



Mach Drill Series

Master-piece of Deep Hole Drilling

New

Mach Long Drill

Features

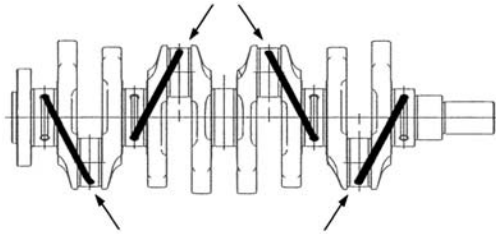
- Specially designed cutting edge guarantees long tool life by generating with low cutting force.
- Special chip pocket design for effective chip evacuation.
- Optimized design for rigidity of drill to prevent bending of drill during machining.
- Lubrication & thermal resistance of coating have been increased by adopting new TiAlN.
- Good chip evacuation due to special post treatment technique.
- Over 20D deep hole drilling is possible without step drilling.
- Best cutting performance with MQL system.
- Guarantees tool life & cutting performance by efficient process management.



Mach Long Drill

Deep hole drilling

Deep hole drilling



Application example
(Oil hole for Crank Shaft, 20D)

New
MLD

1. Mach Long Drill is ideal for...

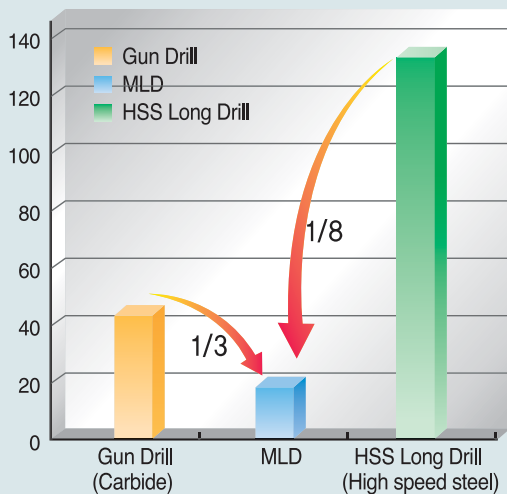
- Deep and inclined hole drilling of crank shaft
 - Coolant passing through drilling of cam shaft
 - Deep hole making of mold and machinery
→ deep hole drilling aspect ratio over 15D
 - Saving cycle time for better productivity
 - Tool guide bush is not required
 - Reduce idle time by prolonged tool life
 - Green coolant solution(MQL) to protect environment
- Ineffective conventional drilling : High Speed Steel Long Drill, Gun Drill...

2. MLD Productivity : MLD0680-20A

- Ø 6.8 x 140 x 170L x 7S

Tool	vc (m/min)	fn (mm/rev)	n (min ⁻¹)	vf (mm/min)	Coolant	Step operation
Gun drill(Carbide)	100	0.04	4,683	187	Inner coolant oil	-
High Speed Steel long drill	15	0.10	703	70	Outer coolant oil	15mm 9 times
Mach Long Drill	80	0.14	3,747	525	MQL- Air out 0.4MPa, Oil 20cc/h	Not required

- Cycle time



- Advantages of MLD against conventional drill

- Shortening cycle time up to 8 times
- Increasing productivity by process reduction
- Optimal efficiency with MQL system



Mach Long Drill

Features of MLD | Cutting condition | Notice for MLD drilling

Features of MLD

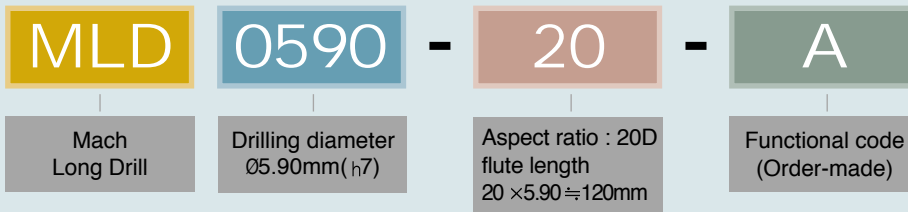
1. Specially designed cutting edge guarantees long tool life by generating with low cutting force.
2. Special chip pocket design for effective chip evacuation.
3. Optimized design for rigidity of drill to prevent bending of drill during machining.
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5. Good chip evacuation due to special post treatment technique.
6. Over 20D deep hole drilling is possible without step drilling.
7. Best cutting performance with MQL system.
8. Guarantee tool life & cutting performance by efficient process management.

Cutting condition

Standard cutting condition for MLD 0600 - 20 A

	Carbon steel (Ck45, AISI1045)		Low alloy steel (41CrMo4, AISI4140)		Cast iron (GG/GGG)	
	vc	fn	vc	fn	vc	fn
MQL	90m/min	0.2mm/rev	80m/min	0.19mm/rev	70m/min	0.15mm/rev

· Mach Long Drill code system



Notice for MLD drilling

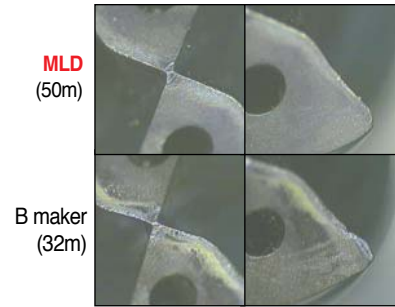
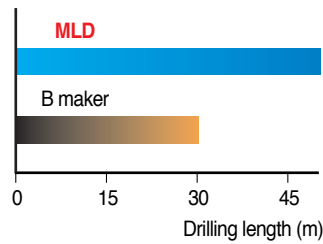
1. Centering tolerance of Mach long drill from previously machined center of pilot drill should be within 0.01mm.
 - The tolerance affects sudden fracture of long drill.
2. Composition for MQL system.
 - MQL system : Air over 6bar(0.6Mpa), Oil over 20cc/hour
 - Internal Oil supply system : Pumping pressure over 15bar(1.5Mpa), Coolant : Water soluble.
3. Machining sequence for tilted face : Endmilling to make flat face → Pilot drill → Mach long drill
 - In case of tilted face, sphere shape, convex or concave face should have endmill process first.

Mach Long Drill

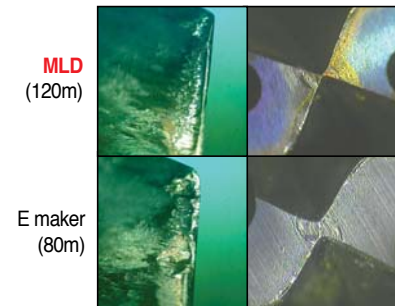
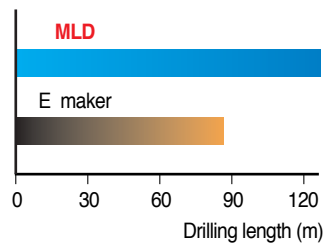
MLD application examples

MLD application examples

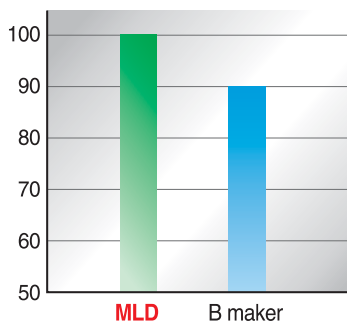
- Designation : MLD0590-20A
($\text{\O}5.9\text{mm}$, Aspect ratio=20D)
- Workpiece : SCM440 (HRC20)
- Cutting condition
vc = 80m/min
fn = 0.14mm/rev
ap = 75mm
- Coolant : Air out 0.4Mpa / Oil 15cc/h



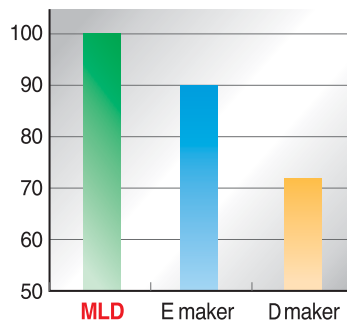
- Designation : MLD0700-22A
($\text{\O}7.0\text{mm}$, Aspect ratio=22D)
- Workpiece : SCM440 (HRC22)
- Cutting condition
vc = 80m/min
fn = 0.19mm/rev
ap = 80mm
- Coolant : Air out 0.3Mpa / Oil 20cc/h



A customer test ($\text{\O}5.9$)



C customer test ($\text{\O}7.0$)



Comparison of machined chip

Better chip breaking than competitors : reduction of chip evacuation resistance



Mach Long Drill

MLDP : Pilot drill

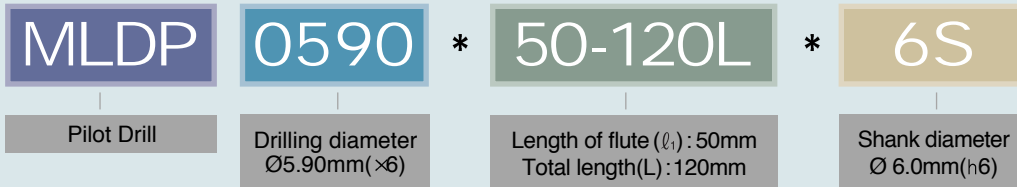
MLDP : Pilot drill

Features of MLD & MLDP

	diameter(ØD)	Length (L)	Point angle	Coolant hole
Mach Long Drill	D (tolerance h7)	Over 15D	140°	○
MLDP	D (tolerance x6)	Over 1.5~2D	150°	○

MLDP Drilling diameter tolerance		×6
Excess	Under	
-	3	+0.020~0.026
3	6	+0.028~0.036
6	10	+0.034~0.043

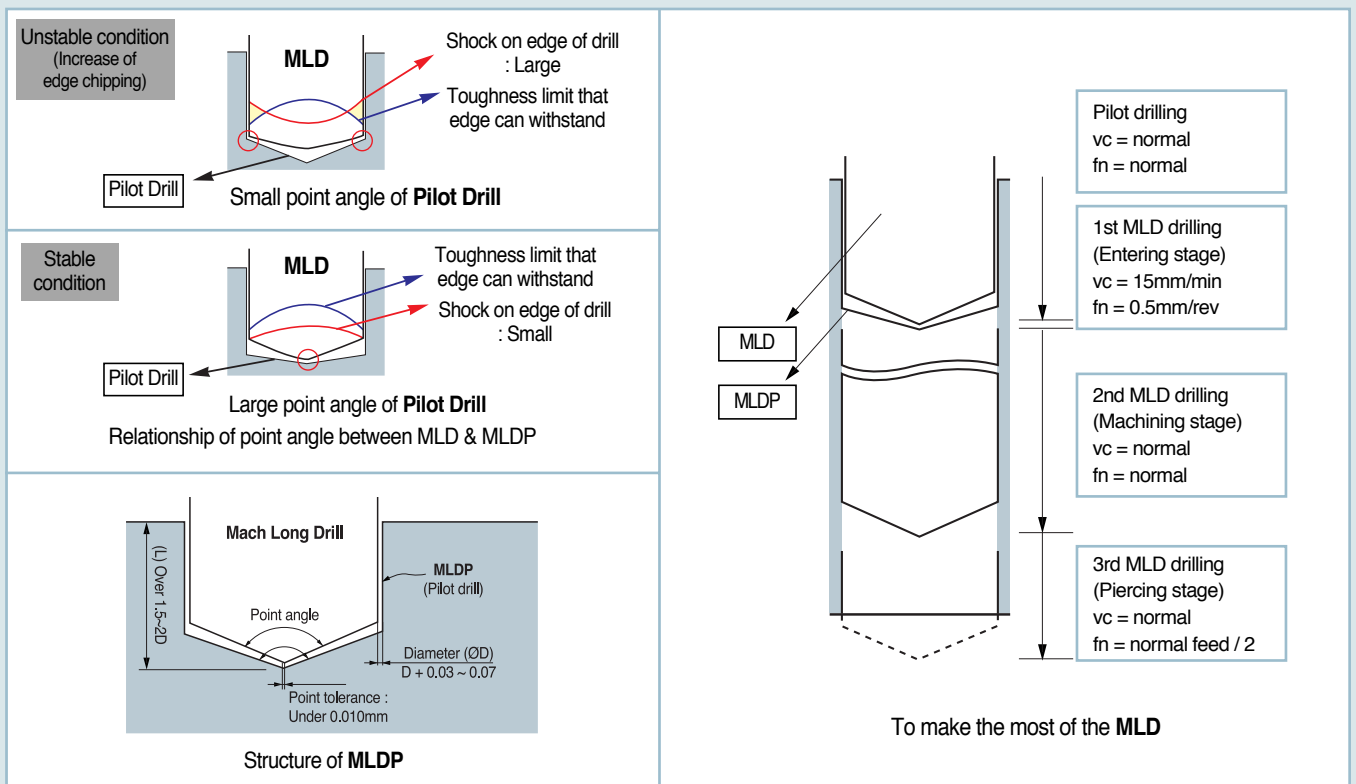
· MLDP code system



Notice for MLDP drilling

- Hole size : When the diameter of MLDP is larger than MLD over 0.5mm, chattering of MLD would be occurred due to incorrect base hole. Please apply to right tooling with proper KORLOY MLDP.
- Hole making : In case the depth of MLDP is under 2D, noise and inaccuracy operation by chattering would be occurred. We would like to recommend drilling over 2D hole.
- Point angle : The point angle of pilot drill should be bigger than MLD,s due to effect on breakage and tool life of drill.
- Please notify the center point tolerance to be under 0.010mm

· Function of MLD & MLDP



Mach Long Drill

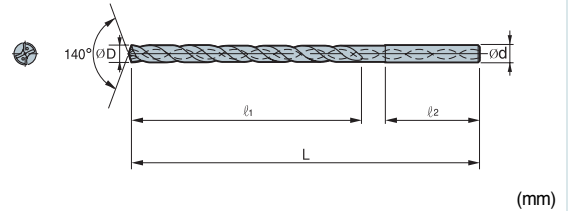
MLD | MLDP

MLD

Mach Long Drill with oil hole for deep hole machine



- Tolerance of drill diameter
Every size Drill diameter h7
Shank diameter h6



Designation	øD	ød	20(L / ØD=20)			25(L / ØD=25)		
			Stock	l ₁	L	Stock	l ₁	L
MLD0300-□	3.0	3.0	○	60	110	○	75	120
MLD0400-□	4.0	4.0	○	80	130	○	100	150
MLD0500-□	5.0	5.0	○	100	150	○	125	175
MLD0600-□	6.0	6.0	○	120	170	○	150	200
MLD0700-□	7.0	7.0	○	140	190	○	175	225
MLD0800-□	8.0	8.0	○	160	210	○	200	250
MLD0900-□	9.0	9.0	○	180	230	○	225	275
MLD1000-□	10.0	10.0	○	200	250	○	250	300

- How to name for order made item : MLD○○○○-Aspect ratio
Ex.1) Cutting edge diameter 5.3, Cutting edge length 120, Total length 180 →MLD0530-22A
- Last alphabet character is for detail information as per customers.

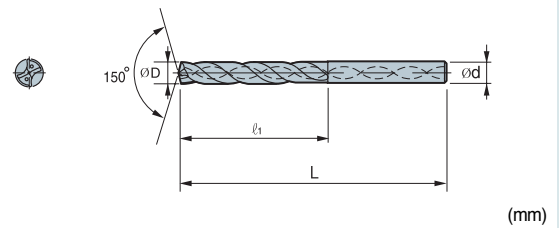
● Stock item, ○ Under preparing for stock

MLDP

Pilot Drill with oil hole for MLD



- Tolerance of drill diameter
Every size Drill diameter x6
Shank diameter h6



Designation	ØD	Ød	5(L / ØD=5)			7(L / ØD=7)		
			Stock	l ₁	L	Stock	l ₁	L
MLDP0300-□	3.0	3.0	○	25	70	○	30	75
MLDP0400-□	4.0	4.0	○	34	80	○	40	86
MLDP0500-□	5.0	5.0	○	43	90	○	50	97
MLDP0600-□	6.0	6.0	○	48	96	○	60	108
MLDP0700-□	7.0	7.0	○	56	105	○	70	120
MLDP0800-□	8.0	8.0	○	60	110	○	80	130
MLDP0900-□	9.0	9.0	○	72	125	○	90	143
MLDP1000-□	10.0	10.0	○	75	129	○	95	150

- How to name for order made item : MLDP○○○○×Ø-L×ødS
Ex.1) Pilot drill to make pre-hole for long drill ø5.8, Cutting edge length 50, Total length 100, Shank diameter 6 →MLDP0580 ×50-100L ×6S
- When using MLD, MLDP has to be used at first.

● Stock item, ○ Under preparing for stock



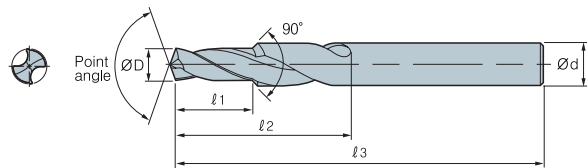
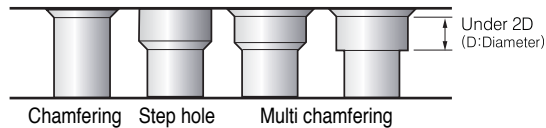
Mach Long Drill

Detail tolerance for drill shank & diameter | Code system for mach step drills | Order sheet

Detail tolerance for drill shank & diameter

Drill diameter(Ø)		h6	h7	x6
Excess	downward			
-	3	0~-0.006	0~-0.010	+0.020~+0.026
3	6	0~-0.008	0~-0.012	+0.028~+0.036
6	10	0~-0.009	0~-0.015	+0.034~+0.043
10	14	0~-0.011	0~-0.018	+0.040~+0.051
14	18	0~-0.011	0~-0.018	+0.045~+0.056
18	24	0~-0.013	0~-0.021	+0.054~+0.067

Code system for mach step drills



MSD(H)S

- Solid type : MSDS
- Oil-hole type : MSDHS

ØD

(Tool diameter)

*

ℓ1

(Valid flute length)

-

ℓ2

(Flute length)

-

ℓ3

(Overall length)L

*

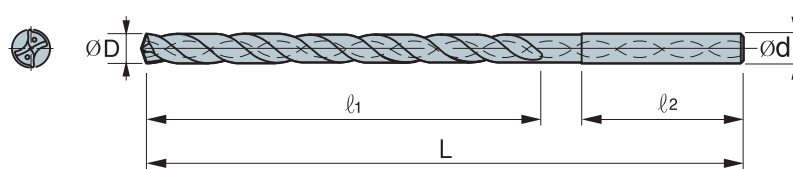
Ød

(Shank diameter)S

Order sheet

• Please fill out this form and send this to KORLOY sales dealers.

Drilling diameter (ØD) Available diameter : Ø2.5 ~ Ø15mm		mm	Special comment
Shank diameter (Ød) Available diameter : Ø3.0 ~ Ø15mm		mm	
Length of flute (ℓ1) Max ℓ1 size: 250mm		mm	
Length of shank (ℓ2)		mm	
Total length (L) Max L size : 310mm		mm	
Workpiece :	vc:		
Hardness :	n:		
Product name :	fn:		
	vf:		
	Coolant :		



► Advice for making a better choice

1. Please make sure to choose short drill to improve tool life and consider drill length against diameter when you order.



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May. 2008



Warning

※ Safety instruction

- Use glasses safely and face cover with protective equipment. If cutting condition and use method are inaccurate, you may be injured by broken tools or scattered chips.
- Excessive cutting load may influence badly on both tool and machine.
Make suitable tool replacement for preventing failure of machining.
- After machine stopped, clean remained chips from machine with special cleaning equipment.
- Keep safety distance from acute and hot chip during machining.
- Make precaution for prevention of fire in advance when you use insoluble cutting oil.
- Assembled parts may be scattered at high speed cutting. Please use protective equipment.