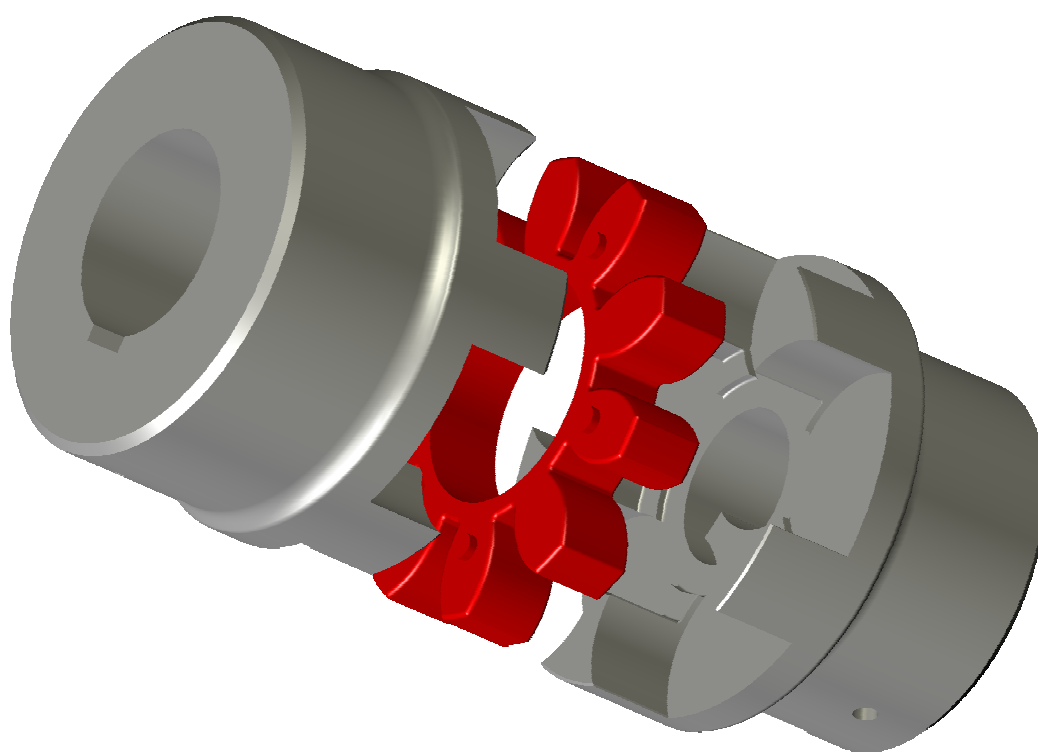


TRASCO® Couplings

USER AND MAINTENANCE MANUAL



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1 General information

We recommend that you carefully read all the mounting instructions before installing the coupling, paying particular attention to the safety instructions.

TRASCO® coupling is suitable for use in potentially explosive atmospheres. When using the coupling in hazardous areas, strictly observe the special information and instructions regarding safety in the ATEX attachment.

The mounting instructions are part of the product; please keep them safe and close to the coupling.

They are available in electronic format on the website www.sitspa.com.

All the rights of this manual are reserved and are the property of SIT S.p.A.; therefore, its sale and reproduction without permission are prohibited.

1.1 Purpose of the document

The purpose of this document is the description of the TRASCO® couplings, both in the standard version and in the version suitable for use in potentially explosive environments in accordance with ATEX Directive 2014/34/EU.

All the indications are provided, so that it is properly dimensioned, stored and assembled.

As regards the couplings that have to work in potentially explosive environments, all the indications and standards for identifying the installation areas for which the coupling is certified to operate in safe conditions are provided.

1.2 Proper use

Before handling a SIT coupling for moving, installing, or performing maintenance, it is advisable to carefully read the mounting instructions.

Any kind of changes aren't authorized except those expressly provided for in the operating and maintenance manual.

SIT assumes no liability for damage resulting from tampered material and, therefore, no longer original.

SIT reserves the right to make changes to the product; as a consequence, this manual will be updated. The technical specifications listed in the operating and maintenance manual exactly match the state of the art at the time of printing.

1.3 Warning symbols for safety

The warning symbols included in this manual alert the user to possible risks that may occur during handling, assembling and use of the coupling.

It is necessary to pay particular attention to them.



DANGER

Danger of injury to persons.



CAUTION

Possible damages to the machine.



ATTENTION

Important guidelines to follow.



PRECAUTION

Hints about explosion protections.

1.4 General advice in case of danger



DANGER!

Every operation performed on the coupling, either with mounting or maintenance, must be carried out with the machine not connected to the power supply. Accidental contact with the rotating parts can cause serious injury to the operator. It is recommended to read these operating instructions to ensure safety.

- Affix proper warning signs around the machine
- Instruct the operator before giving permission to work on the coupling
- Operate on the coupling and on the transmission in safe conditions
- Make sure the machine power is disconnected before carrying out any operation
- Do not touch any moving part of the machine and wait until it stops completely
- Protect the coupling against accidental contact with protection devices

1.5 Reference laws and standards

This evaluation was carried out in accordance with the provisions of the relevant laws, directives, standards mentioned below:

DIN 740/2	Reference standard for flexible couplings
ATEX DIRECTIVE 2014/34/EU	Equipment and protective systems intended for use in potentially explosive atmospheres
ATEX GUIDELINES 2014/34/EU	Guidelines to the application of Directive 2014/34/EU
EN 1127-1:2011	Explosion prevention and protection against explosion. Basic concepts and methodology
EN ISO 80079-36:2016	Explosive environments – part 36. Non-electrical equipment for potentially explosive atmospheres. Basic method and requirements
EN ISO 80079-37:2016	Explosive environments – part 37. Non-electrical equipment for potentially explosive atmospheres. Non-electrical equipment constructional safety type "c", control of the sources of ignition type "b", immersion in liquid type "k".

2 Characteristics of TRASCO® couplings

TRASCO® couplings are a flexible and constant-velocity coupling that ensures maximum performance with same overall dimensions. It is very compact and allows a safe transmission of motion between the motor and the driven machine, absorbing shocks and torsional vibrations. It also allows, through the elastic deformation of the elastic spider, to compensate for angular, radial and axial misalignments due to small variations in length of the shafts. The hub teeth and spider profiles are designed so as to obtain a uniform pressure distribution.

The elastic element is subject only to compression stress and does not induce any axial or radial stresses, providing the TRASCO® coupling with great load capacity and durability. The coupling can be assembled both horizontally and vertically, and it correctly tolerates load variations and reversals.



The TRASCO® series is suitable for use in areas classified with the presence of flammable gases, vapours and mists or combustible dusts (Zone 1/21, category 2 GD, EPL Gb Db) and applications in mining (Group I, category M2, EPL Mb).

It is designed and built in accordance with the ATEX Directive 2014/34/EU and in accordance with the following European standards:

- **EN 1127-1:2011**
- **EN ISO 80079-36:2016**
- **EN ISO 80079-37:2016**

2.1 Hubs

The TRASCO® coupling consists of two metal hubs that have cut-outs with circular sections which contain the teeth of the elastic spider. The materials of standard hubs are laminated cast iron, spheroidal cast iron or aluminium, depending on the types and sizes. For details see [TABLE 2.1 - TRASCO®: hubs materials](#).

TABLE 2.1 - TRASCO®: hubs materials

SERIES	SIZE	STANDARD MATERIAL	OPTIONAL MATERIALS
GRMP	19/24	Steel sintered	Steel / Stainless steel / Aluminium / Spheroidal cast iron
	from 24/32 to 90/100	Grey cast iron	Steel / Stainless steel / Aluminium / Spheroidal cast iron
	from 100/110 to 180/200	Spheroidal cast iron	Steel / Stainless steel / Aluminium / Spheroidal cast iron
GRMALU	All	Aluminium diecast	Steel / Stainless steel / Aluminium / Spheroidal cast iron
GRB	All	Grey cast iron	Steel / Stainless steel / Aluminium / Spheroidal cast iron
GRS	All	Aluminium	Steel / Stainless steel / Aluminium / Spheroidal cast iron
GRF	All	Spheroidal cast iron	Steel / Stainless steel / Aluminium / Spheroidal cast iron

Note: For details contact the Technical Department.

2.1.1 GRMP series hubs

The TRASCO® hubs series GRMP are made, depending on the size, in two versions: A (hollow) and B (full).

They are different for the exterior design and for the maximum bore that can be achieved.

Each of them has the respective AL and BL extended version ([TABLE 2.2 - TRASCO® GRMP dimensions](#), [TABLE 2.3 - TRASCO® GRMP lengths](#)).

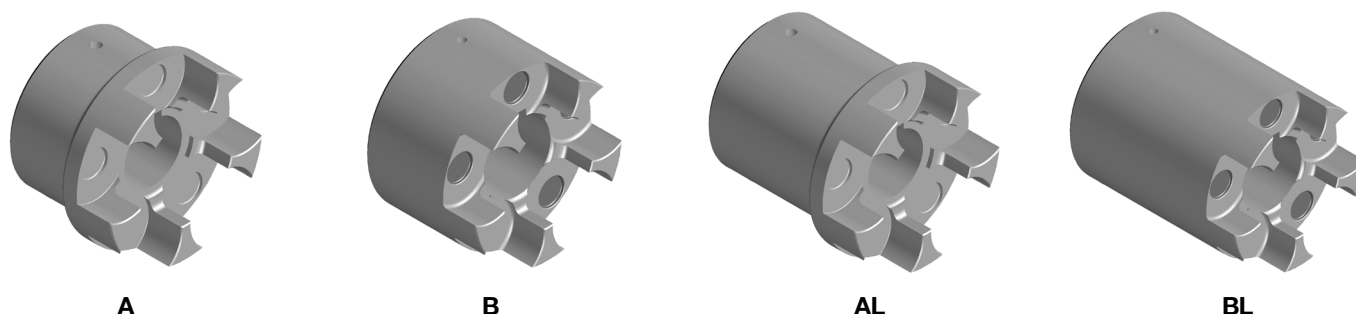


Figure 2-1 - GRMP TRASCO® Hubs

The milling of the seat of the flexible element of the GRMP guarantees a perfect coupling with the elastic spider in order to ensure a long life in the correct operating conditions.

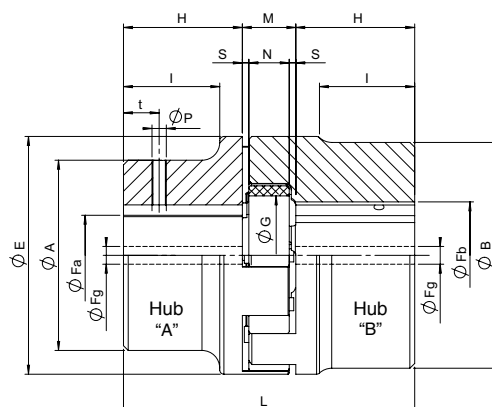


Table 2.2 - TRASCO® GRMP Dimensions

SIZE	Fa	Fb max	Fg				E	A	B	M	S	N	G
			max	Fb	AL	BL							
19/24	-	24	-	-	-	-	40	-	40	16	2	12	18
24/32	24	32	8	10	8	10	55	40	55	18	2	14	27
28/38	28	38	8	10	8	10	65	48	65	20	2,5	15	30
38/45	38	45	10	12	14	14	80	66	80	24	3	18	38
42/55	42	55	10	12	16	16	95	75	95	26	3	20	46
48/60	48	60	12	12	16	16	105	85	105	28	3,5	21	51
55/70	55	70	15	15	16	16	120	98	120	30	4	22	60
65/75	65	75	15	15	20	20	135	115	135	35	4,5	26	68
75/90	75	90	15	15	22	22	160	135	160	40	5	30	80
90/100	90	100	20	20	30	30	200	160	180	45	5,5	34	100
100/110	115	-	45	-	-	-	225	180	-	50	6	38	113
110/125	125	-	55	-	-	-	255	200	-	55	6,5	42	127
125/145	145	-	55	-	-	-	290	230	-	60	7	46	147
140/160	160	-	55	-	-	-	320	255	-	65	7,5	50	165
160/185	185	-	75	-	-	-	370	290	-	75	9	57	190
180/200	200	-	80	-	-	-	420	325	-	85	10,5	64	220

* measures in mm

Table 2.3 - TRASCO® GRMP lengths

SIZE	Execution A			Execution B			Execution AL			Execution BL		
	H	L (A+A)	I	H	L (B+B)	I	H	L (AL+AL)	I	H	L (BL+BL)	I
19/24	-	-	-	25	66	-	-	-	-	50	-	-
24/32	30	78	24	30	78	-	50	118	44	60	116	-
28/38	35	90	28	35	90	-	60	140	53	80	180	-
38/45	45	114	37	45	114	-	80	184	72	110	244	-
42/55	50	126	40	50	126	-	110	246	100	110	246	-
48/60	56	140	45	56	140	-	110	248	99	140	308	-
55/70	65	160	52	65	160	-	110	250	97	140	310	-
65/75	75	185	61	75	185	-	140	315	126	140	315	-
75/90	85	210	69	85	210	-	140	320	124	170	380	-
90/100	100	245	81	100	245	81	170	385	151	210	465	191
100/110	110	270	89	110	270	-	-	-	-	-	-	-
110/125	120	295	96	120	295	-	-	-	-	-	-	-
125/145	140	340	112	140	340	-	-	-	-	-	-	-
140/160	155	375	124	-	-	-	-	-	-	-	-	-
160/185	175	425	140	-	-	-	-	-	-	-	-	-
180/200	195	475	156	-	-	-	-	-	-	-	-	-

* measures in mm

2.1.2 GRMALU series hubs

The TRASCO® GRMALU series hubs are made of die-casting aluminium for A and B versions ([TABLE 2.4 - TRASCO® GRMALU dimensions](#)).

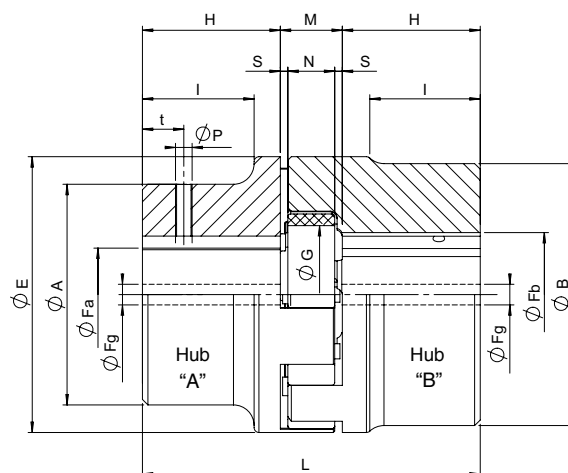


Table 2.4 - TRASCO® GRMALU Dimensions

SIZE	Fa max	Fb max	Fg		E	A	B	L	H	M	S	N	I	G	t	P
			A	B												
19/24	-	24	-	-	40	40	40	66	25	16	2	12	-	18	10	M5
24/32	24	32	-	-	55	40	55	78	30	18	2	14	24	27	10	M5
28/38	28	38	12	28	65	48	65	90	35	20	2,5	15	28	30	15	M6
38/45	38	45	22	38	80	66	77	114	45	24	3	18	37	38	15	M8
42/55	-	55	-	22	95	-	95	126	50	26	3	20	-	46	20	M8
48/60	-	60	-	30	105	-	105	140	56	28	3,5	21	-	51	20	M8

* measures in mm

2.1.3 GRB series hubs

The TRASCO® GRB series couplings for taper bush combines high performance characteristics, typical of standard hub coupling, the ease of use, assembly and disassembly, resulting from the coupling with a SER-SIT® taper bush. ([TABLE 2.5 - TRASCO® GRB dimensions](#)).

They are produced in two versions:

- B1, with bush mounting from the outside of the hub
- B2, with bush mounting from the inside of the hub

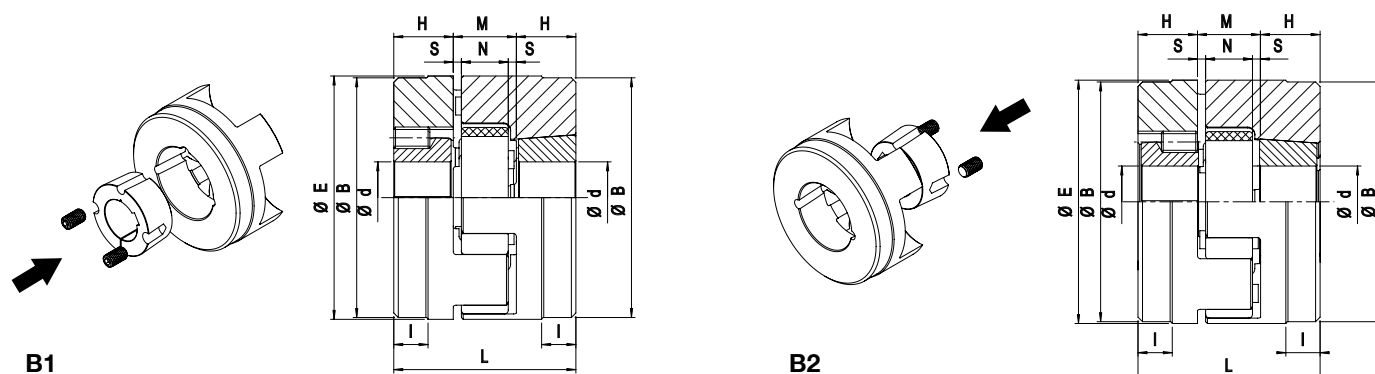


Figure 2-2 - TRASCO® GRB Series

Table 2.5 - TRASCO® GRB Dimensions

SIZE	SER-SIT® TAPER BUSH	E	B	L	H	M	S	N	I
28/38	1108 (2820)	65	65	66	23	20	2,5	15	-
38/45	1108 (2820)	80	78	70	23	24	3	18	15
42/55	1610 (4025)	95	94	78	26	26	3	20	16
48/60	1615 (4040)	105	104	106	39	28	3,5	21	28
55/70	2012 (5030)	120	118	96	33	30	4	22	20
65/75	2012 (5030)	135	133	101	33	35	4,5	26	19
75/90	2517 (6545)	160	158	130	45	40	5	30	36
90/100**	3535 (9090)	200	180	223	89	45	5,5	34	70

* measures in mm

** available only in version B1.

SER-SIT® SIZE	BORE DIAMETER (H7) Tolerance of the seat of the keyway JS9		Torque [Nm]
1108 (2820)	[mm]	9 10 11 12 14 15 16 18 19 20 22 24 25 26 27 28	150
	[inches]	3/8 - 1/2 - 5/8 - 3/4 - 7/8 - 1 - 1 1/8	
1610 (4025)	[mm]	12 14 15 16 18 19 20 22 24 25 26 28 30 32 35 38 40 42	490
	[inches]	3/8 - 1/2 - 5/8 - 3/4 - 7/8 - 1 - 1 1/8 - 1 1/4 - 1 3/8 - 1 1/2 - 1 5/8	
1615 (4040)	[mm]	12 14 15 16 18 19 20 22 24 25 28 30 32 35 38 40 42	490
	[inches]	1/2 - 5/8 - 3/4 - 7/8 - 1 - 1 1/8 - 1 1/4 - 1 3/8 - 1 1/2 - 1 5/8 - 1 3/4	
2012 (5030)	[mm]	14 15 16 18 19 20 22 24 25 26 28 30 32 35 38 40 42 45 48 50	800
	[inches]	5/8 - 3/4 - 7/8 - 1 - 1 1/8 - 1 1/4 - 1 3/8 - 1 1/2 - 1 5/8 - 1 3/4 - 1 7/8 - 2	
2517 (6545)	[mm]	6 18 19 20 22 24 25 28 30 32 35 38 40 42 45 48 50 55 60 65	1300
	[inches]	3/4 - 7/8 - 1 - 1 1/8 - 1 1/4 - 1 3/8 - 1 1/2 - 1 5/8 - 1 3/4 - 1 7/8 - 2 - 2 1/8 - 2 1/4 - 2 3/8 - 2 1/2	
3535 (9090)	[mm]	25 28 30 32 35 38 40 42 45 48 50 55 60 65 70 75 80 85 90	5000
	[inches]	1 1/2 - 1 5/8 - 1 3/4 - 1 7/8 - 2 - 2 1/8 - 2 1/4 - 2 3/8 - 2 1/2 - 2 5/8 - 2 3/4 - 2 7/8 - 3 - 3 1/8 - 3 1/4 - 3 3/8 - 3 1/2	

* measures in mm

** Transmittable friction torque without the keyway

2.1.4 GRS series hubs

The GRS series hubs are intermediate elements that increase the ability of the coupling to compensate for axial, radial and angular misalignments.

The presence of two elastic spiders allows a high damping effect of the vibrations, with consequent reduction of the transmission noise and a reduced wear of the connected components, such as bearings.

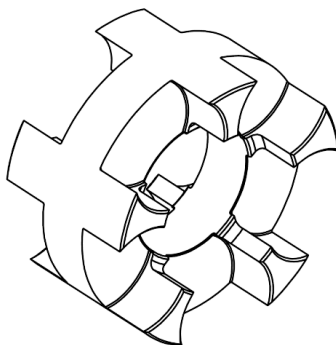


Figure 2-3 - TRASCO® GRS series

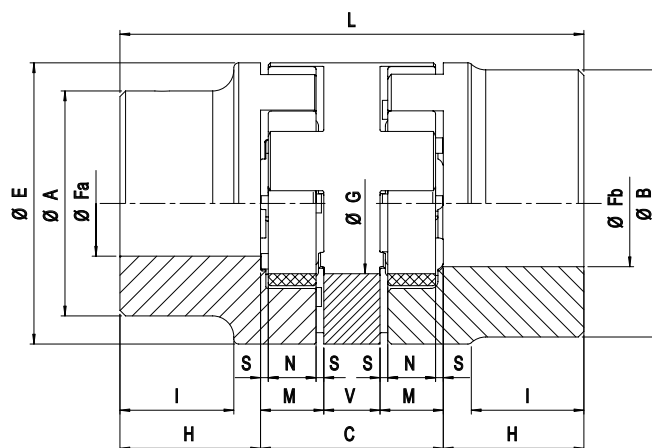


Table 2.6 - TRASCO® GRS Dimensions

SIZE	Fa	Fb	H	V	C	M	S	N	L	E	A	B	G	ΔKr	ΔKw
24/32	9 - 24	11 - 32	30	16	52	18	2	14	112	55	40	55	27	0,89	1°30'
28/38	9 - 28	11 - 38	35	18	58	20	2,5	15	128	65	48	65	30	1	1°30'
38/45	11 - 38	13 - 45	45	20	68	24	3	18	158	80	66	80	38	1,15	1°30'
42/55	11 - 42	13 - 55	50	22	74	26	3	20	174	95	75	95	46	1,26	1°30'
48/60	13 - 48	13 - 60	56	24	80	28	3,5	21	192	105	85	105	51	1,36	1°30'
55/70	16 - 55	16 - 70	65	28	88	30	4	22	218	120	98	120	60	1,52	1°30'
65/75	16 - 65	16 - 75	75	32	102	35	4,5	26	252	135	115	135	68	1,75	1°30'
75/90	16 - 75	16 - 90	85	36	116	40	5	30	286	160	135	160	80	2	1°30'
90/100	21 - 90	21 - 100	100	40	130	45	5,5	34	330	200	160	180	100	2,5	1°30'

* measures in mm

2.1.5 GRF series hubs

The GRF series is the flange version that fits all the hubs of the TRASCO® family.

There are three different possibilities of coupling:

- Flange-flange: through the fastening bores of the flange CF (CFN in the compact version)
- Shaft-flange: on the shaft side, it is possible to install any hub of the TRASCO® family
- Shaft-shaft: with this version, it is possible to replace the flexible element without moving the hubs on the shafts or motor and driven machine.

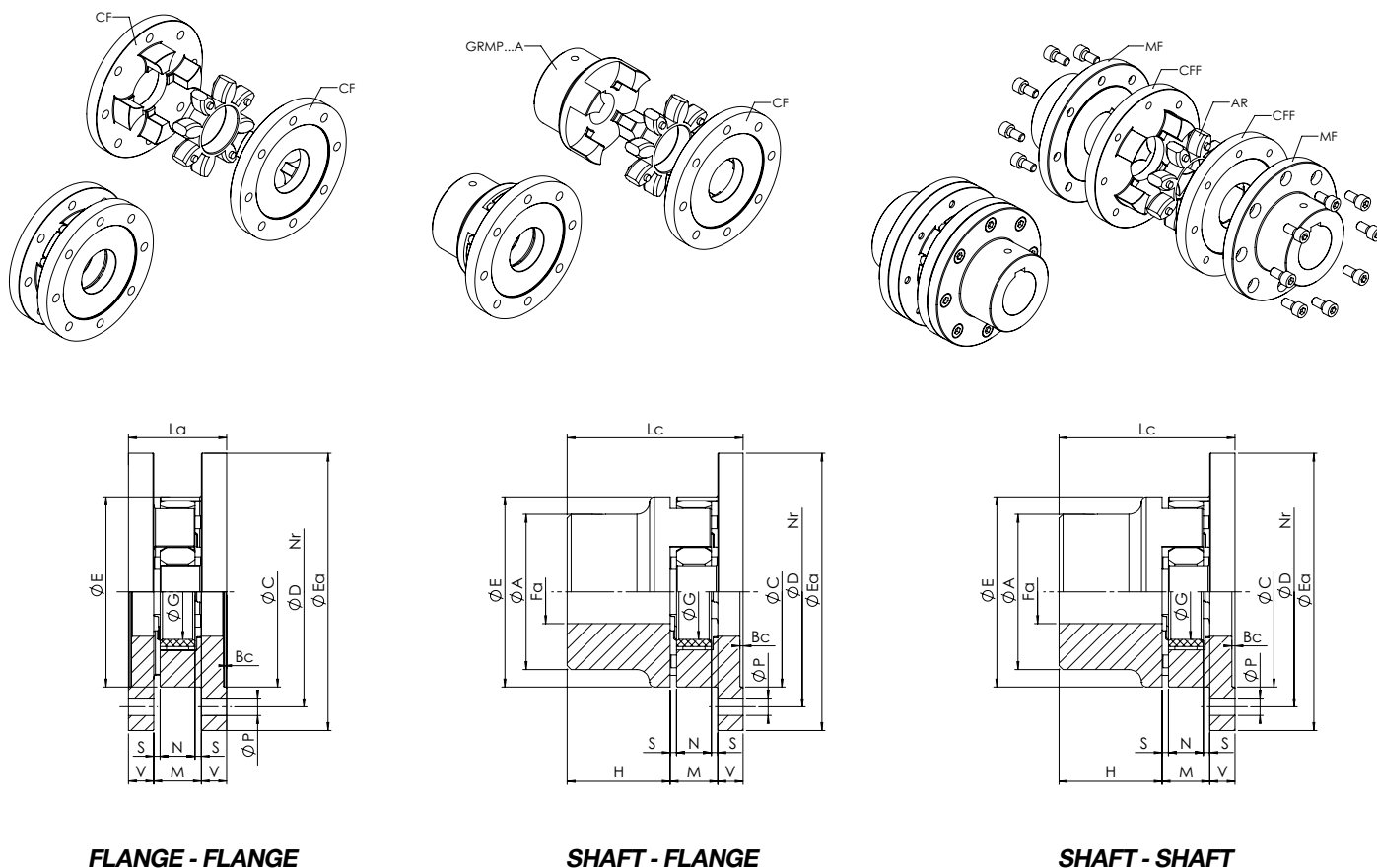


Figure 2-4 - GRF TRASCO® Hubs

Table 2.7 - TRASCO® GRF Dimensions

SIZE	Fa min	Fa max	E	Ea	A	C	D	No. screws	P	G	H	Bb	Bc	I	V	M	S	N	La	Lb	Lc
19/24	6	19	40	65	40/32	40	50	5	4,5	18	25	26	1,5	17	8	16	2	12	32	82	49
24/32	8	24	55	80	55/40	55	65	5	4,5	27	30	31	1,5	22	8	18	2	14	34	94	56
28/38	10	28	65	100	65/48	65	80	6	6,5	30	35	36	1,5	25	10	20	2,5	15	40	110	65
38/45	12	38	80	115	66	80	95	6	6,5	38	45	46	1,5	35	10	24	3	18	44	134	79
42/55	14	42	95	140	75	95	115	6	9	46	50	51	2	38	12	26	3	20	50	150	88
48/60	15	48	105	150	85	105	125	8	9	51	56	57	2	44	12	28	3,5	21	52	164	96
55/70	20	55	120	175	98	120	145	8	11	60	65	66	2	49	16	30	4	22	62	192	111
65/75	22	65	135	190	115	135	160	10	11	68	75	76	2	59	16	35	4,5	26	67	217	126
75/90	30	75	160	215	135	160	185	10	14	80	85	87	2,5	66	19	40	5	30	78	248	144
90/100	40	90	200	260	160	200	225	12	14	100	100	102	3	80	20	45	5,5	34	85	285	165
100/110	45	115	225	285	180	225	250	12	14	113	110	112	4	85	25	50	6	38	100	320	185
110/125	55	125	255	330	200	255	290	12	18	127	120	122	4	94	26	55	6,5	42	107	347	201
125/145	55	145	290	370	230	290	325	16	18	147	140	142	5	110	30	60	7	46	120	400	230

* measures in mm

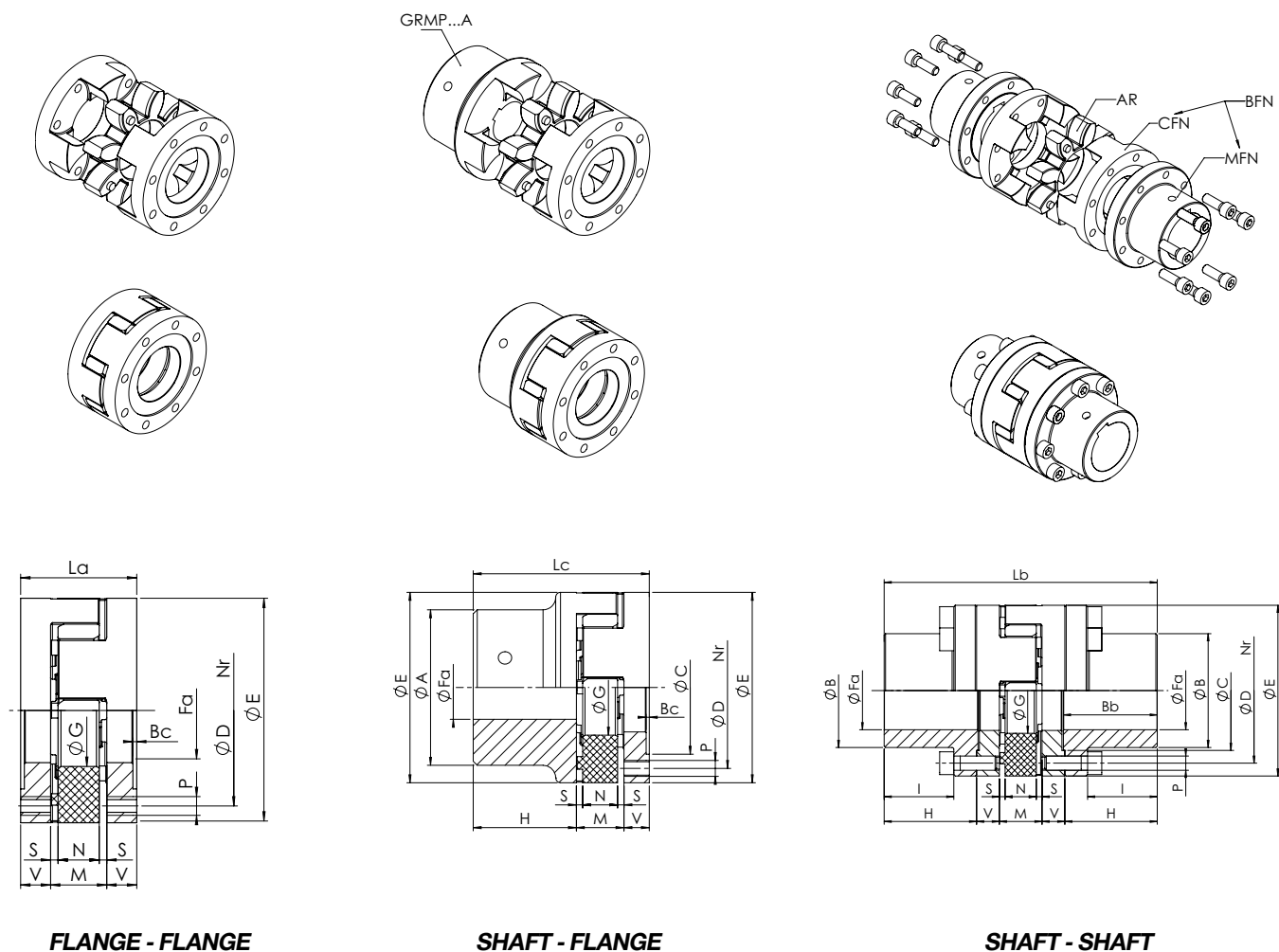


Figure 2-5 - GRF C Hubs

Table 2.8 - TRASCO® GRF C Dimensions

SIZE	Fa min	Fa max	E	A	B	H	I	La	Lb	Lc	V	M	S	N	Bb	Bc	G	D	Nr	C	P
24/32	8	24	55	40	36	30	22	34	94	56	8	18	2	14	31	1,5	27	45	8	36	M5
28/38	10	28	65	48	42	35	25	40	110	65	10	20	2,5	15	36	1,5	30	54	8	44	M6
38/45	12	38	80	66	52	45	35	44	134	79	10	24	3	18	46	1,5	38	66	8	54	M8
42/55	14	42	95	75	62	50	38	50	150	88	12	26	3	20	51	2	46	80	12	65	M8
48/60	15	48	105	85	70	56	44	52	164	96	12	28	3,5	21	57	2	51	90	12	75	M8
55/70	20	55	120	98	80	65	49	62	192	111	16	30	4	22	66	2	60	102	8	84	M10
65/75	22	65	135	115	94	75	59	67	217	126	16	35	4,5	26	76	2	68	116	12	96	M10
75/90	30	75	160	135	108	85	66	78	248	144	19	40	5	30	87	2,5	80	136	15	112	M12
90/100	40	90	200	160	142	100	80	85	285	165	20	45	5,5	34	102	3	100	172	15	145	M16
100/110	45	115	225	180	158	110	85	100	320	185	25	50	6	38	112	4	113	195	15	165	M16
110/125	55	125	255	200	178	120	94	107	347	201	26	55	6,5	42	122	4	127	218	15	180	M20
125/145	55	145	290	230	206	140	110	120	400	230	30	60	7	46	142	5	147	252	15	215	M20

* measures in mm

2.1.6 Hubs machining

Any machining of the hubs must not compromise its functionality.

As for the maximum diameter of the bore that can be achieved, please refer to the table in the catalogue.

The bore machining must be carried out in accordance with the concentricity values with the outer diameter and the perpendicularity values between the hole and the flat internal surface of the hub with a degree of tolerance IT8.

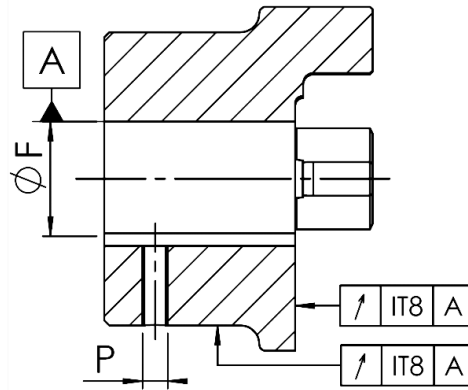


Figure 2-6 - Processing tolerance

It is important not to exceed, for all the materials of which the hub is composed, the maximum value of the hole provided by SIT and reported in the technical catalogue; if this value is not respected the coupling may break, causing serious dangers during the rotation.



DANGER!

The maximum bore allowed and indicated in the catalogue table must not be exceeded. Higher values could cause breakage and danger around the machine.

If the hub bore is machined by the customer, the concentricity and radial oscillation values specified by SIT must be respected. Carefully align the hubs when machining the finished bore.



CAUTION!

The customer is responsible for all the machining performed.

SIT assumes no liability arising from incorrect machining or for failure to observe the instructions contained in this manual and in the technical catalogue.



PRECAUTION!

Except for the machining of the hole, the seat of the keyway and the threaded bore for the setscrew in accordance with the values shown in the technical catalogue, any machining of couplings that must be used in hazardous areas must obtain the express permission of SIT.

The customer must provide SIT with a technical drawing which shows the machining to be carried out. It is the responsibility of SIT to evaluate and approve it.

Any spare parts for these couplings must be standard hubs unbored or with pilot bore marked with the ATEX marking.

2.1.7 Position and size of the setscrew

SIT supplies flathead setscrews class 45H according to DIN 913 for fastening the hub on the shaft.

For the position and size of the setscrews, refer to [TABLE 2.9 - TRASCO®: setscrew position](#) and to the drawing of [FIGURE 2-7 - Setscrew position](#).

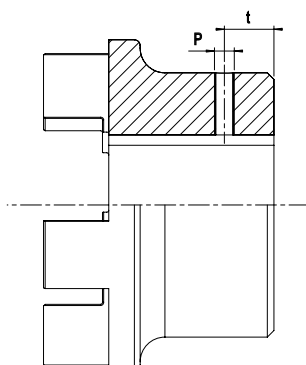


Figure 2-7 - Setscrew position

Table 2.9 - TRASCO®: Setscrew position

SIZE	THREAD	DISTANCE [mm]	TIGHTNING TORQUE [Nm]
19/24	M5	10	2
24/32	M5	10	2
28/38	M6	15	4,8
38/45	M8	15	10
42/55	M8	20	10
48/60	M8	20	10
55/70	M10	20	17
65/75	M10	20	17
75/90	M10	25	17
90/100	M12	30	40
100/110	M12	30	40
110/125	M16	35	80
125/145	M16	40	80
140/160	M20	45	140
160/185	M20	50	140
180/200	M20	50	140

2.2 Elastic spider

The elastic spider is a toothed ring produced with special polyurethane compounds that allows for optimised coupling performance according to the application.

The flexible element is particularly resistant to ageing, hydrolysis (therefore also suitable for tropical climates), fatigue, abrasion and is self-damping.

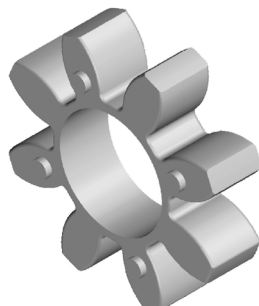


Figure 2-8 - Elastic spider

The spiders are available, as standard product, in three hardness to suit different applications and related operating temperature:

- Yellow ring 92 Sh A -40 °C / + 90 °C
- Red ring 98 Sh A -30 °C / + 90 °C
- Green ring 64 Sh D -30 °C / + 110 °C

2.2.1 Elastic spider performance

Table 2.10 - Elastic spider performance

SIZE	COLOUR	HARDNESS [Shore]	RATED TORQUE T _{kn} [Nm]	MAXIMUM TORQUE T _{max} [Nm]	VIBRATORY TORQUE T _{kw} [Nm]	MAXIMUM SPEED [rpm]
19/24	Yellow	92 Sh A	10	20	2,7	14000
	Red	98 Sh A	17	34	4,4	14000
	Green	64 Sh D	21	42	5,5	14000
24/32	Yellow	92 Sh A	35	70	9	10600
	Red	98 Sh A	60	120	16	10600
	Green	64 Sh D	75	150	19,5	10600
28/38	Yellow	92 Sh A	95	190	25	8500
	Red	98 Sh A	160	320	42	8500
	Green	64 Sh D	200	400	52	8500
38/45	Yellow	92 Sh A	190	380	49	7100
	Red	98 Sh A	325	650	85	7100
	Green	64 Sh D	405	810	105	7100
42/55	Yellow	92 Sh A	265	530	69	6000
	Red	98 Sh A	450	900	117	6000
	Green	64 Sh D	560	1120	145	6000
48/60	Yellow	92 Sh A	310	620	81	5600
	Red	98 Sh A	525	1050	137	5600
	Green	64 Sh D	655	1310	170	5600
55/70	Yellow	92 Sh A	410	820	107	4750
	Red	98 Sh A	680	1250	178	4750
	Green	64 Sh D	825	1650	215	4750
65/75	Yellow	92 Sh A	625	1250	163	4250
	Red	98 Sh A	950	1900	245	4250
	Green	64 Sh D	1175	2350	305	4250
75/90	Yellow	92 Sh A	1280	2560	333	3550
	Red	98 Sh A	1950	3900	500	3550
	Green	64 Sh D	2410	4820	325	3550
90/100	Yellow	92 Sh A	2400	4800	624	2800
	Red	98 Sh A	3600	7200	936	2800
	Green	64 Sh D	4500	9000	1170	2800
100/110	Yellow	92 Sh A	3300	6600	860	2500
	Red	98 Sh A	4950	9900	1290	2500
	Green	64 Sh D	6200	12400	1600	2500
110/125	Yellow	92 Sh A	4800	9600	1250	2240
	Red	98 Sh A	7200	14400	1870	2240
	Green	64 Sh D	9000	18000	2340	2240
125/145	Yellow	92 Sh A	6650	13300	1730	2000
	Red	98 Sh A	10000	20000	2600	2000
	Green	64 Sh D	12500	25000	3250	2000
140/160	Red	95 Sh A	12800	25600	3328	1800
160/185	Red	95 Sh A	19200	38400	4992	1500
180/200	Red	95 Sh A	28000	56000	7280	1400

Note: For GRB and GRCAL types it is necessary to check the transmissible torque capacity, respectively, as from the bush and clamp

2.3 Coupling misalignments

TABLE 2.11 shows the misalignment values based on the different coupling sizes that can accomodated.

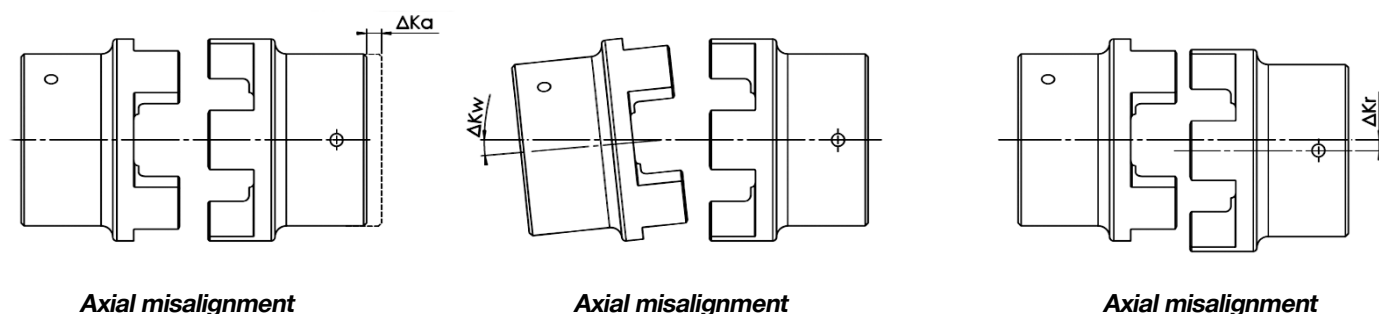


Figure 2-9 - TRASCO®: misalignments

Table 2.11 - TRASCO®: misalignments

SIZE	Axial mis. ΔK_a [mm]	Angular mis. ΔK_w [°]	Radial mis. ΔK_r [mm]
19/24	1,2	1°30'	0,20
24/32	1,4	1°30'	0,22
28/38	1,5	1°30'	0,25
38/45	1,8	1°30'	0,28
42/55	2,0	1°30'	0,32
48/60	2,1	1°30'	0,36
55/70	2,2	1°30'	0,38
65/75	2,6	1°30'	0,42
75/90	3,0	1°30'	0,48
90/100	3,4	1°30'	0,50
100/110	3,8	1°30'	0,52
110/125	4,2	1°30'	0,55
125/145	4,6	1°30'	0,60
140/160	5,0	1°30'	0,62
160/185	5,7	1°30'	0,64
180/200	6,4	1°30'	0,68

Note: Values valid in room temperature conditions of 20 °C and for speeds up to 1500 rpm. For other conditions, contact our Technical Department.

In order to guarantee a long life of the coupling, it is necessary to pay close attention to the alignment.



PRECAUTION!

In case of use in potentially explosive areas of group II with II 2GD and Group I M2 marking, only half of the above indicated misalignments is allowed. If these values are not complied with, the coupling is considered as deliberately damaged.

3 Storage

The couplings must be stored in covered and dry places.

It is important that the storage areas are protected against light sources, ultraviolet lamps, mercury vapour and high electrical voltage sources.

The moisture percentage must be maintained below 65%.

In good storage conditions the characteristics of the spiders can remain unchanged for up to 6 years.

4 Assembly

The TRASCO® coupling is supplied unassembled, therefore it is recommended to check the presence of all the components and check that they match the application requirements.

The characteristic of the TRASCO® family of couplings gives the possibility of mounting any hub version provided that they belong to the same size.

As regards the hubs, the size is printed on the marking located on the lateral surface.

The size of the spider is printed on a flat surface.



ATTENTION!

Install the hubs using only with the spider provided by SIT S.p.A. and of the same size.

SIT S.p.A. assumes no liability for malfunctions and/or failures due to incorrect assembly or that does not comply with the instructions provided in this manual.

4.1 GRMP coupling assembly

Components:

- 2 hubs
- 1 elastic spider
- 2 setscrews

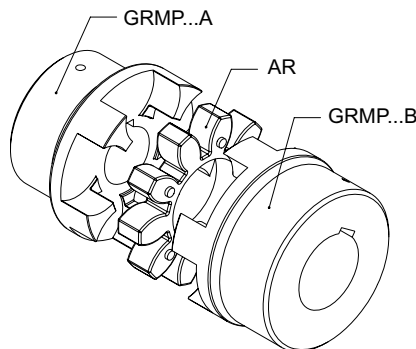


Figure 4-1 - GRMP coupling



ATTENTION!

Before assembling SIT recommends to check that the following parts are matching: shafts diameters, hubs bores, keyways size and their seat on the hubs.

If the dimensions of shaft and keyway is less than the diameter of the spider hole, one or both shafts may protrude into the spider.

- Install the hubs on the driving and driven shafts (see [FIGURE 4-2 - GRMP: mounting](#))
- Insert the spider into one of the two hubs
- Check the driving and driven hub to achieve the value **M** (see [FIGURE 4-2](#) and [TABLE 4.1](#))
- If the motor and driven machine are already firmly assembled, move axially the hubs on the shafts to adjust the **M** dimension
- Set the hubs using the setscrews, tightening according to [TABLE 2.9 - TRASCO®: SETSCREW POSITION](#)

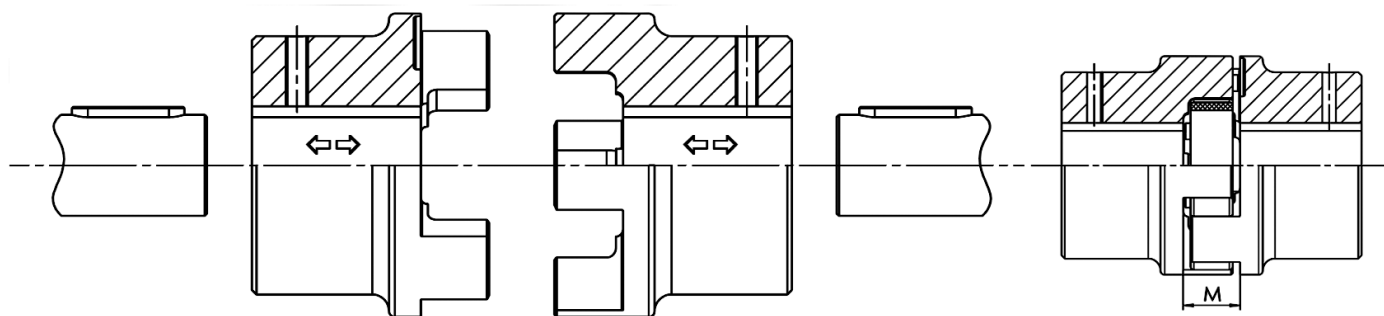


Figure 4-2 - GRMP: mounting

Table 4.1 - M Value

SIZE	M VALUE [mm]
19/24	16
24/32	18
28/38	20
38/45	24
42/55	26
48/60	28
55/70	30
65/75	35
75/90	40
90/100	45
100/110	50
110/125	55
125/145	60
140/160	65
160/185	75
180/200	85



PRECAUTIONS!

Be very careful in the dangerous areas.



DANGER!

Touching overheated hubs may causes burns. We recommend wearing safety gloves.



CAUTION!

For the installation make sure that the distance M is maintained in order to ensure that the spider can be moved axially. If this advice is disregarded, the device could be damaged.



CAUTION!

If the dimensions of shaft and key is lower than the diameter of the spider hole, one or both shafts may protrude into the spider.

4.2 GRB coupling assembling

4.2.1 Taper bush mounting

Components:

- 2 hubs (B1 with bush mounting from the outside, B2 with bush mounting from the inside, [FIGURE 4-3 - Types of GRB](#))
- 1 spider
- 2 bushes
- setscrews

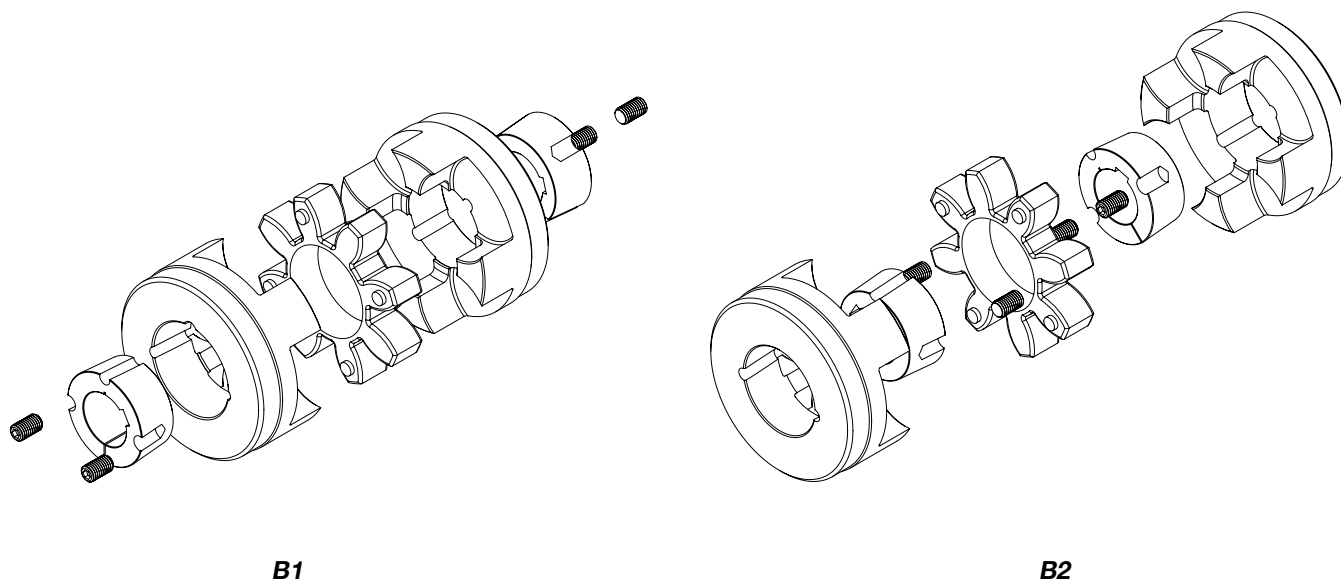


Figure 4-3 - Types of GRB

The taper bush SER-SIT® is a clamping device with threaded holes.

Only half of the holes are in the bush, the other half are in the hub.

For correct assembling please follow these guidelines:

- Insert the bush into the hub matching the fastening holes
- Position the setscrews and tighten them partially
- Insert the whole shaft to the desired position (make sure that the **M** value reported in [TABLE 4.1 - M Value](#) is respected) and fully tighten the setscrews according to the tightening torques specified in [TABLE 4.2 - CONICAL CLAMPING BUSHES SETCREWS](#)
- After a short period of operation, please check that the setscrews are not loose.

Table 4.2 - Conical clamping bushes setcrews

Taper bush size SER-SIT®	Dimensions		Screws				Tightening torque
	L [mm]	D [mm]	No.	Withworth thread [inch]	Length [mm]	Wrench [mm]	[Nm]
1108	22,3	38	2	1/4"	13	3	5,5
1610	25,4	57	2	3/8"	16	5	20
1615	38,1	57	2	3/8"	16	5	20
2012	31,8	70	2	7/16"	22	5	30
2517	44,5	85	2	1/2"	25	6	50
3535	88,9	127	3	1/2"	38	10	115



If used in hazardous areas, it is advisable to use Loctite to prevent the setscrews loosening.



PRECAUTION!

It is not allowed to use the taper bush without keyway in high-risk areas, but only for category 3 equipment.

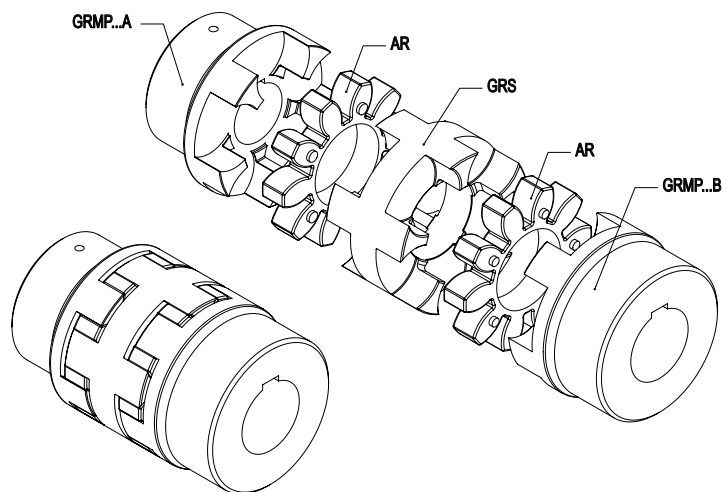
4.2.2 Taper bush disassembly

To remove the taper bush from the hub, remove the setscrews.
Then, insert one of these into the threaded hole of the bush forcing its disassembling.

4.3 GRS coupling assembly

Components:

- 2 hubs
- 2 spiders
- 1 intermediate element
- 2 setscrews



GRS

Figure 4-4 - GRS intermediate element

Follow the instructions of the GRMP type making sure to check the value **M** (see [TABLE 4.1 - M Value](#)) for both spiders.

4.4 GRF coupling assembly

4.4.1 Flange-flange version

Components:

- 1 spider
- 2 flanges (CF/CFN)

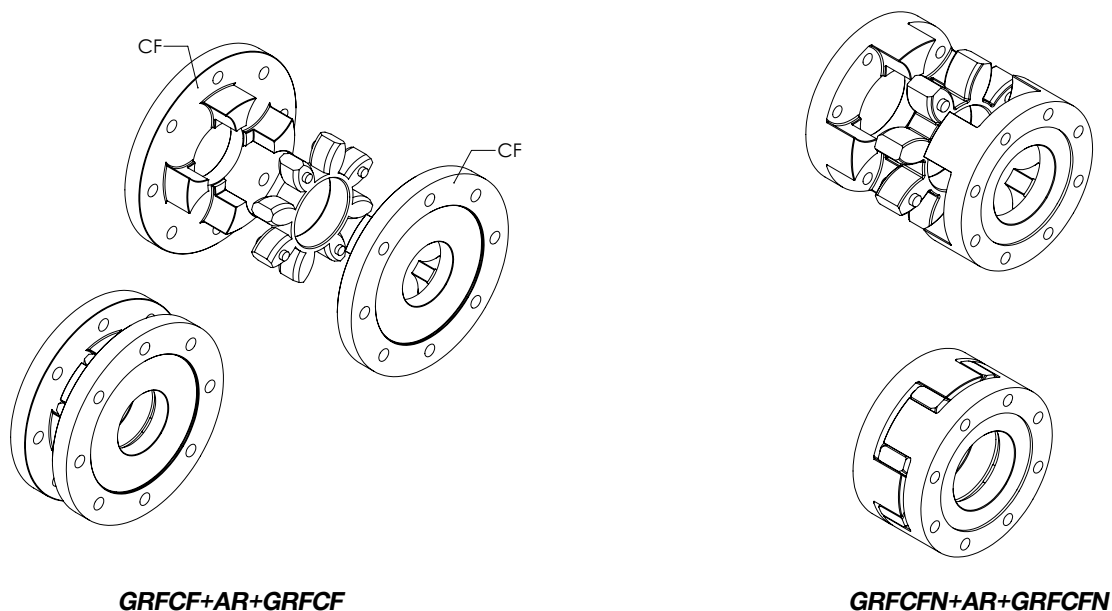


Figure 4-5 - Flange-flange version (CF/CFN)

- Place the CF/CFN flanges onto the motor and the driven machine tightening the screws partially
- Tighten the screws with a torque wrench at the correct tightening torque indicated in [TABLE 4.3 - GRF screws](#)
- Place the spider onto one of the 2 flanges
- Check the driving and driven hub to achieve the value **M** according to [TABLE 4.1 - M Value](#)

Table 4.3 - GRF screws

SIZE	No. SCREWS	ANGULAR SPAN OF BORES	ANGULAR SPAN OF BORES	TIGHTENING TORQUE [Nm]	FLANGE THICKNESS "V" [mm]
19/24	5	72°	M5	10	8
24/32	5	72°	M5	10	8
28/38	6	60°	M8	41	10
38/45	6	60°	M8	41	10
42/55	6	60°	M8	41	12
48/60	8	45°	M10	83	12
55/70	8	45°	M10	83	16
65/75	10	36°	M12	120	16
75/90	10	36°	M16	295	19
90/100	12	30°	M16	295	20
100/110	12	30°	M16	295	25
110/125	12	30°	M20	580	26
125/145	16	22°30'	M20	580	30

4.4.2 Shaft-flange version

Components:

- 1 hub TRASCO®
- 1 spider
- 1 flange (CF/CFN)

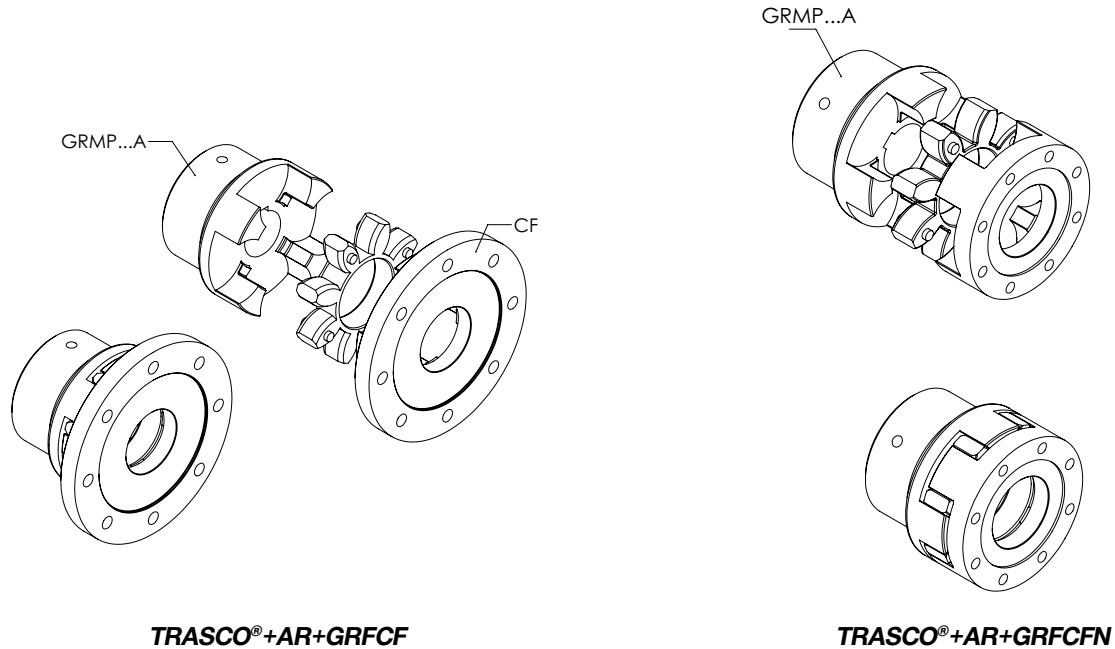


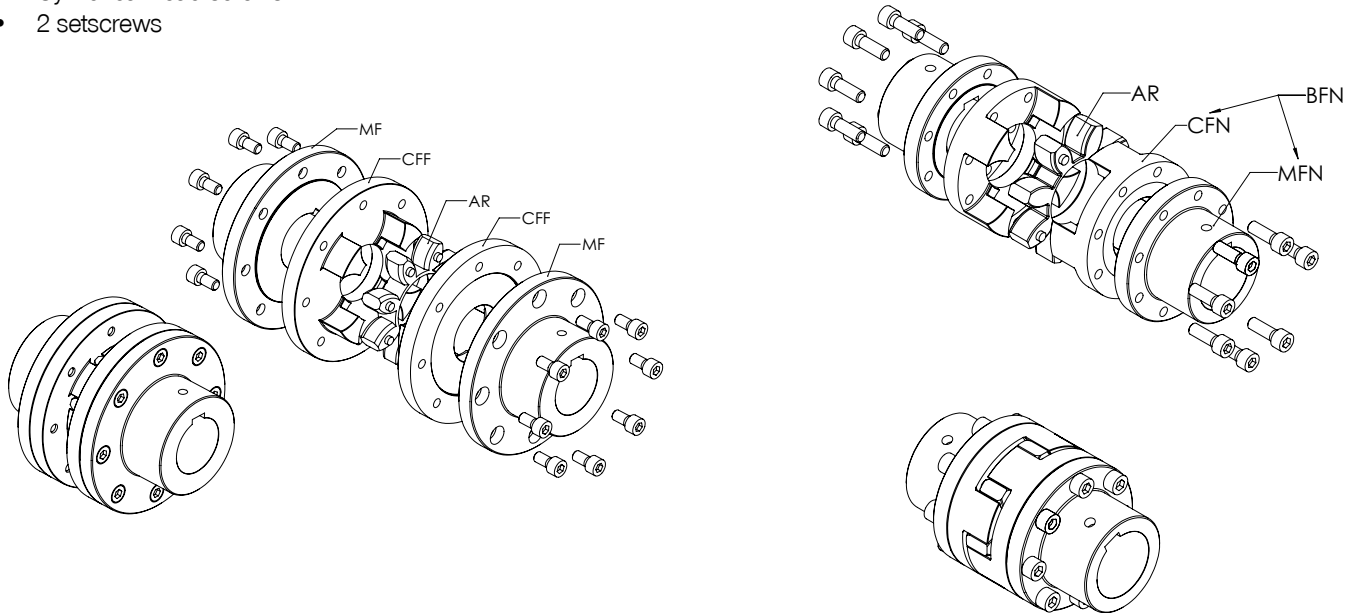
Figure 4-6 - Shaft-flange version (CF/CFN)

- Install the hub on the shaft fastening with the setscrews according to [TABLE 2.9 - TRASCO®: SETSCREWS POSITION](#)
- Place the CF/CFN flanges on the motor and the driven machine tightening the screws partially
- Tighten the screws with a torque wrench at the tightening torque indicated in [TABLE 4.3 - GRF Screws](#)
- Place the spider on one of the 2 flanges
- Check the driving and driven hub to achieve the value **M** according to [TABLE 4.1 - M Value](#)

4.4.3 Shaft-shaft version

Components:

- 1 spider
- 2 flanges (CF/CFN)
- 2 flanged hubs (MF/MFN)
- Cylindrical head screws
- 2 setscrews



MF+GRFCF+AR+GRFCF+MF

MF+GRFCFN+AR+GRFCFN+MF

Figure 4-7 - Shaft-shaft version (CF/CFN)

- Install the flanged hubs on the shafts, being careful that the shafts do not protrude
- Check the driving and driven hub to achieve the value **M+2V** (for **M** see [TABLE 4.1 - M Value](#), for **V** see [TABLE 4.3 - GRF Screws](#))
- Fasten the flanged hubs with the setscrews according to [TABLE 2.9 - TRASCO®: SETSCREW POSITION](#)
- Join together the 2 flanges (CF/CFN) and the spider, then position the assembly between the flanged hubs
- Tighten the parts by hand
- Tighten the screws with a torque wrench as shown in the [TABLE 4.3 - GRF Screws](#)

5 ATEX Annex

This Annex is an integral part of the sale of the SIT TRASCO® coupling according to the ATEX Directive 2014/34/EU, contains the Declaration of Conformity, and, therefore, is delivered together with the coupling.

The User and Maintenance Manual, may be downloaded in electronic format on the website www.sitspa.com.

The analysis of the coupling machining process was carried out by SIT S.p.A.



CAUTION!

These instructions must be complied with in addition to the warnings provided in the technical specifications.

5.1 ATEX zone classification

Below is the cross reference between hazardous zones, substances and categories according to the ATEX Directive 2014/34/EU.

Table 5.1 - ATEX zone classification

SUBSTANCE	ZONE	ZONE DESCRIPTION	ATEX CATEGORY/MARKING	EPL
GASES, VAPOURS, MISTS	Zone 0	A place in which an explosive atmosphere, consisting of a mixture with air of dangerous substances in the form of a gas, vapour or mist, is present continuously or for long periods or frequently (>1000 hours/year).	1G	Ga
	Zone 1	A place in which an explosive atmosphere, consisting of a mixture of air of dangerous substances in the form of a gas, vapour or mist, is likely to occur in normal operation occasionally (10 - 1000 hours/year).	2G or 1G	Gb or Ga
	Zone2	A place in which an explosive atmosphere, consisting of a mixture of air of dangerous substances in the form of gas, vapour or mist, is not likely to occur in normal operation but, if it does occur, will persist for a short period only (<10 hours/year).	3G, 2G or 1G	Gc, Gb or Ga
DUSTS	Zone 20	A place in which an explosive atmosphere, in the form of a cloud of combustible dust in air is present continuously or for long periods or frequently (>1000 hours/year).	1D	Da
	Zone 21	A place in which an explosive atmosphere, in the form of a cloud of combustible dust in air, is likely to occur in normal operation occasionally (10 - 1000 hours/year).	2D or 1D	Db or Da
	Zone 22	A place in which an explosive atmosphere, in the form of a cloud of combustible dust in air, is not likely to occur in normal operation but, if it occurs, will persist for a short period only (<10 hours/year).	3D, 2D or 1D	Dc, Db or Da

5.2 ATEX equipment classification

Below is the classification of equipment and protection systems according to the ATEX Directive 2014/34/EU.

Table 5.2 - ATEX groups and categories classification

GROUP	EPL	CATEGORY	RISK LEVEL	PROTECTION CHARACTERISTICS	OPERATING CONDITIONS
GROUP I (mining industry)	Ma	M1	Very high	Two independent means of protection or safety ensured even in the event of two faults occurring independently of each other.	The equipment remains connected to the power supply and in operation even in the presence of explosive atmospheres.
	Mb	M2	High	Suitable for normal operation and for severe operating conditions. Where appropriate, also suitable for frequent disturbances or defects which normally need to be taken into account.	The equipment is disconnected from the power supply in the presence of explosive atmospheres.
GROUP II GAS (industry, except mining industry)	Ga	1	Very high	Two independent means of protection or safety ensured even in the event of two faults occurring independently of each other.	The equipment remains connected to the power supply and in operation in zones 0, 1, 2.
	Gb	2	High	Suitable for normal operating conditions and for frequent disturbances or devices in which faults normally need to be taken into account.	The equipment remains connected to the power supply and in operation in zones 1, 2.
	Gc	3	Normal	Suitable for normal operation.	The equipment remains connected to the power supply and in operation in zones 2.
GROUP III DUSTS (industry, except mining industry)	Da	1	Very high	Two independent means of protection or safety ensured even in the event of two faults occurring independently of each other.	The equipment remains connected to the power supply and in operation in zones 20, 21, 22.
	Db	2	High	Suitable for normal operating conditions and for frequent disturbances or devices in which faults normally need to be taken into account.	The equipment remains connected to the power supply and in operation in zones 21, 22.
	Dc	3	Normal	Suitable for normal operation.	The equipment remains connected to the power supply and in operation in zones 22.

5.3 Appropriate use of TRASCO® couplings in ATEX zones

The analysis carried out by SIT S.p.A. led to the conclusion that the couplings can be used in the presence of flammable gases, vapours, mists or combustible dusts according to the following scheme:

- Gases, vapours or mists in zones 1 and 2 (not suitable for zone 0)
- Dusts in zones 21 and 22 (not suitable for zone 20)
- Equipment in group I (mining) and categories M2 (not suitable for category M1)
- Equipment in group II (gas) and categories 2 and 3 (not suitable for category 1)
- Explosion group IIC, including groups IIA and IIB
- Equipment in group III (dust) and categories 2 and 3 (not suitable for category 1)
- Explosion group IIIC, including groups IIIA and IIIB

5.3.1 Gas temperature classes for Group II equipment and maximum surface temperature for equipment of Group III

Table 5.3 - Gas temperature classes

TEMPERATURE CLASS	MAXIMUM SURFACE TEMPERATURE [°C]	AMBIENT OR OPERATING TEMPERATURE T _s [°C]
T4	110	-30 °C < T _a < 90 °C
T5	95	-30 °C < T _a < 75 °C
T6	80	-30 °C < T _a < 60 °C

The table indicates the temperature above which the gases, belonging to the respective class, ignite.

The ambient or operating temperature of the couplings was determined by SIT according to the characteristics of the coupling and taking into account a safety factor equal to 20 K. For every class of temperature, there is a safety factor of 5 K.

The maximum surface temperature of 110 °C refers to the applications with potential deposit of inflammable dust.

The environment and operating temperature are limited to 90 °C due to the limits of the compound of the spiders.

5.3.2 Temperature classes for Group I equipment

Couplings mounted on Group I Category M2 equipment can operate in environments with the following temperature range:

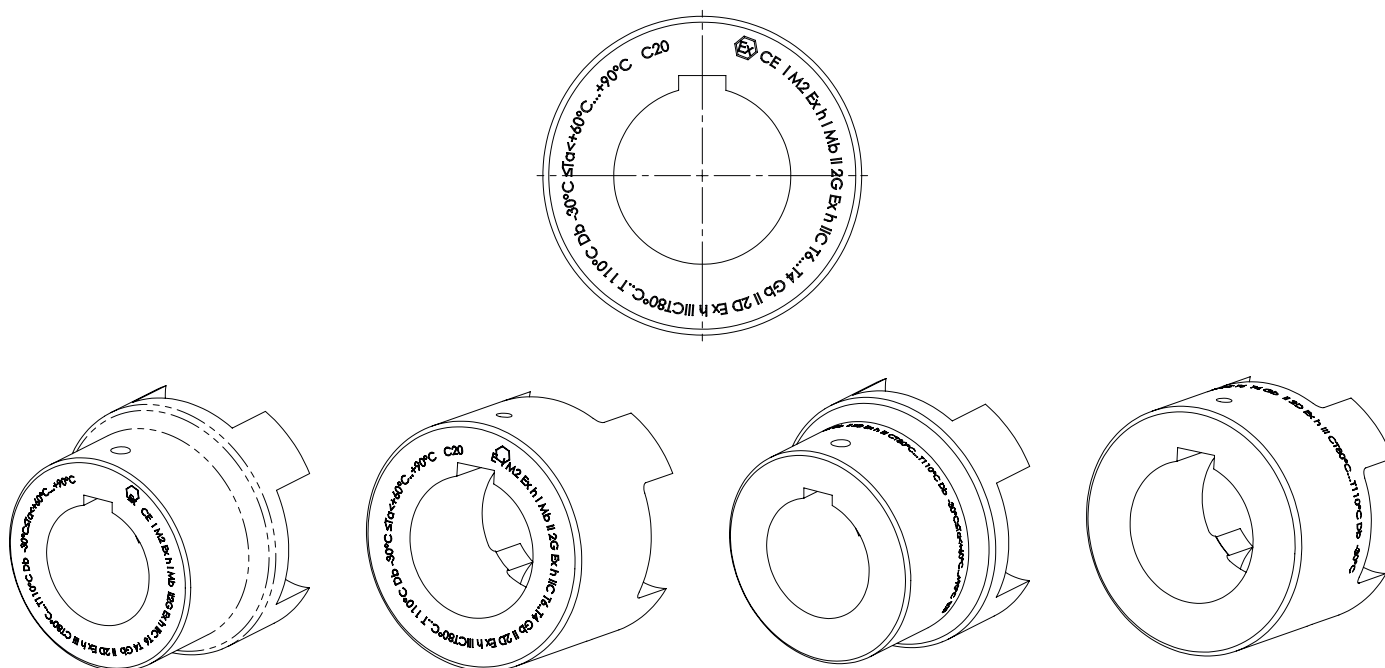
$$-30\text{ °C} < T_a < 90\text{ °C}$$

The coupling is **not** suitable for Category M1 equipment.

5.4 Marking

SIT TRASCO® couplings are marked as required by Directive ATEX 2014/34/EU for equipment operating in zones classified for the presence of a potential hazardous atmosphere.

The marking is indelible and positioned, at SIT's discretion, in a suitable area of the hub surface.



5.4.1 Complete marking



I M2 Ex h I Mb
II 2G Ex h IIC T6...T4 Gb
II 2D Ex h IIIC T80° C...T110° C Db
-30° C ≤ Ta < +60° C...+90° C

SYMBOL	DESCRIPTION
I/II	Group (I mining industry, II surface machine)
2	Category 2 (zone 1 / zone 21)
G	Explosive atmosphere with gases, vapours or mists
D	Explosive atmosphere with dust
Ex h	Type of protection - Constructional safety
IIC	Explosion group for gases
IIIC	Explosion group for dusts
T6...T4	Temperature class (gas)
T80...T110	Maximum surface temperature (dusts)
Mb, Gb, Db	EPL
Ta	Ambient or operating temperature range

The line regarding gases shows the temperature classes and the related admissible ambient temperature range, given the coupling characteristics and a safety factor of 20 K.

5.4.2 Compact marking

Where the size of the coupling does not allow complete marking, the Directive allows a reduced version which refers to this manual for its comprehension.



The letter **X** refers to this manual which includes a summary table of the temperature class and the resulting maximum permissible ambient temperature that must be at least 20 K less, in accordance with the elastic spider's ability to resist.

5.5 Hub machining in ATEX environment

The machining of the bore, the seat of the keyway and the threaded bore for the fixing screw must follow the instructions provided in the UNHSO 2768 standard. Any other machining on couplings to be used in hazardous zones must obtain the express consent of SIT. The customer must provide SIT with a technical drawing showing the machining to be carried out. It is the responsibility of SIT to evaluate and approve it.

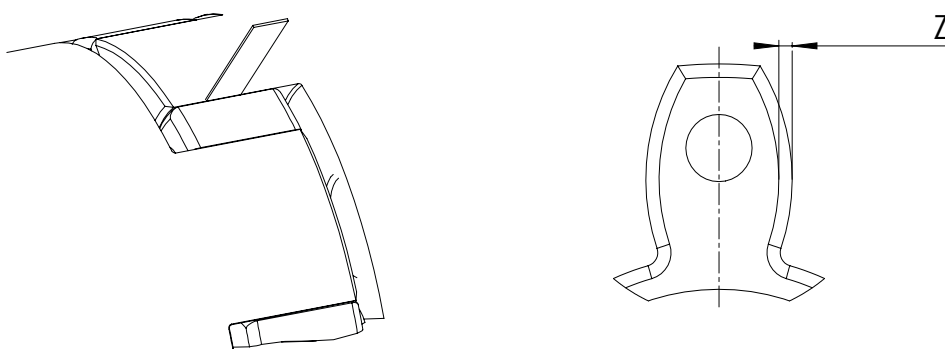
5.6 Elastic spider check

The elastic spider must undergo periodic checks for wear.

The first check must be made after 2000 hours of operation or after 3 months from the start of use.

The next check should be made after 4000 hours or 12 months, provided that the first inspection did not show excessive wear values that led to replacement of the elastic spider.

The check is performed using a feeler gauge to assess the wear of each element of the spider.



If the measured value (Z value) is higher than that indicated in the Z VALUE FOR CHECKING SPIDER WEAR, it is recommended to replace the spider with an equivalent one.

Table 5.4 - Z value for checking spider wear

SIZE	QUOTE Z [mm]
19/24	3
24/32	3
28/38	3
38/45	3
42/55	4
48/60	4
55/70	5
65/75	5

SIZE	QUOTE Z [mm]
75/90	6
90/100	8
100/110	9
110/125	9
125/145	10
140/160	12
160/185	14
180/200	14

**CAUTION!**

Replace the elastic spider with an equivalent one of the same size. SIT S.p.A. does not accept any liability for incorrect replacements. For information on correct assembly, please refer to this User and Maintenance Manual.

5.7 Internal manufacturing check

Before marking and placing on the market, TRASCO® transmission couplings have been subjected to the checks and inspections provided for by the internal manufacturing system and by the company's quality system.

SIT S.p.A. has in fact obtained Certification of the Quality Management System according to international UNI EN ISO 9001 standard.

5.8 Starting

**CAUTION!**

All operations must be performed by trained and qualified personnel; different or additional uses to those envisaged in this User and Maintenance Manual are not permitted.

Before placing the coupling into service, check:

- The tightening torque of the hub screws.
- The correct alignment has been achieved.
- The correct distance between the hubs.

Working in hazardous zones, tightening of the screws must be made even more securely by using Loctite (medium strength).

The user must periodically check, depending on the type of use and the substances used:

- the state of wear and correct functioning of the coupling
- the presence of vibrations and/or noise: in this case, the user must identify the causes and contact the manufacturer

For use in zones classified for the presence of combustible dust, ensure regular cleaning in order to avoid the formation of dust layers; for this purpose, use equipment suitable for the classification of the zone.

This operation must be performed with the elements tightly coupled and in the absence of electrical voltage.

Ensure routine maintenance, according to a frequency to be determined according to the operating conditions, environment and temperature. Nevertheless, residual risks can be present during normal operation of the coupling, if:

- it is not subjected to the normal maintenance plans provided from the User and Maintenance Manual
- it is not used as provided in the design specifications

Different or additional uses not included in the technical specification are not permitted and SIT shall not be liable for any damage related to unauthorised uses.

All maintenance operations must be carried out as indicated in the User and Maintenance Manuals: no modifications are permitted without the written consent of SIT.

Unauthorised replacements or those using non-original parts invalidate the safety of TRASCO® couplings; all spare parts must be obtained from SIT.

5.8.1 Protection devices for couplings in hazardous atmospheres

Protection devices for couplings against unintended contact must be firmly attached.

Couplings for use in hazardous atmospheres must be protected by sturdy guards (if possible, made of stainless steel) against falling objects. They must be able to be easily opened and the aperture size must not exceed the following limits:

- lateral aperture: 8 mm
- upper aperture: 4 mm

The minimum distance between the mechanical guard and the rotating parts must be equal to 5 mm in all directions.

The guard must be electrically conductive within the range allowed by law and can only be removed after having isolated the machine from the electrical supply.

Those in aluminium and NBR can be used between the pump and the electric motor only if the magnesium, titanium and zirconium content is less than 7,5%.

5.8.2 Electrical continuity

TRASCO® couplings must be installed and maintained in accordance with the standards and rules of good practice for classified environments against the risk of explosion due to gases, vapours and dusts.



CAUTION!

TRASCO® couplings must not be insulated from the earth; ensure that connection of the couplings with the earth is always guaranteed over time.

The electrical continuity between the two metal parts of TRASCO® couplings is ensured by the conductivity of the components on which it is mounted (for example motor-pump).

The electrical resistance, measured between the various metallic parts of the coupling and the point of reference, must be verified at the time of initial installation and, subsequently, during periodic checks.

5.9 Declaration of conformity

DECLARATION OF CONFORMITY

We



SIT S.p.A.
Viale A. Volta 2
20090 Cusago (MI)

declare under our sole responsibility that the product:

TRASCO® Coupling

**to which this declaration refers,
is in conformity with the following European Directive**

Directive ATEX 2014/34/UE

***The conformity is under observance of the following
standards or standards documents:***

EN ISO 80079-36:2016

EN ISO 80079-37:2016

The technical documentation is deposited with the

**DNV GL Presafe AS
Veristasveien 3
1363 HOVIK
Norway**

Cusago, 02/03/2020

*SIT S.p.A.
Riccardo Scaglia
Managing Director*

