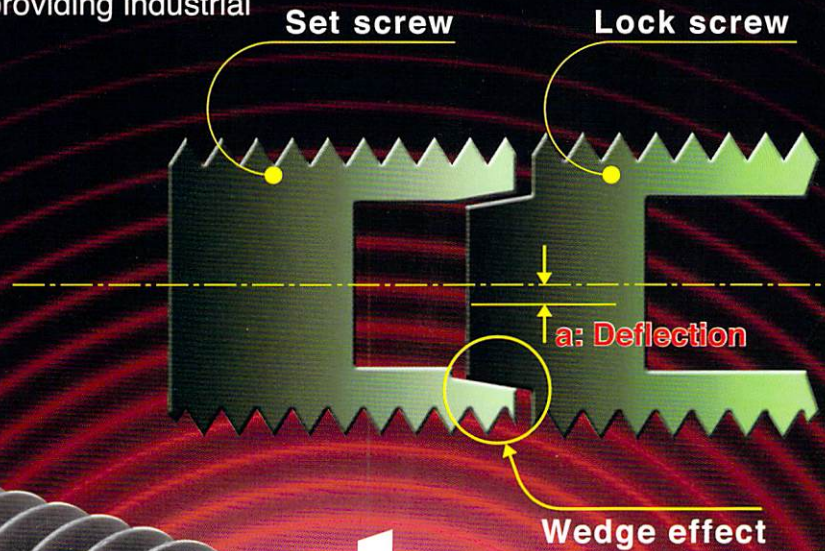


HLS

HARD LOCK SETSCREW

HARD LOCK SETSCREWS are locking parts to tighten molds developed by application of the wedge principle in the same manner as lock nut **HLs** and **HLBs**, providing industrial fields with safety.

Safety is power !



Therefore, HLSs prevent
looseness completely
and increase productivity greatly.

HARD LOCK Industry Co.,Ltd.

HL (HARD LOCK NUTs) and HLB (HARD LOCK BEARING NUTs)

offer reliability and satisfactory results.

HL (HARD LOCK NUTs) and HLB (HARD LOCK BEARING NUTs) are lock nuts appeared from the wedge principle. This great locking energy has provided industrial fields worldwide with safety and reliability.

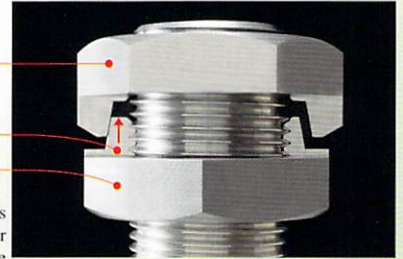


The structure of the wedge principle (HL)

Upper nut 

Wedge 

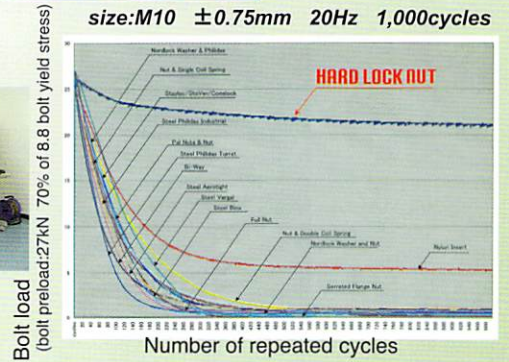
Lower nut 



Tightening the upper nut causes the wedge formed in the lower nut to break into a space of the upper nut, resulting in the generation of strong locking energy.

Junker vibration test

size: M10 ±0.75mm 20Hz 1,000cycles



NAS3350 vibration test



Vibrational frequency: 1,780c.p.m
Shaking stroke: 11mm
Impacting stroke: 19mm
Shaking frame acceleration: 19.5G

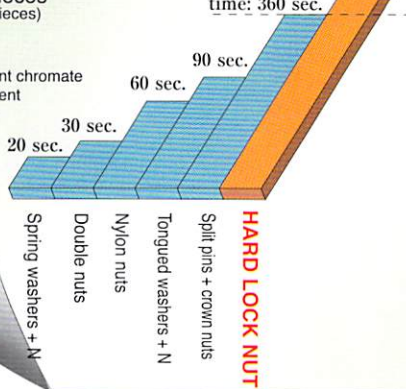
**No abnormalities
End of test**

Vibration-resistance time: 1,020 sec (17 min.)

Conditions of test pieces (common to various test pieces)

Size: M12
Material: SS400
Surface treatment: Trivalent chromate treatment
Tightening torque: 40N·m

Vibration-resistance time: 360 sec.



HLSs provide the same performance!

Features

Self-Locking effect

Fully passed the vibration test based on **US National Aerospace Standard 3350/3354**.

Workability

Locking screws and set screws can be tightened easily with a single hexagonal wrench.

Weather resistance

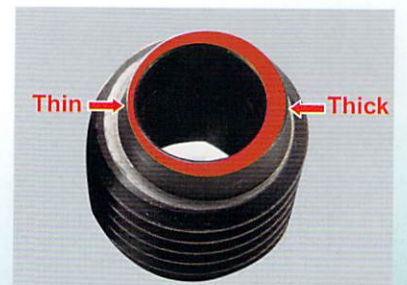
Resistant against severe environments (heat and cold resistance) and maintain locking power.

Attachment / detachment

Possible to attach and detach repeatedly. Maintains tightness safely.

Economy

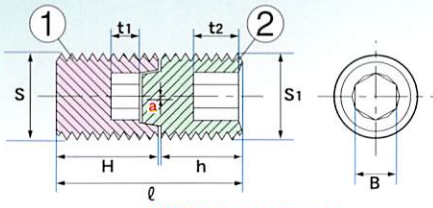
The maintenance-free design reduces the total cost greatly.



Deflection structure of lower nut (凸) (through type)

HARD LOCK SETSCREW Dimension table

HLS (standard type)



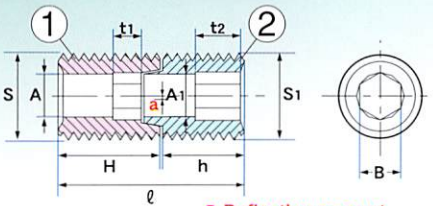
a: Deflection amount



Model No.	Screw dia.		Pitch P	Set screw①			Lock screw②		Setting dimensions ℓ		Hexagonal socket ①and②	
	S	S1		H	tolerance	t1	h	t2	Min	Max	B	tolerance
HLS8AC	M8		1.25	10	± 0.4	≥ 2.5	7.5	≥ 5	17.5	18	4	+0.10 +0.02
HLS10AC	M10		1.5	12	± 0.4	≥ 3	9	≥ 6	21	22	5	+0.10 +0.02
HLS12AC	M12		1.75	16	± 0.4	≥ 5	13	≥ 8	29	30	6	+0.15 +0.02
HLS12AF			1.5									
HLS14AC	M14		2	16	± 0.4	≥ 5	12	≥ 8	28	29	6	+0.15 +0.02
HLS14AF			1.5									
HLS16AC	M16		2	20	± 0.4	≥ 6	16	≥ 10	36	37	8	+0.15 +0.02
HLS16AF			1.5									
HLS18AC	M18		2.5	20	± 0.4	≥ 5.5	16	≥ 10	35.5	37	8	+0.15 +0.02
HLS18AF			1.5									
HLS20AC	M20		2.5	20	± 0.4	≥ 7	15	≥ 12	35	36.5	10	+0.20 +0.02
HLS20AF			1.5									
HLS22AC	M22		2.5	25	± 0.5	≥ 7	19	≥ 15	44	45.5	12	+0.20 +0.02
HLS22AF			1.5									
HLS24AC	M24		3	25	± 0.5	≥ 9	19	≥ 15	44	45.5	12	+0.30 +0.02
HLS24AF			1.5									
HLS30AC	M30		3.5	30	± 0.5	≥ 9	24	≥ 15	54	56	17	+0.30 +0.02
HLS30AF			1.5									
HLS36AC	M36		4	35	± 0.5	≥ 8	28	≥ 15	63	65	17	+0.30 +0.02
HLS36AF			1.5									

Material: M8 ~ M20: SCM435 heat-treated steel
 (Surface hardness: HRC45 ~ 53), M24 ~ M36: S45C heat-treated steel (Surface hardness: HRC30 ~ 43)
 Surface treatment: Black oxide finish (phosphate coating)

HLS (through type)



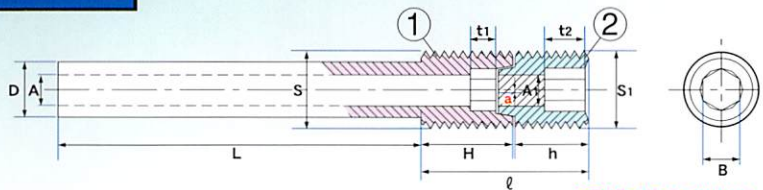
a: Deflection amount



Model No.	Screw dia.		Pitch P	Set screw①			Lock screw②		Setting dimensions ℓ		Hexagonal socket ①and②		Through-hole dia.	
	S	S1		H	tolerance	t1	h	t2	Min	Max	B	tolerance	A, A1	tolerance
HLS12BC	M12		1.75	16	± 0.4	≥ 4	13	≥ 8	29	30	6	+0.15 +0.02	6	± 0.2
HLS12BF			1.5											
HLS14BC	M14		2	16	± 0.4	≥ 5	12	≥ 8	28	29	6	+0.15 +0.02	6	± 0.2
HLS14BF			1.5											
HLS16BC	M16		2	20	± 0.4	≥ 5	16	≥ 10	36	37	8	+0.15 +0.02	8	± 0.2
HLS16BF			1.5											
HLS20BC	M20		2.5	20	± 0.4	≥ 6	15	≥ 12	35	36.5	10	+0.20 +0.02	10	± 0.2
HLS20BF			1.5											
HLS24BC	M24		3	25	± 0.5	≥ 8	19	≥ 15	44	45.5	12	+0.30 +0.02	12	± 0.2
HLS24BF			1.5											
HLS30BC	M30		3.5	30	± 0.5	≥ 8	24	≥ 15	54	56	17	+0.30 +0.02	17	± 0.2
HLS30BF			1.5											
HLS36BC	M36		4	35	± 0.5	≥ 7	28	≥ 15	63	65	17	+0.30 +0.02	17	± 0.2
HLS36BF			1.5											

Material: S45C heat-treated steel (Surface hardness: HRC30 ~ 43),
 Surface treatment: Black oxide finish (phosphate coating)

Spacing rod through type



a: Deflection amount



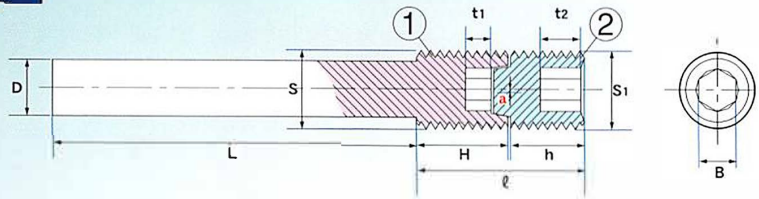
Model No.	Screw dia.		Pitch P	Set screw①			Lock screw②			Threaded ℓ		L	Hexagonal socket ①and②		Pin diameter		Pin hole diameter	
	S	S1		H	tolerance	t1	h	t2	tolerance	Min	Max		B	tolerance	D	tolerance	A, A1	tolerance
HLS14DCL100	M14		2	20	± 0.4	≥ 5	12	9	+0 -0.3	32	33	100	6	+0.15 +0.04	10	+0 -0.2	6	± 0.2
HLS14DFL100			1.5															
HLS16DCL100	M16		2	20	± 0.4	≥ 6	16	12	+0 -0.3	36	37	100	8	+0.15 +0.04	12	+0 -0.2	7	± 0.2
HLS16DFL100			1.5															
HLS16DCL200	M16		2	20	± 0.4	≥ 6	16	12	+0 -0.3	36	37	200	8	+0.15 +0.04	12	+0 -0.2	7	± 0.2
HLS16DFL200			1.5															
HLS20DCL100	M20		2.5	25	± 0.4	≥ 6	15	12	+0 -0.3	40	41.5	100	10	+0.23 +0.05	16	+0 -0.2	10	± 0.2
HLS20DFL100			1.5															
HLS20DCL200	M20		2.5	25	± 0.4	≥ 6	15	12	+0 -0.3	40	41.5	200	10	+0.23 +0.05	16	+0 -0.2	10	± 0.2
HLS20DFL200			1.5															
HLS24DCL100	M24		3	35	± 0.5	≥ 7	19	15	+0 -0.3	53	54.5	100	12	+0.23 +0.05	20	+0 -0.2	12	± 0.2
HLS24DFL100			1.5															
HLS24DCL200	M24		3	35	± 0.5	≥ 7	19	15	+0 -0.3	53	54.5	200	12	+0.23 +0.05	20	+0 -0.2	12	± 0.2
HLS24DFL200			1.5															
HLS30DCL100	M30		3.5	40	± 0.5	≥ 7	24	20	+0 -0.3	64	66	100	17	+0.23 +0.05	24	+0 -0.2	17	± 0.2
HLS30DFL100			1.5															
HLS30DCL200	M30		3.5	40	± 0.5	≥ 7	24	20	+0 -0.3	64	66	200	17	+0.23 +0.05	24	+0 -0.2	17	± 0.2
HLS30DFL200			1.5															
HLS36DCL100	M36		4	40	± 0.5	≥ 7	28	20	+0 -0.3	68	70	100	17	+0.23 +0.05	30	+0 -0.2	17	± 0.2
HLS36DFL100			1.5															
HLS36DCL200	M36		4	40	± 0.5	≥ 7	28	20	+0 -0.3	68	70	200	17	+0.23 +0.05	30	+0 -0.2	17	± 0.2
HLS36DFL200			1.5															

Material: S45C heat-treated steel (Surface hardness: HRC30 ~ 43),
 Surface treatment: Black oxide finish (phosphate coating)

※Dimensions may be slightly changed in a range within which there is no influence on performance during manufacturing processes.

HARD LOCK SETSCREW Dimension table

Spacing rod type



a: Deflection amount

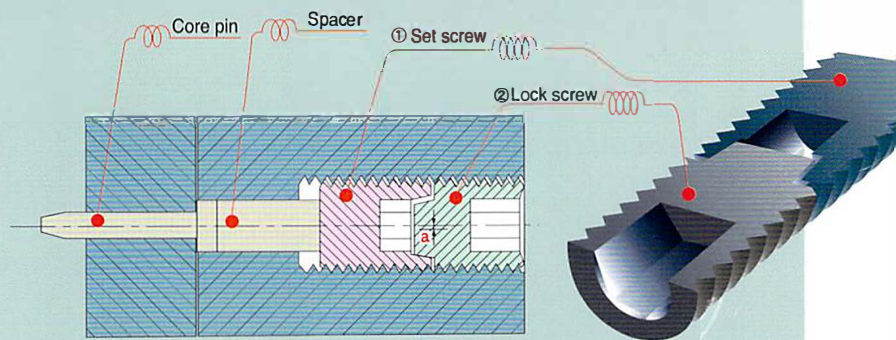
Model No.	Screw dia		Pitch P	Set screw①			Lock screw②			Threaded ℓ		L	Hexagonal socket (D and ϕ)		Pin diameter	
	S	S1		H	tolerance	t1	h	t2	tolerance	Min	Max		B	tolerance	D	tolerance
HLS12CCL100	M12		1.75	15	± 0.4	≥ 4	13	12	$+0 -0.3$	28	29	100	6	$+0.15 +0.02$	8	$+0 -0.2$
HLS12CFL100			1.5									100				
HLS12CCL200			1.75									200				
HLS12CFL200			1.5									200				
HLS16CCL100	M16		2	20	± 0.4	≥ 6	16	12	$+0 -0.3$	36	37	100	8	$+0.15 +0.02$	12	$+0 -0.2$
HLS16CFL100			1.5									100				
HLS16CCL200			2									200				
HLS16CFL200			1.5									200				
HLS16CCL250			2									250				
HLS20CCL100	M20		2.5	25	± 0.4	≥ 6	15	12	$+0 -0.3$	40	41.5	100	10	$+0.20 +0.02$	16	$+0 -0.2$
HLS20CFL100			1.5									100				
HLS20CCL200			2.5									200				
HLS20CFL200			1.5									200				
HLS20CCL250			2.5									250				
HLS20CCL300			2.5									300				
HLS24CCL100	M24		3	35	± 0.5	≥ 7	19	15	$+0 -0.3$	54	55.5	100	12	$+0.30 +0.02$	20	$+0 -0.2$
HLS24CFL100			1.5									100				
HLS24CCL200			3									200				
HLS24CFL200			1.5									200				
HLS24CCL250			3									250				
HLS24CCL300			3									300				
HLS30CCL100	M30		3.5	40	± 0.5	≥ 7	24	20	$+0 -0.3$	64	66	100	17	$+0.30 +0.02$	24	$+0 -0.2$
HLS30CFL100			1.5									100				
HLS30CCL200			3.5									200				
HLS30CFL200			1.5									200				
HLS30CCL250			3.5									250				
HLS36CCL100	M36		4	40	± 0.5	≥ 7	28	20	$+0 -0.3$	68	70	100	17	$+0.30 +0.02$	30	$+0 -0.2$
HLS36CFL100			1.5									100				
HLS36CCL200			4									200				
HLS36CFL200			1.5									200				

Material: S45C heat-treated steel (Surface hardness: HRC30 ~ 43),
Surface treatment: Black oxide finish (phosphate coating)

※ Dimensions may be slightly changed in a range within which there is no influence on performance during manufacturing processes.

HLS reference tightening torque table

Screw dia.	Pitch	Reference tightening torque (N·m)		Max tightening torque
		Set screw (M)	Lock screw (L)	
M8	coarse	10 \pm 10%	10 \pm 10%	16
M10	coarse	18 \pm 10%	18 \pm 10%	30
M12	coarse/line	30 \pm 10%	30 \pm 10%	52
M14	coarse/line	30 \pm 10%	30 \pm 10%	52
M16	coarse/line	70 \pm 10%	70 \pm 10%	120
M18	coarse/line	70 \pm 10%	70 \pm 10%	120
M20	coarse/line	100 \pm 10%	100 \pm 10%	220
M24	coarse/line	170 \pm 10%	170 \pm 10%	370
M30	coarse/line	590 \pm 10%	590 \pm 10%	980
M36	coarse/line	590 \pm 10%	590 \pm 10%	980



★ Installation method and precautions

- (1) After tightening the set screw (M) at your controlled torque, tighten the lock screw (L) at our recommended torque.
- (2) Do not use improper tightening tools (with a size that does not fit, or which are worn). Doing so may cause breakage of holes or personal injury during tightening work.
- (3) Do not weld any objects to HLS. (The strength of the bolt will decrease.)
- (4) Do not subject HLS to surface treatment without the approval of our company. Because these bolts are thermally treated, a decrease in strength and hydrogen brittleness may be caused under certain surface treatment conditions.

AUTHORISED DISTRIBUTOR IN THE USA



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