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New

Dog Bone

Universal Groove-Turn system

High Versatility and Superior Operational Productivity



Brochure/MDC/2026/005

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Groove- Turn System Tooling from MTTL for high Versatility and Operational Productivity

Groove- Turn System Tooling, often also termed as multi directional turning system has been specially designed with the consideration of versatility of cutting processes. With this system, it is possible to perform groove turn as well as profiling operations. Multiple ISO turning tool holders can be replaced by one or two versatile Groove-Turn tools, thereby reducing the total number of tools.

Rigid insert clamping system: This is the key to good performance of the tool. The special design of the insert ensures proper rigidity

Fig.1

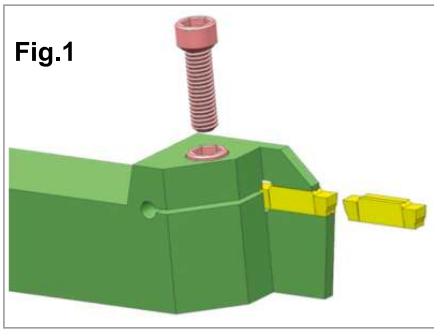


Fig.2

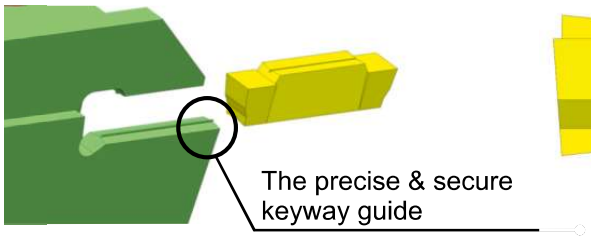
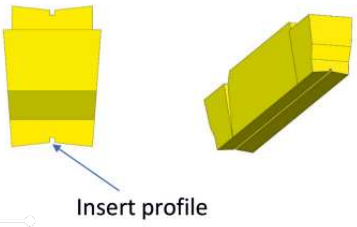


Fig.3



Groove Turn Insert Nomenclature System:

The Inserts belonging to Groove Turn System are divided into two basic types:

- **MGSN** type having a square/rectangular cutting edge – TG1 geometry.
- **MGRN** type having a half round cutting edge for profiling – PT1 geometry.

The Nomenclature system for the Inserts is as shown in the chart below:

2 Edge Grooving Inserts Nomenclature

MGSN	20	10	-	TG1	-	DGP4015U
Motherson Grooving	Groove Width	Corner Radius		Geometry		Grade

Short Name	Groove Type
MGSN	Square Groove
MGRN	Half Round Groove

Value in Description	Width
20	2.0
25	2.5
50	5.0

Value in Description	Corner Radius
10	R0.10
25	R0.25
Half Round (MGRN)	No value

Geometry Name	Purpose / Operation
PG1	Plunge Grooving
TG1	Groove Turning
PT1	Profile Turning (MGRN)

Item Descriotion	Groove Type	W	Corner Radius	Geometry
MGSN2520 -TG1-DGP4015U	Square	2.5	0.2	TG1
MGRN30-PT1-DGP4015U	Half Round	3	As defualt	PT1

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Success Case

Combined grooving cum turning operation

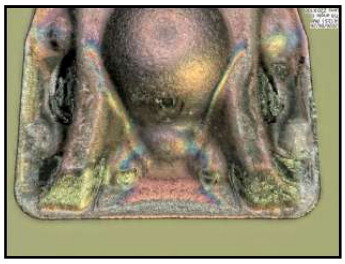
Material: CK45 (Steel) - ISO P
Hardness: 15-18 HRC
Tool overhang: 46.00mm
Insert: **MGSN**4040-TG1-**DGP4015U**

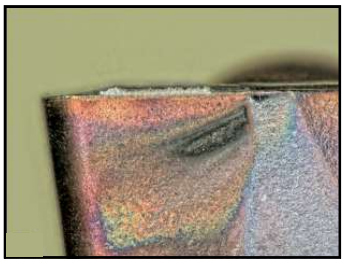
Cutting Parameters:
Vc = 150m/min, **f**=0.1mm/rev (**Grooving**), **f**=0.1mm/rev (**Turning**), **Ap**=2.0mm(Radial), **Turning Length**=252mm, Wet



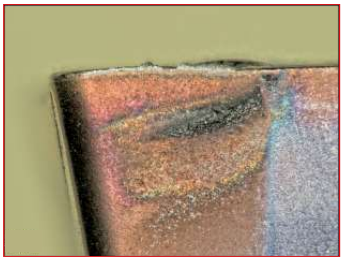
Setup

Wear comaprison after 4.032mtr





Existing

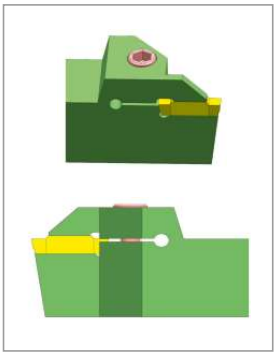




MGSN

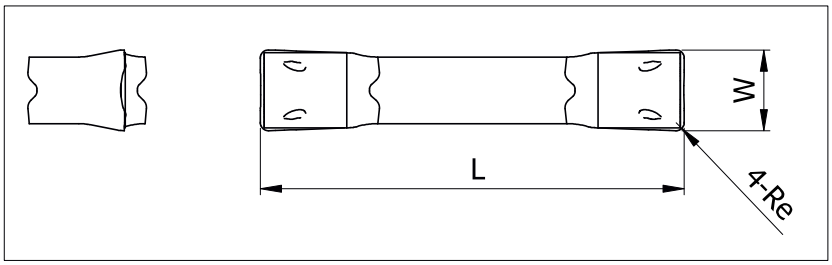
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Insert Range:

1. Geometry: TG1 geometry (2-5 mm width)
2. Geometry: PT1 geometry (2-6 mm width).



Catalogue Description	W Width	Re Corner Radius	L Length	Groove Type	Operation
MGSN2015 -TG1-DGP4015U	2.0	0.15	16.0	Square	Groove-Turn
MGSN2520 -TG1-DGP4015U	2.5	0.20	18.5	Square	Groove-Turn
MGSN3020 -TG1-DGP4015U	3.0	0.20	21.0	Square	Groove-Turn
MGSN4040 -TG1-DGP4015U	4.0	0.40	21.0	Square	Groove-Turn
MGSN5060 -TG1-DGP4015U	5.0	0.60	26.0	Square	Groove-Turn
MGRN20-PT1-DGP4015U	2.0	1.00	16.0	Half Round	Profile
MGRN30-PT1-DGP4015U	3.0	1.50	21.0	Half Round	Profile
MGRN40-PT1-DGP4015U	4.0	2.00	21.0	Half Round	Profile
MGRN50-PT1-DGP4015U	5.0	2.50	26.0	Half Round	Profile
MGRN60-PT1-DGP4015U	6.0	3.00	26.0	Half Round	Profile

Insert Grade:

The groove-turn inserts are manufactured in a dedicated universal grade **DGP4015U**.

Universal first choice grade for Groove-Turn Inserts.

DGP4015U is an universal application grade from the Motherson Deltacarb grade basket, specially developed for groove turn applications.

Application Areas: P10-P20, M10-M20, K10-K20 and S10-S20

Grade description:

The grade **DGP4015U** derives its properties from the specially engineered fine-grained substrate and a multilayer PVD coating. The PVD coating is very smooth, which gives additional advantages while machining sticky materials.

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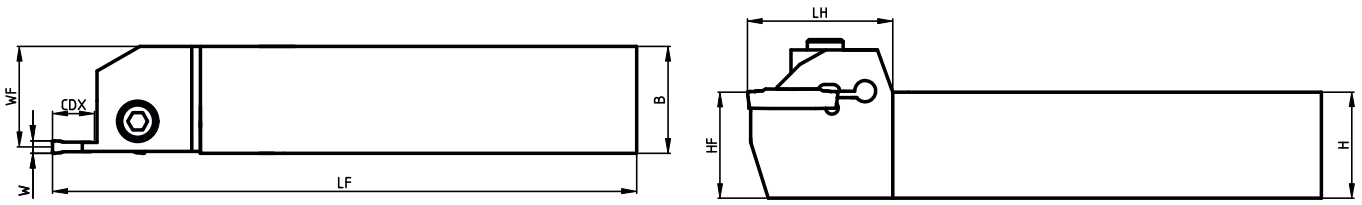
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Tool Holders Range

Cutting Depth - Short

(All dimensions are in mm)

MGES : Motherson Grooving External Short
R/L : Right / Left



Shank	Description	H	B	LF	WF	HF	LH	CW	CDX	Applicable Insert	Fig.
20x20	MGESR/L2020K-206	20	20	125	19.2	20	30	2	6	MGSN20 / MGRN20	1
20x20	MGESR/L2020K-308	20	20	125	18.8	20	30	3	8	MGSN30 / MGRN30	1
20x20	MGESR/L2020K-408	20	20	125	18.5	20	30	4	8	MGSN40 / MGRN40	1
20x20	MGESR/L2020K-510	20	20	125	18	20	33	5	10	MGSN50 / MGRN50	1
20x20	MGESR/L2020K-610	20	20	125	18	20	33	6	10	MGRN60 (Only R3)	1
25x25	MGESR/L2525M-206	25	25	150	24.2	25	30	2	6	MGSN20 / MGRN20	1
25x25	MGESR/L2525M-308	25	25	150	23.8	25	30	3	8	MGSN30 / MGRN30	1
25x25	MGESR/L2525M-408	25	25	150	23.5	25	30	4	8	MGSN40 / MGRN40	1
25x25	MGESR/L2525M-510	25	25	150	23	25	33	5	10	MGSN50 / MGRN50	1
25x25	MGES R/L2525M-610	25	25	150	23	25	33	6	10	MGRN60 (Only R3)	1

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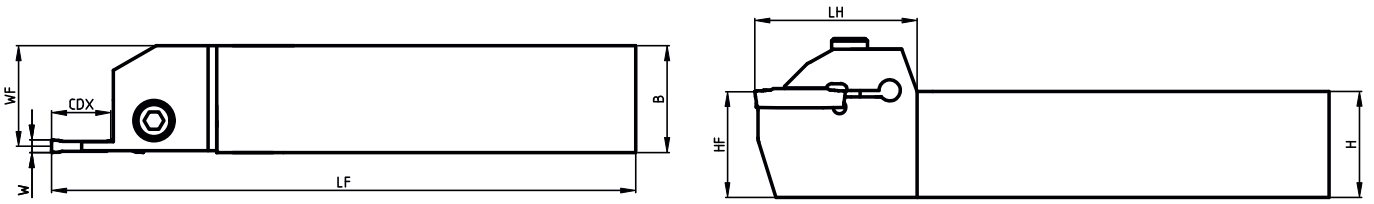
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Tool Holders Range

Cutting Depth - Medium

(All dimensions are in mm)

MGEM : Motherson Grooving External Medium
R/L : Right / Left



Shank	Description	H	B	LF	WF	HF	LH	CW	CDX	Applicable Insert	Fig.
20x20	MGEMR/L2020K-210	20	20	125	19.2	20	34	2	10	MGSN20 / MGRN20	2
20x20	MGEMR/L2020K-315	20	20	125	18.8	20	37	3	15	MGSN30 / MGRN30	2
20x20	MGEMR/L2020K-415	20	20	125	18.5	20	37	4	15	MGSN40 / MGRN40	2
20x20	MGEMR/L2020K-518	20	20	125	18	20	41	5	18	MGSN50 / MGRN50	2
20x20	MGEMR/L2020K-618	20	20	125	18	20	41	6	18	MGRN60 (Only R3)	2
25x25	MGEMR/L2525M-210	25	25	150	24.2	25	34	2	10	MGSN20 / MGRN20	2
25x25	MGEMR/L2525M-315	25	25	150	23.8	25	37	3	15	MGSN30 / MGRN30	2
25x25	MGEMR/L2525M-415	25	25	150	23.5	25	37	4	15	MGSN40 / MGRN40	2
25x25	MGEMR/L2525M-518	25	25	150	23	25	41	5	18	MGSN50 / MGRN50	2
25x25	MGEMR/L2525M-618	25	25	150	23	25	41	6	18	MGRN60 (Only R3)	2

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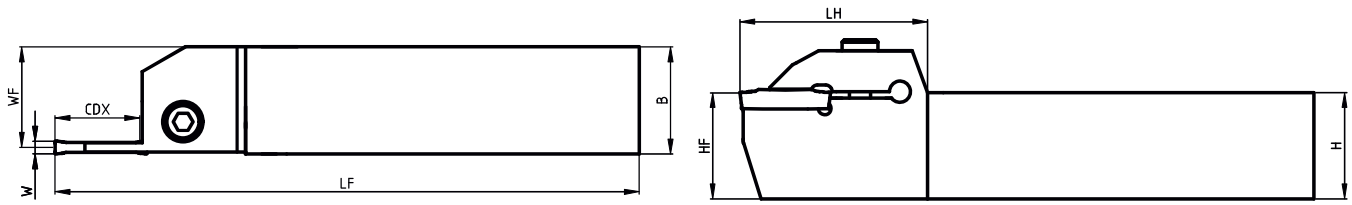
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Tool Holders Range

Cutting Depth - Long

(All dimensions are in mm)

MGEM : Motherson Grooving External Long
R/L : Right / Left



Shank	Description	H	B	LF	WF	HF	LH	CW	CDX	Applicable Insert	Fig.
20x20	**MGELR/L2020K-215**	20	20	125	19.2	20	39	2	15	MGSN20 / MGRN20	3
20x20	**MGELR/L2020K-318**	20	20	125	18.8	20	40	3	18	MGSN30 / MGRN30	3
20x20	**MGELR/L2020K-418**	20	20	125	18.5	20	40	4	18	MGSN40 / MGRN40	3
20x20	**MGELR/L2020K-523**	20	20	125	18	20	46	5	23	MGSN50 / MGRN50	3
20x20	**MGELR/L2020K-623**	20	20	125	18	20	46	6	23	MGRN60 (Only R3)	3
25x25	**MGELR/L2525M-215**	25	25	150	24.2	25	39	2	15	MGSN20 / MGRN20	3
25x25	**MGELR/L2525M-318**	25	25	150	23.8	25	40	3	18	MGSN30 / MGRN30	3
25x25	**MGELR/L2525M-418**	25	25	150	23.5	25	40	4	18	MGSN40 / MGRN40	3
25x25	**MGELR/L2525M-523**	25	25	150	23	25	46	5	23	MGSN50 / MGRN50	3
25x25	**MGELR/L2525M-623**	25	25	150	23	25	46	6	23	MGRN60 (Only R3)	3

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Recommended Cutting Parameters:

The cutting parameters are given in the table below. It may be noted that **for side turning operations**, there is a **requirement of certain minimum depth of cut and a minimum feed rate.** This is required to generate a minimum value of tool holder blade deflection, so as the create the required clearance angle and avoid rubbing of the front cutting edge against the workpiece.

Material	Insert Width	Parameters								
		Feed (mm/tooth)			Ap (mm)			Speed (m/min)		
		Min.	Ideal	Max.	Min.	Ideal	Max.	Min.	Ideal	Max.
P Steel	2	0.05	0.1	0.2	0.15	0.75	1.5	75	140	180
	3	0.05	0.15	0.25	0.3	1.5	2.0	75	140	180
	4	0.08	0.2	0.3	0.4	2.0	3.0	75	140	180
	5	0.1	0.2	0.3	0.5	2.5	3.5	75	140	180
	6	0.15	0.25	0.35	0.6	3.0	4.0	75	140	180

Material	Insert Width	Parameters								
		Feed (mm/tooth)			Ap (mm)			Speed (m/min)		
		Min.	Ideal	Max.	Min.	Ideal	Max.	Min.	Ideal	Max.
M Stainless Steel	2	0.05	0.1	0.18	0.15	0.75	1.5	50	120	150
	3	0.05	0.15	0.22	0.3	1.5	2.0	50	120	150
	4	0.08	0.2	0.25	0.4	2.0	3.0	50	120	150
	5	0.1	0.2	0.28	0.5	2.5	3.5	50	120	150
	6	0.15	0.25	0.35	0.6	3.0	4.0	50	120	150

Material	Insert Width	Parameters								
		Feed (mm/tooth)			Ap (mm)			Speed (m/min)		
		Min.	Ideal	Max.	Min.	Ideal	Max.	Min.	Ideal	Max.
K Cast Iron	2	0.05	0.1	0.2	0.15	0.75	1.5	80	150	200
	3	0.05	0.15	0.25	0.3	1.5	2.0	80	150	200
	4	0.08	0.2	0.3	0.4	2.0	3.0	80	150	200
	5	0.1	0.2	0.3	0.5	2.5	3.5	80	150	200
	6	0.15	0.25	0.35	0.6	3.0	4.0	80	150	200

Material	Insert Width	Parameters								
		Feed (mm/tooth)			Ap (mm)			Speed (m/min)		
		Min.	Ideal	Max.	Min.	Ideal	Max.	Min.	Ideal	Max.
S Exotic Alloys	2	0.05	0.1	0.18	0.15	0.75	1.5	30	45	60
	3	0.05	0.15	0.22	0.3	1.5	2.0	30	45	60
	4	0.08	0.2	0.25	0.4	2.0	3.0	30	45	60
	5	0.1	0.2	0.28	0.5	2.5	3.5	30	45	60
	6	0.15	0.25	0.35	0.6	3.0	4.0	30	45	60

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Application advice for optimum performance of Groove-Turn Tools

- While changing the direction of cut by 90 degrees, tool retraction by 1-2 mm is recommended.
- Outfacing is generally not recommended. Direction of the tool movement should be from outside towards the center line.
- Minimum doc and feed requirement during side turning needs to be respected.



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