CORE CHUCK MANUAL – HS – PMS Ges.m.b.H

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1.0.Introduction:

The purpose of this manual is to help insure the long - lasting, high performance operation of HS - PMS Ges.m.b.H. core chucks manufactured after 01.01.1997.

This manual is valuable to technicians, maintenance and production supervisors and part managers. The information includes descriptions of spare parts, materials and instructions for the core chuck operation, preventive maintenance, troubleshooting and executing repairs.

The HS - PMS Ges.m.b.H. core chuck is a torque activated device that grips proportionally to applied torque (brake or drive).

Because the mechanism functions automatically, operation requires minimal instruction. The chuck is purely mechanical, therefore inspection, maintenance and repair are consistent with conventional principles such as corrosion avoidance and wear recognition.

2.0.Materials, Spare Parts:

2.1.Steel Qualities

The flange - / cam - unit and the expansion elements are manufactured from quenched and tampered steel qualities. The surface of the cam is harder than the surface of the expansion elements (working part).

The expansion cage is made from engineering steel.

The used steel qualities are variable and correspond to the actual load and operation conditions. For more information call Tel. ++43 / 676 / 3007727.

2.2. Spare Parts



Storage at customers side

1	Flange - / Cam - unit	Х
2	Bearing 1	XX
3	Pin	XX
4	Expansion Element	XX
5	Screw for fixing the Bottom Plate	XX
6	Bottom Plate	XX
7	Expansion Cage	Х
8	Bearing 2	XX
9	Ring	XX
10	End Cap	х
11	End Cap Screw	х
	-	

^{*)} x -suggested, xx - required (working part)

In case of spare part order, please note the HS - PMS Ges.m.b.H. - order number which is signed on every HS - PMS Ges.m.b.H. - core chuck (order number / year of manufacture).

Non - standard parts should be stocked by the customer, as they are rarely stocked by HS - PMS Ges.m.b.H..

Spare chucks will minimise down - time in all cases of chuck repair. Further, spare chucks will greatly facilitate chuck inspection and preventive maintenance and reduce the need of spare parts.

2.3. Bearings

The used bearings organise a perfect action between the 2 core chuck parts (flange - cam - unit / expansion unit) and realise a quick tighten of the core.

Standard are ballbearings. In some cases it is necessary to use special bearings or sleeve bearings.

2.4. Screws

Socket head cap screws 8.8 (DIN EN ISO 4762) are typically used to mount core chucks. To protect against loosening due to vibration, it is essential to tighten screws adequately according to the screw manufacturers' recommendations (see table of seating torque's in chapter 7.0) and the use of high strength thread adhesive like " Loctite no. 277 " or equivalent.

2.5. Lubricants

For standard operations lubricants are not required.

If you have to give the core chuck more action, you can use a dry silicon spray lubricant. Do not lubricate with oil or grease because this lubricants keep dust and paper particles and can entail operation problems.

For some special applications the use of open ball bearings is needed. In this case a regular (4 - 6 weeks) inspection including dismantle, cleaning, optical check, grease and assemble is required. Please follow the bearing manufacturers recommendations.

3.0.Core Chuck Installation:

3.1. Flange

The standard application to mount a core chuck is the flange connection.

HS - PMS Ges.m.b.H. flanges are manufactured for customers requests, adapter plates are not required.

On the back of the flange - / cam - unit a pilot (positive or negative) is located. The pilot controls the concentricity of the chuck, yet it permit easy installation. Therefore a diametrical clearance of approximately - 0,1 mm is recommended.

Socket head cap screws are typically used to mount the core chucks (refer chapter 2.4).

3.2. Expansion Cage



One big advantage of the HS - PMS Ges.m.b.H. core chucks is the quick change of the expansion unit. This operation is needed if the customers use different core dimensions (inner diameter). This possibility reduce down time at core change.

To change the expansion unit you have to remove the end cap screw and pull the unit by hand. The expansion elements are fixed with little pins in the cage and can not go out of the cage during unit changing.

After pushing the new expansion unit on the cam, do not forget to tighten the end cap screw (refer chapter 2.4 and 7.0).

3.3. Expansion Elements



The expansion elements are manufactured as working parts. The expansion elements have to be replaced in case of damage (retention tabs) or high wear (refer chapter 4.1).

To replace the elements at first you have to remove the bearing (part no. 2). Please do not destroy the bearing and use a bearing remover.

Next step is to push the pin (part no. 3) into the expansion element. Than you can move the expansion element in the centre of the expansion cage and remove the element through the hole of the bearing.

To mount the new expansion elements go the same steps backwards. Please realise that the bevel end of the expansion elements is looking in end cap direction.

3.3.1.Divided Expansion Elements:



For some special applications it is necessary to use divided expansion elements. In case of element removal because of wear it is only required to change the bottom plate.

For expansion element removal you have to dismantle the element. At first you remove the screw on the bearing no. 2 site. Than you have to push the pin (part no. 3) into the element. Now you remove the second screw from the expansion element and it divided into 2 parts.

The bottom plate you have to remove through the bearing hole, the other part you have to remove to the outside.

To assemble the expansion elements go the same steps backwards.

3.4. Special Solutions

For some special applications it is not possible to use mounting flanges (refer chapter 3.1.). In this case HS - PMS Ges.m.b.H. can manufacture special solutions to make the HS - PMS Ges.m.b.H. - core chucks usable.

For more information call Tel. ++43 / 676 / 3007727.

4.0.Core Chuck Operation:

4.1. Application Limitations

Refer to the HS - PMS Ges.m.b.H. - core chucks see performance specification chart in chapter 7.0. Rolls in excess of chuck capacity can cause failure of the structure and / or mechanism of the chuck.

The HS - PMS Ges.m.b.H. core chuck reacts to applied torque and therefore is not applicable without a centre brake or drive.

Examples include the nonbrake side of a single brake unwind or a surface driven rewind. However, if centre torque is used in conjunction with a surface assist, the HS - PMS Ges.m.b.H. core chuck is applicable.

Idlers or torque independent chucks can be provided as required. For more information call Tel. ++43 / 676 / 3007727.

Torque magnitudes, in case of chuck capacity, can cause failure of the structure and / or mechanism of the chuck. This is particularly important when using single - brake roll stands and / or when executing extreme emergency stops. In some cases the core cannot transmit the rated torque of the chuck. If this problem cannot be solved directly with improved fibre (paper) or metal cores, special chucks may be required.

The HS - PMS Ges.m.b.H. - core chuck is designed for use fibre (paper), steel, plastic and aluminium cores. Fibre cores must be strong and without excessive damage (crush resistance min. 12 kN / m). All cores must have inside diameters which are within reasonable tolerances (1 / 10 mm range, DIN ISO 13542). The HS - PMS Ges.m.b.H. - core chuck is not recommended for use with coreless rolls.

Sidearm force is not required for core chuck operation. Excessive sidearm force creates unnecessary, potentially damaging loads on both the chuck and roll stand components. Indications of excessive sidearm force include core crushing, thrust washer wear and difficulties in chuck - core separation. Modest amounts of sidearm force, required by some applications, will not harm the chuck performance.

The axial resistance of the used fibre cores is min. 0,8 kN / cm².

Some plastic cores might be too slippery to enable the reliable use of the standard core chuck, modifications to standard design can be executed if required.

All shaftless core chucks require alignment to avoid elevated mechanical stress.

4.2. Operation

Expansion of the HS - PMS Ges.m.b.H. core chuck occurs as a result of counter rotation of the expansion cage relative to the flange - cam unit. The expansion elements slide on the cam surface and are forced outward. Bearings on both ends of the expansion cage ensure smooth operation.

The expansion force is proportional to the applied load / torque.

Entering the core, the bevel end of the expansion elements enable a rotation of the expansion cage in 0 - position (no expansion). The expansion elements grip the core automatically with the initiation of applied torque, either from a brake or a motor, for either roll unwinding or rewinding.

Sidearm force is not required for core chuck operation. Excessive sidearm force creates unnecessary, potentially damaging loads on both the chuck and roll stand components.

To remove the chuck from the core, it is sometimes necessary to release the chucks grip by rotating the core backwards (about 10 $^{\circ}$). For unwind applications this might require the activation of the brake (s).

Note : The HS - PMS Ges.m.b.H. core chuck works in both directions. A to big return angle grips the core again.

<u>Picture: Expansion Description</u>



Expansion Element

Note For Roll / Core Change:

- 1 activate brake
- 2 roll / core turn backwards 10° by hand
- 3 release brake
- 4 move sidearm
- 5 remove roll / core

5.0.Inspection / Maintenance:

5.1. Routine Inspection

Routine inspection can usually be accomplished without disassembly or removal of the chuck from the roll stand. Routine inspection is to be done all 1 - 2 weeks.

The purpose of routine inspection is to ensure that the expansion mechanism works freely. The expansion elements need to be grasped to simulate inward force from the core and the expansion cage is then rotated throughout its range. If this is accomplished smoothly and with ease, the chuck functioning correctly.

If tightness or roughness is felt, maintenance is required.

If you find out, that the core chuck is mechanically damaged, repair is required (refer chapter 2.2).

5.2.Internal Inspection

Usually internal inspection is required 2 - 3 month regularly. Internal inspection is valuable for preventive maintenance as well as for the correction of existing problems.

Internal inspection can be accomplished without removing the chuck from the roll - stand. However, to minimise downtime and to facilitate maintenance, it is recommended that the chuck be removed from the roll - stand and replaced with a spare. This permits the placement of the chuck upright on a bench for servicing.

In all kinds of internal inspection you have to dismantle the core chuck completely (see chapter 5.4.). Clean all parts (wire brush or similar means and solvent) and inspect the general condition of the parts for rust, paper dust and other contamination. Check also the expansion elements and the polygon for pitting and other signs of damage. The expansion elements are working parts and have to be replaced if the thickness is reduced for more than 2 mm.

Note: Damaged parts has to be replaced or repaired professionally (use repair service of HS - PMS Ges.m.b.H.).

If the chucks are several years old / or severely loaded, replacement of some parts may be normal and these parts should be stocked accordingly (refer chapter 2.2.). After internal inspection all parts must be carefully reassembled as described in chapter 5.4.

If the core chucks are severely loaded, internal inspection is required 2 - 3 weeks regularly.

Note: Refer to the HS - PMS Ges.m.b.H. - core chuck assembly drawing (refer chapter 5.4.) for general reference and part nomenclature. For specific part numbers, depending on the size and style of the chuck, consult HS - PMS Ges.m.b.H.

5.3. Maintenance

HS - PMS Ges.m.b.H. - core chucks have to be maintained regularly. Usually it only requires inspection and cleaning.

Intensive maintenance is required in all kinds of not perfect operation of the chore chuck. In this case, the main problem is rust and / or other contamination and require a internal inspection.

If the problem is only dry paper dust inside of the chuck, you have to remove the expansion cage (refer chapter 3.2.) to clean all parts (in - / outside) with compressed air.

The HS - PMS Ges.m.b.H. - core chuck mechanism can function without any lubrication or coating. This helps prevent paper dust contamination. However, if corrosion is a known problem, it is important to coat the internal parts of the chuck. Dry silicon spray is suitable and will not attract dust. Oils may be also used and can be reapplied without disassembly.

However, oil may attract paper dust which may lead to a requirement for cleaning. All this three alternatives have been successful in various applications. Routine inspection can evaluate this requirement.

In general, HS - PMS Ges.m.b.H. recommends either no lubrication or dry silicon lubrication unless a corrosion problem is know n.

Exceptions are possible at high loaded applications.

5.4.Disassembly / Assembly



To dismantle the HS - PMS Ges.m.b.H. - core chuck you have to remove the end cap screw (part no. 11). Than you can take off the whole expansion unit from the flange - cam - unit.

To dismantle the bearing (part no. 8) it is necessary to remove the end cap (part no. 10) and the ring (part no. 9). Remove the bearing in any case with a bearing remover to avoid destruction.

Bearing (part no. 2) has to be removed with a bearing remover in the same way as part no. 8.

The dismantle of the expansion elements is specified in chapter 3.3.

To reassemble the core chuck go the same steps backwards.

Note : Do not destroy the bearings during dismantle and reassemble.

6.0. Trouble Shooting

In case of any core chuck operation problem check all important points in chapter 4.1 + 4.2.

Is professional help needed to solve the operation problem, please consult HS - PMS Ges.m.b.H..

Chart 1.

Core Size	Polygon	Expansion	max. Roll weight /	max.Torque /
mm		mm	Rollstand - kg	2 Chucks - Nm
			(2 core chucks)	
70	50	68,5 - 78,5	4000	1150
76,2 (3")	50	74,5 - 84,5	4000	1150
76,2 (3")	55	74,5 - 84,5	6500	1150
100	50	99 - 109	4000	2500
100	55	99 - 109	6500	2500
100	70	99 - 109	8000	2500
120	50	119 - 129	4000	2500
120	55	119 - 129	6500	2500
120	70	119 - 129	8000	2500
127(5")	50	125,5 - 135,5	4000	2500
127 (5 ")	55	125,5 - 135,5	6500	2500
127 (5 ")	70	125,5 - 135,5	8000	2500
150	50	148 - 158	4000	5000
150	55	148 - 158	6500	5000
150	70	148 - 158	8000	5000
150	90	148 - 158	12000	5000
152,4(6")	50	151,9 - 161,9	4000	5000
152,4(6")	55	151,9 - 161,9	6500	5000
152,4 (6 ")	70	151,9 - 161,9	8000	5000
152,4 (6 ")	90	151,9 - 161,9	12000	5000
200	50	199 - 209	4000	7500
200	55	199 - 209	6500	7500
200	70	199 - 209	8000	7500
200	90	199 - 209	12000	7500
203,2(8")	50	201,5 - 211,5	4000	7500
203,2 (8")	55	201,5 - 211,5	6500	7500
203,2 (8")	70	201,5 - 211,5	8000	7500
203,2 (8")	90	201,5 - 211,5	12000	7500
300	50	299 - 309	4000	10000
300	55	299 - 309	6500	10000
300	70	299 - 309	8000	10000
300	90	299 - 309	12000	10000
304,8(12 ")	50	303,3 - 313,3	4000	10000
304,8 (12 ")	55	303,3 - 313,3	6500	10000
304,8 (12 ")	70	303,3 - 313,3	8000	10000
304,8 (12 ")	90	303,3 - 313,3	12000	10000

Torque Chart for Screws Chart 2.

Size		Torque - Nm
M 6		16
M 8		39
M 10		77
M 12		135
M 16		330
M 20		650
M 24		1100

8.0.Warranty:

HS - PMS Ges.m.b.H. warrants that products manufactured by it will be free from defects in material and workmanship for a period of one (1) year from date of shipment.

This warranty shall not apply to any goods which have been subjected to misuse, improper installation, repair, alteration, neglect, accident, abnormal conditions of operation or use or maintenance in any manner contrary to HS - PMS Ges.m.b.H. instructions, nor to products not manufactured by HS - PMS Ges.m.b.H.

There are no express warranties other than as expressed herein and no words or conduct of any representative of HS - PMS Ges.m.b.H. shall be deemed to create any except by express written consent.

HS - PMS Ges.m.b.H. obligation under the express warranty are limited to repair or replacement of the affected part or parts, at HS – PMS Ges.m.b.H. opinion to refund the purchase price. In no event shall HS - PMS Ges.m.b.H. be liable for buyers manufacturing costs, lost profits, goodwill or any other special, incidental or consequential damages arising out of the breach of the agreement.

No material may be returned to HS - PMS Ges.m.b.H. without HS - PMS Ges.m.b.H. express prior permission in the form of a return authorisation.

9.0.Returns:

Warranty and non - warranty returns are initiated through the issuance of a return authorisation from HS - PMS Ges.m.b.H.. If questions arise or if additional information is required call HS - PMS Ges.m.b.H..

Product returns should be sent to:

HS - PMS Ges.m.b.H. Grossmarktstrasse 7

A - 1232 Wien

<u>HS – PMS Ges.m.b.H.</u>

Spannkopf-Fragebogen / Core Chuck Questionnaire

Anschrift der Firma / Name of the customer:
Telefon- und Faxnummer / telephon- and fax no.:
Sachbearbeiter / official in charge of:
Hülseninnendurchmesser (mm) / core inner diameter (mm):
Hülsentoleranz (+/- mm) / core tolerance (+/- mm):
Hülsenmaterial / core material: () Papphülsen / board cores () Stahlhülsen / steel cores
() Plastikhülsen / plastic cores () neue Hülsen / new
Rollengewicht max. (kg) roll weight max. (kg):
Rollendurchmesser max. (mm) / roll diameter max. (mm):
Rollenbreite max. (mm) / roll width max. (mm):
Bahnzug (N/m) / web tension (N/m):
Material / material:
Flächengewicht, Dicke / paper weight, thickness:

Blatt 2 -Maßblatt Spanndorn-Fragebogen -

