

# Varimec™

Round or square caps •  
variable total and above recess heights



## DISTINCTIVE FEATURES

Round or square cap: 5.2 mm, 7.8 mm, 11.6 mm

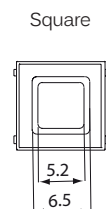
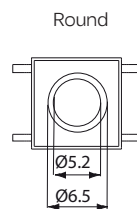
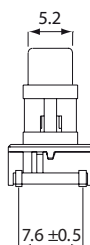
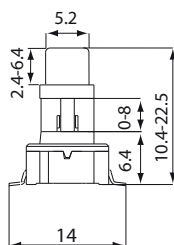
10 total height options 10.4 - 22.5 mm

8 above recess height options 2.4 - 6.4 mm

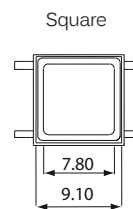
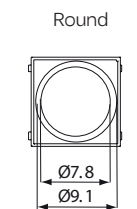
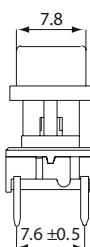
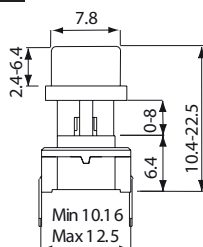


SWITCH SPECIFICATIONS : see Multimec™ 3 series.

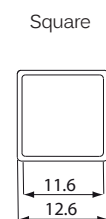
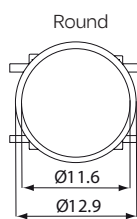
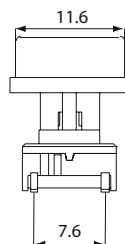
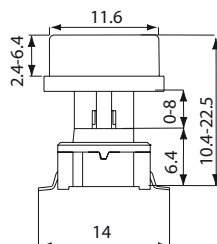
### 3E+5.2



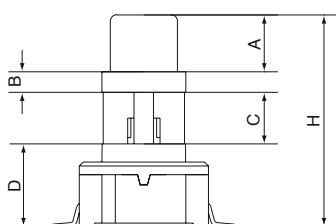
### 3E+7.8



### 3E+11.6



## THE CONCEPT



- H= Overall heights from 10.4-22.5
- A= Variable height from 2.4 to 6.4  
H has to exceed A with min. 8.0
- B= Fixed recess 1.6
- D= Fixed switch 6.4
- C= Variable from 0-8.1  
C=H-A-B-D
- All measurements in mm

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## BUILD YOUR PART NUMBER

### ROUND

| SERIES | MOUNTING                            | SHAPE AND SIZE                       | COLOR                                                 | OVERALL HEIGHT H                                                                                 | HEIGHT ABOVE RECESS A                                                | TAPE       |
|--------|-------------------------------------|--------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------|
| 3E     | TH through-hole<br>SH surface mount | A Ø5.2 mm<br>E Ø7.8 mm<br>K Ø11.6 mm | 60 blue<br>63 grey<br>64 yellow<br>68 red<br>69 black | A 10.4<br>B 11.0<br>C 12.0<br>D 12.5<br>E 13.0<br>F 14.0<br>G 15.0<br>H 16.0<br>J 19.0<br>K 22.5 | A 2.4<br>B 3.0<br>C 3.5<br>D 4.0<br>E 4.5<br>F 5.0<br>G 5.6<br>H 6.4 | R optional |

### SQUARE

| SERIES | MOUNTING                            | SHAPE AND SIZE                    | COLOR                                                 | OVERALL HEIGHT H                                                                                 | HEIGHT ABOVE RECESS A                                                | TAPE       |
|--------|-------------------------------------|-----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------|
| 3E     | TH through-hole<br>SH surface mount | B 5.2 mm<br>F 7.8 mm<br>L 11.6 mm | 60 blue<br>63 grey<br>64 yellow<br>68 red<br>69 black | A 10.4<br>B 11.0<br>C 12.0<br>D 12.5<br>E 13.0<br>F 14.0<br>G 15.0<br>H 16.0<br>J 19.0<br>K 22.5 | A 2.4<br>B 3.0<br>C 3.5<br>D 4.0<br>E 4.5<br>F 5.0<br>G 5.6<br>H 6.4 | R optional |

**NOTICE :** please note that not all combinations of above numbers are available. Contact APEM for further information.



## MOUNTING

- Panel cut-out :  
5.2 mm : min. Ø5.6 / 5.6x5.6 mm  
7.8 mm : min. Ø8.2 / 8.2x8.2 mm  
11.6 mm : min. Ø12.0 / 12.0x12.0 mm
- Switch spacing AxB :  
5.2 & 7.8 mm : min. 12.7x10.3 mm  
11.6 mm : min. 12.9 x 12.9 mm



## MATERIALS

- Cap :  
- solid color : polyamide UL94V2



## STANDARD LEGENDS

| STANDARD LEGENDS |       |         |                       |      |             |      |      |                         |                 |
|------------------|-------|---------|-----------------------|------|-------------|------|------|-------------------------|-----------------|
| LEGEND           | 1D09_ | 1F096R_ | 1ZB09D_<br>1ZB16DLMH_ | 1ZC_ | 1Z_<br>1ZW_ | 10A_ | 10C_ | 10R_ & 10RF_<br>10RM16_ | 10Q_<br>10QM16_ |
| 0                | 000   | 000     |                       |      |             |      |      |                         |                 |
| 1                | 001   | 001     |                       |      |             |      |      |                         |                 |
| 2                | 002   | 002     |                       |      |             |      |      |                         |                 |
| 3                | 003   | 003     |                       |      |             |      |      |                         |                 |
| 4                | 004   | 004     |                       |      |             |      |      |                         |                 |
| 5                | 005   | 005     |                       |      |             |      |      |                         |                 |
| 6                | 006   | 006     |                       |      |             |      |      |                         |                 |
| 7                | 007   | 007     |                       |      |             |      |      |                         |                 |
| 8                | 008   | 008     |                       |      |             |      |      |                         |                 |
| 9                | 009   | 009     |                       |      |             |      |      |                         |                 |
| #                | 107   | 107     |                       |      |             |      |      |                         |                 |
| *                | 019   | 019     |                       |      |             |      |      |                         |                 |
| ←                | 033   |         |                       |      |             |      |      |                         |                 |
| →                | 133   |         |                       |      |             |      |      |                         |                 |
| ↑                | 034   |         |                       |      |             |      |      |                         |                 |
| ↓                | 134   |         |                       |      |             |      |      |                         |                 |
| ↙                | 135   | 135     |                       |      |             |      |      |                         |                 |
| +                |       |         |                       |      |             | 054  |      | 054                     | 054             |
| -                |       |         |                       |      |             | 059  |      | 059                     | 059             |
| ▲                |       |         | 136                   |      | 136         | 136  |      |                         |                 |
| ⏻                | 123   | 123     |                       | 123* | 123         |      | 123  | 123                     | 123             |
| ON/OFF           |       |         |                       |      |             |      |      | 017                     | 017             |
| STOP             |       |         |                       |      |             |      |      | 018                     | 018             |
| START            |       |         |                       |      |             |      |      | 031                     | 031             |
| RESET            |       |         |                       | 038  |             |      |      | 038                     | 038             |
| CANCEL           |       |         |                       |      |             |      |      | 048                     | 048             |
| ENTER            |       |         |                       |      |             |      |      | 105                     | 105             |
| ESC              |       |         |                       | 051  |             |      |      |                         |                 |
| ON               |       |         |                       |      |             | 116  |      |                         |                 |
| OFF              |       |         |                       |      |             | 117  |      |                         |                 |
| OK               |       |         |                       | 118* | 118         |      | 118  | 118                     | 118             |
| SET              |       |         |                       | 119  |             |      |      |                         |                 |
| MENU             |       |         |                       | 120  |             |      |      |                         |                 |
| FUNC             |       |         |                       | 121  |             |      |      |                         |                 |
| HOME             |       |         |                       | 122  |             |      |      |                         |                 |

### STANDARD OPTIONS

- 1D: pad printed
- 1F: reverse printed
- 1ZB: pad printed / laser marked
- 1ZC: pad printed \*reverse printed \*laser marked
- 1Z & 1ZW: pad printed / laser marked

- 10A: pad printed / laser marked
- 10C: pad printed / laser marked
- 10R(F) & 10Q: pad printed / reverse printed
- 10RM & 10QM: metal symbol

# Legends

Available for Multimec caps

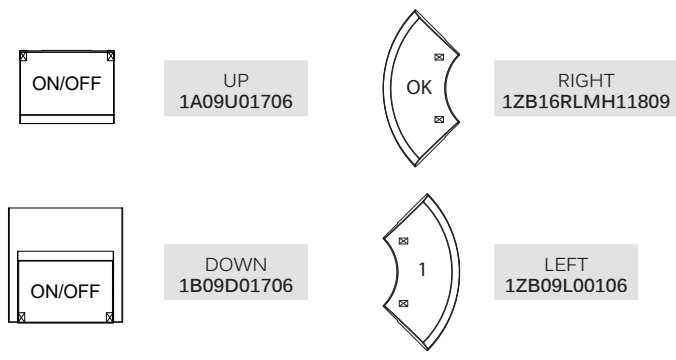


## HOW TO ORDER

### POSITIONING OF LEGENDS ON ROCKER-ACTION CAPS

When ordering legends for caps with hinge-type cap retention system, it is important to note the position of the cap. An extra letter (U, D, R or L) needs to be added to the part number to refer to the position of the hinges in relation to the legend. See samples:

Rocker-action caps without a lens: 1A, 1B, 1M, 1ZA and 1ZB



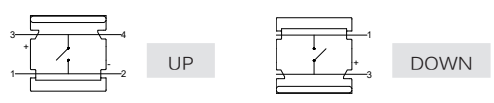
### STANDARD AND CUSTOM LEGENDS

- Standard are only certain legends on certain caps. See the table on the previous page.
- All standard pad-printed legends are white on black caps.
- All standard reverse-printed and laser marked legends are black on frosted white cap.

### LEGEND ILLUMINATION

- **Option 1 - laser marked:** In case of laser marked legends an "LM" is added after the cap colour, before the legend code. We recommend using hard paint (additional "H" ) for increased lifetime of the paint. E.g. 1ZB16DLMH13609
- **Option 2 - reverse printed:** In case of reverse printed caps an "R" is added after the cap colour, before the legend code. Especially relevant when standard legends have both negative and positive print options. E.g. 1FS096R00009
- **Option 3 - metal symbol:** Only available for 10RM and 10QM (therefore the "M"). E.g. 10RM16059

### ORIENTATION OF THE SWITCH



### STANDARD LEGENDS

| CAP | CAP COLOR        | DIRECTION* | TYPE*                          | LEGEND  | LEGEND COLOR*  |
|-----|------------------|------------|--------------------------------|---------|----------------|
| 1D  | 00 Blue          | D Down     | UV UV printed                  | 001 1   | 00 Blue        |
| 1F  | 02 Green         | U Up       | LM Laser marked on soft paint  | 002 2   | 03 Grey        |
| ... | 03 Grey          | R Right    | LMH Laser marked on hard paint | 003 3   | 06 White       |
|     | 04 Yellow        | L Left     | R Reverse printed              | ... etc | 08 Red         |
|     | 06 White         |            |                                |         | 09 Black       |
|     | 08 Red           |            |                                |         | MC Multi color |
|     | 09 Black         |            |                                |         | ... Etc        |
|     | 16 Frosted white |            |                                |         |                |
|     | ... Etc          |            |                                |         |                |

\*In case of reverse printed and laser marked legends the colour of the paint

**Notice:** The size of the legends listed may not correspond to the actual size.  
If you decide to use one of the standard legends without any adjustments (without a new cliché or programming) on another cap than designated in the table, then there is no cliché or programming cost, for this to apply the cap has to be black and the print white.  
For further information on legends please contact APEM.

# Solid colors

Available for Multimec caps

|          |                                                                                     | Colour / RAL Code |              |             |               |              |            |              |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
|----------|-------------------------------------------------------------------------------------|-------------------|--------------|-------------|---------------|--------------|------------|--------------|-------------------|-------------------|------------------|--------------|---------------------|------------------|-------------------|------------------|-------------------------------|--------------------------------|-------------------------------|------------------------------|
|          |                                                                                     | Blue / 5012       | green / 6018 | Grey / 7004 | Yellow / 1023 | White / 9010 | Red / 3000 | Black / 9004 | Ultra blue / 5002 | Mint green / 6029 | Tele grey / 7046 | Melon / 1028 | Signal white / 9003 | Noble red / 3002 | Dusty blue / 5014 | Aqua blue / 5021 | Metal dark blue / No ral code | Metal light grey / No ral code | Metal dark grey / No ral code | Metal bordeaux / No ral code |
| CAP      | CODE                                                                                | 00                | 02           | 03          | 04            | 06           | 08         | 09           | 30                | 32                | 33               | 34           | 36                  | 38               | 40                | 42               | 50                            | 53                             | 57                            | 58                           |
| 1A       |    | •                 | •            | •           | •             | •            | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1B       |    | •                 | •            | •           | •             | •            | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1D       |    | •                 | •            | •           | •             | •            | •          | •            | •                 | •                 | •                | •            |                     | •                | •                 | •                | •                             | •                              | •                             | •                            |
| 1E/1F    |    |                   |              | •           |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1GA/1GC  |    |                   |              |             |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1H       |    |                   |              | •           |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1K       |    | •                 | •            | •           | •             | •            | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1M       |   |                   | •            | •           |               |              | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1N       |  |                   |              | •           |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1P       |  | •                 | •            | •           | •             | •            | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1Q       |  | •                 |              | •           |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1R       |  |                   |              | •           |               |              |            |              |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1S       |  | •                 | •            | •           | •             | •            | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1T/1U/1V |  | •                 |              | •           |               |              | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1WA/ 1WD |  |                   |              | •           |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1X       |  |                   |              | •           |               | •            |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| 1ZA      |  |                   |              | •           |               | •            |            | •            | •                 |                   |                  |              |                     |                  | •                 | •                | •                             | •                              | •                             | •                            |
| 1ZB      |  |                   |              | •           |               | •            |            | •            | •                 |                   |                  |              |                     |                  | •                 | •                | •                             | •                              | •                             | •                            |
| 1ZC      |  |                   |              | •           |               | •            | •          | •            | •                 |                   |                  |              |                     |                  | •                 | •                | •                             | •                              | •                             | •                            |
| 10A      |  |                   |              | •           |               |              | •          | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |
| AQC      |                                                                                     |                   |              |             |               |              |            | •            |                   |                   |                  |              |                     |                  |                   |                  |                               |                                |                               |                              |

The RAL Codes mentioned are the codes nearest to the solid colors in the multimec™ range.

\*3E actuators and Varimec use different materials and therefor have a different color code and are not represented in this table

# Cap & Bezel Specifications

Multimec™ caps

| ACCESSORY SPECIFICATIONS |                                                                                                                                                                          |                          |           |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------|
| MATERIAL                 | PARTS                                                                                                                                                                    | TEMP. LIMIT              | UL RATING |
| ABS                      | Solid color 1A, 1B, 1D, 1E, 1F, 1H, 1K, 1M, 1N, 1P, 1Q, 1R, 1T, 1U, 1V, 1WA, 1WD, 1X, 1ZA, 1ZB, 1ZC and AQC<br>Bezels 2C, 2D and 2K, reflectors for 1KB, 1KC, 1Y and 1YA | Max 65 °C<br>Max 149 °F  | UL94HB    |
| Polycarbonate            | All lenses and transparent colour caps, lids for 1KB & 1KC                                                                                                               | Max 85 °C<br>Max 185 °F  | UL94HB    |
| Polyamide                | 1GA, 1GC, 1S and 2S                                                                                                                                                      | Max 160 °C<br>Max 320 °F | UL94V2    |
| Legends adhesion         | DS/EN ISO 2409 Class 1 & ASTM D3359 Class 4B                                                                                                                             |                          |           |

# Multimec™ 3E

High performance tactile switches •  
robust



## DISTINCTIVE FEATURES

10 x 10 mm; h=6.4 mm

Variable height options with 3E actuators and Varimec caps



## ENVIRONMENTAL SPECIFICATIONS

- Sealing : IP67 according to IEC 60529
- Working and storage temperature : -40 °C/+160 °C (-40 °F to +320 °F)
- Soldering :
  - through-hole : IEC 60068-2-20 8
  - surface mount : JEDEC J-STD-020E



## ELECTRICAL SPECIFICATIONS

- Recommended load :
  - Gold contacts : 0.5µ-50 mA 24 VDC
  - Silver contacts : 0.5-50 mA 24 VDC
- Contact resistance : <30 mΩ - typically 10 mΩ
- Insulation resistance : >10 MΩ
- Contact bounce : <2 mS - typically 0.5 mS



## MECHANICAL SPECIFICATIONS

- Standard actuation force : 3.5 N
- Max. actuation force : 100 N for 10 sec
- Travel : 1 mm
- Lifetime : >10,000,000 cycles

The company reserves the right to change specifications without notice.



## MATERIALS

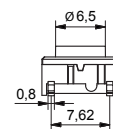
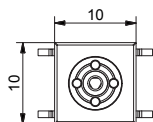
- Housing : PPS UL94V0
- Actuator : PPS UL94V0
- Sealing : Silicone rubber
- Contacts spring : Stainless steel
  - Silver : +3 µAg
  - Gold : +1 µAu
- Fixed contacts :
  - Silver : SnCu + 2 µNI + 3 µAg
  - Gold : SnCu + 2 µNI + 1 µAu
- Terminals : SnCu + 2 µNI + 3 µSn100

All tolerance if not otherwise specified ±0.2 mm.

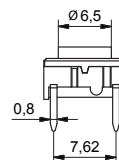
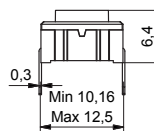
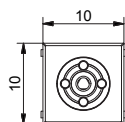
# Multimec® 3E

High performance tactile switches • robust

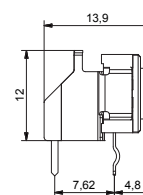
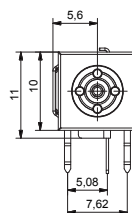
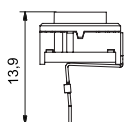
## 3E - SMD



## 3E - TH

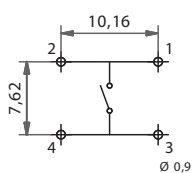


## 3E - RAS

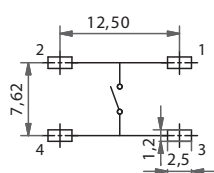


## PCB LAYOUT & CIRCUIT DIAGRAM

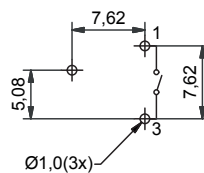
TH



SMD



RAS

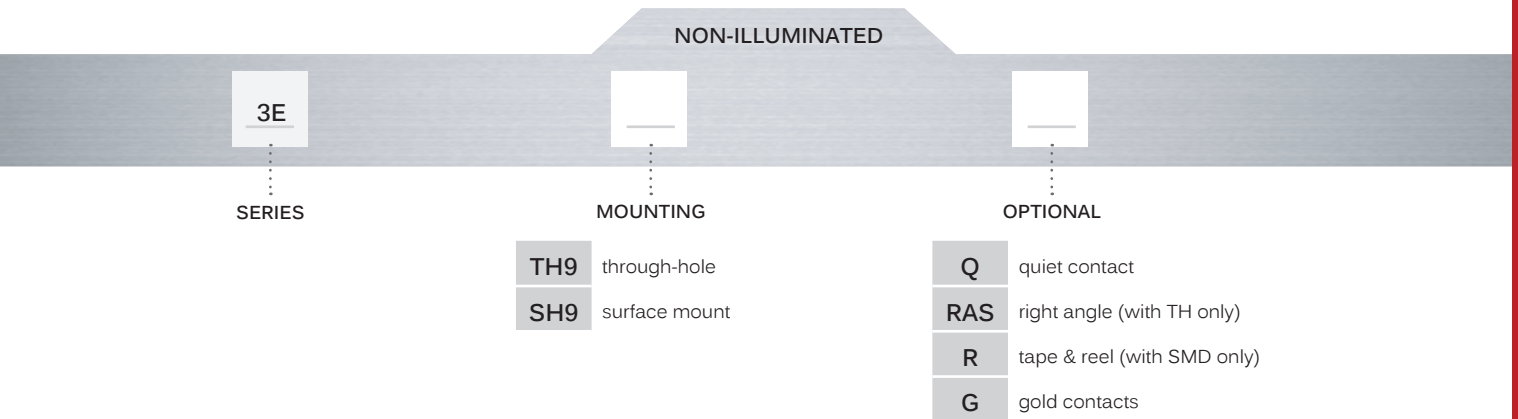


# Multimec® 3E

High performance tactile switches •  
robust



## BUILD YOUR PART NUMBER



## ABOUT THIS SERIES



**Caps and accessories :** for the full range of accessories for Multimec™ 3E please see the website.

# Multimec™ 3E

High performance tactile switches • robust



## TAPE & REEL

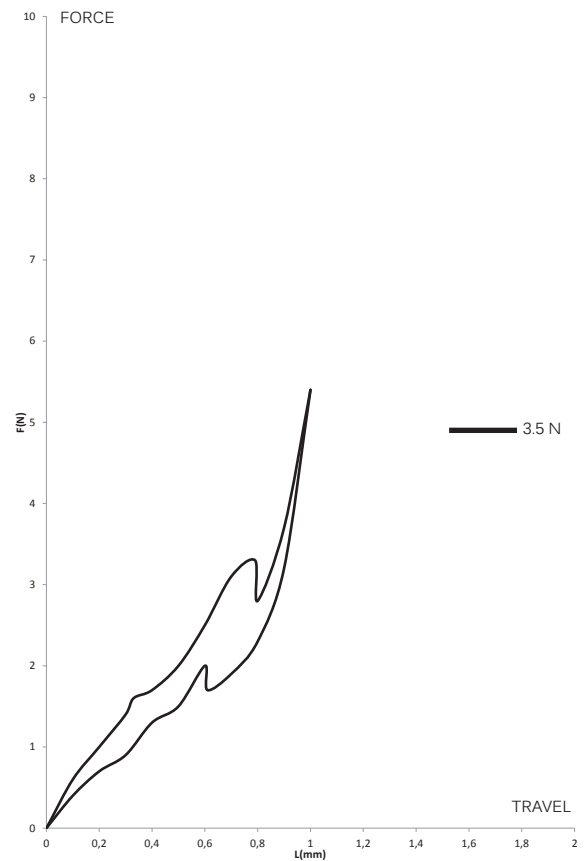
Tape and reel is available for the parts listed and has the following specifications

- Reel diameter: Ø330 mm
- Tape width: 24 mm
- Pitch: see list
- Tape and reel material: antistatic or better
- Quantity per reel: see list

| PART NO.                                     | ORDERING CODE | PITCH | QUANTITY PER REEL |
|----------------------------------------------|---------------|-------|-------------------|
| 3ESH9                                        | 3ESH9R        | 16    | 500               |
| 3ESH9-08.0                                   | 3ESH9R08.0    | 20    | 250               |
| 3ESH9-09.5                                   | 3ESH9R09.5    | 20    | 250               |
| 3ESH9-10.4                                   | 3ESH9R10.4    | 20    | 250               |
| 3ESH9-11.0                                   | 3ESH9R11.0    | 20    | 250               |
| 3ESH9-12.0                                   | 3ESH9R12.0    | 20    | 250               |
| All Varimec below 12.5; R after the part no. |               | 20    | 250               |



## OPERATING FORCE



## MOUNTING

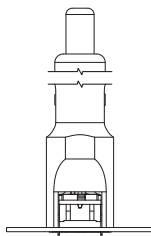
MOUNTING TOOLS FOR MULTIMEC™ THROUGH-HOLE SWITCHES



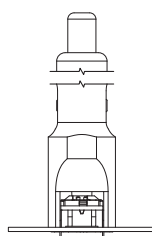
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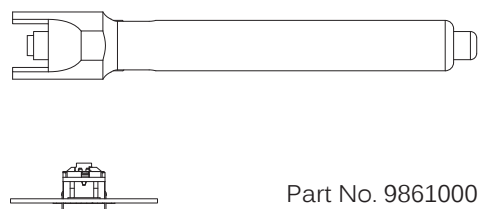
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3



4



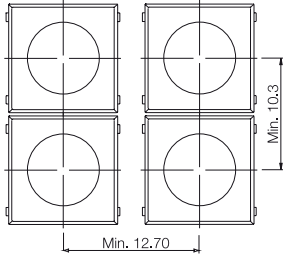
5

Part No. 9861000

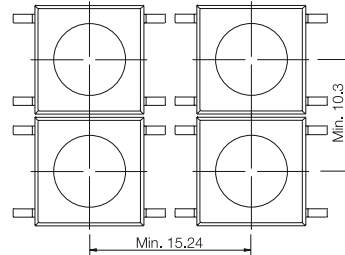


## MOUNTING (CONTINUED)

### SPACE REQUIREMENT - MATRIX MOUNTING

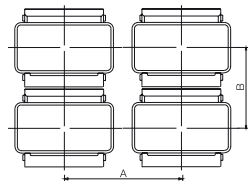


Through-hole (TH)

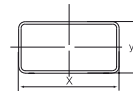


Surface mount (SMD)

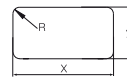
### SPACE REQUIREMENT - SWITCH/CAP



Switch spacing



Cap dimensions



Panel cut-out

| CAP SERIES   | RECOMMENDED<br>MIN.SWITCH SPACING AxB     | NOMINAL CAP DIMENSION<br>WxH                                | RECOMMENDED<br>MIN. PANEL CUT-CUT                           |
|--------------|-------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| 3E ACTUATORS | 12.7 x 10.3                               | Ø6.5                                                        | Ø7.0                                                        |
| VARIMEC      | 12.7 x 10.3<br>12.7 x 10.3<br>12.9 x 12.9 | Ø5.2 / 5.2 x 5.2<br>Ø7.8 / 7.8 x 7.8<br>Ø11.6 / 11.6 x 11.6 | Ø5.6 / 5.6 x 5.6<br>Ø8.2 / 8.2 x 8.2<br>Ø12.0 / 12.0 x 12.0 |

# Multimec™ 3E

High performance tactile switches • robust



## USAGE GUIDELINES

### HOW TO GET THE BEST RESULTS WITH MEC SWITCHES ?

These guidelines are offered to users of MEC Switches as an aid to ensure successful and reliable switch operation. Please see the technical specifications for details on operating and storage temperatures and soldering guidelines to make sure you select the best switch for your application. When reflow soldering is taking place, MEC strongly recommend that the temperature profile is analyzed and compared with the temperature rating of the switch. It is also important to monitor the accumulated heat buildup from both the pre-heat zones and the solder zone.

The 3E actuators and Varimec caps are, however, made of high temperature materials and will meet the same temperature specifications as the switches. For accessories made from other plastic materials please see multimec® and unimec™ technical specifications.

### MOUNTING AND DISMOUNTING

If switches are to be mounted in rows it is essential that the recommendations regarding spacing are followed. PC board thickness should be  $1.4 \pm 0.2$  mm and terminal hole diameter should be 0.9 mm.

Once 3E actuators are installed they are not designed to be removed. To do so may cause damage to the switch and the PC board if not done very carefully.

A mounting tool is available for through hole multimec™ 3 series switches.

### SOLDERING AND CLEANING MULTIMEC™ 3 SERIES

Multimec™ 3 series switches are fully sealed to IP67 specifications to prevent solder flux and aqueous based cleaning solutions from entering the switch and contaminating the contacts. The switches can be placed on the PC board with other components and reflow soldered. Multimec™ 3 series offers a high level of sealing, however, with aqueous solvent solutions care must be taken to avoid the worst case situation with water jets, complete immersion into a liquid with a temperature below the board or surface tension reducing additives.

Recommended cleaning methods are demineralized water. Any surface tension reducing agents, such as soap, must not be used as they risk causing a potential leakage of the switch.

### SOLDERING - THROUGH HOLE VERSIONS

Hand soldering: max. 350 °C for max. 3 sec

**Wave soldering:** heat built up in the switch during pre-heating and soldering must not exceed the maximum operating temperature of the switch. Peak temperature must not exceed 260 °C, and soldering time is max 10 sec. (IEC 60068-2-20 8)

### SOLDERING - SURFACE MOUNT VERSIONS

For all methods - infrared, convection and vapor phase. The upper limit 240 °C/40 sec must be observed. The soldering temperature profile must have moderate temperature gradients. (JEDEC J-STD-020E)

### ROHS COMPLIANCE

As of 1 July 2006 MEC has completed the conversion to RoHS compliance. For more info please see our homepage [www.apem.com](http://www.apem.com)

### TEMPERATURE LIMITS:

|             |        |
|-------------|--------|
| Switch      | 160 °C |
| Accessories | 160 °C |

### PACKAGING

Multimec™ 3 series switches are packed in rigid tubes of 50 pieces each.

A box contains 1.000 pcs.

The surface mount versions of multimec™ 3 series switches with a height up to 12.5 mm can also be delivered on tape/reel.

Each reel contains 250/500 pcs.

Right angle switches are packed into trays.

Each tray contains 100 pcs.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Apem:](#)

[3E-E69DA](#) [3E-E69CA](#) [3E-A69BA](#)