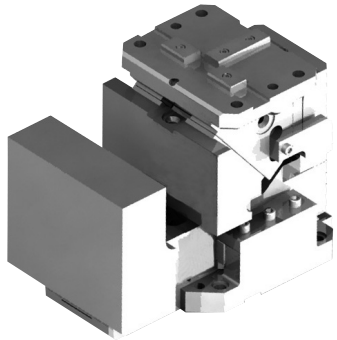
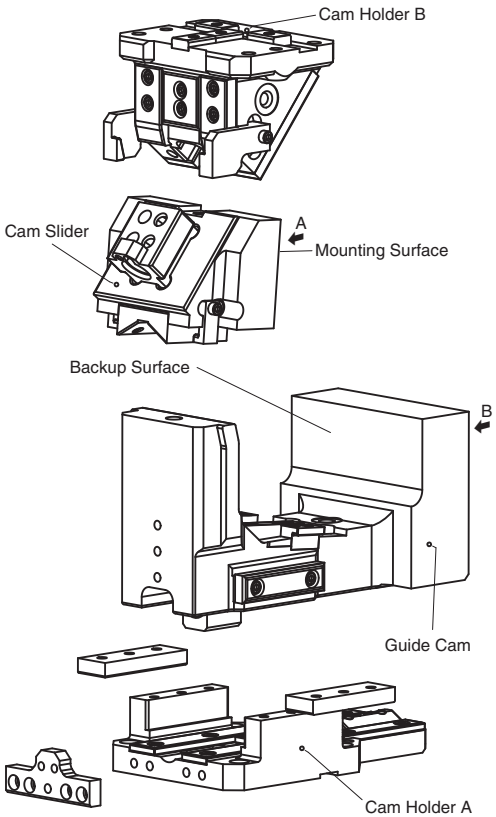
Double Cam Unit General Description of WCMSH / WCMS

FOR NEGATIVE ANGLE FORMING

The Double Cam Unit WCMS Series is ideal for machining countersink on a car door locking of an inner door panel.

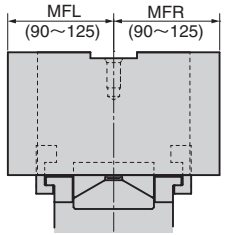


■Types and Features of Double Cam Unit



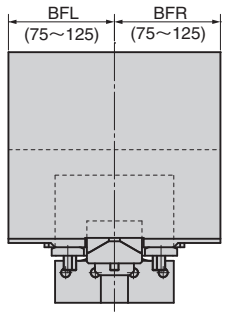
- Positive Returns on the Working Cam Holder helps assure the Guide Cam is returned safely.
- The Aerial structure allows the unit to be compact for tight areas.
- Working angle adjustment does not affect shut height consistency.
- Working Angles:
  From 0.0° to 10.0° in increments of 0.5°
  From 1.6° to 3.9° in increments of 0.1°
- The width of the Mounting Surface and Backup Surface for the right and left sides can be specified from the centerline.
- Working Force: 98 kN
- Guide Cam travel: 6 mm
- May be ordered with or without Cam Holder A.
  If you install WCMS without Cam Holder A, the unit is mounted directly into a die body. Please select “WCMS”. With Cam Holder A, order as WCMSH.

●Mounting Surface width
(View A)



Width dimensions for right (MFR) and left (MFL) can be specified between 90 mm to 125 mm (in increments of 5 mm) from the centerline.

●Backup Surface width
(View B)



Width dimensions for right (BFR) and left (BFL) can be specified between 75 mm to 125 mm (in increments of 5 mm) from the centerline.
Note that this drawing shows the view from arrow B in page 1177.

■Spring specifications

For double cam unit WCMS series, the pressure source can be selected. Either ISO coil spring or gas spring (Kaller) can be selected.

●Spring Type

Spring Type PS	Cam Slider	Guide Cam
ISO	TJM32-152	TJM40-76
GK (KALLER)	X350-050-7.5MPa	X500-013-5.5MPa

●Spring Force

Spring Type PS		Initial Load N	Final Load N
ISO	For Cam Slider TJM32-152 (38.6 N/mm)	540.4	2084.4
	For Guide Cam TJM40-76 (105.3 N/mm)	1263.6	1895.4
GK	For Cam Slider X350-050-7.5MPa	-	2084.4
	For Guide Cam X500-013-5.5MPa	-	1980

Gas Spring

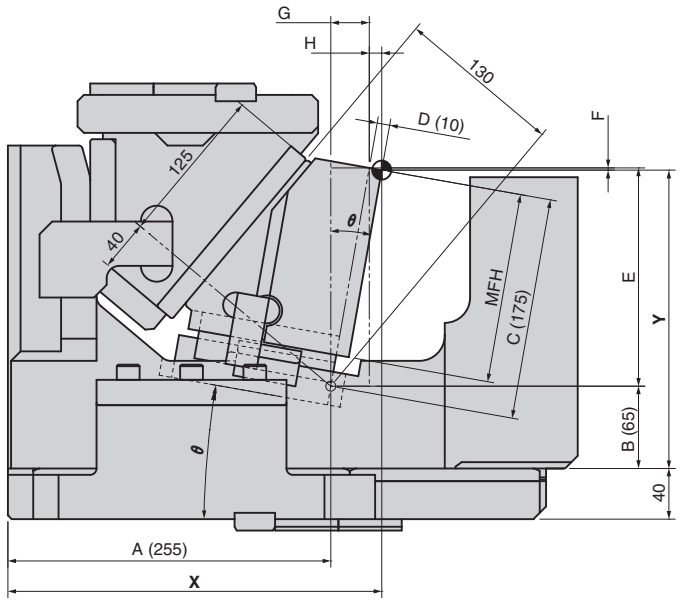
Please contact your local sales representative if you prefer to use a gas spring not specified in our catalog.
For use and maintenance of gas spring, please contact the manufacturer directly.

Double Cam Unit General Description of WCMSH / WCMS

FOR NEGATIVE ANGLE FORMING

■Coordinates of working cam reference point

●Calculation of X and Y coordinates



$X = A + C \times \sin\theta + D \times \cos\theta$

$Y = B + C \times \cos\theta - D \times \sin\theta$

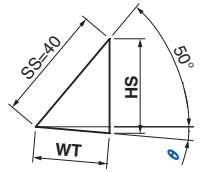
$E = C \times \cos\theta = 175 \times \cos\theta$

$F = D \times \sin\theta = 10 \times \sin\theta$

$G = C \times \sin\theta = 175 \times \sin\theta$

$H = D \times \cos\theta = 10 \times \cos\theta$

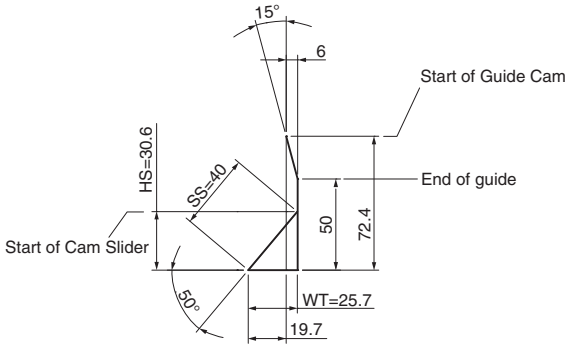
●Calculation of cam travel (WT) and press travel (HS)



$HS : 40 \times (\sin 50 + \cos 50 \times \tan\theta)$

$WT : 40 \times \cos 50 / \cos\theta$

●Cam diagram (Example of 0.0°)



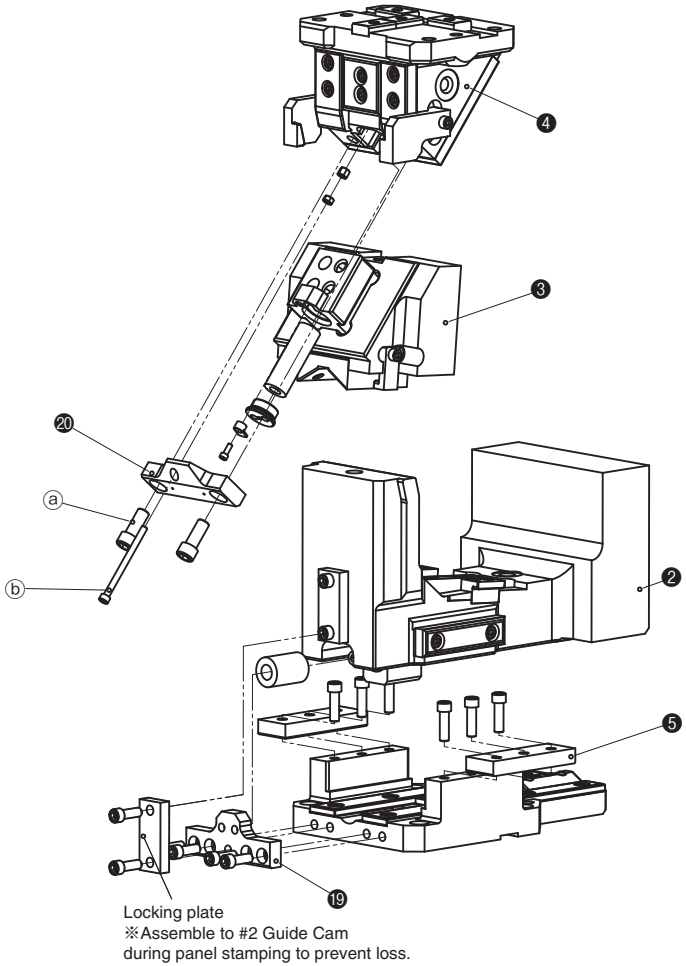
●Values of XY coordinates and cam diagram

θ1	X	Y	MFH	WT	HS
0	265.0	240.0	140	25.7	30.6
0.5	266.5	239.9	140	25.7	30.9
1	268.1	239.8	140	25.7	31.1
1.5	269.6	239.7	145	25.7	31.3
1.6	269.9	239.7	145	25.7	31.4
1.7	270.2	239.6	145	25.7	31.4
1.8	270.5	239.6	145	25.7	31.4
1.9	270.8	239.6	145	25.7	31.5
2	271.1	239.5	145	25.7	31.5
2.1	271.4	239.5	145	25.7	31.6
2.2	271.7	239.5	145	25.7	31.6
2.3	272.0	239.5	145	25.7	31.7
2.4	272.3	239.4	145	25.7	31.7
2.5	272.6	239.4	145	25.7	31.8
2.6	272.9	239.4	145	25.7	31.8
2.7	273.2	239.3	145	25.7	31.9
2.8	273.5	239.3	145	25.7	31.9
2.9	273.8	239.3	145	25.7	31.9
3	274.1	239.2	145	25.7	32.0
3.1	274.4	239.2	145	25.7	32.0
3.2	274.8	239.2	145	25.8	32.1
3.3	275.1	239.1	145	25.8	32.1
3.4	275.4	239.1	145	25.8	32.2
3.5	275.7	239.1	145	25.8	32.2
3.6	276.0	239.0	145	25.8	32.3
3.7	276.3	239.0	145	25.8	32.3
3.8	276.6	239.0	145	25.8	32.3
3.9	276.9	238.9	145	25.8	32.4
4	277.2	238.9	145	25.8	32.4
4.5	278.7	238.7	145	25.8	32.7
5	280.2	238.5	145	25.8	32.9
5.5	281.7	238.2	150	25.8	33.1
6	283.2	238.0	150	25.9	33.3
6.5	284.7	237.7	150	25.9	33.6
7	286.3	237.5	150	25.9	33.8
7.5	287.8	237.2	150	25.9	34.0
8	289.3	236.9	150	26.0	34.3
8.5	290.8	236.6	150	26.0	34.5
9	292.3	236.3	150	26.0	34.7
9.5	293.7	235.9	150	26.1	34.9
10	295.2	235.6	150	26.1	35.2

Double Cam Unit General Description of WCMSH / WCMS

FOR NEGATIVE ANGLE FORMING

■WCMSH Structure and Assembly・Disassembly



●Disassembly method

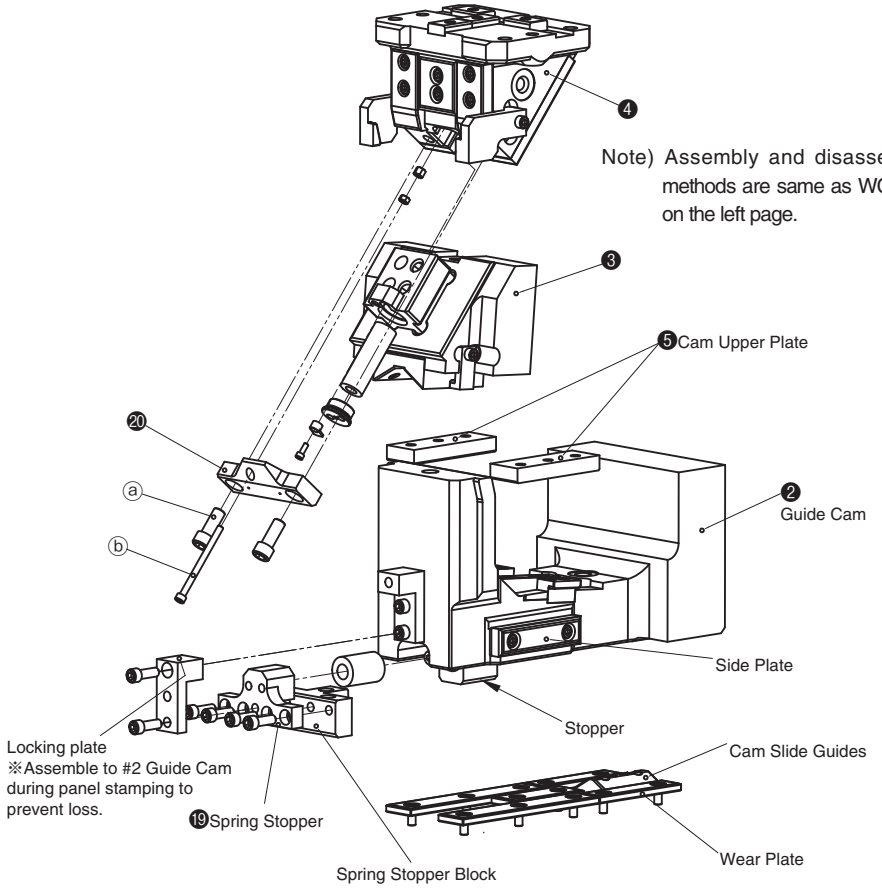
1) Loosen hexagonal socket head bolts and remove #20 Stopper Plate.
2) Pull out and remove #3 Cam Slider from #4 Cam Holder B to the rear.

・#2 Guide Cam can be removed to the upper direction by removing #19 Spring Stopper A and #5 Cam Upper Plate.

●Assembly method

1) Assemble parts in the reverse order of disassembly.
   - Make sure that there is no foreign matter on the sliding area and apply grease on sliding surface.
   - Since clearances of #3 Cam Slider and #4 Cam Holder B are controlled, make sure that serial numbers engraved on the Cam Slider and the Cam Holder are identical.
   - After assembly, make sure that all bolts are correctly tightened.

■WCMS Structure and Assembly・Disassembly



Note) Assembly and disassembly methods are same as WCMSH on the left page.

●WCMS die mounting method

・Machine grooves to assemble Stopper and Spring Stopper Block on lower die.
・Require a sliding surface of Side Plate on lower die and machine to fix Cam Upper Plate.

Double Cam Unit General Description of WCMSH / WCMS

FOR NEGATIVE ANGLE FORMING

■Table of Components — WCMSH

No.	Description	Qty	Material and Remark
①	Cam Holder A	1	FCD550
②	Guide Cam	1	FCD550
③	Cam Slider	1	FCD550
④	Cam Holder B	1	FCD550
⑤	Cam Upper Plate	2	MCUF52-150
⑥	Side Plate	2	SESW38-150
⑦	Spring Guide Block	1	Bronze with Graphite
⑧	Cam Slide Guide	1	CBSPL65-100
⑨	Cam Slide Guide	1	CBSL65-100
⑩	Cam Slide Guide	1	S45C
⑪	Cam Slide Guide	1	Bronze with Graphite
⑫	Cam Stroke Plate	2	Bronze with Graphite
⑬	Slide Plate R	1	S45C Copper Powder
⑭	Slide Plate L	1	S45C Copper Powder
⑮	Positive Return Block	2	S45C
⑯	Positive Return	2	Bronze
⑰	Positive Return R	1	Bronze
⑱	Positive Return L	1	Bronze
⑲	Spring Stopper A	1	S45C
⑳	Stopper Plate	1	S45C
㉑	Spring Stopper B	1	S45C
㉒	Stopper	1	S45C
㉓	Wear Plate	2	TWX38-150
㉔	Wear Plate	2	TWX48-250
㉕	Wear Plate	1	TWX48-125
㉖	Wear Plate	1	SESW75-75
㉗	Key	8	SS400 LKU32-50-14
㉘	Stopper	2	Urethane
㊹	Locking Plate A	1	S45C
㊻	Spring Guide Pin	1	S45C ISO Specification only
㊻	Spring Stopper C	1	S45C GK Specification only
㊼	Spring	1	Refer to The Spring Specification Table.
㊽	Spring Guide Pin	1	S45C ISO Specification only
㊽	Spring Stopper D	1	S45C GK Specification only
㊾	Spring	1	Refer to The Spring Specification Table.

⚠ Bolts for assembly are not indicated.
Part numbers are shown on the drawing.

■Table of Components — WCMS

No.	Description	Qty	Material and Remark
②	Guide Cam	1	FCD550
③	Cam Slider	1	FCD550
④	Cam Holder B	1	FCD550
⑤	Cam Upper Plate	2	MCUF52-150
⑥	Side Plate	2	SESW38-150
⑦	Spring Guide Block	1	Bronze with Graphite
⑧	Cam Slide Guide	1	CBSPL65-100
⑨	Cam Slide Guide	1	CBSL65-100
⑩	Cam Slide Guide	1	S45C
⑪	Cam Slide Guide	1	Bronze with Graphite
⑫	Cam Stroke Plate	2	Bronze with Graphite
⑬	Slide Plate R	1	S45C Copper Powder
⑭	Slide Plate L	1	S45C Copper Powder
⑮	Positive Return Block	2	S45C
⑯	Positive Return	2	Bronze
⑰	Positive Return R	1	Bronze
⑱	Positive Return L	1	Bronze
⑲	Spring Stopper F	1	S45C
⑳	Stopper Plate	1	S45C
㉑	Spring Stopper B	1	S45C
㉒	Stopper	1	S45C
㉓	Wear Plate	2	TWX38-150
㉔	Wear Plate	2	TWX48-250
㉕	Wear Plate	1	TWX48-125
㉖	Wear Plate	1	SESW75-75
㉗	Key	4	SS400 LKU32-50-14
㉘	Stopper	2	Urethane
㊹	Locking Plate B	1	S45C
㊻	Spring Guide Pin	1	S45C ISO Specification only
㊻	Spring Stopper C	1	S45C GK Specification only
㊼	Spring	1	Refer to The Spring Specification Table.
㊽	Spring Guide Pin	1	S45C ISO Specification only
㊽	Spring Stopper D	1	S45C GK Specification only
㊾	Spring	1	Refer to The Spring Specification Table.
㊷	Spring Stopper Block	1	S45C

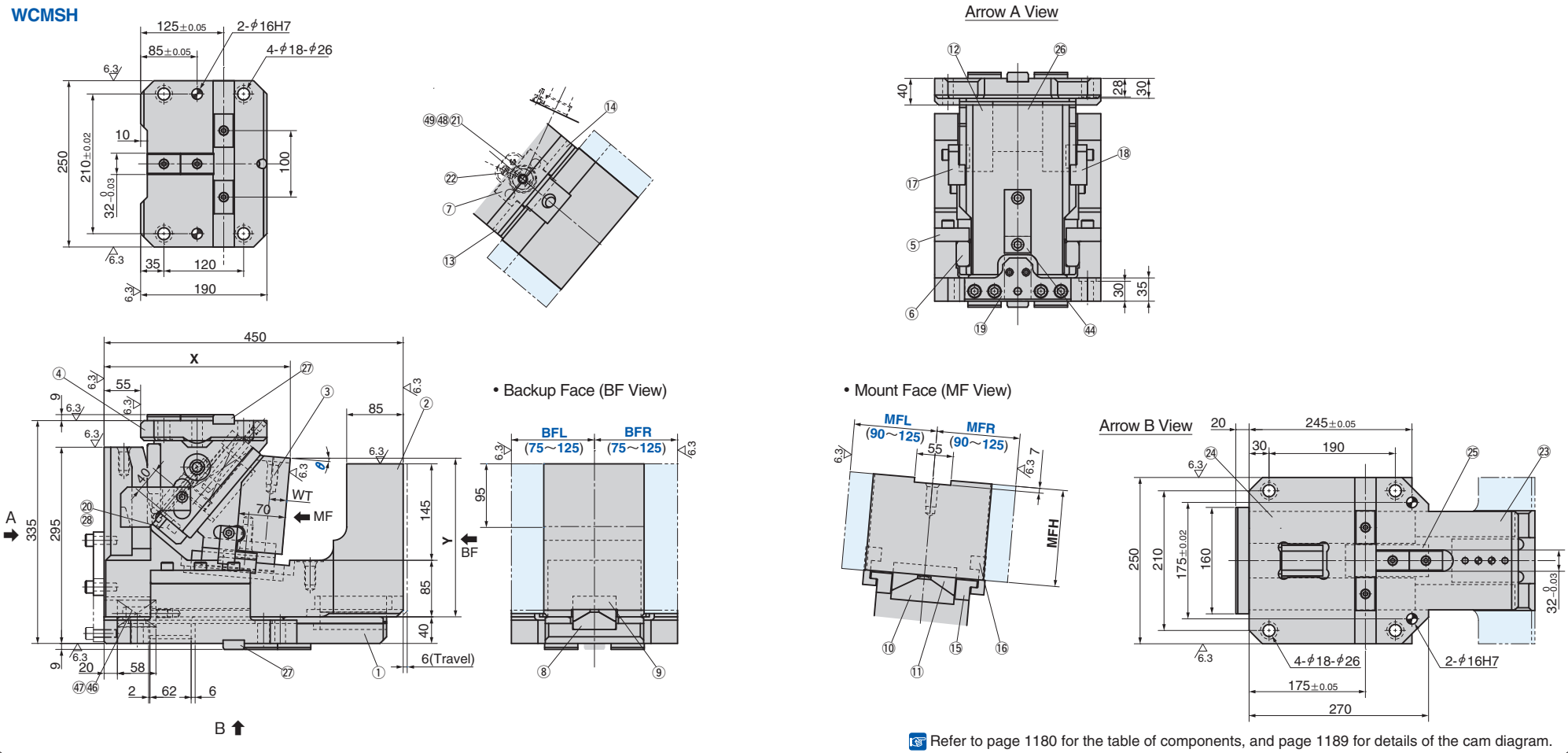
⚠ Bolts for assembly are not indicated.
Part numbers are shown on the drawing.

Double Cam Unit

WITH HOLDER

CAD FILE

WCMSH



Refer to page 1180 for the table of components, and page 1189 for details of the cam diagram.

Catalog No.	Nominal	Mounting Surface Increments of 5mm		θ Increments of 0.5° *1	Backup Surface Increments of 5mm		Spring Type PS *2
		MFL	MFR		BFL	BFR	
WCMSH	250	90～125	90～125	0.0～10.0	75～125	75～125	ISO・GK・NGK

Order

Catalog No.	Nominal	—	MFL	—	MFR	—	θ	—	BFL	—	BFR	—	PS
WCMSH	250	—	100	—	90	—	3.0	—	100	—	90	—	GK

*1 θ : The angle can be specified at increments of 0.1° from 1.6° to 3.9°.

*2 NGK : Without gas spring but accessories for installation of are included.

Option

Option Code	Specification
NF	Nitrogen gas not charged.

■ Spring specifications

Spring Type PS	Cam Slider Spring Force N		Guide Cam Spring Force N	
	Initial Load	Final Load	Initial Load	Final Load
ISO	540.4	2084.4	1263.6	1895.4
GK	-	2084.4	-	1980

ISO : For Cam Slider TJM32-152 (38.6 N/mm) Guideline of spring durability 300,000 strokes
For Guide Cam TJM40-76 (105.3 N/mm) Guideline of spring durability 1,000,000 strokes
GK : For Cam Slider X350-050-7.5MPa
For Guide Cam X500-013-5.5MPa

■ Working Force

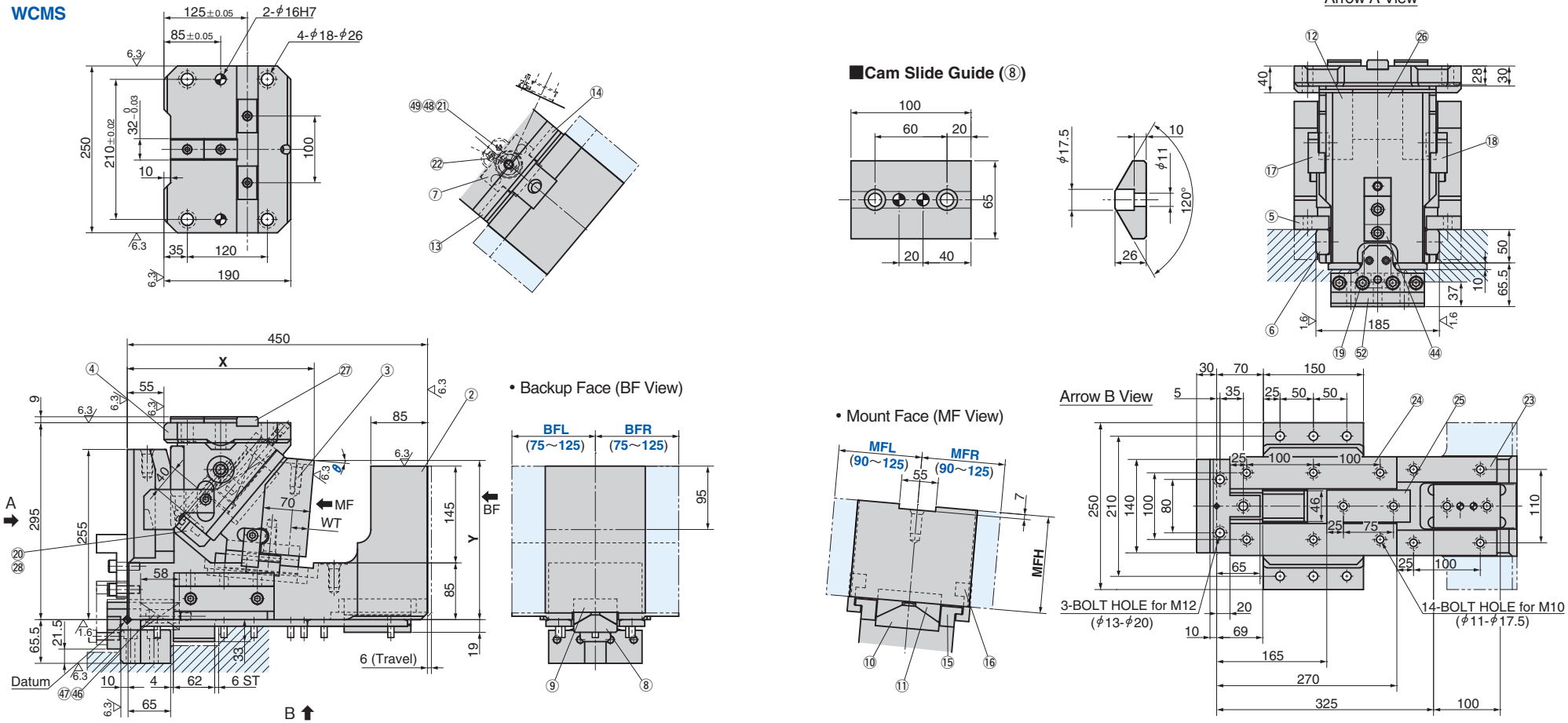
Working Force kN (tonf)
98.0 (10.0)

Double Cam Unit

WITHOUT HOLDER

CAD FILE

WCMS



Refer to page 1180 for the table of components, and page 1189 for details of the cam diagram.

Catalog No.	Nominal	Mounting Surface Increments of 5mm		θ Increments of 0.5° *1	Backup Surface Increments of 5mm		Spring Type PS *2
		MFL	MFR		BFL	BFR	
WCMS	250	90～125	90～125	0.0～10.0	75～125	75～125	ISO・GK・NGK

Order

Catalog No.	Nominal	—	MFL	—	MFR	—	θ	—	BFL	—	BFR	—	PS
WCMS	250	—	100	—	90	—	5.0	—	100	—	90	—	ISO

*1 θ : The angle can be specified at increments of 0.1° from 1.6° to 3.9°.

*2 NGK : Without gas spring but accessories for installation of are included.

Option

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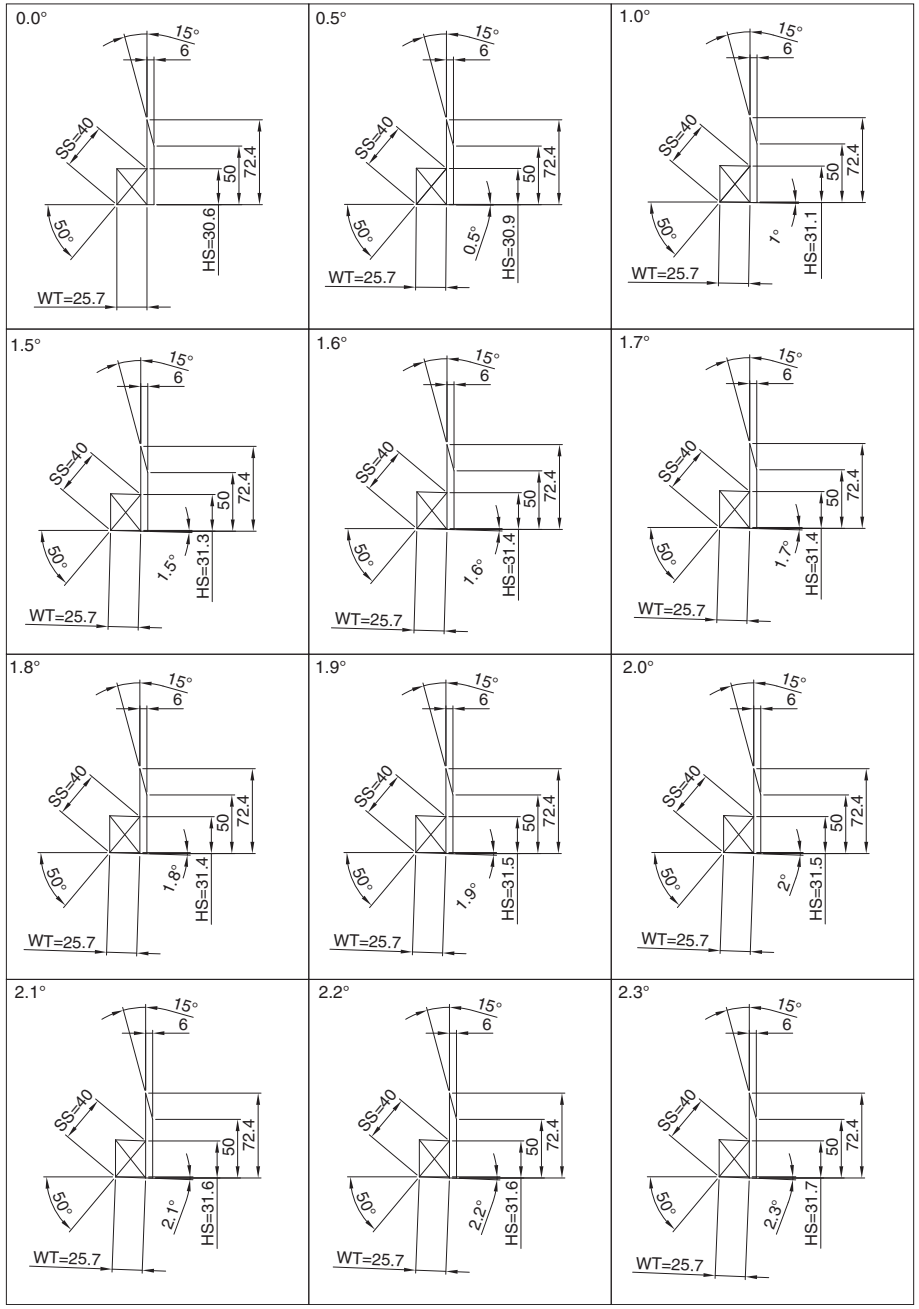
GK : For Cam Slider X350-050-7.5MPa
For Guide Cam X500-013-5.5MPa

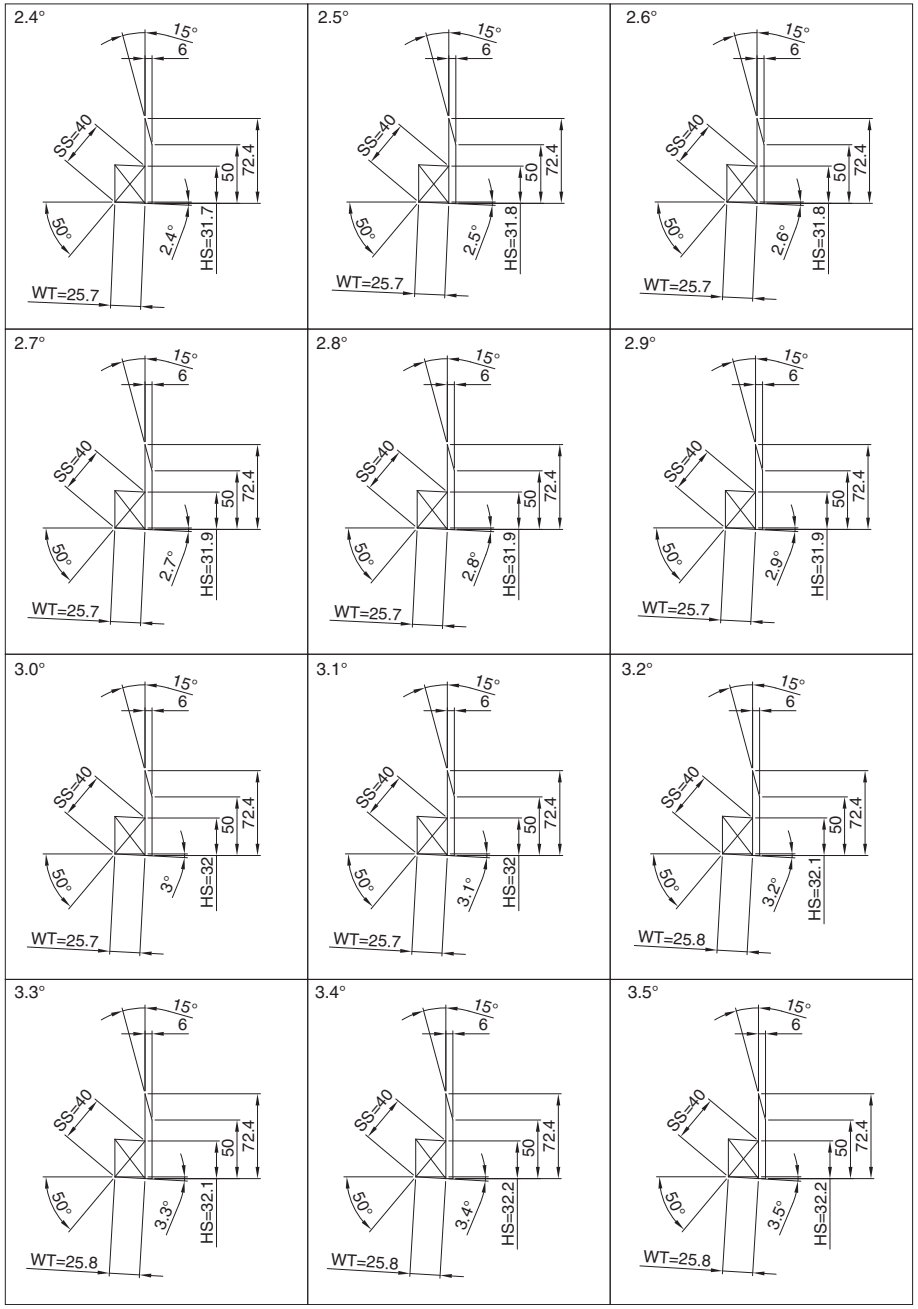
■ Working Force

Working Force kN (tonf)
98.0 (10.0)

Double Cam Unit

CAM DIAGRAM

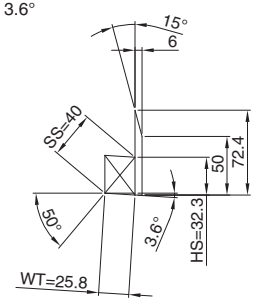




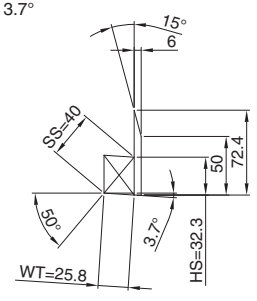
Double Cam Unit

CAM DIAGRAM

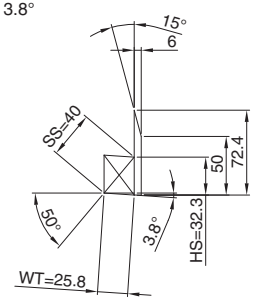
3.6°



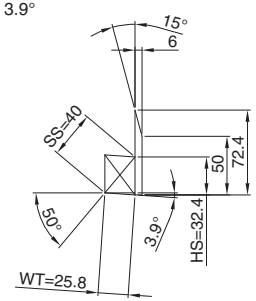
3.7°



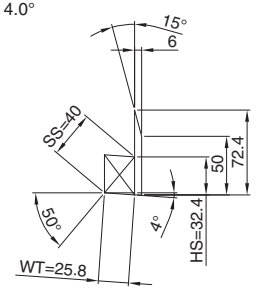
3.8°



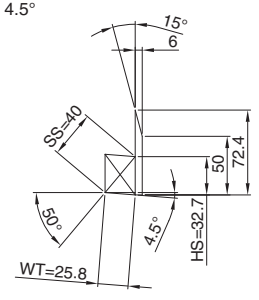
3.9°



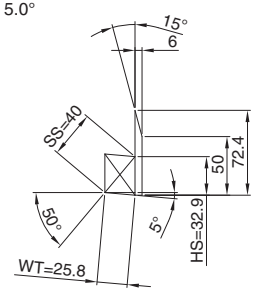
4.0°



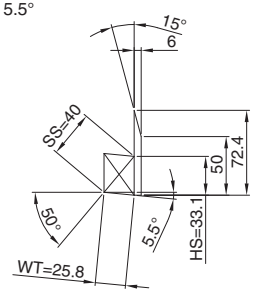
4.5°



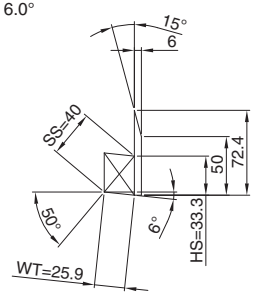
5.0°



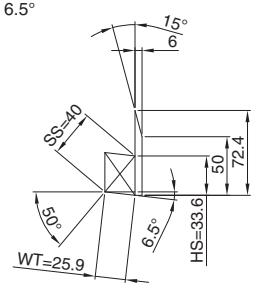
5.5°



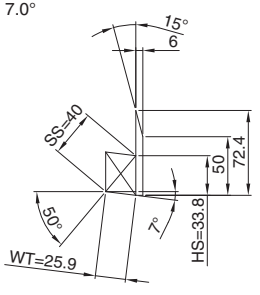
6.0°



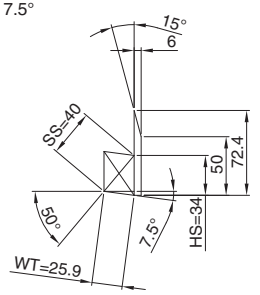
6.5°



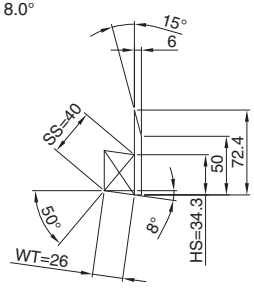
7.0°



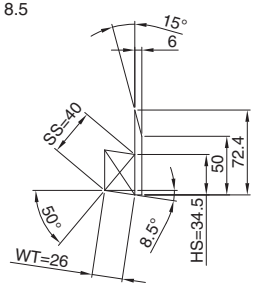
7.5°



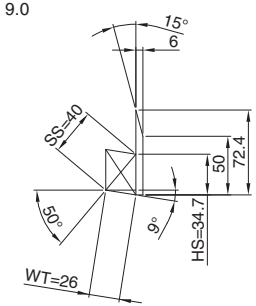
8.0°



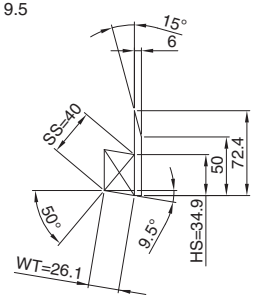
8.5



9.0



9.5



10.0°