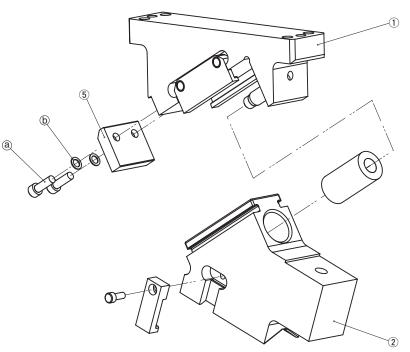
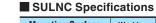
For Pierce Aerial Cam Unit - General Description of SULNC

OUTLINE OF SULNC

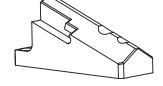
- Mounting width: 65mm.
- •Mounting surface maximum extension is 150mm.
- •V-shaped guide.
- •Working Force (300,000 strokes) 14.7kN
- •Available angle is 0° to 25° at increments of 5°

Structure and Assembly/Disassembly of SULNC.





Mounting	Mounting Surface		Travel	Working Force kN(tonf)	Spring Force	
W	Н	Angle	ITavei	(300,000 strokes)	N(kgf)	
		00	30.2			
		05	31.9			
65	80	10	35.0	14.7(1.5)	2115.0(215.7)	
05	80	15	31.4	14.7(1.5)	2115.0(215.7)	
		20	32.3			
		25	35.0			



• Disassembly method of SULNC

1) Remove hexagon socket head bolt (ⓐ) and washer (ⓑ), and remove stopper plate (⑤). 2)Pull and remove cam sliderW from cam holder(1) to the rear.

- Assembly method of SULNC
- 1)Assemble components in the reverse order of disassembly.
- · Make sure that there is no foreign matter on the sliding area and assemble components.
- The clearance between the cam slider and the cam holder is controlled. Match the stamped serial number on the holder and slider before assembly.
- · When cam is disassembled and then reassembled, please do not forget to assemble all bolts provided.



Cam Units

Aerial Cam Unit- General Description of SULNC

PIERCING LONG NOSE TYPE

Durability test for 300,000 strokes: No problem



A long nose type cam slider may cause runout of the nose end due to wear.

If run-out occurs, the product may have burrs. In a worst case, the punch may not fit with the button die, resulting in damage to the die. These may be attributable to wear resistance, accuracy of components and degree of total accuracy.

Sankyo's long nose type cam has achieved the durability test of 300,000 strokes to ensure higher quality product and customer satisfaction.

Durability test and result

Contents of the test

- 1. Load of 14.7 kN (1.5 tonf) was applied to the mount of the long nose type cam and the durability test of 300,000 strokes was performed. (Photo 1)
- 2. After the durability test in 1, a panel pierceing test was performed to check run-out at the end. (Photo 2)

Testing conditions

a. Cam specification used in the test SULNC65-10-SC150 / A nose length of 150 mm and machining \angle of 10° was used.

b. Testing conditions

1) Durability test						
Load	14.7kN(1.5tonf)					
Number of stroke	300,000 strokes					
Press speed	35spm					
Entry	5mm					
Grease	Albania EP grease					

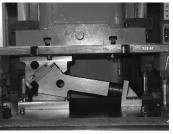


Photo 1(Lower Dead Point)

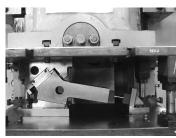


Photo 2(Lower Dead Point)

(2) Panel piercing test

Press speed	35spm
Working Force	7.5kN
Material	SPCC
Thickness	0.8mm

30			
¢10.00			
¢10.08			

Test result

After the durability test of 300,000 strokes, performance sliding is good. It was found that there was no problem for run-out of the long nose in the panel stamping test.

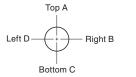
1. Durability test result

- · There was no scoring in the durability test (300,000 strokes) and the sliding surface was good. (Refer to the photo in the right.)
- · Total wear (Change of nose end height) was approximately $12 \,\mu$ m.

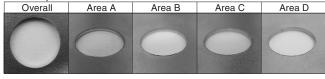
2. Panel stamping test result

- The worn out amount (lateral) checked by hand at the lower dead point is: Before durability test - 10 µm.
 - After durability test ----- 2 µm. The backlash was reduced because of initial fitting in sliding.
- The panel stamping test was performed 30 times. No burr was observed.

(Status of pierce hole surface)



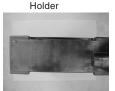
Status of pierce hole at 30th shot



There was no burr.

·Minor flash was felt with hand. (Areas A and B)

(Status of sliding surface after test)



Slider (holder side)

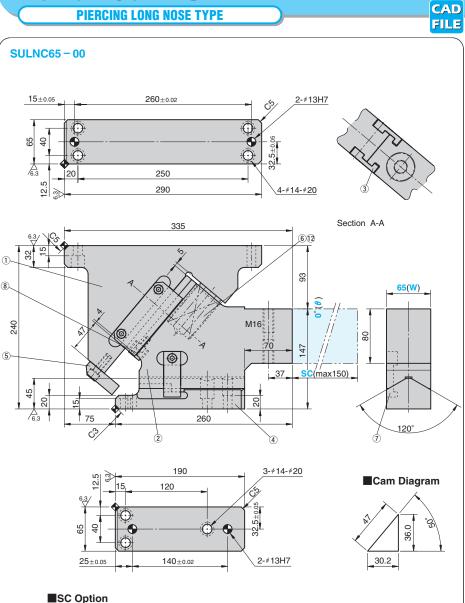
Slider (driver side)





Driver





Travel S		ing Force kN(tonf))0,000 strokes)		ring Fo nitial .oad	rce N(kgf) Final Load	Return Force N(kgf)	Total Weight kg	Catalog No.	w	θ
30.2		14.7 (1.5)		26.9 12.9)	2115.0 (215.7)	2881 (294.0)	33.7	SULNC	65	00
Or	der	Catalog No. SULNC	0 6		<i>θ</i> 00			Space for ren	noving	
Ор	tion	Option Code	Specification							
		SC	the ran	nge fror	urface is ex n 1 to 150 r 1 mm).					
		N12		Dowel pin holes of cam holder and cam driver are changed to ϕ 12H7						
		Order	SULNC65 - 00 - SC120 - N12							
		of tapped	holes a	bage 389 for detailed specifications holes and dowel pin holes (prepared ed hole) for retainer.						

	Table of Components										
No.	Description	Qty	Material and Remark								
1	Cam Holder	1	FC250								
2	Cam Slider	1	FC250 with Graphite								
3	Slide Keeper	2	S45C with Graphite								
4	Cam Driver	1	SF700								
(5)	Stopper Plate	1	SS400(1020)								
6	Coil Spring	1	TL40-125								

Final 2115.0 1 TL40-125 Load(215.7) ⑦ Positive Return Follower 1 S45C(1045)

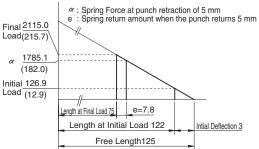
12 Spring Guide Pin 1 SPRG19-60 A Bolts for assembly are not indicated.

1 Rubber

8 Stopper

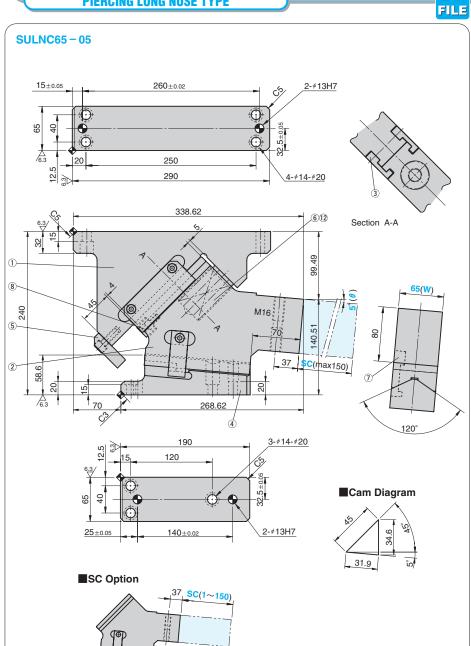
Spring Diagram Spring Used TL40-125 (1 piece)

• Spring Constant 42.3N/mm (4.31kgf/mm) Guideline of spring durability 300,000 strokes



Cam Units

PIERCING LONG NOSE TYPE



Travel S		ng Force kN(to 0,000 strokes)	nf)	Spring Fo Initial Load	rce N(kgf) Final Load	Return Force N(kgf)	Total Weight kg	Catalog No.	w	θ
31.9		14.7 (1.5)		211.5 (21.6)	2115.0 (215.7)	2872 (293.1)	33.2	SULNC	65	05
Or	der	Catalog No. SULNC		W –	θ - 05			Space for ren	noving	
Ор	tion	Option Code		Spe	cification				\sim	
		SC	the		urface is ex n 1 to 150 r 1 mm).			Lab		
		N12			es of cam I e changed t	8				
		Order								
		of tapped	Refer to page 389 for detailed specifications of tapped holes and dowel pin holes (prepared hole,finished hole) for retainer.							

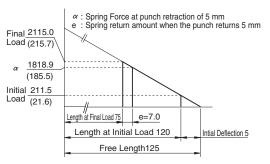
1	Table of Components									
No.	Description	Qty	Material and Remark							
1	Cam Holder	1	FC250							
2	Cam Slider	1	FC250 with Graphite							
3	Slide Keeper	2	S45C with Graphite							
4	Cam Driver	1	SF700							
(5)	Stopper Plate	1	SS400(1020)							
6	Coil Spring	1	TL40-125							
$\overline{\mathcal{O}}$	Positive Return Follower	1	S45C(1045)							
(8)	Stopper	1	Rubber							
12	Spring Guide Pin	1	SPRG19-60							

Bolts for assembly are not indicated.

CAD

Spring Diagram

Spring Used TL40-125 (1 piece)
 Spring Constant 42.3N/mm (4.31kgf/mm)
 Guideline of spring durability 300,000 strokes



SULNC 65

CAD **PIERCING LONG NOSE TYPE** FILE **SULNC65 - 10** 15 ± 0.05 260±0.02 2-¢13H7 රු \mathbf{O} 40 C 32.5±0.0 A.3 20 250 S 0 290 <u>4-#14-#20</u> N 341.65 5 612 Section A-A 5 106.7 8 65(W) 240 M16 (5)-80 133.3 72.3 _37 C(max150) 20 6.3 276.65 65 120° 3-#14-#20 190 ŝ 120 Cam Diagram 6.3 65 9 35. 140±0.02 2-#13H7 25±0.05 음 35.0 SC Option ,37, SC(1~150)

Travel S		ng Force kN(to 0,000 strokes)	nf) Initial	rce N(kgf) Final Load	Return Force N(kgf)	Total Weight kg	Catalog No.	w	θ
35.0		14.7 (1.5)	211.5 (21.6)	2115.0 (215.7)	2862 (292.0)	32.7	SULNC	65	10
Catalog No.W $ \theta$ SULNC65 $-$ 10							Space for ren	noving	
Op	tion	Option Code	Spe	Specification			7	\sim	
		SC	The mount s the range from increments of	m 1 to 150 i			5 Job		
		N12	Dowel pin holes of cam holder and cam driver are changed to ϕ 12H7						
		Order	SULNC65 - 10 - SC120 - N12						
		Refer to page 389 for detailed specifications of tapped holes and dowel pin holes (prepared hole,finished hole) for retainer.							

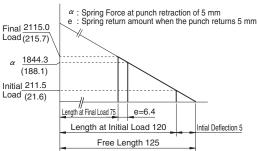
Table of Components No. Qty Material and Remark Description 1 Cam Holder 1 FC250 (2) Cam Slider 1 FC250 with Graphite 3 Slide Keeper 2 S45C with Graphite (4) Cam Driver 1 SF700 5 Stopper Plate 1 SS400(1020) 6 Coil Spring 1 TL40-125 ⑦ Positive Return Follower 1 S45C(1045) (8) Stopper 1 Rubber 12 Spring Guide Pin 1 SPRG19-60

A Bolts for assembly are not indicated.

- Spring Diagram

 Spring Used
 TL40-125 (1 piece)

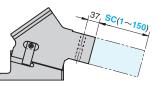
 Spring Constant
 42.3N/mm (4.31kgf/m
- Spring Constant 42.3N/mm (4.31kgf/mm) • Guideline of spring durability 300,000 strokes



SULNC 65

CAD **PIERCING LONG NOSE TYPE** FILE **SULNC65 - 15** 260±0.02 2-#13H7 15 ± 0.05 රු ÷Đ 65 6 9 5±0 ÷Õ 6.3 20 250 12.5 \approx 290 4-\$14-\$20 339.01 Section A-A 612 (1 114.59 (8)-0 240 M16 # 65(W) 5 125. 86.5 .37 Sc(max150) 20 20 A.3 284.01 1 155 . . . (4) 3-#14-#20 190 2.5 120 15 120 6.3/ 65 40 $25{\scriptstyle\pm0.05}$ 140 ± 0.02 2-#13H7 Y

SC Option



Cam I	Diag	ram
31	29.3	15° 35°

Travel S		ng Force kN(to 0,000 strokes)		Spring Fo Initial Load	rce N(kgf) Final Load	Return Force N(kgf)	Total Weight kg	Catalog No.	w	
31.4		14.7 (1.5)		550.0 (56.1)	2115.0 (215.7)	2851 (291.0)	32.1	SULNC	65	
Ore		Catalog No. SULNC	. [W – 65 –	θ 15 cification			Space for ren	noving	
Op	tion	SC	the	e mount si	urface is ex n 1 to 150 r			5 deb		J
		N12			es of cam h e changed to					
		Order	SI	JLNC65 –	15 - SC 12	0 - N12			S]

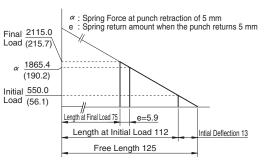
🞯 Refer to page 389 for detailed specifications of tapped holes and dowel pin holes (prepared hole, finished hole) for retainer.

1	Table of Components								
No.	Description	Qty	Material and Remark						
1	Cam Holder	1	FC250						
2	Cam Slider	1	FC250 with Graphite						
3	Slide Keeper	2	S45C with Graphite						
4	Cam Driver	1	SF700						
(5)	Stopper Plate	1	SS400(1020)						
6	Coil Spring	1	TL40-125						
\bigcirc	Positive Return Follower	1	S45C(1045)						
8	Stopper	1	Rubber						
12	Spring Guide Pin	1	SPRG19-60						

Bolts for assembly are not indicated.

Spring Diagram

 Spring Used TL40-125 (1 piece) • Spring Constant 42.3N/mm (4.31kgf/mm) Guideline of spring durability 300,000 strokes



SULNC 65

732

θ

CAD PIERCING LONG NOSE TYPE FILE SULNC65 - 20 $260{\scriptstyle\pm0.02}$ 15 ± 0.05 2-#13H7 ්/ Ô ÷ 65 40 f 5 ± 0.0 (6.3 250 20 LO n 290 4-#14-#20 2 335.66 612 5 Section A-A ß 1 133.09 8-240 M16 0 5-65(W) 106.91 4 91. .37 80 SC/ 0 max150) A.3 290.66 4 190 3-#14-#20 ŝ N 120 15 6.3 1200 65 6 (• • 32-(÷ Cam Diagram $140{\scriptstyle \pm 0.02}$ 2-#13H7 $25{\scriptstyle \pm 0.05}$ SC Option 32,3

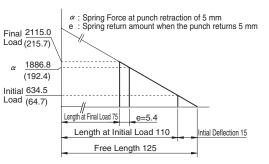
Travel S		ing Force kN(tonf)		Spring Force N(kgf)		Return Force	Total Weight	Catalog No.	w	θ
		0,000 strokes)		Load	Load	N(kgf)	kg	outalog Hol		
32.3		14.7		634.5	2115.0	2840	32.1	SULNC	65	20
		(1.5)		(64.7)	(215.7)	(289.8)				
Or	der	Catalog No.		W –	θ					
		SULNC		65 –	- 20			Space for ren	noving	
Option		Option Code		Spe	cification					
		SC	The mount surface is extended in the range from 1 to 150 mm (in the increments of 1 mm).						L.	
		N12			es of cam I e changed t			37		
		Order	รเ	JLNC65 –	20 – SC12	20 – N12			S	$/ \zeta$
Refer to page 389 for detailed specifications of tapped holes and dowel pin holes (prepared hole,finished hole) for retainer.										

1	Table of Components							
No.	Description		Material and Remark					
1	Cam Holder	1	FC250					
2	Cam Slider	1	FC250 with Graphite					
3	Slide Keeper	2	S45C with Graphite					
4	Cam Driver	1	SF700					
(5)	Stopper Plate	1	SS400(1020)					
6	Coil Spring	1	TL40-125					
1	Positive Return Follower	1	S45C(1045)					
(8)	Stopper	1	Rubber					
12	Spring Guide Pin	1	SPRG19-60					

Bolts for assembly are not indicated.

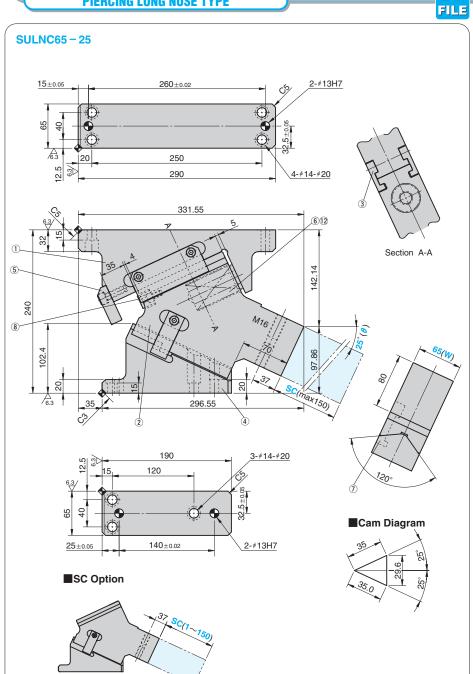
Spring Diagram Spring Used TL40

Spring Used TL40-125 (1 piece)
 Spring Constant 42.3N/mm (4.31kgf/mm)
 Guideline of spring durability 300,000 strokes



SULNC 65

PIERCING LONG NOSE TYPE



			Spring F	orce N(kgf)	Return	Total			
Travel S	Working Force kN(ton (300,000 strokes)		Initial Load	Final Load	Force N(kgf)	Weight kg	Catalog No.	w	θ
35.0		14.7 (1.5)	634.5 (64.7)	2115.0 (215.7)	2829 (288.7)	31.8	SULNC	65	25
Ore	der	Catalog No.	W 65	- θ - 25			Space for ren	noving	
Op	tion	Option Code	SI	pecification				\sim	
		SC 1		surface is ex om 1 to 150 i of 1 mm).					
			Dowel pin holes of cam holder and cam driver are changed to \$12H7						
		Order	SULNC65	– 25 – SC1:	20 – N12			S	\bigwedge
Refer to page 389 for detailed specifications of tapped holes and dowel pin holes (prepared hole,finished hole) for retainer.									

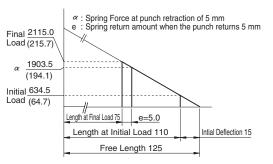
	Table of Components							
No.	Description		Material and Remark					
1	Cam Holder	1	FC250					
2	Cam Slider	1	FC250 with Graphite					
3	Slide Keeper	2	S45C with Graphite					
4	Cam Driver	1	SF700					
(5)	Stopper Plate	1	SS400(1020)					
6	Coil Spring	1	TL40-125					
7	Positive Return Follower	1	S45C(1045)					
8	Stopper	1	Rubber					
12	Spring Guide Pin	1	SPRG19-60					

Bolts for assembly are not indicated.

CAD

Spring Diagram

 Spring Used TL40-125 (1 piece) • Spring Constant 42.3N/mm (4.31kgf/mm) • Guideline of spring durability 300,000 strokes



SULNC 65