



Drum-Couplings TTXs

Installation and operating instructions

incl. operation in potentially explosive areas



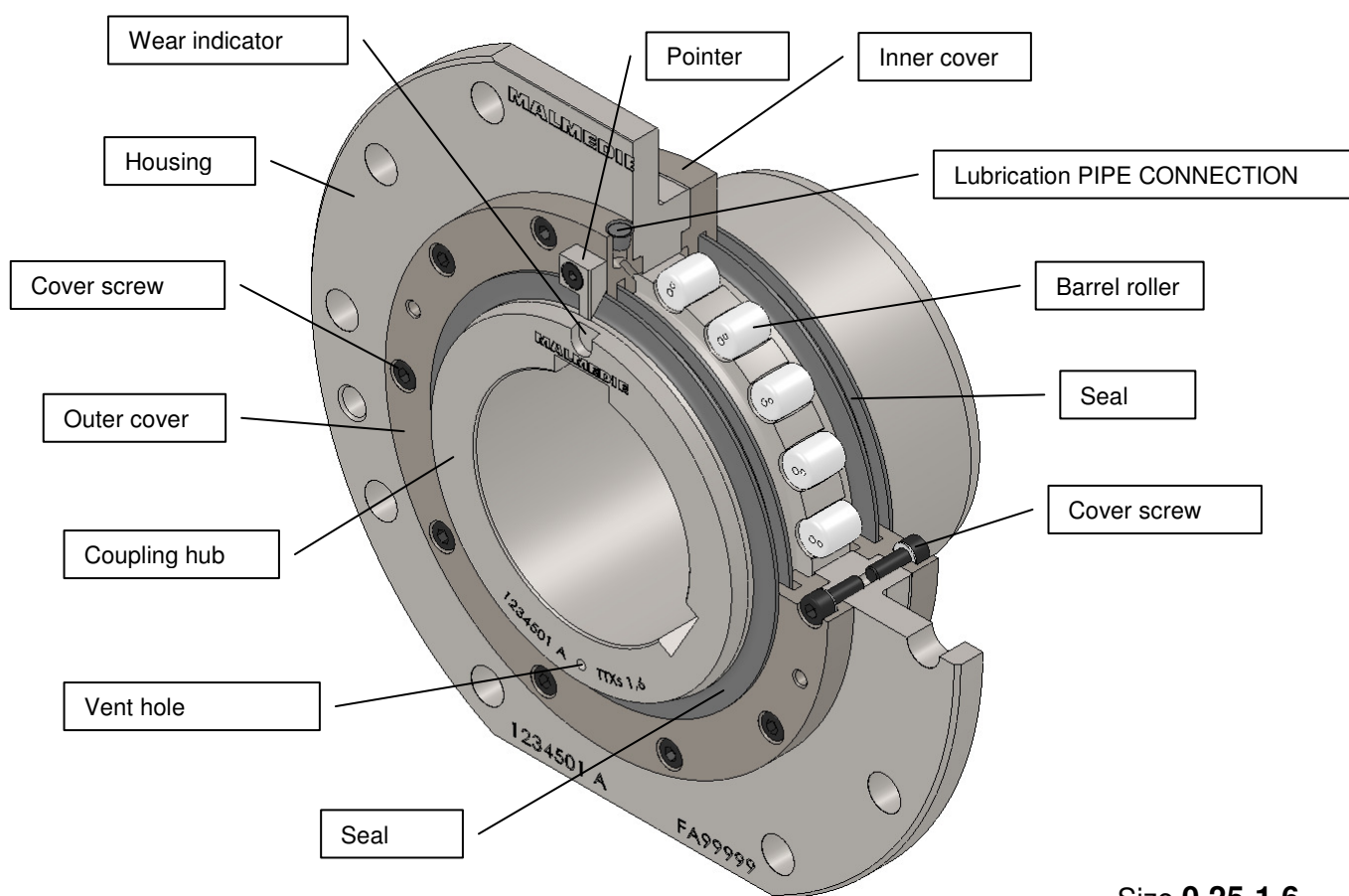
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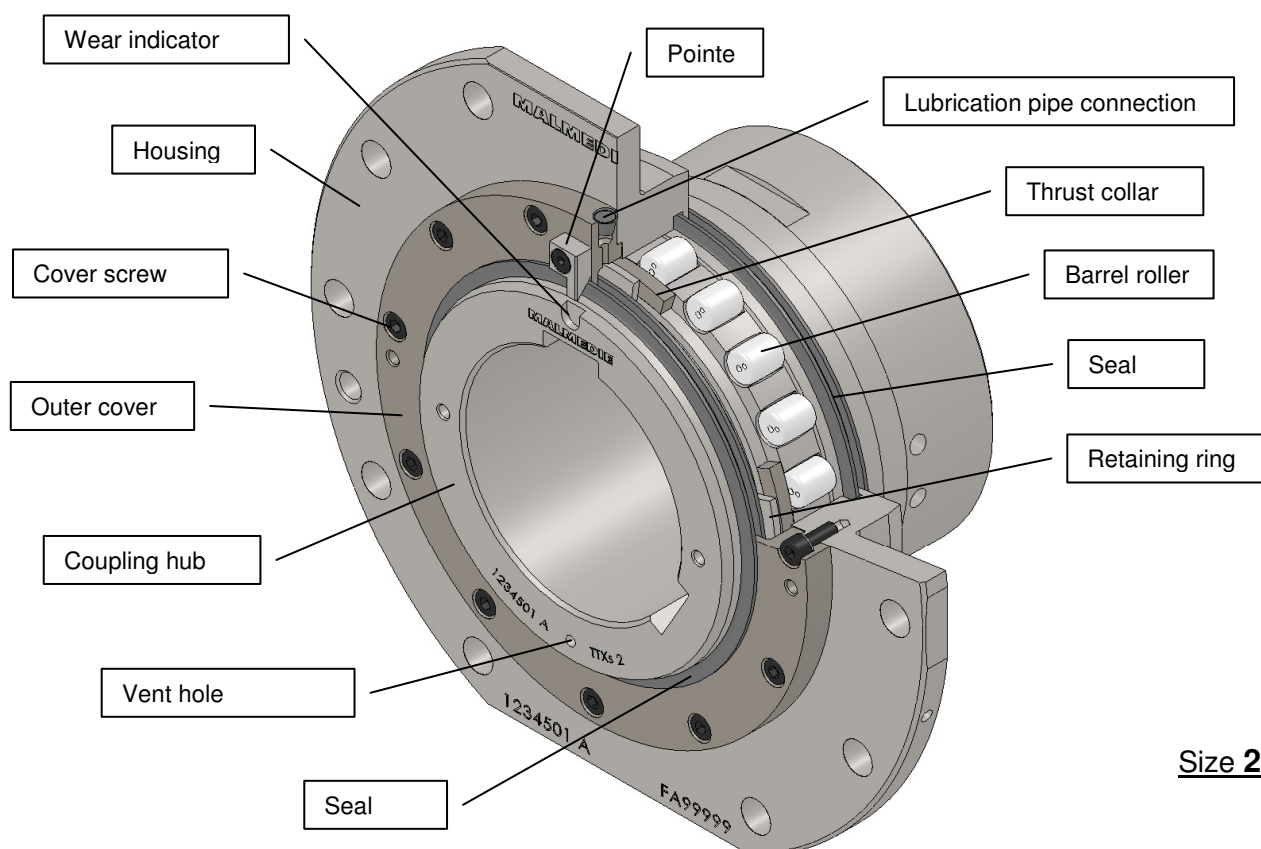
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Size 0.25-1.6



Size 2-92

General information

These installation and operating instructions are supplied with the coupling and should always be kept accessible and near the MALMEDIE Drum-Coupling.

The MALMEDIE Drum-Coupling has been developed for use in general machine engineering and corresponds to the state of the art at the time of printing of these installation and operating instructions. In the interests of further development we reserve the right to make modifications that serve to increase capacity and safety.

Legal requirements applicable at the place of use must be complied with.

Intended use

The MALMEDIE Drum-Coupling has been developed exclusively as a rope drum coupling for use in general machine engineering. It serves to transmit torques and radial loads between gearbox and rope drum.

Any other application and any subsequent modification to the MALMEDIE Drum-Coupling are strictly forbidden! Non-compliance with the rules for intended use or non-compliance with instructions causes danger to human life and results in the manufacturer's warranty becoming void.

Safety rules

Warning notices and symbols in these installation and operating instructions



Safety precautions that must be taken to avoid harm to persons.



Safety precautions for operation in potentially explosive areas

The MALMEDIE Drum-Coupling must be used only in conditions where the permitted capacity according to TTXs catalogue is not exceeded.

The MALMEDIE Drum-Coupling has been designed according to the current state of the art and is supplied operation proof (except first grease filling). Modifications that affect the operational reliability are not permitted. With the exception of drilling a finished hole in the coupling hub, no modifications may be carried out without the approval of MALMEDIE.

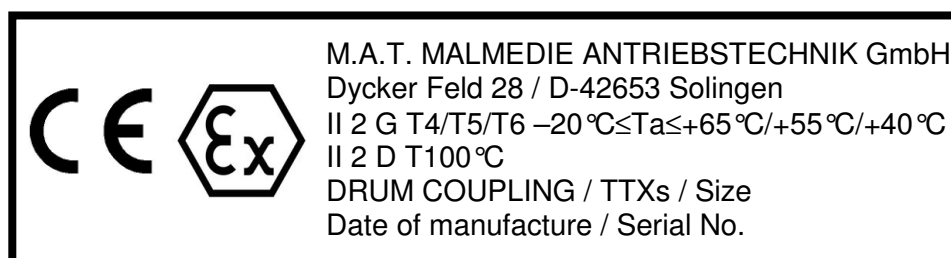
The MALMEDIE Drum-Coupling must be installed, maintained and put into operation only by briefed and trained personnel who have read and understood the installation and operating instructions.

For transport, installation, operation, maintenance or disassembly the regulations for safety at work and environmental protection are to be complied with.

Before any work on the MALMEDIE Drum-Coupling switch the drive off and ensure that it cannot be unintentionally switched on.

Marking

MALMEDIE Drum-Couplings that are approved for use in potentially explosive zones are marked in the factory by the application of a label.



Transport and storage

MALMEDIE Drum-Couplings are supplied ready installed, although **without** any grease filling.

When delivered, the couplings have adequate preservation treatment for storage:

in closed dry rooms	- 18 months
in closed rooms with high air humidity	- 12 months
not in closed rooms	- 3 months

The relative air humidity must not exceed 65%. Care must be taken to ensure that no condensation occurs. The seals must not be stored together with chemicals, solvents, fuels, acids etc.



- For transporting the coupling use only appropriate means of transport.
- Ensure that any lifting gears or load handling devices used have an adequate carrying capacity.

Technical instructions

Values shown on the drawing must be given priority.



- If the maximum permissible torques are exceeded the coupling can break. Pieces of a coupling flying around are a danger to life.



- The coupling then becomes an ignition source.

The maximum admissible finish bores indicated in the MALMEDIE TTXs catalogue are designed for key connections in accordance with DIN 6885 Sheet 1 and must not on any account be exceeded.



- If the maximum permissible finish bore are exceeded the coupling can break. Pieces of a coupling flying around are a danger to life.



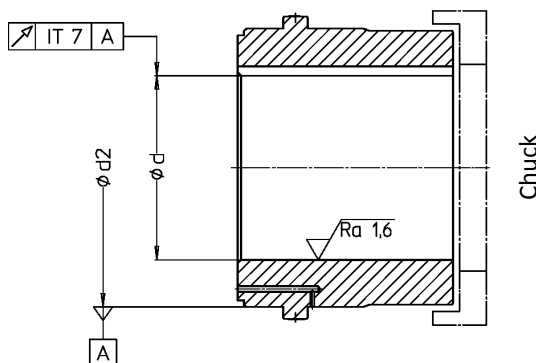
- The coupling then becomes an ignition source.

The coupling hub must be fixed on the gear shaft with an end plate or suitable oversize to prevent axial shifting.

Drilling of a finish bore

- Remove the coupling and clean the coupling parts to remove any corrosion inhibitors.
- Chuck the coupling hub (1) as shown in Fig. 1 before drilling the finish bore.
- **ATTENTION!** The sealing surfaces must not be damaged.
- Align the coupling hub very carefully before drilling the finish bore.
- For the admissible concentricity tolerances, refer to DIN ISO 286 standard tolerance grade IT 7.
- After machining, clean the coupling hub (1) and install the coupling.

Fig. 1



If in a key connection the keyway is not in accordance with DIN6885 Sheet 1 or if another shaft/hub connection is selected, please consult MALMEDIE.

Installation

Before installation, note:



- Before any work on the MALMEDIE Drum-Coupling switch the drive off.
- Ensure that the drive cannot be unintentionally switched on.
- For transporting and installing the coupling use only appropriate means of transport and tools.
- Tighten all bolted connections to the appropriate torque.
- All work must be performed with care and always paying attention to safety.



- Perform the installation outside the danger zone if at all possible.
- It is essential to secure all screws using a threadlocker such as LOCTITE 222 in order to prevent loosening.
- The covers must satisfy at least the requirements of protection class IP20.
- The covering must not touch the MALMEDIE Drum-Coupling and must not impair its function.
- In order to avoid static charging, the MALMEDIE Drum-Coupling must not be installed electrically insulated.
- Establish potential equalisation between the drive and the output.

General information

Before starting installation, dismantle the MALMEDIE Drum-Coupling and clean all parts. The surfaces must be clean, dry, and free of grease.

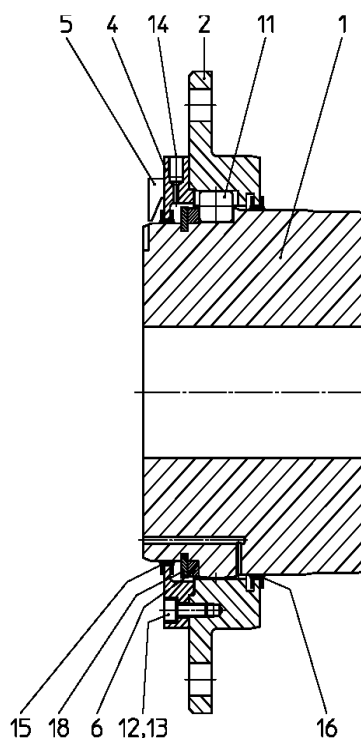
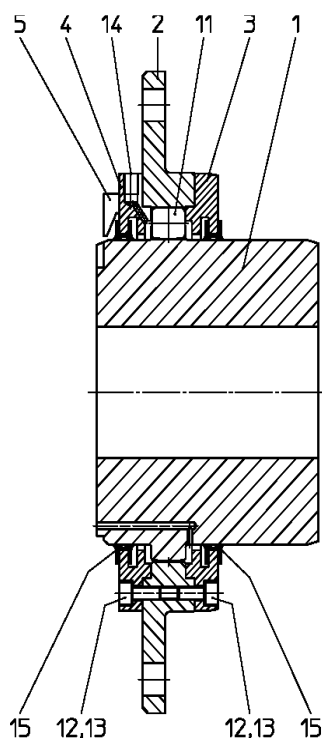


- Follow manufacturers' instructions when handling solvents.

- Ensure that mating surfaces, seal seats or the bore are not damaged by lifting gears.
- During installation, pay attention to correct positioning of the pointer, wear mark and alignment surface (see page 9 – Fig. 7).
- Forcing the coupling hub into place with blows should be avoided.
- After pushing on, the coupling hub (1) must be in contact with a shaft shoulder or spacer ring on the gear side.

Fig. 2 Size **0.25-1.6**

Size **2-92**



- 1 Coupling hub
- 2 Housing
- 3 Inner cover
- 4 Outer cover
- 5 Pointer
- 6 Thrust ring
- 11 Barrel roller
- 12 Cover screw
- 13 Lock washer
- 14 Lubrication pipe connection
- 15 Seal
- 16 Seal
- 18 Retaining ring

Installation of the coupling

A) Hub/shaft connections with key, multiple splined profile, gearing, etc.

Before pushing on the coupling hub (1), push the outer cover (4) incl. seal (15), thrust collar (6) and retaining ring (18) onto the gear shaft. To simplify fitting, the coupling hub (1) may be heated to max. 80° C. The coupling hub must be fixed on the gear shaft with an end plate to prevent axial shifting.



- It is essential to secure all screws using a threadlocker such as LOCTITE 222 in order to prevent loosening.
- Attention! Follow manufacturers' instructions when handling threadlocker.

B) Hub/shaft connection with shrink-fit connection

Before pushing on the coupling hub (1), push the outer cover (4) incl. seal (15), thrust ring (6) and retaining ring (18) onto the gear shaft. Fit the outer cover (4) with seal (15) on the shaft in such a way that the Seal (15) cannot be damaged when the coupling hub (1) is pushed on. The coupling hub (1) must be heated to shrink-fit temperature (calculation, see TTXs catalogue page 11 or to manufacturer's specification) slowly and uniformly; local overheating must be avoided.



- Attention! Take care to avoid burns from hot parts.



- Observe the ignition risks in potentially explosive areas!
An environment must be ensured where there is no explosion hazard.

Wait until the heated coupling hub (1) has cooled to room temperature before touching the seals (15,16) and all subsequent activities. Coat the gearings of the coupling hub (1) and the housing (2) with the appropriate lubricant (see page 10). Push the housing (2) over the coupling hub (1) and engage the barrel rollers (11) in the circular gearing.
Install thrust collar (6) and fit retaining ring (18) into the appropriate groove.

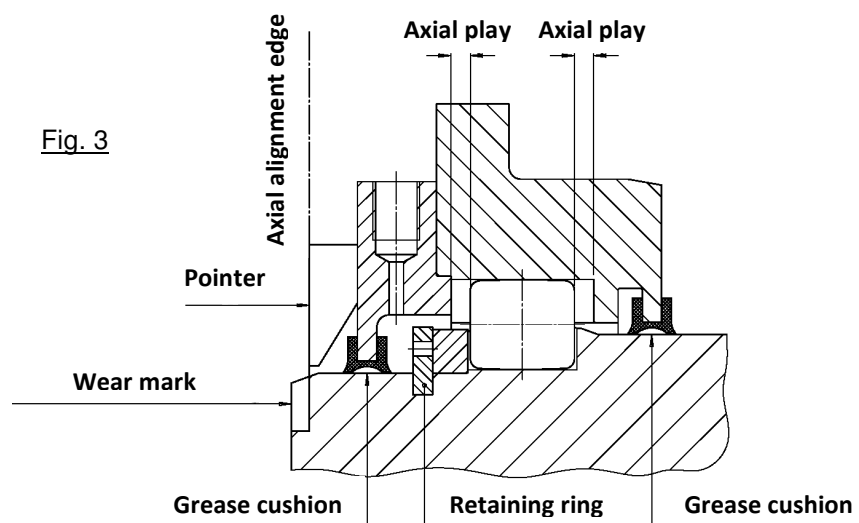
ATTENTION ! · Use suitable pliers for installing and removing the retaining rings (18).

Grease the seal in the outer cover slightly with a suitable grease (see page 10).
Push on outer cover (4) incl. seal and bolt it. The pointer (5) must be positioned over the middle of the wear mark.



- It is essential to secure all screws using a threadlocker such as LOCTITE 222 in order to prevent loosening.
- Attention! Follow manufacturers' instructions when handling threadlocker.

Check the axial displacement of the housing (2).



Bolted connections

Bolts according to DIN931, DIN933 or DIN6914 of strength class 10.9 and high tensile prestressed washers according to DIN6916 are to be used to fasten the MALMEDIE Drum-Coupling to the rope drum.

Bolts of strength class 8.8 to DIN 912 are to be used as cover bolts (12).

All bolts are to be tightened with a torque wrench to the values given in Table 1.



- For tightening and loosening the bolts, the correct tools must be used.
- Attention! Follow manufacturers' instructions when handling threadlocker.



- It is essential to secure screws using a threadlocker such as LOCTITE 222 in order to prevent loosening.

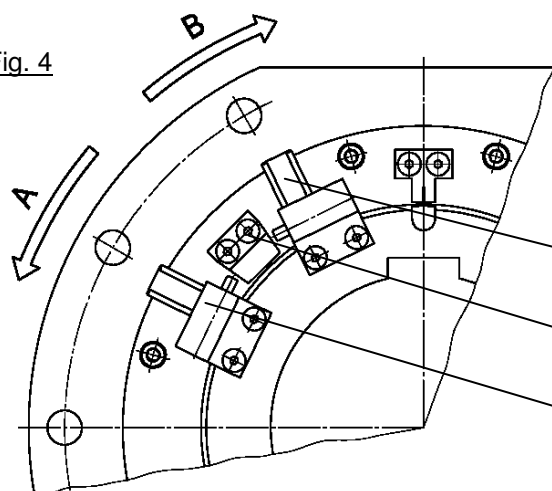
Table 1

Size	Cover bolts strength class 8.8			Coupling/rope drum connection strength class 10.9				
	Hex. socket head DIN 912 [mm]		Tightening torque Ma at $\mu=0.14$ [Nm]	Hexagon head DIN 931/933 [mm]		Hexagon head DIN6914 [mm]		Tightening torque Ma at $\mu=0.14$ [Nm]
	Size	Wrench size		Size	Wrench size	Size	Wrench size	
0.25	M6	5	10	M12	19	M12	22	115
0.5	M8	6	23	M12	19	M12	22	115
0.75	M8	6	23	M16	24	M16	27	290
1	M8	6	23	M16	24	M16	27	290
1.3	M8	6	23	M16	24	M16	27	290
1.6	M8	6	23	M16	24	M16	27	290
2	M8	6	23	M16	24	M16	27	290
3	M8	6	23	M16	24	M16	27	290
4	M8	6	23	M20	30	M20	32	560
5	M8	6	23	M20	30	M20	32	560
6	M10	8	46	M20	30	M20	32	560
10	M10	8	46	M20	30	M20	32	560
15	M10	8	46	M20	30	M20	32	560
21	M10	8	46	M20	30	M20	32	560
26	M10	8	46	M20	30	M20	32	560
34	M12	10	80	M24	36	M24	41	970
42	M12	10	80	M24	36	M24	41	970
62	M12	10	80	M24	36	M24	41	970
82	M12	10	80	M24	36	M24	41	970
92	M12	10	80	M30	46	M30	50	1950

The tightening torques indicated are valid for untreated, lightly oiled bolts with a coefficient of friction of $\mu=0.14$. The use of substances (e.g. solid film lubricant) that change the friction coefficient μ is not permitted.

Automatic wear monitoring

Fig. 4



An automatic wear monitoring is available as an option for coupling sizes 6-62 that is installed as follows, depending on the direction of rotation:

Installation position for load direction **B**

Fixed stop

Installation position for load direction **A**

Only the bolts supplied must be used to fasten the automatic wear monitoring. The bolts are coated at the factory with a suitable locking compound and must be pretightened to a torque of $M_a = 32 \text{ Nm}$ using a torque wrench.



– For tightening and loosening the bolts, the correct tools must be used.

ATTENTION ! – The wear monitoring is not suitable for use in potentially explosive areas.

Alignment of the coupling

The maximum axial force resulting from the components of the rope tension and the translatory inertial force of the rope drum - unloaded when the drum impacts the buffers in the axial direction - must be accepted by the drum bearing and the supporting construction on the trolley frame, without permanent deformation or displacement, via fastening bolts. The elastic horizontal distortion in relation to the drum axis may not be larger than the permissible axial play according to dimension sheet 709-03.

All bolt connections must be capable of accepting the maximum forces.

In combination with the counter bearing, the MALMEDIE Drum-Coupling compensates deviations of up to 1° . The alignment of the rope drum axis is found by measuring dimension "C" (Fig. 6) at four points offset at 90° from each other.

The largest difference between the four measured dimensions "C" must not exceed the following values:

Drum diameter $\leq 1000 - 0,5 \text{ mm}$

Drum diameter $> 1000 - 0,8 \text{ mm}$

Fig. 5

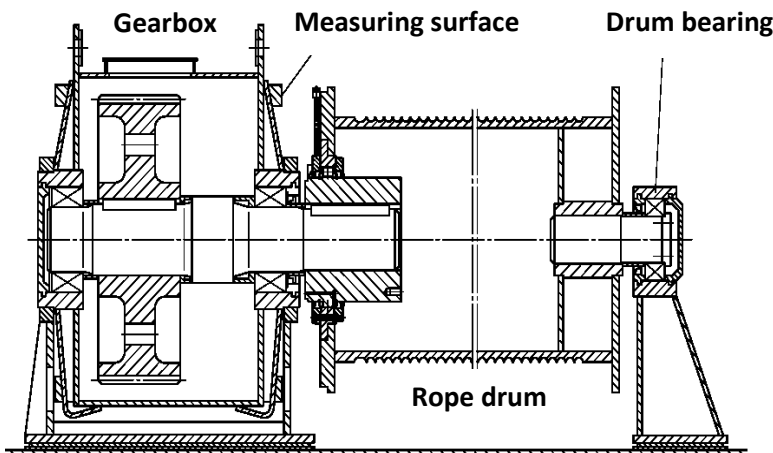
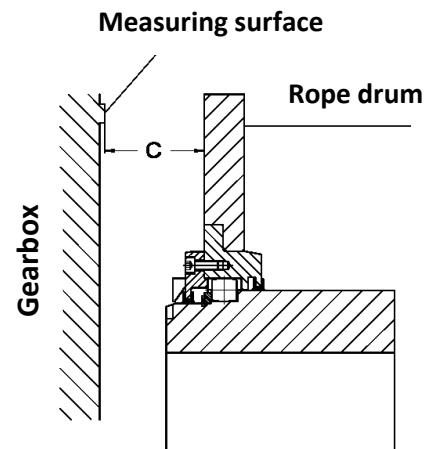


Fig. 6



Before drilling the fastening holes for the drum bearing, the fitted drum-coupling must be aligned axially. For this the front edge of the pointer on the outer cover must be aligned with the bottom of the wear mark.

Table 2

Coupling size	Tolerance [mm]
0.25 – 5	± 0.5
6 – 62	± 1.0

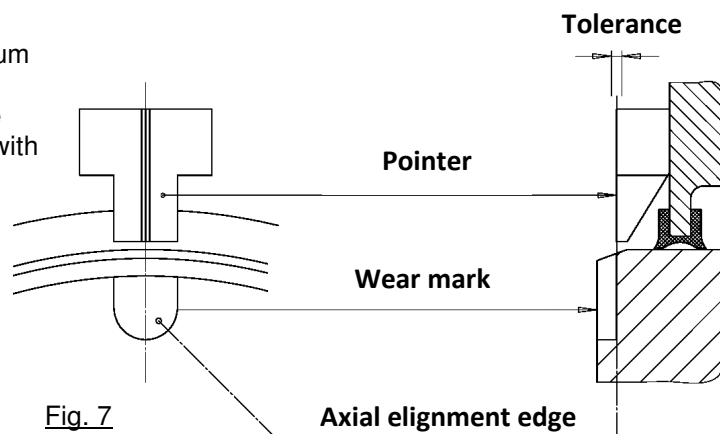


Fig. 7

Commissioning

Lubrication

After installation of the MALMEDIE Drum-Coupling in the rope drum, the lubricant pipe to be supplied by the customer must be screwed into the lubrication pipe connection provided on the outer cover (4).



- It is essential to secure the lubricant pipe using a threadlocker such as LOCTITE 222 to prevent it from coming loose.



- Attention! Follow manufacturers' instructions when handling threadlocker.

Initial filling should be made preferably during assembly of the MALMEDIE Drum-Coupling, but in any case after complete installation, without load, and before crane operation begins. The lubricant should be KP 2 K grease according to DIN51502 or a lubricant grease of the same quality. Grease should be pressed in until clean grease emerges from the vent hole.



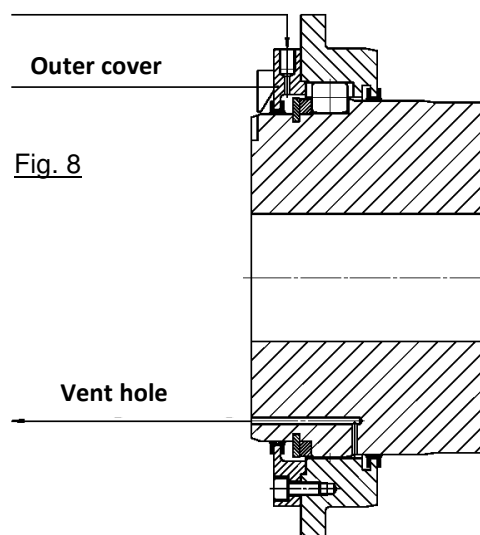
- Attention! Comply with the manufacturer's instructions when using lubricants.



- If the lubricant filling does not correspond to the prescribed volume, the coupling will become an ignition source.

ATTENTION! – Surplus lubricant must be collected fully and disposed of in accordance with the applicable regulations.

Lubrication pipe connection



Lubricant:

Designation as per DIN 51502 - KP 2 K

NLGI class: 2

Base oil viscosity: > 150 mm²/s at 40 °C

Operating temperature: -20 °C to +100 °C

EP additives: required

Table 3

Manufacturer	Product name	Manufacturer	Product name
ADDINOL	Longlife Grease KP 2 K-SEB	FUCHS Lubritech	LAGERMEISTER EP 2
AGIP	LONGTIME GREASE 2	FUCHS	RENOLIT H 443 – HD 88
ARAL	Aralub HLP 2 / SL	KLÜBER	CENTOPLEX EP 2
AVIA	LITHOPLEX 2 EP	MOBIL	Mobilux EP 2
BECHER	HIGH-LUB LT 2 EP	RHENUS	Norlith LIH 2
BP	Energ grease LS-EP 2	SHELL	Alvania EP (LF) 2
CASTROL	Spheerol EPL 2	TEXACO	MULTIFAK EP 2
ESSO	BEACON EP2	TOTAL	MULTIS EP 2

Lubricant quantity

Table 4

Type / size	Lubricant quantity [dm ³]									
	0.25	0.5	0.75	1	1.3	1.6	2	3	4	5
TTXs	0.07	0.08	0.11	0.13	0.14	0.15	0.16	0.17	0.20	0.27
FTTXs	-	-	-	-	-	-	-	-	-	-
MTTXs	-	-	-	-	-	-	0.13	0.15	0.17	0.22

Type / size	Lubricant quantity [dm ³]									
	6	10	15	21	26	34	42	62	82	92
TTXs	0.45	0.55	0.65	0.95	1.00	1.25	1.40	1.50	2.20	3.10
FTTXs	0.40	0.45	0.75	0.80	0.90	1.00	1.30	1.40	2.10	3.30
MTTXs	0.40	0.45	0.55	0.80	0.85	1.05	1.20	1.30	2.00	2.90

Regreasing is to be done, depending on the drive group, according to the data in Table 5.

Lubrication timetable

Table 5

Drive group according to		Lubrication timetable	
DIN 15 020	F.E.M. 1.001	Operating hours	Interval
1Bm - 3m	M3 - M6	2000 h	min. 1x in 2 years
4m - 5m	M7 - M8	1000 h	min. 1x per year



- The specified intervals must be halved if the MALMEDIE Drum-Coupling is, exceptionally, used in potentially explosive zones.

Check before first use



- Exact alignment of the MALMEDIE Drum-Coupling will prolong its service life and reduce risks in the potentially explosive area.



- The sum of angular and radial offset must not exceed a deflection of 1°.
- Before using check all bolted connections for the prescribed torque and correct seat.
- Before commissioning, check that the MALMEDIE Drum-Coupling has been filled with a sufficient quantity of a lubricant suitable for the coupling.
- The MALMEDIE Drum-Coupling must be clean and leak-tight.
- Before commissioning, all protective devices to prevent accidental contact with freely moving or rotary parts must be fitted.
- Pay attention to running noises, vibrations, leaks and other unusual occurrences during commissioning and operation.
- Turn off the drive immediately if you discover any abnormalities during commissioning or operation.
- All machine components and operating conditions must be taken into account when troubleshooting and rectifying faults.

Operation

General information

Pay attention during operation of the MALMEDIE Drum-Coupling to:

- Changes to running noises
- Vibrations
- Leakages



- If any abnormalities are noticed during operation, turn off the drive immediately.

The MALMEDIE Drum-Coupling must run with low noise and vibration-free during operation. Any behaviour that deviates from this is to be regarded as a fault that must be corrected promptly.

In a complex plant, all machine items and operating conditions must always be taken into account.

The following operating troubles and possible causes are only a guideline for the troubleshooting

Operating troubles and possible causes

Defect	Hazard	Cause	Remedy
• Irregular running noises • Vibration	Increased reactionary forces, danger of ignition due to increased coupling temperature	– Alignment error	Correct alignment
		– Incorrect lubricant	Check and correct type and quantity of lubricant
		– Too little lubricant	
		– Worn circ. teeth	Check coupling parts for damage, replace them if necessary
		– Imbalance	Check balance weights of the system components and correct if necessary
• Damage to the coupling teeth	Loosening of screws or parts. Danger of ignition due to sparks	– Loose bolted connections	Tighten bolts to the specified torque and secure them against accidental loosening
	Increased reactionary forces, danger of ignition due to increased coupling temperature, tooth breakage	– Alignment error	Correct alignment
		– Overloading	Check coupling design, install a larger coupling if necessary
		– Incorrect lubricant	Check and correct type and quantity of lubricant
		– Too little lubricant	
		– Rotary vibrations	Check balance weights of the system components and correct if necessary

Possible faults

In selecting the coupling:

- Machine torque or speed too high
- Service factor not correctly selected
- Aggressive substances in the surroundings not considered
- Incorrect selection of shaft/hub connection

During installation of the coupling:

- Damaged coupling components are installed
- Seals (15,16) are damaged
- Incorrect tightening torques of the bolts
- Thrust collar (6) and retaining ring (18) incorrectly installed
- Coupling hub (1) not fixed axially
- Alignment values not as specified in the installation and operating instructions
- Sealing surfaces also coated
- Incorrect quantity of lubricant (not as shown in the installation and operating instructions)

During maintenance of the coupling:

- Maintenance intervals exceeded
- Non original spare parts are used

Service and maintenance

General information



- Before any work on the coupling switch the drive off.
- Ensure that the drive cannot be unintentionally switched on.
- Before commissioning, all protective devices to prevent accidental contact with freely moving or rotary parts must be fitted.
- Pay attention to running noises, vibrations, leaks and other unusual occurrences during commissioning and operation.
- Turn off the drive immediately if you discover any abnormalities during commissioning or operation.



The MALMEDIE Drum-Coupling must be serviced and lubricated at regular intervals. The coupling should be inspected for leaks, heating, running noise and wear at least every 6 months.

The following tests are to be carried out at least once a year for cranes of drive groups according to DIN 15020 and FEM 1.001:

Installation position and alignment

The correct axial positioning of the MALMEDIE Drum-Coupling and the drum bearing is indicated by the pointer and the alignment edge as shown in Fig. 5. If axial displacement greater than the values given in dimension sheet 709-04 has occurred, then the drum bearing is to be axially aligned and fixed in place again.

Bolt connections

All bolt connections of the MALMEDIE Drum-Coupling and the drum bearing are to be checked for tightness according to Table 1. If any are found to be loose, the bolts are to be re-tightened or replaced.



- It is essential to secure all screws using a threadlocker such as LOCTITE 222 in order to prevent loosening.

Lubricant quantity and Lubrication timetable

Regreasing is to be done, depending on the drive group, according to the data in Table 6.

Table 6

Drive group according to		Lubrication timetable	
DIN 15 020	F.E.M. 1.001	Operating hours	Interval
1Bm - 3m	M3 - M6	2000 h	min. 1x in 2 years
4m - 5m	M7 - M8	1000 h	min. 1x per year



- The specified intervals must be halved if the MALMEDIE Drum-Coupling is, exceptionally, used in potentially explosive zones.

Relubrication should be carried out in load-free state, if possible. Lubricating grease KP 2 K to DIN51502 or SEB181253 or another lubricating grease of equivalent quality should be used as lubricant (see Table 3). Grease should be pressed in until clean grease emerges from the vent hole (Fig. 8). Check the sealing screws for tightness every time after filling the lubricant.



- Attention! Comply with the manufacturer's instructions when using lubricants.



- If the lubricant filling does not correspond to the prescribed volume, the coupling will become an ignition source.

ATTENTION – Surplus lubricant must be collected fully and disposed of in accordance with the applicable regulations.

Wear indicator

Wear which has occurred in the MALMEDIE Drum-Coupling can be read from the displacement of the pointer in relation to the wear notch.

The maximum permissible wear values $\frac{m}{2}$ are given in Table 7.

The MALMEDIE Drum-Coupling must be replaced as soon as the limit value is exceeded.

In cases where there are two load directions (e.g. trolley), the maximum permissible wear values $\frac{m}{2}$ must be halved.

Table 7

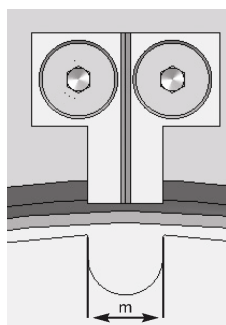


Fig. 9
without wear

Coupling size	max. permissible wear $\frac{m}{2}$
0.25 - 1	4 mm
1.3 - 5	6 mm
6 - 92	8 mm

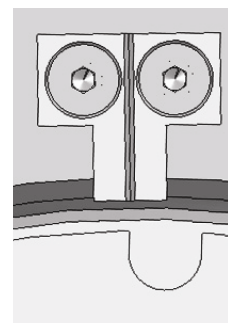
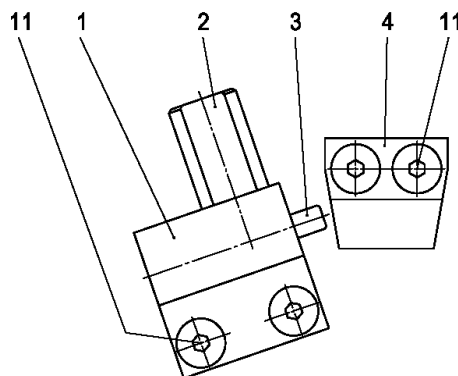


Fig. 10
with max. wear

Automatic wear monitoring

An automatic wear indicator is optionally available for coupling sizes from 6 to 62. However, this does not release you from your duty to check the wear indicator regularly.

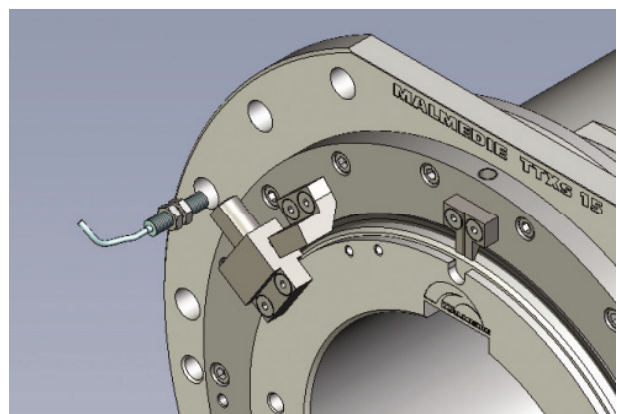
Fig. 11



- 1 Housing
- 2 Release Piston
- 3 Pin
- 4 Fixed Stop
- 11 Countersunk-head bolt

Fig. 12

Fig. 12 shows a wear monitoring in load direction "A" (see page 8). The sensor must be supplied by the customer and does not form part of the scope of supply. The wear indicator is activated at 80% of the max. permissible wear at the latest.



Dimensions for positioning of the sensor

Fig. 13

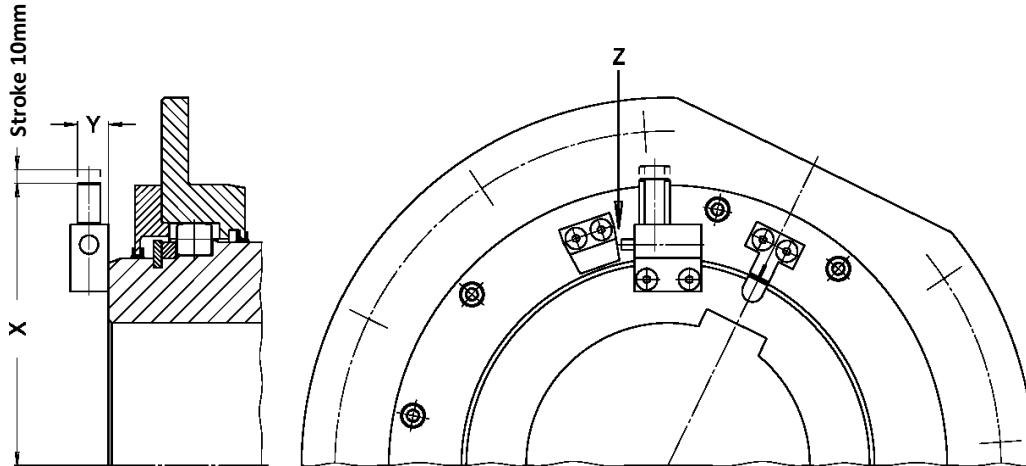


Table 8

Dimensions / size	Drum-Coupling TTXs							
	6	10	15	21	26	34	42	62
X [mm]	211	231	264	274	279	292	322	354
Y [mm]	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5

ATTENTION! - The switching distance of the sensor has to be taken into consideration.

A function check must be carried out at least once a year, proceeding as follows:



- Before any work on the coupling switch the drive off.
- Ensure that the drive cannot be unintentionally switched on.
- Before commissioning, all protective devices to prevent accidental contact with freely moving or rotary parts must be fitted.

Press pin (3) at point "Z". This activates the release piston (2).

Start the system without load and check the function of the sensor and the corresponding indicator.



- Before any work on the coupling switch the drive off.
- Ensure that the drive cannot be unintentionally switched on.
- Before commissioning, all protective devices to prevent accidental contact with freely moving or rotary parts must be fitted.

Press in the release piston (2) again by hand and put the system into operation again.

**Only original spare parts from
M.A.T. MALMEDIE ANTRIEBSTECHNIK GMBH
to be used**