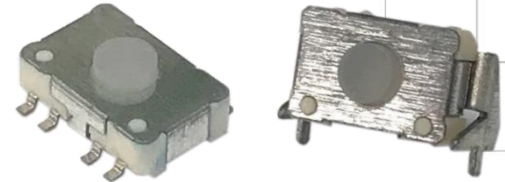




# Series 228H

## 5.2 x 8.0mm Illuminated Tactile Switch

- Surface mount gull-wing terminal or standard through hole configurations
- Compatible with IR reflow, manual soldering
- Single color display during illumination
- Variety of LED color options
- Halogen Free



### Ordering Information

| Series   | Terminal Type           | Actuating Direction | Actuation Force   | LED Color | LED Type                | Packaging |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
|--|-------------------------|---------------------|---|-----------|-------------------------|-----------|----------------------|--|--|------|-------|---|----------|----|------|---|--|------|-------|---|-------|---|------|---|-------|----|--------------|----|---------------|----|--------------------|----|---------------------|----|------------|----|-------------------|----|------------------|--|------|-------|---|-----------------------|
| 228H   | M                       | V                   | A   | A         | F                       | R         |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| <table><tr><th>Code</th><th>Spec.</th></tr><tr><td>M</td><td>Surface mount gull wing</td></tr><tr><td>*D</td><td>Standard though hole</td></tr></table> <p>*Standard though hole is only available with side actuation</p> |                         | Code                | Spec.   | M         | Surface mount gull wing | *D        | Standard though hole | <table><tr><th>Code</th><th>Spec.</th></tr><tr><td>V</td><td>Vertical</td></tr><tr><td>*S</td><td>Side</td></tr></table> <p>*Side actuation is only available with standard though hole terminal</p> |  | Code | Spec. | V | Vertical | *S | Side | <table><tr><th>Code</th><th>Spec.</th></tr><tr><td>A</td><td>Amber</td></tr><tr><td>B</td><td>Blue</td></tr><tr><td>W</td><td>White</td></tr><tr><td>AB</td><td>Amber &amp; Blue</td></tr><tr><td>AW</td><td>Amber &amp; White</td></tr><tr><td>LB</td><td>Olive Green &amp; Blue</td></tr><tr><td>LW</td><td>Olive Green &amp; White</td></tr><tr><td>RB</td><td>Red &amp; Blue</td></tr><tr><td>RL</td><td>Red &amp; Olive Green</td></tr><tr><td>RG</td><td>Red &amp; Pure Green</td></tr></table> |  | Code | Spec. | A | Amber | B | Blue | W | White | AB | Amber & Blue | AW | Amber & White | LB | Olive Green & Blue | LW | Olive Green & White | RB | Red & Blue | RL | Red & Olive Green | RG | Red & Pure Green | <table><tr><th>Code</th><th>Spec.</th></tr><tr><td>R</td><td>Tape &amp; reel packaging</td></tr></table> | Code | Spec. | R | Tape & reel packaging |
| Code   | Spec.                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| M  | Surface mount gull wing |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| *D   | Standard though hole    |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| Code   | Spec.                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| V  | Vertical                |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| *S   | Side                    |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| Code   | Spec.                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| A  | Amber                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| B  | Blue                    |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| W  | White                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| AB   | Amber & Blue            |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| AW   | Amber & White           |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| LB   | Olive Green & Blue      |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| LW   | Olive Green & White     |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| RB   | Red & Blue              |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| RL   | Red & Olive Green       |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| RG   | Red & Pure Green        |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| Code   | Spec.                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| R  | Tape & reel packaging   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
|  |                         |                     | <table><tr><th>Code</th><th>Spec.</th></tr><tr><td>A</td><td>160 gf</td></tr></table> | Code      | Spec.                   | A         | 160 gf               |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| Code   | Spec.                   |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |
| A  | 160 gf                  |                     |   |           |                         |           |                      |  |  |      |       |   |          |    |      |   |  |      |       |   |       |   |      |   |       |    |              |    |               |    |                    |    |                     |    |            |    |                   |    |                  |  |      |       |   |                       |

## Electrical Specifications

| Parameter             | Conditions & Remarks              | Min | Max            | Unit            |
|-----------------------|-----------------------------------|-----|----------------|-----------------|
| Contact Resistance    |                                   |     | 100            | milliohms       |
| Insulation Resistance | Between insulated terminals       | 100 |                | megohms         |
| Dielectric Strength   | 250 VAC between adjacent switches |     | 1              | minute          |
| Nonswitching Rating   |                                   |     | 50<br>or<br>12 | mA<br>or<br>VDC |

## Mechanical and Environmental

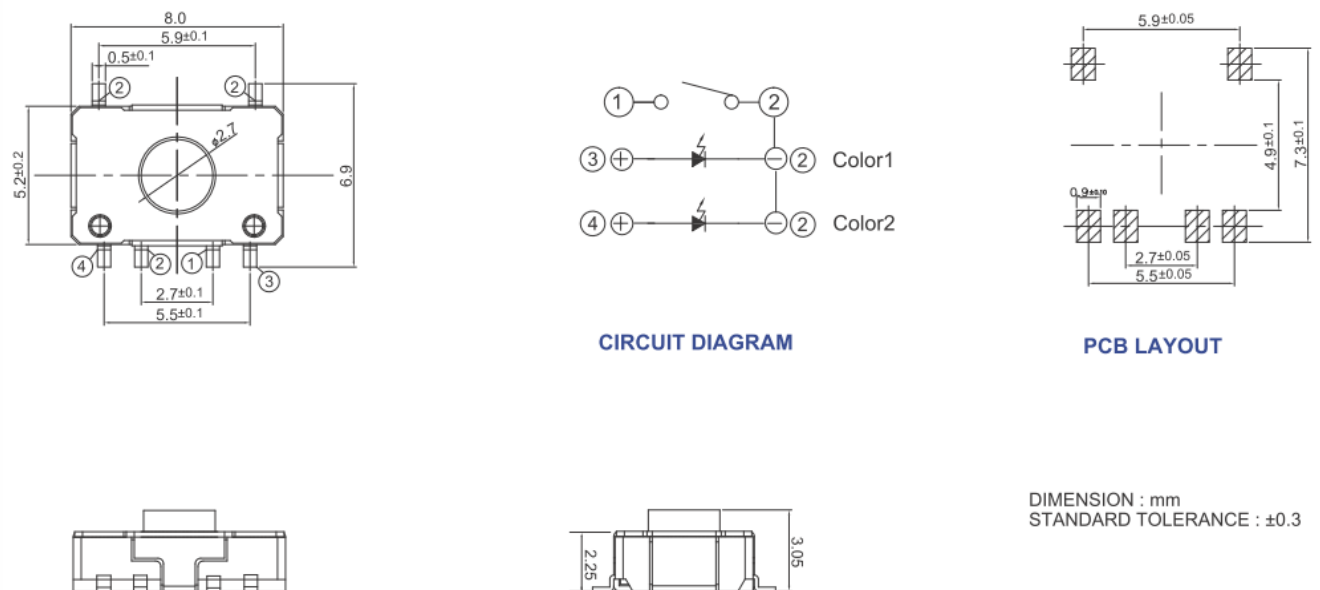
|                             |   |
|-----------------------------|---|
| Soldering                   | Maximum reflow temperature, 260°C for 3 seconds         |
| RoHS                        | Lead-Free. Fully compliant to RoHS Directive 2011/65/EU |
| Operating Force             | 160±50 gf   |
| Actuation Life              | 100,000 cycles  |
| Actuator Strength           | 3 Kgf maximum   |
| Travel                      | 0.5±0.15mm  |
| Packaging                   | Tape&reel packaging                                     |
| Operating Temperature Range | -20°C to +70°C  |
| Storage Temperature Range   | -30°C to +80°C  |
| MSL Level                   | 3   |

## LED Specifications

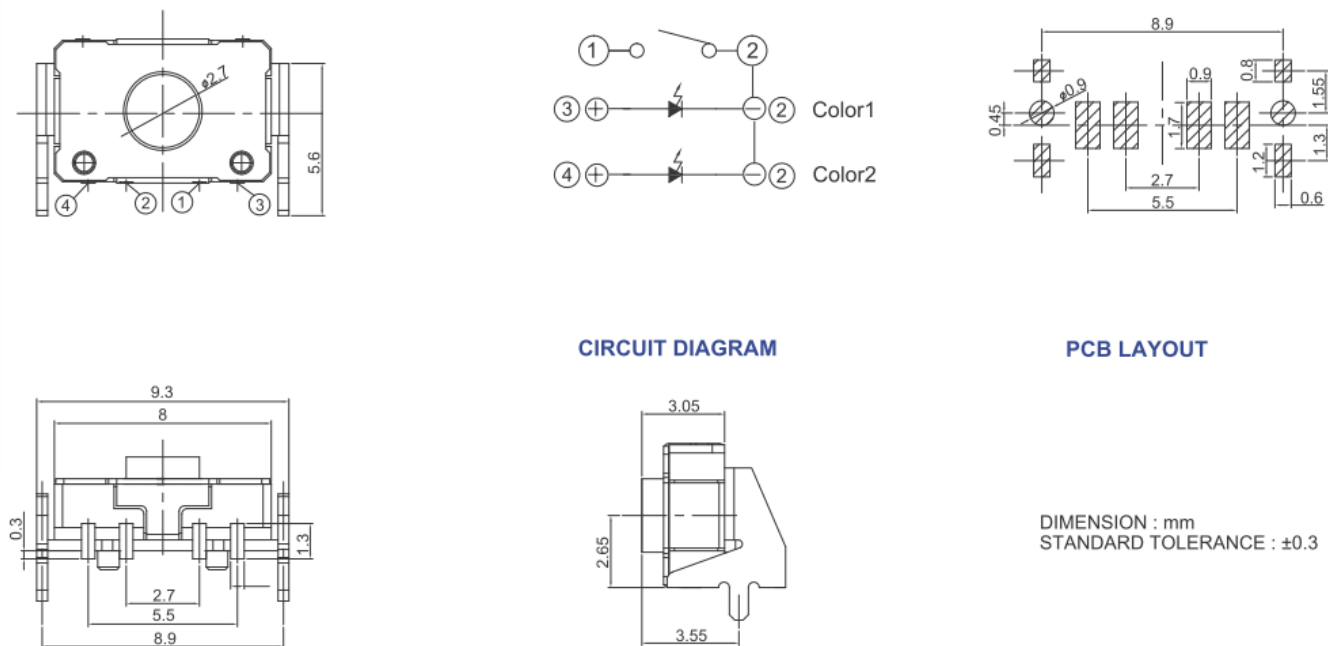
| Color       | Reversed Voltage (Max) | Reversed Current (Max) | Recommended Operating Current | Forward Voltage at 20mA |      | Chromaticity Coordinates |       |
|-------------|------------------------|------------------------|-------------------------------|-------------------------|------|--------------------------|-------|
|             |                        |                        |                               | Nor                     | Max  |                          |       |
| Red         | 5 Vdc                  | 100 µA                 | 30 mA                         | 1.9V                    | 2.4V |                          |       |
| Olive Green | 5 Vdc                  | 100 µA                 | 30 mA                         | 1.9V                    | 2.4V |                          |       |
| Yellow      | 5 Vdc                  | 100 µA                 | 30 mA                         | 1.9V                    | 2.4V |                          |       |
| Blue        | 5 Vdc                  | 50 µA                  | 30 mA                         | 3.2V                    | 4.0V |                          |       |
|             |                        |                        |                               | Forward Voltage at 20mA |      | Chromaticity Coordinates |       |
|             |                        |                        |                               |                         |      | X                        | Y     |
| White       | 5 Vdc                  | 50 µA                  | 30 mA                         | 3.0V                    | 4.0V | 0.297                    | 0.295 |

### Mechanical Specifications

**Figure 1 – 228H MV, Surface Mount Gull Wing, Vertical Actuation**



**Figure 2 – 228H DV, Standard Through Hole, Vertical Actuation**

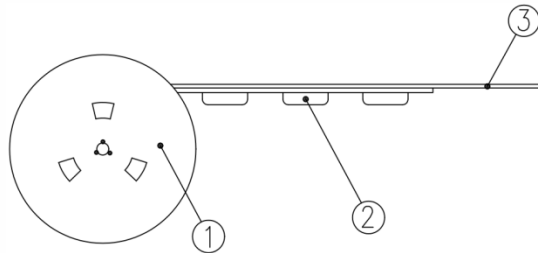


### Packing: Tape and Reel

Surface Mount Gull Wing, Actuator Height 3.05mm

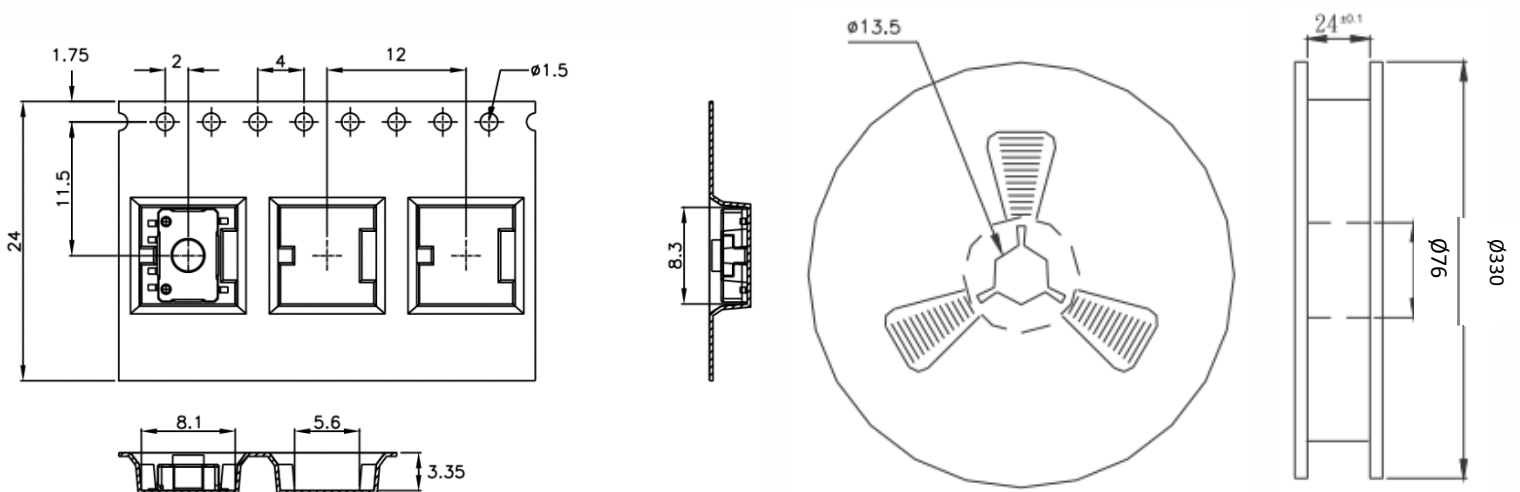
The packing specifications:

1. Structure and materials:



| No | PART NAME    | MATERIAL    |
|----|--------------|-------------|
| ①  | REEL         | POLYSTYRENE |
| ②  | CARRIER TAPE | POLYSTYRENE |
| ③  | COVER TAPE   | POLYESTER   |

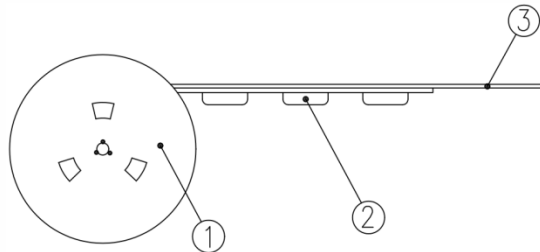
2. Packing quantity: 1500 pcs/reel
3. More than 160mm empty pockets should remain at each end of the carrier tape for each reel. After reel packaging, the end of tape 180mm, shall be empty and the tape edge shall be cut in 45°. The cover tape shall be extended 180±10 mm from the tape edge and fixed with tape.
4. Shortage of less than 2 pcs a reel is acceptable.
5. Stripping strength of cover tape is between 10 gf to 130 gf and stripping angle should be within 165°~180°.
6. The product in the pocket of carrier tape should be placed in a specified correct position.
7. Tape and reel per EIA-481.
8. Dimensions:



### Standard Through Hole, Actuator Height 5.60mm

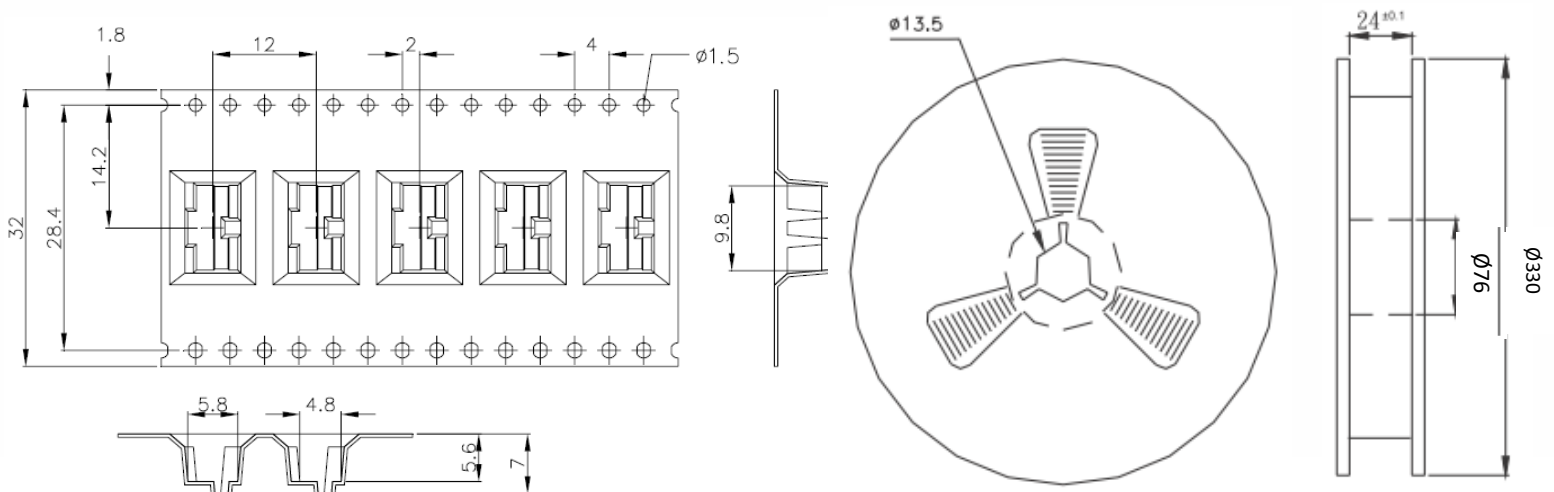
The packing specifications:

1. Structure and materials:



| No | PART NAME    | MATERIAL    |
|----|--------------|-------------|
| ①  | REEL         | POLYSTYRENE |
| ②  | CARRIER TAPE | POLYSTYRENE |
| ③  | COVER TAPE   | POLYESTER   |

- Packing quantity: 700 pcs/reel
- More than 160mm empty pockets should remain at each end of the carrier tape for each reel. After reel packaging, the end of tape 180mm, shall be empty and the tape edge shall be cut in 45°. The cover tape shall be extended 180±10 mm from the tape edge and fixed with tape.
- Shortage of less than 2 pcs a reel is acceptable.
- Stripping strength of cover tape is between 10 gf to 130 gf and stripping angle should be within 165°~180°.
- The product in the pocket of carrier tape should be placed in a specified correct position.
- Tape and reel per EIA-481.
- Dimensions:



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[228HDSALWFR](#) [228HMVABFR](#) [228HMVALBFR](#) [228HMVALWFR](#) [228HMVARGFR](#) [228HMVARLFR](#)  
[228HMVAWFR](#) [228HDSARGFR](#) [228HDSARLFR](#) [228HDSAWFR](#) [228HMVAABFR](#) [228HMVAAFR](#) [228HMVAAWFR](#)