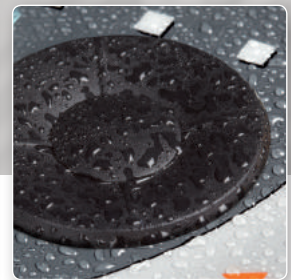
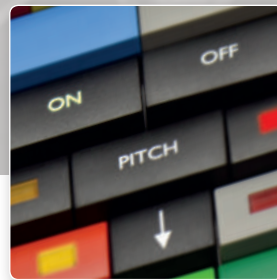


# switches



**SINCE 1938**  
**DANISH DESIGN**  
**IN-HOUSE R&D AND PRODUCTION**  
**IN-LINE QUALITY CONTROL**

Since its foundation in 1938, MEC has been making state-of-the-art electromechanical components.

Located in a suburb of Copenhagen, Denmark, MEC has earned a reputation as one of the leading European manufacturers of high performance tactile switches.

A wealth of know-how has been built up over the years for the benefit of innovative product development and custom solutions.

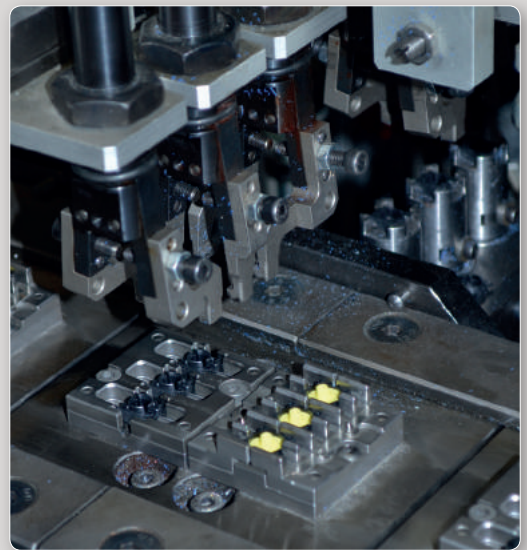
Despite the trend of outsourcing it has been MEC policy to maintain a high degree of vertical integration that enables us to react promptly to customer requests. 98% of all the parts used in MEC switches are produced in-house.

With 100% in-line inspection, tight tolerance on all parts and use of only quality materials we position ourselves to reach the highest achievable level within high performance tactile switches.

The vertical integration combined with a strong R&D facility enables us to provide custom designs from conception to completion.

To be part of a sustainable industrialised world environmental consciousness is crucial. At MEC we have substituted materials to more environmental-friendly alternatives and are recycling as much as possible. Legal authorities are auditing our environmental management system regularly and confirming that our goal is being reached. All MEC products are RoHS compatible.

MEC have a well established global distribution network that provides a presence in all parts of the world where electronic manufacturing takes place. Through close contact and continuous product training offered to our distributors we maintain a highly qualified and responsive global distribution network.



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# Caps and accessories series

## Selection guide

|                    | NON-ILLUMINATED   | NON-ILLUMINATED & ILLUMINATED   |   |  |   | ILLUMINATED |
|--------------------|---|---|---|--|---|-------------|
| ROUND              | <b>1SS</b><br>Ø6.5mm<br>h=8.0 - 22.5mm<br>*for 5E<br>  | <b>1JS</b><br>Ø9.6mm<br>h=10.4mm<br>               | <b>1DS</b><br>Ø9.6mm<br>h=14.9mm<br>         | <b>1GAS</b><br>Ø11mm<br>h=12.5mm<br>  | <b>1IS</b><br>Ø6.5mm<br>h=10.4 - 22.5mm<br>        |             |
|                    | <b>varimec™ round</b><br>Ø5.2; 7.8; 11.6mm<br>h=10.4-22.5mm<br>*for 3E<br>                   | <b>1US</b><br>Ø10.6mm<br>h=14.9mm<br>              | <b>1ZCS</b><br>Ø14.3mm<br>h=11.7mm<br>       | <b>1GCS</b><br>Ø15mm<br>h=12.5mm<br>  | <b>1LS</b><br>Ø6.5mm<br>h=12.0mm-22.5mm<br>        |             |
|                    |   | <b>1Z</b><br>Ø29.5mm<br>h=12.0mm<br>               | <b>1ZW</b><br>Ø29.5mm<br>h=12.3mm<br>        | <b>aquamec</b><br>Ø10.6mm<br>h from front panel=14.3mm<br>h=24.2-27.2mm<br> | <b>1ES</b><br>Ø9.6mm<br>h=14.9mm<br>               |             |
|                    |   | <b>10R/10RF</b><br>Ø30mm<br>h=12.6/11.0mm<br>      | <b>10RM16</b><br>Ø30mm<br>h=11.0mm<br>       | <b>navimec</b><br>Ø34.25mm<br>h=11.7/12.2mm<br>                             | <b>1FS</b><br>Ø9.6mm<br>h=14.9mm<br>               |             |
| SQUARE/RECTANGULAR | <b>1ZA</b><br>18.65x10.1mm<br>h=12.2mm<br>   | <b>1PS</b><br>12.5x6.5mm<br>h=15.7mm<br>         | <b>1XS</b><br>7.4x9.4mm<br>h=18.5mm<br>    | <b>1QS</b><br>12.5x6.5mm<br>h=15.7mm<br>                                  | <b>1RS</b><br>12.5x6.5mm<br>h=15.7mm<br>         |             |
|                    | <b>1M</b><br>25.0x10.1mm<br>h=12.2mm<br>   | <b>1A</b><br>12.5x10.1mm<br>h=12.2mm<br>         | <b>1TS</b><br>10.6x10.6mm<br>h=14.9mm<br>  | <b>1H</b><br>12.5x10.1mm<br>h=12.2mm<br>                                  | <b>1C + 2C/2D</b><br>15.1x15.1mm<br>h=12.2mm<br> |             |
|                    | <b>varimec™ square</b><br>5.2x5.2; 7.8x7.8;<br>11.6x11.6mm<br>h=10.4-22.5mm<br>*for 3E<br> | <b>1B + 2C/2D</b><br>15.1x15.1mm<br>h=12.2mm<br> | <b>1KS</b><br>14.3x14.3mm<br>h=19.1mm<br>  | <b>2K</b><br>17.75x17.75mm<br>  | <b>1KBS</b><br>14.3x14.3mm<br>h=20.2mm<br>       |             |
|                    | <b>unimec™ 16300</b><br>6.0x12.3mm<br>h=16.9mm<br>   | <b>10Q</b><br>22x22mm<br>h=11.0mm<br>            | <b>10QM16</b><br>22x22mm<br>h=11.0mm<br>   |  | <b>1KCS</b><br>14.3x14.3mm<br>h=20.1mm<br>       |             |
|                    | <b>unimec™ 16700</b><br>14.9x14.9mm<br>h=14.6mm<br>  |   |   |  | <b>1YS</b><br>15x15mm<br>h=12.5mm<br>*for 5E<br> |             |
| OTHER              | <b>2SS</b><br>extender for 5G snap on caps<br>h=5-10mm<br>                                 | <b>1NS</b><br>Ø9.6/□4.9mm<br>h=14.9mm<br>        | <b>1VS</b><br>10.6x13.25mm<br>h=14.9mm<br> | <b>1ZB</b><br>90°<br>R=17.5mm<br>h=12.2mm<br>                             |   |             |
|                    | <b>1TW/1UW/1VW</b><br>sealing for 1TS/1US/1VS<br>  | <b>1WAS</b><br>6.5x12.5mm<br>h=14.9mm<br>        | <b>1WDS</b><br>8.0x15.2mm<br>h=14.9mm<br>  | <b>1WPS</b><br>6.5x12.5mm<br>h=15.7mm<br>                                 |   |             |

\*Caps are for 5G if not otherwise specified



## CAPS

MANY OPTIONS REGARDING:

SHAPE, SIZE, HEIGHT, COLOUR AND ILLUMINATION

SOLUTIONS:

NAVIMEC™, CONTROLMEC™, FOILMEC™, VARIMEC™, AQUAMEC™



MEC has a wide range of caps for the multimec® switch series. There are many cap series including navimec™, controlmec™ foilmec™ and aquamec™ for multimec® 5 series switches, and varimec™ that is still for the 3 series switches.

18 solid colours and 6 transparent colours

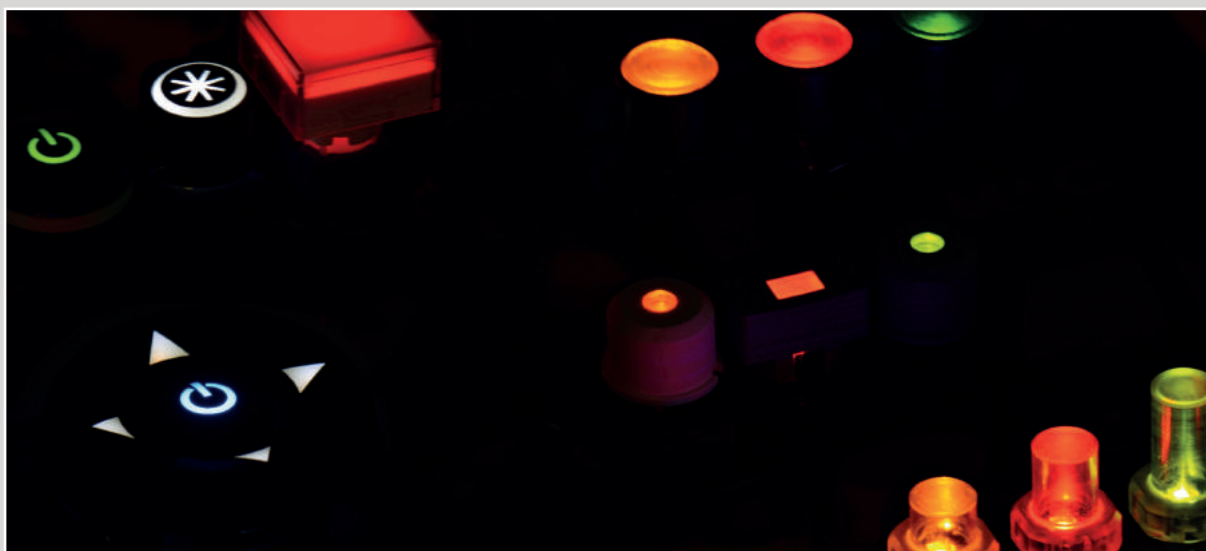
Overall height varies from 8.0 mm to 27.2 mm



## ILLUMINATION

SINGLE- OR BI-COLOUR

MANY OPTIONS IN LED, CAP AND LENS COLOUR



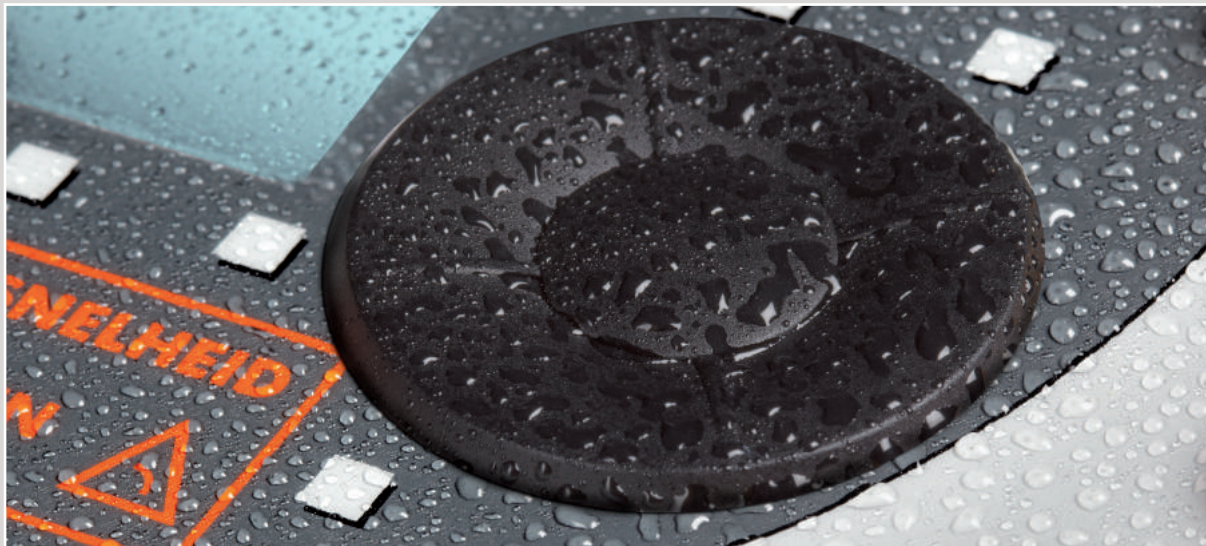
5 LED colour options available: blue, green, yellow, white and red.

Bi-colour combination can be made with any two LED colours.

Illumination can be full, dot, rectangular or legend.



MEC cap range includes options for the front panel sealing. We have designed cap options for outdoor, dusty and humid applications - switch solutions that can endure a rough environment.



## PANEL SEALED SOLUTIONS



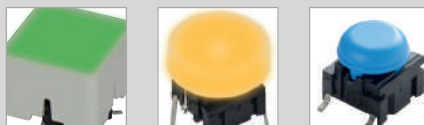
CONTROLMEC™ 1ZW

PANEL SEALED 1TS/1US/1VS

PANEL SEALED 10R & 10Q SERIES

AQUAMEC™

## CAPS FOR FOIL OVERLAY



FOILMEC™ + 1GAS/1GCS + 1JS



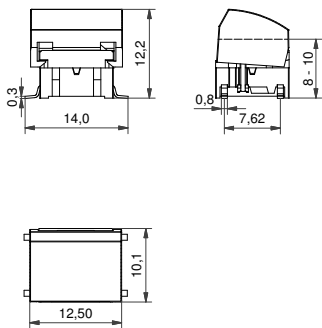
- Rectangular caps
- Rocker-action pushbutton cap
- 12.5 mm x 10.1 mm; 18.65 mm x 10.1 mm; 25.0 mm x 10.1 mm
- h = 12.2 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1A/1H-13.0 x 10.5, 1M-25.7 x 10.5, 1ZA-19.4x10.5

All dimensions in mm

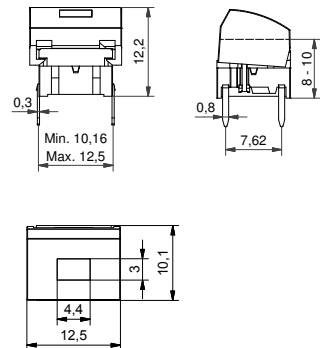
Tolerances +/-0.2mm

### DIMENSIONS

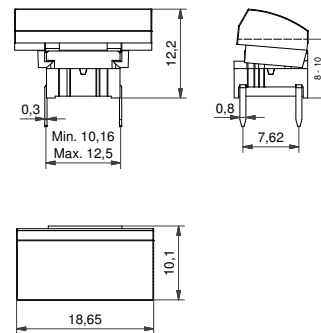
#### SMD w/LED + 1A



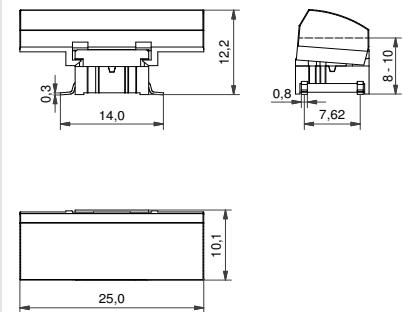
#### TH w/LED + 1H



#### TH + 1ZA



#### SMD + 1M



### ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | LED  | + | Cap   | Colour code 1H  | Lens 1H  |
|--------|--|---|--|---|---|---|--|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              |   | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>             | <input type="checkbox"/>   |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>35<br>65<br>Q*                              | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 1H<br><br>1A<br>                                  | 03 grey<br>09 black<br><br>Colour code 1A<br>16 frosted white | 1 transparent<br>2 green<br>4 yellow<br>6 frosted white<br>8 red |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | + | Cap   | Colour code 1A/1M   | Colours 1ZA:  |
|--------|--|---|---|---|---|---|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>                             |   |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>20Q<br>35<br>65                             |   | 1A<br><br>1ZA<br><br>1M<br>   | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black | 03 grey<br>06 white<br>09 black<br>30 ultra blue<br>40 dusty blue<br>42 aqua blue<br>50 metal dark blue<br>53 metal light grey<br>57 metal dark grey<br>58 metal bordeaux |

Ordering example:

5GSH93582 + 1H098 with illumination OR 5GTH965 + 1ZA57 without illumination OR \*5GTH92001Q (illuminated quiet version).

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



- Rectangular caps; square solution
- Rocker-action pushbutton cap
- 15.1 mm x 15.1 mm
- h = 12.2 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap and bezel: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1B/1C+2C/2D-15.5 x 15.5

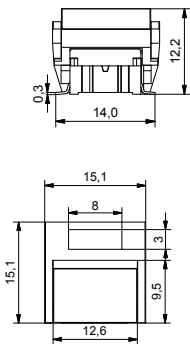


All dimensions in mm

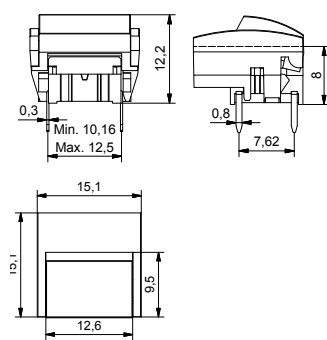
Tolerances +/-0.2mm

### DIMENSIONS

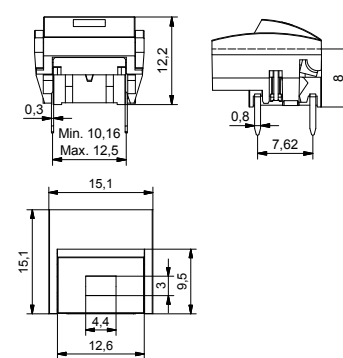
#### SMD 1B+2D



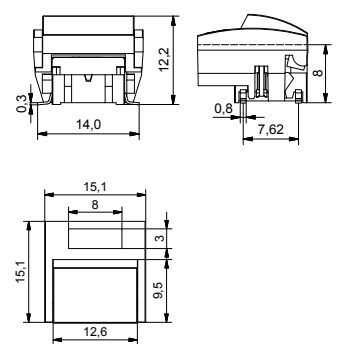
#### TH 1B+2C






#### TH w/LED 1C+2C



#### SMD w/LED 1B+2D






### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED  | Cap   | Bezel   |
|------------|--|---|--|---|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <b>1 C</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <b>2 C</b> <input type="checkbox"/> <input type="checkbox"/>                          |
|            | <b>TH9</b> through-hole  | <b>20</b>   | <b>02</b> blue   | Solid colour  | Colour code   |
|            | <b>SH9</b> surface mount   | <b>35</b>   | <b>22</b> green  |    |  |
|            |  | <b>65</b>   | <b>42</b> yellow   | <input type="checkbox"/>  | Colour code   |
|            |  | <b>Q*</b>   | <b>61</b> white  | <b>1 B</b> <input type="checkbox"/> <input type="checkbox"/>                          | <b>2 D</b> <input type="checkbox"/> <input type="checkbox"/>                          |
|            |  |   | <b>82</b> red  | Transparent   | Colour code   |
|            |  |   | <b>2242</b> green/yellow   |    | <input type="checkbox"/>  |
|            |  |   | <b>8222</b> red/green  |   | Colour code   |
|            |  |   | <b>8242</b> red/yellow   |   | Lens  |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | Cap   | Bezel   |
|------------|--|---|---|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <b>1 B</b> <input type="checkbox"/> <input type="checkbox"/>                        | <b>2 C</b> <input type="checkbox"/> <input type="checkbox"/>                          |
|            | <b>TH9</b> through-hole  | <b>20</b>   | Solid colour  | Colour code   |
|            | <b>SH9</b> surface mount   | <b>20Q</b>  | <input type="checkbox"/>  |   |
|            |  | <b>35</b>   |  | <input type="checkbox"/>  |
|            |  | <b>65</b>   |   | OR <b>2 D</b> <input type="checkbox"/> <input type="checkbox"/>                       |
|            |  |   |   |  |
|            |  |   |   | Colour code   |
|            |  |   |   | Lens  |

### COLOUR CODES

| Transparent caps        | Solid caps 1B    | Solid caps 1C   | Solid colours 2C & 2D: | Lenses                 |
|-------------------------|------------------|-----------------|------------------------|------------------------|
| <b>16</b> frosted white | <b>00</b> blue   | <b>03</b> grey  | <b>00</b> blue         | <b>1</b> transparent   |
|                         | <b>02</b> green  | <b>08</b> red   | <b>03</b> grey         | <b>2</b> green         |
|                         | <b>03</b> grey   | <b>09</b> black | <b>06</b> white        | <b>4</b> yellow        |
|                         | <b>04</b> yellow |                 | <b>08</b> red          | <b>6</b> frosted white |
|                         |                  |                 | <b>09</b> black        | <b>8</b> red           |

Ordering example:  
 5GTH93561+1C031+2C09 with illumination OR 5GSH965+1B08+2D081 without illumination OR \*5GSH92001Q (illuminated quiet version)  
 Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



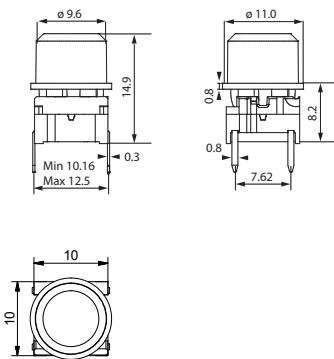
- Round caps
- Ø9.6 mm
- h =14.9 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap :-40/+85°C
- Panel cut-out: 1DS/1ES/1FS-Ø10.0

All dimensions in mm

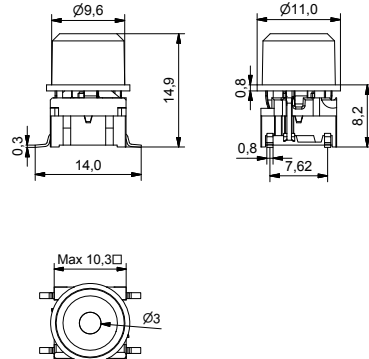
Tolerances -/+0.2mm

### DIMENSIONS

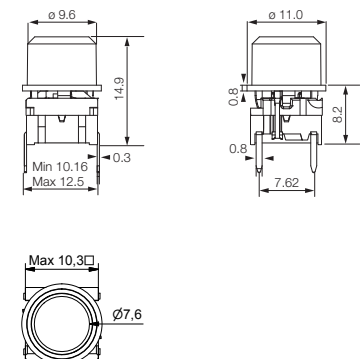
#### TH + 1DS



#### SMD w/LED + 1ES



#### TH w/LED + 1FS



### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED  | + | Cap  | Colour code  | Lens  |
|------------|--|---|--|---|--|--|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>   |   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>  | <input type="checkbox"/>  |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b><br><b>Q*</b>  | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white<br><b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |   | <b>1ES</b><br><br><b>1FS</b><br>   | <b>00</b> blue<br><b>02</b> green<br><b>03</b> grey<br><b>04</b> yellow<br><b>06</b> white<br><b>08</b> red<br><b>09</b> black | <b>1</b> transparent<br><b>2</b> green<br><b>4</b> yellow<br><b>6</b> frosted white<br><b>8</b> red |
|            |  |   |  |   | <b>1DS</b><br>   | <b>11</b> transparent<br><b>16</b> frosted white   |   |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | + | Cap  | Colour code  |
|------------|--|--|---|--|--|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>  |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b>                          |   | <b>1DS</b><br>   | <b>00</b> blue<br><b>02</b> green<br><b>03</b> grey<br><b>04</b> yellow<br><b>06</b> white<br><b>08</b> red<br><b>09</b> black                               |
|            |  |  |   |  | <b>30</b> ultra blue<br><b>40</b> dusty blue<br><b>42</b> aqua blue<br><b>32</b> mint green<br><b>33</b> tele grey<br><b>34</b> melon<br><b>38</b> noble red |
|            |  |  |   |  | <b>50</b> metal dark blue<br><b>53</b> metal light grey<br><b>57</b> metal dark grey<br><b>58</b> metal bordeaux   |

Ordering example:  
5GTH935+1DS06 without illumination OR 5GSH96561+1FS096R13509 with illumination OR \*5GSH92042Q (illuminated quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Round caps
- Excellent option for foil overlay
- Ø11 mm; Ø15 mm
- h = 12.5 mm
- Material: polyamide
- Temp. Range:
  - Solid cap: -40/+160°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1GAS/1GCS-Ø11.4; Ø15.4

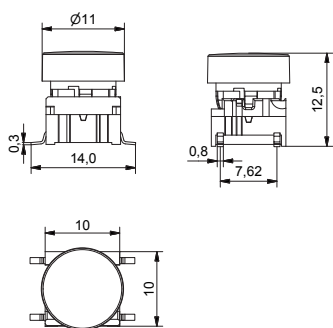
All dimensions in mm

Tolerances +/-0.2mm

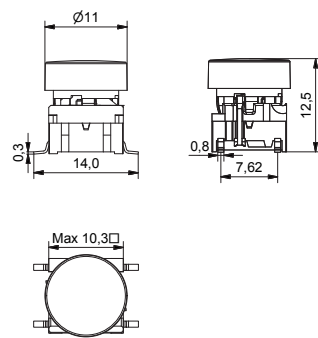


## DIMENSIONS

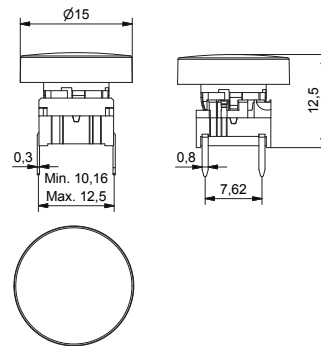
### SMD + 1GAS



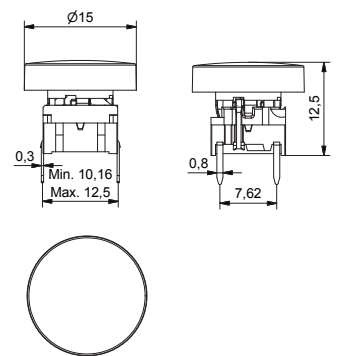
### SMD w/LED + 1GAS



### TH + 1GCS



### TH w/LED + 1GCS



## ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force      | LED  | + | Cap transparent colour | Colour code                        |
|--------|---------------------------------------|----------------------|--|---|------------------------|------------------------------------|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>35<br>65<br>Q* | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 1GAS<br>1GCS           | 11 transparent<br>16 frosted white |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

## NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force       | + | Cap solid colour | Colour code   |
|--------|---------------------------------------|-----------------------|---|------------------|---|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>20Q<br>35<br>65 |   | 1GAS<br>1GCS     | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black |

Ordering example:  
5GSH935 + 1GAS09 without illumination OR 5GTH96502 + 1GCS16 with illumination OR \*5GTH92061Q (illuminated quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



- Round cap
- Ø9.6 mm
- h =10.4 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1JS-Ø10.4

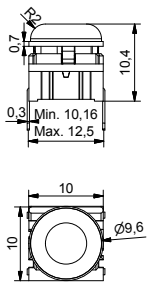
\*Legends on the picture are custom

All dimensions in mm

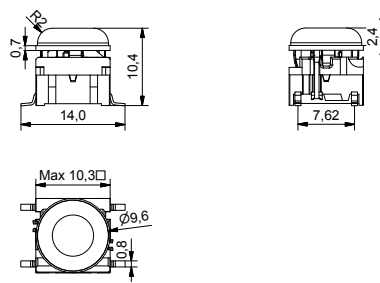
Tolerances +/-0.2mm

## DIMENSIONS


### TH + 1JS




### SMD w/LED + 1JS



## ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED  | + | Cap transparent  | Colour code                                       |
|------------|--|---|--|---|--|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  |   | <b>1 J S</b>   | <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b><br><b>Q*</b>  | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white<br><b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |   |  | <b>11</b> transparent<br><b>16</b> frosted white  |

## NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | + | Cap solid colour  | Colour code  |
|------------|--|---|---|---|--|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |   | <b>1 J S</b>  | <input type="checkbox"/> <input type="checkbox"/>  |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b> |   |  | <b>00</b> blue<br><b>02</b> green<br><b>03</b> grey<br><b>04</b> yellow<br><b>06</b> white<br><b>08</b> red<br><b>09</b> black |

Ordering example:

5GTH935+1JS08 without illumination OR 5GTH93501+1JS16 with illumination OR \*5GTH92001Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



- Square caps
- Different top surfaces: flat, convex or concave
- 14.3 mm x 14.3 mm
- h = 19.1 mm; 20.2 mm; 20.1 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1KS/1KBS/1KCS-14.7 x 14.7



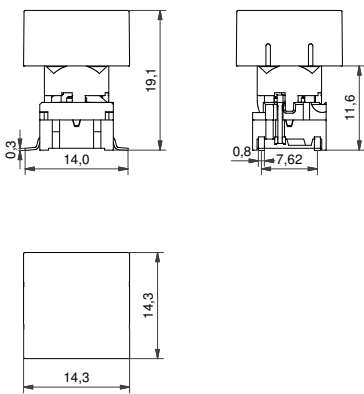
All dimensions in mm

Tolerances +/-0.2mm

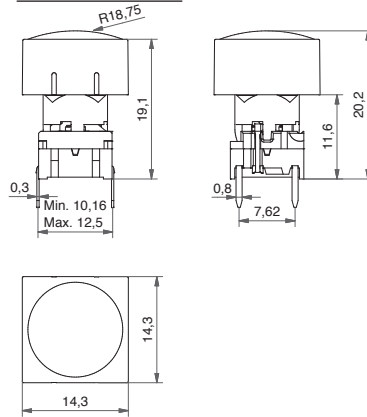
Custom solution

### DIMENSIONS

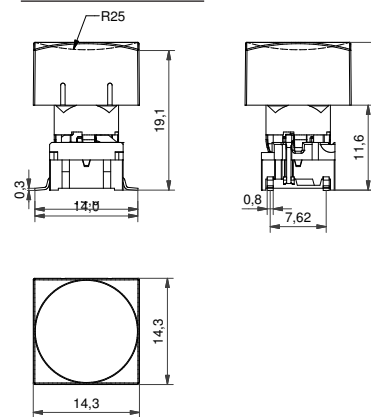
#### SMD w/LED + 1KS



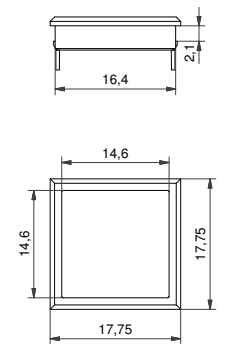
#### TH w/LED + 1KBS



#### SMD w/LED + 1KCS



#### Bezel (optional)



### ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force      | LED  | + | Cap   | + | Bezel  |
|--------|---------------------------------------|----------------------|--|---|---|---|--|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>35<br>65<br>Q* | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow | + | 1 1 1 6<br>Frosted white lens and transparent lid | + | 2 K<br>03 grey<br>06 white<br>08 red<br>09 black |
|        |                                       |                      |  |   | 1KS<br>1KBS                                       |   |  |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force       | + | Cap                             | + | Bezel  |
|--------|---------------------------------------|-----------------------|---|---------------------------------|---|--|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>20Q<br>35<br>65 | + | 1 K S 1 6<br>Frosted white lens | + | 2 K<br>03 grey<br>06 white<br>08 red<br>09 black |
|        |                                       |                       |   | 1KS                             |   |  |

Ordering example:

5GTH93501+1KCS1116+2K09 with illumination OR 5GSH965+1KS0916+2K03 without illumination OR \*5GTH92082Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



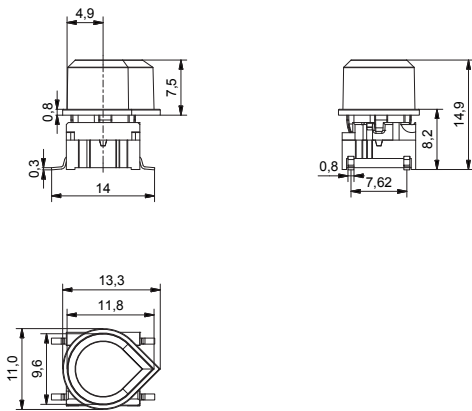
- Teardrop-shaped cap
- Ø9.6 mm; □ = 4.9 mm
- h = 14.9 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1NS-Ø10.2/ □ = 5.1

All dimensions in mm

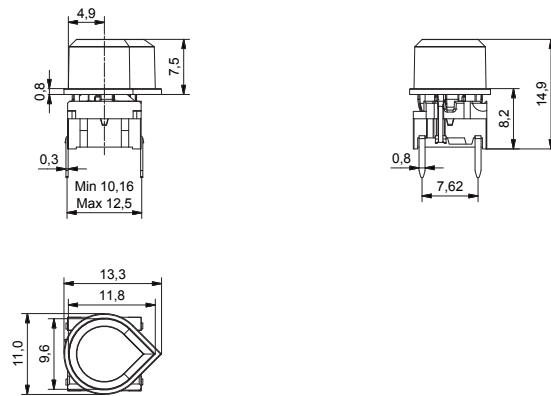
Tolerances +/-0.2mm

## DIMENSIONS

### SMD + 1NS



### TH w/LED + 1NS



## ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | LED  | + | Cap transparent | Colour code                                       |
|------------|--|--|--|---|-----------------|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  |   | <b>1 N S</b>    | <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b><br><b>Q*</b>                           | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white<br><b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |   |                 | <b>16</b> frosted white                           |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

## NON-ILLUMINATED – HOW TO ORDER

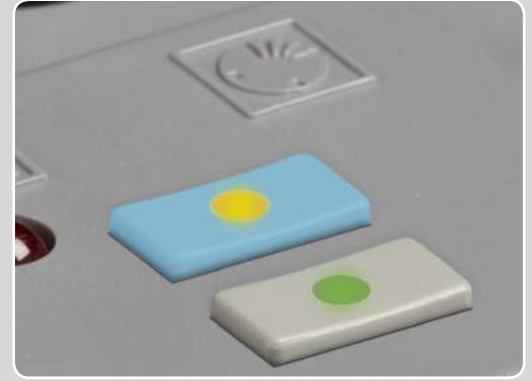
| Switch     | Mounting   | Actuation force  | + | Cap          | Colour code                                       |
|------------|--|--|---|--------------|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |   | <b>1 N S</b> | <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b>                          |   |              | <b>03</b> grey<br><b>09</b> black                 |

Ordering example:  
5GSH965+1NS09 non-illuminated OR 5GTH93502+1NS16 with illumination OR \*5GTH92082Q (illuminated quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Rectangular caps
- Concave top surface
- 12.5 mm x 6.5 mm
- h = 15.7 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1PS/1QS/1RS-7.0 x 13.0, R max. 1.0

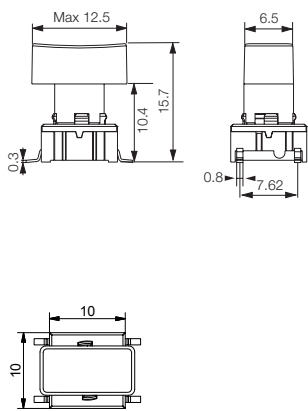
All dimensions in mm

Tolerances -/+0.2mm

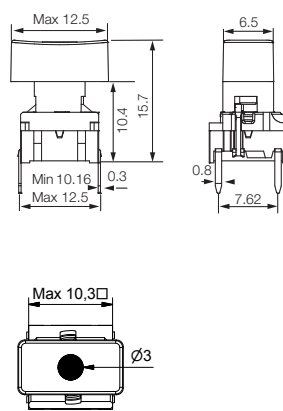


### DIMENSIONS

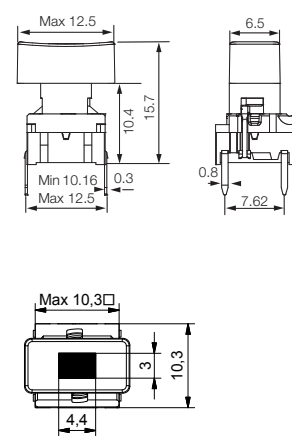
#### SMD (5E) + 1PS



#### TH w/LED (5G) + 1RS



#### TH w/LED (5G) + 1QS



### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED   | + | Cap   | Colour code                                       | Lens                     |
|------------|--|---|---|---|---|---|--------------------------|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> |
|            | <b>TH9</b> through-hole  | <b>20</b>   | <b>02</b> blue  |   | <b>1QS</b>  | <b>00</b> blue                                    | <b>1</b> transparent     |
|            | <b>SH9</b> surface mount   | <b>35</b>   | <b>22</b> green   |   |   | <b>03</b> grey                                    | <b>6</b> frosted white   |
|            |  | <b>65</b>   | <b>42</b> yellow  |   | <b>1RS</b>  | <b>09</b> black                                   |                          |
|            |  | <b>Q*</b>   | <b>61</b> white   |   |   |   |                          |
|            |  |   | <b>82</b> red   |   |   |   |                          |
|            |  |   | <b>2242</b> green/yellow  |   |   |   |                          |
|            |  |   | <b>8222</b> red/green   |   |   |   |                          |
|            |  |   | <b>8242</b> red/yellow  |   |   |   |                          |
|            |  |   |   |   | <b>1PS</b>  | <b>11</b> transparent                             |                          |
|            |  |   |   |   |   | <b>16</b> frosted white                           |                          |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | + | Cap   | Colour code                                       |
|------------|--|--|---|---|---|
| <b>5 E</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
| <b>5 G</b> | <b>TH9</b> through-hole  | <b>20</b>  |   | <b>1PS</b>  | <b>00</b> blue                                    |
|            | <b>SH9</b> surface mount   | <b>20Q</b>   |   |   | <b>02</b> green                                   |
|            |  | <b>35</b>  |   |   | <b>03</b> grey                                    |
|            |  | <b>65</b>  |   |   | <b>04</b> yellow                                  |
|            |  |  |   |   | <b>06</b> white                                   |
|            |  |  |   |   | <b>08</b> red                                     |
|            |  |  |   |   | <b>09</b> black                                   |

Ordering example:

5GTH935+1PS08 without illumination OR 5GSH96542+1RS001 with illumination OR \*5GSH92061Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



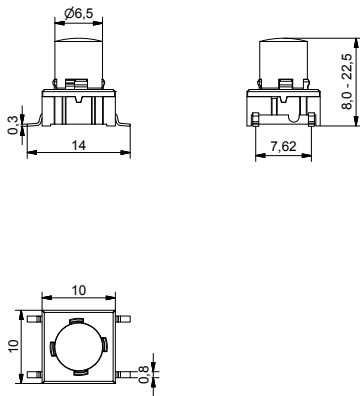
- Round caps
- 9 standard options in overall height
- Ø6.5 mm
- h = 8-22.5 mm; 10.4-22.5 mm; 12-22.5 mm
- Material: polyamide
- Temp. Range:
  - Solid cap: -40/+160°C (1SS); -40/+65°C (1LS)
  - Transparent cap: -40/+85°C
- Panel cut-out: 1SS/1LS/1IS-Ø7.0

All dimensions in mm

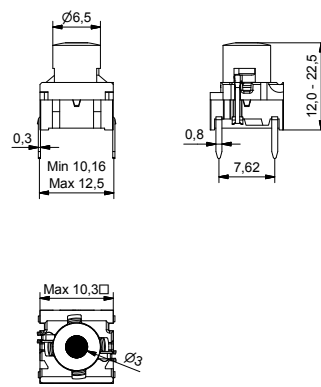
Tolerances +/-0.2mm

## DIMENSIONS

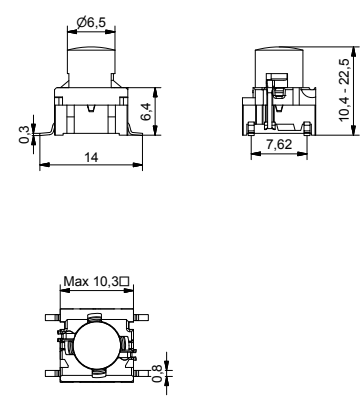
### SMD (5E) + 1SS



### TH w/LED (5G) + 1LS



### SMD w/LED (5G) + 1IS



## ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force      | LED  | Cap                                    | Colour code   | Lens   | Height 1LS  |
|--------|---------------------------------------|----------------------|--|--|---|--|---|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>35<br>65<br>Q* | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow | 1LS with lens<br>1IS fully illuminated | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black<br>11 transparent<br>16 frosted white | 1 transparent<br>2 green<br>4 yellow<br>6 frosted white<br>8 red | 12.0 19.0<br>15.0 22.5<br>16.0<br>Height 1IS<br>10.4 16.0<br>11.0 19.0<br>12.0 22.5<br>15.0 |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

## NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force       | Cap              | Colour code   | Height  |
|--------|---------------------------------------|-----------------------|------------------|---|---|
| 5 E    | TH9 through-hole<br>SH9 surface mount | 20<br>20Q<br>35<br>65 | 1SS solid colour | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black | 08.0 16.0<br>09.5 19.0<br>10.4 22.5<br>11.0<br>12.0<br>15.0 |

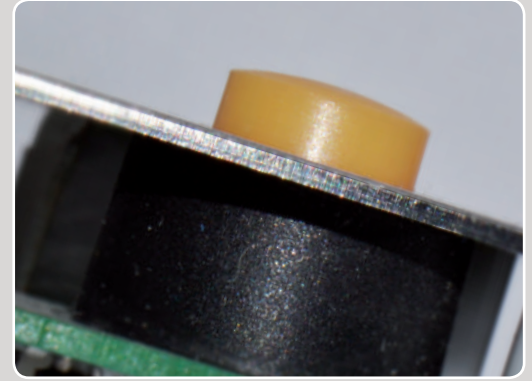
Ordering example:

5ETH920+1SS04-09.5 without illumination OR 5GSH93542+1IS16-19.0 with illumination OR \*5GTH9208222Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



- Square, round and half-ellipse shaped caps
- Rounded top surface
- Option to have it panel sealed
  - IP65 = 5G+1TS+1TW
  - IP67 = 5G+1US+1UW
  - IP65 = 5G+1VS+1VW
- 10.6 mm x 10.6 mm; Ø10.6 mm; 10.6 mm x 13.25 mm
- h =14.9 mm
- Material: ABS/polycarbonate (cap); silicone rubber (sealing)
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1TS-11.0 x 11.0, 1US-Ø11.0, 1VS-11.0 x 13.65

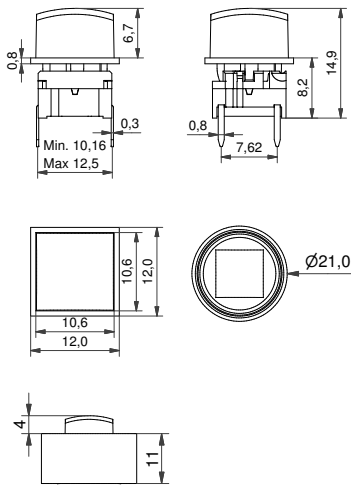


All dimensions in mm

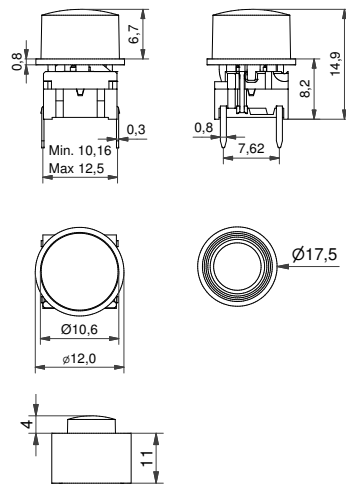
Tolerances +/-0.2mm

### DIMENSIONS

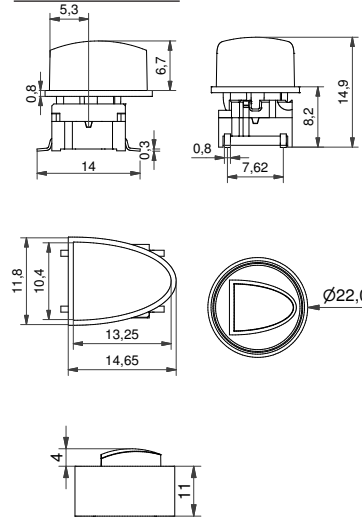
#### TH + 1TS+1TW



#### TH w/LED + 1US+1UW



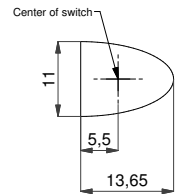
#### SMD + 1VS+1VW



### PANEL CUT-OUT

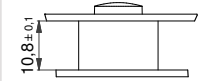
#### Recommended

- 1TS - 11x11 mm
- 1US - Ø11 mm
- 1VS



\*mathematical shape of half-ellipse

Distance between PCB and front panel



### ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force      | LED  | + | Cap        | Colour code      | + | Sealing           |
|--------|---------------------------------------|----------------------|--|---|------------|------------------|---|-------------------|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>35<br>65<br>Q* | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 1TS<br>1US | 16 frosted white |   | 1TW<br>1UW<br>1VW |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting                              | Actuation force       | + | Cap        | Colour code                              | + | Sealing           |
|--------|---------------------------------------|-----------------------|---|------------|--|---|-------------------|
| 5 G    | TH9 through-hole<br>SH9 surface mount | 20<br>20Q<br>35<br>65 |   | 1TS<br>1US | 00 blue<br>03 grey<br>08 red<br>09 black |   | 1TW<br>1UW<br>1VW |

Ordering example:

5GSH935 + 1TS03 + 1TW without illumination OR 5GTH96542 + 1US16 + 1UW with illumination OR \*5GTH92082Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



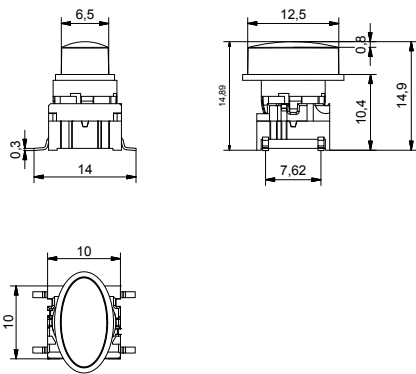
- Ellipse-shaped caps
- Convex or concave top surface
- 6.5 mm x 12.5 mm; 8.0 mm x 15.2 mm
- h = 15.7 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1WAS/1WPS-12.9x6.9, 1WDS-15.6x8.4

All dimensions in mm

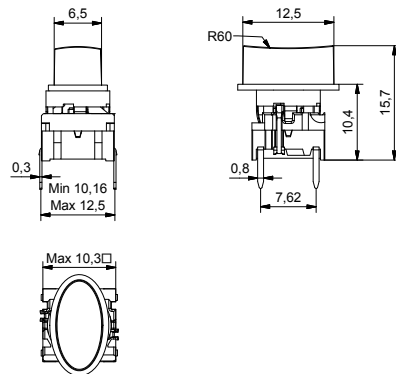
Tolerances +/-0.2mm

### DIMENSIONS

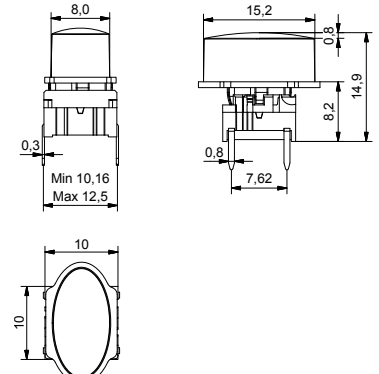
#### SMD + 1WAS



#### TH w/LED + 1WPS



#### TH + 1WDS



### ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | LED  | + | Cap   | Colour code                                       |
|--------|--|---|--|---|---|---|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>35<br>65<br>Q*                              | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 1WAS<br>1WDS<br>1WPS  | 16 frosted white                                  |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | + | Cap   | Colour code   |
|--------|--|---|---|---|---|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>   |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>20Q<br>35<br>65                             |   | 1WAS<br>1WDS<br>1WPS  | 00 blue<br>03 grey<br>08 red<br>09 black<br>30 ultra blue<br>40 dusty blue<br>42 aqua blue<br>53 metal light grey<br>57 metal dark grey |

Ordering example:  
5GTH935+1WAS00 without illumination OR 5GSH96582+1WDS16 with illumination OR \*5GSH92042Q (illuminated quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Rectangular cap
- 7.4 mm x 9.4 mm
- h = 18.5 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1XS-9.8 x 7.9

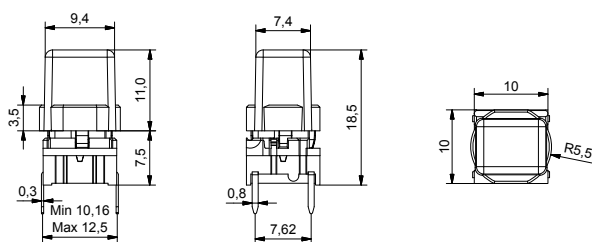


All dimensions in mm

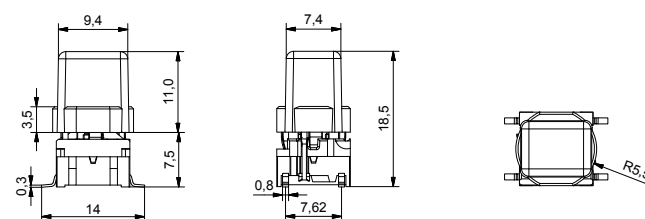
Tolerances -/+0.2mm

### DIMENSIONS

#### TH + 1XS



#### SMD w/LED + 1XS



### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | LED  | + | Cap          | Colour code                                       |
|------------|--|--|--|---|--------------|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  |   | <b>1 X S</b> | <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b><br><b>Q*</b>                           | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white<br><b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |   |              | <b>11</b> transparent<br><b>16</b> frosted white  |

### NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | + | Cap          | Colour code  |
|------------|--|--|---|--------------|--|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |   | <b>1 X S</b> | <input type="checkbox"/> <input type="checkbox"/>  |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface moun                         | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b>                          |   |              | <b>00</b> blue<br><b>02</b> green<br><b>03</b> grey<br><b>04</b> yellow<br><b>06</b> white<br><b>08</b> red<br><b>09</b> black |

Ordering example:

5GTH9352242+1XS16 with illumination OR 5GSH965+1XS02 non-illuminated OR \*5GTH9208242Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



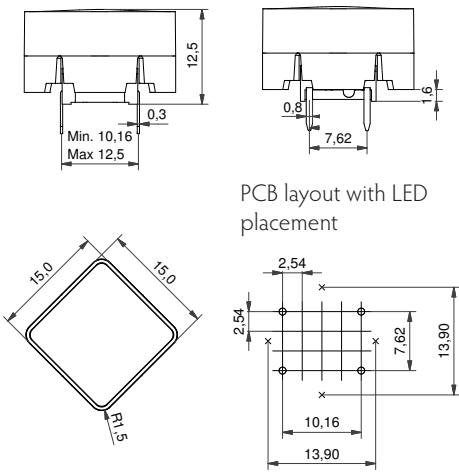
- Square cap
- Designed for foil overlay
- 15 mm x 15 mm
- h = 12.5 mm
- Material: ABS/polycarbonate
- Temp. Range: -40/+65°C
- Panel cut-out: 1YS-16 x 16

All dimensions in mm

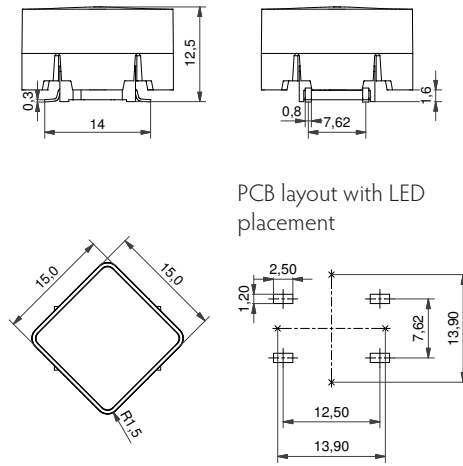
Tolerances +/-0.2mm

## DIMENSIONS

### TH + 1YS

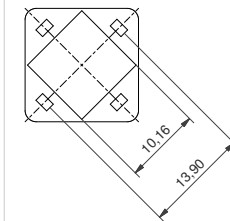


### SMD + 1YS

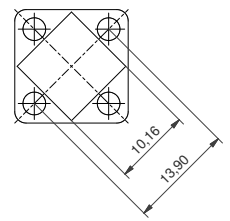


## RECOMMENDED PLACEMENT OF LEDs

### SMD



### TH



LED Recommendation  
 SMD: 1206 - 0805 - 0603 - 0402  
 TH: 3 mm - Ø max 3.2 - Height max 6.5 mm

## HOW TO ORDER

Switch  
**5 E**

Mounting

Actuation force

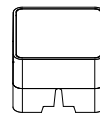
+

Cap  
**1 Y S 0 6 1 6**

**TH9** through-hole  
**SH9** surface mount

**20**  
**20Q**  
**35**  
**65**

**1YS0616** white cap with frosted white lens

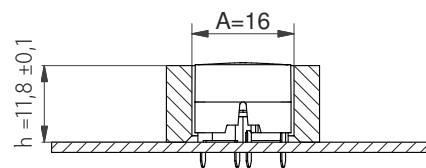


A: We recommend you to allocate enough space for travel of the foil and leave the area free from adhesive. Switch travel = 1 mm.

H: The height recommendation does not include the foil. We recommend embossing the foil to follow the curve of the keycap.

The best tactile feeling is obtained with a small pretravel.

The dimension H is based on an embossed foil. With a flat foil the dimension "H" will have to be adjusted, and enough area between the cap and front panel needs to be addressed to ensure foil flexibility.



Ordering example: 5ESH935+1YS0616

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Round solution
- Designed for navigating a display or controlling a unit
- 90° R=17.5 mm; Ø14.3 mm (Ø34.25 mm)
- h =12.2 mm; 11.7 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1ZB-R<sub>1</sub> 7,1 R<sub>2</sub> 17,5 – 17,75 90° 1ZCS-Ø14.7
- navimec™ panel cut-out: Ø35,0 - 35,5 Depending on application

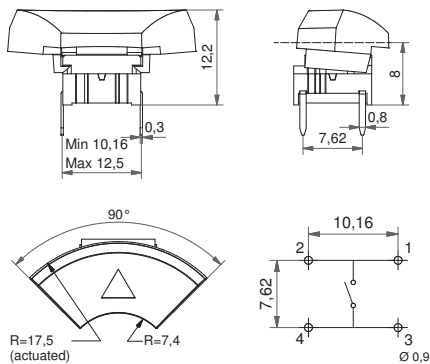
All dimensions in mm

Tolerances +/-0.2mm

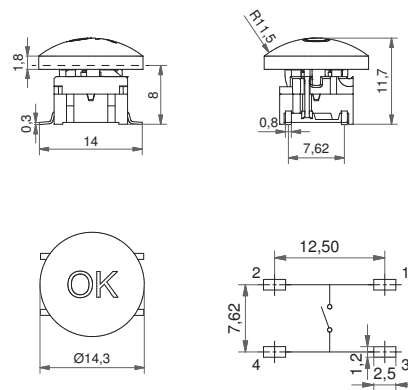


### DIMENSIONS

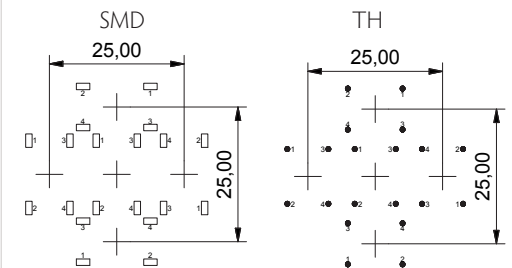
#### TH + 1ZB



#### SMD w/LED + 1ZCS




#### PCB layout for Navimec solution





We recommend using through-hole terminals for precise placing.

### ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force  | LED  | +                        | Cap  | Legend code  |
|--------|--|--|--|--------------------------|--|--|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              | <input type="checkbox"/> | 1 Z B 1 6  | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|        | TH9 through-hole<br>(SH9 surface mount)                                    | 20<br>35<br>65<br>Q*   | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |                          | Frosted white with black hard paint and laser marking                                | DLMH136 ▲  |
|        |  |  |  |                          |  | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|        |  |  |  |                          | 1 Z C S 1 6  | LMH118 OK<br>LMH123 ⏻  |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force  | +                        | Cap   | Colour code   | Legend code**  |
|--------|--|--|--------------------------|---|---|--|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> | 1 Z B   | <input type="checkbox"/> <input type="checkbox"/>                                 | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>           |
|        | TH9 through-hole<br>(SH9 surface mount)                                    | 20<br>20Q<br>35<br>65  |                          |  | 03 grey<br>06 white<br>09 black<br>30 ultra blue<br>40 dusty blue<br>42 aqua blue | 50 metal dark blue<br>53 metal light grey<br>57 metal dark grey<br>58 metal bordeaux |
|        |  |  |                          | 1 Z C S   |   | D136 ▲   |
|        |  |  |                          |  |   | 038 RESET<br>105 ENTER<br>118 OK<br>119 SET  |
|        |  |  |                          |   |   | 120 MENU<br>121 FUNC<br>122 HOME<br>123 ⏻  |

\*\* White legends on black caps are standard, other options are available but considered custom products. See pages 34-35 or www.apem.com

Ordering example: 4x 5GTH93561+1ZB16DLMH13609 + 1x 5GTH93561+1ZCS16LMH12309 (with illumination) OR 4x 5GSH920+1ZB09 + 1x 5GSH920+1ZCS09 (without illumination) OR \*5GTH92002Q (Illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on www.apem.com





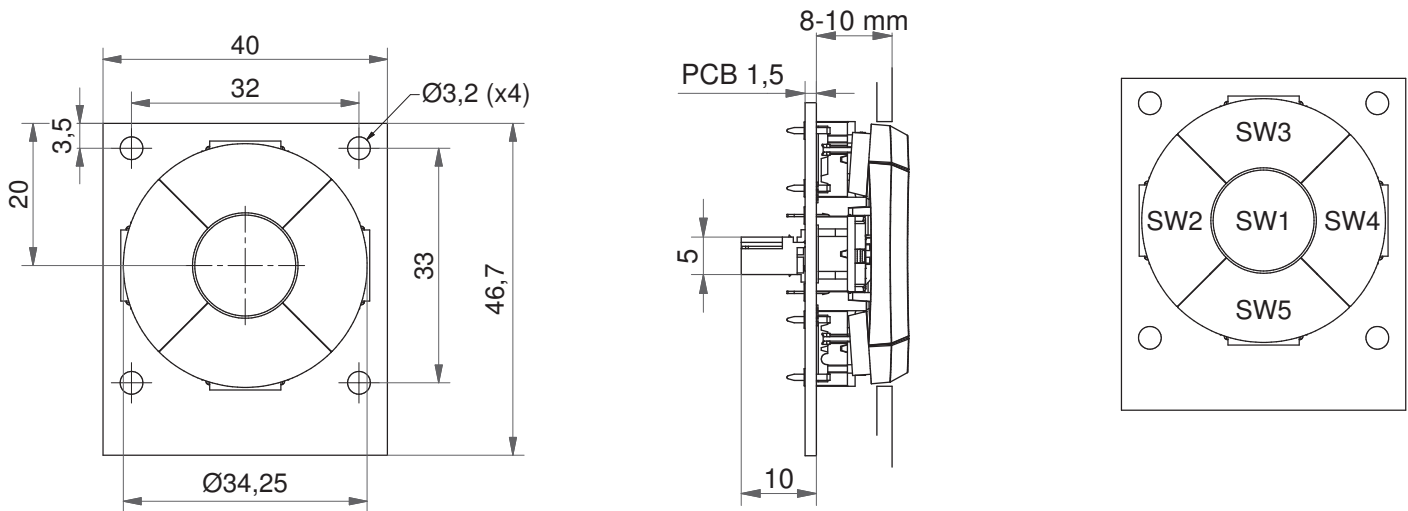
- Module should be attached to the front plate with bolts (bolts not supplied by MEC)
- Round solution
- Ø34.25 mm
- h =11.7 mm; 12.2 mm
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Recommended panel cut-out: Ø35,0 - 35,5 Depending on application

All dimensions in mm

Tolerances +/-0.2mm

## DIMENSIONS

### Navimec Module



When the 1ZB is activated the diameter changes from 34,25 mm to 35,0 mm

## HOW TO ORDER

navimec™ Module ordering options:

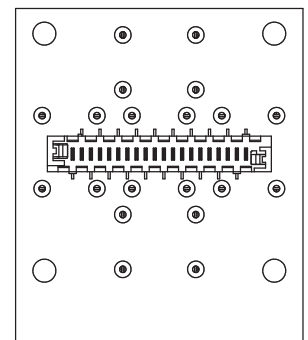
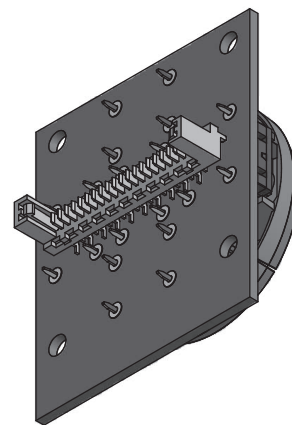
- navimec™ Module excl. keycaps
- navimec™ Module incl. keycaps
- navimec™ Module incl. keycaps with legends
- Illuminated navimec™ Module excl. keycaps
- Illuminated navimec™ Module incl. keycaps with legends

Part no. for a module:

navimec™ Module has many customisation options regarding actuation force, cap and LED colours and legends. Because of that "How to order" has been placed on page 43.

See previous page for information on switch and cap options.

SEE THE "HOW TO ORDER" GRAPH AS WELL AS CIRCUIT DIAGRAM AND CONNECTOR INFO ON [PAGE 43](#)



Ordering example:

95NA200913611806 (without illumination)

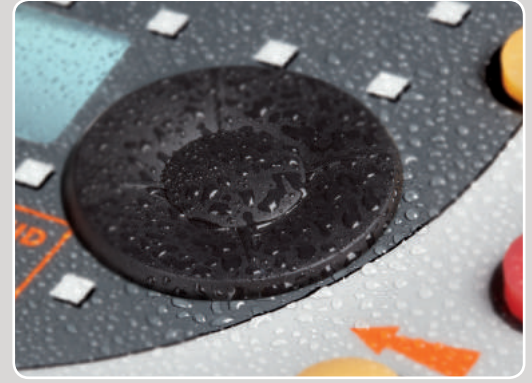
95NB350116LMH13612309 (with illumination)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Round cap
- Panel sealed solution, designed to control a unit or navigate a display
- Ø29.5 mm
- h = 12.3 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1ZW-Ø30.3

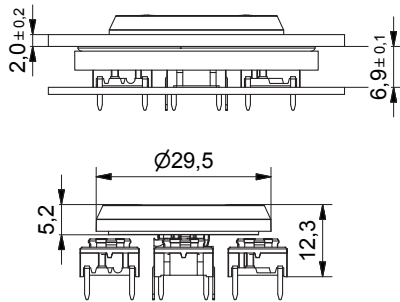
All dimensions in mm

Tolerances +/-0.2mm

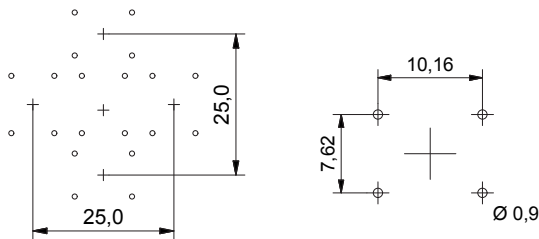


### DIMENSIONS

TH + 1ZW

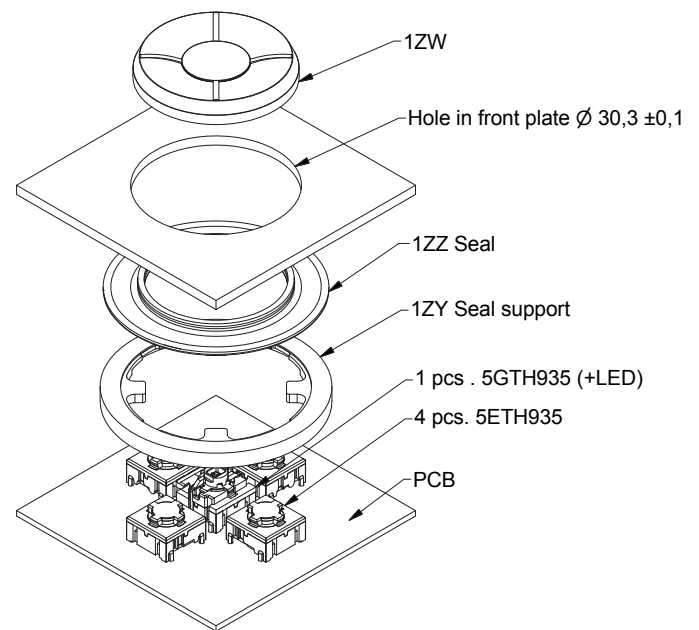


PCB layout



We recommend using through-hole terminals for precise placing.

### MOUNTING EXAMPLE



### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED (optional)   |   | Cap  | Colour code  | Legend code                                       |
|------------|--|---|--|---|--|--|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>                        | <input type="checkbox"/> <input type="checkbox"/> |
|            | TH9 through-hole<br>(SH9 surface mount)                                    | 35<br>65  | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | <b>1ZW</b><br>   | 00 blue<br>03 grey<br>06 white<br>08 red<br>09 black<br>16 frosted white | 136 ▲<br>118 OK<br>123 ⏻                          |

| Switch     | Mounting   | Actuation force                                   |   | Panel seal        | Seal  | Seal support                                      |
|------------|--|---|---|-------------------|---|---|
| <b>5 E</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | + | <b>Panel seal</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
|            | TH9 through-hole<br>(SH9 surface mount)                                    | 35<br>65  |   |                   | <b>09 black</b><br>   | <b>1ZY</b><br>                                    |

Ordering example:

5GTH935+1ZW09+4x 5ETH935+1ZZ09+1ZY without illumination OR 5GTH96582+1ZW16LMH13611809+4x 5ETH965+1ZZ09+1ZY with illumination

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



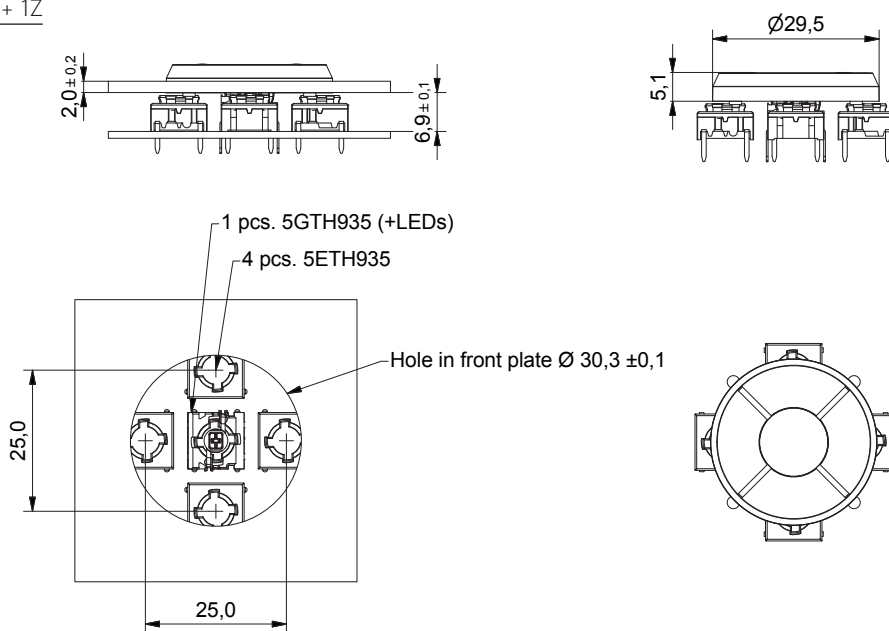
- Round cap
- Designed to control a unit or navigate in a display
- Ø29.5 mm
- h =12.0 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1Z-Ø30.3

All dimensions in mm

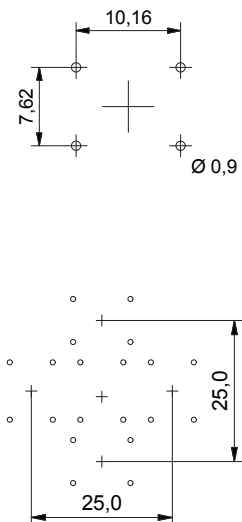
Tolerances +/-0.2mm

## DIMENSIONS

TH + 1Z




PCB layout



We recommend using through-hole terminals for precise placing

## ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | LED (optional)   | + | Cap  | Colour code  | Legend code                                       |
|--------|--|---|--|---|--|--|---|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                 | <input type="checkbox"/> <input type="checkbox"/>                        | <input type="checkbox"/> <input type="checkbox"/> |
|        | TH9 through-hole<br>(SH9 surface mount)                                    | 35<br>65  | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 1Z<br> | 00 blue<br>03 grey<br>06 white<br>08 red<br>09 black<br>16 frosted white | 136 ▲<br>118 OK<br>123 ⏻                          |

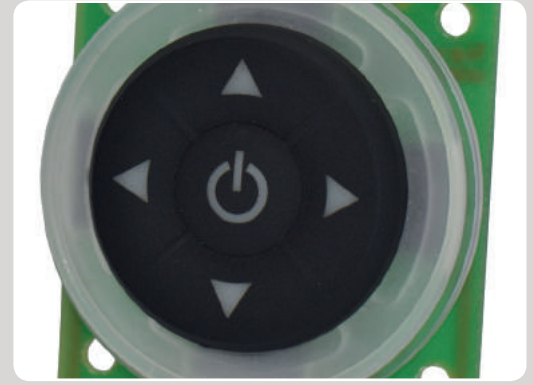
| Switch | Mounting   | Actuation force                                   |
|--------|--|---|
| 5 E    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
|        | TH9 through-hole<br>(SH9 surface mount)                                    | 35<br>65  |

Ordering example:  
5GTH935+1Z03 +4x 5ETH935 without illumination OR 5GTH96561+1Z16LMH13611809 +4x 5ETH965 with illumination  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Module should be attached to the front plate with bolts (bolts not supplied by MEC)
- Round cap
- Panel sealed or non-panel sealed solution
- Ø29.5 mm
- h =12.3 mm; 12.0 mm
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 1ZW/1Z module-Ø30.3

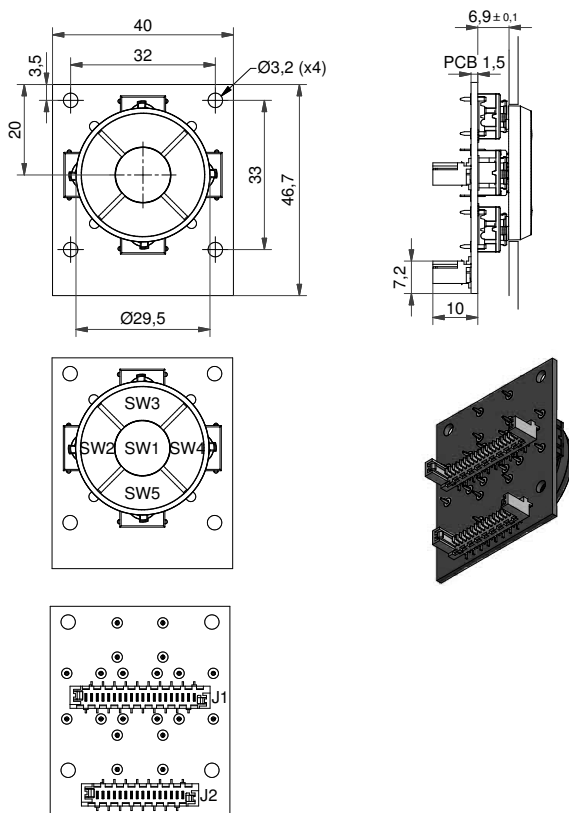
All dimensions in mm

Tolerances -/+0.2mm

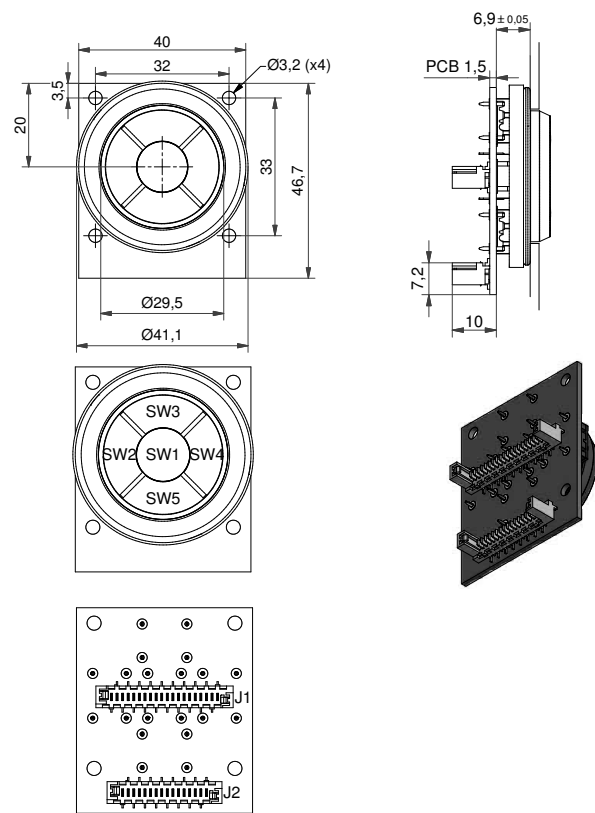


### DIMENSIONS

#### 1Z module



#### 1ZW module



### HOW TO ORDER

controlmec™ Module ordering options:

- controlmec™ Module excl. keycaps
- controlmec™ Module incl. keycaps
- controlmec™ Module incl. keycaps with legends
- illuminated controlmec™ Module excl. keycaps
- illuminated controlmec™ Module incl. keycaps with legends
- Sealed controlmec™ Module excl. keycaps
- Sealed controlmec™ Module incl. keycaps
- Sealed controlmec™ Module incl. keycaps with legends
- Sealed illuminated controlmec™ Module excl. keycaps
- Sealed illuminated controlmec™ Module incl. keycaps with legends

Part no. for a module:

controlmec™ Module has many customisation options regarding actuation force, cap and LED colours and legends. Because of that "How to order" has been placed on page 43.

See previous pages for information on switch and cap options.

SEE THE "HOW TO ORDER" GRAPH AS WELL AS CIRCUIT DIAGRAM AND CONNECTOR INFO ON [PAGE 43](#)

Ordering example: 95CA350913611806 (without illumination)  
 95CB358216LMH13612309 (with illumination)  
 95CC6509 (sealed without illumination)  
 95CD356116LMH13612309 (sealed with illumination)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



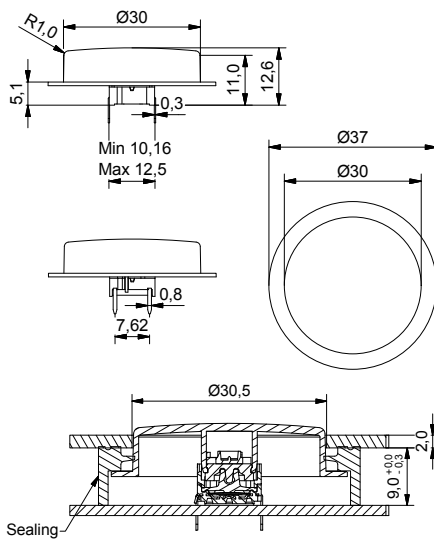
- Panel sealing option
- Round cap; Ø30 mm
- h =11 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 10R/10RF/10RM-Ø30.6
- Height of the spacer: 3.9mm
- Sealing IP67 (we recommend 6.5N switch)

All dimensions in mm

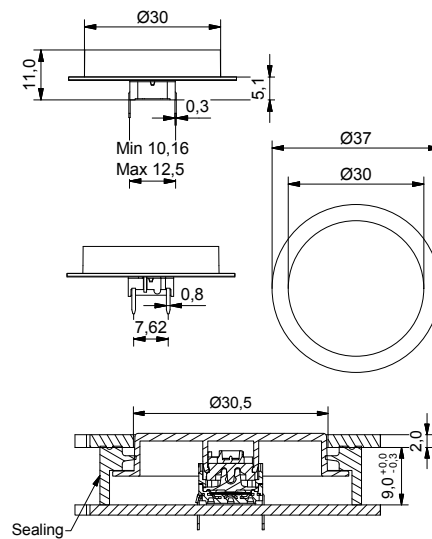
Tolerances +/-0.2mm

### DIMENSIONS

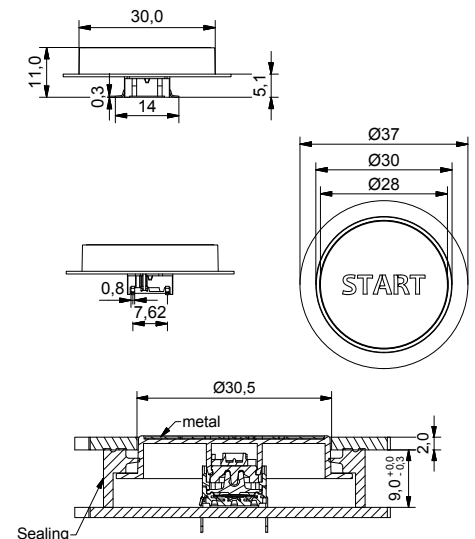
#### TH + 10R



#### TH + 10RF



#### SMD w/LED + 10RM



### ILLUMINATED - HOW TO ORDER

| Switch | Mounting                              | Actuation force      | LED  | Cap                 | Colour code      | Sealing  | Spacer   |
|--------|---------------------------------------|----------------------|--|---------------------|------------------|----------|----------|
| 5 G    |                                       |                      |  | +                   |                  | +        |          |
|        | TH9 through-hole<br>SH9 surface mount | 20<br>35<br>65<br>Q* | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow | 10R<br>10RF<br>10RM | 16 frosted white | optional | optional |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

See pages 34-35 for metal legend.

### NON-ILLUMINATED- HOW TO ORDER

| Switch | Mounting                              | Actuation force       | Cap         | Colour code   | Sealing  | Spacer   |
|--------|---------------------------------------|-----------------------|-------------|---|----------|----------|
| 5 G    |                                       |                       | +           |   | +        |          |
|        | TH9 through-hole<br>SH9 surface mount | 20<br>20Q<br>35<br>65 | 10R<br>10RF | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black | optional | optional |

Ordering example: 5GSH965+10R08+10RY non-illuminated with spacer OR 5GTH93502+10RM16031 with illumination OR 5GSH965+10RF0901806+10RW with sealing OR \*5GTH92061Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



- Panel sealing option
- Square cap; 22 mm x 22 mm
- h = 11 mm
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C
- Panel cut-out: 10Q/10QM-22.5 x 22.5
- Height of the spacer: 3.9mm/5.1mm
- Sealing IP65 (we recommend 6.5N switch)

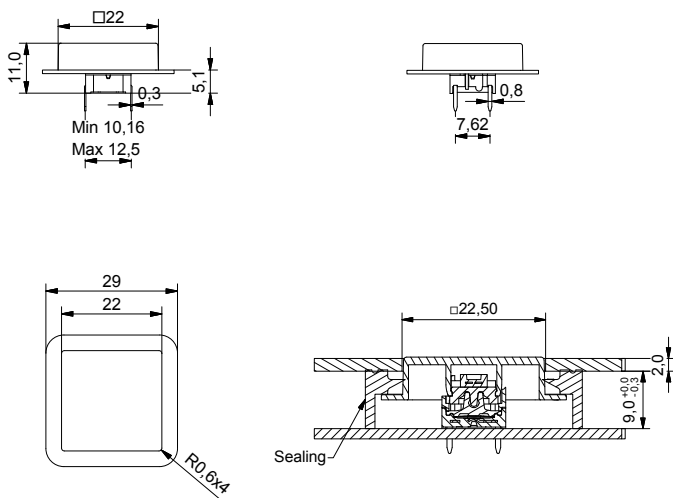


All dimensions in mm

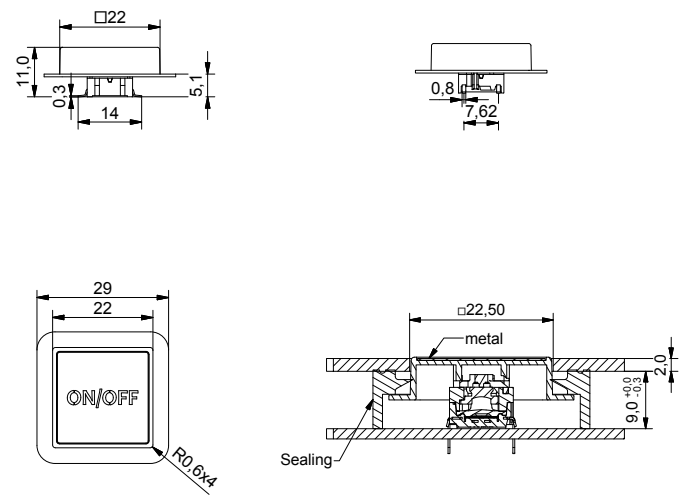
Tolerances +/-0.2mm

### DIMENSIONS

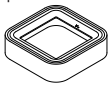

#### TH + 10Q



#### SMD w/LED + 10QM



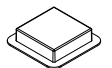


### ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force                                   | LED  |   | Cap   | Colour code                                       | Sealing  | Spacer   |
|--------|--|---|--|---|---|---|--|--|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>              | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | + <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 10QW | + <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 10QY |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>35<br>65<br>Q*                              | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red<br>2242 green/yellow<br>8222 red/green<br>8242 red/yellow |   | 10Q<br>10QM   | 16 frosted white                                  | optional<br>          | optional<br>          |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

See pages 34-35 for metal legend.

### NON-ILLUMINATED – HOW TO ORDER

| Switch | Mounting   | Actuation force  |   | Cap   | Colour code   | Sealing  | Spacer   |
|--------|--|--|---|---|---|--|--|
| 5 G    | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | + | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/>                             | + <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 10QW | + <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 10QY |
|        | TH9 through-hole<br>SH9 surface mount                                      | 20<br>20Q<br>35<br>65  |   | 10Q<br>          | 00 blue<br>02 green<br>03 grey<br>04 yellow<br>06 white<br>08 red<br>09 black | optional<br>          | optional<br>          |

Ordering example: 5GSH920+10Q00+10QY non-illuminated with spacer OR 5GTH93582+10QM16017 with illumination OR 5GSH965+10Q0910506+10QW with sealing OR \*5GTH92001Q (illuminated quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

## AUDIO – FOOT PEDAL



MEC part no: 5GTH935 + 1VS09

## SECURITY PANEL



MEC part no: 5GSH920 + 1PS chromed

## COFFEE MACHINE



MEC part no: 5GTH965 + 1TS09 +1TS00

## LEISURE - CASINO CHIP SORTER



MEC part no: navimec™, 5GTH935 + 1ZCS09

## MEDICAL – REMOTE CONTROL FOR CT SCANNER



MEC part no: navimec™, 5GSH935 + 1ZCS30 + 1GAS04

## AUDIO – TURNTABLE



MEC part no: navimec™, 5GSH935 + 1KS1116

## AGRICULTURE – TRACTOR



MEC part no: 5GTH965 + 1JS00



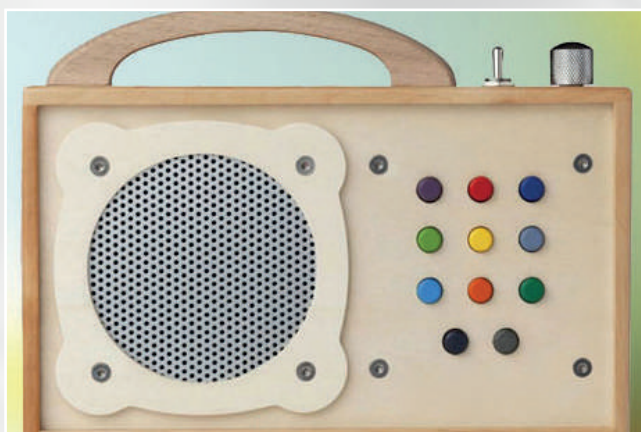
MEC part no: 5GTH965 + 1KS0016

## MILITARY - NAVIGATION CHART SYSTEMS



MEC part no: 5GSH935 + 1TS09 + 1PS09

## AUDIO – CHILDREN'S RADIO



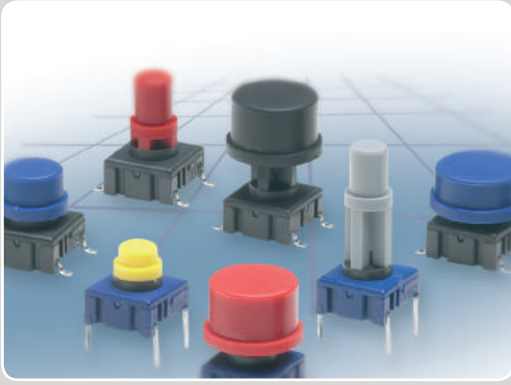
MEC part no: 5GSH935 + 1DS in many colours

## INSTRUMENTATION – MEASUREMENT CONTROLLER



MEC part no: navimec™, 5GSH920 + 1ZCS08 + 1A09 + 1PS30





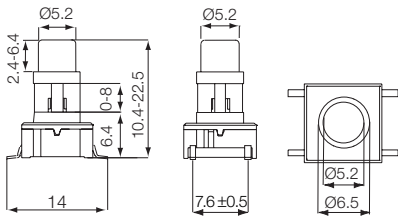
- Round caps
- 2400 options in the series
- Ø5.2 mm; Ø7.8 mm; Ø11.6 mm
- h =10.4-22.5 mm
- Material: polyamide
- Temp. Range:-40/+160°C

All dimensions in mm

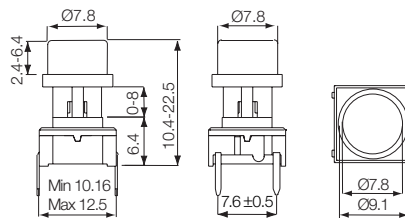
Tolerances +/-0.2mm

## DIMENSIONS

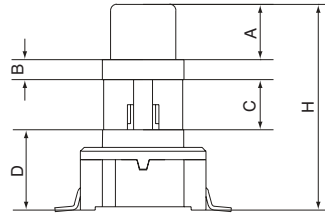
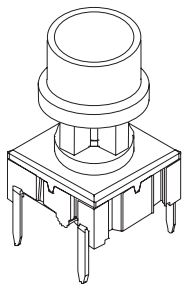
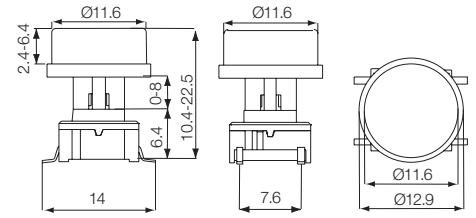
### SMD+Round ø5.2



### TH+Round ø7.8



### SMD+Round ø11.6



### 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

## HOW TO ORDER

| Switch         | Shape and size  | Colour code  | Overall height H   | Height above recess A  | Tape*                    |
|----------------|---|--|--|--|--------------------------|
| <b>3 E S H</b> | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/>   | <input type="checkbox"/>   | <input type="checkbox"/> |
| <b>3 E T H</b> | <b>A</b> 5.2 Round<br><b>E</b> 7.8 Round<br><b>K</b> 11.6 Round | <b>60</b> blue<br><b>63</b> grey<br><b>64</b> yellow<br><b>68</b> red<br><b>69</b> black | <b>A</b> 10.4<br><b>B</b> 11.0<br><b>C</b> 12.0<br><b>D</b> 12.5<br><b>E</b> 13.0<br><b>F</b> 14.0<br><b>G</b> 15.0<br><b>H</b> 16.0<br><b>J</b> 19.0<br><b>K</b> 22.5 | <b>A</b> 2.4<br><b>B</b> 3.0<br><b>C</b> 3.5<br><b>D</b> 4.0<br><b>E</b> 4.5<br><b>F</b> 5.0<br><b>G</b> 5.6<br><b>H</b> 6.4 | <b>R</b>                 |

Ordering example:

Examples switch and cap: 3ETHE64CC = Switch 3ETH, 7.8 round cap, yellow, overall height 12.0, height above recess 3.5, (height under recess 0.5).

Example caap alone: 3E-E63FF = Cap, 7.8 round, grey, overall height with switch 14.0, height above recess 5.0, (height under recess 1.0).

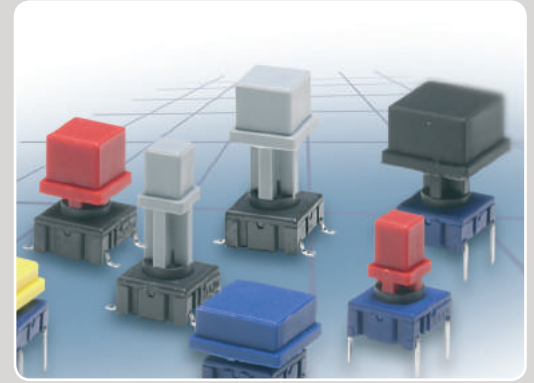
Min. order is 2.000 pcs. per shape, size and heights for parts mentioned above.

For heights not mentioned in the list a start-up fee will apply.

\*Only overall height up to 12.5mm can be supplied on tape.

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Square caps
- 2400 options in the series
- 5.2 mm x 5.2 mm; 7.8 mm x 7.8 mm; 11.6 mm x 11.6 mm
- h = 10.4-22.5 mm
- Material: polyamide
- Temp. Range: -40/+160°C

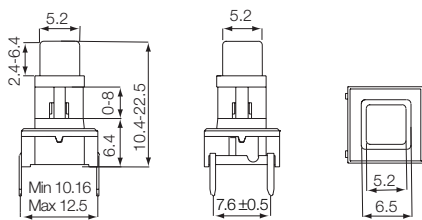


All dimensions in mm

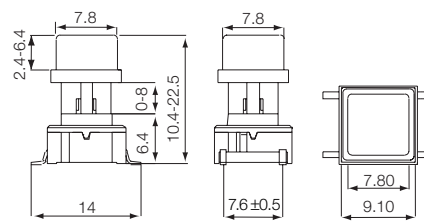
Tolerances +/-0.2mm

## DIMENSIONS

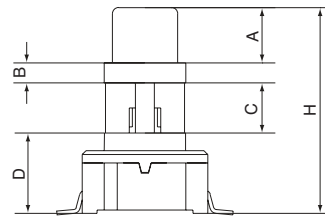
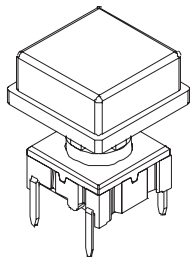
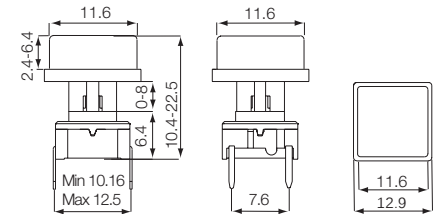
### TH+Square 5.2



### SMD+Square 7.8



### TH+Square 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

## HOW TO ORDER

| Switch         | Shape and size           | Colour code              | Overall height H         | Height above recess A    | Tape*                    |
|----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>3 E S H</b> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>3 E T H</b> | <b>B</b> 5.2 Square      | <b>60</b> blue           | <b>A</b> 10.4            | <b>A</b> 2.4             | <b>R</b>                 |
|                | <b>F</b> 7.8 Square      | <b>63</b> grey           | <b>B</b> 11.0            | <b>B</b> 3.0             |                          |
|                | <b>L</b> 11.6 Square     | <b>64</b> yellow         | <b>C</b> 12.0            | <b>C</b> 3.5             |                          |
|                |                          | <b>68</b> red            | <b>D</b> 12.5            | <b>D</b> 4.0             |                          |
|                |                          | <b>69</b> black          | <b>E</b> 13.0            | <b>E</b> 4.5             |                          |
|                |                          |                          | <b>F</b> 14.0            | <b>F</b> 5.0             |                          |
|                |                          |                          | <b>G</b> 15.0            | <b>G</b> 5.6             |                          |
|                |                          |                          | <b>H</b> 16.0            | <b>H</b> 6.4             |                          |
|                |                          |                          | <b>J</b> 19.0            |                          |                          |
|                |                          |                          | <b>K</b> 22.5            |                          |                          |

Ordering example:

Examples switch and cap: 3ESH60AA = Switch 3ESH, 5.2 square cap, blue, overall height 10.4, height above recess 2.4, (height under recess 0).

Example caap alone: 3E-E63FF = Cap, 7.8 square, grey, overall height with switch 14.0, height above recess 5.0, (height under recess 1.0).

Min. order is 2.000 pcs. per shape, size and heights for parts mentioned above.

For heights not mentioned in the list a start-up fee will apply.

\*Only overall height up to 12.5mm can be supplied on tape.

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

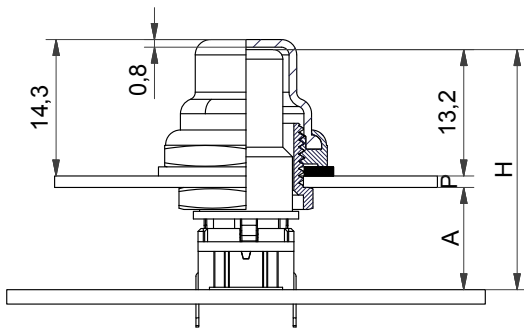




- Round cap
- Solution panel sealed to IP 67
- Ø10.6 mm
- h =24.2-27.2 mm (h from front panel=14.3 mm)
- Material: ABS/polycarbonate
- Temp. Range:
  - Solid cap: -40/+65°C
  - Transparent cap: -40/+85°C

All dimensions in mm

Tolerances +/-0.2mm



$$H=A+P+13.2$$

this leaves nominal 0.3 mm clearance between the top of the cap and the inner side of the sealing boot to accomplish assembly tolerances. A can be chosen between 10-13 mm, we recommend 10 mm to reduce building height and optimise cap guidance.

| A    | P   | CAP         | H    | BUSHING |
|------|-----|-------------|------|---------|
| 10.0 | 1.0 | AQCSxx-24.2 | 24.2 | AQN-0.5 |
| 10.0 | 2.0 | AQCSxx-25.2 | 25.2 | AQN-0.5 |
| 10.0 | 3.0 | AQCSxx-26.2 | 26.2 | AQN-2.5 |
| 10.0 | 4.0 | AQCSxx-27.2 | 27.2 | AQN-2.5 |


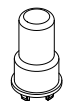


Cap is available in black (09) or transparent (11).

The dimension H is the overall height of the switch+cap.

Bushing AQN-0.5 accepts panel thickness (P) 0.5-2.5 mm.




Bushing AQN-2.5 accepts panel thickness (P) 2.5-4.0 mm.

### ILLUMINATED – HOW TO ORDER

| Switch        | Mounting  | Actuation force          | LED        | Bushing   | Cap   | Overall height (H) | Sealing boot  |
|---------------|-----------|--------------------------|------------|---|---|--------------------|---|
| 5 G           |           |                          |            | + A Q N - .   | + A Q C S   | - . .              | + A Q B 0 1   |
| <b>TH9</b>    | <b>20</b> | <b>02</b> blue           | <b>0.5</b> | <b>11</b> transparent   | <b>24.2</b>   | incl. sealing      |   |
| through-hole  | <b>35</b> | <b>22</b> green          | <b>2.5</b> |  |  | <b>25.2</b>        | <b>11</b> transparent   |
|               | <b>65</b> | <b>42</b> yellow         |            |   | <b>26.2</b>   |                    |  |
| <b>SH9</b>    | <b>Q*</b> | <b>61</b> white          |            |   | <b>27.2</b>   |                    |  |
| surface mount |           | <b>82</b> red            |            |   |   |                    |   |
|               |           | <b>2242</b> green/yellow |            |   |   |                    |   |
|               |           | <b>8222</b> red/green    |            |   |   |                    |   |
|               |           | <b>8242</b> red/yellow   |            |   |   |                    |   |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### NON-ILLUMINATED – HOW TO ORDER

| Switch        | Mounting   | Actuation force   | Bushing         | Cap         | Overall height (H)  | Sealing boot |
|---------------|------------|---|-----------------|-------------|---|--------------|
| 5 G           |            |   | + A Q N - .     | + A Q C S   | - . .   | + A Q B 0 1  |
| <b>TH9</b>    | <b>20</b>  | <b>0.5</b>  | <b>09</b> black | <b>24.2</b> | incl. sealing   |              |
| through-hole  | <b>20Q</b> | <b>2.5</b>  |                 | <b>25.2</b> | <b>09</b> black   |              |
|               | <b>35</b>  |  |                 | <b>26.2</b> |  |              |
| <b>SH9</b>    | <b>65</b>  |   |                 | <b>27.2</b> |  |              |
| surface mount |            |   |                 |             |   |              |

Ordering example: 5GTH93522+AQN-0.5+AQCS11-24.2+aqb0111 with illumination OR 5GSH965+AQN-2.5+AQCS09-27.2+aqb0109 non-illuminated, \*5GSH92082Q (illuminated quiet version)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Designed for 5G cap retention system
- Stackable, giving the possibility to match most overall heights
- $h = 5-10$  mm
- Material: Nylon
- Temp. Range:
  - Switch:  $-40/+160^{\circ}\text{C}$
  - LED:  $-30/+85^{\circ}\text{C}$
  - Solid keycap:  $-40/+65^{\circ}\text{C}$
  - Transparent keycap:  $-40/+85^{\circ}\text{C}$

All dimensions in mm

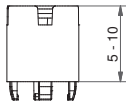
Tolerances  $\pm 0.2\text{mm}$



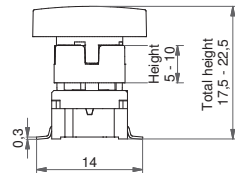
## DIMENSIONS

### 2SS

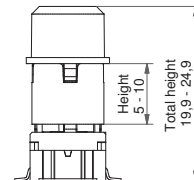
5 mm, 6 mm, 7 mm, 8 mm, 9 mm, 10 mm



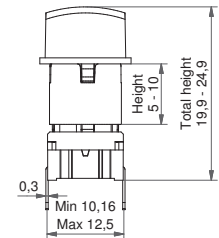
### SMD + 2SS+1GCS



### SMD + 2SS+1DS



### TH + 2SS+1TS

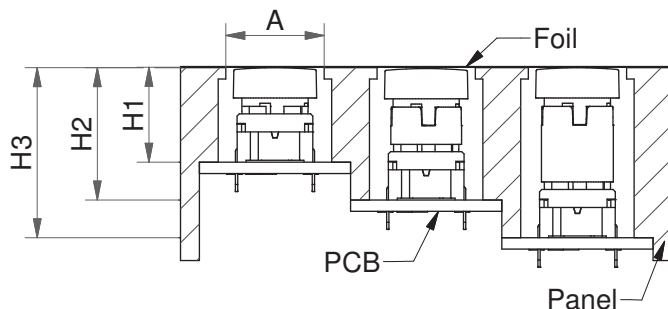


## HOW TO ORDER

| Switch     | Mounting   | Actuation force                                   | LED (optional)   | +        | Cap  | Extender 2SS height  |
|------------|--|---|--|----------|--|--|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  | <b>+</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <b>2 5 5 0 9 - . 0</b>   |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b><br><b>Q*</b>  | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white<br><b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |          | See the table below  | <b>05.0</b><br><b>06.0</b><br><b>07.0</b><br><b>08.0</b><br><b>09.0</b><br><b>10.0</b> |

\*For an illuminated quiet 2.0N switch add Q to the end of the switch part number.

### How to use 1GAS/1GCS + 2SS under foil



A=We recommend you to allocate enough space for travel of the foil and leave the area free from adhesive  
H=We recommend you to calculate this dimension from the top of the PCB to the inner top of the panel with a small pretention 0.1-0.2mm

### 2SS can be used with all 5G-type snap-on caps

All 2SS extenders are stackable giving the possibility to match most overall heights.

| Cap            | Original height (H1) | Height with a single extender (H2;H3) |
|----------------|----------------------|---------------------------------------|
| 1DS/1ES/1FS    | 14.9                 | 19.9-24.9                             |
| 1GAS/1GCS      | 12.5                 | 17.5-22.5                             |
| 1KS/1KBS/1KCS  | 19.1; 20.2; 20.1     | 24.1; 25.2; 25.1-29.1; 30.2; 30.1     |
| 1NS            | 14.9                 | 19.9-24.9                             |
| 1TS/1US/1VS    | 14.9                 | 19.9-24.9                             |
| 1WAS/1WDS/1WPS | 15.7                 | 20.7-25.7                             |
| 1XS            | 18.5                 | 23.5-28.5                             |
| 1ZCS           | 11.7                 | 16.7-21.7                             |

Ordering example: 5GTH935+1GAS09+2SS09-06.0 OR \*5GSH920Q or 5GTH92082Q (quiet version)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

# Legends

Available for Multimec caps

standard legends

| LEGEND | 1B09U_<br>1B09D_ | 1DS09_ | 1FS096R_ | 1ZB09D_<br>1ZB16DLMH_ | 1ZCS_ | 10R_ & 10RF_<br>10RM16_ | 10Q_<br>10QM16_ |
|--------|------------------|--------|----------|-----------------------|-------|-------------------------|-----------------|
| 0      | 000              | 000    | 000      |                       |       |                         |                 |
| 1      | 001              | 001    | 001      |                       |       |                         |                 |
| 2      | 002              | 002    | 002      |                       |       |                         |                 |
| 3      | 003              | 003    | 003      |                       |       |                         |                 |
| 4      | 004              | 004    | 004      |                       |       |                         |                 |
| 5      | 005              | 005    | 005      |                       |       |                         |                 |
| 6      | 006              | 006    | 006      |                       |       |                         |                 |
| 7      | 007              | 007    | 007      |                       |       |                         |                 |
| 8      | 008              | 008    | 008      |                       |       |                         |                 |
| 9      | 009              | 009    | 009      |                       |       |                         |                 |
| #      |                  | 107    | 107      |                       |       |                         |                 |
| *      |                  | 019    | 019      |                       |       |                         |                 |
| →      |                  | 033    |          |                       |       |                         |                 |
| ←      |                  | 133    |          |                       |       |                         |                 |
| ↑      |                  | 034    |          |                       |       |                         |                 |
| ↓      |                  | 134    |          |                       |       |                         |                 |
| ↙      |                  | 135    | 135      |                       |       |                         |                 |
| +      |                  |        |          |                       |       | 054                     | 054             |
| -      |                  |        |          |                       |       | 059                     | 059             |
| ▲      |                  |        |          | 136*                  |       |                         |                 |
| ⏻      |                  | 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                     | 105             |
| ESC    |                  |        |          |                       | 051   |                         |                 |
| OK     |                  |        |          |                       | 118*  | 118                     | 118             |
| SET    |                  |        |          |                       | 119   |                         |                 |
| MENU   |                  |        |          |                       | 120   |                         |                 |
| FUNC   |                  |        |          |                       | 121   |                         |                 |
| HOME   |                  |        |          |                       | 122   |                         |                 |

## STANDARD OPTIONS

1B  
pad printed

1DS  
pad printed

1FS  
reverse printed

1ZB  
pad printed  
\*laser marked

1ZCS  
pad printed  
\*reverse printed  
\*laser marked

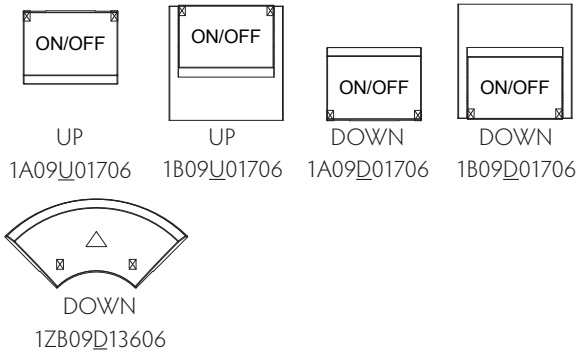
10R(F) & 10Q  
pad printed  
reverse printed

10RM & 10QM  
metal symbol

# Legends

Available for Multimec caps

how to order

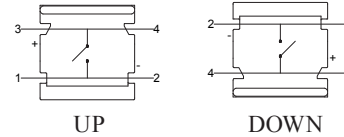


## POSITIONING OF LEGENDS ON ROCKER-ACTION CAPS

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 or D) needs to be added to the part number to refer to the position of the hinges in relation to the legend. See samples to the left.

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

Orientation of the switch:



## 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 has both negative and positive print option. E.g. 1FS096R00009

Option 3: METAL SYMBOL

Only available for 10RM and 10QM (therefore the "M"). E.g. 10RM16059

## STANDARD AND CUSTOM LEGENDS - HOW TO ORDER

### STANDARD 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.

| Cap        | Cap colour              | Direction*                | Type*                                 | Legend       | Legend colour*   |
|------------|-------------------------|---------------------------|---------------------------------------|--------------|------------------|
| □□□□       | □□                      | □□                        | □□□□                                  | □□□□         | □□               |
| <b>1B</b>  | <b>00</b> blue          | <b>D</b> down             | <b>LM</b> laser marked on soft paint  | <b>001</b> 1 | <b>00</b> blue   |
| <b>1DS</b> | <b>02</b> green         | <b>U</b> up               | <b>LMH</b> laser marked on hard paint | <b>002</b> 2 | <b>02</b> green  |
| ... etc    | <b>03</b> grey          |                           | <b>R</b> reverse printed              | <b>003</b> 3 | <b>03</b> grey   |
|            | <b>04</b> yellow        | *only for hinge-type caps | *in case of illumination              | ... etc      | <b>04</b> yellow |
|            | <b>06</b> white         |                           |                                       |              | <b>06</b> white  |
|            | <b>08</b> red           |                           |                                       |              | <b>08</b> red    |
|            | <b>09</b> black         |                           |                                       |              | <b>09</b> black  |
|            | <b>16</b> frosted white |                           |                                       |              | ... etc          |
|            | ... etc                 |                           |                                       |              |                  |

\*in case of laser marked legends the colour of the soft or hard paint

## NOTE:

- 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) on another cap than designated in the table, then there is no start-up cost, for this to apply the cap has to be black and the print white.
- Standard legend colours are white paint on a black cap and black paint on a frosted white cap. Other colour combinations are handled as custom.
- For further information on legends please contact your local distributor or MEC.



























PLEASE FIND THE FULL LIST OF AVAILABLE LEGENDS ON MEC WEBSITE [www.apem.com](http://www.apem.com)

Ordering example: 1ZW0913611806; 1B06U13508; 10R16R10509

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

# Switch series

## Selection guide

|                                    | MOMENTARY   | LATCHING  | QUIET   | KEY FEATURES   |
|------------------------------------|---|---|---|--|
| 2.5N<br>actuation force            | <b>1540x</b><br>>10M operations<br>-40/+160°C<br>silver or gold contacts<br> | <b>1545x</b><br>5M operations<br>-40/+160°C<br>silver or gold contacts<br> | <b>15420</b><br>>10M operations<br>-40/+160°C<br>gold contacts<br> | <b>unimec:</b><br>through-hole<br>double pole<br>8 contact functions<br>1.8mm travel   |
|                                    | <b>STANDARD</b>   | <b>STANDARD</b>   | <b>ILLUMINATED</b>  | <b>KEY FEATURES</b>  |
| 3.5N (3 series)<br>actuation force | <b>3CTH9</b><br>through-hole<br>-40/+160°C<br>                               | <b>3ETH9</b><br>through-hole<br>-40/+160°C<br>                             | <b>3FTH9xxRAS</b><br>through-hole<br>                              | <b>Multimec 3 series:</b><br>momentary/ single pole<br>>10 million operations<br>IP 67<br>1 mm travel                                  |
|                                    | <b>3CSH9</b><br>surface mount<br>-40/+160°C<br>                              | <b>3ESH9</b><br>surface mount<br>-40/+160°C<br>                            |   |  |
| 2.0N<br>actuation force            | <b>5ETH920</b><br>through-hole<br>quiet version<br>RAS version<br>          | <b>5GTH920</b><br>through-hole<br>quiet version<br>RAS version<br>        | <b>5GTH920xx</b><br>through-hole<br>quiet version<br>             | <b>Multimec 5 series:</b><br>momentary/ single pole<br>>10 million operations<br>IP 67 – 1mm travel<br>Temp. range: -40/+160°C         |
|                                    | <b>5ESH920</b><br>surface mount<br>quiet version<br>                       | <b>5GSH920</b><br>surface mount<br>quiet version<br>                     | <b>5GSH920xx</b><br>surface mount<br>quiet version<br>           | <b>Function:</b><br>normally open (NO) or normally closed/normally open (NC/NO)  |
| 3.5N<br>actuation force            | <b>5ETH935</b><br>through-hole<br>RAS version<br>NO or NC/NO<br>           | <b>5GTH935</b><br>through-hole<br>RAS version<br>NO or NC/NO<br>         | <b>5GTH935xx</b><br>through-hole<br>                             | <b>LED colours:</b><br>01 blue - 22 green - 42 yellow<br>61 white - 82 red - 8222 red/<br>green - 2242 green/yellow<br>8242 red/yellow |
|                                    | <b>5ESH935</b><br>surface mount<br>NO or NC/NO<br>                         | <b>5GSH935</b><br>surface mount<br>NO or NC/NO<br>                       | <b>5GSH935xx</b><br>surface mount<br>                            | <b>RAS:</b><br>right angle version only available with through-hole (TH) normally open (NO) switch                                     |
| 6.5N<br>actuation force            | <b>5ETH965</b><br>through-hole<br>RAS version<br>                          | <b>5GTH965</b><br>through-hole<br>RAS version<br>                        | <b>5GTH965xx</b><br>through-hole<br>                             |  |
|                                    | <b>5ESH965</b><br>surface mount<br>  | <b>5GSH965</b><br>surface mount<br>                                      | <b>5GSH965xx</b><br>surface mount<br>                            |  |



10 MILLION ACTUATIONS

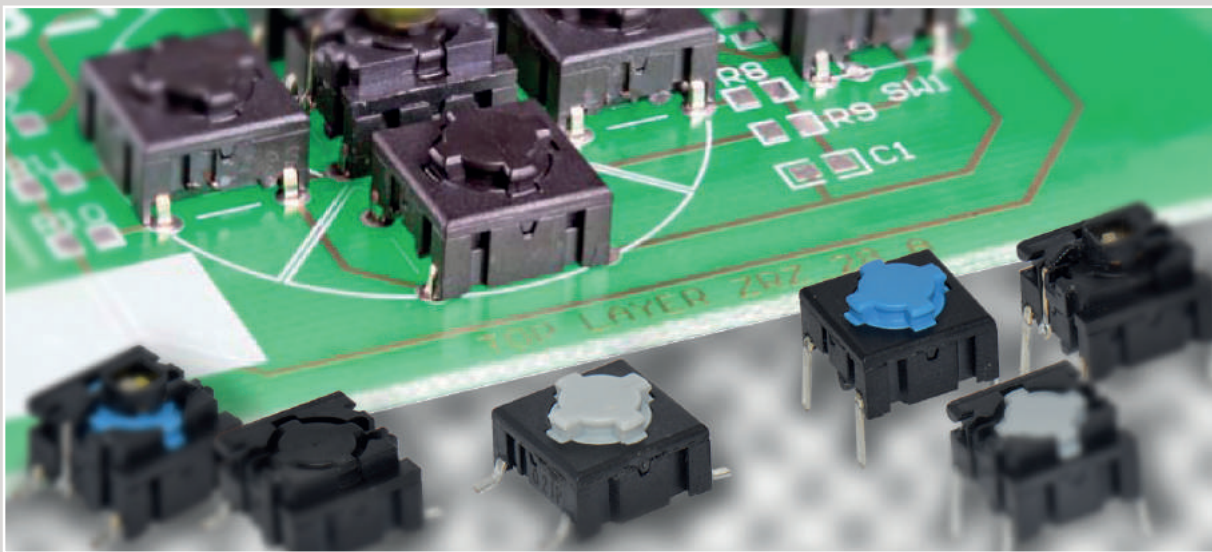
IP 67 SEALING

NORMALLY OPEN (NO) OR

NORMALLY CLOSED/NORMALLY OPEN (NC/NO)

THROUGH-HOLE RIGHT ANGLE VERSION

QUIET CONTACT OPTION WITH 2.0N

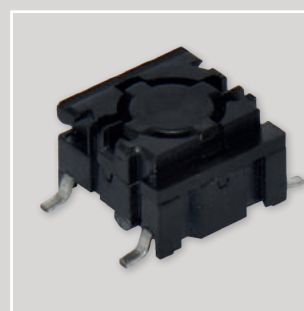


multimec® 5 series is the new generation of 3A, 3F, 4A and 4F switch. In principle the multimec® 5 series is very similar to the 3 series - it has the same pin layout, the same dimensions and the same electrical specifications.

The four main updates are the cap retention system and actuator, three standard actuation forces, one temperature range and possibility of normally closed/normally open function.



5E



5G



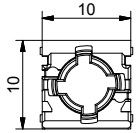
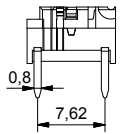
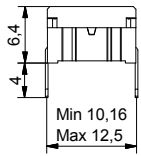
- Through-hole (TH) or surface mount (SMD)
- 50mA/24VDC
- Single pole/momentary
- 10,000,000 operations lifetime (NO function)
- Temperature range:
  - Switch: -40/+160°C
  - LED: -40/+85°C
- IP 67 sealing
- Actuation force: 2.0N, 3.5N, 6.5N
- NO or NC/NO

All dimensions in mm

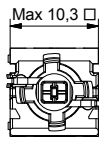
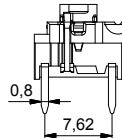
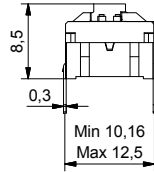
Tolerances +/-0.2mm

### THROUGH-HOLE (TH)

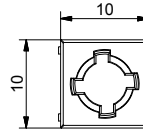
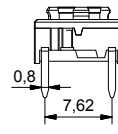
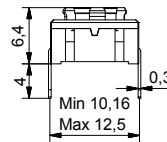
5G



5G illuminated

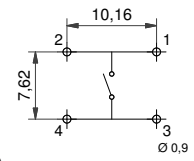


5E

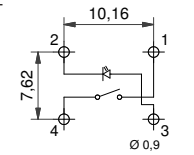


### PCB LAYOUT

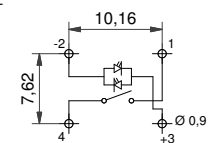
Non-illuminated



1 LED

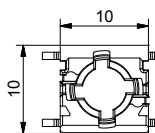
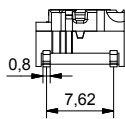
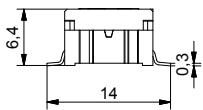


2 LED

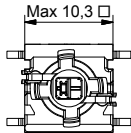
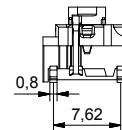
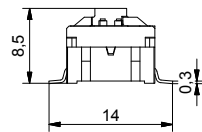


### SURFACE MOUNT (SMD)

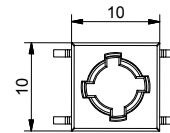
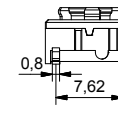
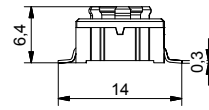
5G



5G illuminated

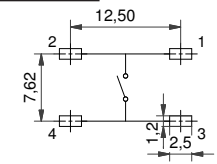


5E

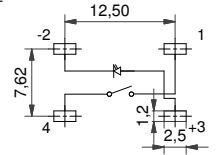


### PCB LAYOUT

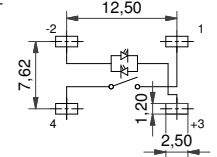
Non-illuminated



1 LED



2 LED

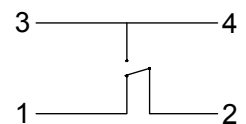


### NORMALLY CLOSED/NORMALLY OPEN FUNCTION

### NOT FOR SALE IN JAPAN

### CIRCUIT DIAGRAM

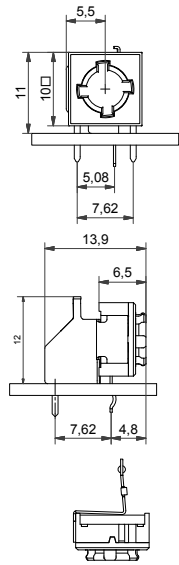
- Available for 5E and non-illuminated 5G in 3.5N actuation force.
- Same PCB layout as the NO 5E and 5G
- Housing colour is **grey**



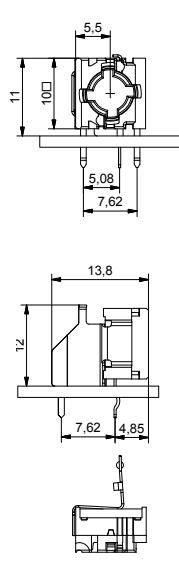
### RIGHT ANGLE SWITCHES

### PCB LAYOUT

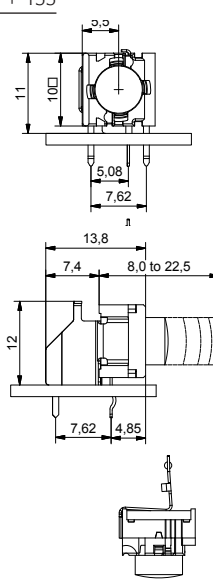
5E



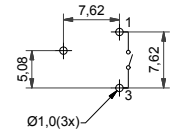
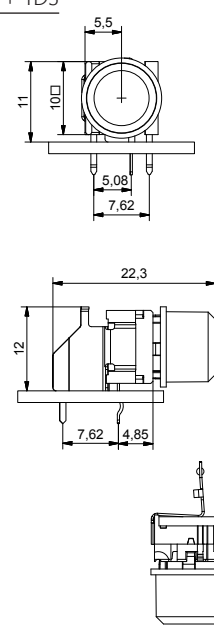
5G



5G + 1SS



5G + 1DS



multimec® 5 series has only normally open (NO) non-illuminated right angle switch.

### ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | LED  | Quiet (optional)          |
|------------|--|--|--|---------------------------|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                   | <input type="checkbox"/>  |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>35</b><br><b>65</b>  | <b>02</b> blue<br><b>22</b> green<br><b>42</b> yellow<br><b>61</b> white                     | <b>Q</b><br>only for 2.0N |
|            |  |  | <b>82</b> red<br><b>2242</b> green/yellow<br><b>8222</b> red/green<br><b>8242</b> red/yellow |                           |

### NON-ILLUMINATED – HOW TO ORDER

| Switch     | Mounting   | Actuation force  | RAS (optional)   | or   | NC/NO (only for 3.5N)   |
|------------|--|--|--|--|---|
| <b>5 E</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b>                          | <b>RAS</b> right angle switch  |  | <b>NCNO</b> normally closed/<br>normally open function  |

| Switch     | Mounting   | Actuation force  | RAS (optional)   | or   | NC/NO (only for 3.5N)   |
|------------|--|--|--|--|---|
| <b>5 G</b> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|            | <b>TH9</b> through-hole<br><b>SH9</b> surface mount                        | <b>20</b><br><b>20Q</b><br><b>35</b><br><b>65</b>                          | <b>RAS</b> right angle switch  |  | <b>NCNO</b> normally closed/<br>normally open function  |

Ordering example: 5ESH935 (non-illuminated), 5GTH9658222 (illuminated), 5GSH935NCNO (normally closed/normally open); 5ETH920RAS (right angle) 5ETH920Q or 5GSH92061Q (quiet versions)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

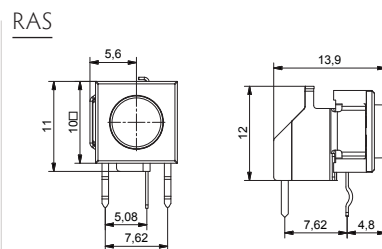
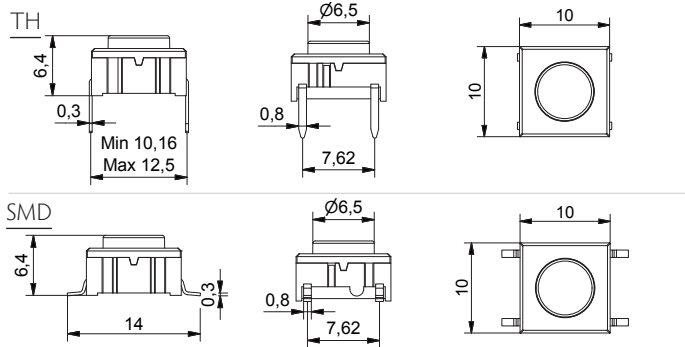


- Through-hole (TH) or surface mount (SMD)
- 50mA/24VDC
- Single pole/momentary
- 10,000,000 operations lifetime
- Temperature range:
  - High temp: -40/+160C
- IP 67 sealing
- Actuation force: 3.5N
- Most caps in the catalogue have a version for mounting on 3F switch as well. Contact MEC for further information.

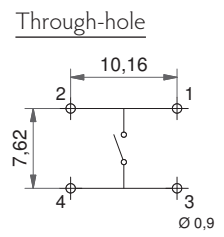
All dimensions in mm

Tolerances +/-0.2mm

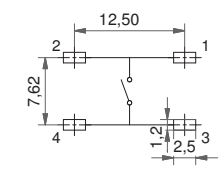
### 3C (TH, SMD & RAS)



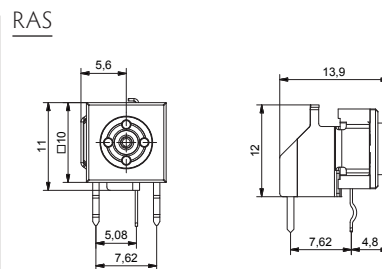
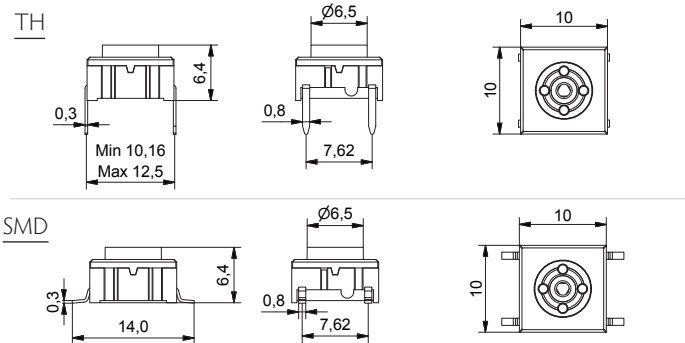
### PCB LAYOUT



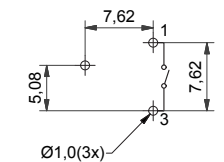
### Surface mount



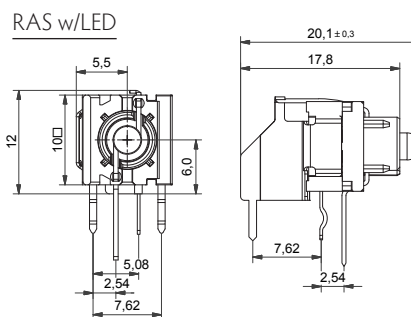
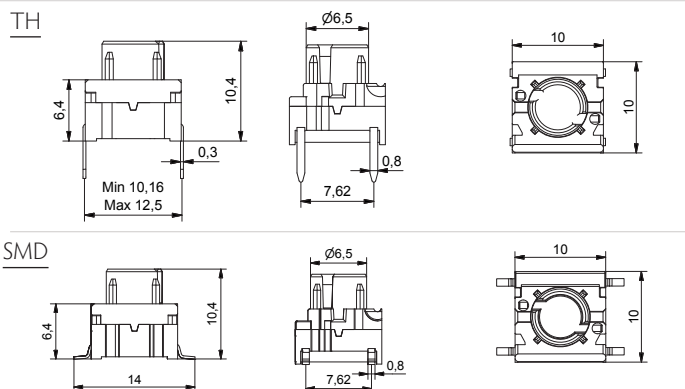
### 3E (TH, SMD & RAS)



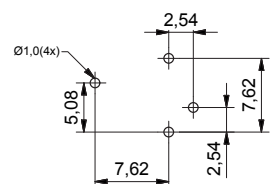
### Through-hole RAS



### 3F (TH, SMD & RAS w/LED)



### Through-hole illuminated RAS



### HOW TO ORDER

| Switch                   | Mounting                 | Temperature range    | LED (onyl for 3F)   | Right angle support   |
|--------------------------|--------------------------|----------------------|---|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <b>H 9</b>           | <input type="checkbox"/>  | <input type="checkbox"/>  |
| <b>3C</b>                | <b>T</b> through-hole    | <b>H9</b> high temp. | <b>00</b> blue <b>60</b> white <b>8020</b> red/<br><b>20</b> green <b>80</b> red                    green | <b>RAS</b> optional   |
| <b>3E</b>                | <b>S</b> surface mount   |                      | <b>40</b> yellow <b>2040</b> green/<br>yellow                    yellow                                   | 3FTH9RAS with LED can be used with the 3 series keycaps: 1D, 1E, 1F, 1K, 1N, 1Q, 1R, 1S, 1T, 1U, 1V, 1WA, 1WD, 1WP, 1X. Ask further information on caps from MEC. |
| <b>3F</b>                |                          |                      |   |   |

Ordering example: 3CTH9, 3ESH9, 3FTH9RAS Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

## Tape & Reel

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

|                |          |                         |                      |
|----------------|----------|-------------------------|----------------------|
| Reel diameter: | Ø330mm   | Tape and reel material: | antistatic or better |
| Tape width:    | 24mm     | Quantity per reel:      | see list             |
| Pitch:         | see list |                         |                      |

### 3C/3E/5E/5G multimec® tape & reel

| Part No.                                  | Ordering Code      | Pitch | Quantity per reel |
|---|--------------------|-------|-------------------|
| 3CSH9                                     | 3CSH9R             | 16    | 500               |
| 3ESH9                                     | 3ESH9R             | 16    | 500               |
| 5ESH9XX                                   | 5ESH9XXR           | 16    | 500               |
| 5GSH9XX                                   | 5GSH9XXR           | 16    | 500               |
| 5XSH9XX1SSXX-08.0                         | 5XSH9XXR1SSXX-08.0 | 20    | 250               |
| 5XSH9XX1SSXX-09.5                         | 5XSH9XXR1SSXX-09.5 | 20    | 250               |
| 5XSH9XX1SSXX-10.4                         | 5XSH9XXR1SSXX-10.4 | 20    | 250               |
| 5XSH9XX1SSXX-11.0                         | 5XSH9XXR1SSXX-11.0 | 20    | 250               |
| 5XSH9XX1SSXX-12.0                         | 5XSH9XXR1SSXX-12.0 | 20    | 250               |
| All varimec h <12.5; add R after part no. |                    |       | 20 250            |

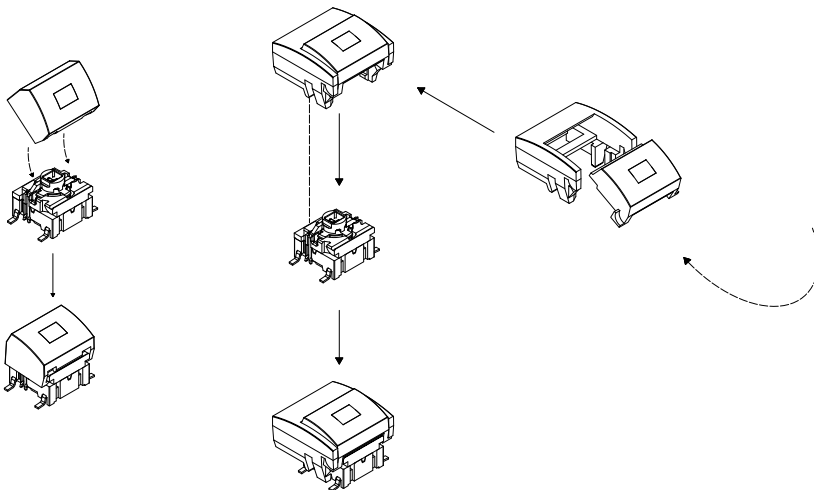
### illuminated 5G multimec® tape & reel

| Part No.    | Ordering Code | Pitch | Quantity per reel |
|-------------|---------------|-------|-------------------|
| 5GSH9XX02   | 5GSH9XX02R    | 20    | 250               |
| 5GSH9XX22   | 5GSH9XX22R    | 20    | 250               |
| 5GSH9XX42   | 5GSH9XX42R    | 20    | 250               |
| 5GSH9XX61   | 5GSH9XX61R    | 20    | 250               |
| 5GSH9XX82   | 5GSH9XX82R    | 20    | 250               |
| 5GSH9XX2242 | 5GSH9XX2242R  | 20    | 250               |
| 5GSH9XX8222 | 5GSH9XX8222R  | 20    | 250               |
| 5GSH9XX8242 | 5GSH9XX8242R  | 20    | 250               |

## How to assemble

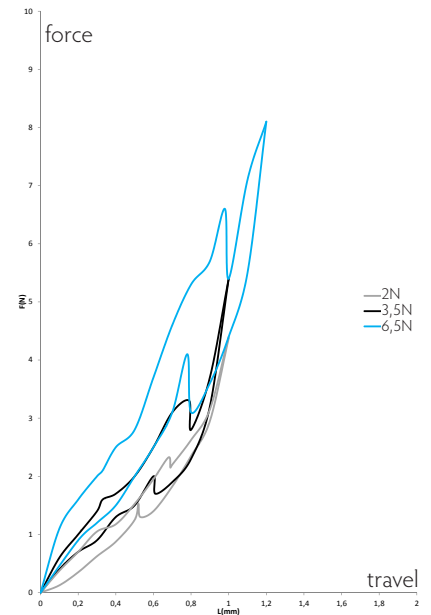
multimec®  
5GS+1A/H

multimec®  
5GS+1B/C+2C/D

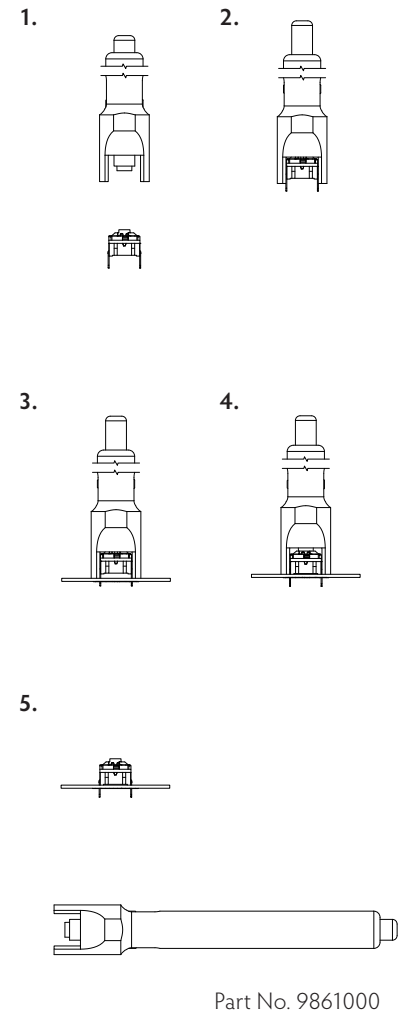


## Operating force

(typical example)

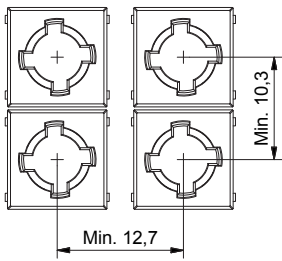


## Mounting tool for multimec® through-hole switches

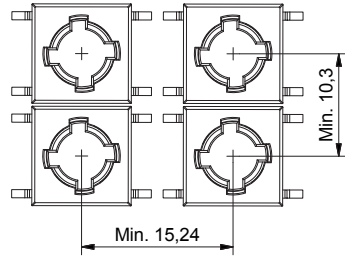


### Basic switch spacing

through-hole (TH)

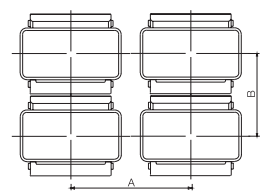


surface mount (SMD)

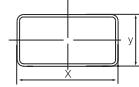


### Recommended switch/cap spacing

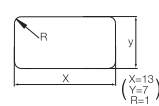
Switch spacing



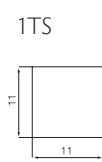
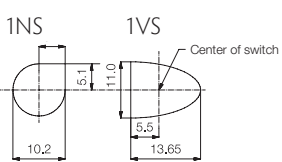
Cap dimensions



Panel cut-out

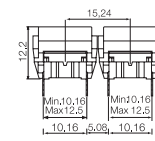


Panel cut-out

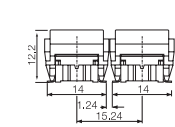


### Spacing examples

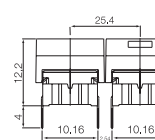
multimec  
5GT+1B/C+2C/D



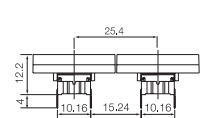
multimec  
5GS+1B/C+2C/D



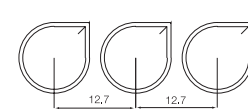
multimec  
5GT + 1A/H



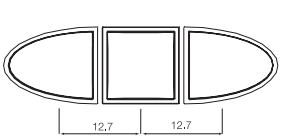
multimec  
5GT + 1M



multimec  
1NS + 1NS + 1NS



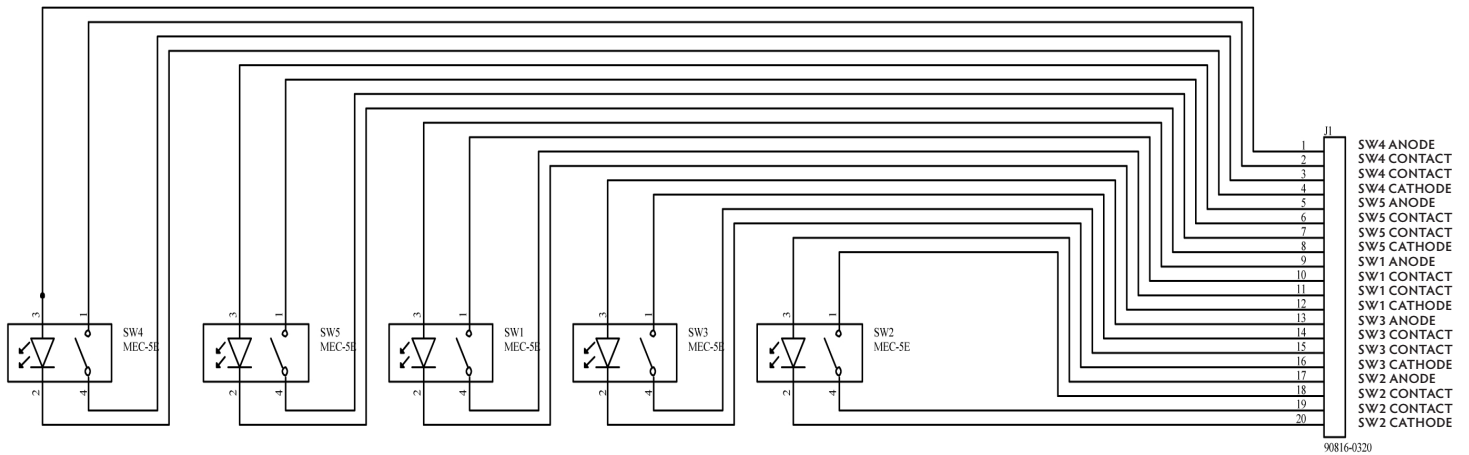
multimec  
1VS + 1TS+ 1VS



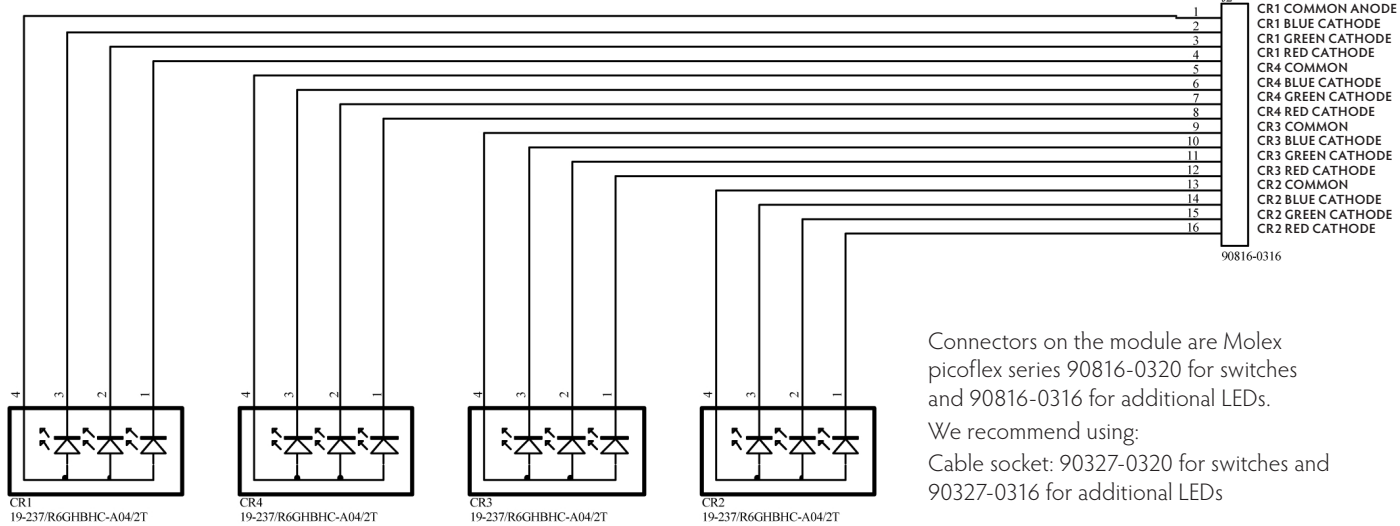
| Cap series    | Recommended<br>min. switch spacing AxB | Nominal cap dimension<br>WxH | Recommended<br>min. panel cut-out |
|---------------|--|------------------------------|-----------------------------------|
| 1A/1H         | 12.7x10.16                             | 12.6x10.1                    | 13.0x10.5                         |
| 1B/1C+2C/2D   | 15.24x15.24                            | 15.1x15.1                    | 15.5x15.5                         |
| 1DS/1ES/1FS   | 12.7x12.7                              | ø9.6                         | ø10.0                             |
| 1GAS          | 12.7x11.14                             | ø11                          | ø11.4                             |
| 1GCS          | 15.14x15.14                            | ø15                          | ø15.4                             |
| 1JS           | 12.7x12.7                              | ø9.6                         | ø10.4                             |
| 1KS/1KBS/1KCS | 15.24x15.24                            | 14.3x14.3                    | 14.7x14.7                         |
| 1M            | 25.4x10.16                             | 25.0x10.                     | 25.7x10.5                         |
| 1NS           | 12.7x12.7                              | ø9.8/□4.9                    | ø10.2/□5.1                        |
| 1PS/1QS/1RS   | 15.24x10.16                            | 6.5x12.5                     | 7.0x13.0, R max. 1.0              |
| 1SS/1IS/1LS   | 12.7x12.7                              | ø6.5                         | ø7.0                              |
| 1TS           | 12.7x12.7                              | 10.6x10.6                    | 11.0x11.0                         |
| 1US           | 12.7x12.7                              | ø10.6                        | ø11.0                             |
| 1VS           | 12.7x12.7                              | 10.6x13.25                   | 11.0x13.65                        |
| 1WAS/1WPS     | 12.7x10.3                              | 12.5x6.5                     | 12.9x6.9                          |
| 1WDS          | 15.34x10.3                             | 15.2x8.0                     | 15.6x8.4                          |
| 1XS           | 12.7x12.7                              | 9.4x7.4                      | 9.8x7.9                           |
| 1YS           | 17x17                                  | 15x15                        | 16x16                             |
| 1ZA           | 18.84x10.3                             | 18.7x10.1                    | 19.4x10.5                         |
| 1ZB           | 24.34x12.1                             | R1=7.4; R2=17.5 90°          | R1=7.1; R2=17.5-17.75 90°         |
| 1ZCS          | 14.44x14.44                            | ø14.3                        | ø14.7                             |
| 1Z/1ZW        | 35.5x35.5; 41.6x41.6                   | ø29.5                        | ø30.3                             |
| 10R/10RF/10RM | 40.5x40.5                              | ø30.0                        | ø30.6                             |
| 10Q/10QM      | 32.5x32.5                              | 22x22                        | 22.5x22.5                         |



Circuit diagram for switches



Circuit diagram for additional LEDs for controlmec™



Connectors on the module are Molex picoflex series 90816-0320 for switches and 90816-0316 for additional LEDs.  
We recommend using:  
Cable socket: 90327-0320 for switches and 90327-0316 for additional LEDs

**HOW TO ORDER - MODULES**

| Module | Cap   | Type   | Actuation force                 | LED*   |
|--------|---|--|---------------------------------|--|
| 9 5    | +   | +  | +                               | +  |
|        | C controlmec module<br>N navimec module<br>Q 10Q module<br>R 10R module | A non-illuminated<br>B illuminated<br><u>Sealed controlmec module:</u><br>C non-illuminated<br>D illuminated | 20 2.0N**<br>35 3.5N<br>65 6.5N | 02 blue<br>22 green<br>42 yellow<br>61 white<br>82 red |

| Cap colour                   | Legend type*  | Legend on the edges* | Legend in the centre* | Legend colour*       |
|------------------------------|---|----------------------|-----------------------|----------------------|
| +                            | +   | +                    | +                     | +                    |
| 09 black<br>16 frosted white | (nothing) pad printed<br>LMH hard paint laser marked<br>M Metal | 136 ▲                | 118 OK<br>123 ☺       | 06 white<br>09 black |

\*optional, \*\* 2.0N actuation force not recommended for controlmec

\*\*\*Find more options on [apem.com](http://apem.com)

Ordering example:  
95CB358216LMH13611809 - illuminated non-sealed controlmec  
95CC650913612306 - non-illuminated panel sealed controlmec  
95NB358216LMH13611809 - illuminated Navimec module  
95QB200116M118 - illuminated 10Q module  
95RA350912306 - non-illuminated 10R module  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

## RoHS Compatible

|   | HIGH TEMPERATURE VERSIONS  |                               |                   |
|---|--|-------------------------------|-------------------|
|   | SILVER   | GOLD                          | NC/NO             |
| <b>ELECTRICAL SPECIFICATIONS</b>          |  |                               |                   |
| Contact resistance                        | <30m Ω - typ. 10m Ω  |                               |                   |
| Insulation resistance                     | >10M Ω   |                               |                   |
| Recommended load                          | 0.5-50mA 24VDC   | 0.5μ-50mA 24VDC               |                   |
| Contact bounce                            | <2mS - typically 0.5mS   |                               |                   |
| <b>MECHANICAL SPECIFICATIONS</b>          |  |                               |                   |
| Standard actuation force (switch)         | 2.0N, 3.5N, 6.5 N  |                               | 3.5N              |
| Max. Actuation force without cap          | 115N for 60 sec  | (according to MIL-PRF-22885H) | 100N for 10 sec   |
| Key travel (switch)                       | 1 mm   |                               |                   |
| Life time (switch)                        | >10,000,000 cycles   |                               | >1,000,000 cycles |
| <b>TEMPERATURE RANGE</b>                  |  |                               |                   |
| Working temperature                       | Min -40°C Max +160°C   |                               |                   |
| Storage temperature                       | Min -40°C Max +160°C   |                               |                   |
| 5G with LED (working & storage temp)      | Min -30°C Max +85°C  |                               |                   |
| Soldering (through-hole switch)           | IEC 60068-2-20 8:  |                               |                   |
|   | Infrared, vapour phase, wave - max 240°C for max 40 sec or max 260°C for max 30 sec. |                               |                   |
|   | Soldering iron - max 350°C for max 3 sec.  |                               |                   |
|   | Flux tight.  |                               |                   |
| <b>SOLDERING (SMD)</b>                    | JEDEC J-STD-020E   |                               |                   |
| <b>ENVIRONMENTAL ENDURANCE IEC 68-2-3</b> |  |                               |                   |
| Temperature                               | +40°C  |                               |                   |
| Humidity                                  | 93% RH   |                               |                   |
| Duration                                  | 56 Days  |                               |                   |
| <b>TEMPERATURE CYCLING IEC 68-2-14</b>    |  |                               |                   |
| Temperature limit                         | Min -55°C - Max +85°C  |                               |                   |
| Number of cycles                          | 200  |                               |                   |
| Exposure time at each temperature         | 10 min   |                               |                   |
| Recovery time before measurements         | 16 hrs   |                               |                   |
| Sealing IEC 529                           | IP-67  |                               |                   |
| Cleaning                                  | Standard methods - see usage guidelines  |                               |                   |
| <b>MATERIAL SPECIFICATIONS - SWITCHES</b> |  |                               |                   |
| Housing                                   | PPS UL94V0   |                               |                   |
| Actuator                                  | PPS UL94V0   |                               |                   |
| Sealing + spring                          | Silicone rubber  |                               |                   |
| Contact spring                            | Stainless steel  |                               | Stainless steel   |
|   | + 3μAg   |                               | + 1μAu            |
| Fixed contacts                            | SnCu + 2μNI + 3μAg   | SnCu + 2μNI + 1μAu            |                   |
| Terminals                                 | SnCu + 2μNI + 3μSn100  |                               |                   |

## Caps, Bezels & Legends – Material Specifications

| MATERIAL         | PARTS   | TEMP. LIMIT | UL RATING |
|------------------|---|-------------|-----------|
| ABS              | 1A, 1B, 1C, 1DS, 1ES, 1FS, 1H, 1JS, 1KS, 1LS, 1M, 1NS, 1PS, 1QS, 1RS, 1TS, 1US, 1VS, 1WAS, 1WDS, 1WPS, 1XS, 1Z, 1ZA, 1ZB, 1ZCS, 1ZW, 2C, 2D, 2K, reflectors for 1KBS/1KCS and 1YS | Max. 65°C   | UL94HB    |
| Polycarbonate    | All lenses and transparent colour caps, lids for 1KBS/1KCS  | Max. 85°C   | UL94HB    |
| Polyamide        | 1GAS/1GCS, 1SS, 2SS   | Max. 160°C  | UL94V2    |
| Legends Adhesion | DS/EN ISO 2409 Class 1 & ASTM D3359 Class 4B  |             |           |

## RoHS Compatible

|   |  | HIGH TEMPERATURE VERSIONS |      |
|---|--|---------------------------|------|
|   |  | SILVER                    | GOLD |
| <b>ELECTRICAL SPECIFICATIONS</b>          |  |                           |      |
| Contact resistance                        | <30m Ω - typ. 10m Ω  |                           |      |
| Insulation resistance                     | >10M Ω   |                           |      |
| Recommended load                          | 0.5-50mA 24VDC   | 0.5μ-50mA 24VDC           |      |
| Contact bounce                            | <2mS - typically 0.5mS   |                           |      |
| <b>MECHANICAL SPECIFICATIONS</b>          |  |                           |      |
| Standard actuation force (switch)         | 3.5N typ   |                           |      |
| Max. Actuation force without cap          | 100N for 10 sec  |                           |      |
| Key travel (switch)                       | 1 mm   |                           |      |
| Life time (switch)                        | >10,000,000  |                           |      |
| Temperature Range                         |  |                           |      |
| Working temperature                       | Min -40°C Max +160°C   |                           |      |
| Storage temperature                       | Min -40°C Max +160°C   |                           |      |
| Soldering IEC 60068-2-20 8 :              | Infrared, vapour phase, wave - max 240°C for max 40 sec or max 260°C for max 30 sec.<br>Soldering iron - max 350°C for max 3 sec.<br>Flux tight. |                           |      |
| <b>ENVIRONMENTAL ENDURANCE IEC 68-2-3</b> |  |                           |      |
| Temperature                               | +40°C  |                           |      |
| Humidity                                  | 93% RH   |                           |      |
| Duration                                  | 56 Days  |                           |      |
| <b>TEMPERATURE CYCLING IEC 68-2-14</b>    |  |                           |      |
| Temperature limit                         | Min -55°C - Max +85°C  |                           |      |
| Number of cycles                          | 200  |                           |      |
| Exposure time at each temperature         | 10 min   |                           |      |
| Recovery time before measurements         | 16 hrs   |                           |      |
| Sealing IEC 529                           | IP-67  |                           |      |
| Cleaning                                  | Standard methods - see usage guidelines  |                           |      |
| <b>MATERIAL SPECIFICATIONS - SWITCHES</b> |  |                           |      |
| Housing                                   | PPS UL94V0   |                           |      |
| Actuator                                  | PPS UL94V0   |                           |      |
| Sealing + spring                          | Silicone rubber  |                           |      |
| Contact spring                            | Stainless steel  | Stainless steel           |      |
|   | + 3μAg   | + 1μAu                    |      |
| Fixed contacts                            | SnCu + 2μNI + 3μAg   | SnCu + 2μNI + 1μAu        |      |
| Terminals                                 | SnCu + 2μNI + 3μSn100  |                           |      |

## Caps – Material Specifications

| MATERIAL  | PARTS                  | TEMP. LIMIT | UL RATING |
|-----------|------------------------|-------------|-----------|
| Polyamide | Actuators for varimec™ | Max 160°C   | UL94V2    |

### LEDs specifications

#### 5G switches

| Colour  |          | Blue                | Green   | Yellow  | White   | Red     | High Intensity Green |
|---|----------|---------------------|---------|---------|---------|---------|----------------------|
| Colour Codes  |          | 02                  | 22      | 42      | 61      | 82      | 29                   |
| <b>ABSOLUTE MAXIMUM RATINGS (Ta=25°C)</b>           |          |                     |         |         |         |         |                      |
| Power   | mW       | 95                  | 75      | 60      | 48      | 65      | 102.5                |
| Current forward                                     | mA       | 25                  | 30      | 25      | 15      | 25      | 25                   |
| Forward peak current                                | mA       | 100                 | 80      | 60      | 100     | 100     | 150                  |
| Voltage reverse                                     | V        | 5                   | 5       | 5       | NA      | 12      | 5                    |
| Operating temperature                               | °C       | -40/+85             | -55/+85 | -40/+85 | -40/+85 | -30/+85 | -40/+85              |
| Storage temperature                                 | °C       | -40/+90             | -55/+85 | -40/+90 | -40/+85 | -40/+85 | -40/+85              |
| Soldering temperature                               | °C       | 245 for max. 10 sec |         |         |         |         |                      |
| <b>ELECTRICAL-OPTICAL CHARACTERISTICS (Ta=25°C)</b> |          |                     |         |         |         |         |                      |
| Voltage forward                                     | Typ. V   | 3.3                 | 2       | 1.75**  | 2.85    | 2       | 3.3                  |
|   | Max. V   | 3.7                 | 2.4     | 2.35    | 3.1     | 2.5     | 4.1                  |
| Current reverse (VR=5V)                             | Max. µA  | 50                  | 100     | 10      | NA      | 100     | 50                   |
| Wave length   | nm       | 470                 | 571     | 591     | NA      | 633     | 525                  |
| Spread  | Δnm      | 25                  | NA      | 15      | NA      | 16      | 30                   |
| Spread angle  | degree   | 120                 | 130     | 120     | 150     | 160     | 60                   |
| <b>Luminous Intensity</b>                           | Min. mcd | 45                  | 18      | 28.5    | 71      | 28      | 500                  |
|   | Typ. mcd | 112*                | 35      | 72*     | 224*    | 180*    | 1000                 |
| Optical intensity                                   | Lm/w     | NA                  | NA      | NA      | 36      | 7       | NA                   |

\*Max.mcd \*\*Min. V

#### 3F switches

#### 3FXXX (for 1E-1F-1N-1Q-1R-1S-1X)

#### 3FXXX (for 1K-1T-1U-1V-1W-1WD)

| Colour  |  | B                 | G    | Y    | W        | R        | G/Y     | R/G               | R/Y     | G       | Y                 | R                 |  |
|---|--|-------------------|------|------|----------|----------|---------|-------------------|---------|---------|-------------------|-------------------|--|
| Colour Codes  |  | 00                | 20   | 40   | 65       | 80       | 2040    | 8020              | 8040    | 24      | 46                | 87                |  |
| <b>Absolute Maximum Ratings</b>                     | (Ta=25°C)  |                   |      |      |          |          |         |                   |         |         |                   |                   |  |
| Power   | mW   | 105               | 70   | 60   | 120      | 60       | 120     | 100               | 120     | 60      | 60                | 120               |  |
| Current forward                                     | mA   | 30                | 20   | 20   | 25       | 20       | 25      | 30                | 25      | 25      | 25                | 50                |  |
| Forward peak current                                | mA   | 150               | 60** | 60** | 100      | 60**     | 150     | 120               | 150     | 60      | 60                | 200               |  |
| Voltage reverse                                     | V  | 5                 | 3    | 3    | 5        | 3        | 5       | 5                 | 5       | 5       | 5                 | 5                 |  |
| Operating temperature                               | °C   | -40/+85           |      |      | -40/+85  | -25/+85  | -40/+85 | -55/+100          | -40/+85 | -40/+85 | -40/+85           | -40/+85           |  |
| Storage temperature                                 | °C   | -40/+85           |      |      | -40/+100 | -30/+100 | -40/+85 | -55/+100          | -40/+85 | -40/+85 | -40/+100          | -40/+100          |  |
| Soldering temperature                               | °C   | 260 for max 5 sec |      |      |          |          |         | 260 for max 2 sec |         |         | 300 for max 3 sec | 260 for max 5 sec |  |
| <b>Electrical-Optical Characteristics (Ta=25°C)</b> |  |                   |      |      |          |          |         |                   |         |         |                   |                   |  |
| Voltage forward                                     | Typ. V   | 3.8               | 2.1  | 2.1  | 3.8      | 2.0      | 2.1     | 2.0               | 2.1     | 2.0*    | 2.0               | 2.0***            |  |
|   | Max. V   | 4.5               | 3.0  | 3.0  | 4.3      | 3.0      | 2.8     | 2.6               | 2.8     | 2.4*    | 2.4               | 2.4***            |  |
| Current reverse (VR=5V)                             | µA   | 10                | 10   | 10   | 50       | 10       | 2       | 2                 | 2       | 10      | 10                | 10                |  |
| Wave length   | nm   | 466               | 563  | 585  | NA       | 650      | 565/590 | 630/565           | 625/590 | 570     | 589               | 624/632           |  |
| Spread  | Δnm  | 60                | 40   | 40   | NA       | 40       | 35      | 35                | 35      | 10      | NA                | 20                |  |
| Spread angle  | degree   | 60                | 45   | 45   | 25       | 45       | 60      | 200               | 60      | 100     | 40                | 40                |  |
| <b>Luminous Intensity</b>                           | Min. mcd   | 18                | 9.0  | 5.6  | 630      | 5.6      | 8       | 2.2               | 8       | 70****  | 630               | 400****           |  |
|   | Typ. mcd   | 50                | 25   | 16   | 1000     | 16       | 25      | 4.8               | 25      | 20****  | 1250              | 800****           |  |
| Orientation   | The longer pin is the anode, the shorter is the cathode.<br>For bicolour LEDs the anode for the first colour (ex. 2080) is the longer pin. |                   |      |      |          |          |         |                   |         |         |                   |                   |  |

\*\*Pulse width 1ms Duty cycle 1:5, \*\*\*/F =50mA, \*\*\*\* Luminous Flux mlm

B=Blue, G=Green, Y=Yellow, R=Red, W=White

Specifications are subject to change without notice.

Specifications are subject to change without notice.

For product updates and/or changes of specifications please see [www.apem.com](http://www.apem.com)

## 2 POLE SWITCH

MOMENTARY AND LATCHING FUNCTION

ADJUSTABLE TO MULTIMEC® CAP RANGE



unimec™ product range has high temperature switches with square- or rectangular-shaped cap solutions.

unimec™ switches have 8 contact function options making it very flexible and suitable for any application.

Redundancy coming from the number of poles makes it an excellent choice where safety is a concern.





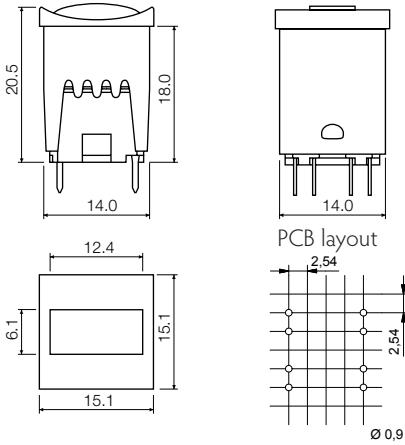
- Square solution
- 15.1mm x 15.1mm
- h=20.5 mm
- Material: ABS
- Temp. Range: -40/+65°C

All dimensions in mm

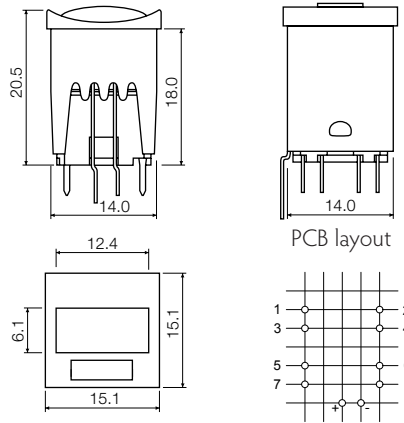
Tolerances +/-0.2mm

## DIMENSIONS

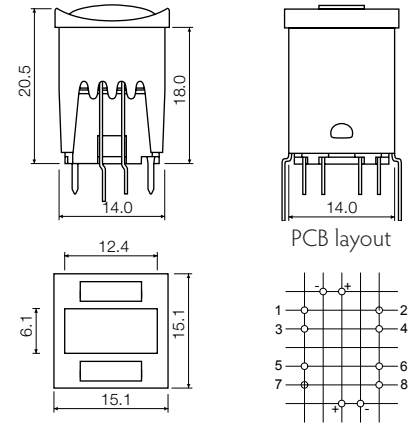
(TH) + 16324






(TH w/LED) + 16325










(TH 2 w/LED) + 16326



## NON-ILLUMINATED - HOW TO ORDER

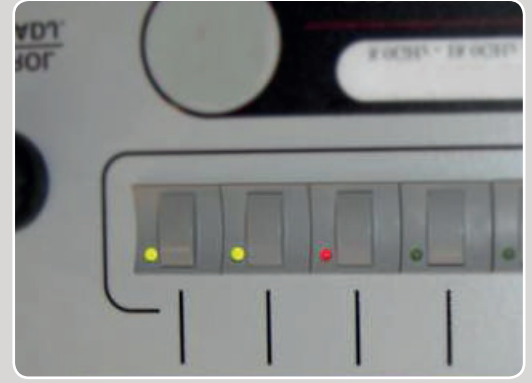
|                   |   |   |   |           |   |   |
|-------------------|---|---|---|-----------|---|---|
| Switch            |   | Extender  |   | Cap       |   | Bezel   |
| 1 5 4             | + | 1 6 2 7 0   | + | 1 6 3 0 0 | +   | 1 6 3 2 4   |
| 15401 mom. silver |   |  |   | 00 blue   |  | 03 grey   |
| 15402 mom. gold   |   |   |   | 02 green  |   | 09 black  |
| 15420 silent gold |   |   |   | 03 grey   |   |  |
| 15451 lat. silver |   |   |   | 04 yellow |   |   |
| 15452 lat. gold   |   |   |   | 06 white  |   |   |
|                   |   |   |   | 08 red    |   |   |
|                   |   |   |   | 09 black  |   |   |

## ILLUMINATED - HOW TO ORDER

|  |   |   |   |   |   |   |  |   |   |   |
|--|---|---|---|---|---|---|--|---|---|---|
| Switch   |   | Extender  |   | Cap   |   | Bezel   |  | Lens  |   | LED   |
| 1 5 4  | + | 1 6 2 7 0   | + | 1 6 3 0 0   | + |   |  | 1 6 3 2 7   | + | 1 6 9 2 2   |
|  |   |  |   |  |   | 16325   |  | 02 green  |   | 02 green  |
|  |   |   |   |   |   |  |  | 04 yellow   |   | 04 yellow   |
|  |   |   |   |   |   | 16326   |  | 08 red  |   | 08 red  |
|  |   |   |   |   |   |  |  | Lens 16327  |   | LED 16922   |
|  |   |   |   |   |   |   |  | 2 required  |   | 2 required  |
|  |   |   |   |   |   |   |  |  |   |  |

Ordering example: 15451+16270+1630004+1632403 (non-illuminated) OR 15401+16270+1630008+1632509+1632708+1692208 (illuminated)  
Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)

- Square solution
- 15.1mm x 15.1mm
- h=16.0 mm
- Material: ABS
- Temp. Range: -40/+65°C

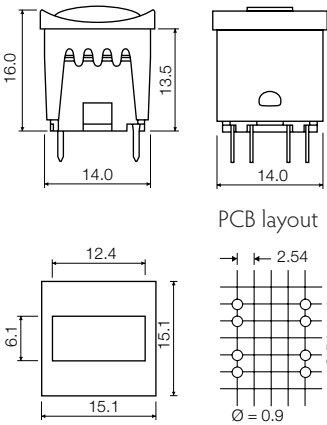


All dimensions in mm

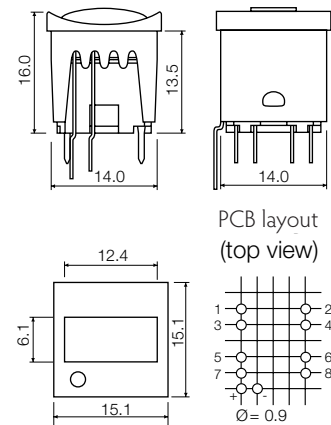
Tolerances +/-0.2mm

### DIMENSIONS

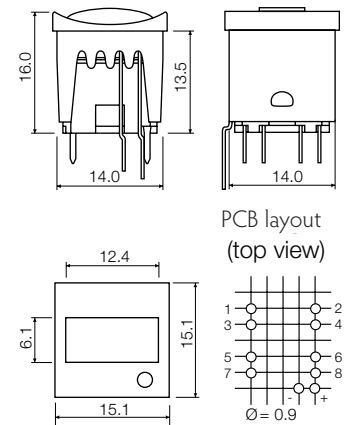
(TH) + 16310



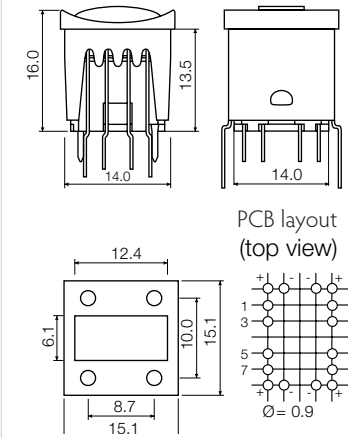
(TH w/LED) + 16311



(TH w/LED) + 16312



(TH w/4 LED) + 16315



### NON-ILLUMINATED – HOW TO ORDER

Switch

1 5 4

- 15401 mom. silver
- 15402 mom. gold.
- 15420 silent gold
- 15451 lat. silver
- 15452 lat. gold

+

Cap

1 6 3 0 0

- 00 blue
- 02 green
- 03 grey
- 04 yellow
- 06 white
- 08 red
- 09 black

+

Bezel

1 6 3 1 0

- 03 grey
- 08 red
- 09 black

Additional colours for 16310 only:

- 00 blue
- 02 green
- 04 yellow
- 06 white

### ILLUMINATED – HOW TO ORDER

Switch

1 5 4



+

Cap

1 6 3 0 0



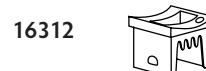
+

Bezel

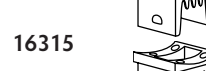
16311



16312



16314



16315



+

LED

1 6 9 2 1

- 02 green
- 04 yellow
- 08 red

+

1 6 9 2 0

- 02 green
- 04 yellow
- 08 red

+

LED 16920 1 required

LED 16921 1 required

+

LED 16920 2 required

LED 16921 2 required



Ordering example: 15400+1630002+1631002 (non-illuminated) OR 15401+1630003+1631408+1692008+1692108 (illuminated)

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



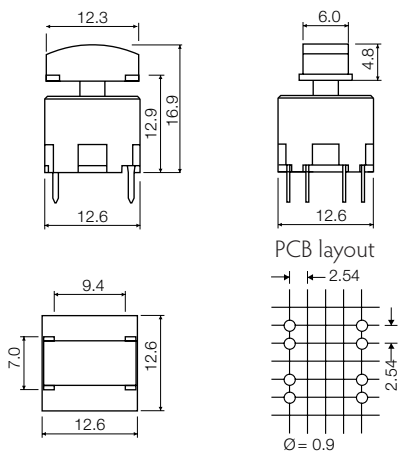
- Square and rectangular caps
- 6mm x 12.3mm; 14.9mm x 14.9mm; 15.1mm x 15.1mm
- h=16.9mm; 14.6mm; 14.5mm
- Material: ABS
- Temp. Range: -40/+65°C

All dimensions in mm

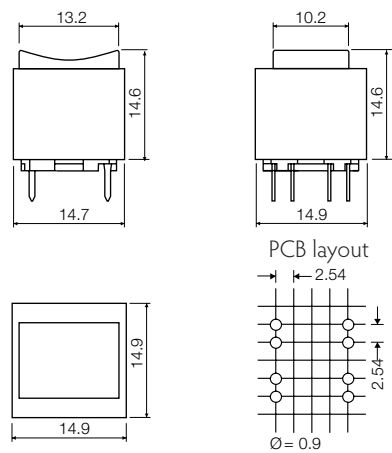
Tolerances -/+0.2mm

### DIMENSIONS

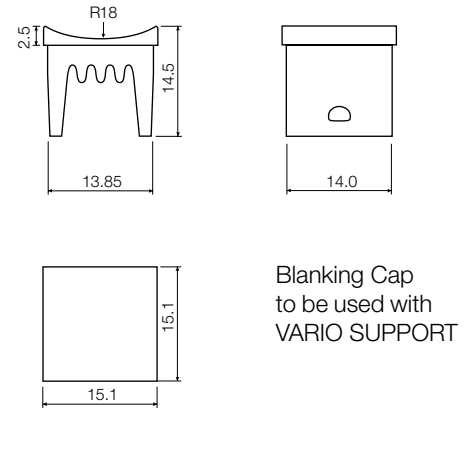
#### (TH) + 16300



#### (TH) + 16700



#### (TH) + 16800



### NON-ILLUMINATED- HOW TO ORDER

#### Switch

1 5 4

- 15401 mom. silver
- 15402 mom. gold.
- 15420 silent gold
- 15451 lat. silver.
- 15452 lat. gold

#### Cap and color code

+ 1 6 3 0 0



- 00 blue
- 02 green
- 03 grey
- 04 yellow
- 06 white
- 08 red
- 09 black

#### Switch

1 5 4



+

#### Cap

1 6 7 0 0



- 00 blue
- 02 green
- 03 grey

- 04 yellow
- 06 white
- 08 red

- 09 black

Ordering example: 15451+1630003 OR 15401+1670008

Please see colour codes, updates of products and changes of specifications on [www.apem.com](http://www.apem.com)



Standard legends are marked with red.

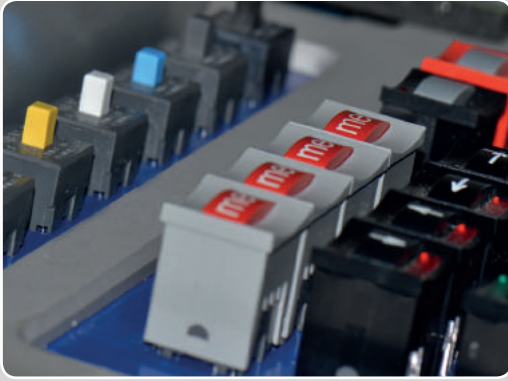
All standard legends are white on black caps.

The size of the legends listed may not correspond to the actual size. Please ask your local distributor, if you do not find what you need on the list. New legends may have been added after this catalogue was printed.

Custom legends and other colour combinations are available, please contact your local distributor.

## Available Legends

| Part no. |     |     | Part no. |     |     | Part no. |     |     |
|----------|-----|-----|----------|-----|-----|----------|-----|-----|
| LEGEND   | 18_ | 18_ | LEGEND   | 18_ | 18_ | LEGEND   | 18_ | 18_ |
| 0        | 000 | 200 | A        | 010 | 210 | ON/OFF   | 017 | 217 |
| 1        | 001 | 201 | B        | 011 | 211 | STOP     | 018 | 218 |
| 2        | 002 | 202 | C        | 012 | 212 | START    | 031 | 231 |
| 3        | 003 | 203 | D        | 013 | 213 | CLEAR    | 036 | 236 |
| 4        | 004 | 204 | E        | 014 | 214 | LOAD     | 037 | 237 |
| 5        | 005 | 205 | F        | 015 | 215 | RESET    | 038 | 238 |
| 6        | 006 | 206 | G        | 063 | 263 | CR       | 043 | 243 |
| 7        | 007 | 207 | H        | 064 | 264 | MANUAL   | 044 | 244 |
| 8        | 008 | 208 | I        | 065 | 265 | END      | 047 | 247 |
| 9        | 009 | 209 | J        | 066 | 266 | CANCEL   | 048 | 248 |
| 10       | 020 | 220 | K        | 067 | 267 | CTRL     | 050 | 250 |
| 11       | 021 | 221 | L        | 068 | 268 | ESC      | 051 | 251 |
| 12       | 022 | 222 | M        | 069 | 269 | DSP      | 053 | 253 |
| 13       | 023 | 223 | N        | 070 | 270 | ENTER    | 105 | 305 |
| 14       | 024 | 224 | P        | 072 | 272 | SHIFT    | 106 | 306 |
| 15       | 025 | 225 | S        | 075 | 275 | ON       | 116 | 316 |
| 16       | 026 | 226 | T        | 076 | 276 | OFF      | 117 | 317 |
|          |     |     | U        | 077 | 277 |          |     |     |
|          |     |     | V        | 078 | 278 |          |     |     |
|          |     |     | W        | 079 | 279 |          |     |     |
|          |     |     | #        | 107 | 207 |          |     |     |
|          |     |     | *        | 019 | 219 |          |     |     |
|          |     |     | ☐        | 016 | 216 |          |     |     |
|          |     |     | →        | 033 | 233 |          |     |     |
|          |     |     | ←        | 133 | 233 |          |     |     |
|          |     |     | ↑        | 034 | 234 |          |     |     |
|          |     |     | ↓        | 134 | 234 |          |     |     |
|          |     |     | ↙        | 135 | 235 |          |     |     |
|          |     |     | ↕        | 115 | 215 |          |     |     |
|          |     |     | ↔        | 041 | 241 |          |     |     |
|          |     |     | +        | 054 | 254 |          |     |     |
|          |     |     | -        | 059 | 259 |          |     |     |
|          |     |     | •        | 056 | 256 |          |     |     |
|          |     |     | :        | 055 | 255 |          |     |     |

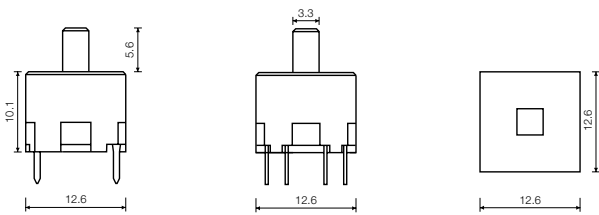


- Max. 250mA/120V/9W AC/6W DC
- 2 pole
- Momentary or latching
- 8 contact functions
- Temperature range:  
High temp: -40/+160°C
- Through-hole version (TH)

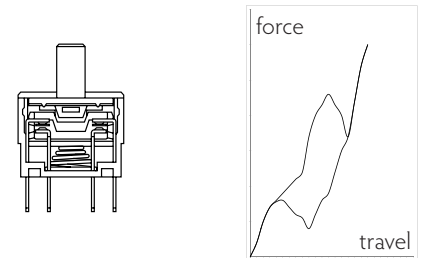
All dimensions in mm

Tolerances +/-0.2mm

### DIMENSIONS THROUGH-HOLE



### OPERATING FORCE (TYPICAL EXAMPLE)

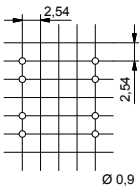


### PCB MOUNTING HOLE DIMENSIONS

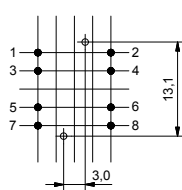
### FUNCTIONAL DIAGRAM

### CIRCUIT DIAGRAM

Basic switch

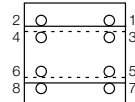


w/Extender 16250

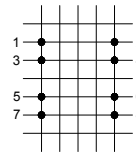


With LED

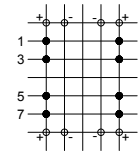
16923 and 16924



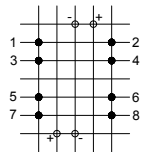
— up  
-- down



Without LED



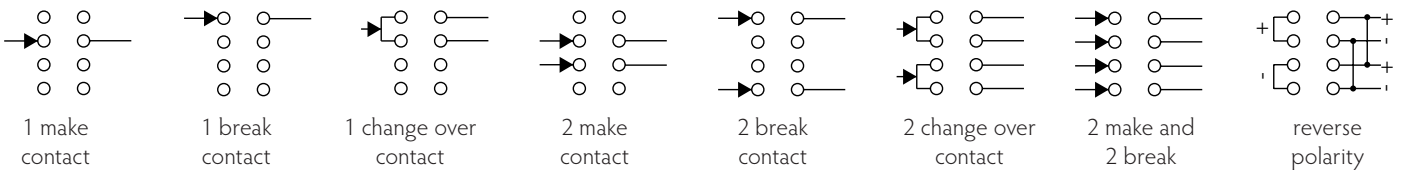
With round LED  
16920 and 16921



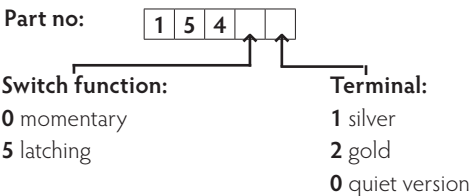
With rect. LED  
16922

### WIRING DIAGRAM

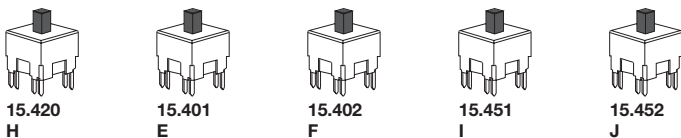
Select the contact function you require - and design your PC board accordingly



### HOW TO ORDER



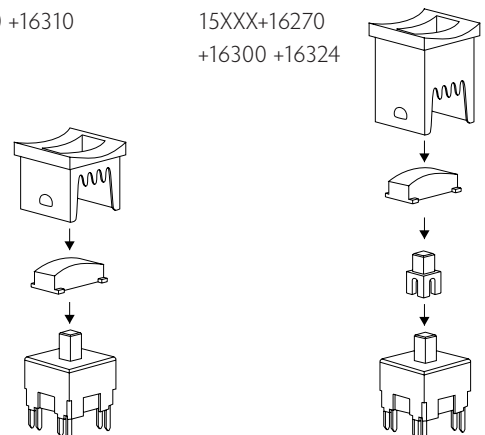
### High temp.



### HOW TO ASSEMBLE

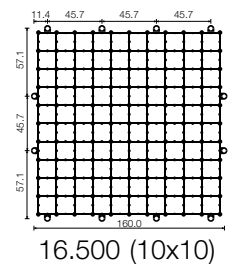
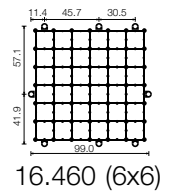
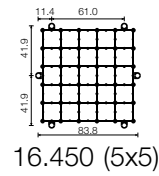
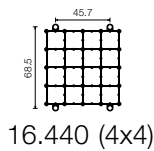
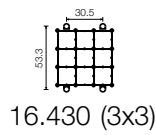
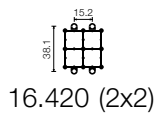
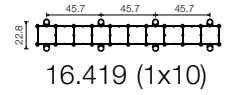
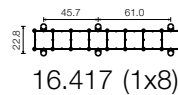
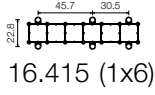
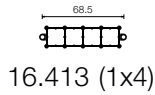
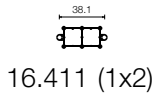
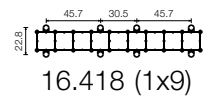
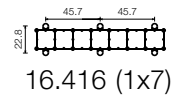
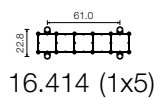
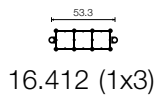
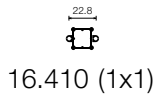
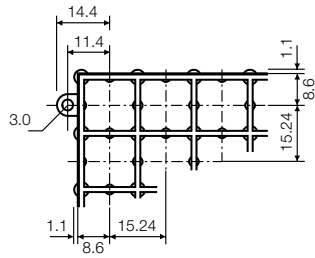
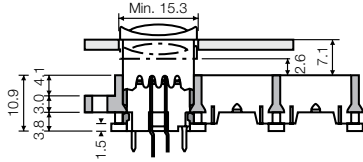
unimec™  
15XXX+16300 +16310

unimec™  
15XXX+16270  
+16300 +16324








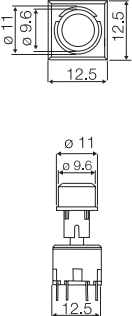
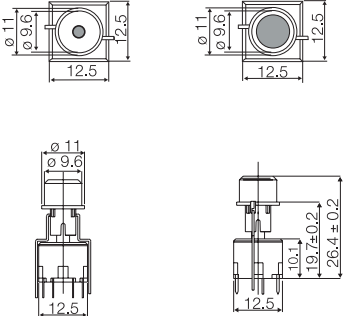
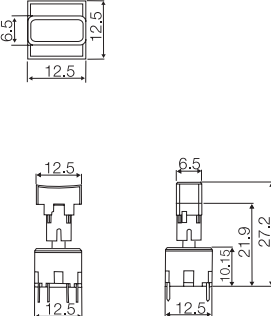
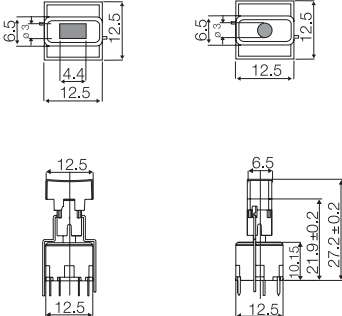



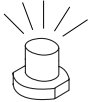



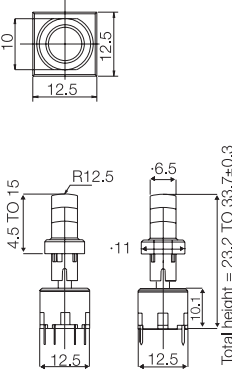
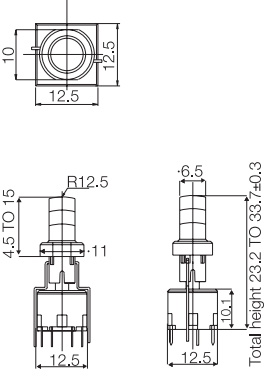
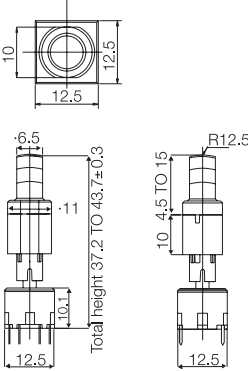
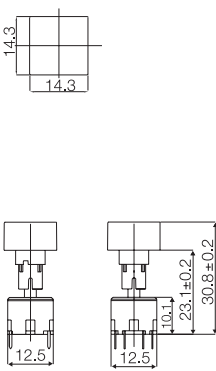







For all types of unimec™ switches with bezels - 16310 - 16315 and 16324 - 16326.  
More options available as custom.



## Selection guide

|  <b>A 16250 extender is needed when mounting multimec® on unimec™ switches</b> |   |  |   |
|--|---|--|---|
| <b>Cap</b><br> 1D   |  1E  1F |  1P   |  1Q  1R                 |
| <b>Dimensions</b><br>  |    |    |    |
| <b>LED</b>   | <b>16923XX</b><br>00 blue<br> 20 green<br>40 yellow<br>65 white<br>80 red              |  | <b>16923XX</b><br>00 blue<br> 20 green<br>40 yellow<br>65 white<br>80 red                                |
| <b>Cap</b><br> 1S   |  1S illuminated  |  1S + 2S   |  1K  1K illuminated |
| <b>Dimensions</b><br>  |    |    |    |
| <b>LED</b>   | <b>16923XX</b><br>00 blue<br> 20 green<br>40 yellow<br>65 white<br>80 red              | <b>16923XX</b><br>00 blue<br> 20 green<br>40 yellow<br>65 white<br>80 red | <b>16924XX</b><br> 23 green<br>45 yellow<br>88 red   |

For specific dimensions, color codes, how to order and other information please refer to the pages with the keycaps on multimec® switches. For technical information on the unimec™ basic switches please see technical specifications or go to our website [www.apem.com](http://www.apem.com) where you will find a page for each option. The multimec® keycaps 1N, 1T, 1U, 1V, 1WA, 1WD, 1WP and 1X can also be used on unimec™ switches. Please ask for technical drawings on dimensions.

## RoHS Compatible

|  |           | RA  |                            |
|--|-----------|---|----------------------------|
|  |           | High Temperature Versions   |                            |
|  |           | Silver  | Gold                       |
| <b>Electrical Specifications</b>                       |           |   |                            |
| Contact resistance                                     |           | Max. 100 m Ω (initially)  |                            |
| Insulation resistance                                  |           | >10 M Ω   |                            |
| Recommended load                                       |           | Min. 0.5 mA   | Min. 0.5 μA                |
|  |           | Max. 250 mA – 120 V – 9W AC – 6W DC                                 |                            |
| Max. Current in non switching state                    |           | 0.5 A   |                            |
| Contact bounce   |           | Max. 10 ms  |                            |
| Dielectric strength between adjacent contacts          |           | 1000 V for 2 min.   |                            |
| Insulation resistance between adjacent contacts        |           | 5 X 10 <sup>13</sup> Ω  |                            |
| Capacitance between adjacent contacts                  |           | 0.5 pF  |                            |
| <b>Mechanical Specifications</b>                       |           |   |                            |
| Standard actuation force (switch)                      |           | Typ 2.5N  |                            |
| Max. Actuation force without cap                       |           | 100N for 10 sec.  |                            |
| Key travel (switch)                                    |           | 1.8 mm  |                            |
| Lifetime   | Momentary | >10.000.000 cycles  |                            |
|  | Latching  | 5.000.000 cycles  |                            |
| <b>Temperature range</b>                               |           |   |                            |
| Working temperature                                    |           | Min. -40°C Max. +160°C  |                            |
| Storage temperature                                    |           | Min. -65°C Max. +160°C  |                            |
| <b>Soldering IEC 68-2-20</b>                           |           |   |                            |
|  |           | Wave – max 260°C for max. 10 sec., please refer to usage guidelines |                            |
|  |           | Soldering iron – max. 350°C for max. 3 sec. Flux tight.             |                            |
| <b>Environmental Endurance IEC 68-2-3</b>              |           |   |                            |
| Temperature  |           | +40°C   |                            |
| Humidity   |           | 93% RH  |                            |
| Duration   |           | 56 days   |                            |
| Sealing IEC 529  |           | IP-54   |                            |
| Cleaning   |           | Standard methods such as water and soap (not immersed)              |                            |
| <b>Material Specifications – Switches</b>              |           |   |                            |
| Housing and actuator                                   |           | LCP UL94V0  |                            |
| Switch spring  |           | Stainless steel   |                            |
| Key spring   |           | Stainless steel   |                            |
| Latch pin  |           | Stainless steel   |                            |
| Fixed contact  |           | SnCu+2μNi+3μAg  | SnCu+2μNi+3μAu             |
| Moving contact   |           | Stainless steel +3μAg   | Stainless steel +3μAg+1μAu |
| <b>Terminals</b>                                       |           |   |                            |
| Contact lubricant                                      |           | Special protective lubricant Klüber Barrierta I EL Fluid            |                            |
| <b>Material Specifications – All Caps &amp; Bezels</b> |           |   |                            |
| Temperature limit                                      |           | Max. +65°C  |                            |
| <b>Tampon Printing</b>                                 |           |   |                            |
|  |           | According to ISO Class: 1/ASTM Class:4B                             |                            |

## unimec™ LEDs

| Part Nos.                                    | 16920/16921 |  |     | 16922 |                     |     | 16923 |                     |      |      |      | 16924 |                     |         |         |
|--|-------------|--|-----|-------|---------------------|-----|-------|---------------------|------|------|------|-------|---------------------|---------|---------|
| Colour (G=green, Y=yellow, R=red)            | G           | Y  | R   | G     | Y                   | R   | B     | G                   | Y    | W    | R    | G     | Y                   | R       |         |
| Colour Codes                                 | 02          | 04   | 08  | 02    | 04                  | 08  | 00    | 20                  | 40   | 65   | 80   | 23    | 45                  | 88      |         |
| Absolute Maximum Ratings (Ta=25°C)           |             |  |     |       |                     |     |       |                     |      |      |      |       |                     |         |         |
| Power  | mW          | 100  | 100 | 100   | 135                 | 135 | 135   | 105                 | 70   | 60   | 120  | 60    | 150                 | 130     | 300     |
| Current forward                              | mA          | 30   | 30  | 30    | 30                  | 30  | 30    | 30                  | 20   | 20   | 25   | 20    | 40                  | 40      | 90      |
| Forward peak current                         | mA          | 50   | 50  | 50    | 90                  | 90  | 90    | 200                 | 60** | 60** | 100  | 60**  | 500                 | 500     | 1000    |
| Voltage reverse                              | V           | 5  | 5   | 5     | 5                   | 5   | 5     | 5                   | 3    | 3    | 5    | 3     | 12                  | 12      | 5       |
| Operating temperature                        | °C          | -25 - +100   |     |       | -55 - +100          |     |       | -25 - +85           |      |      |      |       | -55 - +100          |         |         |
| Storage temperature                          | °C          | -25 - +100   |     |       | -55 - +100          |     |       | -30 - +100          |      |      |      |       | -55 - +100          |         |         |
| Soldering temperature                        | °C          | +245 for max. 3 sec                                      |     |       | +300 for max. 3 sec |     |       | +260 for max. 5 sec |      |      |      |       | +300 for max. 3 sec |         |         |
| Electrical-Optical Characteristics (Ta=25°C) |             |  |     |       |                     |     |       |                     |      |      |      |       |                     |         |         |
| Voltage forward                              | Typ. V      | 2.0  | 2.0 | 2.0   | 2.1                 | 2.2 | 2.3   | 2.1                 | 2.1  | 2.1  | 3.8  | 2.0   | 2.1*                | 2.3***  | 2.4***  |
|  | Max. V      | 3.0  | 3.0 | 3.0   | 3.0                 | 3.0 | 3.0   | 2.8                 | 3.0  | 3.0  | 4.3  | 3.0   | 2.5*                | 2.5***  | 3.8***  |
| Current reverse                              | μA          | 100  | 100 | 100   | 100                 | 100 | 100   | 2                   | 10   | 10   | 50   | 10    | 10                  | 10      | 10      |
| Wave length                                  | nm          | 560  | 590 | 660   | 565                 | 585 | 635   | 460                 | 563  | 585  | NA   | 650   | 570                 | 587     | 635     |
| Spread                                       | Ønm         | 10   | 10  | 10    | 10                  | 10  | 10    | 40                  | 40   | 40   | NA   | 40    | 25                  | 45      | 45      |
| Spread angle                                 | Degree      | 20   | 20  | 20    | 45                  | 45  | 45    | 20                  | 45   | 45   | 25   | 45    | 80                  | 90      | 55      |
| Luminous Intensity                           | Min. mcd    | 1  | 1   | 0.8   | 1.5                 | 2.5 | 2.5   | 20                  | 9.0  | 5.6  | 630  | 5.6   | 71****              | 71****  | 100**** |
|  | Typ. mcd    | 2  | 3   | 1.6   | 2.5                 | 3.0 | 5.0   | 25                  | 25   | 16   | 1000 | 16    | 112****             | 112**** | 160**** |
| Orientation                                  |             | The longer pin is the anode, the shorter is the cathode. |     |       |                     |     |       |                     |      |      |      |       |                     |         |         |

\*F=20mA, \*\*Pulse width 1ms Duty cycle 1:5, \*\*\*F=50mA, \*\*\*\*Luminous Flux mlm

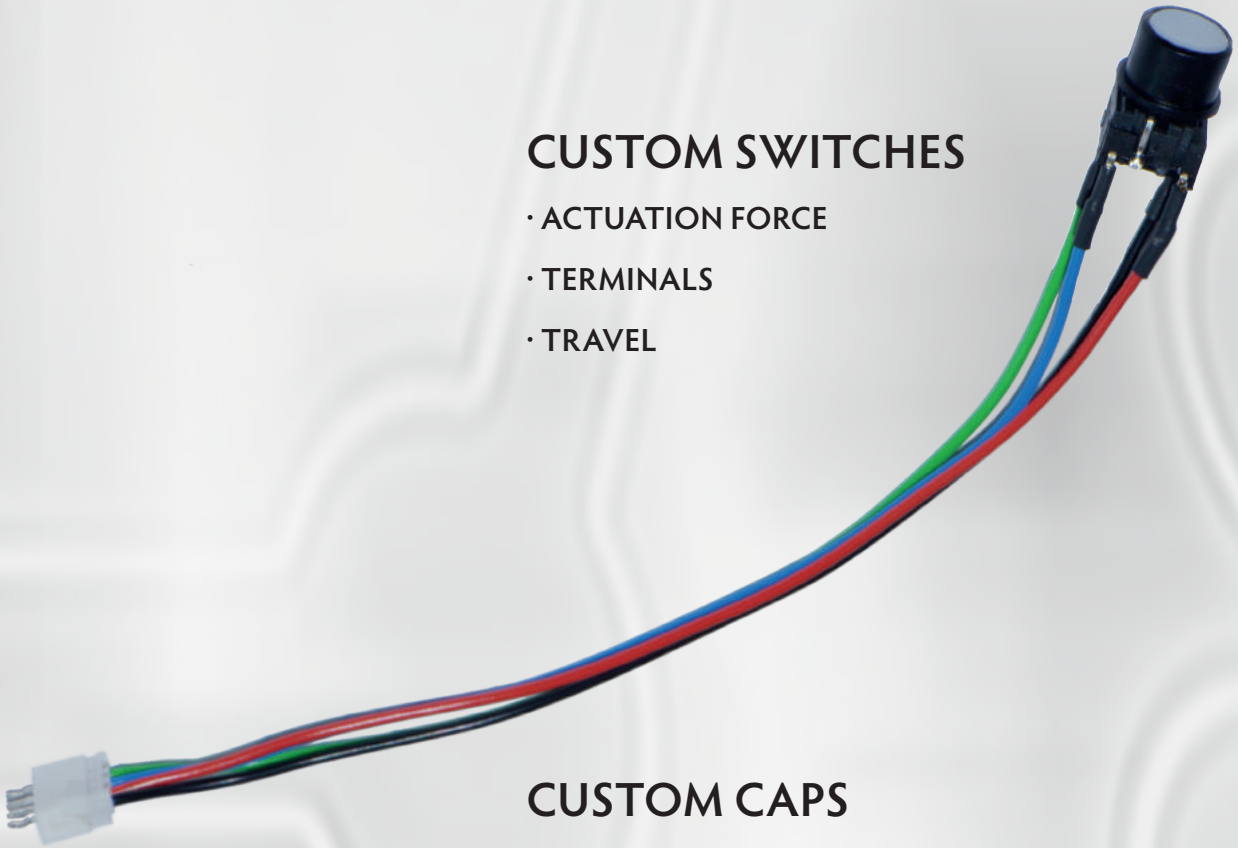
## WE WELCOME ANY CUSTOM REQUIREMENT

The wide range of MEC standard products is well known world wide, but also many custom solutions have been created. Equipped with the latest CAD solutions with 3D facilities and optical simulation software our experienced MEC team can provide you custom designs from conception to completion. Our R&D engineers generate computer animated solutions, rapid prototypes and manage the whole industrialisation process.



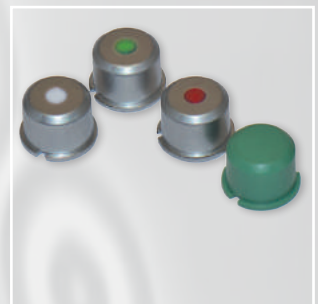
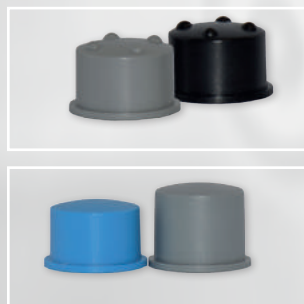
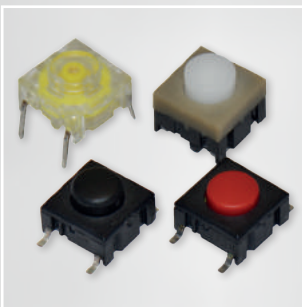
## CUSTOM SWITCHES

- ACTUATION FORCE
- TERMINALS
- TRAVEL



## CUSTOM CAPS

- DESIGN
- SHAPE
- SIZE
- COLOUR
- LEGENDS



























|          |            |   |            |   |           |   |        |   |           |   |            |   |           |   |
|----------|------------|---|------------|---|-----------|---|--------|---|-----------|---|------------|---|-----------|---|
| No.      | 00         |  | 02         |  | 03        |  | 04     |  | 06        |  | 08         |  | 09        |  |
| Colour   | blue       |   | green      |   | grey      |   | yellow |   | white     |   | red        |   | black     |   |
| RAL Code | 5012       |   | 6018       |   | 7004      |   | 1023   |   | 9010      |   | 3000       |   | 9004      |   |
| No.      | 30         |  | 32         |  | 33        |  | 34     |  | 38        |  | 40         |  | 42        |  |
| Colour   | ultra blue |   | mint green |   | tele grey |   | melon  |   | noble red |   | dusty blue |   | aqua blue |   |
| RAL Code | 5002       |   | 6029       |   | 7046      |   | 1028   |   | 3002      |   | 5014       |   | 5021      |   |

## Metallic Colours

|          |             |   |             |   |             |   |             |   |
|----------|-------------|---|-------------|---|-------------|---|-------------|---|
| No.      | 50          |  | 53          |  | 57          |  | 58          |  |
| Colour   | dark blue   |   | light grey  |   | dark grey   |   | bordeaux    |   |
| RAL Code | No Ral Code |   | No Ral Code |   | No Ral Code |   | No Ral Code |   |

| CAP CODE       |   | 00 | 02 | 03 | 04 | 06 | 08 | 09 | 30 | 32 | 33 | 34 | 38 | 40 | 42 | 50 | 53 | 57 | 58 |
|----------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1A             |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1B             |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1C             |  |    |    | •  |    |    | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1DS            |  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  | •  |
| 1ES/1FS        |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1GAS/1GCS      |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1H             |  |    |    | •  |    |    |    | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1JS            |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1KS            |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1M             |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1NS            |  |    |    | •  |    |    |    | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1PS            |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1QS/1RS        |  | •  |    | •  |    |    |    | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1SS/1LS        |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1TS/1US/1VS    |  | •  |    | •  |    |    |    | •  | •  |    |    |    |    |    |    |    |    |    |    |
| 1WAS/1WDS/1WPS |  | •  |    | •  |    |    |    | •  | •  | •  |    |    |    | •  | •  |    | •  | •  |    |
| 1XS            |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |
| 1ZA            |  |    |    | •  |    | •  |    | •  | •  |    |    |    |    | •  | •  | •  | •  | •  | •  |
| 1ZB            |  |    |    | •  |    | •  |    | •  | •  |    |    |    |    | •  | •  | •  | •  | •  | •  |
| 1ZCS           |  |    |    | •  |    | •  |    | •  | •  | •  |    |    |    | •  | •  | •  | •  | •  | •  |
| 1Z/1ZW         |  | •  |    | •  |    | •  |    | •  |    |    |    |    |    |    |    |    |    |    |    |
| 10R/10RF + 10Q |  | •  | •  | •  | •  | •  | •  | •  |    |    |    |    |    |    |    |    |    |    |    |

# 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.

### Temperature

Both unimec™ and multimec® switches are produced in low and high temperature versions. 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 wave soldering is taking place, MEC strongly recommend that the temperature profile is analysed and compared with the temperature rating of the switch. In case of doubt always select the high temperature versions unimec™ 154XX, and multimec® 5XXH9XX. It is also important to monitor the accumulated heat build up from both the pre-heat zones and the solder zone.

Most standard accessories for both unimec™ and multimec® switches are made from ABS plastic with a maximum operating temperature of 65°C. It is strongly recommended that accessories are mounted after soldering of the switch. If this is not possible care must be taken not to overheat the accessories during the soldering process. The 1SS, 1GAS/1GCS and Varimec™ caps are, however, made of high temperature materials and will meet the same temperature specifications as the high temperature switches.

For accessories made from other plastic materials please see multimec® and unimec™ technical specifications.

LEDs have their own temperature specifications. When fitted in a high temperature switch the LED will determine the max. operating temperature, i.e. 5GTH93524 has an upper temperature limit of 85°C! This also applies with 3F switches.

### 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±0.2 mm and terminal hole diameter should be 0.9mm.

All unimec™ and multimec® caps and bezels are easily snapped onto the switch modules and can be changed at a later time with the exception of the unimec 16.700 cap. The same applies to the 3E caps. Once these caps 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. If the 16.300 or 16.700 cap must be removed from a unimec™ alternate action switch, make sure that the switch actuator is in the released, upper position before attempting to remove the cap. This will prevent possible damage to the internal latching pin.

Care must be taken when inserting the 3FT switch and LED assembly into the PC board. Do not press direct on the LED. This will force the LED down into the actuator and risks to cause the switch contacts to remain in the closed position. To correct the fault, the LED must be raised slightly and centered in the actuator to assure unrestricted movement of the actuator. A mounting tool is available for multimec® switches.

### Soldering and Cleaning unimec™

Most assembly and field problems experienced by users of unsealed switches are caused by the contamination of the contacts during soldering and cleaning.

Contact contamination may be recognised by an increase in contact resistance and possible intermittent operation of the switch, especially in low power applications. Care must be taken not to submerge the switch in cleaning agents or spray the switch during cleaning. The switch must be protected at all times to prevent contamination by flux or cleaning liquids.

For unimec™ alternate versions we recommend to leave the actuator in the released upper position during soldering. This makes the switch more resistant to overheating.

### Soldering and Cleaning multimec®

multimec® 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 wave soldered. multimec® 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., this applies for both low temperature and high temperature versions.

Wave soldering: heat built up in the switch during pre-heating and soldering must not exceed the maximum operating temperature of the switch. If, for some reason, a high pre-heating temperature is required, MEC recommend the high temperature switches. In any case peak temperature must not exceed 260°C, and soldering time is max 10 sec.

### Soldering - Surface Mount Versions

For all methods - infrared, convection and vapour phase. The upper limit 260°C/30 sec must be observed. The soldering temperature profile must have moderate temperature gradients.

### 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:

|                         |             |
|-------------------------|-------------|
| Low temperature switch  | 115°C       |
| High temperature switch | 160°C       |
| LEDs                    | 85/100°C    |
| Accessories             | 65/85/160°C |

### Packaging

unimec™ and multimec® switches are packed in rigid tubes of 50 pieces each.

A box contains 1.000 pcs.

The surface mount versions of multimec® switches with a height up to 12.5mm can also be delivered on tape/reel. Each reel contains 250/500 pcs.



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