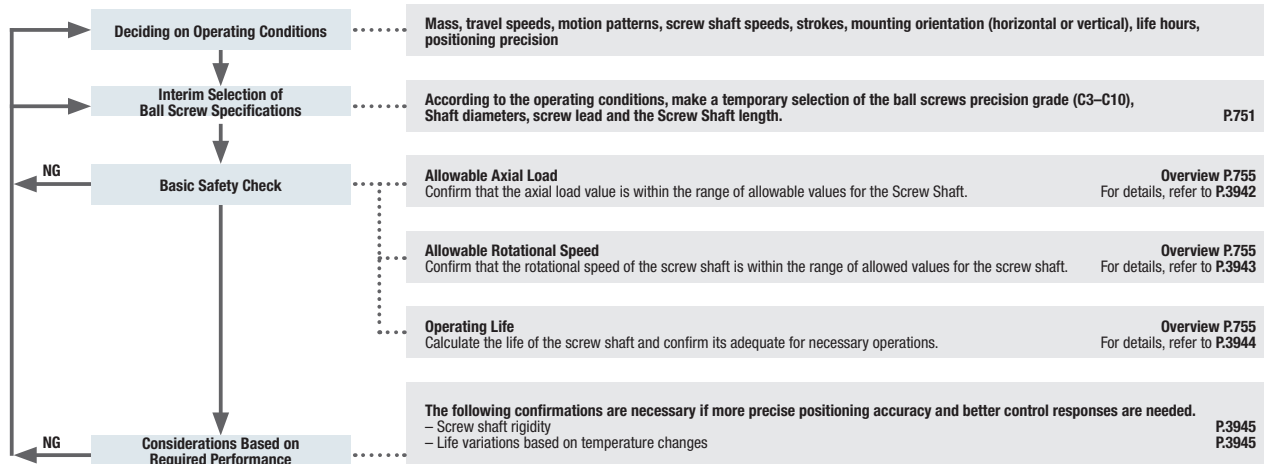


# Rolled Ball / Precision Ball Screws

## Selection Process

### Selection of Ball Screws

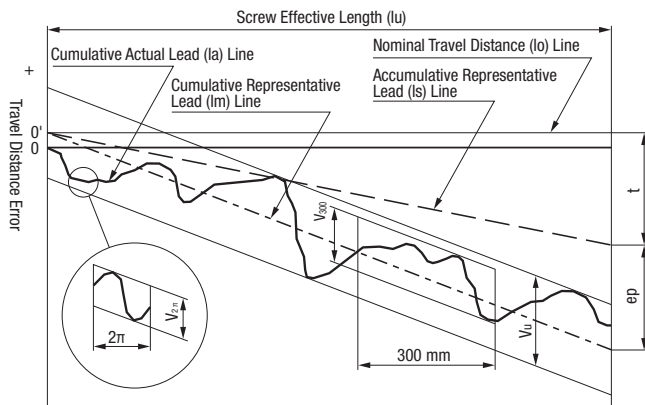
Refer to the following for the standard Ball Screws selection procedures.



\*For details on each item to be examined, refer to P.3940–3947.

### Lead Accuracy of Ball Screws (Details P.3940)

The lead accuracy of the Ball Screws is defined by the JIS Standard Characteristics ( $ep$ ,  $Vu$ ,  $V_{300}$  and  $V_{2\pi}$ ). In general, confirm the Actual Mean Travel Error for the Ball Screws is within the range of necessary positioning precision. Then select the precision grade for the Ball Screws to be used. Following are definitions and allowable values for each characteristic.



Term	Symbol	Meaning
<b>Actual Mean Travel Error</b>	$ep$	Difference between Actual Mean Travel and Specified Travel.
<b>Variation</b>	$Vu$	Maximum difference of the actual travel contained between two lines drawn parallel to the actual mean travel. Defined by the following three parameters:
	$V_{300}$	$Vu$ : Maximum value for the effective thread length. $V_{300}$ : Variation for a 300 mm span arbitrarily taken from the effective thread length.
	$V_{2\pi}$	$V_{2\pi}$ : Variation for an arbitrary 1 revolution ( $2\pi$ rad).
<b>Specified Travel</b>	$Is$	While the Nominal Travel indicates the nominal travel distance, this is the amount of axial travel distance after compensating possible axis expansion and contraction caused by thermal rise and loads.
<b>Specified Travel Target Value</b>	$t$	Difference between Specified Travel and Nominal Travel over the effective thread length. This value is predetermined by compensating for possible expansion and contraction caused by thermal conditions and external loads. This is determined by experimental data or experiences.
<b>Actual Travel</b>	$Ia$	Actual measured travel distance.
<b>Actual Mean Travel</b>	$Im$	Straight line representing the trend of actual travel. Straight line obtained by least squares method or other simplified and optimal approximation method from the curve that indicates the actual travel distance.

### Allowable Value

Allowable value of Actual Mean Travel Error ( $\pm ep$ ) and Variation ( $Vu$ ) for Positioning Screws (C series) Unit:  $\mu m$

Effective Screw Length (mm)		Precision Grade			
		C3		C5	
More Than	or Less	Actual Mean Travel Lead Error	Variation	Actual Mean Travel Lead Error	Variation
315	315	12	8	23	18
400	400	13	10	25	20
400	500	15	10	27	20
500	630	16	12	30	23
630	800	18	13	35	25
800	1000	21	15	40	27
1000	1250	24	16	46	30
1250	1600	29	18	54	35

Standard values for variations within 300mm of effective thread length ( $V_{300}$ ) and in one revolution ( $V_{2\pi}$ ) for Positioning Screws (JIS B 1192-1997, C accuracy grade series). Unit:  $\mu m$

Precision Grade	C3		C5	
Item	$V_{300}$	$V_{2\pi}$	$V_{300}$	$V_{2\pi}$
<b>Standard Value</b>	8	6	18	8

Standard values for variations within 300 mm of effective thread length ( $V_{300}$ ) for Transfer Screws (JIS B 1192-1997, Ct accuracy grade series). Unit:  $\mu m$

Precision Grade	Ct7	Ct10
<b>V300</b>	50	210

① Actual Mean Travel Error ( $ep$ ) for Transfer Screws (JIS B 1192-1997, Ct accuracy grade series) is obtained by  $ep=2 Lu/300 \cdot V_{300}$ .