2 pieces). (See page 12 and page 20.)
- For dimensions and terminal arrangement, see page 9. For internal circuit, see page 16.

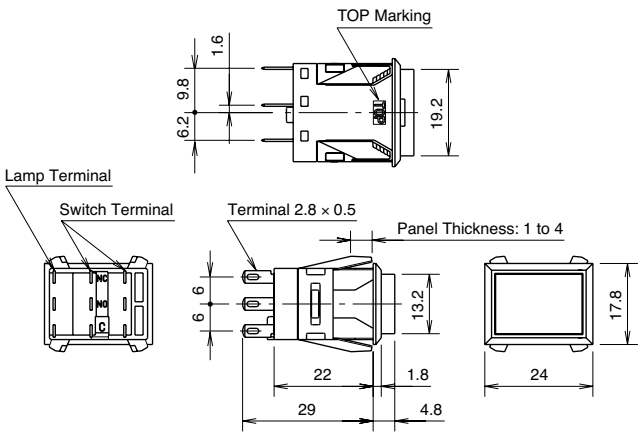
MA3 Illuminated Pushbuttons / Pilot Lights

Package Quantity: 1

Shape	Operation	Contact Material	Operating Voltage	Con-tact	Part No.	Illumination Color Code
MA3 (Rectangular) Long Two-way Split  [Standard Color] TOP Marking Side ↓ ∗1PW ∗2PW ∗1 R ∗2 G ∗1 R ∗2PW ∗1 G ∗2PW	Momentary	Gold	24V AC/DC ±5%	SPDT	MA3L-M1342 ∗1 ∗2	Specify illumination color codes for left and right sides in place of ∗1 and ∗2, respectively. G: green PW: pure white R: red Choose the color codes from the standard color arrangement shown below the photo on the left.
				DPDT	MA3L-M2342 ∗1 ∗2	
			12V AC/DC ±5%	SPDT	MA3L-M1332 ∗1 ∗2	
				DPDT	MA3L-M2332 ∗1 ∗2	
			5V DC ±5%	SPDT	MA3L-M1312 ∗1 ∗2	
				DPDT	MA3L-M2312 ∗1 ∗2	
		Silver	24V AC/DC ±5%	SPDT	MA3L-M5342 ∗1 ∗2	
				DPDT	MA3L-M6342 ∗1 ∗2	
			12V AC/DC ±5%	SPDT	MA3L-M5332 ∗1 ∗2	
				DPDT	MA3L-M6332 ∗1 ∗2	
			5V DC ±5%	SPDT	MA3L-M5312 ∗1 ∗2	
				DPDT	MA3L-M6312 ∗1 ∗2	
	Maintained	Gold	24V AC/DC ±5%	SPDT	MA3L-A1342 ∗1 ∗2	
				DPDT	MA3L-A2342 ∗1 ∗2	
			12V AC/DC ±5%	SPDT	MA3L-A1332 ∗1 ∗2	
				DPDT	MA3L-A2332 ∗1 ∗2	
			5V DC ±5%	SPDT	MA3L-A1312 ∗1 ∗2	
				DPDT	MA3L-A2312 ∗1 ∗2	
		Silver	24V AC/DC ±5%	SPDT	MA3L-A5342 ∗1 ∗2	
				DPDT	MA3L-A6342 ∗1 ∗2	
			12V AC/DC ±5%	SPDT	MA3L-A5332 ∗1 ∗2	
				DPDT	MA3L-A6332 ∗1 ∗2	
			5V DC ±5%	SPDT	MA3L-A5312 ∗1 ∗2	
				DPDT	MA3L-A6312 ∗1 ∗2	
	Pilot Light	—	24V AC/DC ±5%	—	MA3P-342 ∗1 ∗2	
			12V AC/DC ±5%	—	MA3P-332 ∗1 ∗2	
			5V DC ±5%	—	MA3P-312 ∗1 ∗2	
MA3 (Rectangular) Two-color Alternate 	Momentary	Gold	24V AC/DC ±5%	SPDT	MA3L-M1344RG	Red (R) ↔ Green (G) alternate illumination
				DPDT	MA3L-M2344RG	
		Silver	24V AC/DC ±5%	SPDT	MA3L-M5344RG	
				DPDT	MA3L-M6344RG	
	Maintained	Gold	24V AC/DC ±5%	SPDT	MA3L-A1344RG	
				DPDT	MA3L-A2344RG	
		Silver	24V AC/DC ±5%	SPDT	MA3L-A5344RG	
				DPDT	MA3L-A6344RG	
	Pilot Light	—	24V AC/DC ±5%	—	MA3P-344RG	

•To mount the horizontal rectangular unit vertically, use the optional vertical leaf spring (MA9Z-T3: 2 pieces). (See page 12 and page 20.)

Dimensions

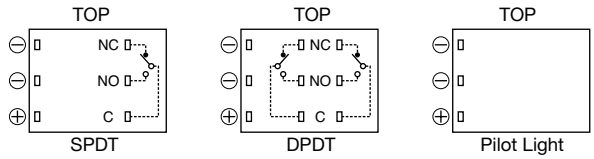


All dimensions in mm.

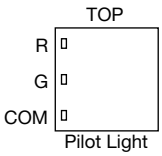
Terminal Arrangement (Bottom View)

For internal circuit, see page 16.

Two-way Split Illumination



Two-color Alternate Illumination



•Two negative (–) terminals are not interconnected inside.

•For "One-color Full" illumination, use the upper negative (–) terminal. For division into upper and lower sections, connect the negative (–) terminals for the upper and lower circuits separately.

•The above figure shows the polarities of the 5V DC type. (The 12V AC/DC and 24V AC/DC types have no polarity.)

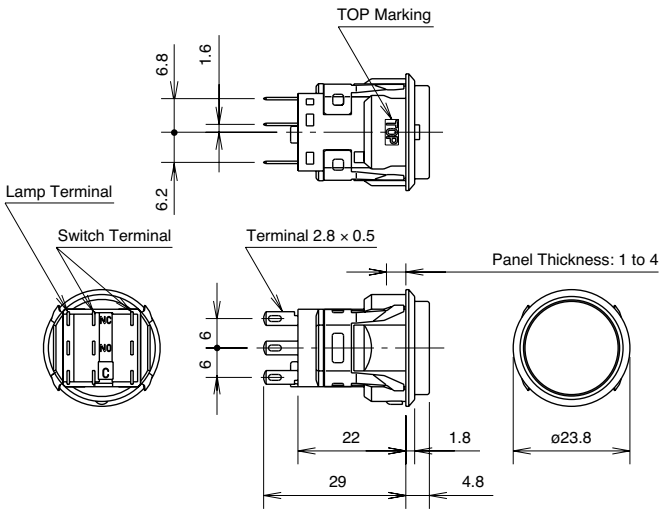
MA8 Illuminated Pushbuttons / Pilot Lights

Package Quantity: 1

Shape	Operation	Contact Material	Operating Voltage	Con-tact	Part No.	Illumination Color Code
MA8 (Round) One-color Full 	Momentary	Gold	24V AC/DC ±5%	SPDT	**MA8L-M1141** ∗	Specify an illumination color code in place of ∗ in the Part No. A: amber G: green PW: pure white R: red S: blue Y: yellow
				DPDT	**MA8L-M2141** ∗	
			12V AC/DC ±5%	SPDT	**MA8L-M1131** ∗	
				DPDT	**MA8L-M2131** ∗	
			5V DC ±5%	SPDT	**MA8L-M1111** ∗	
				DPDT	**MA8L-M2111** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA8L-M5141** ∗	
				DPDT	**MA8L-M6141** ∗	
			12V AC/DC ±5%	SPDT	**MA8L-M5131** ∗	
				DPDT	**MA8L-M6131** ∗	
			5V DC ±5%	SPDT	**MA8L-M5111** ∗	
				DPDT	**MA8L-M6111** ∗	
	Maintained	Gold	24V AC/DC ±5%	SPDT	**MA8L-A1141** ∗	
				DPDT	**MA8L-A2141** ∗	
			12V AC/DC ±5%	SPDT	**MA8L-A1131** ∗	
				DPDT	**MA8L-A2131** ∗	
			5V DC ±5%	SPDT	**MA8L-A1111** ∗	
				DPDT	**MA8L-A2111** ∗	
		Silver	24V AC/DC ±5%	SPDT	**MA8L-A5141** ∗	
				DPDT	**MA8L-A6141** ∗	
			12V AC/DC ±5%	SPDT	**MA8L-A5131** ∗	
				DPDT	**MA8L-A6131** ∗	
			5V DC ±5%	SPDT	**MA8L-A5111** ∗	
				DPDT	**MA8L-A6111** ∗	
	Pilot Light	—	24V AC/DC ±5%	—	**MA8P-141** ∗	
			12V AC/DC ±5%	—	**MA8P-131** ∗	
			5V DC ±5%	—	**MA8P-111** ∗	

•Use a pure white (PW) LED for yellow (Y) illumination.

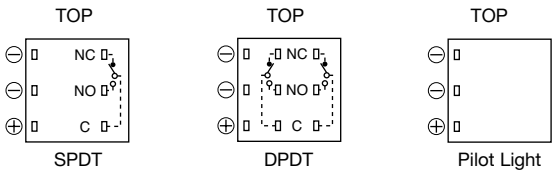
Dimensions



All dimensions in mm.

Terminal Arrangement (Bottom View)

•For internal circuit, see page 16.
•The following figure shows the polarities of the 5V DC type. (The 12V DC and 24V DC types have no polarity.)



MA2 / MA3 / MA8 Pushbuttons

Package Quantity: 1

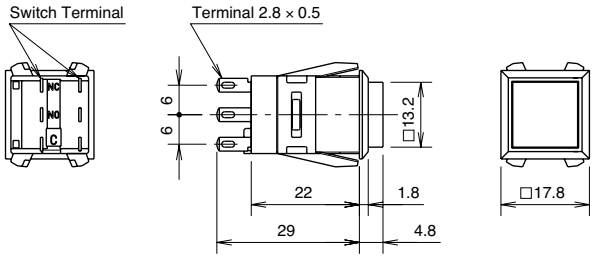
Shape	Operation	Contact Material	Con-tact	Part No.	Button Color Code	
					Button	Lens
MA2 (Square) 	Momentary	Gold	SPDT	**MA2B-M119** ∗	Specify an opaque button color code in place of ∗ in the Part No. B: black G: green R: red S: blue W: white Y: yellow	Specify a trans-parent lens color code in place of ∗ in the Part No. LA: amber LG: green LR: red LS: blue LW: white LY: yellow
			DPDT	**MA2B-M219** ∗		
		Silver	SPDT	**MA2B-M519** ∗		
			DPDT	**MA2B-M619** ∗		
	Maintained	Gold	SPDT	**MA2B-A119** ∗		
			DPDT	**MA2B-A219** ∗		
		Silver	SPDT	**MA2B-A519** ∗		
			DPDT	**MA2B-A619** ∗		
MA3 (Rectangular) 	Momentary	Gold	SPDT	**MA3B-M139** ∗		
			DPDT	**MA3B-M239** ∗		
		Silver	SPDT	**MA3B-M539** ∗		
			DPDT	**MA3B-M639** ∗		
	Maintained	Gold	SPDT	**MA3B-A139** ∗		
			DPDT	**MA3B-A239** ∗		
		Silver	SPDT	**MA3B-A539** ∗		
			DPDT	**MA3B-A639** ∗		
MA8 (Round)Pushbuttons 	Momentary	Gold	SPDT	**MA8B-M119** ∗		
			DPDT	**MA8B-M219** ∗		
		Silver	SPDT	**MA8B-M519** ∗		
			DPDT	**MA8B-M619** ∗		
	Maintained	Gold	SPDT	**MA8B-A119** ∗		
			DPDT	**MA8B-A219** ∗		
		Silver	SPDT	**MA8B-A519** ∗		
			DPDT	**MA8B-A619** ∗		

Note: The button is opaque. Color screen and a marking plate are not included. Apply marking directly on the button front surface, if required. Color screen and marking plates are included with lens style buttons.

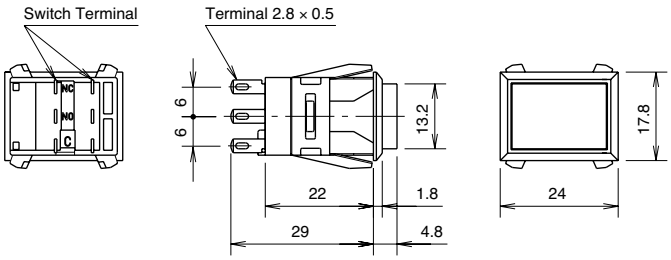
•To mount the horizontal unit vertically, use the optional vertical leaf spring (MA9Z-T3: 2 pieces). (See page 12 and page 20.)

Dimensions

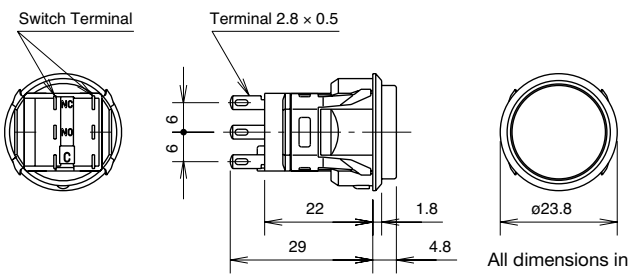
MA2 (Square)



MA3 (Rectangular)



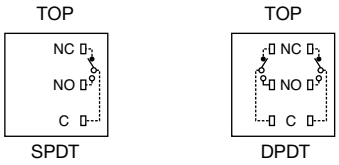
MA8 (Round)



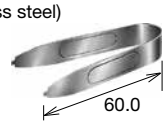
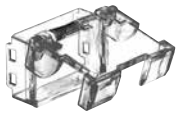
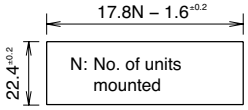
All dimensions in mm.

Terminal Arrangement (Bottom View)

For internal circuit, see page 16.



Accessories

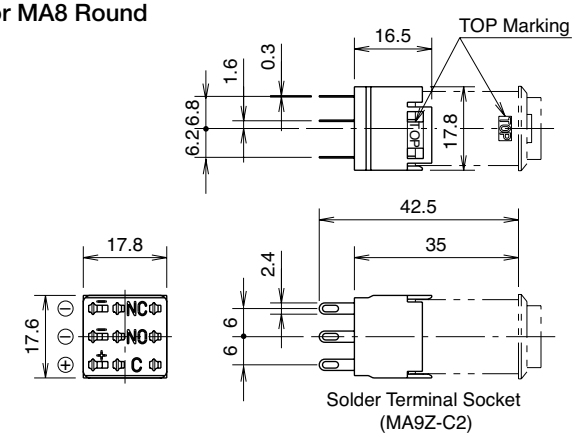
Name & Shape	Specifications		Part No.	Ordering No.	Package Quantity	Remarks	Dimension Page
Lens Removal Tool (Stainless steel) 	—		MT-101	MT-101	1	• Used to remove the lens from the housing. (Compatible with IDEC's A series Miniature Control Units)	—
Socket (Polyamide) 	For MA2 Square For MA8 Round	Solder Terminals	MA9Z-C2	MA9Z-C2	1	• Snaps onto the rear of MA units.	13
		PC Board Terminals	MA9Z-C2V	MA9Z-C2V	1		
	For MA3 Rectangular	Solder Terminals	MA9Z-C3	MA9Z-C3	1		
		PC Board Terminals	MA9Z-C3V	MA9Z-C3V	1		
Barrier (Polycarbonate) 	For MA2 Square For MA3 Rectangular	End Barrier (Black)	MA9Z-BF1B	MA9Z-BF1BPN10	10	• Used to prevent inadvertent operation and improve panel appearance. Note: For panel cut-out dimensions, see page 17.	14
		Spacer Barrier (Black)	MA9Z-BF2B	MA9Z-BF2BPN10	10		
Guard Barrier (Polycarbonate) 	For MA2 Square	Black	MA9Z-G2B	MA9Z-G2BPN10	10	• For panel cut-out dimensions, see page 17. • Cannot be used in combination with barriers.	14
	For MA3 Rectangular	Black	MA9Z-GF3B	MA9Z-GF3BPN10	10		
Switch Guard (Polycarbonate) 	For MA2 Square		MA9Z-K2	MA9Z-K2	1	• 180° opening spring return type Note: For panel cut-out dimensions, see page 18.	13
	For MA3 Rectangular		MA9Z-KF3	MA9Z-KF3	1	• Cannot be used in combination with barriers.	
Switch Guard with Lens (Polycarbonate) 	For MA3 Rectangular		MA9Z-KR3	MA9Z-KR3	1	• Not compatible with Maintained. • For mounting procedure, see Mounting/Removing the Lens and Marking Plate on page 19. • Cannot be used in combination with barriers.	13
Dust Cover (Base: Polypropylene, Cover: Vinyl chloride elastomer) 	For MA2 Square		MA9Z-D2	MA9Z-D2	1	• Non-waterproof type • For panel cut-out dimensions, see page 18.	14
	For MA3 Rectangular		MA9Z-D3	MA9Z-D3	1		
Dummy Unit (Polycarbonate) 	For MA2 Square		MA9Z-E2B	MA9Z-E2B	1	• Housing color: Black	14
	For MA3 Rectangular		MA9Z-E3FB	MA9Z-E3FB	1		
MA3 Vertical Leaf Spring (Stainless steel) 	Panel cut-out of vertical mounting 		MA9Z-T3	MA9Z-T3PN10	10	• By using the optional vertical leaf springs, MA3 can be vertically mounted in a horizontal row. • For the mounting and removing procedures, see page 20.	—

Accessory Dimensions

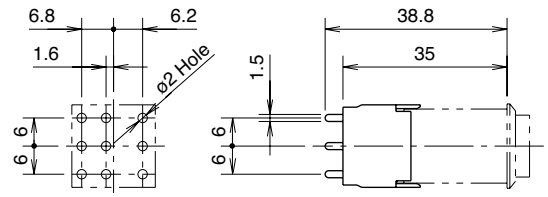
All dimensions in mm.

Socket

For MA2 Square
For MA8 Round



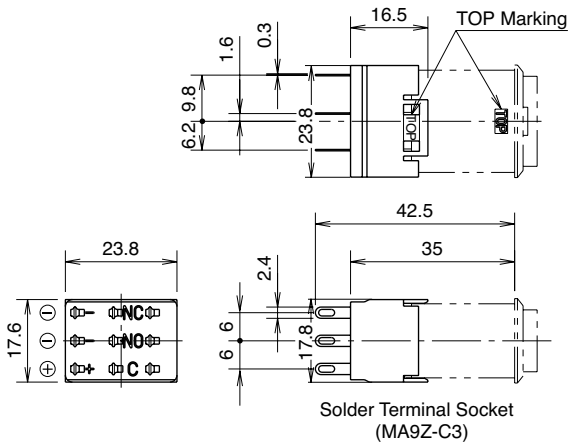
Solder Terminal Socket
(MA9Z-C2)



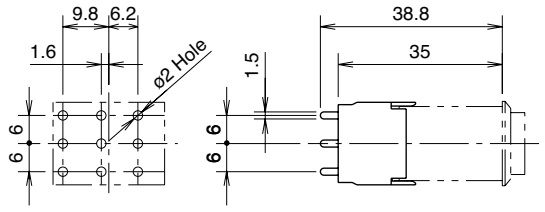
PC Board Drilling Layout
(Bottom View)

PC Board Terminal Socket
(MA9Z-C2V)

For MA3 Rectangular



Solder Terminal Socket
(MA9Z-C3)

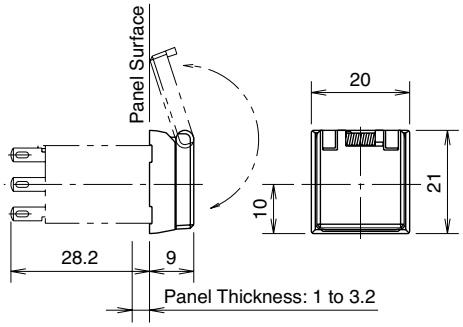


PC Board Drilling Layout
(Bottom View)

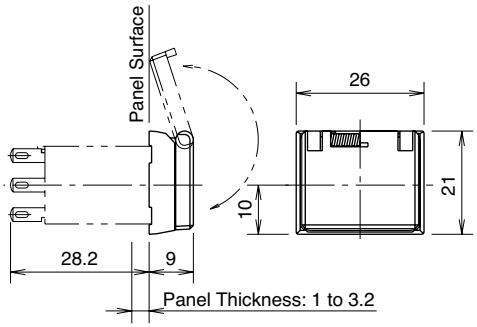
PC Board Terminal Socket
(MA9Z-C3V)

Switch Guard

For MA2 Square (MA9Z-K2)



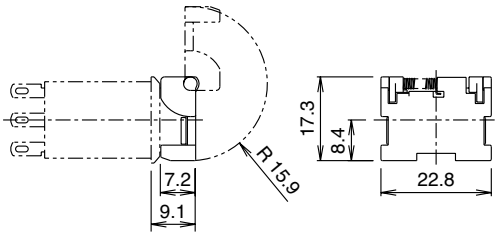
For MA3 Rectangular (MA9Z-KF3)



Note: For panel cut-out dimensions, see page 18.

Switch Guard with Lens

For MA3 Rectangular (MA9Z-KR3)



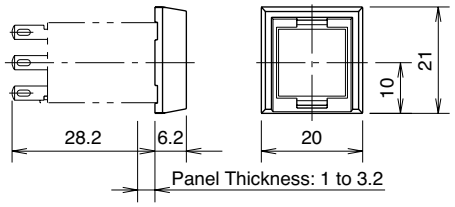
Note: The panel cut-out dimensions for the switch guard with lens are the same as those for the MA3 rectangular type.

Accessory Dimensions

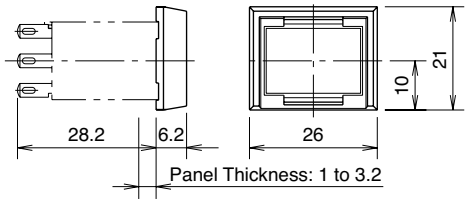
All dimensions in mm.

Guard Barrier

For MA2 Square (MA9Z-G2B)



For MA3 Rectangular (MA9Z-GF3B)

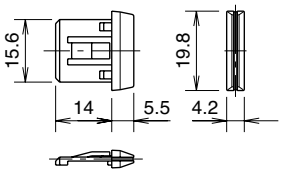


Note: For panel cut-out dimensions, see page 17.

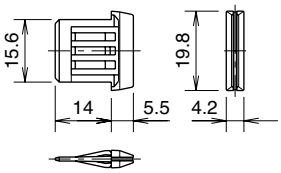
Barrier

For MA2 Square
For MA3 Rectangular

End Barrier (MA9Z-BF1B)



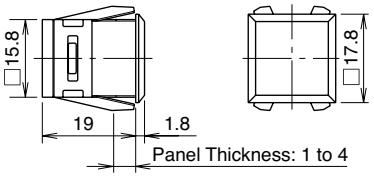
Spacer Barrier (MA9Z-BF2B)



Note: For installation of the unit, see the panel cut-out dimensions on page 17.

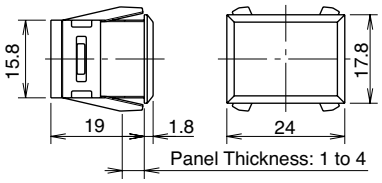
Dummy Unit

For MA2 Square (MA9Z-E2B)



Note: For panel cut-out dimensions, see page 17 (same as guard barrier MA2 Square).

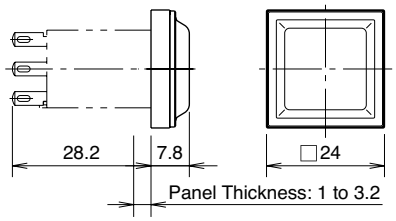
For MA3 Rectangular (MA9Z-E3FB)



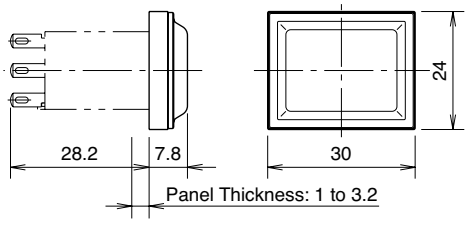
Note: For panel cut-out dimensions, see page 17 (same as guard barrier MA3 Rectangular).

Dust Cover

For MA2 Square (MA9Z-D2)

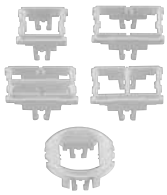


For MA3 Rectangular (MA9Z-D3)

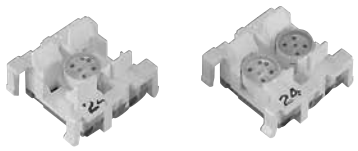
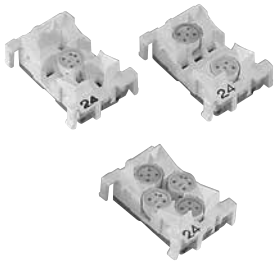


Note: For panel cut-out dimensions, see page 18.

Maintenance Parts

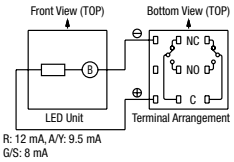
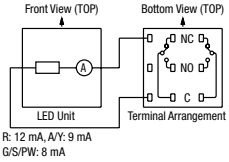
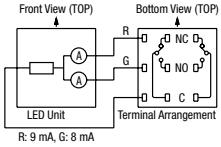
Name & Shape	Specifications		Part No.	Ordering No.	Package Quantity	Remarks
Color Screen (Acrylic) 	For MA2 Square	Full (11.5H × 11.5W × 1.1t)	**MA9Z-P21 ∗**	**MA9Z-P21 ∗ PN05**	5	• Specify a color code in place of ∗ in the Ordering No. A (Amber), C (Clear), R (Red), S (Blue)
	For MA3 Rectangular	Full (11.5H × 17.5W × 1.1t)	**MA9Z-P31 ∗**	**MA9Z-P31 ∗ PN05**	5	
		Long Two-way Split (5.7H × 17.5W × 1.1t)	**MA9Z-P32 ∗**	**MA9Z-P32 ∗ PN05**	5	• Only C (Clear), G (Green), and R (Red) are available.
		Short Two-way Split (11.5H × 8.7W × 1.1t)	**MA9Z-P33 ∗**	**MA9Z-P33 ∗ PN05**	5	
	For MA8 Round	Full (ø17.2 × 1.1t)	**MA9Z-P81 ∗**	**MA9Z-P81 ∗ PN05**	5	• A (Amber), C (Clear), G (Green), R (Red), S (Blue), Y (Yellow)
Marking Plate (Acrylic) 	For MA2 Square	11.5H × 11.5W × 1.1t	**MA9Z-P21W**	**MA9Z-P21WPN05**	5	• No difference between both sides of the marking plate.
	For MA3 Rectangular	11.5H × 17.5W × 1.1t	**MA9Z-P31W**	**MA9Z-P31WPN05**	5	
	For MA8 Round	ø17.2 x 1.1t	**MA9Z-P81W**	**MA9Z-P81WPN05**	5	
Lens (Polycarbonate) 	For MA2 Square		**MA9Z-L2**	**MA9Z-L2PN05**	5	• The lens is transparent.
	For MA3 Rectangular		**MA9Z-L3**	**MA9Z-L3PN05**	5	
	For MA8 Round		**MA9Z-L8**	**MA9Z-L8PN05**	5	
Button (Polyarylate) 	For MA2 Square		**MA9Z-B2 ∗**	**MA9Z-B2 ∗ PN05**	5	• Specify a color code in place of ∗ in the Ordering No. B (Black), G (Green), R (Red), S (Blue), W (White), Y (Yellow)
	For MA3 Rectangular		**MA9Z-B3 ∗**	**MA9Z-B3 ∗ PN05**	5	
	For MA8 Round		**MA9Z-B8 ∗**	**MA9Z-B8 ∗ PN05**	5	
Lens Holder (Polyarylate) 	For MA2 Square	Full	**MA9Z-LH21**	**MA9Z-LH21PN05**	5	
	For MA3 Rectangular	Full	**MA9Z-LH31**	**MA9Z-LH31PN05**	5	
		Long Two-way Split (with light barrier)	**MA9Z-LH32**	**MA9Z-LH32PN05**	5	
		Short Two-way Split (with light barrier)	**MA9Z-LH33**	**MA9Z-LH33PN05**	5	
	For MA8 Round	Full	**MA9Z-LH81**	**MA9Z-LH81PN05**	5	

Maintenance Parts (LED Unit)

Name & Shape	Specifications	Operational Voltage	Part No.	Remarks
MA2 Square / MA8 Round 	One-color	24V AC/DC ±5%	**MA9Z-2D41N- ∗**	• Specify a color code in place of ∗ in the Ordering No. A (Amber), G (Green), PW (Pure White), R (Red), S (Blue) Use a PW (pure white) LED unit for yellow illumination. • Blue (S) is for One-color only. • For color codes of Two-way Split type, RG, RPW, GPW, PWPW are available. • Package quantity: 1
		12V AC/DC ±5%	**MA9Z-2D31N- ∗**	
		5V DC ±5%	**MA9Z-2D11N- ∗**	
	Two-color Alternate (Except for MA8)	24V AC/DC ±5%	**MA9Z-2D44N-RG**	
MA3 Rectangular 	One-color	24V AC/DC ±5%	**MA9Z-3D41N- ∗**	
		12V AC/DC ±5%	**MA9Z-3D31N- ∗**	
		5V DC ±5%	**MA9Z-3D11N- ∗**	
	Short Two-way Split	24V AC/DC ±5%	**MA9Z-3D43N- ∗∗**	
		12V AC/DC ±5%	**MA9Z-3D33N- ∗∗**	
		5V DC ±5%	**MA9Z-3D13N- ∗∗**	
	Long Two-way Split	24V AC/DC ±5%	**MA9Z-3D42N- ∗∗**	
		12V AC/DC ±5%	**MA9Z-3D32N- ∗∗**	
		5V DC ±5%	**MA9Z-3D12N- ∗∗**	
	Two-color Alternate	24V AC/DC ±5%	**MA9Z-3D44N-RG**	

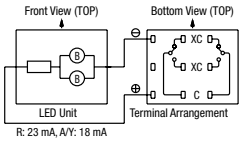
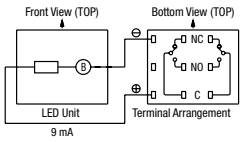
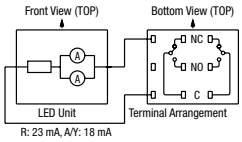
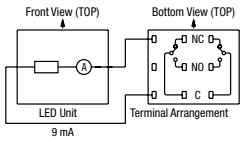
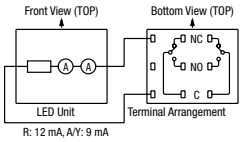
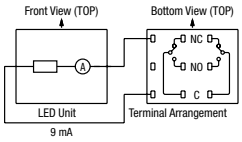
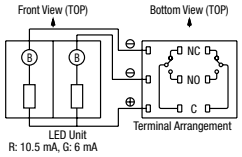
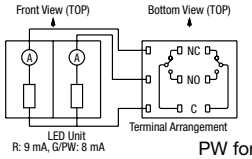
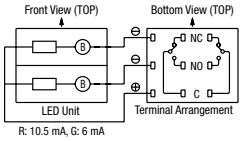
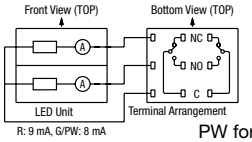
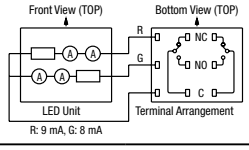
Internal Circuit

MA2 (Square) / MA8 (Round)

		5V DC	12V AC/DC · 24V AC/DC
MA2 (Square) MA8 (Round)	One-color		
	Two-color Alternate (MA2)	24V AC/DC 	

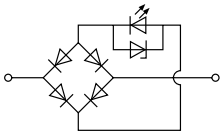
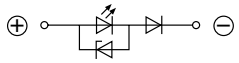
Note: Ⓐ, Ⓑ: LED modules (For details of the LED modules, see the LED module internal circuit below.)

MA3 (Rectangular)

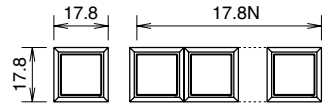
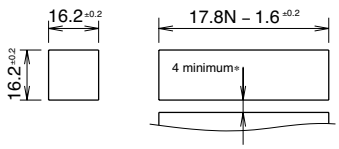
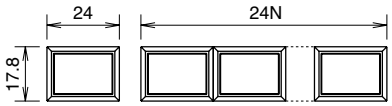
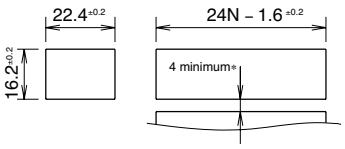
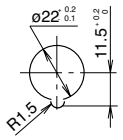
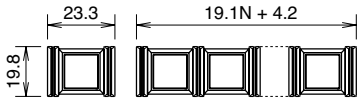
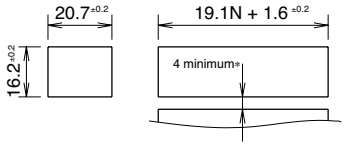
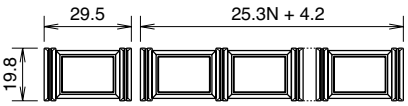
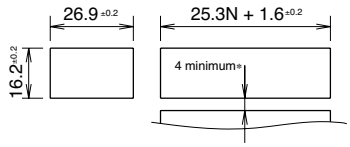
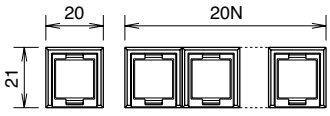
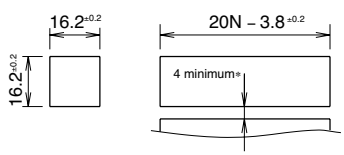
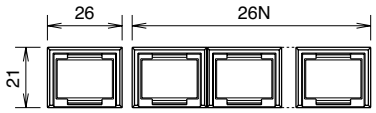
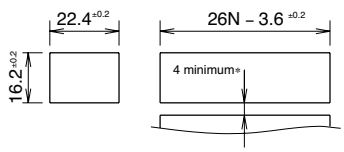
		5V DC	12V AC/DC
MA3 (Rectangular)	One-color	 	 
		24V AC/DC 	
	Short Two-way Split	5V DC 	12V AC/DC · 24V AC/DC  PW for 24V AC/DC only
	Long Two-way Split	5V DC 	12V AC/DC · 24V AC/DC  PW for 24V AC/DC only
	Two-color Alternate	24V AC/DC 	

Note: Ⓐ, Ⓑ: LED modules (For details of the LED modules, see the LED module internal circuit below.)

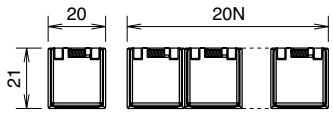
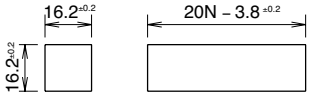
LED Module Internal Circuit

Ⓐ	Ⓑ
	

Panel Cut-out

Item		Front View (mm)	Panel Cut-out Dimensions (mm)	Remarks
MA2 Square				N: No. of MA units mounted MA2 collective mounting Vertical: 4 rows max. Horizontal: 12 columns max. MA3 collective mounting Vertical: 4 rows max. Horizontal: 9 columns max. * Consider the strength of panel thickness. Panel thickness: 1 to 4 mm
MA3 Rectangular				
MA8 Round				
With Barrier	MA2 Square			N: No. of MA units mounted MA2 collective mounting Vertical: 4 rows max. Horizontal: 12 columns max. MA3 collective mounting Vertical: 4 rows max. Horizontal: 9 columns max. * Consider the strength of panel thickness. Panel thickness: 1 to 4 mm Note: When the barrier is mounted, the guard barrier, switch guard or dust cover cannot be mounted together.
	MA3 Rectangular			
With Guard Barrier	MA2 Square			N: No. of MA units mounted MA2 collective mounting Vertical: 4 rows max. Horizontal: 12 columns max. MA3 collective mounting Vertical: 4 rows max. Horizontal: 9 columns max. * Consider the strength of panel thickness. Panel thickness: 1 to 3.2 mm • The panel cut-out are the same as those required for switch guard. Therefore, the guard barrier and switch guard can be used together for collective mounting.
	MA3 Rectangular			

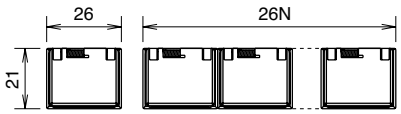
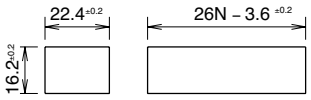
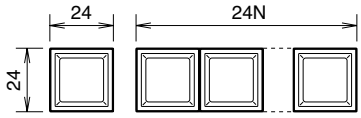
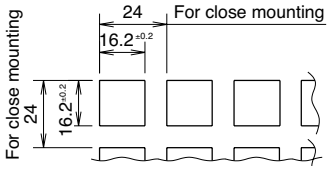
Panel Cut-out

<table>
<tr><th colspan="2">Item</th><th>Front View (mm)</th><th>Panel Cut-out Dimensions (mm)</th><th>Remarks</th></tr>
<tr><td rowspan="2">With Switch Guard</td><td>MA2
Square</td><td> 
</td><td> 
</td><td rowspan="2">N: No. of MA units mounted

MA2 collective mounting
Vertical: 4 rows max.
Horizontal: 12 columns max.

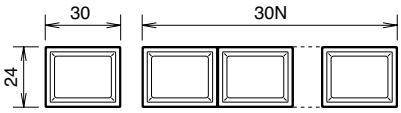
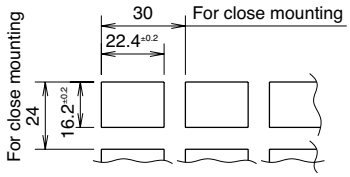
MA3 collective mounting
Vertical: 4 rows max.
Horizontal: 9 columns max.

* Consider the strength of panel thickness.
Panel thickness: 1 to 3.2 mm

• The panel cut-out are the same as those required for guard barrier. Therefore, the switch guard and guard barrier can be used together for collective mounting.</td></tr>
<tr><td>MA3
Rectangular</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="2">With Dust Cover</td><td>MA2
Square</td><td> 
</td><td> 
</td><td rowspan="2">N: No. of MA units mounted

MA2 collective mounting
Vertical: 4 rows max.
Horizontal: 12 columns max.

MA3 collective mounting
Vertical: 4 rows max.
Horizontal: 9 columns max.

* Consider the strength of panel thickness.
Panel thickness: 1 to 3.2 mm</td></tr>
<tr><td>MA3
Rectangular</td><td> 
</td><td> 
</td></tr>
</table>

Safety Precautions

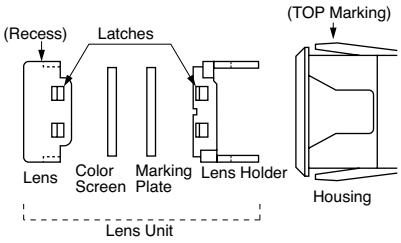
- Turn off power to the MA unit before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shocks or fire hazard.
- When replacing LED units, use the optional lens removal tool (MT-101) to prevent burning your hand.
- Use the MA unit within the rated values, otherwise electrical shocks or fire hazard may occur.
- For wiring, use wires of proper size to meet the voltage and current requirements.
- Improper soldering or failure to tighten the terminal screw may cause overheating and fire.
- Use the optional locking ring wrench to mount the unit onto a panel.

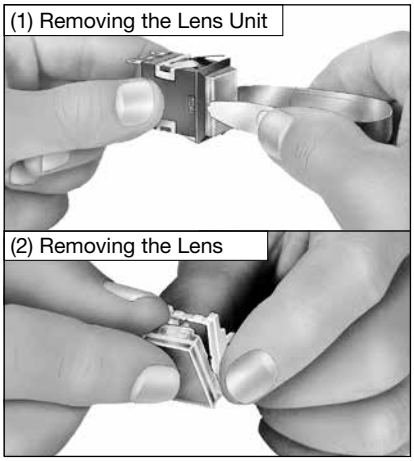
Instructions

Mounting/Removal of the Lens and Marking Plate

Removal

Pull out the lens unit (lens, color screen, marking plate and lens holder) while pinching the recesses of the lens using the lens removal tool. (See photo 1)
The marking plate can be removed by unlatching the lens from the lens holder. (See photo 2)





Installation

Put the color screen and marking plate into the lens, then press the lens holder into the lens. Make sure to install the lens unit into the housing in the correct direction.

Mounting Order of Color Screen and Marking Plate

Insert the color screen and the marking plate in the following order, depending on the application.

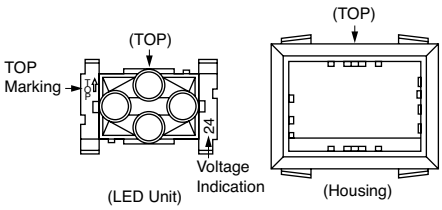
Display Color (Lamp OFF)	Insertion Order
Color [Initial condition]	A Lens ↓ Color Screen ↓ Marking Plate ↓ Housing
White	B Lens ↓ Marking Plate ↓ Color Screen ↓ Housing

Notes:
1. For white illumination, the display color in OFF status is white, regardless of the mounting order of A or B.
2. Both marking plate and color screen can be engraved.
3. The Two-color Alternate (Red ↔ Green) illumination type uses two marking plates, without using a color screen.

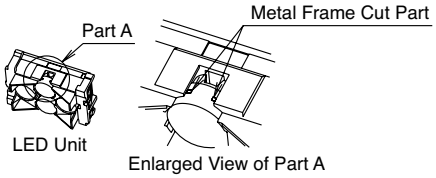
LED Unit

Mounting/Removal of the LED Unit

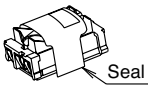
Remove the LED unit from the housing using the lens removal tool.
To mount the LED unit, insert the LED unit into the housing first, and then insert the lens unit into the housing. In this step, be careful about orientation of each unit. When inserting the LED unit, align the TOP marking on the LED unit with the TOP marking on the housing. Inserting the LED unit in an incorrect orientation may cause damage to the contacts on the LED unit.



When handling the LED unit for the Long Two-way Split type using G (green) LED or of the Two-color (red/green) Alternate illumination type, be careful not to touch the metal frame cut part of the LED unit with your hand (see the figure below) to prevent application of static electricity to this part. If static electricity is applied to this part, the LED element may be damaged.



A protective seal is attached to spare LED units to prevent static electricity from being applied to the metal frame cut part. Remove the protective seal immediately before replacing LED units.



LED Unit Voltage Marking

When mounting or removing the LED unit, make sure that the operational voltage is correct. The operational voltage is indicated by a number on the LED unit, and identified by color of the contact base as follows:

Voltage Indication		LED Unit Operational Voltage
Number	Base Color	
5	Blue	5V DC
12	Yellow	12V AC/DC
14	Red	24V AC/DC

Installation of Accessories

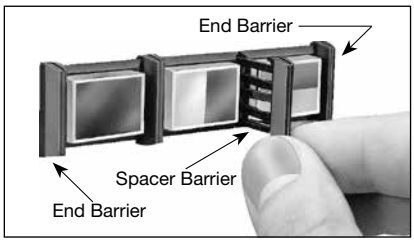
Installing the Barrier

Single mounting

Put end barriers on both sides of the MA unit, insert it from the front of the panel.

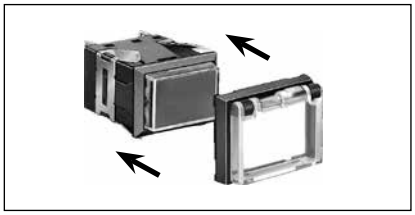
Instructions

Collective mounting
Insert end barriers at both ends of MA units, insert them into the panel cut-out. After mounting the MA units into the panel, insert the spacer barrier between the MA units.



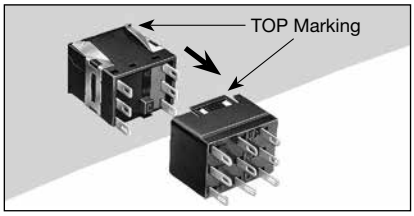
Installing the Switch Guard

Install the switch guard before mounting into a panel cut-out. To install switch guard, place the hinge of the switch guard upward, and depress the switch guard onto the flange of the MA unit.



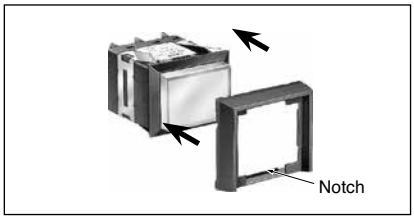
Installing the Socket

Align the TOP marking of the MA unit with that of the socket, and press the socket onto the MA unit.



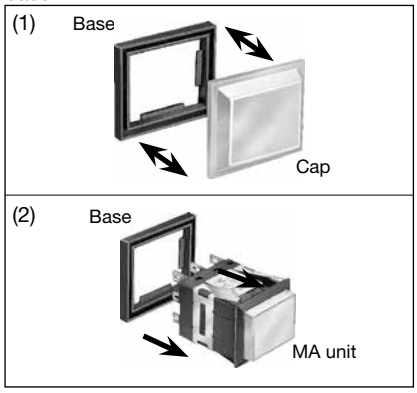
Installation of the Guard Barrier

Install the guard barrier before mounting into a panel cut-out. To the install the guard barrier, orientate the notch of guard barrier downward, and depress the guard barrier onto the bezel of the MA unit.



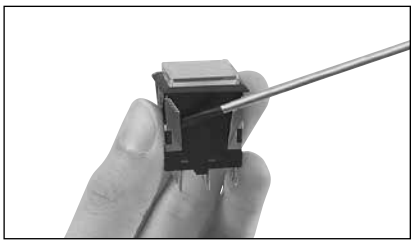
Installation of the Dustproof Cover

Separate the cap (translucent rubber) and the base (black plastic). (See Photo 1)
Install the base from the MA unit terminal side onto the bezel. (See Photo 2)
In this step, make sure that the base is placed between the bezel and the leaf springs.
Then, mount the MA unit into the panel cut-out, and mount the cap onto the base. Make sure that the cap is fitted to the base.

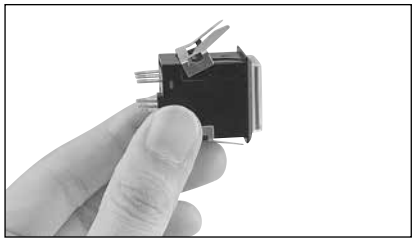


Installation of Leaf Springs for Vertical Mounting

First, insert a small flat-blade screwdriver under the leaf spring on the MA unit, and remove the leaf spring for horizontal mounting.



Place the vertical leaf spring on the MA unit temporarily, and then press the spring until it is secured on the MA unit.



Wiring Precautions

- Solder the terminals at 350°C within 3 seconds, using a 60W soldering iron. Sn-Ag-Cu solder is recommended. While soldering, keep the soldering iron as far from the plastic part of the switch as possible. Do not apply external force to the switch unit. Do not bend the terminals, pull the cable, etc. To use a soldering iron, check your actual operating conditions.
- Use a non-corrosive, liquid rosin soldering flux.
- Among the LED terminals, the center terminal on a one-color full illuminated unit is a dummy.
- A current limiting resistor is incorporated in all LED units.

Operating Instructions

LED Operating Voltage (5V DC)

The rated operating voltage is based on a pure direct current source. To use the LED under rectified DC, make sure that the peak voltage does not exceed the rated DC operating voltage. If the peak voltage exceeds the rated DC operating voltage, the LED life may be shortened.

Microswitch Contacts

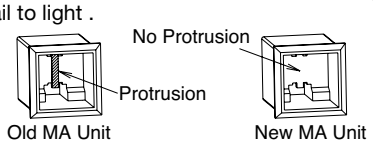
When using both the NO and NC contacts of the same microswitch, avoid connections of different voltages, or connections of different power supply types. Failure to observe this instruction may cause a short-circuit.

Operating and Storage Conditions

Use the MA unit in an environment within the rated operating temperature and humidity range. Do not use the MA unit in a place where it is subjected to oil or water splashes, or in a place with dust accumulation.

New Super Bright LED Units

To accommodate the new super bright LED unit, the MA2 unit has no protrusion inside. If your MA unit has a protrusion inside, it is an older type and the new LED unit cannot be used. If the new LED unit is used with the old MA unit, the LED may fail to light .



Ordering Terms and Conditions

Thank you for using IDEC Products.

By purchasing products listed in our catalogs, datasheets, and the like (hereinafter referred to as "Catalogs") you agree to be bound by these terms and conditions. Please read and agree to the terms and conditions before placing your order.

1. Notes on contents of Catalogs

(1) Rated values, performance values, and specification values of IDEC products listed in this Catalog are values acquired under respective conditions in independent testing, and do not guarantee values gained in combined conditions.
Also, durability varies depending on the usage environment and usage conditions.

(2) Reference data and reference values listed in Catalogs are for reference purposes only, and do not guarantee that the product will always operate appropriately in that range.

(3) The specifications / appearance and accessories of IDEC products listed in Catalogs are subject to change or termination of sales without notice, for improvement or other reasons.

(4) The content of Catalogs is subject to change without notice.

2. Note on applications

(1) If using IDEC products in combination with other products, confirm the applicable laws / regulations and standards.
Also, confirm that IDEC products are compatible with your systems, machines, devices, and the like by using under the actual conditions. IDEC shall bear no liability whatsoever regarding the compatibility with IDEC products.

(2) The usage examples and application examples listed in Catalogs are for reference purposes only. Therefore, when introducing a product, confirm the performance and safety of the instruments, devices, and the like before use. Furthermore, regarding these examples, IDEC does not grant license to use IDEC products to you, and IDEC offers no warranties regarding the ownership of intellectual property rights or non-infringement upon the intellectual property rights of third parties.

(3) When using IDEC products, be cautious when implementing the following.

i. Use of IDEC products with sufficient allowance for rating and performance

ii. Safety design, including redundant design and malfunction prevention design that prevents other danger and damage even in the event that an IDEC product fails

iii. Wiring and installation that ensures the IDEC product used in your system, machine, device, or the like can perform and function according to its specifications

(4) Continuing to use an IDEC product even after the performance has deteriorated can result in abnormal heat, smoke, fires, and the like due to insulation deterioration or the like. Perform periodic maintenance for IDEC products and the systems, machines, devices, and the like in which they are used.

(5) IDEC products are developed and manufactured as general-purpose products for general industrial products. They are not intended for use in the following applications, and in the event that you use an IDEC product for these applications, unless otherwise agreed upon between you and IDEC, IDEC shall provide no guarantees whatsoever regarding IDEC products.

i. Use in applications that require a high degree of safety, including nuclear power control equipment, transportation equipment (railroads / airplanes / ships / vehicles / vehicle instruments, etc.), equipment for use in outer space, elevating equipment, medical instruments, safety devices, or any other equipment, instruments, or the like that could endanger life or human health

ii. Use in applications that require a high degree of reliability, such as provision systems for gas / waterworks / electricity, etc., systems that operate continuously for 24 hours, and settlement systems

iii. Use in applications where the product may be handled or used deviating from the specifications or conditions / environment listed in the Catalogs, such as equipment used outdoors or applications in environments subject to chemical pollution or electromagnetic interference
If you would like to use IDEC products in the above applications, be sure to consult with an IDEC sales representative.

3. Inspections

We ask that you implement inspections for IDEC products you purchase without delay, as well as thoroughly keep in mind management/maintenance regarding handling of the product before and during the inspection.

4. Warranty

(1) Warranty period

The warranty period for IDEC products shall be one (1) year after purchase or delivery to the specified location. However, this shall not apply in cases where there is a different specification in the Catalogs or there is another agreement in place between you and IDEC.

(2) Warranty scope

Should a failure occur in an IDEC product during the above warranty period for reasons attributable to IDEC, then IDEC shall replace or repair that product, free of charge, at the purchase location / delivery location of the product, or an IDEC service base. However, failures caused by the following reasons shall be deemed outside the scope of this warranty.

i. The product was handled or used deviating from the conditions / environment listed in the Catalogs

ii. The failure was caused by reasons other than an IDEC product

iii. Modification or repair was performed by a party other than IDEC

iv. The failure was caused by a software program of a party other than IDEC

v. The product was used outside of its original purpose

vi. Replacement of maintenance parts, installation of accessories, or the like was not performed properly in accordance with the user's manual and Catalogs

vii. The failure could not have been predicted with the scientific and technical standards at the time when the product was shipped from IDEC

viii. The failure was due to other causes not attributable to IDEC (including cases of force majeure such as natural disasters and other disasters)

Furthermore, the warranty described here refers to a warranty on the IDEC product as a unit, and damages induced by the failure of an IDEC product are excluded from this warranty.

5. Limitation of liability

The warranty listed in this Agreement is the full and complete warranty for IDEC products, and IDEC shall bear no liability whatsoever regarding special damages, indirect damages, incidental damages, or passive damages that occurred due to an IDEC product.

6. Service scope

The prices of IDEC products do not include the cost of services, such as dispatching technicians. Therefore, separate fees are required in the following cases.

(1) Instructions for installation / adjustment and accompaniment at test operation (including creating application software and testing operation, etc.)

(2) Maintenance inspections, adjustments, and repairs

(3) Technical instructions and technical training

(4) Product tests or inspections specified by you

The above content assumes transactions and usage within your region. Please consult with an IDEC sales representative regarding transactions and usage outside of your region. Also, IDEC provides no guarantees whatsoever regarding IDEC products sold outside your region.

IDEC CORPORATION

Head Office
6-64, Nishi-Miyahara-2-Chome, Yodogawa-ku, Osaka 532-0004, Japan

www.idec.com

USA	IDEC Corporation	Tel: +1-408-747-0550	opencontact@idec.com	**Hong Kong**	IDEC Izumi (H.K.) Co., Ltd.	Tel: +852-2803-8989	info@hk.idec.com
Germany	APEM GmbH	Tel: +49-40-25 30 54-0	service@eu.idec.com	**China**	IDEC (Shanghai) Corporation	Tel: +86-21-6135-1515	idec@cn.idec.com
Singapore	IDEC Izumi Asia Pte. Ltd.	Tel: +65-6746-1155	info@sg.idec.com		Beijing Branch	Tel: +86-10-6581-6131	idec@cn.idec.com
Thailand	IDEC Asia (Thailand) Co., Ltd	Tel: +66-2-392-9765	sales@th.idec.com		Guangzhou Branch	Tel: +86-20-8362-2394	idec@cn.idec.com
India	IDEC Controls India Private Limited	Tel: +91-80679-35328	info_india@idec.com	**Japan**	IDEC Corporation	Tel: +81-6-6398-2527	jp_marketing@idec.com
Taiwan	IDEC Taiwan Corporation	Tel: +886-2-2577-6938	service@tw.idec.com				

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