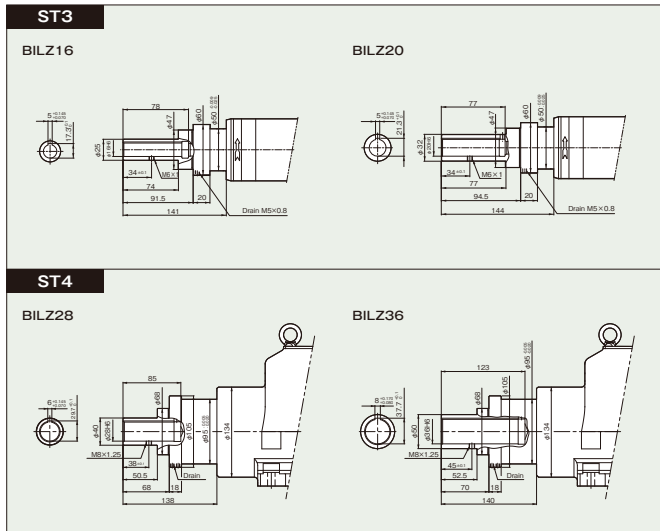


Adjustable spindle nose^[ST3-ST4]

An adjustable spindle nose is available for ST3 and ST4 models.
Please specify the adjustable spindle nose when ordering your synchro tapper.
Sugino supplies adjustable spindle noses other than those shown below, upon request.

Dimensions (mm)



Notes 1. Dimensions of spindle shown here are as per recommendation of NT Tool Co., Ltd.
2. Drain must be downward when the unit is set for horizontal position or declining position for downward.
3. Drain plug must be removed when the unit is set for horizontal position or declining position for downward.

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SUGINO

CAT.NO.N3312E

SERVO

series

Mechanical feed and electronic control tapping unit

synchro tapper™

Servo series



 **SUGINO MACHINE LIMITED**

synchro taper™ Servo series

Electronically controlled and high accuracy tapping unit equipped with high quality servo motor.
It is suitable for small hole and blind hole tapping.



synchro taper model ST2

1. Repeatability of $\pm 0.03\text{mm}$ or less at full stroke.
2. High speed tapping at up to $4,000\text{min}^{-1}$.
3. A second reference point allows for greatly reduced cycle time.

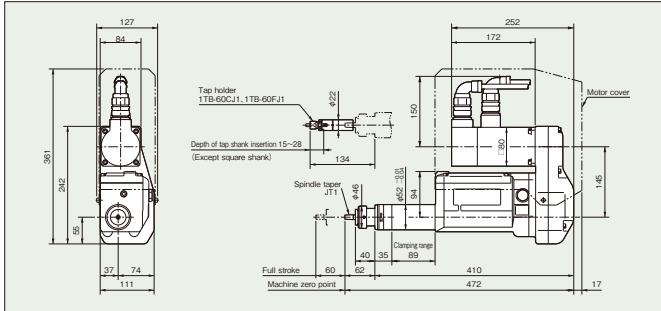
Tapping capacity
Aluminium : M6
Steel : M5

Capacity

Specs.	Spindle speed		Tapping capacity		Stroke			Motor	Thread pitch		Weight
	Fast approach speed	Pitch feed speed	AL* (ADC)	ST* (S45C)	Fast approach speed	Pitch feed speed	Full stroke		mm	Thread/inch	
Model	min ⁻¹	mm	mm	mm	mm	mm	mm	kW	mm	Thread/inch	kg
ST2-104	Max.4,000	When machining M1~M5 1~4,000 When machining M6 1~3,000	M1 M6 (M6)	M1 M5 (M3.5)	Max.60	Max.60	Max.60	0.6 AC servo motor	0.25	100	13
									0.3	72	
									0.35	64	
									0.4	56	
									0.45	48	
									0.5	44	
									0.6	36	
									0.7	28	
									0.8	27	
									1.0	24	

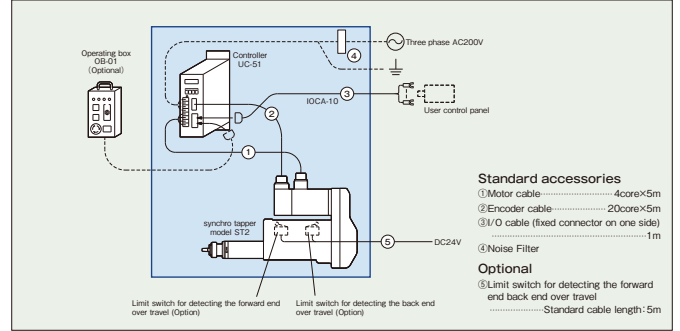
- Notes 1. Tapping capacities are for spiral tap or point tap (upper part) and for hand tap 2 (lower part) based on the depth of tapping being limited to 1.5 times of the tap diameter.
2. Rotating speed is decided by the material, tapping diameter and tapping speed etc.
3. The adequate feed rates shall be selected for the tapping pitch.
4. Rapid feed rate and cutting feed rate differ with thread pitch and spindle speed. Please contact your nearest sales office for more information.
5. Maximum weight of the attachment is as follows, Horizontal use : 8kg, Vertical (downward) use : 6kg.
6. When mounting the unit upward, please provide water proof cover in order to protect the unit from cutting oil and chips.
7. AL* - Aluminium ST* - Steel

Dimensions (mm)



- Notes 1. When tapping in a small hole at high speed, please select 1TB-60CJ1 (Centering type), and in a large hole at low speed, please select 1TB-60FJ1 (Floating type).
2. A motor cover and a tap holder (1TB-60CJ1 and 1TB-60FJ1) are optional.

Electric system diagram



- Notes 1. Operation box, OB-01 is optional. Please see page 10 for details.
2. Controller UC-51 has the function to detect the forward end and back end over travel (soft limit).
3. Other types of I/O cables than the above are available. Please see page 10 for details.

Controller [UC-51]

Special controller for ST2 to input digital data of stroke and rotating speed.



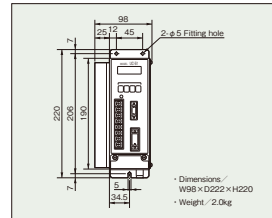
Specifications of input/output signals

Input signal	Input voltage	DC24V (Input signal at relay contact point or open collector transistor.)
	Input electric current	11mA
Output signal	Maximum contact capacity	Open collector DC24V, 50mA (Open collector can drive miniature relay and photo coupler.)
	External power supply	DC24V, 200mA (The sum of the input and output electric current must be less than 200mA.)

Function

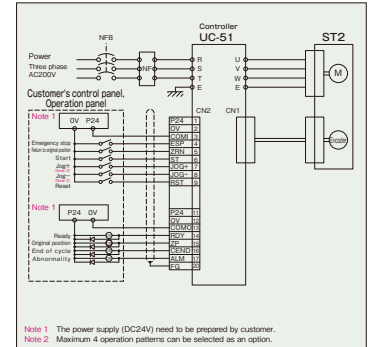
- Data input
- Monitoring
- External control (start-up, stop, signal at a cycle completion etc.)
- Alarm indication

Dimensions (mm)



- Note: Model ST2 cannot be controlled by only the sequence and requires UC-51 controller.

Electric schematic



- Note 1. The power supply (DC24V) need to be prepared by customer.
Note 2. Maximum 4 operation patterns can be selected as an option.



synchro tapper model ST3

1. Repeatability of $\pm 0.03\text{mm}$ or less at full stroke.
2. High speed tapping at up to $4,000\text{min}^{-1}$.
3. A second reference point allows for greatly reduced cycle time.

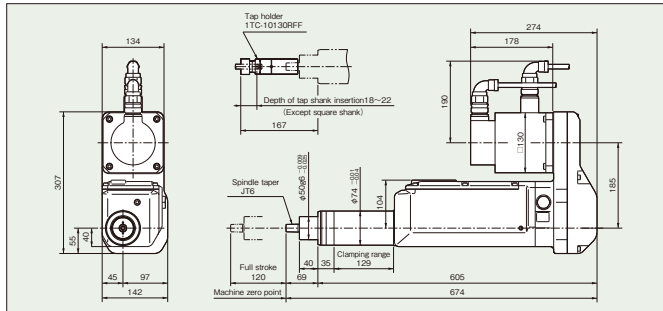
Tapping capacity
 Aluminium : M12
 Steel : M7

Capacity

Specs.	Spindle speed		Tapping capacity								Stroke			Motor	Thread pitch	Weight		
			1 spindle		2 spindles		3 spindles		4 spindles		Fast approach speed	Pitch feed speed	Full stroke					
	Fast approach speed	Pitch feed speed	AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)							mm	mm
Model	min ⁻¹																	
	Max. 4,000	When machining M3~M6 1~4,000	M12	M7	M8	M5	M8	M5	M6	M4								
		When machining M7~M12 1~3,000																
With multiple tapping head 1~3,000		M8	M6	M7	M4	M6	M3.5	M5	M3									
										Max. 120	Max. 120	Max. 120		1.8 AC servo motor				
															0.5	40	31	
															0.7	32		
															0.8	28		
															1.0	24		
															1.25	20		
															1.5	18		
															1.75	16		
																14		

- Notes 1. Tapping capacities are for spiral tap or point tap (upper part) and for hand tap 2 (lower part) based on the depth of tapping being limited to 1.5 times of the tap diameter.
 2. Rotating speed is decided by the material, tapping diameter and tapping speed etc.
 3. The adequate feed point shall be selected for the tapping pitch.
 4. Rapid feed rate and cutting feed rate differ with thread pitch and spindle speed. Please contact your nearest sales office for more information.
 5. Maximum weight of the attachment is as follows, Horizontal use : 15kg, Vertical (downward) use : 12kg
 6. When mounting the unit upward, please provide water proof cover in order to protect the unit from cutting oil and chips.
 7. AL* - Aluminium ST* - Steel

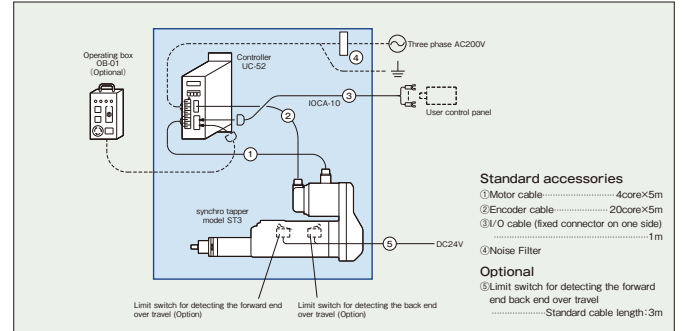
Dimensions (mm)



- Notes 1. When tapping in a small hole at high speed, please select 1TC-10130RFC (Centering type), and in a large hole at low speed, please select 1TC-10130RFF (Floating type).
 2. Tap holder (1TC-10130RC~1TC-10130RFF) is optional.

Electric system diagram

Electric parts supplied as standard are indicated in box. The customer is responsible for and needs to have the other cables and units.



- Notes 1. Operation box, OB-01 is optional. Please see page 10 for details.
 2. Controller UC-52 has the function to detect the forward end and back end over travel (soft limit).
 3. Other types of I/O cables than the above are available. Please see page 10 for details.

Controller [UC-52]

Special controller for ST3 to input digital data of stroke and rotating speed.



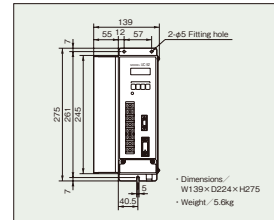
Specifications of input/output signals

Input signal	Input voltage	DC24V (Input signal at relay contact point or open collector transistor.)
	Input electric current	11mA
Output signal	Maximum contact capacity	Open collector DC24V, 50mA (Open collector can drive miniature relay and photo coupler.)
	External power supply	DC24V, 200mA (The sum of the input and output electric current must be less than 200mA.)

Function

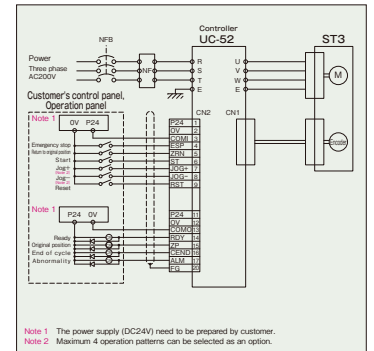
- Data input
- Monitoring
- External control (start-up, stop, signal at a cycle completion etc.)
- Alarm indication

Dimensions (mm)



Dimensions / W139 x D124 x H77.5
 Weight / 5.6kg

Electric schematic



- Notes 1. The power supply (DC24V) need to be prepared by customer.
 Note 2. Maximum 4 operation patterns can be selected as an option.

synchro tapper model ST4

1. Powerful unit with capacity to tap large holes up to M27 in aluminum.
2. A second reference point allows for greatly reduced cycle time.
3. 99 programs can be set for stroke and rotating speed.



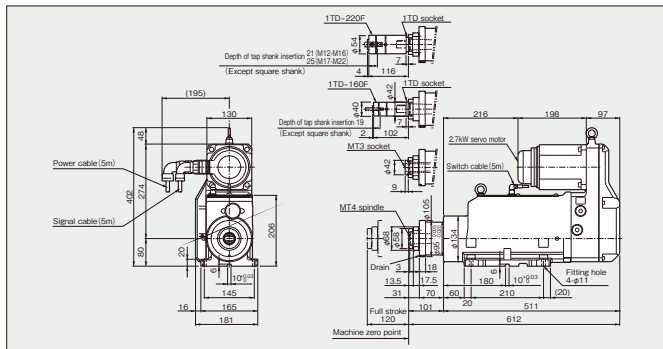
Tapping capacity
 Aluminium : M27
 Steel : M20

Capacity

Specs.	Spindle speed for tapping min ⁻¹	Tapping capacity								Stroke mm	Motor kW	Thread pitch		Weight kg
		1 spindle		2 spindles		3 spindles		4 spindles				mm	Thread/inch	
Model		AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)	AL* (ADC)	ST* (S45C)					
ST4-420	Max.550	M27	M20	M20	M12	M16	M10	M12	M8	Max. 120	2.7 AC servo motor	0.7	32 16	
												0.75	28 14	
												0.8	27 13	
												1	26 12	
												1.5	24 11	
												1.75	20 10	
												2	19 9	
												2.5	18 8	
												3		
												3.5		

- Notes 1. Tapping capacities are for spiral tap or point tap (upper part) and for hand tap 2 (lower part) based on the depth of tapping being limited to 1.5 times of the tap diameter.
 2. Rotating speed is decided by the material, tapping diameter and tapping speed etc.
 3. The adequate feed points shall be selected for the tapping pitch.
 4. Rapid feed rate and cutting feed rate differ with thread pitch and spindle speed. Please contact your nearest sales office for more information.
 5. Maximum weight of the attachment is 40kg for both horizontal and vertical use.
 6. When mounting the unit upward, please provide water proof cover in order to protect the unit from cutting oil and chips.
 7. AL* - Aluminium ST* - Steel

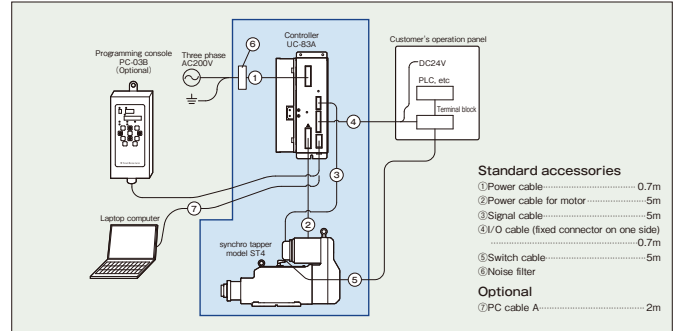
Dimensions (mm)



- Notes 1. A tap holder can be used if 1TD socket is equipped as an option.
 2. M14 tapping holder can be used for M14 spindle.
 3. M13 shank tapping holder can be used if M13 socket is equipped as an option.

Electric system diagram

Electric parts supplied as standard are indicated in box. The customer is responsible for and needs to have the other cables and units.



- Notes 1. The programming console and the touch panel are optionally available.
 2. Programming from a computer is possible using a "PC cable A". In such case, a dedicated computer monitoring software is required. Working environment: OS Windows 95/98/XP (The mode setting is necessary). Communication interface RS232C port.

Controller [UC-B3A] Same type of controller for selffeeder <varimec> SSV5 type. (Parameter is different.)



Function

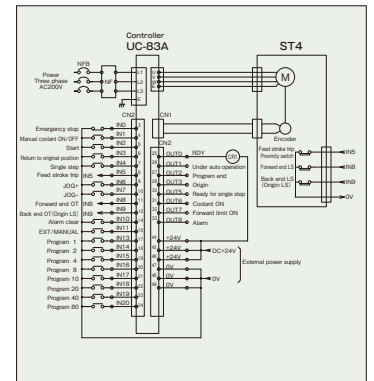
External control (start-up, stop, program complete signal etc.)

Note: PC-03B, TP-01 or PC monitor software is required for data input, monitoring, and alarm indication.

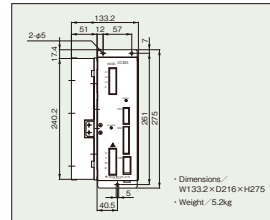
Specification of signal

Input signal	Input voltage	DC24V (Input signal at relay contact point or open collector transistor.)
	Input electric current	10mA
Output signal	Maximum contact capacity	Open collector DC24V, 90mA (Open collector can drive miniature relay and photo coupler.)

Electric schematic



Dimensions (mm)



Dimensions / W133.2 x D216 x H275
 Weight / 5.2kg

Note: Model ST4 cannot be controlled by only the sequence and requires UC-B3A controller.

synchro tapper model ST1



1. A compact tapping unit with a short length with total length of 348mm.
2. Efficient tapping with maximum 3,000 min⁻¹.
3. Maximum 99 different programs for stroke and rotating speed etc. can be preset.

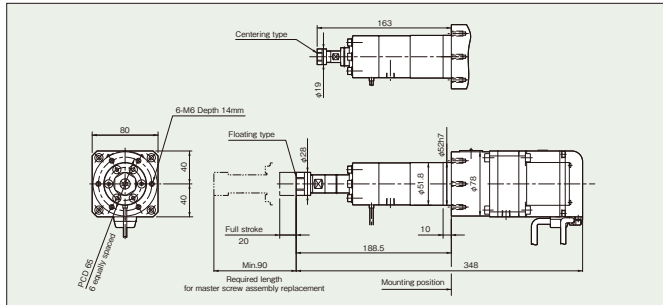
Tapping capacity
 Aluminium : M5
 Steel : M3.5

Capacity

Specs. Model	Spindle speed		Tapping capacity		Stroke			Motor	Thread pitch		Weight kg
	Fast approach speed min ⁻¹	Pitch feed speed	AL ¹ (ADC)	ST ² (S45C)	Fast approach speed	Pitch feed speed	Full stroke		mm	Thread inch	
ST1-103M	Max.4,000	Max.3,000	M5	M3.5	Max.20	Max.20	Max.20	0.4 AC servo motor	0.25 0.3 0.35 0.4 0.45 0.5 0.6 0.7 0.8	64 56 56 48 40 32	7

Notes 1. Tapping capacities are for spiral tap or point tap based on the tapping being limited to 1.5 times of the tapping diameter.
 2. Optional RPM is determined by the material, tapping diameter and tap pitch.
 3. The proper master screw assembly must be selected for each particular tap pitch.
 4. AL¹-Aluminium ST²-Steel

Dimensions (mm)



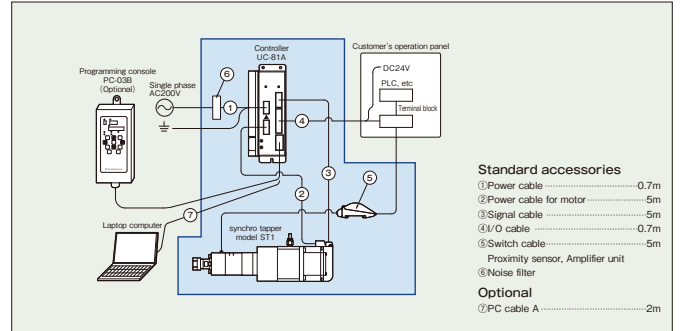
Tap holding collet chuck

We offer following two types of tap holding collet chucks.

- **Floating type**
Used for slower tapping and when there is misalignment of a pre-hole and the tap center is allowed radial float up to 0.2mm(OD).
- **Centering type**
For higher speeds and when small tapped holes are located accurately, the radial float is extremely small.

Electric system diagram

Electric parts supplied as standard are indicated in box. The customer is responsible for and needs to have the other cables and units.



- Standard accessories**
- ① Power cable 0.7m
 - ② Power cable for motor 5m
 - ③ Signal cable 5m
 - ④ I/O cable 0.7m
 - ⑤ Switch cable 5m
 - ⑥ Proximity sensor, Amplifier unit
 - ⑦ Noise filter
- Optional**
- ⑧ PC cable A 2m

Notes 1. The programming console and the touch panel are optionally available.
 2. Programming from a computer is possible using a "PC cable A". In such case, a dedicated computer monitoring software is required.
 Working environment: OS Windows 95/98/XP (The mode setting is necessary). Communication interface RS232C port.

Controller [UC-81A] Same type of controller for selfeeder <<varime>> SSV2 and SSV3 type. (Parameter is differ.)



Specification of signal

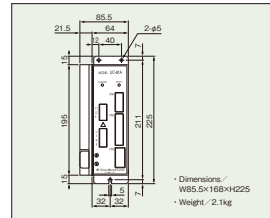
Input signal	Input voltage	DC24V (Input signal at relay contact point or open collector transistor.)
	Input electric current	10mA
Output signal	Maximum contact capacity	Open collector DC24V, 90mA (Open collector can drive miniature relay and photo coupler.)

Function

• External control (start-up, stop, program complete signal etc.)

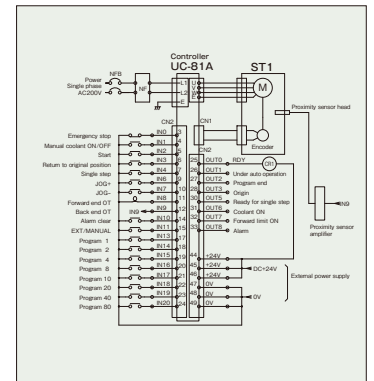
Note: PC-03B, TP-01 or PC monitor software is required for data input, monitoring and alarm indication.

Dimensions (mm)



Note: Model ST1 cannot be controlled by only the sequence and requires UC-81A controller.

Electric schematic

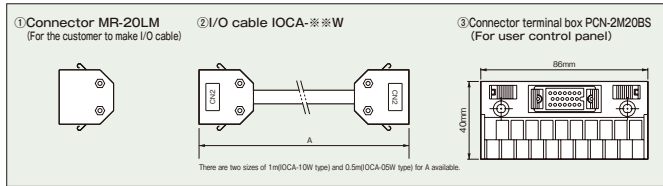


Optional Controlling

Special device for model ST2 and ST3

I/O cable

I/OCA-10 type shown in the electric schematic on page 3 and 5 is standard I/O cable. Following options are available.



Operating box OB-01

Operating box to operate model ST2 or ST3 individually. (Cable length : 5m)



- Function**
- Return to original position
 - Cycle operation
 - Jog operation
 - Emergency stop
 - Reset at abnormal situation
 - Status indication

Note: The bracket to fix an operating box (OB-01) to the machine is also available.

Over travel detecting limit switch cable

Limit switch cable to detect forward end and back end over travel which is to be connected to the customer's control panel. Please see the electric schematic on page 3 and 5 for details.

Addition of operation pattern

Standard operation pattern by controller UC-51 and UC-52 is one pattern. The customer can add maximum 4 patterns as an option.

Special device for model ST1 and ST4

Programming console PC-03B

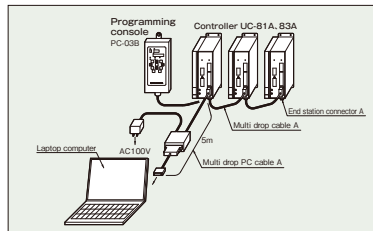
PC-03B type is the same programming console with selfeeder <<varimec>> series. The setting of stroke and rotation speed can be easily done.



- Function**
- Data input
 - Monitoring
 - Individual manual operation (start-up, stop, return to original position etc.)
 - Alarm indication

Multi drop connection

By connecting multiple controllers with multi drop cable, programming can be done without pulling out cables. (Maximum 10 controllers are connected.)



Optional Attachment

Special device for model ST2 and ST3

Flex stands

The Flex stand is a jig for fixing of synchro taper model ST2 and ST3 at a desired angle of operation.

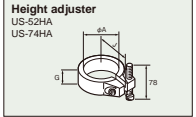


Dimensions (mm)

Model	Symbol	A	B	C	D	E	F	G	H	J	Applicable
FS-52	US-52	52	80	40	115	120	500	30	43	52	ST2
FS-74	US-74	74	110	45	135	140	600	30	56	65	ST3

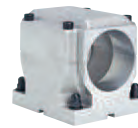
Dimensions (mm)

Model	Symbol	A	B	C	D	E	F	G	H	J	Applicable
FS-52	US-52	52	80	40	115	120	500	30	43	52	ST2
FS-74	US-74	74	110	45	135	140	600	30	56	65	ST3

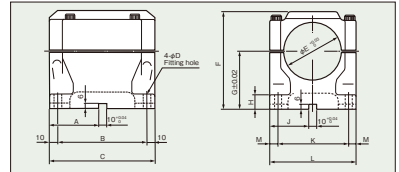


Level clamps

Fixture to set synchro taper model ST2 and ST3 parallel to machine base. 2 types available for different centering.



Dimensions (mm)



Dimensions (mm)

Model	Symbol	A	B	C	D	E	F	G	H	J	K	L	M	Applicable
LC-52							95	60						ST2
LC-52H		30	50	70	6.5	52	135	100	14	35	64	80	8	
LC-74							120	70						ST3
LC-74H		60	110	130	9	74	150	100	18	50	90	110	10	