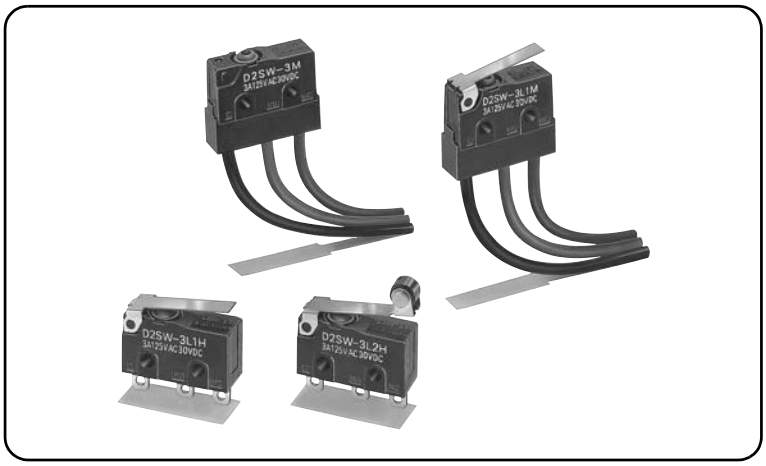
# D2SW

## Sealed Subminiature Basic Switch

## Sealed Subminiature Basic Switch Conforming to IP67 (Excluding the terminals on terminal models)




- **Use of epoxy resin assures stable sealing, making this switch ideal for places subject to water spray or excessive dust.**
- **Ideal for automobiles, automatic vending machines, refrigerators, ice-making equipment, bath equipment, hot-water supply systems, air conditioners, and industrial equipments, which require high environmental resistance.**
- **Models available with UL, CSA, and VDE safety standard compliance.**

**RoHS Compliant**



## Model Number Legend

D2SW-[1][2][3][4][5]

**1. Ratings**
- 3 : 125 VAC 3 A
- 01 : 30 VDC 0.1 A

**2. Actuator**
- None : Pin plunger
- L1 : Hinge lever
- L2 : Hinge roller lever
- L3 : Simulated roller hinge lever

**3. Contact form**
- None : SPDT
- -2 : SPST-NC (Molded lead wire models only)
- -3 : SPST-NO (Molded lead wire models only)

**4. Terminals**
- H, HS : Solder terminals
- D, DS : Self-clinching PCB terminals
- T, TS : Quick-connect terminals (#110)
- M, MS: Molded lead wires

Note: UL/CSA approved versions are available. In this case, HS, DS, TS, MS will be added to the end of the model number. UL/CSA approved models have UL approved wiring (AWG22 UL1015). Consult your OMRON sales representative for details.

**5. Length of the molded lead wire**
- None : 300 mm
- -0 : 1,000 mm

## List of Models

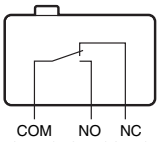
| Actuator | Terminals | Ratings Contact form | 3 A | 0.1 A |
|---|---|---|---|---|
| Pin plunger | Solder terminals | SPDT | D2SW-3H | D2SW-01H |
| | Quick-connect terminals (#110) | SPDT | D2SW-3T | D2SW-01T |
| | PCB terminals | SPDT | D2SW-3D | D2SW-01D |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3M | D2SW-01M |
| | | SPST-NC | D2SW-3-2M | D2SW-01-2M |
| | | SPST-NO | D2SW-3-3M | D2SW-01-3M |
| | Molded lead wire terminals (1,000 mm) | SPDT | D2SW-3M-0 | D2SW-01M-0 |
| Hinge lever | Solder terminals | SPDT | D2SW-3L1H | D2SW-01L1H |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L1T | D2SW-01L1T |
| | PCB terminals | SPDT | D2SW-3L1D | D2SW-01L1D |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L1M | D2SW-01L1M |
| | | SPST-NC | D2SW-3L1-2M | D2SW-01L1-2M |
| | | SPST-NO | D2SW-3L1-3M | D2SW-01L1-3M |
| | Molded lead wire terminals (1,000 mm) | SPDT | D2SW-3L1M-0 | D2SW-01L1M-0 |
| Hinge roller lever | Solder terminals | SPDT | D2SW-3L2H | D2SW-01L2H |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L2T | D2SW-01L2T |
| | PCB terminals | SPDT | D2SW-3L2D | D2SW-01L2D |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L2M | D2SW-01L2M |
| | | SPST-NC | D2SW-3L2-2M | D2SW-01L2-2M |
| | | SPST-NO | D2SW-3L2-3M | D2SW-01L2-3M |
| | Molded lead wire terminals (1,000 mm) | SPDT | D2SW-3L2M-0 | D2SW-01L2M-0 |
| Simulated roller hinge lever | Solder terminals | SPDT | D2SW-3L3H | D2SW-01L3H |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L3T | D2SW-01L3T |
| | PCB terminals | SPDT | D2SW-3L3D | D2SW-01L3D |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L3M | D2SW-01L3M |
| | | SPST-NC | D2SW-3L3-2M | D2SW-01L3-2M |
| | | SPST-NO | D2SW-3L3-3M | D2SW-01L3-3M |
| | Molded lead wire terminals (1,000mm) | SPDT | D2SW-3L3M-0 | D2SW-01L3M-0 |

### ●Safety Standard Approved Models

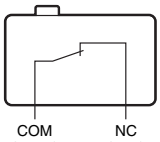
| Actuator | Terminals | Ratings Contact form | 3 A | 0.1 A |
|---|---|---|---|---|
| Pin plunger | Solder terminals | SPDT | D2SW-3HS | D2SW-01HS |
| | Quick-connect terminals (#110) | SPDT | D2SW-3TS | D2SW-01TS |
| | PCB terminals | SPDT | D2SW-3DS | D2SW-01DS |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3MS | D2SW-01MS |
| Hinge lever | Solder terminals | SPDT | D2SW-3L1HS | D2SW-01L1HS |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L1TS | D2SW-01L1TS |
| | PCB terminals | SPDT | D2SW-3L1DS | D2SW-01L1DS |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L1MS | D2SW-01L1MS |
| Hinge roller lever | Solder terminals | SPDT | D2SW-3L2HS | D2SW-01L2HS |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L2TS | D2SW-01L2TS |
| | PCB terminals | SPDT | D2SW-3L2DS | D2SW-01L2DS |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L2MS | D2SW-01L2MS |
| Simulated roller hinge lever | Solder terminals | SPDT | D2SW-3L3HS | D2SW-01L3HS |
| | Quick-connect terminals (#110) | SPDT | D2SW-3L3TS | D2SW-01L3TS |
| | PCB terminals | SPDT | D2SW-3L3DS | D2SW-01L3DS |
| | Molded lead wire terminals (300 mm) | SPDT | D2SW-3L3MS | D2SW-01L3MS |

## Contact Form

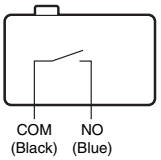
### ●SPDT




### ●SPST-NC (Molded lead wire models only)




### ●SPST-NO (Molded lead wire models only)




The color in parentheses indicates the color of the lead wire.

Separator (Sold Separately), Terminal Connector (Sold Separately) ➡ Refer to "**Basic Switch Common Accessories**"

## Contact Specifications

| Item | Model | D2SW-3 models | D2SW-01 models |
|---|---|---|---|
| Contact | Specification | Rivet | Crossbar |
| | Material | Silver | Gold alloy |
| | Gap (standard value) | 0.5 mm | |
| Inrush current | NC | 20 A max. | 1 A max. |
| | NO | 10 A max. | 1 A max. |
| Minimum applicable load (reference value) * | | 160 mA at 5 VDC | 1 mA at 5 VDC |

* Please refer to "**Using Micro Loads**" in "**Precautions**" for more information on the minimum applicable load.

## Ratings

| Model | Item Rated voltage | Resistive load |
|---|---|---|
| D2SW-3 models | 250 VAC<br>125 VAC | 2 A<br>3 A |
| | 30 VDC | 3 A |
| D2SW-01 models | 125 VAC | 0.1 A |
| | 30 VDC | 0.1 A |

Note. The above rating values apply under the following test conditions.
(1) Ambient temperature: 20±2°C
(2) Ambient humidity: 65±5%
(3) Operating frequency: 30 operations/min

## Approved Safety Standards

### UL (UL1054)/CSA (CSA C22.2 No.55)

The terminal specification for models with UL/CSA safety standard certification is “HS”, “TS”, “DS” or “MS.”

| Rated voltage | Model | D2SW-3 | D2SW-01 |
|---|---|---|---|
| 125 VAC<br>250 VAC | | 3 A<br>2 A | 0.1 A<br>- |
| 30 VDC | | 3 A | 0.1 A |

### VDE (EN61058-1)

The models in the *List of Models* on the previous page are not certified for VDE standards.
Contact your OMRON representative if you require certified models.

| Rated voltage | Model | D2SW-3 | D2SW-01 |
|---|---|---|---|
| 125 VAC<br>250 VAC | | -<br>2 A | 0.1 A<br>- |
| 30 VDC | | 2 A | 0.1 A |

Testing conditions: D2SW-3 3E4 (30,000 operations) T85 (0°C to 85°C)
D2SW-01 5E4 (50,000 operations) T85 (0°C to 85°C)

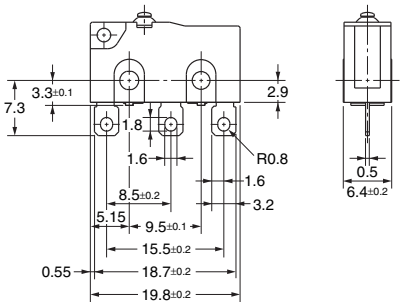
## Characteristics

| Item | Model | D2SW-3 models | D2SW-01 models |
|---|---|---|---|
| Permissible operating speed | | 0.1 mm to 1 m/s (for pin plunger models) | |
| Permissible operating frequency | Mechanical | 300 operations/min | |
| | Electrical | 60 operations/min | |
| Insulation resistance | | 100 mΩ min. (at 500 VDC with insulation tester) | |
| Contact resistance (initial value) | For terminal models | 30 mΩ max. | 50 mΩ max. |
| | For molded lead wire models (300mm) | 50 mΩ max. | 70 mΩ max. |
| | For molded lead wire models (1,000mm) | 200 mΩ max. | 250 mΩ max. |
| Dielectric strength *1 | Between terminals of the same polarity | 1,000 VAC 50/60 Hz for 1 min | 600 VAC 50/60 Hz for 1 min |
| | Between current-carrying metal parts and ground | 1,500 VAC 50/60 Hz for 1 min | |
| | Between terminals and non-current-carrying metal parts | 1,500 VAC 50/60 Hz for 1 min | |
| Vibration resistance *2 | Malfunction | 10 to 55 Hz, 1.5 mm double amplitude | |
| Shock resistance | Destruction | 1,000 m/s² {approx. 100G} max. | |
| | Malfunction *2 | 300 m/s² {approx. 30G} max. | |
| Durability * 3 | Mechanical | 5,000,000 operations min. (60 operations/min) | |
| | Electrical | 200,000 operations min. (30 operations/min) (125 VAC 3 A)<br>100,000 operations min. (30 operations/min) (250 VAC 2 A) | 200,000 operations min. (30 operations/min) |
| Degree of protection | For terminal models | IEC IP67 (excluding the terminals on terminal models) | |
| | For molded lead wire models | IEC IP67 | |
| Degree of protection against electric shock | | Class I | |
| Proof tracking index (PTI) | | 175 | |
| Ambient operating temperature | | –40°C to +85°C (at ambient humidity of 60% max.) (with no icing or condensation) | |
| Ambient operating humidity | | 95% max. (for +5°C to +35°C) | |
| Weight | | Approx. 2 g (for pin plunger models with terminals) | |

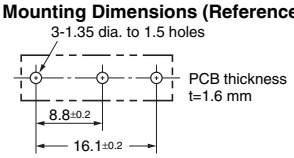
Note. The data given above are initial values.
*1. The values for dielectric strength shown are for models with a Separator (refer to "**Basic Switch Common Accessories**").
*2. For the pin plunger models, the above values apply for use at the free position and total travel position. For the lever models, they apply at the total travel position. Close or open circuit of the contact is 1 ms max.
*3. For testing conditions, consult your OMRON sales representative.

## Terminals and Shapes (Unit: mm)

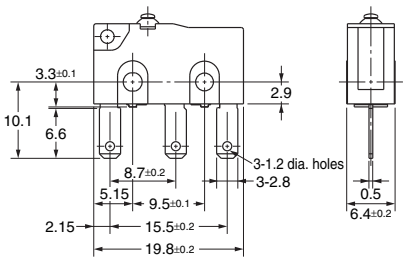
### ●Solder terminals



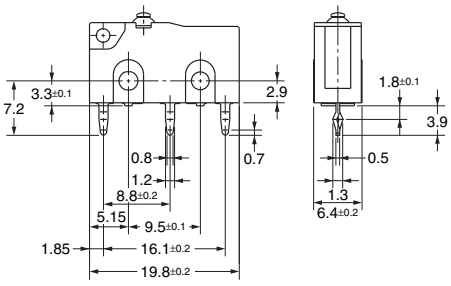

**<PCB Mounting Dimensions (Reference)>**



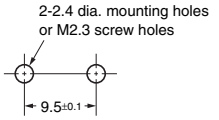

### ●Quick-connect terminals (#110)




### ●PCB terminals



## Mounting Holes (Unit: mm)




## Dimensions (Unit: mm) slash Operating Characteristics

Models with terminals

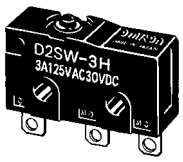
D2SW

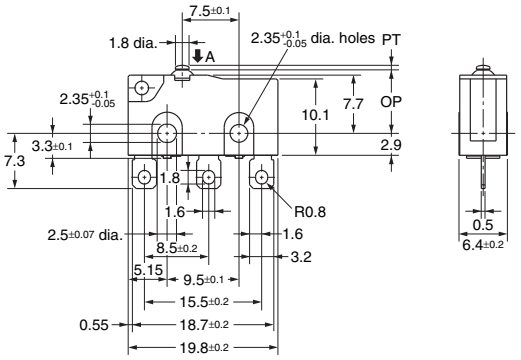
The illustrations and dimensions are for models with solder terminals. Refer to "**Terminals and Shapes**" of the previous page for models with quick-connect terminals (#110) and PCB terminals.
(Note. The dimensions not described are the same as those of models with pin plungers.)

The □ is replaced with the code for the terminal that you need. See the "**List of Models**" for available combinations of models.

### ●Pin Plunger Models

**D2SW-3□**
**D2SW-01□**

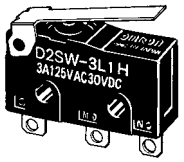


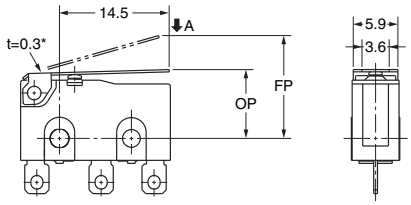




| | | | |
|---|---|---|---|
| Operating Force | OF | Max. | 1.77 N {180 gf} |
| Releasing Force | RF | Min. | 0.29 N {30 gf} |
| Pretravel | PT | Max. | 0.6 mm |
| Overtravel | OT | Min. | 0.5 mm |
| Movement Differential | MD | Max. | 0.1 mm |
| Operating Position | OP | | 8.4±0.3 mm |

### ●Hinge Lever Models

**D2SW-3L1□**
**D2SW-01L1□**



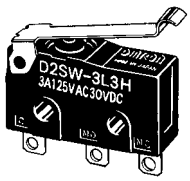



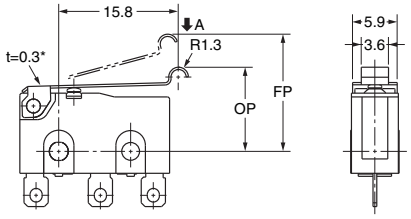

*Stainless-steel lever

| | | | |
|---|---|---|---|
| Operating Force | OF | Max. | 0.59 N {60 gf} |
| Releasing Force | RF | Min. | 0.06 N {6 gf} |
| Overtravel | OT | Min. | 1.0 mm |
| Movement Differential | MD | Max. | 0.8 mm |
| Free Position | FP | Max. | 13.6 mm |
| Operating Position | OP | | 8.8±0.8 mm |

### ●Simulated Roller Hinge Lever Models

**D2SW-3L3□**
**D2SW-01L3□**



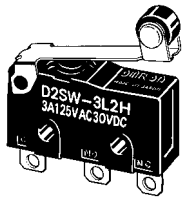



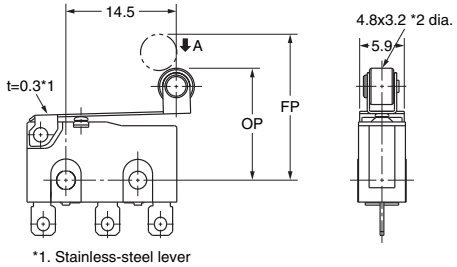

*Stainless-steel lever

| | | | |
|---|---|---|---|
| Operating Force | OF | Max. | 0.59 N {60 gf} |
| Releasing Force | RF | Min. | 0.06 N {6 gf} |
| Overtravel | OT | Min. | 1.0 mm |
| Movement Differential | MD | Max. | 0.8 mm |
| Free Position | FP | Max. | 15.5 mm |
| Operating Position | OP | | 10.7±0.8 mm |

### ●Hinge Roller Lever Models

**D2SW-3L2□**
**D2SW-01L2□**




*1. Stainless-steel lever
*2. Polyacetal resin roller

| | | | |
|---|---|---|---|
| Operating Force | OF | Max. | 0.59 N {60 gf} |
| Releasing Force | RF | Min. | 0.06 N {6 gf} |
| Overtravel | OT | Min. | 1.0 mm |
| Movement Differential | MD | Max. | 0.8 mm |
| Free Position | FP | Max. | 19.3 mm |
| Operating Position | OP | | 14.5±0.8 mm |

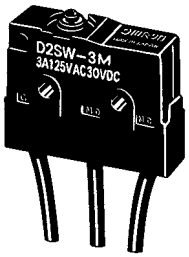
Note 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
Note 2. The operating characteristics are for operation in the A direction ( ⬇ ).

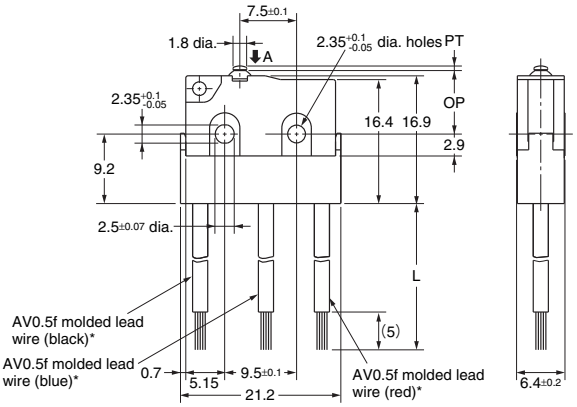
## Models with lead wires

Pin plunger models are shown as representatives. Dimensions and operation characteristics of other actuator models are the same as those of terminal models.
The illustration and drawing shown is the SPDT model. SPST-NC model and SPST-NO model are omitted in the illustration below.

### ●Pin Plunger Models

**D2SW-3M**
**D2SW-3M-0**
**D2SW-01M**
**D2SW-01M-0**




| | | | |
|---|---|---|---|
| Operating Force | OF | Max. | 1.77 N {180 gf} |
| Releasing Force | RF | Min. | 0.29 N {30 gf} |
| Pretravel | PT | Max. | 0.6 mm |
| Overtravel | OT | Min. | 0.5 mm |
| Movement Differential | MD | Max. | 0.1 mm |
| Operating Position | OP | | 8.4±0.3 mm |

Dimensions

| | 300 mm type | 1,000 mm type |
|---|---|---|
| L | 300±10 | 1,000±30 |

* UL/CSA approved models have UL approved wiring (AWG22 UL1015).

Note 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
Note 2. The operating characteristics are for operation in the A direction (⬇).

## Precautions

**★Please refer to "Basic Switches Common Precautions" for correct use.**



### Cautions

**●Degree of Protection**

Do not use the Switch underwater.
The Switch was tested and found to meet the conditions necessary to meet the following standard, however, the test checks for water intrusion after immersion for a specified time period, not for switching operation underwater.

JIS C0920:
Degrees of protection provided by enclosures of electrical apparatus (IP Code)
IEC 60529:
Degrees of protection provided by enclosures (IP Code)
Degree of protection:IP67
(check water intrusion after immersion for 30 min submerged 1 m underwater)

**●Protection Against Chemicals**

Prevent the Switch from coming into contact with oil or chemicals.
Otherwise, damage to or deterioration of Switch materials may result.

**●Soldering**

- Connecting to Solder Terminals
  When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and then conduct soldering.
  Complete the soldering at the iron tip temperature between 350 to 400°C within 5 seconds, and do not apply any external force for 1 minute after soldering. Soldering at a excessively high temperature or soldering for more than 5 seconds may deteriorate the characteristics of the Switch.
- Connecting to Quick-connect Terminals
  Wire the quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Applying excessive external force laterally may cause deformation of terminals and may damage the housings.
- Connecting to PCB terminals
  When using automatic soldering baths, we recommend soldering at 260±5°C within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.
  When soldering terminals manually, complete the soldering at the iron tip temperature between 350 to 400°C within 5 seconds, and do not apply any external force for 1 minute after soldering. When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to flow into the case.

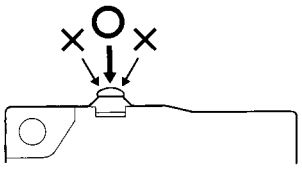
### Correct Use

**●Mounting**

Use M2.3 mounting screw with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}.

**●Operating Body**

With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.

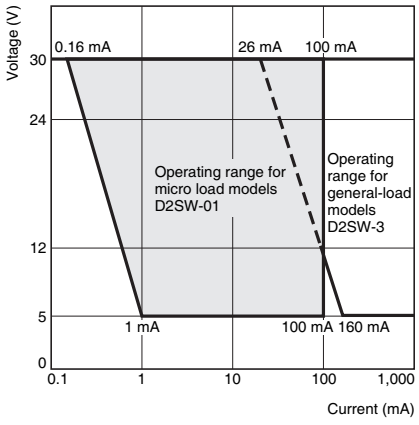


**●Handling**

Handle the Switch carefully so as not to break the sealing rubber.

**●Using Micro Loads**

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in faulty contact. Use models that operate in the following range. However, even when using micro load models within the following operating range, if inrush current occurs when the contact is opened or closed, it may increase the contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The N-level reference value applies for the minimum applicable load. This value indicates the malfunction reference level for the reliability level of 60% ($\lambda_{60}$).
(JIS C5003)
The equation, $\lambda_{60}=0.5\times10^{-6}$/operations indicates that the estimated malfunction rate is less than $\frac{1}{2,000,000}$ operations with a reliability level of 60%.



**OMRON Corporation**
**Electronic and Mechanical Components Company**
**Contact: www.omron.com/ecb**
**Cat. No. C097-E1-05**
0417(0207)(O)