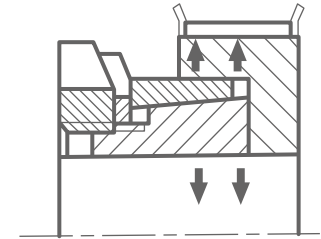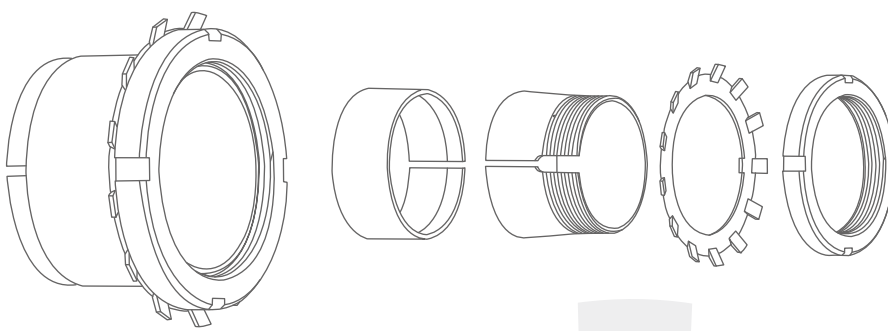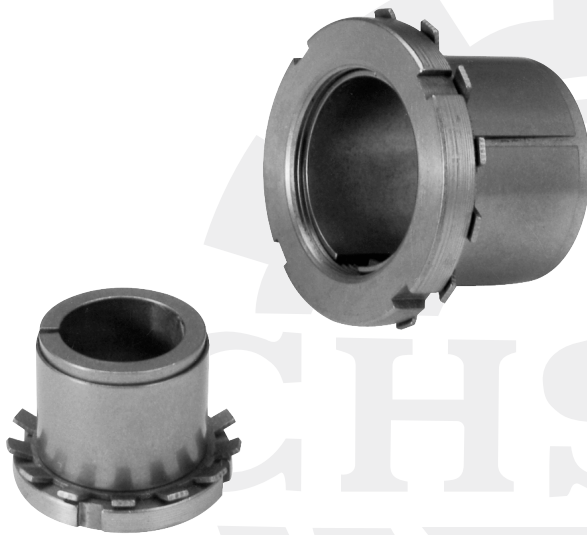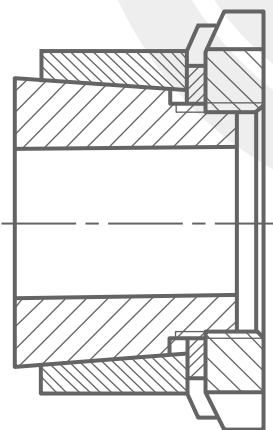# CAPT-LOCKS

suit for shaft diameter
metric:f14～f60mm

CAPT lock type HLL is the longer one for Type HL with a very good characteristics of anti lock. It can transfer a bigger torque due to a longer length. When the transmission can't be ensured by Type HL, Type HLL can be selected.

CAPT lock type HLL suit for the connection between medium or small shaft and hub. It is of self-centered. The inner bores for shaft and hub are both plain and so the machining is simple and price is very good.

The working principle for CAPT lock Type HLL is that tighting the round nut on the inner hub with outside taper surface to make the inner hub move axially. This will press the outer hub with taper bore and the pressure and friction emerged in radial effect the connection without key and slot between hub and shaft.

Only one round nut will be enough for the intallation. After tightening round nut and make the hub and shaft press each other .Then the round nut should be locked with the relevant washer to avoid CAPT lock move axially to ensure the reliability that rated torque can be transmited.

Type HLL can be installed and used only when the axial length of the inner bore of hub is smaller than dimension B.

Nomenclature for CAPT-LOCK HLL

CL 50 X 60 HLL

CAPT LOCK HLL

out diameter D

bore diameter d

enterprise code CAPT-LOCKS
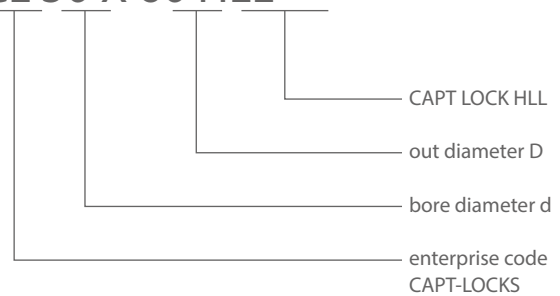
HLL CAPT-LOCKS

CAPT-LOCKS

HLL
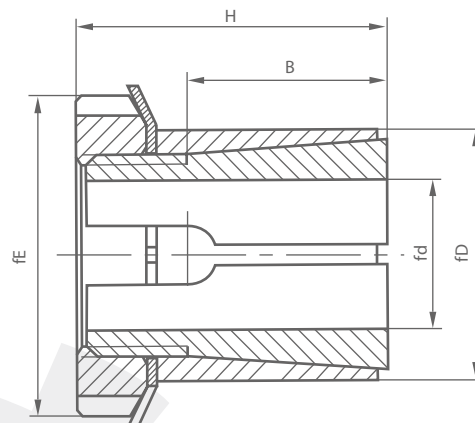

HLL CAPT-LOCKS ®

Catalog	Fundamental dimensions			Locking nut		Rated load		Ps	Ph	G
dxD	B	H	E	Sizes	Ma(N.m)	Ft(Kn)	Mt(Kn.m)	Mpa	Mpa	Kg
CL14x25HLL	20	30	32	M20x1.0	95	9	0.064	85	45	0.11
CL15x25HLL	20	30	32	M20x1.0	95	9	0.07	80	45	0.11
CL16x25HLL	20	30	32	M20x1.0	95	9	0.073	75	45	0.11
CL17x25HLL	20	32	32	M20x1.0	95	9	0.08	70	45	0.13
CL18x30HLL	20	32	38	M25x1.5	160	9	0.091	65	45	0.13
CL19x30HLL	20	32	38	M25x1.5	160	11	0.105	75	45	0.13
CL20x30HLL	20	32	38	M25x1.5	160	11	0.112	70	45	0.15
CL22x35HLL	25	36	45	M30x1.5	220	14	0.163	70	45	0.15
CL24x35HLL	25	36	45	M30x1.5	220	14	0.178	65	45	0.17
CL25x35HLL	25	36	45	M30x1.5	220	14	0.185	60	45	0.17
CL28x40HLL	30	42	52	M35x1.5	340	17	0.25	55	40	0.17
CL30x40HLL	30	42	52	M35x1.5	340	17	0.27	50	40	0.26
CL32x45HLL	30	44	58	M40x1.5	480	21	0.35	60	45	0.26
CL35x45HLL	30	44	58	M40x1.5	480	21	0.39	55	45	0.26
CL38x50HLL	30	45	65	M45x1.5	680	26	0.51	60	45	0.30
CL40x50HLL	30	45	65	M45x1.5	680	26	0.52	55	45	0.33
CL42x55HLL	30	46	70	M50x1.5	870	30	0.63	65	50	0.38
CL45x55HLL	30	46	70	M50x1.5	870	30	0.68	60	50	0.45
CL48x60HLL	30	46	75	M55x2.0	970	35	0.84	60	50	0.51
CL50x60HLL	30	46	75	M55x2.0	970	35	0.88	60	50	0.66
CL55x65HLL	30	46	80	M60x2.0	1100	37	1.03	60	50	0.72
CL60x70HLL	30	52	85	M65x2.0	1300	45	1.36	65	55	0.80

Key elements for designing and calculation (HL-HLL)

1.Determine max torque needed and max axial load
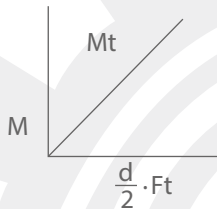
$$Mt\ max = \frac{30000H}{p.n} \cdot K(N\ m)$$

$$Ft\ max = Ft \cdot K$$

H--Transmission power KW
n--rotational speed r/min
K--coefficient needed
Sheet for coefficient needed, K

No shock load, transmitting with little inertia	$1.5 - 2.5$
Slight shock load,transmitting with middle inertia	$2.0 - 4.0$
Big shock load, transmitting with heavy inertia	$3.0 - 5.0$

2.Calculate synthetic load and transmitted torque

$$M = \sqrt{Mt^2 - (\frac{d}{2} \times Ft)^2}$$

M--Required transmitted torque N.M
Mt--CAPT lock rated transmitted torque N.m
Ft--Rated axial force N
d--Transmission shaft diameter mm

Mt $\geqslant$ M, can be used.
Mt<M, need bigger type of CAPT lock or to be installed by two CAPT locks or more together

3.Calculation for the hub diameter

$$Da \geqslant D\sqrt{\frac{\sigma b + Ka \cdot Ph}{\sigma b - Ka \cdot Ph}}$$

Da--outside diameter of hub mm
D--inside diameter of hub mm
Ph--suface pressure on hub Mpa
σb--tensile strength of material
Ka--It should be 0.6 for single CAPT lock, it will be 0.8 when two CAPT locks or more are installed together
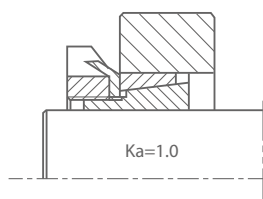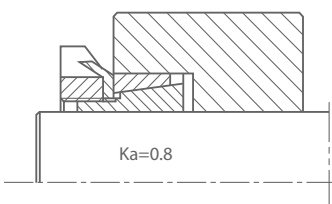
4.Calculation for the inside diameter of hollow shaft

$$dB \leqslant d\sqrt{\frac{\sigma b - 2 \times Ps \cdot K3}{\sigma b}}$$

dB--inside diameter of hollow shaft mm
d--outside diameter of hollow shaft mm
6b--tensile strength of shaft material Mpa
Ps--pressure on the surface of shaft Mpa
K3--coefficient=0.6

## 5.Settlement for the surface roughness and dimension tolerance

Fitting section	Ra(um) Surface roughness	Dimension precision
Shaft diameter d	1.6	$h8 - H9$
Bore diameter D	1.6	$H8 - H9$

## 6.Installation and disassembling for CAPT lock type HL,HLL

Installation:

Before installation,oil or dust must be cleaned up with cleaning agent so that torque transmission won't be affected.Loosen the round nut and made it in relax and meanwhile install hub,shaft and CAPT lock together in right position.But to the step shaft, a short distance "a" should be deep and data for "a"should be larger than the distance in axial while the CAPT lock is tightened. Then the round nut should be tightened in clockwise direction to reach the specified torque. At last the round nut should be locked with the washer to avoid it not to become self crowded.

Put the washers into the split groove of nuts

Ka=0.8

Ka=1.0
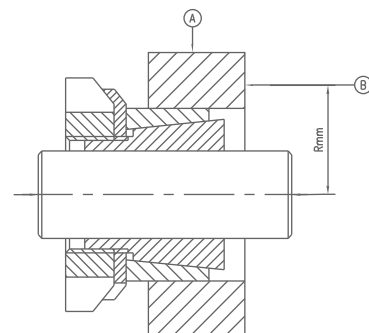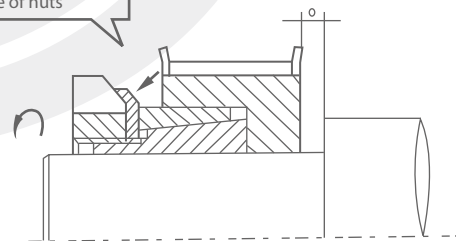
Disassembling :

When the disassembling is done, as long as the locked washer is opened and loose the round nut, the CAPT lock will be separated with shaft and hub, and then come back to its original shape.

Pull out the washer from the split groove of nut

Conventional installation with non-through bored hubs
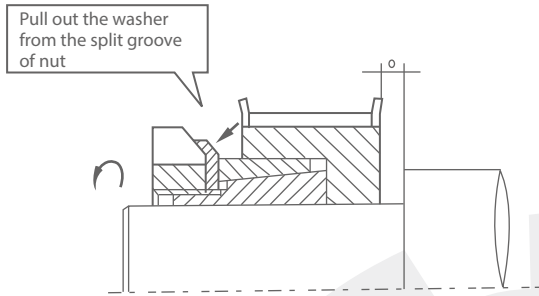
Dimension table of split round nuts

Catalog	fundamental dimensions				
	D_1	b_1	D	m	n
M20x1	32	6	26	4	2
M22x1	35	7	29	5	2
M25x1.5	38	7	32	5	2
M30x1.5	45	7	38	5	2
M32x1.5	48	7	41	5	2
M35x1.5	52	8	44	5	2
M36x1.5	55	9	47	6	2.5
M40x1.5	58	9	50	6	2.5
M42x1.5	62	10	52	6	2.5
M45x1.5	65	10	56	6	2.5
M48x1.5	68	11	58	6	2.5
M50x1.5	70	11	61	6	2.5
M55x2	75	11	67	7	3
M60x2	80	11	73	7	3
M65x2	85	12	79	7	3
M70x2	92	12	85	8	3.5
M75x2	98	13	90	8	3.5

Conventional installation with through bored hubs

Installed pairs of CAPT-LOCKS at two sides symmetrically. They can transmit greater powers

Dimension table of stop backing washers

Catalog	fundamental dimensions					
	d	D	S	n	F	E
20	20.5	26	1	4	19	4
25	25.5	32	1.25	5	24	5
30	30.5	38	1.25	5	28	5
35	35.5	44	1.25	6	33	5
40	40.5	50	1.25	6	38.5	6
45	45.5	56	1.25	6	43	6
50	50.5	61	1.25	6	48	6
55	55.5	67	1.25	8	53	7
60	60.5	73	1.5	8	58.5	7
65	65.5	79	1.5	8	63	7
70	70.5	85	1.5	8	68	8
75	75.5	90	1.5	8	73	8

Installed with counter bore, The CAPT-LOCKS can be completely installed into the hub, thus the installation space can be saved.