

# Co-ordinate Measuring Machine RA / RAF STANDARD/PREMIUM

## Technical Data



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## Short description

- CNC Coordinate Measuring Machine, mechanical bearings, guideway floor level or guide arm with touch trigger or scanning probe system
- Operation modes manual, joystick-controlled, full CNC (optional)
- High-precision linear guideways (ball bearings) and roller bearings
- Several sizes for a optimal choice of the required measuring volume, duplex-mode possible

## Application areas

- Mould and die, toolmakers, body-in-white and large-volume components with a medium accuracy requirement.
- In Analysis, gauges and fixtures
- Measurement of prismatic and free-form components
- Both series and individual measurements
- Palletised operation possible

## Standard Features

- X-axis with ball bearings
- Guideways and scale protected by walk-on steel covers
- Weight of gauge stand directly supported by table or beam
- Y-axis with rollers. Guiding profile of carbon-fibre-compounds for utmost stiffness and low CTE (coefficient of temperature expansion)
- Compact HT 400 control panel with central, logarithmic joystick, „mouse function“ and context-sensitive function buttons. Selectable joystick's axis assignment (optional)
- Counterbalance guided by mechanical bearings, free-of-play
- Basic version manual, optional full CNC, drives disengageable
- Baseplate made of special cast iron or guide arm made of mineral casting for utmost stability
- High dynamic servo drives with speed error control, combined friction and form-fitted transmission
- Two-stage speed selection and variable speed adjustment (override 0-100%) in all operation modes, resulting in sensitive movement via joystick or in CNC debugging
- Three-axis contouring controller with intelligent „look-ahead“ function for application-optimised trajectory

## Probe systems

- Renishaw PH6M, compact probe head for 3D probe mounting
- Renishaw PH6M, fixed probe head with the possibility of using complex probes like SP25, SP600
- Renishaw PH10M, PH10T, indexable probe heads featuring 720 repeatable positions in 7.5° steps
- TP20, touch-trigger probe. Stylus module changeable via optional tool changer
- TP200 touch-trigger probe, highly precise and suitable for styli up to 100 mm in length. Styli can be changed via optional tool changer
- PHS servo positioning head. Can be swivelled continuously. Minimized calibration need. Extensions up to 750mm
- Optical high speed sensor „Phoenix“ Hybrid system with high-resolution CCD camera for image processing in the X-Y plane and multiple laser triangulation for distance measuring in Z

## Software

- User-friendly Windows software Metrosoft CM for measuring and evaluating geometry and free-form elements (option)
- Graphic user interface featuring extensive automatism to support the User
- User dialog and reporting can be selected and switched on-line independently between 12 languages
- Graphically interactive on- and offline programming system „Grips“ for measurement program creation based on CAD data.
- Numeric and graphic reporting of the measured results
- Workpiece-oriented database, SQL-capable, with multi-user access, network capabilities
- Integrated statistic functions, frequency distribution, trend diagram, machine-capability Cm and Cmk, SPC control charts, process capability Cp and Cpk. Interface to QS-Stat
- Shape- and location tolerances according to ISO 1101 / ASME Y14.5M
- Context-sensitive on-line help in all 12 User languages

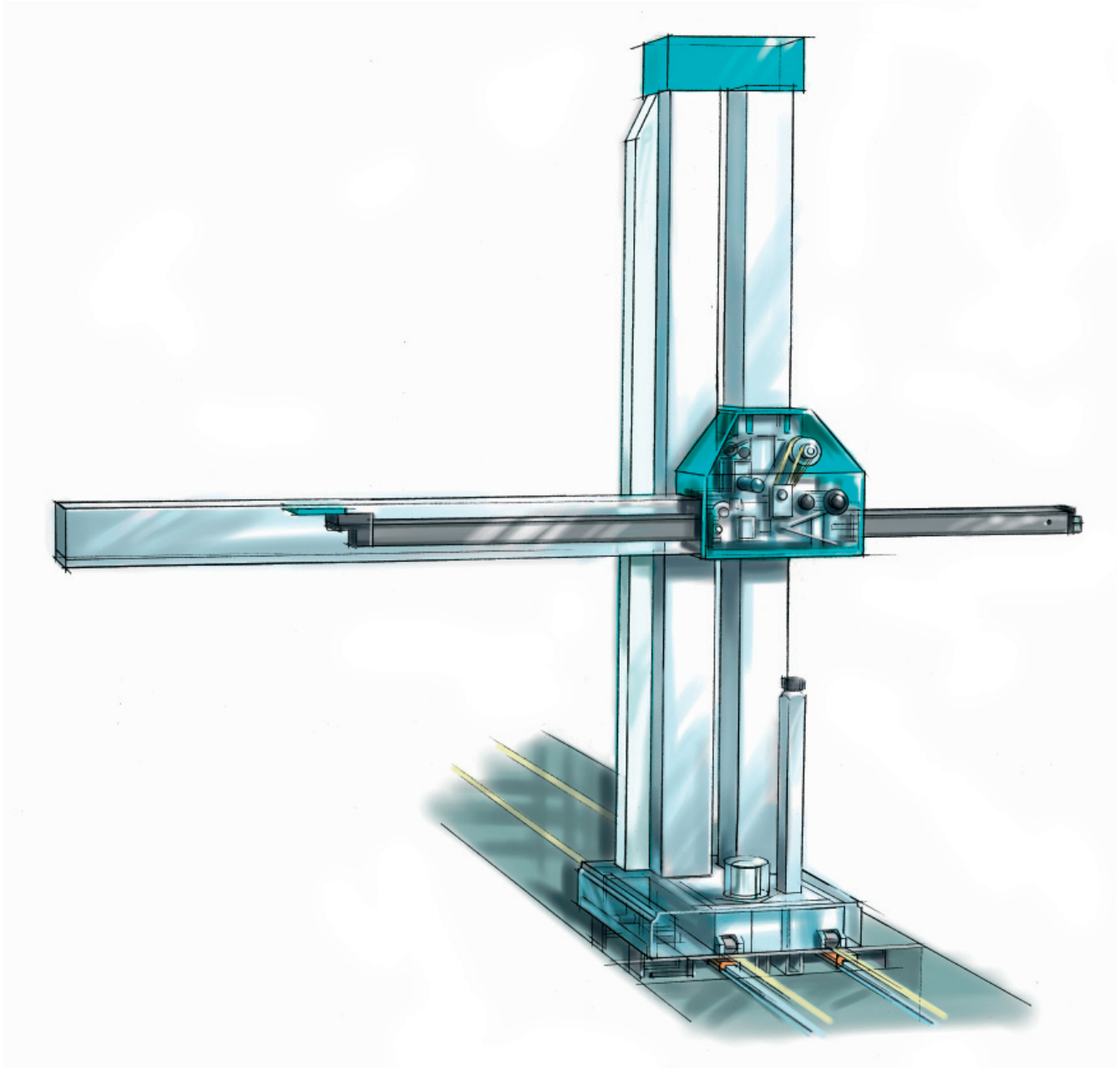
## Options:

- Software package CM-Surf for measuring free-form surfaces
- CAD direct interfaces (e.g. CATIA V4/V5, Pro-E, Unigraphics, Parasolid)
- I++DME Server
- DMIS Import, DMIS Export, DMIS Reporting, DMIS Native Interpreter

# Technical Data RA / RAF

Machine Type		RA / RAF 1012			RA / RAF 1215			RA / RAF 1618			RA / RAF 1621			RA / RAF 1625		
<b>Measuring Ranges, Weights</b>																
Measuring ranges	x [mm]	4000	5000	6000	4000	5000	6000	4000	5000	6000	4000	5000	6000	4000	5000	6000
	y [mm]	1000			1200			1600			1600			1600		
	z [mm]	1200			1500			1800			2100			2500		
Useable table surface*	[mm]	4800x1235	5800x1235	6800x1235	4800x1435	5800x1435	6800x1435	4800x1835	5800x1835	6800x1835	4800x1835	5800x1835	6800x1835	4800x1835	5800x1835	6800x1835
Machine weight*	[kg]	6900	8300	9700	7800	9300	10800	9400	11200	13000	9450	11250	13050	9510	11310	13110
Permissible part weight*	[kg]	4600	5500	6500	5200	6200	7200	6300	7500	8700	6300	7500	8700	6350	7550	8750
<b>General Requirements</b>																
Electric	Single-phase AC, 1P+N+PE, 115/230V +/- 10%, 50/60 Hz, max. 1000 VA, acc. to EN 60204/1															
Compressed air	Supply pressure 6-10 bar, pre-filtered, quality according to ISO 8573-1: Class 4 or better															
Air consumption	(Nl/min) <5															
<b>Measuring Accuracy</b>																
Measurement system	Photoelectric scale system, optical division 20µm, resolution 0,5 µm															
Construction	Standard	Premium	Standard	Premium	Standard	Premium	Standard	Premium	Standard	Premium	Standard	Premium	Standard	Premium	Standard	Premium
Probing uncertainty <sup>1</sup>	MPE <sub>P</sub> [µm]	20	15	20	15	20	15	25	18	25	30	23	35	25		
Volumetric length measuring uncertainty <sup>1</sup>	MPE <sub>E</sub> [µm]	25+L/40 ≤ 90	15+L/45 ≤ 50	30+L/40 ≤ 100	15+L/45 ≤ 60	40+L/35 ≤ 110	25+L/40 ≤ 70	45+L/35 ≤ 110	30+L/40 ≤ 85	55+L/35 ≤ 120	35+L/40 ≤ 100					
Volumetric length measuring uncertainty <sup>2</sup>	MPE <sub>EM</sub> [µm]	40+L/20 ≤ 120	25+L/35 ≤ 60	45+L/20 ≤ 130	25+L/35 ≤ 75	60+L/20 ≤ 140	35+L/30 ≤ 90	65+L/20 ≤ 145	45+L/25 ≤ 100	80+L/20 ≤ 155	55+L/25 ≤ 120					
<b>Operating Environment</b>																
Operating temperature	15°C - 30°C															
Temperature range for MPE <sub>E</sub>	16°C - 24°C, ΔT 1,5 K/h, 0,5 K/m															
Relative humidity	40% - 70%															
<b>Dynamics</b>																
Joystick operation	V <sub>max</sub>	0-20 mm/s (creep mode), 0-100 mm/s (normal)														
CNC mode	V <sub>max</sub>	300 mm/s axial, 519 mm/s volumetric														
CNC mode	a <sub>max</sub>	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric	400 mm/s <sup>2</sup> axis-related, 700 mm/s <sup>2</sup> volumetric

1: According to DIN EN ISO 10360-2 2: According to VDI/VDI 2617 Blatt 2.3  
 \*: Part dimensions and weights don't affect the RAF series  
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