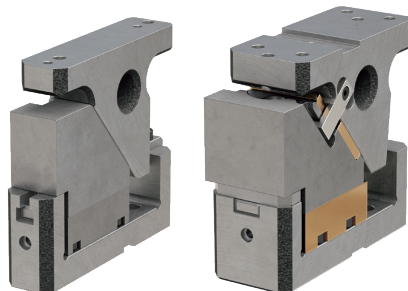


## Product Information

- **CMSD** :Cast iron and solid lubricant sliding,  
Coil spring type
- **CMSDG**:Bronze and solid lubricant sliding,  
Gas spring type  
Higher working force
- Ensured rigidity and durability by CAE  
analysis and endurance test
- Interchangeable between CMSD and CMSDG



Catalog No.	Mount face		Working Angle	Travel	Working Force [kN (tonf)]	
	W	H			Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes
CMSD	52	75	00	55	19.6 (2.0)	39.2 (4.0)
			05			
			10			
			15			
	90	82	20	55	38.2 (3.9)	76.4 (7.8)
			00			
			05			
			10			
CMSDG	52	75	15	55	39.2 (4.0)	58.8 (6.0)
			00			
			05			
			10			
	90	82	15	55	58.8 (6.0)	88.2 (9.0)
			20			
			00			
			05			

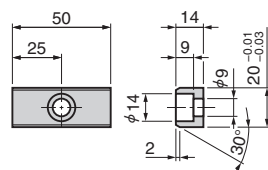
 Refer to page 929 for CMSDG working force distribution diagram.

### ■ Option of CMSD·CMSDG

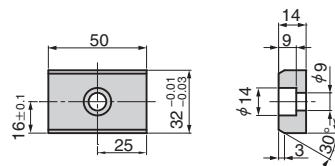
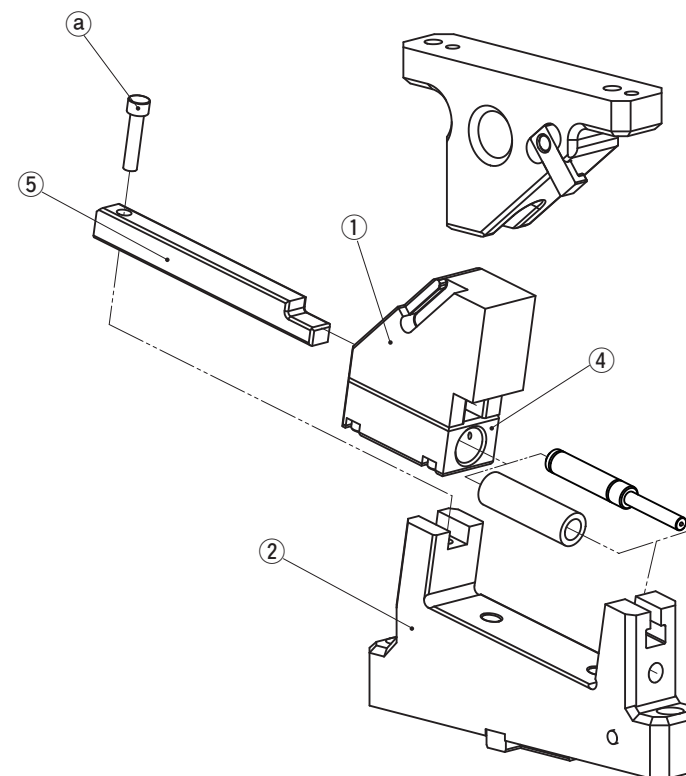
- **Key Specification (–K)**

**CMSD52**  
LKU20-50 (2 pcs, with M8)

**CMSDG52**  
LKU20-50 (3 pcs, with M8)



**CMSD90·CMSDG90**  
LKU32-50 (2 pcs, with M8)

**■CMSD·CMSDG Assembly Instructions**

- Disassembly

- 1) Remove Hexagon Socket Head Bolt (Ⓐ), pull out Guide Bar (Ⓔ) from Cam Holder (Ⓐ) to the rear for 30 mm, and then remove Guide Bar and Cam Slider (Ⓐ④).
- 2) Pull up Guide Bar to remove from Cam Slider.

- Assembly

Assembly is the reverse procedure of disassembly.

- Ensure that all parts are clean, particularly the sliding components, to which a small amount of lubricant is applied and is then placed on position.
- Take care the respective tolerances are observed when assembling Guide Bar, Cam Slider and Cam Holder, which also should be identified by the same serial number.
- Ensure that all bolts are tightened to the recommended torque.



### Gas Spring

Please contact your local sales representative if you prefer to use a gas spring not specified in our catalog. For use and maintenance of gas spring, please contact the manufacturer directly.

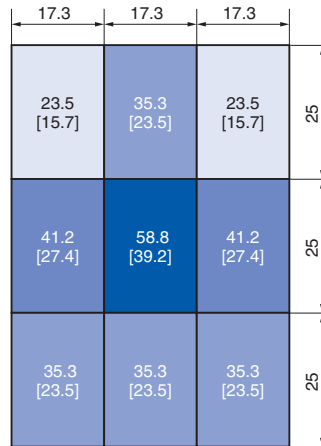
## Product Information

### ■CMSDG Working Force Distribution Diagram

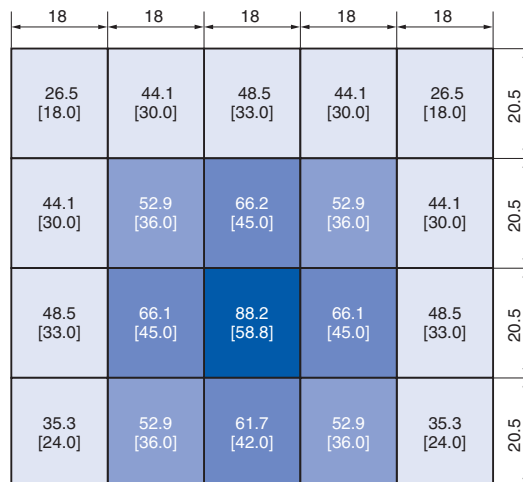
The working forces indicated in the mount face distribution diagram are reached by putting the tooling center of gravity within each area for the following pictures.

: Working force (kN) allowed for up to 300,000 strokes  
[ ]: Working force (kN) allowed for up to 1,000,000 strokes

#### CMSDG52

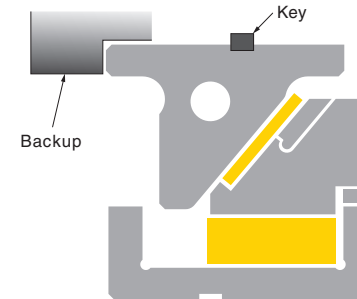


#### CMSDG90



### ■CMSDG Backup Settings with Increased Working Force

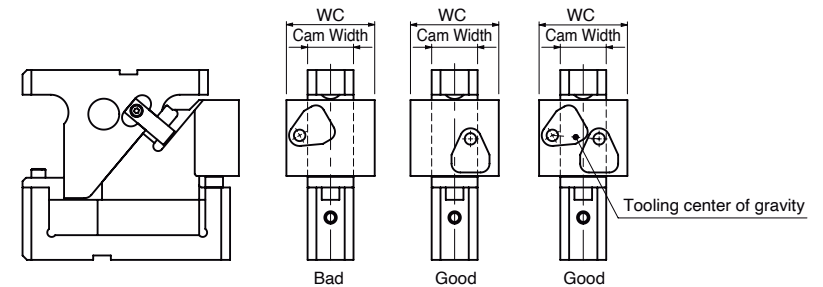
Set a backup or a key for the cam driver when using CMSDG at more than following working force.



W	Working Force [kN (tonf)]
	Standard Working Force 1,000,000 strokes
52	39.2 (4.0)
90	58.8 (6.0)

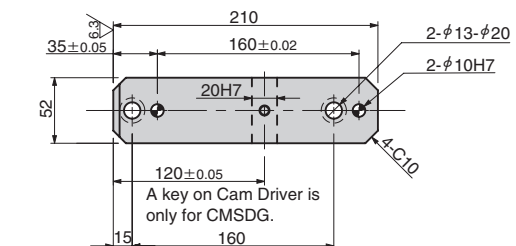
### ■CMSD-CMSDG Installation Range of Piercing Punch

Make sure to mount a tool not to stick out of the cam unit and to keep tooling center of gravity within cam slider width.

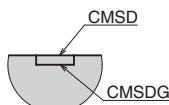
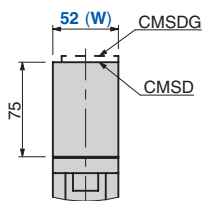
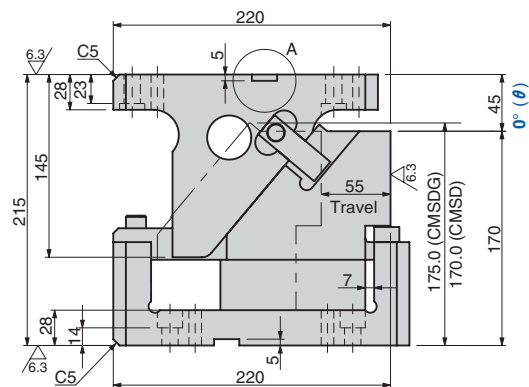
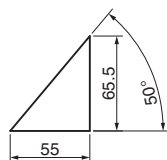


## Die Mounted Cam Unit

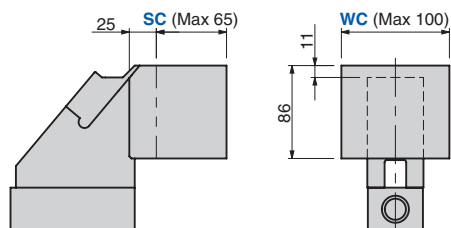
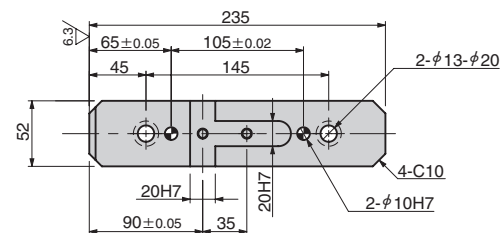
**CMSD52-00-55**  
**CMSDG52-00-55**



● Cam Diagram



A: No key groove on CMSD Cam Driver.



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
19.6 (2.0)	39.2 (4.0)	85.3 (8.7)	606.7 (62.1)	14.2	<b>CMSD</b>	52	00	55	No Code (Coil Spring)
39.2 (4.0)	58.8 (6.0)	—	2465.0 (251.5)	13.7	<b>CMSDG</b>	52	00	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	52	—	00	—	55				
<b>CMSDG</b>	52	—	00	—	55	—	SC5	—	WC100
<b>CMSDG</b>	52	—	00	—	55	—	GK	—	NF-SC10-WC100-K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>SC</b>	Mount face length is extended from 0 to 65 mm in increments of 1 mm.
<b>WC</b>	The width of the mount face is extended from 53 to 100 mm in increments of 1 mm.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

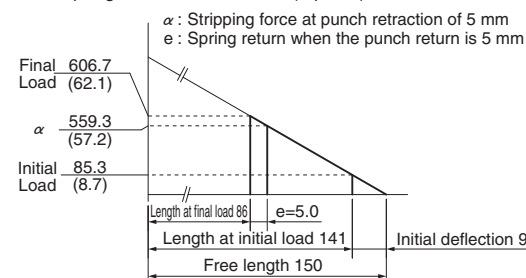
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	1	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

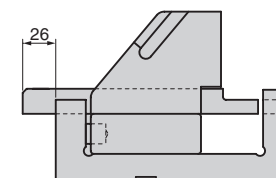
Gas filling pressure is 10 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

• Spring Model SWS26-150 (1 piece)



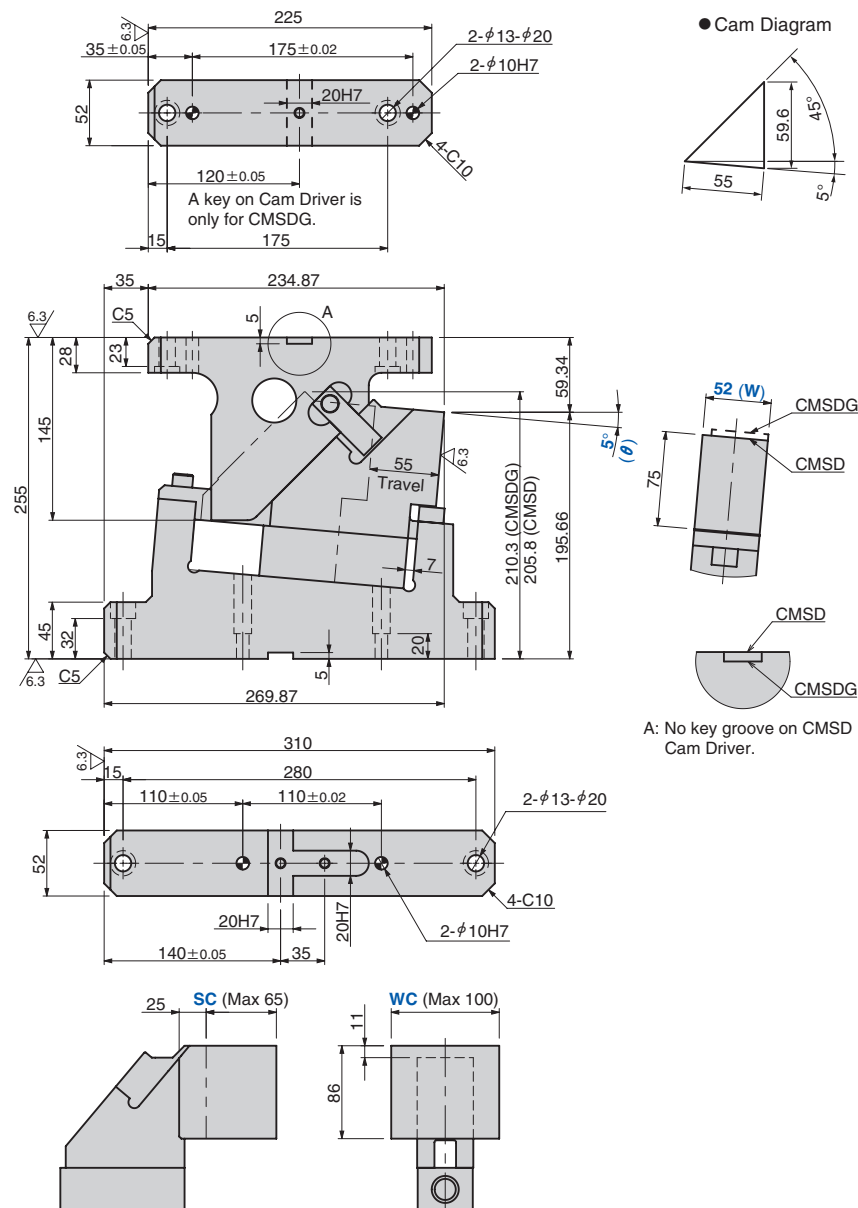
### Rear Removal Space



Refer to page 941, 942 for Table of Components.

## Die Mounted Cam Unit

**CMSD52-05-55**  
**CMSDG52-05-55**



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
19.6 (2.0)	39.2 (4.0)	85.3 (8.7)	606.7 (62.1)	18.5	<b>CMSD</b>	52	05	55	No Code (Coil Spring)
39.2 (4.0)	58.8 (6.0)	—	2465.0 (251.5)	19.2	<b>CMSDG</b>	52	05	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	52	—	05	—	55				
<b>CMSDG</b>	52	—	05	—	55	—	GK	—	SC5—WC100
									NF—SC10—WC100—K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>SC</b>	Mount face length is extended from 0 to 65 mm in increments of 1 mm.
<b>WC</b>	The width of the mount face is extended from 53 to 100 mm in increments of 1 mm.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

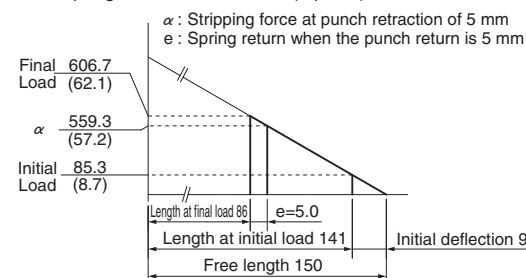
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	1	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

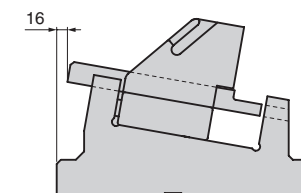
Gas filling pressure is 10 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

• Spring Model SWS26-150 (1 piece)



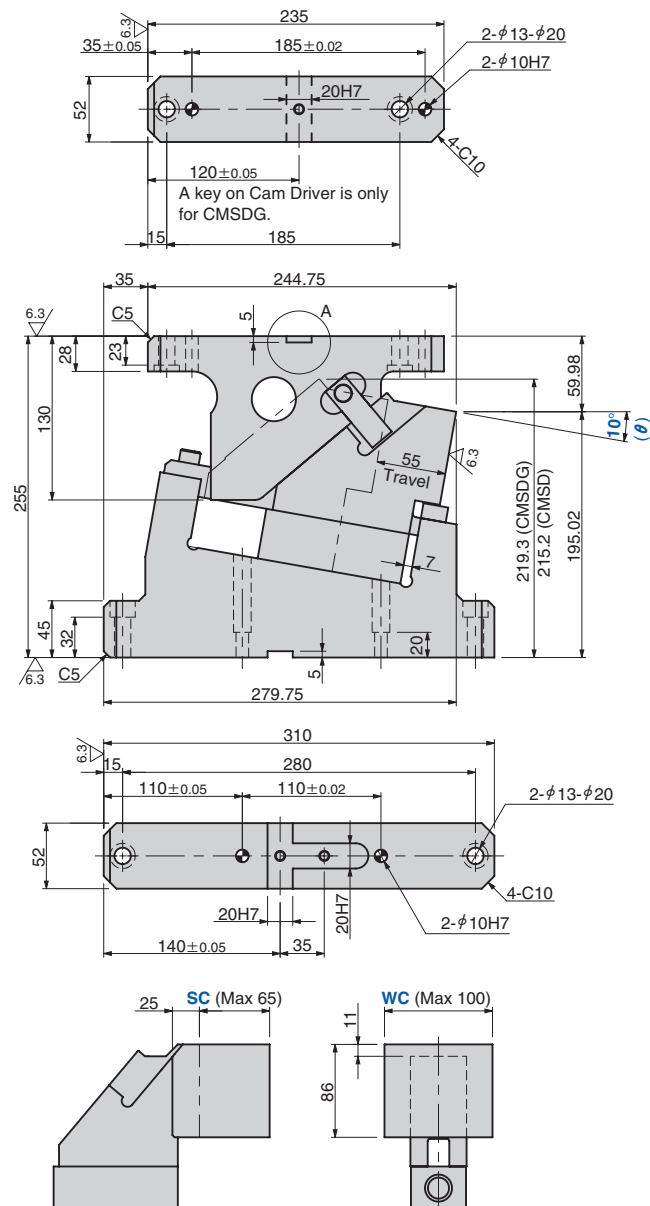
### Rear Removal Space



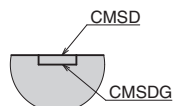
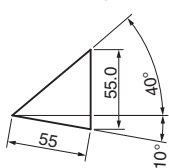
Refer to page 941, 942 for Table of Components.

## Die Mounted Cam Unit

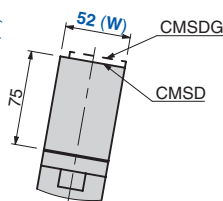
**CMSD52-10-55**  
**CMSDG52-10-55**



● Cam Diagram



A: No key groove on CMSD Cam Driver.



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
19.6 (2.0)	39.2 (4.0)	85.3 (8.7)	606.7 (62.1)	19.4	<b>CMSD</b>	52	10	55	No Code (Coil Spring)
39.2 (4.0)	58.8 (6.0)	—	2465.0 (251.5)	20.1	<b>CMSDG</b>	52	10	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	52	—	10	—	55				
<b>CMSD</b>	52	—	10	—	55				— SC5 — WC100
<b>CMSDG</b>	52	—	10	—	55	—	GK	—	NF — SC10 — WC100 — K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>SC</b>	Mount face length is extended from 0 to 65 mm in increments of 1 mm.
<b>WC</b>	The width of the mount face is extended from 53 to 100 mm in increments of 1 mm.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

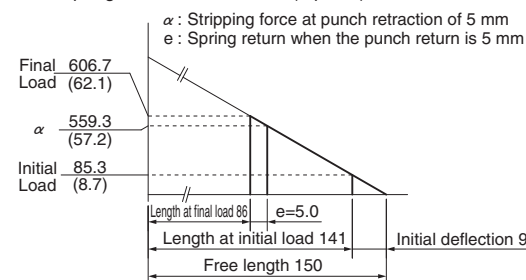
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	1	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

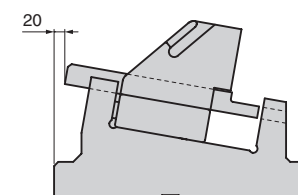
Gas filling pressure is 10 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

• Spring Model SWS26-150 (1 piece)



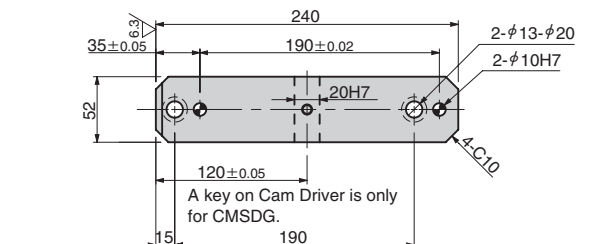
### Rear Removal Space



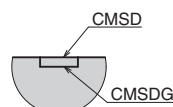
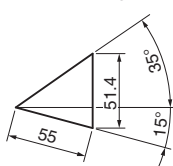
Refer to page 941, 942 for Table of Components.

## Die Mounted Cam Unit

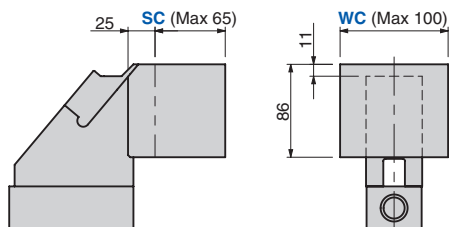
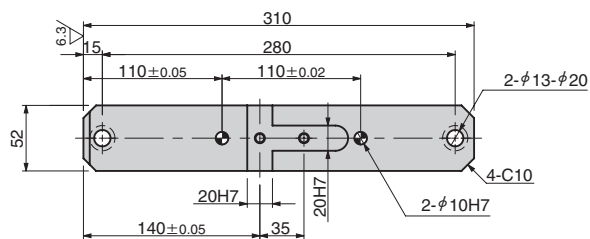
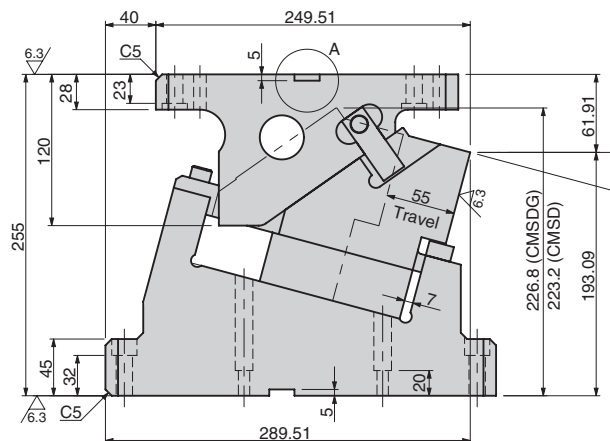
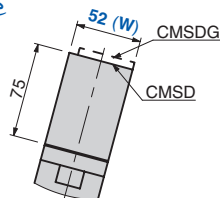
**CMSD52-15-55**  
**CMSDG52-15-55**



● Cam Diagram



A: No key groove on CMSD Cam Driver.



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
19.6 (2.0)	39.2 (4.0)	85.3 (8.7)	606.7 (62.1)	20.0	<b>CMSD</b>	52	15	55	No Code (Coil Spring)
39.2 (4.0)	58.8 (6.0)	—	2465.0 (251.5)	20.7	<b>CMSDG</b>	52	15	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	52	—	15	—	55				
<b>CMSDG</b>	52	—	15	—	55	—	SC5	—	WC100
<b>CMSDG</b>	52	—	15	—	55	—	GK	—	NF-SC10-WC100-K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>SC</b>	Mount face length is extended from 0 to 65 mm in increments of 1 mm.
<b>WC</b>	The width of the mount face is extended from 53 to 100 mm in increments of 1 mm.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

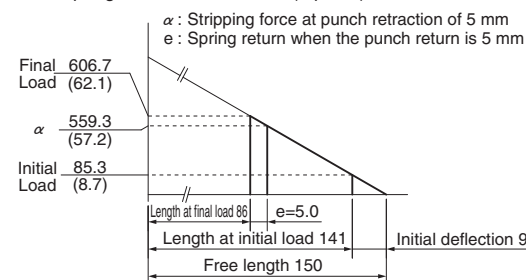
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	1	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

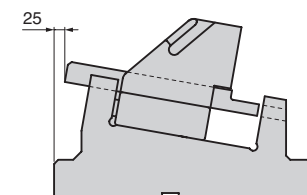
Gas filling pressure is 10 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

• Spring Model SWS26-150 (1 piece)



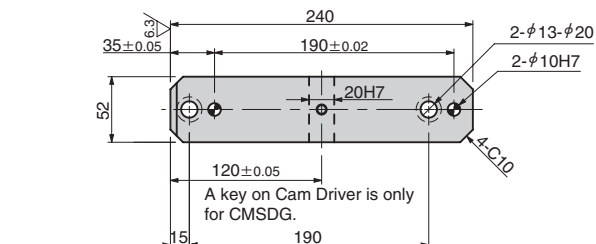
### Rear Removal Space



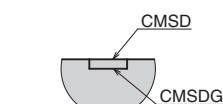
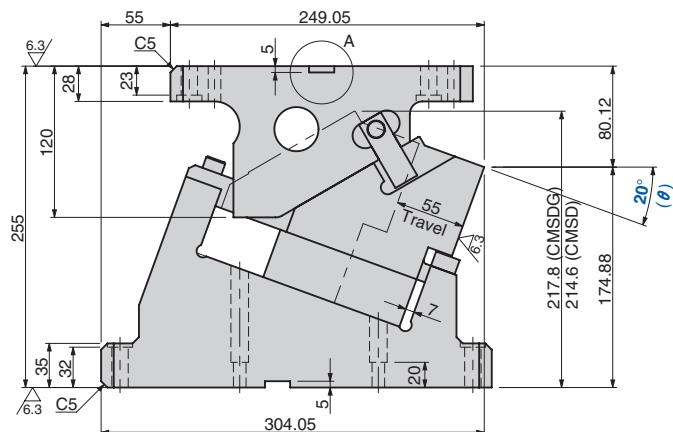
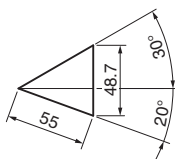
Refer to page 941, 942 for Table of Components.

## Die Mounted Cam Unit

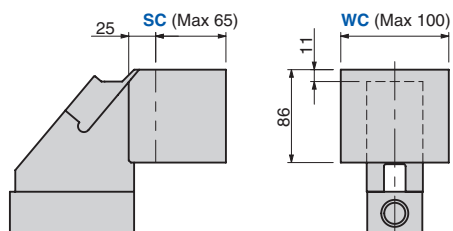
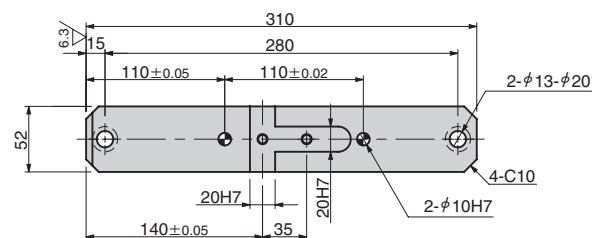
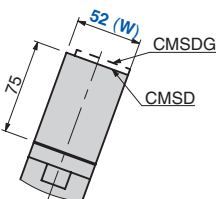
**CMSD52-20-55**  
**CMSDG52-20-55**



● Cam Diagram



A: No key groove on CMSD Cam Driver.



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
19.6 (2.0)	39.2 (4.0)	85.3 (8.7)	606.7 (62.1)	19.5	<b>CMSD</b>	52	20	55	No Code (Coil Spring)
39.2 (4.0)	58.8 (6.0)	—	2465.0 (251.5)	20.3	<b>CMSDG</b>	52	20	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	52	—	20	—	55				
<b>CMSDG</b>	52	—	20	—	55	—	GK	—	SC5—WC100
									NF—SC10—WC100—K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>SC</b>	Mount face length is extended from 0 to 65 mm in increments of 1 mm.
<b>WC</b>	The width of the mount face is extended from 53 to 100 mm in increments of 1 mm.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

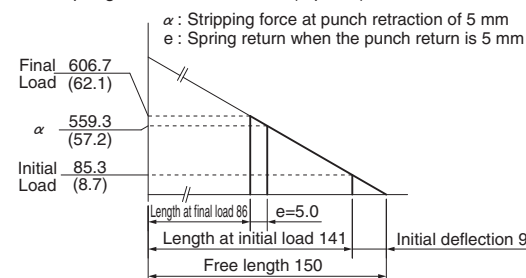
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	1	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

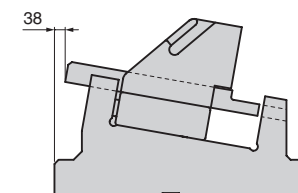
Gas filling pressure is 10 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

• Spring Model SWS26-150 (1 piece)



### Rear Removal Space

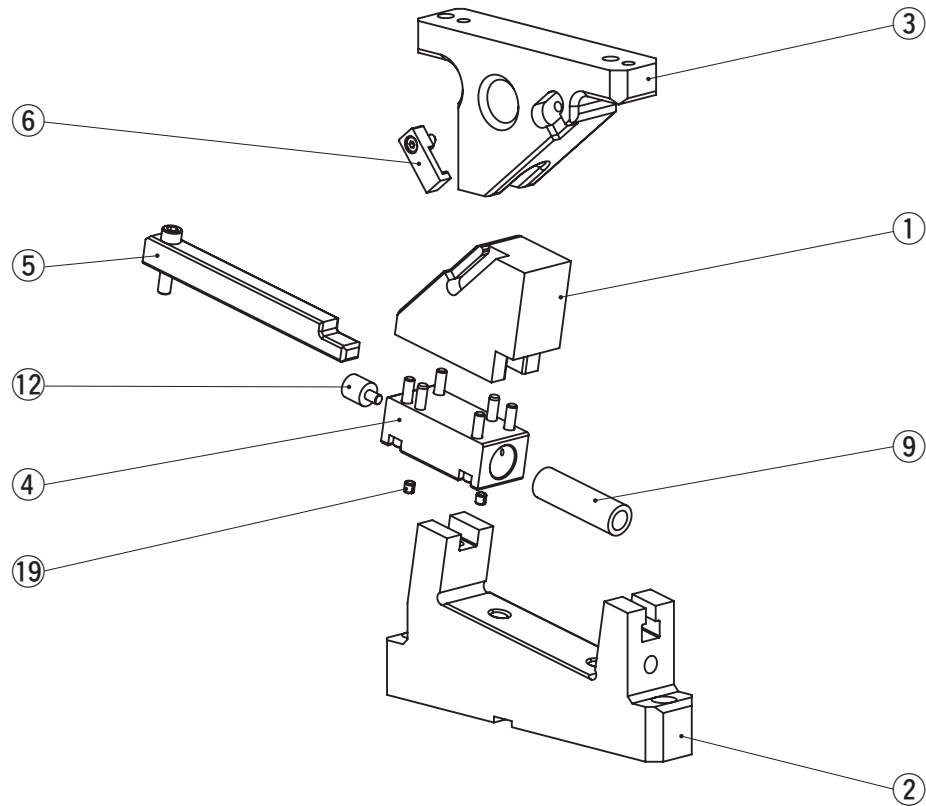


Refer to page 941, 942 for Table of Components.



**Die Mounted Cam Unit**

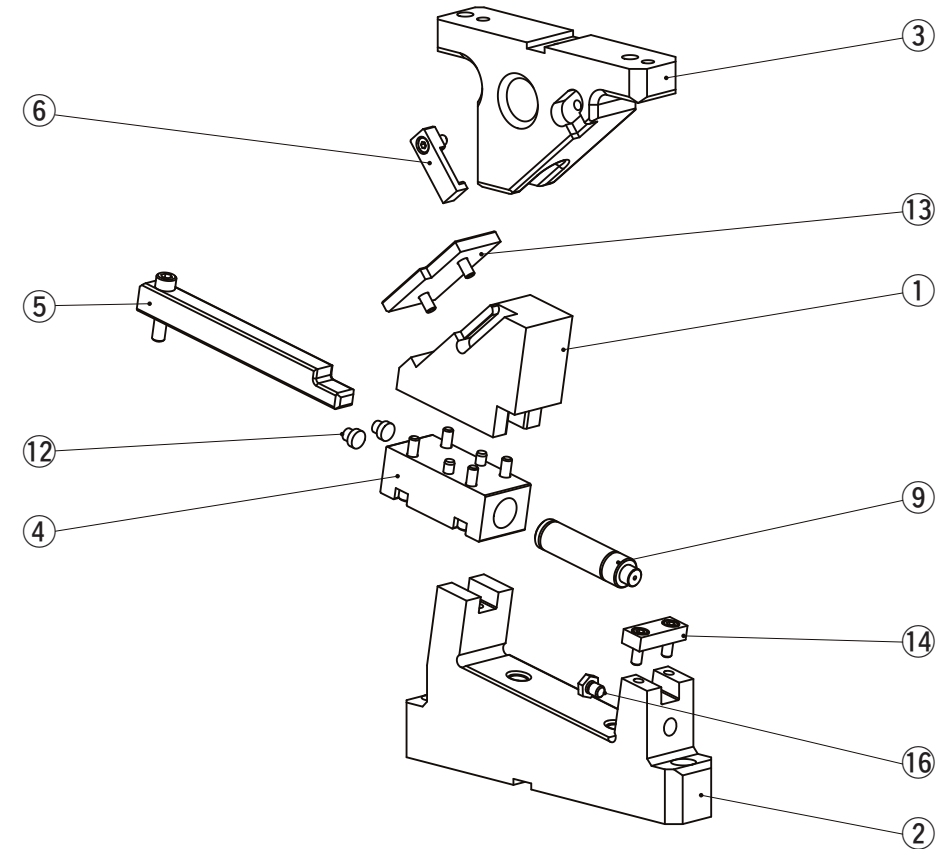
**CMSD52**



No.	Description	Qty
1	Cam Slider	1
2	Cam Holder	1
3	Cam Driver	1
4	Cam Lower Slider	1
5	Guide Bar	1
6	Positive Return Follower	1
9	Coil Spring	1
12	Stopper	1
19	Spring Plug	2

Bolts, nuts, dowels, and washers for assembly are not indicated.

**CMSDG52**



No.	Description	Qty
1	Cam Slider	1
2	Cam Holder	1
3	Cam Driver	1
4	Cam Lower Slider	1
5	Guide Bar	1
6	Positive Return Follower	1
9	Gas Spring	1
12	Stopper	2
13	Wear Plate	1
14	Block	1
16	Stop Pin	1

Bolts, nuts, dowels, and washers for assembly are not indicated.

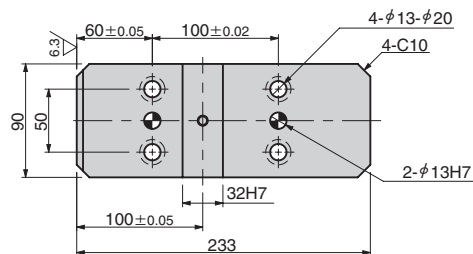
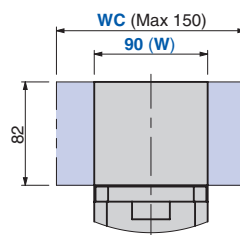
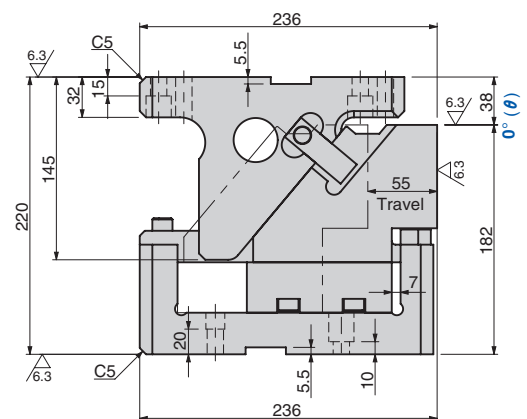
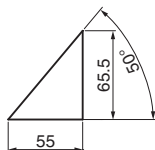
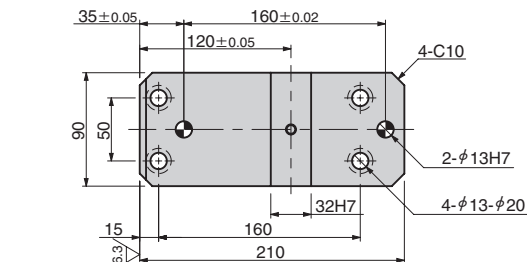


## Die Mounted Cam Unit

CMSD90-00-55  
CMSDG90-00-55



● Cam Diagram



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
38.2 (3.9)	76.4 (7.8)	170.6 (17.5)	1213.4 (124.2)	24.9	CMSD	90	00	55	No Code (Coil Spring)
58.8 (6.0)	88.2 (9.0)	—	4590.0 (468.4)	25.8	CMSDG	90	00	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
CMSD	90	—	00	—	55				
CMSD	90	—	00	—	55				— WC150 — N12 — K
CMSDG	90	—	00	—	55		GK		— NF — WC100 — K



Option Code	Specification
NF	Nitrogen gas not charged.
WC	The width of the mount face is extended from 91 to 150 mm in increments of 1 mm.
N12	Dowel holes of cam holder and cam driver are changed to φ 12H7.
K	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

### Spring Specification

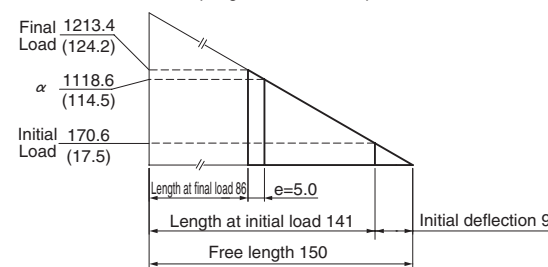
No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	2	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

Gas filling pressure is 18 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

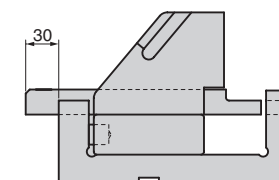
### Spring Diagram

• Spring Model SWS26-150 (2 pieces)

α : Stripping force at punch retraction of 5 mm  
e : Spring return when the punch return is 5 mm



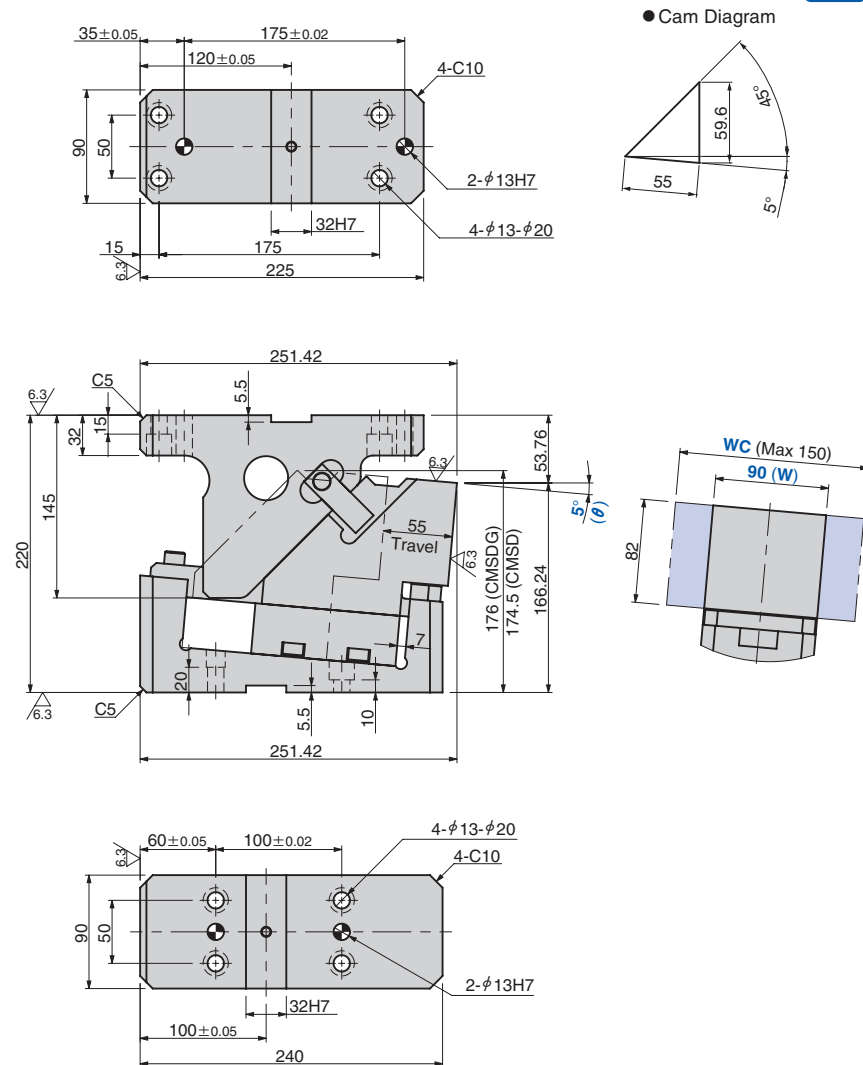
### Rear Removal Space



Refer to page 951, 952 for Table of Components.

## Die Mounted Cam Unit

CMSD90-05-55  
CMSDG90-05-55



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
38.2 (3.9)	76.4 (7.8)	170.6 (17.5)	1213.4 (124.2)	25.9	<b>CMSD</b>	90	05	55	No Code (Coil Spring)
58.8 (6.0)	88.2 (9.0)	—	4590.0 (468.4)	26.9	<b>CMSDG</b>	90	05	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	90	—	05	—	55				
<b>CMSDG</b>	90	—	05	—	55				— WC150—N12—K
							<b>GK</b>		— NF—WC100—K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>WC</b>	The width of the mount face is extended from 91 to 150 mm in increments of 1 mm.
<b>N12</b>	Dowel holes of cam holder and cam driver are changed to φ 12H7.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

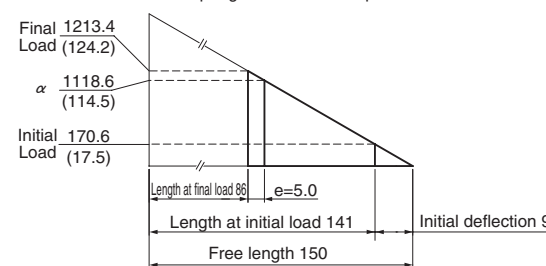
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	2	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

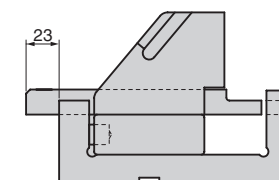
Gas filling pressure is 18 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

- Spring Model SWS26-150 (2 pieces)
- α : Stripping force at punch retraction of 5 mm
- e : Spring return when the punch return is 5 mm



### Rear Removal Space



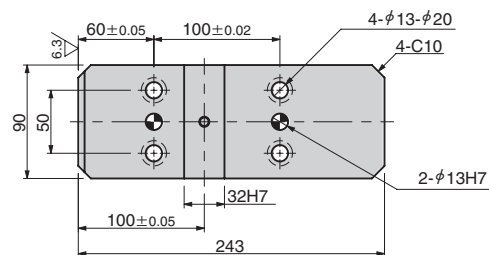
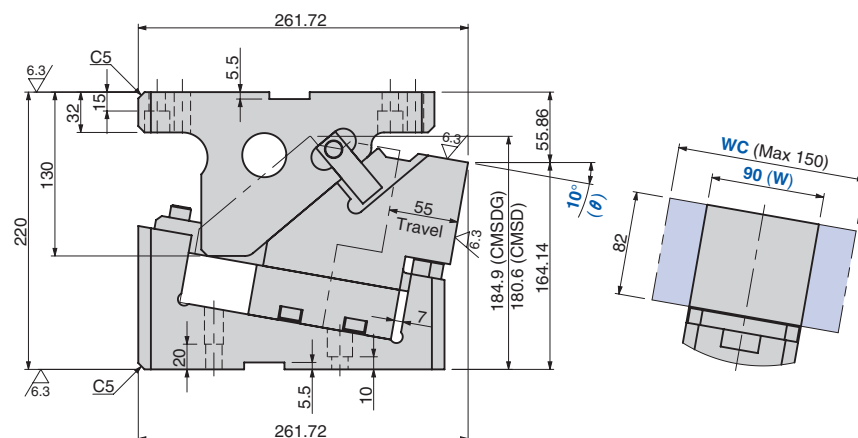
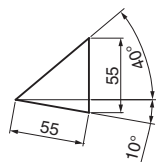
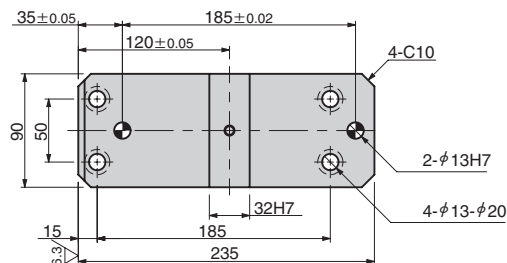
Refer to page 951, 952 for Table of Components.

## Die Mounted Cam Unit

CMSD90-10-55  
CMSDG90-10-55



● Cam Diagram



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
38.2 (3.9)	76.4 (7.8)	170.6 (17.5)	1213.4 (124.2)	27.3	<b>CMSD</b>	90	10	55	No Code (Coil Spring)
58.8 (6.0)	88.2 (9.0)	—	4590.0 (468.4)	28.4	<b>CMSDG</b>	90	10	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
<b>CMSD</b>	90	—	10	—	55				
<b>CMSD</b>	90	—	10	—	55				— WC150—N12—K
<b>CMSDG</b>	90	—	10	—	55		GK		— NF—WC100—K



Option Code	Specification
<b>NF</b>	Nitrogen gas not charged.
<b>WC</b>	The width of the mount face is extended from 91 to 150 mm in increments of 1 mm.
<b>N12</b>	Dowel holes of cam holder and cam driver are changed to φ 12H7.
<b>K</b>	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

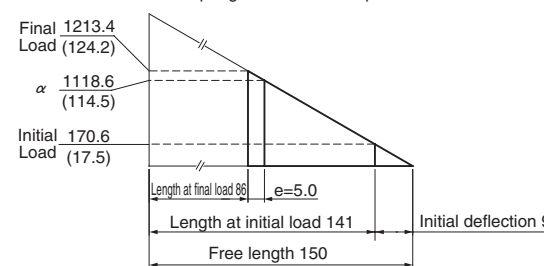
### Spring Specification

No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	2	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

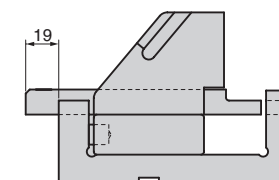
Gas filling pressure is 18 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

### Spring Diagram

- Spring Model SWS26-150 (2 pieces)
- α : Stripping force at punch retraction of 5 mm
- e : Spring return when the punch return is 5 mm



### Rear Removal Space



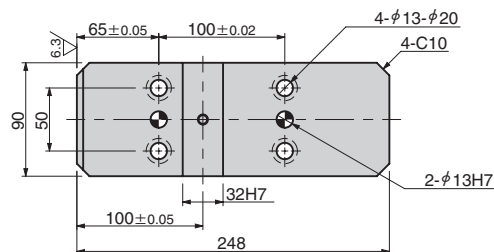
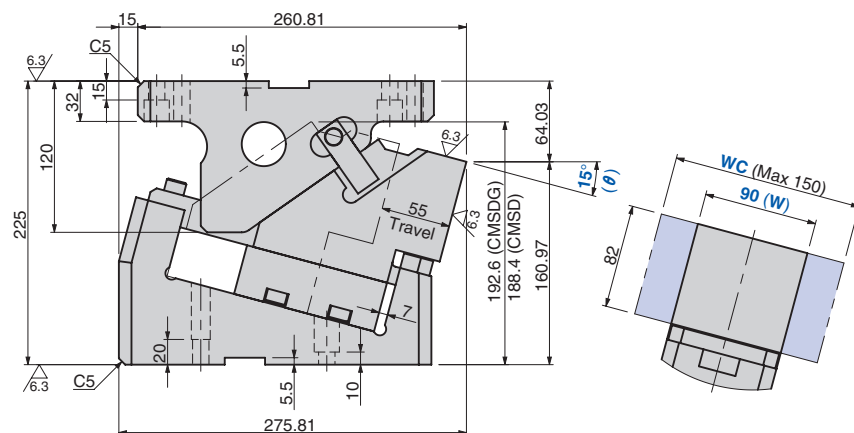
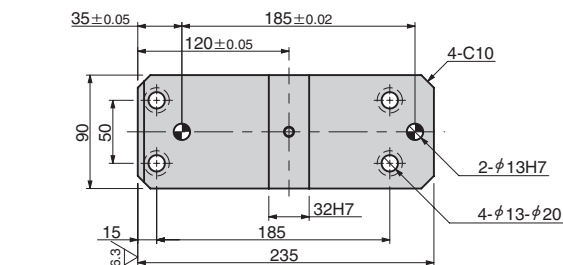
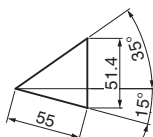
Refer to page 951, 952 for Table of Components.

## Die Mounted Cam Unit

CMSD90-15-55  
CMSDG90-15-55



● Cam Diagram



Working Force [kN (tonf)]		Spring Force [N (kgf)]		Total Weight kg	Catalog No.	W	θ	Travel S	Spring Type PS
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes	Initial Load	Final Load						
38.2 (3.9)	76.4 (7.8)	170.6 (17.5)	1213.4 (124.2)	29.3	CMSD	90	15	55	No Code (Coil Spring)
58.8 (6.0)	88.2 (9.0)	—	4590.0 (468.4)	29.7	CMSDG	90	15	55	GK NGK GD NGD

No Code: Coil Spring GK: Gas Spring (KALLER) GD: Gas Spring (DADCO)  
NGK/NGD: Without Gas Spring Parts for spring assembly are included.



Catalog No.	W	—	θ	—	S	—	PS	—	Option
CMSD	90	—	15	—	55				
CMSD	90	—	15	—	55				— WC150—N12—K
CMSDG	90	—	15	—	55		GK		— NF—WC100—K



Option Code	Specification
NF	Nitrogen gas not charged.
WC	The width of the mount face is extended from 91 to 150 mm in increments of 1 mm.
N12	Dowel holes of cam holder and cam driver are changed to φ 12H7.
K	Key attached.



Refer to page 377 for the machining details of tapped holes and dowel holes for retainer mounting.  
Refer to page 927 for key specification.

### Spring Specification

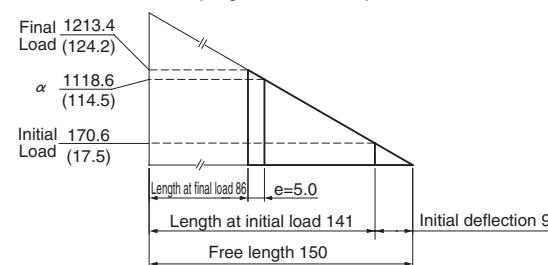
No.	PS	Spring Model	Qty	Remark
	No Code	SWS26-150	2	Coil Spring 9.48 N/mm (0.97 kgf/mm)
9	GK	X320-63-TD	1	Gas Spring (KALLER)
	GD	U.0325.063.TO	1	Gas Spring (DADCO)

Gas filling pressure is 18 MPa.  
Life expectancy of Coil Spring is approximately 300,000 strokes.

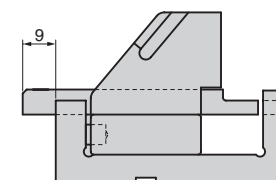
### Spring Diagram

• Spring Model SWS26-150 (2 pieces)

α : Stripping force at punch retraction of 5 mm  
e : Spring return when the punch return is 5 mm



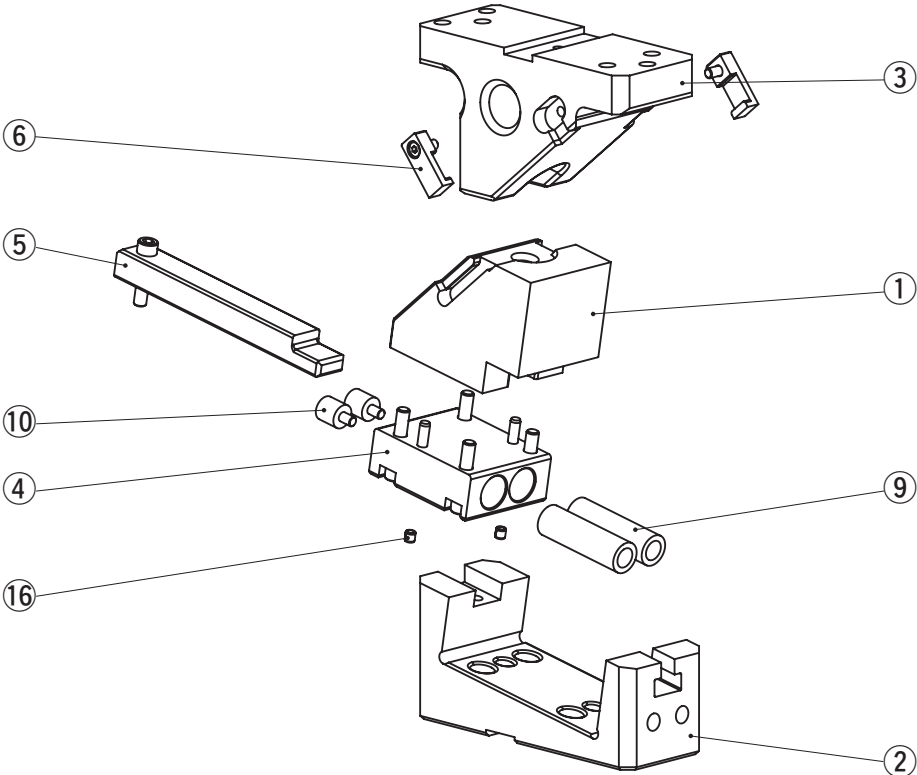
### Rear Removal Space



Refer to page 951, 952 for Table of Components.

**Die Mounted Cam Unit**

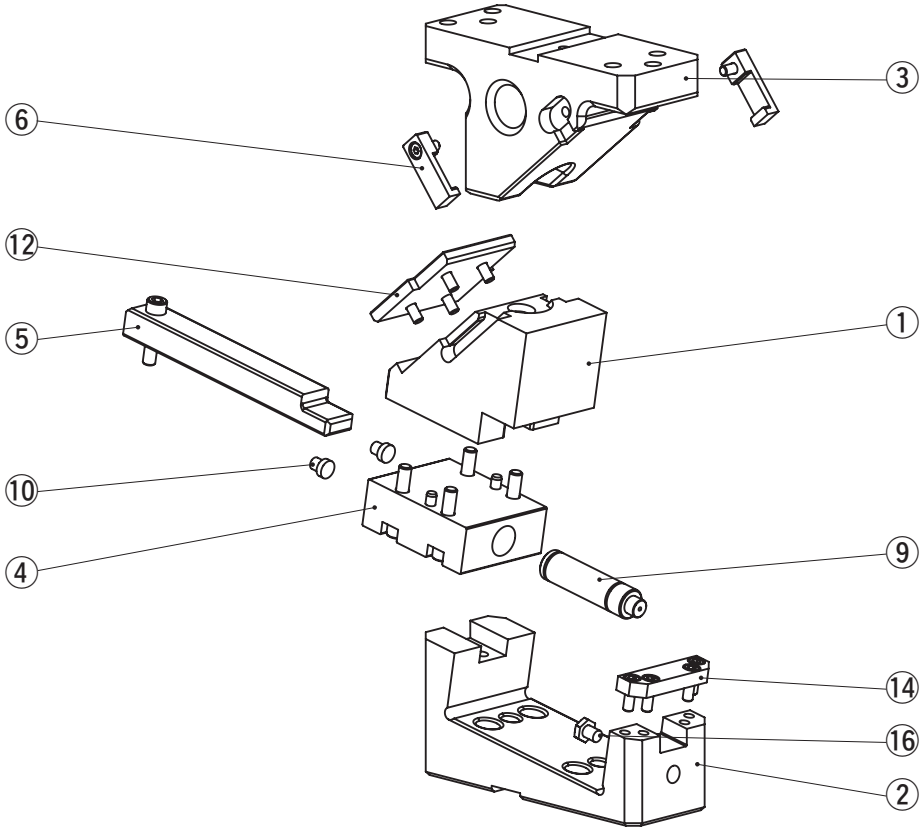
**CMSD90**



No.	Description	Qty
1	Cam Slider	1
2	Cam Holder	1
3	Cam Driver	1
4	Cam Lower Slider	1
5	Guide Bar	1
6	Positive Return Follower	2
9	Coil Spring	2
10	Stopper	2
16	Spring Plug	2

Bolts, nuts, dowels, and washers for assembly are not indicated.

**CMSDG90**



No.	Description	Qty
1	Cam Slider	1
2	Cam Holder	1
3	Cam Driver	1
4	Cam Lower Slider	1
5	Guide Bar	1
6	Positive Return Follower	2
9	Gas Spring	1
10	Stopper	2
12	Wear Plate	1
14	Block	1
16	Stop Pin	1

Bolts, nuts, dowels, and washers for assembly are not indicated.

# Cam Units [Overview]

## Information

### ■ Tapped Hole and Dowel Hole (Prepared Hole, Finish) Machining for Retainer Mounting

#### Instruction method for machining

Indicate the tapped hole diameter and the dowel hole (or prepared hole) diameter with the XY coordinates.

#### To indicate the coordinates

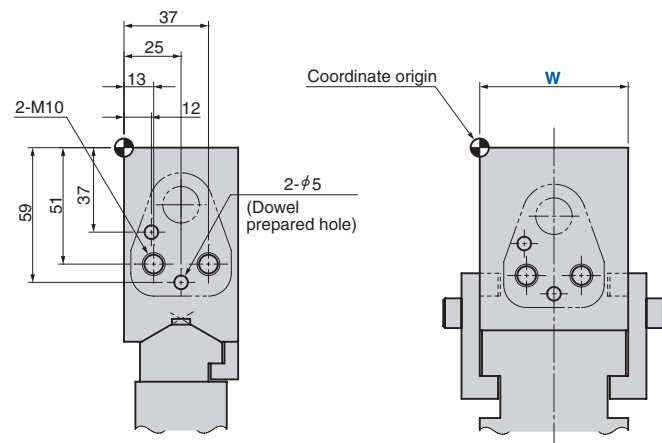
- The origin is positioned at the upper left corner of the mount face. (However, machining uses our machining datum as the reference.)
- Indication symbol

—M···Tapped hole, —N···Dowel prepared hole, —K···Dowel finish hole

#### Machining standard

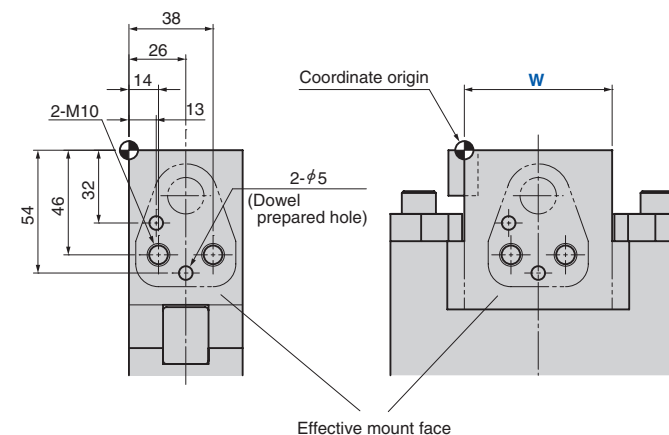
- Tapped holes and dowel prepared holes are machined to general tolerances.
- The hole depth is 2.5 times the diameter for both tapped holes and dowel holes. The dowel pilot hole is processed for 2 times the diameter.
- The dowel hole spacing is machined to the tolerance of  $\pm 0.02$ . The hole tolerance is H7.

〈Example of Aerial Cam Unit〉



Order	Catalog No.	W	θ	Additional Machining
	SACE	52	00	— M10 — X (13.0) — Y (−51.0) — M10 — X (37.0) — Y (−51.0) — K5.0 — X (12.0) — Y (−37.0) — K5.0 — X (25.0) — Y (−59.0)

〈Example of Die Mounted Cam Unit〉



Catalog No.	W	θ	S	Additional Machining
CMSD	52	00	55	— M10 — X (14.0) — Y (−46.0) — M10 — X (38.0) — Y (−46.0) — K5.0 — X (13.0) — Y (−32.0) — K5.0 — X (26.0) — Y (−54.0)

### ■ Other machining

Please give instructions on a separate drawing for drilling or cutting other than tapped holes and dowel holes.