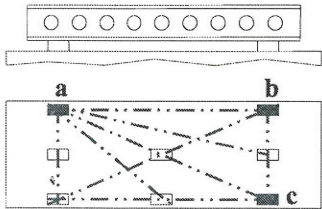

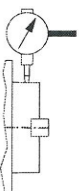
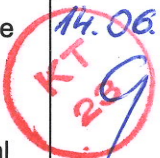
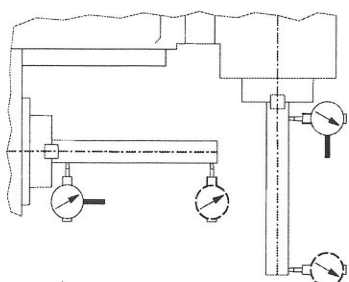
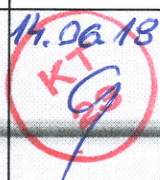
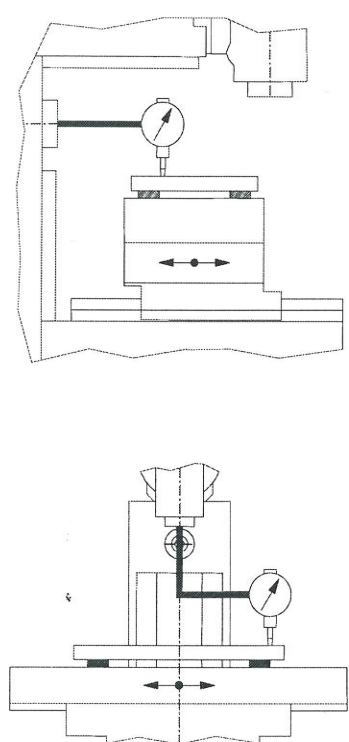
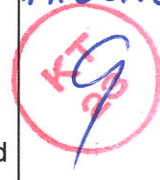
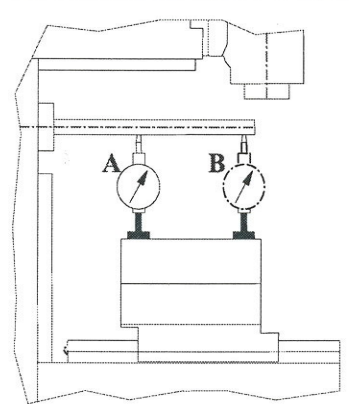
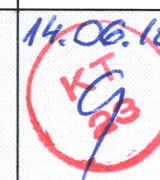
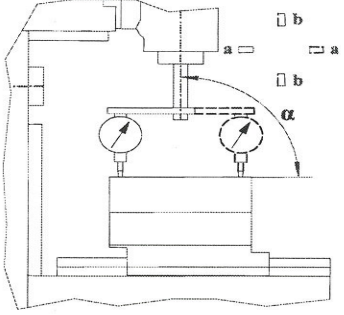
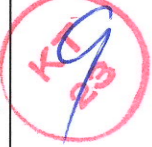
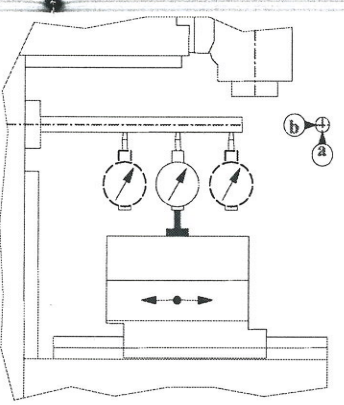
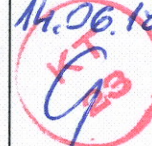
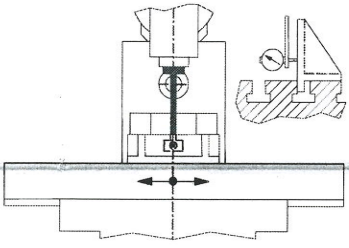
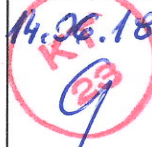


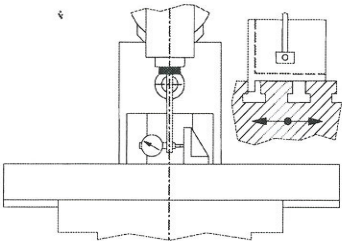
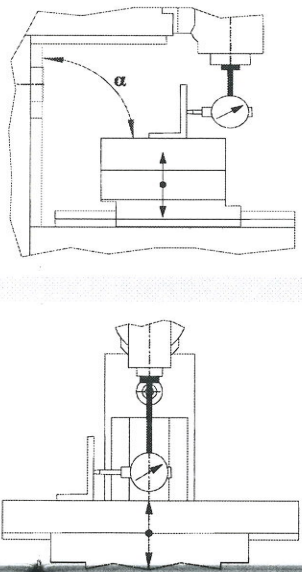
MILLING MACHINE GEOMETRICAL ACCURACY VERIFICATION

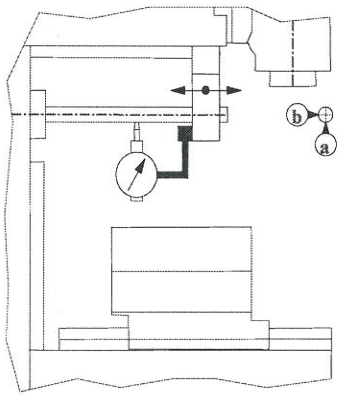
Type / number: VP 2500 No 02

Item	Verification object Sketch	Acceptable deviations	Measured deviations	Measuring instruments	Measurement method	Date, GJ stamp and signature
1	2	3	4	5	6	7
1	Verification of table working surface flatness. 	0.04/1000 Local tolerance 0.02/300	0,025 0,010	Straight-edge, gauge blocks	Set the table and slide in their midpositions. Measure according to PN-ISO 230-1:1998, point 5.322.1.	14.06.18 
2	Measurement of spindle nose radial run-out: a) horizontal b) vertical. 	a) 0.01 b) 0.01	0,005 0,007	Dial gauge	Put the dial gauge tip perpendicular to... cylindrical spindle nose surface. Take dial gauge readings during one slow spindle revolution.	14.06.18 
3.	Measurement of radial run-out of the spindle female cone: a) horizontal 1) at the spindle front surface 2) within the distance of 300mm from spindle front surface b) vertical 1) at the spindle front surface 2) within the distance of 300mm from spindle front surface 	a1) 0.01 a2) 0.02 b1) 0.01 b2) 0.02	0,004 0,016 0,005 0,018	Dial gauge, control arbor	Seat the control arbor into the spindle cone. Put the dial gauge tip on the control arbor. Take dial gauge readings during one spindle slow revolution. Measure in the points (1) and (2). Repeat the measurements four times, each time turn the control arbor by 90° in relation to the spindle. In each case measure the run-out in horizontal and vertical plane.	14.06.18 

<p>4.</p>	<p>Verification of table surface parallelism to table travellings:</p> <p>a) transverse</p> <p>b) longitudinal</p> 	<p>a) 0.025/300</p> <p>b) 0.04</p> <p>locally 0.025/300</p>	<p>0,010</p> <p>0,015</p> <p>0,005</p>	<p>Straight-edge, dial gauge</p>	<p>Measure by means of the straight edge put parallel to the table surface. Fasten the dial gauge on the locked spindle or on the machine body. Put the dial gauge tip on the straight edge. Move the table in the chosen direction</p>	<p>14.06.18</p> 
<p>5.</p>	<p>Verification of horizontal spindle parallelism to table working surface.</p> 	<p>0.025/300</p> <p>(only an inclination of the control arbor free end downwards could be accepted)</p>	<p>0,005</p>	<p>Dial gauge, control arbor</p>	<p>Seat the control arbor into the spindle female cone. Place the dial gauge on the table. Put the dial gauge tip on the control arbor. Measure in the points A and B. The control arbor is to be set up in the medium run-out position for this measurement process.</p>	<p>14.06.18</p> 

<p>6.</p>	<p>Verification of vertical spindle axis perpendicularity to the table working surface:</p> <p>a) in the vertical symmetry plane of the machine;</p> <p>b) in a vertical plane perpendicular to the vertical symmetry plane of the machine.</p> 	<p>a) 0.025/300 at α 90°</p> <p>b) 0.025/300</p>	<p>0,010</p> <p>0,005</p>	<p>Dial gauge with an angular holder</p>	<p>Fasten the dial gauge with its angular holder in the spindle. Put the dial gauge tip on the table working surface and take dial gauge readings. Turn the spindle by 180° and evaluate the difference between the dial gauge indications. Measure in (a) and (b) planes.</p>	<p>14.06.18</p> 
<p>7.</p>	<p>Verification of horizontal spindle axis parallelism to table transverse travelling:</p> <p>a) in vertical plane</p> <p>b) in horizontal plane</p> 	<p>a) 0.025/300 (only an inclination of the control arbor free end downwards could be accepted)</p> <p>b) 0.025/300</p>	<p>0,005</p> <p>0,012</p>	<p>Dial gauge, control arbor</p>	<p>Bring the table into its central position in longitudinal direction. Seat the control arbor into the spindle cone. Fasten the dial gauge on the table. Put the dial gauge tip on the control arbor in vertical plane. Move the table in transverse direction and simultaneously take dial gauge readings. During the measurement the control arbor is to be set up in the medium run-out position. Repeat the measurement also in horizontal plane.</p>	<p>14.06.18</p> 
<p>8.</p>	<p>Verification of table central (reference) T-slots parallelism to table longitudinal travelling.</p> 	<p>0,04 local 0.015/300</p>	<p>0,010</p> <p>0,003</p>	<p>Dial gauge, Straight-edge with a faying face</p>	<p>Fasten the dial gauge on the locked spindle or on the machine body. Bring the straight edge with faying face into abutment against central T-slot side surface. Put the dial gauge tip on the straight edge in horizontal plane. Press and hold down the straight edge and simultaneously move the table and take dial gauge readings.</p>	<p>14.06.18</p> 

9.	Verification of table central (reference) T-slot width – basic size 18mm.	H7	18H7	Gauge	Evaluate by means of the gauge.	14.06.18 K.P.G.
10.	<p>Verification of table central (reference) T-slots perpendicularity to table transverse travelling.</p> 	0.02/300	0,005	Dial gauge, square with a faying face	Bring the table into its central position. Fasten the dial gauge on the locked spindle or on the machine body. Bring the square with faying face into abutment against central T-slot side surface. Put the dial gauge tip on the square arm. Move the table in transverse direction and simultaneously take dial gauge readings.	14.06.18 K.P.G.
11.	<p>Verification of table working surface perpendicularity to vertical console travelling (in three positions: central position as well as upper and bottom end positions):</p> <p>a) in the vertical symmetry plane of the machine;</p> <p>b) in a vertical plane perpendicular to the vertical symmetry plane of the machine.</p> 	<p>a) 0.025/300 at α</p> <p>\square 90°</p> <p>b) 0.025/300</p>	<p>0,022</p> <p>0,005</p>	Dial gauge, square	Bring the table into its central position. Bring the console into its central position. Fasten the dial gauge on the locked spindle or on the machine body. Put the square on the table in machine symmetry plane. Put the dial gauge tip on the square arm and take dial gauge readings. Bring the console into its upper end position and evaluate the difference between the dial gauge indications. Repeat the measurement also in the bottom end position. Repeat all the measurements in the (b) plane.	14.06.18 K.P.G.

12.	<p>Verification of beam slideway parallelism to the horizontal spindle axis:</p> <p>a) in vertical plane</p> <p>b) in horizontal plane</p> 	<p>a) 0.02/300 (only an inclination of the control arbor free end downwards could be accepted)</p> <p>b) 0.02/300</p>	<p>0,010</p> <p>0,005</p>	<p>Dial gauge, control arbor</p>	<p>Clamp the beam in its advanced position. Seat the control arbor in the spindle cone. Fasten the dial gauge on the rest. Clamp the rest. Put the dial gauge tip on the control arbor in vertical plane at spindle nose and take dial gauge readings. Unclamp the rest, shift it by 300 mm and clamp again. Evaluate the difference between dial gauge indications. During the measurement the control arbor is to be set up in the medium run-out position. Repeat the measurement also in horizontal plane.</p>	<p>14.06.18</p> <p>KT</p> <p>25</p>
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