

# General Description of Slide Unit

## FOR LOOSE CORE

The slide unit for loose core is the unit to remove the core block smoothly from the inner undercut of the product.

**Sankyo's** slide unit is able to specify the slide angle at increments of 1°(max. 20°) corresponding to the undercut angle. The slide has oilless bearing and it can be used without any lubrication.

KOCU series, compact RCSU series and cooling type are available.

### ■ Types and features of slide units for loose core

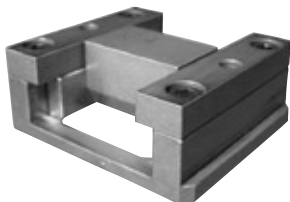
- Inclined Pin Fixing Type—**KOCU-S**  
—**KOCU-S-□/2**

#### KOCU-S



Maintenance-free inclined ejector core unit for easy removing of mouldings with undercut.  
Totally self-lubricating even at temperatures to  $300 \pm ^\circ\text{C}$ .  
Pivoted pin holder for maximum working angle of  $30^\circ$ .  
Fixing by screws and dowel pins or clamping between ejector plates.

#### KOCU-S-□/2



Maintenance-free inclined ejector core unit for easy removing of mouldings with undercut.  
Totally self-lubricating even at temperatures up to  $300^\circ\text{C}$ .  
Pivoted pin holder for maximum working angle of  $30^\circ$ .  
Fixing by screws and dowel pins or clamping between ejector plates.

### ● Inclined Pin Cooling Type—**KOCU-K**



Maintenance-free inclined ejector core unit for easy removing of mouldings with undercut.

With twin wall cooling for direct cooling of the slide core.

Totally self-lubricating even at temperatures up to  $300^\circ\text{C}$ .

Pivoted pin holder for maximum working angle of  $20^\circ$ .

Fixing by screws and dowel pins or clamping between ejector plates.

# General Description of Slide Unit

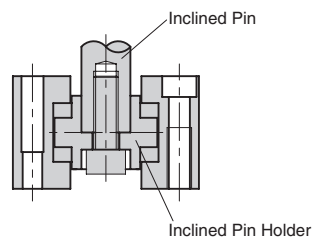
## FOR LOOSE CORE

### Types and features of slide units for loose core

#### ● Inclined Pin Fixing Type—KOCUF



Type to locate the core block by adjusting the inclined pin length.  
Use this when it is easy to insert and remove the core block and the inclined pin. The number of parts is limited and the unit is inexpensive.



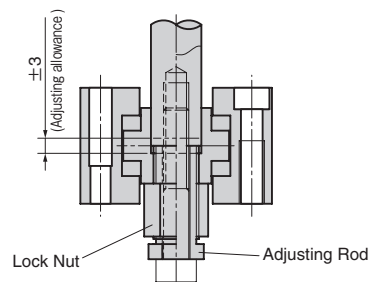
#### ● Inclined Pin Adjusting Type —KOCUM



It is not necessary to adjust the inclined pin length.

The adjusting rod of the screw can adjust the height.

Adjustment by inserting/removing the core block and the inclined pin is not required.



#### ● Compact Inclined Pin • Fixing Type —RCSUF • Adjusting Type —RCSUM

RCSU series is more compact than KOCU series.

Different from KOCU series (bolt hole counterbore type), bolt hole was changed to no counterbore and the area was limited to about 80% of KOCU. The height is about 90%. Fixing type and adjusting type are available. Full sizes are lined up.

#### RCSUF



#### RCSUM



#### ● Cooling Type Slide Unit • Adjusting Type —KOCUMR • Fixing Type —KOCUFR



Slide unit for inclined pin with cooling hole. Since the adjusting structure is used, adjustment by inserting/removing the core block and the inclined pin is not required. Please use the special manifold available as standard part.

### List of Slide Units for Loose Core

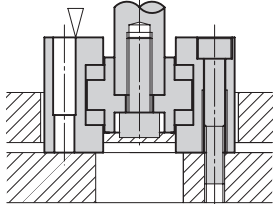
Catalog No.	Inclined Pin Holder		Slide Inclined Angle (increments of 1°)	Inclined Pin Diameter(φ)						
	Fixing Type	Adjusting Type		10	12	16	20	25	30	40
KOCUF	●	—	0° ~ 10°	—	—	●	●	●	●	—
KOCUM	—	●	0° ~ 10°	—	—	●	●	●	●	—
RCSUF	●	—	0° ~ 5°	●	●	—	—	—	—	—
			0° ~ 20°	—	—	●	●	●	●	●
RCSUM	—	●	0° ~ 20°	—	—	●	●	●	●	●
KOCUMR	—	●	0° ~ 10°	—	—	—	—	●	●	—
KOCUFR	●	—		—	—	—	—	—	—	—

### ■ Using the slide unit for Loose Core

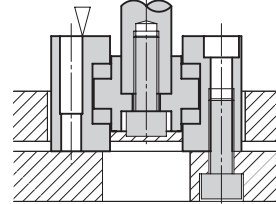
#### ● Installation method on die

The unit can be installed with four methods of ① to ④ shown below.

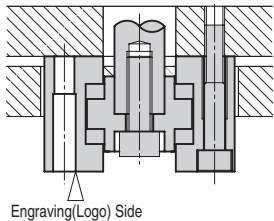
① Engraving(Logo) Side



② Engraving(Logo) Side

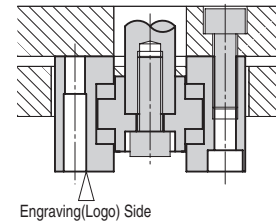


③



Engraving(Logo) Side

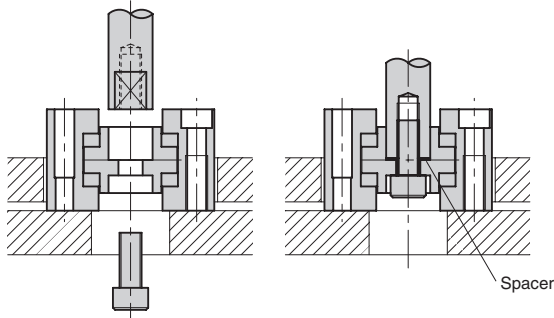
④



Engraving(Logo) Side

#### ● Fixing method of inclined pin on slide unit

##### 1) For fixing Type

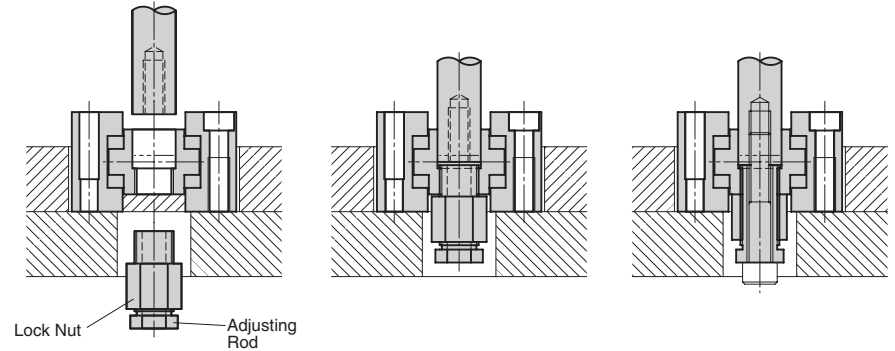


Spacer

Insert the pin by aligning the notch of the inclined pin to the loosening lock pin of the holder and fix the pin from underneath with a bolt.

⚠ Adjust the position of the core block with the pin length or spacer.

### 2) Adjusting Type



Lock Nut  
Adjusting Rod

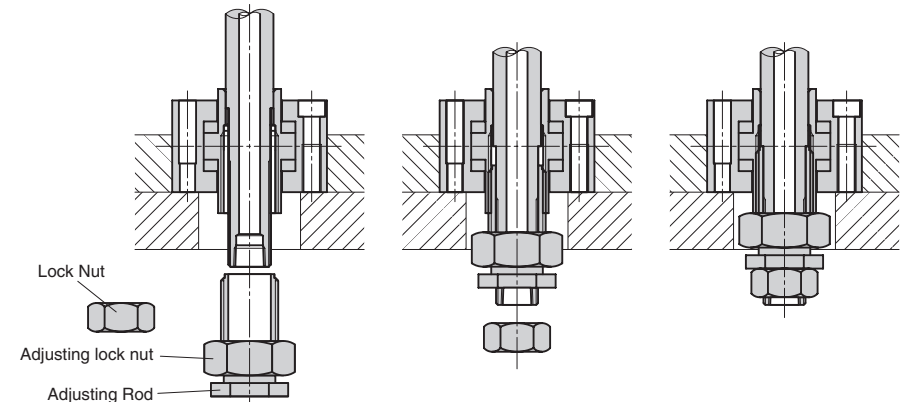
Insert the inclined pin into the holder and adjust the position.

Screw in the adjusting rod from underneath and have close contact with lower part of the Inclined Pin.

Fix the position by tightening the lock nut.

Fix it by pulling with a bolt.

### 3) Type with cooling hole



Lock Nut  
Adjusting lock nut  
Adjusting Rod

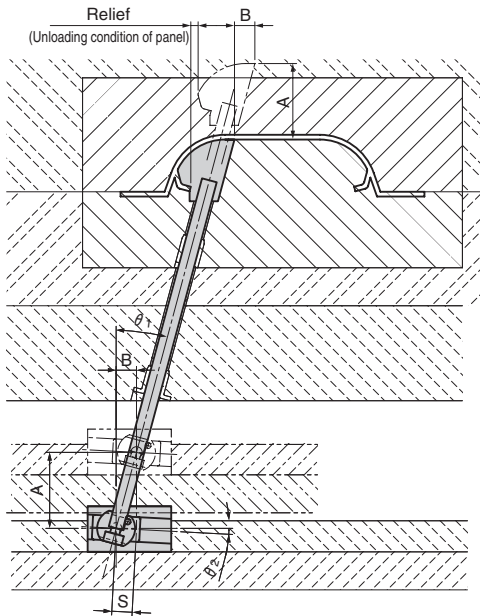
Insert the inclined pin into the holder and adjust the position.

When the core block position is determined, screw in the adjusting rod from underneath and have close contact with the inclined pin.

Tighten the adjusting lock nut and fix the adjusting rod on the inclined pin holder.  
Fix the inclined pin with a lock nut.

### Slide Unit Design Guide for Loose Core

#### (1) Movement of core ejector pin



To calculate movement:

- A : Panel ejection
- B : Horizontal movement of core
- $\theta_1$  : Angle of core ejector pin
- $\theta_2$  : Slide inclination angle of slide unit
- S : Actual movement of core

It is calculated by the equation of

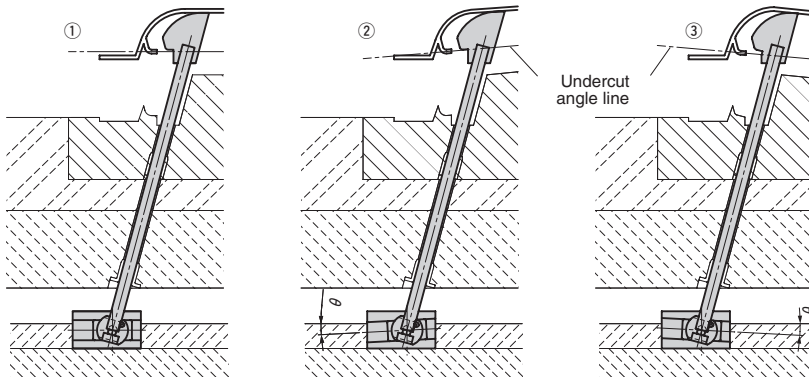
$$S = \tan \theta_1 \cdot A \cdot \operatorname{Cosec} \theta_2$$

- $\theta_1$  is determined by the relief width and the ejection.
- $\theta_2$  is generally determined equal to the angle at undercut.

#### (2) Angle at undercut and slide unit

The angle of the slide unit can be determined according to the angle at undercut.

In ①,  $\theta$  is  $0^\circ$  because the undercut angle is  $0^\circ$ . In ② and ③, the guide groove of the slide unit has angle corresponding to each undercut angle. Angle can be determined up to  $10^\circ$  (partially  $20^\circ$ ) at increments of  $1^\circ$ .



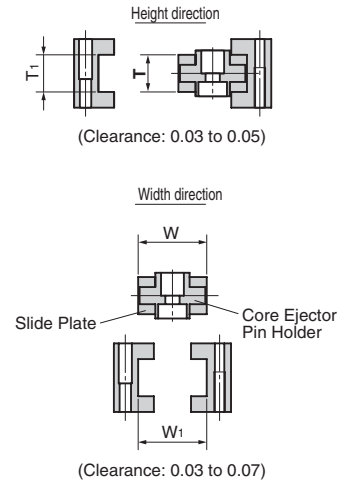
#### (3) Clearance of Slide Unit

- Clearance of the core ejector pin holder (slide plate) for the guide rail groove is determined to be:  
Height direction (T and T1)..... $0.03 \sim 0.05$   
Width direction (W and W1)..... $0.03 \sim 0.07$

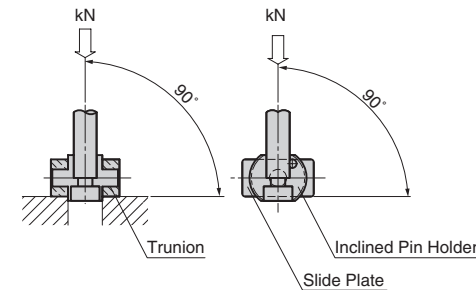
⚠ Clearance for width above shows when the tolerance between dowel holes is  $\pm 0$ .

- Loose Clearance Type Option  
To facilitate adjustment of the adjustment in assembly, provide play of 0.1 to 0.2 in the width direction.

⚠ Indicate -G at the end of order code.  
Play of 0.1 to 0.2 is provided when the tolerance between dowel holes is  $\pm 0$ .



#### (4) Load Resistance of Slide Unit



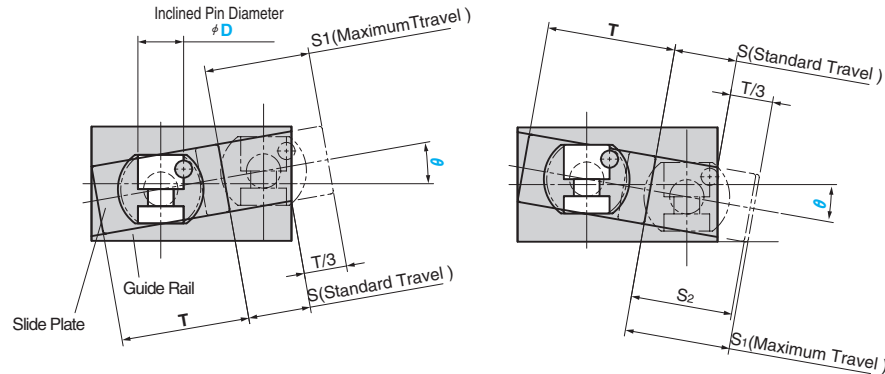
Catalog No.	Inclined Pin Diameter (φ)	Static Allowable Load(kN)
RCSUF	10	49.3
	12	61.6
KOCUF	16	79.2
KOCUM	20	79.2
RCSUF	25	92.4
RCSUM	30	134.6
RCSUF	35	158.4
RCSUM	40	193.6

\*The static allowable loads above are the values considering the following three factors:

- ① Strength at the inclined pin holder trunion
- ② Strength of the inclined pin holder seating
- ③ Strength of the slide plate

## ■ Slide Unit Design guide for Loose Core

(5) Travel of slide unit



In normal operation, use the slide unit in the range of the standard travel.

\*The standard travel means the travel range that does not make the slide plate does to come out of the guide rail.

For a slide unit that comes out of the guide rail, the protrusion should be limited to 1/3 of the slide plate length T (at the maximum travel).

If a travel beyond the guide rail is determined, consider interference with the ejector plate for operation.

## • Standard Travel

Catalog No.	D	T	S standard travel for each $\theta$										
			0	1	2	3	4	5	6	7	8	9	10
KOCUF	16	45	25.0	24.6	24.2	23.8	23.5	23.2	22.9	22.6	22.3	22.1	21.8
KOCUM	20	45	30.0	29.6	29.2	28.8	28.5	28.2	27.9	27.6	27.4	27.1	26.9
KOCUMR	25	50	35.0	34.6	34.1	33.8	33.4	33.0	32.7	32.4	32.2	31.9	31.7
KOCUFR	30	60	40.0	39.5	39.0	38.6	38.1	37.8	37.4	37.1	36.8	36.5	36.3

\*KOCUMR • KOCUFR has only D25 and 30.

( $\theta \leq 10^\circ$ )

Catalog No.	D	T	S standard travel for each $\theta$										
			0	1	2	3	4	5	6	7	8	9	10
RCSUF	10	28	22	21.7	21.4	21.2	20.9	20.7	—	—	—	—	—
	12	36	24	23.7	23.3	23.0	22.7	22.5	—	—	—	—	—
	16	40	25	24.7	24.3	24.0	23.8	23.5	23.3	23.0	22.8	22.6	22.5
	20	40	30	29.6	29.2	28.8	28.5	28.2	27.9	27.6	27.3	27.1	26.8
RCSUF	25	45	35	34.6	34.1	33.7	33.4	33.0	32.7	32.4	32.1	31.9	31.7
RCSUM	30	55	45	44.5	44.0	43.6	43.1	42.8	42.4	42.1	41.8	41.5	41.3
	35	70	45	44.4	43.9	43.4	42.9	42.5	42.1	41.7	41.3	41.0	40.8
	40	70	55	54.4	53.7	53.2	52.6	52.2	51.7	51.3	50.9	50.5	50.2

## • Standard Travel

( $\theta \geq 11^\circ$ )

Catalog No.	D	T	S standard travel for each $\theta$									
			11	12	13	14	15	16	17	18	19	20
RCSUF	16	40	22.3	22.2	22.1	22.0	21.9	21.9	21.9	21.8	21.9	21.9
	20	40	26.6	26.5	26.3	26.2	26.0	25.9	25.9	25.8	25.8	25.8
	25	45	31.4	31.3	31.1	31.0	30.9	30.8	30.7	30.7	30.7	30.7
	30	55	41.0	40.9	40.7	40.6	40.5	40.4	40.4	40.4	40.4	40.5
	35	70	40.5	40.3	40.2	40.0	40.0	39.9	39.9	39.9	39.9	40.0
RCSUM	40	70	50.0	49.7	49.5	49.4	49.2	49.1	49.1	49.1	49.1	49.2

## • Maximum Travel

Catalog No.	D	T	S <sub>1</sub> Maximum travel for each $\theta$ [Values in ( ) refer to S <sub>2</sub> .]										
			0	1	2	3	4	5	6	7	8	9	10
KOCUF	16	45	40.0	39.6	39.2	38.8	38.5	38.2	37.9	37.6	37.3	37.1	(35.8)
KOCUM	20	45	45.0	44.6	44.2	43.8	43.5	43.2	42.9	42.6	42.4	42.1	41.9
KOCUMR	25	50	51.7	51.2	50.8	50.4	50.1	49.7	49.4	49.1	48.8	48.6	48.4
KOCUFR	30	60	60.0	59.5	59.0	58.6	58.1	57.8	57.4	57.1	56.8	56.5	56.3

\*KOCUMR • KOCUFR has only D25 and 30.

( $\theta \leq 10^\circ$ )

Catalog No.	D	T	S <sub>1</sub> Maximum travel for each $\theta$ [Values in ( ) refer to S <sub>2</sub> .]										
			0	1	2	3	4	5	6	7	8	9	10
RCSUF	10	28	31.3	31.0	30.8	30.5	30.3	30.0	—	—	—	—	—
	12	36	36.0	35.7	35.3	35.0	34.7	34.5	—	—	—	—	—
	16	40	38.3	38.0	37.7	37.4	37.1	36.8	36.6	36.4	36.2	36.0	35.8
RCSUF	20	40	43.3	42.9	42.1	42.1	41.8	41.5	41.2	40.9	40.6	40.4	40.2
	25	45	50.0	49.6	49.1	48.7	48.4	48.0	47.7	47.4	47.1	46.9	46.7
	30	55	63.3	62.8	62.3	61.9	61.5	61.1	60.7	60.4	60.1	59.8	59.6
RCSUM	35	70	68.3	67.8	67.2	66.7	66.2	65.8	65.4	65.0	64.7	64.4	(64.1)
	40	70	78.3	77.7	77.1	76.5	76.0	75.5	75.0	74.6	74.2	73.9	(73.6)

( $\theta \geq 11^\circ$ )

Catalog No.	D	T	S <sub>1</sub> Maximum travel for each $\theta$									
			11	12	13	14	15	16	17	18	19	20
RCSUF	16	40	35.7	35.5	35.4	35.3	35.3	35.2	35.2	35.2	35.2	35.2
	20	40	40.0	39.8	39.6	39.5	39.4	39.3	39.2	39.1	39.1	39.1
	25	45	46.4	46.3	46.1	46.0	45.9	45.8	45.7	45.7	45.7	45.7
	30	55	59.4	59.2	59.0	58.9	58.8	58.8	58.7	58.7	58.8	58.8
	35	70	63.9	63.7	63.5	63.4	63.3	63.2	63.2	63.2	63.3	63.3
RCSUM	40	70	73.3	73.1	72.8	72.7	72.6	72.5	72.4	72.4	72.5	72.5