

## 1-3 Accuracy

### ■ 1-3-1 Lead/Travel Accuracy

According to the standard of JIS, we classified our lead accuracy through  $E$ ,  $e$ ,  $e_{300}$  and  $e_{2\pi}$ , four main regulations. As figure 1.3.1 ~ 1.3.3 shown in below, all the definition and tolerance are specified. To test the accumulated travel deviations for grade C7 and C10, the tolerance will be chosen in random 300mm of useful length and evaluated if it is qualified with the  $e_{300}$  table of 1.3.3.

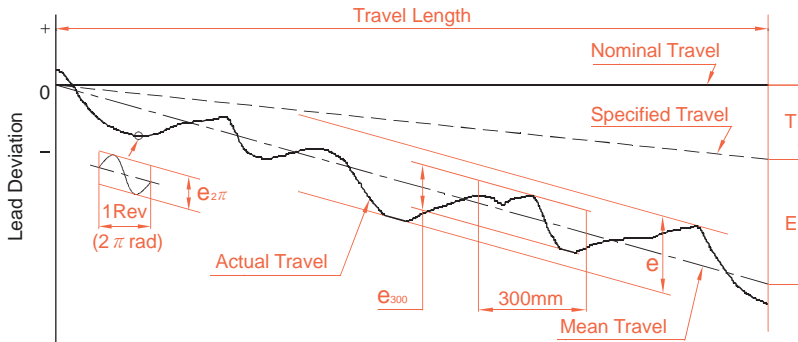


Fig 1.3.1 Diagram of Lead Accuracy

Terms	Reference	Definition	Allowable
Travel Compensation	T	Travel compensation is the deduction between specified and nominal travel in the useful travel. A slightly smaller value compared with nominal travel is often selected by customer, to compensate for an expected elongation caused by temperature rise or external load. Therefore " T " is usually a negative value. <i>Note : if no compensation is needed, specified travel is the same as nominal travel.</i>	
Actual Travel		Actual travel is the axial displacement of the nut relative to the screw shaft.	
Mean Travel		Mean travel is the linear best fit line of actual. This could be obtained by the least squares method. This line represents the tendency of actual travel.	
Mean Travel Deviation	E	Mean travel deviation is the deduction between mean travel and specified travel within travel length.	Table 1.3.2
Travel Variations	e	Travel variations is the coverage of 2 lines drawn parallel to the mean travel.	Table 1.3.2
	$e_{300}$	Maximum width of variation within the travel length.	Table 1.3.3
	$e_{2\pi}$	Actual width of variation for the length of 300mm taken anywhere within the travel length. Wobble error, actual width of variation for one revolution ( $2\pi$ radian)	Table 1.3.3

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Table 1.3.2 Mean Travel Deviation ( $\pm E$ ) and Travel Variation ( $e$ ) (JIS B 1192)

Unit :  $\mu\text{m}$

Grade		C0		C1		C2		C3		C5		C7	C10		
Travel Length (mm)	Over	Incl.	$\pm E$	$e$	$\pm E$	$e$	$\pm E$	$e$	$\pm E$	$e$	$\pm E$	$e$	$e$		
		100		3	3	3.5	5	5	7	8	8	18	18	$\pm 50/300\text{mm}$	$\pm 210/300\text{mm}$
	100	200	3.5	3	4.5	5	7	7	10	8	20	18			
	200	315	4	3.5	6	5	8	7	12	8	23	18			
	315	400	5	3.5	7	5	9	7	13	10	25	20			
	400	500	6	4	8	5	10	7	15	10	27	20			
	500	630	6	4	9	6	11	8	16	12	30	23			
	630	800	7	5	10	7	13	9	18	13	35	25			
	800	1000	8	6	11	8	15	10	21	15	40	27			
	1000	1250	9	6	13	9	18	11	24	16	46	30			
	1250	1600	11	7	15	10	21	13	29	18	54	35			
	1600	2000			18	11	25	15	35	21	65	40			
	2000	2500			22	13	30	18	41	24	77	46			
	2500	3150			26	15	36	21	50	29	93	54			
	3150	4000			30	18	44	25	60	35	115	65			
	4000	5000					52	30	72	41	140	77			
	5000	6300					65	36	90	50	170	93			
	6300	8000							110	60	210	115			
	8000	10000									260	140			
	10000	12500									320	170			

Table 1.3.3 Variation per 300mm ( $e_{300}$ ) and Wobble Error ( $e_{2\pi}$ ) (JIS B 1192)

Unit :  $\mu\text{m}$

Grade	C0	C1	C2	C3	C5	C7	C10
$e_{300}$	3.5	5	7	8	18	50	210
$e_{2\pi}$	2.5	4	5	6	8		

### 1-3-2 Axial Play

Axial play of kalatec precision ball screw is shown in

Table 1.3.4 Classification of Axial Play

Grade	P0	P1	P2	P3	P4
Axial Play	Yes	No	No	No	No
Preload	No	No	Light	Medium	Heavy