

Optimum Reliability in Motion Control Units

# SANDEX- $\alpha$ *Alpha Series*

## INDEXING DRIVES



9AD/11AD/15AD/23AD

As the world's attention shifts toward global environmental issues, companies are placing strong emphasis on internationally recognized guidelines such as ISO14000. The trend is to raise productivity and efficiency without compromising conservation efforts.

Sankyo looks at this as an opportunity to build environment-friendly products with sound, perfected, and reliable motion characteristics. Introducing the Sandex  $\alpha$  (Alpha) series, a new addition to our Sandex series, which has provided the industry with quality indexing equipment for 25 years.

The Sandex  $\alpha$  series is a low profile indexing drive featuring a cost-effective geared motor. Notice these easy-to-integrate and ease-of-use features:

- Frequency inverter comes standard. No more clutch/brake components or other wearable parts
- Rigid output surface for directly mounting dials.

Ecology and economy -- two words synonymous with today's industrial sector. Two qualities you get when you integrate the Sandex  $\alpha$  series into today's highly productive automation machines.

## Description

The  $\alpha$  series is an all-in-one indexing drive complete with geared motor mounted directly on the input shaft. The indexing motion comes from the same roller gear cam mechanism found in all of our Sandex products. As a result, you get ease of use and maintenance with all the qualities of a Sandex.

The  $\alpha$  series comes with a frequency inverter allowing controlled starts and stops without a clutch/brake mechanism. By eliminating mechanical elements, we succeeded in reducing costs and maintenance.

## Features

- Center distances available in eight standard sizes: 70, 90, 110, 150, 190, 230, 330, and 450mm.
- Wide selection of stops: 2 to 32
- Rigid large flange surface
- Low profile housing
- Standard hollow fixed shaft inside output flange
- Can be mounted with up to 3 pairs of timing cams and sensors
- Optional Torque Limiters for output shaft
- Standard hollow-center shaft-type geared motor with inverter controller.



SANDEX  
Alpha series

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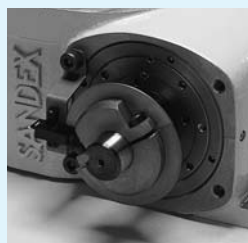
Note : Geared motor shown in optional special paint color.

## ⚠ Units used in this document

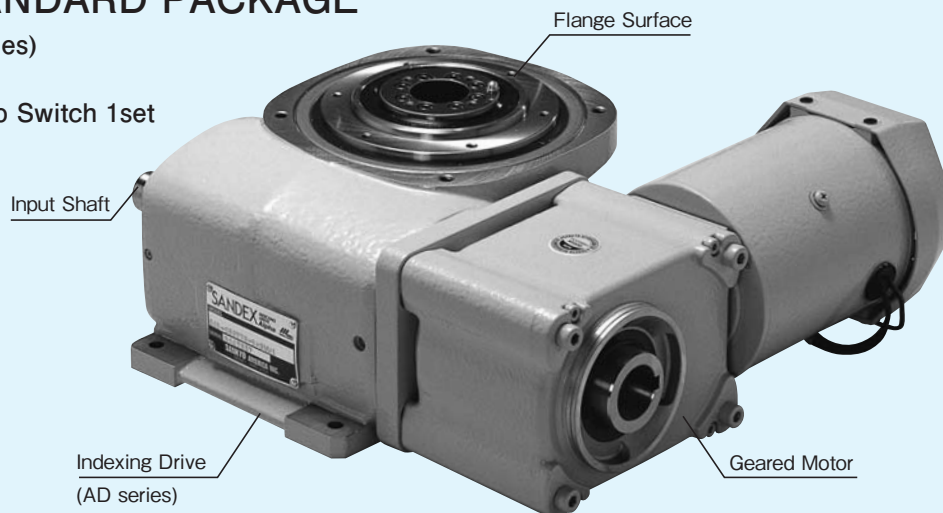
This catalog uses SI units, particularly in the Specifications and Torque Capacity Table. It should be noted that moment of inertia is expressed at a fourth (1/4) of the  $GD^2$  in the metric system.

## α SERIES STANDARD PACKAGE

- Indexing Drive(AD series)
- Geared Motor
- Timing Cam and Photo Switch 1set

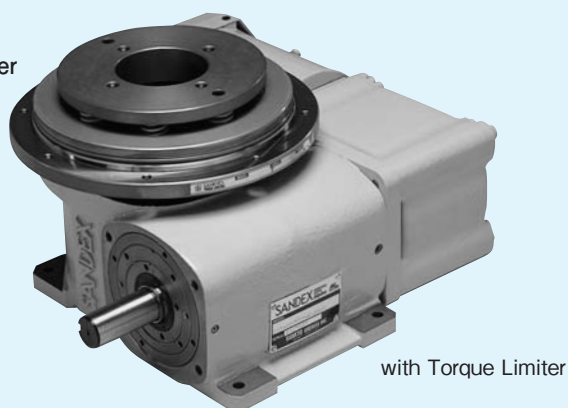


Timing Cam-Photo Switch

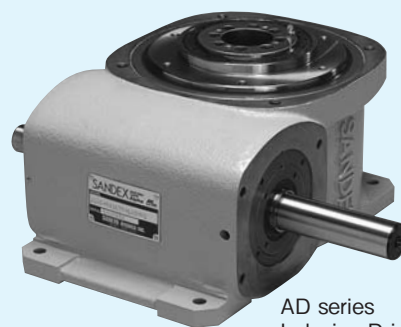


### Option

- Torque Limiter



with Torque Limiter



AD series  
Indexing Drive

## Alpha Series(Standard Type)

### 1DWELL (7AD~45AD)

| S  | θ | 120° | 150° | 180° | 210° | 240° | 270° | 300° | 330° |
|----|---|------|------|------|------|------|------|------|------|
| 2  |   |      |      |      |      |      |      |      | △    |
| 3  |   |      |      |      |      |      |      | △    | △    |
| 4  |   |      |      |      |      | △    | △    |      |      |
| 5  |   |      |      |      | △    | △    | ○    |      |      |
| 6  |   |      | △    | △    | △    | ○    |      |      |      |
| 8  |   | △    | △    | △    | ○    | ○    |      |      |      |
| 10 | △ | △    | △    | ○    | ○    | ○    |      |      |      |
| 12 | △ | △    | ○    | ○    | ○    | ○    |      |      |      |
| 15 | △ | △    | ○    | ○    | ○    | ○    |      |      |      |
| 16 | △ | △    | ○    | ○    | ○    | ○    |      |      |      |

### 2DWELL (7AD~45AD)

| S  | θ | 120° | 150° | 180° | 210° | 240° | 270° | 300° | 330° |
|----|---|------|------|------|------|------|------|------|------|
| 16 |   |      |      | ○    | ○    | ○    |      |      |      |
| 20 |   |      |      | ○    | ○    | ○    | ○    |      |      |
| 24 |   |      |      | ○    | ○    | ○    | ○    | ○    |      |
| 32 |   |      |      | ○    | ○    | ○    | ○    | ○    |      |

S : Number of stops

θ : Index period

△ SMS-3 Curve or SMCV-3 Curve

○ SMS-3 Curve only

△ SMCV-3 Curve only

■ : Can not be produced

□ : Can be produced as special instruction

Note: 2 DWELL drives will two indexes and two stops per one rotation of camshaft.  
The total indexing period per one rotation of the camshaft can be found in the index period column.

| Model                       | 7AD                                     | 9AD     | 11AD     | 15AD              | 19AD    | 23AD             | 33AD                                      | 45AD          |
|-----------------------------|-----------------------------------------|---------|----------|-------------------|---------|------------------|-------------------------------------------|---------------|
| Geared motor power(kW)      | 0.1/0.2                                 | 0.2/0.4 | 0.4/0.75 | 0.75/1.5<br>(2.2) | 1.5/2.2 | 2.2/3.7<br>(5.5) | 5.5/7.5<br>(11)                           | 11/15<br>(18) |
| Timing cam and photo switch | Up to 3 sets on double-end input shafts |         |          |                   |         |                  | Up to 3 sets with optional extended shaft |               |
| Optional torque limiter     | 7TAD                                    | 9TAD    | 11TAD    | 15TAD             | 19TAD   | 23TAD            | —                                         | —             |
| Optional inverter           | Be selected by us as requested          |         |          |                   |         |                  |                                           |               |

The number of motor power in ( ) is a special instruction.

### 7AD



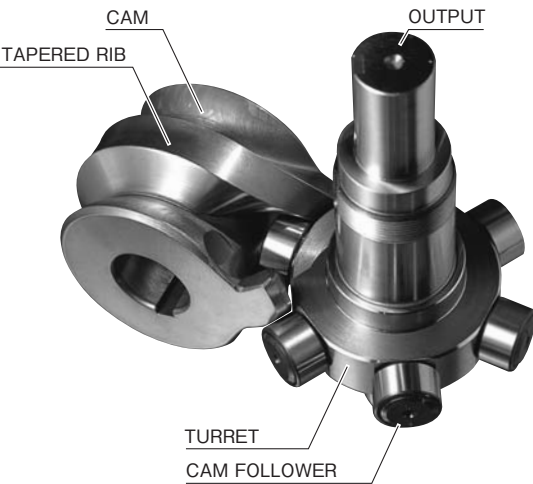
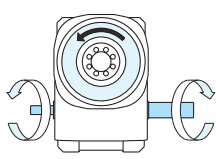
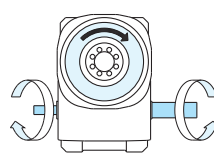
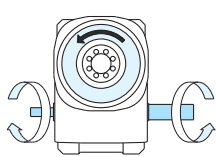
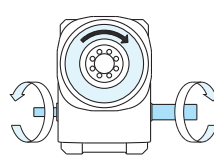
### 33AD



# Model Code

9 AD – 08 18 7R – S R3 VW 1 X

a      b                      c<sub>1</sub>      c<sub>2</sub>      d      e                      f      g      h      i                      j

| a<br>Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | b<br>Model                                                                     | c <sub>1</sub><br>Number of Stops<br>(S)                                 | c <sub>2</sub><br>Index Period<br>(θ)                                            | d<br>Motion Curve                                                                                                                                                                                                                                                                                                                                                                        | e<br>Hand of Cam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="border: 1px solid black; padding: 2px;">9</span><br>90mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <span style="border: 1px solid black; padding: 2px;">AD</span><br>Alpha Series | <span style="border: 1px solid black; padding: 2px;">08</span><br>8 Stop | <span style="border: 1px solid black; padding: 2px;">18</span><br>180°           | <span style="border: 1px solid black; padding: 2px;">7</span><br>SMS-3 Curve                                                                                                                                                                                                                                                                                                             | <span style="border: 1px solid black; padding: 2px;">R</span><br>1 Dwell Right Hand Cam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Shaft-to-shaft distance<br><span style="border: 1px solid black; padding: 2px;">7</span> , <span style="border: 1px solid black; padding: 2px;">9</span> , <span style="border: 1px solid black; padding: 2px;">11</span><br><span style="border: 1px solid black; padding: 2px;">15</span> , <span style="border: 1px solid black; padding: 2px;">19</span> , <span style="border: 1px solid black; padding: 2px;">23</span><br><span style="border: 1px solid black; padding: 2px;">33</span> , <span style="border: 1px solid black; padding: 2px;">45</span><br>are available | <span style="border: 1px solid black; padding: 2px;">AD</span> Alpha Series    | Number of stops of the Indexing Drive.                                   | Cam rotation period (during which the output moves.)<br>(Total angle at 2 dwell) | <div> <div> <span style="border: 1px solid black; padding: 2px;">7</span> SMS-3 Curve (SANKYO Modified Sine)               <span style="border: 1px solid black; padding: 2px;">8</span> SMCV-3 Curve (SANKYO Modified Constant Velocity)               <span style="border: 1px solid black; padding: 2px;">9</span> Custom-made Motion Curve (Special order)             </div> </div> | Indicates rotating direction of input and output shafts and number of dwells. <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div>             1 Dwell<br/>             Right Hand Cam <span style="border: 1px solid black; padding: 2px;">R</span><br/>             Left Hand Cam <span style="border: 1px solid black; padding: 2px;">L</span> </div> <div>             2 Dwell<br/>             Right Hand Cam <span style="border: 1px solid black; padding: 2px;">R2</span><br/>             Left Hand Cam <span style="border: 1px solid black; padding: 2px;">L2</span> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                |                                                                          |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                          | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 20px; height: 10px; background-color: #0070C0; border: 1px solid black;"></div> Input           <div style="width: 20px; height: 10px; background-color: #D9E1F2; border: 1px solid black;"></div> Output         </div> <div style="margin-top: 10px;"> <span style="border: 1px solid black; padding: 2px;">R</span>, <span style="border: 1px solid black; padding: 2px;">R2</span> Right Hand Cam           <div style="display: flex; justify-content: space-around; margin-top: 5px;">   </div> </div> <div style="margin-top: 10px;"> <span style="border: 1px solid black; padding: 2px;">L</span>, <span style="border: 1px solid black; padding: 2px;">L2</span> Left Hand Cam (Special order)           <div style="display: flex; justify-content: space-around; margin-top: 5px;">   </div> </div> |

## Geared Motor

Example

GM 0.75 – 30 A S – 15AD –02

a      b                      c      d      e                      f                      g

| a<br>Model                                                                     | b<br>Motor power                                                                                                                                                                                                                                                                                                                                | c<br>Gear ratio                                                                                                                                                                                                                                           | d<br>Motor voltage                                                                                                                                                          | e<br>Specification                                                                                                                   | f<br>Model size                              | g<br>Revision code                                                                                                                                           |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="border: 1px solid black; padding: 2px;">GM</span><br>Geared motor | Indicates the motor power<br><span style="border: 1px solid black; padding: 2px;">0.2</span> .....0.2kW<br><span style="border: 1px solid black; padding: 2px;">0.75</span> ...0.75kW<br><span style="border: 1px solid black; padding: 2px;">3.7</span> .....3.7kW<br><span style="border: 1px solid black; padding: 2px;">11</span> .....11kW | Indicates the gear ratio<br><span style="border: 1px solid black; padding: 2px;">10</span> .....10<br><span style="border: 1px solid black; padding: 2px;">20</span> .....20<br><span style="border: 1px solid black; padding: 2px;">20.37</span> ..20.37 | Indicates the motor voltage<br><span style="border: 1px solid black; padding: 2px;">A</span> 200/220V<br><span style="border: 1px solid black; padding: 2px;">B</span> 230V | Indicates the specification of geared motor<br><span style="border: 1px solid black; padding: 2px;">S</span> Standard (Sankyo model) | Indicates the size and model of Alpha series | Indicates the revision number of the product code listed in the geared motor properties table.<br>*This cell is left blank when there is no revision number. |

### Model Selection information

Sandex model codes are specified by a combination of numbers and alphabetic characters. An erroneously specified product code will usually result in a product unusable in other applications. Use the same caution when specifying the product code for the geared motor and optional torque limiters. When specifying other requirements such as special gear ratios, motor voltages, copper plated terminal boxes, etc., include the symbol X at the end of the product code and attach a separate user requirements sheet. Queries concerning price, volume, and delivery should be directed to a Sankyo salesman or representative.

| f<br>Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | g<br>Input Shaft Projection                                                                                                                                                                                                              | h<br>Mounting Holes                                                                                                                                                                                       | i<br>Mounting Position                                            | j<br>Special Instruction                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>S</b><br>Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>R3</b><br>Both T and U surface                                                                                                                                                                                                        | <b>VW</b>                                                                                                                                                                                                 | <b>1</b>                                                          | <b>X</b>                                                                                                                                                            |
| <b>S</b> Standard<br><b>L</b> with Torque Limiter on output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Input shaft projection as shown below.<br><b>7AD~23AD</b><br>1, 2, R1 become special order<br><b>33AD &amp; 45AD</b><br>In case of input shaft projecting at the both side, one side will be extended shaft for installation timing cam. | <b>7AD~23AD</b><br>Tapped mounting holes on surface V and through mounting holes on surface W come automatically.<br><b>33AD &amp; 45AD</b><br>Tapped mounting holes on surface R,V,W come automatically. | Mounting position as shown below.<br><b>1, 2, 5</b> are available | Include the symbol <b>X</b> in case of special orders<br><input type="checkbox"/> Standard (No Symbols)<br><input checked="" type="checkbox"/> Special Instructions |
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <b>1 (Special order)</b><br/> </div> <div style="text-align: center;"> <b>2 (Special order)</b><br/> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <b>3</b><br/> </div> <div style="text-align: center;"> <b>4</b><br/> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <b>R1 (Special order)</b><br/> </div> <div style="text-align: center;"> <b>R3</b><br/> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <b>1</b><br/> </div> <div style="text-align: center;"> <b>2</b><br/> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <b>5</b><br/> </div> </div> |                                                                                                                                                                                                                                          |                                                                                                                                                                                                           |                                                                   |                                                                                                                                                                     |

### Timing Cam-Photo Switch

| <b>TC</b>                           | <b>1</b>                                                 | <b>15AD</b>                                                       |
|-------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|
| a                                   | b                                                        | c                                                                 |
| a<br>Model                          | b<br>Number                                              | c<br>Model size                                                   |
| <b>TC</b> Timing cam + Photo switch | <b>1</b> ...1set<br><b>2</b> ...2set<br><b>3</b> ...3set | Indicates the size and model of Alpha series mounting timing cam. |

### Torque Limiter(option)

Model code example

15
TAD
—
20
L

a
b
c
d

| a                                                                                                                                                                   | b                                                                        | c                                                                           | d                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Torque limiter size                                                                                                                                                 | Model                                                                    | Maximum tripping torque(Tmax)                                               | Type of spring                                                                                                                                |
| <p>Indicates the size of the torque limiter</p> <p><b>7</b>, <b>9</b>, <b>11</b>, <b>15</b>, <b>19</b></p> <p><b>23</b></p> <p>Choose same size as Alpha series</p> | <p>Indicates the type of torque limiter</p> <p><b>TAD</b> Alpha-type</p> | <p>Indicates the maximum tripping torque</p> <p><b>20</b> Tmax = 200N·m</p> | <p>Two types of springs are available: <b>L</b>, <b>H</b></p> <p><b>L</b> Light-duty coil springs</p> <p><b>H</b> Heavy-duty coil springs</p> |



Figure 7AD-2

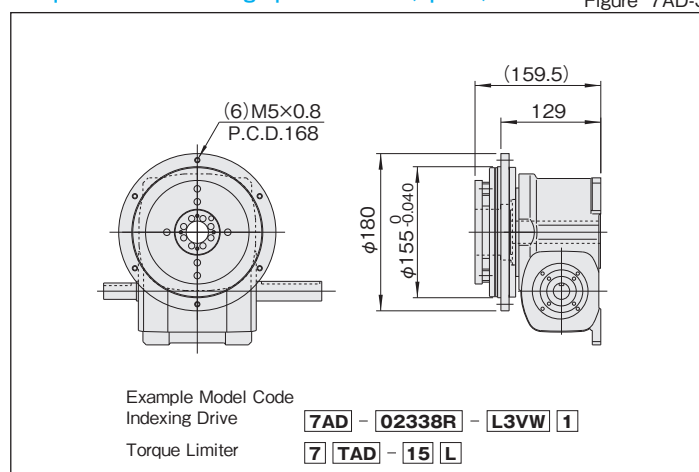
## Specifications of geared motor

Table 7AD-3

| Code              |                   | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|-------------------|-------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V          | 230V              |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM0.1-20AS-7AD-01 | GM0.1-20BS-7AD-01 | 0.1                 | 20                          | 75                                         | 90   | 11                                              | 8.6  | 8.0×10 <sup>-4</sup>                                     | 6.5            |
| GM0.1-25AS-7AD-01 | GM0.1-25BS-7AD-01 |                     | 25                          | 60                                         | 72   | 13                                              | 11   |                                                          |                |
| GM0.1-30AS-7AD-01 | GM0.1-30BS-7AD-01 |                     | 30                          | 50                                         | 60   | 16                                              | 13   |                                                          |                |
| GM0.1-40AS-7AD-01 | GM0.1-40BS-7AD-01 |                     | 40                          | 37.5                                       | 45   | 21                                              | 18   |                                                          |                |
| GM0.1-50AS-7AD-01 | GM0.1-50BS-7AD-01 |                     | 50                          | 30                                         | 36   | 25                                              | 22   |                                                          |                |
| GM0.2-10AS-7AD-01 | GM0.2-10BS-7AD-01 | 0.2                 | 10                          | 150                                        | 180  | 11                                              | 9.2  | 10.0×10 <sup>-4</sup>                                    | 8.5            |
| GM0.2-15AS-7AD-01 | GM0.2-15BS-7AD-01 |                     | 15                          | 100                                        | 120  | 17                                              | 14   |                                                          |                |
| GM0.2-20AS-7AD-01 | GM0.2-20BS-7AD-01 |                     | 20                          | 75                                         | 90   | 23                                              | 19   |                                                          |                |
| GM0.2-25AS-7AD-01 | GM0.2-25BS-7AD-01 |                     | 25                          | 60                                         | 72   | 27                                              | 24   |                                                          |                |
| GM0.2-30AS-7AD-01 | GM0.2-30BS-7AD-01 |                     | 30                          | 50                                         | 60   | 33                                              | 27   |                                                          |                |
| GM0.2-40AS-7AD-01 | GM0.2-40BS-7AD-01 |                     | 40                          | 37.5                                       | 45   | 44                                              | 37   |                                                          |                |
| GM0.2-50AS-7AD-01 | GM0.2-50BS-7AD-01 |                     | 50                          | 30                                         | 36   | 55                                              | 46   |                                                          |                |

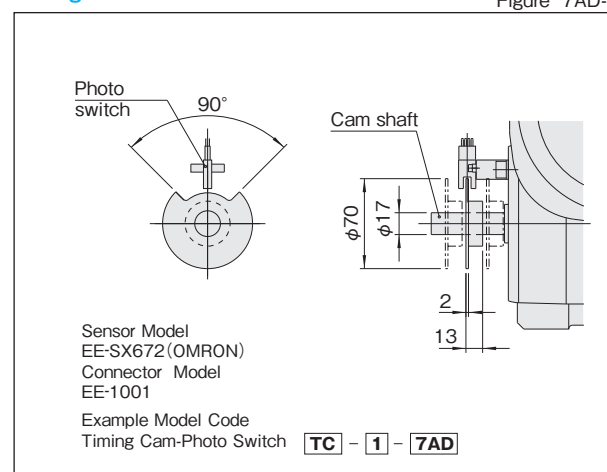
## Torque limiter mounting specifications (option)

Figure 7AD-3



## Timing cam-Photo switch

Figure 7AD-4



## Precautions

- The dimension drawing (Figure 7AD-1, 7AD-2) shows the standard mounting position for geared motor.
- Model 7AD can be equipped with 0.1kW and 0.2kW motor. Exchange is not permitted after purchase because of different hollow size of geared motor.
- Model 7AD can be equipped with torque limiter 7TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The notch angle (90°) of timing cam is not adjustable.

## Standard input shaft (T surface side)

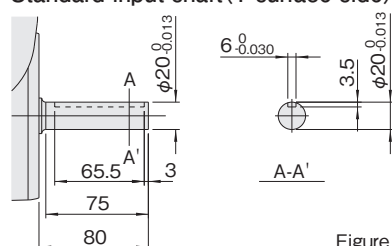


Figure 7AD-5

## Output fixed flange specifications

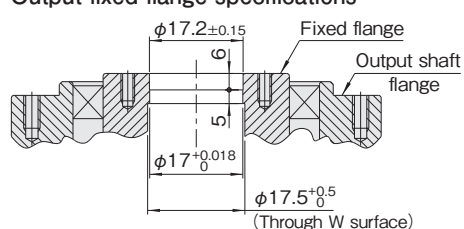


Figure 7AD-6

## Locations of oil plug, etc., and oil capacity

Figure 7AD-7

| Mounting position | 1   | 2   | 5   |
|-------------------|-----|-----|-----|
| Location          |     |     |     |
| Oil capacity (ℓ)  | 0.4 | 0.7 | 0.8 |

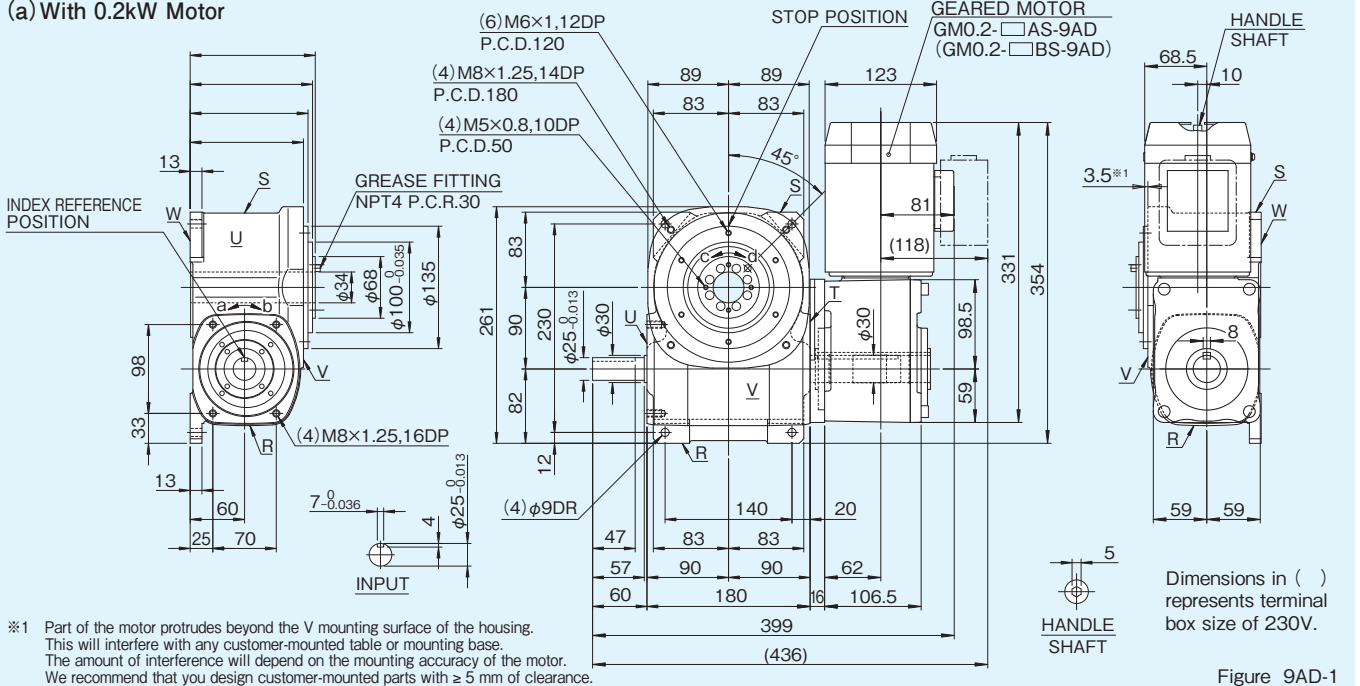
## Precautions

- Each point indicated in the mounting positions shown in Figure 7AD-7 represents (starting at top) the oil plug (PT1/4), oil level (VA-01), and drain (PT1/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 7AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.

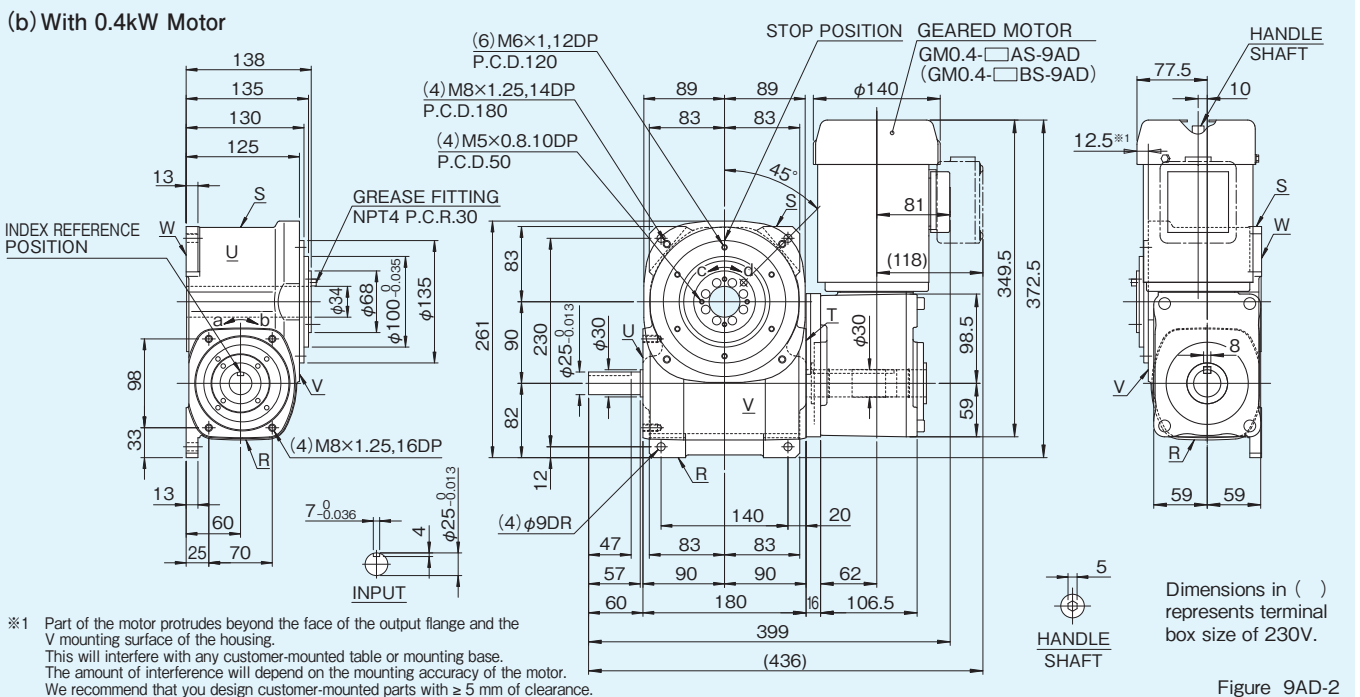
## 9AD Dimensions

[Unit : mm]

(a) With 0.2kW Motor



(b) With 0.4kW Motor



## Specifications

Table 9AD-1

| Item                            | Symbol         | Unit              | Value                          | Item                                      | Symbol         | Unit              | Value                | Item                        | Symbol | Unit         | Value |
|---------------------------------|----------------|-------------------|--------------------------------|-------------------------------------------|----------------|-------------------|----------------------|-----------------------------|--------|--------------|-------|
| Output allowable axial load     | P <sub>1</sub> | N                 | 4900                           | Input allowable axial load                | P <sub>4</sub> | N                 | 2500                 | Indexing accuracy (1 DWELL) |        | sec          | ±30   |
| Output allowable radial load    | P <sub>2</sub> | N                 | 2100                           | Input maximum repetitive bending force    | P <sub>5</sub> | N                 | 2500                 | Indexing accuracy (2 DWELL) |        | sec          | ±60   |
| Output static torque            | T <sub>s</sub> | N·m               | Refer to Torque Capacity Table | Input maximum repetitive allowable torque | P <sub>6</sub> | N·m               | 245                  | Repetitive accuracy         |        | sec          | 30    |
| Output torsional rigidity       | K <sub>1</sub> | N·m/rad           | 2.64×10 <sup>5</sup>           | Input torsional rigidity                  | K <sub>2</sub> | N·m/rad           | 3.36×10 <sup>4</sup> | Product weight (Index body) |        | kg           | 24    |
| Output inertia                  | J <sub>o</sub> | kg·m <sup>2</sup> | 1.11×10 <sup>-2</sup>          | Input inertia                             | J <sub>c</sub> | kg·m <sup>2</sup> | 2.5×10 <sup>-3</sup> | Housing color               |        | Ivory        |       |
| Output allowable bending moment | P <sub>3</sub> | N·m               | 98                             |                                           |                |                   |                      | Geared motor paint color    |        | Light Silver |       |

Note: Input inertia: J is calculated in dwell.

1N·m≒0.102kgf·m



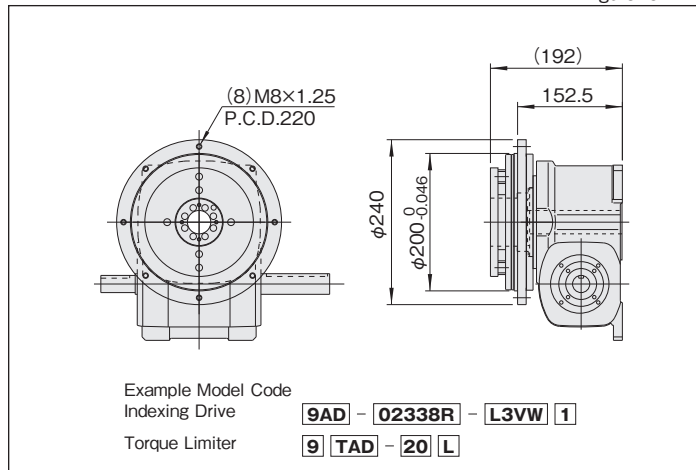
## Specifications of geared motor

Table 9AD-3

| Code           |                | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|----------------|----------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V       | 230V           |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM0.2-20AS-9AD | GM0.2-20BS-9AD | 0.2                 | 20                          | 75                                         | 90   | 22.5                                            | 18.6 | 0.74×10 <sup>-3</sup>                                    | 9.8            |
| GM0.2-25AS-9AD | GM0.2-25BS-9AD |                     | 25                          | 60                                         | 72   | 27.4                                            | 23.5 |                                                          |                |
| GM0.2-30AS-9AD | GM0.2-30BS-9AD |                     | 30                          | 50                                         | 60   | 33.3                                            | 27.4 |                                                          |                |
| GM0.2-40AS-9AD | GM0.2-40BS-9AD |                     | 40                          | 37.5                                       | 45   | 44.1                                            | 37.2 |                                                          |                |
| GM0.2-50AS-9AD | GM0.2-50BS-9AD |                     | 50                          | 30                                         | 36   | 55.9                                            | 46.1 |                                                          |                |
| GM0.4-10AS-9AD | GM0.4-10BS-9AD | 0.4                 | 10                          | 150                                        | 180  | 22.5                                            | 18.6 | 0.90×10 <sup>-3</sup>                                    | 10.5           |
| GM0.4-15AS-9AD | GM0.4-15BS-9AD |                     | 15                          | 100                                        | 120  | 33.3                                            | 27.4 |                                                          |                |
| GM0.4-20AS-9AD | GM0.4-20BS-9AD |                     | 20                          | 75                                         | 90   | 44.1                                            | 37.2 |                                                          |                |
| GM0.4-25AS-9AD | GM0.4-25BS-9AD |                     | 25                          | 60                                         | 72   | 55.9                                            | 46.1 |                                                          |                |
| GM0.4-30AS-9AD | GM0.4-30BS-9AD |                     | 30                          | 50                                         | 60   | 66.6                                            | 55.9 |                                                          |                |
| GM0.4-40AS-9AD | GM0.4-40BS-9AD |                     | 40                          | 37.5                                       | 45   | 84.3                                            | 70.6 |                                                          |                |
| GM0.4-50AS-9AD | GM0.4-50BS-9AD |                     | 50                          | 30                                         | 36   | 106.0                                           | 88.2 |                                                          |                |

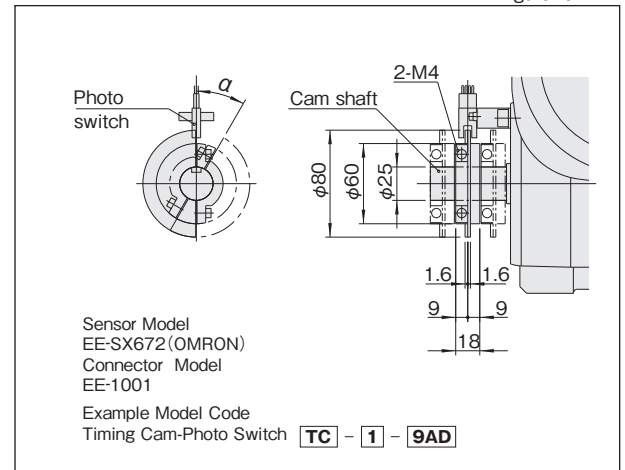
## Torque limiter mounting specifications (option)

Figure 9AD-3



## Timing cam-Photo switch

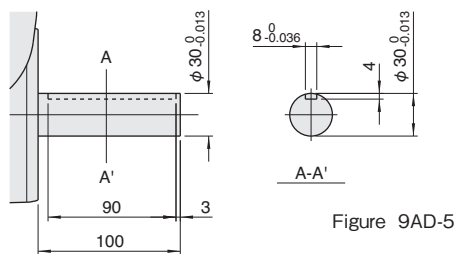
Figure 9AD-4



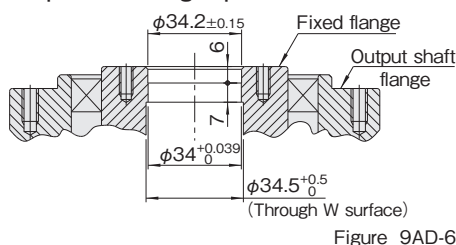
## Precautions

- The dimension drawing (Figure 9AD-1, 9AD-2) shows the standard mounting position for the geared motor.
- Model 9AD can be equipped with 0.2kW and 0.4kW motor. Note, when using the 0.4kW motor, the motor will protrude beyond the indexer flange.
- Model 9AD can be equipped with torque limiter 9TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period (α) below 180°.

## Standard input shaft (T surface side)



## Output fixed flange specifications



## Locations of oil plug, etc., and oil capacity

Figure 9AD-7

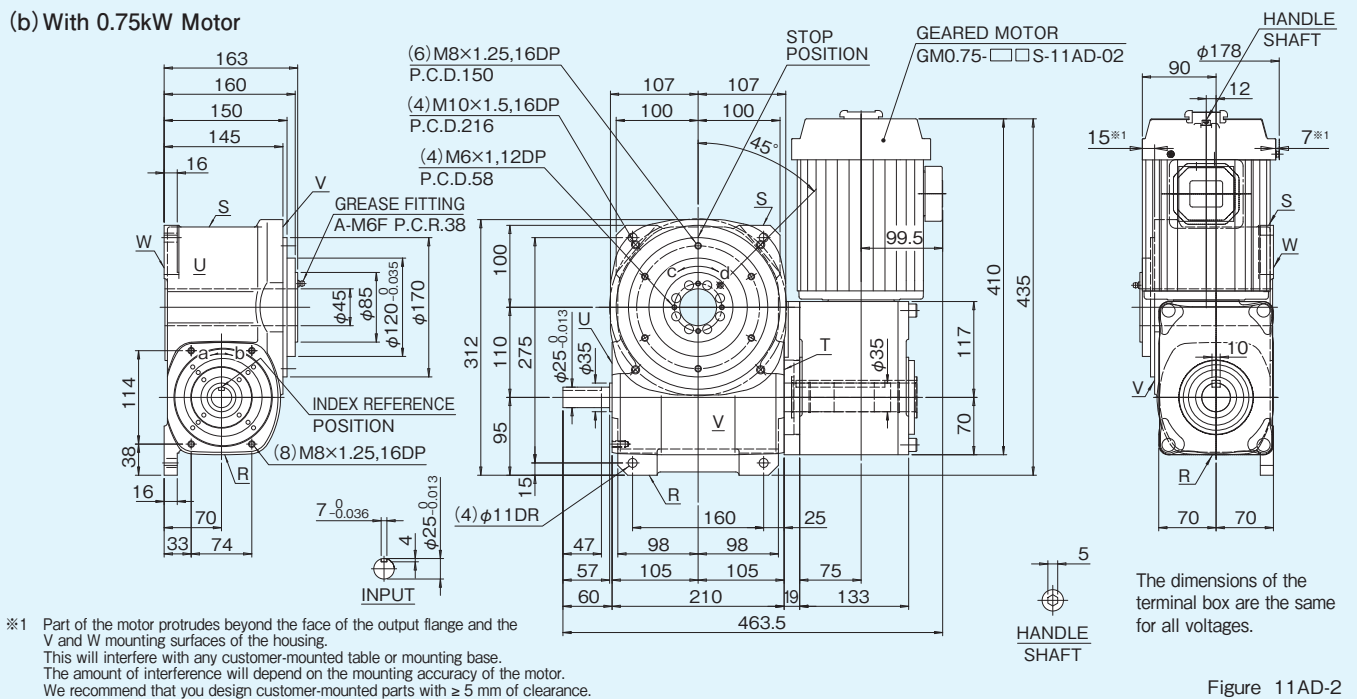
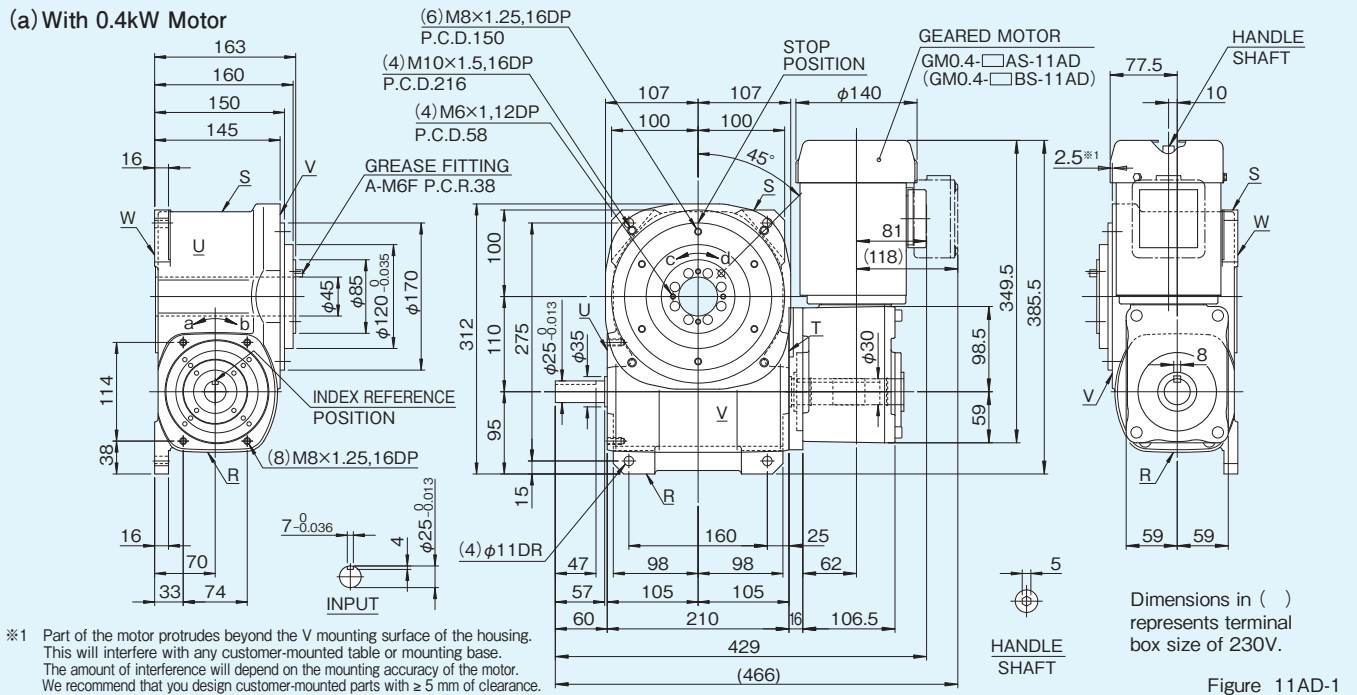
| Mounting position | 1   | 2   | 5   |
|-------------------|-----|-----|-----|
| Location          |     |     |     |
| Oil capacity (ℓ)  | 0.5 | 0.9 | 1.0 |

## Precautions

- Each point indicated in the mounting positions shown in Figure 9AD-7 represents (starting at top) the oil plug (PT3/8), oil level (VA-01), and drain (PT3/8).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 9AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.

## 11AD Dimensions

(Unit : mm)



## Specifications

Table 11AD-1

| Item                            | Symbol | Unit              | Value                          | Item                                       | Symbol | Unit              | Value                | Item                        | Symbol       | Unit | Value    |
|---------------------------------|--------|-------------------|--------------------------------|--------------------------------------------|--------|-------------------|----------------------|-----------------------------|--------------|------|----------|
| Output allowable axial load     | $P_1$  | N                 | 6800                           | Input allowable axial load                 | $P_4$  | N                 | 3000                 | Indexing accuracy (1 DWELL) |              | sec  | $\pm 30$ |
| Output allowable radial load    | $P_2$  | N                 | 3400                           | Input maximum repetitious bending force    | $P_5$  | N                 | 3500                 | Indexing accuracy (2 DWELL) |              | sec  | $\pm 60$ |
| Output static torque            | $T_s$  | N·m               | Refer to Torque Capacity Table | Input maximum repetitious allowable torque | $P_6$  | N·m               | 294                  | Repetitive accuracy         |              | sec  | 30       |
| Output torsional rigidity       | $K_1$  | N·m/rad           | $4.43 \times 10^5$             | Input torsional rigidity                   | $K_2$  | N·m/rad           | $3.98 \times 10^4$   | Product weight (Index body) |              | kg   | 42       |
| Output inertia                  | $J_o$  | kg·m <sup>2</sup> | $3.47 \times 10^{-2}$          | Input inertia                              | $J_c$  | kg·m <sup>2</sup> | $6.0 \times 10^{-3}$ | Housing color               | Ivory        |      |          |
| Output allowable bending moment | $P_3$  | N·m               | 147                            |                                            |        |                   |                      | Geared motor paint color    | Light Silver |      |          |

Note: Input inertia: J is calculated in dwell.

1N·m $\approx$ 0.102kgf·m

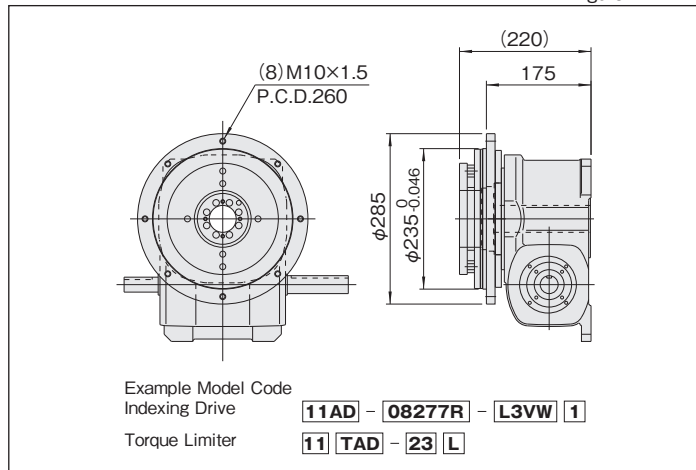
## Specifications of geared motor

Table 11AD-3

| Code                |                     | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|---------------------|---------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V            | 230V                |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM0.4-20AS-11AD     | GM0.4-20BS-11AD     | 0.4                 | 20                          | 75                                         | 90   | 44.1                                            | 37.2 | 0.90×10 <sup>-3</sup>                                    | 10.5           |
| GM0.4-25AS-11AD     | GM0.4-25BS-11AD     |                     | 25                          | 60                                         | 72   | 55.9                                            | 46.1 |                                                          |                |
| GM0.4-30AS-11AD     | GM0.4-30BS-11AD     |                     | 30                          | 50                                         | 60   | 66.6                                            | 55.9 |                                                          |                |
| GM0.4-40AS-11AD     | GM0.4-40BS-11AD     |                     | 40                          | 37.5                                       | 45   | 84.3                                            | 70.6 |                                                          |                |
| GM0.4-50AS-11AD     | GM0.4-50BS-11AD     |                     | 50                          | 30                                         | 36   | 106.0                                           | 88.2 |                                                          |                |
| GM0.75-10AS-11AD-02 | GM0.75-10BS-11AD-02 | 0.75                | 10                          | 150                                        | 180  | 42.1                                            | 34.3 | 1.83×10 <sup>-3</sup>                                    | 24             |
| GM0.75-15AS-11AD-02 | GM0.75-15BS-11AD-02 |                     | 15                          | 100                                        | 120  | 62.7                                            | 51.9 |                                                          |                |
| GM0.75-20AS-11AD-02 | GM0.75-20BS-11AD-02 |                     | 20                          | 75                                         | 90   | 83.3                                            | 69.6 |                                                          |                |
| GM0.75-25AS-11AD-02 | GM0.75-25BS-11AD-02 |                     | 25                          | 60                                         | 72   | 104                                             | 87.2 |                                                          |                |
| GM0.75-30AS-11AD-02 | GM0.75-30BS-11AD-02 |                     | 30                          | 50                                         | 60   | 125                                             | 104  |                                                          |                |
| GM0.75-40AS-11AD-02 | GM0.75-40BS-11AD-02 |                     | 40                          | 37.5                                       | 45   | 159                                             | 132  |                                                          |                |
| GM0.75-50AS-11AD-02 | GM0.75-50BS-11AD-02 |                     | 50                          | 30                                         | 36   | 198                                             | 165  |                                                          |                |

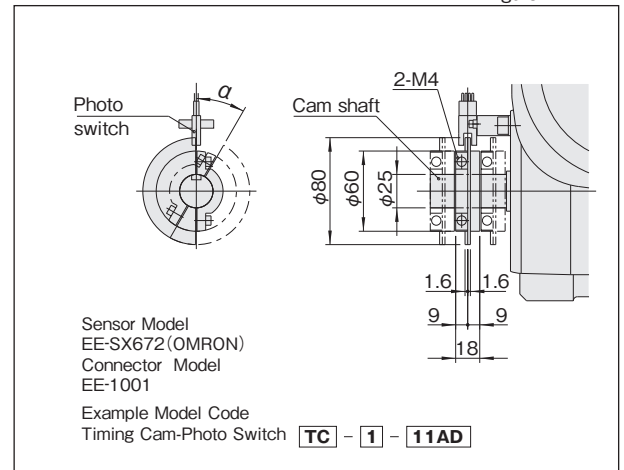
## Torque limiter mounting specifications (option)

Figure 11AD-3



## Timing cam-Photo switch

Figure 11AD-4



## Precautions

- The dimension drawing (Figure 11AD-1, 11AD-2) shows the standard mounting position for geared motor.
- Model 11AD can be equipped with 0.4kW and 0.75kW motor. Exchange is not permitted after purchase because of different hollow size of geared motor.
- When using the 0.75kW motor, the motor will protrude beyond the indexer flange, and geared motor's bottom surface will also protrude beyond Index W surface.
- Model 11AD can be equipped with torque limiter 11TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period[α] below 180°.

## Standard input shaft (T surface side)

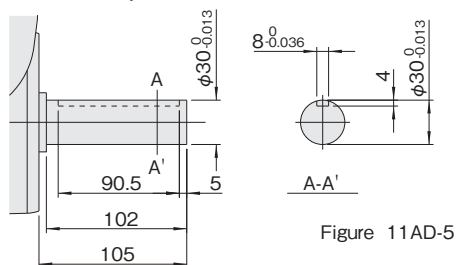


Figure 11AD-5

## Output fixed flange specifications

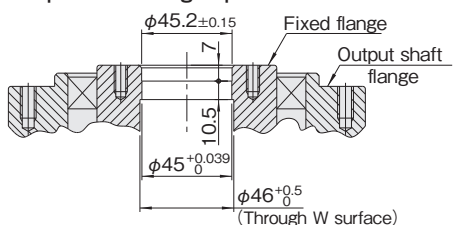


Figure 11AD-6

## Locations of oil plug, etc., and oil capacity

Figure 11AD-7

| Mounting position | 1   | 2   | 5   |
|-------------------|-----|-----|-----|
| Location          |     |     |     |
| Oil capacity(ℓ)   | 0.8 | 1.4 | 1.6 |

## Precautions

- Each point indicated in the mounting positions shown in Figure 11AD-7 represents (starting at top) the oil plug (PT1/2), oil level (VA), and drain (PT1/2).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 11AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.



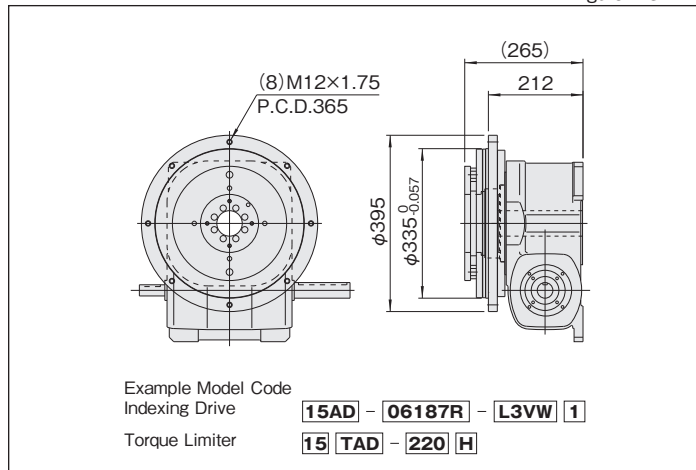
## Specifications of geared motor

Table 15AD-3

| Code                |                     | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|---------------------|---------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V            | 230V                |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM0.75-20AS-15AD-02 | GM0.75-20BS-15AD-02 | 0.75                | 20                          | 75                                         | 90   | 83.3                                            | 69.6 | 1.83×10 <sup>-3</sup>                                    | 24             |
| GM0.75-25AS-15AD-02 | GM0.75-25BS-15AD-02 |                     | 25                          | 60                                         | 72   | 104                                             | 87.2 |                                                          |                |
| GM0.75-30AS-15AD-02 | GM0.75-30BS-15AD-02 |                     | 30                          | 50                                         | 60   | 125                                             | 104  |                                                          |                |
| GM0.75-40AS-15AD-02 | GM0.75-40BS-15AD-02 |                     | 40                          | 37.5                                       | 45   | 159                                             | 132  |                                                          |                |
| GM0.75-50AS-15AD-02 | GM0.75-50BS-15AD-02 |                     | 50                          | 30                                         | 36   | 198                                             | 165  |                                                          |                |
| GM1.5-10AS-15AD-02  | GM1.5-10BS-15AD-02  | 1.5                 | 10                          | 150                                        | 180  | 83.3                                            | 69.6 | 6.2×10 <sup>-3</sup>                                     | 41             |
| GM1.5-15AS-15AD-02  | GM1.5-15BS-15AD-02  |                     | 15                          | 100                                        | 120  | 124                                             | 104  |                                                          |                |
| GM1.5-20AS-15AD-02  | GM1.5-20BS-15AD-02  |                     | 20                          | 75                                         | 90   | 166                                             | 138  |                                                          |                |
| GM1.5-25AS-15AD-02  | GM1.5-25BS-15AD-02  |                     | 25                          | 60                                         | 72   | 208                                             | 173  |                                                          |                |
| GM1.5-30AS-15AD-02  | GM1.5-30BS-15AD-02  |                     | 30                          | 50                                         | 60   | 249                                             | 208  |                                                          |                |
| GM1.5-40AS-15AD-02  | GM1.5-40BS-15AD-02  |                     | 40                          | 37.5                                       | 45   | 317                                             | 264  |                                                          |                |
| GM1.5-50AS-15AD-02  | GM1.5-50BS-15AD-02  |                     | 50                          | 30                                         | 36   | 396                                             | 330  |                                                          |                |

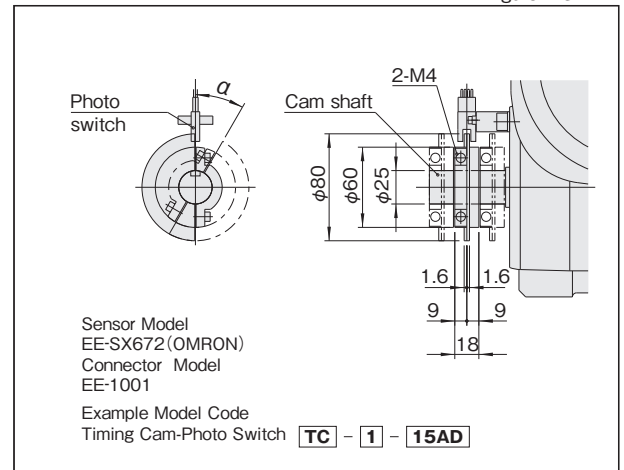
## Torque limiter mounting specifications (option)

Figure 15AD-3



## Timing cam-Photo switch

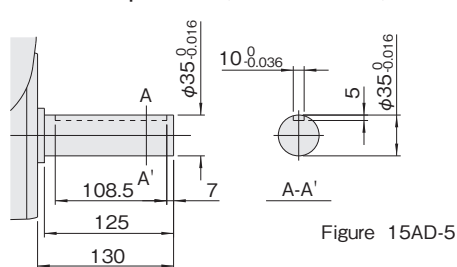
Figure 15AD-4



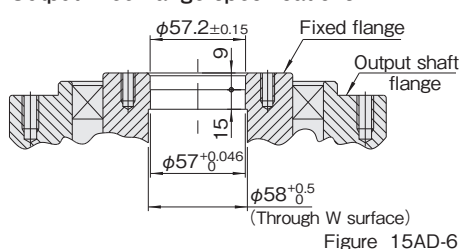
## Precautions

- The dimension drawing (Figure 15AD-1, 15AD-2) shows the standard mounting position for geared motor.
- Model 15AD can be equipped with 0.75kW and 1.5kW motor. Exchange is not permitted after purchase because of different hollow size of geared motor. 2.2kW motor is also available as special instructions.
- When using the 1.5kW motor, the motor will protrude beyond the indexer flange, and geared motor's bottom surface will also protrude beyond Index W surface.
- Model 15AD can be equipped with torque limiter 15TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period (α) below 180°.

## Standard input shaft (T surface side)



## Output fixed flange specifications



## Locations of oil plug, etc., and oil capacity

Figure 15AD-7

| Mounting position | 1   | 2 | 5   |
|-------------------|-----|---|-----|
| Location          |     |   |     |
| Oil capacity (ℓ)  | 2.2 | 3 | 3.3 |

## Precautions

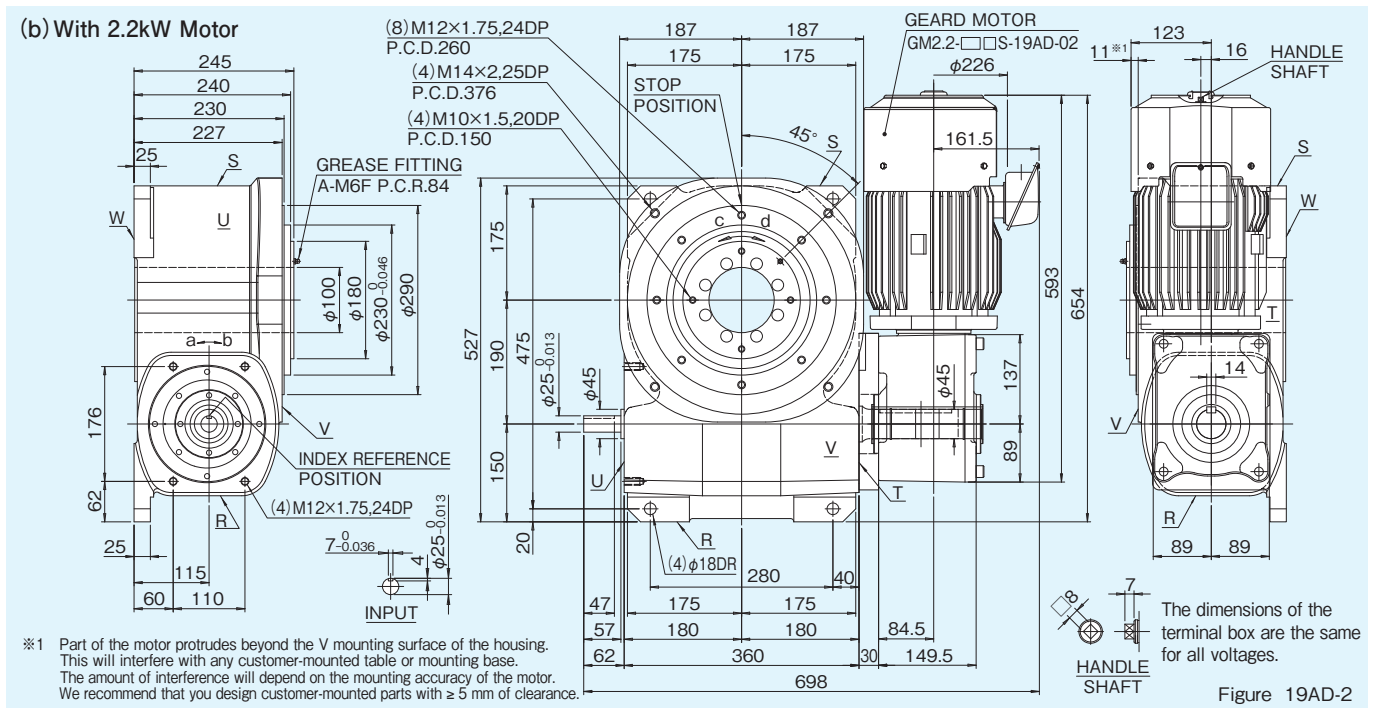
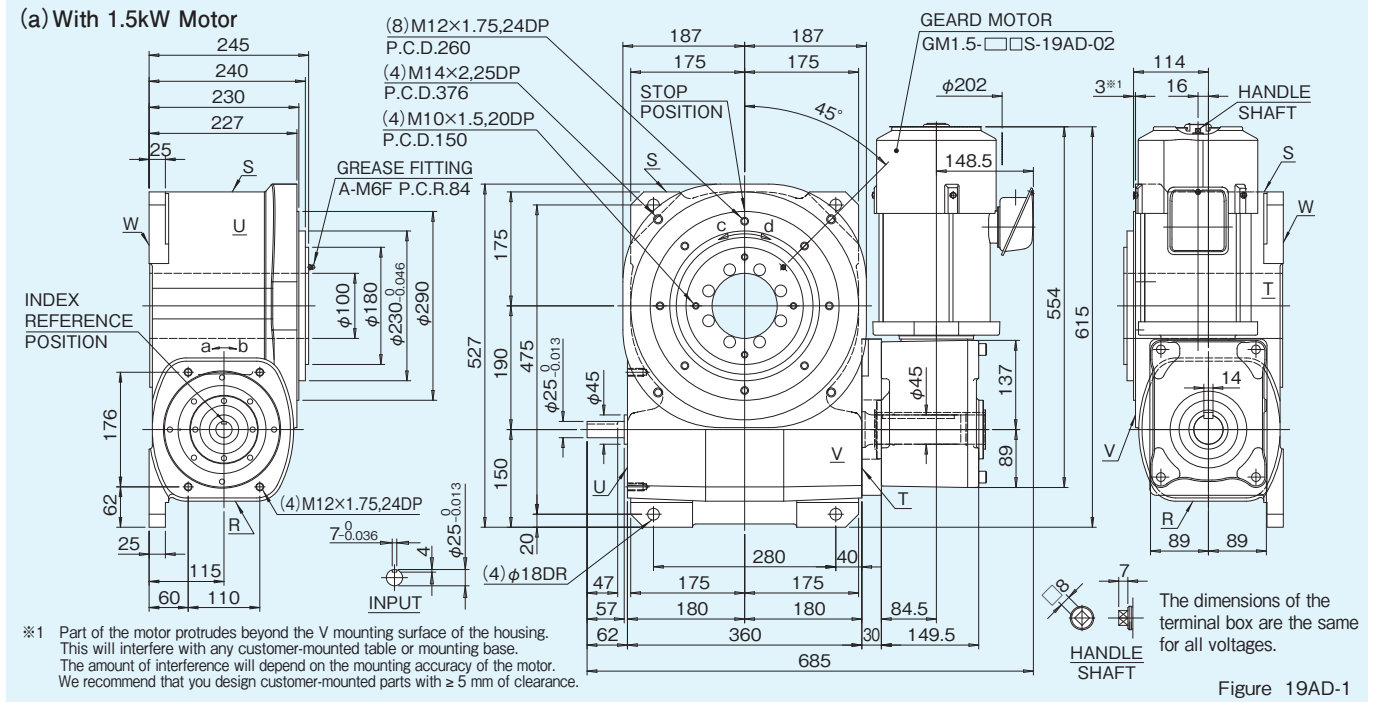
- Each point indicated in the mounting positions shown in Figure 15AD-7 represents (starting at top) the oil plug (PT1/2), oil level (VA), and drain (PT1/2).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 15AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.



# 19AD

## 19AD Dimensions

[Unit : mm]



## Specifications

Table 19AD-1

| Item                            | Symbol | Unit              | Value                          | Item                                      | Symbol | Unit              | Value             | Item                        | Symbol       | Unit | Value |
|---------------------------------|--------|-------------------|--------------------------------|-------------------------------------------|--------|-------------------|-------------------|-----------------------------|--------------|------|-------|
| Output allowable axial load     | $P_1$  | N                 | 18000                          | Input allowable axial load                | $P_4$  | N                 | 5000              | Indexing accuracy (1 DWELL) |              | sec  | ±30   |
| Output allowable radial load    | $P_2$  | N                 | 9000                           | Input maximum repetitive bending force    | $P_5$  | N                 | 5000              | Indexing accuracy (2 DWELL) |              | sec  | ±60   |
| Output static torque            | $T_s$  | N·m               | Refer to Torque Capacity Table | Input maximum repetitive allowable torque | $P_6$  | N·m               | 600               | Repetitive accuracy         |              | sec  | 30    |
| Output torsional rigidity       | $K_1$  | N·m/rad           | $3.5 \times 10^6$              | Input torsional rigidity                  | $K_2$  | N·m/rad           | $8.4 \times 10^4$ | Product weight (Index body) |              | kg   | 180   |
| Output inertia                  | $J_o$  | kg·m <sup>2</sup> | 0.549                          | Input inertia                             | $J_c$  | kg·m <sup>2</sup> | 0.105             | Housing color               | Ivory        |      |       |
| Output allowable bending moment | $P_3$  | N·m               | 600                            |                                           |        |                   |                   | Geared motor paint color    | Light Silver |      |       |

Note: Input inertia: J is calculated in dwell.

1N·m≒0.102kgf·m

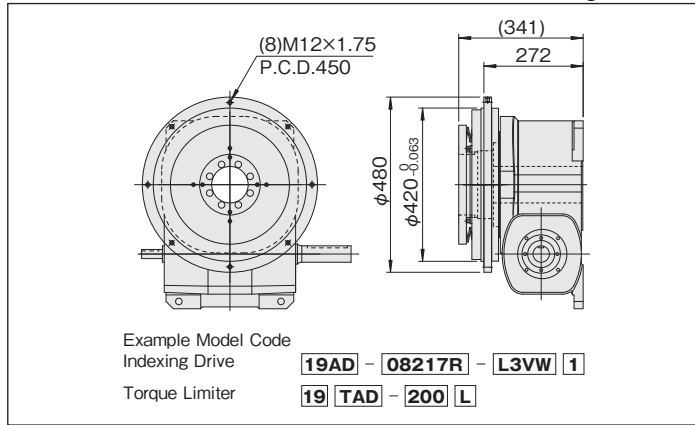
## Specifications of geared motor

Table 19AD-3

| Code               |                    | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|--------------------|--------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V           | 230V               |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM1.5-20AS-19AD-02 | GM1.5-20BS-19AD-02 | 1.5                 | 20                          | 75                                         | 90   | 166                                             | 138  | 6.2×10 <sup>-3</sup>                                     | 41             |
| GM1.5-25AS-19AD-02 | GM1.5-25BS-19AD-02 |                     | 25                          | 60                                         | 72   | 208                                             | 173  |                                                          |                |
| GM1.5-30AS-19AD-02 | GM1.5-30BS-19AD-02 |                     | 30                          | 50                                         | 60   | 249                                             | 208  |                                                          |                |
| GM1.5-40AS-19AD-02 | GM1.5-40BS-19AD-02 |                     | 40                          | 37.5                                       | 45   | 317                                             | 264  |                                                          |                |
| GM1.5-50AS-19AD-02 | GM1.5-50BS-19AD-02 |                     | 50                          | 30                                         | 36   | 396                                             | 330  |                                                          |                |
| GM2.2-25AS-19AD-02 | GM2.2-10BS-19AD-02 | 2.2                 | 10                          | 150                                        | 180  | 122                                             | 102  | 8.8×10 <sup>-3</sup>                                     | 48             |
| GM2.2-15AS-19AD-02 | GM2.2-15BS-19AD-02 |                     | 15                          | 100                                        | 120  | 182                                             | 152  |                                                          |                |
| GM2.2-20AS-19AD-02 | GM2.2-20BS-19AD-02 |                     | 20                          | 75                                         | 90   | 244                                             | 203  |                                                          |                |
| GM2.2-25AS-19AD-02 | GM2.2-25BS-19AD-02 |                     | 25                          | 60                                         | 72   | 290                                             | 242  |                                                          |                |
| GM2.2-30AS-19AD-02 | GM2.2-30BS-19AD-02 |                     | 30                          | 50                                         | 60   | 349                                             | 290  |                                                          |                |
| GM2.2-40AS-19AD-02 | GM2.2-40BS-19AD-02 |                     | 40                          | 37.5                                       | 45   | 465                                             | 387  |                                                          |                |
| GM2.2-50AS-19AD-02 | GM2.2-50BS-19AD-02 |                     | 50                          | 30                                         | 36   | 581                                             | 484  |                                                          |                |

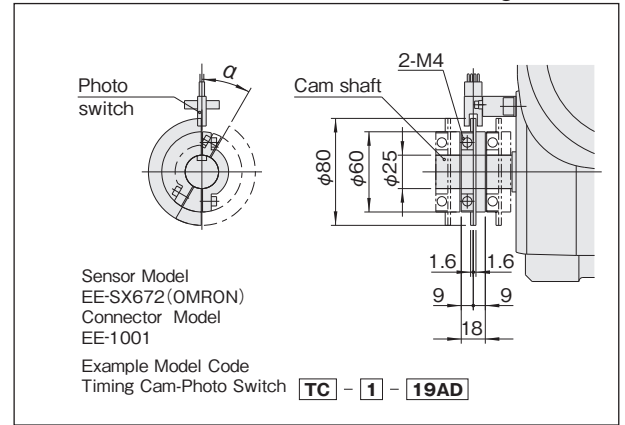
## Torque limiter mounting specifications(option)

Figure 19AD-3



## Timing cam-Photo switch

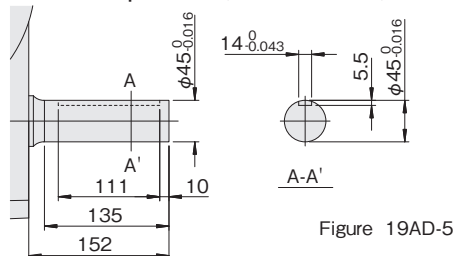
Figure 19AD-4



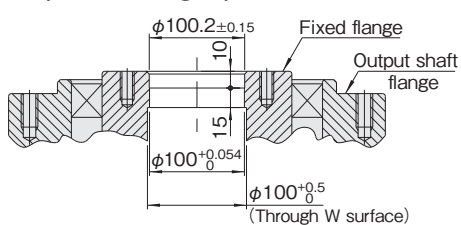
## Precautions

- The dimension drawing (Figure 19AD-1, 19AD-2) shows the standard mounting position for geared motor.
- Model 19AD can be equipped with 1.5kW and 2.2kW motor. When using the 1.5kW and 2.2kW motor, the motor will protrude beyond the indexer flange, and geared motor's bottom surface will also protrude beyond Index W surface.
- Model 19AD can be equipped with torque limiter 19TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period(α) below 180°.

## Standard input shaft(T surface side)



## Output fixed flange specifications



## Locations of oil plug, etc., and oil capacity

Figure 19AD-7

| Mounting position | 1 | 2 | 5   |
|-------------------|---|---|-----|
| Location          |   |   |     |
| Oil capacity(ℓ)   | 5 | 6 | 6.5 |

## Precautions

- Each point indicated in the mounting positions shown in Figure 19AD-7 represents (starting at top) the oil plug (PT3/4), oil level (VB), and drain (PT3/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 19AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.



## Specifications of geared motor

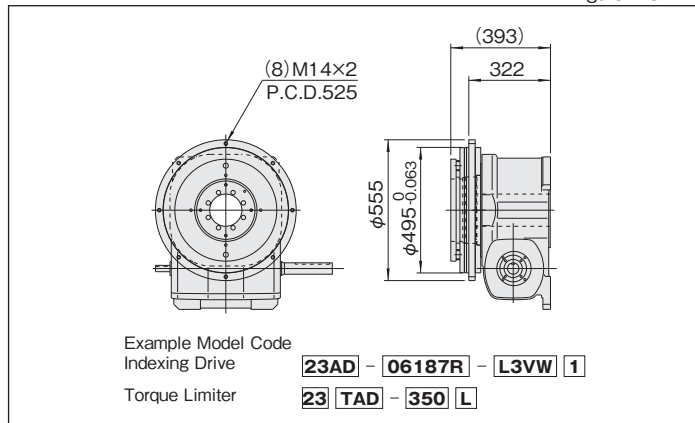
Table 23AD-3

| Code                  |                       | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|-----------------------|-----------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V              | 230V                  |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM2.2-20.37AS-23AD-01 | GM2.2-20.37BS-23AD-01 | 2.2                 | 20.37                       | 69                                         | 82   | 275                                             | 230  | 11.2×10 <sup>-3</sup>                                    | 60             |
| GM2.2-23.33AS-23AD-01 | GM2.2-23.33BS-23AD-01 |                     | 23.33                       | 60                                         | 72   | 295                                             | 250  |                                                          |                |
| GM2.2-26.93AS-23AD-01 | GM2.2-26.93BS-23AD-01 |                     | 26.93                       | 52                                         | 62   | 340                                             | 285  |                                                          |                |
| GM2.2-29.63AS-23AD-01 | GM2.2-29.63BS-23AD-01 |                     | 29.63                       | 47                                         | 57   | 375                                             | 315  |                                                          |                |
| GM2.2-34.80AS-23AD-01 | GM2.2-34.80BS-23AD-01 |                     | 34.80                       | 40                                         | 48   | 435                                             | 365  |                                                          |                |
| GM2.2-36.85AS-23AD-01 | GM2.2-36.85BS-23AD-01 |                     | 36.85                       | 38                                         | 46   | 460                                             | 385  |                                                          |                |
| GM2.2-41.89AS-23AD-01 | GM2.2-41.89BS-23AD-01 |                     | 41.89                       | 34                                         | 40   | 520                                             | 440  |                                                          |                |
| GM2.2-46.40AS-23AD-01 | GM2.2-46.40BS-23AD-01 |                     | 46.40                       | 30                                         | 36   | 570                                             | 485  |                                                          |                |
| GM3.7-10AS-23AD-02    | GM3.7-10BS-23AD-02    | 3.7                 | 10                          | 150                                        | 180  | 205                                             | 171  | 16.7×10 <sup>-3</sup>                                    | 80             |
| GM3.7-15AS-23AD-02    | GM3.7-15BS-23AD-02    |                     | 15                          | 100                                        | 120  | 308                                             | 256  |                                                          |                |
| GM3.7-20AS-23AD-02    | GM3.7-20BS-23AD-02    |                     | 20                          | 75                                         | 90   | 410                                             | 341  |                                                          |                |
| GM3.7-25AS-23AD-02    | GM3.7-25BS-23AD-02    |                     | 25                          | 60                                         | 72   | 489                                             | 407  |                                                          |                |
| GM3.7-30AS-23AD-02    | GM3.7-30BS-23AD-02    |                     | 30                          | 50                                         | 60   | 586                                             | 489  |                                                          |                |
| GM3.7-40AS-23AD-02    | GM3.7-40BS-23AD-02    |                     | 40                          | 37.5                                       | 45   | 782                                             | 652  |                                                          |                |
| GM3.7-50AS-23AD-02    | GM3.7-50BS-23AD-02    |                     | 50                          | 30                                         | 36   | 977                                             | 814  |                                                          |                |

※2.2-kW 230-VAC motor (GM2.2-□BS-23AD-01) is only available for 60 Hz.

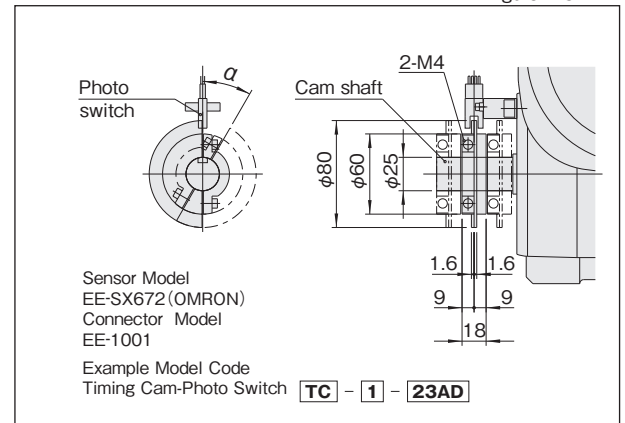
## Torque limiter mounting specifications(option)

Figure 23AD-3



## Timing cam-Photo switch

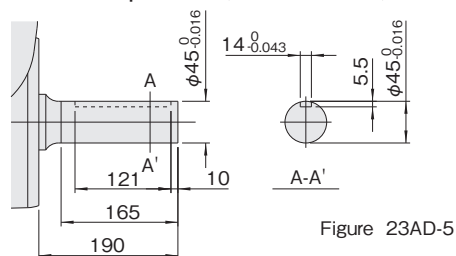
Figure 23AD-4



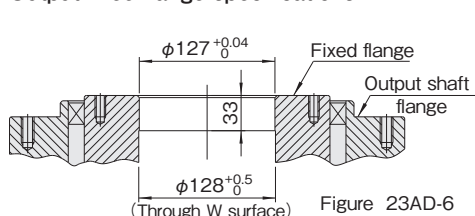
## Precautions

- The dimension drawing (Figure 23AD-1, 23AD-2) shows the standard mounting position for geared motor.
- Model 23AD can be equipped with 2.2kW and 3.7kW motor. Exchange is not permitted after purchase because of different hollow size of geared motor. 5.5kW motor is also available as special instructions.
- When using the 3.7kW motor, reducer box will protrude beyond the indexer flange.
- Model 23AD can be equipped with torque limiter 23TAD.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period (α) below 180°.

## Standard input shaft(T surface side)



## Output fixed flange specifications



## Locations of oil plug, etc., and oil capacity

Figure 23AD-7

| Mounting position | 1  | 2  | 5  |
|-------------------|----|----|----|
| Location          |    |    |    |
| Oil capacity(ℓ)   | 10 | 12 | 13 |

## Precautions

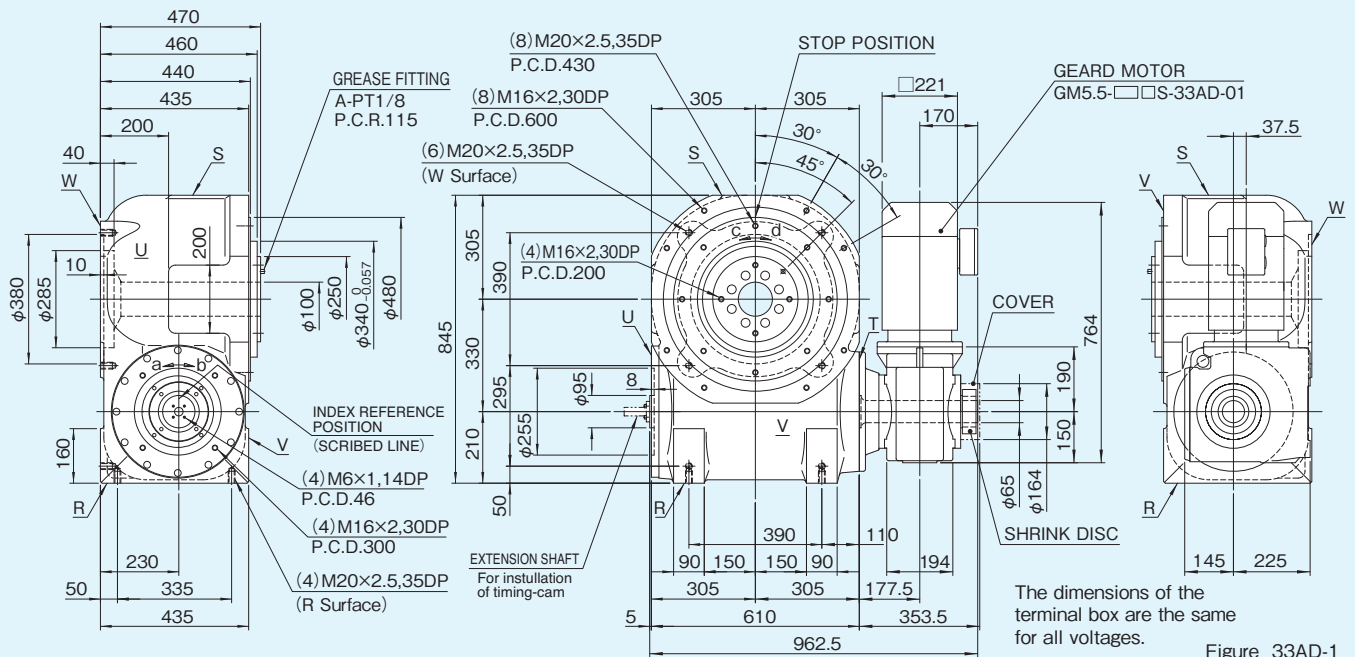
- Each point indicated in the mounting positions shown in Figure 23AD-7 represents (starting at top) the oil plug (PT3/4), oil level (VB), and drain (PT3/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 23AD-7 are given in general figures and will differ according to the profile of the cam and the number of cam followers.

# 33AD

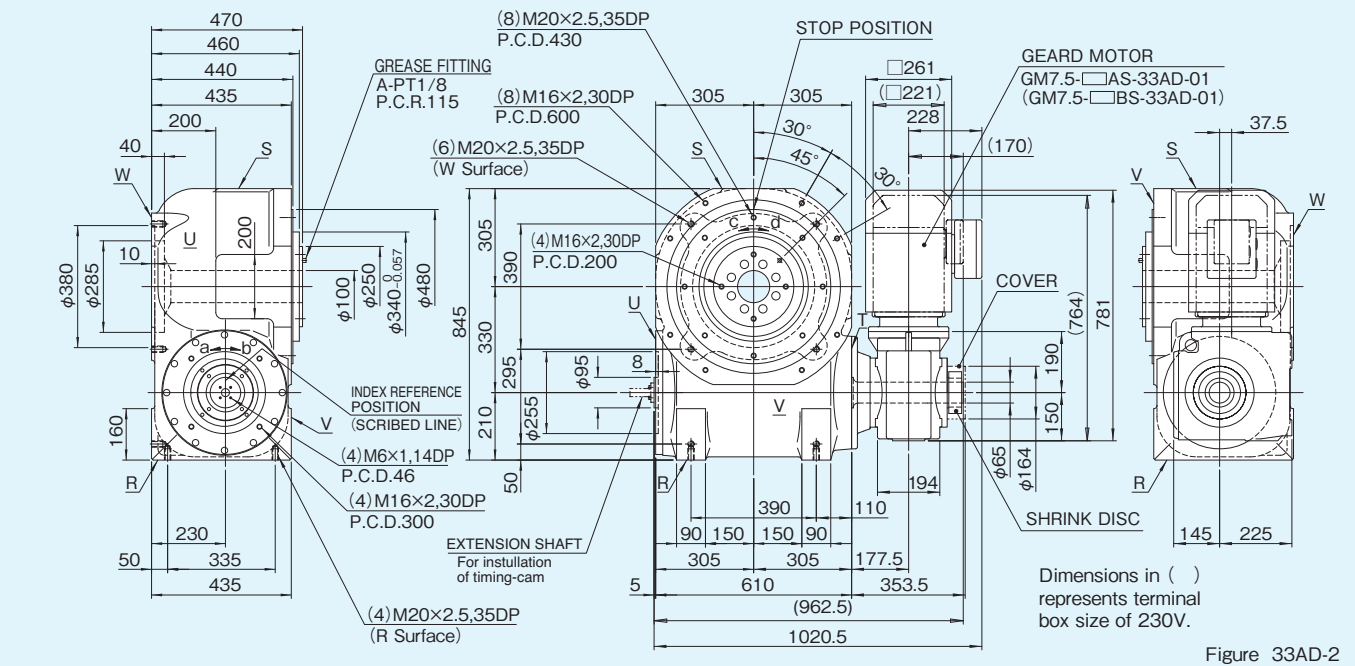
## 33AD Dimensions

[Unit : mm]

### (a) With 5.5kW Motor



### (b) With 7.5kW Motor



## Specifications

Table 33AD-1

| Item                            | Symbol         | Unit              | Value                          | Item                                       | Symbol         | Unit              | Value                | Item                        | Symbol | Unit  | Value |
|---------------------------------|----------------|-------------------|--------------------------------|--------------------------------------------|----------------|-------------------|----------------------|-----------------------------|--------|-------|-------|
| Output allowable axial load     | P <sub>1</sub> | N                 | 34890                          | Input allowable axial load                 | P <sub>4</sub> | N                 | 18440                | Indexing accuracy (1 DWELL) |        | sec   | ±20   |
| Output allowable radial load    | P <sub>2</sub> | N                 | 33570                          | Input maximum repetitious bending force    | P <sub>5</sub> | N                 | 20900                | Indexing accuracy (2 DWELL) |        | sec   | ±40   |
| Output static torque            | T <sub>s</sub> | N·m               | Refer to Torque Capacity Table | Input maximum repetitious allowable torque | P <sub>6</sub> | N·m               | 6400                 | Repetitive accuracy         |        | sec   | 20    |
| Output torsional rigidity       | K <sub>1</sub> | N·m/rad           | 1.68×10 <sup>7</sup>           | Input torsional rigidity                   | K <sub>2</sub> | N·m/rad           | 4.19×10 <sup>5</sup> | Product weight (Index body) |        | kg    | 1000  |
| Output inertia                  | J <sub>o</sub> | kg·m <sup>2</sup> | 8.29                           | Input inertia                              | J <sub>c</sub> | kg·m <sup>2</sup> | 1.71                 | Housing color               |        | Ivory |       |
| Output allowable bending moment | P <sub>3</sub> | N·m               | 2030                           |                                            |                |                   |                      | Geared motor paint color    |        | Ivory |       |

Note: Input inertia: J is calculated in dwell.

1N·m≒0.102kgf·m



## Specifications of geared motor

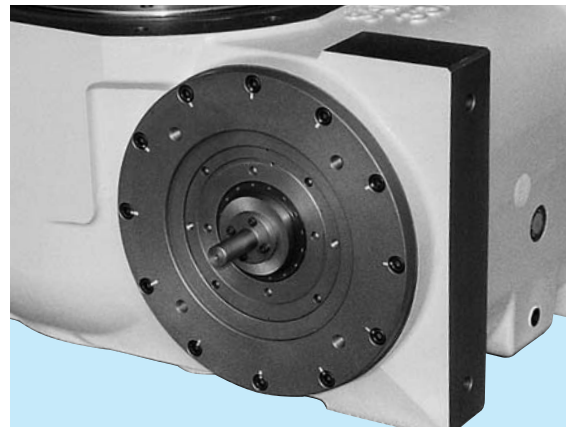
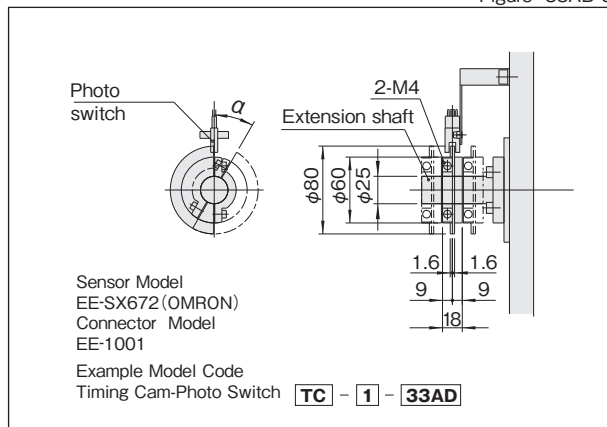
Table 33AD-3

| Code                  |                       | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>( i ) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|-----------------------|-----------------------|---------------------|-------------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V              | 230V                  |                     |                               | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
|                       |                       |                     |                               |                                            |      |                                                 |      |                                                          |                |
| GM5.5-19.70AS-33AD-01 | GM5.5-19.70BS-33AD-01 | 5.5                 | 19.70                         | 73                                         | 87   | 670                                             | 565  | 25.8×10 <sup>-3</sup>                                    | 152            |
| GM5.5-25.50AS-33AD-01 | GM5.5-25.50BS-33AD-01 |                     | 25.50                         | 56                                         | 67   | 860                                             | 725  |                                                          |                |
| GM5.5-31.43AS-33AD-01 | GM5.5-31.43BS-33AD-01 |                     | 31.43                         | 46                                         | 55   | 1040                                            | 870  |                                                          |                |
| GM5.5-34.96AS-33AD-01 | GM5.5-34.96BS-33AD-01 |                     | 34.96                         | 41                                         | 49   | 1150                                            | 970  |                                                          |                |
| GM5.5-39.10AS-33AD-01 | GM5.5-39.10BS-33AD-01 |                     | 39.10                         | 37                                         | 44   | 1280                                            | 1080 |                                                          |                |
| GM5.5-44.03AS-33AD-01 | GM5.5-44.03BS-33AD-01 |                     | 44.03                         | 33                                         | 39   | 1440                                            | 1210 |                                                          |                |
| GM5.5-47.91AS-33AD-01 | GM5.5-47.91BS-33AD-01 |                     | 47.91                         | 30                                         | 36   | 1560                                            | 1310 |                                                          |                |
| GM5.5-57.00AS-33AD-01 | GM5.5-57.00BS-33AD-01 |                     | 57.00                         | 25                                         | 30   | 1840                                            | 1550 |                                                          |                |
| GM7.5-10.93AS-33AD-01 | GM7.5-10.93BS-33AD-01 | 7.5                 | 10.93                         | 133                                        | 159  | 510                                             | 425  | 38.1×10 <sup>-3</sup>                                    | 166            |
| GM7.5-15.64AS-33AD-01 | GM7.5-15.64BS-33AD-01 |                     | 15.64                         | 93                                         | 111  | 720                                             | 605  |                                                          |                |
| GM7.5-19.70AS-33AD-01 | GM7.5-19.70BS-33AD-01 |                     | 19.70                         | 74                                         | 88   | 910                                             | 760  |                                                          |                |
| GM7.5-25.50AS-33AD-01 | GM7.5-25.50BS-33AD-01 |                     | 25.50                         | 57                                         | 68   | 1170                                            | 980  |                                                          |                |
| GM7.5-31.43AS-33AD-01 | GM7.5-31.43BS-33AD-01 |                     | 31.43                         | 46                                         | 55   | 1400                                            | 1170 |                                                          |                |
| GM7.5-34.96AS-33AD-01 | GM7.5-34.96BS-33AD-01 |                     | 34.96                         | 41                                         | 50   | 1550                                            | 1300 |                                                          |                |
| GM7.5-39.10AS-33AD-01 | GM7.5-39.10BS-33AD-01 |                     | 39.10                         | 37                                         | 45   | 1730                                            | 1450 |                                                          |                |
| GM7.5-44.03AS-33AD-01 | GM7.5-44.03BS-33AD-01 |                     | 44.03                         | 33                                         | 40   | 1940                                            | 1630 |                                                          |                |

※230 VAC is only available for 60 Hz.

## Torque limiter mounting specifications(option)

Figure 33AD-3



Mounting extended shaft

## Precautions

- The dimension drawing(Figure 33AD-1, 33AD-2) shows the standard mounting position for geared motor.
- Model 33AD can be equipped with 5.5kW and 7.5kW motor. 11kW motor is also available as special instructions.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period[α]below 180°.

## Standard input shaft(T surface side)

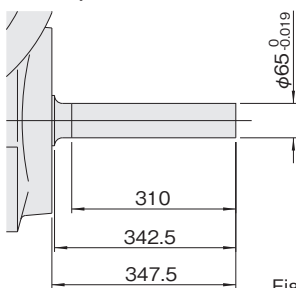


Figure 33AD-4

## Output fixed flange specifications

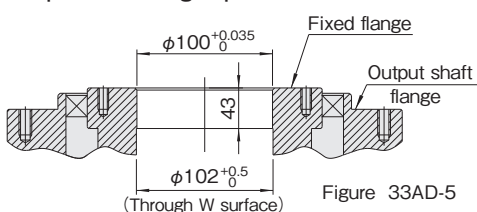


Figure 33AD-5

## Locations of oil plug, etc., and oil capacity

Figure 33AD-6

| Mounting position | 1  | 2  | 5  |
|-------------------|----|----|----|
| Location          |    |    |    |
| Oil capacity(ℓ)   | 60 | 55 | 60 |

## Precautions

- Each point indicated in the mounting positions shown in Figure 33AD-6 represents (starting at top) the oil plug (PT3/4), oil level (VB), and drain (PT3/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 33AD-6 are given in general figures and will differ according to the profile of the cam and the number of cam followers.

# 45AD

## 45AD Dimensions

[Unit : mm]

(a) With 11kW Motor

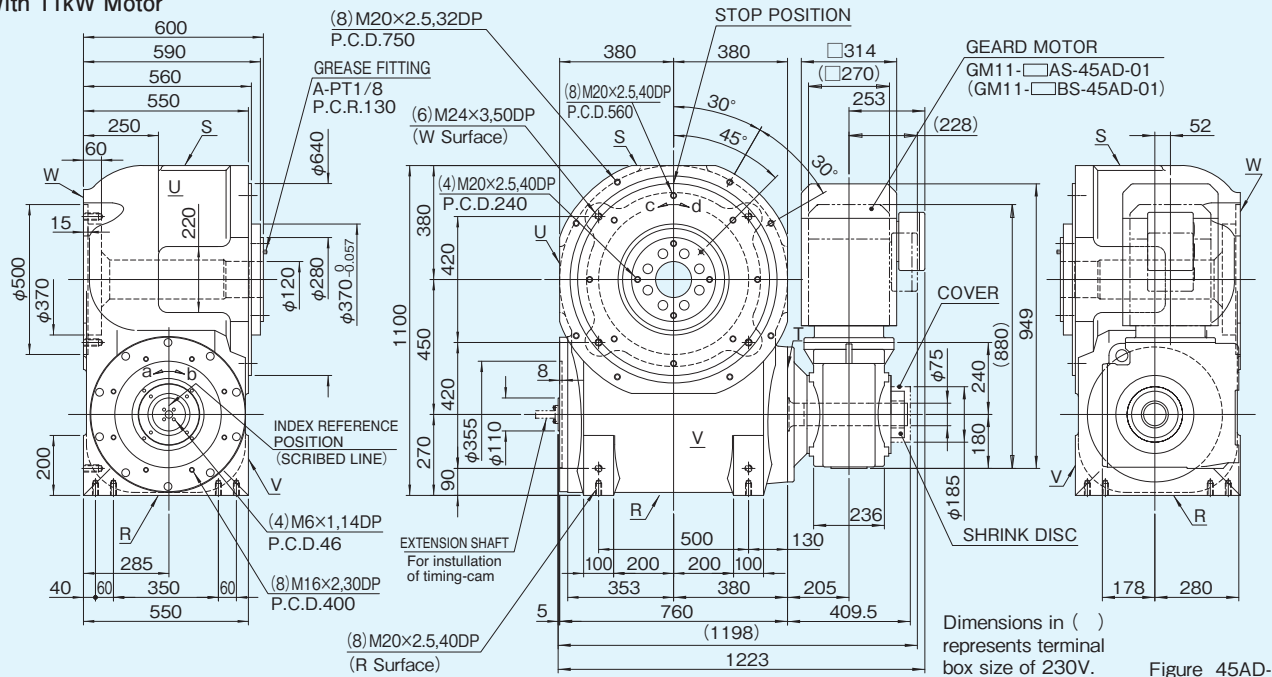


Figure 45AD-1

(b) With 15kW Motor

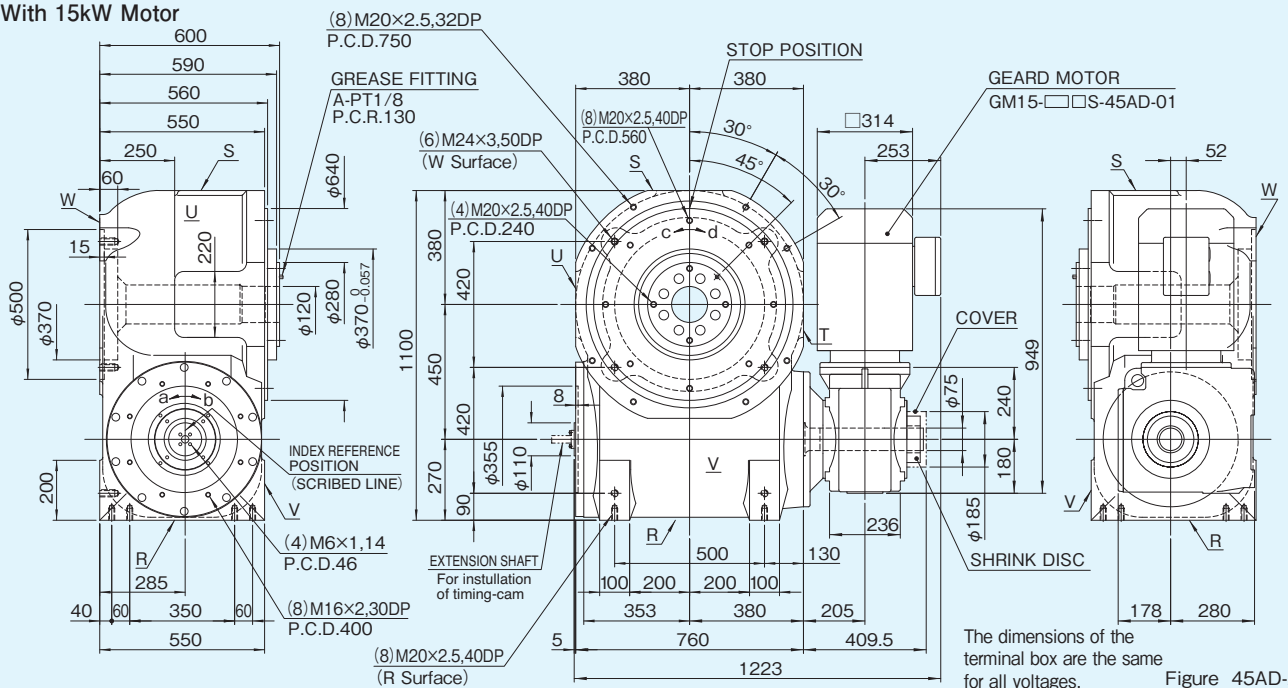


Figure 45AD-2

## Specifications

Table 45AD-1

| Item                            | Symbol | Unit              | Value                          | Item                                      | Symbol | Unit              | Value              | Item                        | Symbol | Unit  | Value      |
|---------------------------------|--------|-------------------|--------------------------------|-------------------------------------------|--------|-------------------|--------------------|-----------------------------|--------|-------|------------|
| Output allowable axial load     | $P_1$  | N                 | 47460                          | Input allowable axial load                | $P_4$  | N                 | 25100              | Indexing accuracy (1 DWELL) |        | sec   | $\pm 20$   |
| Output allowable radial load    | $P_2$  | N                 | 40750                          | Input maximum repetitive bending force    | $P_5$  | N                 | 27000              | Indexing accuracy (2 DWELL) |        | sec   | $\pm 40$   |
| Output static torque            | $T_s$  | N·m               | Refer to Torque Capacity Table | Input maximum repetitive allowable torque | $P_6$  | N·m               | 8400               | Repetitive accuracy         |        | sec   | 20         |
| Output torsional rigidity       | $K_1$  | N·m/rad           | $3.18 \times 10^7$             | Input torsional rigidity                  | $K_2$  | N·m/rad           | $6.44 \times 10^5$ | Product weight (Index body) |        | kg    | About 1600 |
| Output inertia                  | $J_o$  | kg·m <sup>2</sup> | 25.78                          | Input inertia                             | $J_c$  | kg·m <sup>2</sup> | 7.90               | Housing color               |        | Ivory |            |
| Output allowable bending moment | $P_3$  | N·m               | 3070                           |                                           |        |                   |                    | Geared motor paint color    |        | Ivory |            |

Note: Input inertia: J is calculated in dwell.

1N·m $\approx$ 0.102kgf·m

## Specifications of geared motor

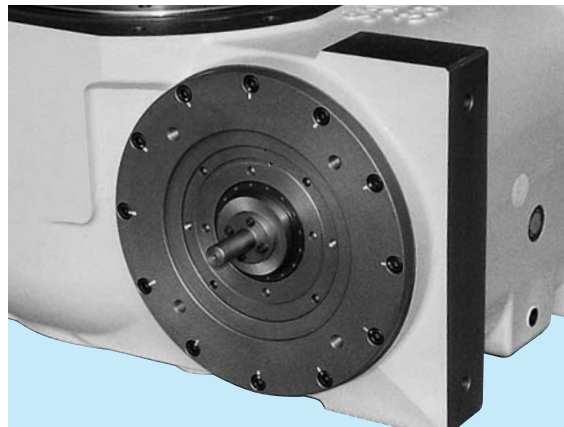
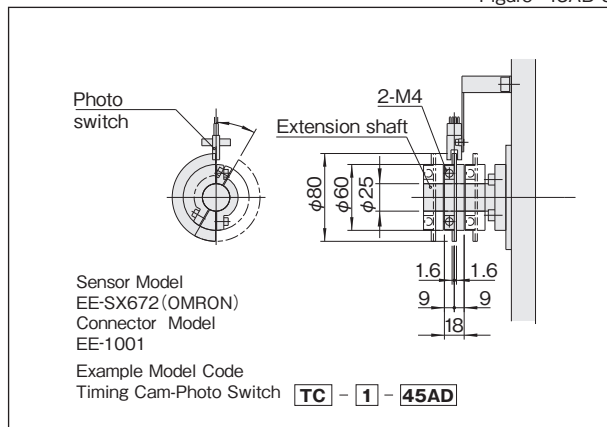
Table 45AD-3

| Code                 |                      | Motor Power<br>(kW) | Actual<br>Gear Ratio<br>(i) | Output Shaft Speed<br>N <sub>M</sub> (rpm) |      | Output Allowable Torque<br>T <sub>R</sub> (N·m) |      | Moment of inertia<br>J <sub>M</sub> (kg·m <sup>2</sup> ) | Weight<br>(kg) |
|----------------------|----------------------|---------------------|-----------------------------|--------------------------------------------|------|-------------------------------------------------|------|----------------------------------------------------------|----------------|
| 200/220V             | 230V                 |                     |                             | 50Hz                                       | 60Hz | 50Hz                                            | 60Hz |                                                          |                |
| GM11-19.23AS-45AD-01 | GM11-19.23BS-45AD-01 | 11                  | 19.23                       | 75                                         | 90   | 1320                                            | 1110 | 81.7×10 <sup>-3</sup>                                    | 271            |
| GM11-23.59AS-45AD-01 | GM11-23.59BS-45AD-01 |                     | 23.59                       | 61                                         | 73   | 1610                                            | 1350 |                                                          |                |
| GM11-26.39AS-45AD-01 | GM11-26.39BS-45AD-01 |                     | 26.39                       | 55                                         | 66   | 1800                                            | 1510 |                                                          |                |
| GM11-32.60AS-45AD-01 | GM11-32.60BS-45AD-01 |                     | 32.60                       | 44                                         | 53   | 2160                                            | 1820 |                                                          |                |
| GM11-36.05AS-45AD-01 | GM11-36.05BS-45AD-01 |                     | 36.05                       | 40                                         | 48   | 2380                                            | 2000 |                                                          |                |
| GM11-40.65AS-45AD-01 | GM11-40.65BS-45AD-01 |                     | 40.65                       | 36                                         | 43   | 2680                                            | 2250 |                                                          |                |
| GM11-44.89AS-45AD-01 | GM11-44.89BS-45AD-01 |                     | 44.89                       | 32                                         | 39   | 2950                                            | 2480 |                                                          |                |
| GM11-49.87AS-45AD-01 | GM11-49.87BS-45AD-01 |                     | 49.87                       | 29                                         | 35   | 3270                                            | 2750 |                                                          |                |
| GM15-9.55AS-45AD-01  | GM15-9.55BS-45AD-01  | 15                  | 9.55                        | 153                                        | 183  | 890                                             | 745  | 113.0×10 <sup>-3</sup>                                   | 321            |
| GM15-15.42AS-45AD-01 | GM15-15.42BS-45AD-01 |                     | 15.42                       | 95                                         | 114  | 1430                                            | 1200 |                                                          |                |
| GM15-21.23AS-45AD-01 | GM15-21.23BS-45AD-01 |                     | 21.23                       | 69                                         | 82   | 1970                                            | 1640 |                                                          |                |
| GM15-26.39AS-45AD-01 | GM15-26.39BS-45AD-01 |                     | 26.39                       | 55                                         | 66   | 2430                                            | 2040 |                                                          |                |
| GM15-32.60AS-45AD-01 | GM15-32.60BS-45AD-01 |                     | 32.60                       | 45                                         | 54   | 2920                                            | 2450 |                                                          |                |
| GM15-36.05AS-45AD-01 | GM15-36.05BS-45AD-01 |                     | 36.05                       | 41                                         | 49   | 3230                                            | 2700 |                                                          |                |
| GM15-40.65AS-45AD-01 | GM15-40.65BS-45AD-01 |                     | 40.65                       | 36                                         | 43   | 3630                                            | 3040 |                                                          |                |
| GM15-44.89AS-45AD-01 | GM15-44.89BS-45AD-01 |                     | 44.89                       | 33                                         | 39   | 4000                                            | 3350 |                                                          |                |

※230 VAC is only available for 60 Hz.

## Torque limiter mounting specifications (option)

Figure 45AD-3



Mounting extended shaft

## Precautions

- The dimension drawing (Figure 45AD-1, 45AD-2) shows the standard mounting position for geared motor.
- Model 45AD can be equipped with 11kW and 15kW motor. 18.5kW motor is also available as special instructions.
- Up to 3 sets of timing cams and photo switches can be added as necessary. The timing cam can be freely adjusted to any period (α) below 180°.

## Standard input shaft (T surface side)

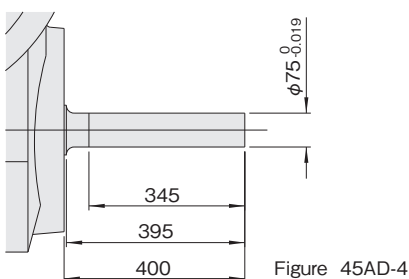


Figure 45AD-4

## Output fixed flange specifications

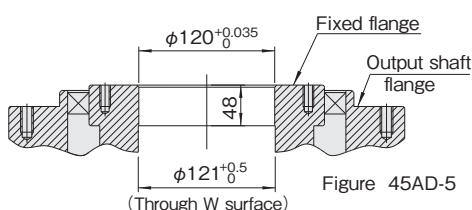


Figure 45AD-5

## Locations of oil plug, etc., and oil capacity

Figure 45AD-6

| Mounting position | 1   | 2   | 5   |
|-------------------|-----|-----|-----|
| Location          |     |     |     |
| Oil capacity (ℓ)  | 115 | 105 | 115 |

## Precautions

- Each point indicated in the mounting positions shown in Figure 45AD-6 represents (starting at top) the oil plug (PT1), oil level (VB), and drain (PT1).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 45AD-6 are given in general figures and will differ according to the profile of the cam and the number of cam followers.

# 7AD Torque Capacity Tables

## 7AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)
- (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)
- (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 7AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>$T_o$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|----------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------------------|----------------------------------------------|------------------------------|
|                      |                                |             |                                              | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                          |                                              |                              |
|                      |                                |             |                                              | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                      |                                              |                              |
| 4                    | 270                            | 7AD 0427 7R | 204.8                                        | 80.3                                                        | 80.3         | 80.3<br>0.1  | 80.3<br>0.1  | 80.3<br>0.2  | 80.3<br>0.3  | 75.4<br>0.5              | 4.9                                          | 16                           |
| 5                    | 240                            | 7AD 0524 7R | 78.1                                         | 57.9                                                        | 47.0         | 41.6<br>0.1  | 38.2<br>0.1  | 35.7<br>0.2  | 33.8<br>0.3  | 31.0<br>0.5              | 2.5                                          | 14                           |
|                      | 270                            | 7AD 0527 7R | 227.6                                        | 84.6                                                        | 84.6         | 84.6<br>0.1  | 84.6<br>0.1  | 84.6<br>0.2  | 84.6<br>0.2  | 84.6<br>0.4              | 4.6                                          | 16                           |
| 6                    | 180                            | 7AD 0618 7R | 238.1                                        | 191.4                                                       | 160.5<br>0.1 | 142.2<br>0.1 | 130.4<br>0.2 | 122.0<br>0.3 | 115.5<br>0.4 | 105.9<br>0.8             | 5.6                                          | 22                           |
|                      | 210                            | 7AD 0621 7R | 256.7                                        | 196.0                                                       | 159.2        | 141.0<br>0.1 | 129.3<br>0.1 | 120.9<br>0.2 | 114.5<br>0.3 | 105.0<br>0.6             | 5.3                                          | 22                           |
|                      | 240                            | 7AD 0624 7R | 271.5                                        | 193.6                                                       | 157.3        | 139.3<br>0.1 | 127.7<br>0.1 | 119.5<br>0.2 | 113.1<br>0.2 | 103.8<br>0.4             | 5.2                                          | 22                           |
|                      | 270                            | 7AD 0627 7R | 283.2                                        | 190.9                                                       | 155.0        | 137.3<br>0.1 | 125.9<br>0.1 | 117.8<br>0.1 | 111.5<br>0.2 | 102.3<br>0.3             | 5.0                                          | 22                           |
| 8                    | 180                            | 7AD 0818 7R | 247.3                                        | 119.1                                                       | 119.1        | 119.1<br>0.1 | 119.1<br>0.1 | 119.1<br>0.2 | 119.1<br>0.3 | 112.5<br>0.6             | 4.7                                          | 19                           |
|                      | 210                            | 7AD 0821 7R | 286.6                                        | 209.9                                                       | 195.7        | 173.3<br>0.1 | 159<br>0.1   | 148.7<br>0.2 | 140.7<br>0.2 | 129.1<br>0.4             | 5.0                                          | 22                           |
|                      | 240                            | 7AD 0824 7R | 297.8                                        | 214.0                                                       | 191.7        | 169.7<br>0.1 | 155.7<br>0.1 | 145.6<br>0.1 | 137.8<br>0.2 | 126.4<br>0.3             | 4.8                                          | 22                           |
|                      | 270                            | 7AD 0827 7R | 306.3                                        | 217.1                                                       | 187.6        | 166.1        | 152.4<br>0.1 | 142.5<br>0.1 | 135.0<br>0.1 | 123.8<br>0.3             | 4.7                                          | 22                           |
| 10                   | 180                            | 7AD 1018 7R | 251.7                                        | 89.0                                                        | 89.0         | 89.0<br>0.1  | 89.0<br>0.1  | 89.0<br>0.2  | 89.0<br>0.3  | 89.0<br>0.5              | 4.3                                          | 16                           |
|                      | 210                            | 7AD 1021 7R | 275.9                                        | 125.8                                                       | 125.8        | 125.8<br>0.1 | 125.8<br>0.1 | 125.8<br>0.1 | 125.8<br>0.2 | 125.4<br>0.3             | 4.3                                          | 19                           |
|                      | 240                            | 7AD 1024 7R | 283.3                                        | 127.5                                                       | 127.5        | 127.5        | 127.5<br>0.1 | 127.5<br>0.1 | 127.5<br>0.2 | 122.1<br>0.3             | 4.2                                          | 19                           |
|                      | 270                            | 7AD 1027 7R | 288.6                                        | 128.7                                                       | 128.7        | 128.7        | 128.7<br>0.1 | 128.7<br>0.1 | 128.7<br>0.1 | 119.0<br>0.2             | 4.2                                          | 19                           |
| 12                   | 120                            | 7AD 1212 7R | 84.7                                         | 76.2                                                        | 72.1<br>0.1  | 63.8<br>0.1  | 58.6<br>0.2  | 54.8<br>0.3  | 51.9<br>0.5  | 47.6<br>0.9              | 2.4                                          | 14                           |
|                      | 150                            | 7AD 1215 7R | 91.6                                         | 82.4                                                        | 70.1         | 62.1<br>0.1  | 57.0<br>0.1  | 53.3<br>0.2  | 50.4<br>0.3  | 46.3<br>0.6              | 2.3                                          | 14                           |
|                      | 180                            | 7AD 1218 7R | 263.5                                        | 91.1                                                        | 91.1         | 91.1<br>0.1  | 91.1<br>0.1  | 91.1<br>0.1  | 91.1<br>0.2  | 91.1<br>0.4              | 4.1                                          | 16                           |
|                      | 210                            | 7AD 1221 7R | 271.5                                        | 92.5                                                        | 92.5         | 92.5         | 92.5<br>0.1  | 92.5<br>0.1  | 92.5<br>0.2  | 92.5<br>0.3              | 4.0                                          | 16                           |
|                      | 240                            | 7AD 1224 7R | 277.1                                        | 93.4                                                        | 93.4         | 93.4         | 93.4<br>0.1  | 93.4<br>0.1  | 93.4<br>0.1  | 93.4<br>0.2              | 3.9                                          | 16                           |
|                      | 270                            | 7AD 1227 7R | 281.1                                        | 94.1                                                        | 94.1         | 94.1         | 94.1         | 94.1<br>0.1  | 94.1<br>0.1  | 94.1<br>0.2              | 3.9                                          | 16                           |
| 15                   | 150                            | 7AD 1515 7R | 48.7                                         | 43.8                                                        | 37.8         | 33.4<br>0.1  | 30.7<br>0.1  | 28.7<br>0.2  | 27.2<br>0.3  | 24.9<br>0.4              | 2.1                                          | 12                           |
|                      | 180                            | 7AD 1518 7R | 50.5                                         | 44.8                                                        | 36.4         | 32.2         | 29.6<br>0.1  | 27.6<br>0.1  | 26.2<br>0.2  | 24.0<br>0.3              | 2.0                                          | 12                           |
|                      | 210                            | 7AD 1521 7R | 102.5                                        | 89.8                                                        | 72.9         | 64.6         | 59.2<br>0.1  | 55.4<br>0.1  | 52.4<br>0.1  | 48.1<br>0.2              | 2.2                                          | 14                           |
|                      | 240                            | 7AD 1524 7R | 104.0                                        | 86.9                                                        | 70.6         | 62.5         | 57.3         | 53.6<br>0.1  | 50.8<br>0.1  | 46.6<br>0.2              | 2.1                                          | 14                           |
|                      | 270                            | 7AD 1527 7R | 105.1                                        | 84.3                                                        | 68.5         | 60.6         | 55.6         | 52.0<br>0.1  | 49.2<br>0.1  | 45.2<br>0.1              | 2.1                                          | 14                           |
| 16                   | 150                            | 7AD 1615 7R | 49.4                                         | 44.4                                                        | 38.9         | 34.5<br>0.1  | 31.6<br>0.1  | 29.6<br>0.2  | 28.0<br>0.2  | 25.7<br>0.4              | 2.0                                          | 12                           |
|                      | 180                            | 7AD 1618 7R | 51.0                                         | 45.9                                                        | 37.4         | 33.2         | 30.4<br>0.1  | 28.4<br>0.1  | 26.9<br>0.2  | 24.7<br>0.3              | 2.0                                          | 12                           |
|                      | 210                            | 7AD 1621 7R | 52.0                                         | 44.5                                                        | 36.1         | 32.0         | 29.3<br>0.1  | 27.4<br>0.1  | 26.0<br>0.1  | 23.8<br>0.2              | 2.0                                          | 12                           |
|                      | 240                            | 7AD 1624 7R | 52.8                                         | 43.0                                                        | 34.9         | 30.9         | 28.4         | 26.5<br>0.1  | 25.1<br>0.1  | 23.1<br>0.2              | 2.0                                          | 12                           |
|                      | 270                            | 7AD 1627 7R | 53.3                                         | 41.7                                                        | 33.9         | 30.0         | 27.5         | 25.7         | 24.4<br>0.1  | 22.4<br>0.1              | 1.9                                          | 12                           |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 7AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|----------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|-----------------------------|----------------------------------------------|------------------------------|
|                      |                                |             |                                              | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                             |                                              |                              |
|                      |                                |             |                                              | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                         |                                              |                              |
| <b>2</b>             | 330                            | 7AD 0233 8R | 67.8                                         | 39.9                                                        | 32.4<br>0.1  | 28.7<br>0.1  | 26.3<br>0.2  | 24.6<br>0.4  | 23.3<br>0.6  | 21.4<br>1.0                 | 2.6                                          | 14                           |
| <b>3</b>             | 270                            | 7AD 0327 8R | 76.2                                         | 49.5                                                        | 40.2<br>0.1  | 35.6<br>0.1  | 32.7<br>0.2  | 30.6<br>0.4  | 28.9<br>0.5  | 26.5<br>1.0                 | 2.5                                          | 14                           |
|                      | 300                            | 7AD 0330 8R | 221.5                                        | 83.5                                                        | 83.5<br>0.1  | 83.5<br>0.1  | 83.5<br>0.2  | 83.5<br>0.3  | 82.3<br>0.4  | 75.5<br>0.8                 | 4.6                                          | 16                           |
| <b>4</b>             | 240                            | 7AD 0424 8R | 241.4                                        | 117.7                                                       | 117.7<br>0.1 | 117.7<br>0.1 | 113.2<br>0.2 | 105.8<br>0.4 | 100.2<br>0.5 | 91.9<br>0.9                 | 4.8                                          | 19                           |
|                      | 270                            | 7AD 0427 8R | 252.3                                        | 120.3                                                       | 120.3<br>0.1 | 120.3<br>0.1 | 111.7<br>0.2 | 104.4<br>0.3 | 98.9<br>0.4  | 90.7<br>0.7                 | 4.7                                          | 19                           |
| <b>5</b>             | 210                            | 7AD 0521 8R | 236.0                                        | 86.2                                                        | 86.2<br>0.1  | 86.2<br>0.1  | 86.2<br>0.2  | 86.2<br>0.4  | 86.2<br>0.5  | 86.2<br>1.0                 | 4.5                                          | 16                           |
|                      | 240                            | 7AD 0524 8R | 247.0                                        | 88.2                                                        | 88.2<br>0.1  | 88.2<br>0.1  | 88.2<br>0.2  | 88.2<br>0.3  | 88.2<br>0.4  | 88.2<br>0.7                 | 4.3                                          | 16                           |
| <b>6</b>             | 180                            | 7AD 0618 8R | 277.2                                        | 206.5                                                       | 173.2<br>0.1 | 153.4<br>0.2 | 140.7<br>0.3 | 131.6<br>0.4 | 124.6<br>0.6 | 114.3<br>1.1                | 5.1                                          | 22                           |
|                      | 210                            | 7AD 0621 8R | 291.4                                        | 208.8                                                       | 169.6<br>0.1 | 150.2<br>0.1 | 137.8<br>0.2 | 128.8<br>0.3 | 122.0<br>0.5 | 111.9<br>0.8                | 4.9                                          | 22                           |
| <b>8</b>             | 150                            | 7AD 0815 8R | 261.0                                        | 122.3                                                       | 122.3<br>0.1 | 122.3<br>0.2 | 122.3<br>0.3 | 122.3<br>0.5 | 122.3<br>0.7 | 122.1<br>1.2                | 4.5                                          | 19                           |
|                      | 180                            | 7AD 0818 8R | 302.0                                        | 215.5                                                       | 210.4<br>0.1 | 186.3<br>0.1 | 170.9<br>0.2 | 159.8<br>0.3 | 151.3<br>0.5 | 138.8<br>0.8                | 4.8                                          | 22                           |
| <b>10</b>            | 120                            | 7AD 1012 8R | 247.0                                        | 88.2                                                        | 88.2<br>0.1  | 88.2<br>0.2  | 88.2<br>0.4  | 88.2<br>0.6  | 88.2<br>0.8  | 88.2<br>1.5                 | 4.3                                          | 16                           |
|                      | 150                            | 7AD 1015 8R | 262.2                                        | 90.9                                                        | 90.9<br>0.1  | 90.9<br>0.1  | 90.9<br>0.2  | 90.9<br>0.4  | 90.9<br>0.5  | 90.9<br>0.9                 | 4.1                                          | 16                           |
| <b>12</b>            | 120                            | 7AD 1212 8R | 94.7                                         | 85.2                                                        | 76.2<br>0.1  | 67.5<br>0.2  | 61.9<br>0.3  | 57.9<br>0.5  | 54.8<br>0.7  | 50.3<br>1.2                 | 2.3                                          | 14                           |
|                      | 150                            | 7AD 1215 8R | 271.8                                        | 92.5                                                        | 92.5<br>0.1  | 92.5<br>0.1  | 92.5<br>0.2  | 92.5<br>0.3  | 92.5<br>0.4  | 92.5<br>0.8                 | 4.0                                          | 16                           |
| <b>15</b>            | 120                            | 7AD 1512 8R | 49.9                                         | 44.9                                                        | 40.9<br>0.1  | 36.2<br>0.1  | 33.2<br>0.3  | 31.0<br>0.4  | 29.4<br>0.6  | 27.0<br>1.0                 | 2.0                                          | 12                           |
|                      | 150                            | 7AD 1515 8R | 51.7                                         | 46.5                                                        | 38.9<br>0.1  | 34.4<br>0.1  | 31.6<br>0.2  | 29.5<br>0.2  | 28.0<br>0.4  | 25.7<br>0.6                 | 2.0                                          | 12                           |
| <b>16</b>            | 120                            | 7AD 1612 8R | 50.5                                         | 45.4                                                        | 42.1<br>0.1  | 37.3<br>0.1  | 34.2<br>0.2  | 32.0<br>0.4  | 30.3<br>0.5  | 27.8<br>0.9                 | 2.0                                          | 12                           |
|                      | 150                            | 7AD 1615 8R | 52.1                                         | 46.8                                                        | 40.0<br>0.1  | 35.4<br>0.1  | 32.5<br>0.2  | 30.4<br>0.2  | 28.7<br>0.3  | 26.4<br>0.6                 | 2.0                                          | 12                           |

## (3) 7AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE         | Ts<br>(N·m) | Input Shaft Speed (Index/min) |       |       |              |              |              |              | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|--------------|-------------|-------------------------------|-------|-------|--------------|--------------|--------------|--------------|-------------|-------------|
|    |                |              |             | 25                            | 50    | 75    | 100          | 125          | 150          | 200          |             |             |
| 16 | 210            | 7AD 1621 7R2 | 286.6       | 209.9                         | 209.9 | 209.9 | 195.7<br>0.1 | 183.0<br>0.1 | 173.3<br>0.1 | 159.0<br>0.2 | 5.0         | 22          |
|    | 240            | 7AD 1624 7R2 | 297.8       | 214.0                         | 214.0 | 208.9 | 191.7        | 179.2<br>0.1 | 169.7<br>0.1 | 155.7<br>0.2 | 4.8         | 22          |
|    | 270            | 7AD 1627 7R2 | 306.3       | 217.1                         | 217.1 | 204.5 | 187.6        | 175.5        | 166.1<br>0.1 | 152.4<br>0.1 | 4.7         | 22          |
| 20 | 180            | 7AD 2018 7R2 | 251.7       | 89.0                          | 89.0  | 89.0  | 89.0<br>0.1  | 89.0<br>0.1  | 89.0<br>0.1  | 89.0<br>0.2  | 4.3         | 16          |
|    | 210            | 7AD 2021 7R2 | 261.8       | 90.8                          | 90.8  | 90.8  | 90.8         | 90.8<br>0.1  | 90.8<br>0.1  | 90.8<br>0.2  | 4.1         | 16          |
|    | 240            | 7AD 2024 7R2 | 269.1       | 92.1                          | 92.1  | 92.1  | 92.1         | 92.1<br>0.1  | 92.1<br>0.1  | 92.1<br>0.1  | 4.1         | 16          |
|    | 270            | 7AD 2027 7R2 | 288.6       | 128.7                         | 128.7 | 128.7 | 128.7        | 128.7        | 128.7<br>0.1 | 128.7<br>0.1 | 4.2         | 19          |
| 24 | 180            | 7AD 2418 7R2 | 96.1        | 86.4                          | 83.7  | 74.1  | 68.0<br>0.1  | 63.6<br>0.1  | 60.2<br>0.1  | 55.2<br>0.2  | 2.2         | 14          |
|    | 210            | 7AD 2421 7R2 | 99.1        | 89.1                          | 81.2  | 71.9  | 66.0         | 61.7<br>0.1  | 58.4<br>0.1  | 53.6<br>0.1  | 2.2         | 14          |
|    | 240            | 7AD 2424 7R2 | 101.3       | 91.1                          | 78.8  | 69.8  | 64.0         | 59.9         | 56.7<br>0.1  | 52.0<br>0.1  | 2.2         | 14          |
|    | 270            | 7AD 2427 7R2 | 281.1       | 94.1                          | 94.1  | 94.1  | 94.1         | 94.1         | 94.1<br>0.1  | 94.1<br>0.1  | 3.9         | 16          |
| 32 | 180            | 7AD 3218 7R2 | 51.0        | 45.9                          | 45.9  | 40.8  | 37.4         | 35.0<br>0.1  | 33.2<br>0.1  | 30.4<br>0.1  | 2.0         | 12          |
|    | 210            | 7AD 3221 7R2 | 52.0        | 46.8                          | 44.5  | 39.4  | 36.1         | 33.8         | 32.0<br>0.1  | 29.3<br>0.1  | 2.0         | 12          |
|    | 240            | 7AD 3224 7R2 | 52.8        | 47.5                          | 43.0  | 38.1  | 34.9         | 32.7         | 30.9<br>0.1  | 28.4<br>0.1  | 2.0         | 12          |
|    | 270            | 7AD 3227 7R2 | 53.3        | 47.9                          | 41.7  | 36.9  | 33.9         | 31.7         | 30.0         | 27.5<br>0.1  | 1.9         | 12          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m



# 9AD Torque Capacity Tables

## 9AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)  
 (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)  
 (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 9AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>$T_o$ (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|-------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------------------|-------------------------------------------|------------------------------|
|                      |                                |             |                                           | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                          |                                           |                              |
|                      |                                |             |                                           | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                      |                                           |                              |
| 4                    | 270                            | 9AD 0427 7R | 276.8                                     | 187.6                                                       | 152.3<br>0.1 | 134.9<br>0.2 | 123.7<br>0.4 | 115.7<br>0.6 | 109.6<br>0.8 | 100.5<br>1.5             | 6.6                                       | 19                           |
|                      | 240                            | 9AD 0524 7R | 276.3                                     | 197.2                                                       | 160.2<br>0.1 | 141.9<br>0.2 | 130.1<br>0.4 | 121.7<br>0.6 | 115.2<br>0.8 | 105.7<br>1.5             | 6.1                                       | 16                           |
| 5                    | 270                            | 9AD 0527 7R | 308.9                                     | 219.6                                                       | 178.4<br>0.1 | 157.9<br>0.2 | 144.9<br>0.3 | 135.5<br>0.5 | 128.3<br>0.7 | 117.7<br>1.2             | 6.2                                       | 19                           |
|                      | 180                            | 9AD 0618 7R | 441.9                                     | 366.2                                                       | 297.4<br>0.2 | 263.4<br>0.3 | 241.6<br>0.6 | 225.9<br>0.9 | 213.9<br>1.4 | 196.2<br>2.4             | 8.8                                       | 26                           |
| 6                    | 210                            | 9AD 0621 7R | 479.8                                     | 364.3                                                       | 295.9<br>0.1 | 262.0<br>0.2 | 240.3<br>0.4 | 224.8<br>0.7 | 212.8<br>1.0 | 195.2<br>1.8             | 8.4                                       | 26                           |
|                      | 240                            | 9AD 0624 7R | 510.2                                     | 360.9                                                       | 293.2<br>0.1 | 259.6<br>0.2 | 238.1<br>0.3 | 222.7<br>0.5 | 210.8<br>0.8 | 193.4<br>1.4             | 8.1                                       | 26                           |
|                      | 270                            | 9AD 0627 7R | 534.8                                     | 356.7                                                       | 289.7<br>0.1 | 256.5<br>0.2 | 235.3<br>0.3 | 220.1<br>0.4 | 208.4<br>0.6 | 191.1<br>1.1             | 7.9                                       | 26                           |
|                      | 180                            | 9AD 0818 7R | 510.2                                     | 459.2                                                       | 373.4<br>0.1 | 330.6<br>0.3 | 303.3<br>0.5 | 283.6<br>0.7 | 268.5<br>1.1 | 246.3<br>1.9             | 8.1                                       | 26                           |
| 8                    | 210                            | 9AD 0821 7R | 541.9                                     | 452.3                                                       | 367.4<br>0.1 | 325.3<br>0.2 | 298.4<br>0.3 | 279.1<br>0.5 | 264.2<br>0.8 | 242.4<br>1.4             | 7.8                                       | 26                           |
|                      | 240                            | 9AD 0824 7R | 566.0                                     | 444.1                                                       | 360.7<br>0.1 | 319.4<br>0.1 | 293.0<br>0.3 | 274.0<br>0.4 | 259.4<br>0.6 | 238.0<br>1.1             | 7.6                                       | 26                           |
|                      | 270                            | 9AD 0827 7R | 584.4                                     | 435.6                                                       | 353.8<br>0.1 | 313.3<br>0.1 | 287.4<br>0.2 | 268.8<br>0.3 | 254.5<br>0.5 | 233.4<br>0.8             | 7.4                                       | 26                           |
|                      | 180                            | 9AD 1018 7R | 377.1                                     | 335.3                                                       | 272.4<br>0.1 | 241.2<br>0.2 | 221.2<br>0.4 | 206.9<br>0.6 | 195.9<br>0.8 | 179.7<br>1.4             | 6.3                                       | 22                           |
| 10                   | 210                            | 9AD 1021 7R | 393.2                                     | 327.0                                                       | 265.6<br>0.1 | 235.2<br>0.1 | 215.7<br>0.3 | 201.7<br>0.4 | 191.0<br>0.6 | 175.2<br>1.1             | 6.2                                       | 22                           |
|                      | 240                            | 9AD 1024 7R | 404.9                                     | 318.7                                                       | 258.9<br>0.1 | 229.2<br>0.1 | 210.3<br>0.2 | 196.7<br>0.3 | 186.2<br>0.5 | 170.8<br>0.8             | 6.0                                       | 22                           |
|                      | 270                            | 9AD 1027 7R | 413.5                                     | 310.9                                                       | 252.5<br>0.1 | 223.6<br>0.1 | 205.1<br>0.2 | 191.8<br>0.3 | 181.6<br>0.4 | 166.6<br>0.6             | 5.9                                       | 22                           |
|                      | 120                            | 9AD 1212 7R | 299.8                                     | 269.8                                                       | 245.9<br>0.2 | 217.8<br>0.4 | 199.8<br>0.6 | 186.8<br>1.0 | 176.9<br>1.4 | 162.3<br>2.5             | 5.9                                       | 16                           |
| 12                   | 150                            | 9AD 1215 7R | 324.4                                     | 292.0                                                       | 239.2<br>0.1 | 211.8<br>0.2 | 194.3<br>0.4 | 181.7<br>0.6 | 172.1<br>0.9 | 157.8<br>1.6             | 5.6                                       | 16                           |
|                      | 180                            | 9AD 1218 7R | 360.5                                     | 320.5                                                       | 260.3<br>0.1 | 230.5<br>0.2 | 211.4<br>0.3 | 197.7<br>0.5 | 187.2<br>0.7 | 171.7<br>1.2             | 5.7                                       | 19                           |
|                      | 210                            | 9AD 1221 7R | 372.1                                     | 310.9                                                       | 252.5<br>0.1 | 223.6<br>0.1 | 205.1<br>0.2 | 191.8<br>0.3 | 181.6<br>0.5 | 166.6<br>0.9             | 5.5                                       | 19                           |
|                      | 240                            | 9AD 1224 7R | 380.2                                     | 301.9                                                       | 245.2<br>0.1 | 217.2<br>0.1 | 199.2<br>0.2 | 186.3<br>0.3 | 176.4<br>0.4 | 161.8<br>0.7             | 5.4                                       | 19                           |
|                      | 270                            | 9AD 1227 7R | 386.2                                     | 293.7                                                       | 238.6<br>0.1 | 211.2<br>0.1 | 193.8<br>0.1 | 181.2<br>0.2 | 171.6<br>0.3 | 157.4<br>0.5             | 5.4                                       | 19                           |
|                      | 150                            | 9AD 1515 7R | 343.6                                     | 309.2                                                       | 267.9<br>0.1 | 237.2<br>0.2 | 217.6<br>0.3 | 203.5<br>0.5 | 192.7<br>0.8 | 176.7<br>1.3             | 5.4                                       | 16                           |
| 15                   | 180                            | 9AD 1518 7R | 355.7                                     | 317.7                                                       | 258.0<br>0.1 | 228.5<br>0.1 | 209.6<br>0.2 | 196.0<br>0.4 | 185.6<br>0.5 | 170.2<br>0.9             | 5.3                                       | 16                           |
|                      | 210                            | 9AD 1521 7R | 363.6                                     | 306.7                                                       | 249.1<br>0.1 | 220.6<br>0.1 | 202.3<br>0.2 | 189.2<br>0.3 | 179.1<br>0.4 | 164.3<br>0.7             | 5.2                                       | 16                           |
|                      | 240                            | 9AD 1524 7R | 369.0                                     | 296.8                                                       | 241.1<br>0.1 | 213.5<br>0.1 | 195.8<br>0.1 | 183.1<br>0.2 | 173.4<br>0.3 | 159.1<br>0.5             | 5.1                                       | 16                           |
|                      | 270                            | 9AD 1527 7R | 372.8                                     | 288.0                                                       | 233.9<br>0.1 | 207.1<br>0.1 | 190.0<br>0.1 | 177.7<br>0.2 | 168.2<br>0.2 | 154.3<br>0.4             | 5.0                                       | 16                           |
|                      | 150                            | 9AD 1615 7R | 348.3                                     | 313.5                                                       | 276.0<br>0.1 | 244.3<br>0.2 | 224.1<br>0.3 | 209.6<br>0.5 | 198.5<br>0.7 | 182.1<br>1.3             | 5.3                                       | 16                           |
| 16                   | 180                            | 9AD 1618 7R | 359.2                                     | 323.3                                                       | 265.3<br>0.1 | 234.9<br>0.1 | 215.5<br>0.2 | 201.6<br>0.3 | 190.8<br>0.5 | 175.1<br>0.9             | 5.2                                       | 16                           |
|                      | 210                            | 9AD 1621 7R | 366.3                                     | 315.0                                                       | 255.8<br>0.1 | 226.5<br>0.1 | 207.8<br>0.2 | 194.4<br>0.3 | 184.0<br>0.4 | 168.8<br>0.6             | 5.1                                       | 16                           |
|                      | 240                            | 9AD 1624 7R | 371.2                                     | 304.6                                                       | 247.4<br>0.1 | 219.1<br>0.1 | 201.0<br>0.1 | 188.0<br>0.2 | 178.0<br>0.3 | 163.2<br>0.5             | 5.0                                       | 16                           |
|                      | 270                            | 9AD 1627 7R | 374.6                                     | 295.4                                                       | 239.9<br>0.1 | 212.5<br>0.1 | 194.9<br>0.1 | 182.3<br>0.2 | 172.6<br>0.2 | 158.3<br>0.4             | 5.0                                       | 16                           |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
 All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 9AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|----------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|-----------------------------|----------------------------------------------|------------------------------|
|                      |                                |             |                                              | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                             |                                              |                              |
|                      |                                |             |                                              | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                         |                                              |                              |
| 2                    | 330                            | 9AD 0233 8R | 253.7                                        | 152.4                                                       | 123.8<br>0.2 | 109.6<br>0.4 | 100.5<br>0.7 | 94.0<br>1.1  | 89.0<br>1.6  | 81.7<br>2.9                 | 6.9                                          | 19                           |
| 3                    | 270                            | 9AD 0327 8R | 269.4                                        | 168.7                                                       | 137.1<br>0.2 | 121.4<br>0.4 | 111.3<br>0.7 | 104.1<br>1.1 | 98.6<br>1.6  | 90.4<br>2.8                 | 6.2                                          | 16                           |
|                      | 300                            | 9AD 0330 8R | 283.7                                        | 167.8                                                       | 136.3<br>0.1 | 120.7<br>0.3 | 110.7<br>0.6 | 103.5<br>0.9 | 98.0<br>1.3  | 89.9<br>2.3                 | 6.0                                          | 16                           |
| 4                    | 240                            | 9AD 0424 8R | 309.2                                        | 205.4                                                       | 166.8<br>0.2 | 147.7<br>0.4 | 135.5<br>0.7 | 126.7<br>1.1 | 120.0<br>1.5 | 110.0<br>2.7                | 6.2                                          | 19                           |
|                      | 270                            | 9AD 0427 8R | 324.4                                        | 203.0                                                       | 164.9<br>0.1 | 146.0<br>0.3 | 133.9<br>0.5 | 125.3<br>0.8 | 118.6<br>1.2 | 108.8<br>2.1                | 6.1                                          | 19                           |
| 5                    | 210                            | 9AD 0521 8R | 303.1                                        | 215.0                                                       | 174.7<br>0.2 | 154.7<br>0.4 | 141.9<br>0.7 | 132.7<br>1.1 | 125.6<br>1.6 | 115.2<br>2.9                | 5.8                                          | 16                           |
|                      | 240                            | 9AD 0524 8R | 318.0                                        | 211.6                                                       | 171.9<br>0.1 | 152.2<br>0.3 | 139.6<br>0.6 | 130.6<br>0.9 | 123.6<br>1.2 | 113.4<br>2.2                | 5.7                                          | 16                           |
| 6                    | 180                            | 9AD 0618 8R | 522.1                                        | 398.0<br>0.1                                                | 323.3<br>0.2 | 286.2<br>0.5 | 262.6<br>0.9 | 245.6<br>1.3 | 232.5<br>1.9 | 213.3<br>3.4                | 8.0                                          | 26                           |
|                      | 210                            | 9AD 0621 8R | 552.3                                        | 390.8                                                       | 317.5<br>0.2 | 281.1<br>0.4 | 257.9<br>0.6 | 241.2<br>1.0 | 228.3<br>1.4 | 209.4<br>2.5                | 7.7                                          | 26                           |
| 8                    | 150                            | 9AD 0815 8R | 369.9                                        | 321.0<br>0.1                                                | 260.7<br>0.2 | 230.9<br>0.5 | 211.8<br>0.9 | 198.1<br>1.4 | 187.5<br>2.0 | 172.0<br>3.6                | 6.4                                          | 22                           |
|                      | 180                            | 9AD 0818 8R | 575.0                                        | 488.0                                                       | 396.3<br>0.2 | 351.0<br>0.4 | 321.9<br>0.7 | 301.1<br>1.0 | 285.1<br>1.5 | 261.5<br>2.7                | 7.5                                          | 26                           |
| 10                   | 120                            | 9AD 1012 8R | 318.0                                        | 286.2<br>0.1                                                | 234.8<br>0.3 | 207.9<br>0.6 | 190.7<br>1.1 | 178.4<br>1.7 | 168.9<br>2.4 | 154.9<br>4.3                | 5.7                                          | 16                           |
|                      | 150                            | 9AD 1015 8R | 358.6                                        | 313.2                                                       | 254.4<br>0.2 | 225.2<br>0.4 | 206.6<br>0.7 | 193.2<br>1.1 | 183.0<br>1.5 | 167.8<br>2.7                | 5.7                                          | 19                           |
| 12                   | 120                            | 9AD 1212 8R | 355.0                                        | 319.5<br>0.1                                                | 291.7<br>0.2 | 258.3<br>0.5 | 237.0<br>0.9 | 221.6<br>1.5 | 209.8<br>2.1 | 192.5<br>3.8                | 5.7                                          | 19                           |
|                      | 150                            | 9AD 1215 8R | 372.5                                        | 335.3                                                       | 279.5<br>0.2 | 247.5<br>0.3 | 227.0<br>0.6 | 212.3<br>0.9 | 201.0<br>1.4 | 184.4<br>2.4                | 5.5                                          | 19                           |
| 15                   | 120                            | 9AD 1512 8R | 351.9                                        | 316.7                                                       | 289.9<br>0.2 | 256.7<br>0.4 | 235.4<br>0.7 | 220.2<br>1.2 | 208.5<br>1.7 | 191.2<br>3.0                | 5.3                                          | 16                           |
|                      | 150                            | 9AD 1515 8R | 363.9                                        | 327.5                                                       | 275.7<br>0.1 | 244.1<br>0.3 | 223.9<br>0.5 | 209.4<br>0.7 | 198.3<br>1.1 | 181.9<br>1.9                | 5.1                                          | 16                           |
| 16                   | 120                            | 9AD 1612 8R | 355.8                                        | 320.2                                                       | 298.2<br>0.2 | 264.1<br>0.4 | 242.2<br>0.7 | 226.6<br>1.1 | 214.5<br>1.6 | 196.8<br>2.8                | 5.3                                          | 16                           |
|                      | 150                            | 9AD 1615 8R | 366.6                                        | 329.9                                                       | 283.1<br>0.1 | 250.7<br>0.3 | 230.0<br>0.4 | 215.1<br>0.7 | 203.6<br>1.0 | 186.8<br>1.8                | 5.1                                          | 16                           |

## (3) 9AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE          | Ts<br>(N·m) | Input Shaft Speed (Index/min) |       |              |              |              |              |              | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|---------------|-------------|-------------------------------|-------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
|    |                |               |             | 25                            | 50    | 75           | 100          | 125          | 150          | 200          |             |             |
| 16 | 210            | 9AD 1621 7R 2 | 368.9       | 332.0                         | 285.9 | 253.1<br>0.1 | 232.2<br>0.2 | 217.2<br>0.3 | 205.6<br>0.4 | 188.6<br>0.6 | 6.4         | 22          |
|    | 240            | 9AD 1624 7R 2 | 384.2       | 345.0                         | 280.3 | 248.2<br>0.1 | 227.6<br>0.1 | 212.9<br>0.2 | 201.6<br>0.3 | 184.9<br>0.5 | 6.3         | 22          |
|    | 270            | 9AD 1627 7R 2 | 584.4       | 526.0                         | 435.6 | 385.7<br>0.1 | 353.8<br>0.1 | 330.9<br>0.2 | 313.3<br>0.2 | 287.4<br>0.4 | 7.4         | 26          |
| 20 | 180            | 9AD 2018 7R 2 | 377.1       | 339.4                         | 335.3 | 296.9<br>0.1 | 272.4<br>0.2 | 254.7<br>0.3 | 241.2<br>0.4 | 221.2<br>0.7 | 6.3         | 22          |
|    | 210            | 9AD 2021 7R 2 | 393.2       | 353.9                         | 327.0 | 289.5<br>0.1 | 265.6<br>0.1 | 248.4<br>0.2 | 235.2<br>0.3 | 215.7<br>0.5 | 6.2         | 22          |
|    | 240            | 9AD 2024 7R 2 | 404.9       | 364.4                         | 318.7 | 282.2<br>0.1 | 258.9<br>0.1 | 242.1<br>0.2 | 229.2<br>0.2 | 210.3<br>0.4 | 6.0         | 22          |
|    | 270            | 9AD 2027 7R 2 | 413.5       | 372.2                         | 310.9 | 275.3        | 252.5<br>0.1 | 236.2<br>0.1 | 223.6<br>0.2 | 205.1<br>0.3 | 5.9         | 22          |
| 24 | 180            | 9AD 2418 7R 2 | 360.5       | 324.5                         | 320.5 | 283.8<br>0.1 | 260.3<br>0.1 | 243.4<br>0.2 | 230.5<br>0.3 | 211.4<br>0.6 | 5.7         | 19          |
|    | 210            | 9AD 2421 7R 2 | 372.1       | 334.9                         | 310.9 | 275.3<br>0.1 | 252.5<br>0.1 | 236.2<br>0.2 | 223.6<br>0.2 | 205.1<br>0.4 | 5.5         | 19          |
|    | 240            | 9AD 2424 7R 2 | 380.2       | 342.2                         | 301.9 | 267.3<br>0.0 | 245.2<br>0.1 | 229.4<br>0.1 | 217.2<br>0.2 | 199.2<br>0.3 | 5.4         | 19          |
|    | 270            | 9AD 2427 7R 2 | 386.2       | 347.6                         | 293.7 | 260.1<br>0.0 | 238.6<br>0.1 | 223.1<br>0.1 | 211.2<br>0.1 | 193.8<br>0.3 | 5.4         | 19          |
| 32 | 180            | 9AD 3218 7R 2 | 359.2       | 323.3                         | 323.3 | 289.3<br>0.1 | 265.3<br>0.1 | 248.2<br>0.2 | 234.9<br>0.2 | 215.5<br>0.4 | 5.2         | 16          |
|    | 210            | 9AD 3221 7R 2 | 366.3       | 329.7                         | 315.0 | 278.9        | 255.8<br>0.1 | 239.3<br>0.1 | 226.5<br>0.2 | 207.8<br>0.3 | 5.1         | 16          |
|    | 240            | 9AD 3224 7R 2 | 371.2       | 334.1                         | 304.6 | 269.7        | 247.4<br>0.1 | 231.4<br>0.1 | 219.1<br>0.1 | 201.0<br>0.2 | 5.0         | 16          |
|    | 270            | 9AD 3227 7R 2 | 374.6       | 337.1                         | 295.4 | 261.6        | 239.9        | 224.4<br>0.1 | 212.5<br>0.1 | 194.9<br>0.2 | 5.0         | 16          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m

# 11AD Torque Capacity Tables

## 11AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)  
 (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)  
 (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 11AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>Toi (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|-------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|------------------------|-------------------------------------------|------------------------------|
|                      |                                |              |                                           | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                        |                                           |                              |
|                      |                                |              |                                           | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                    |                                           |                              |
| 4                    | 270                            | 11AD 0427 7R | 540.7                                     | 387.7<br>0.1                                                | 314.9<br>0.3 | 278.8<br>0.6 | 255.8<br>1.1 | 239.2<br>1.7 | 226.5<br>2.5 | 207.8<br>4.5           | 10.2                                      | 26                           |
| 5                    | 240                            | 11AD 0524 7R | 365.1                                     | 307.1<br>0.1                                                | 249.4<br>0.3 | 220.8<br>0.7 | 202.6<br>1.3 | 189.5<br>2.0 | 179.4<br>2.9 | 164.5<br>5.2           | 8.1                                       | 22                           |
|                      | 270                            | 11AD 0527 7R | 606.3                                     | 455.5<br>0.1                                                | 370.0<br>0.2 | 327.6<br>0.5 | 300.5<br>0.9 | 281.1<br>1.4 | 266.1<br>2.1 | 244.1<br>3.7           | 9.5                                       | 26                           |
| 6                    | 180                            | 11AD 0618 7R | 680.3                                     | 564.2<br>0.1                                                | 458.3<br>0.4 | 405.8<br>1.0 | 372.2<br>1.8 | 348.1<br>2.8 | 329.6<br>4.0 | 302.4<br>7.1           | 12.4                                      | 32                           |
|                      | 210                            | 11AD 0621 7R | 738.2                                     | 561.2<br>0.1                                                | 455.8<br>0.3 | 403.6<br>0.7 | 370.3<br>1.3 | 346.3<br>2.0 | 327.8<br>2.9 | 300.7<br>5.2           | 11.8                                      | 32                           |
|                      | 240                            | 11AD 0624 7R | 784.9                                     | 555.9<br>0.1                                                | 451.6<br>0.3 | 399.8<br>0.6 | 366.8<br>1.0 | 343.0<br>1.6 | 324.8<br>2.3 | 297.9<br>4.0           | 11.4                                      | 32                           |
|                      | 270                            | 11AD 0627 7R | 822.5                                     | 549.3<br>0.1                                                | 446.2<br>0.2 | 395.1<br>0.4 | 362.4<br>0.8 | 339.0<br>1.2 | 320.9<br>1.8 | 294.4<br>3.2           | 11.1                                      | 32                           |
| 8                    | 180                            | 11AD 0818 7R | 756.5                                     | 666.3<br>0.1                                                | 541.2<br>0.3 | 479.2<br>0.7 | 439.6<br>1.3 | 411.1<br>2.1 | 389.3<br>3.0 | 357.1<br>5.3           | 10.9                                      | 30                           |
|                      | 210                            | 11AD 0821 7R | 833.4                                     | 696.5<br>0.1                                                | 565.7<br>0.2 | 500.9<br>0.6 | 459.5<br>1.0 | 429.8<br>1.5 | 406.9<br>2.2 | 373.2<br>4.0           | 11.0                                      | 32                           |
|                      | 240                            | 11AD 0824 7R | 870.1                                     | 683.7<br>0.1                                                | 555.4<br>0.2 | 491.8<br>0.4 | 451.1<br>0.8 | 421.9<br>1.2 | 399.4<br>1.7 | 366.4<br>3.0           | 10.7                                      | 32                           |
|                      | 270                            | 11AD 0827 7R | 898.3                                     | 670.6<br>0.1                                                | 544.7<br>0.1 | 482.3<br>0.3 | 442.4<br>0.6 | 413.8<br>0.9 | 391.8<br>1.3 | 359.4<br>2.4           | 10.4                                      | 32                           |
| 10                   | 180                            | 11AD 1018 7R | 678.0                                     | 603.6<br>0.1                                                | 490.3<br>0.3 | 434.1<br>0.6 | 398.2<br>1.0 | 372.4<br>1.6 | 352.6<br>2.3 | 323.5<br>4.1           | 8.9                                       | 26                           |
|                      | 210                            | 11AD 1021 7R | 708.9                                     | 589.3<br>0.1                                                | 478.7<br>0.2 | 423.8<br>0.4 | 388.8<br>0.8 | 363.6<br>1.2 | 344.3<br>1.7 | 315.8<br>3.0           | 8.7                                       | 26                           |
|                      | 240                            | 11AD 1024 7R | 891.4                                     | 745.1<br>0.1                                                | 605.2<br>0.2 | 535.9<br>0.3 | 491.6<br>0.6 | 459.7<br>1.0 | 435.3<br>1.4 | 399.3<br>2.5           | 9.8                                       | 30                           |
|                      | 270                            | 11AD 1027 7R | 913.2                                     | 727.9<br>0.1                                                | 591.3<br>0.1 | 523.6<br>0.3 | 480.3<br>0.5 | 449.2<br>0.8 | 425.3<br>1.1 | 390.1<br>2.0           | 9.6                                       | 30                           |
| 12                   | 120                            | 11AD 1212 7R | 524.0                                     | 471.6<br>0.1                                                | 471.6<br>0.5 | 449.0<br>1.2 | 411.9<br>2.1 | 256.8<br>3.3 | 243.2<br>4.8 | 223.1<br>8.6           | 7.1                                       | 19                           |
|                      | 150                            | 11AD 1215 7R | 642.7                                     | 578.4<br>0.1                                                | 578.4<br>0.4 | 512.4<br>0.8 | 470.1<br>1.4 | 293.1<br>2.2 | 277.5<br>3.2 | 254.5<br>5.6           | 7.4                                       | 22                           |
|                      | 180                            | 11AD 1218 7R | 690.8                                     | 621.7<br>0.1                                                | 568.0<br>0.2 | 503.0<br>0.6 | 461.4<br>1.0 | 287.7<br>1.5 | 272.4<br>2.2 | 249.8<br>3.9           | 7.1                                       | 22                           |
|                      | 210                            | 11AD 1221 7R | 725.6                                     | 653.0<br>0.1                                                | 555.9<br>0.2 | 492.2<br>0.4 | 451.5<br>0.7 | 281.5<br>1.1 | 266.5<br>1.6 | 244.5<br>2.9           | 6.9                                       | 22                           |
|                      | 240                            | 11AD 1224 7R | 751.2                                     | 669.0<br>0.1                                                | 543.4<br>0.1 | 481.1<br>0.3 | 441.4<br>0.6 | 275.2<br>0.9 | 260.5<br>1.2 | 239.0<br>2.2           | 6.8                                       | 22                           |
|                      | 270                            | 11AD 1227 7R | 1087.2                                    | 613.8<br>0.1                                                | 498.6<br>0.1 | 441.5<br>0.2 | 405.0<br>0.4 | 378.8<br>0.6 | 358.6<br>0.9 | 328.9<br>1.6           | 8.1                                       | 26                           |
| 15                   | 150                            | 11AD 1515 7R | 637.9                                     | 574.1<br>0.1                                                | 574.1<br>0.3 | 574.1<br>0.6 | 537.2<br>1.1 | 290.1<br>1.7 | 274.6<br>2.5 | 251.9<br>4.5           | 6.5                                       | 19                           |
|                      | 180                            | 11AD 1518 7R | 673.3                                     | 606.0<br>0.1                                                | 606.0<br>0.2 | 569.6<br>0.4 | 522.5<br>0.8 | 282.1<br>1.2 | 267.1<br>1.7 | 245.0<br>3.1           | 6.4                                       | 19                           |
|                      | 210                            | 11AD 1521 7R | 697.6                                     | 627.8<br>0.1                                                | 625.2<br>0.1 | 553.6<br>0.3 | 507.8<br>0.6 | 274.2<br>0.9 | 259.6<br>1.3 | 238.2<br>2.3           | 6.2                                       | 19                           |
|                      | 240                            | 11AD 1524 7R | 714.9                                     | 643.4<br>0.1                                                | 608.1<br>0.1 | 538.4<br>0.2 | 493.9<br>0.4 | 266.7<br>0.7 | 252.5<br>1.0 | 231.6<br>1.7           | 6.1                                       | 19                           |
|                      | 270                            | 11AD 1527 7R | 727.6                                     | 654.8<br>0.1                                                | 592.1<br>0.1 | 524.3<br>0.2 | 481.0<br>0.3 | 259.7<br>0.5 | 245.9<br>0.8 | 225.6<br>1.4           | 6.1                                       | 19                           |
| 16                   | 150                            | 11AD 1615 7R | 651.2                                     | 586.1<br>0.1                                                | 586.1<br>0.3 | 586.1<br>0.6 | 556.2<br>1.0 | 300.3<br>1.6 | 284.3<br>2.4 | 260.8<br>4.2           | 6.5                                       | 19                           |
|                      | 180                            | 11AD 1618 7R | 684.1                                     | 615.7<br>0.1                                                | 615.7<br>0.2 | 588.3<br>0.4 | 539.7<br>0.7 | 291.4<br>1.1 | 275.9<br>1.6 | 253.1<br>2.9           | 6.3                                       | 19                           |
|                      | 210                            | 11AD 1621 7R | 706.4                                     | 635.8<br>0.1                                                | 635.8<br>0.1 | 570.8<br>0.3 | 523.6<br>0.5 | 282.7<br>0.8 | 267.7<br>1.2 | 245.6<br>2.1           | 6.2                                       | 19                           |
|                      | 240                            | 11AD 1624 7R | 722.2                                     | 650.0<br>0.1                                                | 626.2<br>0.1 | 554.5<br>0.2 | 508.6<br>0.4 | 274.7<br>0.6 | 260.0<br>0.9 | 238.5<br>1.6           | 6.1                                       | 19                           |
|                      | 270                            | 11AD 1627 7R | 733.6                                     | 660.2<br>0.1                                                | 609.2<br>0.1 | 539.4<br>0.2 | 494.8<br>0.3 | 267.2<br>0.5 | 253.0<br>0.7 | 232.1<br>1.3           | 6.0                                       | 19                           |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
 All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 11AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |              |              |              |              |              | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|-------------------------------------------|-------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|-----------------------------|-------------------------------------------|------------------------------|
|                      |                                |              |                                           | Input Shaft Speed (Index/min)                               |              |              |              |              |              |                             |                                           |                              |
|                      |                                |              |                                           | 25                                                          | 50           | 75           | 100          | 125          | 150          | 200                         |                                           |                              |
| 2                    | 330                            | 11AD 0233 8R | 340.2                                     | 200.9<br>0.1                                                | 163.2<br>0.5 | 144.5<br>1.1 | 132.5<br>2.0 | 123.9<br>3.2 | 117.3<br>4.6 | 107.6<br>8.1                | 8.7                                       | 22                           |
| 3                    | 270                            | 11AD 0327 8R | 321.8                                     | 225.7<br>0.1                                                | 183.3<br>0.6 | 162.3<br>1.3 | 148.9<br>2.4 | 139.2<br>3.7 | 131.8<br>5.3 | 120.9<br>9.4                | 7.5                                       | 19                           |
|                      | 300                            | 11AD 0330 8R | 344.2                                     | 226.1<br>0.1                                                | 183.7<br>0.5 | 162.6<br>1.1 | 149.2<br>1.9 | 139.5<br>3.0 | 132.1<br>4.3 | 121.2<br>7.6                | 7.3                                       | 19                           |
| 4                    | 240                            | 11AD 0424 8R | 392.8                                     | 284.6<br>0.1                                                | 231.2<br>0.6 | 204.7<br>1.3 | 187.8<br>2.3 | 175.6<br>3.5 | 166.3<br>5.1 | 152.5<br>9.1                | 7.8                                       | 22                           |
|                      | 270                            | 11AD 0427 8R | 638.3                                     | 421.2<br>0.1                                                | 342.1<br>0.4 | 303.0<br>0.9 | 277.9<br>1.6 | 259.9<br>2.5 | 246.1<br>3.6 | 225.7<br>6.3                | 9.3                                       | 26                           |
| 5                    | 210                            | 11AD 0521 8R | 413.0                                     | 339.9<br>0.2                                                | 276.1<br>0.6 | 244.5<br>1.4 | 224.3<br>2.4 | 209.8<br>3.8 | 198.6<br>5.4 | 182.2<br>9.6                | 7.7                                       | 22                           |
|                      | 240                            | 11AD 0524 8R | 441.8                                     | 337.8<br>0.1                                                | 274.4<br>0.5 | 242.9<br>1.0 | 222.8<br>1.8 | 208.4<br>2.9 | 197.3<br>4.2 | 181.0<br>7.4                | 7.4                                       | 22                           |
| 6                    | 180                            | 11AD 0618 8R | 803.0                                     | 613.0<br>0.2                                                | 497.9<br>0.6 | 440.9<br>1.4 | 404.4<br>2.5 | 378.2<br>4.0 | 358.1<br>5.7 | 328.5<br>10.1               | 11.2                                      | 32                           |
|                      | 210                            | 11AD 0621 8R | 849.2                                     | 601.9<br>0.1                                                | 488.9<br>0.5 | 432.9<br>1.0 | 397.1<br>1.9 | 371.4<br>2.9 | 351.6<br>4.2 | 322.6<br>7.4                | 10.8                                      | 32                           |
| 8                    | 150                            | 11AD 0815 8R | 804.6                                     | 724.1<br>0.2                                                | 596.2<br>0.7 | 527.9<br>1.5 | 484.3<br>2.7 | 452.9<br>4.2 | 428.8<br>6.1 | 393.3<br>10.8               | 10.5                                      | 30                           |
|                      | 180                            | 11AD 0818 8R | 854.0                                     | 716.0<br>0.1                                                | 581.6<br>0.5 | 515.0<br>1.1 | 472.4<br>1.9 | 441.8<br>2.9 | 418.3<br>4.2 | 383.7<br>7.5                | 10.1                                      | 30                           |
| 10                   | 120                            | 11AD 1012 8R | 441.8                                     | 397.6<br>0.2                                                | 374.8<br>0.9 | 331.9<br>2.1 | 304.4<br>3.7 | 284.7<br>5.8 | 269.6<br>8.3 | 247.3<br>14.8               | 7.4                                       | 22                           |
|                      | 150                            | 11AD 1015 8R | 484.8                                     | 436.3<br>0.1                                                | 367.2<br>0.6 | 325.1<br>1.3 | 298.2<br>2.4 | 278.9<br>3.7 | 264.1<br>5.3 | 242.2<br>9.5                | 7.1                                       | 22                           |
| 12                   | 120                            | 11AD 1212 8R | 675.2                                     | 607.7<br>0.2                                                | 607.7<br>0.8 | 561.6<br>1.8 | 515.1<br>3.1 | 321.2<br>4.9 | 304.1<br>7.0 | 278.9<br>12.5               | 7.2                                       | 22                           |
|                      | 150                            | 11AD 1215 8R | 727.0                                     | 654.3<br>0.1                                                | 615.5<br>0.5 | 545.0<br>1.1 | 499.9<br>2.0 | 311.7<br>3.1 | 295.1<br>4.5 | 270.7<br>8.0                | 6.9                                       | 22                           |
| 15                   | 120                            | 11AD 1512 8R | 662.0                                     | 595.8<br>0.2                                                | 595.8<br>0.6 | 595.8<br>1.4 | 585.1<br>2.5 | 315.9<br>3.9 | 299.1<br>5.6 | 274.4<br>9.9                | 6.4                                       | 19                           |
|                      | 150                            | 11AD 1515 8R | 698.6                                     | 628.7<br>0.1                                                | 628.7<br>0.4 | 612.8<br>0.9 | 562.1<br>1.6 | 303.5<br>2.5 | 287.4<br>3.6 | 263.6<br>6.3                | 6.2                                       | 19                           |
| 16                   | 120                            | 11AD 1612 8R | 673.6                                     | 606.2<br>0.1                                                | 606.2<br>0.6 | 606.2<br>1.3 | 604.8<br>2.3 | 326.6<br>3.6 | 309.2<br>5.2 | 283.6<br>9.3                | 6.4                                       | 19                           |
|                      | 150                            | 11AD 1615 8R | 707.3                                     | 636.6<br>0.1                                                | 636.6<br>0.4 | 631.8<br>0.8 | 579.6<br>1.5 | 313.0<br>2.3 | 296.3<br>3.4 | 271.8<br>6.0                | 6.2                                       | 19                           |

## (3) 11AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE           | Ts<br>(N·m) | Input Shaft Speed (Index/min) |              |              |              |              |              |              | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|----------------|-------------|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
|    |                |                |             | 25                            | 50           | 75           | 100          | 125          | 150          | 200          |             |             |
| 16 | 210            | 11AD 1621 7R 2 | 833.4       | 750.1                         | 696.5<br>0.1 | 616.7<br>0.3 | 565.7<br>0.5 | 529.1<br>0.8 | 500.9<br>1.1 | 459.5<br>2.0 | 11.0        | 32          |
|    | 240            | 11AD 1624 7R 2 | 870.1       | 783.1                         | 683.7<br>0.1 | 605.4<br>0.2 | 555.4<br>0.4 | 519.4<br>0.6 | 491.8<br>0.9 | 451.1<br>1.5 | 10.7        | 32          |
|    | 270            | 11AD 1627 7R 2 | 898.3       | 808.5                         | 670.6<br>0.1 | 593.8<br>0.2 | 544.7<br>0.3 | 509.4<br>0.5 | 482.3<br>0.7 | 442.4<br>1.2 | 10.4        | 32          |
| 20 | 180            | 11AD 2018 7R 2 | 678.0       | 610.2                         | 603.6<br>0.1 | 534.5<br>0.3 | 490.3<br>0.5 | 458.5<br>0.8 | 434.1<br>1.2 | 398.2<br>2.1 | 8.9         | 26          |
|    | 210            | 11AD 2021 7R 2 | 708.9       | 638.0                         | 589.3<br>0.1 | 521.8<br>0.2 | 478.7<br>0.4 | 447.7<br>0.6 | 423.8<br>0.8 | 388.8<br>1.5 | 8.7         | 26          |
|    | 240            | 11AD 2024 7R 2 | 891.4       | 802.3                         | 745.1<br>0.1 | 659.7<br>0.2 | 605.2<br>0.3 | 566.0<br>0.5 | 535.9<br>0.7 | 491.6<br>1.2 | 9.8         | 30          |
|    | 270            | 11AD 2027 7R 2 | 913.2       | 821.9                         | 727.9<br>0.1 | 644.6<br>0.1 | 591.3<br>0.2 | 553.0<br>0.4 | 523.6<br>0.5 | 480.3<br>1.0 | 9.6         | 30          |
| 24 | 180            | 11AD 2418 7R 2 | 690.8       | 621.7                         | 621.7<br>0.1 | 619.2<br>0.3 | 568.0<br>0.5 | 354.2<br>0.8 | 335.3<br>1.1 | 307.6<br>2.0 | 7.1         | 22          |
|    | 210            | 11AD 2421 7R 2 | 725.6       | 653.0                         | 653.0<br>0.1 | 606.0<br>0.2 | 555.9<br>0.4 | 346.6<br>0.6 | 328.1<br>0.8 | 301.0<br>1.4 | 6.9         | 22          |
|    | 240            | 11AD 2424 7R 2 | 751.2       | 676.1                         | 669.0<br>0.1 | 592.4<br>0.2 | 543.4<br>0.3 | 338.8<br>0.4 | 320.8<br>0.6 | 294.2<br>1.1 | 6.8         | 22          |
|    | 270            | 11AD 2427 7R 2 | 1087.2      | 755.7                         | 613.8<br>0.0 | 543.5<br>0.1 | 498.6<br>0.2 | 466.3<br>0.3 | 441.5<br>0.4 | 405.0<br>0.8 | 8.1         | 26          |
| 32 | 180            | 11AD 3218 7R 2 | 684.1       | 615.7                         | 615.7<br>0.1 | 615.7<br>0.2 | 615.7<br>0.4 | 358.8<br>0.6 | 339.7<br>0.8 | 311.6<br>1.5 | 6.3         | 19          |
|    | 210            | 11AD 3221 7R 2 | 706.4       | 635.8                         | 635.8<br>0.1 | 635.8<br>0.2 | 635.8<br>0.3 | 348.1<br>0.4 | 329.6<br>0.6 | 302.3<br>1.1 | 6.2         | 19          |
|    | 240            | 11AD 3224 7R 2 | 722.2       | 650.0                         | 650.0<br>0.1 | 650.0<br>0.1 | 626.2<br>0.2 | 338.1<br>0.3 | 320.1<br>0.5 | 293.7<br>0.8 | 6.1         | 19          |
|    | 270            | 11AD 3227 7R 2 | 733.6       | 660.2                         | 660.2<br>0.1 | 660.2<br>0.1 | 609.2<br>0.2 | 329.0<br>0.3 | 311.5<br>0.4 | 285.7<br>0.6 | 6.0         | 19          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m

# 15AD Torque Capacity Tables

## 15AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)  
 (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)  
 (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 15AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |               |               |               |               |                | Top (N·m)<br>Toi (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|----------------------------------------------|-------------------------------------------------------------|---------------|---------------|---------------|---------------|----------------|------------------------|----------------------------------------------|------------------------------|
|                      |                                |              |                                              | Input Shaft Speed (Index/min)                               |               |               |               |               |                |                        |                                              |                              |
|                      |                                |              |                                              | 25                                                          | 50            | 75            | 100           | 125           | 150            | 200                    |                                              |                              |
| 4                    | 270                            | 15AD 0427 7R | 872.2                                        | 657.4<br>0.3                                                | 534.0<br>1.3  | 472.8<br>3.0  | 433.7<br>5.4  | 405.7<br>8.4  | 384.1<br>12.1  | 352.3<br>21.6          | 17.2                                         | 32                           |
| 5                    | 240                            | 15AD 0524 7R | 899.6                                        | 741.9<br>0.3                                                | 602.6<br>1.4  | 533.6<br>3.1  | 489.4<br>5.5  | 457.8<br>8.6  | 433.4<br>12.3  | 397.6<br>22.0          | 16.1                                         | 30                           |
|                      | 270                            | 15AD 0527 7R | 964.3                                        | 741.4<br>0.3                                                | 602.2<br>1.1  | 533.3<br>2.4  | 489.2<br>4.3  | 457.5<br>6.8  | 433.1<br>9.8   | 397.3<br>17.3          | 15.7                                         | 30                           |
| 6                    | 180                            | 15AD 0618 7R | 1309.2                                       | 1135.9<br>0.5                                               | 922.6<br>2.1  | 817.0<br>4.7  | 749.4<br>8.3  | 700.9<br>12.9 | 663.6<br>18.6  | 608.7<br>33.1          | 22.1                                         | 40                           |
|                      | 210                            | 15AD 0621 7R | 2014.8                                       | 1634.0<br>0.4                                               | 1327.2<br>1.5 | 1175.2<br>3.4 | 1078.0<br>6.1 | 1008.2<br>9.5 | 954.5<br>13.7  | 875.6<br>24.3          | 25.4                                         | 47                           |
|                      | 240                            | 15AD 0624 7R | 2158.5                                       | 1624.8<br>0.3                                               | 1319.8<br>1.2 | 1168.6<br>2.6 | 1072.0<br>4.7 | 1002.6<br>7.3 | 949.2<br>10.5  | 870.7<br>18.6          | 24.5                                         | 47                           |
|                      | 270                            | 15AD 0627 7R | 2276.9                                       | 1610.9<br>0.2                                               | 1308.4<br>0.9 | 1158.6<br>2.1 | 1062.8<br>3.7 | 993.9<br>5.7  | 941.0<br>8.3   | 863.2<br>14.7          | 23.8                                         | 47                           |
| 8                    | 180                            | 15AD 0818 7R | 1555.5                                       | 1400.0<br>0.4                                               | 1186.5<br>1.6 | 1050.6<br>3.6 | 963.7<br>6.4  | 901.3<br>10.0 | 853.4<br>14.4  | 782.8<br>25.7          | 20.5                                         | 40                           |
|                      | 210                            | 15AD 0821 7R | 2311.5                                       | 2056.5<br>0.3                                               | 1670.4<br>1.2 | 1479.0<br>2.7 | 1356.8<br>4.8 | 1268.9<br>7.5 | 1201.4<br>10.8 | 1102.0<br>19.2         | 23.6                                         | 47                           |
|                      | 240                            | 15AD 0824 7R | 2430.2                                       | 2025.8<br>0.2                                               | 1645.5<br>0.9 | 1457.0<br>2.1 | 1336.5<br>3.7 | 1250.0<br>5.7 | 1183.5<br>8.3  | 1085.6<br>14.7         | 22.9                                         | 47                           |
|                      | 270                            | 15AD 0827 7R | 2523.1                                       | 1992.5<br>0.2                                               | 1618.4<br>0.7 | 1433.0<br>1.6 | 1314.5<br>2.9 | 1229.4<br>4.5 | 1164.0<br>6.5  | 1067.7<br>11.6         | 22.4                                         | 47                           |
| 10                   | 180                            | 15AD 1018 7R | 1384.0                                       | 1245.6<br>0.3                                               | 1077.7<br>1.3 | 954.3<br>2.9  | 875.4<br>5.1  | 818.7<br>8.0  | 775.1<br>11.5  | 711.0<br>20.5          | 17.2                                         | 35                           |
|                      | 210                            | 15AD 1021 7R | 1471.4                                       | 1306.2<br>0.2                                               | 1061.0<br>0.9 | 939.4<br>2.1  | 861.8<br>3.8  | 806.0<br>5.9  | 763.1<br>8.5   | 700.0<br>15.0          | 16.7                                         | 35                           |
|                      | 240                            | 15AD 1024 7R | 1913.0                                       | 1659.5<br>0.2                                               | 1347.9<br>0.7 | 1193.5<br>1.7 | 1094.8<br>3.0 | 1023.9<br>4.7 | 969.4<br>6.7   | 889.3<br>11.9          | 18.4                                         | 40                           |
|                      | 270                            | 15AD 1027 7R | 1973.6                                       | 1627.0<br>0.1                                               | 1321.6<br>0.6 | 1170.2<br>1.3 | 1073.4<br>2.4 | 1003.9<br>3.7 | 950.5<br>5.3   | 871.9<br>9.4           | 18.1                                         | 40                           |
| 12                   | 120                            | 15AD 1212 7R | 1111.1                                       | 1000.0<br>0.6                                               | 1000.0<br>2.5 | 1000.0<br>5.6 | 923.0<br>10.0 | 575.5<br>15.7 | 544.9<br>22.6  | 499.8<br>40.1          | 13.5                                         | 26                           |
|                      | 150                            | 15AD 1215 7R | 1569.9                                       | 1369.7<br>0.4                                               | 1112.6<br>1.5 | 985.1<br>3.3  | 903.7<br>6.0  | 704.3<br>9.3  | 666.8<br>13.4  | 611.7<br>23.8          | 14.7                                         | 30                           |
|                      | 180                            | 15AD 1218 7R | 1744.1                                       | 1423.6<br>0.3                                               | 1156.3<br>1.1 | 1023.9<br>2.4 | 939.2<br>4.2  | 732.0<br>6.6  | 693.0<br>9.5   | 635.7<br>16.8          | 14.8                                         | 32                           |
|                      | 210                            | 15AD 1221 7R | 1826.7                                       | 1391.1<br>0.2                                               | 1129.9<br>0.8 | 1000.5<br>1.7 | 917.8<br>3.1  | 715.3<br>4.8  | 677.2<br>6.9   | 621.2<br>12.3          | 14.4                                         | 32                           |
|                      | 240                            | 15AD 1224 7R | 2282.0                                       | 1567.5<br>0.2                                               | 1273.2<br>0.6 | 1127.3<br>1.4 | 1034.1<br>2.5 | 879.2<br>3.8  | 832.4<br>5.5   | 763.6<br>9.8           | 15.9                                         | 35                           |
|                      | 270                            | 15AD 1227 7R | 2339.4                                       | 1531.9<br>0.1                                               | 1244.3<br>0.5 | 1101.8<br>1.1 | 1010.7<br>1.9 | 859.3<br>3.0  | 813.6<br>4.4   | 746.3<br>7.8           | 15.7                                         | 35                           |
| 15                   | 150                            | 15AD 1515 7R | 1388.9                                       | 1250.0<br>0.3                                               | 1250.0<br>1.3 | 1250.0<br>2.9 | 1223.1<br>5.2 | 660.4<br>8.2  | 625.3<br>11.7  | 573.6<br>20.9          | 12.4                                         | 26                           |
|                      | 180                            | 15AD 1518 7R | 1792.0                                       | 1513.9<br>0.2                                               | 1229.6<br>0.8 | 1088.8<br>1.9 | 998.8<br>3.4  | 778.4<br>5.3  | 737.0<br>7.6   | 676.0<br>13.5          | 13.8                                         | 30                           |
|                      | 210                            | 15AD 1521 7R | 1852.5                                       | 1469.7<br>0.2                                               | 1193.7<br>0.6 | 1057.0<br>1.4 | 969.6<br>2.5  | 755.7<br>3.9  | 715.5<br>5.6   | 656.3<br>10.0          | 13.5                                         | 30                           |
|                      | 240                            | 15AD 1524 7R | 1895.3                                       | 1428.1<br>0.1                                               | 1160.0<br>0.5 | 1027.2<br>1.1 | 942.2<br>1.9  | 734.3<br>3.0  | 695.3<br>4.3   | 637.8<br>7.6           | 13.3                                         | 30                           |
|                      | 270                            | 15AD 1527 7R | 1998.6                                       | 1473.9<br>0.1                                               | 1197.1<br>0.4 | 1060.0<br>0.9 | 972.4<br>1.5  | 757.9<br>2.4  | 717.5<br>3.5   | 658.2<br>6.1           | 13.6                                         | 32                           |
| 16                   | 150                            | 15AD 1615 7R | 1422.9                                       | 1280.6<br>0.3                                               | 1280.6<br>1.2 | 1280.6<br>2.8 | 1269.3<br>4.9 | 685.4<br>7.7  | 648.9<br>11.1  | 595.3<br>19.7          | 12.3                                         | 26                           |
|                      | 180                            | 15AD 1618 7R | 1508.2                                       | 1357.4<br>0.2                                               | 1357.4<br>0.9 | 1348.8<br>1.9 | 1237.2<br>3.4 | 668.1<br>5.3  | 632.5<br>7.7   | 580.2<br>13.7          | 12.0                                         | 26                           |
|                      | 210                            | 15AD 1621 7R | 1567.8                                       | 1411.0<br>0.2                                               | 1411.0<br>0.6 | 1313.0<br>1.4 | 1204.4<br>2.5 | 650.4<br>3.9  | 615.7<br>5.6   | 564.8<br>10.0          | 11.8                                         | 26                           |
|                      | 240                            | 15AD 1624 7R | 1610.4                                       | 1449.4<br>0.1                                               | 1443.8<br>0.5 | 1278.5<br>1.1 | 1172.8<br>1.9 | 633.3<br>3.0  | 599.6<br>4.3   | 550.0<br>7.7           | 11.7                                         | 26                           |
|                      | 270                            | 15AD 1627 7R | 1941.1                                       | 1428.9<br>0.1                                               | 1160.6<br>0.4 | 1027.7<br>0.8 | 942.7<br>1.4  | 734.7<br>2.2  | 695.6<br>3.2   | 638.1<br>5.7           | 13.1                                         | 30                           |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
 All models in the torque capacity table are shown as type R.

1N·m≒0.102kgf·m



## (2) 15AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |               |               |                |                |                | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|-------------------------------------------|-------------------------------------------------------------|---------------|---------------|----------------|----------------|----------------|-----------------------------|-------------------------------------------|------------------------------|
|                      |                                |              |                                           | Input Shaft Speed (Index/min)                               |               |               |                |                |                |                             |                                           |                              |
|                      |                                |              |                                           | 25                                                          | 50            | 75            | 100            | 125            | 150            | 200                         |                                           |                              |
| 2                    | 330                            | 15AD 0233 8R | 757.4                                     | 499.0<br>0.6                                                | 405.3<br>2.5  | 358.9<br>5.7  | 329.2<br>10.1  | 307.9<br>15.8  | 291.5<br>22.8  | 267.4<br>40.5               | 17.3                                      | 30                           |
| 3                    | 270                            | 15AD 0327 8R | 673.7                                     | 500.0<br>0.7                                                | 406.2<br>2.8  | 359.6<br>6.2  | 329.9<br>11.1  | 308.5<br>17.3  | 292.1<br>24.9  | 268.0<br>44.3               | 14.2                                      | 26                           |
|                      | 300                            | 15AD 0330 8R | 724.6                                     | 502.4<br>0.6                                                | 408.1<br>2.2  | 361.4<br>5.0  | 331.5<br>9.0   | 310.0<br>14.0  | 293.5<br>20.2  | 269.2<br>35.8               | 13.9                                      | 26                           |
| 4                    | 240                            | 15AD 0424 8R | 1001.7                                    | 729.9<br>0.6                                                | 592.8<br>2.4  | 524.9<br>5.4  | 481.5<br>9.7   | 450.4<br>15.1  | 426.4<br>21.8  | 391.1<br>38.7               | 16.2                                      | 32                           |
|                      | 270                            | 15AD 0427 8R | 1066.4                                    | 726.9<br>0.5                                                | 590.4<br>1.9  | 522.8<br>4.3  | 479.6<br>7.7   | 448.5<br>12.0  | 424.7<br>17.2  | 389.5<br>30.6               | 15.8                                      | 32                           |
| 5                    | 210                            | 15AD 0521 8R | 1013.2                                    | 819.5<br>0.6                                                | 665.6<br>2.5  | 589.4<br>5.7  | 540.7<br>10.2  | 505.7<br>15.9  | 478.7<br>22.9  | 439.2<br>40.7               | 15.3                                      | 30                           |
|                      | 240                            | 15AD 0524 8R | 1121.1                                    | 862.8<br>0.5                                                | 700.8<br>2.0  | 620.5<br>4.4  | 569.2<br>7.9   | 532.4<br>12.3  | 504.0<br>17.8  | 462.3<br>31.6               | 15.4                                      | 32                           |
| 6                    | 180                            | 15AD 0618 8R | 1600.6                                    | 1256.0<br>0.7                                               | 1020.2<br>2.9 | 903.3<br>6.6  | 828.6<br>11.8  | 775.0<br>18.4  | 733.7<br>26.5  | 673.1<br>47.0               | 20.2                                      | 40                           |
|                      | 210                            | 15AD 0621 8R | 2362.5                                    | 1769.3<br>0.5                                               | 1437.2<br>2.2 | 1272.6<br>4.9 | 1167.3<br>8.6  | 1091.7<br>13.5 | 1033.6<br>19.4 | 948.2<br>34.5               | 23.3                                      | 47                           |
| 8                    | 150                            | 15AD 0815 8R | 1345.8                                    | 1211.2<br>0.8                                               | 1003.6<br>3.3 | 888.7<br>7.4  | 815.2<br>13.1  | 762.4<br>20.5  | 721.8<br>29.5  | 662.2<br>52.5               | 17.4                                      | 35                           |
|                      | 180                            | 15AD 0818 8R | 1811.7                                    | 1576.5<br>0.1                                               | 1280.5<br>0.5 | 1133.8<br>1.1 | 1040.1<br>1.9  | 972.7<br>2.9   | 921.0<br>4.2   | 844.8<br>7.5                | 19.0                                      | 40                           |
| 10                   | 120                            | 15AD 1012 8R | 1080.6                                    | 972.5<br>1.0                                                | 902.2<br>3.9  | 798.8<br>8.8  | 732.8<br>15.6  | 685.3<br>24.3  | 648.9<br>35.1  | 595.2<br>62.3               | 14.9                                      | 30                           |
|                      | 150                            | 15AD 1015 8R | 1224.5                                    | 1102.1<br>0.6                                               | 935.7<br>2.5  | 828.5<br>5.7  | 760.0<br>10.1  | 710.8<br>15.8  | 673.0<br>22.8  | 617.3<br>40.4               | 14.8                                      | 32                           |
| 12                   | 120                            | 15AD 1212 8R | 1706.7                                    | 1536.0<br>0.8                                               | 1291.8<br>3.3 | 1143.9<br>7.4 | 1049.3<br>13.2 | 817.8<br>20.6  | 774.3<br>29.7  | 710.2<br>52.8               | 14.9                                      | 32                           |
|                      | 150                            | 15AD 1215 8R | 1829.9                                    | 1540.2<br>0.5                                               | 1251.0<br>2.1 | 1107.8<br>4.8 | 1016.2<br>8.4  | 792.0<br>13.2  | 749.8<br>19.0  | 687.8<br>33.8               | 14.4                                      | 32                           |
| 15                   | 120                            | 15AD 1512 8R | 1450.5                                    | 1305.5<br>0.7                                               | 1305.5<br>2.9 | 1305.5<br>6.5 | 1305.5<br>11.6 | 721.7<br>18.1  | 683.2<br>26.1  | 626.8<br>46.3               | 12.2                                      | 26                           |
|                      | 150                            | 15AD 1515 8R | 1854.9                                    | 1626.8<br>0.4                                               | 1321.3<br>1.7 | 1170.0<br>3.9 | 1073.3<br>6.9  | 836.5<br>10.8  | 792.0<br>15.6  | 726.5<br>27.7               | 13.5                                      | 30                           |
| 16                   | 120                            | 15AD 1612 8R | 1480.9                                    | 1332.8<br>0.7                                               | 1332.8<br>2.7 | 1332.8<br>6.1 | 1332.8<br>10.9 | 747.6<br>17.1  | 707.8<br>24.6  | 649.3<br>43.7               | 12.1                                      | 26                           |
|                      | 150                            | 15AD 1615 8R | 1570.1                                    | 1413.1<br>0.4                                               | 1413.1<br>1.7 | 1413.1<br>3.9 | 1333.3<br>7.0  | 720.0<br>10.9  | 681.6<br>15.7  | 625.3<br>27.9               | 11.8                                      | 26                           |

## (3) 15AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE           | Ts<br>(N·m) | Input Shaft Speed (Index/min) |               |               |               |               |               |               | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|----------------|-------------|-------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|-------------|
|    |                |                |             | 25                            | 50            | 75            | 100           | 125           | 150           | 200           |             |             |
| 16 | 210            | 15AD 1621 7R 2 | 1341.6      | 1207.4<br>0.1                 | 1115.3<br>0.6 | 987.5<br>1.3  | 905.9<br>2.3  | 847.2<br>3.6  | 802.1<br>5.2  | 735.8<br>9.2  | 17.5        | 35          |
|    | 240            | 15AD 1624 7R 2 | 1774.5      | 1597.1<br>0.1                 | 1431.2<br>0.5 | 1267.3<br>1.0 | 1162.5<br>1.8 | 1087.2<br>2.8 | 1029.3<br>4.1 | 944.2<br>7.2  | 19.2        | 40          |
|    | 270            | 15AD 1627 7R 2 | 2523.1      | 2270.8<br>0.1                 | 1992.5<br>0.4 | 1764.3<br>0.8 | 1618.4<br>1.5 | 1513.6<br>2.3 | 1433.0<br>3.3 | 1314.5<br>5.8 | 22.4        | 47          |
| 20 | 180            | 15AD 2018 7R 2 | 1384.0      | 1245.6<br>0.2                 | 1245.6<br>0.6 | 1174.8<br>1.4 | 1077.7<br>2.6 | 1007.9<br>4.0 | 954.3<br>5.8  | 875.4<br>10.2 | 17.2        | 35          |
|    | 210            | 15AD 2021 7R 2 | 1833.8      | 1650.4<br>0.1                 | 1650.4<br>0.5 | 1497.5<br>1.1 | 1373.6<br>1.9 | 1284.7<br>3.0 | 1216.3<br>4.4 | 1115.7<br>7.8 | 18.9        | 40          |
|    | 240            | 15AD 2024 7R 2 | 1913.0      | 1721.7<br>0.1                 | 1659.5<br>0.4 | 1469.4<br>0.8 | 1347.9<br>1.5 | 1260.6<br>2.3 | 1193.5<br>3.4 | 1094.8<br>6.0 | 18.4        | 40          |
|    | 270            | 15AD 2027 7R 2 | 1973.6      | 1776.2<br>0.1                 | 1627.0<br>0.3 | 1440.7<br>0.7 | 1321.6<br>1.2 | 1236.0<br>1.8 | 1170.2<br>2.7 | 1073.4<br>4.7 | 18.1        | 40          |
| 24 | 180            | 15AD 2418 7R 2 | 1744.1      | 1569.7<br>0.1                 | 1423.6<br>0.5 | 1260.6<br>1.2 | 1156.3<br>2.1 | 901.2<br>3.3  | 853.2<br>4.7  | 782.7<br>8.4  | 14.8        | 32          |
|    | 210            | 15AD 2421 7R 2 | 1826.7      | 1644.0<br>0.1                 | 1391.1<br>0.4 | 1231.8<br>0.9 | 1129.9<br>1.5 | 880.6<br>2.4  | 833.8<br>3.5  | 764.8<br>6.2  | 14.4        | 32          |
|    | 240            | 15AD 2424 7R 2 | 1887.1      | 1672.4<br>0.1                 | 1358.4<br>0.3 | 1202.8<br>0.7 | 1103.3<br>1.2 | 859.9<br>1.8  | 814.1<br>2.7  | 746.8<br>4.7  | 14.1        | 32          |
|    | 270            | 15AD 2427 7R 2 | 2339.4      | 1886.0<br>0.1                 | 1531.9<br>0.2 | 1356.5<br>0.5 | 1244.3<br>1.0 | 1057.9<br>1.5 | 1001.6<br>2.2 | 918.8<br>3.9  | 15.7        | 35          |
| 32 | 180            | 15AD 3218 7R 2 | 1508.2      | 1357.4<br>0.1                 | 1357.4<br>0.4 | 1357.4<br>1.0 | 1357.4<br>1.7 | 822.5<br>2.7  | 778.7<br>3.8  | 714.3<br>6.8  | 12.0        | 26          |
|    | 210            | 15AD 3221 7R 2 | 1567.8      | 1411.0<br>0.1                 | 1411.0<br>0.3 | 1411.0<br>0.7 | 1411.0<br>1.3 | 800.7<br>2.0  | 758.1<br>2.8  | 695.4<br>5.0  | 11.8        | 26          |
|    | 240            | 15AD 3224 7R 2 | 1610.4      | 1449.4<br>0.1                 | 1449.4<br>0.2 | 1449.4<br>0.5 | 1443.8<br>1.0 | 779.6<br>1.5  | 738.1<br>2.2  | 677.1<br>3.8  | 11.7        | 26          |
|    | 270            | 15AD 3227 7R 2 | 1941.1      | 1747.0<br>0.0                 | 1428.9<br>0.2 | 1265.2<br>0.4 | 1160.6<br>0.7 | 904.6<br>1.1  | 856.4<br>1.6  | 785.6<br>2.8  | 13.1        | 30          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m

# 19AD Torque Capacity Tables

## 19AD Torque Transmission Capacity Table

(1) 1-dwell with cam curve SMS-3 (cam curve code 7)

(2) 1-dwell with cam curve SMCV-3 (cam curve code 8)

(3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 19AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |               |                |                |                |                | Top(N·m)<br>Toi (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF<br>(mm) |
|----------------------|--------------------------------|--------------|----------------------------------------------|-------------------------------------------------------------|---------------|----------------|----------------|----------------|----------------|-----------------------|----------------------------------------------|---------------------------------|
|                      |                                |              |                                              | Input Shaft Speed (Index/min)                               |               |                |                |                |                |                       |                                              |                                 |
|                      |                                |              |                                              | 25                                                          | 50            | 75             | 100            | 125            | 150            | 200                   |                                              |                                 |
| 4                    | 270                            | 19AD 0427 7R | 2054.0                                       | 1456.1<br>1.0                                               | 1182.8<br>4.1 | 1047.3<br>9.3  | 960.7<br>16.5  | 898.5<br>25.8  | 850.7<br>37.2  | 780.3<br>66.1         | 33.0                                         | 40                              |
| 5                    | 240                            | 19AD 0524 7R | 2144.1                                       | 1751.8<br>1.2                                               | 1422.9<br>4.6 | 1259.9<br>10.4 | 1155.8<br>18.5 | 1080.9<br>28.8 | 1023.4<br>41.5 | 938.8<br>73.8         | 32.1                                         | 40                              |
|                      | 270                            | 19AD 0527 7R | 2290.2                                       | 1747.6<br>0.9                                               | 1419.5<br>3.6 | 1256.9<br>8.2  | 1153.0<br>14.6 | 1078.4<br>22.8 | 1021.0<br>32.8 | 936.5<br>58.3         | 31.1                                         | 40                              |
| 6                    | 180                            | 19AD 0618 7R | 2687.7                                       | 2320.3<br>1.8                                               | 1884.7<br>7.1 | 1668.8<br>15.9 | 1530.8<br>28.2 | 1431.7<br>44.1 | 1355.5<br>63.5 | 1243.4<br>112.8       | 39.4                                         | 52                              |
|                      | 210                            | 19AD 0621 7R | 3865.9                                       | 3278.2<br>1.4                                               | 2662.7<br>5.5 | 2357.7<br>12.3 | 2162.8<br>21.9 | 2022.8<br>34.2 | 1915.1<br>49.2 | 1756.7<br>87.5        | 44.5                                         | 60                              |
|                      | 240                            | 19AD 0624 7R | 4174.2                                       | 3272.7<br>1.0                                               | 2658.2<br>4.2 | 2353.8<br>9.4  | 2159.1<br>16.7 | 2019.3<br>26.2 | 1911.9<br>37.7 | 1753.8<br>67.0        | 43.0                                         | 60                              |
|                      | 270                            | 19AD 0627 7R | 4433.9                                       | 3255.8<br>0.8                                               | 2644.6<br>3.3 | 2341.7<br>7.4  | 2148.0<br>13.2 | 2009.0<br>20.7 | 1902.0<br>29.8 | 1744.8<br>52.9        | 41.8                                         | 60                              |
| 8                    | 180                            | 19AD 0818 7R | 3177.0                                       | 2859.3<br>1.4                                               | 2413.2<br>5.4 | 2136.8<br>12.2 | 1960.1<br>21.7 | 1833.2<br>33.9 | 1735.6<br>48.8 | 1592.1<br>86.8        | 36.5                                         | 52                              |
|                      | 210                            | 19AD 0821 7R | 3416.9                                       | 2941.9<br>1.0                                               | 2389.6<br>4.0 | 2115.9<br>9.0  | 1940.9<br>15.9 | 1815.2<br>24.9 | 1718.6<br>35.9 | 1576.5<br>63.8        | 35.2                                         | 52                              |
|                      | 240                            | 19AD 0824 7R | 4778.9                                       | 4139.9<br>0.8                                               | 3362.6<br>3.3 | 2977.5<br>7.4  | 2731.3<br>13.1 | 2554.4<br>20.4 | 2418.5<br>29.4 | 2218.5<br>52.3        | 40.3                                         | 60                              |
|                      | 270                            | 19AD 0827 7R | 4992.8                                       | 4084.6<br>0.6                                               | 3317.7<br>2.6 | 2937.7<br>5.8  | 2694.8<br>10.3 | 2520.3<br>16.2 | 2386.2<br>23.3 | 2188.9<br>41.3        | 39.4                                         | 60                              |
| 10                   | 180                            | 19AD 1018 7R | 2995.5                                       | 2696.0<br>1.1                                               | 2324.9<br>4.3 | 2058.6<br>9.7  | 1888.4<br>17.3 | 1766.1<br>27.0 | 1672.1<br>38.9 | 1533.9<br>69.1        | 30.9                                         | 47                              |
|                      | 210                            | 19AD 1021 7R | 3168.5                                       | 2810.8<br>0.8                                               | 2283.0<br>3.2 | 2021.6<br>7.1  | 1854.4<br>12.7 | 1734.3<br>19.8 | 1642.0<br>28.6 | 1506.2<br>50.8        | 30.1                                         | 47                              |
|                      | 240                            | 19AD 1024 7R | 3872.3                                       | 3355.5<br>0.6                                               | 2725.5<br>2.5 | 2413.3<br>5.6  | 2213.8<br>10.0 | 2070.5<br>15.6 | 1960.2<br>22.5 | 1798.2<br>40.1        | 33.0                                         | 52                              |
|                      | 270                            | 19AD 1027 7R | 3988.3                                       | 3287.2<br>0.5                                               | 2670.0<br>2.0 | 2364.2<br>4.5  | 2168.7<br>7.9  | 2028.3<br>12.4 | 1920.3<br>17.8 | 1761.5<br>31.6        | 32.4                                         | 52                              |
| 12                   | 120                            | 19AD 1212 7R | 1964.9                                       | 1768.4<br>1.9                                               | 1768.4<br>7.8 | 1661.1<br>17.4 | 1523.7<br>31.0 | 1187.6<br>48.5 | 1124.4<br>69.8 | 1031.4<br>124.1       | 26.0                                         | 35                              |
|                      | 150                            | 19AD 1215 7R | 3136.3                                       | 2674.5<br>1.2                                               | 2172.3<br>5.0 | 1923.5<br>11.2 | 1764.5<br>19.8 | 1650.2<br>31.0 | 1562.4<br>44.7 | 1433.2<br>79.4        | 29.3                                         | 40                              |
|                      | 180                            | 19AD 1218 7R | 3341.0                                       | 2613.4<br>0.9                                               | 2122.8<br>3.4 | 1879.6<br>7.8  | 1724.2<br>13.8 | 1612.6<br>21.5 | 1526.7<br>31.0 | 1400.5<br>55.1        | 28.3                                         | 40                              |
|                      | 210                            | 19AD 1221 7R | 3485.6                                       | 2548.8<br>0.6                                               | 2070.3<br>2.5 | 1833.1<br>5.7  | 1681.6<br>10.1 | 1572.7<br>15.8 | 1489.0<br>22.8 | 1365.9<br>40.5        | 27.7                                         | 40                              |
|                      | 240                            | 19AD 1224 7R | 3590.2                                       | 2485.2<br>0.5                                               | 2018.6<br>1.9 | 1787.4<br>4.4  | 1639.6<br>7.8  | 1533.4<br>12.1 | 1451.8<br>17.4 | 1331.8<br>31.0        | 27.2                                         | 40                              |
|                      | 270                            | 19AD 1227 7R | 4227.1                                       | 2974.4<br>0.4                                               | 2415.9<br>1.6 | 2139.2<br>3.7  | 1962.4<br>6.5  | 1835.3<br>10.2 | 1737.6<br>14.7 | 1593.9<br>26.1        | 28.2                                         | 47                              |
| 15                   | 150                            | 19AD 1515 7R | 2852.3                                       | 2567.1<br>1.0                                               | 2513.8<br>4.0 | 2225.9<br>9.0  | 2041.8<br>16.0 | 1350.3<br>25.1 | 1278.4<br>36.1 | 1172.7<br>64.2        | 24.0                                         | 35                              |
|                      | 180                            | 19AD 1518 7R | 3022.8                                       | 2720.5<br>0.7                                               | 2450.1<br>2.8 | 2169.5<br>6.3  | 1990.1<br>11.1 | 1316.1<br>17.4 | 1246.0<br>25.1 | 1143.0<br>44.6        | 23.5                                         | 35                              |
|                      | 210                            | 19AD 1521 7R | 3141.6                                       | 2827.4<br>0.5                                               | 2384.9<br>2.0 | 2111.8<br>4.6  | 1937.1<br>8.2  | 1281.1<br>12.8 | 1212.9<br>18.4 | 1112.6<br>32.8        | 23.0                                         | 35                              |
|                      | 240                            | 19AD 1524 7R | 3226.7                                       | 2858.8<br>0.4                                               | 2322.1<br>1.6 | 2056.1<br>3.5  | 1886.1<br>6.3  | 1247.3<br>9.8  | 1180.9<br>14.1 | 1083.3<br>25.1        | 22.7                                         | 35                              |
|                      | 270                            | 19AD 1527 7R | 3263.1                                       | 2936.8<br>0.3                                               | 2394.1<br>1.4 | 2119.9<br>3.0  | 1944.6<br>5.4  | 1818.7<br>8.5  | 1721.9<br>12.2 | 1579.5<br>21.6        | 26.2                                         | 40                              |
| 16                   | 150                            | 19AD 1615 7R | 2764.3                                       | 2487.9<br>0.9                                               | 2396.5<br>3.7 | 2122.0<br>8.4  | 1946.5<br>14.9 | 1287.3<br>23.3 | 1218.8<br>33.5 | 1118.0<br>59.6        | 23.2                                         | 32                              |
|                      | 180                            | 19AD 1618 7R | 3075.3                                       | 2767.8<br>0.7                                               | 2532.7<br>2.6 | 2242.6<br>5.9  | 2057.2<br>10.5 | 1360.5<br>16.4 | 1288.0<br>23.6 | 1181.5<br>41.9        | 23.3                                         | 35                              |
|                      | 210                            | 19AD 1621 7R | 3184.7                                       | 2866.2<br>0.5                                               | 2460.9<br>1.9 | 2179.0<br>4.3  | 1998.9<br>7.7  | 1321.9<br>12.0 | 1251.5<br>17.3 | 1148.0<br>30.8        | 22.9                                         | 35                              |
|                      | 240                            | 19AD 1624 7R | 3262.3                                       | 2936.1<br>0.4                                               | 2392.9<br>1.5 | 2118.8<br>3.3  | 1943.6<br>5.9  | 1285.4<br>9.2  | 1216.9<br>13.3 | 1116.3<br>23.6        | 22.6                                         | 35                              |
|                      | 270                            | 19AD 1627 7R | 3318.9                                       | 2868.3<br>0.3                                               | 2329.8<br>1.2 | 2062.9<br>2.6  | 1892.4<br>4.7  | 1251.4<br>7.3  | 1184.8<br>10.5 | 1086.9<br>18.6        | 22.4                                         | 35                              |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 19AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                |                |                |                |                 | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|-------------------------------------------|-------------------------------------------------------------|----------------|----------------|----------------|----------------|-----------------|-----------------------------|-------------------------------------------|------------------------------|
|                      |                                |              |                                           | Input Shaft Speed (Index/min)                               |                |                |                |                |                 |                             |                                           |                              |
|                      |                                |              |                                           | 25                                                          | 50             | 75             | 100            | 125            | 150             | 200                         |                                           |                              |
| 2                    | 330                            | 19AD 0233 8R | 1866.9                                    | 1178.1<br>2.0                                               | 956.9<br>7.8   | 847.3<br>17.7  | 777.2<br>31.4  | 726.9<br>49.1  | 688.2<br>70.6   | 631.3<br>125.6              | 34.5                                      | 40                           |
| 3                    | 270                            | 19AD 0327 8R | 2080.7                                    | 1491.6<br>2.1                                               | 1211.5<br>8.6  | 1072.8<br>19.3 | 984.1<br>34.3  | 920.3<br>53.7  | 871.4<br>77.3   | 799.3<br>137.4              | 32.5                                      | 40                           |
|                      | 300                            | 19AD 0330 8R | 2213.5                                    | 1490.6<br>1.7                                               | 1210.7<br>7.0  | 1072.0<br>15.6 | 983.4<br>27.8  | 919.7<br>43.5  | 870.8<br>62.6   | 798.8<br>111.3              | 31.6                                      | 40                           |
| 4                    | 240                            | 19AD 0424 8R | 2618.8                                    | 1983.4<br>2.1                                               | 1611.0<br>8.5  | 1426.5<br>19.0 | 1308.5<br>33.8 | 1223.8<br>52.9 | 1158.7<br>76.2  | 1062.9<br>135.4             | 32.9                                      | 47                           |
|                      | 270                            | 19AD 0427 8R | 2781.7                                    | 1973.2<br>1.7                                               | 1602.7<br>6.7  | 1419.1<br>15.0 | 1301.8<br>26.7 | 1217.5<br>41.8 | 1152.7<br>60.2  | 1057.4<br>107.0             | 32.0                                      | 47                           |
| 5                    | 210                            | 19AD 0521 8R | 2424.9                                    | 1897.9<br>2.0                                               | 1541.6<br>7.8  | 1365.0<br>17.6 | 1252.2<br>31.4 | 1171.1<br>49.0 | 1108.7<br>70.5  | 1017.1<br>125.4             | 30.5                                      | 40                           |
|                      | 240                            | 19AD 0524 8R | 2563.5                                    | 1874.8<br>1.5                                               | 1522.8<br>6.0  | 1348.4<br>13.5 | 1236.9<br>24.0 | 1156.8<br>37.5 | 1095.2<br>54.0  | 1004.7<br>96.0              | 29.6                                      | 40                           |
| 6                    | 180                            | 19AD 0618 8R | 3265.7                                    | 2557.6<br>2.5                                               | 2077.4<br>10.0 | 1839.5<br>22.5 | 1687.4<br>40.0 | 1578.1<br>62.6 | 1494.1<br>90.1  | 1370.6<br>160.2             | 36.0                                      | 52                           |
|                      | 210                            | 19AD 0621 8R | 4625.2                                    | 3585.7<br>1.9                                               | 2912.5<br>7.8  | 2578.9<br>17.5 | 2365.7<br>31.0 | 2212.5<br>48.5 | 2094.8<br>69.8  | 1921.5<br>124.1             | 40.9                                      | 60                           |
| 8                    | 150                            | 19AD 0815 8R | 2918.8                                    | 2626.9<br>2.7                                               | 2172.9<br>10.8 | 1924.0<br>24.4 | 1764.9<br>43.3 | 1650.7<br>67.7 | 1562.8<br>97.5  | 1433.6<br>173.3             | 31.3                                      | 47                           |
|                      | 180                            | 19AD 0818 8R | 3677.3                                    | 3196.4<br>1.9                                               | 2596.2<br>7.7  | 2298.9<br>17.3 | 2108.8<br>30.8 | 1972.3<br>48.1 | 1867.3<br>69.3  | 1712.9<br>123.2             | 33.9                                      | 52                           |
| 10                   | 120                            | 19AD 1012 8R | 2563.5                                    | 2307.2<br>3.0                                               | 2080.2<br>12.0 | 1841.9<br>27.0 | 1689.6<br>48.0 | 1580.2<br>75.0 | 1496.1<br>108.0 | 1372.4<br>192.0             | 29.6                                      | 40                           |
|                      | 150                            | 19AD 1015 8R | 2761.4                                    | 2485.3<br>1.9                                               | 2019.2<br>7.7  | 1787.9<br>17.3 | 1640.1<br>30.7 | 1533.9<br>48.0 | 1452.3<br>69.1  | 1332.2<br>122.9             | 28.5                                      | 40                           |
| 12                   | 120                            | 19AD 1212 8R | 2728.5                                    | 2455.7<br>2.5                                               | 2319.2<br>10.1 | 2053.6<br>22.7 | 1883.8<br>40.4 | 1761.8<br>63.2 | 1668.0<br>91.0  | 1530.1<br>161.8             | 28.6                                      | 40                           |
|                      | 150                            | 19AD 1215 8R | 2890.2                                    | 2601.2<br>1.6                                               | 2232.4<br>6.5  | 1976.7<br>14.6 | 1813.2<br>25.9 | 1695.8<br>40.4 | 1605.6<br>58.2  | 1472.8<br>103.5             | 27.7                                      | 40                           |
| 15                   | 120                            | 19AD 1512 8R | 2968.1                                    | 2671.3<br>2.2                                               | 2671.3<br>8.9  | 2427.8<br>20.0 | 2227.1<br>35.6 | 1472.8<br>55.6 | 1394.4<br>80.1  | 1279.1<br>142.4             | 23.6                                      | 35                           |
|                      | 150                            | 19AD 1515 8R | 3146.2                                    | 2831.6<br>1.4                                               | 2640.1<br>5.7  | 2337.8<br>12.8 | 2144.5<br>22.8 | 1418.2<br>35.6 | 1342.7<br>51.3  | 1231.7<br>91.1              | 23.0                                      | 35                           |
| 16                   | 120                            | 19AD 1612 8R | 2866.9                                    | 2580.2<br>2.1                                               | 2580.2<br>8.3  | 2310.6<br>18.6 | 2119.6<br>33.1 | 1401.7<br>51.6 | 1327.1<br>74.4  | 1217.4<br>132.2             | 22.9                                      | 32                           |
|                      | 150                            | 19AD 1615 8R | 3188.9                                    | 2870.0<br>1.3                                               | 2724.1<br>5.4  | 2412.1<br>12.1 | 2212.6<br>21.4 | 1463.3<br>33.5 | 1385.4<br>48.2  | 1270.8<br>85.7              | 22.9                                      | 35                           |

## (3) 19AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE           | Ts<br>(N·m) | Input Shaft Speed (Index/min) |               |               |               |                |                | Tx<br>(N·m)    | SCF<br>(mm) |     |
|----|----------------|----------------|-------------|-------------------------------|---------------|---------------|---------------|----------------|----------------|----------------|-------------|-----|
|    |                |                |             | 25                            | 50            | 75            | 100           | 125            | 150            |                |             | 200 |
| 16 | 210            | 19AD 1621 7R 2 | 2910.5      | 2619.5<br>0.5                 | 2414.8<br>1.9 | 2138.3<br>4.4 | 1961.5<br>7.8 | 1834.5<br>12.2 | 1736.8<br>17.5 | 1593.2<br>31.1 | 31.3        | 47  |
|    | 240            | 19AD 1624 7R 2 | 3605.2      | 3244.7<br>0.4                 | 2903.2<br>1.5 | 2570.7<br>3.4 | 2358.1<br>6.1 | 2205.4<br>9.5  | 2088.0<br>13.7 | 1915.4<br>24.4 | 34.3        | 52  |
|    | 270            | 19AD 1627 7R 2 | 4992.8      | 4493.5<br>0.3                 | 4084.6<br>1.3 | 3616.8<br>2.9 | 3317.7<br>5.2 | 3102.9<br>8.1  | 2937.7<br>11.6 | 2694.8<br>20.7 | 39.4        | 60  |
| 20 | 180            | 19AD 2018 7R 2 | 2623.2      | 2360.9<br>0.5                 | 2294.0<br>1.9 | 2031.2<br>4.2 | 1863.3<br>7.5 | 1742.6<br>11.7 | 1649.9<br>16.9 | 1513.4<br>30.1 | 29.3        | 40  |
|    | 210            | 19AD 2021 7R 2 | 3168.5      | 2851.7<br>0.4                 | 2810.8<br>1.6 | 2488.8<br>3.6 | 2283.0<br>6.3 | 2135.2<br>9.9  | 2021.6<br>14.3 | 1854.4<br>25.4 | 30.1        | 47  |
|    | 240            | 19AD 2024 7R 2 | 3872.3      | 3485.1<br>0.3                 | 3355.5<br>1.3 | 2971.2<br>2.8 | 2725.5<br>5.0 | 2549.0<br>7.8  | 2413.3<br>11.3 | 2213.8<br>20.0 | 33.0        | 52  |
|    | 270            | 19AD 2027 7R 2 | 3988.3      | 3589.5<br>0.2                 | 3287.2<br>1.0 | 2910.7<br>2.2 | 2670.0<br>4.0 | 2497.1<br>6.2  | 2364.2<br>8.9  | 2168.7<br>15.8 | 32.4        | 52  |
| 24 | 180            | 19AD 2418 7R 2 | 3341.0      | 3006.9<br>0.4                 | 2613.4<br>1.7 | 2314.1<br>3.9 | 2122.8<br>6.9 | 1985.3<br>10.8 | 1879.6<br>15.5 | 1724.2<br>27.6 | 28.3        | 40  |
|    | 210            | 19AD 2421 7R 2 | 3485.6      | 3137.0<br>0.3                 | 2548.8<br>1.3 | 2256.9<br>2.8 | 2070.3<br>5.1 | 1936.2<br>7.9  | 1833.1<br>11.4 | 1681.6<br>20.3 | 27.7        | 40  |
|    | 240            | 19AD 2424 7R 2 | 3590.2      | 3059.6<br>0.2                 | 2485.2<br>1.0 | 2200.5<br>2.2 | 2018.6<br>3.9 | 1887.9<br>6.1  | 1787.4<br>8.7  | 1639.6<br>15.5 | 27.2        | 40  |
|    | 270            | 19AD 2427 7R 2 | 4227.1      | 3661.9<br>0.2                 | 2974.4<br>0.8 | 2633.7<br>1.8 | 2415.9<br>3.3 | 2259.5<br>5.1  | 2139.2<br>7.3  | 1962.4<br>13.0 | 28.2        | 47  |
| 32 | 180            | 19AD 3218 7R 2 | 3075.3      | 2767.8<br>0.3                 | 2767.8<br>1.3 | 2761.0<br>2.9 | 2532.7<br>5.2 | 1674.9<br>8.2  | 1585.8<br>11.8 | 1454.7<br>21.0 | 23.3        | 35  |
|    | 210            | 19AD 3221 7R 2 | 3184.7      | 2866.2<br>0.2                 | 2866.2<br>1.0 | 2682.7<br>2.2 | 2460.9<br>3.9 | 1627.4<br>6.0  | 1540.8<br>8.7  | 1413.4<br>15.4 | 22.9        | 35  |
|    | 240            | 19AD 3224 7R 2 | 3262.3      | 2936.1<br>0.2                 | 2936.1<br>0.7 | 2608.6<br>1.7 | 2392.9<br>2.9 | 1582.5<br>4.6  | 1498.2<br>6.6  | 1374.3<br>11.8 | 22.6        | 35  |
|    | 270            | 19AD 3227 7R 2 | 3318.9      | 2987.0<br>0.1                 | 2868.3<br>0.6 | 2539.8<br>1.3 | 2329.8<br>2.3 | 1540.7<br>3.6  | 1458.7<br>5.2  | 1338.1<br>9.3  | 22.4        | 35  |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m

# 23AD Torque Capacity Tables

## 23AD Torque Transmission Capacity Table

(1) 1-dwell with cam curve SMS-3 (cam curve code 7)

(2) 1-dwell with cam curve SMCV-3 (cam curve code 8)

(3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 23AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                |                |                 |                 |                 | Top(N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF<br>(mm) |
|----------------------|--------------------------------|--------------|----------------------------------------------|-------------------------------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|----------------------------|----------------------------------------------|---------------------------------|
|                      |                                |              |                                              | Input Shaft Speed (Index/min)                               |                |                |                 |                 |                 |                            |                                              |                                 |
|                      |                                |              |                                              | 25                                                          | 50             | 75             | 100             | 125             | 150             | 200                        |                                              |                                 |
| 4                    | 270                            | 23AD 0427 7R | 2691.9                                       | 2035.7<br>3.2                                               | 1653.5<br>12.9 | 1464.1<br>29.1 | 1343.0<br>51.8  | 1256.1<br>80.9  | 1189.2<br>116.5 | 1090.9<br>207.1            | 38.7                                         | 47                              |
| 5                    | 240                            | 23AD 0524 7R | 2963.4                                       | 2417.9<br>3.1                                               | 1964.0<br>12.4 | 1739.0<br>27.9 | 1595.2<br>49.6  | 1492.0<br>77.5  | 1412.5<br>111.7 | 1295.7<br>198.5            | 37.6                                         | 47                              |
|                      | 270                            | 23AD 0527 7R | 3169.1                                       | 2413.7<br>2.5                                               | 1960.5<br>9.8  | 1736.0<br>22.1 | 1592.4<br>39.2  | 1489.3<br>61.3  | 1410.0<br>88.2  | 1293.5<br>156.9            | 36.5                                         | 47                              |
| 6                    | 180                            | 23AD 0618 7R | 4245.3                                       | 3684.0<br>5.0                                               | 2992.3<br>20.0 | 2649.6<br>45.0 | 2430.5<br>80.0  | 2273.2<br>125.0 | 2152.2<br>180.0 | 1974.2<br>320.0            | 52.1                                         | 60                              |
|                      | 210                            | 23AD 0621 7R | 5879.5                                       | 4985.4<br>3.6                                               | 4049.4<br>14.5 | 3585.6<br>32.6 | 3289.1<br>57.9  | 3076.2<br>90.5  | 2912.4<br>130.4 | 2671.6<br>231.7            | 57.6                                         | 70                              |
|                      | 240                            | 23AD 0624 7R | 6364.0                                       | 4983.0<br>2.8                                               | 4047.5<br>11.1 | 3583.9<br>25.0 | 3287.6<br>44.4  | 3074.7<br>69.3  | 2911.0<br>99.8  | 2670.3<br>177.4            | 55.5                                         | 70                              |
|                      | 270                            | 23AD 0627 7R | 6775.0                                       | 4962.9<br>2.2                                               | 4031.2<br>8.8  | 3569.5<br>19.7 | 3274.3<br>35.0  | 3062.3<br>54.8  | 2899.3<br>78.9  | 2659.6<br>140.2            | 53.8                                         | 70                              |
| 8                    | 180                            | 23AD 0818 7R | 5058.4                                       | 4552.6<br>3.6                                               | 3857.2<br>14.5 | 3415.4<br>32.6 | 3133.0<br>58.0  | 2930.2<br>90.6  | 2774.2<br>130.4 | 2544.8<br>231.9            | 48.0                                         | 60                              |
|                      | 210                            | 23AD 0821 7R | 5464.8                                       | 4712.8<br>2.7                                               | 3828.0<br>10.6 | 3389.5<br>24.0 | 3109.3<br>42.6  | 2907.9<br>66.5  | 2753.2<br>95.8  | 2525.5<br>170.3            | 46.2                                         | 60                              |
|                      | 240                            | 23AD 0824 7R | 7325.3                                       | 6331.5<br>2.2                                               | 5142.8<br>8.7  | 4553.8<br>19.6 | 4177.3<br>34.8  | 3906.8<br>54.3  | 3698.8<br>78.2  | 3393.0<br>139.0            | 51.8                                         | 70                              |
|                      | 270                            | 23AD 0827 7R | 7669.2                                       | 6253.5<br>1.7                                               | 5079.5<br>6.9  | 4497.7<br>15.4 | 4125.8<br>27.5  | 3858.6<br>42.9  | 3653.3<br>61.8  | 3351.2<br>109.9            | 50.6                                         | 70                              |
| 10                   | 180                            | 23AD 1018 7R | 4187.8                                       | 3769.0<br>3.0                                               | 3286.2<br>12.1 | 2909.8<br>27.2 | 2669.2<br>48.4  | 2496.4<br>75.7  | 2363.5<br>108.9 | 2168.1<br>193.7            | 38.6                                         | 52                              |
|                      | 210                            | 23AD 1021 7R | 4469.4                                       | 3990.7<br>2.2                                               | 3241.4<br>8.9  | 2870.2<br>20.0 | 2632.9<br>35.6  | 2462.4<br>55.6  | 2331.3<br>80.0  | 2138.6<br>142.3            | 37.4                                         | 52                              |
|                      | 240                            | 23AD 1024 7R | 6252.1                                       | 5412.6<br>1.7                                               | 4396.4<br>6.7  | 3892.9<br>15.1 | 3571.0<br>26.8  | 3339.8<br>42.0  | 3162.0<br>60.4  | 2900.6<br>107.4            | 43.0                                         | 60                              |
|                      | 270                            | 23AD 1027 7R | 6456.4                                       | 5309.4<br>1.3                                               | 4312.6<br>5.3  | 3818.6<br>11.9 | 3502.9<br>21.2  | 3276.1<br>33.1  | 3101.7<br>47.7  | 2845.2<br>84.9             | 42.2                                         | 60                              |
| 12                   | 120                            | 23AD 1212 7R | 3100.4                                       | 2790.4<br>6.6                                               | 2661.4<br>26.3 | 2356.6<br>59.3 | 2161.7<br>105.3 | 1684.8<br>164.6 | 1595.1<br>237.0 | 1463.2<br>421.4            | 30.4                                         | 40                              |
|                      | 150                            | 23AD 1215 7R | 5078.9                                       | 3778.7<br>3.6                                               | 3069.2<br>14.4 | 2717.7<br>32.3 | 2493.0<br>57.5  | 2331.6<br>89.9  | 2207.5<br>129.4 | 2024.9<br>230.0            | 34.2                                         | 47                              |
|                      | 180                            | 23AD 1218 7R | 6387.4                                       | 4562.0<br>2.6                                               | 3705.5<br>10.3 | 3281.1<br>23.1 | 3009.8<br>41.1  | 2814.9<br>64.2  | 2665.1<br>92.5  | 2444.7<br>164.4            | 37.2                                         | 52                              |
|                      | 210                            | 23AD 1221 7R | 6727.8                                       | 4470.4<br>1.9                                               | 3631.1<br>7.5  | 3215.2<br>17.0 | 2949.4<br>30.2  | 2758.4<br>47.2  | 2611.6<br>67.9  | 2395.6<br>120.8            | 36.3                                         | 52                              |
|                      | 240                            | 23AD 1224 7R | 6980.2                                       | 4374.7<br>1.4                                               | 3553.3<br>5.8  | 3146.4<br>13.0 | 2886.2<br>23.1  | 2699.3<br>36.1  | 2555.7<br>52.0  | 2344.3<br>92.5             | 35.5                                         | 52                              |
|                      | 270                            | 23AD 1227 7R | 7170.6                                       | 4280.0<br>1.1                                               | 3476.5<br>4.6  | 3078.3<br>10.3 | 2823.8<br>18.3  | 2640.9<br>28.5  | 2500.3<br>41.1  | 2293.6<br>73.1             | 35.0                                         | 52                              |
| 15                   | 150                            | 23AD 1515 7R | 3960.0                                       | 3564.0<br>3.4                                               | 3564.0<br>13.6 | 3564.0<br>30.7 | 3311.8<br>54.6  | 1959.1<br>85.3  | 1854.8<br>122.8 | 1701.5<br>218.3            | 28.0                                         | 40                              |
|                      | 180                            | 23AD 1518 7R | 4255.0                                       | 3829.5<br>2.4                                               | 3829.5<br>9.5  | 3543.1<br>21.3 | 3250.2<br>37.9  | 1922.7<br>59.2  | 1820.3<br>85.3  | 1669.8<br>151.6            | 27.2                                         | 40                              |
|                      | 210                            | 23AD 1521 7R | 6051.6                                       | 4077.3<br>1.5                                               | 3311.8<br>6.0  | 2932.5<br>13.5 | 2690.0<br>24.0  | 2515.8<br>37.4  | 2381.9<br>53.9  | 2184.9<br>95.8             | 31.2                                         | 47                              |
|                      | 240                            | 23AD 1524 7R | 6201.3                                       | 3965.3<br>1.1                                               | 3220.8<br>4.6  | 2851.9<br>10.3 | 2616.1<br>18.3  | 2446.7<br>28.7  | 2316.5<br>41.3  | 2125.0<br>73.4             | 30.7                                         | 47                              |
|                      | 270                            | 23AD 1527 7R | 6310.6                                       | 3861.2<br>0.9                                               | 3136.3<br>3.6  | 2777.1<br>8.2  | 2547.5<br>14.5  | 2382.5<br>22.6  | 2255.7<br>32.6  | 2069.2<br>58.0             | 30.4                                         | 47                              |
| 16                   | 150                            | 23AD 1615 7R | 4069.4                                       | 3662.5<br>3.2                                               | 3662.5<br>12.8 | 3662.5<br>28.9 | 3444.2<br>51.4  | 2037.4<br>80.3  | 1929.0<br>115.6 | 1769.5<br>205.5            | 27.7                                         | 40                              |
|                      | 180                            | 23AD 1618 7R | 4348.4                                       | 3913.6<br>2.2                                               | 3913.6<br>8.9  | 3674.6<br>20.1 | 3370.8<br>35.7  | 1994.0<br>55.7  | 1887.9<br>80.3  | 1731.8<br>142.7            | 27.0                                         | 40                              |
|                      | 210                            | 23AD 1621 7R | 4547.2                                       | 4092.5<br>1.6                                               | 4051.9<br>6.6  | 3587.8<br>14.7 | 3291.2<br>26.2  | 1946.9<br>40.9  | 1843.3<br>59.0  | 1690.9<br>104.8            | 26.5                                         | 40                              |
|                      | 240                            | 23AD 1624 7R | 4691.8                                       | 4222.6<br>1.3                                               | 3954.2<br>5.0  | 3501.3<br>11.3 | 3211.8<br>20.1  | 1900.0<br>31.4  | 1798.8<br>45.1  | 1650.1<br>80.3             | 26.1                                         | 40                              |
|                      | 270                            | 23AD 1627 7R | 4799.4                                       | 4319.5<br>1.0                                               | 3860.4<br>4.0  | 3418.3<br>8.9  | 3135.7<br>15.9  | 1854.9<br>24.8  | 1756.2<br>35.7  | 1611.0<br>63.4             | 25.8                                         | 40                              |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m



## (2) 23AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE         | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                |                |                 |                 |                 | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|--------------|----------------------------------------------|-------------------------------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------------------|----------------------------------------------|------------------------------|
|                      |                                |              |                                              | Input Shaft Speed (Index/min)                               |                |                |                 |                 |                 |                             |                                              |                              |
|                      |                                |              |                                              | 25                                                          | 50             | 75             | 100             | 125             | 150             | 200                         |                                              |                              |
| 2                    | 330                            | 23AD 0233 8R | 2506.5                                       | 1632.4<br>5.7                                               | 1325.9<br>23.0 | 1174.0<br>51.6 | 1077.0<br>91.8  | 1007.2<br>143.5 | 953.6<br>206.6  | 874.8<br>367.3              | 40.6                                         | 47                           |
| 3                    | 270                            | 23AD 0327 8R | 2874.3                                       | 2057.5<br>5.8                                               | 1671.2<br>23.0 | 1479.8<br>51.8 | 1357.5<br>92.1  | 1269.6<br>143.9 | 1202.0<br>207.2 | 1102.6<br>368.4             | 38.1                                         | 47                           |
|                      | 300                            | 23AD 0330 8R | 3061.0                                       | 2057.2<br>4.7                                               | 1671.0<br>18.7 | 1479.6<br>42.0 | 1357.3<br>74.6  | 1269.4<br>116.6 | 1201.8<br>167.9 | 1102.4<br>298.4             | 37.1                                         | 47                           |
| 4                    | 240                            | 23AD 0424 8R | 3598.6                                       | 2767.2<br>5.9                                               | 2247.7<br>23.7 | 1990.2<br>53.4 | 1825.7<br>94.9  | 1707.5<br>148.2 | 1616.6<br>213.4 | 1482.9<br>379.4             | 41.2                                         | 52                           |
|                      | 270                            | 23AD 0427 8R | 3849.7                                       | 2762.8<br>4.7                                               | 2244.1<br>18.7 | 1987.0<br>42.2 | 1822.7<br>74.9  | 1704.7<br>117.1 | 1614.0<br>168.6 | 1480.5<br>299.8             | 40.0                                         | 52                           |
| 5                    | 210                            | 23AD 0521 8R | 3323.5                                       | 2665.3<br>5.8                                               | 2164.9<br>23.0 | 1917.0<br>51.8 | 1758.5<br>92.0  | 1644.6<br>143.8 | 1557.1<br>207.0 | 1428.3<br>368.1             | 35.7                                         | 47                           |
|                      | 240                            | 23AD 0524 8R | 3534.9                                       | 2640.9<br>4.4                                               | 2145.1<br>17.6 | 1899.4<br>39.6 | 1742.3<br>70.5  | 1629.5<br>110.1 | 1542.8<br>158.5 | 1415.2<br>281.8             | 34.6                                         | 47                           |
| 6                    | 180                            | 23AD 0618 8R | 5208.0                                       | 4080.4<br>7.1                                               | 3314.3<br>28.4 | 2934.7<br>63.9 | 2692.1<br>113.6 | 2517.7<br>177.4 | 2383.7<br>255.5 | 2186.6<br>454.2             | 47.3                                         | 60                           |
|                      | 210                            | 23AD 0621 8R | 7079.5                                       | 5470.5<br>5.1                                               | 4443.4<br>20.6 | 3934.5<br>46.3 | 3609.2<br>82.2  | 3375.5<br>128.5 | 3195.8<br>185.0 | 2931.6<br>329.0             | 52.7                                         | 70                           |
| 8                    | 150                            | 23AD 0815 8R | 5481.5                                       | 4933.4<br>7.4                                               | 4241.0<br>29.6 | 3755.3<br>66.7 | 3444.8<br>118.5 | 3221.7<br>185.1 | 3050.2<br>266.6 | 2798.0<br>474.0             | 46.2                                         | 60                           |
|                      | 180                            | 23AD 0818 8R | 5912.2                                       | 5133.9<br>5.1                                               | 4170.0<br>20.6 | 3692.4<br>46.3 | 3387.1<br>82.3  | 3167.8<br>128.6 | 2999.2<br>185.1 | 2751.2<br>329.1             | 44.4                                         | 60                           |
| 10                   | 120                            | 23AD 1012 8R | 3462.9                                       | 3116.6<br>9.4                                               | 3005.4<br>37.7 | 2661.2<br>84.9 | 2441.1<br>150.9 | 2283.1<br>235.8 | 2161.6<br>339.6 | 1982.8<br>603.7             | 34.6                                         | 47                           |
|                      | 150                            | 23AD 1015 8R | 4480.8                                       | 4032.7<br>6.2                                               | 3590.3<br>24.7 | 3179.1<br>55.7 | 2916.2<br>99.0  | 2727.4<br>154.6 | 2582.2<br>222.7 | 2368.7<br>395.9             | 37.4                                         | 52                           |
| 12                   | 120                            | 23AD 1212 8R | 5334.8                                       | 4140.8<br>8.0                                               | 3363.4<br>31.9 | 2978.2<br>71.7 | 2731.9<br>127.5 | 2555.0<br>199.3 | 2419.0<br>287.0 | 2219.0<br>510.2             | 33.4                                         | 47                           |
|                      | 150                            | 23AD 1215 8R | 5743.2                                       | 4018.2<br>5.1                                               | 3263.8<br>20.4 | 2890.0<br>45.9 | 2651.0<br>81.6  | 2479.4<br>127.5 | 2347.4<br>183.7 | 2153.3<br>326.5             | 32.2                                         | 47                           |
| 15                   | 120                            | 23AD 1512 8R | 4159.0                                       | 3743.1<br>7.6                                               | 3743.1<br>30.3 | 3743.1<br>68.1 | 3629.0<br>121.1 | 2146.7<br>189.1 | 2032.5<br>272.4 | 1864.4<br>484.2             | 27.5                                         | 40                           |
|                      | 150                            | 23AD 1515 8R | 4476.6                                       | 4028.9<br>4.8                                               | 4028.9<br>19.4 | 3838.6<br>43.6 | 3521.2<br>77.5  | 2083.0<br>121.1 | 1972.1<br>174.3 | 1809.0<br>309.9             | 26.7                                         | 40                           |
| 16                   | 120                            | 23AD 1612 8R | 4258.2                                       | 3832.4<br>7.1                                               | 3832.4<br>28.5 | 3832.4<br>64.1 | 3767.1<br>113.9 | 2228.4<br>178.0 | 2109.8<br>256.3 | 1935.4<br>455.7             | 27.2                                         | 40                           |
|                      | 150                            | 23AD 1615 8R | 4555.0                                       | 4099.5<br>4.6                                               | 4099.5<br>18.2 | 3972.3<br>41.0 | 3643.9<br>72.9  | 2155.5<br>113.9 | 2040.8<br>164.1 | 1872.1<br>291.7             | 26.5                                         | 40                           |

## (3) 23AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE           | Ts<br>(N·m) | Input Shaft Speed (Index/min) |               |                |                |                |                | Tx<br>(N·m)    | SCF<br>(mm) |     |
|----|----------------|----------------|-------------|-------------------------------|---------------|----------------|----------------|----------------|----------------|----------------|-------------|-----|
|    |                |                |             | 25                            | 50            | 75             | 100            | 125            | 150            |                |             | 200 |
| 16 | 210            | 23AD 1621 7R 2 | 5464.8      | 4918.3<br>1.3                 | 4712.8<br>5.3 | 4173.0<br>12.0 | 3828.0<br>21.3 | 3580.1<br>33.3 | 3389.5<br>47.9 | 3109.3<br>85.2 | 46.2        | 60  |
|    | 240            | 23AD 1624 7R 2 | 7325.3      | 6592.8<br>1.1                 | 6331.5<br>4.3 | 5606.4<br>9.8  | 5142.8<br>17.4 | 4809.8<br>27.2 | 4553.8<br>39.1 | 4177.3<br>69.5 | 51.8        | 70  |
|    | 270            | 23AD 1627 7R 2 | 7669.2      | 6902.3<br>0.9                 | 6253.5<br>3.4 | 5537.3<br>7.7  | 5079.5<br>13.7 | 4750.6<br>21.5 | 4497.7<br>30.9 | 4125.8<br>54.9 | 50.6        | 70  |
| 20 | 180            | 23AD 2018 7R 2 | 3591.8      | 3232.6<br>1.5                 | 3232.6<br>5.9 | 2919.6<br>13.3 | 2678.2<br>23.6 | 2504.8<br>36.9 | 2371.5<br>53.2 | 2175.4<br>94.5 | 34.2        | 47  |
|    | 210            | 23AD 2021 7R 2 | 4469.4      | 4022.5<br>1.1                 | 3990.7<br>4.4 | 3533.6<br>10.0 | 3241.4<br>17.8 | 3031.6<br>27.8 | 2870.2<br>40.0 | 2632.9<br>71.1 | 37.4        | 52  |
|    | 240            | 23AD 2024 7R 2 | 6252.1      | 5626.9<br>0.8                 | 5412.6<br>3.4 | 4792.7<br>7.6  | 4396.4<br>13.4 | 4111.7<br>21.0 | 3892.9<br>30.2 | 3571.0<br>53.7 | 43.0        | 60  |
|    | 270            | 23AD 2027 7R 2 | 6456.4      | 5810.8<br>0.7                 | 5309.4<br>2.7 | 4701.3<br>6.0  | 4312.6<br>10.6 | 4033.3<br>16.6 | 3818.6<br>23.9 | 3502.9<br>42.4 | 42.2        | 60  |
| 24 | 180            | 23AD 2418 7R 2 | 5458.1      | 4566.0<br>1.2                 | 3708.7<br>5.0 | 3283.9<br>11.2 | 3012.4<br>20.0 | 2817.3<br>31.2 | 2667.4<br>44.9 | 2446.8<br>79.9 | 33.0        | 47  |
|    | 210            | 23AD 2421 7R 2 | 5732.4      | 4467.8<br>0.9                 | 3629.0<br>3.7 | 3213.4<br>8.3  | 2947.7<br>14.7 | 2756.8<br>22.9 | 2610.1<br>33.0 | 2394.2<br>58.7 | 32.2        | 47  |
|    | 240            | 23AD 2424 7R 2 | 5934.2      | 4367.3<br>0.7                 | 3547.3<br>2.8 | 3141.1<br>6.3  | 2881.3<br>11.2 | 2694.8<br>17.5 | 2551.3<br>25.3 | 2340.4<br>44.9 | 31.6        | 47  |
|    | 270            | 23AD 2427 7R 2 | 7170.6      | 5269.3<br>0.6                 | 4280.0<br>2.3 | 3789.8<br>5.1  | 3476.5<br>9.1  | 3251.3<br>14.3 | 3078.3<br>20.5 | 2823.8<br>36.5 | 35.0        | 52  |
| 32 | 180            | 23AD 3218 7R 2 | 4348.4      | 3913.6<br>1.1                 | 3913.6<br>4.5 | 3913.6<br>10.0 | 3913.6<br>17.8 | 2454.9<br>27.9 | 2324.2<br>40.1 | 2132.1<br>71.3 | 27.0        | 40  |
|    | 210            | 23AD 3221 7R 2 | 4547.2      | 4092.5<br>0.8                 | 4092.5<br>3.3 | 4092.5<br>7.4  | 4051.9<br>13.1 | 2396.9<br>20.5 | 2269.4<br>29.5 | 2081.7<br>52.4 | 26.5        | 40  |
|    | 240            | 23AD 3224 7R 2 | 4691.8      | 4222.6<br>0.6                 | 4222.6<br>2.5 | 4222.6<br>5.6  | 3954.2<br>10.0 | 2339.1<br>15.7 | 2214.6<br>22.6 | 2031.5<br>40.1 | 26.1        | 40  |
|    | 270            | 23AD 3227 7R 2 | 4799.4      | 4319.5<br>0.5                 | 4319.5<br>2.0 | 4208.4<br>4.5  | 3860.4<br>7.9  | 2283.7<br>12.4 | 2162.1<br>17.8 | 1983.3<br>31.7 | 25.8        | 40  |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m



# 33AD Torque Capacity Tables

## 33AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)  
 (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)  
 (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 33AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number<br>of Stops<br>S | Index<br>Period<br>$\theta$ (deg) | CODE        | Static-rated<br>Output<br>Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque<br>Top (N·m)<br>Toi (N·m) |                 |                  |                  |                  |                 | Camshaft<br>Frictional<br>Torque<br>$T_x$<br>(N·m) | Sankyo<br>Cam<br>Follower<br>SCF<br>(mm) |     |
|-------------------------|-----------------------------------|-------------|----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------|------------------|------------------|------------------|-----------------|----------------------------------------------------|------------------------------------------|-----|
|                         |                                   |             |                                                    | Input Shaft Speed (Index/min)                                                         |                 |                  |                  |                  |                 |                                                    |                                          |     |
|                         |                                   |             |                                                    | 25                                                                                    | 50              | 75               | 100              | 125              | 150             | 200                                                |                                          |     |
| 4                       | 270                               | 33AD 04277R | 6229.4                                             | 5606.5<br>16.3                                                                        | 4772.9<br>65.3  | 4226.2<br>146.8  | 3876.8<br>261.0  | 3625.7<br>407.8  | 3432.7<br>587.3 |                                                    | 76.5                                     | 70  |
| 5                       | 240                               | 33AD 05247R | 5278.6                                             | 4750.8<br>16.3                                                                        | 2449.9<br>65.2  | 3763.1<br>146.7  | 3452.0<br>260.7  | 3228.4<br>407.4  | 3056.6<br>586.6 |                                                    | 63.7                                     | 60  |
|                         | 270                               | 33AD 05277R | 5653.8                                             | 5088.5<br>12.9                                                                        | 4245.6<br>51.5  | 3759.4<br>115.9  | 3448.5<br>206.0  | 3225.2<br>321.9  | 3053.6<br>463.5 | 2801.1<br>824.0                                    | 61.6                                     | 60  |
| 6                       | 180                               | 33AD 06187R | 7933.3                                             | 7140.0<br>24.9                                                                        | 6910.4<br>99.4  | 6118.9<br>223.7  | 5613.0<br>397.7  | 5249.5<br>621.3  | 4970.1<br>894.7 |                                                    | 96.0                                     | 80  |
|                         | 210                               | 33AD 06217R | 11122.6                                            | 10010.4<br>19.0                                                                       | 9279.5<br>75.9  | 8216.7<br>170.7  | 7537.3<br>303.5  | 7049.3<br>474.2  | 6674.1<br>682.9 | 6122.2<br>1214.1                                   | 105.0                                    | 90  |
|                         | 240                               | 33AD 06247R | 12969.3                                            | 11672.4<br>14.9                                                                       | 10330.0<br>59.7 | 9146.9<br>134.2  | 8390.6<br>238.6  | 7847.3<br>372.8  | 7429.6<br>536.9 | 6815.2<br>954.4                                    | 108.4                                    | 100 |
|                         | 270                               | 33AD 06277R | 13815.1                                            | 12433.6<br>11.8                                                                       | 10291.4<br>47.1 | 9112.7<br>106.1  | 8359.2<br>188.5  | 7817.9<br>294.6  | 7401.8<br>424.2 | 6789.8<br>754.1                                    | 105.0                                    | 100 |
| 8                       | 180                               | 33AD 08187R | 9500.9                                             | 8550.8<br>19.2                                                                        | 8550.8<br>76.7  | 7919.7<br>172.5  | 7264.9<br>306.7  | 6794.5<br>479.2  | 6432.8<br>690.1 | 5900.9<br>1226.8                                   | 87.8                                     | 80  |
|                         | 210                               | 33AD 08217R | 13094.8                                            | 11785.3<br>14.8                                                                       | 11785.3<br>59.2 | 10565.9<br>133.1 | 9692.3<br>236.7  | 9064.7<br>369.8  | 8582.2<br>532.6 | 7872.6<br>946.8                                    | 96.8                                     | 90  |
|                         | 240                               | 33AD 08247R | 13930.2                                            | 12537.1<br>11.3                                                                       | 11824.0<br>45.3 | 10469.8<br>101.9 | 9604.1<br>181.2  | 8982.2<br>283.1  | 8504.1<br>407.7 | 7800.9<br>724.9                                    | 93.8                                     | 90  |
|                         | 270                               | 33AD 08277R | 15661.2                                            | 14095.1<br>9.3                                                                        | 12983.7<br>37.0 | 11496.6<br>83.3  | 10546.0<br>148.1 | 9863.2<br>231.4  | 9338.2<br>333.3 | 8566.0<br>592.4                                    | 98.1                                     | 100 |
| 10                      | 180                               | 33AD 10187R | 8241.5                                             | 7417.4<br>14.9                                                                        | 7417.4<br>59.8  | 6807.8<br>134.5  | 6244.9<br>239.1  | 5840.5<br>373.5  | 5529.6<br>537.9 | 5072.4<br>956.3                                    | 66.4                                     | 70  |
|                         | 210                               | 33AD 10217R | 11321.8                                            | 10189.6<br>11.6                                                                       | 10189.6<br>46.3 | 9239.5<br>104.2  | 8475.5<br>185.3  | 7926.7<br>289.5  | 7504.8<br>416.9 | 6884.3<br>741.1                                    | 80.1                                     | 80  |
|                         | 240                               | 33AD 10247R | 11851.3                                            | 10666.2<br>8.9                                                                        | 10256.6<br>35.5 | 9081.9<br>79.8   | 8331.0<br>141.9  | 7791.5<br>221.6  | 7376.8<br>319.2 | 6766.8<br>567.4                                    | 78.0                                     | 80  |
|                         | 270                               | 33AD 10277R | 15698.4                                            | 14128.6<br>7.4                                                                        | 13573.0<br>29.7 | 12018.4<br>66.9  | 11024.7<br>118.9 | 10310.8<br>185.8 | 9762.0<br>267.6 | 8954.8<br>475.8                                    | 87.6                                     | 90  |
| 12                      | 120                               | 33AD 12127R | 4260.6                                             | 3834.5<br>29.2                                                                        | 3834.5<br>116.7 | 3834.5<br>262.5  | 3834.5<br>466.7  | 3673.5<br>729.2  |                 |                                                    | 50.9                                     | 52  |
|                         | 150                               | 33AD 12157R | 6343.9                                             | 5709.5<br>19.2                                                                        | 5709.5<br>76.6  | 5709.5<br>172.4  | 5480.0<br>306.5  | 5125.2<br>478.9  | 4852.4<br>689.6 | 4451.2<br>1226.0                                   | 57.3                                     | 60  |
|                         | 180                               | 33AD 12187R | 8715.8                                             | 7844.2<br>13.8                                                                        | 7844.2<br>55.2  | 7844.2<br>124.2  | 7284.0<br>220.8  | 6812.3<br>345.0  | 6449.7<br>496.8 | 5916.4<br>883.3                                    | 63.8                                     | 70  |
|                         | 210                               | 33AD 12217R | 9226.9                                             | 8304.2<br>10.1                                                                        | 8304.2<br>40.6  | 7800.8<br>91.3   | 7155.8<br>162.2  | 6692.5<br>253.5  | 6336.2<br>365.0 | 5812.3<br>648.9                                    | 62.0                                     | 70  |
|                         | 240                               | 33AD 12247R | 9611.1                                             | 8650.0<br>7.8                                                                         | 8638.3<br>31.1  | 7649.0<br>69.9   | 7016.5<br>124.2  | 6562.2<br>194.1  | 6212.9<br>279.5 | 5699.2<br>496.8                                    | 60.7                                     | 70  |
|                         | 270                               | 33AD 12277R | 9904.2                                             | 8913.7<br>6.1                                                                         | 8464.6<br>24.5  | 7495.1<br>55.2   | 6875.4<br>98.1   | 6430.2<br>153.3  | 6087.9<br>220.8 | 5584.5<br>392.6                                    | 59.6                                     | 70  |
| 15                      | 150                               | 33AD 15157R | 5254.7                                             | 4729.2<br>15.1                                                                        | 4729.2<br>60.4  | 4729.2<br>135.9  | 4472.8<br>241.6  | 4183.2<br>377.5  | 3960.5<br>543.6 | 3633.0<br>966.4                                    | 46.3                                     | 52  |
|                         | 180                               | 33AD 15187R | 7421.0                                             | 6678.9<br>10.8                                                                        | 6678.9<br>43.3  | 6678.9<br>97.5   | 6152.7<br>173.2  | 5754.3<br>270.7  | 5448.0<br>389.8 | 4997.5<br>693.0                                    | 53.1                                     | 60  |
|                         | 210                               | 33AD 15217R | 7729.3                                             | 6956.4<br>8.0                                                                         | 6956.4<br>31.8  | 6535.8<br>71.6   | 5995.4<br>127.3  | 5607.2<br>198.9  | 5308.7<br>286.4 | 4869.8<br>509.1                                    | 51.9                                     | 60  |
|                         | 240                               | 33AD 15247R | 7951.2                                             | 7156.1<br>6.1                                                                         | 7156.1<br>24.4  | 6368.7<br>54.8   | 5842.1<br>97.5   | 5463.8<br>152.3  | 5173.0<br>219.3 | 4745.2<br>389.8                                    | 50.9                                     | 60  |
|                         | 270                               | 33AD 15277R | 8115.0                                             | 7303.5<br>4.8                                                                         | 7013.8<br>19.3  | 6210.5<br>43.3   | 5697.0<br>77.0   | 5328.1<br>120.3  | 5044.5<br>173.2 | 4627.4<br>308.0                                    | 50.2                                     | 60  |
| 16                      | 150                               | 33AD 16157R | 5373.6                                             | 4836.2<br>14.2                                                                        | 4836.2<br>56.8  | 4836.2<br>127.9  | 4636.7<br>227.3  | 4336.5<br>355.2  | 4105.7<br>511.5 | 3766.2<br>909.3                                    | 45.7                                     | 52  |
|                         | 180                               | 33AD 16187R | 7557.0                                             | 6801.3<br>10.2                                                                        | 6801.3<br>40.8  | 6801.3<br>91.9   | 6364.5<br>163.3  | 5952.4<br>255.2  | 5635.5<br>367.5 | 5169.6<br>653.3                                    | 52.5                                     | 60  |
|                         | 210                               | 33AD 16217R | 7841.6                                             | 7057.4<br>7.5                                                                         | 7057.4<br>30.0  | 6748.2<br>67.5   | 6190.2<br>120.0  | 5789.4<br>187.5  | 5481.2<br>270.0 | 5028.0<br>480.0                                    | 51.4                                     | 60  |
|                         | 240                               | 33AD 16247R | 8044.5                                             | 7240.0<br>5.7                                                                         | 7240.0<br>23.0  | 6566.5<br>51.7   | 6023.6<br>91.9   | 5633.5<br>143.5  | 5333.7<br>206.7 | 4892.7<br>367.5                                    | 50.5                                     | 60  |
|                         | 270                               | 33AD 16277R | 8193.0                                             | 7373.7<br>4.5                                                                         | 7224.2<br>18.2  | 6396.8<br>40.8   | 5867.9<br>72.6   | 5487.9<br>113.4  | 5195.8<br>163.3 | 4766.2<br>290.4                                    | 49.9                                     | 60  |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
 All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 33AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$ (N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                  |                  |                 |                  |                  | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$ (N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|-------------------------------------------|-------------------------------------------------------------|------------------|------------------|-----------------|------------------|------------------|-----------------------------|-------------------------------------------|------------------------------|
|                      |                                |             |                                           | Input Shaft Speed (Index/min)                               |                  |                  |                 |                  |                  |                             |                                           |                              |
|                      |                                |             |                                           | 25                                                          | 50               | 75               | 100             | 125              | 150              | 200                         |                                           |                              |
| 2                    | 330                            | 33AD 02338R | 4451.4                                    | 3523.1<br>30.2                                              | 2861.6<br>120.9  | 2533.9<br>272.1  | 2324.4<br>483.7 |                  |                  |                             | 69.3                                      | 60                           |
| 3                    | 270                            | 33AD 03278R | 5116.9                                    | 4448.5<br>30.3                                              | 3613.3<br>121.1  | 3199.4<br>272.6  | 2934.9<br>484.5 | 2744.9<br>757.1  |                  |                             | 64.7                                      | 60                           |
|                      | 300                            | 33AD 03308R | 6896.9                                    | 5988.6<br>25.2                                              | 4864.2<br>100.9  | 4307.1<br>227.1  | 3951.0<br>403.7 | 3695.2<br>630.7  | 3498.5<br>908.2  |                             | 72.7                                      | 70                           |
| 4                    | 240                            | 33AD 04248R | 7159.8                                    | 6526.1<br>29.3                                              | 5300.9<br>117.2  | 4693.7<br>263.8  | 4305.6<br>468.9 | 4026.8<br>732.7  | 3812.5<br>1055.1 |                             | 71.4                                      | 70                           |
|                      | 270                            | 33AD 04278R | 9791.9                                    | 8812.7<br>24.2                                              | 7246.2<br>96.8   | 6416.2<br>217.7  | 5885.7<br>387.0 | 5504.6<br>604.7  | 5211.6<br>870.8  | 4780.7<br>1548.0            | 86.5                                      | 80                           |
| 5                    | 210                            | 33AD 05218R | 7515.8                                    | 6764.3<br>31.2                                              | 6318.0<br>124.7  | 5594.4<br>280.5  | 5131.8<br>498.7 | 4799.5<br>779.2  | 4544.0<br>1122.0 | 4168.3<br>1994.7            | 69.7                                      | 70                           |
|                      | 240                            | 33AD 05248R | 8019.8                                    | 7217.8<br>23.9                                              | 6270.1<br>95.5   | 5552.0<br>214.8  | 5092.9<br>381.8 | 4763.1<br>596.5  | 4509.6<br>859.0  | 4136.7<br>1527.2            | 67.4                                      | 70                           |
| 6                    | 180                            | 33AD 06188R | 12438.2                                   | 11194.3<br>36.7                                             | 10277.5<br>146.6 | 9100.4<br>329.9  | 8347.9<br>586.4 | 7807.3<br>916.3  | 7391.8<br>1319.5 |                             | 99.4                                      | 90                           |
|                      | 210                            | 33AD 06218R | 14442.9                                   | 12998.6<br>27.6                                             | 11346.6<br>110.6 | 10047.1<br>248.9 | 9216.3<br>442.4 | 8619.5<br>691.2  | 8160.8<br>995.4  | 7486.0<br>1769.6            | 102.6                                     | 100                          |
| 8                    | 150                            | 33AD 08158R | 10326.6                                   | 9293.9<br>39.2                                              | 9393.9<br>156.7  | 8720.9<br>352.7  | 7999.8<br>627.0 | 7481.8<br>979.6  | 7083.6<br>1410.7 | 6497.9<br>2507.8            | 84.2                                      | 80                           |
|                      | 180                            | 33AD 08188R | 11175.2                                   | 10057.7<br>27.2                                             | 9700.3<br>108.9  | 8589.3<br>244.9  | 7879.1<br>435.4 | 7368.9<br>680.3  | 6976.7<br>979.6  | 6399.8<br>1741.5            | 80.7                                      | 80                           |
| 10                   | 120                            | 33AD 10128R | 8019.8                                    | 7217.8<br>47.7                                              | 7217.8<br>190.9  | 7217.8<br>429.5  | 6957.1<br>763.6 | 6506.6<br>1193.1 | 6160.3<br>1718.0 |                             | 67.4                                      | 70                           |
|                      | 150                            | 33AD 10158R | 11349.6                                   | 10214.6<br>32.2                                             | 10214.6<br>128.9 | 10214.6<br>290.0 | 9387.2<br>515.5 | 8779.4<br>805.4  | 8312.1<br>1159.8 | 7624.8<br>2061.9            | 80.0                                      | 80                           |
| 12                   | 120                            | 33AD 12128R | 6699.6                                    | 6029.6<br>42.5                                              | 6029.6<br>170.0  | 6029.6<br>382.4  | 6021.5<br>679.9 | 5631.5<br>1062.3 | 5331.8<br>1529.7 |                             | 55.9                                      | 60                           |
|                      | 150                            | 33AD 12158R | 9247.3                                    | 8322.6<br>28.2                                              | 8322.6<br>112.8  | 8322.6<br>253.9  | 7924.6<br>451.4 | 7411.4<br>705.3  | 7017.0<br>1015.6 | 6436.8<br>1805.5            | 62.0                                      | 70                           |
| 15                   | 120                            | 33AD 15128R | 7279.8                                    | 6551.9<br>34.6                                              | 6551.9<br>138.3  | 6551.9<br>311.3  | 6551.9<br>553.3 | 6436.5<br>864.6  | 6093.9<br>1245.0 |                             | 53.6                                      | 60                           |
|                      | 150                            | 33AD 15158R | 7741.2                                    | 6967.1<br>22.1                                              | 6967.1<br>88.5   | 6967.1<br>199.2  | 6637.3<br>354.1 | 6207.5<br>553.3  | 5877.1<br>796.8  | 5391.2<br>1416.5            | 51.8                                      | 60                           |
| 16                   | 120                            | 33AD 16128R | 7425.7                                    | 6683.1<br>32.6                                              | 6683.1<br>130.4  | 6683.1<br>293.4  | 6683.1<br>521.7 | 6663.6<br>815.1  | 6308.9<br>1173.7 |                             | 53.1                                      | 60                           |
|                      | 150                            | 33AD 16158R | 7852.6                                    | 7067.3<br>20.9                                              | 7067.3<br>83.5   | 7067.3<br>187.8  | 6852.5<br>333.9 | 6408.8<br>521.7  | 6067.6<br>751.2  | 5565.9<br>1335.4            | 51.4                                      | 60                           |

## (3) 33AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE         | Ts<br>(N·m) | Input Shaft Speed (Index/min) |                 |                 |                 |                  |                  |                  | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|--------------|-------------|-------------------------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|-------------|-------------|
|    |                |              |             | 25                            | 50              | 75              | 100             | 125              | 150              | 200              |             |             |
| 16 | 210            | 33AD 16217R2 | 10293.8     | 9264.4<br>7.0                 | 9264.4<br>28.2  | 9264.4<br>63.4  | 8889.1<br>112.7 | 8313.5<br>176.0  | 7871.0<br>253.5  | 7220.2<br>450.7  | 84.3        | 80          |
|    | 240            | 33AD 16247R2 | 13930.2     | 12537.1<br>5.7                | 12537.1<br>22.7 | 12537.1<br>51.0 | 11824.0<br>90.6 | 11058.4<br>141.6 | 10469.8<br>203.9 | 9604.1<br>362.4  | 93.8        | 90          |
|    | 270            | 33AD 16277R2 | 15661.2     | 14095.1<br>4.6                | 14095.1<br>18.5 | 14095.1<br>41.7 | 12983.7<br>74.1 | 12143.0<br>115.7 | 11496.6<br>166.6 | 10546.0<br>296.2 | 98.1        | 100         |
| 20 | 180            | 33AD 20187R2 | 6496.0      | 5846.4<br>7.2                 | 5846.4<br>29.0  | 5846.4<br>65.2  | 5702.6<br>115.9 | 5333.4<br>181.1  | 5049.5<br>260.7  | 4632.0<br>463.5  | 57.3        | 60          |
|    | 210            | 33AD 20217R2 | 11321.8     | 10189.6<br>5.8                | 10189.6<br>23.2 | 10189.6<br>52.1 | 10189.6<br>92.6 | 9758.9<br>144.7  | 9239.5<br>208.4  | 8475.5<br>370.5  | 80.1        | 80          |
|    | 240            | 33AD 20247R2 | 15152.5     | 13637.2<br>4.7                | 13637.2<br>18.8 | 13637.2<br>42.3 | 13637.2<br>75.3 | 12919.9<br>117.6 | 12232.2<br>169.4 | 11220.8<br>301.1 | 89.5        | 90          |
|    | 270            | 33AD 20277R2 | 15698.4     | 14128.6<br>3.7                | 14128.6<br>14.9 | 14128.6<br>33.5 | 13573.0<br>59.5 | 12694.1<br>92.9  | 12018.4<br>133.8 | 11024.7<br>237.9 | 87.6        | 90          |
| 24 | 180            | 33AD 24187R2 | 8715.8      | 7844.2<br>6.9                 | 7844.2<br>27.6  | 7844.2<br>62.1  | 7844.2<br>110.4 | 7844.2<br>172.5  | 7844.2<br>248.4  | 7284.0<br>441.6  | 63.8        | 70          |
|    | 210            | 33AD 24217R2 | 9226.9      | 8304.2<br>5.1                 | 8304.2<br>20.3  | 8304.2<br>45.6  | 8304.2<br>81.1  | 8239.4<br>126.7  | 7800.8<br>182.5  | 7155.8<br>324.5  | 62.0        | 70          |
|    | 240            | 33AD 24247R2 | 12461.1     | 11215.4<br>3.7                | 11215.4<br>14.8 | 11215.4<br>33.2 | 11215.4<br>59.1 | 10669.8<br>92.3  | 10101.8<br>132.8 | 9266.5<br>236.1  | 75.6        | 80          |
|    | 270            | 33AD 24277R2 | 12788.0     | 11509.2<br>3.0                | 11509.2<br>11.7 | 11509.2<br>26.3 | 11155.7<br>46.7 | 10433.3<br>72.9  | 9878.0<br>105.0  | 9061.2<br>186.6  | 74.2        | 80          |
| 32 | 180            | 33AD 32187R2 | 7557.0      | 6801.3<br>5.1                 | 6801.3<br>20.4  | 6801.3<br>45.9  | 6801.3<br>81.7  | 6801.3<br>127.6  | 6801.3<br>183.7  | 6364.5<br>326.7  | 52.5        | 60          |
|    | 210            | 33AD 32217R2 | 7841.6      | 7057.4<br>3.7                 | 7057.4<br>15.0  | 7057.4<br>33.7  | 7057.4<br>60.0  | 7057.4<br>93.7   | 6748.2<br>135.0  | 6190.2<br>240.0  | 51.4        | 60          |
|    | 240            | 33AD 32247R2 | 8044.5      | 7240.0<br>2.9                 | 7240.0<br>11.5  | 7240.0<br>25.8  | 7240.0<br>45.9  | 6935.7<br>71.8   | 6566.5<br>103.4  | 6023.6<br>183.7  | 50.5        | 60          |
|    | 270            | 33AD 32277R2 | 8193.0      | 7373.7<br>2.3                 | 7373.7<br>9.1   | 7373.7<br>20.4  | 7224.2<br>36.3  | 6756.4<br>56.7   | 6396.8<br>81.7   | 5867.9<br>145.2  | 49.9        | 60          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m

# 45AD Torque Capacity Tables

## 45AD Torque Transmission Capacity Table

- (1) 1-dwell with cam curve SMS-3 (cam curve code 7)  
 (2) 1-dwell with cam curve SMCV-3 (cam curve code 8)  
 (3) 2-dwell with cam curve SMS-3 (cam curve code 7)

### Notes

The dynamic rated torque output, the Top values, given in this table are calculated based on an expected service life of 8,000 hours, and proper operating conditions such as mounting and lubrication.

### (1) 45AD Cam curve SMS-3 (cam curve code 7) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                  |                  |                   |                   |                   | Top (N·m)<br>Toi (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|----------------------------------------------|-------------------------------------------------------------|------------------|------------------|-------------------|-------------------|-------------------|------------------------|----------------------------------------------|------------------------------|
|                      |                                |             |                                              | Input Shaft Speed (Index/min)                               |                  |                  |                   |                   |                   |                        |                                              |                              |
|                      |                                |             |                                              | 25                                                          | 50               | 75               | 100               | 125               | 150               | 200                    |                                              |                              |
| 4                    | 270                            | 45AD 04277R | 16076.9                                      | 14178.0<br>52.5                                             | 11516.1<br>210.2 | 10197.1<br>472.9 | 9354.0<br>840.7   | 8748.3<br>1313.5  | 8282.6<br>1891.5  |                        | 155.9                                        | 100                          |
| 5                    | 240                            | 45AD 05247R | 15847.8                                      | 14263.0<br>53.3                                             | 12326.8<br>213.4 | 10915.0<br>480.1 | 10012.5<br>853.4  | 9364.1<br>1333.5  | 8865.7<br>1920.3  |                        | 140.8                                        | 90                           |
|                      | 270                            | 45AD 05277R | 16817.1                                      | 15090.6<br>42.1                                             | 12257.3<br>168.6 | 10853.5<br>379.3 | 9956.1<br>674.3   | 9311.4<br>1053.6  | 8815.8<br>1517.2  |                        | 136.0                                        | 90                           |
| 6                    | 180                            | 45AD 06187R | 26959.2                                      | 24263.3<br>81.9                                             | 22453.4<br>327.7 | 19881.8<br>737.2 | 18237.9<br>1310.6 | 17056.9<br>2047.9 | 16149.0<br>2949.0 |                        | 197.7                                        | 120                          |
|                      | 210                            | 45AD 06217R | 29388.5                                      | 26449.6<br>60.2                                             | 22383.8<br>240.7 | 19820.1<br>541.6 | 18181.3<br>962.9  | 17004.0<br>1504.6 | 16098.9<br>2166.6 | 14767.8<br>3851.7      | 188.1                                        | 120                          |
|                      | 240                            | 45AD 06247R | 31368.1                                      | 27352.8<br>46.1                                             | 22217.3<br>184.3 | 19672.7<br>414.7 | 18046.1<br>737.2  | 16877.6<br>1151.9 | 15979.2<br>1658.8 | 14658<br>2949.0        | 180.9                                        | 120                          |
|                      | 270                            | 45AD 06277R | 32982.2                                      | 27073.9<br>36.4                                             | 21990.8<br>145.6 | 19472.2<br>327.7 | 17862.1<br>582.5  | 16705.5<br>910.2  | 15816.3<br>1310.6 | 14508.5<br>2330.0      | 175.3                                        | 120                          |
| 8                    | 180                            | 45AD 08187R | 31368.1                                      | 28231.3<br>64.1                                             | 28231.3<br>256.2 | 25117.9<br>576.5 | 23041.0<br>1024.9 | 21549.1<br>1601.4 | 20402.1<br>2306.0 | 18715.1<br>4099.6      | 180.9                                        | 120                          |
|                      | 210                            | 45AD 08217R | 33451.7                                      | 30106.5<br>47.1                                             | 27969.9<br>188.3 | 24766.5<br>423.6 | 22718.6<br>753.0  | 21247.6<br>1176.5 | 20116.6<br>1694.2 | 18453.3<br>3011.9      | 173.7                                        | 120                          |
|                      | 240                            | 45AD 08247R | 35049.3                                      | 31544.4<br>36.0                                             | 27505.8<br>144.1 | 24355.5<br>324.3 | 22341.7<br>576.5  | 20895.0<br>900.8  | 19782.8<br>1297.1 | 18147.1<br>2306.0      | 168.3                                        | 120                          |
|                      | 270                            | 45AD 08277R | 36287.0                                      | 32658.3<br>28.5                                             | 27015.6<br>113.9 | 23921.4<br>256.2 | 21943.5<br>455.5  | 20522.6<br>711.7  | 19430.2<br>1024.9 | 17823.6<br>1822.0      | 164.1                                        | 120                          |
| 10                   | 180                            | 45AD 10187R | 33540.1                                      | 30186.1<br>51.4                                             | 30186.1<br>205.6 | 27704.0<br>462.5 | 25413.3<br>822.3  | 23767.8<br>1284.8 | 22502.7<br>1850.1 | 20642.0<br>3289.1      | 168.7                                        | 110                          |
|                      | 210                            | 45AD 10217R | 36005.8                                      | 32405.2<br>39.4                                             | 32243.1<br>157.4 | 28550.3<br>354.2 | 26189.6<br>629.8  | 24493.8<br>984.0  | 23190.0<br>1417.0 | 21272.5<br>2519.0      | 165.0                                        | 120                          |
|                      | 240                            | 45AD 10247R | 37257.3                                      | 33531.6<br>30.1                                             | 31510.8<br>120.5 | 27901.8<br>271.2 | 25594.7<br>482.2  | 23937.4<br>753.4  | 22663.3<br>1084.9 | 20789.4<br>1928.6      | 160.7                                        | 120                          |
|                      | 270                            | 45AD 10277R | 38194.8                                      | 34375.3<br>23.8                                             | 30797.1<br>95.2  | 27269.9<br>214.3 | 25015.0<br>381.0  | 23395.3<br>595.3  | 22150.0<br>857.2  | 20318.5<br>1523.9      | 157.3                                        | 120                          |
| 12                   | 120                            | 45AD 12127R | 13278.8                                      | 11950.9<br>96.0                                             | 11950.9<br>384.0 | 11950.9<br>864.0 | 11950.9<br>1536.1 | 11181.5<br>2400.1 | 10586.4<br>3456.2 |                        | 117.3                                        | 80                           |
|                      | 150                            | 45AD 12157R | 18835.4                                      | 16951.8<br>63.6                                             | 16951.8<br>254.4 | 16929.0<br>572.4 | 15529.2<br>1017.6 | 14523.6<br>1590.0 | 13750.6<br>2289.7 | 12613.6<br>4070.5      | 126.5                                        | 90                           |
|                      | 180                            | 45AD 12187R | 21459.4                                      | 19313.5<br>45.4                                             | 19313.5<br>181.5 | 18358.8<br>408.5 | 16840.8<br>726.2  | 15750.3<br>1134.6 | 14912.0<br>1633.9 | 13679.0<br>2904.6      | 130.2                                        | 100                          |
|                      | 210                            | 45AD 12217R | 22366.3                                      | 20129.7<br>33.3                                             | 20129.7<br>133.4 | 17895.7<br>300.1 | 16416.0<br>533.5  | 15353.0<br>833.6  | 14535.8<br>1200.4 | 13333.9<br>2134.0      | 126.5                                        | 100                          |
|                      | 240                            | 45AD 12247R | 23020.4                                      | 20718.4<br>25.5                                             | 19698.7<br>102.1 | 17442.6<br>229.8 | 16000.3<br>408.5  | 14964.3<br>638.2  | 14167.8<br>919.1  | 12996.3<br>1633.9      | 123.7                                        | 100                          |
|                      | 270                            | 45AD 12277R | 23503.5                                      | 21153.2<br>20.2                                             | 19213.3<br>80.7  | 17012.7<br>181.5 | 15606.0<br>322.7  | 14595.5<br>504.3  | 13818.6<br>726.2  | 12676.0<br>1291.0      | 121.6                                        | 100                          |
| 15                   | 150                            | 45AD 15157R | 15855.4                                      | 14269.9<br>50.2                                             | 14269.9<br>200.9 | 14269.9<br>452.1 | 13345.1<br>803.7  | 12481.0<br>1255.8 | 11816.6<br>1808.3 | 10839.6<br>3214.8      | 106.3                                        | 80                           |
|                      | 180                            | 45AD 15187R | 16623.4                                      | 14961.0<br>34.9                                             | 14961.0<br>139.5 | 14103.2<br>314.0 | 12937.1<br>558.1  | 12099.4<br>872.1  | 11455.4<br>1255.8 | 10508.2<br>2232.5      | 103.1                                        | 80                           |
|                      | 210                            | 45AD 15217R | 17144.0                                      | 15429.6<br>25.6                                             | 15429.6<br>102.5 | 13675.1<br>230.7 | 12544.4<br>410.1  | 11732.1<br>640.7  | 11107.6<br>922.6  | 10189.2<br>1640.2      | 100.7                                        | 80                           |
|                      | 240                            | 45AD 15247R | 22287.4                                      | 20058.6<br>20.5                                             | 19703.3<br>81.9  | 17446.6<br>184.2 | 16004.1<br>327.4  | 14967.8<br>511.6  | 14171.1<br>736.7  | 12999.3<br>1309.6      | 112.3                                        | 90                           |
|                      | 270                            | 45AD 15277R | 22606.0                                      | 20345.4<br>16.2                                             | 19154.7<br>64.7  | 16960.9<br>145.5 | 15558.5<br>258.7  | 14551.0<br>404.2  | 13776.5<br>582.1  | 12637.4<br>1034.8      | 110.7                                        | 90                           |
| 16                   | 150                            | 45AD 16157R | 16146.9                                      | 14532.2<br>5.0                                              | 14532.2<br>189.7 | 14532.2<br>426.7 | 13792.7<br>758.7  | 12899.6<br>1185.4 | 12213.0<br>1707.0 | 11203.2<br>3034.6      | 105.1                                        | 80                           |
|                      | 180                            | 45AD 16187R | 16855.0                                      | 15169.5<br>32.9                                             | 15169.5<br>131.7 | 14544.5<br>296.4 | 13341.8<br>526.8  | 12477.9<br>823.2  | 11813.8<br>1185.4 | 10836.9<br>2107.4      | 102.0                                        | 80                           |
|                      | 210                            | 45AD 16217R | 17329.8                                      | 15596.9<br>24.2                                             | 15596.9<br>96.8  | 14081.4<br>217.7 | 12917.1<br>387.1  | 12080.7<br>604.8  | 11437.7<br>870.9  | 10491.9<br>1548.3      | 99.9                                         | 80                           |
|                      | 240                            | 45AD 16247R | 17660.4                                      | 15894.4<br>18.5                                             | 15423.4<br>74.1  | 13656.9<br>166.7 | 12527.7<br>296.4  | 11716.5<br>463.0  | 11092.8<br>666.8  | 10175.6<br>1185.4      | 98.2                                         | 80                           |
|                      | 270                            | 45AD 16277R | 17898.3                                      | 16108.5<br>14.6                                             | 14987.8<br>58.5  | 13271.2<br>131.7 | 12173.9<br>234.2  | 11385.6<br>365.9  | 10779.6<br>526.8  | 9888.3<br>936.6        | 97.0                                         | 80                           |

Note) The torque transmission capacity is the same whether the rotating direction of the cam is right hand (R) or left hand (L).  
 All models in the torque capacity table are shown as type R.

1N·m $\approx$ 0.102kgf·m

## (2) 45AD Cam curve SMCV-3 (cam curve code 8) 1 Dwell

| Number of Stops<br>S | Index Period<br>$\theta$ (deg) | CODE        | Static-rated Output Torque<br>$T_s$<br>(N·m) | Dynamic-rated Output Torque<br>Internal Inertia Load Torque |                  |                   |                   |                   |                   | Top (N·m)<br>$T_{oi}$ (N·m) | Camshaft Frictional Torque<br>$T_x$<br>(N·m) | Sankyo Cam Follower SCF (mm) |
|----------------------|--------------------------------|-------------|----------------------------------------------|-------------------------------------------------------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------|----------------------------------------------|------------------------------|
|                      |                                |             |                                              | Input Shaft Speed (Index/min)                               |                  |                   |                   |                   |                   |                             |                                              |                              |
|                      |                                |             |                                              | 25                                                          | 50               | 75                | 100               | 125               | 150               | 200                         |                                              |                              |
| 2                    | 330                            | 45AD 02338R | 13617.3                                      | 10369.8<br>98.1                                             | 8422.9<br>392.3  | 7458.2<br>882.6   | 6841.5<br>1569.1  |                   |                   |                             | 153.2                                        | 90                           |
|                      | 270                            | 45AD 03278R | 15421.5                                      | 12959.2<br>98.7                                             | 10526.1<br>394.8 | 9320.5<br>888.2   | 8549.9<br>1579.0  | 7996.2<br>2467.2  |                   |                             | 143.0                                        | 90                           |
| 3                    | 300                            | 45AD 03308R | 17523.5                                      | 14285.2<br>81.6                                             | 11603.2<br>326.2 | 10274.2<br>734.0  | 9424.7<br>1305.0  | 8814.4<br>2039.0  |                   |                             | 148.2                                        | 100                          |
|                      | 240                            | 45AD 04248R | 29763.5                                      | 26787.2<br>99.1                                             | 21919.3<br>396.3 | 19408.8<br>891.8  | 17804.0<br>1585.4 | 16651.2<br>2477.1 | 15764.9<br>3567.1 |                             | 181.8                                        | 110                          |
| 4                    | 270                            | 45AD 04278R | 32144.5                                      | 28212.8<br>80.8                                             | 22915.9<br>323.3 | 20291.3<br>727.5  | 18613.5<br>1293.2 | 17408.3<br>2020.7 | 16481.7<br>2909.8 |                             | 178.1                                        | 120                          |
|                      | 210                            | 45AD 05218R | 18804.1                                      | 16923.7<br>101.1                                            | 14910.2<br>404.4 | 13202.5<br>910.0  | 12110.9<br>1617.7 | 11326.7<br>2527.7 |                   |                             | 142.0                                        | 100                          |
| 5                    | 240                            | 45AD 05248R | 19802.8                                      | 17822.5<br>77.4                                             | 14700.2<br>309.6 | 13016.5<br>696.7  | 11940.3<br>1238.6 | 11167.1<br>1935.2 | 10572.7<br>2786.7 |                             | 137.3                                        | 100                          |
|                      | 180                            | 45AD 06188R | 32144.5                                      | 28930.0<br>116.3                                            | 24517.9<br>465.1 | 21709.8<br>1046.6 | 19914.7<br>1860.5 | 18625.2<br>2907.1 | 17633.8<br>4186.2 |                             | 178.1                                        | 120                          |
| 6                    | 210                            | 45AD 06218R | 34139.3                                      | 29701.7<br>85.4                                             | 24125.3<br>341.7 | 21362.2<br>768.9  | 19595.8<br>1366.9 | 18327.0<br>2135.8 | 17351.5<br>3075.6 |                             | 171.3                                        | 120                          |
|                      | 150                            | 45AD 08158R | 33535.7                                      | 30182.1<br>130.9                                            | 30182.1<br>523.8 | 27431.3<br>1178.5 | 25163.2<br>2095.1 | 23533.8<br>3273.5 | 22281.2<br>4713.9 | 20438.8<br>8380.2           | 173.4                                        | 120                          |
| 8                    | 180                            | 45AD 08188R | 35651.8                                      | 32086.7<br>90.9                                             | 30241.8<br>363.7 | 26778.1<br>818.4  | 24564.0<br>1454.9 | 22973.4<br>2273.3 | 21750.6<br>3273.5 | 19952.1<br>5819.6           | 166.2                                        | 120                          |
|                      | 120                            | 45AD 10128R | 19802.8                                      | 17822.5<br>154.8                                            | 17822.5<br>619.3 | 17781.1<br>1393.4 | 16310.9<br>2477.1 | 15254.7<br>3870.5 |                   |                             | 137.3                                        | 100                          |
| 10                   | 150                            | 45AD 10158R | 35283.1                                      | 31754.8<br>105.1                                            | 31754.8<br>420.2 | 30012.3<br>945.5  | 27530.7<br>1680.9 | 25748.1<br>2626.4 | 24377.6<br>3782.0 |                             | 162.8                                        | 110                          |
|                      | 120                            | 45AD 12128R | 21044.9                                      | 18940.4<br>145.0                                            | 18940.4<br>579.8 | 18940.4<br>1304.6 | 18834.5<br>2319.4 | 17614.9<br>3624.0 |                   |                             | 131.8                                        | 100                          |
| 12                   | 150                            | 45AD 12158R | 22401.6                                      | 20161.4<br>92.8                                             | 20161.4<br>371.1 | 19812.0<br>835.0  | 18173.9<br>1484.4 | 16997.1<br>2319.4 | 16092.4<br>3339.9 |                             | 126.3                                        | 100                          |
|                      | 120                            | 45AD 15128R | 16379.8                                      | 14741.9<br>111.4                                            | 14741.9<br>445.7 | 14741.9<br>1002.7 | 14503.0<br>1782.7 | 13564.0<br>2785.4 |                   |                             | 104.1                                        | 80                           |
| 15                   | 150                            | 45AD 15158R | 21869.9                                      | 19682.9<br>74.4                                             | 19682.9<br>297.5 | 19682.9<br>669.3  | 18254.1<br>1189.8 | 17072.1<br>1859.1 | 16163.4<br>2677.1 |                             | 114.2                                        | 90                           |
|                      | 120                            | 45AD 16128R | 16631.4                                      | 14968.3<br>105.2                                            | 14968.3<br>420.7 | 14968.3<br>946.5  | 14967.3<br>1682.7 | 13998.1<br>2629.3 |                   |                             | 103.2                                        | 80                           |
| 16                   | 150                            | 45AD 16158R | 17347.9                                      | 15613.1<br>67.3                                             | 15613.1<br>269.2 | 15585.1<br>605.8  | 14296.5<br>1077.0 | 13370.8<br>1682.7 | 12659.1<br>2423.1 |                             | 99.8                                         | 80                           |

## (3) 45AD Cam curve SMS-3 (cam curve code 7) 2 Dwell

| S  | $\theta$ (deg) | CODE         | Ts<br>(N·m) | Input Shaft Speed (Index/min) |                  |                  |                  |                  |                  |                   | Tx<br>(N·m) | SCF<br>(mm) |
|----|----------------|--------------|-------------|-------------------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------|-------------|
|    |                |              |             | 25                            | 50               | 75               | 100              | 125              | 150              | 200               |             |             |
| 16 | 210            | 45AD 16217R2 | 33451.7     | 30106.5<br>23.5               | 30106.5<br>94.1  | 30106.5<br>211.8 | 27969.9<br>376.5 | 26158.8<br>588.3 | 24766.5<br>847.1 | 22718.6<br>1506.0 | 173.7       | 120         |
|    | 240            | 45AD 16247R2 | 35049.3     | 31544.4<br>18.0               | 31544.4<br>72.1  | 29985.1<br>162.1 | 27505.8<br>288.3 | 25724.8<br>450.4 | 24355.5<br>648.6 | 22341.7<br>1153.0 | 168.3       | 120         |
|    | 270            | 45AD 16277R2 | 36287.0     | 32658.3<br>14.2               | 33260.1<br>56.9  | 29450.7<br>128.1 | 27015.6<br>227.8 | 25266.3<br>355.9 | 23921.4<br>512.5 | 21943.5<br>911.0  | 164.1       | 120         |
| 20 | 180            | 45AD 20187R2 | 33540.1     | 30186.1<br>25.7               | 30186.1<br>102.8 | 30186.1<br>231.3 | 30186.1<br>411.1 | 29261.6<br>642.4 | 27704.0<br>925.1 | 25413.3<br>1644.6 | 168.7       | 110         |
|    | 210            | 45AD 20217R2 | 36005.8     | 32405.2<br>19.7               | 32405.2<br>78.7  | 32405.2<br>177.1 | 32243.1<br>314.9 | 30155.3<br>492.0 | 28550.3<br>708.5 | 26189.6<br>1259.5 | 165.0       | 120         |
|    | 240            | 45AD 20247R2 | 37257.3     | 33531.6<br>15.1               | 33531.6<br>60.3  | 33531.6<br>135.6 | 31510.8<br>241.1 | 29470.4<br>376.7 | 27901.8<br>542.4 | 25594.7<br>964.3  | 160.7       | 120         |
|    | 270            | 45AD 20277R2 | 38194.8     | 34375.3<br>11.9               | 34375.3<br>47.6  | 33573.1<br>107.1 | 30797.1<br>190.5 | 28803.0<br>297.6 | 27269.9<br>428.6 | 25015.0<br>761.9  | 157.3       | 120         |
| 24 | 180            | 45AD 24187R2 | 21459.4     | 19313.5<br>22.7               | 19313.5<br>90.8  | 19313.5<br>204.2 | 19313.5<br>363.1 | 19313.5<br>567.3 | 18358.8<br>816.9 | 16840.8<br>1452.3 | 130.2       | 100         |
|    | 210            | 45AD 24217R2 | 22366.3     | 20129.7<br>16.7               | 20129.7<br>66.7  | 20129.7<br>150.0 | 20210.4<br>266.8 | 18901.8<br>416.8 | 17895.7<br>600.2 | 16416.0<br>1067.0 | 126.5       | 100         |
|    | 240            | 45AD 24247R2 | 23020.4     | 20718.4<br>12.8               | 20718.4<br>51.1  | 20718.4<br>114.9 | 19698.7<br>204.2 | 18423.2<br>319.1 | 17442.6<br>459.5 | 16000.3<br>816.9  | 123.7       | 100         |
|    | 270            | 45AD 24277R2 | 23503.5     | 21153.2<br>10.1               | 21153.2<br>40.3  | 20945.1<br>90.8  | 19213.3<br>161.4 | 17969.2<br>252.1 | 17012.7<br>363.1 | 15606.0<br>645.5  | 121.6       | 100         |
| 32 | 180            | 45AD 32187R2 | 16855.0     | 15169.5<br>16.5               | 15169.5<br>65.9  | 15169.5<br>148.2 | 15169.5<br>263.4 | 15169.5<br>411.6 | 14544.5<br>592.7 | 13341.8<br>1053.7 | 102.0       | 80          |
|    | 210            | 45AD 32217R2 | 17329.8     | 15596.9<br>12.1               | 15596.9<br>48.4  | 15596.9<br>108.9 | 15596.9<br>193.5 | 14873.1<br>302.4 | 14081.4<br>435.5 | 12917.1<br>774.1  | 99.9        | 80          |
|    | 240            | 45AD 32247R2 | 17660.4     | 15894.4<br>9.3                | 15894.4<br>37.0  | 15894.4<br>83.3  | 15423.4<br>148.2 | 14424.7<br>231.5 | 13656.9<br>333.4 | 12527.7<br>592.7  | 98.2        | 80          |
|    | 270            | 45AD 32277R2 | 17898.3     | 16108.5<br>7.3                | 16108.5<br>29.3  | 16108.5<br>65.9  | 14987.8<br>117.1 | 14017.3<br>182.9 | 13271.2<br>263.4 | 12173.9<br>468.3  | 97.0        | 80          |

Note) A 2-dwell cam performs two identical indexes and stops per one turn of the input shaft.  
The indexing angle is the total indexing angle per one turn of the input shaft.

1N·m $\approx$ 0.102kgf·m



# Sizing

## Sizing Advice

When sizing a Sandex Alpha Series, make sure to follow these guidelines to ensure best performance and to prevent premature breakage.

The conditions for driving the input and the loads on the output shaft are also important factors. Make sure you know these conditions before sizing your indexer.

Feel free to consult with your Sankyo representative as these calculations involve unique index-related formulas and symbols.

Sankyo can also size an indexer for you by performing the necessary torque calculations. Use the FAX Sheet at the end of this brochure for prompt service.

## Sizing Procedure

### 〈Sizing Procedure〉

#### (1) Determine the number of stops (S)

Select the number of stops from the Standard Specifications that best suits the usage conditions.

#### (2) Determine the indexing angle ( $\theta$ )

Calculate a temporary indexing angle based on the ratio of stopping time versus indexing time. Then find the closest indexing angle from the Standard Specifications list.

$$t_1:t_2=(360-\theta):\theta$$

If you need a long stopping time ratio, start and stop the cam shaft with a VFD or a brake motor.

In this case, select the indexing angle by considering the amount of time needed for braking. Try to find the widest angle possible ( $240^\circ$  to  $270^\circ$  is generally recommended).

You may need to review the indexing angle if, for example, you are using variable frequency control for high-speed operation.

If in doubt, contact a Sankyo representative.

#### (3) Calculate the input speed (N)

$$N = \frac{60}{t_2} \cdot \frac{\theta}{360 \times m}$$

#### (4) Calculate the moment of inertia (J) [Formula (A)]

Calculate the moment of inertia J for each element: table, fixture, workpiece.

#### (5) Calculate the required torque ( $T_t$ ) [Formulas (B, C, D, and E)]

Calculate the inertia torque ( $T_i$ ), friction torque ( $T_f$ ), and working load torque ( $T_w$ ). Then, calculate the required torque ( $T_t$ ).

#### (6) Select a model

Based on the number of stops, indexing angle, cam curve, and rotating speed, select a size where the dynamic rated output torque  $T_{op}$  (see Torque Capacity Table) is greater than the required torque  $T_t$ .

#### (7) Calculate the cam shaft torque ( $T_c$ ) [Formula (F)]

#### (8) Select the motor size [Formula (G)]

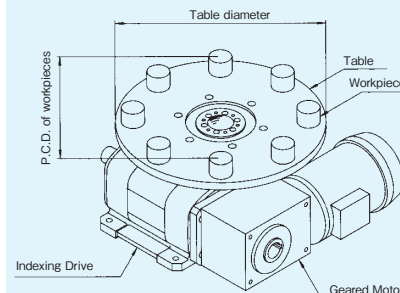
Calculate the required motor power ( $P_s$ ), and then select an appropriate motor.

## Symbols Used for Sizing

|                                                                                       |                                                         |                                                           |                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------|
| $a_4$ : Backlash factor                                                               | Lh : Expected service life (hr)                         | S : Number of stops                                       | $T_s$ : Static rated output torque (N·m)        |
| $A_m$ : Non-dimensional maximum acceleration                                          | m : Number of dwells                                    | $t_1$ : Stopping time (sec)                               | $T_t$ : Required torque of output shaft (N·m)   |
| Ba : Equivalent backlash of the output shaft                                          | M : Mass (kg)                                           | $t_2$ : Indexing time (sec)                               | $T_w$ : Working load torque (N·m)               |
| E : Regenerative braking efficiency of the VFD                                        | N : Input speed (rpm)                                   | $t_d$ : Start and braking time (sec)                      | $T_x$ : Cam shaft friction torque (N·m)         |
| F : Working load (N)                                                                  | $N_D$ : Maximum output speed (rpm)                      | $t_D$ : Dwell time (sec)                                  | $V_m$ : Non-dimensional maximum velocity        |
| i : Gear ratio ( $i > 1$ )                                                            | $N_M$ : Motor speed (rpm)                               | $T_c$ : Cam shaft torque (N·m)                            | W : Load weight (N)                             |
| J : Total moment of inertia of output load ( $\text{kg}\cdot\text{m}^2$ )             | $N_R$ : Geared motor output speed (rpm)                 | $T_d$ : Starting and stopping torque (N·m)                | $\beta$ : Working angle (deg)                   |
| $J_c$ : Moment of inertia of input shaft ( $\text{kg}\cdot\text{m}^2$ )               | P : Feed pitch (m)                                      | $T_f$ : Friction torque (N·m)                             | $\gamma$ : Speed ratio $\gamma > 1$             |
| $J_M$ : Moment of inertia of motor ( $\text{kg}\cdot\text{m}^2$ )                     | $P_{INV}$ : VFD capacity (kW)                           | $T_i$ : Inertia torque (N·m)                              | $\theta$ : Indexing angle (deg)                 |
| $J_{MC}$ : Equivalent moment of inertia on motor shaft ( $\text{kg}\cdot\text{m}^2$ ) | $P_s$ : Motor power (kW)                                | $T_{oi}$ : Internal inertia load torque (N·m)             | $\theta_d$ : Braking angle of input shaft (deg) |
| K : Radius of gyration (m)                                                            | $Q_m$ : Non-dimensional maximum cam shaft torque factor | $T_{op}$ : Dynamic rated output torque (N·m)              | $\mu$ : Friction coefficient                    |
| Lf : Life factor                                                                      | R : Rotational pitch circle diameter (m)                | $T_R$ : Allowable output torque of the geared motor (N·m) | $\varepsilon$ : Inertia load ratio              |

Figure 37-1

### For Table/Dial Applications



#### Required data

- ① Number of stations
- ② Stopping time ( $t_1$ ) and Indexing time: ( $t_2$ )
- ③ Mass of table/dial: outer diameter
- ④ Quantity, mass, and mounting pitch of tools or fixtures
- ⑤ Quantity, mass, and mounting pitch of workpieces
- ⑥ Options (TorqueLimiter, variable frequency drive)
- ⑦ Expected service life

#### (9) Calculate the backlash factor ( $a_4$ )

1. Determine the total amount ( $B_i$ ) of backlash, torsion, and deflection in the input drive.

● If using a hypoid gear reducer [F2S/F3S/HMT]:  $B_i = 0.6$

● If using a worm gear reducer (SAF/SHF):  $B_i = 0.4$

● For other transmission elements, refer to the SANDEX General Catalog (A71 to 77) to calculate this factor.

2. Calculate the equivalent backlash ( $B_a$ ) in output shaft

$$B_a = \frac{B_i \times V_m \times 360}{S \cdot \theta}$$

3. Calculate the inertia load factor ( $\varepsilon$ )

$$\varepsilon = \frac{T_i + T_{oi} - T_f}{T_s}$$

4. Determine the backlash factor ( $a_4$ )

Based on the equivalent backlash of the output shaft and the inertia load factor, find the backlash factor by referring to Table 38-5.

#### (10) Check the expected lifetime ( $L_h$ ) [Formula (H)]

Calculate the life factor  $L_f$ , and then determine  $L_h$ .

Find the approximate life value in Table 38-4.

#### (11) Select a geared motor

Check the Geared Motor Characteristics Table to make sure the motor you selected in Step 8 will fit your selected indexer. Some models may allow you to mount a geared motor that is one frame larger as a special option. Make sure to read the notes under the characteristics table.

2. From the characteristics table, select the gear ratio ( $i$ ) for the input shaft speed ( $N$ ).

If you are using variable frequency control, select a gear ratio that represents the speed of the input shaft during continuous rotation at 40 to 60 Hz.

3. Make sure the allowable output torque ( $T_R$ ) of the geared motor is greater than the cam shaft torque ( $T_c$ ).



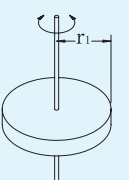
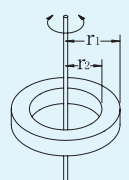
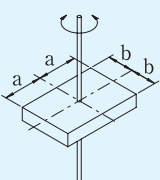
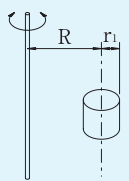
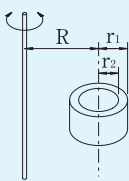
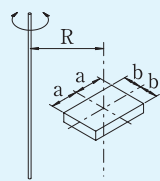
## Formulas

Table 38-1

|                                 | Rotating Motions                                                                                                                                                                                                                                                                                                          | Linear Motions                                                                                  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| (A) Moment of inertia $J$       | $J = MK^2$ ( $\text{kg}\cdot\text{m}^2$ )                                                                                                                                                                                                                                                                                 | $J = M \left( \frac{S \cdot P}{2\pi} \right)^2$ ( $\text{kg}\cdot\text{m}^2$ )                  |
| (B) Inertia torque $T_i$        | $T_i = 226.2 A m \frac{J \cdot N^2}{S \cdot (\theta/m)^2}$ ( $\text{N}\cdot\text{m}$ )                                                                                                                                                                                                                                    | $T_i = 5.73 A m \frac{M \cdot S \cdot P^2 \cdot N^2}{(\theta/m)^2}$ ( $\text{N}\cdot\text{m}$ ) |
| (C) Friction torque $T_f$       | $T_f = W \cdot \mu \cdot R$ ( $\text{N}\cdot\text{m}$ )                                                                                                                                                                                                                                                                   | $T_f = \frac{W \cdot \mu \cdot S \cdot P}{2\pi}$ ( $\text{N}\cdot\text{m}$ )                    |
| (D) Working load torque $T_w$   | $T_w = R \cdot F \cdot \cos \beta$ ( $\text{N}\cdot\text{m}$ )                                                                                                                                                                                                                                                            | $T_w = \frac{F \cdot S \cdot P}{2\pi} \cos \beta$ ( $\text{N}\cdot\text{m}$ )                   |
| (E) Required torque $T_t$       | $T_t = T_i + T_f + T_w$ ( $\text{N}\cdot\text{m}$ )                                                                                                                                                                                                                                                                       |                                                                                                 |
| (F) Cam shaft torque $T_c$      | $T_c = 500 Q_m \frac{1}{S \cdot \theta} (T_t + T_{oi}) + T_x$ ( $\text{N}\cdot\text{m}$ )                                                                                                                                                                                                                                 |                                                                                                 |
| (G) Motor power $P_s$           | $P_s = \frac{T_c \cdot N}{9550}$ (kW)                                                                                                                                                                                                                                                                                     |                                                                                                 |
| (H) Expected service life $L_h$ | $L_h = 8000 L_f^{10/3}$ (hr)                                                                                                                                                                                                                                                                                              | $L_f = \frac{T_{op}}{a_4 (T_i + T_{oi}) + T_f + T_w}$                                           |
| (I) VFD capacity $P_{INV1}$     | $P_{INV1} = \frac{a_4 \times T_c \times N}{9550 \times E}$ (kW)                                                                                                                                                                                                                                                           |                                                                                                 |
| For indirect drives             | Use the following formulas when obtaining rotation or linear motion indirectly from the output shaft.<br>Equivalent moment of inertia $J_e = J / \gamma^2$ Equivalent friction torque $T_{fe} = T_f / \gamma$<br>Equivalent working load torque $T_{we} = T_w / \gamma$ Equivalent inertia torque $T_{ie} = T_i / \gamma$ |                                                                                                 |

## Radius of Gyration K

Table 38-2

|       |                                                                                     |                                                                                     |                                                                                     |
|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|       |  |  |  |
| $K^2$ | $\frac{r_1^2}{2}$                                                                   | $\frac{r_1^2 + r_2^2}{2}$                                                           | $\frac{a^2 + b^2}{3}$                                                               |
|       |  |  |  |
| $K^2$ | $\frac{r_1^2}{2} + R^2$                                                             | $\frac{r_1^2 + r_2^2}{2} + R^2$                                                     | $\frac{a^2 + b^2}{3} + R^2$                                                         |

## Cam curve characteristic value (Am, Vm, Qm)

Table 38-3

| Cam curve | Code | Max velocity $V_m$ | Max acceleration $A_m$ | Max cam shaft torque factor $Q_m$ |
|-----------|------|--------------------|------------------------|-----------------------------------|
| SMS-3     | 7    | 1.818              | $\pm 4.848$            | $\pm 1.178$                       |
| SMCV-3    | 8    | 1.290              | $\pm 6.882$            | $\pm 0.836$                       |

## Life factor Lf and Life hours Lh (hr)

Table 38-4

| Lh (hr) | Lf    | Lh (hr) | Lf   | Lh (hr) | Lf   |
|---------|-------|---------|------|---------|------|
| 2000    | 0.659 | 10000   | 1.06 | 26000   | 1.42 |
| 3000    | 0.745 | 12000   | 1.12 | 28000   | 1.45 |
| 4000    | 0.812 | 14000   | 1.18 | 30000   | 1.48 |
| 5000    | 0.868 | 16000   | 1.23 | 35000   | 1.55 |
| 6000    | 0.917 | 18000   | 1.27 | 40000   | 1.62 |
| 7000    | 0.960 | 20000   | 1.31 | 45000   | 1.67 |
| 8000    | 1.00  | 22000   | 1.35 | 50000   | 1.73 |
| 9000    | 1.03  | 24000   | 1.39 | 55000   | 1.78 |

## Backlash Factors $a_4$

Table 38-5

| $\epsilon$ | 0    | 5    | 10   | 15   | 20   | 25   | 30   | 35   | 40   | 45   | 50   | 55   | 60   | 65   | 70   | 75   | 80   |
|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0.05       | 1.00 | 1.05 | 1.07 | 1.09 | 1.10 | 1.12 | 1.12 | 1.13 | 1.14 | 1.15 | 1.16 | 1.17 | 1.18 | 1.19 | 1.19 | 1.20 | 1.21 |
| 0.1        | 1.02 | 1.11 | 1.15 | 1.18 | 1.21 | 1.24 | 1.26 | 1.27 | 1.29 | 1.31 | 1.33 | 1.35 | 1.37 | 1.39 | 1.41 | 1.43 | 1.44 |
| 0.2        | 1.06 | 1.21 | 1.30 | 1.36 | 1.42 | 1.48 | 1.51 | 1.54 | 1.57 | 1.60 | 1.63 | 1.66 | 1.69 | 1.72 | 1.75 | 1.78 | 1.81 |
| 0.3        | 1.08 | 1.28 | 1.40 | 1.48 | 1.56 | 1.64 | 1.68 | 1.72 | 1.76 | 1.80 | 1.84 | 1.88 | 1.92 | 1.96 | 2.00 | 2.04 | 2.08 |
| 0.4        | 1.10 | 1.35 | 1.50 | 1.60 | 1.70 | 1.80 | 1.85 | 1.90 | 1.95 | 2.00 | 2.05 | 2.10 | 2.15 | 2.20 | 2.25 | 2.30 | 2.35 |
| 0.5        | 1.12 | 1.42 | 1.60 | 1.72 | 1.84 | 1.96 | 2.02 | 2.08 | 2.14 | 2.20 | 2.26 | 2.32 | 2.38 | 2.44 | 2.50 | 2.56 | 2.62 |

$\epsilon$ : Inertia load ratio

Ba: Equivalent backlash of the output shaft

# Sizing a Variable Frequency Drive

## Notes on Sizing Variable Frequency Drives (VFD)

If you are going to use a VFD to start and stop the Alpha Series, the VFD must be sized properly for the operating conditions. However, as long as it has sufficient capacity, it can be used regardless of the type that you select.

Refer to the brochure for the VFD you are considering, and use the following procedure to make sure it has enough capacity.

Upon request, Sankyo can size the VFD for you if you provide us with the pertinent information.

## Procedure for Sizing a VFD

### 〈Sizing Procedure〉

The VFD model that you choose must be sized according to the capacity required to continuously drive the Alpha Series indexer cam shaft ( $P_{INV1}$ ), and the capacity required to start and stop the motor when the indexer is in dwell position ( $P_{INV2}$ ). The latter must take into account the characteristics of the geared motor, such as moment of inertia

(Note) The VFD capacity of interest is not the rated capacity, but the nominal capacity (when driving a standard motor).

### 〈Capacity when driving the input shaft continuously: $P_{INV1}$ 〉

#### (1) Determining the efficiency (E) of the regenerative braking torque

The regenerative braking efficiency (E) depends on the manufacturer, model, and capacity of the VFD. It also depends on whether an external resistor is used. Check the brochure for the VFD.

The value of E is 1.5 for 150%, 1.0 for 100%, 0.5 for 50%, and 0.2 for 20%.

#### (2) Calculating the VFD capacity ( $P_{INV1}$ )

[Formula (I)]

Calculate the capacity of the VFD, and then select a motor size that is greater than the motor capacity selected for Step (8) on page 37.

### 〈Capacity required to start and stop the motor: $P_{INV2}$ 〉

#### (1) Calculating the dwell time ( $t_D$ )

Determine the dwell time (stop time) when the cam shaft (input shaft) of the Alpha Series is driven continuously at the operating speed.

$$t_D = \frac{60}{N} \times \frac{360 - \theta}{360}$$

If your application calls for an input shaft speed above 100 rpms, contact a Sankyo representative first.

#### (2) Calculating the equivalent moment of inertia on motor shaft ( $J_{MC}$ )

1. Check the moment of inertia of input shaft ( $J_C$ ) in the Table of Characteristics.

2. Check the moment of inertia of motor ( $J_M$ ) in the Table of Characteristics.

3. Calculate the equivalent moment of inertia on the motor shaft ( $J_{MC}$ ) without including the load on the output shaft.

$$J_{MC} = \frac{J_C}{i^2} + J_M$$

#### (3) Determining the VFD capacity ( $P_{INV}$ )

1. Check the speed of the motor to be used ( $N_M$ )

50Hz...1500rpm, 60Hz...1800rpm

2. Calculate the VFD capacity ( $P_{INV2}$ )

$$P_{INV2} = \frac{J_{MC} \times N_M^2}{91406 \times t_D}$$

3. Determine the VFD capacity ( $P_{INV}$ ) required to drive the Alpha Series

Determine the required capacity of the VFD for driving the Alpha Series such that the following condition is met.

$$P_{INV} \geq P_{INV1}, P_{INV2}$$

#### (4) Calculating the starting and braking time ( $t_d$ )

Calculate the time it takes for the VFD to start and brake the motor.

$$t_d = \frac{J_{MC} \times N_M^2}{91406 \times P_{INV}}$$

(Note) Some VFD models allow you to set the braking time in increments of 0.1 seconds.

In this case, set it to 0.1 seconds.

Depending on the manufacturer or model, the ramp up and ramp down times can only be set within a prescribed range. Make sure to check the catalog for your VFD.

#### (5) Braking angle of cam shaft ( $\theta_d$ )

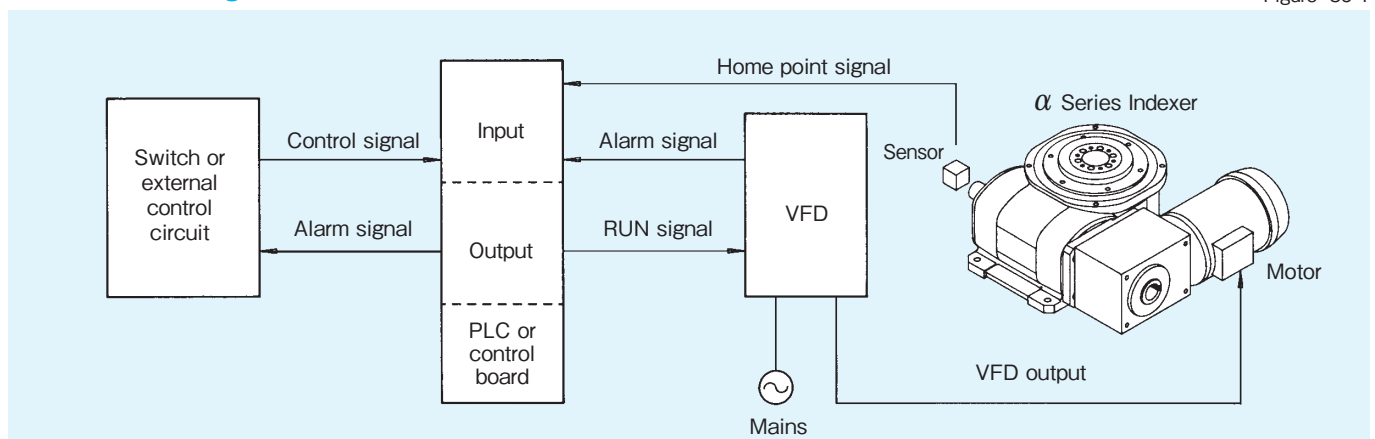
Calculate the braking angle of the cam shaft required to detect a signal from a sensor and timing cam or plate.

$$\theta = 3 \times N \times t_d$$

This  $\theta_d$  is the angle required to start or stop the indexer, so it must be equal to  $2\theta_d$  to allow for adjustment of the timing cam or plate.

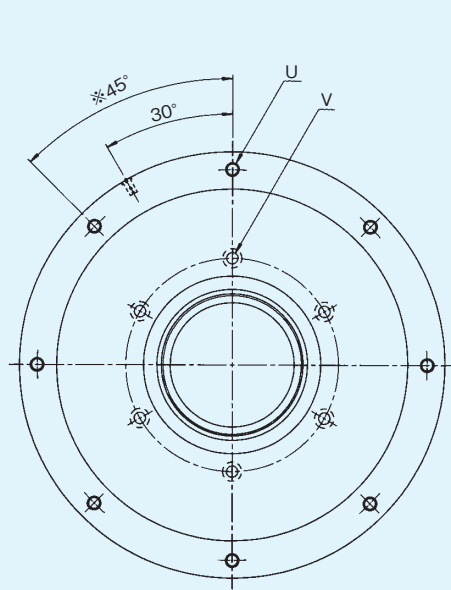
## Control Block Diagram

Figure 39-1



# Torque Limiter

## Dimensions



7TAD provides  
\* part angle 60°.

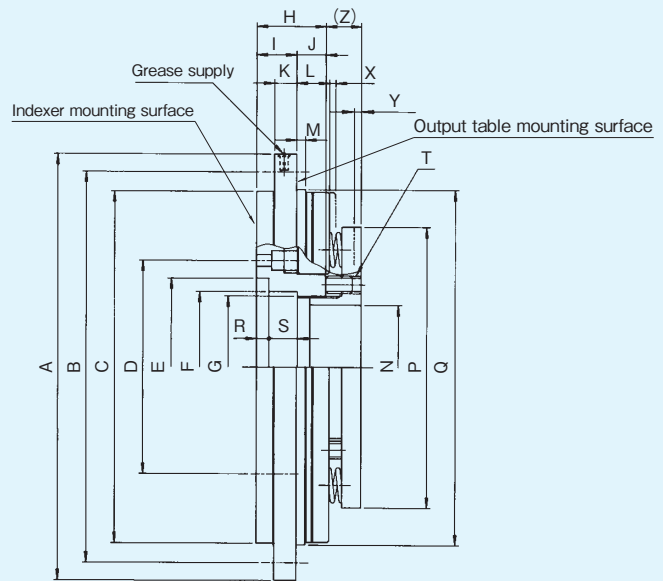


Figure TAD-1

Table of dimensions

| Model | A    | B    | C    | D    | E                                   | F    | G      | H  | I    | J    | K    | L    | M | N    | P    | Q                                   | R  | S  | T     | U          | V        | X   | Y <sub>max</sub> | Z    |
|-------|------|------|------|------|-------------------------------------|------|--------|----|------|------|------|------|---|------|------|-------------------------------------|----|----|-------|------------|----------|-----|------------------|------|
| 7TAD  | φ180 | φ168 | φ152 | φ85  | φ70 <sup>+0.03</sup> <sub>0</sub>   | φ60  | M55×2  | 33 | 19   | 14   | 10.5 | 14   | 5 | φ47  | φ107 | φ155 <sup>0</sup> <sub>-0.04</sub>  | 7  | 10 | 4-M5  | 6-M5×0.8   | 6-6.6DR. | 3   | 5                | 16.5 |
| 9TAD  | φ240 | φ220 | φ198 | φ120 | φ100 <sup>+0.035</sup> <sub>0</sub> | φ85  | M80×2  | 39 | 22.5 | 16.5 | 12.5 | 17.5 | 5 | φ70  | φ158 | φ200 <sup>0</sup> <sub>-0.046</sub> | 7  | 16 | 4-M10 | 8-M8×1.25  | 6-6.6DR. | 3.5 | 7                | 23   |
| 11TAD | φ285 | φ260 | φ229 | φ150 | φ120 <sup>+0.035</sup> <sub>0</sub> | φ108 | M105×2 | 44 | 25   | 19   | 14.5 | 20   | 6 | φ95  | φ186 | φ235 <sup>0</sup> <sub>-0.046</sub> | 12 | 13 | 4-M10 | 8-M10×1.5  | 6-9DR.   | 3.7 | 7.5              | 26   |
| 15TAD | φ395 | φ365 | φ328 | φ210 | φ172 <sup>+0.040</sup> <sub>0</sub> | φ155 | M145×2 | 64 | 37   | 27   | 20   | 27   | 6 | φ130 | φ256 | φ335 <sup>0</sup> <sub>-0.057</sub> | 12 | 33 | 4-M10 | 8-M12×1.75 | 6-11DR.  | 5.5 | 7                | 26   |
| 19TAD | φ480 | φ450 | φ419 | φ260 | φ230 <sup>+0.046</sup> <sub>0</sub> | φ186 | M180×2 | 77 | 42   | 35   | 21   | 33   | 8 | φ166 | φ326 | φ420 <sup>0</sup> <sub>-0.063</sub> | 16 | 43 | 4-M10 | 8-M12×1.75 | 8-14DR.  | 5.6 | 7                | 34   |
| 23TAD | φ555 | φ525 | φ494 | φ336 | φ275 <sup>+0.052</sup> <sub>0</sub> | φ262 | M260×2 | 82 | 47   | 35   | 25   | 35   | 9 | φ246 | φ402 | φ495 <sup>0</sup> <sub>-0.063</sub> | 17 | 44 | 4-M10 | 8-M14×2    | 8-14DR.  | 6.5 | 8                | 36   |

[Unit : mm]

## Specifications

| Model | Code       | Range of tripping torque (N·m) | Thread pitch on torque adjusting nut (mm) | Max. allowable radial load (N) | Max. allowable thrust load (N) | Max. allowable bending moment (N·m) | Max. revolution per minute (r.p.m.) | Moment of inertia (kg·m <sup>2</sup> ) | Mass (kg) |
|-------|------------|--------------------------------|-------------------------------------------|--------------------------------|--------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-----------|
| 7TAD  | 7TAD-15L   | 40 ~ 150                       | 2                                         | 2450                           | 2950                           | 45                                  | 200                                 | 0.02                                   | 4.5       |
|       | 7TAD-25H   | 100 ~ 250                      |                                           |                                |                                |                                     |                                     |                                        |           |
| 9TAD  | 9TAD-20L   | 60 ~ 200                       | 2                                         | 5200                           | 5000                           | 100                                 | 200                                 | 0.07                                   | 9.6       |
|       | 9TAD-45H   | 140 ~ 450                      |                                           |                                |                                |                                     |                                     |                                        |           |
| 11TAD | 11TAD-23L  | 90 ~ 230                       | 2                                         | 7300                           | 7000                           | 180                                 | 200                                 | 0.15                                   | 15        |
|       | 11TAD-60H  | 150 ~ 600                      |                                           |                                |                                |                                     |                                     |                                        |           |
| 15TAD | 15TAD-100L | 300 ~ 1000                     | 2                                         | 11800                          | 12000                          | 430                                 | 140                                 | 0.8                                    | 43        |
|       | 15TAD-220H | 650 ~ 2200                     |                                           |                                |                                |                                     |                                     |                                        |           |
| 19TAD | 19TAD-200L | 600 ~ 2000                     | 2                                         | 16800                          | 17000                          | 750                                 | 120                                 | 2.1                                    | 74        |
|       | 19TAD-450H | 1500 ~ 4500                    |                                           |                                |                                |                                     |                                     |                                        |           |
| 23TAD | 23TAD-350L | 1200 ~ 3500                    | 2                                         | 24800                          | 35000                          | 1950                                | 100                                 | 4.5                                    | 110       |
|       | 23TAD-550H | 2000 ~ 5500                    |                                           |                                |                                |                                     |                                     |                                        |           |

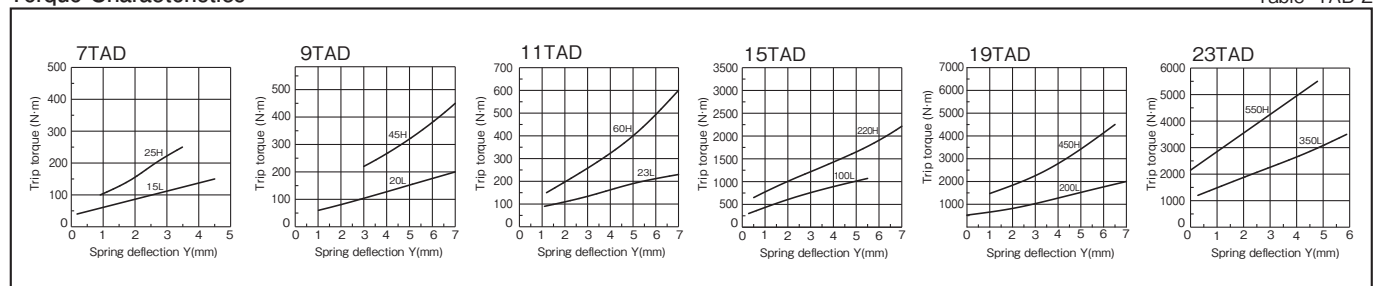
X : When an overload occurs, the overload detection panel moves X mm.  
This movement is used to active a sensing device and thereby allows the user to control operation of the mechanism involved.

(Z) : Since this dimension is the reference value for the amount the torque adjustment nut protrudes when the spring height is at its maximum (free), please pay attention to any possible interference with peripheral equipment or material when installing the part. In addition, the (Z) dimension may fluctuate due to variations in the free spring height.

Y : Since this dimension is the amount that the spring has been deflected from the spring free height, read the spring deflection Y by looking at the cutoff torque in the torque characteristic chart. Tighten the torque adjustment nut until it reaches the cutoff torque value Y.  
\*Since the Ymax value shown in the dimension table makes the mechanism inoperable, do not tighten the nut beyond this value.

## Torque Characteristics

Table TAD-2



# Handling

## Handling Procedures for the Alpha Series

An indexer that uses a roller gear cam mechanism is precision equipment. Improper handling can lead to premature breakage, and it can damage the automated machinery in which it is integrated.

Make sure you fully understand this aspect the product and handle it properly.

### (1) Installation

Use an oil stone to hone the mounting surface free from nicks, burr, and residual paint.

Clean the surface and apply grease or mineral oil to prevent rust. Then, install the indexer.

The indexer is subject to sharp fluctuating loads so make sure it is mounted securely.

### (2) Environment

The ambient operating conditions may have a significant impact on the performance of this indexer.

Review the conditions where the indexer will be installed beforehand, and take all necessary preventive measures.

a) The ambient operating temperature for a standard indexer is from 0°C to 40 40°C.

b) An indexer that is used in a moist atmosphere is prone to rusting.

Rust proof thoroughly.

c) The input and output shaft is sealed with an oil seal. Depending on the amount and type of dust, this seal can wear and eventually leak. Consider a furnishing a protective cover.

d) Electrical current can cause the indexer to wear. Make sure electrical circuits are properly insulated.

### (3) Operation

Automated machines built around an indexer usually has many parts that are intricately assembled. Often, the machine will not run after it is first assembled.

After assembling the major components, you should always operate the machine by hand, or micro-jog if available, to make sure the parts move without interference.

Motor sizes from 0.4 to 1.5 kW have a hex-wrench hole, where the fan is mounted, to allow hand-operated testing.

(This hole is square for 1.5-kW motors.)

Always test run by hand, or micro-jog if available, to make sure the operation is smooth.

Then, run with power and check for noise, vibration, temperature changes, oil leaks, and other possible signs of failure.

### (4) Handling the input shaft

When center line of the keyway in the input shaft points toward the turret, the input shaft is at the indexing angle reference position.

On an indexer, the starting position of the indexing angle and the key should be used for positioning and for the safe transmission of shock loads. During normal operation, the key should not be relied upon. Instead, use a different means of transmission.

### (5) Handling the output

a) The output of an indexer is subject to positive and negative inertia torque as it indexes and stops, thus requiring sufficient stiffness to ensure positioning accuracy. There is no tolerance for vibration.

The output on the AD Type models is designed with a wide flange surface to allow precision mounting of tables or dials.

b) To ensure precise positioning of the workstations on the table, bore an oversized center hole by 0.1 to 0.2 mm. Center the table by moving it radially and the direction of rotation, then tighten the bolts and, if necessary, insert a knock pin.

The recommended tightening torques for bolts in the indexer flange are given below.

|      | Mounting bolts |                   | (Recommended) knock pin holes |                 |
|------|----------------|-------------------|-------------------------------|-----------------|
|      | Size           | Tightening torque | Machining positions           | Machining depth |
| 7AD  | 6-M6           | 13.5 N·m          | P.C.D. 85                     | 12mm            |
| 9AD  | 6-M6           | 13.5 N·m          | P.C.D. 120                    | 12mm            |
| 11AD | 6-M8           | 34 N·m            | P.C.D. 150                    | 16mm            |
| 15AD | 6-M10          | 67.5 N·m          | P.C.D. 210                    | 20mm            |
| 19AD | 8-M12          | 84 N·m            | P.C.D. 260                    | 24mm            |
| 23AD | 8-M12          | 84 N·m            | P.C.D. 336                    | 24mm            |
| 33AD | 8-M20          | 402 N·m           | P.C.D. 430                    | 35mm            |
| 45AD | 8-M20          | 402 N·m           | P.C.D. 560                    | 40mm            |

c) The center of the output is standard equipped with a robust fixed flange with a thru-hole.

You can directly mount your fixed table to this flange.

You can machine a hole in your mounting base where the center of the output will be. This provides a convenient passage for piping and wiring.

### (6) Lubrication

Lubrication serves an important role. It reduces friction of rolling parts, removes frictional heat, and prevents rust, in addition to other benefits.

Use of improperly selected oil will reduce the accuracy and life. Make sure to select an oil that suits the operating conditions.

Sankyo recommends the use of a good quality mineral oil with pressure additives. Do not mix with oil from different manufacturers.

The viscosity depends on the operating speed. Use the table below to select the proper oil.

### (7) Maintenance and servicing

a) Backlash in the input and output will increase over time.

Always perform regular inspections and adjustments.

b) If the indexer is over filled with oil, the indexer will show abnormal temperature rises and may even leak. Make sure the indexer has the proper amount of oil at all times.

c) Replace the lubrication oil every 3,000 hours. Or, if the indexer is not operated that long, replace it at least once every one to two years.

### (8) Lubrication of the geared motor

● For 0.1 kW to 1.5 kW and 2.2 kW (19AD, 3.7 kW motors

These motors are lubricated by grease.

Normally, the grease does not need to be replaced or added.

● For 2.2 kW (23AD), and 5.5 kW to 15 kW motors

Replace the oil every 10,000 hours of operation, or once every two years, whichever comes first.

| Lubrication oil | Product name         | ISO viscosity grade |
|-----------------|----------------------|---------------------|
| Mineral oil     | Mobilgear 600 XP 680 | VG680               |

The amount of oil to fill depends on the mounting position.

|                                        | 2.2kW | 5.5/7.5kW | 11/15kW |
|----------------------------------------|-------|-----------|---------|
| Indexer is mounted in positions 1 or 2 | 1ℓ    | 3.8ℓ      | 7ℓ      |
| Indexer is mounted in position 5       | 2.9ℓ  | 11.2ℓ     | 21ℓ     |

| Input shaft speed (rpm) | 7AD~23AD | 33AD, 45AD |
|-------------------------|----------|------------|
| 20 or slower            | 680      | 680        |
| Between 20 and 100      | 460      | 320        |
| Between 100 and 200     | 320      | 220        |

### Oil Viscosities (units: cSt)

| Viscosity cSt/40°C | Oil brands                |                          |                  |                      |
|--------------------|---------------------------|--------------------------|------------------|----------------------|
|                    | Idemitsu                  | JXTG Nippon Oil & Energy | Cosmo            | Exxon Mobile         |
| 680                | Daphne Super Gear Oil 680 | Bonnok TS680             | Cosmo Gear SE680 | Mobilgear 600 XP 680 |
| 460                | Daphne Super Gear Oil 460 | Bonnok TS460             | Cosmo Gear SE460 | Mobilgear 600 XP 460 |
| 320                | Daphne Super Gear Oil 320 | Bonnok TS320             | Cosmo Gear SE320 | Mobilgear 600 XP 320 |
| 220                | Daphne Super Gear Oil 220 | Bonnok TS220             | Cosmo Gear SE220 | Mobilgear 600 XP 220 |

[Special Note] If the input shaft speed is a borderline value, choose the viscosity of the higher grade (larger number).

(1cSt=1mm<sup>2</sup>/s)

Attn : \_\_\_\_\_

SANDEX- $\alpha$  series Model Selection data

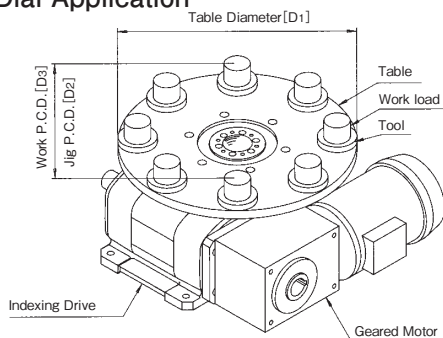
|            |  |     |  |
|------------|--|-----|--|
| Company    |  |     |  |
| Department |  |     |  |
| Name       |  |     |  |
| Phone      |  | Fax |  |

Sankyo will select a model based on your loads and requirements.

Fill this page in and fax it to us.

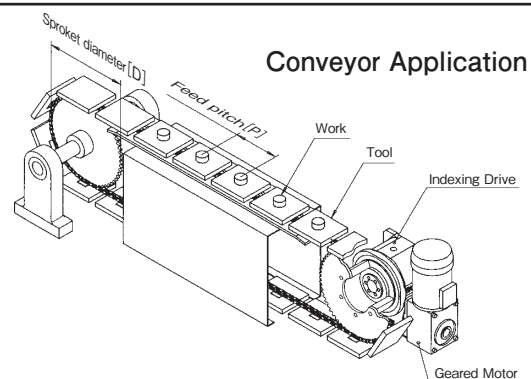
- Number of stops..... S   
 ● Working time.....  $t_1$   sec  
 ● Index time.....  $t_2$   sec

## Index Dial Application



- Table diameter..... D1  mm  
 ● Table weight..... M1  kg  
 ● Jig P.C.D..... D2  mm  
 ● Weight per tool..... M2  kg  
 ● Number of tool..... n2   
 ● Work P.C.D..... D3  mm  
 ● Weight per work..... M3  kg  
 ● Number of work..... n3

- Feed pitch..... P  mm  
 ● Weight of chain with attachment... M1  kg  
 ● Weight of tool..... M2  kg  
 ● Weight of work..... M3  kg  
 ● Sprocket diameter..... D  mm  
 ● Weight per sprocket..... M4  kg  
 ● Number of sprocket..... n4   
 ● Coefficient of friction.....  $\mu$



## Conveyor Application

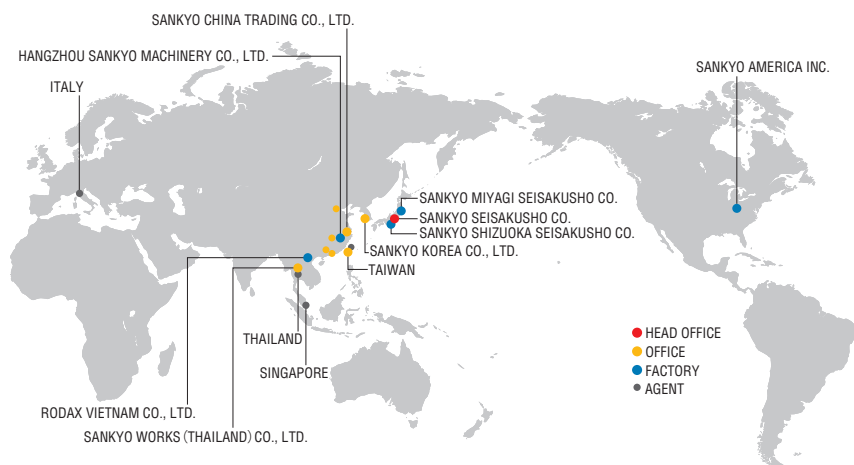
- |                |          |                           |                      |
|----------------|----------|---------------------------|----------------------|
| Geared Motor   | Yes • No | Timing Cam - Photo Switch | Yes ( 1. 2. 3 ) • No |
| Torque Limiter | Yes • No |                           |                      |

MEMO



# SERVICE NETWORK

## Global network



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## MEMO

**For further information, questions, or inquiries, please contact us by e-mail or visit our website.**

\*Specifications and dimensions are subject to change without notice. Consult Sankyo sales before ordering.