

## MULTI CROSS RILLO

Highly flexible  
tyre coupling  
with taper bushings



**Maschinenfabrik Dipl.-Ing. Herwarth Reich GmbH**

Vierhausstr. 53 D-44807 Bochum  
Tel.: +49 / (0)234 / 959 16-0  
Internet: <http://www.reich-kupplungen.de>

P.O. Box 10 20 66 D-44720 Bochum  
Fax: +49 / (0)234 / 959 16 16  
Email: [mail@reich-kupplungen.de](mailto:mail@reich-kupplungen.de)

# Table of contents

	Page
General description.....	3
Features of the highly flexible MULTI CROSS RILLO couplings .....	3
MULTI CROSS RILLO shaft coupling types .....	4
MULTI CROSS RILLO coupling layout.....	5
Components - materials .....	
Technical details of MULTI CROSS RILLO couplings .....	
Selection of the proper coupling size .....	6
Calculate the driving torque .....	
Select the coupling size.....	
Verify the maximum torque capacity .....	
Calculation example .....	
Assignment to IEC standard motors .....	7
Power ratings .....	
MULTI CROSS RILLO shaft couplings .....	8
Technical details.....	
MULTI CROSS RILLO shaft couplings with spacers .....	9
Technical details.....	
Ordering information .....	10
Available taper bushes .....	
Permissible shaft displacements of MULTI CROSS RILLO couplings .....	
Mounting instructions for MULTI CROSS RILLO shaft couplings .....	11
Removing the coupling hubs with taper bushes .....	
Instructions for inserting the rubber tyre .....	12
Mounting instructions for MULTI CROSS RILLO shaft couplings with spacer .....	12

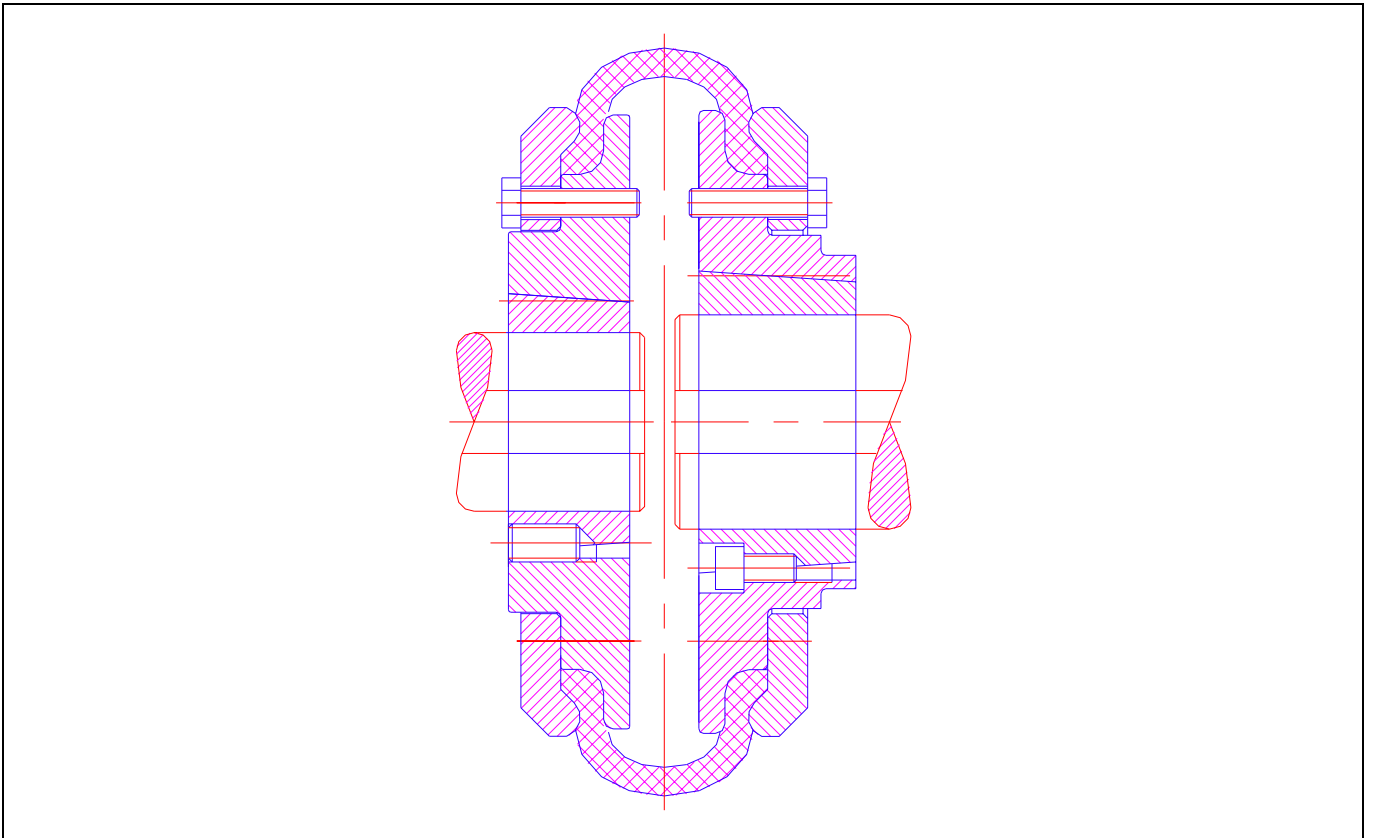
Issue April 2003

The present MULTI CROSS RILLO edition renders all previous catalogues of this coupling type obsolete.

All dimensions in millimeters.

We reserve the right to change dimensions and/or design details without prior notice.

## General description



**MULTI CROSS RILLO** couplings are highly torsionally flexible tyre couplings with progressive torsional deflection characteristic. The salient feature of the **MULTI CROSS RILLO** shaft couplings is that the coupling hubs are supplied with commercially available taper bushes for nominal torques of up to 11500 Nm. This allows easy and time saving mounting of the coupling hubs on the shaft. Special tools are not required.

The torque transmission element of the **MULTI CROSS RILLO** coupling is a rubber tyre reinforced with fabric plies. This tyre transmits the torque without torsional backlash, it is wear-resistant and maintenance-free. The rubber tyre is slit, thus permitting easy radial installation with no need for axial movement of the coupled machines.

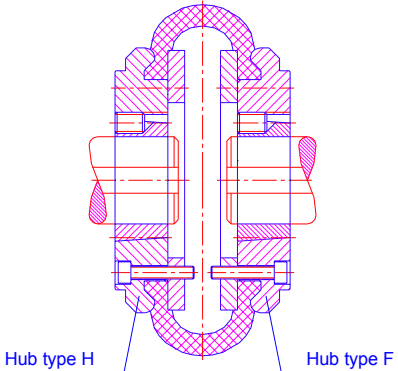
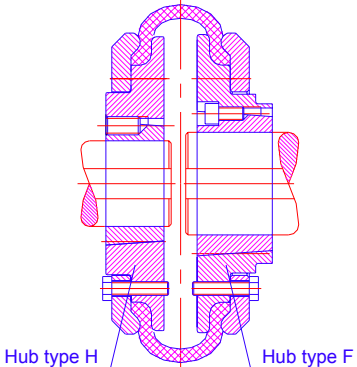
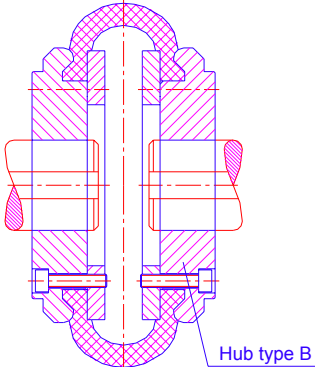
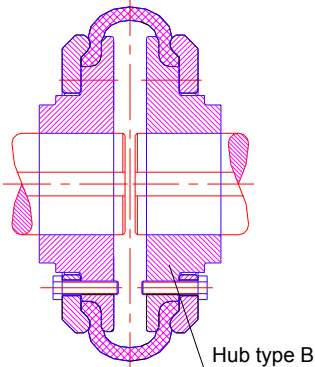
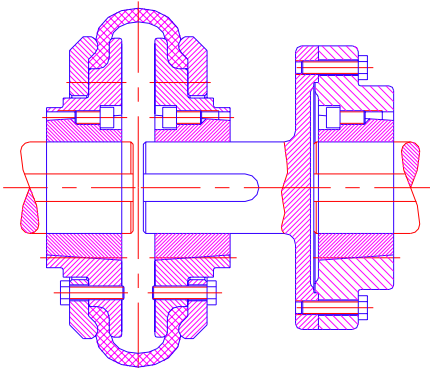
**MULTI CROSS RILLO** shaft couplings reduce torque surges substantially. In applications where torsional vibrations occur the stresses in the drive trains are minimized thanks to their high torsional flexibility.

The use of a rubber tyre as the transmission element compensates to a large extent for axial, radial and angular shaft displacements.

## Features of the highly flexible MULTI CROSS RILLO couplings

- High torsional flexibility with progressive torsional deflection characteristic
- High compensating capability for axial, radial and angular misalignments
- Easy and time saving mounting of the coupling hubs thanks to the use of taper bushes
- Radial change of the rubber element without axial movement of the coupled machines
- Backlash-free torque transmission even in case of alternating directions of rotation
- High torsional vibration and shock load damping capability
- Noise level insulation
- Wear-resistant and maintenance-free

# MULTI CROSS RILLO shaft coupling types

 <p>Hub type H                      Hub type F</p>	<p><b>MULTI CROSS RILLO</b> Shaft couplings with taper bushes</p> <p><b>Sizes MCR 40 to 60</b> <math>T_{KN} = 24</math> to 125 Nm</p> <p>Hub type H: taper bush connection from outside</p> <p>Hub type F: taper bush connection from inside</p>
 <p>Hub type H                      Hub type F</p>	<p><b>MULTI CROSS RILLO</b> Shaft couplings with taper bushes</p> <p><b>Sizes MCR 70 to 220</b> <math>T_{KN} = 250</math> to 11 500 Nm</p> <p>Hub type H: taper bush connection from outside</p> <p>Hub type F: taper bush connection from inside</p>
 <p>Hub type B</p>	<p><b>MULTI CROSS RILLO</b> Shaft couplings</p> <p><b>Sizes MCR 40 to MCR 60</b> <math>T_{KN} = 25</math> to 125 Nm</p> <p>Hub type B: without taper bush</p>
 <p>Hub type B</p>	<p><b>MULTI CROSS RILLO</b> Shaft couplings</p> <p><b>Sizes MCR 70 to MCR 250</b> <math>T_{KN} = 250</math> to 14 500 Nm</p> <p>Hub type B: without taper bush</p>
	<p><b>MULTI CROSS RILLO</b> Couplings with spacers</p> <p><b>Sizes MCR 40 to 140</b> <math>T_{KN} = 25</math> to 2 350 Nm</p> <p>The flange hub is also available without taper bush on request.</p>

# MULTI CROSS RILLO coupling layout

Rubber tyre, highly flexible elastic element

Item 2

Clamp ring

Item 3

Taper bush

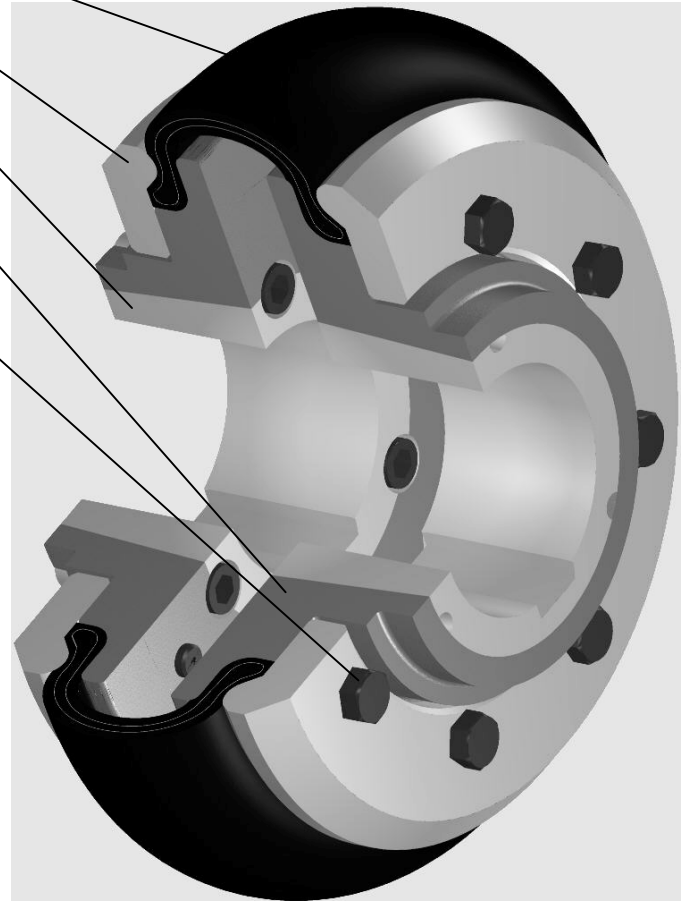
Item 4

Coupling hub type F,H or B

Item 1

Fastening bolts

Item 5



## Components - materials

**MULTI CROSS RILLO** couplings have no fail safe device.

Item	Specification	Material
1	Coupling hub	GGG 40
2	Rubber tyre	a) Standard version Natural rubber tyre b) Chloroprene tyre flame-resistant and antistatic
3	Clamp ring	Steel / GGG 40
4	Taper bush	GG 25
5	Fastening bolt	Grade 8.8

## Technical details of MULTI CROSS RILLO couplings

Coupling size	Nominal Torque $T_{KN}$ [Nm]	Maximum torque $T_{Kmax}$ [Nm]	Fatigue torque $T_{KW}$ [10 Hz] [Nm]	Dynamic torsional stiffness $C_T$ [Nm/rad]	Relative damping $\Psi$ [-]	Maximum speed $n_{max}$ [rpm]	Permissible shaft displacement <sup>1)</sup>		
							axial $\Delta K_a$ [mm]	radial $\Delta K_r$ [mm]	angular $\Delta K_w$ [mm]
<b>MCR 40</b>	25	65	11	285	0.9	5500	1.3	1.1	5.7
<b>MCR 50</b>	65	160	26	745	0.9	4500	1.7	1.3	7.0
<b>MCR 60</b>	125	320	53	1500	0.9	4000	2.0	1.6	8.7
<b>MCR 70</b>	250	490	81	2350	0.9	3600	2.3	1.9	10.0
<b>MCR 80</b>	380	760	125	3600	0.9	3100	2.6	2.1	12.0
<b>MCR 90</b>	500	1100	185	5200	0.9	3000	3.0	2.4	13.0
<b>MCR 100</b>	670	1500	250	7200	0.9	2600	3.3	2.6	15.0
<b>MCR 110</b>	880	2150	355	10000	0.9	2300	3.7	2.9	16.0
<b>MCR 120</b>	1350	3550	590	17000	0.9	2050	4.0	3.2	18.0
<b>MCR 140</b>	2350	5650	940	28000	0.9	1800	4.6	3.7	22.0
<b>MCR 160</b>	3800	9350	1560	44500	0.9	1600	5.3	4.2	24.0
<b>MCR 180</b>	6300	16500	2750	78500	0.9	1500	6.0	4.8	28.0
<b>MCR 200</b>	9300	23500	3900	110000	0.9	1300	6.6	5.3	30.0
<b>MCR 220</b>	11500	33000	5550	160000	0.9	1100	7.3	5.8	33.0
<b>MCR 250</b>	14500	42500	7100	200000	0.9	1000	8.2	6.6	37.0

<sup>1)</sup> See explanations on page 10

## Selection of the proper coupling size

The coupling size should be adequately to ensure that the permissible coupling load is not exceeded in any operating condition encountered. For drives which are not subjected to periodically recurring vibratory torque loads, the coupling design may be selected based on the driving torque with reference to the corresponding service factors.

For specific applications which are subject to periodically recurring high vibratory torques such as combustion engines, piston pumps and compressors, please consult us. Upon request and receipt of your pertinent technical details, we would be pleased to provide a torsional vibration analysis for your specific application.

### Calculate the driving torque: $T_{AN}$

Given a driving power  $P_{AN}$  and a coupling speed  $n_{AN}$ , the driving torque is calculated as follows:

$T_{AN}$  in Nm,  $P_{AN}$  in kW,  $n_{AN}$  in rpm

$$T_{AN} = \frac{9550 \times P_{AN}}{n_{AN}}$$

### Select the coupling size:

The following prerequisites must be given for the proper coupling selection:

Nominal torque capacity  $T_{KN}$  in Nm,  $T_{AN}$  in Nm, service factor  $S_A$  as per table below

$$T_{KN} \geq T_{AN} \times S_A$$

Service factor: $S_A$	Type of operation of the driven machine		
	Load		
Prime mover	uniform	medium shock	heavy shock
Electric motors, turbines, hydraulic motors	1.00	1.75	2.50
Combustion engines 4 – 6 cylinders	1.25	2.00	2.75
Combustion engines 1 – 3 cylinders	1.50	2.25	3.00

Service factor  $S_A$  allows for up to 25 starts per hour. For up to 120 starts per hour, the service factor shall be increased by 0.75.

**Uniform loads:** Agitators (light liquids), centrifugal pumps, blowers and fans ( $T \leq 100$  Nm), belt conveyors, screw pumps, filling machines, light-weight centrifuges.

**Medium shock loads:** Agitators (viscous liquids) construction machinery, blowers and fans ( $T \leq 1000$  Nm), mixers, conveyors, planing machines, plastics industry machinery, textile machines, heavy centrifuges.

**Heavy shock loads:** Blowers and fans ( $T \geq 1000$  Nm), travelling gears, planing machines, plate shears, plate mills, paper machines, belt conveyors, frequency transformers, presses.

### Verify the maximum torque capacity: $T_{Kmax}$

The max. coupling torque capacity  $T_{Kmax}$  must be greater than any max. torque  $T_{max}$  encountered in operation :

$$T_{Kmax} \geq T_{max}$$

Permissible **ambient temperature** range:

$$-50 \text{ }^\circ\text{C} \leq \vartheta \leq +70 \text{ }^\circ\text{C}$$

For applications at higher ambient temperatures, please consult us.

### Calculation example:

**Required:** A **MULTI CROSS RILLO** shaft coupling for driving a planing machine positioned between the electric motor and the gearbox. Electric motor  $P_M = 75$  kW, speed  $n_M = 1485$  rpm, power requirement of the planing machine  $P_{AN} = 60$  kW, up to 60 starts/hr, ambient temperature  $25$  °C.

**Solution:** The **MULTI CROSS RILLO** coupling shall be designed for  $P_{AN} = 60$  kW and with a service factor of  $S_A=2.5$  (1.75 as per table plus 0.75 for a starting frequency of more than 25).

Therefore:  $T_{AN} = 9550 \times P_{AN} / n_{AN} = 9550 \times 60 \text{ kW} / 1485 \text{ rpm} = 385 \text{ Nm}$  and  
 $T_{KN} \geq T_{AN} \times S_A = 385 \text{ Nm} \times 2.5 = 965 \text{ Nm}$ .

The **MULTI CROSS RILLO** coupling **MCR 120 FF** at  $T_{KN} = 1350$  Nm should be selected for the present application.

# Assignment to IEC standard motors

MULTI CROSS RILLO shaft couplings for IEC Standard motors acc. to DIN 42 637/1

Motor size	Motor power at ~ 3000 rpm		Coupling MCR	Motor power at ~ 1500 rpm		Coupling MCR	Motor power at ~ 1000 rpm		Coupling MCR	Motor power at ~ 750 rpm		Coupling MCR	Cyl. shaft extension D x L [mm]	
	power P [kW]	torque T [Nm]		power P [kW]	torque T [Nm]		power P [kW]	torque T [Nm]		power P [kW]	torque T [Nm]		3000 rpm	1500 rpm
56	0.09 0.12	0.29 0.38	MCR 40 MCR 40	0.06 0.09	0.38 0.57	MCR 40 MCR 40								9 x 20
63	0.18 0.25	0.57 0.80	MCR 40 MCR 40	0.12 0.18	0.76 1.1	MCR 40 MCR 40								11 x 23
71	0.37 0.55	1.2 1.8	MCR 40 MCR 40	0.25 0.37	1.6 2.4	MCR 40 MCR 40								14 x 30
80	0.75 1.1	2.4 3.5	MCR 40 MCR 40	0.55 0.75	3.5 4.8	MCR 40 MCR 40	0.37 0.55	3.5 5.3	MCR 40 MCR 40					19 x 40
90 S 90 L	1.5 2.2	4.8 7.0	MCR 50 MCR 50	1.1 1.5	7.0 9.6	MCR 50 MCR 50	0.75 1.1	7.2 11	MCR 50 MCR 50					24 x 50
100 L	3	9.6	MCR 50	2.2 3	14 19	MCR 50 MCR 50	1.5	14	MCR 50	0.75 1.1	10 14	MCR 50 MCR 50		28 x 60
112 M	4	13	MCR 50	4	25	MCR 50	2.2	21	MCR 50	1.5	19	MCR 50		38 x 80
132 S	5.5 7.5	18 24	MCR 60 MCR 60	5.5	35	MCR 60	3	29	MCR 60	2.2	28	MCR 60		
132 M	- -	- -	- -	7.5	48	MCR 60	4 5.5	38 53	MCR 60 MCR 60	3	38	MCR 60		42 x 110
160 M	11 15	35 48	MCR 70 MCR 70	11	70	MCR 70	7.5	72	MCR 70	4 5.5	51 70	MCR 70 MCR 70		
160 L	18.5	59	MCR 70	15	96	MCR 70	11	105	MCR 70	7.5	96	MCR 70		48 x 110
180 M 180 L	22 -	70 -	MCR 70 -	18.5 22	118 140	MCR 70 MCR 70	- 15	- 143	- MCR 80	- 11	- 140	- MCR 70		
200L	30 37	96 118	MCR 80 MCR 80	30	191	MCR 80	18.5 22	177 210	MCR 80 MCR 80	15	191	MCR 80		55 x 110
225 S 225 M	- 45	- 143	- MCR 80	37 45	236 287	MCR 90 MCR 100	- 30	- 287	- MCR 100	18.5 22	236 280	MCR 90 MCR 90	55 x 110	60 x 140
250 M	55	175	MCR 80	55	350	MCR 100	37	353	MCR 100	30	382	MCR 100	60 x 140	65 x 140
280 S 280 M				75 90	478 573	MCR 110 MCR 120	45 55	430 525	MCR 110 MCR 120	37 45	471 573	MCR 120 MCR 120	65 x 140	75 x 140
315 S 315 M 315 L				110 132 160 200	700 840 1019 1273	MCR 120 MCR 140 MCR 140 MCR 140	75 90 110 132	716 860 1051 1261	MCR 120 MCR 140 MCR 140 MCR 140	55 75 90 110	700 955 1146 1401	MCR 120 MCR 140 MCR 140 MCR 160	65 x 140	80 x 170
355 L				250 315	1592 2006	MCR 160 MCR 160	160 200 250	1528 1910 2388	MCR 160 MCR 160 MCR 180	132 160 200	1681 2037 2547	MCR 160 MCR 160 MCR 180	75 x 140	95 x 170
400L				355 400	2260 2547	MCR 180 MCR 180	315	3008	MCR 180	250	3183	MCR 180	80 x 170	100x200

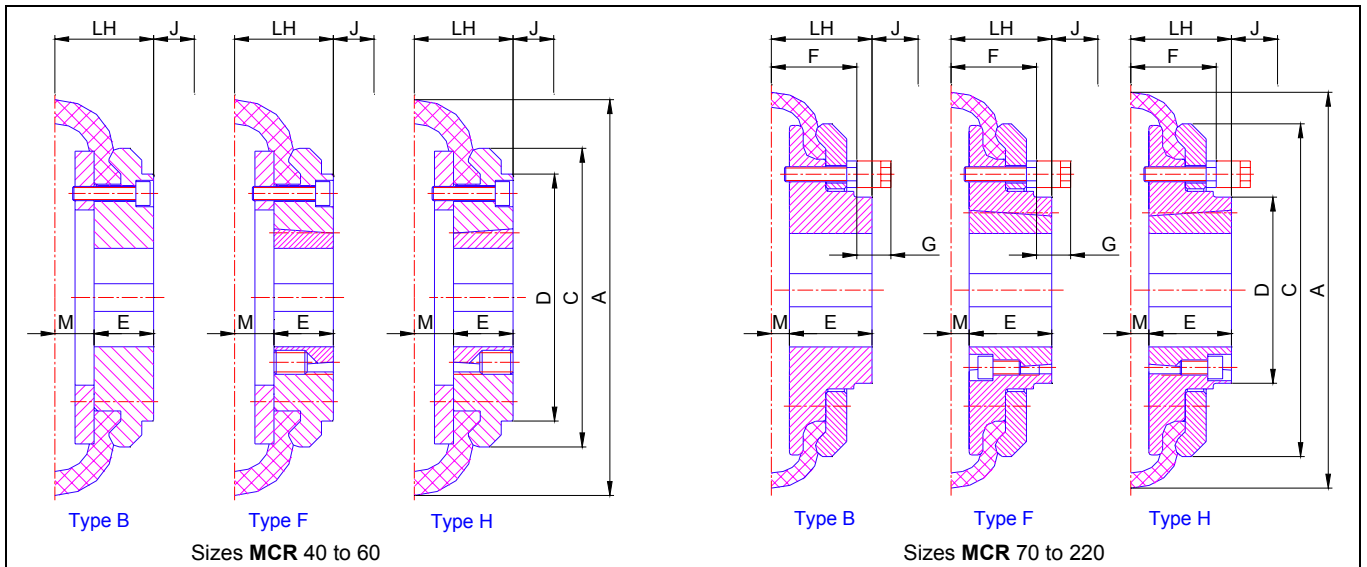
This assignment takes usual loads, service factor  $S_A = 1.75$ , into account. For other loads, a design according to „Selection of the proper coupling size“ on page 6 is required. For plants with predominant periodic excitation, the design shall either comply with DIN 740 part 2, or a torsional vibration analysis shall be conducted. The analysis could be provided by us on request.

## Power ratings

Speed rpm	Size	40	50	60	70	80	90	100	110	120	140	160	180	200	220	250
		Power rating ( kW )														
100		0.25	0.69	1.31	2.62	3.98	5.2	7.1	9.2	14.1	24.6	39.8	66	97	120	152
200		0.50	1.38	2.62	5.24	7.96	10.5	14.2	18.4	28.3	49.2	79.6	132	195	241	304
300		0.75	2.07	3.93	7.85	11.94	15.7	21.4	27.6	42.4	73.8	119	198	292	361	455
400		1.01	2.76	5.24	10.47	15.92	20.9	28.5	36.9	56.5	98.4	159	264	390	482	607
500		1.26	3.46	6.54	13.09	19.90	26.2	35.6	46.1	70.7	123	199	330	487	602	759
600		1.51	4.15	7.85	15.71	23.87	31.4	42.7	55.3	84.8	148	239	396	584	723	911
740		1.86	5.11	9.69	19.37	29.4	38.7	52.7	68.2	105	182	294	488	721	891	1124
800		2.01	5.5	10.5	20.9	31.8	41.9	57.0	73.7	113	197	318	528	779	963	1215
960		2.41	6.6	12.6	25.1	38.2	50.3	68.4	88.5	136	236	382	633	935	1156	1458
1200		3.02	8.3	15.7	31.4	47.7	62.8	85.4	111	170	295	477	792	1169		
1480		3.72	10.2	19.4	38.7	58.9	77.5	105	136	209	364	589	976			
1600		4.0	11.1	20.9	41.9	63.7	83.8	114	147	226	394	637				
1800		4.5	12.4	23.6	47.1	71.6	94.2	128	166	254	443					
2000		5.0	13.8	26.2	52.4	79.6	105	142	184	283						
2200		5.5	15.2	28.8	57.6	87.5	115	157	203							
2400		6.0	16.6	31.4	62.8	95.5	126	171								
2600		6.5	18.0	34.0	68.1	103	136	185								
2800		7.0	19.4	36.6	73.3	111	147									
2960		7.4	20.5	38.7	77.5	118	155									
3100		7.8	21.4	40.6	81.2	123										
3600		9.0	24.9	47.1	94.2											

The given power ratings apply to the service factor  $S_A = 1.0$ , see page 6. For other service conditions and/or other power ratings, the design should be selected according to page 6.

# MULTI CROSS RILLO shaft couplings



Coupling size	Hub type	Taper bush	Bore max. mm	A mm	C mm	D mm	LH mm	M mm	E mm	F mm	G <sup>2)</sup> mm	J <sup>3)</sup> mm	Mass <sup>1)</sup> kg	Moment of inertia <sup>1)</sup> kgm <sup>2</sup>
MCR 40	B	-	32	104	82	-	33	11	22	-	-	-	1.0	0.001
	F	1008	22				33		22			29	0.9	0.001
	H	1008	22				33		22			29	0.9	0.001
MCR 50	B	-	38	133	100	79	45	13	32	-	-	-	1.9	0.002
	F	1210	32				38		25			38	1.4	0.002
	H	1210	32				38		25			38	1.4	0.002
MCR 60	B	-	45	165	125	70	55	17	38	-	-	-	3.5	0.005
	F	1610	40			103	42		25			38	2.3	0.004
	H	1610	40			103	42		25			38	2.3	0.004
MCR 70	B	-	50	187	144	80	47	12	35	100	13	-	3.2	0.006
	F	2012	50				44		32			42	2.6	0.005
	H	1610	40				42		25			38	2.7	0.005
MCR 80	B	-	60	211	167	98	55	13	42	108	16	-	5.2	0.021
	F	2517	60			97	58		45			48	4.2	0.012
	H	2012	50			98	45		32			42	4.4	0.014
MCR 90	B	-	70	235	188	112	64	14	50	120	16	-	7.5	0.025
	F	2517	60			108	60		45			48	6.4	0.025
	H	2517	60			108	60		45			48	6.4	0.025
MCR 100	B	-	80	254	216	125	71	14	57	124	16	-	10.9	0.073
	F	3020	75			120	66		51			55	8.6	0.042
	H	2517	60			113	66		45			48	9.4	0.047
MCR 110	B	-	90	279	233	128	75	13	62	124	16	-	13.5	0.105
	F	3020	75			134	64		51			55	10.9	0.064
	H	3020	75			134	64		51			55	10.9	0.064
MCR 120	B	-	100	314	264	143	85	15	70	134	16	-	19.2	0.163
	F	3525	90			140	80		65			67	15.2	0.123
	H	3020	75			140	66		51			55	16.3	0.127
MCR 140	B	-	130	359	311	178	117	16	95	146	17	-	31.8	0.452
	F	3525	90			82	65		67			25.8	0.373	
	H	3525	90			82	65		67			25.8	0.373	
MCR 160	B	-	140	402	345	187	117	15	102	156	19	-	42.5	0.737
	F	4030	100			197	92		77			80	34.3	0.594
	H	4030	100			197	92		77			80	34.3	0.594
MCR 180	B	-	150	470	398	200	137	23	114	188	19	-	57.6	1.302
	F	4535	110			205	112		89			89	47.2	1.078
	H	4535	110			205	112		89			89	47.2	1.078
MCR 200	B	-	150	508	429	200	138	24	114	206	19	-	71.5	1.847
	F	4535	110			205	113		89			89	61.0	1.592
	H	4535	110			205	113		89			89	61.0	1.592
MCR 220	B	-	160	562	474	218	155	28	127	236	20	-	90.0	2.829
	F	5040	125			223	130		102			92	77.0	2.431
	H	5040	125			223	130		102			92	77.0	2.431
MCR 250	B	-	190	628	532	254	162	30	132	250	25	-	112.0	3.645

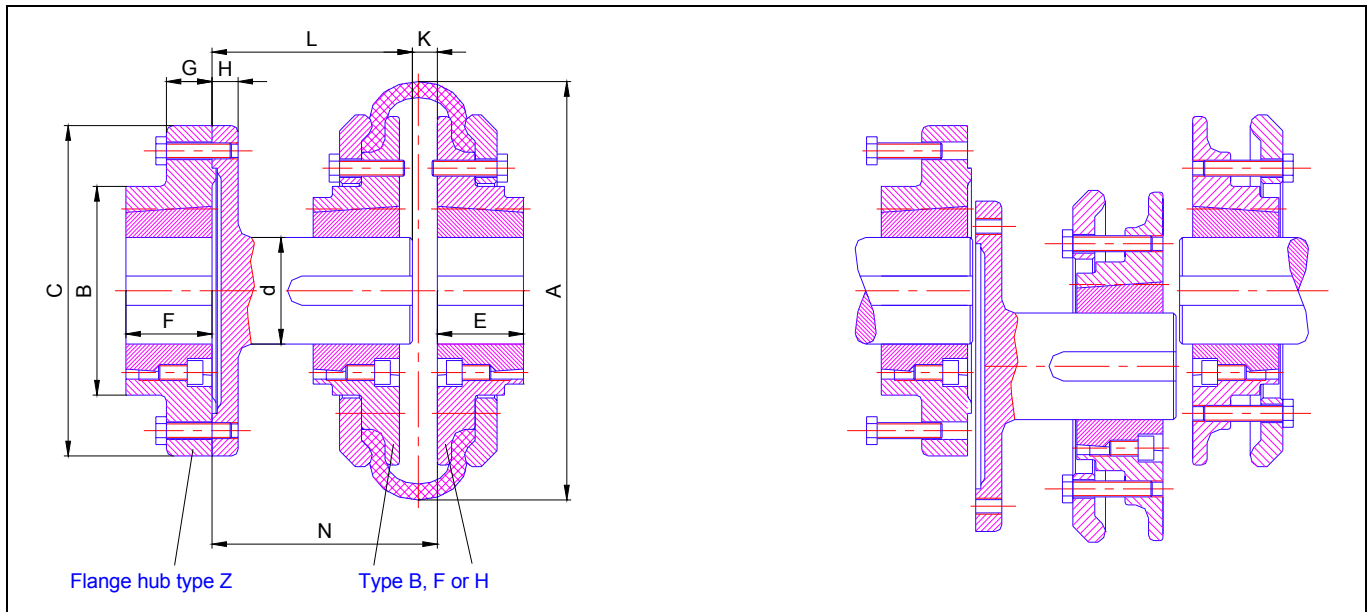
<sup>1)</sup> Mass and moment of inertia for complete coupling, including tyre and taper bush

<sup>2)</sup> G = Space required for removing and changing the rubber tyre

<sup>3)</sup> J = Space required for fixing and removing the bushes and clamp rings



# MULTI CROSS RILLO shaft couplings with spacers



Coupling size	Taper bush			Bore				A	B	C	d	E			F	L	K	N		Mass <sup>1)</sup> total kg	Moment of inertia <sup>1)</sup> total kgm <sup>2</sup>
	Type F	Type H	Type Z	Type B max. mm	Type F max. mm	Type H max. mm	Type Z max. mm					Type B	Type F	Type H				Type Z	min. mm		
<b>MCR 40 Z</b> <sup>2)</sup>	1008	1008	1210	32	22	22	32	104	83	118	25	22	22	22	25	65	6	80		2.6	0.010
			1610				40								80	127	32	25	88	9	100
<b>MCR 50 Z</b>	1210	1210	1610	38	32	32	40	133	80	127	32	32	25	25	25	85	9	100	116	3.2	0.014
																125	9	140	156	3.4	0.015
<b>MCR 60 Z</b>	1610	1610	1610	45	40	40	40	165	80	127	32	38	25	25	25	78	9	100	124	3.2	0.014
																118	9	140	164	3.4	0.015
<b>MCR 70 Z</b> <sup>3)</sup>	2012	1610	2517	50	50	40	60	187	125	180	48	35	32	25	45	80	9	100	114	7.8	0.075
																120	9	140	154	8.4	0.080
																160	9	180	194	9.0	0.084
<b>MCR 80 Z</b>	2517	2012	2517	60	60	50	60	211	123	178	48	42	45	32	45	78	9	100	117	7.8	0.075
																116	9	140	158	8.4	0.080
																156	9	180	198	9.0	0.084
<b>MCR 90 Z</b>	2517	2517	2517	70	60	60	60	235	123	178	48	50	45	45	45	116	9	140	158	8.4	0.080
																156	9	180	198	9.0	0.084
<b>MCR 100 Z</b>	3020	2517	3020	80	75	60	75	254	146	216	60	57	51	45	51	116	9	140	158	14.5	0.202
																156	9	180	198	15.4	0.212
<b>MCR 110 Z</b>	3020	3020	3020	90	75	75	75	279	146	216	60	62	51	51	51	116	9	140	158	14.5	0.202
																156	9	180	198	15.4	0.212
<b>MCR 120 Z</b>	3525	3020	3525	100	90	75	90	314	178	248	80	70	65	51	63	114	9	140	160	22.2	0.331
																154	9	180	200	23.8	0.350
<b>MCR 140 Z</b>	3525	3525	3525	130	90	90	90	359	178	248	80	95	65	65	63	111	9	140	163	22.2	0.331
																151	9	180	203	23.8	0.350

Dimensions G and H on request. Further dimensions see MCR shaft couplings on page 8

<sup>1)</sup> Mass and moment of inertia for complete coupling, including tyre and taper bush

<sup>2)</sup> MCR 40 B coupling half for spacer shaft required

<sup>3)</sup> MCR 70 F coupling half for spacer shaft required

## Ordering information

The following parts are required for a complete **MULTI CROSS RILLO** shaft coupling:

- a) 2 coupling halves, each consisting of hub (type F, H or B), clamp ring, fastening bolts
- b) 1 rubber tyre
- c) For hub type F or H: taper bush size with indication of the bore dimensions; e.g. bush 3020 with 65 mm bore, corresponding designation: 3020.65, for hub type B only bore diameter requested.

**Ordering example:**     **1 MULTI CROSS RILLO shaft coupling size MCR 100 FH**  
 consisting of  
                                   1 coupling half MCR 100 F (hub, clamp ring and set of fastening bolts)  
                                   1 coupling half MCR 100 H (hub, clamp ring and set of fastening bolts)  
                                   1 rubber tyre MCR 100  
                                   1 taper bush 3020.65 (keyway acc. to DIN 6885/1)  
                                   1 taper bush 2517.48 (keyway acc. to DIN 6885/1)

The following parts are required for a complete **MULTI CROSS RILLO** shaft coupling with spacer:

- d) 2 coupling halves, each consisting of hub (type F or H), clamp ring, fastening bolts
- e) 1 rubber tyre
- f) For hub type F or H: taper bush size with indication of the bore dimensions; e.g. bush 2517 with 48 mm bore, corresponding designation: 2517.48, for hub type B only bore diameter requested.
- g) Flange hub with specification of the taper bush size and the motor shaft diameter, spacer (with indication of the required length L, see page 9) and fastening bolts. The flange hub is also available without a taper bush but with cylindrical bore on request.

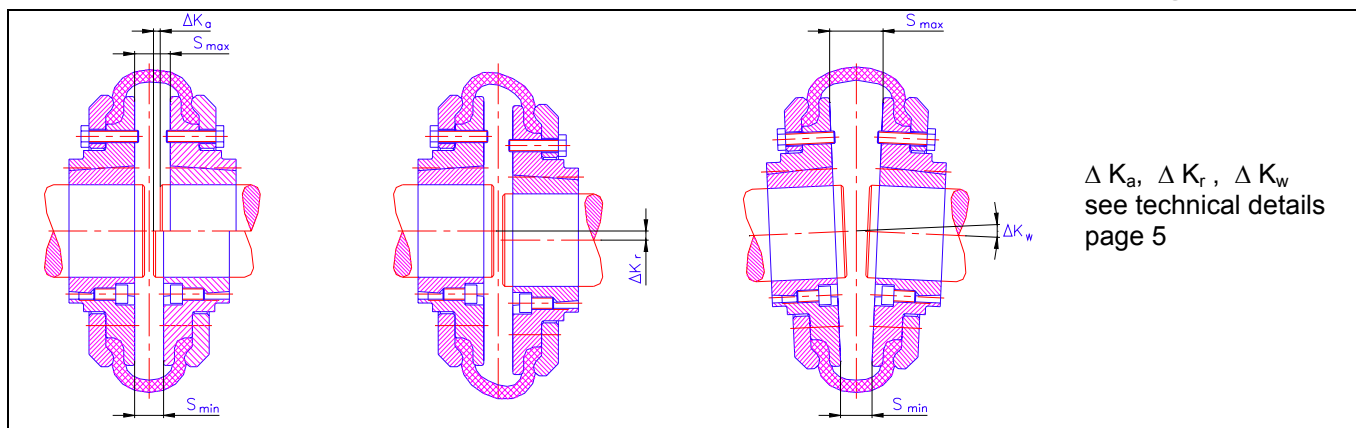
**Ordering example:**     **1 MULTI CROSS RILLO coupling with spacer shaft size MCR 90 FF Z**  
 consisting of  
                                   2 coupling halves MCR 90 F (hub, clamp ring and set of fastening bolts)  
                                   1 rubber tyre MCR 90  
                                   1 taper bush 2517.48 (keyway acc. to DIN 6885/1) dimension d, see page 9  
                                   1 taper bush 2517.48 (keyway acc. to DIN 6885/1) for pump shaft  
                                   1 spacer shaft with L =134 mm  
                                   1 flange hub MCR 90 Z  
                                   1 taper bush 2517.55 (keyway acc. to DIN 6885/1)

## Available taper bushes

Taper bushes mount **MULTI CROSS RILLO** couplings in a shrink-fit-like manner on the shafts. The taper bushes shown below are available from stock. Taper bushes are also available with inch bores.

No.	Metric bores and keyways acc. to DIN 6885/1																		
1008	9	10	11	12	14	16	18	19	20	22									
1210	11	12	14	16	18	19	20	22	24	25	28	30	32						
1610	14	16	18	19	20	22	24	25	28	30	32	35	38	40	42				
2012	14	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	
2517	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60
3020	25	28	30	32	35	38	40	42	45	48	50	55	60	65	70	75			
3525	35	38	40	42	45	48	50	55	60	65	70	75	80	85	90				
4030	40	42	45	48	50	55	60	65	70	75	80	85	90	95	100				
4535	55	60	65	70	75	80	85	90	95	100	105	110							
5040	70	75	80	85	90	95	100	105	110	115	120	125							

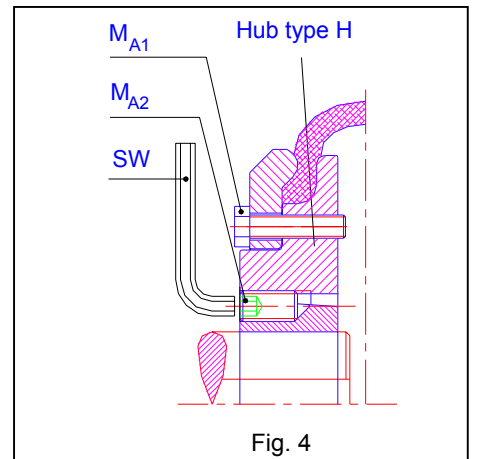
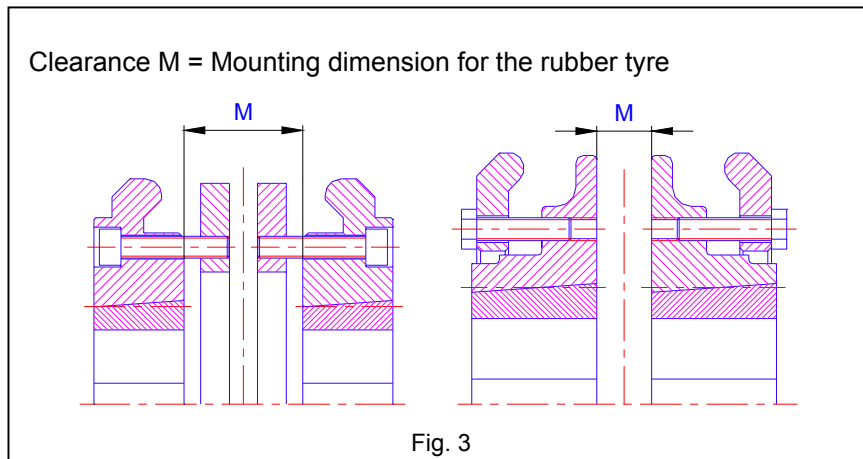
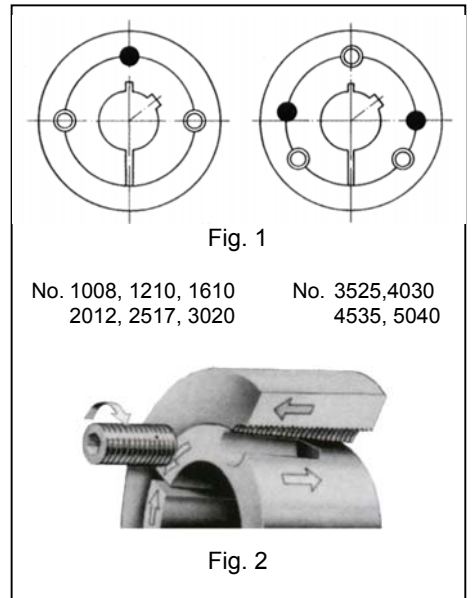
## Permissible shaft displacements of MULTI CROSS RILLO couplings



The indicated values for  $\Delta K_a$  [mm] =  $S_{max} - S_{min}$  correspond to an angular displacement of  $\Delta K_w = 4^\circ$ . This permissible angular shaft displacement is the max. angular misalignment of the coupling halves which may only be fully utilized when no axial and radial misalignments exist. An angular displacement of  $\Delta K_w = 2^\circ$  is permissible when axial and radial misalignments of  $\frac{1}{2} \Delta K_a$  and  $\frac{1}{2} \Delta K_r$  are present.

# Mounting instructions for MULTI CROSS RILLO shaft couplings

1. The outer taper of the bush and the hub bore with inner taper shall be bright and free from grease prior to assembly. Any preservatives shall be removed completely.
2. Insert the bush into the coupling hub making sure that all connecting bores are lined up. This means that the threaded half holes shall be opposite the plain half holes (Fig. 1).
3. Lightly oil or grease the mounting screws and screw them in loosely. Do not tighten the screw yet (Fig. 2).
4. Push the coupling hub with inserted taper bush onto the cleaned shaft with key and position it properly so that the clearance M (see Table 1 and Fig. 3) is maintained. Attach the (outer or inner) clamp ring loosely prior to assembly of the hub.
5. Tighten the screws uniformly with a torque wrench to half of the specified tightening torque  $M_{A2}$  (Table 2).
6. Hold a piece of wood or brass against the bush and hit it lightly with a hammer and tighten the screws to the specified tightening torque  $M_{A2}$  (Table 2). Repeat, if necessary.



**Table 1: Clearance M and tightening torques for mounting the clamp ring**

MCR coupling size	40	50	60	70	80	90	100	110	120	140	160	180	200	220	250
Clearance M [mm]	22	25	33	23	25	27	27	25	29	32	30	46	48	55	59
Screw size	M5	M6	M6	M8	M8	M10	M10	M10	M12	M12	M16	M16	M16	M20	M20
Number of screws	4	4	10	10	12	12	12	12	12	16	16	20	24	24	28
Tightening torque $M_{A1}$ [Nm]	6	10	10	25	25	50	50	50	85	85	210	210	210	420	420

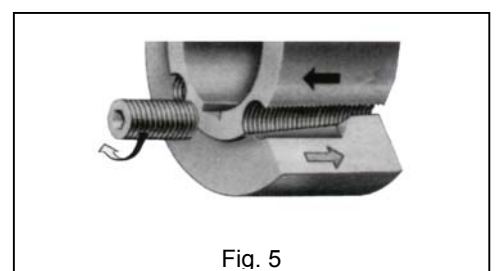
**Table 2: Tightening torques for mounting the taper bushes**

MCR coupling size	40	50	60 70	70 80	80 90 100	100 110 120	120 140	160	180 200	220
Taper bush No.	1008	1210	1610	2012	2517	3020	3525	4030	4535	5040
Screw size B.S.W. *)	$\frac{1}{4} \times 13$	$\frac{3}{8} \times 16$	$\frac{3}{8} \times 16$	$\frac{7}{16} \times 22$	$\frac{1}{2} \times 25$	$\frac{5}{8} \times 32$	$\frac{1}{2} \times 38$	$\frac{5}{8} \times 45$	$\frac{3}{4} \times 51$	$\frac{7}{8} \times 57$
Tightening torque $M_{A2}$ [Nm]	5.7	20	20	31	49	92	115	172	195	275
Screw size SW [mm]	3	5	5	6	6	8	10	12	14	14

\*) No. 1008/1210/1610/2012/2517/ 3020 set screw ; \*) Nr. 3525/4030/4535/5040 socket head cap screws

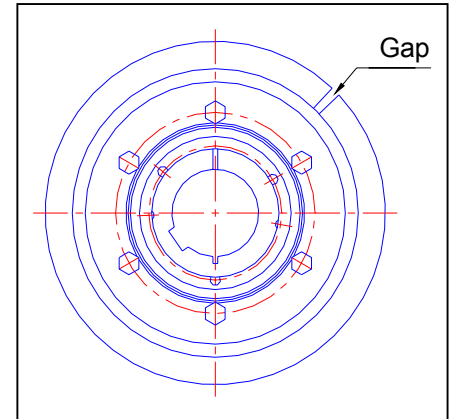
## Removing the coupling hubs with taper bushes

1. Loosen and remove all screws. Depending on the taper bush size, screw 1 or 2 greased screws into the half threaded push-off holes of the taper bush (Fig. 5).
2. Tighten the screws uniformly until the bush detaches from the hub.
3. The hub can be pulled off the shaft together with the taper bush as soon as the taper bush is detached.



# Instructions for inserting the rubber tyre

1. Make sure that the coupling hubs are positioned at right angles on the shaft ends. Align the coupling hubs to each other in the axial, radial and angular directions. See also permissible shaft displacements on pages 5 and 10. The radial and angular displacements should be kept as small as possible, particularly in high speed applications.
2. Pull the rubber tyre that is slit for assembly apart and place it over the coupling hub. Make sure that the tyre lies completely against the hub. If not, apply light hammer blows onto the outer contours of the tyre. After completion of the assembly, a gap as specified in Table 3 shall exist between the ends of the rubber tyre.
3. Fit the remaining clamp rings, if any, and tighten the screws hand-tight. Thereafter, tighten them uniformly in an alternating sequence (half a turn each) until the specified tightening torque  $M_{A1}$  (Table 1 and Fig. 4 on page 11) is reached.



**Table 3**

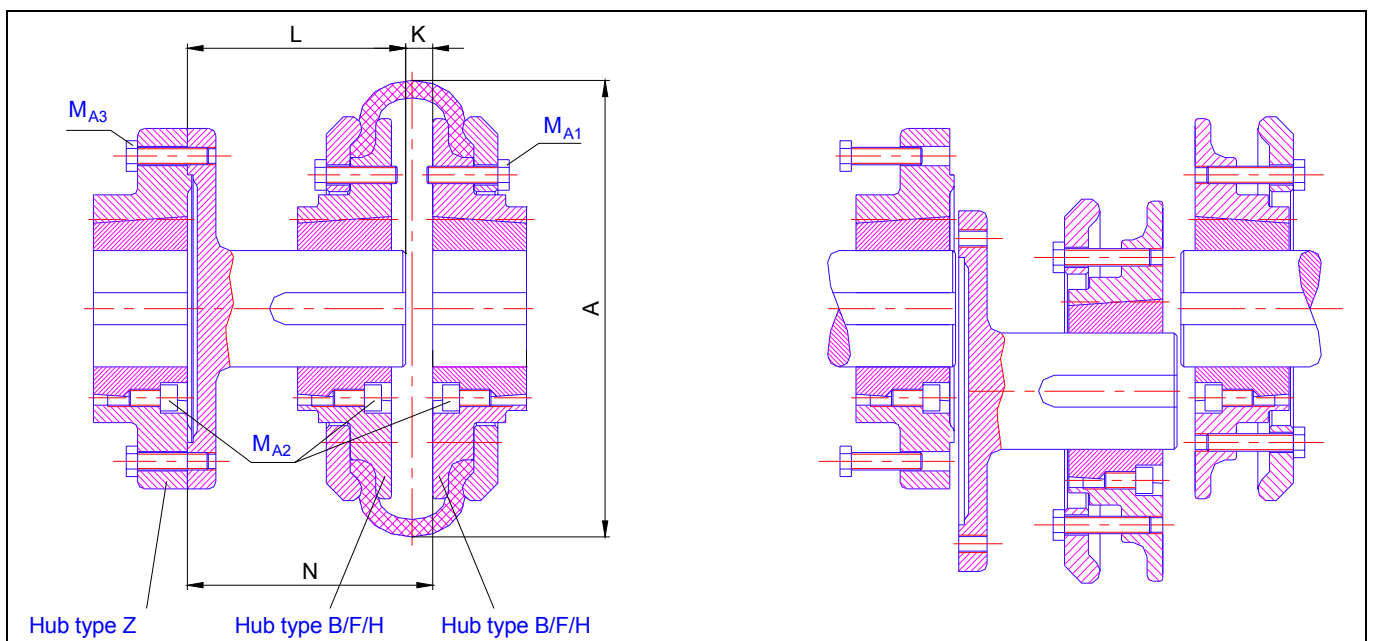
MCR coupling size	40 bis 60	70 bis 120	140 bis 160	180 bis 250
Rubber tyre gap [mm]	2	3	5	6

## Mounting instructions for MULTI CROSS RILLO shaft couplings with spacer

1. According to the mounting instructions for **MULTI CROSS RILLO** shaft coupling hubs with taper bushes shall be mounted completely on the shaft ends. It is important to make sure that the coupling hubs are flush with the shaft ends to enable subsequent assembly or disassembly of the spacer.
2. Mount the flange hub properly on the shaft. It is important to ensure that the flange hub does not protrude from the shaft end.
3. Mount the spacer (with the coupling hub placed on the top) to the flange hub using the proper tightening torque  $M_{A3}$  (Table 4).
4. Align the **MULTI CROSS RILLO** coupling and insert the tyre according to the above instructions.

**Table 4 : Tightening torques for mounting the spacers**

MCR coupling size	40		50	60	70	80	90	100	110	120	140
Screw size	M6	M8	M8	M8	M10	M10	M10	M16	M16	M16	M16
Number of screws	6	6	6	6	6	6	6	8	8	8	8
Tightening torque $M_{A3}$ [Nm]	10	25	25	25	50	50	50	210	210	210	210



For dimensions L, N, K and A see page 9

## Safety instructions

*It is the customer's and user's responsibility to provide proper guards over rotating machinery and to observe the national and international safety rules and laws.*

*Check all screwed connections for proper fit preferably after the test run.*