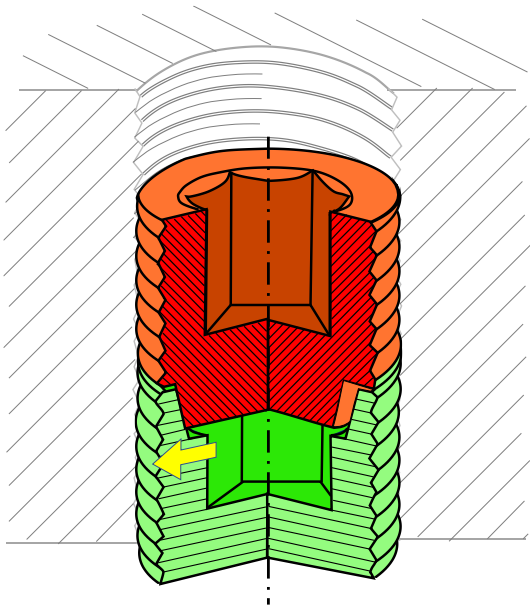




HARDLOCK[®]
Solution

Set Screws

HLS[®]

The globally recognized HARDLOCK Set Screw (HLS)

HARDLOCK SET SCREW



HLS Standard Normal type



HLS-T Standard Hollow type



HLS-P Pin Normal type



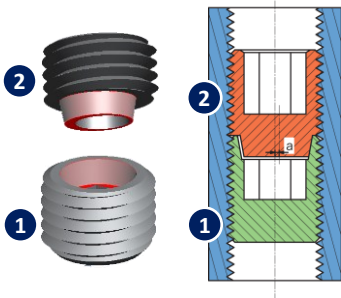
HLS-TP Pin Hollow type

ADVANTAGES

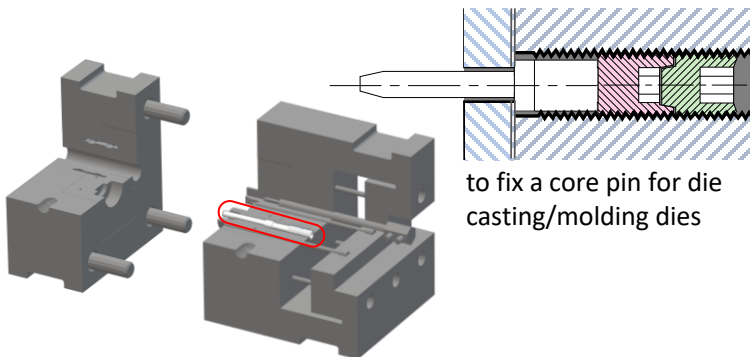
- ◆ The self-locking effect remains even in the most severe environments.
- ◆ All metal with little abrasion enables repeated reuse.
- ◆ Simple and fast installation.
- ◆ Significant cost reduction.



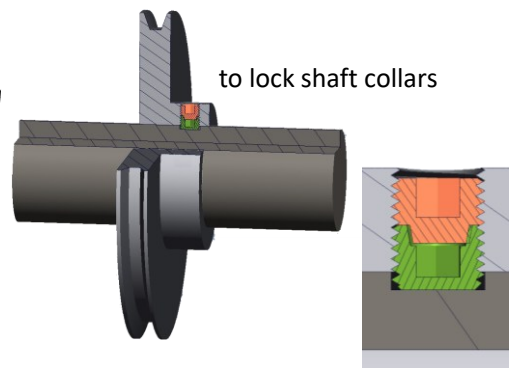
MAINTENANCE-FREE WITH EXTRAORDINARY LOCKING PERFORMANCE



The HARDLOCK Set Screw (HLS) is a revolutionary self-locking set screw (Hexagon socket head set screw) which applies the “Wedge Principle” and delivers superior self-locking effect like the other HARDLOCK products. By combining the concave set screw ① with its concentric conical recess and the convex set screw ② designed with an eccentric protrusion, due to the wedge principle, they will lock themselves in the direction perpendicular to the axis.



to fix a core pin for die casting/molding dies



to lock shaft collars

INSTALLATION PROCEDURE

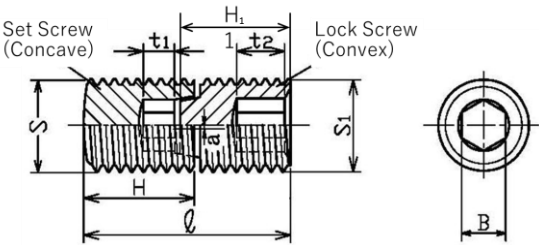


- 1 Tighten the concave set screw first.
- 2 Use a general tightening tool (L-wrench or the like).
- 3 Tighten the convex (lock) screw by the specified torque or by 1 turn (360 degrees) after prevailing torque is generated (When the protrusion and recess comes into contact.).
- 4 Installation Complete.

DIMENSION AND TIGHTENING TORQUE TABLE

STANDARD - NORMAL TYPE
HLS-A (HLS)

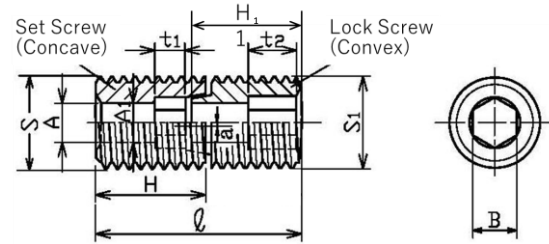
Size	Materials	Plating
M8 - M20	Property Class 45H Surface Hardness 45 - 53HRC	Black Oxide
M22 - M36	Property Class 33H Surface Hardness 33 - 44HRC	Black Oxide



Nominal size	Pitch		Set screw (1) (Concave)			Lock screw (2) (Convex)			Overall height (Approx.)	Hexagon socket Common to (1) (2)		Unit weight (g)	Reference tightening torque (Nm) *Common to (1) & (2)	Proof torque (Nm)
	S, S1	Coarse Fine	H	Tolerance	t1	H1	Tolerance	t2		B	Tolerance			
M8	1.25	-	10	±0.29	≥2.5	10	±0.29	≥5	17.5	4	+0.02 / +0.10	4	9~10	16
M10	1.5	-	12	±0.35	≥3	12	±0.35	≥6	21	5	+0.02 / +0.14	8	17~20	30
M12	1.75	1.5	16	±0.35	≥5	16	±0.35	≥8	29	6	+0.02 / +0.14	16	29~34	52
M14	2	1.5	16	±0.35	≥4	16	±0.35	≥8	28	6	+0.02 / +0.14	22	29~34	52
M16	2	1.5	20	±0.42	≥6	20	±0.42	≥10	36	8	+0.03 / +0.18	37	66~78	120
M18	2.5	1.5	20	±0.42	≥6	20	±0.42	≥10	36	8	+0.03 / +0.18	47	66~78	120
M20	2.5	1.5	20	±0.42	≥7	20	±0.42	≥12	35	10	+0.03 / +0.18	52	121~143	220
M22	2.5	1.5	25	±0.42	≥10	25	±0.42	≥15	45	12	+0.03 / +0.18	79	204~241	370
M24	3	1.5	25	±0.42	≥9	25	±0.42	≥15	44	12	+0.05 / +0.23	95	204~241	370
M30	3.5	1.5	30	±0.42	≥9	30	±0.42	≥15	54	17	+0.05 / +0.23	161	539~637	980
M36	4	1.5	35	±0.5	≥8	35	±0.5	≥15	63	17	+0.05 / +0.23	368	539~637	980

STANDARD - HOLLOW TYPE
HLS-B (HLS-T)

Size	Materials	Plating
M12 - M36	Property Class 33H Surface Hardness 33 - 44HRC	Black Oxide



Nominal size	Pitch		Set screw (1) (Concave)			Lock screw (2) (Convex)			Overall height (Approx.)	Hexagon socket Common to (1) (2)		Hole dia.		Unit weight (g)	Reference tightening torque (Nm) *Common to (1) & (2)	Proof torque (Nm)
	S, S1	Coarse Fine	H	Tolerance	t1	H1	Tolerance	t2		B	Tolerance	A, A1	Tolerance			
M12	1.75	1.5	16	±0.35	≥2	16	±0.35	≥5	29	6	+0.02 / +0.14	6	±0.2	13	29~34	52
M14	2	1.5	16	±0.35	≥2	16	±0.35	≥6	28	6	+0.02 / +0.14	6	±0.2	18	29~34	52
M16	2	1.5	20	±0.42	≥4	20	±0.42	≥8	36	8	+0.03 / +0.18	8	±0.2	29	66~78	120
M20	2.5	1.5	20	±0.42	≥5	20	±0.42	≥10	35	10	+0.03 / +0.18	10	±0.2	44	121~143	220
M24	3	1.5	25	±0.42	≥6	25	±0.42	≥12	44	12	+0.05 / +0.23	12	±0.2	81	204~241	370
M30	3.5	1.5	30	±0.42	≥9	30	±0.42	≥15	54	17	+0.05 / +0.23	17	±0.2	134	539~637	980
M36	4	1.5	35	±0.5	≥8	35	±0.5	≥15	63	17	+0.05 / +0.23	17	±0.2	293	539~637	980

- External dimensions: JIS B1177(2007) / ISO4026
- Threads tolerance: Class 6g JIS B0209(2001) / ISO965
- Reference tightening torque is calculated by multiplying 0.6 plus or minus 5% of the proof torque of hexagonal wrenches stipulated in JIS B4648 (ISO2936).

DIMENSION AND TIGHTENING TORQUE TABLE

PIN - NORMAL TYPE
HLS-C (HLS-P)

Table with 3 columns: Size, Materials, Plating. Row 1: M12 - M36, Property Class 33H Surface Hardness 33 - 44HRC, Black Oxide.

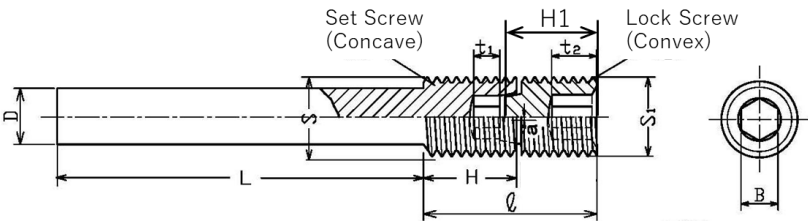


Table with 17 columns: Size, Pitch (Coarse, Fine), L, Set Screw (1) (Concave) (H, Tolerance, t1), Lock Screw (2) (Convex) (H1, Tolerance, t2), Thread length (l), Hexagonal socket (B, Tolerance), Pin dia. (A, A1, Tolerance), Unit weight (g), Reference tightening torque (Nm), Proof torque (Nm). Rows include M12, M16, M20, M24, M30, M36 with various pitch and length options.

PIN - HOLLOW TYPE
HLS-D (HLS-TP)

Table with 3 columns: Size, Materials, Plating. Row 1: M14 - M36, Property Class 33H Surface Hardness 33 - 44HRC, Black Oxide.

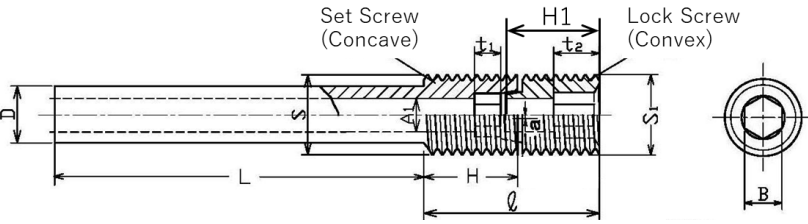
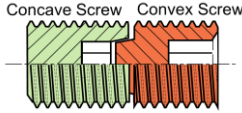
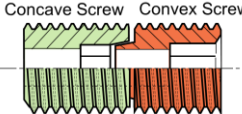
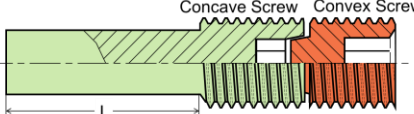
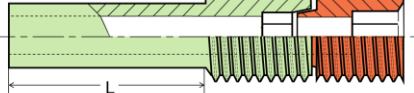


Table with 17 columns: Size, Pitch (Coarse, Fine), L, Set Screw(1) (Concave) (H, Tolerance, t1), Lock Screw(2) (Convex) (H1, Tolerance, t2), Thread length (l), Hexagonal socket (B, Tolerance), Pin dia. (D, Tolerance), Pin hole dia. (A, A1, Tolerance), Unit weight (g), Reference tightening torque (Nm), Proof Torque (Nm). Rows include M14, M16, M20, M24, M30, M36 with various pitch and length options.

- External dimensions: JIS B1177(2007) / ISO4026
- Threads tolerance: Class 6g JIS B0209(2001) / ISO965
- Reference tightening torque is calculated by multiplying 0.6 plus or minus 5% of the proof torque of hexagonal wrenches stipulated in JIS B4648 (ISO2936).

Materials of HARDLOCK Set Screw

Type	Size	Pitch		Material	
		Coarse	Fine	Concave	Convex
HARDLOCK Set Screw Standard HLS-A (HLS) 	M8	1.25		JIS SCM435	JIS SCM435
	M10	1.5		JIS SCM435	JIS SCM435
	M12	1.75		JIS SCM435	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M14	2.0		JIS SCM435	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M16	2.0		JIS SCM435	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M18	2.5		JIS SCM435	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M20	2.5		JIS SCM435	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M22	2.5	1.5	JIS S45C	JIS S45C
HARDLOCK Set Screw Standard Hollow HLS-B (HLS-T) 	M12	1.8		JIS S45C	JIS S45C
	M14	2.0	1.5	JIS S45C	JIS S45C
	M16	2.0	1.5	JIS S45C	JIS S45C
	M20	2.5	1.5	JIS S45C	JIS S45C
	M24	3.0	1.5	JIS S45C	JIS S45C
	M30	3.5	1.5	JIS S45C	JIS S45C
	M36	4.0	1.5	JIS S45C	JIS S45C
HARDLOCK Set Screw Pin HLS-C (HLS-P) 	M12	1.75		JIS S45C	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M16	2.0		JIS S45C	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M20	2.5		JIS S45C	JIS SCM435
			1.5	JIS S45C	JIS S45C
	M24	3.0	1.5	JIS S45C	JIS S45C
HARDLOCK Set Screw Pin Hollow HLS-D (HLS-TP) 	M14	2.0	1.5	JIS S45C	JIS S45C
	M16	2.0	1.5	JIS S45C	JIS S45C
	M20	2.5	1.5	JIS S45C	JIS S45C
	M24	3.0	1.5	JIS S45C	JIS S45C
	M30	3.5		JIS S45C	JIS S45C
	M36	4.0		JIS S45C	JIS S45C
				JIS S45C	JIS S45C

These materials are subject to change without notice due to the availability of material screw.



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