

Manual Switches

Advanced Manual Line

AML CHARACTERISTICS

	AML 10 Series	AML 20 Series	AML 30 Series	AML 40 Series
Electrical/Mechanical Life*				N/A
Pushbuttons–Momentary	1,000,000	25,000 (silver)/ 100,000 (gold)	25,000	---
Pushbuttons–Alternate	25,000	25,000	25,000	---
Rockers	25,000	25,000	25,000	---
Paddles	25,000	25,000	25,000	---
Agency Ratings (May not apply to every series division)				
UL	File E53576	File E12252	File E12252	File E58932
CSA	File LR4442	File LR4442	File LR4442	File LR4442
VDE	None	File 0630/10.78+	File 0630/10.78+ +	None
CE		Rating 1710 No. 4275.5788	Rating 1710 No. 4275.5788	

* 95% Survival
 + Exception: Four-Pole AML's are not included in VDE Approval
 ++ Exception: Only the 2-pole AML33 and AML34 are certified by VDE

AML ELECTRICAL DATA

● AML10 Series

Electrical Characteristics						Absolute Maximum Rating ^④			
Integrated Circuit Function	Supply Current (Max.)	Output Voltage (Operated)	Output Leakage Current max. (Released)	Switching Time Max.		Supply Voltage (V _s)	Voltage Externally Applied to Output	Loads to Output	Storage Temperature
				Rise 10% to 90%	Fall 90% to 10%				
4.5-24 VDC Sinking	5 V 7.0 mA (Released) 24 V 9.0 mA (Released) 14.0 mA (Operated-no load)	+ .4 Volt (Sinking 10 mA)	10 μA	1.5 μ sec (Sinking 10 mA)	0.5 μ sec (Sinking 10 mA)	-30 to +30 VDC	-0.5 Volt min. +24 Volts max. (Off condition)	20 mA (Sinking)	-40–C to +65°C (-40° to +149°F)

① Over temperature range of 0° to +55°C (+32° to +131°F) and supply voltage of 4.5 to 5.5 VDC.
 ② Over temperature range of 0° to +55°C (+32° to +131°F) and supply voltage of 16 VDC.
 ③ At 24°C. (+75°F)
 ④ As with all solid state components, performance can be expected to deteriorate as rating limits are approached; however, they will not be damaged unless the limits are exceeded.

● AML20 Series

Contacts	Voltage	Current	Load Type
Silver or Gold-plated Silver	250 VAC 125 VAC 24 VDC	2 Amps 3 Amps 2 Amps	75% Power Factor 75% Power Factor Resistive
Gold	125 VAC/DC	100 mA	Resistive

● AML30 Series

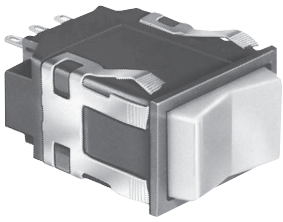
Voltage	Current		Load Type
	Pushbuttons	Rockers or Paddles	
125 VAC	10 amps	15 amps	60% power factor
250 VAC	10 amps	15 amps	60% power factor



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Electronic Control Rocker >> Rocker Actuators are Ordered Separately <<

INCANDESCENT OR NON-LIGHTED DISPLAY



FEATURES

- Silver or gold contacts.
- 2 or 3 position operation.
- UL recognized, CSA certified.
- Lamps can be furnished installed or ordered separately.
- Lamp circuit independent of switch circuit.

Electrical Data	page 11
Rockers	page 39
Lamps	page 46
Accessories	pages 44/45
Mounting Dimensions	pages 47/50

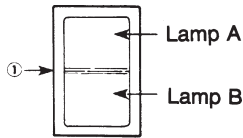


*AML24 Series: 1 pole and 2-pole only.

Rocker operators ordered separately.

AML24 ORDER GUIDE

AML24 E	B	A	2	AA	01
Housing Type	Bezel Color	Incandescent Lamp Type	Terminal Type	Circuitry Codes	Operating Action
AML24 E Rectangular Non-Lighted AML24 F Rectangular 1 Lamp Ckt. (A) AML24 G Rectangular 2 Lamp Ckts.	B Black	A No Lamp Installed B 6 V Lamp* C 14 V Lamp* E 28 V Lamp*	2 .110 × .020 (Solder or Quick-Connect) 3 .025 × .025 (Printed Ckt., or Push-on)	Insert Code letters as shown in Circuitry Chart	Insert Code numbers from Operating Action Chart



① The "MICRO SWITCH" identification is shown on this side of the switch housings.

* Lamps will be installed per each lamp circuit specified in the Housing Type.

Example: AML24EBA2AA01

Rectangular non-lighted rocker switch housing; black bezel; .110 × .020 terminals; with one circuit ON and one circuit OFF in each extreme operator position (maintained).

CIRCUITRY

Silver Contacts	Gold Contacts	2-Position	3-Position	
AA	BA			
AC	BC			
(Non-illuminated switches only)				
CA	DA			
CC	DC			
(Non-illuminated switches only)				

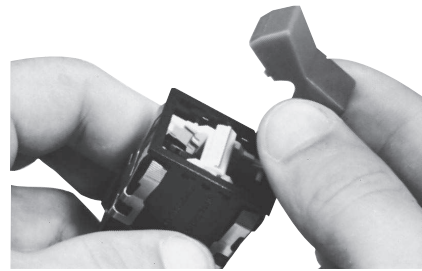
OPERATING ACTION

2-Position:		
Maint.	01 None	Maint.
Mom.	02 None	Maint.
Maint.	03 None	Mom.
3-Position:		
Maint.	04 Maint.	Maint.
Mom.	05 Maint.	Mom.
Maint.	06 Maint.	Mom.
Mom.	07 Maint.	Maint.

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Rocker Switch Operators

COLOR DISPLAY OPTIONS



Rocker operators are assembled to the switches by simply snapping them into recesses in the switch operator sockets.

Transmitted color — Color is displayed whether lamp is On or Off. Choice of 1-piece rockers (types 10 or 20) or rockers with clear cap and colored translucent insert (types 11 or 12).

Dead front hidden color/hidden legend — Rocker appears black with lamp Off. Legend and color appear when illuminated (types 30 or 40).

Projected color — Translucent white rocker with transparent colored insert (types 50 or 60). White rocker appears colored when illuminated.

AML54 ROCKER OPERATOR ORDER GUIDE (All possible color combinations may not be available.)

For AML14, AML24, AML34 incandescent or non-lighted display.

AML54-F	10	R	
Rocker Operator Type	Display/Legend Type	Rocker Color – See Note Below	
AML54-F	Transmitted Color	Full rocker, 1/2 rocker, or one side of two-piece rockers	Other side of two-piece rockers
 Full Rocker	10 No legend 20 With legend on cap	R Red Y Yellow G Green B Blue ***W White K* Black L* Gray A** Amber	R Red Y Yellow G Green B Blue ***W White K* Black L* Gray A** Amber
 1/2 Rocker	11 No legend 21 With legend on insert		
 Two-Piece Rocker	Dead Front † (Smoky gray cap and color insert) 30 No legend 40 With legend on insert ***Projected Color † (White cap and color insert) 50 No legend 60 With legend on cap		

NOTE: AML54-F10 and AML54-F20 are one-piece, one-color full rockers. Thus only one color code letter is necessary when ordering. Include a two letter code for all other AML54-E (and AML54-T) catalog listings.

* Not for lighted display.
 ** Not available with projected color or dead front.
 *** Insert is clear for projected color when "W" is used.
 † Not available for use with AML34 power switches.

Example: **AML54-F10R**
 Full rocker; with transmitted color, no legend; red.

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AML56 ROCKER OPERATOR ORDER GUIDE

For AML36 neon display.

AML56-N	10	R	Y
Rocker Operator Type	Display/Legend Type	Lens Color	Rocker Color
 Full Rocker with Colored Lens	Transmitted Color 10 No Legend 20 With Legend	T Clear R Red Y Yellow	R Red Y Yellow G Green B Blue W White K Black

AML56-N rockers have a colored lenticular lens window which extends over the neon lamp.

Example: **AML56-N10RY**
 Full rocker; with transmitted color, no legend; yellow rocker and red lens.

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Barriers/Panel Seal Accessories

AML71 BARRIERS

When mounting an individual unit, an end barrier is attached to each side of the housing. The center barrier is used in a slot mount array.

FEATURES

- Barriers separate individually mounted switches and indicators — help prevent inadvertent actuation of two pushbutton switches with a single push.
- Front of panel mounting simplifies installation.

AML71 BARRIER ORDER GUIDE (See notes)

Barriers shown in order guide are black.

Barrier Length	Type	Catalog Listing
Short (For use with square devices and short side of rectangular devices.)	Center	AML71SCB
	End	AML71SEB
Long (For use with long side of rectangular devices.)	Center	AML71LCB
	End	AML71LEB

Notes:

Not for use with AML61 mounting hardware or any full guard bezel products.
Not for use with AML41J, K, or L lens type indicators; or AML45 annunciators.

FEATURES

- AML75 panel seals fit pushbutton switches and indicators.
- Provides protection from contamination from accidental beverage spills, dust, and dirt.
- Easy to install, without tools
- No effect on display color, light intensity, or legend quality.
- Replace seal or change lamps without removing switch from panel.
- For .19-inch standard height square or rectangular pushbuttons.
- Mounting dimensions page 53.

The design complements AML's functional appearance, creating a pleasing framed effect around the button. It consists of a matte black plastic base which press-fits between the panel and switch bezel, and a transparent flexible seal which snaps into the base. PK 8521, shipped with each order, provides installation instructions.

Button colors and legends can be viewed without distortion whether lighted or unlighted. Seals can be conveniently replaced or removed for relamping, without removing the switch from panel.

Operating temperature range is 32° to 131°F (0° to 55°C).

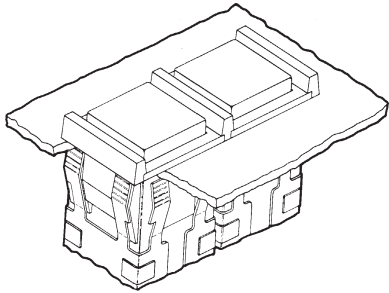
AML75 PANEL SEAL ORDER GUIDE

Description	For Use With:		
	Square .19" high pushbuttons	Rectangular .19" high pushbuttons	Rockers
Base & Seal	AML75ABC	AML75BBC	AML75RBC

Notes:

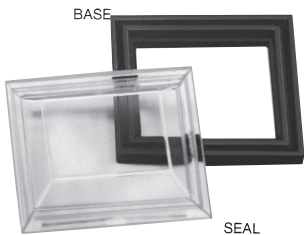
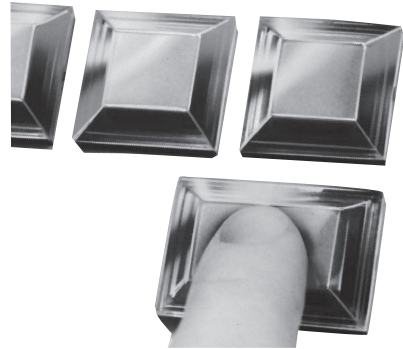
Multiple units should not be mounted in a single slot, since this would create an unsealed space between each unit. AML75 seals are not for use with barriers,

full guard bezels, AML61 mounting hardware, AML45 annunciators, or AML41J, K, or L lens type indicators.



Drawing shows two switches, slot mounted. From left to right: one center barrier, a second switch, plus another end barrier to complete the arrangement.

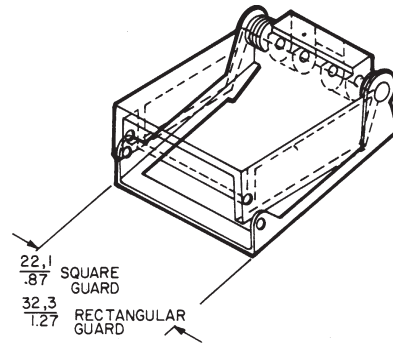
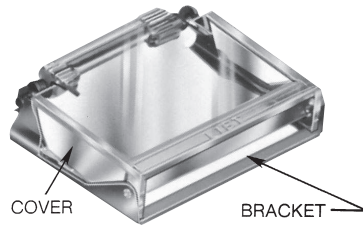
AML75 PANEL SEAL



MATERIAL
Base: Polypropylene
Cap: Polyvinyl Chloride

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Switch Guard/Panel Plugs, Dummy Housings



FEATURES

- Button cannot be operated when switch guard cover is closed, preventing accidental operation
- Wire lock-down feature further prevents unintentional actuation of the switch.
- Lamps can be replaced with the switch guard attached, without special tools, saving maintenance time
- Can be used with alternate or momentary action square or rectangular .19 inch standard height AML buttons
- Shock resistant construction, for long, maintenance-free life

AML76 switch guard protects square and rectangular .19-inch standard height pushbuttons from inadvertent actuation. It is for use with standard bezel type switches only.

See page 53 for mounting dimensions.

The switch guard cover is clear, polycarbonate thermoplastic through which the button is easily visible. The word "lift" is molded onto the top front edge of the guard. The bracket is bright-finished stainless steel.

The switch guard may be assembled to the AML pushbutton before the switch is installed in a panel. Or, the guard can be assembled to a pushbutton already mounted in a panel, providing the wiring is sufficiently slack to raise the switch bezel above the panel; and if there is sufficient clearance with adjacent units. PK 8522 contains installation instructions and is shipped with each order.

AML switch guards may be mounted in horizontal or vertical matrices. A wire lock-down feature, using .020-inch diameter locking wire, may be used as an additional protection.

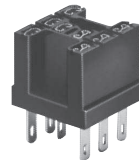
SWITCH GUARD ORDER GUIDE

Guard Type*	Catalog Listing
Square	AML76C10T01P
Rectangular	AML76F10T01P

* The word "LIFT" is molded into the cover. If other languages are desired contact the 800 number.

Note: Switch guard is not designed for use with AML61 mounting hardware, AML71 barriers, or full guard bezel switches.

CONNECTOR BLOCK

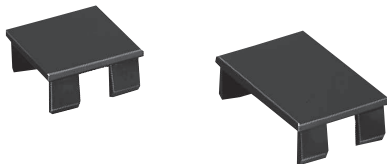


AML79CC

This connector block can be used with square 1 and 2 pole AML21 and AML22 switches with .110 x .020 terminals to enable plug-in wiring.

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AML78 PANEL PLUGS



Plastic panel plugs (shown above) enable the user to provide for future needs by punching extra panel holes. Finished in matte black, they are the same height as the standard AML bezel when snapped in place from the panel front.

Panel plugs are only for use in individual holes or with AML61 mounting hardware in multi-station strips. (Use dummy housings in strip cutouts without AML61 mounting hardware.)

PANEL PLUG ORDER GUIDE

Plug Type	Catalog Listing
Square	AML78CB
Rectangular	AML78FB

AML78 DUMMY HOUSINGS

Dummy housings can be used to provide for expansion needs in strip cutouts without AML61 mounting hardware. They have mounting clips, but there is no provision for switching or illumination.

DUMMY HOUSING ORDER GUIDE

Dummy Housing Type*	Catalog Listing
Rectangular (Pushbutton style)	AML78F100
Rectangular (Lens indicator style)	AML78J100

* Order AML51 Buttons/lenses for use with dummy housings.

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Lamps, Soldering Recommendations, Receptacles

AML91 LAMP ORDER GUIDE

Lamp Type	Industry Lamp No.	Voltage	Catalog Listing
Incandescent T-1-3/4 wedge base	86	6.3	AML91LA86
	73	14.0	AML91LA73
	85	28.0	AML91LA85

LAMP DATA

The following data was compiled from manufacturer's specifications, for reference only.

INCANDESCENT LAMPS

Industry Lamp No.	Volts	Amps	Watts	MSCP	Life A/C Volts
86	6.3	.200	1.25	.49	20,000 hours
	5.5	.185	1.12	.246	106,200 hours
	5.0	.177	.89	.185	290,000 hours
73	14.0	.080	1.12	.30	15,000 hours
	12.0	.077	1.00	.23	36,450 hours
85	28.0	.04	1.12	.30	7,000 hours
	24.0	.037	.89	.177	41,860 hours

Neon Lamps

25,000 hours (half life)

INTEGRAL LEDs

LEDs Furnished Permanently Installed in These Products	V _f	I _f	V _{PD}	Peak Inverse Voltage	
				w/o Diode Protection	w/Diode Protection
AML12, 15, 16, 22, 25, 26, 42	2.4 V	20 mA	.7 V	5 V	34 V
AML45	2.4 V	20 mA	.7 V	4 V	33 V

100,000 hours (half life).

AML92 SERIES LEDs



For use with these AML switches and indicators equipped with lamp sockets:

Pushbutton switches: AML11 (Square Only)*, AML21 (rectangular and square), and AML31.

Paddle switches: AML31/23/33

Rocker switches: AML14/24/34

Indicators: AML41

* Rectangular solid state with one or two lamp circuits cannot be used with LED catalog listings ending in "L".

AML92 ORDER GUIDE

LED Color	Quad Chip	Six Chip
Red	AML92ERY	AML92ERL
Green	AML92EGY	AML92EGL
Yellow	AML92EYY	AML92EYL
White	—	AML92EWL**

** For use with white or yellow buttons.

OPERATING CHARACTERISTICS

Type	V _f Fwd. Voltage (typ.)				I _f Fwd. Current	V _R Rev. Voltage
	Yellow	Green	Red	White		
Quad Chip	8.6	8.6	7.8	—	15 mA	16 V
Six Chip	4 V	4 V	4 V	4 V	50 mA	5.6 V

TEMPERATURE RANGE

(Quad Chip or Six Chip)

Operating: -20 to 60°C (-4 to 140°F)

Storage: -30 to 100°C (-22 to 212°F)

SOLDERING RECOMMENDATIONS

All terminals are solder plated. Proper soldering and cleaning procedures must be followed to maintain the reliability of AML products during installation. An instruction sheet which outlines these procedures is included with AML shipments. You may also obtain a copy from your MICRO SWITCH Sales Office. Request PK 8518.

As a general guide, the following information may be used:

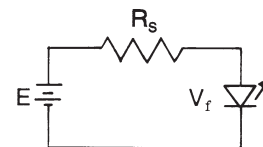
Use a 280°C (538°F) solder iron tip, up to 6 seconds duration, with a 60-40 rosin core solder. This allows the terminal to heat quickly on the exterior of the housing only, and greatly reduces the chance of flux migrating inside the housing.

LED APPLICATION INFORMATION

For those devices without internal current limiting resistors, suitable external control of the LED current must be provided. It is recommended that a minimum of 5 VDC open circuit voltage with an appropriate series resistance be used to drive LED devices. This minimizes the effect of temperature (current variation) on forward voltage of the LED.

Resistor values can be determined by supply voltage or current for LED:

$$R_s = \frac{E - V_f}{I_f}$$



WHERE: R_s = Series Resistance

E = Supply Voltage

V_f = Forward Voltage of LED

I_f = Circuit Current

If a diode is added in series for reverse polarity protection then:

$$R_s = \frac{E - V_f - V_{PD}}{I_f}$$

WHERE: V_{PD} Forward Voltage of Protection Diode

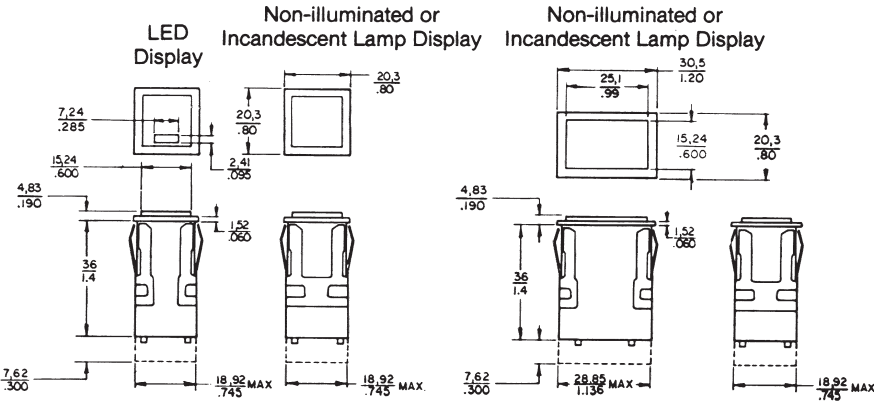
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Mounting Dimensions (For Reference Only)

AML11/12 and 21/22 SWITCHES
AML41C/D and AML42C INDICATORS

Note: Top of full guard bezel housing
 .19/5,0 from panel.

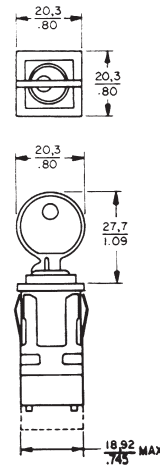
PUSHBUTTONS



For terminal locations, see page 49.

AML27 SWITCHES

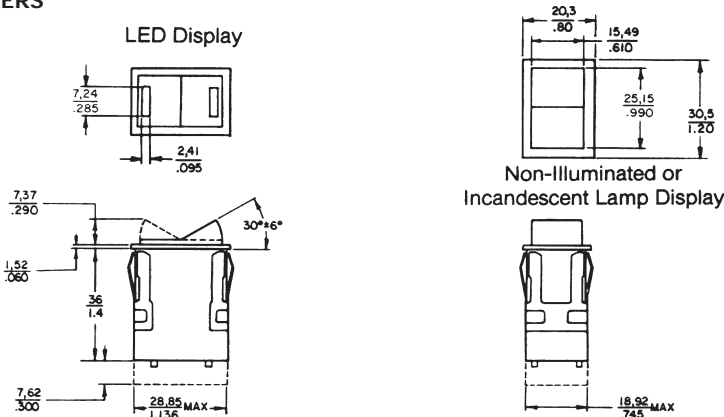
KEYLOCK



For terminal locations, see page 50.

AML14/16 and AML24/26 SWITCHES

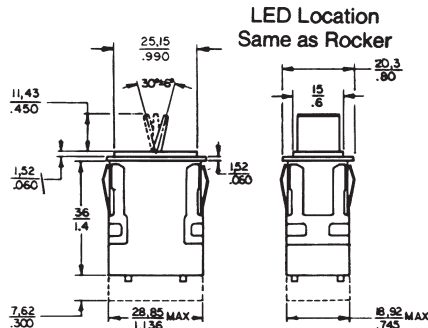
ROCKERS



For terminal locations, see page 49/50.

AML13/15 and 23/25 SWITCHES

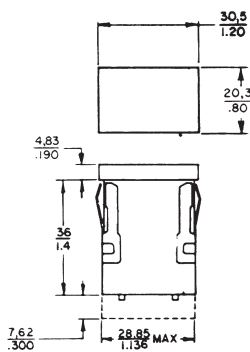
PADDLES



For terminal locations, see page 49/50.

AML41 INDICATOR

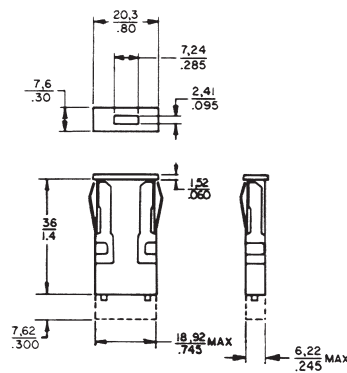
LENS STYLE



For terminal locations, see page 50.

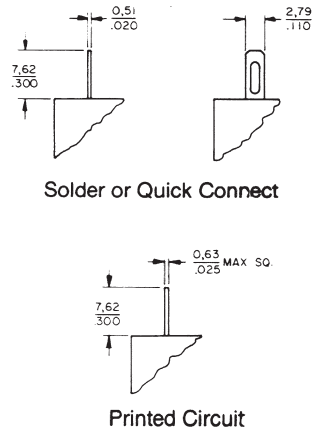
AML42 INDICATOR

MINIATURE



NOTE
 1 Dimensions are mm or mm/IN
 IN

TERMINAL TYPES



Solder Hole will accept two #22 AWG
 Stranded Conductor (per NEMA publication
 DC-2 1976)

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Manual Switches

Mounting Dimensions (For Reference Only)

AML Series

TERMINAL LOCATIONS FOR AML20 SWITCHES

