

Optimum Reliability in Motion Control Units

SANDEX- α 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 α (Alpha) series, a new addition to our Sandex series, which has provided the industry with quality indexing equipment for 25 years.

The Sandex α 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 α series into today's highly productive automation machines.



SANDEX Alpha series

Description

The α 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 α 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.

TABLE OF CONTENTS

● Features, Characters.....	1	● Torque Capacity Tables.....	21
● Standard.....	2	(7AD, 9AD, 11AD, 15AD,)	
● Model Code.....	3	(19AD, 23AD, 33AD, 45AD)	
● Dimensions, Specifications		● Sizing.....	37
7AD.....	5	● Sizing a Variable Frequency Drive.....	39
9AD.....	7	● Torque Limiter.....	40
11AD.....	9	● Handling.....	41
15AD.....	11	● Model Selection Data Sheet.....	42
19AD.....	13		
23AD.....	15		
33AD.....	17		
45AD.....	19		

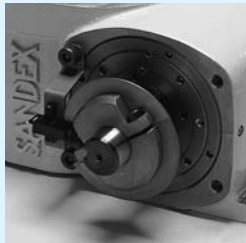
⚠ Units used in this document

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 GD² in the metric system.

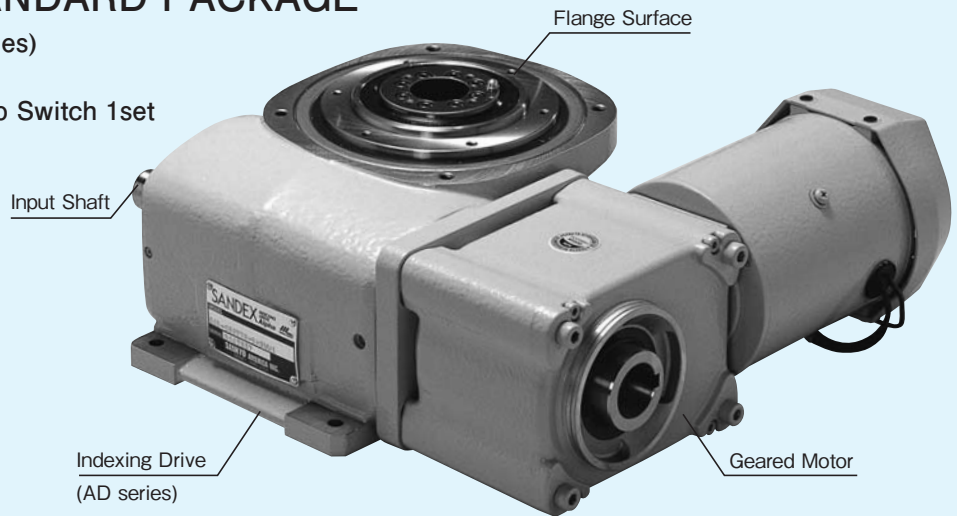
Note : Geared motor shown in optional special paint color.

α SERIES STANDARD PACKAGE

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

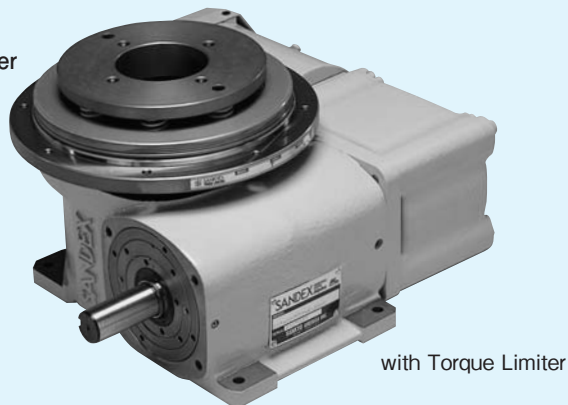


Timing Cam-Photo Switch

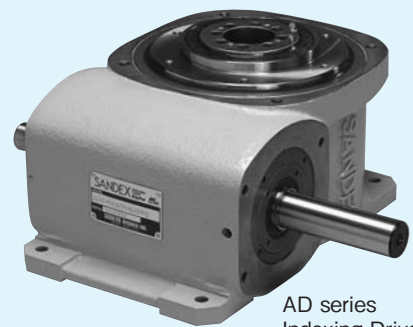


Option

- 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 (2.2)	1.5/2.2	2.2/3.7 (5.5)	5.5/7.5 (11)	11/15 (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.

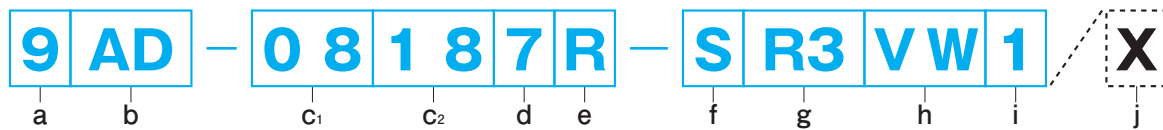
7AD



33AD



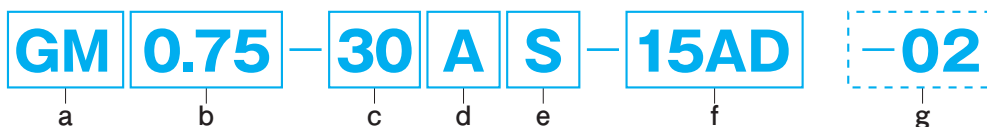
Model Code



a Size	b Model	c ₁ Number of Stops (S)	c ₂ Index Period (θ)	d Motion Curve	e Hand of Cam
9 90mm	AD Alpha Series	08 8 Stop	18 180°	7 SMS-3 Curve	R 1 Dwell Right Hand Cam
Shaft-to-shaft distance 7, 9, 11, 15, 19, 23, 33, 45 are available	AD Alpha Series	Number of stops of the Indexing Drive.	Cam rotation period (during which the output moves.) (Total angle at 2 dwell)	7 SMS-3 Curve (SANKYO Modified Sine) 8 SMCV-3 Curve (SANKYO Modified Constant Velocity) 9 Custom-made Motion Curve (Special order)	Indicates rotating direction of input and output shafts and number of dwells. 1 Dwell 2 Dwell Right Hand Cam R R2 Left Hand Cam L L2

Geared Motor

Example

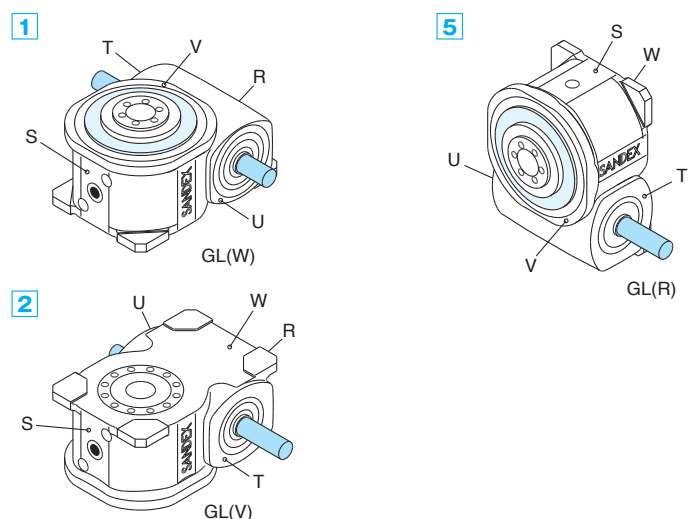
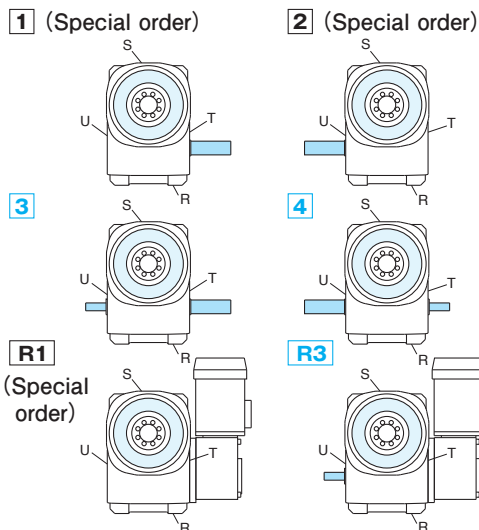


a Model	b Motor power	c Gear ratio	d Motor voltage	e Specification	f Model size	g Revision code
GM Geared motor	Indicates the motor power 0.20.2kW 0.75 ...0.75kW 3.73.7kW 1111kW	Indicates the gear ratio 1010 2020 20.37 ..20.37	Indicates the motor voltage A 200/220V B 230V	Indicates the specification of geared motor S 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. *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 Output	g Input Shaft Projection	h Mounting Holes	i Mounting Position	j Special Instruction
S Standard	R3 Both T and U surface	VW	1	X
S Standard L with Torque Limiter on output	Input shaft projection as shown below. 7AD~23AD 1, 2, R1 become special order 33AD & 45AD In case of input shaft projecting at the both side, one side will be extended shaft for installation timing cam.	7AD~23AD Tapped mounting holes on surface V and through mounting holes on surface W come automatically. 33AD & 45AD Tapped mounting holes on surface R,V,W come automatically.	Mounting position as shown below. 1, 2, 5 are available	Include the symbol X in case of special orders <input type="checkbox"/> Standard (No Symbols) <input checked="" type="checkbox"/> Special Instructions



Timing Cam-Photo Switch

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

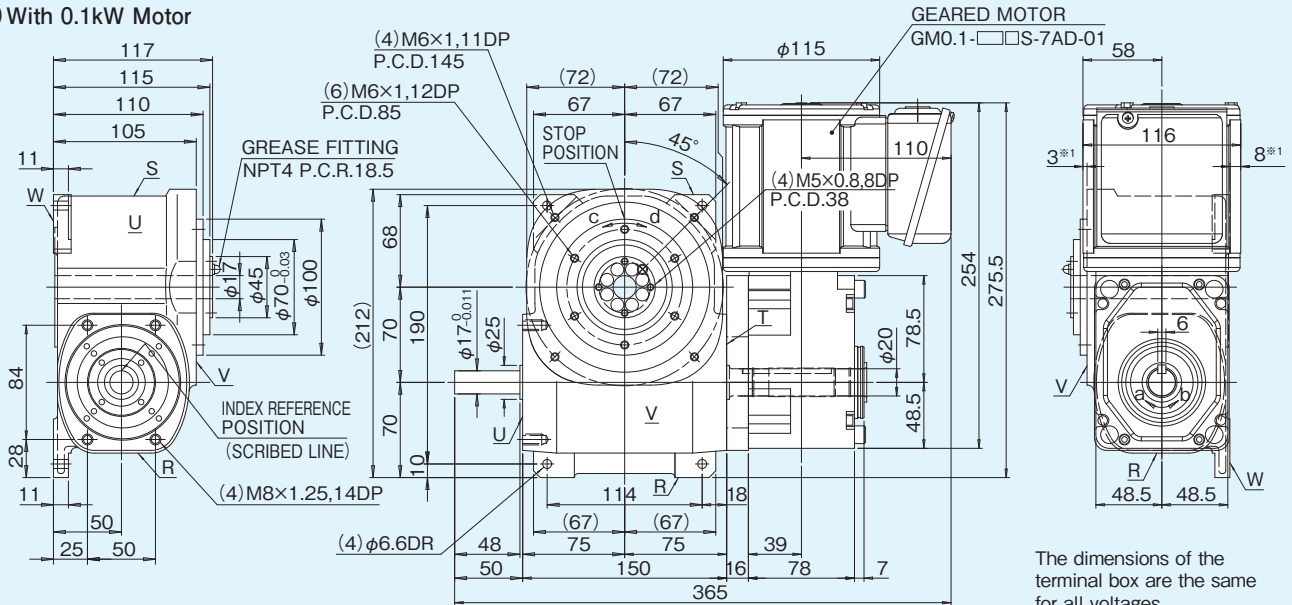
Torque Limiter(option)

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

7AD Dimensions

[Unit : mm]

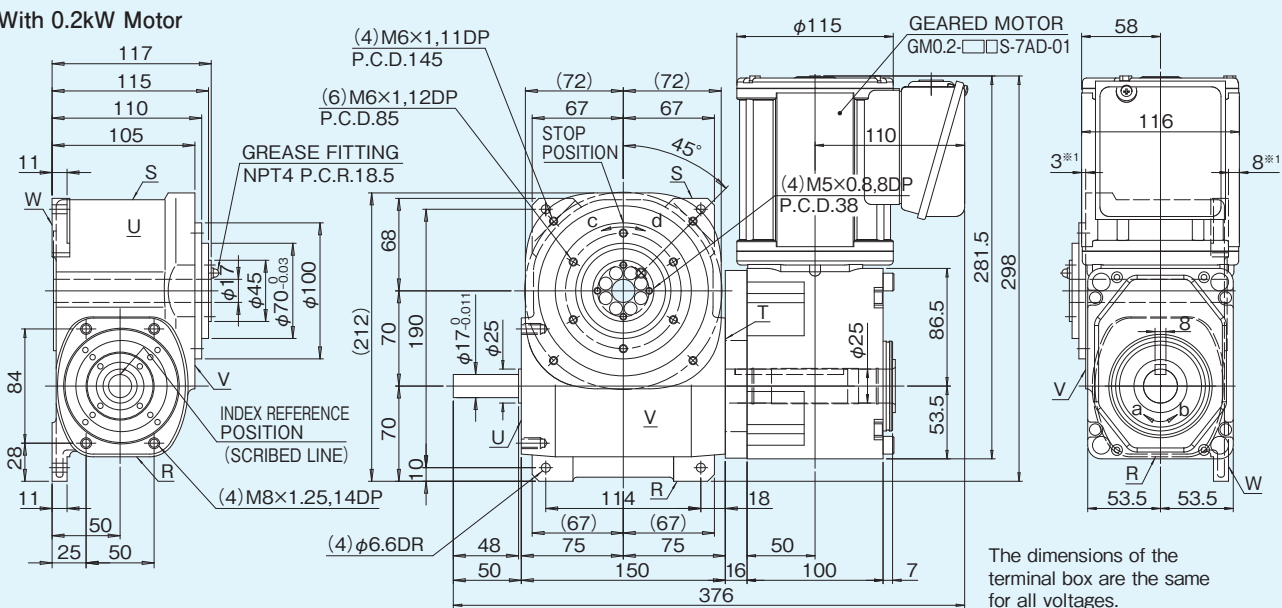
(a) With 0.1kW Motor



- *1 Part of the motor protrudes beyond the V and W mounting surfaces of the housing. This will interfere with any customer-mounted table or mounting base. The amount of interference will depend on the mounting accuracy of the motor. We recommend that you design customer-mounted parts with ≥ 5 mm of clearance.
- *2 The dimensions in parentheses in the figure represent the casting dimensions.

Figure 7AD-1

(b) With 0.2kW Motor



- *1 Part of the motor protrudes beyond the face of the output flange and the V and W mounting surfaces of the housing. This will interfere with any customer-mounted table or mounting base. The amount of interference will depend on the mounting accuracy of the motor. We recommend that you design customer-mounted parts with ≥ 5 mm of clearance.
- *2 The dimensions in parentheses in the figure represent the casting dimensions.

Figure 7AD-2

Specifications

Table 7AD-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Symbol	Unit	Value
Output allowable axial load	P_1	N	3100	Input allowable axial load	P_4	N	1860	Indexing accuracy (1 DWELL)		sec	± 30
Output allowable radial load	P_2	N	1400	Input maximum repetitious bending force	P_5	N	1600	Indexing accuracy (2 DWELL)		sec	± 60
Output static torque	T_s	N·m	Refer to Torque Capacity Table	Input maximum repetitious allowable torque	P_6	N·m	93.1	Repetitive accuracy		sec	30
Output torsional rigidity	K_1	N·m/rad	1.39×10^5	Input torsional rigidity	K_2	N·m/rad	2.62×10^4	Product weight (Index body)		kg	15
Output inertia	J_o	kg·m ²	3.4×10^{-3}	Input inertia	J_c	kg·m ²	1.9×10^{-3}	Housing color		Ivory	
Output allowable bending moment	P_3	N·m	32					Geared motor paint color		Gray	

Note: Input inertia: J is calculated in dwell.

1N·m=0.102kgf·m

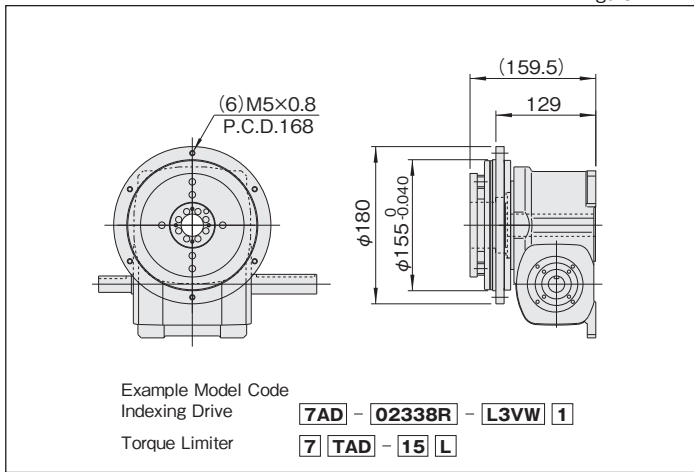
Specifications of geared motor

Table 7AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N_M (rpm)		Output Allowable Torque T_R (N·m)		Moment of inertia J_M (kg·m ²)	Weight (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^{-4}	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^{-4}	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			

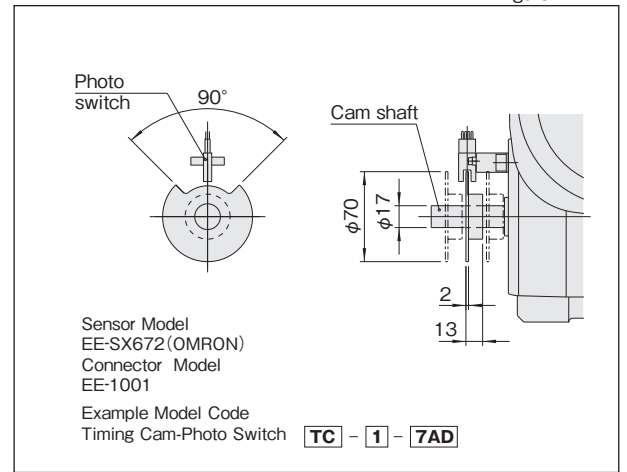
Torque limiter mounting specifications (option)

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)

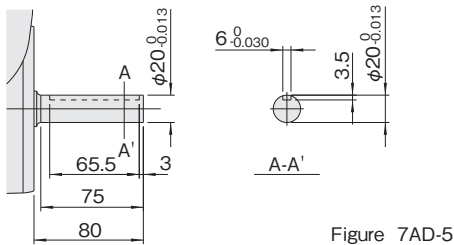


Figure 7AD-5

Output fixed flange specifications

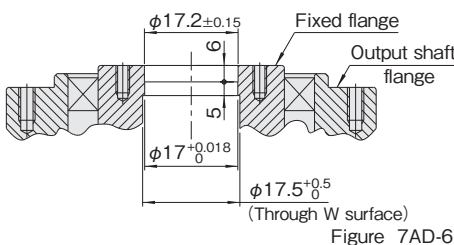


Figure 7AD-6

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

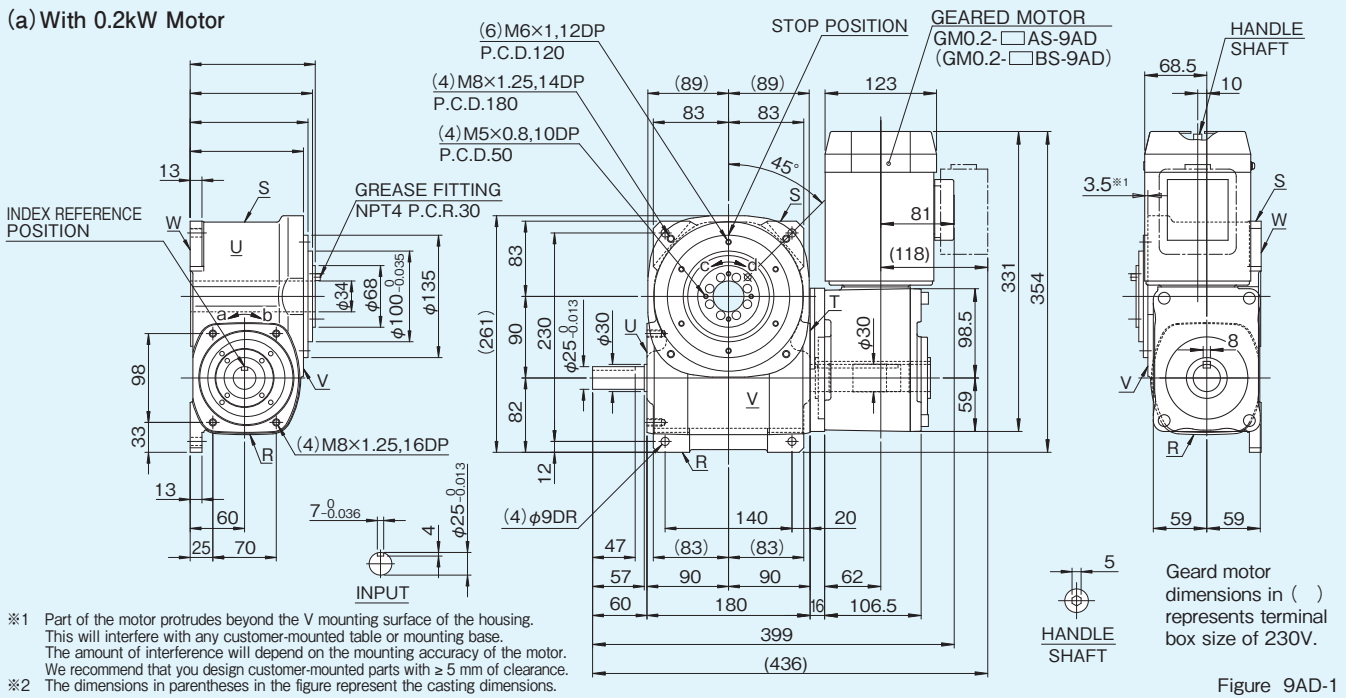


Figure 9AD-1

(b) With 0.4kW Motor

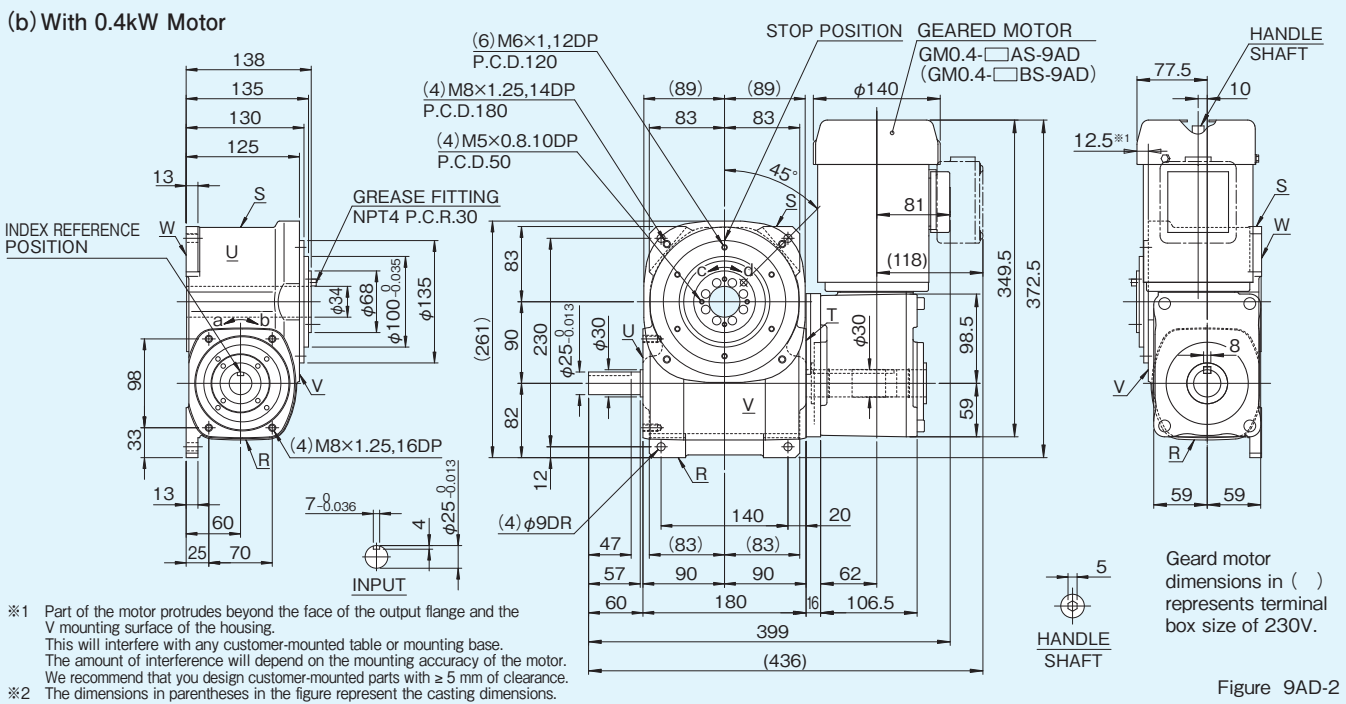


Figure 9AD-2

Specifications

Table 9AD-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Symbol	Unit	Value
Output allowable axial load	P ₁	N	4900	Input allowable axial load	P ₄	N	2500	Indexing accuracy (1 DWELL)		sec	±30
Output allowable radial load	P ₂	N	2100	Input maximum repetitive bending force	P ₅	N	2500	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	245	Repetitive accuracy		sec	30
Output torsional rigidity	K ₁	N·m/rad	2.64×10 ⁵	Input torsional rigidity	K ₂	N·m/rad	3.36×10 ⁴	Product weight (Index body)		kg	24
Output inertia	J _o	kg·m ²	1.11×10 ⁻²	Input inertia	J _c	kg·m ²	2.5×10 ⁻³	Housing color		Ivory	
Output allowable bending moment	P ₃	N·m	98					Geared motor paint color		Light Silver	

Note: Input inertia: J is calculated in dwell.

1N·m=0.102kgf·m

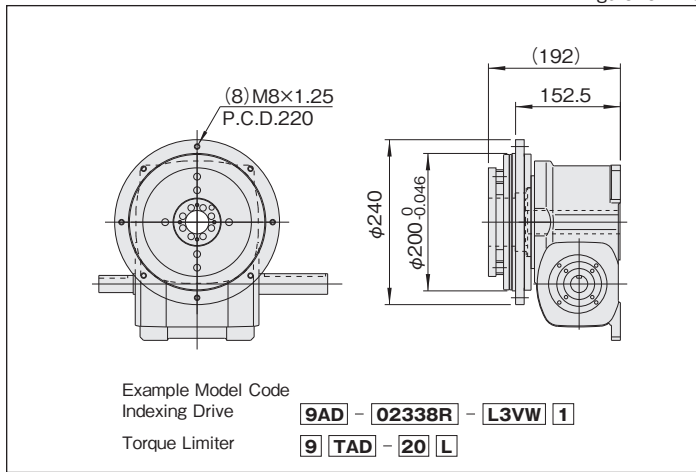
Specifications of geared motor

Table 9AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N_M (rpm)		Output Allowable Torque T_R (N·m)		Moment of inertia J_M (kg·m ²)	Weight (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^{-3}	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^{-3}	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		

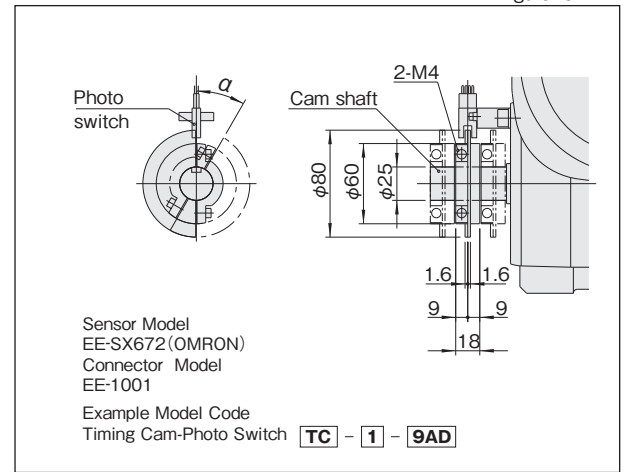
Torque limiter mounting specifications (option)

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)

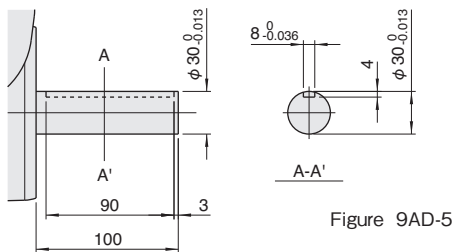


Figure 9AD-5

Output fixed flange specifications

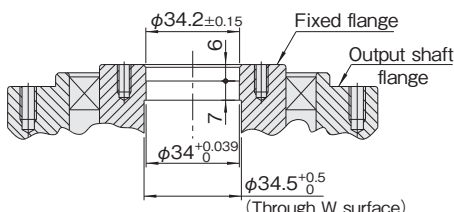


Figure 9AD-6

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)

(a) With 0.4kW Motor

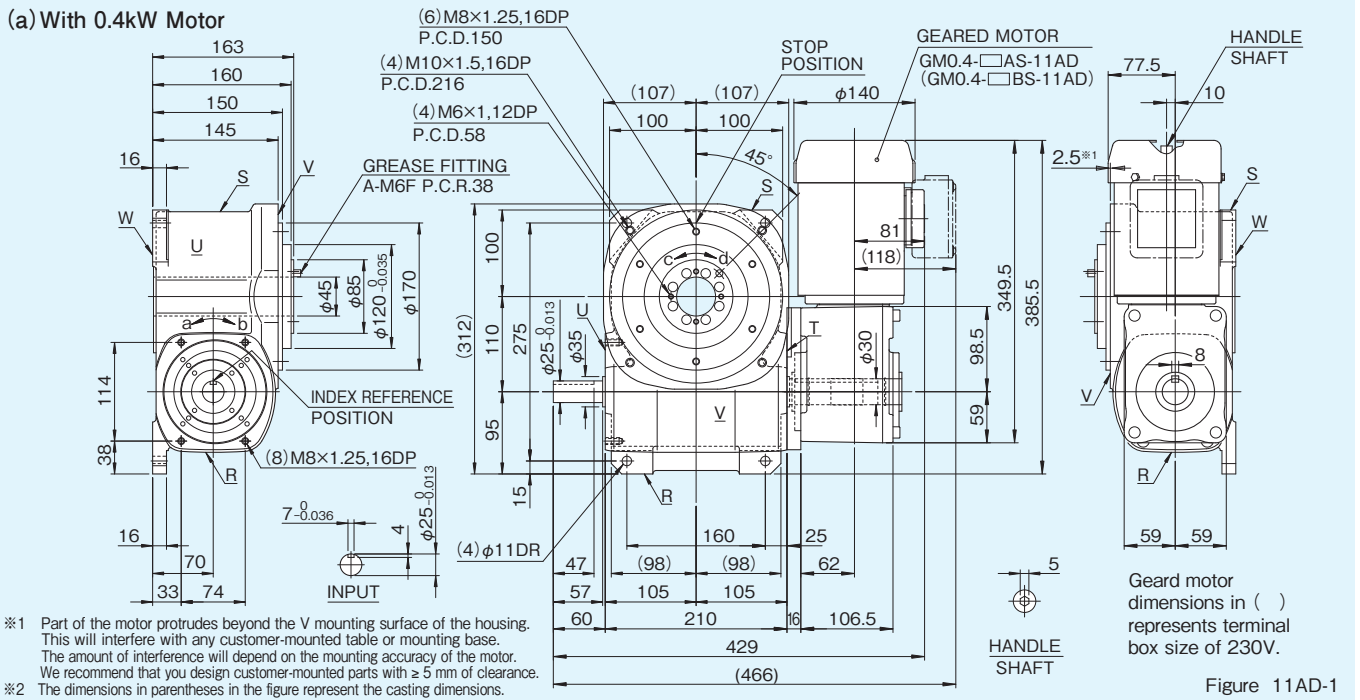


Figure 11AD-1

(b) With 0.75kW Motor

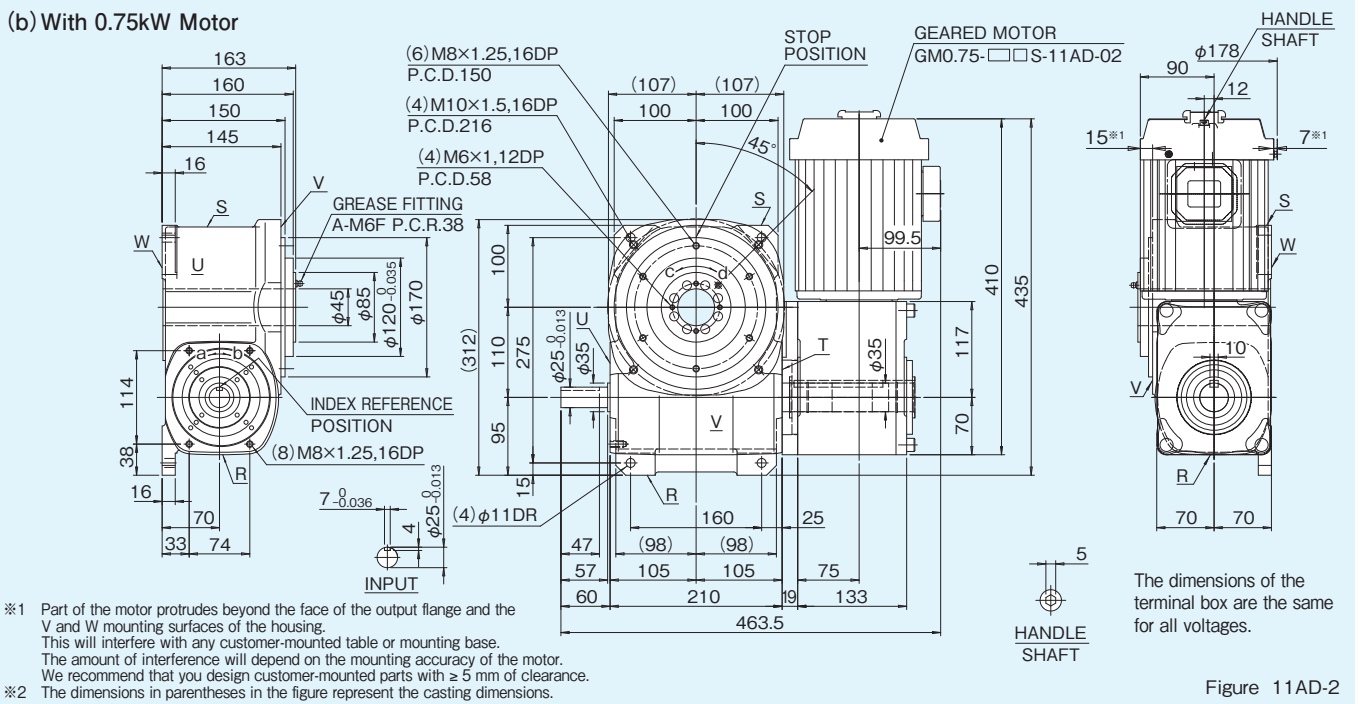


Figure 11AD-2

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	±30
Output allowable radial load	P ₂	N	3400	Input maximum repetitious bending force	P ₅	N	3500	Indexing accuracy (2 DWELL)		sec	±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	4.43×10 ⁵	Input torsional rigidity	K ₂	N·m/rad	3.98×10 ⁴	Product weight (Index body)		kg	42
Output inertia	J _o	kg·m ²	3.47×10 ⁻²	Input inertia	J _c	kg·m ²	6.0×10 ⁻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=0.102kgf·m

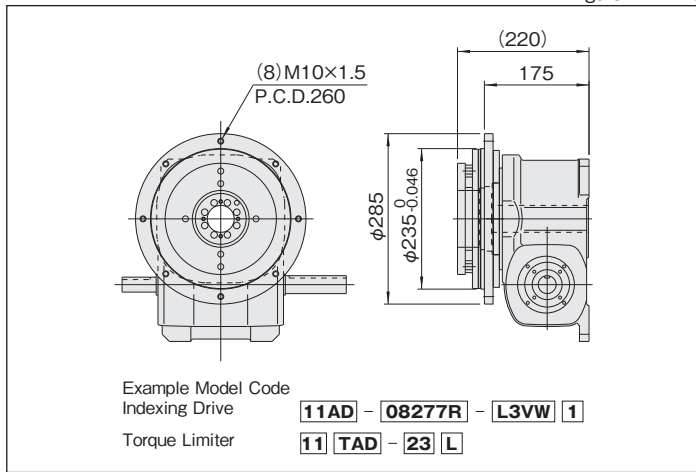
Specifications of geared motor

Table 11AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N_M (rpm)		Output Allowable Torque T_R (N·m)		Moment of inertia J_M (kg·m ²)	Weight (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^{-3}	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^{-3}	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		

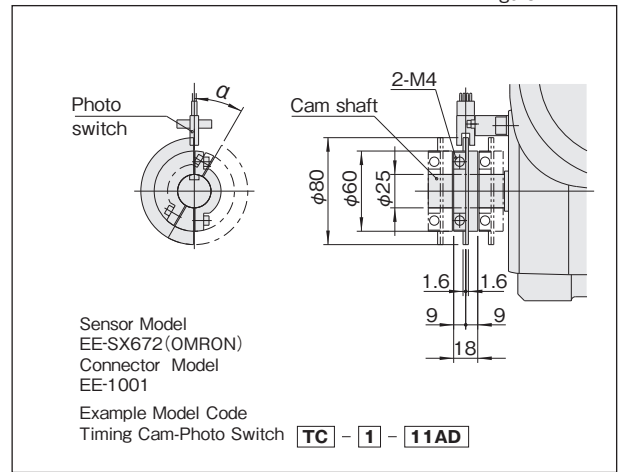
Torque limiter mounting specifications (option)

Figure 11AD-3



Timing cam-Photo switch

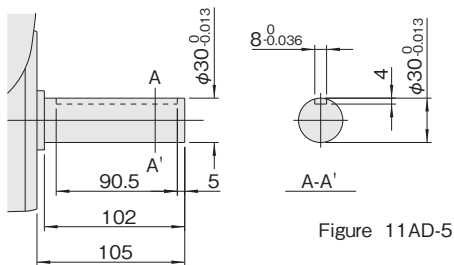
Figure 11AD-4



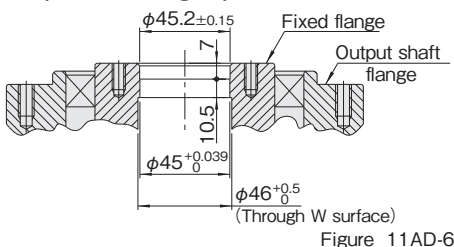
Precautions

- 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)



Output fixed flange specifications



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

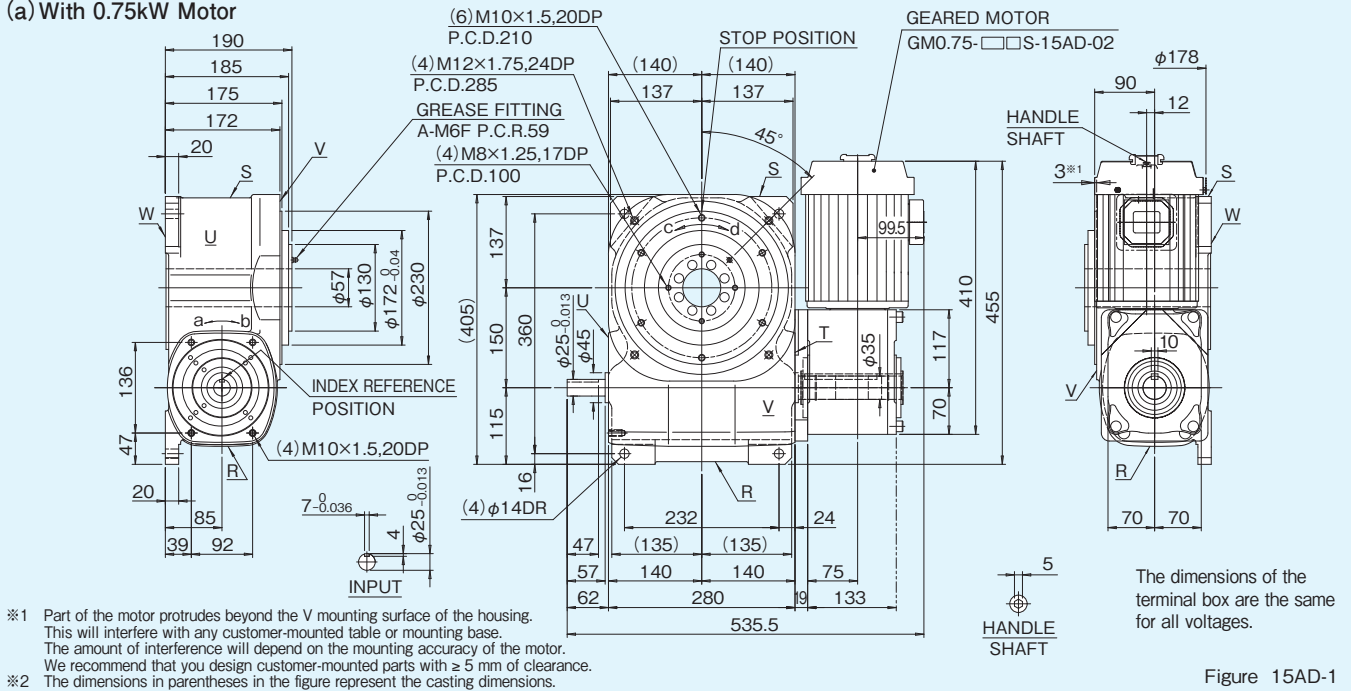
- Each point indicated in the mounting positions shown in Figure 11AD-7 represents (starting at top) the oil plug (PT1/2), oil level (VA), and drain (PT1/2).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 11AD-7 are given in general figures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

15AD

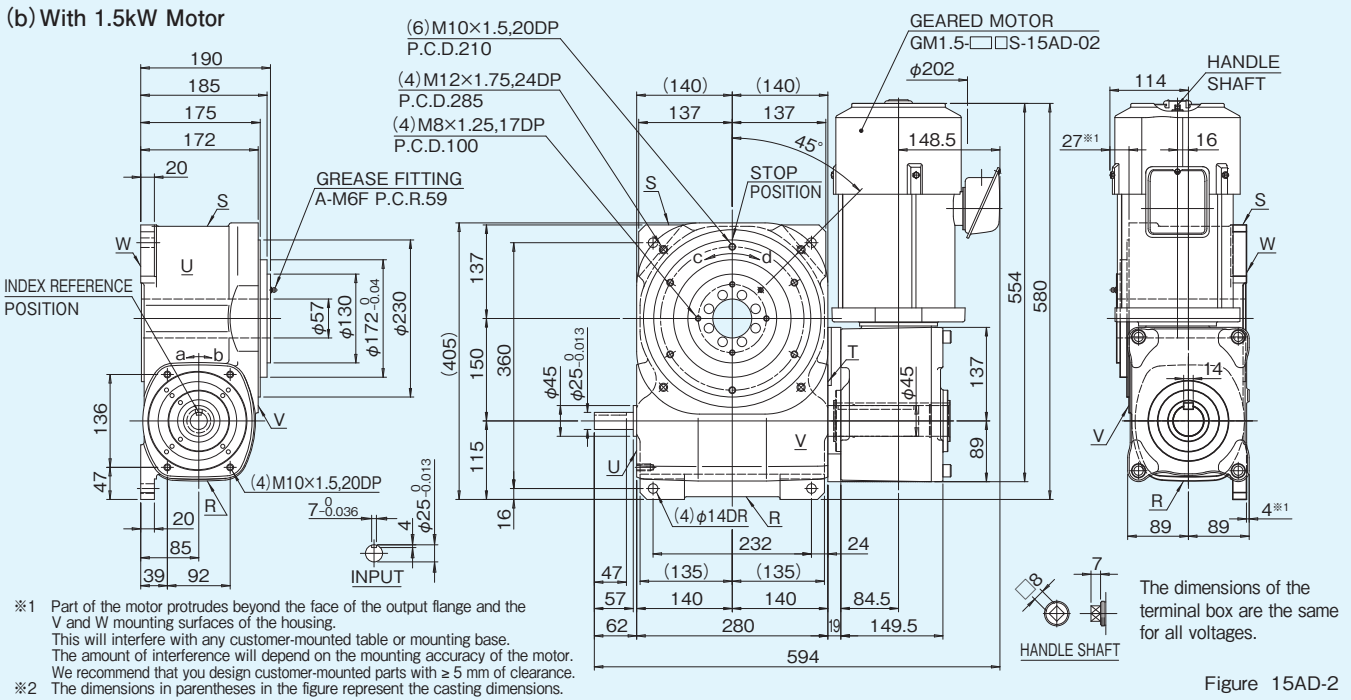
15AD Dimensions

(Unit : mm)

(a) With 0.75kW Motor



(b) With 1.5kW Motor



Specifications

Table 15AD-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Symbol	Unit	Value
Output allowable axial load	P ₁	N	11000	Input allowable axial load	P ₄	N	4000	Indexing accuracy (1 DWELL)		sec	±30
Output allowable radial load	P ₂	N	6800	Input maximum repetitious bending force	P ₅	N	4000	Indexing accuracy (2 DWELL)		sec	±60
Output static torque	T _s	N·m	Refer to Torque Capacity Table	Input maximum repetitious allowable torque	P ₆	N·m	392	Repetitive accuracy		sec	30
Output torsional rigidity	K ₁	N·m/rad	2.37×10 ⁶	Input torsional rigidity	K ₂	N·m/rad	6.64×10 ⁴	Product weight (Index body)		kg	85
Output inertia	J _o	kg·m ²	0.162	Input inertia	J _c	kg·m ²	0.020	Housing color		Ivory	
Output allowable bending moment	P ₃	N·m	333.2					Geared motor paint color		Light Silver	

Note: Input inertia: J is calculated in dwell.

1N·m≒0.102kgf·m

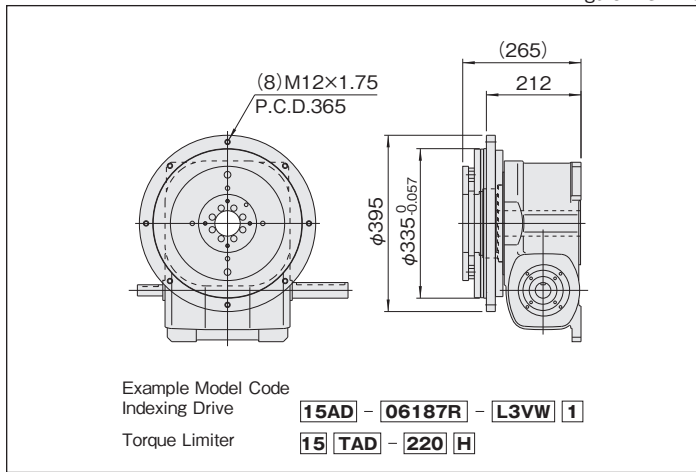
Specifications of geared motor

Table 15AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N_M (rpm)		Output Allowable Torque T_R (N·m)		Moment of inertia J_M (kg·m ²)	Weight (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^{-3}	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^{-3}	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		

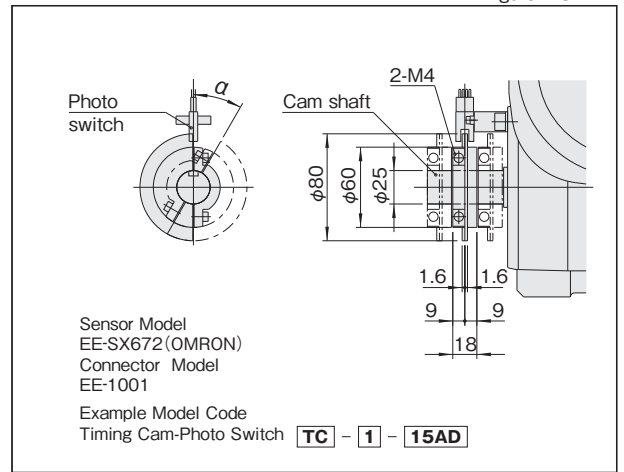
Torque limiter mounting specifications (option)

Figure 15AD-3



Timing cam-Photo switch

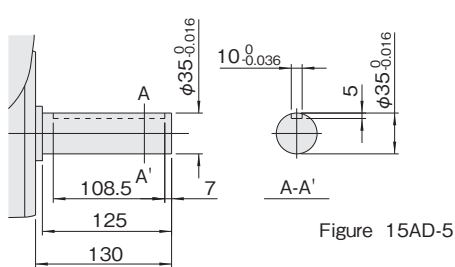
Figure 15AD-4



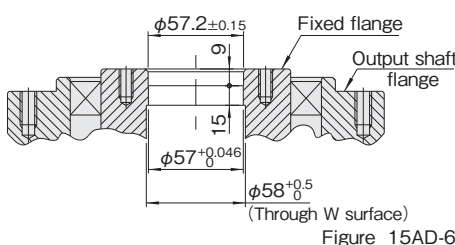
Precautions

- 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 (a) 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

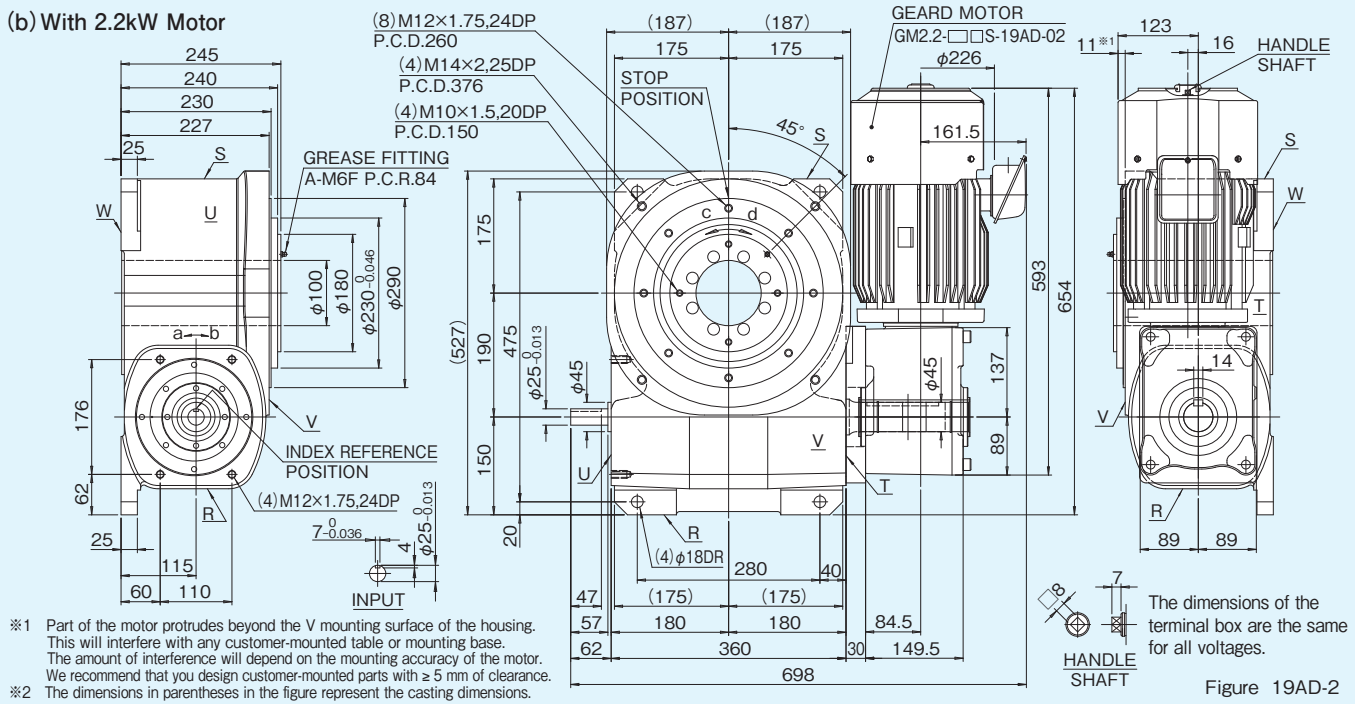
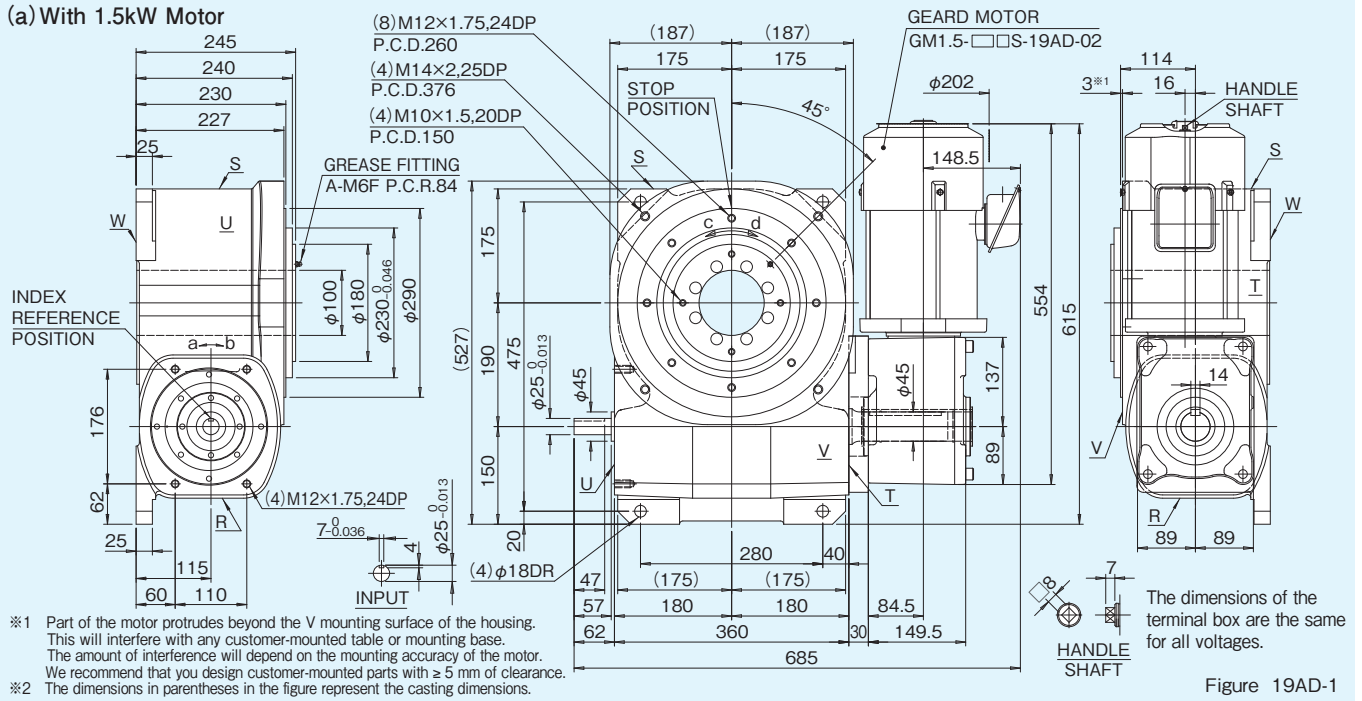
Precautions

- 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 repetitious 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 repetitious allowable torque	P ₆	N·m	600	Repetitive accuracy		sec	30
Output torsional rigidity	K ₁	N·m/rad	3.5×10 ⁶	Input torsional rigidity	K ₂	N·m/rad	8.4×10 ⁴	Product weight (Index body)		kg	180
Output inertia	J _o	kg·m ²	0.549	Input inertia	J _c	kg·m ²	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

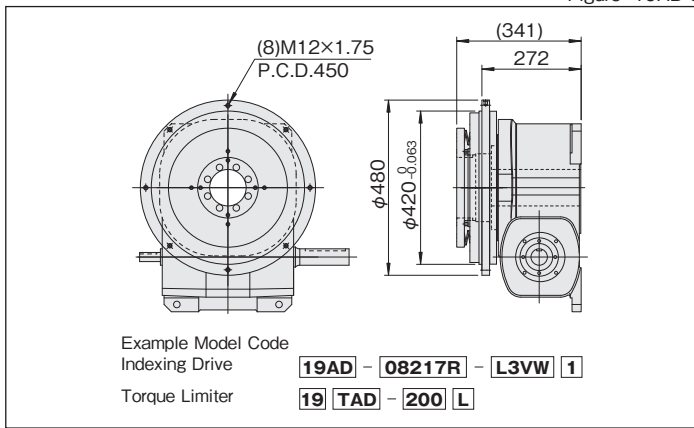
Specifications of geared motor

Table 19AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N _M (rpm)		Output Allowable Torque T _R (N·m)		Moment of inertia J _M (kg·m ²)	Weight (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 ⁻³	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 ⁻³	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			

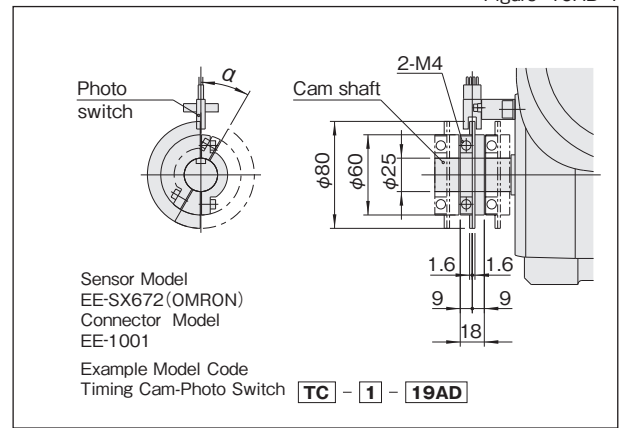
Torque limiter mounting specifications (option)

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)

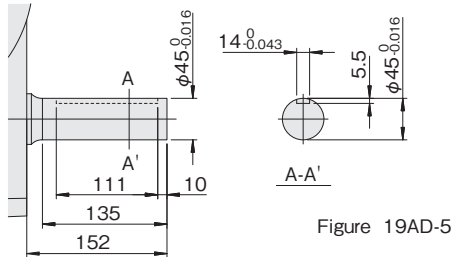


Figure 19AD-5

Output fixed flange specifications

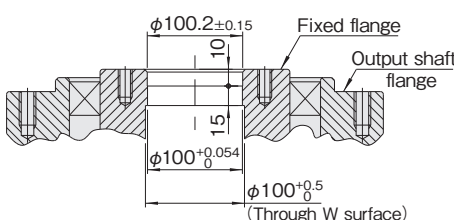


Figure 19AD-6

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

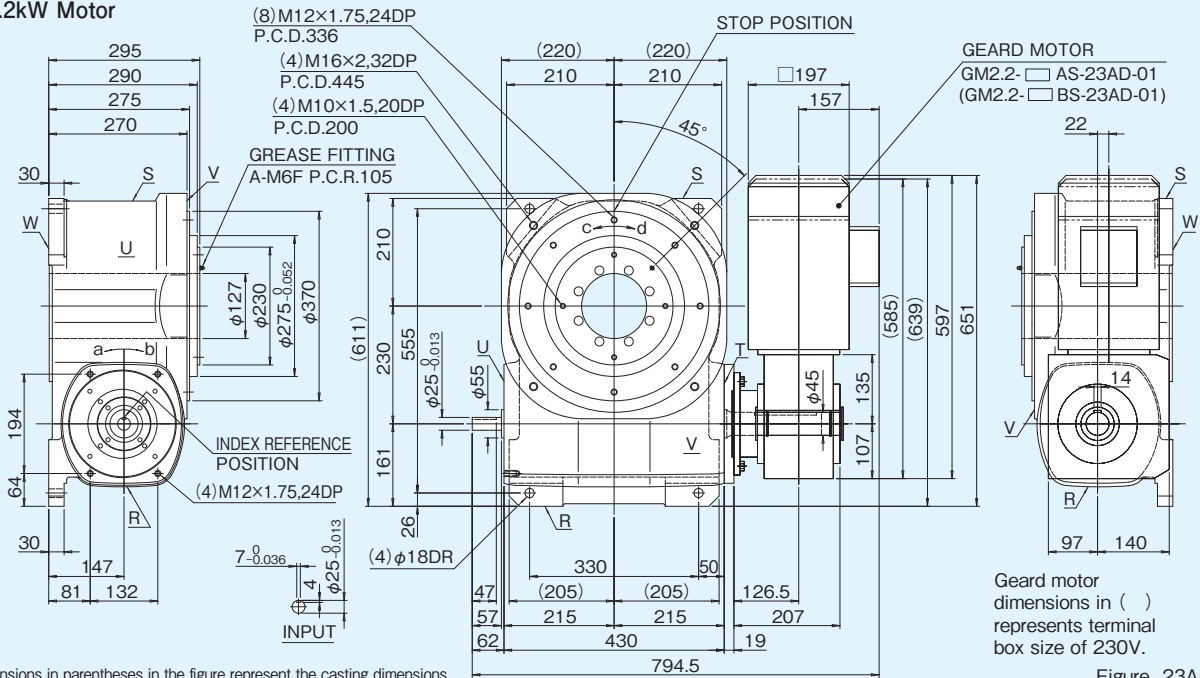
- Each point indicated in the mounting positions shown in Figure 19AD-7 represents (starting at top) the oil plug (PT3/4), oil level (VB), and drain (PT3/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 19AD-7 are given in general figures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

23AD

23AD Dimensions

(Unit : mm)

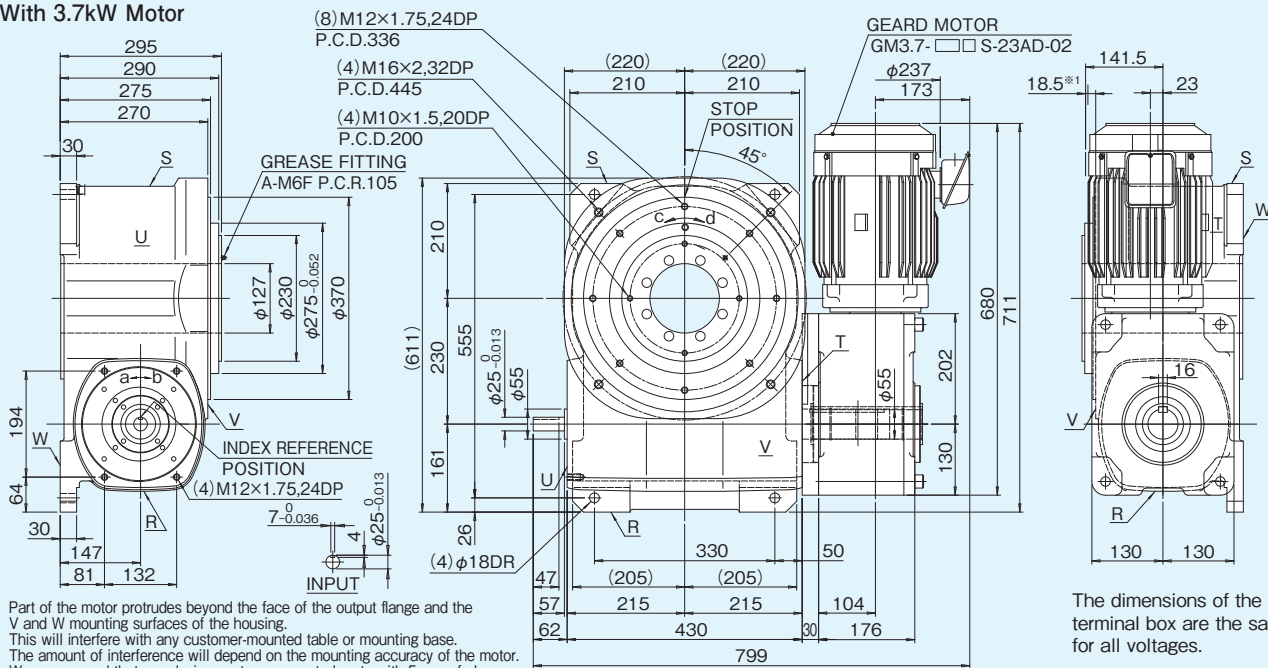
(a) With 2.2kW Motor



※1 The dimensions in parentheses in the figure represent the casting dimensions.

Figure 23AD-1

(b) With 3.7kW Motor



※1 Part of the motor protrudes beyond the face of the output flange and the V and W mounting surfaces of the housing. This will interfere with any customer-mounted table or mounting base. The amount of interference will depend on the mounting accuracy of the motor. We recommend that you design customer-mounted parts with 5 mm of clearance.

※2 The dimensions in parentheses in the figure represent the casting dimensions.

The dimensions of the terminal box are the same for all voltages.

Figure 23AD-2

Specifications

Table 23AD-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Symbol	Unit	Value
Output allowable axial load	P_1	N	27000	Input allowable axial load	P_4	N	6000	Indexing accuracy (1 DWELL)		sec	±30
Output allowable radial load	P_2	N	12000	Input maximum repetitious bending force	P_5	N	6000	Indexing accuracy (2 DWELL)		sec	±60
Output static torque	T_s	N·m	Refer to Torque Capacity Table	Input maximum repetitious allowable torque	P_6	N·m	784	Repetitive accuracy		sec	30
Output torsional rigidity	K_1	N·m/rad	6.2×10^6	Input torsional rigidity	K_2	N·m/rad	1.14×10^5	Product weight (Index body)		kg	285
Output inertia	J_o	kg·m ²	1.685	Input inertia	J_c	kg·m ²	0.136	Housing color		Ivory	
Output allowable bending moment	P_3	N·m	980					Geared motor paint color		2.2kW···Ivory 3.7kW···Light Silver	

Note: Input inertia: J is calculated in dwell.

1N·m=0.102kgf·m

Specifications of geared motor

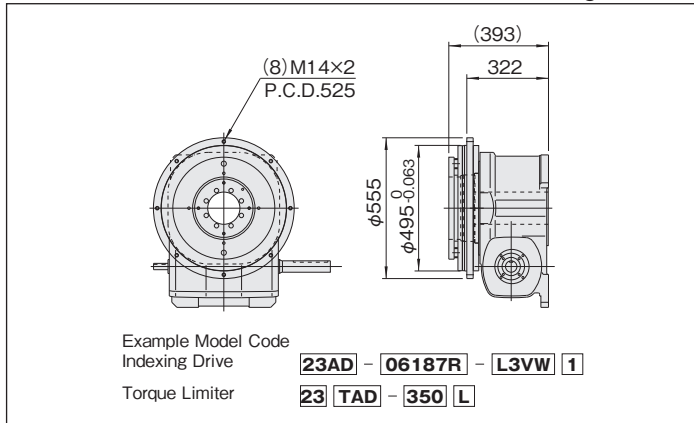
Table 23AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N _M (rpm)		Output Allowable Torque T _R (N·m)		Moment of inertia J _M (kg·m ²)	Weight (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 ⁻³	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 ⁻³	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.

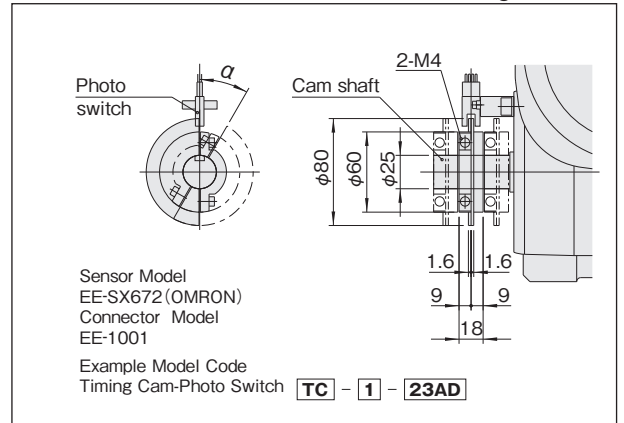
Torque limiter mounting specifications(option)

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)

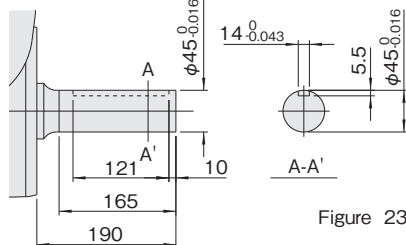


Figure 23AD-5

Output fixed flange specifications

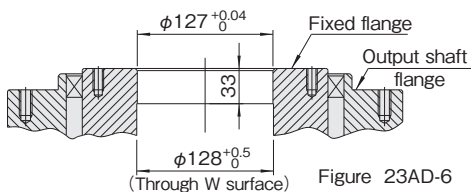


Figure 23AD-6

Locations of oil plug, etc., and oil capacity

Figure 23AD-7

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

Precautions

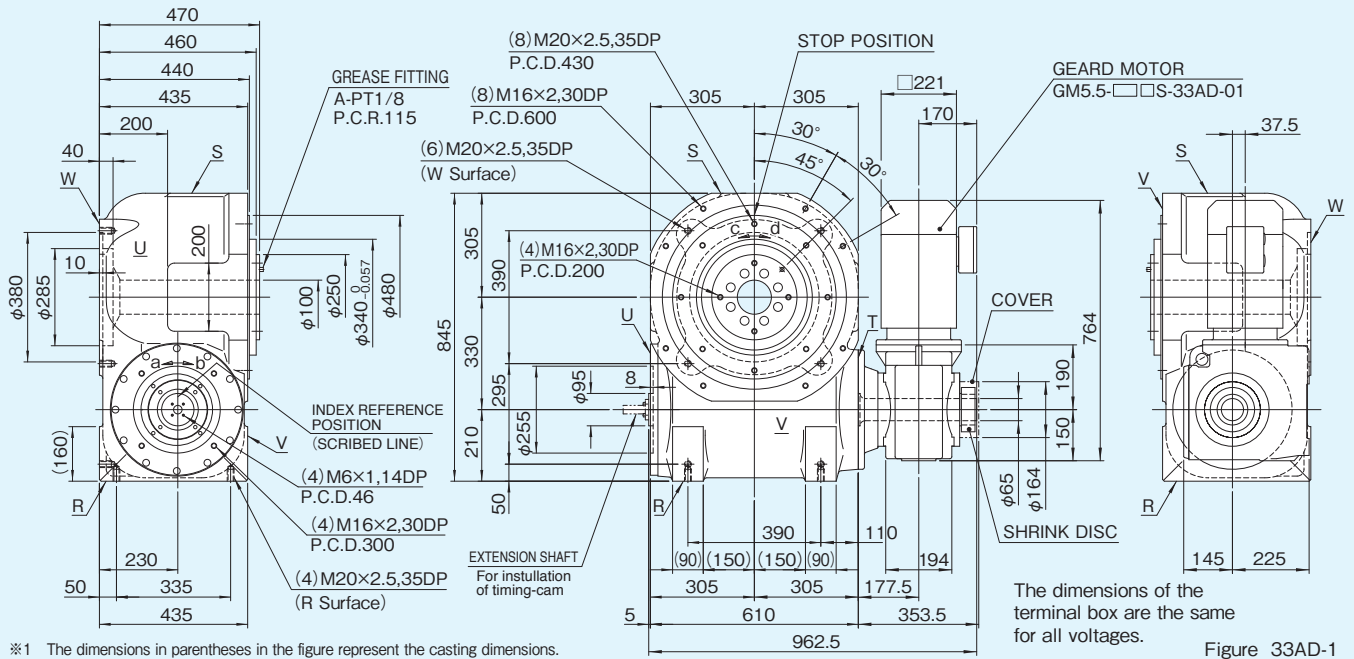
- Each point indicated in the mounting positions shown in Figure 23AD-7 represents (starting at top) the oil plug (PT3/4), oil level (VB), and drain (PT3/4).
- The mounting positions correspond to code i for the indexing drives.
- The oil capacities indicated in Figure 23AD-7 are given in general figures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

33AD

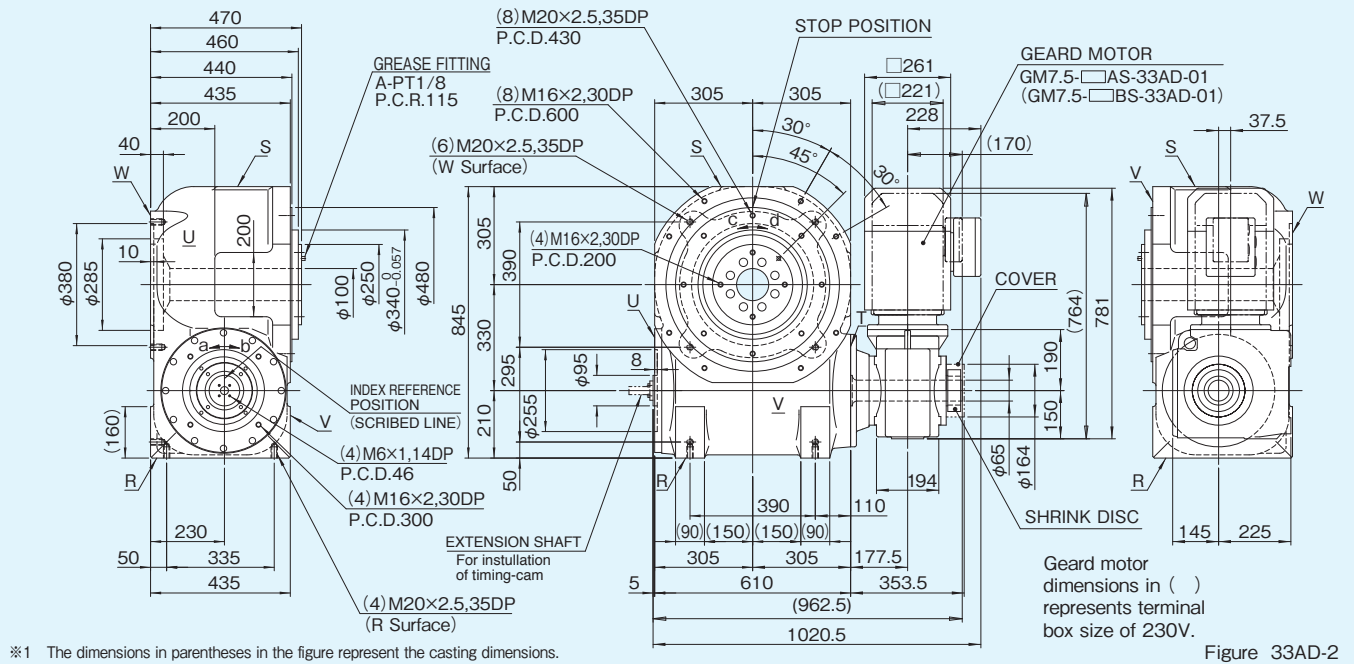
33AD Dimensions

[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_1	N	34890	Input allowable axial load	P_4	N	18440	Indexing accuracy (1 DWELL)		sec	±20
Output allowable radial load	P_2	N	33570	Input maximum repetitive bending force	P_5	N	20900	Indexing accuracy (2 DWELL)		sec	±40
Output static torque	T_s	N·m	Refer to Torque Capacity Table	Input maximum repetitive allowable torque	P_6	N·m	6400	Repetitive accuracy		sec	20
Output torsional rigidity	K_1	$\frac{N \cdot m}{rad}$	1.68×10^7	Input torsional rigidity	K_2	$\frac{N \cdot m}{rad}$	4.19×10^5	Product weight (Index body)		kg	1000
Output inertia	J_o	$kg \cdot m^2$	8.29	Input inertia	J_c	$kg \cdot m^2$	1.71	Housing color		Ivory	
Output allowable bending moment	P_3	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

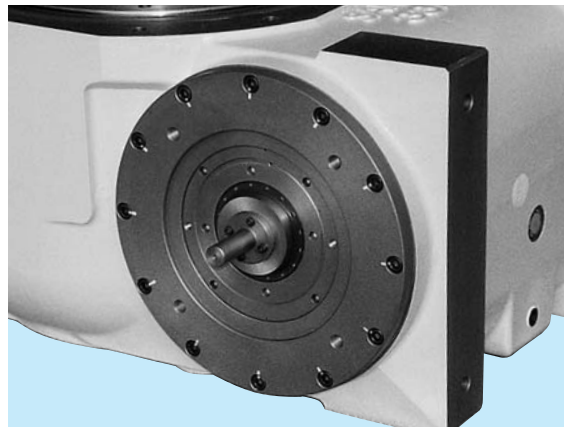
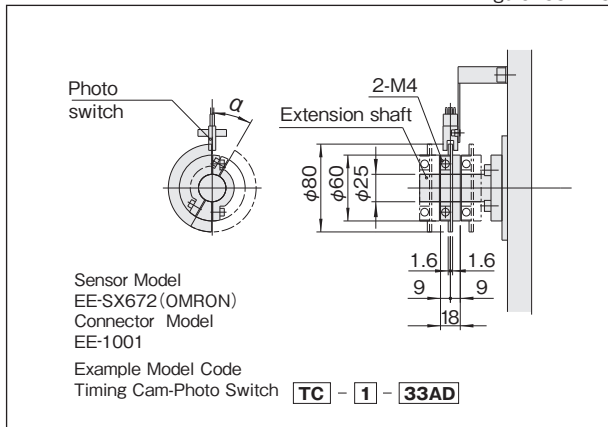
Table 33AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N _M (rpm)		Output Allowable Torque T _R (N·m)		Moment of inertia J _M (kg·m ²)	Weight (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 ⁻³	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 ⁻³	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)

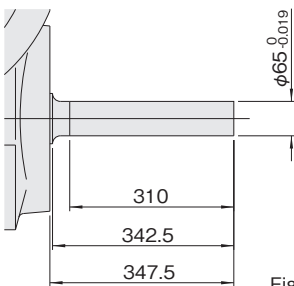


Figure 33AD-4

Output fixed flange specifications

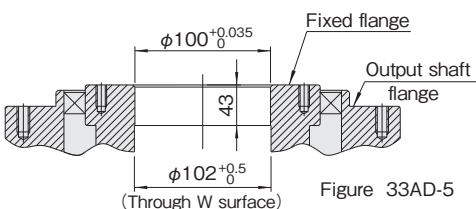


Figure 33AD-5

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

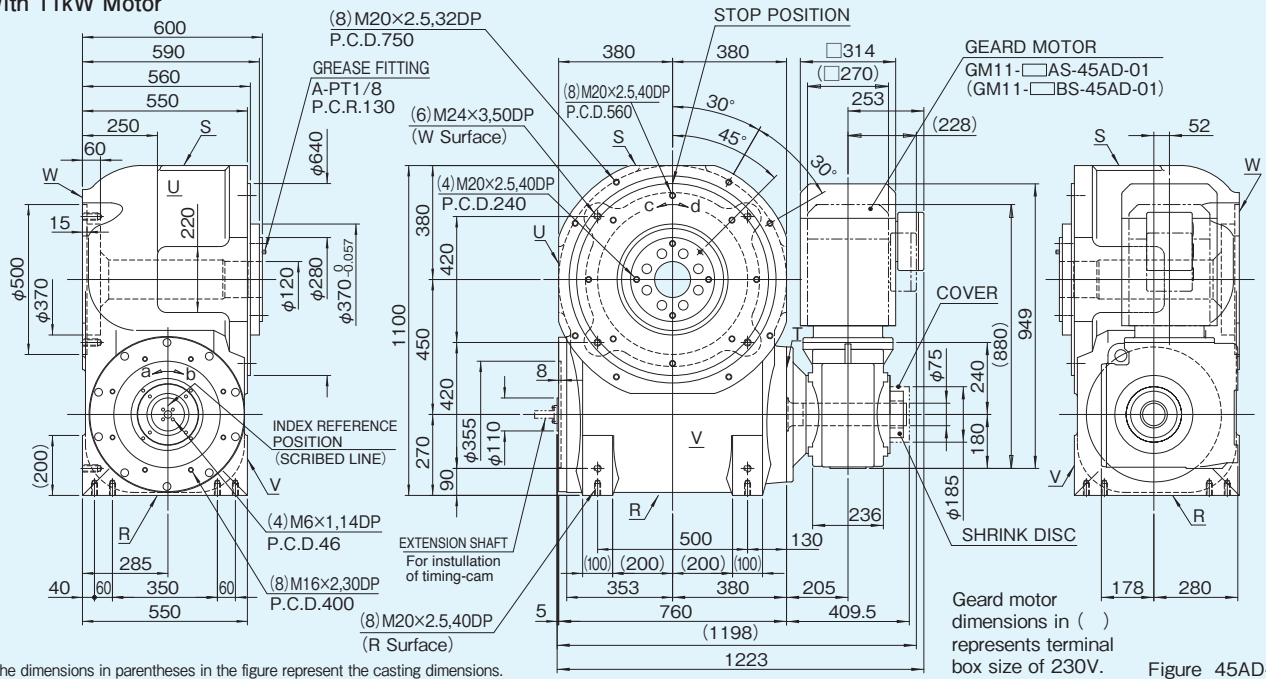


Figure 45AD-1

(b) With 15kW Motor

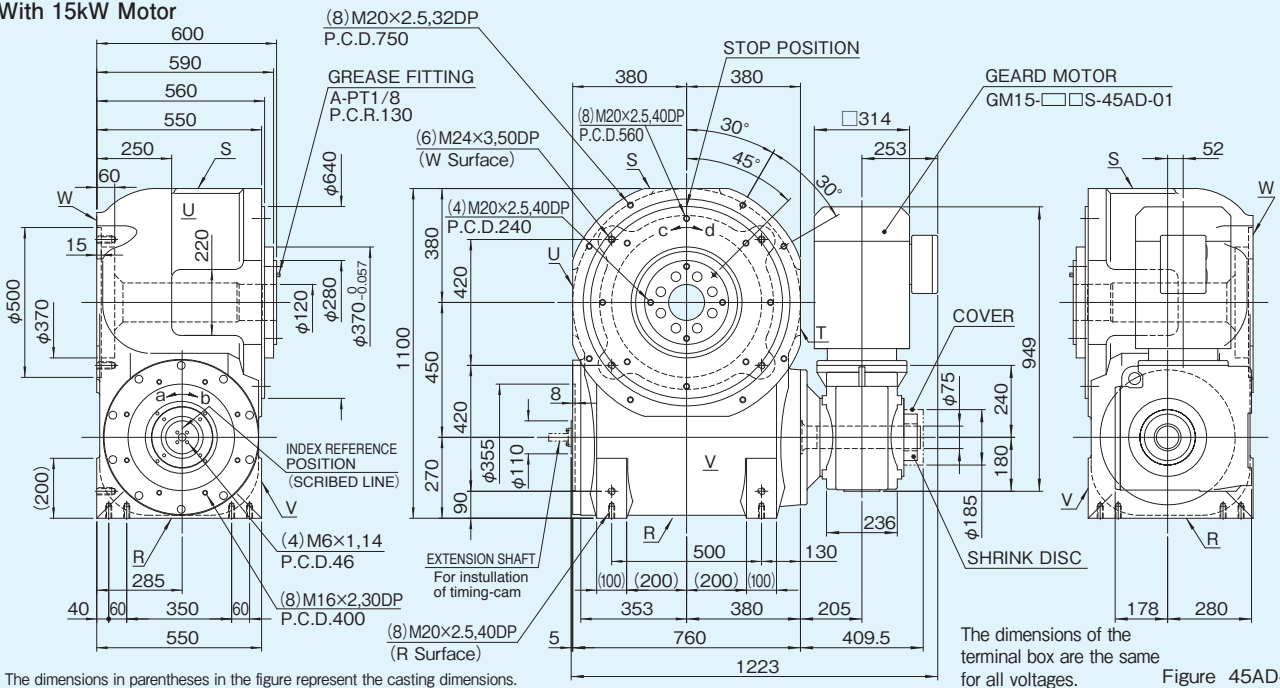


Figure 45AD-2

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	±20
Output allowable radial load	P_2	N	40750	Input maximum repetitious bending force	P_5	N	27000	Indexing accuracy (2 DWELL)		sec	±40
Output static torque	T_s	N·m	Refer to Torque Capacity Table	Input maximum repetitious allowable torque	P_6	N·m	8400	Repetitive accuracy		sec	20
Output torsional rigidity	K_1	$\frac{N \cdot m}{rad}$	3.18×10^7	Input torsional rigidity	K_2	$\frac{N \cdot m}{rad}$	6.44×10^5	Product weight (Index body)		kg	About 1600
Output inertia	J_o	$kg \cdot m^2$	25.78	Input inertia	J_c	$kg \cdot m^2$	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=0.102kgf·m

Specifications of geared motor

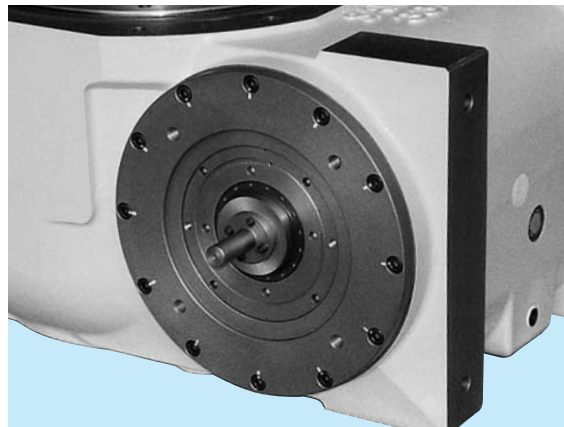
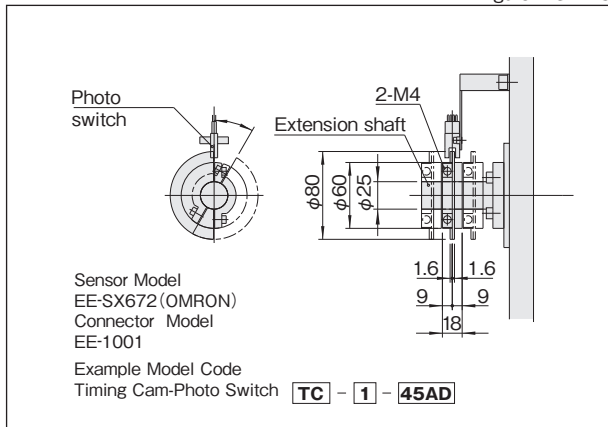
Table 45AD-3

Code		Motor Power (kW)	Actual Gear Ratio (i)	Output Shaft Speed N _M (rpm)		Output Allowable Torque T _R (N·m)		Moment of inertia J _M (kg·m ²)	Weight (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 ⁻³	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 ⁻³	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)

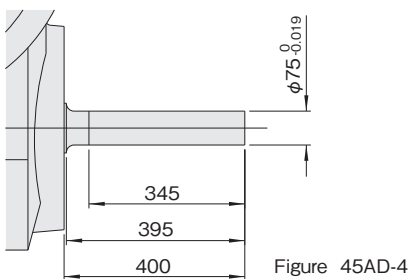


Figure 45AD-4

Output fixed flange specifications

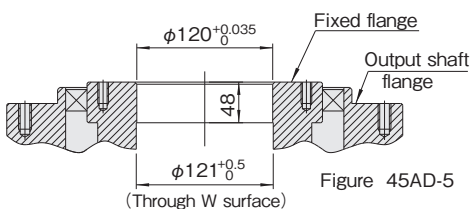


Figure 45AD-5

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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)	
				Internal Inertia Load Torque		Top (N·m)		Toi (N·m)				
				25	50	75	100	125	150			200
4	270	7AD 0427 7R	204.8	80.3	80.3	80.3 0.1	80.3 0.1	80.3 0.2	80.3 0.3	75.4 0.5	4.9	16
	240	7AD 0524 7R	78.1	57.9	47.0	41.6 0.1	38.2 0.1	35.7 0.2	33.8 0.3	31.0 0.5	2.5	14
5	270	7AD 0527 7R	227.6	84.6	84.6	84.6 0.1	84.6 0.1	84.6 0.2	84.6 0.2	84.6 0.4	4.6	16
	180	7AD 0618 7R	238.1	191.4	160.5 0.1	142.2 0.1	130.4 0.2	122.0 0.3	115.5 0.4	105.9 0.8	5.6	22
6	210	7AD 0621 7R	256.7	196.0	159.2	141.0 0.1	129.3 0.1	120.9 0.2	114.5 0.3	105.0 0.6	5.3	22
	240	7AD 0624 7R	271.5	193.6	157.3	139.3 0.1	127.7 0.1	119.5 0.2	113.1 0.2	103.8 0.4	5.2	22
	270	7AD 0627 7R	283.2	190.9	155.0	137.3 0.1	125.9 0.1	117.8 0.1	111.5 0.2	102.3 0.3	5.0	22
	180	7AD 0818 7R	247.3	119.1	119.1	119.1 0.1	119.1 0.1	119.1 0.2	119.1 0.3	112.5 0.6	4.7	19
8	210	7AD 0821 7R	286.6	209.9	195.7	173.3 0.1	159 0.1	148.7 0.2	140.7 0.2	129.1 0.4	5.0	22
	240	7AD 0824 7R	297.8	214.0	191.7	169.7 0.1	155.7 0.1	145.6 0.1	137.8 0.2	126.4 0.3	4.8	22
	270	7AD 0827 7R	306.3	217.1	187.6	166.1 0.1	152.4 0.1	142.5 0.1	135.0 0.1	123.8 0.3	4.7	22
10	180	7AD 1018 7R	251.7	89.0	89.0	89.0 0.1	89.0 0.1	89.0 0.2	89.0 0.3	89.0 0.5	4.3	16
	210	7AD 1021 7R	275.9	125.8	125.8	125.8 0.1	125.8 0.1	125.8 0.1	125.8 0.2	125.4 0.3	4.3	19
	240	7AD 1024 7R	283.3	127.5	127.5	127.5 0.1	127.5 0.1	127.5 0.1	127.5 0.2	122.1 0.3	4.2	19
	270	7AD 1027 7R	288.6	128.7	128.7	128.7 0.1	128.7 0.1	128.7 0.1	128.7 0.1	119.0 0.2	4.2	19
12	120	7AD 1212 7R	84.7	76.2	72.1 0.1	63.8 0.1	58.6 0.2	54.8 0.3	51.9 0.5	47.6 0.9	2.4	14
	150	7AD 1215 7R	91.6	82.4	70.1	62.1 0.1	57.0 0.1	53.3 0.2	50.4 0.3	46.3 0.6	2.3	14
	180	7AD 1218 7R	263.5	91.1	91.1	91.1 0.1	91.1 0.1	91.1 0.1	91.1 0.2	91.1 0.4	4.1	16
	210	7AD 1221 7R	271.5	92.5	92.5	92.5 0.1	92.5 0.1	92.5 0.1	92.5 0.2	92.5 0.3	4.0	16
	240	7AD 1224 7R	277.1	93.4	93.4	93.4 0.1	93.4 0.1	93.4 0.1	93.4 0.1	93.4 0.2	3.9	16
	270	7AD 1227 7R	281.1	94.1	94.1	94.1 0.1	94.1 0.1	94.1 0.1	94.1 0.1	94.1 0.2	3.9	16
15	150	7AD 1515 7R	48.7	43.8	37.8	33.4 0.1	30.7 0.1	28.7 0.2	27.2 0.3	24.9 0.4	2.1	12
	180	7AD 1518 7R	50.5	44.8	36.4	32.2 0.1	29.6 0.1	27.6 0.1	26.2 0.2	24.0 0.3	2.0	12
	210	7AD 1521 7R	102.5	89.8	72.9	64.6 0.1	59.2 0.1	55.4 0.1	52.4 0.1	48.1 0.2	2.2	14
	240	7AD 1524 7R	104.0	86.9	70.6	62.5 0.1	57.3 0.1	53.6 0.1	50.8 0.1	46.6 0.2	2.1	14
	270	7AD 1527 7R	105.1	84.3	68.5	60.6 0.1	55.6 0.1	52.0 0.1	49.2 0.1	45.2 0.1	2.1	14
16	150	7AD 1615 7R	49.4	44.4	38.9	34.5 0.1	31.6 0.1	29.6 0.2	28.0 0.2	25.7 0.4	2.0	12
	180	7AD 1618 7R	51.0	45.9	37.4	33.2 0.1	30.4 0.1	28.4 0.1	26.9 0.2	24.7 0.3	2.0	12
	210	7AD 1621 7R	52.0	44.5	36.1	32.0 0.1	29.3 0.1	27.4 0.1	26.0 0.1	23.8 0.2	2.0	12
	240	7AD 1624 7R	52.8	43.0	34.9	30.9 0.1	28.4 0.1	26.5 0.1	25.1 0.1	23.1 0.2	2.0	12
	270	7AD 1627 7R	53.3	41.7	33.9	30.0 0.1	27.5 0.1	25.7 0.1	24.4 0.1	22.4 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=0.102kgf·m

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

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

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	7AD 1621 7R2	286.6	209.9	209.9	209.9	195.7 0.1	183.0 0.1	173.3 0.1	159.0 0.2	5.0	22
	240	7AD 1624 7R2	297.8	214.0	214.0	208.9	191.7	179.2 0.1	169.7 0.1	155.7 0.2	4.8	22
	270	7AD 1627 7R2	306.3	217.1	217.1	204.5	187.6	175.5	166.1 0.1	152.4 0.1	4.7	22
20	180	7AD 2018 7R2	251.7	89.0	89.0	89.0	89.0 0.1	89.0 0.1	89.0 0.1	89.0 0.2	4.3	16
	210	7AD 2021 7R2	261.8	90.8	90.8	90.8	90.8	90.8 0.1	90.8 0.1	90.8 0.2	4.1	16
	240	7AD 2024 7R2	269.1	92.1	92.1	92.1	92.1	92.1 0.1	92.1 0.1	92.1 0.1	4.1	16
	270	7AD 2027 7R2	288.6	128.7	128.7	128.7	128.7	128.7	128.7 0.1	128.7 0.1	4.2	19
24	180	7AD 2418 7R2	96.1	86.4	83.7	74.1	68.0 0.1	63.6 0.1	60.2 0.1	55.2 0.2	2.2	14
	210	7AD 2421 7R2	99.1	89.1	81.2	71.9	66.0	61.7 0.1	58.4 0.1	53.6 0.1	2.2	14
	240	7AD 2424 7R2	101.3	91.1	78.8	69.8	64.0	59.9	56.7 0.1	52.0 0.1	2.2	14
	270	7AD 2427 7R2	281.1	94.1	94.1	94.1	94.1	94.1	94.1 0.1	94.1 0.1	3.9	16
32	180	7AD 3218 7R2	51.0	45.9	45.9	40.8	37.4	35.0 0.1	33.2 0.1	30.4 0.1	2.0	12
	210	7AD 3221 7R2	52.0	46.8	44.5	39.4	36.1	33.8	32.0 0.1	29.3 0.1	2.0	12
	240	7AD 3224 7R2	52.8	47.5	43.0	38.1	34.9	32.7	30.9 0.1	28.4 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 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≒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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)							Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)			Toi (N·m)			
				25	50	75	100	125	150	200		
4	270	9AD 0427 7R	276.8	187.6	152.3 0.1	134.9 0.2	123.7 0.4	115.7 0.6	109.6 0.8	100.5 1.5	6.6	19
	240	9AD 0524 7R	276.3	197.2	160.2 0.1	141.9 0.2	130.1 0.4	121.7 0.6	115.2 0.8	105.7 1.5	6.1	16
5	270	9AD 0527 7R	308.9	219.6	178.4 0.1	157.9 0.2	144.9 0.3	135.5 0.5	128.3 0.7	117.7 1.2	6.2	19
	180	9AD 0618 7R	441.9	366.2	297.4 0.2	263.4 0.3	241.6 0.6	225.9 0.9	213.9 1.4	196.2 2.4	8.8	26
6	210	9AD 0621 7R	479.8	364.3	295.9 0.1	262.0 0.2	240.3 0.4	224.8 0.7	212.8 1.0	195.2 1.8	8.4	26
	240	9AD 0624 7R	510.2	360.9	293.2 0.1	259.6 0.2	238.1 0.3	222.7 0.5	210.8 0.8	193.4 1.4	8.1	26
	270	9AD 0627 7R	534.8	356.7	289.7 0.1	256.5 0.2	235.3 0.3	220.1 0.4	208.4 0.6	191.1 1.1	7.9	26
8	180	9AD 0818 7R	510.2	459.2	373.4 0.1	330.6 0.3	303.3 0.5	283.6 0.7	268.5 1.1	246.3 1.9	8.1	26
	210	9AD 0821 7R	541.9	452.3	367.4 0.1	325.3 0.2	298.4 0.3	279.1 0.5	264.2 0.8	242.4 1.4	7.8	26
	240	9AD 0824 7R	566.0	444.1	360.7 0.1	319.4 0.1	293.0 0.3	274.0 0.4	259.4 0.6	238.0 1.1	7.6	26
	270	9AD 0827 7R	584.4	435.6	353.8 0.1	313.3 0.1	287.4 0.2	268.8 0.3	254.5 0.5	233.4 0.8	7.4	26
10	180	9AD 1018 7R	377.1	335.3	272.4 0.1	241.2 0.2	221.2 0.4	206.9 0.6	195.9 0.8	179.7 1.4	6.3	22
	210	9AD 1021 7R	393.2	327.0	265.6 0.1	235.2 0.1	215.7 0.3	201.7 0.4	191.0 0.6	175.2 1.1	6.2	22
	240	9AD 1024 7R	404.9	318.7	258.9 0.1	229.2 0.1	210.3 0.2	196.7 0.3	186.2 0.5	170.8 0.8	6.0	22
	270	9AD 1027 7R	413.5	310.9	252.5 0.1	223.6 0.1	205.1 0.2	191.8 0.3	181.6 0.4	166.6 0.6	5.9	22
12	120	9AD 1212 7R	299.8	269.8	245.9 0.2	217.8 0.4	199.8 0.6	186.8 1.0	176.9 1.4	162.3 2.5	5.9	16
	150	9AD 1215 7R	324.4	292.0	239.2 0.1	211.8 0.2	194.3 0.4	181.7 0.6	172.1 0.9	157.8 1.6	5.6	16
	180	9AD 1218 7R	360.5	320.5	260.3 0.1	230.5 0.2	211.4 0.3	197.7 0.5	187.2 0.7	171.7 1.2	5.7	19
	210	9AD 1221 7R	372.1	310.9	252.5 0.1	223.6 0.1	205.1 0.2	191.8 0.3	181.6 0.5	166.6 0.9	5.5	19
	240	9AD 1224 7R	380.2	301.9	245.2 0.1	217.2 0.1	199.2 0.2	186.3 0.3	176.4 0.4	161.8 0.7	5.4	19
	270	9AD 1227 7R	386.2	293.7	238.6 0.1	211.2 0.1	193.8 0.1	181.2 0.2	171.6 0.3	157.4 0.5	5.4	19
15	150	9AD 1515 7R	343.6	309.2	267.9 0.1	237.2 0.2	217.6 0.3	203.5 0.5	192.7 0.8	176.7 1.3	5.4	16
	180	9AD 1518 7R	355.7	317.7	258.0 0.1	228.5 0.1	209.6 0.2	196.0 0.4	185.6 0.5	170.2 0.9	5.3	16
	210	9AD 1521 7R	363.6	306.7	249.1 0.1	220.6 0.1	202.3 0.2	189.2 0.3	179.1 0.4	164.3 0.7	5.2	16
	240	9AD 1524 7R	369.0	296.8	241.1 0.1	213.5 0.1	195.8 0.1	183.1 0.2	173.4 0.3	159.1 0.5	5.1	16
	270	9AD 1527 7R	372.8	288.0	233.9 0.1	207.1 0.1	190.0 0.1	177.7 0.2	168.2 0.2	154.3 0.4	5.0	16
16	150	9AD 1615 7R	348.3	313.5	276.0 0.1	244.3 0.2	224.1 0.3	209.6 0.5	198.5 0.7	182.1 1.3	5.3	16
	180	9AD 1618 7R	359.2	323.3	265.3 0.1	234.9 0.1	215.5 0.2	201.6 0.3	190.8 0.5	175.1 0.9	5.2	16
	210	9AD 1621 7R	366.3	315.0	255.8 0.1	226.5 0.1	207.8 0.2	194.4 0.3	184.0 0.4	168.8 0.6	5.1	16
	240	9AD 1624 7R	371.2	304.6	247.4 0.1	219.1 0.1	201.0 0.1	188.0 0.2	178.0 0.3	163.2 0.5	5.0	16
	270	9AD 1627 7R	374.6	295.4	239.9 0.1	212.5 0.1	194.9 0.1	182.3 0.2	172.6 0.2	158.3 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=0.102kgf·m

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

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

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)							T_x (N·m)	SCF (mm)
				25	50	75	100	125	150	200		
16	210	9AD 1621 7R 2	368.9	332.0	285.9	253.1 0.1	232.2 0.2	217.2 0.3	205.6 0.4	188.6 0.6	6.4	22
	240	9AD 1624 7R 2	384.2	345.0	280.3	248.2 0.1	227.6 0.1	212.9 0.2	201.6 0.3	184.9 0.5	6.3	22
	270	9AD 1627 7R 2	584.4	526.0	435.6	385.7 0.1	353.8 0.1	330.9 0.2	313.3 0.2	287.4 0.4	7.4	26
20	180	9AD 2018 7R 2	377.1	339.4	335.3	296.9 0.1	272.4 0.2	254.7 0.3	241.2 0.4	221.2 0.7	6.3	22
	210	9AD 2021 7R 2	393.2	353.9	327.0	289.5 0.1	265.6 0.1	248.4 0.2	235.2 0.3	215.7 0.5	6.2	22
	240	9AD 2024 7R 2	404.9	364.4	318.7	282.2 0.1	258.9 0.1	242.1 0.2	229.2 0.2	210.3 0.4	6.0	22
	270	9AD 2027 7R 2	413.5	372.2	310.9	275.3	252.5 0.1	236.2 0.1	223.6 0.2	205.1 0.3	5.9	22
24	180	9AD 2418 7R 2	360.5	324.5	320.5	283.8 0.1	260.3 0.1	243.4 0.2	230.5 0.3	211.4 0.6	5.7	19
	210	9AD 2421 7R 2	372.1	334.9	310.9	275.3 0.1	252.5 0.1	236.2 0.2	223.6 0.2	205.1 0.4	5.5	19
	240	9AD 2424 7R 2	380.2	342.2	301.9	267.3 0.0	245.2 0.1	229.4 0.1	217.2 0.2	199.2 0.3	5.4	19
	270	9AD 2427 7R 2	386.2	347.6	293.7	260.1 0.0	238.6 0.1	223.1 0.1	211.2 0.1	193.8 0.3	5.4	19
32	180	9AD 3218 7R 2	359.2	323.3	323.3	289.3 0.1	265.3 0.1	248.2 0.2	234.9 0.2	215.5 0.4	5.2	16
	210	9AD 3221 7R 2	366.3	329.7	315.0	278.9	255.8 0.1	239.3 0.1	226.5 0.2	207.8 0.3	5.1	16
	240	9AD 3224 7R 2	371.2	334.1	304.6	269.7	247.4 0.1	231.4 0.1	219.1 0.1	201.0 0.2	5.0	16
	270	9AD 3227 7R 2	374.6	337.1	295.4	261.6	239.9	224.4 0.1	212.5 0.1	194.9 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≒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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)								Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)
				Internal Inertia Load Torque				Toi (N·m)					
				Input Shaft Speed (Index/min)									
25	50	75	100	125	150	200							
4	270	11AD 0427 7R	540.7	387.7 0.1	314.9 0.3	278.8 0.6	255.8 1.1	239.2 1.7	226.5 2.5	207.8 4.5	10.2	26	
	240	11AD 0524 7R	365.1	307.1 0.1	249.4 0.3	220.8 0.7	202.6 1.3	189.5 2.0	179.4 2.9	164.5 5.2	8.1	22	
5	270	11AD 0527 7R	606.3	455.5 0.1	370.0 0.2	327.6 0.5	300.5 0.9	281.1 1.4	266.1 2.1	244.1 3.7	9.5	26	
	180	11AD 0618 7R	680.3	564.2 0.1	458.3 0.4	405.8 1.0	372.2 1.8	348.1 2.8	329.6 4.0	302.4 7.1	12.4	32	
6	210	11AD 0621 7R	738.2	561.2 0.1	455.8 0.3	403.6 0.7	370.3 1.3	346.3 2.0	327.8 2.9	300.7 5.2	11.8	32	
	240	11AD 0624 7R	784.9	555.9 0.1	451.6 0.3	399.8 0.6	366.8 1.0	343.0 1.6	324.8 2.3	297.9 4.0	11.4	32	
	270	11AD 0627 7R	822.5	549.3 0.1	446.2 0.2	395.1 0.4	362.4 0.8	339.0 1.2	320.9 1.8	294.4 3.2	11.1	32	
8	180	11AD 0818 7R	756.5	666.3 0.1	541.2 0.3	479.2 0.7	439.6 1.3	411.1 2.1	389.3 3.0	357.1 5.3	10.9	30	
	210	11AD 0821 7R	833.4	696.5 0.1	565.7 0.2	500.9 0.6	459.5 1.0	429.8 1.5	406.9 2.2	373.2 4.0	11.0	32	
	240	11AD 0824 7R	870.1	683.7 0.1	555.4 0.2	491.8 0.4	451.1 0.8	421.9 1.2	399.4 1.7	366.4 3.0	10.7	32	
	270	11AD 0827 7R	898.3	670.6 0.1	544.7 0.1	482.3 0.3	442.4 0.6	413.8 0.9	391.8 1.3	359.4 2.4	10.4	32	
10	180	11AD 1018 7R	678.0	603.6 0.1	490.3 0.3	434.1 0.6	398.2 1.0	372.4 1.6	352.6 2.3	323.5 4.1	8.9	26	
	210	11AD 1021 7R	708.9	589.3 0.1	478.7 0.2	423.8 0.4	388.8 0.8	363.6 1.2	344.3 1.7	315.8 3.0	8.7	26	
	240	11AD 1024 7R	891.4	745.1 0.1	605.2 0.2	535.9 0.3	491.6 0.6	459.7 1.0	435.3 1.4	399.3 2.5	9.8	30	
	270	11AD 1027 7R	913.2	727.9 0.1	591.3 0.1	523.6 0.3	480.3 0.5	449.2 0.8	425.3 1.1	390.1 2.0	9.6	30	
12	120	11AD 1212 7R	524.0	471.6 0.1	471.6 0.5	449.0 1.2	411.9 2.1	256.8 3.3	243.2 4.8	223.1 8.6	7.1	19	
	150	11AD 1215 7R	642.7	578.4 0.1	578.4 0.4	512.4 0.8	470.1 1.4	293.1 2.2	277.5 3.2	254.5 5.6	7.4	22	
	180	11AD 1218 7R	690.8	621.7 0.1	568.0 0.2	503.0 0.6	461.4 1.0	287.7 1.5	272.4 2.2	249.8 3.9	7.1	22	
	210	11AD 1221 7R	725.6	653.0 0.1	555.9 0.2	492.2 0.4	451.5 0.7	281.5 1.1	266.5 1.6	244.5 2.9	6.9	22	
	240	11AD 1224 7R	751.2	669.0 0.1	543.4 0.1	481.1 0.3	441.4 0.6	275.2 0.9	260.5 1.2	239.0 2.2	6.8	22	
	270	11AD 1227 7R	1087.2	613.8 0.1	498.6 0.1	441.5 0.2	405.0 0.4	378.8 0.6	358.6 0.9	328.9 1.6	8.1	26	
15	150	11AD 1515 7R	637.9	574.1 0.1	574.1 0.3	574.1 0.6	537.2 1.1	290.1 1.7	274.6 2.5	251.9 4.5	6.5	19	
	180	11AD 1518 7R	673.3	606.0 0.1	606.0 0.2	569.6 0.4	522.5 0.8	282.1 1.2	267.1 1.7	245.0 3.1	6.4	19	
	210	11AD 1521 7R	697.6	627.8 0.1	625.2 0.1	553.6 0.3	507.8 0.6	274.2 0.9	259.6 1.3	238.2 2.3	6.2	19	
	240	11AD 1524 7R	714.9	643.4 0.1	608.1 0.1	538.4 0.2	493.9 0.4	266.7 0.7	252.5 1.0	231.6 1.7	6.1	19	
	270	11AD 1527 7R	727.6	654.8 0.1	592.1 0.1	524.3 0.2	481.0 0.3	259.7 0.5	245.9 0.8	225.6 1.4	6.1	19	
16	150	11AD 1615 7R	651.2	586.1 0.1	586.1 0.3	586.1 0.6	556.2 1.0	300.3 1.6	284.3 2.4	260.8 4.2	6.5	19	
	180	11AD 1618 7R	684.1	615.7 0.1	615.7 0.2	588.3 0.4	539.7 0.7	291.4 1.1	275.9 1.6	253.1 2.9	6.3	19	
	210	11AD 1621 7R	706.4	635.8 0.1	635.8 0.1	570.8 0.3	523.6 0.5	282.7 0.8	267.7 1.2	245.6 2.1	6.2	19	
	240	11AD 1624 7R	722.2	650.0 0.1	626.2 0.1	554.5 0.2	508.6 0.4	274.7 0.6	260.0 0.9	238.5 1.6	6.1	19	
	270	11AD 1627 7R	733.6	660.2 0.1	609.2 0.1	539.4 0.2	494.8 0.3	267.2 0.5	253.0 0.7	232.1 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=0.102kgf·m

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

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

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	11AD 1621 7R 2	833.4	750.1	696.5 0.1	616.7 0.3	565.7 0.5	529.1 0.8	500.9 1.1	459.5 2.0	11.0	32
	240	11AD 1624 7R 2	870.1	783.1	683.7 0.1	605.4 0.2	555.4 0.4	519.4 0.6	491.8 0.9	451.1 1.5	10.7	32
	270	11AD 1627 7R 2	898.3	808.5	670.6 0.1	593.8 0.2	544.7 0.3	509.4 0.5	482.3 0.7	442.4 1.2	10.4	32
20	180	11AD 2018 7R 2	678.0	610.2	603.6 0.1	534.5 0.3	490.3 0.5	458.5 0.8	434.1 1.2	398.2 2.1	8.9	26
	210	11AD 2021 7R 2	708.9	638.0	589.3 0.1	521.8 0.2	478.7 0.4	447.7 0.6	423.8 0.8	388.8 1.5	8.7	26
	240	11AD 2024 7R 2	891.4	802.3	745.1 0.1	659.7 0.2	605.2 0.3	566.0 0.5	535.9 0.7	491.6 1.2	9.8	30
	270	11AD 2027 7R 2	913.2	821.9	727.9 0.1	644.6 0.1	591.3 0.2	553.0 0.4	523.6 0.5	480.3 1.0	9.6	30
24	180	11AD 2418 7R 2	690.8	621.7	621.7 0.1	619.2 0.3	568.0 0.5	354.2 0.8	335.3 1.1	307.6 2.0	7.1	22
	210	11AD 2421 7R 2	725.6	653.0	653.0 0.1	606.0 0.2	555.9 0.4	346.6 0.6	328.1 0.8	301.0 1.4	6.9	22
	240	11AD 2424 7R 2	751.2	676.1	669.0 0.1	592.4 0.2	543.4 0.3	338.8 0.4	320.8 0.6	294.2 1.1	6.8	22
	270	11AD 2427 7R 2	1087.2	755.7	613.8 0.0	543.5 0.1	498.6 0.2	466.3 0.3	441.5 0.4	405.0 0.8	8.1	26
32	180	11AD 3218 7R 2	684.1	615.7	615.7 0.1	615.7 0.2	615.7 0.4	358.8 0.6	339.7 0.8	311.6 1.5	6.3	19
	210	11AD 3221 7R 2	706.4	635.8	635.8 0.1	635.8 0.2	635.8 0.3	348.1 0.4	329.6 0.6	302.3 1.1	6.2	19
	240	11AD 3224 7R 2	722.2	650.0	650.0 0.1	650.0 0.1	626.2 0.2	338.1 0.3	320.1 0.5	293.7 0.8	6.1	19
	270	11AD 3227 7R 2	733.6	660.2	660.2 0.1	660.2 0.1	609.2 0.2	329.0 0.3	311.5 0.4	285.7 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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)							Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)			Toi (N·m)			
				25	50	75	100	125	150	200		
4	270	15AD 0427 7R	872.2	657.4 0.3	534.0 1.3	472.8 3.0	433.7 5.4	405.7 8.4	384.1 12.1	352.3 21.6	17.2	32
	240	15AD 0524 7R	899.6	741.9 0.3	602.6 1.4	533.6 3.1	489.4 5.5	457.8 8.6	433.4 12.3	397.6 22.0	16.1	30
5	270	15AD 0527 7R	964.3	741.4 0.3	602.2 1.1	533.3 2.4	489.2 4.3	457.5 6.8	433.1 9.8	397.3 17.3	15.7	30
	180	15AD 0618 7R	1309.2	1135.9 0.5	922.6 2.1	817.0 4.7	749.4 8.3	700.9 12.9	663.6 18.6	608.7 33.1	22.1	40
6	210	15AD 0621 7R	2014.8	1634.0 0.4	1327.2 1.5	1175.2 3.4	1078.0 6.1	1008.2 9.5	954.5 13.7	875.6 24.3	25.4	47
	240	15AD 0624 7R	2158.5	1624.8 0.3	1319.8 1.2	1168.6 2.6	1072.0 4.7	1002.6 7.3	949.2 10.5	870.7 18.6	24.5	47
	270	15AD 0627 7R	2276.9	1610.9 0.2	1308.4 0.9	1158.6 2.1	1062.8 3.7	993.9 5.7	941.0 8.3	863.2 14.7	23.8	47
	180	15AD 0818 7R	1555.5	1400.0 0.4	1186.5 1.6	1050.6 3.6	963.7 6.4	901.3 10.0	853.4 14.4	782.8 25.7	20.5	40
8	210	15AD 0821 7R	2311.5	2056.5 0.3	1670.4 1.2	1479.0 2.7	1356.8 4.8	1268.9 7.5	1201.4 10.8	1102.0 19.2	23.6	47
	240	15AD 0824 7R	2430.2	2025.8 0.2	1645.5 0.9	1457.0 2.1	1336.5 3.7	1250.0 5.7	1183.5 8.3	1085.6 14.7	22.9	47
	270	15AD 0827 7R	2523.1	1992.5 0.2	1618.4 0.7	1433.0 1.6	1314.5 2.9	1229.4 4.5	1164.0 6.5	1067.7 11.6	22.4	47
10	180	15AD 1018 7R	1384.0	1245.6 0.3	1077.7 1.3	954.3 2.9	875.4 5.1	818.7 8.0	775.1 11.5	711.0 20.5	17.2	35
	210	15AD 1021 7R	1471.4	1306.2 0.2	1061.0 0.9	939.4 2.1	861.8 3.8	806.0 5.9	763.1 8.5	700.0 15.0	16.7	35
	240	15AD 1024 7R	1913.0	1659.5 0.2	1347.9 0.7	1193.5 1.7	1094.8 3.0	1023.9 4.7	969.4 6.7	889.3 11.9	18.4	40
	270	15AD 1027 7R	1973.6	1627.0 0.1	1321.6 0.6	1170.2 1.3	1073.4 2.4	1003.9 3.7	950.5 5.3	871.9 9.4	18.1	40
12	120	15AD 1212 7R	1111.1	1000.0 0.6	1000.0 2.5	1000.0 5.6	923.0 10.0	575.5 15.7	544.9 22.6	499.8 40.1	13.5	26
	150	15AD 1215 7R	1569.9	1369.7 0.4	1112.6 1.5	985.1 3.3	903.7 6.0	704.3 9.3	666.8 13.4	611.7 23.8	14.7	30
	180	15AD 1218 7R	1744.1	1423.6 0.3	1156.3 1.1	1023.9 2.4	939.2 4.2	732.0 6.6	693.0 9.5	635.7 16.8	14.8	32
	210	15AD 1221 7R	1826.7	1391.1 0.2	1129.9 0.8	1000.5 1.7	917.8 3.1	715.3 4.8	677.2 6.9	621.2 12.3	14.4	32
	240	15AD 1224 7R	2282.0	1567.5 0.2	1273.2 0.6	1127.3 1.4	1034.1 2.5	879.2 3.8	832.4 5.5	763.6 9.8	15.9	35
	270	15AD 1227 7R	2339.4	1531.9 0.1	1244.3 0.5	1101.8 1.1	1010.7 1.9	859.3 3.0	813.6 4.4	746.3 7.8	15.7	35
15	150	15AD 1515 7R	1388.9	1250.0 0.3	1250.0 1.3	1250.0 2.9	1223.1 5.2	660.4 8.2	625.3 11.7	573.6 20.9	12.4	26
	180	15AD 1518 7R	1792.0	1513.9 0.2	1229.6 0.8	1088.8 1.9	998.8 3.4	778.4 5.3	737.0 7.6	676.0 13.5	13.8	30
	210	15AD 1521 7R	1852.5	1469.7 0.2	1193.7 0.6	1057.0 1.4	969.6 2.5	755.7 3.9	715.5 5.6	656.3 10.0	13.5	30
	240	15AD 1524 7R	1895.3	1428.1 0.1	1160.0 0.5	1027.2 1.1	942.2 1.9	734.3 3.0	695.3 4.3	637.8 7.6	13.3	30
	270	15AD 1527 7R	1998.6	1473.9 0.1	1197.1 0.4	1060.0 0.9	972.4 1.5	757.9 2.4	717.5 3.5	658.2 6.1	13.6	32
16	150	15AD 1615 7R	1422.9	1280.6 0.3	1280.6 1.2	1280.6 2.8	1269.3 4.9	685.4 7.7	648.9 11.1	595.3 19.7	12.3	26
	180	15AD 1618 7R	1508.2	1357.4 0.2	1357.4 0.9	1348.8 1.9	1237.2 3.4	668.1 5.3	632.5 7.7	580.2 13.7	12.0	26
	210	15AD 1621 7R	1567.8	1411.0 0.2	1411.0 0.6	1313.0 1.4	1204.4 2.5	650.4 3.9	615.7 5.6	564.8 10.0	11.8	26
	240	15AD 1624 7R	1610.4	1449.4 0.1	1443.8 0.5	1278.5 1.1	1172.8 1.9	633.3 3.0	599.6 4.3	550.0 7.7	11.7	26
	270	15AD 1627 7R	1941.1	1428.9 0.1	1160.6 0.4	1027.7 0.8	942.7 1.4	734.7 2.2	695.6 3.2	638.1 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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Internal Inertia Load Torque						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)	
				Top (N·m) T_{oi} (N·m)								
				Input Shaft Speed (Index/min)								
25	50	75	100	125	150	200						
2	330	15AD 0233 8R	757.4	499.0 0.6	405.3 2.5	358.9 5.7	329.2 10.1	307.9 15.8	291.5 22.8	267.4 40.5	17.3	30
3	270	15AD 0327 8R	673.7	500.0 0.7	406.2 2.8	359.6 6.2	329.9 11.1	308.5 17.3	292.1 24.9	268.0 44.3	14.2	26
	300	15AD 0330 8R	724.6	502.4 0.6	408.1 2.2	361.4 5.0	331.5 9.0	310.0 14.0	293.5 20.2	269.2 35.8	13.9	26
4	240	15AD 0424 8R	1001.7	729.9 0.6	592.8 2.4	524.9 5.4	481.5 9.7	450.4 15.1	426.4 21.8	391.1 38.7	16.2	32
	270	15AD 0427 8R	1066.4	726.9 0.5	590.4 1.9	522.8 4.3	479.6 7.7	448.5 12.0	424.7 17.2	389.5 30.6	15.8	32
5	210	15AD 0521 8R	1013.2	819.5 0.6	665.6 2.5	589.4 5.7	540.7 10.2	505.7 15.9	478.7 22.9	439.2 40.7	15.3	30
	240	15AD 0524 8R	1121.1	862.8 0.5	700.8 2.0	620.5 4.4	569.2 7.9	532.4 12.3	504.0 17.8	462.3 31.6	15.4	32
6	180	15AD 0618 8R	1600.6	1256.0 0.7	1020.2 2.9	903.3 6.6	828.6 11.8	775.0 18.4	733.7 26.5	673.1 47.0	20.2	40
	210	15AD 0621 8R	2362.5	1769.3 0.5	1437.2 2.2	1272.6 4.9	1167.3 8.6	1091.7 13.5	1033.6 19.4	948.2 34.5	23.3	47
8	150	15AD 0815 8R	1345.8	1211.2 0.8	1003.6 3.3	888.7 7.4	815.2 13.1	762.4 20.5	721.8 29.5	662.2 52.5	17.4	35
	180	15AD 0818 8R	1811.7	1576.5 0.1	1280.5 0.5	1133.8 1.1	1040.1 1.9	972.7 2.9	921.0 4.2	844.8 7.5	19.0	40
10	120	15AD 1012 8R	1080.6	972.5 1.0	902.2 3.9	798.8 8.8	732.8 15.6	685.3 24.3	648.9 35.1	595.2 62.3	14.9	30
	150	15AD 1015 8R	1224.5	1102.1 0.6	935.7 2.5	828.5 5.7	760.0 10.1	710.8 15.8	673.0 22.8	617.3 40.4	14.8	32
12	120	15AD 1212 8R	1706.7	1536.0 0.8	1291.8 3.3	1143.9 7.4	1049.3 13.2	817.8 20.6	774.3 29.7	710.2 52.8	14.9	32
	150	15AD 1215 8R	1829.9	1540.2 0.5	1251.0 2.1	1107.8 4.8	1016.2 8.4	792.0 13.2	749.8 19.0	687.8 33.8	14.4	32
15	120	15AD 1512 8R	1450.5	1305.5 0.7	1305.5 2.9	1305.5 6.5	1305.5 11.6	721.7 18.1	683.2 26.1	626.8 46.3	12.2	26
	150	15AD 1515 8R	1854.9	1626.8 0.4	1321.3 1.7	1170.0 3.9	1073.3 6.9	836.5 10.8	792.0 15.6	726.5 27.7	13.5	30
16	120	15AD 1612 8R	1480.9	1332.8 0.7	1332.8 2.7	1332.8 6.1	1332.8 10.9	747.6 17.1	707.8 24.6	649.3 43.7	12.1	26
	150	15AD 1615 8R	1570.1	1413.1 0.4	1413.1 1.7	1413.1 3.9	1333.3 7.0	720.0 10.9	681.6 15.7	625.3 27.9	11.8	26

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	15AD 1621 7R 2	1341.6	1207.4 0.1	1115.3 0.6	987.5 1.3	905.9 2.3	847.2 3.6	802.1 5.2	735.8 9.2	17.5	35
	240	15AD 1624 7R 2	1774.5	1597.1 0.1	1431.2 0.5	1267.3 1.0	1162.5 1.8	1087.2 2.8	1029.3 4.1	944.2 7.2	19.2	40
	270	15AD 1627 7R 2	2523.1	2270.8 0.1	1992.5 0.4	1764.3 0.8	1618.4 1.5	1513.6 2.3	1433.0 3.3	1314.5 5.8	22.4	47
20	180	15AD 2018 7R 2	1384.0	1245.6 0.2	1245.6 0.6	1174.8 1.4	1077.7 2.6	1007.9 4.0	954.3 5.8	875.4 10.2	17.2	35
	210	15AD 2021 7R 2	1833.8	1650.4 0.1	1650.4 0.5	1497.5 1.1	1373.6 1.9	1284.7 3.0	1216.3 4.4	1115.7 7.8	18.9	40
	240	15AD 2024 7R 2	1913.0	1721.7 0.1	1659.5 0.4	1469.4 0.8	1347.9 1.5	1260.6 2.3	1193.5 3.4	1094.8 6.0	18.4	40
	270	15AD 2027 7R 2	1973.6	1776.2 0.1	1627.0 0.3	1440.7 0.7	1321.6 1.2	1236.0 1.8	1170.2 2.7	1073.4 4.7	18.1	40
24	180	15AD 2418 7R 2	1744.1	1569.7 0.1	1423.6 0.5	1260.6 1.2	1156.3 2.1	901.2 3.3	853.2 4.7	782.7 8.4	14.8	32
	210	15AD 2421 7R 2	1826.7	1644.0 0.1	1391.1 0.4	1231.8 0.9	1129.9 1.5	880.6 2.4	833.8 3.5	764.8 6.2	14.4	32
	240	15AD 2424 7R 2	1887.1	1672.4 0.1	1358.4 0.3	1202.8 0.7	1103.3 1.2	859.9 1.8	814.1 2.7	746.8 4.7	14.1	32
	270	15AD 2427 7R 2	2339.4	1886.0 0.1	1531.9 0.2	1356.5 0.5	1244.3 1.0	1057.9 1.5	1001.6 2.2	918.8 3.9	15.7	35
32	180	15AD 3218 7R 2	1508.2	1357.4 0.1	1357.4 0.4	1357.4 1.0	1357.4 1.7	822.5 2.7	778.7 3.8	714.3 6.8	12.0	26
	210	15AD 3221 7R 2	1567.8	1411.0 0.1	1411.0 0.3	1411.0 0.7	1411.0 1.3	800.7 2.0	758.1 2.8	695.4 5.0	11.8	26
	240	15AD 3224 7R 2	1610.4	1449.4 0.1	1449.4 0.2	1449.4 0.5	1443.8 1.0	779.6 1.5	738.1 2.2	677.1 3.8	11.7	26
	270	15AD 3227 7R 2	1941.1	1747.0 0.0	1428.9 0.2	1265.2 0.4	1160.6 0.7	904.6 1.1	856.4 1.6	785.6 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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)	
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)		Toi (N·m)				
				25	50	75	100	125	200			
4	270	19AD 0427 7R	2054.0	1456.1 1.0	1182.8 4.1	1047.3 9.3	960.7 16.5	898.5 25.8	850.7 37.2	780.3 66.1	33.0	40
	240	19AD 0524 7R	2144.1	1751.8 1.2	1422.9 4.6	1259.9 10.4	1155.8 18.5	1080.9 28.8	1023.4 41.5	938.8 73.8	32.1	40
5	270	19AD 0527 7R	2290.2	1747.6 0.9	1419.5 3.6	1256.9 8.2	1153.0 14.6	1078.4 22.8	1021.0 32.8	936.5 58.3	31.1	40
	180	19AD 0618 7R	2687.7	2320.3 1.8	1884.7 7.1	1668.8 15.9	1530.8 28.2	1431.7 44.1	1355.5 63.5	1243.4 112.8	39.4	52
6	210	19AD 0621 7R	3865.9	3278.2 1.4	2662.7 5.5	2357.7 12.3	2162.8 21.9	2022.8 34.2	1915.1 49.2	1756.7 87.5	44.5	60
	240	19AD 0624 7R	4174.2	3272.7 1.0	2658.2 4.2	2353.8 9.4	2159.1 16.7	2019.3 26.2	1911.9 37.7	1753.8 67.0	43.0	60
	270	19AD 0627 7R	4433.9	3255.8 0.8	2644.6 3.3	2341.7 7.4	2148.0 13.2	2009.0 20.7	1902.0 29.8	1744.8 52.9	41.8	60
	180	19AD 0818 7R	3177.0	2859.3 1.4	2413.2 5.4	2136.8 12.2	1960.1 21.7	1833.2 33.9	1735.6 48.8	1592.1 86.8	36.5	52
8	210	19AD 0821 7R	3416.9	2941.9 1.0	2389.6 4.0	2115.9 9.0	1940.9 15.9	1815.2 24.9	1718.6 35.9	1576.5 63.8	35.2	52
	240	19AD 0824 7R	4778.9	4139.9 0.8	3362.6 3.3	2977.5 7.4	2731.3 13.1	2554.4 20.4	2418.5 29.4	2218.5 52.3	40.3	60
	270	19AD 0827 7R	4992.8	4084.6 0.6	3317.7 2.6	2937.7 5.8	2694.8 10.3	2520.3 16.2	2386.2 23.3	2188.9 41.3	39.4	60
	180	19AD 1018 7R	2995.5	2696.0 1.1	2324.9 4.3	2058.6 9.7	1888.4 17.3	1766.1 27.0	1672.1 38.9	1533.9 69.1	30.9	47
10	210	19AD 1021 7R	3168.5	2810.8 0.8	2283.0 3.2	2021.6 7.1	1854.4 12.7	1734.3 19.8	1642.0 28.6	1506.2 50.8	30.1	47
	240	19AD 1024 7R	3872.3	3355.5 0.6	2725.5 2.5	2413.3 5.6	2213.8 10.0	2070.5 15.6	1960.2 22.5	1798.2 40.1	33.0	52
	270	19AD 1027 7R	3988.3	3287.2 0.5	2670.0 2.0	2364.2 4.5	2168.7 7.9	2028.3 12.4	1920.3 17.8	1761.5 31.6	32.4	52
	120	19AD 1212 7R	1964.9	1768.4 1.9	1768.4 7.8	1661.1 17.4	1523.7 31.0	1187.6 48.5	1124.4 69.8	1031.4 124.1	26.0	35
12	150	19AD 1215 7R	3136.3	2674.5 1.2	2172.3 5.0	1923.5 11.2	1764.5 19.8	1650.2 31.0	1562.4 44.7	1433.2 79.4	29.3	40
	180	19AD 1218 7R	3341.0	2613.4 0.9	2122.8 3.4	1879.6 7.8	1724.2 13.8	1612.6 21.5	1526.7 31.0	1400.5 55.1	28.3	40
	210	19AD 1221 7R	3485.6	2548.8 0.6	2070.3 2.5	1833.1 5.7	1681.6 10.1	1572.7 15.8	1489.0 22.8	1365.9 40.5	27.7	40
	240	19AD 1224 7R	3590.2	2485.2 0.5	2018.6 1.9	1787.4 4.4	1639.6 7.8	1533.4 12.1	1451.8 17.4	1331.8 31.0	27.2	40
	270	19AD 1227 7R	4227.1	2974.4 0.4	2415.9 1.6	2139.2 3.7	1962.4 6.5	1835.3 10.2	1737.6 14.7	1593.9 26.1	28.2	47
	150	19AD 1515 7R	2852.3	2567.1 1.0	2513.8 4.0	2225.9 9.0	2041.8 16.0	1350.3 25.1	1278.4 36.1	1172.7 64.2	24.0	35
15	180	19AD 1518 7R	3022.8	2720.5 0.7	2450.1 2.8	2169.5 6.3	1990.1 11.1	1316.1 17.4	1246.0 25.1	1143.0 44.6	23.5	35
	210	19AD 1521 7R	3141.6	2827.4 0.5	2384.9 2.0	2111.8 4.6	1937.1 8.2	1281.1 12.8	1212.9 18.4	1112.6 32.8	23.0	35
	240	19AD 1524 7R	3226.7	2858.8 0.4	2322.1 1.6	2056.1 3.5	1886.1 6.3	1247.3 9.8	1180.9 14.1	1083.3 25.1	22.7	35
	270	19AD 1527 7R	3263.1	2936.8 0.3	2394.1 1.4	2119.9 3.0	1944.6 5.4	1818.7 8.5	1721.9 12.2	1579.5 21.6	26.2	40
	150	19AD 1615 7R	2764.3	2487.9 0.9	2396.5 3.7	2122.0 8.4	1946.5 14.9	1287.3 23.3	1218.8 33.5	1118.0 59.6	23.2	32
16	180	19AD 1618 7R	3075.3	2767.8 0.7	2532.7 2.6	2242.6 5.9	2057.2 10.5	1360.5 16.4	1288.0 23.6	1181.5 41.9	23.3	35
	210	19AD 1621 7R	3184.7	2866.2 0.5	2460.9 1.9	2179.0 4.3	1998.9 7.7	1321.9 12.0	1251.5 17.3	1148.0 30.8	22.9	35
	240	19AD 1624 7R	3262.3	2936.1 0.4	2392.9 1.5	2118.8 3.3	1943.6 5.9	1285.4 9.2	1216.9 13.3	1116.3 23.6	22.6	35
	270	19AD 1627 7R	3318.9	2868.3 0.3	2329.8 1.2	2062.9 2.6	1892.4 4.7	1251.4 7.3	1184.8 10.5	1086.9 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=0.102kgf·m

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

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

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	19AD 1621 7R 2	2910.5	2619.5 0.5	2414.8 1.9	2138.3 4.4	1961.5 7.8	1834.5 12.2	1736.8 17.5	1593.2 31.1	31.3	47
	240	19AD 1624 7R 2	3605.2	3244.7 0.4	2903.2 1.5	2570.7 3.4	2358.1 6.1	2205.4 9.5	2088.0 13.7	1915.4 24.4	34.3	52
	270	19AD 1627 7R 2	4992.8	4493.5 0.3	4084.6 1.3	3616.8 2.9	3317.7 5.2	3102.9 8.1	2937.7 11.6	2694.8 20.7	39.4	60
20	180	19AD 2018 7R 2	2623.2	2360.9 0.5	2294.0 1.9	2031.2 4.2	1863.3 7.5	1742.6 11.7	1649.9 16.9	1513.4 30.1	29.3	40
	210	19AD 2021 7R 2	3168.5	2851.7 0.4	2810.8 1.6	2488.8 3.6	2283.0 6.3	2135.2 9.9	2021.6 14.3	1854.4 25.4	30.1	47
	240	19AD 2024 7R 2	3872.3	3485.1 0.3	3355.5 1.3	2971.2 2.8	2725.5 5.0	2549.0 7.8	2413.3 11.3	2213.8 20.0	33.0	52
	270	19AD 2027 7R 2	3988.3	3589.5 0.2	3287.2 1.0	2910.7 2.2	2670.0 4.0	2497.1 6.2	2364.2 8.9	2168.7 15.8	32.4	52
24	180	19AD 2418 7R 2	3341.0	3006.9 0.4	2613.4 1.7	2314.1 3.9	2122.8 6.9	1985.3 10.8	1879.6 15.5	1724.2 27.6	28.3	40
	210	19AD 2421 7R 2	3485.6	3137.0 0.3	2548.8 1.3	2256.9 2.8	2070.3 5.1	1936.2 7.9	1833.1 11.4	1681.6 20.3	27.7	40
	240	19AD 2424 7R 2	3590.2	3059.6 0.2	2485.2 1.0	2200.5 2.2	2018.6 3.9	1887.9 6.1	1787.4 8.7	1639.6 15.5	27.2	40
	270	19AD 2427 7R 2	4227.1	3661.9 0.2	2974.4 0.8	2633.7 1.8	2415.9 3.3	2259.5 5.1	2139.2 7.3	1962.4 13.0	28.2	47
32	180	19AD 3218 7R 2	3075.3	2767.8 0.3	2767.8 1.3	2761.0 2.9	2532.7 5.2	1674.9 8.2	1585.8 11.8	1454.7 21.0	23.3	35
	210	19AD 3221 7R 2	3184.7	2866.2 0.2	2866.2 1.0	2682.7 2.2	2460.9 3.9	1627.4 6.0	1540.8 8.7	1413.4 15.4	22.9	35
	240	19AD 3224 7R 2	3262.3	2936.1 0.2	2936.1 0.7	2608.6 1.7	2392.9 2.9	1582.5 4.6	1498.2 6.6	1374.3 11.8	22.6	35
	270	19AD 3227 7R 2	3318.9	2987.0 0.1	2868.3 0.6	2539.8 1.3	2329.8 2.3	1540.7 3.6	1458.7 5.2	1338.1 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=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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)	
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)		Toi (N·m)				
				25	50	75	100	125	200			
4	270	23AD 0427 7R	2691.9	2035.7 3.2	1653.5 12.9	1464.1 29.1	1343.0 51.8	1256.1 80.9	1189.2 116.5	1090.9 207.1	38.7	47
	240	23AD 0524 7R	2963.4	2417.9 3.1	1964.0 12.4	1739.0 27.9	1595.2 49.6	1492.0 77.5	1412.5 111.7	1295.7 198.5	37.6	47
5	270	23AD 0527 7R	3169.1	2413.7 2.5	1960.5 9.8	1736.0 22.1	1592.4 39.2	1489.3 61.3	1410.0 88.2	1293.5 156.9	36.5	47
	180	23AD 0618 7R	4245.3	3684.0 5.0	2992.3 20.0	2649.6 45.0	2430.5 80.0	2273.2 125.0	2152.2 180.0	1974.2 320.0	52.1	60
6	210	23AD 0621 7R	5879.5	4985.4 3.6	4049.4 14.5	3585.6 32.6	3289.1 57.9	3076.2 90.5	2912.4 130.4	2671.6 231.7	57.6	70
	240	23AD 0624 7R	6364.0	4983.0 2.8	4047.5 11.1	3583.9 25.0	3287.6 44.4	3074.7 69.3	2911.0 99.8	2670.3 177.4	55.5	70
	270	23AD 0627 7R	6775.0	4962.9 2.2	4031.2 8.8	3569.5 19.7	3274.3 35.0	3062.3 54.8	2899.3 78.9	2659.6 140.2	53.8	70
8	180	23AD 0818 7R	5058.4	4552.6 3.6	3857.2 14.5	3415.4 32.6	3133.0 58.0	2930.2 90.6	2774.2 130.4	2544.8 231.9	48.0	60
	210	23AD 0821 7R	5464.8	4712.8 2.7	3828.0 10.6	3389.5 24.0	3109.3 42.6	2907.9 66.5	2753.2 95.8	2525.5 170.3	46.2	60
	240	23AD 0824 7R	7325.3	6331.5 2.2	5142.8 8.7	4553.8 19.6	4177.3 34.8	3906.8 54.3	3698.8 78.2	3393.0 139.0	51.8	70
	270	23AD 0827 7R	7669.2	6253.5 1.7	5079.5 6.9	4497.7 15.4	4125.8 27.5	3858.6 42.9	3653.3 61.8	3351.2 109.9	50.6	70
10	180	23AD 1018 7R	4187.8	3769.0 3.0	3286.2 12.1	2909.8 27.2	2669.2 48.4	2496.4 75.7	2363.5 108.9	2168.1 193.7	38.6	52
	210	23AD 1021 7R	4469.4	3990.7 2.2	3241.4 8.9	2870.2 20.0	2632.9 35.6	2462.4 55.6	2331.3 80.0	2138.6 142.3	37.4	52
	240	23AD 1024 7R	6252.1	5412.6 1.7	4396.4 6.7	3892.9 15.1	3571.0 26.8	3339.8 42.0	3162.0 60.4	2900.6 107.4	43.0	60
	270	23AD 1027 7R	6456.4	5309.4 1.3	4312.6 5.3	3818.6 11.9	3502.9 21.2	3276.1 33.1	3101.7 47.7	2845.2 84.9	42.2	60
12	120	23AD 1212 7R	3100.4	2790.4 6.6	2661.4 26.3	2356.6 59.3	2161.7 105.3	1684.8 164.6	1595.1 237.0	1463.2 421.4	30.4	40
	150	23AD 1215 7R	5078.9	3778.7 3.6	3069.2 14.4	2717.7 32.3	2493.0 57.5	2331.6 89.9	2207.5 129.4	2024.9 230.0	34.2	47
	180	23AD 1218 7R	6387.4	4562.0 2.6	3705.5 10.3	3281.1 23.1	3009.8 41.1	2814.9 64.2	2665.1 92.5	2444.7 164.4	37.2	52
	210	23AD 1221 7R	6727.8	4470.4 1.9	3631.1 7.5	3215.2 17.0	2949.4 30.2	2758.4 47.2	2611.6 67.9	2395.6 120.8	36.3	52
	240	23AD 1224 7R	6980.2	4374.7 1.4	3553.3 5.8	3146.4 13.0	2886.2 23.1	2699.3 36.1	2555.7 52.0	2344.3 92.5	35.5	52
	270	23AD 1227 7R	7170.6	4280.0 1.1	3476.5 4.6	3078.3 10.3	2823.8 18.3	2640.9 28.5	2500.3 41.1	2293.6 73.1	35.0	52
15	150	23AD 1515 7R	3960.0	3564.0 3.4	3564.0 13.6	3564.0 30.7	3311.8 54.6	1959.1 85.3	1854.8 122.8	1701.5 218.3	28.0	40
	180	23AD 1518 7R	4255.0	3829.5 2.4	3829.5 9.5	3543.1 21.3	3250.2 37.9	1922.7 59.2	1820.3 85.3	1669.8 151.6	27.2	40
	210	23AD 1521 7R	6051.6	4077.3 1.5	3311.8 6.0	2932.5 13.5	2690.0 24.0	2515.8 37.4	2381.9 53.9	2184.9 95.8	31.2	47
	240	23AD 1524 7R	6201.3	3965.3 1.1	3220.8 4.6	2851.9 10.3	2616.1 18.3	2446.7 28.7	2316.5 41.3	2125.0 73.4	30.7	47
	270	23AD 1527 7R	6310.6	3861.2 0.9	3136.3 3.6	2777.1 8.2	2547.5 14.5	2382.5 22.6	2255.7 32.6	2069.2 58.0	30.4	47
16	150	23AD 1615 7R	4069.4	3662.5 3.2	3662.5 12.8	3662.5 28.9	3444.2 51.4	2037.4 80.3	1929.0 115.6	1769.5 205.5	27.7	40
	180	23AD 1618 7R	4348.4	3913.6 2.2	3913.6 8.9	3674.6 20.1	3370.8 35.7	1994.0 55.7	1887.9 80.3	1731.8 142.7	27.0	40
	210	23AD 1621 7R	4547.2	4092.5 1.6	4051.9 6.6	3587.8 14.7	3291.2 26.2	1946.9 40.9	1843.3 59.0	1690.9 104.8	26.5	40
	240	23AD 1624 7R	4691.8	4222.6 1.3	3954.2 5.0	3501.3 11.3	3211.8 20.1	1900.0 31.4	1798.8 45.1	1650.1 80.3	26.1	40
	270	23AD 1627 7R	4799.4	4319.5 1.0	3860.4 4.0	3418.3 8.9	3135.7 15.9	1854.9 24.8	1756.2 35.7	1611.0 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=0.102kgf·m

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

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

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	23AD 1621 7R 2	5464.8	4918.3 1.3	4712.8 5.3	4173.0 12.0	3828.0 21.3	3580.1 33.3	3389.5 47.9	3109.3 85.2	46.2	60
	240	23AD 1624 7R 2	7325.3	6592.8 1.1	6331.5 4.3	5606.4 9.8	5142.8 17.4	4809.8 27.2	4553.8 39.1	4177.3 69.5	51.8	70
	270	23AD 1627 7R 2	7669.2	6902.3 0.9	6253.5 3.4	5537.3 7.7	5079.5 13.7	4750.6 21.5	4497.7 30.9	4125.8 54.9	50.6	70
20	180	23AD 2018 7R 2	3591.8	3232.6 1.5	3232.6 5.9	2919.6 13.3	2678.2 23.6	2504.8 36.9	2371.5 53.2	2175.4 94.5	34.2	47
	210	23AD 2021 7R 2	4469.4	4022.5 1.1	3990.7 4.4	3533.6 10.0	3241.4 17.8	3031.6 27.8	2870.2 40.0	2632.9 71.1	37.4	52
	240	23AD 2024 7R 2	6252.1	5626.9 0.8	5412.6 3.4	4792.7 7.6	4396.4 13.4	4111.7 21.0	3892.9 30.2	3571.0 53.7	43.0	60
	270	23AD 2027 7R 2	6456.4	5810.8 0.7	5309.4 2.7	4701.3 6.0	4312.6 10.6	4033.3 16.6	3818.6 23.9	3502.9 42.4	42.2	60
24	180	23AD 2418 7R 2	5458.1	4566.0 1.2	3708.7 5.0	3283.9 11.2	3012.4 20.0	2817.3 31.2	2667.4 44.9	2446.8 79.9	33.0	47
	210	23AD 2421 7R 2	5732.4	4467.8 0.9	3629.0 3.7	3213.4 8.3	2947.7 14.7	2756.8 22.9	2610.1 33.0	2394.2 58.7	32.2	47
	240	23AD 2424 7R 2	5934.2	4367.3 0.7	3547.3 2.8	3141.1 6.3	2881.3 11.2	2694.8 17.5	2551.3 25.3	2340.4 44.9	31.6	47
	270	23AD 2427 7R 2	7170.6	5269.3 0.6	4280.0 2.3	3789.8 5.1	3476.5 9.1	3251.3 14.3	3078.3 20.5	2823.8 36.5	35.0	52
32	180	23AD 3218 7R 2	4348.4	3913.6 1.1	3913.6 4.5	3913.6 10.0	3913.6 17.8	2454.9 27.9	2324.2 40.1	2132.1 71.3	27.0	40
	210	23AD 3221 7R 2	4547.2	4092.5 0.8	4092.5 3.3	4092.5 7.4	4051.9 13.1	2396.9 20.5	2269.4 29.5	2081.7 52.4	26.5	40
	240	23AD 3224 7R 2	4691.8	4222.6 0.6	4222.6 2.5	4222.6 5.6	3954.2 10.0	2339.1 15.7	2214.6 22.6	2031.5 40.1	26.1	40
	270	23AD 3227 7R 2	4799.4	4319.5 0.5	4319.5 2.0	4208.4 4.5	3860.4 7.9	2283.7 12.4	2162.1 17.8	1983.3 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=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 of Stops S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)	
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)		Toi (N·m)				
				25	50	75	100	125	200			
4	270	33AD 04277R	6229.4	5606.5 16.3	4772.9 65.3	4226.2 146.8	3876.8 261.0	3625.7 407.8	3432.7 587.3	76.5	70	
	240	33AD 05247R	5278.6	4750.8 16.3	2449.9 65.2	3763.1 146.7	3452.0 260.7	3228.4 407.4	3056.6 586.6	63.7	60	
5	270	33AD 05277R	5653.8	5088.5 12.9	4245.6 51.5	3759.4 115.9	3448.5 206.0	3225.2 321.9	3053.6 463.5	2801.1 824.0	61.6	60
	180	33AD 06187R	7933.3	7140.0 24.9	6910.4 99.4	6118.9 223.7	5613.0 397.7	5249.5 621.3	4970.1 894.7	96.0	80	
6	210	33AD 06217R	11122.6	10010.4 19.0	9279.5 75.9	8216.7 170.7	7537.3 303.5	7049.3 474.2	6674.1 682.9	6122.2 1214.1	105.0	90
	240	33AD 06247R	12969.3	11672.4 14.9	10330.0 59.7	9146.9 134.2	8390.6 238.6	7847.3 372.8	7429.6 536.9	6815.2 954.4	108.4	100
	270	33AD 06277R	13815.1	12433.6 11.8	10291.4 47.1	9112.7 106.1	8359.2 188.5	7817.9 294.6	7401.8 424.2	6789.8 754.1	105.0	100
	180	33AD 08187R	9500.9	8550.8 19.2	8550.8 76.7	7919.7 172.5	7264.9 306.7	6794.5 479.2	6432.8 690.1	5900.9 1226.8	87.8	80
8	210	33AD 08217R	13094.8	11785.3 14.8	11785.3 59.2	10565.9 133.1	9692.3 236.7	9064.7 369.8	8582.2 532.6	7872.6 946.8	96.8	90
	240	33AD 08247R	13930.2	12537.1 11.3	11824.0 45.3	10469.8 101.9	9604.1 181.2	8982.2 283.1	8504.1 407.7	7800.9 724.9	93.8	90
	270	33AD 08277R	15661.2	14095.1 9.3	12983.7 37.0	11496.6 83.3	10546.0 148.1	9863.2 231.4	9338.2 333.3	8566.0 592.4	98.1	100
	180	33AD 10187R	8241.5	7417.4 14.9	7417.4 59.8	6807.8 134.5	6244.9 239.1	5840.5 373.5	5529.6 537.9	5072.4 956.3	66.4	70
10	210	33AD 10217R	11321.8	10189.6 11.6	10189.6 46.3	9239.5 104.2	8475.5 185.3	7926.7 289.5	7504.8 416.9	6884.3 741.1	80.1	80
	240	33AD 10247R	11851.3	10666.2 8.9	10256.6 35.5	9081.9 79.8	8331.0 141.9	7791.5 221.6	7376.8 319.2	6766.8 567.4	78.0	80
	270	33AD 10277R	15698.4	14128.6 7.4	13573.0 29.7	12018.4 66.9	11024.7 118.9	10310.8 185.8	9762.0 267.6	8954.8 475.8	87.6	90
	120	33AD 12127R	4260.6	3834.5 29.2	3834.5 116.7	3834.5 262.5	3834.5 466.7	3673.5 729.2			50.9	52
12	150	33AD 12157R	6343.9	5709.5 19.2	5709.5 76.6	5709.5 172.4	5480.0 306.5	5125.2 478.9	4852.4 689.6	4451.2 1226.0	57.3	60
	180	33AD 12187R	8715.8	7844.2 13.8	7844.2 55.2	7844.2 124.2	7284.0 220.8	6812.3 345.0	6449.7 496.8	5916.4 883.3	63.8	70
	210	33AD 12217R	9226.9	8304.2 10.1	8304.2 40.6	7800.8 91.3	7155.8 162.2	6692.5 253.5	6336.2 365.0	5812.3 648.9	62.0	70
	240	33AD 12247R	9611.1	8650.0 7.8	8638.3 31.1	7649.0 69.9	7016.5 124.2	6562.2 194.1	6212.9 279.5	5699.2 496.8	60.7	70
	270	33AD 12277R	9904.2	8913.7 6.1	8464.6 24.5	7495.1 55.2	6875.4 98.1	6430.2 153.3	6087.9 220.8	5584.5 392.6	59.6	70
	150	33AD 15157R	5254.7	4729.2 15.1	4729.2 60.4	4729.2 135.9	4472.8 241.6	4183.2 377.5	3960.5 543.6	3633.0 966.4	46.3	52
15	180	33AD 15187R	7421.0	6678.9 10.8	6678.9 43.3	6678.9 97.5	6152.7 173.2	5754.3 270.7	5448.0 389.8	4997.5 693.0	53.1	60
	210	33AD 15217R	7729.3	6956.4 8.0	6956.4 31.8	6535.8 71.6	5995.4 127.3	5607.2 198.9	5308.7 286.4	4869.8 509.1	51.9	60
	240	33AD 15247R	7951.2	7156.1 6.1	7156.1 24.4	6368.7 54.8	5842.1 97.5	5463.8 152.3	5173.0 219.3	4745.2 389.8	50.9	60
	270	33AD 15277R	8115.0	7303.5 4.8	7013.8 19.3	6210.5 43.3	5697.0 77.0	5328.1 120.3	5044.5 173.2	4627.4 308.0	50.2	60
16	150	33AD 16157R	5373.6	4836.2 14.2	4836.2 56.8	4836.2 127.9	4636.7 227.3	4336.5 355.2	4105.7 511.5	3766.2 909.3	45.7	52
	180	33AD 16187R	7557.0	6801.3 10.2	6801.3 40.8	6801.3 91.9	6364.5 163.3	5952.4 255.2	5635.5 367.5	5169.6 653.3	52.5	60
	210	33AD 16217R	7841.6	7057.4 7.5	7057.4 30.0	6748.2 67.5	6190.2 120.0	5789.4 187.5	5481.2 270.0	5028.0 480.0	51.4	60
	240	33AD 16247R	8044.5	7240.0 5.7	7240.0 23.0	6566.5 51.7	6023.6 91.9	5633.5 143.5	5333.7 206.7	4892.7 367.5	50.5	60
	270	33AD 16277R	8193.0	7373.7 4.5	7224.2 18.2	6396.8 40.8	5867.9 72.6	5487.9 113.4	5195.8 163.3	4766.2 290.4	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=0.102kgf·m

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

Number of Stops S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Internal Inertia Load Torque Top (N·m) T_{oi} (N·m)						Camshaft Frictional Torque 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 30.2	2861.6 120.9	2533.9 272.1	2324.4 483.7			69.3	60	
	270	33AD 03278R	5116.9	4448.5 30.3	3613.3 121.1	3199.4 272.6	2934.9 484.5	2744.9 757.1		64.7	60	
3	300	33AD 03308R	6896.9	5988.6 25.2	4864.2 100.9	4307.1 227.1	3951.0 403.7	3695.2 630.7	3498.5 908.2	72.7	70	
	240	33AD 04248R	7159.8	6526.1 29.3	5300.9 117.2	4693.7 263.8	4305.6 468.9	4026.8 732.7	3812.5 1055.1	71.4	70	
4	270	33AD 04278R	9791.9	8812.7 24.2	7246.2 96.8	6416.2 217.7	5885.7 387.0	5504.6 604.7	5211.6 870.8	4780.7 1548.0	86.5	80
	210	33AD 05218R	7515.8	6764.3 31.2	6318.0 124.7	5594.4 280.5	5131.8 498.7	4799.5 779.2	4544.0 1122.0	4168.3 1994.7	69.7	70
5	240	33AD 05248R	8019.8	7217.8 23.9	6270.1 95.5	5552.0 214.8	5092.9 381.8	4763.1 596.5	4509.6 859.0	4136.7 1527.2	67.4	70
	180	33AD 06188R	12438.2	11194.3 36.7	10277.5 146.6	9100.4 329.9	8347.9 586.4	7807.3 916.3	7391.8 1319.5		99.4	90
6	210	33AD 06218R	14442.9	12998.6 27.6	11346.6 110.6	10047.1 248.9	9216.3 442.4	8619.5 691.2	8160.8 995.4	7486.0 1769.6	102.6	100
	150	33AD 08158R	10326.6	9293.9 39.2	9393.9 156.7	8720.9 352.7	7999.8 627.0	7481.8 979.6	7083.6 1410.7	6497.9 2507.8	84.2	80
8	180	33AD 08188R	11175.2	10057.7 27.2	9700.3 108.9	8589.3 244.9	7879.1 435.4	7368.9 680.3	6976.7 979.6	6399.8 1741.5	80.7	80
	120	33AD 10128R	8019.8	7217.8 47.7	7217.8 190.9	7217.8 429.5	6957.1 763.6	6506.6 1193.1	6160.3 1718.0		67.4	70
10	150	33AD 10158R	11349.6	10214.6 32.2	10214.6 128.9	10214.6 290.0	9387.2 515.5	8779.4 805.4	8312.1 1159.8	7624.8 2061.9	80.0	80
	120	33AD 12128R	6699.6	6029.6 42.5	6029.6 170.0	6029.6 382.4	6021.5 679.9	5631.5 1062.3	5331.8 1529.7		55.9	60
12	150	33AD 12158R	9247.3	8322.6 28.2	8322.6 112.8	8322.6 253.9	7924.6 451.4	7411.4 705.3	7017.0 1015.6	6436.8 1805.5	62.0	70
	120	33AD 15128R	7279.8	6551.9 34.6	6551.9 138.3	6551.9 311.3	6551.9 553.3	6436.5 864.6	6093.9 1245.0		53.6	60
15	150	33AD 15158R	7741.2	6967.1 22.1	6967.1 88.5	6967.1 199.2	6637.3 354.1	6207.5 553.3	5877.1 796.8	5391.2 1416.5	51.8	60
	120	33AD 16128R	7425.7	6683.1 32.6	6683.1 130.4	6683.1 293.4	6683.1 521.7	6663.6 815.1	6308.9 1173.7		53.1	60
16	150	33AD 16158R	7852.6	7067.3 20.9	7067.3 83.5	7067.3 187.8	6852.5 333.9	6408.8 521.7	6067.6 731.2	5565.9 1335.4	51.4	60

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

S	θ (deg)	CODE	T_s (N·m)	Input Shaft Speed (Index/min)						T_x (N·m)	SCF (mm)	
				25	50	75	100	125	150			200
16	210	33AD 16217R2	10293.8	9264.4 7.0	9264.4 28.2	9264.4 63.4	8889.1 112.7	8313.5 176.0	7871.0 253.5	7220.2 450.7	84.3	80
	240	33AD 16247R2	13930.2	12537.1 5.7	12537.1 22.7	12537.1 51.0	11824.0 90.6	11058.4 141.6	10469.8 203.9	9604.1 362.4	93.8	90
	270	33AD 16277R2	15661.2	14095.1 4.6	14095.1 18.5	14095.1 41.7	12983.7 74.1	12143.0 115.7	11496.6 166.6	10546.0 296.2	98.1	100
20	180	33AD 20187R2	6496.0	5846.4 7.2	5846.4 29.0	5846.4 65.2	5702.6 115.9	5333.4 181.1	5049.5 260.7	4632.0 463.5	57.3	60
	210	33AD 20217R2	11321.8	10189.6 5.8	10189.6 23.2	10189.6 52.1	10189.6 92.6	9758.9 144.7	9239.5 208.4	8475.5 370.5	80.1	80
	240	33AD 20247R2	15152.5	13637.2 4.7	13637.2 18.8	13637.2 42.3	13637.2 75.3	12919.9 117.6	12232.2 169.4	11220.8 301.1	89.5	90
	270	33AD 20277R2	15698.4	14128.6 3.7	14128.6 14.9	14128.6 33.5	13573.0 59.5	12694.1 92.9	12018.4 133.8	11024.7 237.9	87.6	90
24	180	33AD 24187R2	8715.8	7844.2 6.9	7844.2 27.6	7844.2 62.1	7844.2 110.4	7844.2 172.5	7844.2 248.4	7284.0 441.6	63.8	70
	210	33AD 24217R2	9226.9	8304.2 5.1	8304.2 20.3	8304.2 45.6	8304.2 81.1	8239.4 126.7	7800.8 182.5	7155.8 324.5	62.0	70
	240	33AD 24247R2	12461.1	11215.4 3.7	11215.4 14.8	11215.4 33.2	11215.4 59.1	10669.8 92.3	10101.8 132.8	9266.5 236.1	75.6	80
	270	33AD 24277R2	12788.0	11509.2 3.0	11509.2 11.7	11509.2 26.3	11155.7 46.7	10433.3 72.9	9878.0 105.0	9061.2 186.6	74.2	80
32	180	33AD 32187R2	7557.0	6801.3 5.1	6801.3 20.4	6801.3 45.9	6801.3 81.7	6801.3 127.6	6801.3 183.7	6364.5 326.7	52.5	60
	210	33AD 32217R2	7841.6	7057.4 3.7	7057.4 15.0	7057.4 33.7	7057.4 60.0	7057.4 93.7	6748.2 135.0	6190.2 240.0	51.4	60
	240	33AD 32247R2	8044.5	7240.0 2.9	7240.0 11.5	7240.0 25.8	7240.0 45.9	6935.7 71.8	6566.5 103.4	6023.6 183.7	50.5	60
	270	33AD 32277R2	8193.0	7373.7 2.3	7373.7 9.1	7373.7 20.4	7224.2 36.3	6756.4 56.7	6396.8 81.7	5867.9 145.2	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≒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 S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Top (N·m)					Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)		
				Internal Inertia Load Torque		Input Shaft Speed (Index/min)						
				25	50	75	100	125			150	200
4	270	45AD 04277R	16076.9	14178.0 52.5	11516.1 210.2	10197.1 472.9	9354.0 840.7	8748.3 1313.5	8282.6 1891.5	155.9	100	
				14263.0 53.3	12326.8 213.4	10915.0 480.1	10012.5 853.4	9364.1 1333.5	8865.7 1920.3			
5	240	45AD 05247R	15847.8	15090.6 42.1	12257.3 168.6	10853.5 379.3	9956.1 674.3	9311.4 1053.6	8815.8 1517.2	140.8	90	
				15090.6 42.1	12257.3 168.6	10853.5 379.3	9956.1 674.3	9311.4 1053.6	8815.8 1517.2			
6	180	45AD 06187R	26959.2	24263.3 81.9	22453.4 327.7	19881.8 737.2	18237.9 1310.6	17056.9 2047.9	16149.0 2949.0	197.7	120	
				24263.3 81.9	22453.4 327.7	19881.8 737.2	18237.9 1310.6	17056.9 2047.9	16149.0 2949.0			
	210	45AD 06217R	29388.5	26449.6 60.2	22383.8 240.7	19820.1 541.6	18181.3 962.9	17004.0 1504.6	16098.9 2166.6	14767.8 3851.7	188.1	120
				26449.6 60.2	22383.8 240.7	19820.1 541.6	18181.3 962.9	17004.0 1504.6	16098.9 2166.6	14767.8 3851.7		
240	45AD 06247R	31368.1	27352.8 46.1	22217.3 184.3	19672.7 414.7	18046.1 737.2	16877.6 1151.9	15979.2 1638.8	14658 2949.0	180.9	120	
			27352.8 46.1	22217.3 184.3	19672.7 414.7	18046.1 737.2	16877.6 1151.9	15979.2 1638.8	14658 2949.0			
270	45AD 06277R	32982.2	27073.9 36.4	21990.8 145.6	19472.2 327.7	17862.1 582.5	16705.5 910.2	15816.3 1310.6	14508.5 2330.0	175.3	120	
			27073.9 36.4	21990.8 145.6	19472.2 327.7	17862.1 582.5	16705.5 910.2	15816.3 1310.6	14508.5 2330.0			
8	180	45AD 08187R	31368.1	28231.3 64.1	28231.3 256.2	25117.9 576.5	23041.0 1024.9	21549.1 1601.4	20402.1 2306.0	18715.1 4099.6	180.9	120
				28231.3 64.1	28231.3 256.2	25117.9 576.5	23041.0 1024.9	21549.1 1601.4	20402.1 2306.0	18715.1 4099.6		
	210	45AD 08217R	33451.7	30106.5 47.1	27969.9 188.3	24766.5 423.6	22718.6 753.0	21247.6 1176.5	20116.6 1694.2	18453.3 3011.9	173.7	120
				30106.5 47.1	27969.9 188.3	24766.5 423.6	22718.6 753.0	21247.6 1176.5	20116.6 1694.2	18453.3 3011.9		
240	45AD 08247R	35049.3	31544.4 36.0	27505.8 144.1	24355.5 324.3	22341.7 576.5	20895.0 900.8	19782.8 1297.1	18147.1 2306.0	168.3	120	
			31544.4 36.0	27505.8 144.1	24355.5 324.3	22341.7 576.5	20895.0 900.8	19782.8 1297.1	18147.1 2306.0			
270	45AD 08277R	36287.0	32658.3 28.5	27015.6 113.9	23921.4 256.2	21943.5 455.5	20522.6 711.7	19430.2 1024.9	17823.6 1822.0	164.1	120	
			32658.3 28.5	27015.6 113.9	23921.4 256.2	21943.5 455.5	20522.6 711.7	19430.2 1024.9	17823.6 1822.0			
10	180	45AD 10187R	33540.1	30186.1 51.4	30186.1 205.6	27704.0 462.5	25413.3 822.3	23767.8 1284.8	22502.7 1850.1	20642.0 3289.1	168.7	110
				30186.1 51.4	30186.1 205.6	27704.0 462.5	25413.3 822.3	23767.8 1284.8	22502.7 1850.1	20642.0 3289.1		
	210	45AD 10217R	36005.8	32405.2 39.4	32243.1 157.4	28550.3 354.2	26189.6 629.8	24493.8 984.0	23190.0 1417.0	21272.5 2519.0	165.0	120
				32405.2 39.4	32243.1 157.4	28550.3 354.2	26189.6 629.8	24493.8 984.0	23190.0 1417.0	21272.5 2519.0		
240	45AD 10247R	37257.3	33531.6 30.1	31510.8 120.5	27901.8 271.2	25594.7 482.2	23937.4 753.4	22663.3 1084.9	20789.4 1928.6	160.7	120	
			33531.6 30.1	31510.8 120.5	27901.8 271.2	25594.7 482.2	23937.4 753.4	22663.3 1084.9	20789.4 1928.6			
270	45AD 10277R	38194.8	34375.3 23.8	30797.1 95.2	27269.9 214.3	25015.0 381.0	23395.3 595.3	22150.0 857.2	20318.5 1523.9	157.3	120	
			34375.3 23.8	30797.1 95.2	27269.9 214.3	25015.0 381.0	23395.3 595.3	22150.0 857.2	20318.5 1523.9			
12	120	45AD 12127R	13278.8	11950.9 96.0	11950.9 384.0	11950.9 864.0	11950.9 1536.1	11181.5 2400.1	10586.4 3456.2	117.3	80	
				11950.9 96.0	11950.9 384.0	11950.9 864.0	11950.9 1536.1	11181.5 2400.1	10586.4 3456.2			
	150	45AD 12157R	18835.4	16951.8 63.6	16951.8 254.4	16929.0 572.4	15529.2 1017.6	14523.6 1590.0	13750.6 2289.7	12613.6 4070.5	126.5	90
				16951.8 63.6	16951.8 254.4	16929.0 572.4	15529.2 1017.6	14523.6 1590.0	13750.6 2289.7	12613.6 4070.5		
	180	45AD 12187R	21459.4	19313.5 45.4	19313.5 181.5	18358.8 408.5	16840.8 726.2	15750.3 1134.6	14912.0 1633.9	13679.0 2904.6	130.2	100
				19313.5 45.4	19313.5 181.5	18358.8 408.5	16840.8 726.2	15750.3 1134.6	14912.0 1633.9	13679.0 2904.6		
210	45AD 12217R	22366.3	20129.7 33.3	20129.7 133.4	17895.7 300.1	16416.0 533.5	15353.0 833.6	14535.8 1200.4	13333.9 2134.0	126.5	100	
			20129.7 33.3	20129.7 133.4	17895.7 300.1	16416.0 533.5	15353.0 833.6	14535.8 1200.4	13333.9 2134.0			
240	45AD 12247R	23020.4	20718.4 25.5	19698.7 102.1	17442.6 229.8	16000.3 408.5	14964.3 638.2	14167.8 919.1	12996.3 1633.9	123.7	100	
			20718.4 25.5	19698.7 102.1	17442.6 229.8	16000.3 408.5	14964.3 638.2	14167.8 919.1	12996.3 1633.9			
270	45AD 12277R	23503.5	21153.2 20.2	19213.3 80.7	17012.7 181.5	15606.0 322.7	14595.5 504.3	13818.6 726.2	12676.0 1291.0	121.6	100	
			21153.2 20.2	19213.3 80.7	17012.7 181.5	15606.0 322.7	14595.5 504.3	13818.6 726.2	12676.0 1291.0			
15	150	45AD 15157R	15855.4	14269.9 50.2	14269.9 200.9	14269.9 452.1	13345.1 803.7	12481.0 1255.8	11816.6 1808.3	10839.6 3214.8	106.3	80
				14269.9 50.2	14269.9 200.9	14269.9 452.1	13345.1 803.7	12481.0 1255.8	11816.6 1808.3	10839.6 3214.8		
	180	45AD 15187R	16623.4	14961.0 34.9	14961.0 139.5	14103.2 314.0	12937.1 558.1	12099.4 872.1	11455.4 1255.8	10508.2 2232.5	103.1	80
				14961.0 34.9	14961.0 139.5	14103.2 314.0	12937.1 558.1	12099.4 872.1	11455.4 1255.8	10508.2 2232.5		
	210	45AD 15217R	17144.0	15429.6 25.6	15429.6 102.5	13675.1 230.7	12544.4 410.1	11732.1 640.7	11107.6 922.6	10189.2 1640.2	100.7	80
15429.6 25.6				15429.6 102.5	13675.1 230.7	12544.4 410.1	11732.1 640.7	11107.6 922.6	10189.2 1640.2			
240	45AD 15247R	22287.4	20058.6 20.5	19703.3 81.9	17446.6 184.2	16004.1 327.4	14967.8 511.6	14171.1 736.7	12999.3 1309.6	112.3	90	
			20058.6 20.5	19703.3 81.9	17446.6 184.2	16004.1 327.4	14967.8 511.6	14171.1 736.7	12999.3 1309.6			
270	45AD 15277R	22606.0	20345.4 16.2	19154.7 64.7	16960.9 145.5	15558.5 258.7	14551.0 404.2	13776.5 582.1	12637.4 1034.8	110.7	90	
			20345.4 16.2	19154.7 64.7	16960.9 145.5	15558.5 258.7	14551.0 404.2	13776.5 582.1	12637.4 1034.8			
16	150	45AD 16157R	16146.9	14532.2 5.0	14532.2 189.7	14532.2 426.7	13792.7 758.7	12899.6 1185.4	12213.0 1707.0	11203.2 3034.6	105.1	80
				14532.2 5.0	14532.2 189.7	14532.2 426.7	13792.7 758.7	12899.6 1185.4	12213.0 1707.0	11203.2 3034.6		
	180	45AD 16187R	16855.0	15169.5 32.9	15169.5 131.7	14544.5 296.4	13341.8 526.8	12477.9 823.2	11813.8 1185.4	10836.9 2107.4	102.0	80
				15169.5 32.9	15169.5 131.7	14544.5 296.4	13341.8 526.8	12477.9 823.2	11813.8 1185.4	10836.9 2107.4		
	210	45AD 16217R	17329.8	15596.9 24.2	15596.9 96.8	14081.4 217.7	12917.1 387.1	12080.7 604.8	11437.7 870.9	10491.9 1548.3	99.9	80
15596.9 24.2				15596.9 96.8	14081.4 217.7	12917.1 387.1	12080.7 604.8	11437.7 870.9	10491.9 1548.3			
240	45AD 16247R	17660.4	15894.4 18.5	15423.4 74.1	13656.9 166.7	12527.7 296.4	11716.5 463.0	11092.8 666.8	10175.6 1185.4	98.2	80	
			15894.4 18.5	15423.4 74.1	13656.9 166.7	12527.7 296.4	11716.5 463.0	11092.8 666.8	10175.6 1185.4			
270	45AD 16277R	17898.3	16108.5 14.6	14987.8 58.5	13271.2 131.7	12173.9 234.2	11385.6 365.9	10779.6 526.8	9888.3 936.6	97.0	80	
			16108.5 14.6	14987.8 58.5	13271.2 131.7	12173.9 234.2	11385.6 365.9	10779.6 526.8	9888.3 936.6			

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

Number of Stops S	Index Period θ (deg)	CODE	Static-rated Output Torque T_s (N·m)	Dynamic-rated Output Torque Internal Inertia Load Torque						Camshaft Frictional Torque T_x (N·m)	Sankyo Cam Follower SCF (mm)		
				Top (N·m) T_{oi} (N·m)									
				Input Shaft Speed (Index/min)									
25	50	75	100	125	150	200							
2	330	45AD 02338R	13617.3	10369.8 98.1	8422.9 392.3	7458.2 882.6	6841.5 1569.1			153.2	90		
3	270	45AD 03278R	15421.5	12959.2 98.7	10526.1 394.8	9320.5 888.2	8549.9 1579.0	7996.2 2467.2		143.0	90		
	300	45AD 03308R	17523.5	14285.2 81.6	11603.2 326.2	10274.2 734.0	9424.7 1305.0	8814.4 2039.0		148.2	100		
4	240	45AD 04248R	29763.5	26787.2 99.1	21919.3 396.3	19408.8 891.8	17804.0 1585.4	16651.2 2477.1	15764.9 3567.1		181.8	110	
	270	45AD 04278R	32144.5	28212.8 80.8	22915.9 323.3	20291.3 727.5	18613.5 1293.2	17408.3 2020.7	16481.7 2909.8		178.1	120	
5	210	45AD 05218R	18804.1	16923.7 101.1	14910.2 404.4	13202.5 910.0	12110.9 1617.7	11326.7 2527.7		142.0	100		
	240	45AD 05248R	19802.8	17822.5 77.4	14700.2 309.6	13016.5 696.7	11940.3 1238.6	11167.1 1935.2	10572.7 2786.7		137.3	100	
6	180	45AD 06188R	32144.5	28930.0 116.3	24517.9 465.1	21709.8 1046.6	19914.7 1860.5	18625.2 2907.1	17633.8 4186.2		178.1	120	
	210	45AD 06218R	34139.3	29701.7 85.4	24125.3 341.7	21362.2 708.9	19595.8 1366.9	18327.0 2135.8	17351.5 3075.6		171.3	120	
8	150	45AD 08158R	33535.7	30182.1 130.9	30182.1 523.8	27431.3 1178.5	25163.2 2095.1	23533.8 3273.5	22281.2 4713.9	20438.8 8380.2		173.4	120
	180	45AD 08188R	35651.8	32086.7 90.9	30241.8 363.7	26778.1 818.4	24564.0 1454.9	22973.4 2273.3	21750.6 3273.5	19952.1 5819.6		166.2	120
10	120	45AD 10128R	19802.8	17822.5 154.8	17822.5 619.3	17781.1 1393.4	16310.9 2477.1	15254.7 3870.5		137.3	100		
	150	45AD 10158R	35283.1	31754.8 105.1	31754.8 420.2	30012.3 945.5	27530.7 1680.9	25748.1 2626.4	24377.6 3782.0		162.8	110	
12	120	45AD 12128R	21044.9	18940.4 145.0	18940.4 579.8	18940.4 1304.6	18834.5 2319.4	17614.9 3624.0		131.8	100		
	150	45AD 12158R	22401.6	20161.4 92.8	20161.4 371.1	19812.0 835.0	18173.9 1484.4	16997.1 2319.4	16092.4 3339.9		126.3	100	
15	120	45AD 15128R	16379.8	14741.9 111.4	14741.9 445.7	14741.9 1002.7	14503.0 1782.7	13564.0 2785.4		104.1	80		
	150	45AD 15158R	21869.9	19682.9 74.4	19682.9 297.5	19682.9 669.3	18254.1 1189.8	17072.1 1859.1	16163.4 2677.1		114.2	90	
16	120	45AD 16128R	16631.4	14968.3 105.2	14968.3 420.7	14968.3 946.5	14967.3 1682.7	13998.1 2629.3		103.2	80		
	150	45AD 16158R	17347.9	15613.1 67.3	15613.1 269.2	15585.1 605.8	14296.5 1077.0	13370.8 1682.7	12659.1 2423.1		99.8	80	

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

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

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° to 270° 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 (Tt) [Formulas (B, C, D, and E)]

Calculate the inertia torque (Ti), friction torque (Tf), and working load torque (Tw). Then, calculate the required torque (Tt).

(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 Top (see Torque Capacity Table) is greater than the required torque Tt.

(7) Calculate the cam shaft torque (Tc) [Formula (F)]

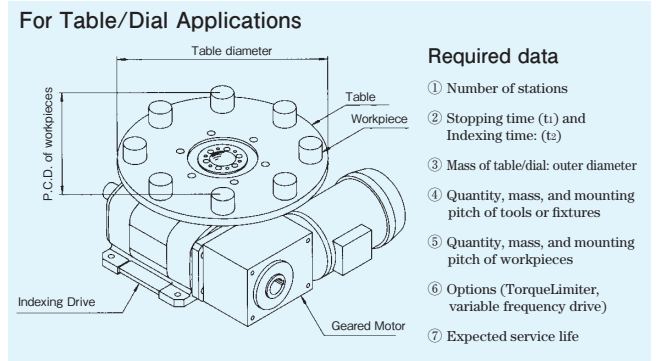
(8) Select the motor size [Formula (G)]

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

Symbols Used for Sizing

a_4 : Backlash factor	Lh : Expected service life (hr)	S : Number of stops	Ts : Static rated output torque (N·m)
Am : Non-dimensional maximum acceleration	m : Number of dwells	t1 : Stopping time (sec)	Tt : Required torque of output shaft (N·m)
Ba : Equivalent backlash of the output shaft	M : Mass (kg)	t2 : Indexing time (sec)	Tw : Working load torque (N·m)
E : Regenerative braking efficiency of the VFD	N : Input speed (rpm)	td : Start and braking time (sec)	Tx : Cam shaft friction torque (N·m)
F : Working load (N)	Nd : Maximum output speed (rpm)	td : Dwell time (sec)	Vm : Non-dimensional maximum velocity
i : Gear ratio ($i>1$)	Nm : Motor speed (rpm)	Tc : Cam shaft torque (N·m)	W : Load weight (N)
J : Total moment of inertia of output load ($\text{kg}\cdot\text{m}^2$)	Nr : Geared motor output speed (rpm)	Td : Starting and stopping torque (N·m)	β : Working angle (deg)
Jc : Moment of inertia of input shaft ($\text{kg}\cdot\text{m}^2$)	P : Feed pitch (m)	Tf : Friction torque (N·m)	γ : Speed ratio $\gamma>1$
Jm : Moment of inertia of motor ($\text{kg}\cdot\text{m}^2$)	Pnv : VFD capacity (kW)	Ti : Inertia torque (N·m)	θ : Indexing angle (deg)
Jmc : Equivalent moment of inertia on motor shaft ($\text{kg}\cdot\text{m}^2$)	Ps : Motor power (kW)	Toi : Internal inertia load torque (N·m)	θ_d : Braking angle of input shaft (deg)
K : Radius of gyration (m)	Qm : Non-dimensional maximum cam shaft torque factor	Top : Dynamic rated output torque (N·m)	μ : Friction coefficient
Lf : Life factor	R : Rotational pitch circle diameter (m)	TR : Allowable output torque of the geared motor (N·m)	ε : Inertia load ratio

Figure 37-1



(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 (ε)

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

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 (Lh) [Formula (H)]

Calculate the life factor Lf, and then determine Lh.

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 (TR) of the geared motor is greater than the cam shaft torque (Tc).

Formulas

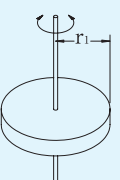
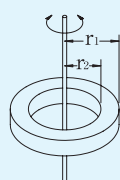
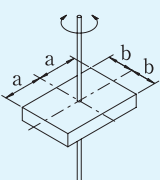
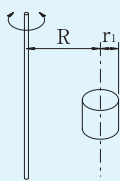
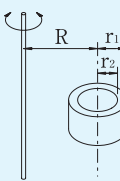
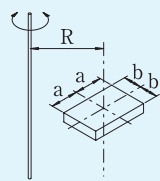
Table 38-1

	Rotating Motions	Linear Motions
(A) Moment of inertia J	$J=MK^2$ (kg·m ²)	$J= M\left(\frac{S \cdot P}{2\pi}\right)^2$ (kg·m ²)
(B) Inertia torque Ti Ti	$T_i=226.2A_m \frac{J \cdot N^2}{S \cdot (\theta/m)^2}$ (N·m)	$T_i=5.73A_m \frac{M \cdot S \cdot P^2 \cdot N^2}{(\theta/m)^2}$ (N·m)
(C) Friction torque Tf	$T_f=W \cdot \mu \cdot R$ (N·m)	$T_f= \frac{W \cdot \mu \cdot S \cdot P}{2\pi}$ (N·m)
(D) Working load torque Tw	$T_w=R \cdot F \cdot \cos \beta$ (N·m)	$T_w= \frac{F \cdot S \cdot P}{2\pi} \cos \beta$ (N·m)
(E) Required torque Tt	$T_t=T_i+T_f+T_w$ (N·m)	
(F) Cam shaft torque Tc	$T_c=500Q_m \frac{1}{S \cdot \theta} (T_t+T_{oi})+T_x$ (N·m)	
(G) Motor power Ps	$P_s= \frac{T_c \cdot N}{9550}$ (kW)	
(H) Expected service life Lh	$L_h= 8000L_f^{10/3}$ (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.			
	Equivalent moment of inertia	$J_e = J / \gamma^2$	Equivalent friction torque	$T_{fe} = T_f / \gamma$
	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 Vm	Max acceleration Am	Max cam shaft torque factor Qm
SMS-3	7	1.818	±4.848	±1.178
SMCV-3	8	1.290	±6.882	±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 a4

Table 38-5

Ba \ ε	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

ε : 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 rpm, 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 (θ_d)

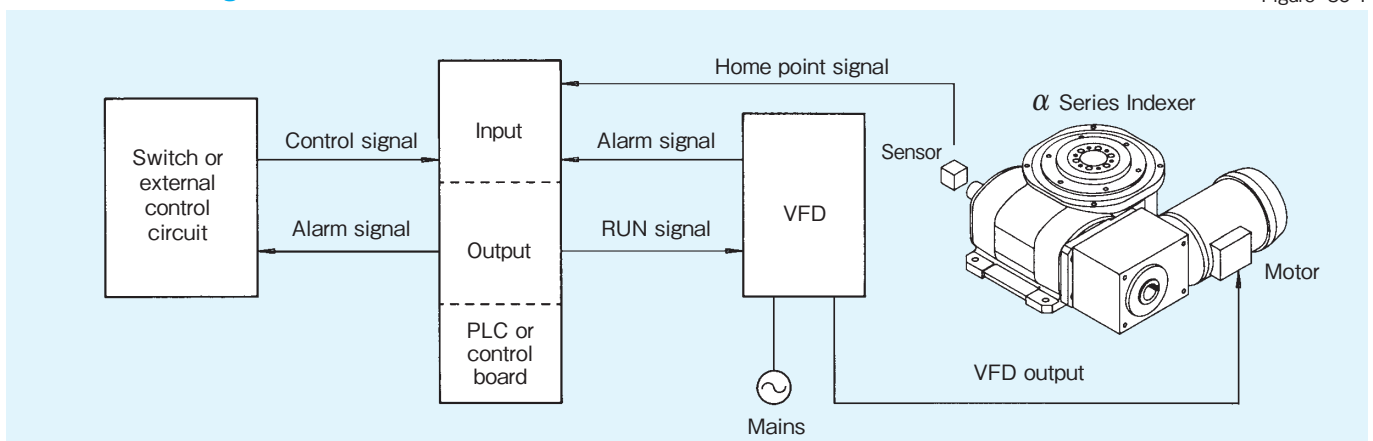
Calculate the braking angle of the cam shaft required to detect a signal from a sensor and timing cam or plate.

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

This θ_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

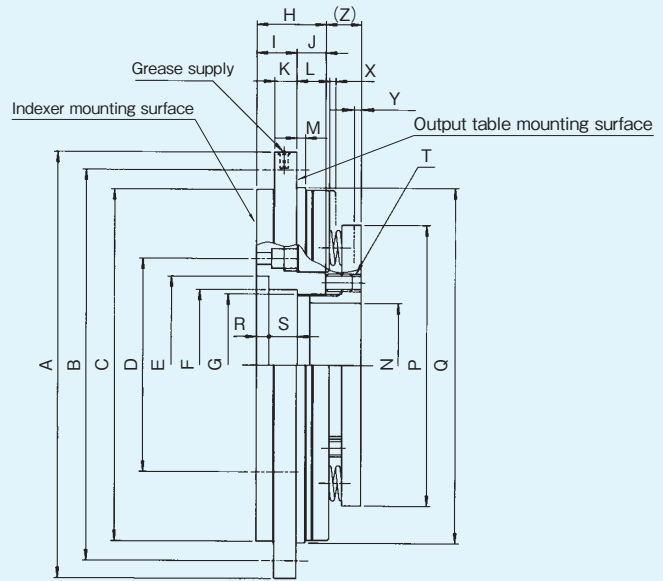
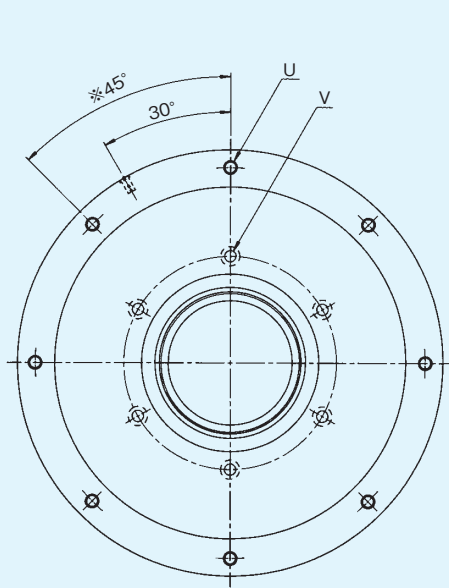


Figure TAD-1

Table of dimensions

Table TAD-1

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

(Unit : mm)

Specifications

Table TAD-2

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 ²)	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 activate a sensing device and thereby allows the user to control operation of the mechanism involved.

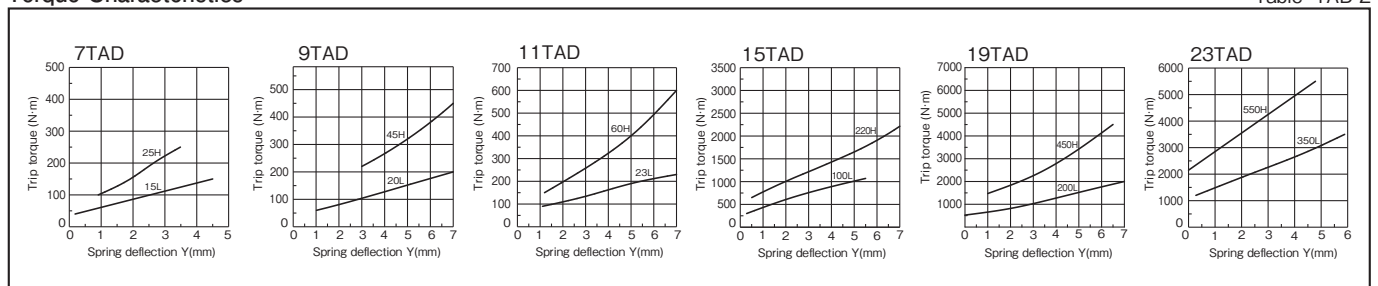
(Z) : Since this dimension is the reference value for the amount the torque adjustment nut protrudes when the spring height is at its maximum (free), please pay attention to any possible interference with peripheral equipment or material when installing the part. In addition, the (Z) dimension may fluctuate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

Table 41-1

Viscosity cSt/40°C	Oil brands			
	Idemitsu	ENEOS	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=1mm²/s)

Our contact person: _____

Model Sizing Form for the SANDEX- α series

Customer's Company, Department		TEL
Address		FAX
Name	Email	

Application		
Number of stops	Working time : t_1 [sec]	Index time : t_2 [sec]

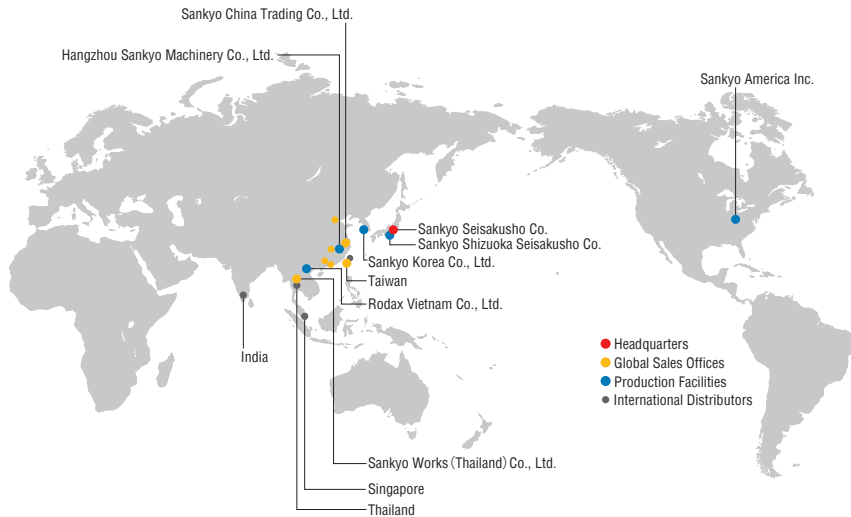
Index Dial Application	Table diameter : D_1 [mm]
	Table weight : M_1 [kg]
	Jig P.C.D. : D_2 [mm]
	Weight per tool : M_2 [kg]
	Number of tool : n_2
	Work P.C.D. : D_3 [mm]
	Weight per work : M_3 [kg]
	Number of work : n_3

Conveyor Application	Feed pitch : P [mm]
	Weight of chain with attachment : M_1 [kg]
	Weight of tool : M_2 [kg]
	Weight of work : M_3 [kg]
	Sprocket diameter : D [mm]
	Weight per sprocket : M_4 [kg]
	Number of sprocket : n_4
	Coefficient of friction : μ

Geared Motor <input type="checkbox"/> Yes <input type="checkbox"/> No	Torque Limiter <input type="checkbox"/> Yes <input type="checkbox"/> No	Timing Cam - Photo Switch <input type="checkbox"/> Yes (1. 2. 3) <input type="checkbox"/> No
--	--	---

MEMO

Global network



Group Companies

Sankyo America Inc.
10655 State Route 47 Sidney, Ohio, 45365 U.S.A.
Phone: +1-(0)937-498-4901 Fax: +1-(0)937-498-9403
Email: sales@sankyoautomation.com

Sankyo Korea Co., Ltd.
1449-48 Seobu-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, 16643 Korea
Phone: +82-(0)31-895-5991 Fax: +82-(0)31-895-6607
Email: kr-sales@rollerdrive.com

Sankyo China Trading Co., Ltd.
[Shanghai Sales Office]
Room 1103, Block B, No.391 Guiping Road,
Shanghai 200233 China
Phone: +86-(0)21-5445-2813 Fax: +86-(0)21-5445-2340
Email: sales@sankyo-china-trading.com

[Shenzhen Sales Office]
Unit 19j, Tower B, Neo Building, No.6009 Shennan Avenue,
Futian District, Shenzhen China
Phone: +86-(0)755-8230-0270 Fax: +86-(0)755-8236-4605

[Tianjin Sales Office]
Room 1905, Pengzhanfeiwo Building A, Crossing Yale Road Yaolin Road,
Xiqing District, Tianjin 300380 China
Phone: +86-(0)22-2312-1005 Fax: +86-(0)22-2312-1007

[Guangzhou Sales Office]
Room 913, Xing Pu Building, No.12 Guan Hong Road,
Guangzhou Economic Development Zone, Huang Pu,
Guang Zhou 510670 China
Phone: +86-(0)20-8985-1846 Fax: +86-(0)20-8225-7346

[Wuhan Sales Office]
Room 2301, Taihe Square, No.134 Wusheng Road, Wuhan,
Hubei Province China
Phone: +86-(0)27-8568-5818 Fax: +86-(0)27-8568-2818

Hangzhou Sankyo Machinery Co., Ltd.
No.2518 Jiang Dong 2 Road, Hangzhou Jiang Dong Industrial Park,
Xiaoshan Zone, Hangzhou, Zhejiang, China
Phone: +86-(0)571-8283-3311 Fax: +86-(0)571-8283-1133

Rodax Vietnam Co., Ltd.
Plot No. M1, Thang Long Industrial Park li
Di Su, My Hao, Hung Yen, Viet Nam
Phone: +84-(0)221-3-589701 Fax: +84-(0)221-3-589708

Sankyo Works (Thailand) Co., Ltd.
9/31 Moo 5, Phaholyotin Road, Klongnueng,
Klong Luang, Patumthani 12120 Thailand
Phone: +66-(0)2-516-5355 Fax: +66-(0)2-068-0931
Email: sales@sankyo-works.co.th

Contact us

Mon-Fri AM8:30-12:00 PM13:00-17:30 UTC + 09:00 (JST) (Except public holidays and company holidays)

■ **Headquarters**
(International Sales Division) 3-37-3 Tabatashinmachi, Kita-ku, Tokyo, Japan 114-8538
Phone: +81-(0)3-3800-3305
Fax: +81-(0)3-3800-3378
Email: overseas@sankyo-seisakusho.co.jp
URL: <https://www.sankyo-seisakusho.co.jp>

■ **Taiwan Sales Office** No.21, Ln.152, Jianxing Rd., Sanhe Vil., Daya Dist., Taichung City 42876, Taiwan (R.O.C.)
Phone: +886-(0)4-2359-4048
Fax: +886-(0)4-2359-4720
Email: tw-sales@rollerdrive.com



<https://www.sankyo-seisakusho.co.jp>

For further information, questions, or inquires,
please contact us by e-mail or visit our website.
*Specifications and dimensions are subject to change without notice.
Consult Sankyo sales before ordering.