HSD

7.1 SCHEDULED MAINTENANCE

The punctual respect of the scheduled maintenance is essential in order to maintain the conditions of use and working planned by HSD S.p.A. when the product was put onto the market.

The frequency has been calculated on the basis of a working week of 5 days, each of 8 working hours, under normal ambient working conditions.

7.1.1 Checking the cleaning of the tool-holder cone and the conical housing in the spindle shaft

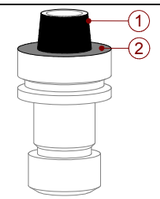
Frequency: DAILY

Before using the electrospindle, ensure that the conical surfaces of the tool-holders (highlighted in black in Figure7 1. and Figure7 2.) and the conical surface of the tool-holder housing in the spindle shaft (highlighted in black in Figure7 3. and Figure7 4.) are thoroughly clean, with no traces of dust, grease, cooling liquid, oil or metallic particles, nor traces of oxide or scale;

ONLY FOR THE HSK MODEL: make the same check also on the stop surfaces of both the tool-holder and the spindle (surfaces highlighted in grey and indicated by no.2 in Figure7 2.) and Figure7 4.).

ISO

Figure7 1. Conical surface of the ISO tool-holder (highlighted in black)



HSK

Figure7 2. HSK tool-holder:
(1) Conical surface (highlighted in black)
(2) Stop surface (highlighted in grey)

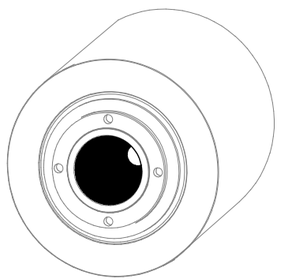


Figure7 3. Conical surface of the ISO spindle shaft (highlighted in black)

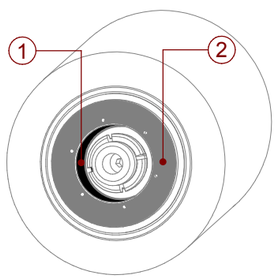


Figure7 4. HSK tool-holder housing
(1) Conical surface (in black)
(2) Stop surface (in grey)

Daily cleaning is recommended, at the end of the working day, using a clean, soft cloth.

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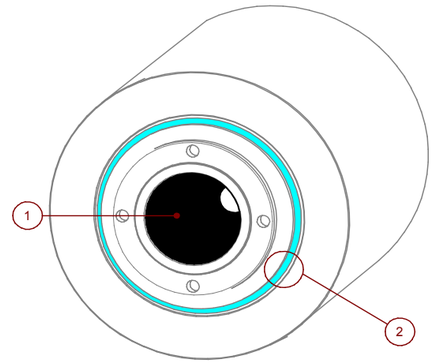
DO NOT DIRECT JETS OF COMPRESSED AIR INTO THE SPINDLE SHAFT WHEN THE TOOL-HOLDER CONE IS ABSENT (figure below).

Never point jets into the pressurised seal labyrinth area, as the infiltrations damage the inside of the electrospindle.

Do not point jets inside the electrospindle when the tool-holder is not attached, as the coupling surface with the tool-holder may get dirty or machining operation waste may enter the electrospindle.

1	Coupling surface.
2	Labyrinth seal.



IMPERFECT CLEANING PREVENTS THE CORRECT POSITIONING OF THE TOOL-HOLDER, WITH SERIOUS CONSEQUENCES FOR THE SAFETY OF THE OPERATOR, THE WEAR AND TEAR OF THE ELECTROSPINDLE AND TOOL-HOLDER, THE PRECISION AND EFFICIENCY OF THE MACHINING OPERATION.

TO CLEAN THE SURFACES HIGHLIGHTED FROM Figure7 1. **TO** Figure7 4., **USE CLEAN, SOFT CLOTHS;**
NEVER USE **ABRASIVE INSTRUMENTS SUCH AS WIRE WOOL, METAL SCRAPERS, EMERY CLOTH, ACIDS OR OTHER AGGRESSIVE MEDIA.**

7.1.2 Purging the filters of the pneumatic circuit

Frequency: DAILY

At the end of the work shift, discharge the compressed air circuit to allow the automatic purging of the filters that protect the HSD product (see section 4.4)

HSD

7.1.3 Protecting the conical seat in the spindle shaft

Frequency: DAILY

THE SEAT OF THE TOOL-HOLDER CONE IN THE SPINDLE SHAFT MUST ALWAYS BE PROTECTED FROM IMPURITIES: USE A CLOSING DEVICE OR A TOOL-HOLDER CONE.

AT THE END OF THE MACHINING OPERATIONS, ALWAYS REMOVE THE TOOL-HOLDER CONE FROM THE ELECTROSPINDLE, TO AVOID ANY PROBLEM OF IT STICKING. REPLACE IT WITH A CLEAN TOOL-HOLDER CONE AT ROOM TEMPERATURE, TO PROTECT THE INSIDE OF THE ELECTROSPINDLE FROM THE OUTSIDE ENVIRONMENT.

7.1.4 Cleaning the tool-holder cone

Frequency: EVERY TWO WEEKS

Carefully clean the conical surfaces of the tool-holders (highlighted in black in Figure7 1.and Figure7 2.) with a clean soft cloth impregnated with ethyl alcohol.

ONLY FOR HSK MODELS: after cleaning with ethyl alcohol, spray the conical surface with **KLÜBER LUSIN PROTECT G 31**, and distribute the product uniformly using a clean, dry cloth. Allow the product to dry before using the tool-holder again.

7.1.5 Lubricating the HSK collet

Frequency: MONTHLY

In order to maintain the proper efficiency of the HSK collet over a long period of time, it must be lubricated every month with grease:

METAFLUX-Fett-Paste no.70-8508

or, alternatively

METAFLUX-Moly-Spray no.70.82

depositing the grease between the segments and the expeller of the HSK collet (see Figure 7.5).

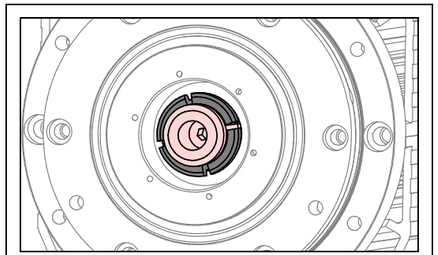


Figure 7.5 Segments (grey) and expeller (pink) of the HSK hook-up system

EXCESSES OF GREASE ARE HARMFUL.

After applying the above-mentioned grease as described, make some tool changes in order to distribute it evenly.

Finally, remove the tool holder from the spindle shaft and, with a clean cloth, remove any visible lumps of grease as they could hold wood chips or other machining operation residues, dirtying the collet, the conical surfaces and the stop surfaces. These areas must be kept as clean as possible in order to guarantee the safety of the operator, the precision of the machining operation, and to reduce wear on the spindle and tool-holder cone.

USE ONLY THE GREASES INDICATED ABOVE.

OTHER PRODUCTS ARE INCOMPATIBLE WITH THAT USED BY HSD FOR THE FIRST GREASING.

GREASES THAT ARE INCOMPATIBLE, MIXED OR USED SUCCESSIVELY ON THE SAME COLLET FORM SUBSTANCES HARMFUL TO THE FUNCTIONING OF THE COLLET ITSELF, WITH SERIOUS CONSEQUENCES FOR SAFETY.

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7.1.6 Check of functionality collet HSK

Frequency : 6 MONTHS or 200000 tool changes

- Control the expulsion limit (see limit " B1" in table 8.1, pag 168)
- Through a blocked tool tighten the dowel in the expeller
- Check the tightening strength (using Power Check). If the tightening force is inferior of 70 % of the nominal value, it is necessary to effect the following operations:
  - grease again , and check again the tightening force
  - change the collet and check again
  - change completey the thightening device

7.1.7 Checking the connections

Frequency: MONTHLY

Check the integrity of the electrical cables of both power and signals, and also that the connectors are firmly fixed. Check the seal of the tubes and connectors of the cooling and compressed air circuits.

7.1.8 Replacing the filters of the pneumatic circuit

Frequency: ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS

Carry out regular maintenance and replacement of the filters of the pneumatic circuit for the HSD product, following the manufacturer's indications (see section 4.4)

7.1.9 Bearings

Frequency: NEVER

THE BEARINGS HAVE BEEN LUBRICATED FOR LIFE AND DO NOT REQUIRE RECURRENT ADDITIONS OF GREASE.