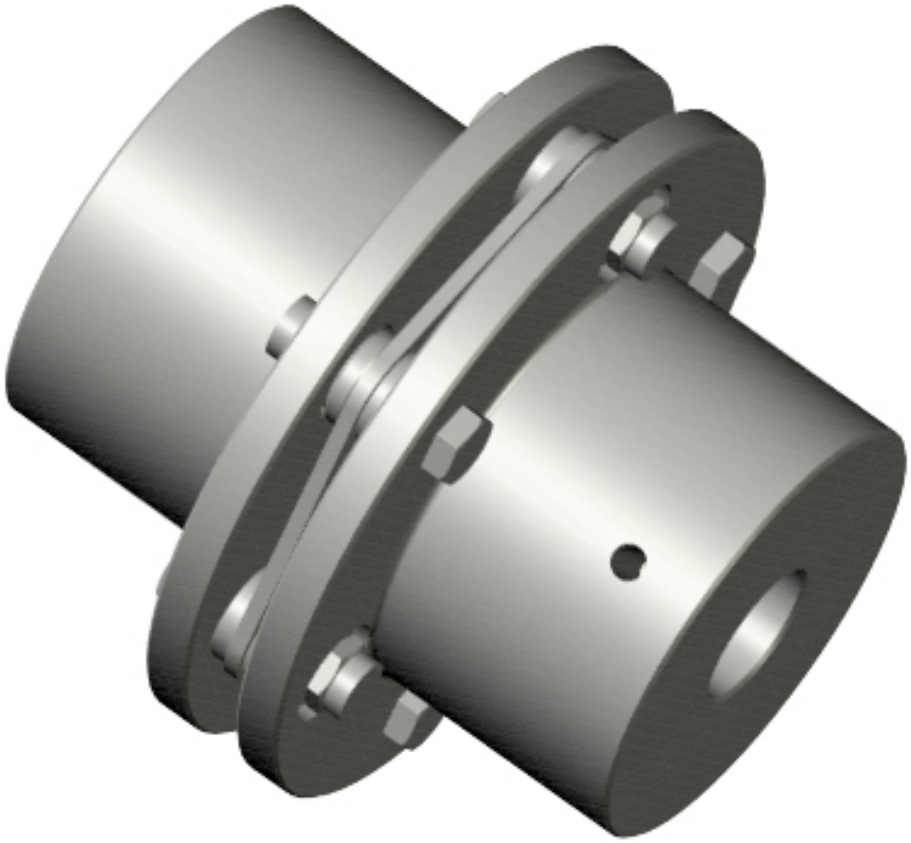
METALDRIVE® Couplings

USER AND MAINTENANCE MANUAL



DRIVE SOLUTIONS

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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.
METALDRIVE® 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.

1.1 Purpose of the document

The purpose of this document is the description of the METALDRIVE® 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 User and Manintenance 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 User 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 Possible damages to the machine

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:

API 610	Reference standard for flexible couplings.
API 671	Equipment and protective systems intended for use in potentially explosive atmospheres.
ATEX DIRECTIVE 2014/34/EU	Guidelines to the application of Directive 2014/34/EU.
ATEX GUIDELINES 2014/34/EU	Explosion prevention and protection against explosion. Basic concepts and methodology.
EN 1127-1:2011	Explosive environments – part 36. Non-electrical equipment for potentially explosive atmospheres. Basic method and requirements.
EN ISO 80079-36:2016	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”.
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 METALDRIVE® coupling

METALDRIVE® couplings are disk pack couplings torsionally rigid that ensures to transmit high torque without any backlash.
The flexibility of the disk pack allows to compensate angular and axial misalignments due to small variations in length of the shafts, e.g. for thermal expansion.
To compensate radial misalignments, it’s necessary the execution with a spacer between two disk packs. The coupling can be assembled both horizontally and vertically with a support for the disk pack.

The METALDRIVE® 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).
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**

METALDRIVE® couplings assembled with component that can generate heat and sparks, like brakes and friction couplings, are not suitable for hazardous areas.

2.1 Hubs

The METALDRIVE® coupling consists of two flanged hubs connected by one or two disk packs, alternatively fixed on the flanges by high precision shoulders screws. The material of standard hubs steel.
For details see TABLE 2.1 - METALDRIVE®: hubs materials.

TABLE 2.1 - METALDRIVE®: hubs material

SERIES	SIZES	STANDARD MATERIAL	OPTIONAL MATERIAL
ALL	ALL	Steel	Stainlees steel

Note: For details contact the Technical Department.

2.1.1 S series

The S series is the standard version with two hubs and a disk pack.
This execution can compensate only the angular and axial misalignments, not the radial ones.

The disk pack is connected to the hubs by means of bolts which are alternatively fixed to the driving and driven machine components.

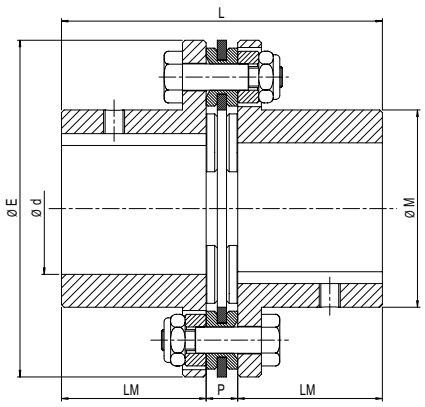


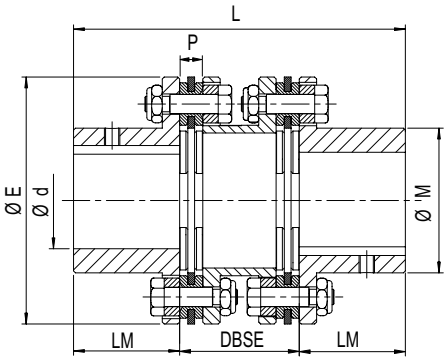
TABLE 2.2 - METALDRIVE® S series dimensions

SIZE	Dimensions [mm]							Screws		
	Pilot bore	d max	E	M	LM	P	L	No.	Type	Tightening torque [Nm]
32	-	32	80	45	40	8	88	6	M5	8,5
38	-	38	92	53	45	8	98	6	M5	8,5
45	-	45	112	64	45	10	100	6	M6	14
52	-	52	136	75	55	12	122	6	M8	35
65	-	65	162	92	65	13	143	6	M10	69
80	35	80	182	112	80	14	174	6	M10	69
90	50	90	206	130	80	15	175	6	M12	120
95	55	95	226	135	90	22	202	6	M14	190
110	65	110	252	155	100	25	225	6	M16	295
120	75	120	296	170	110	32	252	6	M24	1000
138	80	138	318	195	140	32	312	6	M24	1000
155	80	155	352	218	150	32	332	8	M24	1000
175	80	175	386	252	175	37	387	8	M27	1500
190	80	190	426	272	190	37	417	8	M30	2000
205	80	205	456	292	205	42	452	8	M33	2450

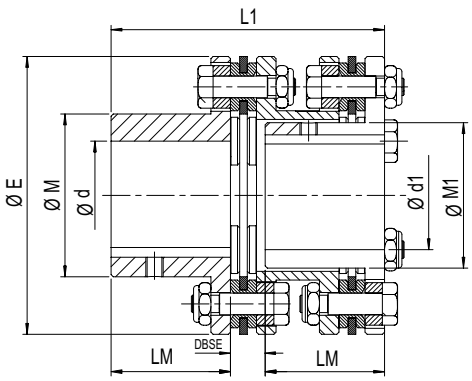
*** measures in mm**

2.1.2 DC series

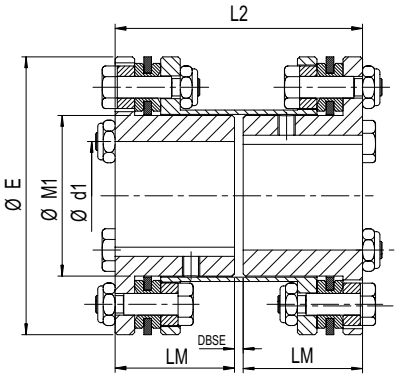
The DC series is a particular execution with a spacer between two disk pack.
This configuration allows to compensate the radial misalignments because of the flexibility of the laminae and their angular deformation. (TABLE 2.3).
Il value of the radial compensation is given by the length of the spacer.



DC



DC 1MR



DC 2MR

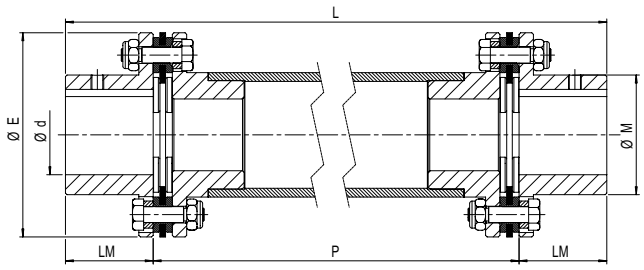
TABLE 2.3 - METALDRIVE® DC series dimensions

SIZE	d max	E	M	LM	P	DC		M1	D1	DC1MR		DC2MR	
						DBSE min	L			DBSE min	L1	DBSE min	L2
32	32	80	45	40	8	45	DBSE + 80	35	25	12	DBSE + 80	3	DBSE + 80
38	38	92	53	45	8	50	DBSE + 90	43	30	12	DBSE + 90	3	DBSE + 90
45	45	112	64	45	10	52	DBSE + 90	54	38	14	DBSE + 90	3	DBSE + 90
52	52	136	75	55	12	62	DBSE + 110	63	45	16	DBSE + 110	3	DBSE + 110
65	65	162	92	65	13	73	DBSE + 130	73	52	17	DBSE + 130	4	DBSE + 130
80	80	182	112	80	14	86	DBSE + 160	85	60	18	DBSE + 160	4	DBSE + 160
90	90	206	130	80	15	87	DBSE + 160	101	72	19	DBSE + 160	6	DBSE + 160
95	95	226	135	90	22	103	DBSE + 180	102	75	26	DBSE + 180	6	DBSE + 180
110	110	252	155	100	25	114	DBSE + 200	126	90	29	DBSE + 200	6	DBSE + 200
120	120	296	170	110	32	135	DBSE + 220	132	95	41	DBSE + 220	6	DBSE + 220
138	138	318	195	140	32	157	DBSE + 280	154	110	37	DBSE + 280	8	DBSE + 280
155	155	352	218	150	32	163	DBSE + 300	180	130	35	DBSE + 300	8	DBSE + 300
175	175	386	252	175	37	191	DBSE + 350	210	150	43	DBSE + 350	10	DBSE + 350
190	190	426	272	190	37	203	DBSE + 380	230	170	43	DBSE + 380	10	DBSE + 380
205	205	456	292	205	42	220	DBSE + 410	235	175	48	DBSE + 410	12	DBSE + 410

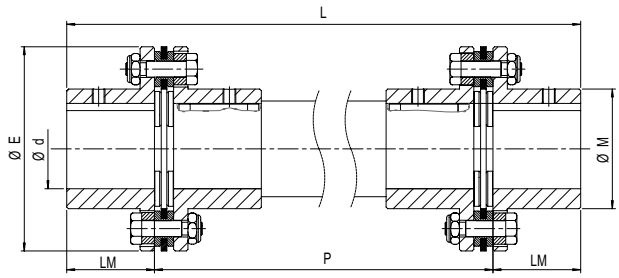
*** measures in mm**

2.1.3 SA series

SA series is made to join two shafts with a great distance between them by a tubular or solid shaft. Depending on application, the tubular shaft can be made in steel or composite fibre.
For the dimensions, see the TABLE 2.4.



SA1



SA2

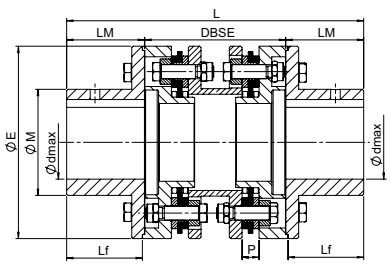
Table 2.4 - METALDRIVE® SA series dimensions

SIZE	Dimensions [mm]						
	Pilote bore	d max	E	M	LM	P - DBSE	L
32	-	32	80	45	40	DBSE on request	DBSE + 80
38	-	38	92	53	45		DBSE + 90
45	-	45	112	64	45		DBSE + 90
52	-	52	136	75	55		DBSE + 110
65	-	65	162	92	65		DBSE + 130
80	35	80	182	112	80		DBSE + 160
90	50	90	206	130	80		DBSE + 160
95	55	95	226	135	90		DBSE + 180
110	65	110	252	155	100		DBSE + 200
120	75	120	296	170	110		DBSE + 220
138	80	138	318	195	140		DBSE + 280
155	80	155	352	218	150		DBSE + 300
175	80	175	386	252	175		DBSE + 350
190	80	190	426	272	190		DBSE + 380
205	80	205	456	292	205		DBSE + 410

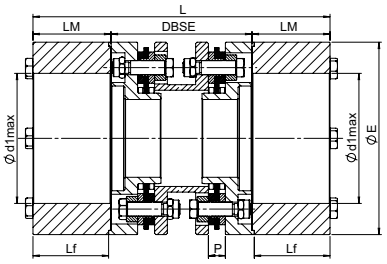
*** measures in mm**

2.1.4 DCA series

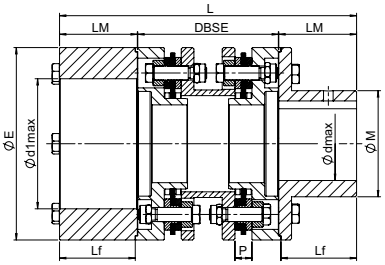
In the DCA series there is a spacer between the two disk packs, which are mounted on special overload collars.
By this configuration, if there is a breaking of the laminae, there is a continuity of the move transmission.
This execution meets the normatives API 610 and API 671.



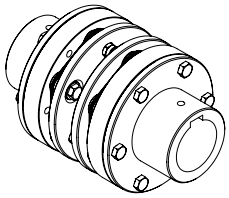
GMD-DCA2MP Version

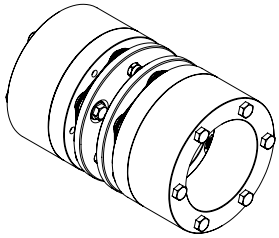


GMD-DCA2MG Version



GMD-DCAMPMG Version





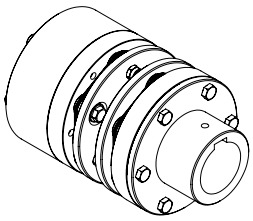


TABLE 2.5 - METALDRIVE® DCA series dimensions

SIZE	Dimensions [mm]													
	Pilote bore	d max	d1 max	E	M	Lf	LC	P	LM	DBSE				L
										Min.	100	140	180	250	
32	-	35	48	80	50	38,5	17,5	8	40	80	X	X			DBSE + 80
38	-	42	55	92	60	43,5	20	8	45	90	X	X			DBSE + 90
45	-	52	75	112	74	43,5	19	10	45	90	X	X			DBSE + 90
52	-	65	92	136	90	53,5	19	12	55	100	X	X	X		DBSE + 110
65	-	80	105	162	112	63,5	23,5	13	65	120		X	X	X	DBSE + 130
80	35	95	120	182	132	78	27	14	80	140		X	X	X	DBSE + 160
90	50	105	135	206	145	78	26,5	15	80	140		X	X	X	DBSE + 160
95	55	118	-	226	165	88	28,5	22	90	160			X	X	DBSE + 180
110	65	125	-	252	175	98	33	25	100	180			X	X	DBSE + 200
120	75	140	-	296	198	108	42,5	32	110	220	ON REQUEST				DBSE + 220
138	80	155	-	318	217	137	51,5	32	140	260					DBSE + 280
155	80	180	-	352	245	147	58,5	32	150	280					DBSE + 300
175	80	190	-	386	270	172	59,5	37	175	310					DBSE + 350
190	80	205	-	426	290	186	68,5	37	190	340					DBSE + 380
205	80	230	-	456	325	201	75	42	205	370					DBSE + 410

*** 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.

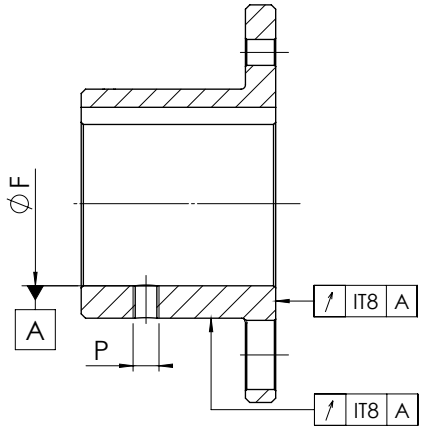


Figure 2-6 - Processing tolerance

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.

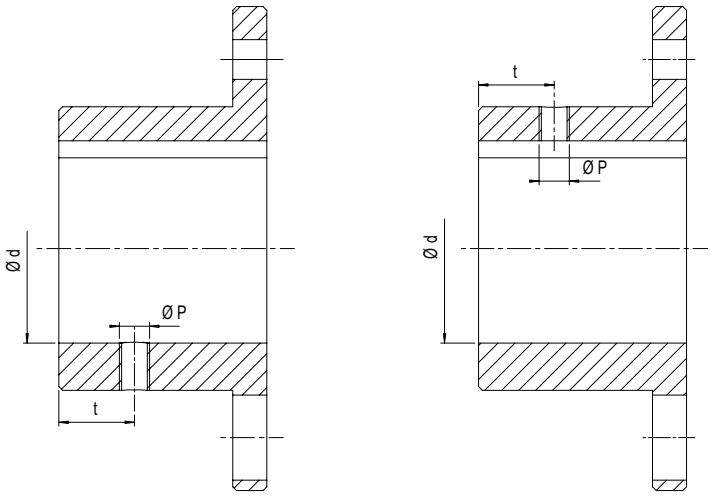
DANGER!
The maximum bore allowed and indicated in the catalogue table must not be exceeded. Higher values could cause breakage and danger around the machine.
If the hub bore is machined by the customer, the concentricity and radial oscillation values specified by SIT must be respected.
Carefully align 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 2.6 and FIGURE 2-7.



Up to size 52 ***From size 65***

Figure 2-7 - Setscrew position

Table 2.6 - METALDRIVE® Setscrew position

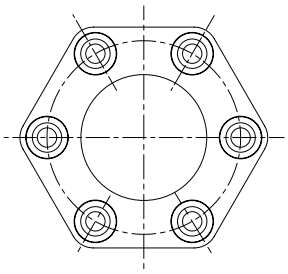
SIZE	THREAD	DISTANCE [mm]	TIGHTENING TORQUE [Nm]
32	M6	15	4.8
38	M6	15	4.8
45	M8	20	10
52	M8	20	10
65	M8	20	10
80	M10	20	17
90	M12	25	40
95	M12	30	40
110	M12	30	40
120	M12	30	40
138	on request		
155			
175			
190			
205			

2.2 Disk pack

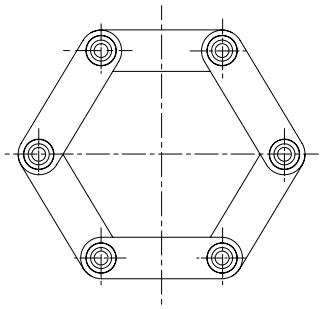
The disk pack is made by stainless steel laminae packed by steel bushes, alternatively fixed the two external hubs. In case of ATEX compliance, the bushes are made of brass.
The main characteristic are:

- Backlash free
- Torsionally rigid
- Compensation of the misalignment due to the flexibility of the laminae Below the main type of the disk pack depending on the size.

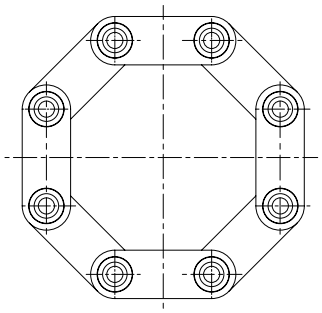
Below the main type of the disk pack depending on the size.



From size 32 to 90



From size 95 to 138



From size 155 to 205

2.2.1 Disk pack performance

TABLE 2.7 - Disk pack performance

SIZE	RATED TORQUE Tkn [Nm]	PEAK TORQUE Tkn [Nm]	PEAK TORQUE Tkn [Nm]	MAXIMUM SPEED [rpm]
32	100	200	30	11500
38	150	300	50	10000
45	300	600	100	8200
52	700	1400	230	6700
65	1100	2200	370	5700
80	1700	3400	570	5000
90	2600	5200	870	4500
95	4000	8000	1330	4100
110	7000	14000	2330	3600
120	9000	18000	3000	3100
138	12000	24000	4000	2900
155	25000	50000	8330	2600
175	35000	70000	11670	2400
190	50000	100000	16670	2200
205	65000	130000	21670	2000

N.B.: The maximum speed refers to a not balanced coupling.

2.2.2 Screws for disk pack

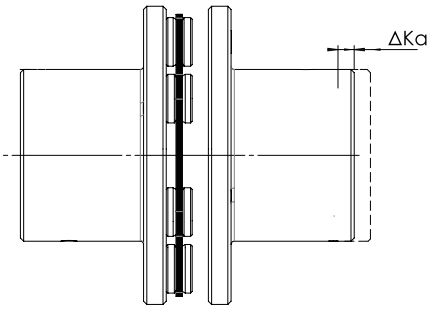
In the table below there are the specification of the fixing screws for disk pack.

TABLE 2.8 - Disk pack setscrew

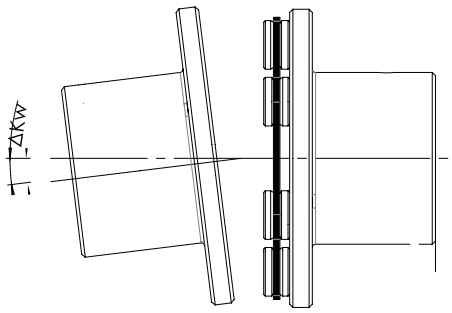
SIZE	No.	THREAD	TIGHTENING TORQUE [Nm]
32	6	M5	8.5
38	6	M5	8.5
45	6	M6	14
52	6	M8	35
65	6	M10	69
80	6	M10	69
90	6	M12	120
95	6	M14	190
110	6	M16	295
120	6	M24	1000
138	6	M24	1000
155	8	M24	1000
175	8	M27	1500
190	8	M30	2000
205	8	M33	2450

2.3 Coupling misalignments

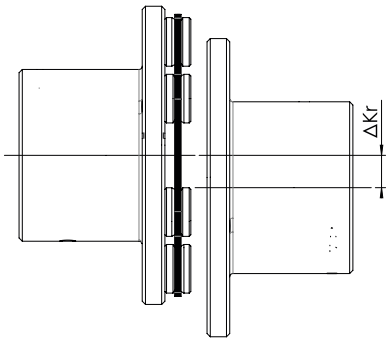
TABLE 2.9 shows the misalignment values based on the different coupling sizes that can accomodated.
Radial misalignments can be compensate only by two disk packs and a spacer between them. The value will depend on the length of the spacer.



Axial misalignment



Angular misalignments



Radial misalignment

TABLE 2.9 - METALDRIVE®: misalignments

SIZE	Axial mis. ΔKa [mm] for disk pack	Angular mis. ΔKw [°] for disk pack	Radial mis. ΔKr [mm] DCL execution	Radial mis. ΔKr [mm] with spacer
32	0,8	0,75	0,32	
38	0,9	0,75	0,42	
45	1,2	0,75	0,53	
52	1,4	0,75	0,74	
65	1,6	0,75	0,84	
80	1,8	0,75	0,92	
90	1,8	0,75	0,96	
95	2	0,75	1,45	(DBSE – P) * tan α
110	2,2	0,75	1,45	
120	2,4	0,75	1,6	
138	2,6	0,75	1,6	
155	2,9	0,5	2,95	
175	3,1	0,5	3,15	
190	3,4	0,5	3,4	
205	3,8	0,5	3,85	

N.B.: the values on the table above are valid only under an environment temperature of 20 °C and a speed of 1500 rpm.

To ensure the best duration of the coupling, particular attention has to be placed the alignment of the coupling.

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. The moisture percentage must be maintained below 65%.

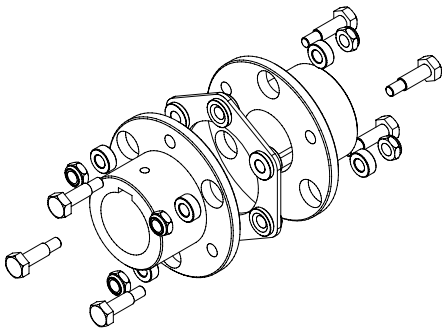
4 Assembly

The METALDRIVE® 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 METALDRIVE® 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 disk pack is printed on the laminae.

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 S series assembly

Components:
- 2 hubs
- 1 disk pack (completed with screws, overload bushes and nuts)
- 2 setscrews



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.

If not otherwise specified by agreement with the customer, the S series execution is supplied completely dismounted.

For the mounting, follow the below instructions:

- Position the two hubs on the motor and driven shaft, with the flange aligned with the end of the shaft (see the FIGURE 4-1)
- Move the motor and the driven machine to get the dimension P (see FIGURE 4-1 and TABLE 4.1)
- If the motor and the driven shaft are fixed, move axially the two hubs to get the dimension P
- Fix the hubs tightening the setscrews according with the TABLE 2.6
- Insert the disk pack between the two hubs
- Insert the calibrated screws to fix the disk pack alternatively to the 2 hubs.
- Tighten the screws by a dynamometric key according with the values of the TABLE 2.8

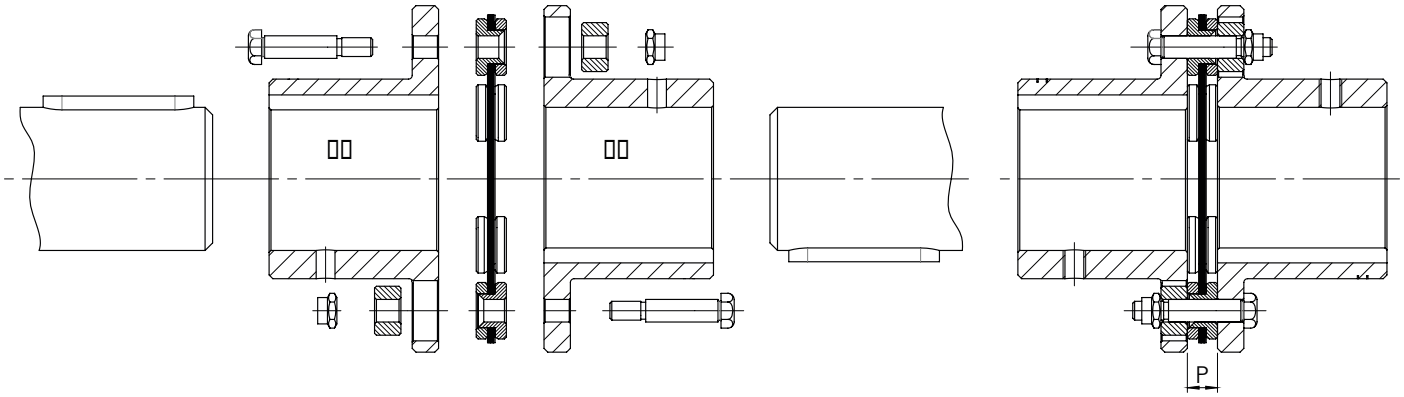


Figure 4-1 - METALDRIVE®: hubs mounting

TABLE 4.1 - P Value

SIZE	P VALUE [mm]
32	8
38	8
45	10
52	12
65	13
80	14
90	15
95	22
110	25
120	32
138	32
155	32
175	37
190	37
205	42

N.B.: the disk pack coupling works properly if the dimension P is correct. It is mandatory to respect the value not to working the disk pack compressed.

PRECAUTIONS!
Be very careful in the dangerous areas.

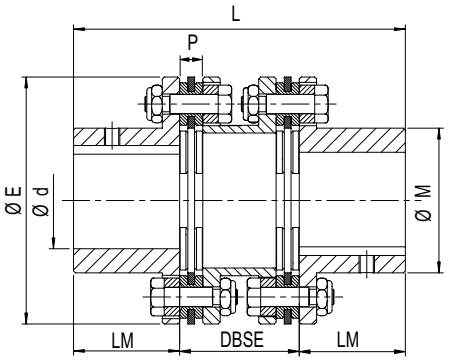
DANGER!
Touching overheated hubs may causes burns. We recommend wearing safety gloves.

CAUTION!
Be sure that the dimension P is respected. If the value is lower than indicated, the disk pack could work compressed and the coupling could work not properly.

ATTENTION!
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 DC series assembly

Components:
- 2 hubs
- 2 disk packs (completed with screws, overload bushes and nuts)
- 1 spacer
- setscrews

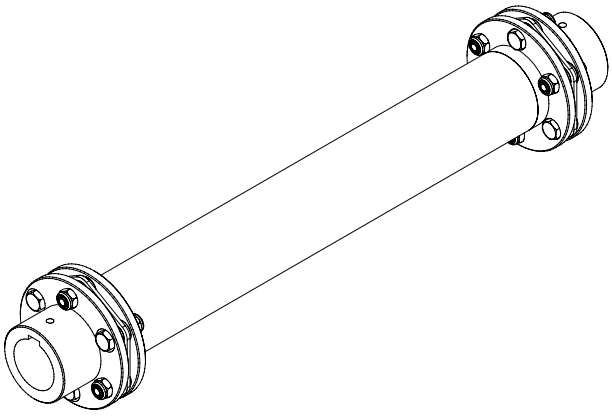


If not otherwise specified by agreement with the customer, the S series execution is supplied completely dismounted.

For the mounting, follow the below instructions:
- Position the two hubs on the motor and driven shaft, with the flange aligned with the end of the shaft (see the FIGURE 4-1)
- Move the motor and the driven machine to get the dimension DBSE (see FIGURE 4-1 and TABLE 4.1)
- If the motor and the driven shaft are fixed, move axially the two hubs to get the dimension DBSE
- Fix the hubs tightening the setscrews according with the TABLE 2.6
- Insert the disk pack and the spacer between the two hubs
- Insert the calibrated screws to fix the disk pack alternatively to the hub and the spacer.
- Tighten the screws by a dynamometric key according with the values of the TABLE 2.8

4.3 SA series assembly

Components:
- 2 hubs
- 2 disk packs (completed with screws, overload bushes and nuts)
- 1 intermediate shaft mounted on two internal hubs
- setscrews



SA1

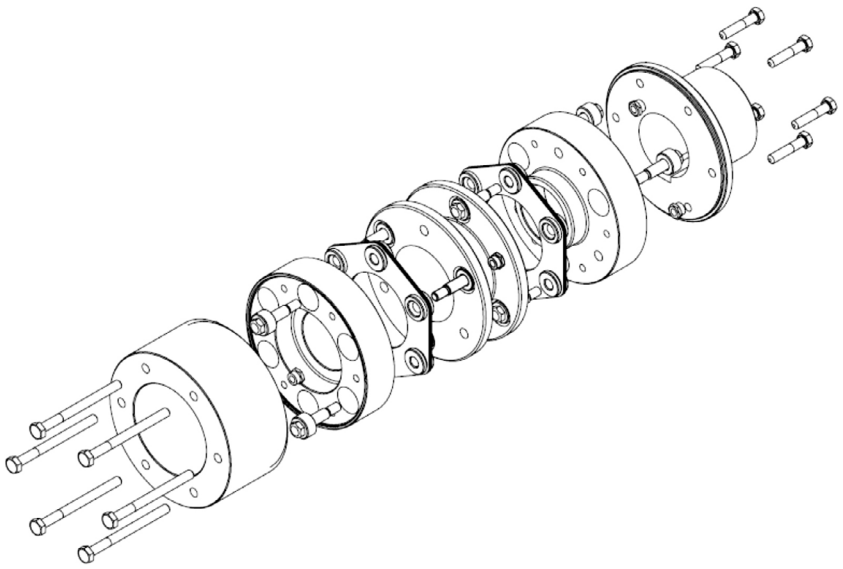
Depending on the customer's requests, the intermediate shaft can be:
- tubular (in steel o in composite material)
- solid shaft in steel

If not otherwise specified by agreement with the customer, the S series execution is supplied completely dismounted and the intermediate shafts in one of the following configurations:
- tubular in steel: shaft welded on the two internal hubs
- tubular in CRF: shaft glued to the internal hubs
- solid shaft: internal hubs machined with bore, keyway and setscrew, shaft machined machined for a bore and keyway connection

For the mounting, follow the below instructions:
- Position the two hubs on the motor and driven shaft, with the flange aligned with the end of the shaft (see the FIGURE 4-1)
- Move the motor and the driven machine to get the dimension DBSE (see FIGURE 4-1 and TABLE 4.1)
- If the motor and the driven shaft are fixed, move axially the two hubs to get the dimension DBSE
- Fix the hubs tightening the setscrews according with the TABLE 2.6
- Insert the disk pack and the intermediate shaft between the two hubs
- Insert the calibrated screws to fix the disk pack alternatively to the hub and the internal hub
- Tighten the screws by a dynamometric key according with the values of the TABLE 2.8

4.4 DCA series assembly

Components:
- 2 hubs (including fixing screws to the overload collars)
- 2 overload collars
- 2 disk packs (completed with screws, overload bushes and nuts)
- 1 spacer
- setscrews



If not otherwise specified by agreement with the customer, the S series execution is supplied completely dismounted.

Assembling of the internal part of the coupling:
- mount the two disk packs on the central spacer, inserting the calibrated screws to fix the disk pack alternatively to the spacer and the overload collar
- mount the overload collars and fix them to the subassembly disk packs/spacer
- tighten the screws according with the TABLE 2.8

Mounted the inner part of the coupling, follow the below instructions to assemble it on the shafts:
- Position the two hubs on the motor and driven shaft, with the flange aligned with the end of the shaft (see the FIGURE 4-1)
- Move the motor and the driven machine to get the dimension DBSE (see FIGURE 4-1 and TABLE 4.1)
- If the motor and the driven shaft are fixed, move axially the two hubs to get the dimension DBSE
- Fix the hubs tightening the setscrews according with the TABLE 2.6
- Insert the internal part of the coupling previously assembled and fix it to the hubs by the screws

5 ATEX Annex

This Annex is part of the sale of the SIT coupling according with the Directive 2014/34/EU, encloses the Declaration of Conformity and, therefore, is delivered together with the coupling.
With the Operating and Assembly Instructions, can be downloaded from the website www.sitspa.com.

The analysis of the process about these coupling was made by SIT S.p.A.

CAUTION!
These instructions have to be followed together with the indications of the Technical Specifications.

5.1 ATEX zone classification

Below the relation among the hazardous areas, the substances and the explosion groups according with 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
	Zone 2	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 the classification of ATEX groups, categories and protection devices according with ATEX Directive 2014/34/EU.

Table 5.2 - ATEX equipment 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 METALDRIVE® couplings in ATEX zones

Below the results of the SIT S.p.A. analysis for the use of METALDRIVE® couplings in environments with combustible gases, fogs and steams:

- Gases, fogs or steams in zones 1 and 2 (not suitable to zone 0)
- Dusts in zones 21 e 22 (not suitable to zone 20)
- Equipment in group I (mining) and categories M2 (not suitable for category M1)
- Equipment in group II 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 - Temperature class for gas

TEMPERATURE CLASS	MAXIMUM SURFACE TEMPERATURE [°C]	AMBIENT OR OPERATING TEMPERATURE T_s [°C]
T2	250	**-40 °C < Ta < 230 °C**
T3	195	**-40 °C < Ta < 175 °C**
T4	130	**-40 °C < Ta < 110 °C**
T5	95	**-40 °C < Ta < 75 °C**
T6	80	**-40 °C < Ta < 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 230 °C refers to the applications with potential deposit of inflammable dust.
The environment and operating temperature are limited to 250 °C.

5.3.2 Temperature classes for Group I equipment

Coupling for machines of Group I Category M2 can work within the following range of temperature:

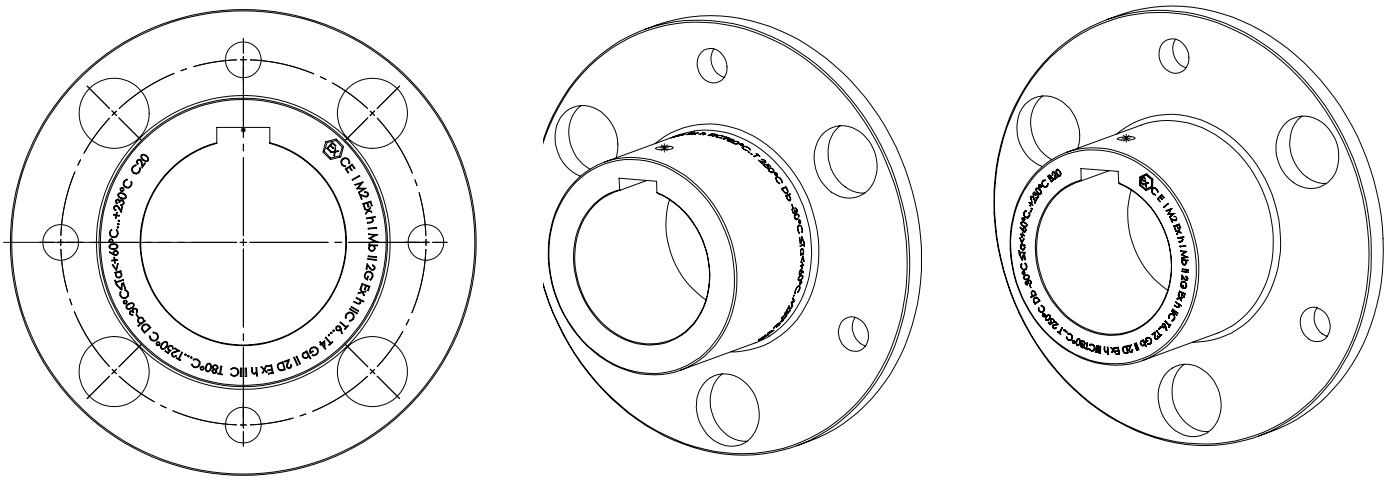
-40 °C < Ta < 130 °C

METALDRIVE® coupling is **not** suitable for product of category M1.

5.4 Marking

METALDRIVE® couplings are marked according with ATEX Directive 2014/34/EU for products that operate in potentially explosive environments.

The marking is indelible and, at SIT own discretion, on a proper place on the hub.



5.4.1 Complete marking

I M2 Ex h I Mb -40 °C < Ta < +130 °C
II 2G Ex h IIC T6...T2 Gb
II 2D Ex h IIIC T80 °C...T250 °C Db
-30 °C ≤ Ta < +60 °C...+230 °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 and operating temperature range

The row of gases indicates the temperature class and the range of operating temperature, considering the characteristic of the coupling and a safety factor of 10 K.
For dusts and Group I is reported only the maximum temperature, because there aren't classes.

5.4.2 Compact marking

If the dimensions of the coupling aren't enough for the complete marking, the ATEX Directive allows a compact version which refers to this Annex for a complete knowledge.

I M2 / II 2GD Ex h X

The letter **X** refers to this annex, to the table of the temperature class (TEMPERATURE CLASS FOR GAS) and to the maximum environment temperature that has to be lower of 20 K, but always according to the technical characteristic of the spider.

5.5 Hub machining in ATEX environment

The machining of bore and keyway has to follow the normative UNI-ISO 2768. Every other machining in ATEX applications ha to be authorized by SIT.
The customer has to give a technical drawing to SIT with every machining he would to make. SIT will evaluate and approval.

5.6 Check of the disk pack

The disk pack has to be check periodically to verify the torsional backlash and the wear.

The first check has to be made after 2000 operating hours or 3 months from the start.
If the first check didn't show any anomalous wear, the next check is after 4000 hours or 12 months.

By a visual inspection, verify that the screws are not loose; in this case, tighten them according with the TABLE 2.8.
The wear of the disk pack is to verify the absence of creeps: in this case, they have to be replaced independently from the periodical inspections.

ATTENTION!
Change the disk pack with a new one of the same size.
SIT S.p.A. disclaims every responsibility about wrong replacements.
For any information about the proper assembly, refer to the User and Maintenance Manual available on SIT official website www.sitspa.com.

5.7 Internal manufacturing check

Before the marking and the selling approval, METALDRIVE® couplings passed inspections and tests according to the internal production planning and the Company Quality System.
SIT S.p.A. achieved the Certification about the Quality Management according to the international standard UNI EN ISO 9001.

5.8 Starting

ATTENTION!
Every operation should be made qualified personnel;
usages other than those indicated in these Instructions are forbidden.

Before starting up the coupling, check:
- The tightening torque of the setscrews
- The alignment
- The right distance between the two hubs

In really hazard areas, the tightening of the screws can be safer using glue with Loctite (medium strength).

The user should check periodically, according to the type of usage and the substances in the area:
- The wear and id the coupling works properly
- Any vibrations or not common noises: in this case it's mandatory to understand the reasons and contact SIT S.p.A.

In hazard areas with combustible dusts, the machine has to be cleaned to avoid accumulation of dust; use suitable equipment for the classification of the area.
This maintenance operation has to be done with every component stopped and with no electrical tension.
Plan an ordinary maintenance according to the condition of the application, the environment and the temperature. Nevertheless, some risks can occur during the normal operations if:
- The application is not submitted to regular maintenance according to the User and Maintenance Manual
- The coupling works not in accordance with the design specifications

Different usages from the technical specifications are forbidden and SIT doesn't assume any liabilities or guarantees regarding any damages due to not proper use.

All the maintenance operations have to be done according to these instructions: no changes are allowed without SIT S.p.A. express authorization.

Not authorized replacements or without original spare parts voids the safe of the coupling: all the spare parts have to be supplied by SIT S.p.A.

5.8.1 Protection device for coupling in hazardous atmosphere

The protection devices for the couplings from no intentional contacts have to be rigidly fixed.
These devices have to be strong against the falling of objects.
Some openings have to be provided in order to permit the regular check. The maximum dimensions are:
- Lateral parts: 8 mm
- Top side: 4 mm

The minimum distance between the mechanical protection and the rotating components has to be 5 mm in every direction.

The device has to conduct the electricity within the terms of the normative and can be remove only after the machine is stopped.
The device in aluminum or NBR can be used between pump and motor only if the percentage of magnesium (Mg), titanium and zirconium is lower than 7.5%.

5.8.2 Electrical continuity

METALDRIVE® coupling has to be installed and maintain according to the normatives and the technical suggestions for hazard areas with risk of explosion due to gases, steams or dusts.

ATTENTION!
METALDRIVE® coupling has never isolated from ground; verify the proper and continuous link to the ground.

The electrical continuity between the two metal parts of the coupling is ensured by the conductivity of the components on which they are mounted (e.g. motor and pump).
The test of the electrical resistance between the two metal parts of the coupling and the reference point has to be made at the first installation and periodically during the maintenance.

5.9 Declaration of Conformity

DECLARATION OF CONFORMITY

We

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

we declare under our sole responsibility that the product:

METALDRIVE® 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 Nemko Presafe AS
Veristasveien 3
1363 HOVIK
Norway

Cusago, 04/03/2020

SIT S.p.A.
Riccardo Scaglia
Amministratore Delegato