

### Wide Selection of Two-Circuit Double-Break Limit Switches








- Rugged diecast housing
- High mechanical strength
- Oiltight, waterproof, dustproof construction
- Overtravel and high-precision types available
- Choose switches with neon lamp or LED status indicator



## Ordering Information

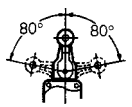






### ■ BASIC TYPE SIDE ROTARY SWITCHES

Total travel 45 degrees, with one-way operation option, 1/2-14NPT conduit (-TS type)

| Actuator<br> |  | Part number  |  |  |   |  |  |
|---|--|--|--|--|---|--|--|
|   |  | Complete switch<br> | Head with lever<br> | Lever<br> | Head<br> | Built-in switch<br> | Leverless<br> |
| Roller lever  | Short (38 mm radius)                       | <b>WLCA2-TS</b>  | <b>WL-1H1100</b>   | <b>WL-1A100</b>  | <b>WL-1H</b>  | <b>W-10FB3</b>   | <b>WLRCA2-TS</b>   |
|   | Medium (50 mm radius)                      | <b>WLCA2-7TS</b>   | <b>WL-1H1200</b>   | <b>WL-1A200</b>  |   |  |  |
|   | Long (63 mm radius)                        | <b>WLCA2-8TS</b>   | <b>WL-1H1300</b>   | <b>WL-1A300</b>  |   |  |  |
| Adjustable roller lever   |  | <b>WLCA12-TS</b>   | <b>WL-1H2100</b>   | <b>WL-2A100</b>  |   |  |  |
| Adjustable rod lever (140 mm)   |  | <b>WLCL-TS</b>   | <b>WL-4H4100</b>   | <b>WL-4A100</b>  | <b>WL-4H</b>  |  | <b>WLRCL-TS</b>  |
| Fork lock lever   | Left roller on front, right roller on back | <b>WLCA32-41TS</b>   | <b>WL-5H5100</b>   | <b>WL-5A100</b>  | <b>WL-5H</b>  |  | <b>WLRCA32-TS</b>  |
|   | Left roller on back, right roller on front | <b>WLCA32-42TS</b>   | <b>WL-5H5102</b>   |  |   |  |  |
|   | Both rollers on front                      | <b>WLCA32-43TS</b>   | <b>WL-5H5104</b>   |  |   |  |  |

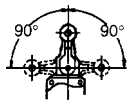






■ OVERTRAVEL TYPE SIDE ROTARY SWITCHES

Total travel 80 degrees, without one-way operation option, 1/2-14NPT conduit (-TS type)

| Actuator<br> |  | Part number  |  |  |   |  |  |
|---|--|--|--|--|---|--|--|
|   |  | Complete switch<br> | Head with lever<br> | Lever<br> | Head<br> | Built-in switch<br> | Leverless<br> |
| Roller lever  | Short (38 mm radius), standard sensitivity | WLH2-TS  | WL-2H1100  | WL-1A100   | WL-2H   | W-10FB3  | WLRH2-TS   |
|   | Short, high sensitivity                    | WLG2-TS  |  |  |   | W-10FB3-8  | WLRG2-TS   |
| Adj. roller lever   | Standard sensitivity                       | WLH12-TS   | WL-2H2100  | WL-2A100   | W-10FB3   | WLRH2-TS   |  |
|   | High sensitivity                           | WLG12-TS   |  |  | W-10FB3-8   | WLRG2-TS   |  |
| Adj. rod lever  | 140 mm, std. sensitivity                   | WLHL-TS  | WL-2H4100  | WL-4A100   | W-10FB3   | WLRH2-TS   |  |
|   | 140 mm, high sensitivity                   | WLGL-TS  |  |  | W-10FB3-8   | WLRG2-TS   |  |
|   | 380 mm, std. sensitivity                   | WLHAL4-TS  |  |  | WL-2H3100   | WL-3A100   | W-10FB3  |
| Spring rod lever  |  | WLHAL5-TS  | WL-2H3200  | WL-3A200   |   |  |  |

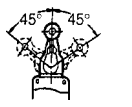






■ OVERTRAVEL TYPE SIDE ROTARY SWITCHES

Total travel 90 degrees, with one-way operation option (-2N type), 1/2-14NPT conduit (-TS type)

| Actuator<br> |                      | Part number  |  |  |   |  |  |
|--|----------------------|--|--|--|---|--|--|
|  |                      | Complete switch<br> | Head with lever<br> | Lever<br> | Head<br> | Built-in switch<br> | Leverless<br> |
| Roller lever   | Short (38 mm radius) | WLCA2-2NTS   | WL-6H1100  | WL-1A100   | WL-6H   | W-10FB3  | WLRCA2-2NTS  |
| Adj. roller lever  |                      | WLCA12-2NTS  | WL-6H2100  | WL-2A100   |   |  | WLRCA12-2NTS   |
| Adj. rod lever, 140 mm   |                      | WLCL-2NTS  | WL-6H3100  | WL-3A100   |   |  | WLRCA4-2NTS  |

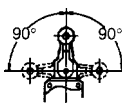






■ HIGH PRECISION TYPE SIDE ROTARY SWITCHES

Total travel 45 degrees, with one-way operation option, 1/2-14NPT conduit (-TS type)

| Actuator<br> |                       | Part number  |  |  |   |  |  |
|---|-----------------------|--|--|--|---|--|--|
|   |                       | Complete switch<br> | Head with lever<br> | Lever<br> | Head<br> | Built-in switch<br> | Leverless<br> |
| Roller lever  | Short (38 mm radius)  | WLGCA2-TS  | WL-1H1100-1  | WL-1A100   | N/A   | W-10FB3-4  | WLRGCA2-TS   |
|   | Medium (50 mm radius) | WLGCA2-7TS   | WL-1H1200-1  | WL-1A200   |   |  |  |
|   | Long (63 mm radius)   | WLGCA2-8TS   | WL-1H1300-1  | WL-1A300   |   |  |  |
| Adjustable roller lever   |                       | WLGCA12-TS   | WL-1H2100-1  | WL-2A100   |   |  |  |
| Adjustable rod lever (140 mm)   |                       | WLGCL-TS   | WL-4H4100-1  | WL-4A100   |   |  | WLRGCL-TS  |




■ **HIGH PRECISION TYPE SIDE ROTARY SWITCHES**

Total travel 90 degrees, without one-way operation option, 1/2-14NPT conduit (-TS type)

| Actuator<br> |                      | Part number   |   |   |   |   |   |
|---|----------------------|---|---|---|---|---|---|
|   |                      | Complete switch   | Head with lever   | Lever   | Head  | Built-in switch   | Leverless   |
| Roller lever  | Short (38 mm radius) |  |  |  |  |  |  |
|   |                      | <b>WLGCA2-2NTS</b>  | <b>WL-3H1100-1</b>  | <b>WL-1A100</b>   | <b>N/A</b>  | <b>W-10FB3-4</b>  | <b>WLRGCA2-2NTS</b>   |




■ **PLUNGER SWITCHES**

1/2-14NPT conduit (-TS type)

| Actuator                  | Part number   |  |   |
|---------------------------|---|--|---|
|                           | Complete switch   | Head with actuator   | Built-in switch   |
|                           |  |  |  |
| Top plunger               | <b>WLD-TS</b>   | <b>WL-7H100</b>  | <b>W-10FB3</b>  |
| Top roller plunger        | <b>WLD2-TS</b>  | <b>WL-7H200</b>  |   |
| Top sealed roller plunger | <b>WLD28-TS</b>   | <b>WL-7H400</b>  |   |
| Top ball plunger          | <b>WLD3-TS</b>  | <b>WL-7H300</b>  |   |
| Horizontal plunger        | <b>WLSD-TS</b>  | <b>WL-8H100</b>  | <b>W-10FB3-4</b>  |
| Horizontal roller plunger | <b>WLSD2-TS</b>   | <b>WL-8H200</b>  |   |
| Horizontal ball plunger   | <b>WLSD3-TS</b>   | <b>WL-8H300</b>  |   |

■ **COIL SPRING / STEEL WIRE SWITCHES**

1/2-14NPT conduit (-TS type)

| Actuator                 | Part number   |   |                   |   |
|--------------------------|---|---|-------------------|---|
|                          | Complete switch   | Head with actuator  | Actuator          | Built-in switch   |
|                          |  |  |                   |  |
| Coil spring, 6.5 mm dia. | <b>WNJ-TS</b>   | <b>WL-9H100</b>   | <b>WL-8WPA100</b> | <b>W-10FB3</b>  |
| Coil spring, 5.0 mm dia. | <b>WLNJ30-TS</b>  | <b>WL-9H200</b>   | <b>WL-8WPA200</b> |   |
| Steel wire, 1.0 mm dia.  | <b>WLNJ-S2TS</b>  | <b>WL-9H400</b>   | <b>WL-8WPA300</b> |   |
| Nylon rod, 8.0 mm dia.   | <b>WLNJ-2TS</b>   | <b>WL-9H300</b>   | <b>WL-8WPA400</b> |   |

■ **STATUS INDICATOR EQUIPPED SWITCHES**

Any of the WL switches above can be ordered with a neon or LED indicator that shows normally open and normally closed status. For a neon indicator, add "-LE" to the end of a part number, for example, **WLD2-TSLE**. For an LED indicator, add "-LD" to the end of a part number, for example, **WLCA2-TSLD**.

## ■ MODEL NUMBER LEGEND

### Base Units

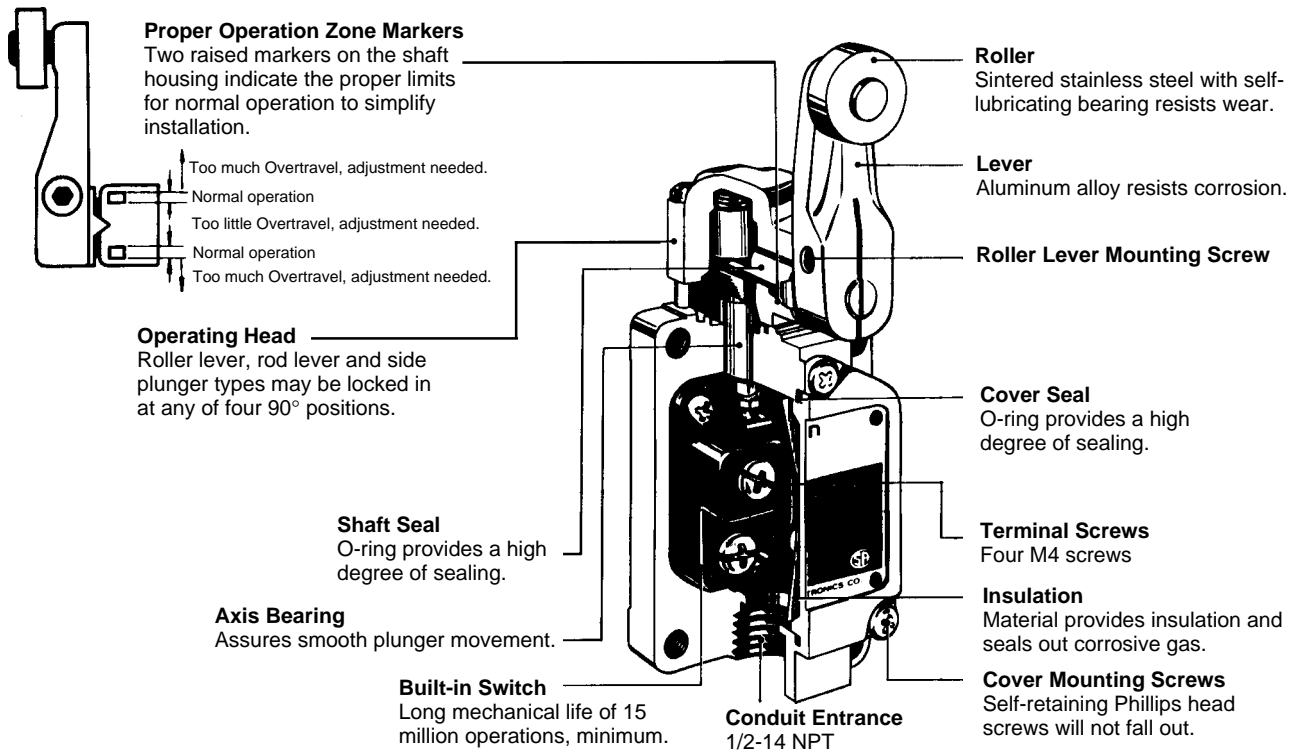
WL - □□-□□□□□□□□□□  
 1 2 3 4 5 6 7 8 9 10 11

| Identifier   | Symbol                                    | Definition  |
|--|---|---|
| 1  | Electrical ratings                        | None<br>10A, 125/250/480 VAC Rivet  |
|  |   | 01<br>0.1 A, 125/250 VAC Micro current/voltage crossbar   |
| 2  | Head, actuator                            | —<br>See following "Head and Actuator Chart"  |
| 3  | Corrosion                                 | None<br>Non-corrosion-proof or acid-proof   |
|  |   | RP<br>Corrosion-proof type  |
|  |   | P1<br>Acid-proof type   |
| 4  | Built-in switch                           | None<br>W-10FB3 (standard type)   |
|  |   | 55<br>W-10FB3-55 (special hermetic type)  |
| 5  | Operating temp.                           | None<br>-10°C to 80°C   |
|  |   | TH<br>5°C to 120°C (high temp. type)  |
|  |   | TC<br>-40°C to 40°C (low temp. type)  |
| 6  | Special hermetic                          | None<br>Without cable/no part is molded/standard switch (W-10FB3)   |
|  |   | 136<br>With 5M VCI cable pre-wired/conduit opening is resin-molded/standard built-in switch (W-10FB3)   |
|  |   | 139<br>With 5M VCI cable pre-wired/conduit opening and case cover are resin-molded/standard built-in switch (W-10FB3)                                     |
|  |   | 140<br>With 5M VCI cable pre-wired/special hermetic built-in switch (W-10FB3-55)  |
|  |   | 141<br>With 5M VCI cable pre-wired/conduit opening and case cover are resin-molded/special hermetic built-in switch (W-10FB3-55)                          |
|  |   | RP40<br>With 5M S-flex cable pre-wired/conduit opening and case cover are resin-molded/special hermetic built-in switch (W-10FB3-55)/special molding head |
|  |   | RP60<br>With 5M S-flex cable pre-wired/conduit opening and case cover are resin-molded/special hermetic built-in switch (W-10FB3-55)/viton sealed         |
| 7  | Conduit                                   | None<br>PF 1/2 without Earth Terminal   |
|  |   | G1<br>PF 1/2 with Earth Terminal  |
|  |   | G<br>PG 13.5 with Earth Terminal  |
|  |   | Y<br>M20 with Earth Terminal  |
|  |   | TS<br>1/2-14NPT with Earth Terminal   |
| 8  | Operating indicator                       | None<br>Without indicator   |
|  |   | LE<br>With neon indicator (125 to 250 VAC)  |
|  |   | LD<br>With LED indicator (10 to 115 VAC/VDC)  |
| 9  | Lever clamping                            | None<br>With single nuts  |
|  |   | A<br>With double nuts   |
| 10   | Spatter proof option                      | None<br>Non-spatter-proof type  |
|  |   | S<br>Spatter-proof type   |
| 11   | Pre-wired connector/<br>receptacle option | None<br>Screw terminal  |
|  |   | K13<br>4-pin receptacle (NO, DC type, wired no.3 & no.4)  |
|  |   | K13A<br>4-pin receptacle (NO, AC type, wired no.3 & no.4)   |
|  |   | K43<br>4-pin receptacle (DC type, all wired)  |
|  |   | K43A<br>4-pin receptacle (AC type, all wired)   |
|  |   | -M1J<br>Pre-wired connector (4-pin, NO, DC type, wired no.3 & no.4, 0.3m cable)   |
|  |   | -AGJ03<br>Pre-wired connector (4-pin, AC type, 0.3m cable)  |
| -DGJ03<br>Pre-wired connector (4-pin, DC type, 0.3m cable) |   |   |

## Head and Actuator Chart

| Symbol  | Definition   |
|---------|--|
| CA2     | Roller lever, short (38 mm radius), with one-way operation option                          |
| CA2-7   | Roller lever, medium (50 mm radius), with one-way operation option                         |
| CA2-8   | Roller lever, long (63 mm radius), with one-way operation option                           |
| H2      | Roller lever, short (38 mm radius), overtravel: 80 degrees                                 |
| G2      | Roller lever, short (38 mm radius), overtravel: 80 degrees, high sensitivity               |
| CA2-2   | Roller lever, short (38 mm radius), overtravel: 90 degrees                                 |
| CA2-2N  | Roller lever, short (38 mm radius), overtravel: 90 degrees, with one-way operation option  |
| GCA2    | Roller lever, short (38 mm radius), high precision, with one-way operation option          |
| GCA2-7  | Roller lever, medium (50 mm radius), high precision, with one-way operation option         |
| GCA2-8  | Roller lever, long (63 mm radius), high precision, with one-way operation option           |
| CA12    | Adjustable roller lever, with one-way operation option                                     |
| H12     | Adjustable roller lever, overtravel: 80 degrees  |
| G12     | Adjustable roller lever, overtravel: 80 degrees, high sensitivity                          |
| CA12-2  | Adjustable roller lever, overtravel: 90 degrees  |
| CA12-2N | Adjustable roller lever, overtravel: 90 degrees, with one-way operation option             |
| GCA12   | Adjustable roller lever, high precision  |
| CL      | Adjustable rod lever (140 mm), with one-way operation option                               |
| HL      | Adjustable rod lever (140 mm), overtravel: 80 degrees                                      |
| HLAL4   | Adjustable rod lever (380 mm), overtravel: 80 degrees                                      |
| GL      | Adjustable rod lever (140 mm), overtravel: 80 degrees, high sensitivity                    |
| CL-2N   | Adjustable rod lever (140 mm), overtravel: 90 degrees, with one-way operation option       |
| HAL5    | Spring rod lever, overtravel: 80 degrees   |
| CA32-41 | Fork lock lever, left roller on front, right roller on back, with one-way operation option |
| CA32-42 | Fork lock lever, left roller on back, right roller on front, with one-way operation option |
| CA32-43 | Fork lock lever, both rollers on front, with one-way operation option                      |
| D       | Top plunger  |
| D2      | Top roller plunger   |
| D28     | Top sealed roller plunger  |
| D3      | Top ball plunger   |
| SD      | Horizontal plunger   |
| SD2     | Horizontal roller plunger  |
| SD3     | Horizontal ball plunger  |
| NJ      | Coil spring, 6.5 mm dia.   |
| NJ-30   | Coil spring, 5.0 mm dia.   |
| NJ-2    | Nylon rod, 8.0 mm dia.   |
| NJ-2S   | Steel wire, 1.0 mm dia.  |

# Construction



# Specifications

## ■ GENERAL RATINGS

| Rated voltage | Non-inductive load |      |           |       | Inductive load |    |            |       |
|---------------|--------------------|------|-----------|-------|----------------|----|------------|-------|
|               | Resistive load     |      | Lamp load |       | Inductive load |    | Motor load |       |
|               | NC                 | NO   | NC        | NO    | NC             | NO | NC         | NO    |
| 125 VAC       | 10 A               | 10 A | 3 A       | 1.5A  | 10 A           |    | 5 A        | 2.5 A |
| 250 VAC       | 10 A               | 10 A | 2 A       | 1 A   | 10 A           |    | 3 A        | 1.5 A |
| 480 VAC       | 10 A               | 10 A | 1.5 A     | 0.8 A | 3 A            |    | 1.5 A      | 0.8 A |
| 600 VAC       | 3 A                | 1 A  | 1 A       | 0.5 A | 1.5 A          |    | 1 A        | 0.5 A |
| 8 VDC         | 10 A               |      | 6 A       | 3 A   | 10 A           |    | 6 A        |       |
| 14 VDC        | 10 A               |      | 6 A       | 3 A   | 10 A           |    | 6 A        |       |
| 30 VDC        | 6 A                |      | 4 A       | 3 A   | 6 A            |    | 4 A        |       |
| 125 VDC       | 0.8 A              |      | 0.2 A     |       | 0.8 A          |    | 0.2 A      |       |
| 250 VDC       | 0.4 A              |      | 0.1 A     |       | 0.4 A          |    | 0.1 A      |       |

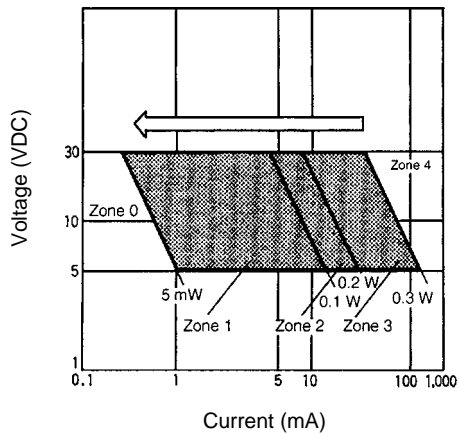
Note: 1. Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).  
 2. Lamp load has an inrush current of 10 times the steady-state current.  
 3. Motor load has an inrush current of 6 times the steady-state current.

### Microvoltage/Current Load Model (WL01□)

| Rated voltage | Resistive Load |
|---------------|----------------|
| 125 VAC       | 0.1 A          |
| 30 VDC        |                |

**Recommended Load Range (DC only)**

Zones 1 through 3



Note: Without neon lamp model

**■ EN60947-5-1 RATINGS**

| Model    | Category and rating                       | Thermal current ( $i_{the}$ ) | Indicator |
|----------|---|-------------------------------|-----------|
| WL□      | AC-15 2 A/250 VAC<br>DC-12 2 A/48 VDC     | 10 A                          | None      |
| WL01□    | AC-14 0.1 A/125 VAC<br>DC-12 0.1 A/48 VDC | 0.5 A                         | None      |
| WL□-LE   | AC-15 2 A/250 VAC                         | 10 A                          | Neon lamp |
| WL01□-LE | AC-14 0.1 A/125 VAC                       | 0.5 A                         | Neon lamp |
| WL□-LD   | AC-15 2 A/115 VAC<br>DC-12 2 A/48 VDC     | 10 A                          | LED       |
| WL01□-LD | AC-14 0.1 A/115 VAC<br>DC-12 0.1 A/48 VDC | 0.5 A                         | LED       |

## ■ CHARACTERISTICS

|   |             |  |
|---|-------------|--|
| Operating speed                               |             | 1 mm/s to 2 m/s (with WLCA2)   |
| Operating frequency                           | Mechanical  | 120 operations/min.  |
|   | Electrical  | 30 operations/min.   |
| Insulation resistance                         |             | 100 MΩ min. (at 500 VDC)   |
| Contact resistance                            |             | 25 mΩ (initial)  |
| Dielectric strength                           |             | 1,000 VAC (600 VAC for overtravel model), 50/60 Hz for 1 min between non-continuous terminals<br>2,200 VAC, 50/60 for 1 min between each terminal and non-current-carrying metal part and between each terminal and ground |
| Rated impulse withstand voltage ( $U_{imp}$ ) |             | 4 kV   |
| Rated insulation voltage ( $U_i$ )            |             | 300 VAC (EN60947-5-1)  |
| Thermal current ( $I_{the}$ )                 |             | 10 A (0.5 A for micro load type) (EN60947-5-1)   |
| Short-circuit protective device               |             | 10 A fuse (type gG, IEC269 approved, EN60947-5-1)  |
| Conditional short circuit current             |             | 100 A (EN60947-5-1)  |
| Operating environment pollution degree        |             | 3 (EN60947-5-1)  |
| Protection against electric shock             |             | Class I  |
| Temperature rise                              |             | 50° max  |
| Vibration resistance                          | Malfunction | 10 to 55 Hz, 1.5 mm double amplitude   |
| Shock resistance (See Note 1.)                | Destruction | 1,000 m/s <sup>2</sup> (approx. 100G)  |
|   | Malfunction | 300 m/s <sup>2</sup> (approx. 30 G)  |
| Ambient temperature                           | Operating   | -10°C to 80°C (14°F to 176°F) with no icing  |
| Ambient humidity                              | Operating   | 95% max  |
| Life expectancy                               | Mechanical  | 15,000,000 operations min. (See Note 2.)   |
|   | Electrical  | See <i>Engineering Data</i>  |
| Enclosure ratings                             | UL          | Types 3, 4 and 13  |
|   | NEMA        | Types 1, 2, 3, 3R, 4, 5, 6, 12 and 13  |
|   | IEC         | IP67   |
| Weight  |             | Approx. 275 g (with WLCA2)   |

Note: 1. Excludes the coil spring models (-NJ)  
2. Overtravel model, low differential model, wobble stick model and micro load model: 10,000,000 operations min.

## ■ APPROVED STANDARDS

| Approval | Standard         | File no.      |
|----------|------------------|---------------|
| UL       | UL508            | E76675        |
| CSA      | CSA C22.2 no. 14 | LR45746       |
| TÜV      | EN60947-5-1      | R9551016      |
| SEV      | SEV              | 93.5 51936.01 |
| LR       | LR               | 88/10274 (E3) |



## ■ OPERATING CHARACTERISTICS

**Legend:** OF = Operating Force (max.); RF = Reset Force (min.); OT = Overtravel (min.); PT = Pretravel

MD = Movement Differential (max.); OP = Operating Position; TT = Total Travel (min.); TTP = Total Travel Position (mm/inch)

| Part number  | Description                               | OF          | RF          | OT         | PT              | MD        | OP              | TT(P)     |
|--------------|---|-------------|-------------|------------|-----------------|-----------|-----------------|-----------|
| WLCA2-TS     | Short roller lever                        | 1.36 kg     | 227 g       | 30°        | 15° ±5°         | 12°       | —               | 40°       |
|              |   | (3 lb)      | (8.01 oz.)  |            |                 |           |                 |           |
| WLCA2-7TS    | Medium roller lever                       | 1.04 kg     | 170 g       | 30°        | 15° ±5°         | 12°       | —               | 40°       |
|              |   | (2.3 lb)    | (6.00 oz.)  |            |                 |           |                 |           |
| WLCA2-8TS    | Long roller lever                         | 820 g       | 137 g       | 30°        | 15° ±5°         | 12°       | —               | 40°       |
|              |   | (28.92 oz.) | (4.83 oz.)  |            |                 |           |                 |           |
| WLCA12-TS*   | Adjustable roller lever                   | 1.36 kg     | 227 g       | 30°        | 15° ±5°         | 12°       | —               | 40°       |
|              |   | (3 lb)      | (8.01 oz.)  |            |                 |           |                 |           |
| WLCL-TS**    | Adjustable rod lever                      | 142 g       | 28 g        | 30°        | 15° ±5°         | 12°       | —               | 40°       |
|              |   | (5.00 oz.)  | (0.99 oz.)  |            |                 |           |                 |           |
| WLCA32-41TS  | Fork roller lever, left front, right back | 1.2 kg      | —           | 35°        | 50° ±5°         | —         | —               | 90° ±10°  |
|              |   | (2.7 lb)    |             |            |                 |           |                 |           |
| WLCA32-42TS  | Fork roller lever, left back, right front | 1.2 kg      | —           | 35°        | 50° ±5°         | —         | —               | 90° ±10°  |
|              |   | (2.7 lb)    |             |            |                 |           |                 |           |
| WLCA32-43TS  | Fork roller lever, both on front          | 1.2 kg      | —           | 35°        | 50° ±5°         | —         | —               | 90° ±10°  |
|              |   | (2.7 lb)    |             |            |                 |           |                 |           |
| WLD-TS       | Plain top plunger                         | 2.72 kg     | 910 g       | 6.4 mm     | 1.7 mm          | 1 mm      | 34 ±0.8 mm      | 29.5 mm   |
|              |   | (6 lb)      | (2.01 lb)   | (0.252 in) | (0.067 in)      | (0.04 in) | (1.34 ±0.03 in) | (1.16 in) |
| WLD2-TS      | Top roller plunger                        | 2.72 kg     | 910 g       | 5.6 mm     | 1.7 mm          | 1 mm      | 44 ±0.8 mm      | 39.5 mm   |
|              |   | (6 lb)      | (2.01 lb)   | (0.220 in) | (0.067 in)      | (0.04 in) | (1.73 ±0.03 in) | (1.56 in) |
| WLD28-TS     | Top sealed roller plunger                 | 1.7 kg      | 450 g       | 5.6 mm     | 1.7 mm          | 1 mm      | 44 ±0.8 mm      | 39.5 mm   |
|              |   | (3.75 lb)   | (15.87 oz.) | (0.220 in) | (0.067 in)      | (0.04 in) | (1.73 ±0.03 in) | (1.56 in) |
| WLD3-TS      | Top ball plunger                          | 2.72 kg     | 910 g       | 4 mm       | 1.7 mm          | 1 mm      | 44.5 ±0.8 mm    | 41 mm     |
|              |   | (6 lb)      | (2.01 lb)   | (0.157 in) | (0.067 in)      | (0.04 in) | (1.75 ±0.03 in) | (1.61 in) |
| WLSD-TS      | Horizontal plain plunger                  | 4.082 kg    | 907 g       | 6.4 mm     | 2.8 mm          | 1 mm      | 40.6 ±0.8 mm    | —         |
|              |   | (9.01 lb)   | (2.00 lb)   | (0.252 in) | (0.110 in)      | (0.04 in) | (1.60 ±0.03 in) |           |
| WLSD2-TS     | Horizontal roller plunger                 | 4.082 kg    | 907 g       | 5.6 mm     | 2.8 mm          | 1 mm      | 54.2 ±0.8 mm    | —         |
|              |   | (9.01 lb)   | (2.00 lb)   | (0.220 in) | (0.110 in)      | (0.04 in) | (2.13 ±0.03 in) |           |
| WLSD3-TS     | Horizontal ball plunger                   | 4.082 kg    | 907 g       | 4 mm       | 28 mm           | 1 mm      | 54.2 ±0.8 mm    | —         |
|              |   | (9.01 lb)   | (2.00 lb)   | (0.157 in) | (0.110 in)      | (0.04 in) | (2.13 ±0.03 in) |           |
| WLNJ-TS***   | Coil spring, 6.5 mm dia.                  | 150 g       | —           | —          | 20 mm ±10 mm    | —         | —               | —         |
|              |   | (5.29 oz.)  |             |            | (0.79 ±0.39 in) |           |                 |           |
| WLNJ30-TS*** | Coil spring, 5.0 mm dia.                  | 150 g       | —           | —          | 20 mm ±10 mm    | —         | —               | —         |
|              |   | (5.29 oz.)  |             |            | (0.79 ±0.39 in) |           |                 |           |
| WLNJ-S2TS*** | Steel wire                                | 29 g        | —           | —          | 40 mm ±20 mm    | —         | —               | —         |
|              |   | (1.02 oz.)  |             |            | (1.58 ±0.79 in) |           |                 |           |
| WLNJ-2TS***  | Nylon rod                                 | 150 g       | —           | —          | 40 mm ±20 mm    | —         | —               | —         |
|              |   | (5.29 oz.)  |             |            | (1.58 ±0.79 in) |           |                 |           |

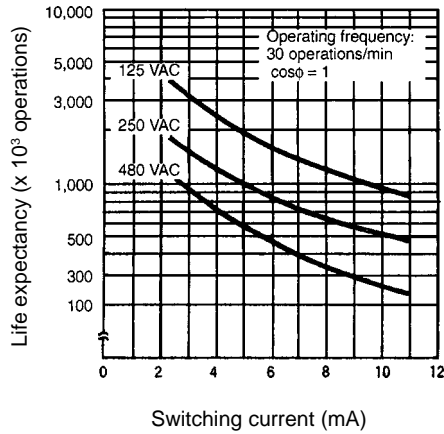
Note: \* Operating characteristics of WLCA-12-TS is measured at arm length of 38 mm (1.496 in).

\*\* Operating characteristics of WLCL-TS is measured at the rod length of 140 mm (5.512 in)

\*\*\* Operating characteristics are measured at the tip of the coil spring or steel wire.

# Engineering Data

## ■ ELECTRICAL LIFE EXPECTANCY



## ■ CONTACT RATINGS

NEMA A600 for SPDT switches without status indicators:

- 10 A at 125, 250, 480 VAC
- 1/2 HP at 125 VAC, 1 HP at 250 VAC
- 0.8 A at 125 VDC, 0.4 A at 250 VDC
- 0.1 A at 600 VDC

NEMA A300 for SPDT switches with neon status indicator type

## ■ CONTACT RESISTANCE

25 mΩ max (initial)

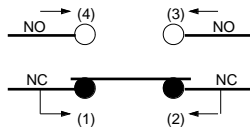
## ■ ELECTRICAL APPROVALS

UL Recognized, File No. E76675  
 CSA Certified, File No. LR45746

# Operation

## ■ CONTACT FORM

### Standard/microload models

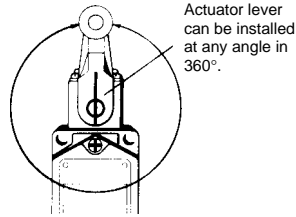


### SPST-NO model



**■ ROTARY ACTUATOR POSITIONING**

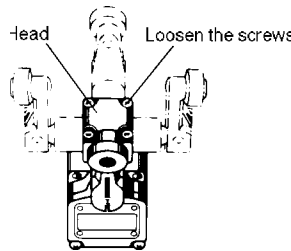
Actuators for rotary switches such as WLCA□-TS roller lever and WLCL-TS rod lever switches can be positioned within a 360° range. Loosen the Allen-head set bolt on the side of the actuator, position the actuator, then tighten in place.



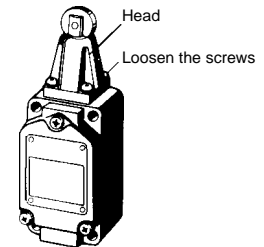
**■ OPERATING HEAD POSITIONING**

The operating head of many switches can be set to four 90° positions to match installation requirements. Loosen the four Phillips head screws on the operating head, and lift the head off. Then, position with the shaft in the desired direction. Replace the four screws to fasten the operating head. Applicable switches include those with roller levers (WLCA□-TS), rod levers (WLCL-TS), horizontal plungers (WLS□-TS) and roller plungers (WLD2-TS and WLD28-TS).

**Example of roller lever, rod lever and horizontal plunger switches**

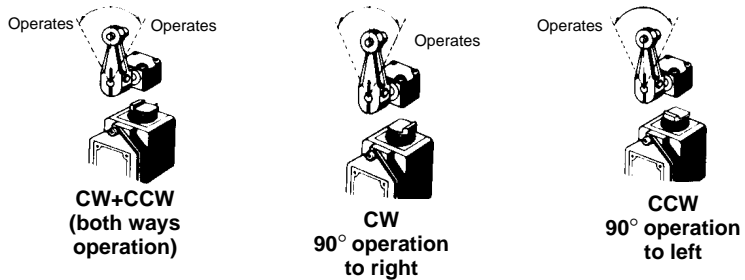


**Example of roller plunger switches**



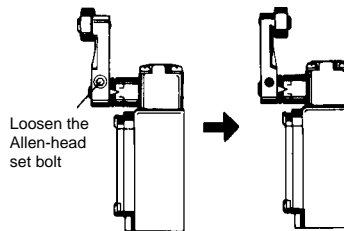
**■ OPERATING DIRECTION OF STANDARD SWITCHES**

Rotary actuator switches can be set for clockwise (CW), counterclockwise (CCW) or operation both ways (CW+CCW). To change the operating direction, loosen the four screws on the switch head. Then, lift off the head. The plunger marker inside is set parallel with the face plate, as shown at right. Turn the plunger so the marking faces left for CW or right for CCW as shown. Replace the actuator head in the direction suitable for the installation and tighten the four screws.



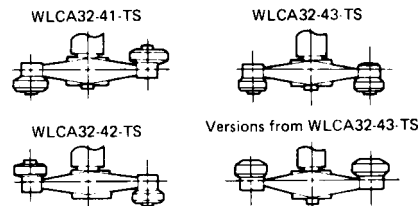
**■ ROLLER LEVER ACTUATOR POSITIONING**

The roller(s) on roller lever actuators may be faced inward toward the operating head or use the more typical installation with the roller lever facing away from the body. To change the actuator position, loosen the Allen-head set bolt, pull the actuator off, and reposition it on the shaft. Then, tighten the set bolt at the desired angle.



**■ FORK ROLLER LEVER ACTUATORS**

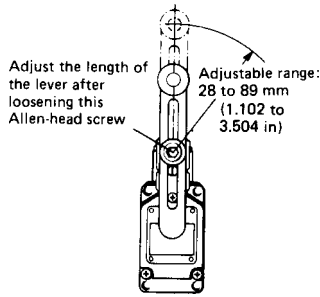
The illustration at right indicates the differences among the fork lever actuators. All may be reversed as shown above.



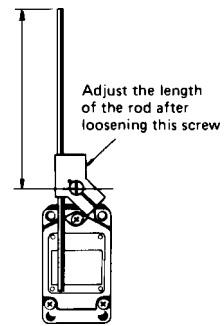
**ADJUSTING LEVER AND ROD LENGTH**

Switches with adjustable lever and rod actuators can be set to desired length by loosening the Allen-head set screw, setting the length. Then tighten the set screw.

**Rod lever switch**

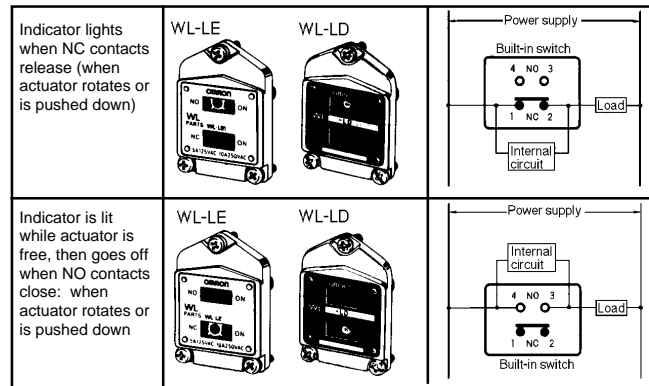


**Adjustable roller lever switch**



**STATUS INDICATOR EQUIPPED SWITCH OPERATION**

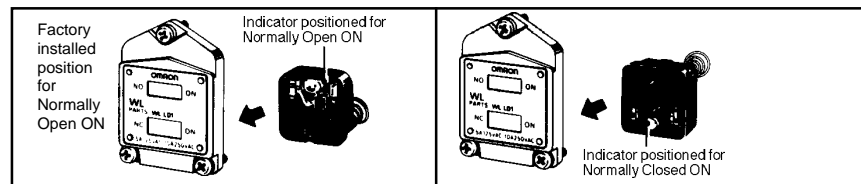
WL switches are available with neon lamp (WL0000-TS-LE) or LED (WL0000-TS-LD) status indicators for easy monitoring and troubleshooting. They come factory-set for Normally Open operation ON. It is easy to change the status to Normally Closed operation ON. See the Installation section for details.



When connecting a limit switch to a programmable controller, select the neon lamp or LED with the smallest leakage current. Refer to the table at right.

| Part number  | Indicator type | Rated voltage                  | Leakage current                  |
|--------------|----------------|--------------------------------|----------------------------------|
| WL0000-TS-LE | Neon lamp      | 125 VAC<br>250 VAC             | Approx. 0.6 mA<br>Approx. 1.9 mA |
| WL0000-TS-LD | LED            | 10 to 115 VAC<br>10 to 115 VDC | Approx. 1 mA                     |

To change operation to Normally Closed ON, remove the cover from the switch body, and rotate lamp holder 180°. Then, replace the unit in the housing.

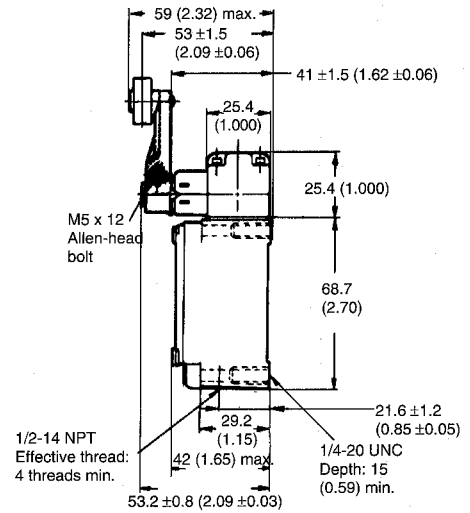
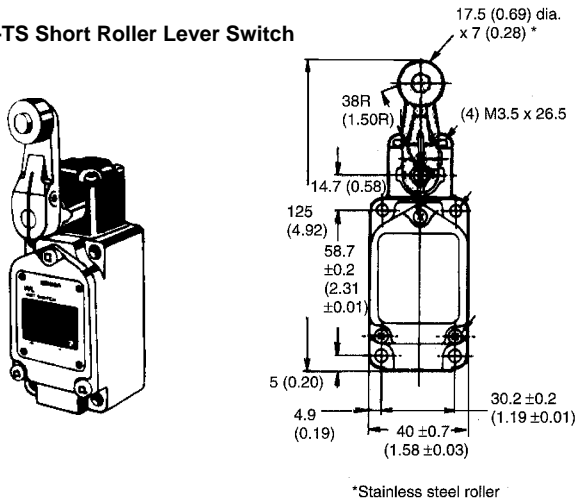


# Dimensions

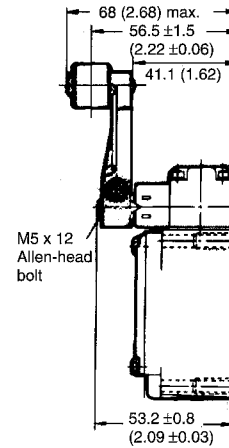
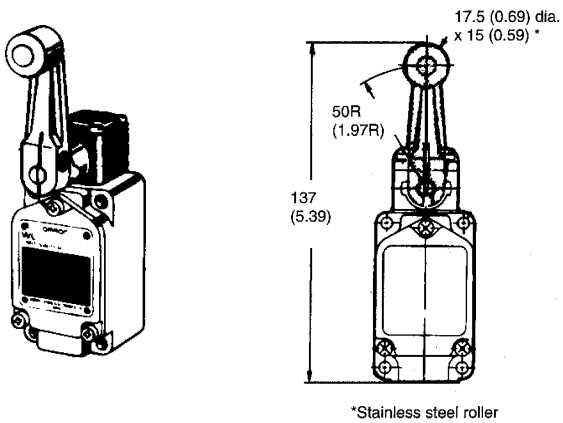
Unit: mm (inch)

## ■ LIMIT SWITCHES

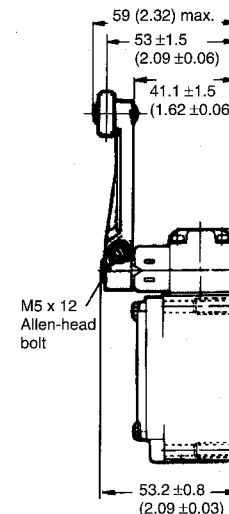
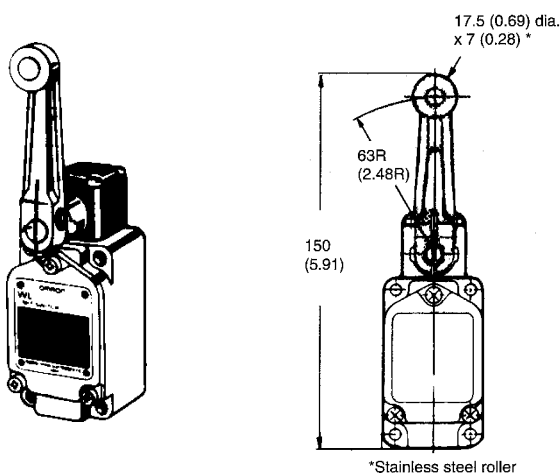
### WLCA2-TS Short Roller Lever Switch



### WLCA2-7TS Medium Roller Lever Switch

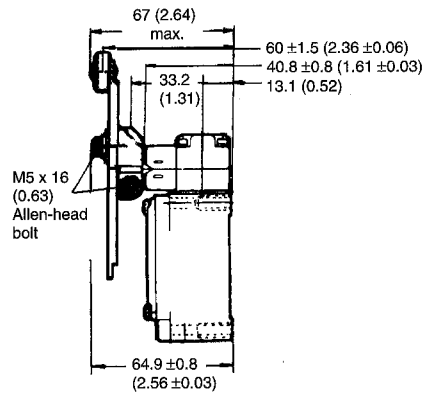
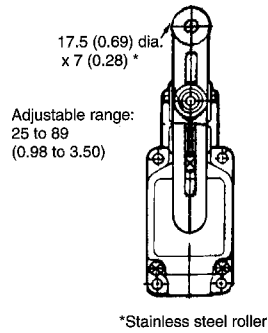
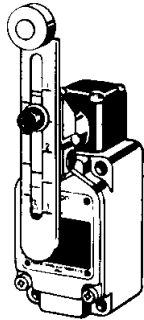


### WLCA2-8TS Long Roller Lever Switch

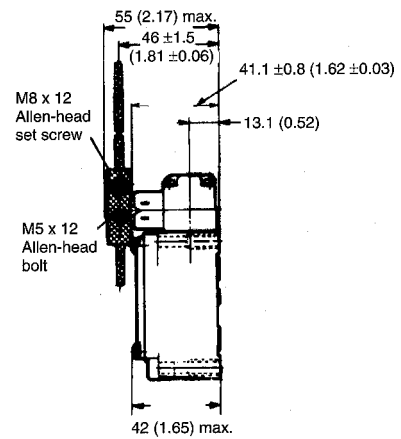
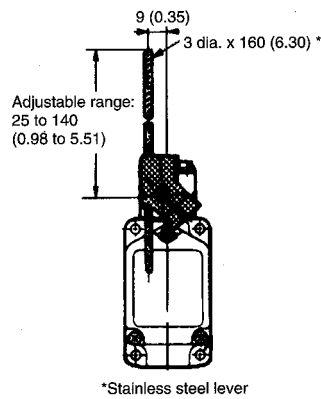
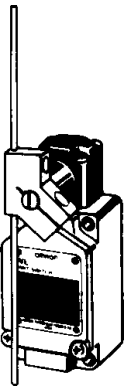


Unit: mm (inch)

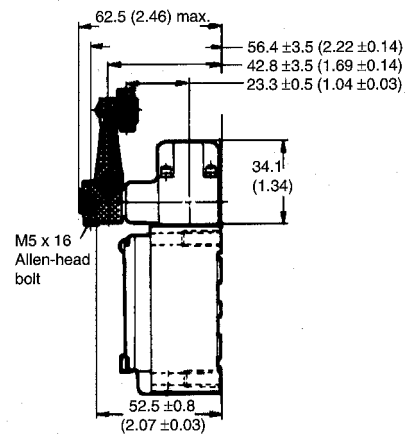
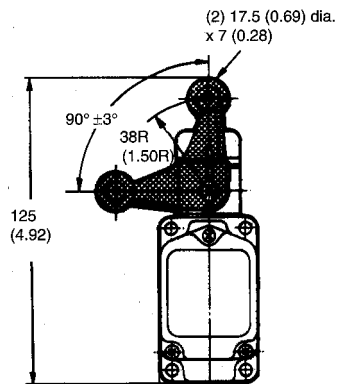
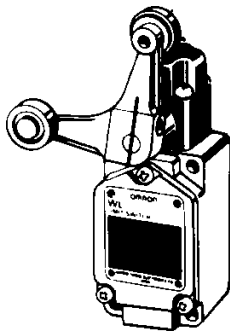
**WLCA12-TS Adjustable Roller Lever Switch**



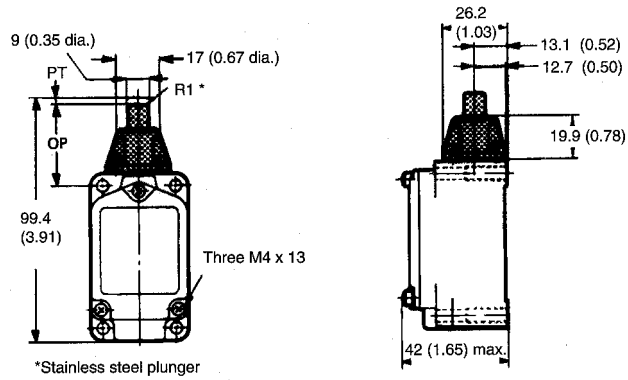
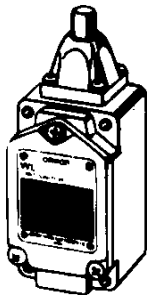
**WLCL-TS Adjustable Rod Lever Switch**



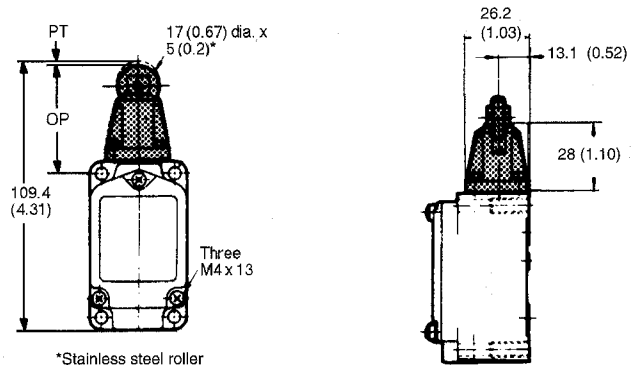
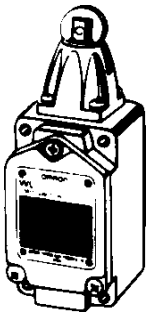
**WLCA32-41, WLCA32-42, WLCA32-43 Fork Roller Lever Switches**



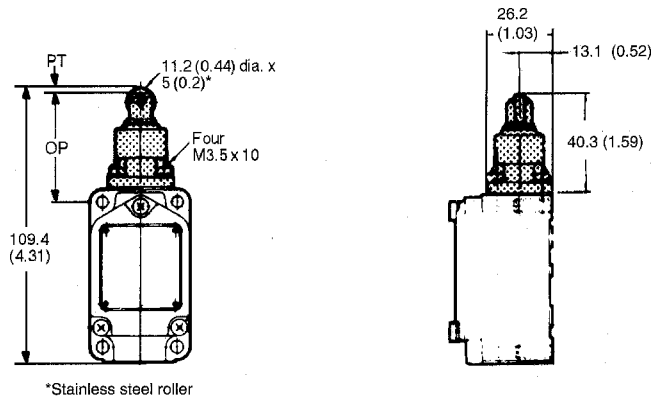
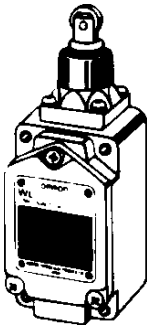
WLD-TS Plain Plunger Switch



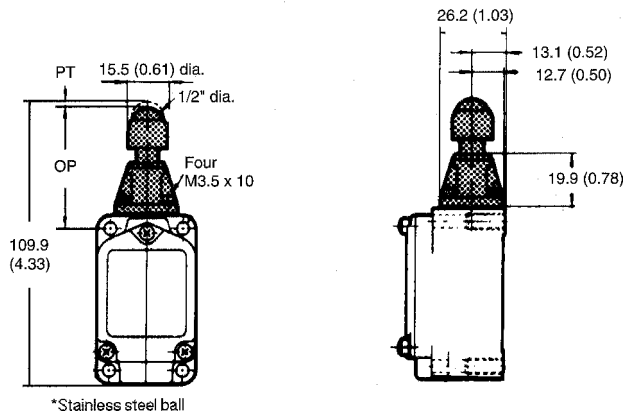
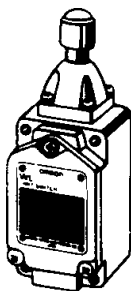
WLD2-TS Roller Plunger Switch



WLD28-TS Sealed Roller Plunger Switch

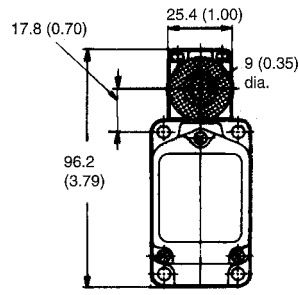
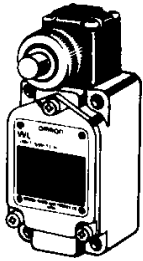


WLD3-TS Ball Plunger Switch

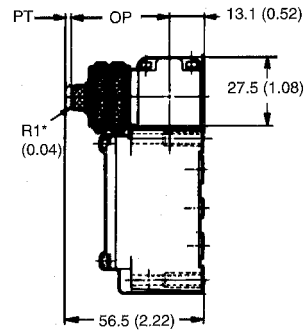


Unit: mm (inch)

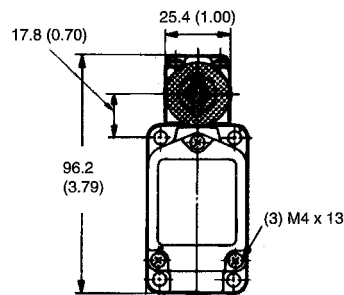
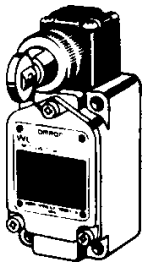
**WLS-D-TS Horizontal Plain Plunger Switch**



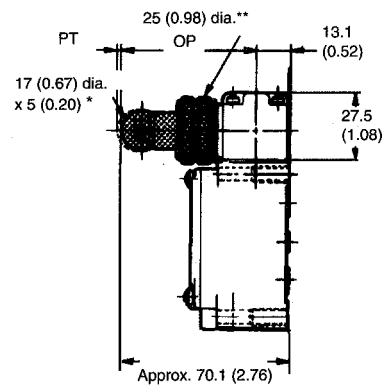
\*Stainless steel plunger



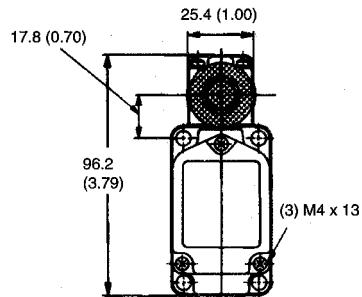
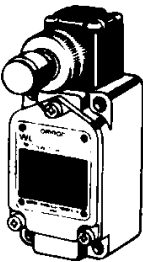
**WLS-D2-TS Horizontal Roller Plunger Switch**



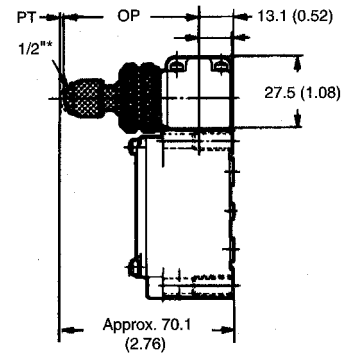
\* Stainless steel roller  
 \*\* Face nut (by loosening this nut, the direction of the roller may be changed).



**WLS-D3-TS Horizontal Ball Plunger Switch**

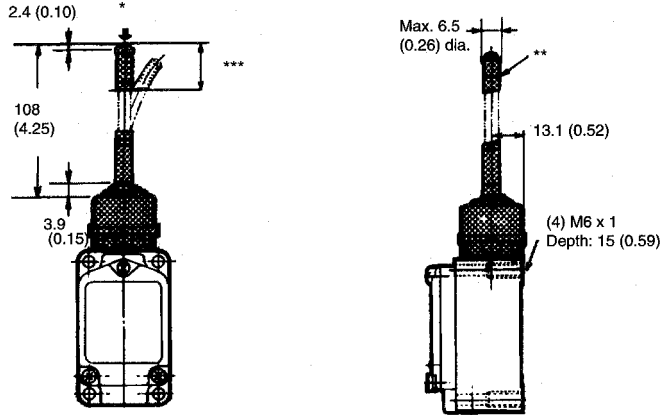
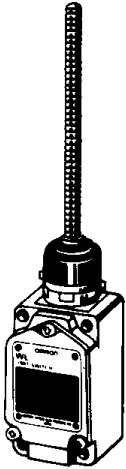


\*Stainless steel ball



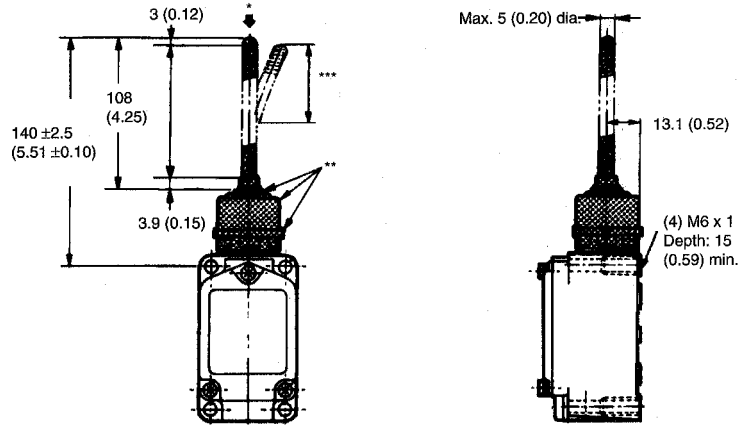
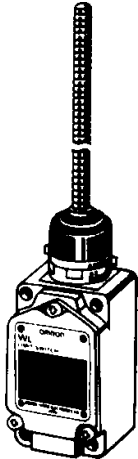


WLNJ-TS Coil Spring Switch



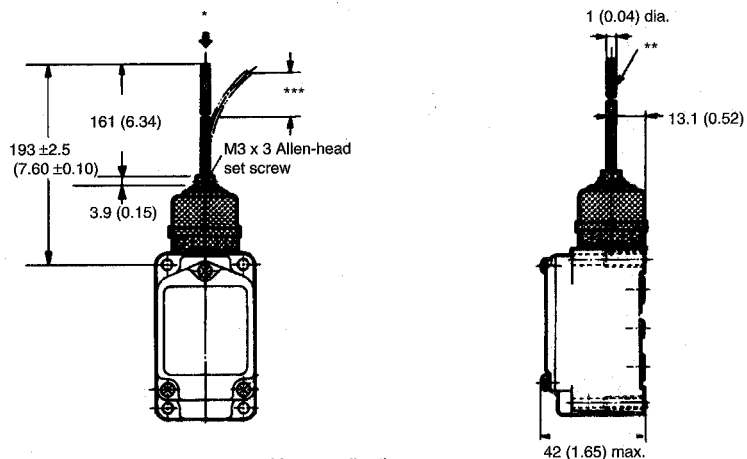
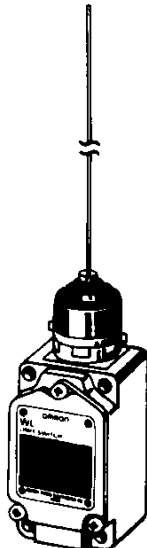
\* The steel wire may be operated from any direction except the axial direction (↓).  
 \*\*Stainless steel coil spring.  
 \*\*\*Optimum operating range of the coil spring is within 1/3 of the entire length from the top end.

WLNJ30-TS Coil Spring Switch



\* The coil spring may be operated from any direction except the axial direction (↓). No clearance occurs between the wires of this spring when warped or bent.  
 \*\*Rubber cap and clamping band.  
 \*\*\*Optimum operating range of the coil spring is within 1/3 of the entire length from the top end.

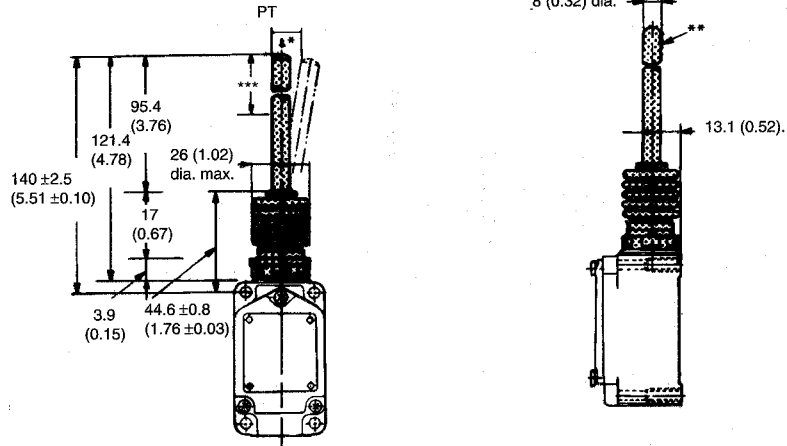
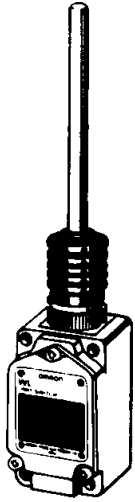
WLNJ-S2TS Steel Wire Switch



\* The steel wire may be operated from any direction except the axial direction (↓).  
 \*\*Stainless steel wire.  
 \*\*\*Optimum operating range of the steel wire is within 1/3 of the entire length from the top end.

Unit: mm (inch)

**WLNJ-2TS Nylon Rod Switch**

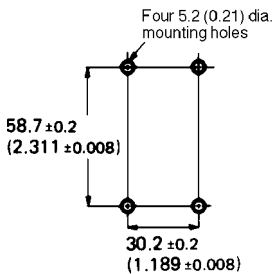


\* The polyamide resin rod may be operated from any direction except the axial direction (↓).  
 No clearance exists between the wires of spring when warped or bent.  
 \*\* Polyamide resin rod.  
 \*\*\* Optimum operating range of the coil spring is within 1/3 of its entire length from the top end.

# Installation

## ■ MOUNTING HOLES

Most WL Switches

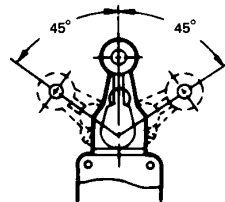


# Customized Models

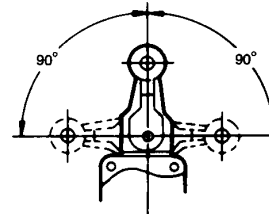
## Overtravel Type

Overtravel type limit switches offer a longer overtravel (OT) to accommodate different cam shapes. The key difference between "standard" and "overtravel" is in the angle of operation: overtravel types can operate at 90° on either side of the center point. Standard types are recommended for operation at 45° on either side of the center point. However, overtravel type switches cannot be expected to provide 90° operation on only one side.

**Standard Limit Switches**



**Overtravel Limit Switches**



■ OPERATING CHARACTERISTICS

**Legend:** OF = Operating Force (max.); RF = Reset Force (min.); OT = Overtravel (min.); PT = Pretravel  
 MD = Movement Differential (max.); OP = Operating Position; TT = Total Travel (min.)

| Part number | Description                    | OF                | RF              | OT  | PT      | MD  | TT  |
|-------------|--------------------------------|-------------------|-----------------|-----|---------|-----|-----|
| WLCA2-2-TS  | Short roller lever             | 900 g (31.74 oz.) | 50 g (1.76 oz.) | 60° | 25° ±5° | 16° | 90° |
| WLCA12-2-TS | Adjustable roller lever        | 900 g (31.74 oz.) | 50 g (1.76 oz.) | 60° | 25° ±5° | 16° | 90° |
| WLCL-2-TS   | Adjustable rod lever, 140 mm L | 260 g (9.17 oz.)  | 10 g (0.35 oz.) | 60° | 25° ±5° | 16° | 90° |
| WLCAL4-2-TS | Adjustable rod lever, 380 mm L | 80 g (2.82 oz.)   | 8 g (0.28 oz.)  | 60° | 25° ±5° | 16° | 90° |
| WLCAL5-2-TS | Spring                         | 80 g (2.82 oz.)   | 8 g (0.28 oz.)  | 60° | 25° ±5° | 16° | 90° |

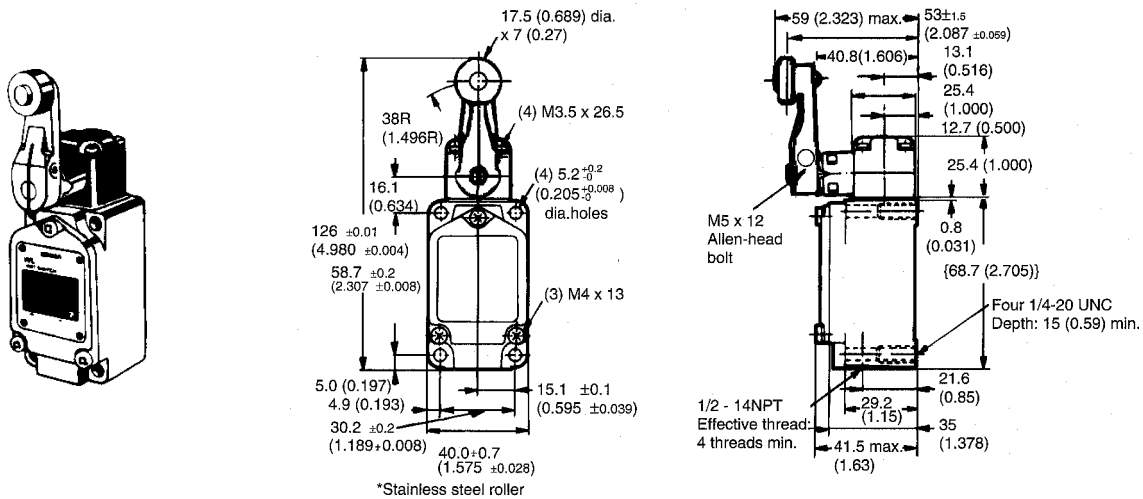
Note:

Levers for WLCAL4-2-TS and WLCAL5-2-TS have a large tare, so positioning the actuator with the bottom up will reduce chattering.  
 Operating characteristics of WLCA12-2-TS are measured at arm length of 38 mm (1.29 in).  
 Operating characteristics of WLCL-2-TS are at arm length of 140 mm (5.51 in)  
 Operating characteristics of WLCAL4-2-TS are measured at rod length of 380 mm (1.25 ft)  
 Operating characteristics of WLCAL5-2-TS are measured at rod length of 412.5 mm (1.35 ft)

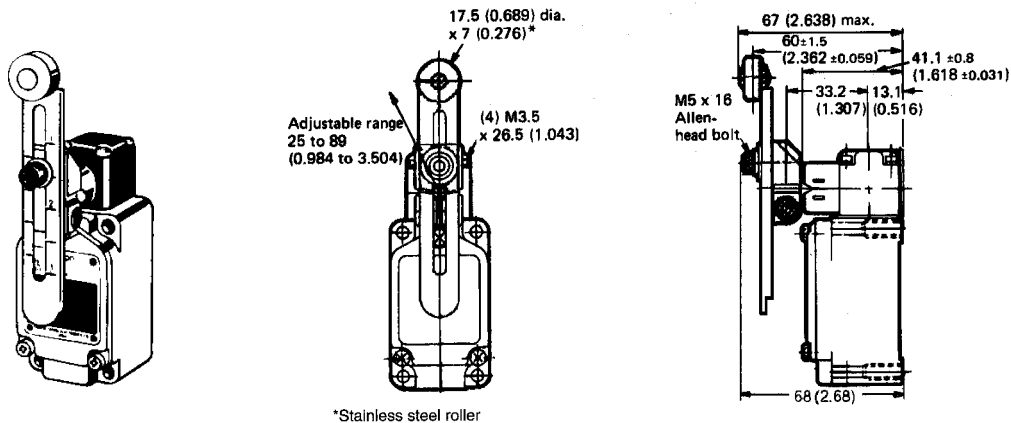
■ DIMENSIONS

Unit: mm (inch)

WLCA2-2TS Short Roller Lever Overtravel Switch

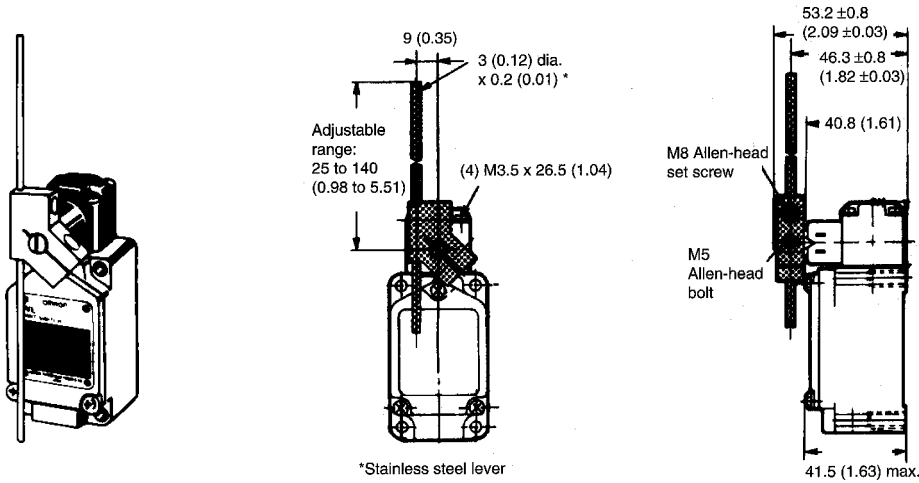


WLCA12-2TS Adjustable Roller Lever Overtravel Switch

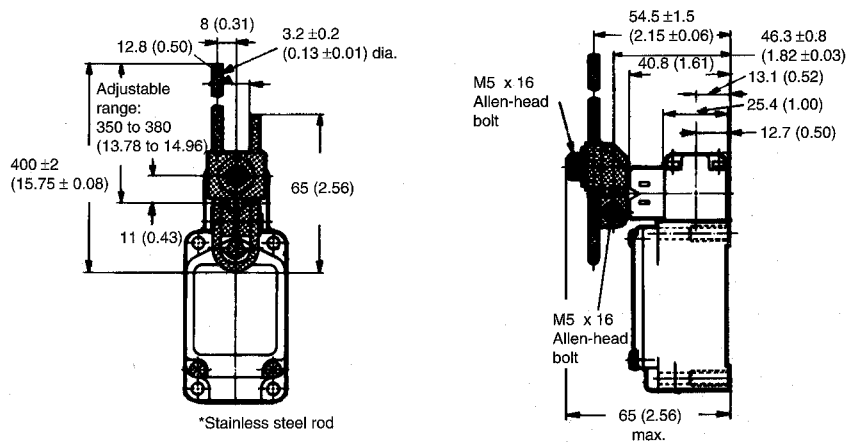


Unit: mm (inch)

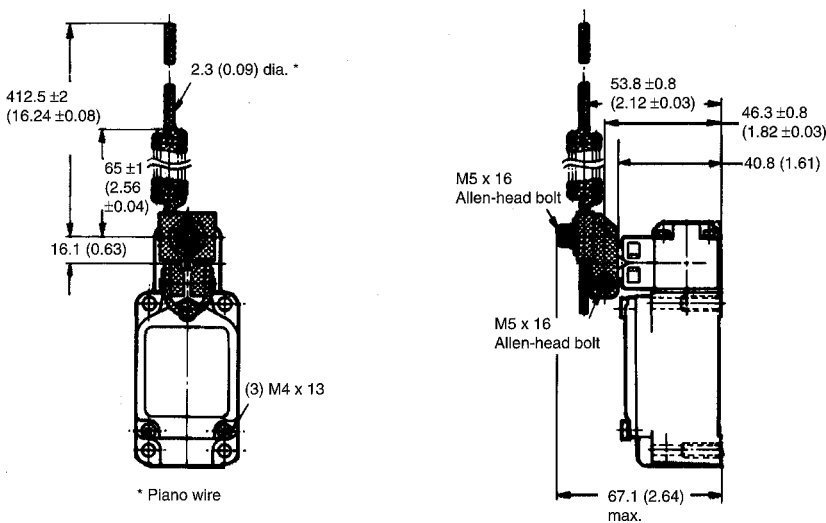
**WLCL-2TS Adjustable Rod Lever Overtravel Switch**



**WLCAL4-2TS Long Adjustable Rod Lever Overtravel Switch**

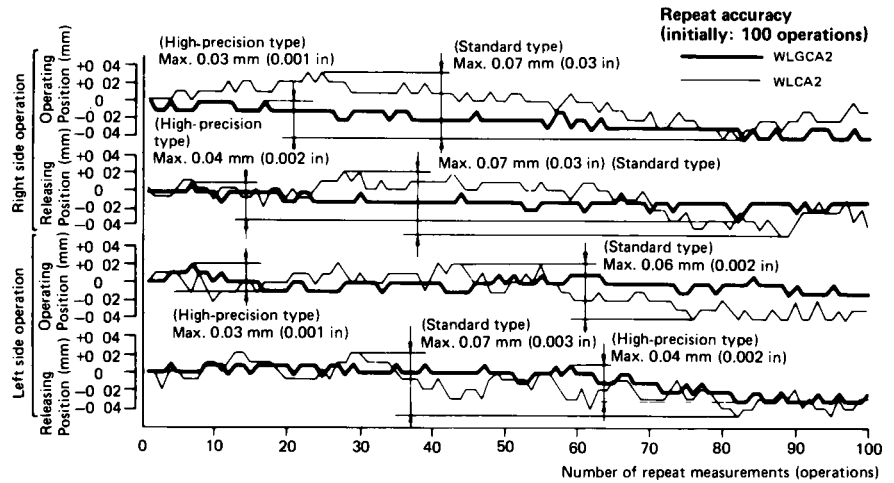


**WLCAL5-2TS Adjustable Spring Lever Overtravel Switch**



# High-Precision Type

The key differences between "high-precision" and "standard" limit switches are in the pretravel (PT) ratings and the repeat accuracy. High-precision switches have a pretravel (PT) of 5° compared to 20° for standard switches. The repeat accuracy is best compared by referring to the graph at right. High-precision switches are ideal for positioning control in machine tools and other applications.



## OPERATING CHARACTERISTICS

**Legend:** OF = Operating Force (max.); RF = Reset Force (min.); OT = Overtravel (min.); PT = Pretravel;  
MD = Movement Differential (max.)

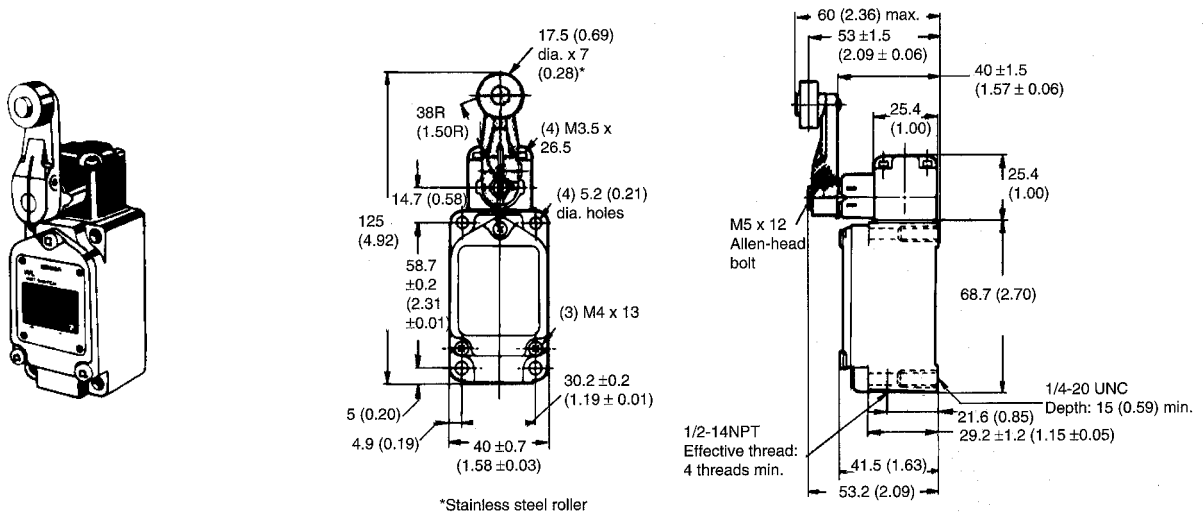
| Part number | Description                    | OF                  | RF               | OT  | PT           | MD |
|-------------|--------------------------------|---------------------|------------------|-----|--------------|----|
| WLGCA2-TS   | Short roller lever             | 1.3 kg (47.97 oz.)  | 150 g (5.29 oz.) | 40° | 5° (+2°/-0°) | 3° |
| WLGCA2-2-TS | Overtravel short roller lever  | 900 g (31.74 oz.)   | 50 g (1.76 oz.)  | 85° | 8° max.      | 3° |
| WLGCA2-7-TS | Medium roller lever            | 1.04 kg (36.68 oz.) | 110 g (3.88 oz.) | 40° | 5°           | 3° |
| WLGCA2-8-TS | Long roller lever              | 820 g (28.92 oz.)   | 90 g (3.17 oz.)  | 40° | 5°           | 3° |
| WLGCA12-TS  | Adjustable roller lever        | 1.36 kg (47.97 oz.) | 150 g (5.29 oz.) | 40° | 5° (+2°/-0°) | 3° |
| WLGCL-TS    | Adjustable rod lever, 140 mm L | 400 g (14.1 oz.)    | 10 g (0.35 oz.)  | 40° | 5° (+2°/-0°) | 3° |

Note:  
Operating characteristics of WLGCA12-TS are measured at arm length of 38 mm (1.29 in).  
Operating characteristics of WLGCL-TS are at arm length of 140 mm (5.51 in)

## DIMENSIONS

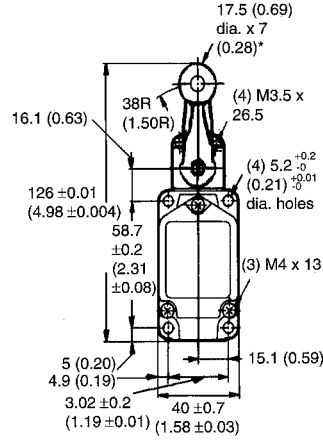
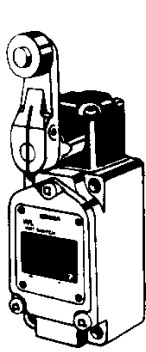
Unit: mm (inch)

### WLGCA2-TS Short Roller Lever High Precision Switch

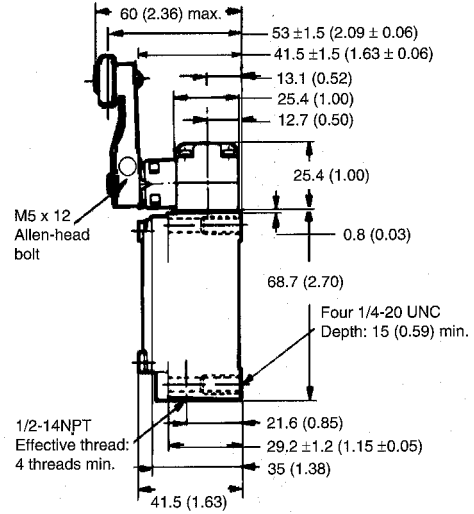


Unit: mm (inch)

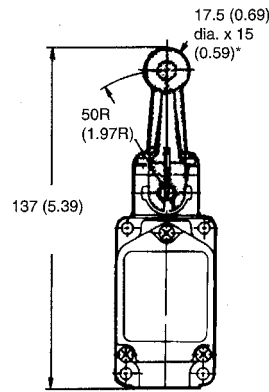
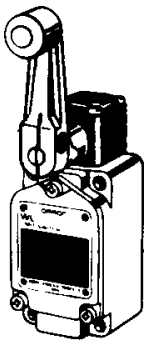
**WLGCA2-2TS Short Overtravel Roller Lever High Precision Switch**



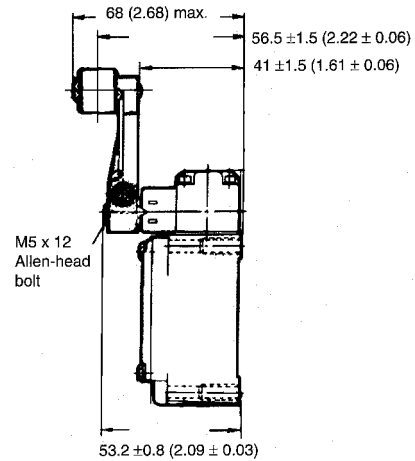
\*Stainless steel roller



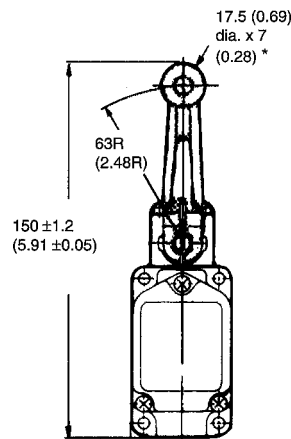
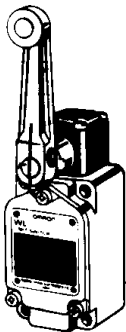
**WLGCA2-7TS Medium Roller Lever High Precision Switch**



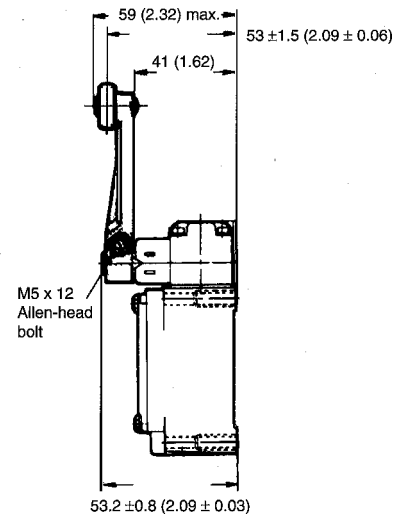
\*Stainless steel roller



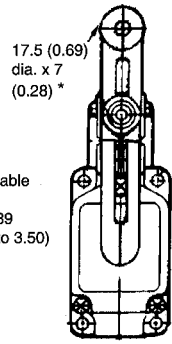
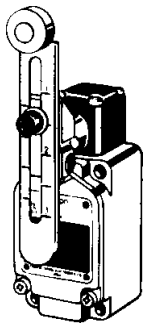
**WLGCA2-8TS Long Roller Lever High Precision Switch**



\*Stainless steel roller

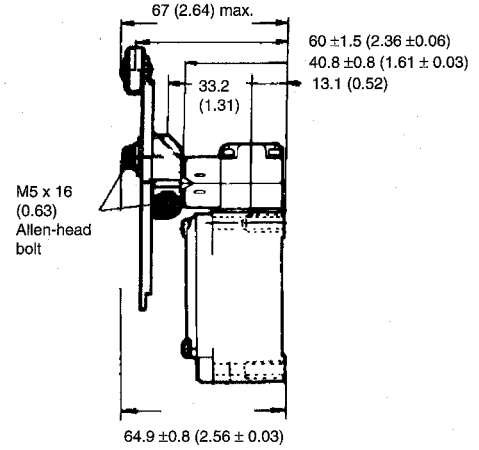


**WLGCA12-TS Adjustable Roller Lever High Precision Switch**

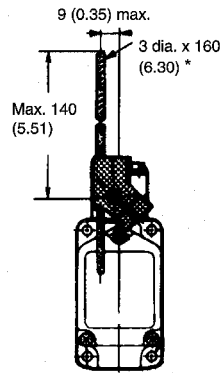
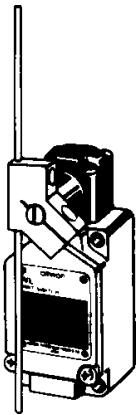


Adjustable  
range:  
25 to 89  
(0.98 to 3.50)

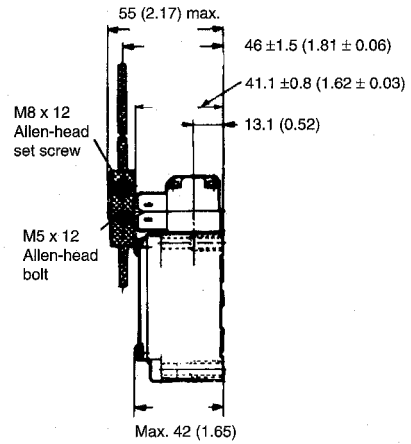
\*Stainless steel roller



**WLGCL-TS Adjustable Rod Lever High Precision Switch**



\*Stainless steel lever



NOTE: DIMENSIONS ARE SHOWN IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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