



Champion Mill 16VS Instruction Manual

Chester UK Ltd
Clwyd Close
Hawarden Industrial Park
Hawarden
Chester CH5 3PZ

Tel: 01244 531631
sales@chestermachinetools.com
www.chestermachinetools.com



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1. Safety

Purpose of this Machine:

This machine has been designed for drilling, deep milling and face milling of small workpieces. If the operator intends to use this machine beyond its design, please contact the manufacturer or dealer before starting the operation.

The Following Should be Obeyed before Operating

Do not operate this machine before reading this manual thoroughly.

Do not use this machine without professional training of drilling and milling operations.

Do not operate this machine outside of its design parameters without first consulting the manufacturer or dealer.

When operating this machine, make sure that every safety precaution is followed as indicated in this manual.

1.1 Safety warnings

Special Warnings for this Machine

Warning! There is a risk of the machine accidentally restarting after a power failure, make sure that all of the operation switches are in the off or neutral positions if the power is interrupted.

Warning! Always wear approved eye protection when operating this machine.

Correct Handling of this Machine

The net weight of this machine is approximately 75kg, we recommend using the correct lifting equipment when moving this machine.

If the operator has to handle the machine without lifting apparatus, make sure that you can comfortably lift this weight. Handle the machine with care and be aware of your surroundings to prevent accidents.

1.2 Proper use

In the event of improper use the machine will

- endanger personnel,
- endanger the machine and other material property of the operator,
- may affect proper operation of the machine

This milling machine is designed and manufactured to be used for milling and drilling cold metals or other non-flammable materials that do not constitute a health hazard by using commercial milling and drilling tools.

This machine must only be installed and operated in a dry and well-ventilated place.

If the milling machine is used in any way other than described above, modified without authorization or operated with different process data, then it is being used improperly.

We do not take any liability for damages caused by improper use. Any such modifications would also render the guarantee null and void.

It is also part of proper use that:

- the maximum values for the machine are complied with
- the operating manual is observed
- inspection and maintenance instructions are observed

1.3 Possible dangers caused by the milling machine

As the machine operates with

- high revolutions
- rotating parts and tools
- electrical voltage and currents

There is a residual risk with use. We have used construction resources and safety techniques to minimize the risk to health to personnel resulting from these hazards.

If the machine is used and maintained by personnel who are not duly qualified, there may be a risk resulting from incorrect or unsuitable maintenance.

All personnel involved in assembly, commissioning, operation and maintenance must

- be duly qualified,
- follow this operating manual

Disconnect the machine whenever cleaning or maintenance work is being carried out.

Warning!

This machine may only be used with the safety devices activated.

Disconnect the machine immediately whenever you detect a failure in the safety devices or when they are not fitted.

All additional installations carried out by the operator must incorporate the prescribed safety devices.

1.4 Qualification of personnel

This manual is addressed to

- operators,
- users,
- maintenance staff

The warning notes therefore refer to both operation and maintenance of the milling machine.

Always disconnect the machine plug from the electrical power supply. This will prevent it from being used by unauthorized personnel.

All personnel involved in assembly, commissioning, operation and maintenance must

- be duly qualified,
- follow this operating manual

In the event of improper use

- there may be a risk to personnel,
- there may be a risk to the machine and other material property,
- the proper operation of the machine may be affected

1.5 Safety devices

Use the milling machine only with properly functioning safety devices.

Stop the machine if there is a failure in the safety device or if it is not functioning for any reason.

If a device has not been activated or has failed, the milling machine must only be used when

- the cause of failure has been removed
- it has been verified that there is no resulting danger for personnel or objects

Warning!

If you bypass, remove or override a safety device in any way, you are endangering yourself any other personnel working with the milling machine. The possible consequences are

- damage as a result of components or parts of components flying off at high speed.
- contact with rotating parts,
- fatal electrocution

The milling machine includes the following safety devices:

- a self-locking emergency stop button
- a protective cover at the drill-mill head

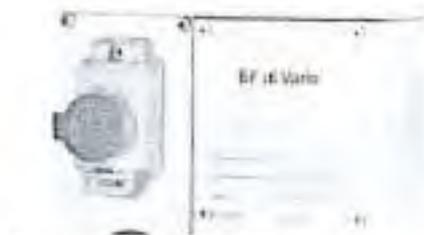


Fig 1-1 EMERGENCY STOP button

Emergency stop button

The emergency stop button switches the machine off.

Open the cover of the emergency stop button in order to switch the machine on again.

Protective cover

The drill-mill head is fitted with a protective cover.

Warning!

Remove the protective cover after the mains plug of the machine has been pulled.



Fig 1-2 Protective cover

1.6 Safety check

Check the milling machine regularly

- at the beginning of each shift,
- once a week,
- after every maintenance and repair operation

General Check

Equipment	Check	OK
Protective covers	Mounted, firmly bolted and not damaged	
Labels, markings	Installed and legible	

Functional Test

Equipment	Check	OK
Emergency Stop	When the Emergency Stop button is activated, the machine should switch off automatically. A restart will not be possible until the Emergency Stop button has been unlocked and the On switch has been activated.	

1.7 Individual protection gear

For certain work individual protection gear is required.

Protect your face and eyes. During all work and specifically work during which your face and eyes are exposed to hazards, a safety helmet with facial protection should be worn.

Use protective gloves when handling pieces with sharp edges.

Wear safety shoes when you position, dismantle or transport heavy components.

Use ear protection if the noise level (inmission) in the workplace exceeds 80 dB (A).

Before starting work, make sure that the prescribed individual protection gear is available at the workplace.

Caution!

Dirty or contaminated individual protection gear can cause disease. Clean it after each use and once a week.

1.8 For your own safety during operation

Warning!

Before activating the machine, double check that it will not endanger other people or cause damage to equipment.

Avoid unsafe working practices:

- The instructions in this manual must be observed during assembly, handling, maintenance and repair.
- Use protective goggles
- Turn off the machine before measuring the workpiece.
- Do not work on the machine if your concentration is reduced, for example, because you are taking medication.
- Stay on the machine until all rotating parts have come to a halt.
- Use the prescribed protection gear. Make sure to wear a well-fitting work suit and a hairnet, if necessary.
- Do not use protective gloves during drilling or milling work.
- Unplug the shockproof plug from the mains before changing the tool.

- Use suitable devices to remove drilling and milling chips.
- Make sure your work does not endanger anyone.
- Clamp the workpiece tightly before activating the machine.

In the description of work on the drilling-milling machine we highlight the dangers specific to that work.

1.9 Disconnecting the machine and making it safe

Pull the main plug before beginning any maintenance or repair work.

Using lifting equipment

Warning!

Use of unstable lifting equipment and load-suspension devices that break under load can cause very serious injuries or even death.

Check that the lifting equipment and load-suspension devices are of sufficient load capacity and in perfect condition.

Observe the rules for preventing accidents issued by your association for the prevention of occupational accidents and safety in the workplace or other inspection authorities.

Tighten loads properly.

Never walk under suspended loads!

2. Technical Data

The following information gives the dimensions and weight and is the manufacturer's authorized machine data.

Engine power consumption	240V / 50Hz / 600W
Drilling capacity	16mm
End Milling capacity	16mm
Face Milling capacity	52mm
Working radius	175mm
Spindle taper	MT2
Spindle stroke	52mm
Headstock tilt	±90°
Cross travel	160mm
Longitudinal travel	440mm
Vertical travel	200mm
Table size	500 x 140mm
Spindle speeds	50-2500rpm
T slot size	10mm
Motor	600W (0.8hp)
Dimensions	520 x 550 x 800mm
Net Weight	75kg

Emissions

The noise level (emission) of the drilling-milling machine ranges below 78 dB(A). If the drilling-milling machine is installed in an area where various machines are in operation, the acoustic influence (inmission) on the user of the drilling-milling machine may exceed 85 dB(A) in the working area.

We recommend the use of soundproofing and ear protection. Remember that the duration of the noise pollution, the type and characteristics of the work area and operation of other machines influence the noise level in the working area.

3. Assembly and Connection

The drilling-milling machine comes pre-assembled.

3.1 Extent of supply

When the drilling-milling machine is delivered, check immediately that the machine has not been damaged during transport and that all components are included. Also check that no fastening screws have come loose.

Compare the parts supplied with the information on the packaging list.

3.2 Transport

Warning!

Machine parts falling off forklift trucks or other transport vehicles could cause very serious or even fatal injuries. Follow the instructions and information on the transport case:

- Centers of gravity,
- Suspension points,
- Weights,
- Means of transport to be used,
- Prescribed shipping position.

Use of unstable lifting equipment and load-suspension devices that break under load can cause very serious injury or even death.

Check that the lifting and load-suspension gear has sufficient load capacity and that it is in perfect condition.

Observe the rules for preventing accidents.

Holds the load properly.

Never walk under suspended loads.

3.3 Storage

Improper storage may cause important parts to be damaged or destroyed.

Store packed or unpacked parts only under the intended environmental conditions.

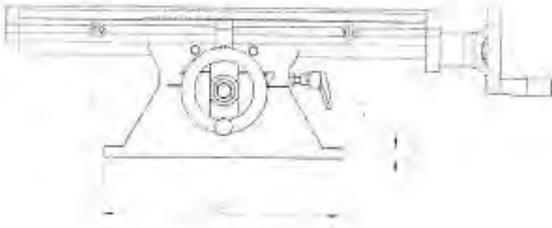
Consult Chester UK if the machine or accessories have to be stored for a period of over three months or under different environmental conditions than those given here.

3.4 Installation and assembly

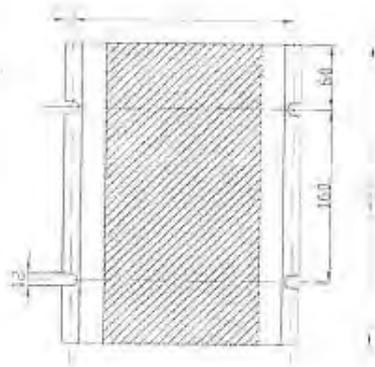
The work area for operation, maintenance and repair work must not be hindered. The mains plug of the drilling-milling machine must be freely accessible.

Proceed with extreme caution when lifting, installing and assembling the machine. Danger of crushing and overturning.

- Secure the load-suspension device around the drill-mill head. Use a lifting sling for this purpose.
- Clamp all the clamping levers at the machine before lifting it.



- Make sure that no add-on pieces or varnished parts are damaged due to the load-suspension.
- Check the horizontal orientation of the base of the machine with a spirit level.
- Check that the foundation has sufficient floor-load capacity and rigidity.



Insufficient rigidity of the foundation leads to the superposition of vibrations between the drilling-milling machine and the foundation (natural frequency of components). Insufficient rigidity of the entire milling machine assembly also rapidly causes the machine to reach critical speeds, with unpleasant vibrations, leading to bad milling results.

- Position the drilling-milling machine on the intended foundation.
- Attach the drilling-milling machine using the provided recesses in the machine base.

3.5 First use

Cleaning and lubricating.

Remove the anticorrosive agent applied on the drilling-milling machine for transport and storage purposes. We recommend the use of kerosene.

Do not use any solvents, thinners or other cleaning agents which could corrode the varnish on the drilling-milling machine. Follow the specifications of the manufacturer of the cleaning agent.

Cleaning the machine.

Lubricate all bright machine parts with non-corrosive lubricating oil.

Grease the machine according to the lubrication chart.

Check smooth running of all spindles.

Connect the electrical power cable (shockproof plug).

4. Operation

4.1 Safety

Use the drilling-milling machine only under the following conditions.

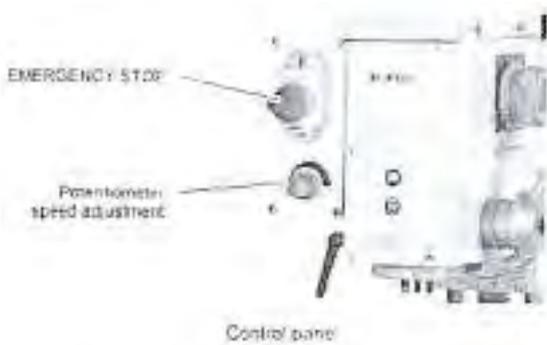
- The machine is in proper working order
- The machine is used as prescribed
- The operating manual is followed
- All safety devices are installed and activated

All anomalies should be eliminated immediately. Stop the drilling-milling machine immediately in the event of any anomaly in operation and make sure it cannot be started up accidentally or without authorization.

4.2 Controlling and indicating elements



4.3 Starting the milling machine



By pressing the green button, the machine is switched on.

By pressing the red button, the machine is switched off.

The electrical system controls the speed with a ramp to the set value. Wait a little while before you continue with the feed when milling or drilling.

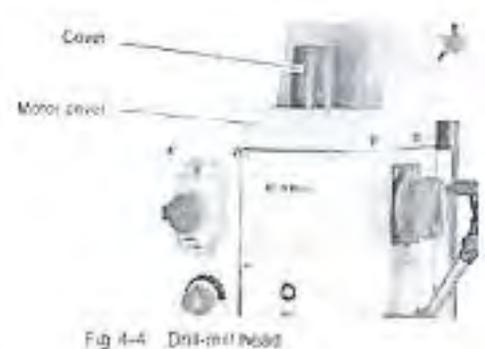
4.4 Inserting tools

The mill head is equipped with an MT2 seat and a M10 draw-in rod.

When milling operations are performed the cone seat must always be fixed to the draw-in rod. All cone connections with the taper bore of the work spindle without using the draw-in rod is not allowed for milling operations. The cone connector should be released by the lateral pressure. Injuries by parts flying off.

In the work spindle you may only use tool holding fixtures and clamping tools with morse taper MK2 and internal screw thread M10 for an interlocking fixture. Reducing bushes is not allowed.

- Remove the cover. There is no need to disassemble the motor cover completely.
- Clean the conical seat in the mill head.
- Clean the taper mandrel of your tool.
- Press the mandrel taper with some push into the seat. If the taper mandrel does not hold by itself, either the taper mandrel or the taper bore of the work spindle are not clean or free of grease.
- Use the draw-in tool supplied with the machine
 - Hexagon socket spanner for draw-in rod
 - Hexagon socket spanner for draw-in nut
- Screw the draw-in rod approx. 15 turns into the taper of your tool
- Tighten the draw-in nut
- Follow the same steps in reverse order to extract the tool from the machine.



Use of collet chucks

When using collet chucks for the reception of milling tools, a higher operation tolerance is possible. The exchange of the collet chucks for a smaller or larger end mill cutter is performed simply and rapidly and the disassembly of the complete tool is not required.

The work spindle is equipped with a surface for the hold-up with a fork wrench to unfasten the swivel nut of the collet chuck retainer. The collet chuck is pressed into the ring of the swivel nut and must hold there by itself. By fastening the swivel nut on the tool the milling cutter is clamped.

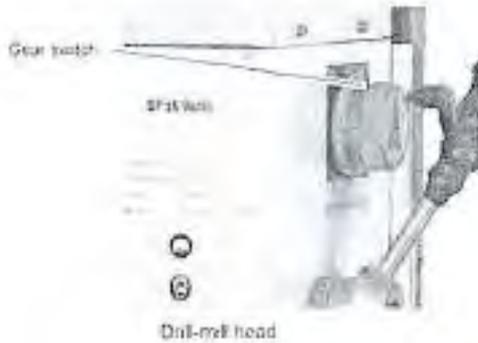
Make sure that the correct collet chuck is used for each milling cutter diameter, so that the milling cutter may be fastened securely and firmly.

Direct clamping into the work spindle

Tools or collet chucks with a MT2 shank may be clamped directly into the work spindle. For mounting these tools, proceed as described in 'inserting tool' on page 13.

Make sure that the tool is clamped with the draw-in rod.

4.5 Changing the speed range



Wait until the machine has come to a complete halt before changing the speed using the gear switch.

- Turn the gear switch in the position 'H' for a speed range of 200 – 3000 min
- Turn the gear switch into the position 'L' for a speed range of 100 – 1500 min
- Adjust the speed with the potentiometer

Selecting the speed

For milling operations, the essential factor is the selection of the correct speed. The speed determines the cutting speed of the cutting edges which cut the material. By selecting the correct cutting speed, the service life of the tool is increased and the working result is optimized.

The optimum cutting speed mainly depends on the material and on the material of the tool. With tools (milling cutters) made of hard metal or ceramic insert it is possible to work with higher speeds than with tools made of high-alloy high speed steel (HSS). You will achieve the correct cutting speed by selecting the correct speed.

For the correct cutting speed for your tool and for the material to be cut you may refer to the following standard values or a table reference book.

The required speed is calculated as follows:

$$n = \frac{V}{\pi \times d}$$

n = speed in min^{-1} (revolutions per minute)

V = cutting speed in m/min (meters per minute)

π = 3,14

d = tool diameter m (meters)

Standard values for cutting speeds

[m/min] with high speed steel and hard metal in conventional milling.

Tool	Steel	Grey cast iron	Age-hardened Al Alloy
Peripheral and side milling cutters	10-25mm	10-22mm	150-350mm
Relived form cutters	15-24mm	10-20mm	150-250mm
Inserted tooth cutter with SS	15-30mm	12-25mm	200-300mm
Inserted tooth cutter with HM	100-200mm	30-100mm	300-400mm

The results are in the following standard values for speeds in dependence of the milling cutter diameter, cutter type and material.

Tool diameter Peripheral and side milling cutters	Steel 10-25m/min	Grey cast iron 10-22m/min	Age hardened Al alloy 150-350m/min
35mm	91-227	91-200	1365-3185
40mm	80-199	80-175	1195-2790
45mm	71-177	71-156	1062-2470
50mm	64-159	64-140	955-2230
55mm	58-145	58-127	870-2027
60mm	53-133	53-117	795-1860
65mm	49-122	49-108	735-1715

Tool diameter Form cutters	Steel 15-24 m/min	Grey cast iron 10-20 m/min	Age hardened Al alloy 150-250 m/min
	Spindle Speed [min ⁻¹]	Spindle Speed [min ⁻¹]	Spindle Speed [min ⁻¹]
4	1194-1911	796-1592	11900-19000
5	955-1529	637-1274	9550-15900
6	796-1274	531-1062	7900-13200
8	597-955	398-796	5900-9900
10	478-764	318-637	4700-7900
12	398-637	265-531	3900-6600
14	341-546	227-455	3400-5600
16	299-478	199-398	2900-4900

Friction during the cutting process causes high temperatures at the cutting edge of the tool. The tool should be cooled during the milling process. Cooling the tool with a suitable cooling lubricant ensures better working results and a longer edge life of the cutting tool.

Use a water soluble and non-pollutant emulsion as a cooling agent. This can be acquired from authorized distributors.

Make sure that the cooling agent is properly retrieved. Respect the environment when disposing of any lubricants and cooling agents. Follow the manufacturer's disposal instructions.

4.6 Clamping workpieces

Caution!

Injury by flying off parts

The workpiece is always to be fixed by a machine vice, jaw chuck or by another appropriate clamping tool such as clamping claws.

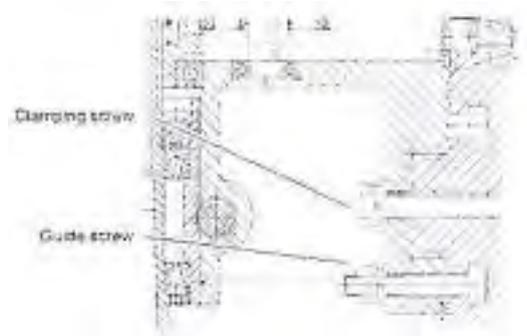
4.7 Swiveling the mill-drill head

The mill-drill head may be swiveled to the left.

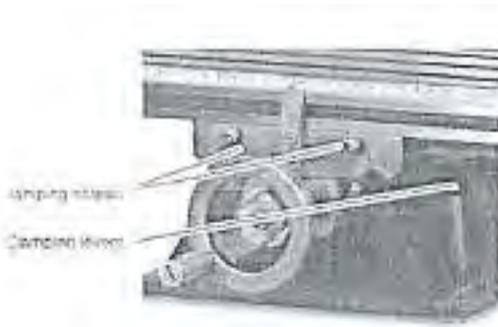
Caution!

The drill head may tilt to the right or the left on it's own after loosening a screw. Proceed with extreme caution when loosening the clamping joints.

- Loosen or unscrew the nut of the guide screw.
- Hold the drill-mill head. Loosen the clamping screw. Swivel the mill-drill head into the desired position.
- Retighten the guide and clamping screw.



4.8 Clamping levers



The machine is equipped with clamping levers and screws for the respective movement axes.

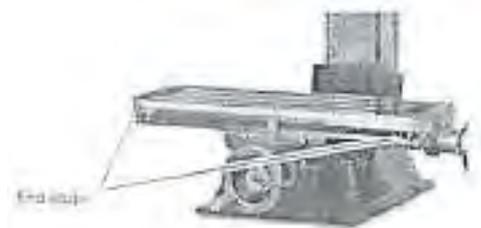
Use the clamping levers for locking the position of the axes during drilling or milling operations.

4.9 End stops

The cross table is fitted with two

adjustable end stops.

Use the end stops for limiting the travel in order to guarantee the exact repeatability when manufacturing various technical components.



4.10 Installation on a lathe

The mill head with column can be mounted on a lathe. For fastening an adapter is required. The adapter needs to be fixed to the engine bed. It is not possible to fix it to the lathe slide. The adapter is dimensioned in a way that the middle of the lathe chuck should be reached with the center of the milling spindle (alignment headstock – lathe chuck).

Due to the manufacturing tolerances of castings and the manufacturing tolerances of two different machines it is however not possible to reach the exact center, the adapter may be too long or short.

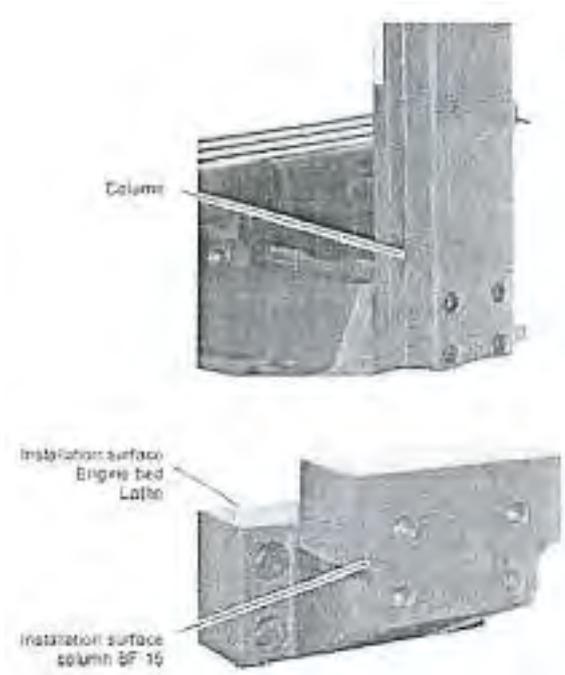
If required, the adapter is to be milled off or equipped with dummy sheets. When using sheets the complete surface is to be filled.

In order to reduce the support expenditure of the column with milling head during the orientation we recommend you disassemble the milling head off the column. Unscrew the locking screw (safety screw) position 266. Disassemble the milling head off the column by completely loosening the clamping screw and the lead screw and stripping off the milling head.

Control the orientation (90° angle horizontal and vertical) of the column with the reference planes on the engine bed of the lathe.

In order to prevent you from having to reorient the milling head when altering later on, we recommend you to provide the column and the adapter as well as the engine bed with alignment pins. If required, pin the column together with the cross table before disassembling the column.

It is recommended to use hardened straight pins according to DIN 6325 in 8mm or 10mm and a fitting tolerance zone m6. (zB. DIN 6325-8 m6 x 30). These alignment pins have a round cap on one side which facilitates pinning together the parts. When assembled the boring holes must be pilot-drilled to 0.2mm smaller and then rubbed with a reamer also when assembled. Ideally, use a new twist drill with a diameter of 7,8mm for alignment pins of 8mm.



5. Maintenance

In this section you'll find important information about

- Inspection
- Maintenance
- Repair

The diagram below shows which of these headings each task falls under:



Properly performed regular maintenance is essential for safe operation, faulty-free operation, a long service life of the milling machine, and the quality of products that you manufacture.

Installation and equipment from other manufacturers must also be in optimum condition.

5.1 Safety

The consequences of incorrect maintenance and repair work may include:

- Serious injury to personnel working on the milling machine
- Damage to the milling machine

Only qualified personnel should carry out maintenance and repair work on the milling machine.

Only carry out work on the milling machine if it has been unplugged from the mains power supply, then pull the plug out.

Restarting

Before restarting the machine run a safety check.

Before disconnecting the machine check that there is no danger for personnel and that the machine is undamaged.

5.2 Inspection and Maintenance

The type and extent of wear depends on individual usage and service conditions. For this reason, all the intervals are only valid for the following authorized conditions:

Interval	Where?	What?	How?
Start of work After each maintenance or repair operation	Drilling-Milling Machine	Safety check	Safety check
Start of work After each maintenance or repair operation	Dovetail sideways	Lubricate	Lubricate all sideways
Weekly	Cross-table	Lubricate	Lubricate all blank steel parts. Use acid-free oil, for example engine oil
As required	Spindle nuts	Re-adjust	An increased clearance in the spindles of the cross-table can be reduced by re-adjusting the spindle nuts. See spare parts drawing 1. The spindle nuts are re-adjusted by reducing the flank of screw thread of the spindle nut with an adjusting screw. By re-adjusting you can assure smooth running of the toolpath, otherwise the wear by friction between spindle nut/spindle would increase considerably.
Every six months	Geared mill-drill head	Grease	Swivel the mill-drill head to the right by 90°. Detach the cover plate on the rear side. Lubricate the gear wheels

The spindle bearing arrangement is permanently lubricated. No new lubrication is necessary.

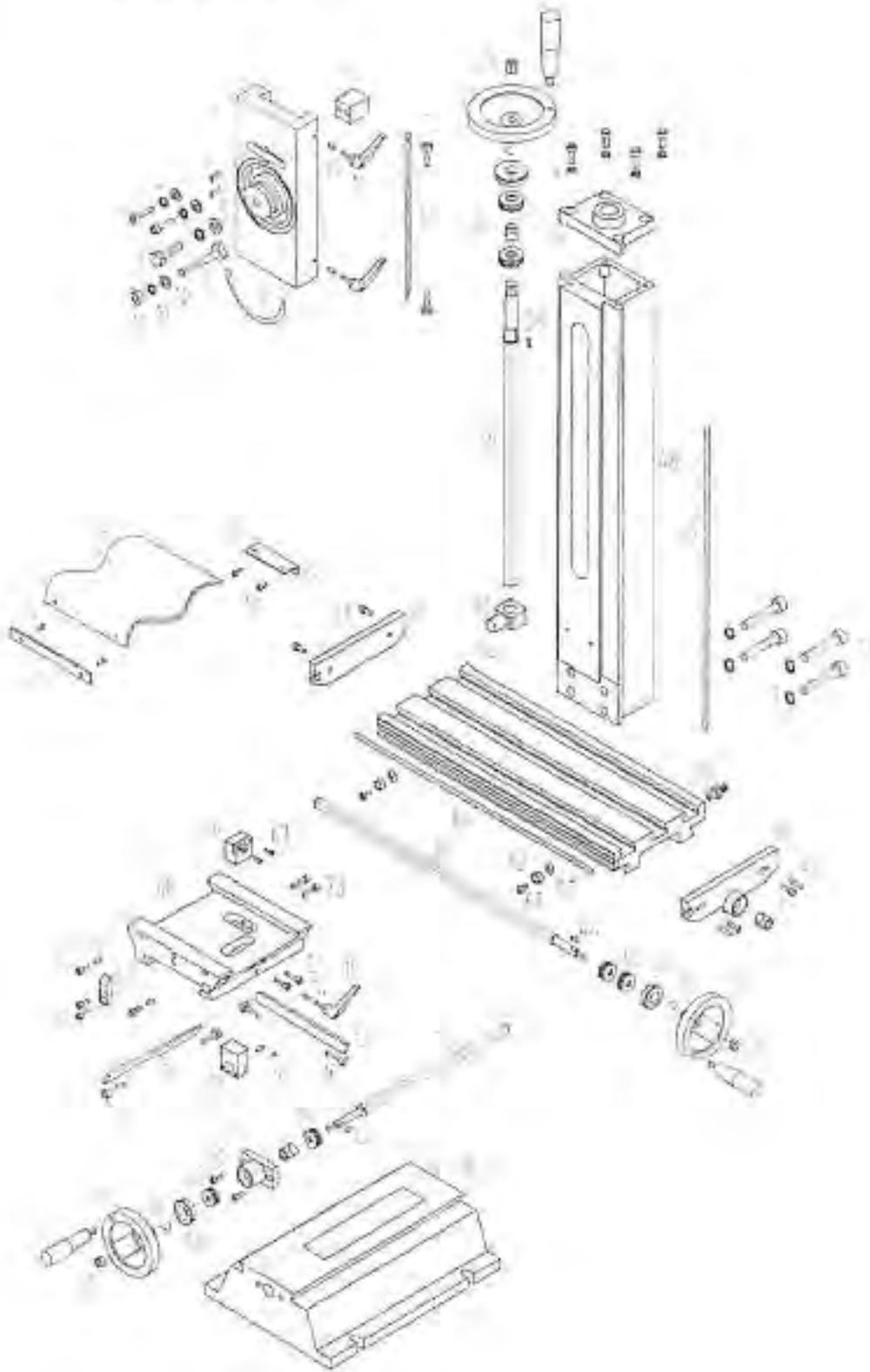
5.3 Repair

Any maintenance work may only be carried out by a specialized company or by a duly trained personnel. Any maintenance work on electrical equipment may only be carried out specialized electrical staff. For any repair work get assistance from our technical service team.

Chester UK Ltd does not take any responsibility nor does it guarantee against damage and operating anomalies resulting from failure to observe this manual.

For repairs only use faulty free and suitable tools, original spare parts or parts authorized by Chester UK Ltd.

5.4 Spare parts drawing 1



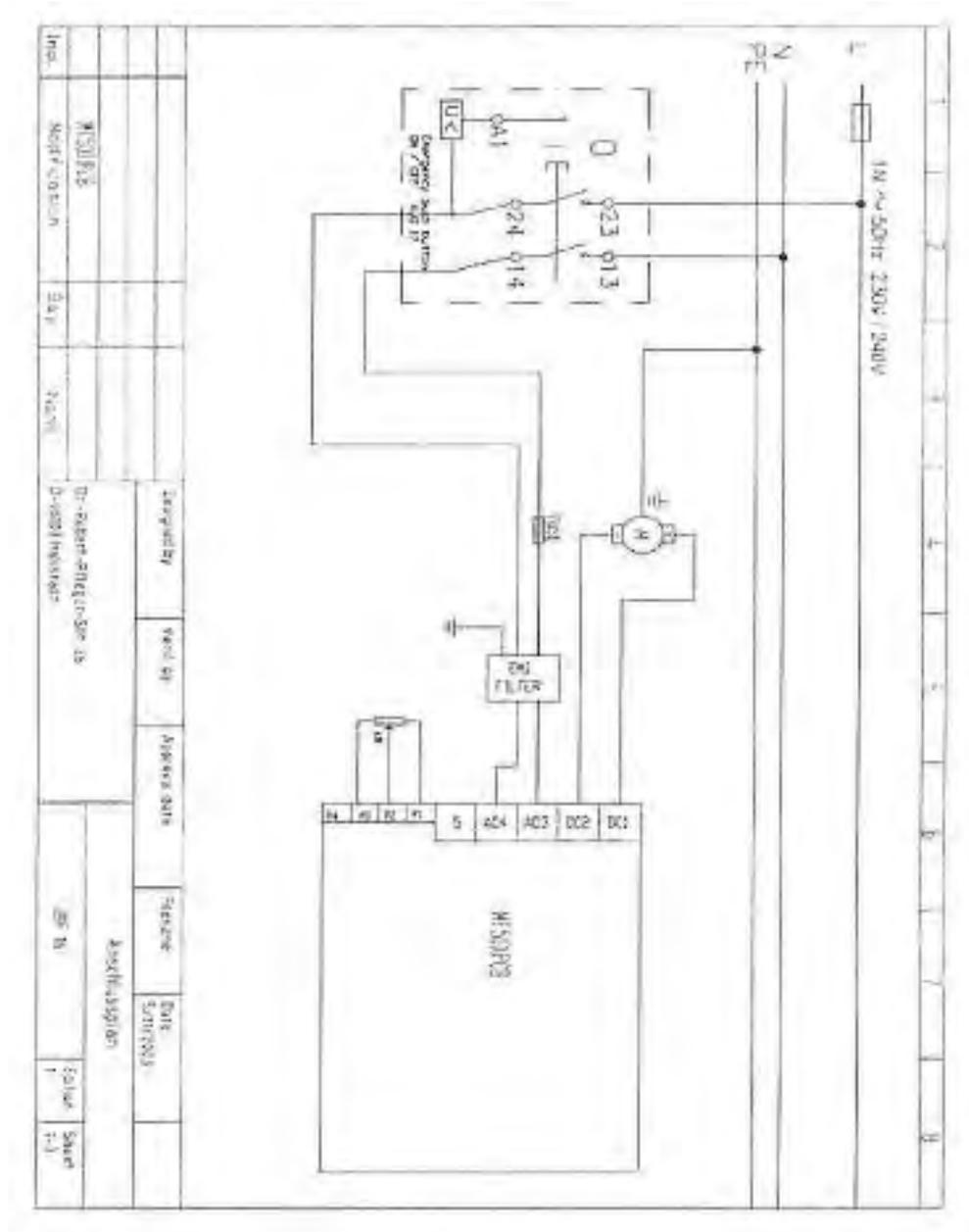
Spare parts list 1

Pos.	Designation	Article No	Qty	Pos.	Designation	Article No	Qty
1	Turnsignal bearing blocked mill head	03336116 1	1	40	Counternut	03338116 40	4
2	Locking screw M6 x 16	03338116 2	2	42	Ball bearing 6001-2RZ		2
3	Washer	03338116 3	2	43	Shaft		1
4	Spring washer 8	03338116 4	6	44	Feather key 4x12	03338116 44	2
5	Hexagon socket screw M8 x 25	03338116 5	2				
6	Nut M12 x 40	03338116 6	1				
7	Spring washer 12	03338116 7	5				
8	Washer 12	03338116 8	1				
9	Screw	03338116 9	1	48	Column	03338116 45	1
10	Washer 10	03338116 10	1	49	Scale-Z axis	03338116 49	1
11	Spring washer 10	03338116 11	1	50	Tapered pin A5x25	03338116 50	1
12	Nut M10	03338116 12	1	51	Hexagon socket screw M6 x 16	03338116 51	8
13	Guidance item	03338116 13	1	52	Bearing block cross table left x-axis	03338116 52	1
14	Brass pin	03338116 14	5	53	Seal	03338116 53	2
15	Clamping lever DM6 x 16	03338116 15	3	54	Milling table	03338116 54	1
16	Slotted head screw	03338116 16	1				
17	Gib	03338116 17	1	56	Bearing block cross table left x-axis	03338116 56	1
18	Angle scale	03338116 18	1	57	Handle M6 x 63	03338116 57	3
19	Hexagon socket screw M5 x 10	03338116 19	12	58	Handwheel	03338116 58	3
20	Bellows	03338116 20	1	59	Scale ring	03338116 59	3
21	Nut M5	03338116 21	2	60	Bearing 51200	03338116 60	5
22	Fixing of bellows	03338116 22	1	61	Hexagon socket screw M6 x 10	03338116 61	2
23	Rubber chip cover	03338116 23	1	62	Bush of top layer limit stop X-axis	03338116 62	2
24	Gib	03338116 24	1	63	Rectangular nut (sliding block)	03338116 63	1
25	Nut M16 x 1.5	03338116 25	2	64	Scale X-axis	03338116 64	1
26	Bearing 51203	03338116 26	1	65	Spindle X-axis	03338116 65	1
27	Tapered toothed wheel	03338116 27	1	66	Spindle nut X-axis	03338116 66	1
28	Feather key 4 x 16	03338116 28	2	67	Hexagon socket screw M4 x 20	03338116 67	4
29	Spindle Z-axis	03338116 29	1	68	Guidance of cross table	03338116 68	1
30	Spindle nut Z-axis	03338116 30	1	69	Limit stop of top layer x-axis	03338116 69	1
31	Washer 5	03338116 31	4	70	Gib	03338116 70	1
32	Cover cap	03338116 32	1	71	Spindle nut Y-axis	03338116 71	1
33	Hexagon socket screw M8 x 20	03338116 33	4	72	Gib	03338116 72	1
34	Cover plate column	03338116 34	1	73	Hexagon socket screw M6 x 25	03338116 73	2
35	Bearing cover	03338116 35	1	74	Bearing block	03338116 74	1
36	Hexagon socket screw M5 x 12	03338116 36	7	75	Spindle Y-axis	03338116 75	1
37	Scale ring	03338116 37	1	76	Machine stand	03338116 76	1
38	Handwheel	03338116 38	1	77	Hexagon socket screw M12 x 90	03338116 77	4

Spare parts list 2

Pos.	Designation	Article No	Qty	Pos.	Designation	Article No	Qty
201	Position disc	0 3338116 201	1	239	Cover	0 3338116 239	1
201	Bush	0 3338116 202	1	240	Countersink head screw M4 x 8	0 3338116 240	6
203	Tension spring 2.5 x 28 x 110-3	0 3338116 203	1				
204	Circlip 45	0 3338116 204	1				
205	Ball bearing 5209-2RZ	0 3338116 205	1	243	Spring piece	0 3338116 243	2
206	Toothed wheel (Z60/Z80)	0 3338116 206	1				
207	Bearing 7007AC	0 3338116 207	1				
208	Circlip 15	0 3338116 208	1	246	Spindle	0 3338116 246	1
209	Toothed wheel (Z46)	0 3338116 209	1	247	Spindle nut	0 3338116 247	1
210	Circlip 32	0 3338116 210	2	248	Ball bearing 7005AC/P5	0 3338116 248	2
211	Ball bearing 600Z-2RZ	0 3338116 211	2	249	Spindle sleeve	0 3338116 249	1
212	Toothed wheel (Z42/Z62)	0 3338116 212	1	250	O-ring 58x2.85	0 3338116 250	1
213	Primary shaft	0 3338116 213	1	251	Tightening nut	0 3338116 251	1
214	Feather key 5 x 50	0 3338116 214	1				
215	Feather key C5 x 12	0 3338116 215	1				
216	Gearshift fork	0 3338116 216	1				
217	Arm of gearshift fork	0 3338116 217	1	255	Handle lever	0 3338116 252	3
218	Screw M5 x 8	0 3338116 218	1				
219	Cover cap of draw-in rod	0 3338116 219	1	257	Hub star knob pinhole infeed	0 3338116 257	1
220	Engine cover	0 3338116 220	1	258	Scale ring star knob	0 3338116 258	1
221	Motor	0 3338116 221	1				
222	Hexagon socket screw M4 x 8	0 3338116 222	6	260	Hexagon socket screw M4 x 10	0 3338116 260	3
223	Washer 4	0 3338116 223	6	261	Cover panel	0 3338116 261	1
224	Hexagon socket screw M6 x 14	0 3338116 224	6				
225	Pin A5 x 25	0 3338116 225	2				
226	Washer 6	0 3338116 226	6	264	Feather key 4 x 12	0 3338116 264	1
227	Milling head casing cover	0 3338116 227	1	265	Low face pinion	0 3338116 265	1
228	Hexagon socket screw M5 x 12	0 3338116 228	6	266	Locking screw M6 x 20	0 3338116 266	1
229	C-Circlip 10	0 3338116 229	1	267	Indicator	0 3338116 267	1
230	Motor toothed wheel (Z25)	0 3338116 230	1	268	Locking screw M8 x 8	0 3338116 268	1
231	Feather key C4 x 16	0 3338116 231	1	269	Spring 0.8 x 5 x 25-3	0 3338116 269	1
232	Type plate	0 3338116 232	1	270	Steel ball 6.5	0 3338116 270	1
				271	Rotary selector switch gear 12 x 50	0 3338116 271	1
				272	Locking screw M5 x 16	0 3338116 272	1
				273	Speed label	0 3338116 273	1
236	Clamping lever DM8 x 20	0 3338116 236	1	274	Retainer disc	0 3338116 274	1
237	Brass pin	0 3338116 237	1	275	Selector shaft	0 3338116 275	1
238	Housing of milling head	0 3338116 238	1				

5.5 Connecting plan



Spare parts list for electrical system

Designation	Article No	Qty.	Designation	Article No	Qty.
Control board	0 3338116 301	1	Motor	0 3338116 303	1
Fine-wire fuse	0 3338116 302	1	Emergency stop on/off	0 3338116 304	1
			Potentiometer	0 3338116 305	1

6. Anomalies

6.1 Anomalies in the machine

Anomaly	Cause/Possible effects	Solution
The machine does not start	<ul style="list-style-type: none"> Defective fuse 	<ul style="list-style-type: none"> Have it checked by authorized personnel
Tool burn	<ul style="list-style-type: none"> Incorrect speed The chips have not been removed from the hole Blunt tool Operating without cooling 	<ul style="list-style-type: none"> Select different speed, feed may be too high Retract tool more frequently Sharpen and replace tool Use cooling agent
Impossible to insert holding taper into spindle sleeve	<ul style="list-style-type: none"> Remove dirt, grease or oil from the internal conical surface of the spindle sleeve or holding taper Morse taper is incorrect size 	<ul style="list-style-type: none"> Clean surfaces well. Keep surfaces free of grease Use M10 taper
Motor won't start	<ul style="list-style-type: none"> Defective fuse 	<ul style="list-style-type: none"> Have it checked by authorized personnel
Working spindle rattling on rough workpiece	<ul style="list-style-type: none"> Climb milling machine not possible under the current operating conditions Clamping levers of the movement axes not tightened Loose collet chuck, loose drill chuck, loose draw-in rod Tool blunt Workpiece loose Excessive slack in bearing Spindle shaft worn or worn out Working spindle goes up and down 	<ul style="list-style-type: none"> Perform conventional milling machining Tighten clamping levers Check, retighten Sharpen or replace tool Secure the workpiece properly Re-adjust bearing clearance or replace bearing. Replace pos. 246 and 251 of spare parts list 2 Re-adjust bearing clearance or replace bearing pos. 248 spare parts list 2

7. Appendix

7.1 Copyright

This document is copyright. All derived rights are also reversed, especially those of translation, re-impression, use of figures, broadcast, reproduction by photo-mechanical or similar means, and recording in data processing systems, whether partial or total.

The company reverse the right to make technical alterations without prior notice.

7.2 Terminology/Glossary

Term	Explanation
Cross table	Bearing surface, clamping surface for the workpiece with X and Y axis travel.
Taper mandrel	Taper of the tool seat, taper of the bit or the drill chuck.
Workpiece	Piece to be milled, drilled or machined.
Draw-in rod	Threaded bar for fastening the taper mandrel in the spindle sleeve.
Drill chuck	Device for the holding bit.
Collet chuck	Holding fixture for end mill cutters.
Drill-mill head	Upper part of the drilling-milling machine.
Spindle sleeve	Hollow shaft in which the milling spindle turns.
Milling sleeve	Shaft activated by the motor.
Drilling table	Bearing surface, clamping surface.
Taper Mandrel	Cone of the bit or mill chuck.
Spindle sleeve lever	Manual control for activating the bit.
Quick action drill chuck	Manually tighten able bit holding fixture.
Workpiece	Piece to be turned or machined.
Tool	Milling cutter, drill bit, countersink etc...

7.3 Product follow up

We are required to perform a follow-up service for our products which extends beyond shipment.

We would be grateful if you could send us the following information:

- Modified settings
- Experiences with the milling machine, which could be important to other users.
- Repeated failings

7.4 EC Declaration of Conformity

The manufacturer / YANGZHOU HUAFEI GENERAL MACHINE
retailer: FACTORY , CHINA
TOUQIAO TOWN GUQIAO ROAD 48#, YANGZHOU

hereby declares that the following product,

Machine type: Drilling-Milling machine

Name of machine: BF 16

Relevant EU directives:

Machinery Directive 98/37/EG, Annex II A

EMV Directive 89/336/EWG

Low Voltage Directive 73/23/EWG

meets the provisions of the aforementioned directive, including any amendments valid at the time of this statement.

In order to ensure conformity, the following harmonized standards in particular have been applied:

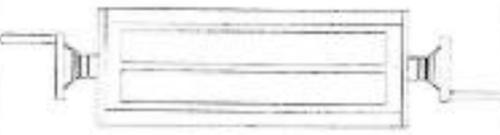
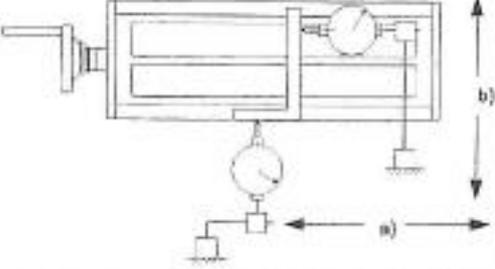
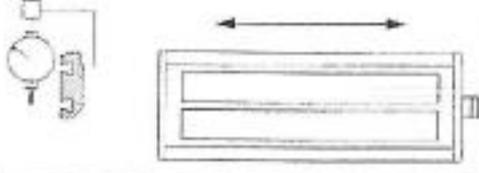
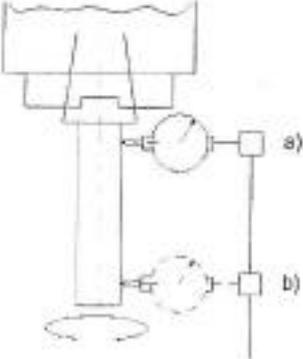
EN 13128: 2001	Safety of machine tools: Milling machines (including boring machines)
EN 62079	Editing of instructions - structure, content and illustration (IEC 62079:2001).

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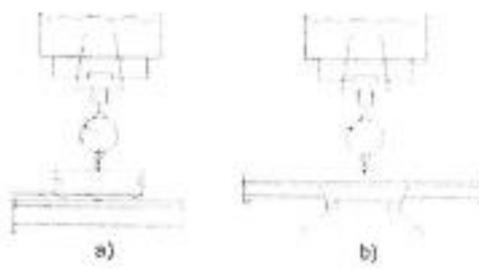
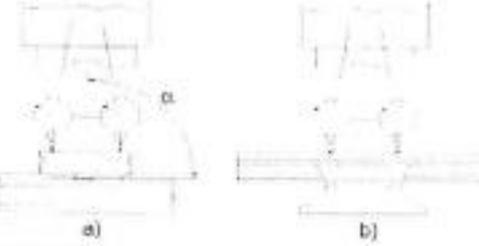
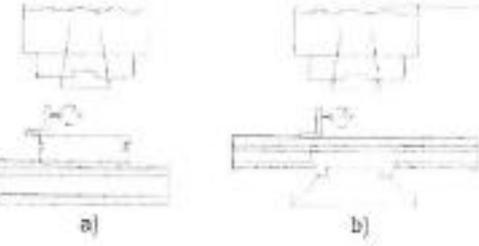
Test Report

CHAMPION 16VS

No.	Object of testing	Drawing	Tolerance [mm]	Measured error [mm]
1	The flatness of worktable surface		on a length of 200 min. 0,025 to a maximum of 0,08 0,08 - 0,025	0,01
2	Square ness of worktable x - axis to y - axis		0,02 / 150	0,02
3	Parallelism of worktable longitudinal movement to the base T-slot		0,04	0,02
4	Run-out of spindle hole center line.		a) at spindle nose 0,008 b) at a distance of 100 mm 0,015	a: 0,005 b: 0,01

Test Report

CHAMPION 16VS

No.	Object of testing	Drawing	Tolerance [mm]	Measured error [mm]
5	Parallelism of worktable movement to worktable surface		a) on a length of 100 0,02 b) on a length of 300 max.: 0,06 0,02	a) 0,01 b) 0,02
6	Parallelism of worktable movement to worktable surface		a) 0,05 / 300 $\alpha \leq 90^\circ$ b) 0,05 / 300	a) 0,03 b) 0,02
7	spindle sleeve vertical movement to base working surface		a) 0,02 / 40 b) 0,06 / 300	a) 0,02 b) 0,02

Inspector:

Date:

Test Report

CHAMPION 16VS

No.	Visual inspection	O.k.	Improved	No.	Electrical test	O.k.	Improved
	Damages of lacquer	<input type="checkbox"/>	<input type="checkbox"/>		Maximum rotation speed in gearbox stage 1 and gearbox stage 2, in left- and right hand turning direction.	<input type="checkbox"/>	<input type="checkbox"/>
	Rust damage	<input type="checkbox"/>	<input type="checkbox"/>		Speed control in gearbox stage 1 and gearbox stage 2, left- and right hand turning direction.	<input type="checkbox"/>	<input type="checkbox"/>
	Transport damages	<input type="checkbox"/>	<input type="checkbox"/>		Function of digital display	<input type="checkbox"/>	<input type="checkbox"/>
	Identification plate data correctly, completely	<input type="checkbox"/>	<input type="checkbox"/>				
Test run				Mechanical test			
	Maximum rotation speed in gearbox stage 1 and gearbox stage 2, in left- and right hand turning direction.	<input type="checkbox"/>	<input type="checkbox"/>		Firing screws of milling head attracted	<input type="checkbox"/>	<input type="checkbox"/>
	Speed control in gearbox stage 1 and gearbox stage 2, left- and right hand turning direction.	<input type="checkbox"/>	<input type="checkbox"/>		Cross table spindle clearance	<input type="checkbox"/>	<input type="checkbox"/>
	Running noises in all speed ratios and all gear trains	<input type="checkbox"/>	<input type="checkbox"/>		spindle clearance	<input type="checkbox"/>	<input type="checkbox"/>