KSS HP Ball Screw Lifetime Calculation Prg. Instruction Mannual

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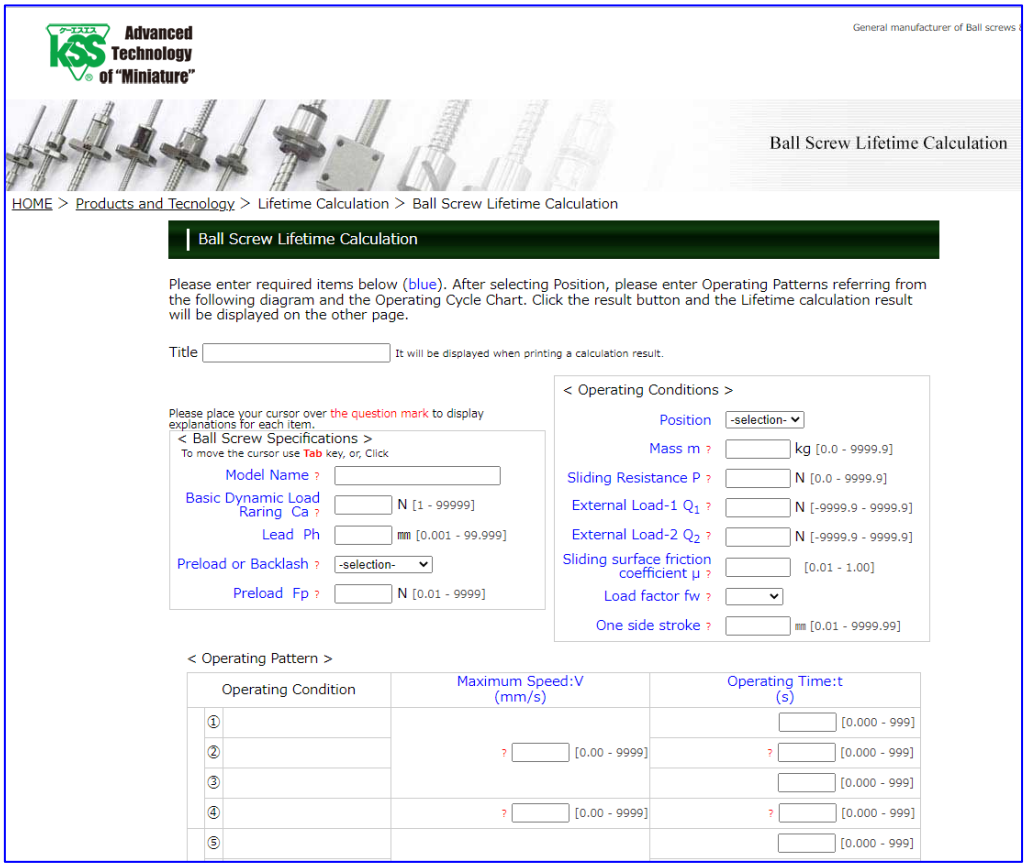
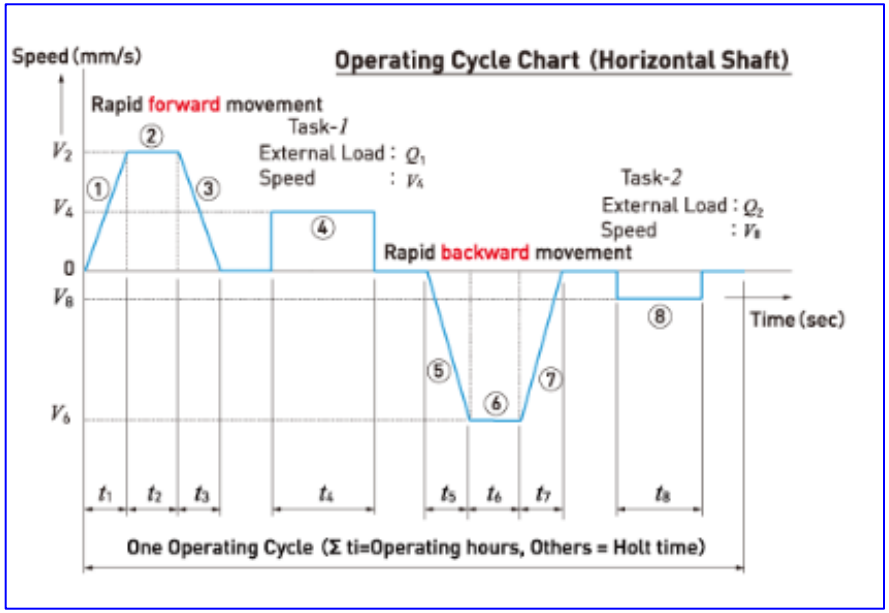
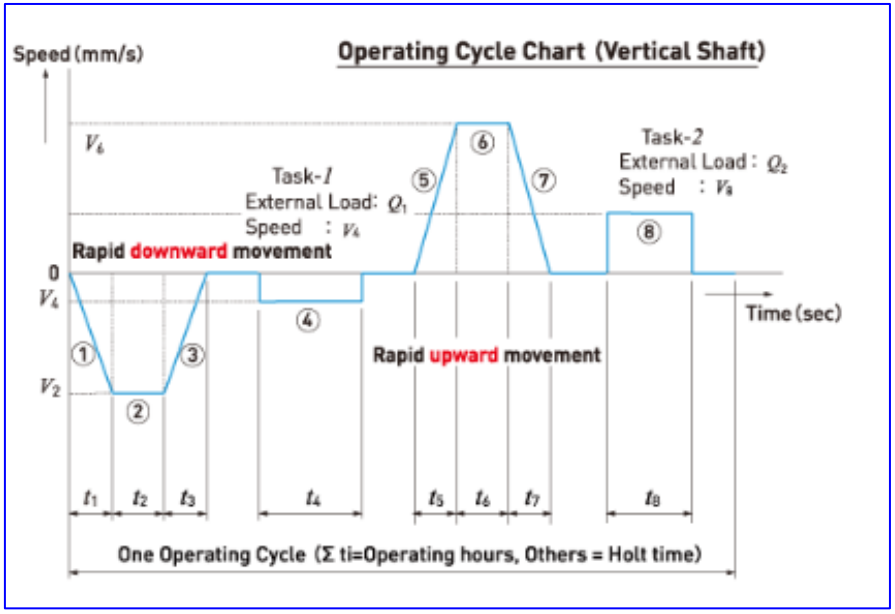


1) Applicable Operating Range

- This Program (Prg.) is applied for two kinds of general Horizontal Shaft and Vertical Shaft, not for Inclined Shaft.
- Applicable operating pattern for Horizontal and Vertical Shaft are as the following Operating Cycle Chart.
- Operating Cycle Chart is set not only rapid positioning for Acceleration, Constant speed and Deceleration, but also some movements (grinding at low speed etc.) are into consideration.
- Operating condition differences between forward and backward movement is into consideration.
- The following operating conditions are also available by changing values in Operating Cycle Chart: only reciprocation with no task, Triangle drive with no Constant speed area, and simply calculating with only load and speed.

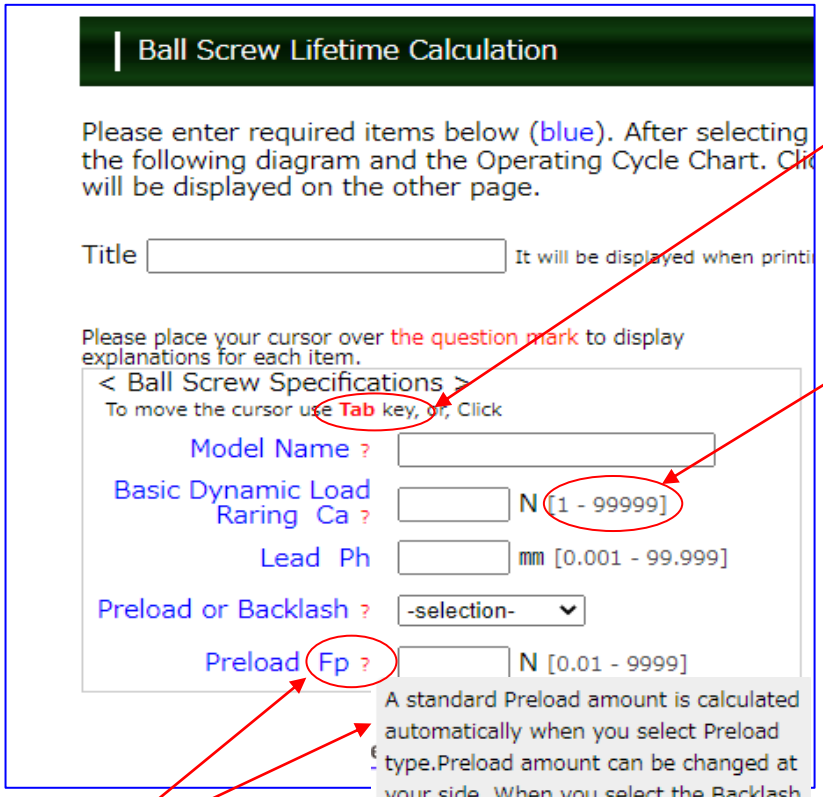




2)-1：Enter the Basic Information

・Please enter required items referring each explanation on screen.

・Placing your cursor over “?” mark appears each explanation regarding entering items.



Please use Tab key to move cursor, not Enter key.

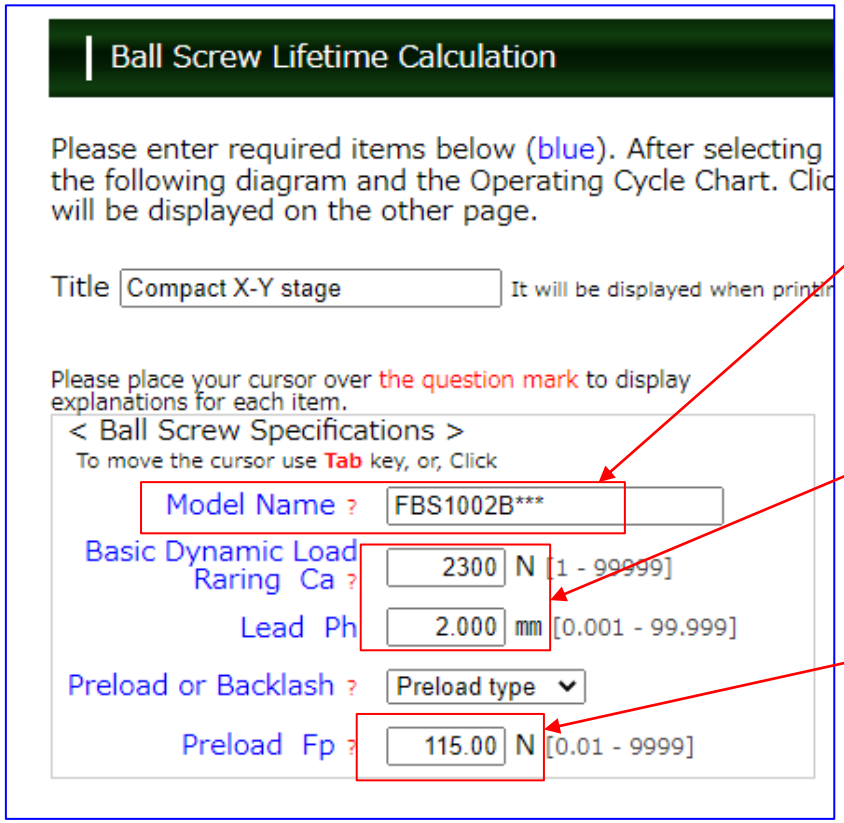
The value range and the number of decimal places you can enter are shown next to each cell.

Placing your cursor over question mark appears the detailed explanation.

2)-2：Enter Ball Screw Specifications

・Model Description, Basic Load Rating Ca, and Lead Ph require to be entered directly, not multiple-choice. To have versatility, it is not quoted from a database, entering directly.
Please enter values referring from KSS catalogue or your drawing.

・Selecting Preload type makes Preload Fpr calculated automatically 5 % of Basic Dynamic Load Rating (Standard value). You can revise Preload Fpr if you set it larger for rigidity up.



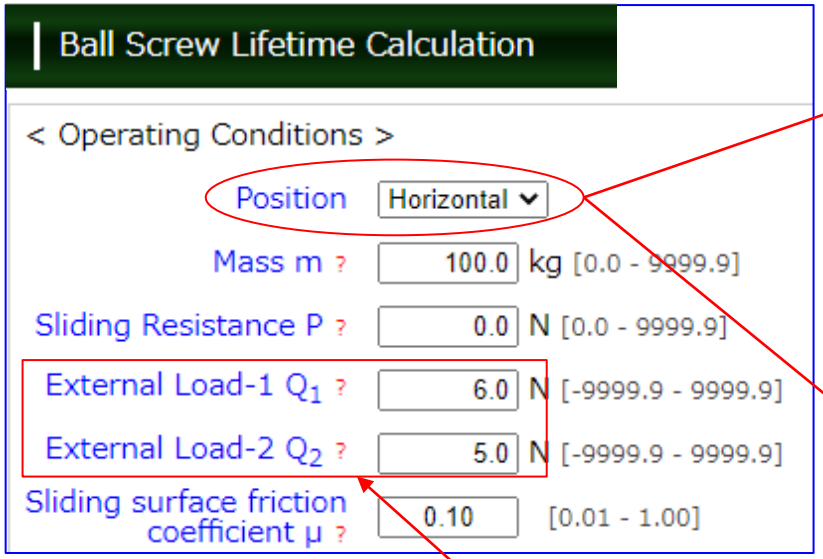
You can put your original Model Name. It is not selection from a database.

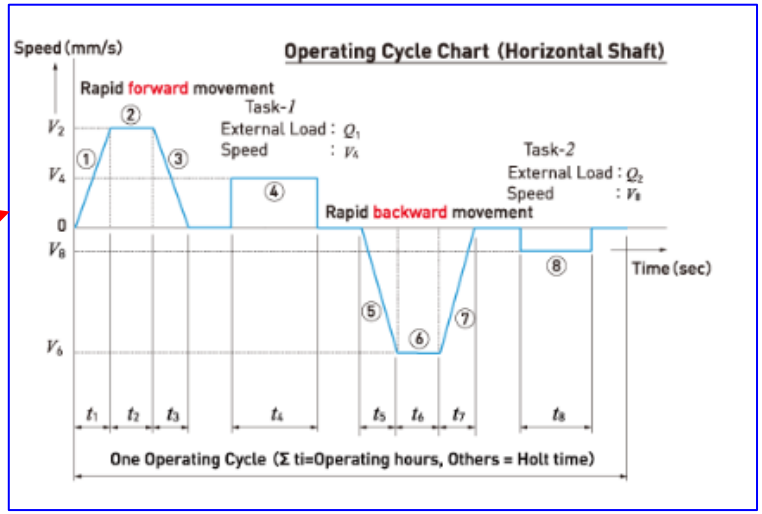
Please refer to KSS Catalogue or your drawing and enter value. It is not linked with Model Name.

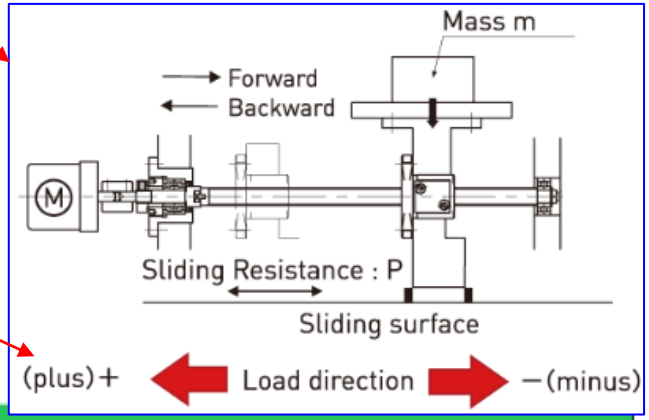
Selecting Preloaded type appears Basic preload automatically, however, you can overwrite value.

【Operating Cycle Chart and Load Direction】

- Selecting Position (Horizontal or Vertical) in Operating Condition appears the Load direction diagram and Operating Cycle Chart.
- Please enter values, External Load Q_1, Q_2, , Mass m, and Sliding Resistance P etc., referring explanations.
- Load direction affects Lifetime Calculation, so please enter value carefully.





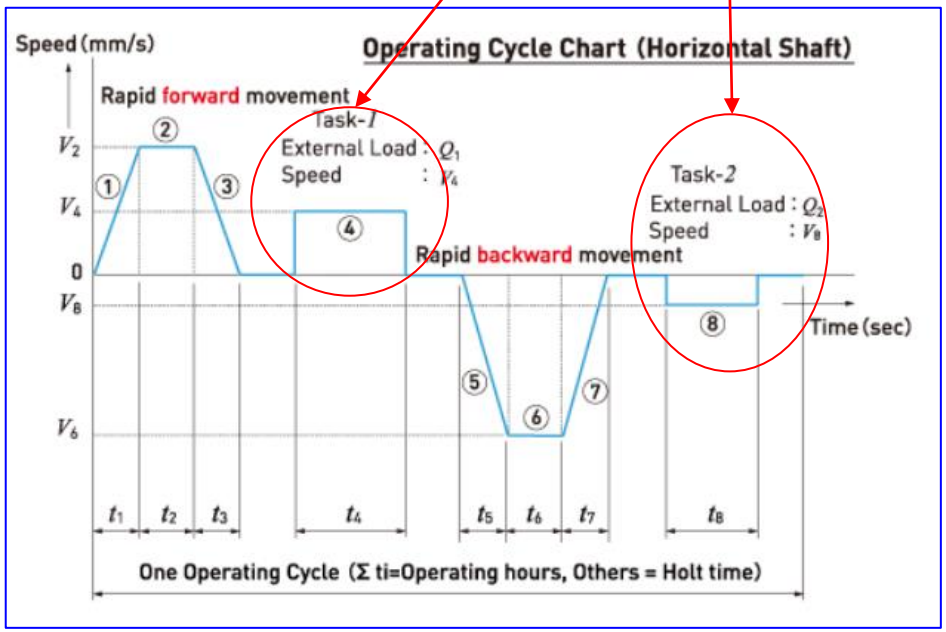


Please enter External Load -1,2 (Q_1,Q_2) considering load direction.

【No Movement task-1,2 (Only transferring)】

・If there is no task-1,2 (④,⑧), please enter 0 in External Load -1(Q_1) and External Load -2(Q_2).

If there is no task-1,2(④,⑧) , please enter 0 in External Load -1(Q1) and External Load -2(Q2).

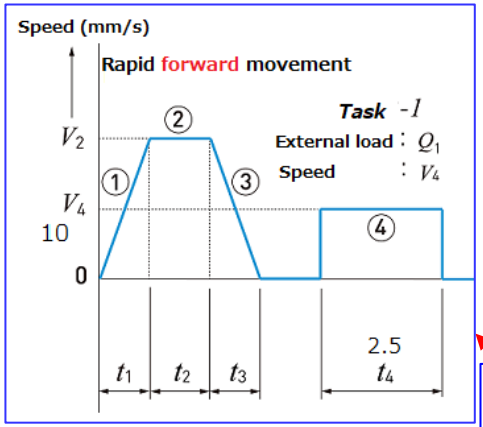


< Operating Conditions >

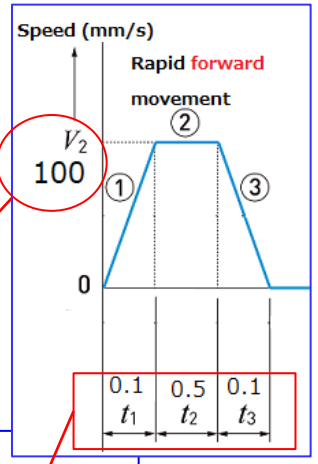
Position	Horizontal	
Mass m ?	100.0	kg [0.0 - 9999.9]
Sliding Resistance P ?	0.0	N [0.0 - 9999.9]
External Load-1 Q_1 ?	0.0	N [-9999.9 - 9999.9]
External Load-2 Q_2 ?	0.0	N [-9999.9 - 9999.9]
Sliding surface friction coefficient μ ?	0.10	[0.01 - 1.00]
Load factor fw ?	1.2	
One side stroke ?	100.00	mm [0.01 - 9999.99]

【Contrast of Operating Cycle Chart and Operating Table】

- The number of Operating Cycle Chart and Operating Table are in pairs.
  Please enter operating conditions (Speed V, Operating Time t) referring Operating Cycle Chart.
- Regarding Speed V (mm/s) at Acceleration and Deceleration, please enter value of Maximum Speed (Constant speed) ② .



Please refer to the Operating Cycle Chart.

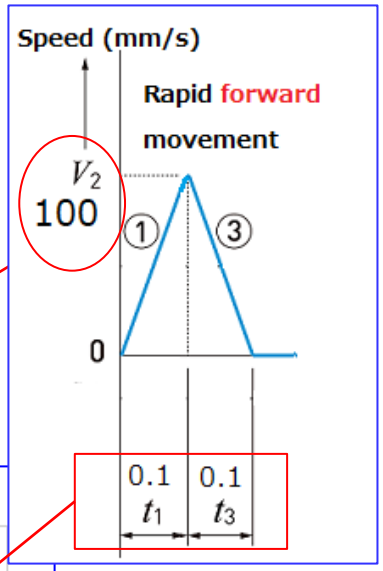


< Operating Pattern >

		Operating Condition	Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? [0.00 - 9999]	? [0.000 - 999]
Backward Movement	⑤	Backward Acceleration		[0.000 - 999]
	⑥	Backward at Constant speed	? [0.00 - 9999]	? [0.000 - 999]
	⑦	Backward Deceleration		[0.000 - 999]
	⑧	On-load 2 Constant speed	? [0.00 - 9999]	? [0.000 - 999]
			Cycle Time	? [0.000 - 9999]

【Triangle drive (No Constant speed area)】

・When it is Triangle drive without any Constant speed area ②, please enter value of Maximum Speed V in Acceleration and Deceleration (①③) and enter 0 in Operating Time t of Constant speed area ②.

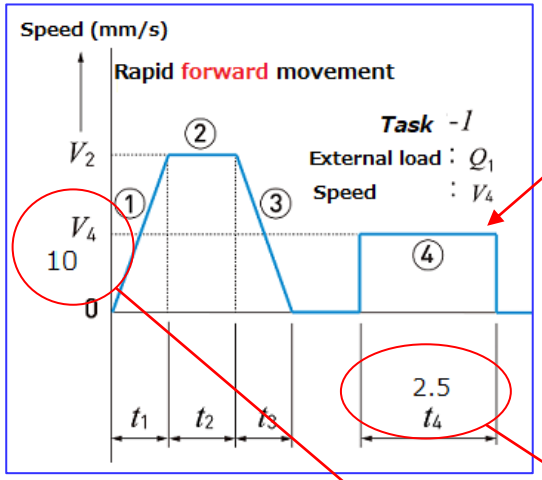


< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.000 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? [0.00 - 9999]	? [0.000 - 999]

【Entering Operating Cycle of Movement task-1,2 】

・Acceleration and Deceleration is not into consideration in task -1,2 (④,⑧), therefore, please enter only Speed conditions (Maximum Speed V and Operating Time t).
In this case, External Load-1,2 (Q_1, Q_2) is required to be entered.



Please enter only Speed V and Operating Time t. Acceleration and Deceleration is not into consideration task -1,2.

< Operating Conditions >

Position	Horizontal		
Mass m ?	100.0	kg	[0.0 - 9999.9]
Sliding Resistance P ?	0.0	N	[0.0 - 9999.9]
External Load-1 Q_1 ?	10.0	N	[-9999.9 - 9999.9]
External Load-2 Q_2 ?	-50.0	N	[-9999.9 - 9999.9]
Sliding surface friction	0.10		[0.01 - 1.00]

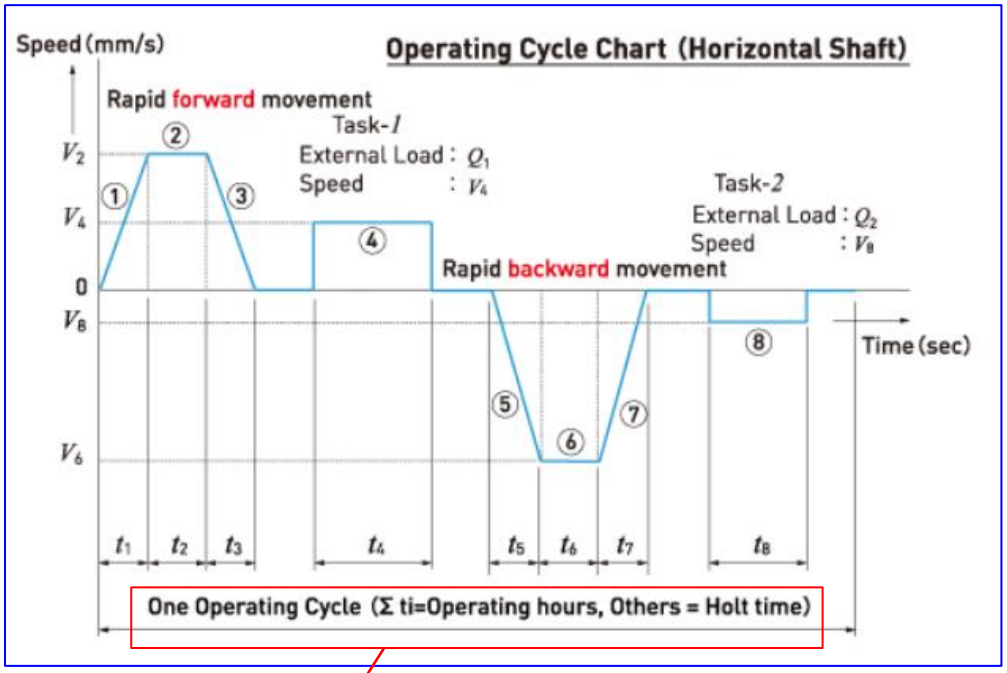
If you do not enter value of External-1 (Q_1), neither ④ nor ⑧ cannot be entered.

< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.000 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? 10.00 [0.00 - 9999]	? 2.500 [0.000 - 999]
	⑤	Backward Acceleration		0.100 [0.000 - 999]

【Entering Cycle time 】

・Please enter the total of operating time and holt time (reciprocation) in Cycle Time as shown in Operating Cycle Chart.



< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Movement	⑦	Backward Deceleration		0.100 [0.000 - 999]
	⑧	On-load 2 Constant speed	? 10.00 [0.00 - 9999]	? 1.500 [0.000 - 999]
			Cycle Time	? 8.500 [0.000 - 9999]

Cycle time is one reciprocation operating time including holt time.

【Calculation Result Button 】

- Clicking “Calculation Result” button appears calculation result on the other page.
- Updated result tab is added when you back to the entering screen, re-enter operating conditions, and click the Calculation Result button.

< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.500 [0.000 - 999]
	②	Forward at Constant speed	? 150.00 [0.00 - 9999]	? 1.000 [0.000 - 999]
	③	Forward Deceleration		0.500 [0.000 - 999]
	④	On-load 1 Constant speed	?	
Backward Movement	⑤	Backward Acceleration		
	⑥	Backward at Constant speed	? 15	
	⑦	Backward Deceleration		
	⑧	On-load 2 Constant speed	?	

Calculation Result | All

Calculation Result appears on the other tab.

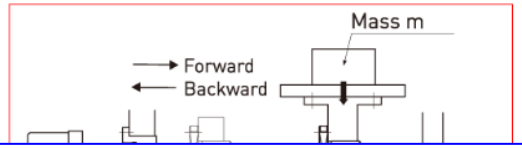
KSS JAPAN | Ball Screw Lifetime | Ball Screw Lifetime Calculation

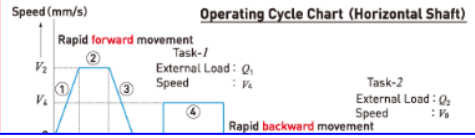
https://www.kssballscrew.com/us/bscalc/index.php

Ball Screw Lifetime Calculation Result (Horizontal Shaft) [Compact X-Y stage]

< Ball Screw Specifications >	
Model Name	FBS1002B
Basic Dynamic Load Raring Ca	1750N
Lead Ph	2.000mm
Preload or Backlash	Preload type
Preload Fp	87.50N

< Operating Conditions >	
Position	Horizontal
Mass m	25.0kg
Sliding Resistance P	10.0N
External Load-1 Q_1	5.0N
External Load-2 Q_2	-10.0N
Sliding surface friction coefficient μ	0.10
Load factor fw	1.5
One side stroke	100.00mm





【Calculation Result Screen】

・Each operating pattern of Acceleration α, Rotational Speed N, and Load F are calculated and shown on the sheet below.

< Operating Pattern >

(Note) Leftward load: +, Rightward load: -

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)	Acceleration:α (m/s^2)	Rotational Speed:N (min^{-1})	Load:F (N)
Forward Movement	①	Forward Acceleration	100.00	0.100	1.00	1,500.00	59.52
	②	Forward at Constant speed		0.500	n/a	3,000.00	34.52
	③	Forward Deceleration		0.100	1.00	1,500.00	9.52
	④	On-load 1 Constant speed	5.00	0.500	n/a	150.00	39.52
Backward Movement	⑤	Backward Acceleration	100.00	0.100	1.00	1,500.00	-59.52
	⑥	Backward at Constant speed		0.500	n/a	3,000.00	-34.52
	⑦	Backward Deceleration		0.100	1.00	1,500.00	-9.52
	⑧	On-load 2 Constant speed	5.00	0.500	n/a	150.00	0.00
			Cycle Time	7.000			
			Operating time	2.400			
			Halt time	4.600			

< Calculation Result >

Rating Lifetime L_{10} : (Merged)	1,066.38 *10^6 rev.
	2,132.75 km
	10.66 *10^6 Cycle(reciprocation)
	9,188.72 hours
Rating Lifetime L_{10} : (Halt time is in considered.)	26,800.43 hours
	1,116.68 days
	3.06 years

Show progress | Print (<Page Setup>Paper Size: A4 Portrait, Margins: minimum, Header and Footer: Hide)

The calculation result is based on JIS B1192-5, however, please note that this is for reference purpose only and we cannot guarantee the values.We shall not take any responsibilities for any damages and troubles through this calculation. For more information regarding calculation result, please contact us +81-3-3756-3921, or intldept@kss-superdrive.co.jp .

・Calculation Result is shown on "Calculation Result" part.
Actual operating Lifetime and Lifetime considering holt time are calculated.

Acceleration α, Rotational Speed N, and Load F are calculated on each operating patterns.

This shows Calculation Result.
The upper part is actual operating time and the lower part is Lifetime considering holt time.

【Calculation Result -Load Direction-】

・The notation of Load F minus (-) in Operating Cycle Chart means that load direction is opposite, not an error.

< Operating Pattern >

(Note) Leftward load: +, Rightward load: -

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)	Acceleration:α (m/s^2)	Rotational Speed:N (min^{-1})	Load:F (N)
Forward Movement	①	Forward Acceleration	100.00	0.100	1.00	1,500.00	59.52
	②	Forward at Constant speed		0.500	n/a	3,000.00	34.52
	③	Forward Deceleration		0.100	1.00	1,500.00	9.52
	④	On-load 1 Constant speed	5.00	0.500	n/a	150.00	39.52
Backward Movement	⑤	Backward Acceleration	100.00	0.100	1.00	1,500.00	-59.52
	⑥	Backward at Constant speed		0.500	n/a	3,000.00	-34.52
	⑦	Backward Deceleration		0.100	1.00	1,500.00	-9.52
	⑧	On-load 2 Constant speed	5.00	0.500	n/a	150.00	0.00
			Cycle Time	7.000			
			Operating time	2.400			
			Halt time	4.600			

Minus notation of Load means load direction is opposite which is contact point of Ball is different.

【 Calculation Result –Rating Lifetime L_{10} – 】

- Calculation Result is shown in four items: Total number of revolution (rev.), Travel distance (km), Number of reciprocation (cycle), and Operating time.
- Number of reciprocation is calculated based on one side stroke (mm) entered.
- Rating Lifetime L_{10} considering holt time is shown hourly, daily and yearly basis.

< Calculation Result >

Rating Lifetime L_{10} : (Merged)	1,066.38 *10^6 rev.
	2,132.75 km
	10.66 *10^6 Cycle(reciprocation)
	9,188.72 hours
Rating Lifetime L_{10} : (Halt time is in considered.)	26,800.43 hours
	1,116.68 days
	3.06 years

Show progress | Print (<Page Setup>Paper Size: A4 Portrait, Margins: minimum, Header and Footer: Hide)

The calculation result is based on JIS B1192-5, however, please note that this is for reference purpose only and we cannot guarantee the values.We shall not take any responsibilities for any damages and troubles through this calculation. For more information regarding calculation result, please contact us +81-3-3756-3921, or intldept@kss-superdrive.co.jp .

Actual operating Lifetime is shown each items: Total number of revolution (rev.), Travel distance (km), Number of reciprocating (cycle), and Operating time.

Rating Lifetime including holt time is shown hourly, daily and yearly basis.

【Calculation Progress】

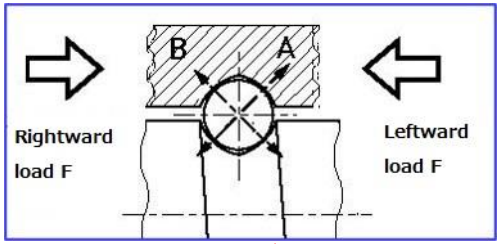
・Clicking “Show Progress” button appears a table below.

This shows load distribution of contact point under each operating conditions and you do not need to concern about it. For further information, please contact KSS.

Rating Lifetime L_{10} : (Halt time is in considered.)	26,800.43 hours
	1,116.68 days
	3.06 years

Show progress | Print (<Page Setup>Paper Size: A4 Portrait, Margins: minimum,

The calculation result is based on JIS B1192-5, however, pl
and we cannot guarantee the values.We shall not take any
through this calculation. For more information regarding ca
3921, or intldept@kss-superdrive.co.jp .



< Calculation progress > <Load distribution of Horizontal shaft Operating conditions>

Load distribution		Leftward load (Contact point A)			Rightward load (Contact point B)		
Operating Conditions		Load Fai(N)	Rotation speed Ni(min^{-1})	Operating time ti(sec)	Load Fbi(N)	Rotation speed Ni(min^{-1})	Operating time ti(sec)
Forward Movement	① Forward Acceleration	120.89	1,500.00	0.100	61.37	1,500.00	0.100
	② Forward at Constant speed	106.43	3,000.00	0.500	71.91	3,000.00	0.500
	③ Forward Deceleration	92.60	1,500.00	0.100	83.08	1,500.00	0.100
	④ On-load 1 Constant speed	109.27	150.00	0.500	69.76	150.00	0.500
Backward Movement	⑤ Backward Acceleration	61.37	1,500.00	0.100	120.89	1,500.00	0.100
	⑥ Backward at Constant speed	71.91	3,000.00	0.500	106.43	3,000.00	0.500
	⑦ Backward Deceleration	83.08	1,500.00	0.100	92.60	1,500.00	0.100
	⑧ On-load 2 Constant speed	0.00	0.00	0.000	0.00	0.00	0.000
Equivalent load/Equivalent Rotation speed/Operating time		93.13	1,934.21	1.900	92.37	1,934.21	1.900
Rating Lifetime by Contact point L_{10} :			1,965.68*10^6 rev.			2,014.81*10^6 rev.	
			16,937.82hour			17,361.21hour	

3)-1：Calculation Result Screen

- Clicking “Print” button enables you to print in A4 size as the screen image.
- PDF files are available.
- Progress table cannot be printed and only input value and calculation result can be printed.

Rating Lifetime L_{10} : (Halt time is in considered.)	26,800.43 hours
	1,116.68 days
	3.06 years

Show progress | Print | (<Page Setup>Paper Size: A4 Portrait, Margins: minimum,

The calculation result is based on JIS B1192-5, however, please note
and we cannot guarantee the values.We shall not take any responsibi
through this calculation. For more information regarding calculation r
3921, or intldept@kss-superdrive.co.jp .

Printing in A4 size and PDF file are available.

Print
Total: 1 sheet of paper

Printer: Adobe PDF

Copies: 1

8, 11-13

Print using system dialog (Ctrl+Shift+P)

Troubleshoot printer issues

Print | Cancel

Ball Screw Lifetime Calculation Result (Horizontal Shaft)

< Ball Screw Specifications >	
Model Name	FBS1002B
Basic Dynamic Load Raring Ca	1750N
Lead Ph	2.000mm
Preload or Backlash	Preload type
Preload Fp	87.50N

< Operating Conditions >	
Position	Horizontal
Mass m	25.0kg
Sliding Resistance P	10.0N
External Load-1 Q_1	5.0N
External Load-2 Q_2	-10.0N
Sliding surface friction coefficient μ	0.10
Load factor fw	1.5
One side stroke	100.00mm

< Operating Pattern > (Note) Leftward load: +, Rightward load: -

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)	Acceleration:α (m/s^2)	Rotational Speed:N (min^{-1})	Load:F (N)
Forward Movement	①	Forward Acceleration	100.00	0.100	1.00	1,500.00	59.52
	②	Forward at Constant speed		0.500	n/a	3,000.00	34.52
	③	Forward Deceleration		0.100	1.00	1,500.00	9.52
	④	On-load 1 Constant speed	5.00	0.500	n/a	150.00	39.52
Backward Movement	⑤	Backward Acceleration	100.00	0.100	1.00	1,500.00	-59.52
	⑥	Backward at Constant speed		0.500	n/a	3,000.00	-34.52
	⑦	Backward Deceleration		0.100	1.00	1,500.00	-9.52
	⑧	On-load 2 Constant speed	5.00	0.500	n/a	150.00	0.00
		Cycle Time		7.000			
		Operating time		2.400			
		Halt time		4.600			

< Calculation Result >

Rating Lifetime L_{10} : (Merged)	$1,066.38 * 10^{6}$ rev.
	2,132.75 km
	$10.66 * 10^{6}$ Cycle(reciprocation)
	9,188.72 hours
Rating Lifetime L_{10} : (Halt time is in considered.)	26,800.43 hours
	1,116.68 days
	3.06 years

4)-1：Only Transporting or Movement

【Only Transporting or Movement 】

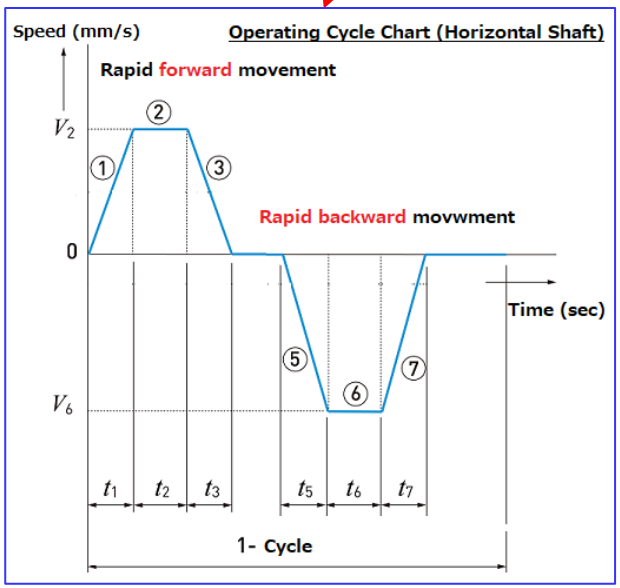
- Simply rapid movement (①～③, ⑤～⑦) is repeated and no task -1,2 (④⑧) on Operating Cycle Chart, entering 0 in ④ and ⑧ calculation works.
- Entering 0 in each External Load-1,2 (Q_1, Q_2) in Operating Condition is required.

Please enter 0 in External Load-1,2 if it is only reciprocation movement and no task -1,2 (④⑧).

< Operating Conditions >

Position	Horizontal	
Mass m ?	25.0	kg [0.0 - 9999.9]
Sliding Resistance P ?	10.0	N [0.0 - 9999.9]
External Load-1 Q_1 ?	0.0	N [-9999.9 - 9999.9]
External Load-2 Q_2 ?	0.0	N [-9999.9 - 9999.9]
Sliding surface friction coefficient μ ?	0.10	[0.01 - 1.00]

Operating pattern with no task-1,2



< Operating Pattern >

		Operating Condition	Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
Backward Movement	⑤	Backward Acceleration		0.100 [0.000 - 999]
	⑥	Backward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	⑦	Backward Deceleration		0.100 [0.000 - 999]
	⑧	On-load 2 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
			Cycle Time	? 7.000 [0.000 - 9999]

【Reciprocation/ Upward and Downward Movement pattern is same】

・Please enter the same value even if operating condition of reciprocation (forward/backward, upward/downward) is same, do not omit backward or downward.
It can differ load distribution of load direction or contact point and it also leads to different result.

Please enter the same value even if operating condition of reciprocation (forward/backward, upward/downward movement) is same.

< Operating Pattern >

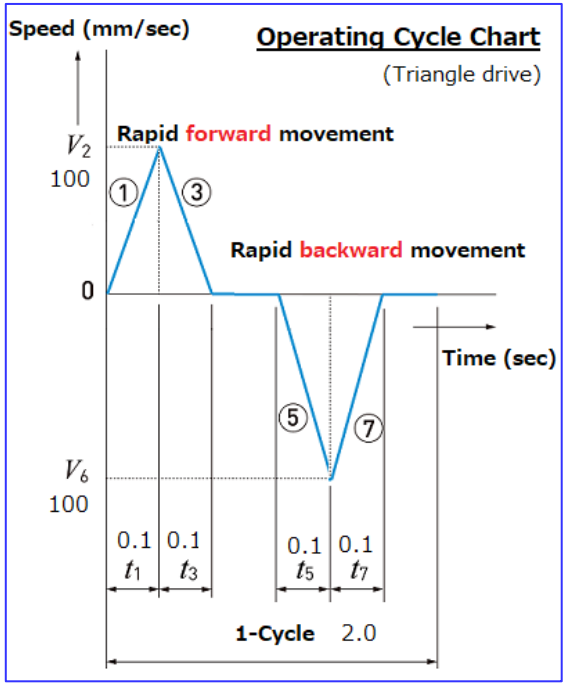
Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
Backward Movement	⑤	Backward Acceleration		0.100 [0.000 - 999]
	⑥	Backward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	⑦	Backward Deceleration		0.100 [0.000 - 999]
	⑧	On-load 2 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
			Cycle Time	? 7.000 [0.000 - 9999]

・Please enter 0 in Operating Time of Constant speed area (②⑥) when it is triangle drive (only Acceleration and Deceleration) with no Constant speed area such as High speed oscillating movement.

Entering 0 in Operating Time t of Constant speed area becomes Triangle drive.

< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.100 [0.000 - 999]
	②	Forward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	③	Forward Deceleration		0.100 [0.000 - 999]
	④	On-load 1 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
Backward Movement	⑤	Backward Acceleration		0.100 [0.000 - 999]
	⑥	Backward at Constant speed	? 100.00 [0.00 - 9999]	? 0.500 [0.000 - 999]
	⑦	Backward Deceleration		0.100 [0.000 - 999]
	⑧	On-load 2 Constant speed	? 0.00 [0.00 - 9999]	? 0 [0.000 - 999]
			Cycle Time	? 7.000 [0.000 - 9999]



Operating pattern of only Acceleration and Deceleration

4)-3 : Calculating with only Load and Speed

- Acceleration and Deceleration conditions are not decided and if you require approximate Rated Lifetime with only Applying Load and Speed, entering value only External Load-1 or -2 enables calculate.
- For example, calculating with only external load 300N and Speed 10mm/s is shown below.
- Regarding Operating Time, entering the same value as Cycle time works.

Entering 0 in Mass m simply calculates with only External Load(Q).

Please enter these three items for calculating with only External Load (Q) and Speed (V). Enter 0 in other items.

< Operating Conditions >

Position	Horizontal	
Mass m	0.0	kg [0.0
Sliding Resistance P	0.0	N [0.0
External Load-1 Q_1	300.0	N [-999
External Load-2 Q_2	0.0	N [-999

< Operating Pattern >

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)
Forward Movement	①	Forward Acceleration		0.000 [0.000 - 999]
	②	Forward at Constant speed	0.00 [0.00 - 9999]	0.000 [0.000 - 999]
	③	Forward Deceleration		0.000 [0.000 - 999]
	④	On-load 1 Constant speed	10.00 [0.00 - 9999]	2.000 [0.000 - 999]
Backward Movement	⑤	Backward Acceleration		0.000 [0.000 - 999]
	⑥	Backward at Constant speed	0.00 [0.00 - 9999]	0.000 [0.000 - 999]
	⑦	Backward Deceleration		0.000 [0.000 - 999]
	⑧	On-load 2 Constant speed	0.00 [0.00 - 9999]	0.000 [0.000 - 999]
			Cycle Time	2.000 [0.000 - 9999]

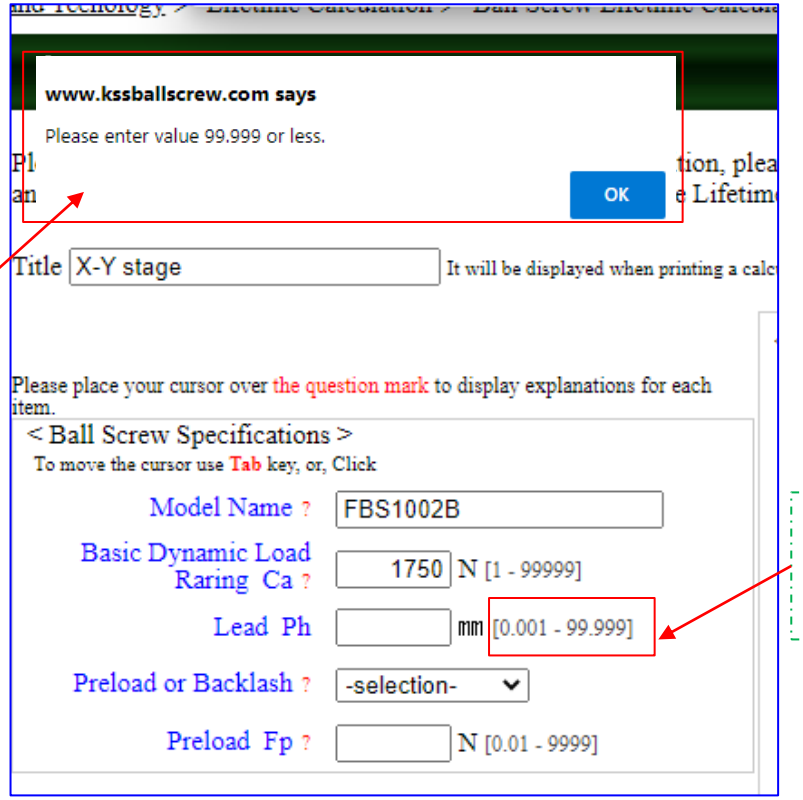
Entering the same value in Operating Time t and Cycle Time enables eliminate considering holt time.

・Error checking function is available if entering value is not correct.
・Please follow direction on screen appearing above and revise value.

【Out of range value】

・The following number of entering digits are limited: Basic Dynamic Load Rating Ca, Lead Ph, External Load-1,2 (Q1,Q2), Mass m, Slide Resistance P, Maximum Speed V, and Operating Time t

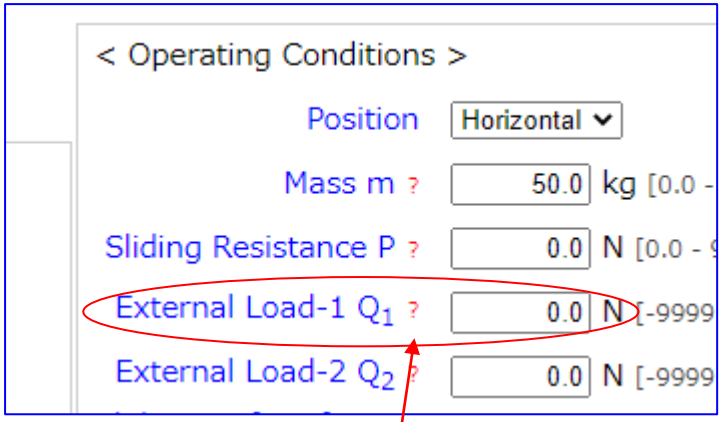
When Error message appears, click OK and revise value.



Number range and number of decimal places you can enter are shown.

【Inconsistent input value between External Load -1,2 (Q_1, Q_2) and Operating Cycle (Case 1)】

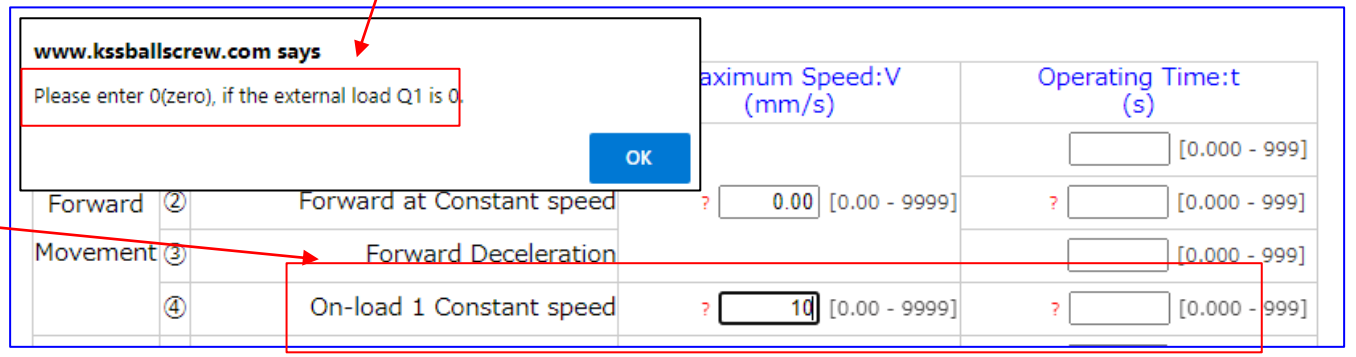
・External Load -1,2 (Q_1, Q_2) is 0 which means external load is not applied, however, what if Speed V or Operating Time t are entered.



・When External Load-1,2 (Q_1, Q_2) are Static Load, it does not effect to Ball Screw Lifetime. Please enter 0. In this case, this calculation Prg. is not applied, only for comparison with Basic Static Load Rating Coa.

When External Load -1 Q_1 is 0, please enter 0 in Speed V and Operating Time t.
It means that there is no operating condition because External Load Q is not applied.

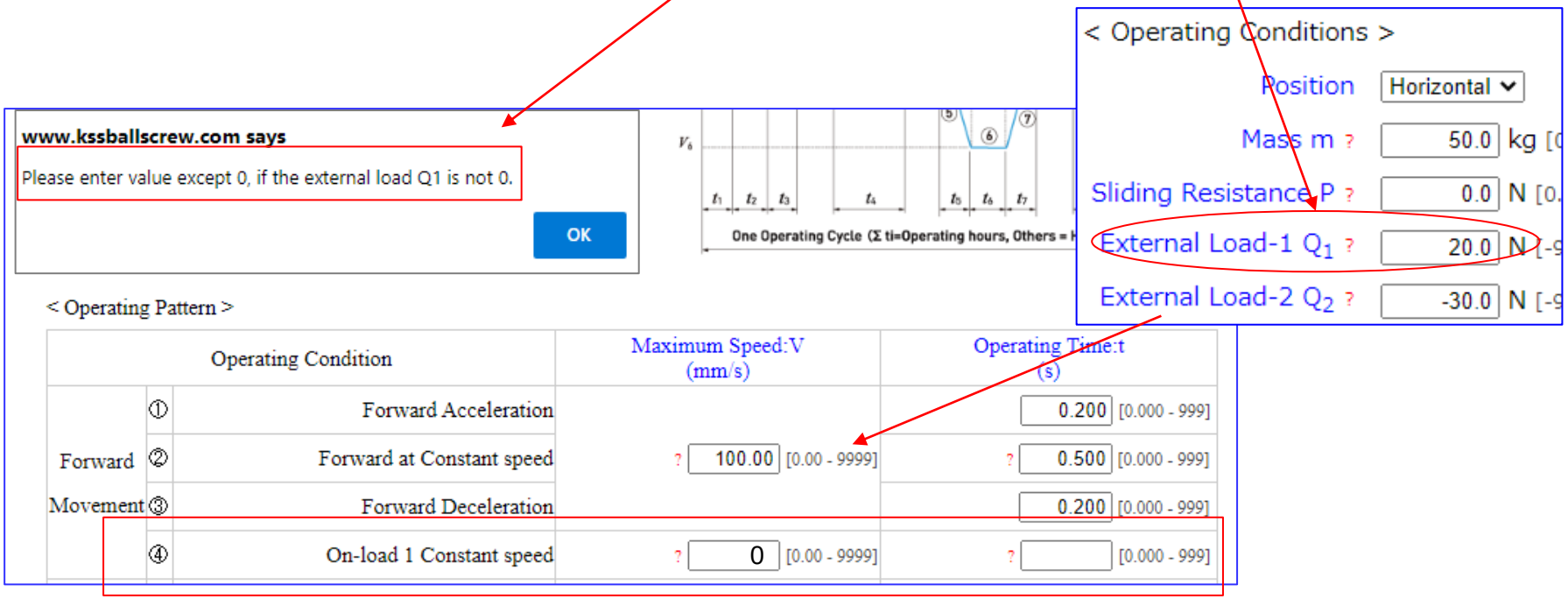
If External Load -1 Q_1 or -2 Q_2 were entered, neither Speed V nor Operating Time t cannot be entered.



【 Inconsistent input value between External Load -1,2 (Q_1, Q_2) and Operating Cycle (Case 2) 】

・Even though External Load -1,2 (Q_1, Q_2) is entered, what if Speed V or Operating Time t is entered 0 in Operating Cycle Chart.

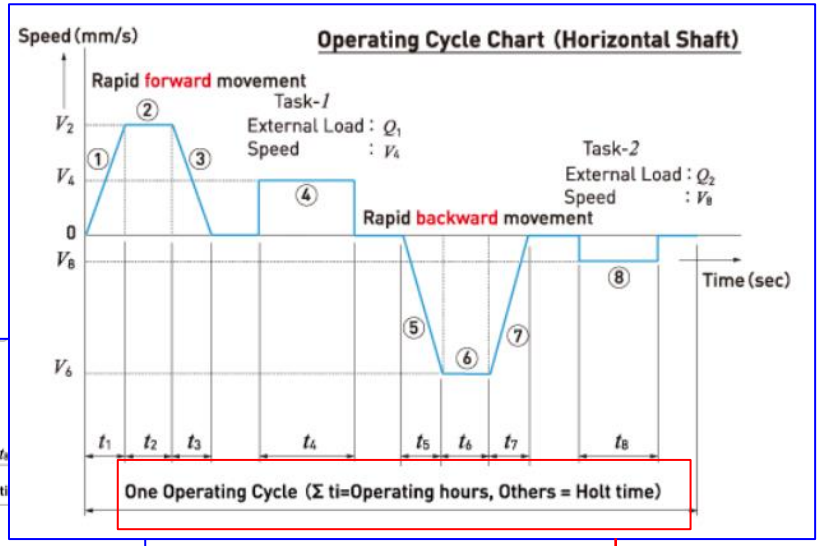
Entering value in External Load -1 Q_1 requires to enter Speed V and Operating Time t.
That is applying External Load Q_1 (Dynamic Load) requires to enter its operating conditions.

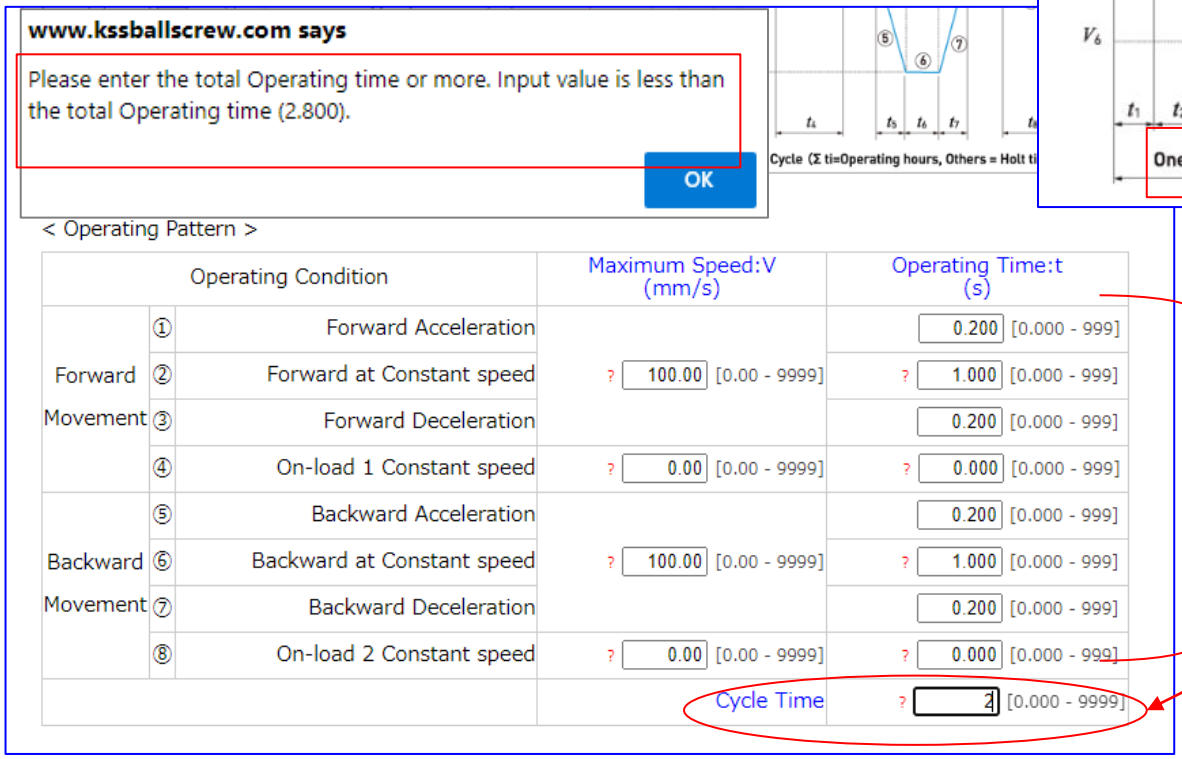


・When External Load-1,2 (Q_1, Q_2) are Static Load, it does not effect to Ball Screw Lifetime.
Please enter 0.
In this case, this calculation Prg. is not applied, only for comparison with Basic Static Load Rating Coa.

【Cycle time (including holt time) is shorter than Operating Time】

- This Cycle Time includes holt time, so please enter value more than the total of Operating Time t.
- Please enter the same value that total of Operating Time if there is no holt time.





The total of Operating Time Σ t

Cycle Time includes holt time. Please enter value more than the total of Operating Time, otherwise Error message appears.

・You can enter value in Operating Cycle Chart, however, when Rotational speed or Acceleration exceeds its usage limit, error message appears and value exceeding limits are written in red.
・Reviewing Operating Conditions on screen is recommended.

< Operating Pattern >

(Note) Downward load: +, Upward load: -

Operating Condition			Maximum Speed:V (mm/s)	Operating Time:t (s)	Acceleration:α (m/s^2)	Rotational Speed:N (min^{-1})	Load:F (N)
Down	①	Down & Acceleration	200.00	0.002	**100.00**	3,000.00	-460.97
	②	Down & Constant speed		1.000	n/a	**6,000.00**	39.04
	③	Down & Deceleration		0.002	**100.00**	3,000.00	539.04
	④	On-load Constant speed	0.00	0.000	n/a	0.00	0.00
Up	⑤	Up & Acceleration	200.00	0.002	**100.00**	3,000.00	559.04
	⑥	Up & Constant speed		1.000	n/a	**6,000.00**	39.04
	⑦	Up & Deceleration		0.002	**100.00**	3,000.00	-440.97
	⑧	On-load Constant speed	0.00	0.000	n/a	0.00	0.00
			Cycle Time	3.000	^ Lifetime calculation was done under the input operating conditions, Acceleration and but the rotation speed is extremely harsh. Please contact KSS for availability to use.		
			Operating time	2.008			
			Halt time	0.992			

Load F written in red means that direction of Load F is opposite. This is not error.

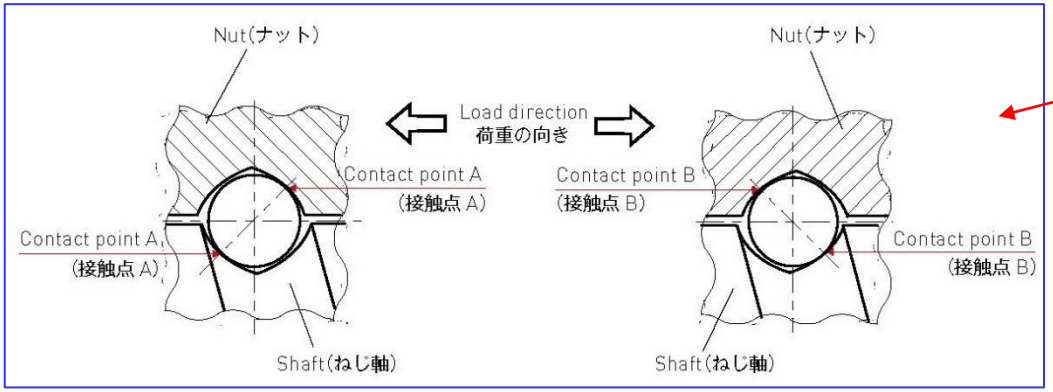
Error message
Checking function is available for Rotational Speed N and Acceleration α.

6) Appendix（Concept of Life Calculation formula）

・This Lifetime Calculation Prg. is based on JIS B1192-5（ISO3408-5）.

・Rating Life is calculated at each contact point and merged Basic Rating Life of both contact points based on a basic formula of Basic Rating Life.

・The following conditions are into consideration: Ball contact point is changed depending on load direction. Elastic displacement of contact point is changed when external load is applied in Preload status.

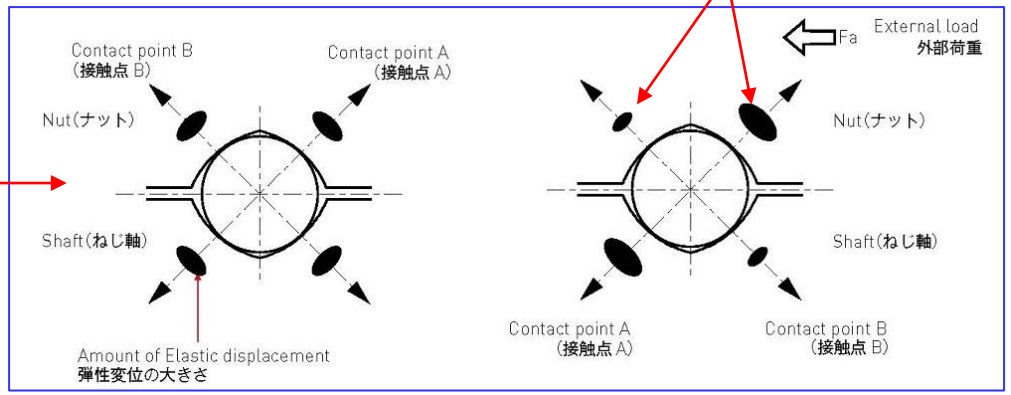


Ball contact condition by load direction

Once load direction is changed, Ball contact points are also changed.
Rating Life is calculated at each contact point and using merged value.

Lifetime is calculated by value of Axial load that equivalent to size of contact point.

Preload Fpr is also considered into Lifetime Calculation.



Ball contact condition under Preload（Left）and external load（Right）

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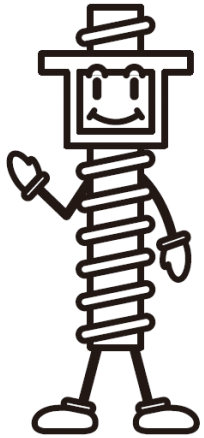
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