

# NAIS

**HIGH ENVIRONMENTAL  
RESISTANCE**

# TURQUOISE SWITCHES V TYPE (ABV)

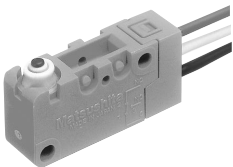
## FEATURES

- Miniature size (33×15.9×10.3 mm) (1.299×.626×.406 inch)
- Sealed construction for use in adverse environment—Sealed construction by epoxy resin and rubber cap keeps off the cause of miscontact such as dust Conforming to IP67\* of IEC protective construction classification
- Elastomer double molding technology, an industry first and ultrasonic swaging technology contribute to uniform seling in high production quantities
- UL/CSA/VDE/SEMKO approved

\*Based on the protective construction classification of IED, items which satisfy the test requirements are denoted with an IP designation.

## TYPICAL APPLICATIONS

- Automotives
- Agricultural devices
- Industrial equipment



## ORDERING INFORMATION

Ex. ABV1 2 1 0 6 1

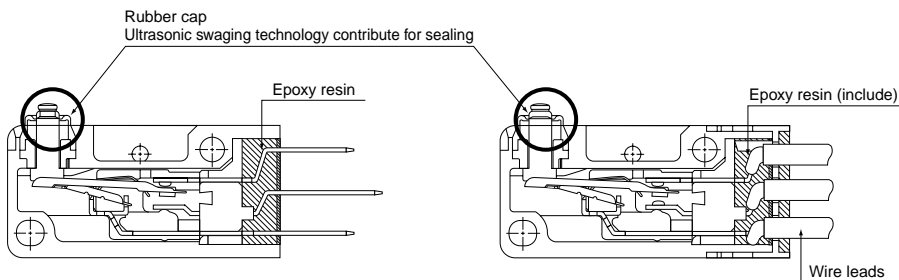
| Type of switch                      | Terminal  | Contact arrangement                 | Actuator  | Operating force by pin plunger (max.)                          | Contact                         |
|-------------------------------------|---|-------------------------------------|---|--|---------------------------------|
| ABV1:<br>Turquoise switch<br>V type | 2: .187 quick-connect terminal<br>6: Wire leads | 1: SPDT<br>2: SPST-NC<br>3: SPST-NO | 0: Pin plunger<br>2: Hinge lever<br>4: Simulated roller lever<br>5: Short roller lever<br>6: Roller lever | 4: 0.98 N {100 gf}<br>5: 1.96 N {200 gf}<br>6: 2.94 N {300 gf} | 1: Gold-clad<br>0: Silver-alloy |

Remarks: 1. Standard packing: Dust protected type 50 pcs./carton, 500 pcs./case; Immersion protected type 50 pcs./case.  
2. Not every combination is available. Please refer to the following table, "PRODUCT TYPES".

## CONSTRUCTION

.187 quick-connect terminal

Wire leads



**PRODUCT TYPES**

**Silver-alloy**

| Contact      | Actuator               | Contact Arrangement | Operating force, Max. | 187 Quick-connect terminal | Wire Leads |
|--------------|------------------------|---------------------|-----------------------|----------------------------|------------|
| Silver-alloy | Pin plunger            | SPDT                | 0.98 N {100 gf}       | ABV121040                  | ABV161040  |
|              |                        |                     | 1.96 N {200 gf}       | ABV121050                  | ABV161050  |
|              |                        |                     | 2.94 N {300 gf}       | ABV121060                  | ABV161060  |
|              |                        | SPST-NC             | 0.98 N {100 gf}       | ABV122040                  | ABV162040  |
|              |                        |                     | 1.96 N {200 gf}       | ABV122050                  | ABV162050  |
|              |                        |                     | 2.94 N {300 gf}       | ABV122060                  | ABV162060  |
|              |                        | SPST-NO             | 0.98 N {100 gf}       | ABV123040                  | ABV163040  |
|              |                        |                     | 1.96 N {200 gf}       | ABV123050                  | ABV163050  |
|              |                        |                     | 2.94 N {300 gf}       | ABV123060                  | ABV163060  |
|              | Hinge lever            | SPDT                | 0.59 N {60 gf}        | ABV121240                  | ABV161240  |
|              |                        |                     | 1.18 N {120 gf}       | ABV121250                  | ABV161250  |
|              |                        |                     | 1.77 N {180 gf}       | ABV121260                  | ABV161260  |
|              |                        | SPST-NC             | 0.59 N {60 gf}        | ABV122240                  | ABV162240  |
|              |                        |                     | 1.18 N {120 gf}       | ABV122250                  | ABV162250  |
|              |                        |                     | 1.77 N {180 gf}       | ABV122260                  | ABV162260  |
|              |                        | SPST-NO             | 0.59 N {60 gf}        | ABV123240                  | ABV163240  |
|              |                        |                     | 1.18 N {120 gf}       | ABV123250                  | ABV163250  |
|              |                        |                     | 1.77 N {180 gf}       | ABV123260                  | ABV163260  |
|              | Simulated roller lever | SPDT                | 0.59 N {60 gf}        | ABV121440                  | ABV161440  |
|              |                        |                     | 1.18 N {120 gf}       | ABV121450                  | ABV161450  |
|              |                        |                     | 1.77 N {180 gf}       | ABV121460                  | ABV161460  |
|              |                        | SPST-NC             | 0.59 N {60 gf}        | ABV122440                  | ABV162440  |
|              |                        |                     | 1.18 N {120 gf}       | ABV122450                  | ABV162450  |
|              |                        |                     | 1.77 N {180 gf}       | ABV122460                  | ABV162460  |
|              |                        | SPST-NO             | 0.59 N {60 gf}        | ABV123440                  | ABV163440  |
|              |                        |                     | 1.18 N {120 gf}       | ABV123450                  | ABV163450  |
|              |                        |                     | 1.77 N {180 gf}       | ABV123460                  | ABV163460  |
|              | Short roller lever     | SPDT                | 1.08 N {110 gf}       | ABV121540                  | ABV161540  |
|              |                        |                     | 2.16 N {220 gf}       | ABV121550                  | ABV161550  |
|              |                        |                     | 3.14 N {320 gf}       | ABV121560                  | ABV161560  |
|              |                        | SPST-NC             | 1.08 N {110 gf}       | ABV122540                  | ABV162540  |
|              |                        |                     | 2.16 N {220 gf}       | ABV122550                  | ABV162550  |
|              |                        |                     | 3.14 N {320 gf}       | ABV122560                  | ABV162560  |
|              |                        | SPST-NO             | 1.08 N {110 gf}       | ABV123540                  | ABV163540  |
|              |                        |                     | 2.16 N {220 gf}       | ABV123550                  | ABV163550  |
|              |                        |                     | 3.14 N {320 gf}       | ABV123560                  | ABV163560  |
| Roller lever | SPDT                   | 0.59 N {60 gf}      | ABV121640             | ABV161640                  |            |
|              |                        | 1.18 N {120 gf}     | ABV121650             | ABV161650                  |            |
|              |                        | 1.77 N {180 gf}     | ABV121660             | ABV161660                  |            |
|              | SPST-NC                | 0.59 N {60 gf}      | ABV122640             | ABV162640                  |            |
|              |                        | 1.18 N {120 gf}     | ABV122650             | ABV162650                  |            |
|              |                        | 1.77 N {180 gf}     | ABV122660             | ABV162660                  |            |
|              | SPST-NO                | 0.59 N {60 gf}      | ABV123640             | ABV163640                  |            |
|              |                        | 1.18 N {120 gf}     | ABV123650             | ABV163650                  |            |
|              |                        | 1.77 N {180 gf}     | ABV136660             | ABV163660                  |            |

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
 When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

# ABV1

## Gold-clad

| Contact   | Actuator               | Contact Arrangement | Operating force, Max. | 187 Quick-connect terminal | Wire Leads |
|-----------|------------------------|---------------------|-----------------------|----------------------------|------------|
| Gold-clad | Pin plunger            | SPDT                | 0.98 N {100 gf}       | ABV121041                  | ABV161041  |
|           |                        |                     | 1.96 N {200 gf}       | ABV121051                  | ABV161051  |
|           |                        |                     | 2.94 N {300 gf}       | ABV121061                  | ABV161061  |
|           |                        | SPST-NC             | 0.98 N {100 gf}       | ABV122041                  | ABV162041  |
|           |                        |                     | 1.96 N {200 gf}       | ABV122051                  | ABV162051  |
|           |                        |                     | 2.94 N {300 gf}       | ABV122061                  | ABV162061  |
|           |                        | SPST-NO             | 0.98 N {100 gf}       | ABV123041                  | ABV163041  |
|           |                        |                     | 1.96 N {200 gf}       | ABV123051                  | ABV163051  |
|           |                        |                     | 2.94 N {300 gf}       | ABV123061                  | ABV163061  |
|           | Hinge lever            | SPDT                | 0.59 N {60 gf}        | ABV121241                  | ABV161241  |
|           |                        |                     | 1.18 N {120 gf}       | ABV121251                  | ABV161251  |
|           |                        |                     | 1.77 N {180 gf}       | ABV121261                  | ABV161261  |
|           |                        | SPST-NC             | 0.59 N {60 gf}        | ABV122241                  | ABV162241  |
|           |                        |                     | 1.18 N {120 gf}       | ABV122251                  | ABV162251  |
|           |                        |                     | 1.77 N {180 gf}       | ABV122261                  | ABV162261  |
|           |                        | SPST-NO             | 0.59 N {60 gf}        | ABV123241                  | ABV163241  |
|           |                        |                     | 1.18 N {120 gf}       | ABV123251                  | ABV163251  |
|           |                        |                     | 1.77 N {180 gf}       | ABV123261                  | ABV163261  |
|           | Simulated roller lever | SPDT                | 0.59 N {60 gf}        | ABV121441                  | ABV161441  |
|           |                        |                     | 1.18 N {120 gf}       | ABV121451                  | ABV161451  |
|           |                        |                     | 1.77 N {180 gf}       | ABV121461                  | ABV161461  |
|           |                        | SPST-NC             | 0.59 N {60 gf}        | ABV122441                  | ABV162441  |
|           |                        |                     | 1.18 N {120 gf}       | ABV122451                  | ABV162451  |
|           |                        |                     | 1.77 N {180 gf}       | ABV122461                  | ABV162461  |
|           |                        | SPST-NO             | 0.59 N {60 gf}        | ABV123441                  | ABV163441  |
|           |                        |                     | 1.18 N {120 gf}       | ABV123451                  | ABV163451  |
|           |                        |                     | 1.77 N {180 gf}       | ABV123461                  | ABV163461  |
|           | Short roller lever     | SPDT                | 1.08 N {110 gf}       | ABV121541                  | ABV161541  |
|           |                        |                     | 2.16 N {220 gf}       | ABV121551                  | ABV161551  |
|           |                        |                     | 3.14 N {320 gf}       | ABV121561                  | ABV161561  |
|           |                        | SPST-NC             | 1.08 N {110 gf}       | ABV122541                  | ABV162541  |
|           |                        |                     | 2.16 N {220 gf}       | ABV122551                  | ABV162551  |
|           |                        |                     | 3.14 N {320 gf}       | ABV122561                  | ABV162561  |
|           |                        | SPST-NO             | 1.08 N {110 gf}       | ABV123541                  | ABV163541  |
|           |                        |                     | 2.16 N {220 gf}       | ABV123551                  | ABV163551  |
|           |                        |                     | 3.14 N {320 gf}       | ABV123561                  | ABV163561  |
|           | Roller lever           | SPDT                | 0.59 N {60 gf}        | ABV121641                  | ABV161641  |
|           |                        |                     | 1.18 N {120 gf}       | ABV121651                  | ABV161651  |
|           |                        |                     | 1.77 N {180 gf}       | ABV121661                  | ABV161661  |
|           |                        | SPST-NC             | 0.59 N {60 gf}        | ABV122641                  | ABV162641  |
|           |                        |                     | 1.18 N {120 gf}       | ABV122651                  | ABV162651  |
|           |                        |                     | 1.77 N {180 gf}       | ABV122661                  | ABV162661  |
| SPST-NO   |                        | 0.59 N {60 gf}      | ABV123641             | ABV163641                  |            |
|           |                        | 1.18 N {120 gf}     | ABV123651             | ABV163651                  |            |
|           |                        | 1.77 N {180 gf}     | ABV136661             | ABV163661                  |            |

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
 When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

# SPECIFICATIONS

## 1. Contact rating

| Type              | Standard rating  | Low-level rating                            |
|-------------------|--|---|
| Gold-clad contact | 3 A 250 V AC (O.F. 1.96 N {200gf}, 2.94 N {300gf})<br>1 A 250 V AC (O.F. 0.98 N {100gf}) | 5 mA 6 V DC<br>2 mA 12 V DC<br>1 mA 24 V DC |
| Silver-alloy      | 5 A 250 V AC (O.F. 1.96 N {200gf}, 2.94 N {300gf})<br>3 A 250 V AC (O.F. 0.98 N {100gf}) | —   |

## 2. Characteristics

|   |  |   |
|---|--|---|
| Mechanical life (O.T.: Specified value)             | Min. 5x10 <sup>6</sup> (at 60 cpm)   |   |
| Electrical life                                     | Nominal rating (O.T.: Max.)  | Min. 10 <sup>5</sup> (at 20 cpm)  |
|   | Low-level rating (O.T.: Specified value)                                   | Min. 10 <sup>6</sup> (at 20 cpm)  |
| Insulation resistance                               | Min. 100 MΩ (at 500 V DC insulation resistance meter)                      |   |
| Dielectric strength                                 | 1,000 Vrms   |   |
| Between non-continuous terminals                    | 2,000 Vrms   |   |
| Between each terminal and other exposed metal parts | 2,000 Vrms   |   |
| Between each terminal and ground                    | 2,000 Vrms   |   |
| Vibration resistance                                | 10 to 55 Hz at single amplitude of 0.75 mm (Contact opening: max. 1 msec.) |   |
| Shock resistance                                    | Min. 294 m/s <sup>2</sup> {30 G} (Contact opening: Max. 1 msec.)           |   |
| Contact resistance                                  | Silver alloy contact type  | Dust protected type (IP50): Max. 50 mΩ<br>Immersion protected type (IP67): Max. 100 mΩ<br>(By voltage drop 1 A 6 to 8 V DC)   |
|   | Gold-clad contact type   | Dust protected type (IP50): Max. 50 mΩ<br>Immersion protected type (IP67): Max. 100 mΩ<br>(By voltage drop 0.1 A 6 to 8 V DC) |
| Allowable operating speed (at no load)              | 1 to 500 mm/sec.   |   |
| Ambient temperature (at no load)                    | -40°C to +85°C -40°F to +185°F   |   |
| Unit weight   | Approx. 7 g .247 oz (IP50 type)  |   |

## 3. Operating characteristics

| Type of actuator       | Operating force, Max. |               |               | Release force, Min. |              |               | Pretravel, Max. mm inch | Movement differential, Max. mm inch | Overtravel, Min. mm inch | Operating position, mm inch |
|------------------------|-----------------------|---------------|---------------|---------------------|--------------|---------------|-------------------------|-------------------------------------|--------------------------|-----------------------------|
|                        | 2.94N {300gf}         | 1.96N {200gf} | 0.98N {100gf} | 0.59N {60gf}        | 0.39N {40gf} | 0.25N {25gf}  |                         |                                     |                          |                             |
| Pin plunger            | 2.94N {300gf}         | 1.96N {200gf} | 0.98N {100gf} | 0.59N {60gf}        | 0.39N {40gf} | 0.25N {25gf}  | 1.6<br>.063             | 0.4<br>.016                         | 0.8<br>.031              | 14.7±0.6<br>.579 ± .024     |
| Hinge lever            | 1.77N {180gf}         | 1.18N {120gf} | 0.59N {60gf}  | 0.20N {20gf}        | 0.13N {13gf} | 0.098N {10gf} | 3.2<br>.126             | 1.2<br>.047                         | 1.2<br>.047              | 15.3±1.2<br>.602 ± .047     |
| Simulated roller lever | 1.77N {180gf}         | 1.18N {120gf} | 0.59N {60gf}  | 0.20N {20gf}        | 0.13N {13gf} | 0.098N {10gf} | 3.2<br>.126             | 1.2<br>.047                         | 1.2<br>.047              | 18.5±1.2<br>.728 ± .047     |
| Short roller lever     | 3.14N {320gf}         | 2.16N {220gf} | 1.08N {110gf} | 0.59N {60gf}        | 0.39N {40gf} | 0.20N {20gf}  | 1.6<br>.063             | 0.5<br>.020                         | 0.8<br>.031              | 20.7±0.8<br>.815 ± .031     |
| Roller lever           | 1.77N {180gf}         | 1.18N {120gf} | 0.59N {60gf}  | 0.20N {20gf}        | 0.13N {13gf} | 0.098N {10gf} | 3.2<br>.126             | 1.2<br>.047                         | 1.2<br>.047              | 20.7±1.2<br>.815 ± .047     |

( ) : Low force type

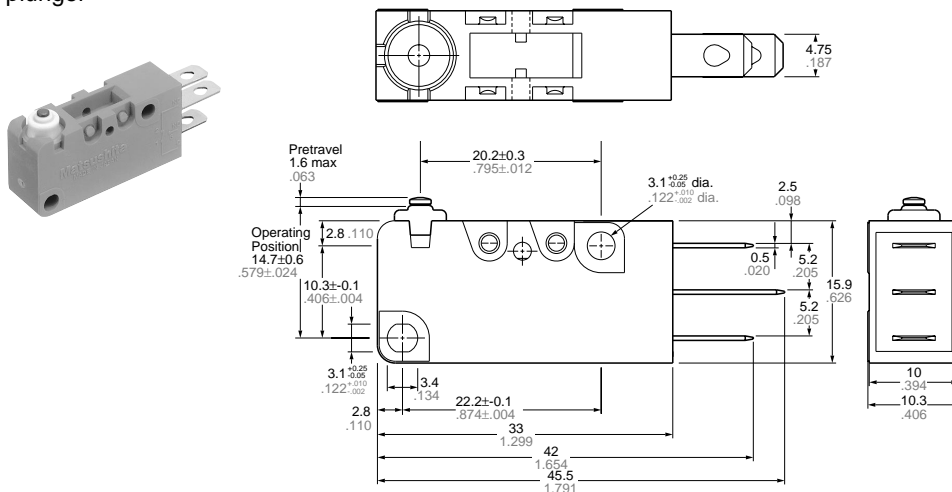
# DIMENSIONS

mm inch General tolerance: ±0.4 ± .016

## 1. Dust protected type

1-(1) .187 quick-connect terminal

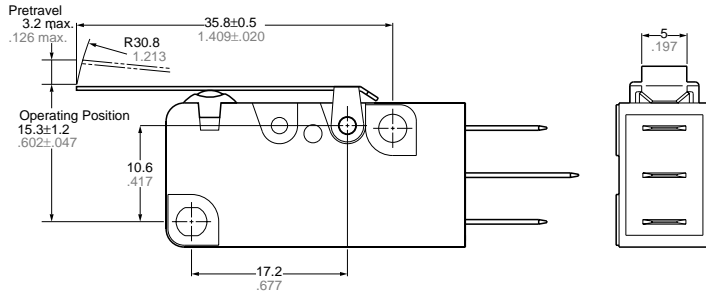
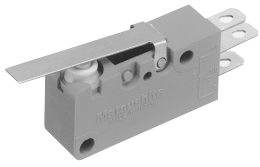
Pin plunger



|                                     |                         |
|-------------------------------------|-------------------------|
| Pretravel, Max. mm inch             | 1.6 .063                |
| Movement differential, Max. mm inch | 0.4 .016                |
| Overtravel, Min. mm inch            | 0.8 .031                |
| Operating position, mm inch         | 14.7±0.6<br>.579 ± .024 |

# ABV1

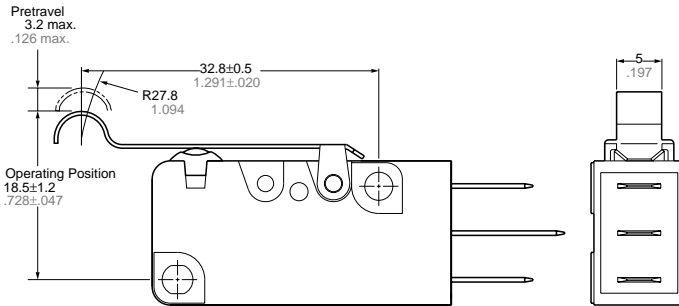
## Hinge lever



mm inch General tolerance: ±0.25 ± .010

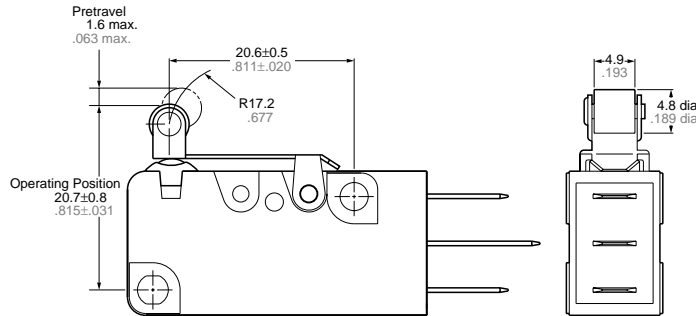
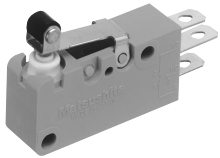
|                                     |                      |
|-------------------------------------|----------------------|
| Pretravel, Max. mm inch             | 3.2 .126             |
| Movement differential, Max. mm inch | 1.2 .047             |
| Overtravel, Min. mm inch            | 1.2 .047             |
| Operating position, mm inch         | 15.3±1.2 .602 ± .047 |

## Simulated roller lever



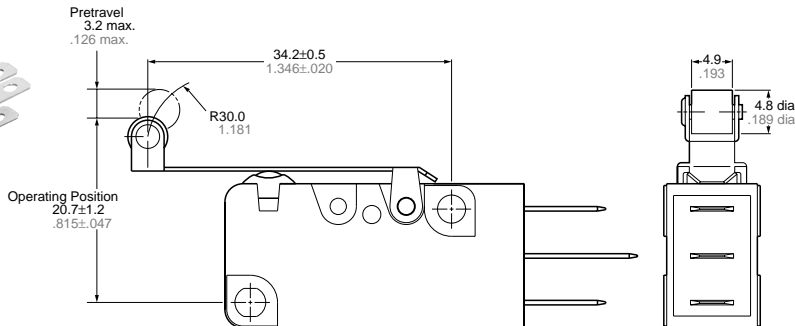
|                                     |                      |
|-------------------------------------|----------------------|
| Pretravel, Max. mm inch             | 3.2 .126             |
| Movement differential, Max. mm inch | 1.2 .047             |
| Overtravel, Min. mm inch            | 1.2 .047             |
| Operating position, mm inch         | 18.5±1.2 .728 ± .047 |

## Short roller lever



|                                       |                      |
|---------------------------------------|----------------------|
| Pretravel, Max. mm inch               | 1.6 .063             |
| Movement differential, Max. mm (inch) | 0.5 .020             |
| Overtravel, Min. mm (inch)            | 0.8 .031             |
| Operating position, mm inch           | 20.7±0.8 .815 ± .031 |

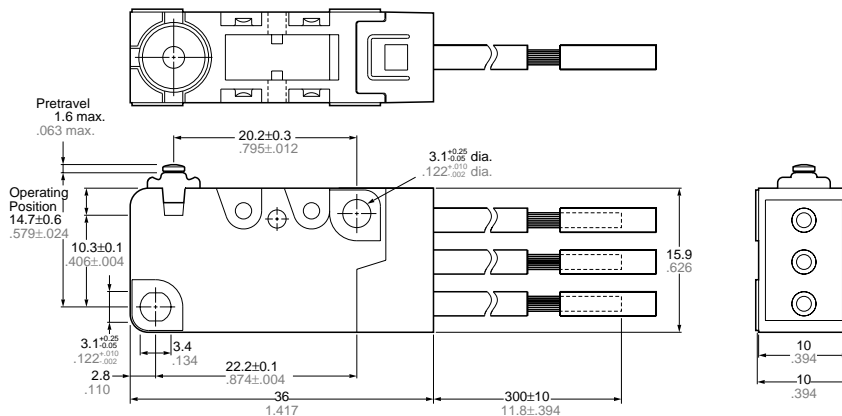
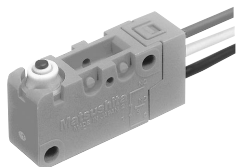
## Roller lever



|                                     |                      |
|-------------------------------------|----------------------|
| Pretravel, Max. mm inch             | 3.2 .126             |
| Movement differential, Max. mm inch | 1.2 .047             |
| Overtravel, Min. mm (inch)          | 1.2 .047             |
| Operating position, mm inch         | 20.7±1.2 .815 ± .047 |

## 2. Immersion protected type

### Wire Leads



Thickness of the lead wire:  
 Standard type: 0.75mm<sup>2</sup>  
 UL/CSA approved type:  
 AWG #18  
 Color of the lead wire  
 COM ...black  
 N.C. ...red  
 N.O. ...white