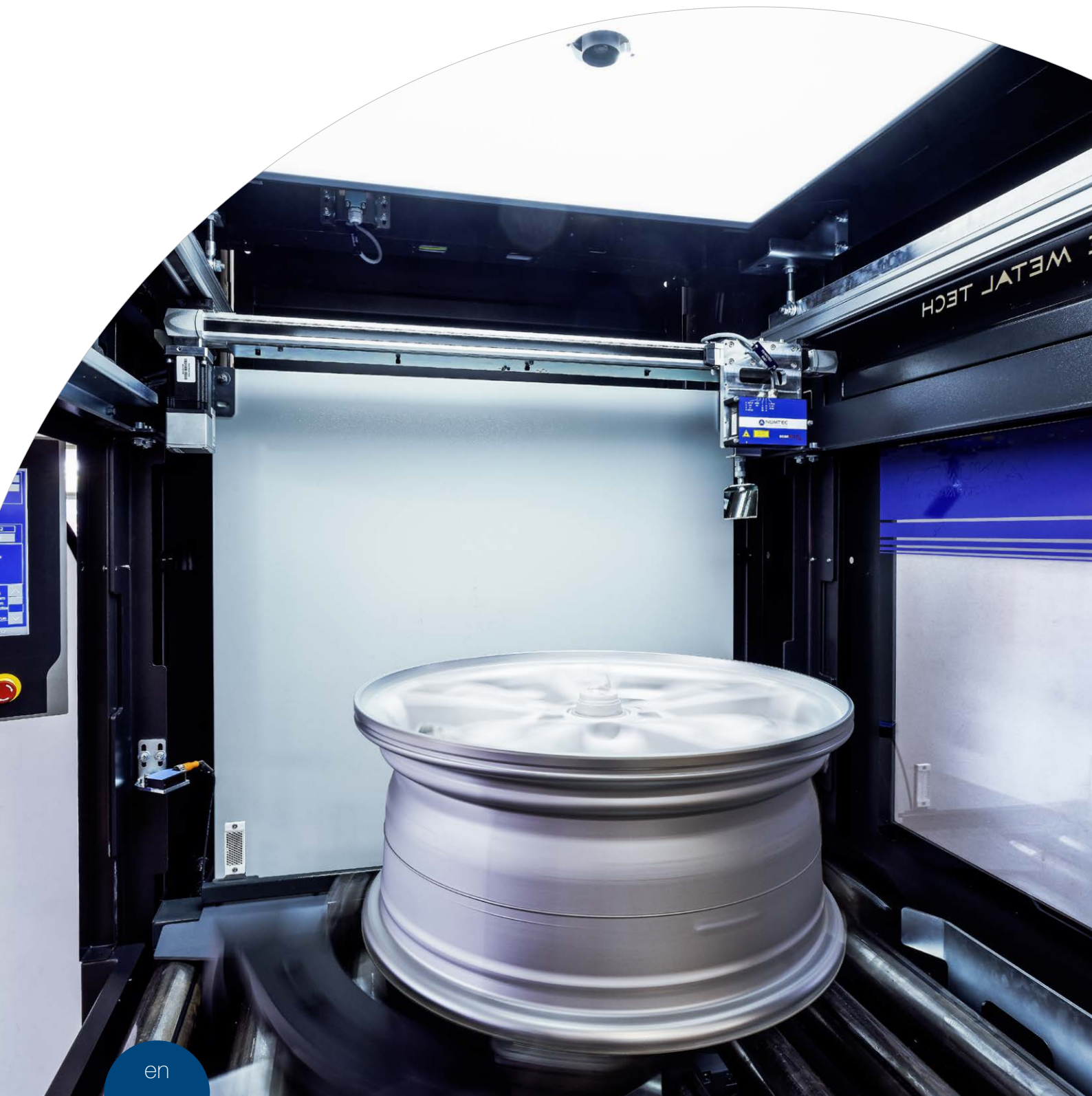


MD321 / MD322

Distortion measurement and wheel positioning



100% process control measurement of alloy wheels before entering the CNC machining cell



MD321 / MD322

Distortion measurement and wheel positioning

The MD321/MD322 machine is used for 100% process control measurement of alloy wheels before entering the CNC machining cell.

The machine is automatically loaded from an inbound conveyor. The cell robot picks up the wheel from the MD321/MD322 machine and then continues to load the wheel for subsequent operations. To shorten the installation and commissioning time, the machine is delivered completely cabled and tested. The measurement of the front face of the wheels is done with a laser scanner, mounted on a moveable X/Y-slide arrangement. The MD321/MD322 measures mainly the deviation of the front side clamping flange and the hub area. With the integrated wheel type recognition and individual type tolerance values, the machine can either be used in batch operation or at fully mixed production lines without any limitations. With the MD321/MD322 at the entrance at a CNC machining cell, only wheels within tolerance will be

produced, and this will increase the overall output of the cell. The optional measurement of the clamping flange flatness and subsequent positioning on the chuck for clamping with the least wheel distortion at OP1 improves the overall wheel quality and significantly reduces unbalance of even the most difficult wheels. When using the NUMTEC barcode system, all measurements can be automatically linked for statistical reasons to a mold and a casting machine, which also monitors the overall performance of the casting area. The two machine versions MD321 and MD322 are basically supplying the same function to the process but supporting different cell layouts. If enough space in the cell is available, the MD322 will be installed such that the robot directly takes the wheel out of the machine gripper. If the space situation is more difficult, the MD321 can be installed outside of the cell and only the small gripper unit moves into the cell robot area for the wheel supply.

YOUR ADVANTAGES

» Distortion measurement

Automatic distortion measurement for individual correction of wheel deviation to increase product quality to improve the overall productivity rate of existing equipment.

» Mixed production

The machine can work in batch operation or in fully flexible production lines with mixed wheel types.

» NUMTEC barcode system / camera system

Wheel type recognition with NUMTEC barcode or optionally with design recognition camera system.

» Statistical data and trend analysis

All measured wheel data is stored in a database system. This system can be used to generate trend analysis of your production, i.e. for casting and heat treatment lines.

» Significant cost savings through quality improvement

With the laser flatness measurement of the outboard clamping flange and the calculation of the individual best chucking orientation at the CNC lathe, massive improvements in the overall wheel quality can be achieved.

This will directly result in less rework percentage and NOK wheels.

FUNCTION

Hub float measurement

With the integrated hub float measurement, the height of the hub area will be compared with the chucking area at the front side clamping flange and the deviation to the nominal value will be detected. The generated data is used in the following ways:

- » For every wheel type, an individual maximum hub float deviation value ensures a perfect product quality. Wheels out of the tolerance range will not be passed on to the CNC machines, and therefore no machining time and cost will be spent on such NOK wheels.
- » Generation of a correcting value for the 2nd OP. The measured deviation from the nominal value will be transferred automatically to the cell PLC and CNC machine to be used as the correction value during the machining process. With this system, every wheel will be produced with individual offset values to achieve best possible quality.
- » Direct quality monitoring of the casting and heat treatment process. With a statistical analysis of all measured wheel parameters, the casting process can be monitored over a long time period. All data is available in a standard database system in the machine PC.

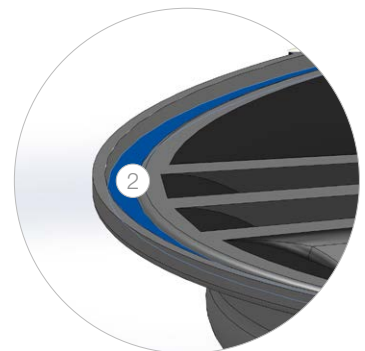
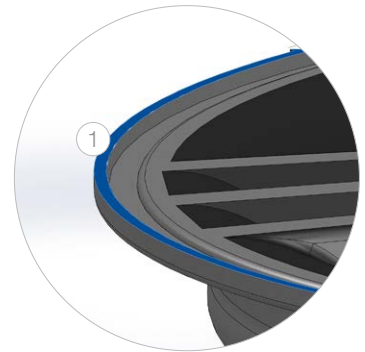


Flatness measurement

After the wheel type detection and the laser position measurement, the laser measures the front side clamping flange flatness. The sensor detects the flatness 360° around the wheel at the pre-defined clamping area for the 1st operation. For each 0.1° around the wheel, a height value is saved. With the generated 3600 measurement values, the exact deformation and flatness of the clamping flange is calculated. The deviation in this area will have a massive impact on the final wheel quality in terms of unbalance and radial run-out. Based on this knowledge, a calculation of acceptable tolerance values individually for each wheel type can also be made in the casting area.

This results in:

- » An early detection of NOK parts and just in time introduction of counteractions during the casting or heat treatment process
- » Prevention of production steps on reject wheels in the area of casting and machining
- » Capacity increase of existing equipment due to immediate separation of NOK wheels



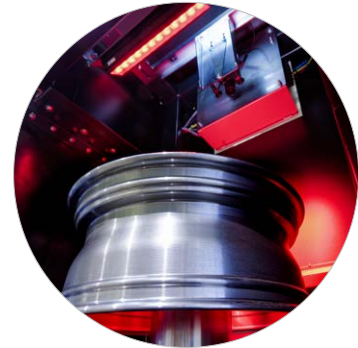
① Possible measuring position 1
» Top side clamping flange

② Possible measuring position 2
» Inner area clamping flange

FEATURES

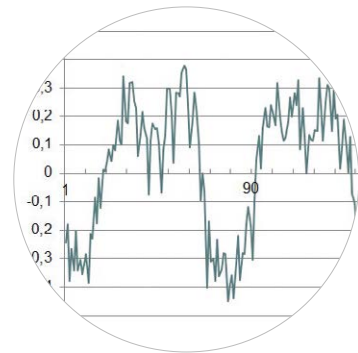
Repositioning unit

Optionally, for use in robot cells with a flexible wheel orientation, a combined repositioning and valve hole positioning camera unit can be supplied. The unit consists of a frame unit, a precise turning unit with centering pin and a camera system. The robot places the wheel prior to the drilling process (after OP1 or OP2) into the unit. The repositioning unit automatically turns the wheel back into zero position and then orients the wheel to the proper positioning for the valve hole.



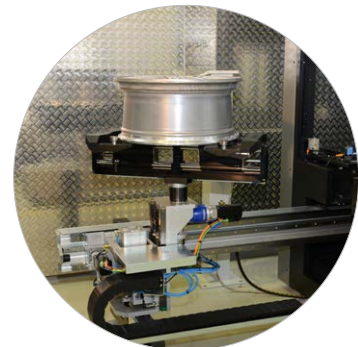
Best fit measurement for OP1

All measurement points from the flatness measurement are used to calculate the best angle position at the OP1 chucking system. The rotation unit turns the wheel into the measured and calculated best angle position; the cell robot only has to take the wheel and load it into the OP1 chuck. For manual production lines, this best position can also be marked with a color point, so that the operator can also use the system.



Moveable gripper of MD321

The machine version MD321 makes installation on existing cells with limited space possible. The complete gripper unit can move after measurement out of the machine frame and delivers the wheel on a slide directly into the robot area in the cell. The servo driven slide can move a maximum length of 10m from outside into the cell area.



Wheel type identification

For the automatic selection of the correct measurement program, the wheel type and the orientation must be detected at the start of a cycle. Typically, this is based on the NUMTEC barcode system that is used in many leading wheel plants all over the world. Optionally, the type recognition can also be done with a built-in camera system; but this has the disadvantage that wheels can only be differentiated by wheel type and not by individual mold numbers.





ALPINE METAL TECH

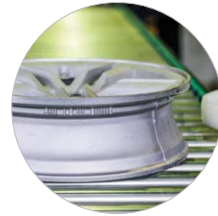




OPTIONS

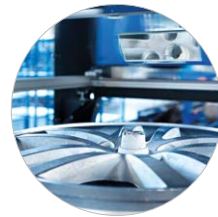
Flow forming wheels

The NUMTEC barcode scanner system is installed on an automatic height axis for moving the laser unit depending on the wheel height into the correct reading position.



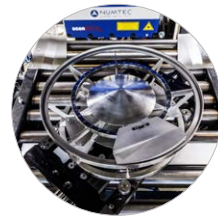
Sprue point control

Depending on the installation location, the machine can automatically detect whether the sprue is already drilled/punched out (safety check at cell entrance).



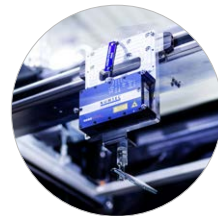
Machine calibration

With the NUMTEC control and calibration part, the machine calibration and accuracy can automatically be checked and documented.



Camera system

The wheel type and orientation will be detected from an integrated camera system.



Color point

For manual operation, to indicate the best chucking position at manually operated machining lines



Remote maintenance

Integrated possibility for remote maintenance access, if requested



MACHINE CONFIGURATOR

The MD321 and MD322 machines are highly standardized products with many options available. To make machine configuration easy, we grant our customers access to a configuration tool. This web-based software tool gives the option of configuring the machine layout exactly to the actual requirements on site. In addition to the conveyor connection side and the position of the access door, the position of

control cabinet and touch panel can be selected. The resulting machine with its unique code can be downloaded directly from the web page as a 3D model for the layout planning. This makes integration easy and avoids any mistake and misunderstanding during the project execution. At this point in time, you know from day one in the project what you will get delivered and how to integrate it into your facility.

ALPINE METAL TECH
Special solutions for long rolling, product identification and product inspection.

MD322

1	Wheel identification	Vision
2	Barcode type	Standard
3	Wheel rest/pad	Standard
4	Wheel supply position	2
5	Robot unload position	1
6	NOK conveyor position	No conveyor
7	Control cabinet position	Extern?
8	Service door position	No service door
9	Touch panel position	1/2
10	CAM 120	No CAM 120
11	CAM 120 Cable length	No
12	CAM 120 Camera position	

CODE MD322VSS21N2H12_N0N

Jetzt aktualisieren Aktualisieren

The 3D model shows a black industrial machine with a control cabinet on the left and a touch panel on the right. The machine is labeled 'ALPINE METAL TECH' and 'MD322'. A blue number '2' is visible on the floor in front of the machine.



- ① Wheel identification » Select the method of how the wheel type will be detected in the machine prior to the measurement process.
- ② Barcode type » If you use the NUMTEC barcode system, you need to define if you are using only monobloc wheels or flow forming wheels.
- ③ Wheel rest pad » Depending on the inboard flange type, you can select different rest pads in the gripping system.
- ④ Wheel supply position » This is decisive for the machine side where the wheels enter on the roller table.
- ⑤ Robot unload position » This is decisive for the machine side where the robot takes out the measured wheel for the further process.
- ⑥ NOK conveyor position » You can select whether a NOK conveyor exists and on which position.
- ⑦ Control cabinet position » You can configure 3 assembly positions for the control cabinet.
- ⑧ Service door position » For access to the machine, you can configure the position of a service door.
- ⑨ Touch panel position » Position of the touch panel, possible on all 4 sides.
- ⑩ CAM120 » Optionally, you can add a separate camera station (repositioning unit) to reorientate the wheel automatically prior to the drilling process.
- ⑪ CAM120 cable length » Defines the length of the pre-manufactured cable set between the MD321/MD322 and the repositioning unit.
- ⑫ CAM120 position » Defines the position of the orientated valve hole in the repositioning unit.

MD321



Moveable gripper – length according customer request

MD322



Typical installation



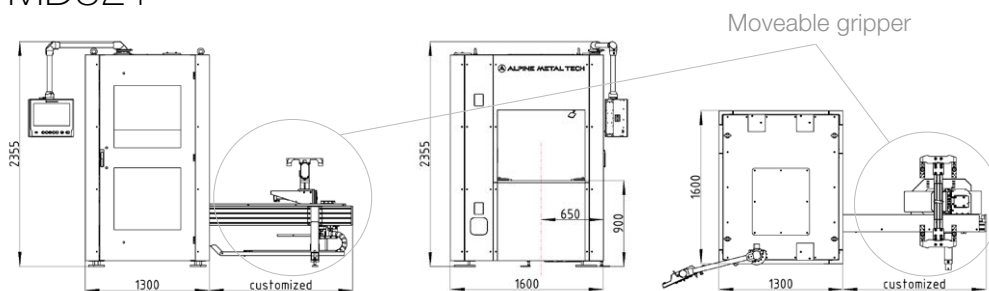
- ① Control system: With central PLC system for data control
- ② Distortion measurement MD321/MD322: For type recognition and improvement of wheel quality
- ③ Robot: With flexible double wheel gripper
- ④ Chucking OP1: For best wheel quality, up to 24"
- ⑤ Chucking OP2: 3, 4 and 6 jaw chucks
- ⑥ Optional repositioning unit: Orientation of wheels for drilling process
- ⑦ Workholding drilling: Flexible, for 3" sizes
- ⑧ Center bore measurement MD422: Including closed-loop control or OP1 machining

TECHNICAL DATA

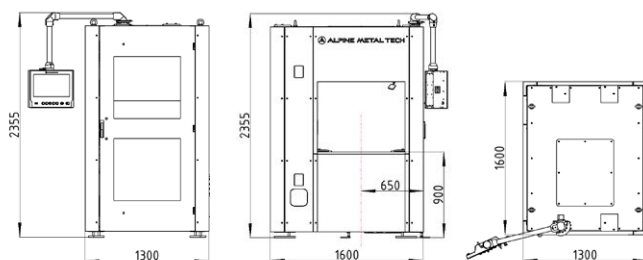
Machine features	measurement principle measurement characteristics measurement positions	laser sensor, triangulation type clamping flange flatness, hub float, distortion front side clamping flange, hub area
Wheel parameters	wheel size wheel weight	14 – 24" in total (2 mechanical clamping ranges, 14 – 21" and 17 – 24", manual change between the two ranges) max. 45 kg
Performance	machine capacity	approx. 60 wheels/hour
Technical components	HMI control system wheel type recognition turning unit	19" touch display industrial PC NUMTEC barcode system or vision system 3 – 10 seconds/revolution PHD gripper system with servo drive pneumatic vertical lifting unit, 220 mm
Interface		Profibus, Profinet, EtherNet/IP, Parallel I/O, 24 VDC or bus system
Media	electric connection pneumatic connection	3 x 400 VAC, 50 Hz, 5 kVA optional 3 x 460 VAC, 60 Hz, 5 kVA min. 6 bar
Machine dimensions	L x W x H	1300 x 1600 x 2353 mm
Weight	MD321 MD322	1450 kg (slide length 1 m) 1230 kg

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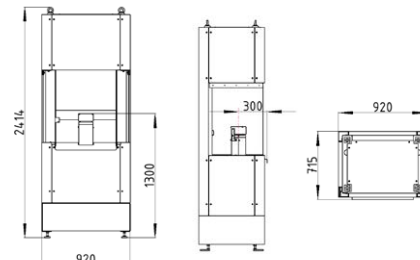
MD321



MD322



Optional repositioning unit



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