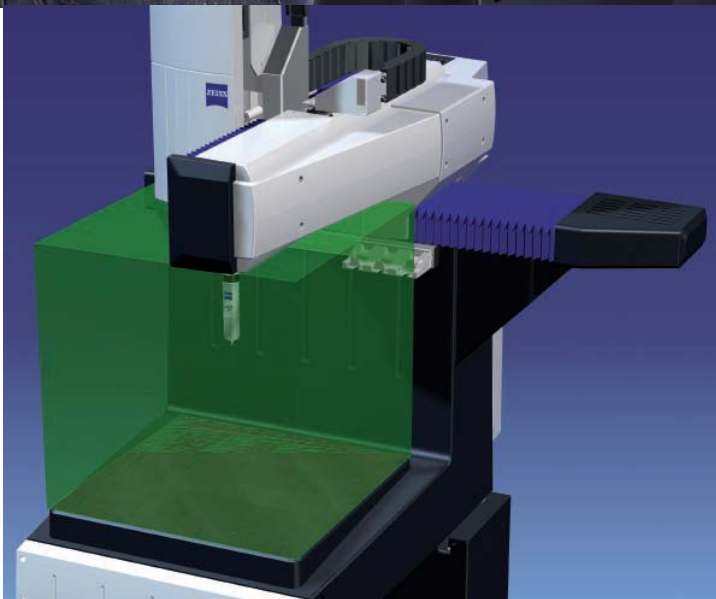


DuraMax. The Right Measuring Equipment for the Shopfloor.

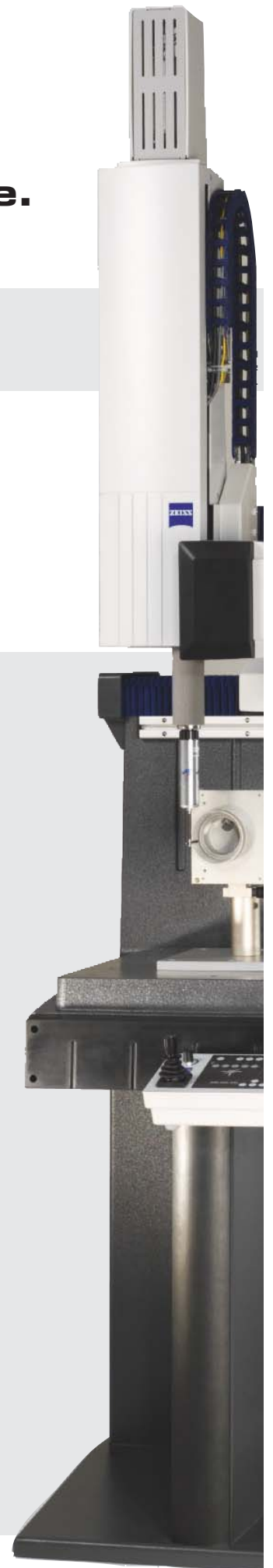


We make it visible.

DuraMax. Measuring can be that simple.

DuraMax as a replacement for complex gages

- Made for the shopfloor and production
- Measure where you manufacture
- No measuring lab required
- Temperature stability up to +30°C
- Can be seamlessly integrated into the production environment
- Scanning is standard
- Faster, more accurate, more reliable measuring



DuraMax as a replacement for gages and manual inspection equipment

- Replacement for fixed, expensive gages
- Flexibility for workpiece changes and different measuring tasks
- Pays for itself in a very short time
- More effective and economical than gages
- Object-oriented programming allows for flexible measurement plans



Upgrade from manual measuring equipment to a CNC machine.

The ability to measure quickly and accurately, and the flexibility to react to changes is a must in the machining and tooling industry. Fixed gages and manual inspection equipment are no longer economical. DuraMax is your answer.



Flexible measurement

The accuracy of measurements with gages is primarily influenced by human factors.

Gage measurement accuracy depends on:

1. User experience and ability
2. Correct use of the equipment

Generally, gages must be moved, adjusted or customized for different needs. These are potential sources of error that considerably influence the reliability and reproducibility of the measuring process. With DuraMax, individual methods or measuring techniques do not influence accuracy.

With DuraMax, you measure:

1. With the same CNC measuring run – always
2. With perfect process reliability
3. With absolute repeatability

Reduce time, travel and costs

With DuraMax, measure on the shopfloor and eliminate the need for a costly measuring lab. CNC runs and optimized measuring programs make it possible to complete measuring tasks more quickly and accurately. Sources of error are detected earlier; expensive rejects avoided.





Extremely compact: DuraMax will fit anywhere.

DuraMax. Replacement for simple gages and inspection equipment.		
	Gage	DuraMax
Measuring time	Varies: Depends on user experience and ability	Short: With scanning and CNC operation
Calibration	Critical: Each gage must be separately calibrated	Simple: Calibrate once, measure everything
Measurement record	Critical: Various documents, rarely in digital form	Simple: One standard record; can be stored and sent digitally
Process control	Defined: Fixed dimensions	Flexible: Variable measuring plan; allows process control and analysis

DuraMax.

The replacement for complex gages.

Typical everyday measurement tasks require several gages, multi-location measuring devices and manual inspection equipment. And when things change, investment in new equipment is needed. With DuraMax, these additional costs and time-consuming changes are no longer necessary.



One for all

All gages and fixed inspection equipment have common disadvantages. They are expensive and not flexible. DuraMax is just the opposite: It is flexible and can be adapted to all workpiece changes and different measuring tasks – paying for itself within a very short time. It's simple math: you work more effectively and economically with one measuring machine for all measuring tasks – instead of one gage for each task.

A lot of ZEISS for little money

DuraMax is a fully functional coordinate measuring machine (CMM) from Carl Zeiss. This CMM houses the knowledge and experience of the innovation and technology leader. This

means that ZEISS scanning is standard. This measuring technology allows you to measure more quickly, more accurately and thus more reliably than with any other method. All critical components are developed and produced by Carl Zeiss.

Measure where you manufacture

DuraMax is made for the shopfloor and production. DuraMax does not need a measuring lab, features temperature stability up to +30°C and is designed to fit seamlessly into the production environment.

Seamlessly integrated

Its small footprint and portability make DuraMax ideal for inline use. Inline measuring increases the productivity and efficiency of production processes. Seamlessly integrated, DuraMax optimizes the flow of material and information. Easy access on location allows for optimum control and monitoring of the production environment.

Not sensitive to temperature and dirt

Every shopfloor or production environment has to deal with temperature fluctuations and harsh environments. DuraMax has been ideally adapted to these conditions. Its enclosed guideways enable consistently accurate measuring.

At home anywhere

DuraMax is at home anywhere in production. Quickly moved with a forklift, it requires little space, needs no measuring lab or compressed air and thus effectively saves money.

Measuring on location

DuraMax measures where you need it to measure. This eliminates unnecessary trips between production and the measuring location. Save time and achieve reliability. Potential sources of error are recognized early on and can be corrected immediately.

DuraMax. Get rid of old gages and manual measuring equipment.		
	Gage	DuraMax
Lifecycle costs	High: a new gage for each measuring task	Low: one-time investment, no compressed air, high reliability and durability
Flexibility	Low: new measuring requirements = new gage	High: one machine for all applications
Temperature stability	Critical: relative	High: temperature stability up to +30°C; no measuring lab
Operator influence	Subjective	Objective
Contamination (ambient)	Critical: possible loss of accuracy	Protected: no influence on accuracy

DuraMax. A lot of ZEISS for little money.

- 1 **Guideways/drives**
 - No compressed air required
 - Electrical components outside the measuring range
 - Low-power drives
 - Maximum precision
- 2 **Measuring range**
 - 500 x 500 x 500 mm
- 3 **Operator ergonomics**
 - Three-sided loading
 - Seated and standing operation
- 4 **VAST XXT**
 - ZEISS measuring scanning sensor
 - For scanning or single point measurement
 - Stylus change directly from the rack
- 5 **Control panel with speed control**
 - Continuous speed setting
 - Easy to use
 - Portable





- 6 Shroud covers
- Protect against temperature influences and fluctuations
 - Protect against contamination

- 7 Glass ceramic length measuring system
- For a high temperature range with high accuracy

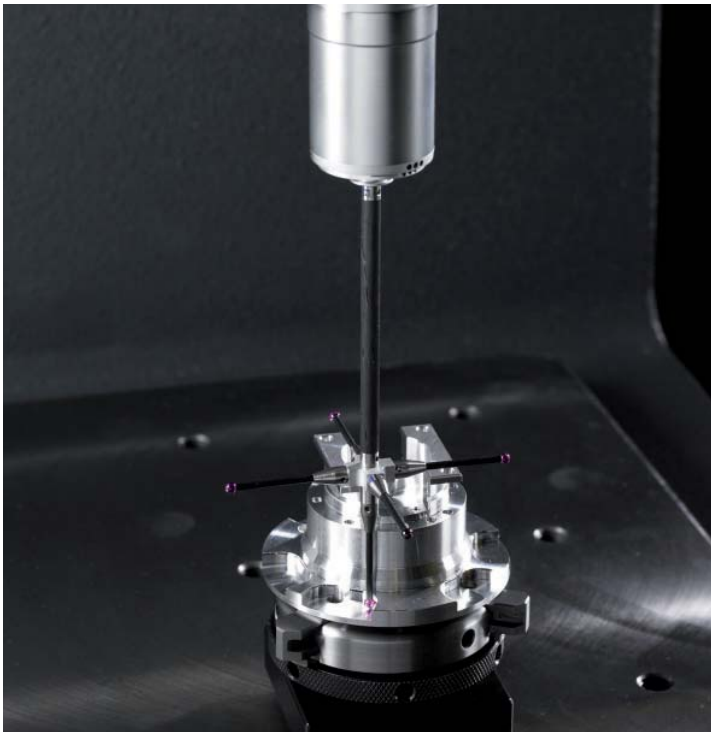
- 8 Stylus rack
- For 3,6 or 9 styli; can be changed during CNC operation
 - Wide variety of styli for a wide range of workpieces

- 9 Base (optional)
- Ergonomic design

- 10 Footprint
- Width: 670 mm, length: 200 mm, depth: 870 mm

Scanning is standard.

Measure quickly and accurately with scanning. No other CNC measuring technology is as reproducible and delivers such precise information on size, form and position. No other measuring method delivers results as fast. Scanning is standard on DuraMax.



Single-point vs. scanning

In metrology, there are two methods of acquiring measuring points: single-point and scanning. Single point measurement approaches a surface and then captures a point. Scanning, on the other hand, is the continuous, uninterrupted probing of contours during which the measured values are continually recorded.

The difference between the two strategies is primarily the quality of the measuring result. In all measuring tasks, single-point measuring is much less accurate and less reproducible. It provides insufficient information on the position of the part feature and none on the form.

The experience with measuring equipment in production operations demonstrates that only scanning is simple, fast and precise. It is no wonder then that this measuring technology is also the dominant technology with larger coordinate measuring machines.

Single-point	Scanning
Acquisition of single points	Acquisition of a point line
Determination of single measuring points	Determination of the absolute form (actual form)
Longer measuring times, less information	Shorter measuring times, more accurate results
High dispersion, low repeatability	Minimal dispersion, maximum reproducibility
Inaccurate information on position, practically none on the form of circles, cylinders, cones and plane surfaces	Precise information on the size, form and position of circles, cylinders, cones and plane surfaces
Measurement of curves and freeform surfaces, as well as unknown contours practically impossible	Precise scanning of known contours of curves and freeform surfaces, as well as unknown contours

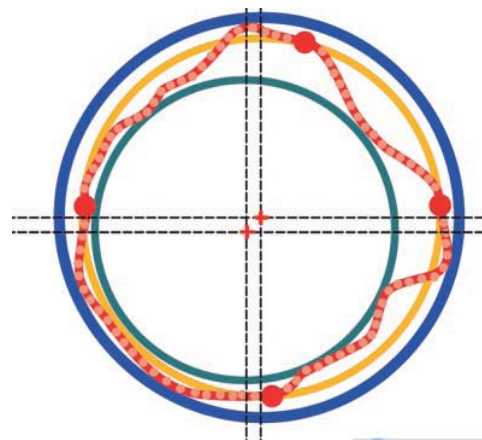


Scanning enables statistical process control
 DuraMax can be located next to the machine tool to manage the ongoing production process. The measuring results take the shortest and fastest route back to the machine tool.

High quality results require a large number of measuring points. As the number of points increases, so does the accuracy of reproducible results. For example, a maximum inscribed circle, vital for pairing behavior, can only be determined with a large number of points.

A compilation of optimal pairings can only be achieved with exact knowledge of the smallest and largest dimensions, particularly in volume production. With scanning, you achieve a considerably higher number of matching parts than with traditional measuring equipment. The rejection rate is reduced to a minimum.

- Maximum inscribed circle:
smallest possible diameter of the borehole
- Minimum circumscribed circle:
largest possible diameter of the wave
- Chebyshev:
mean diameter during adjustment based on lowest deformation



- Minimum circumscribed circle determined using scanning values
- Compensating circle calculated from the 4 single points
- Maximum inscribed circle determined using scanning values
- Shape evaluation
- Single point (4-point measuring)
- ⊕ Different center point coordinates for minimum circumscribed/maximum inscribed circle

CALYPSO.

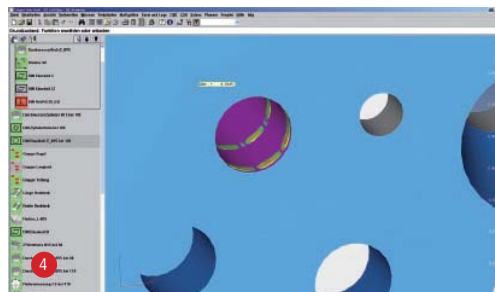
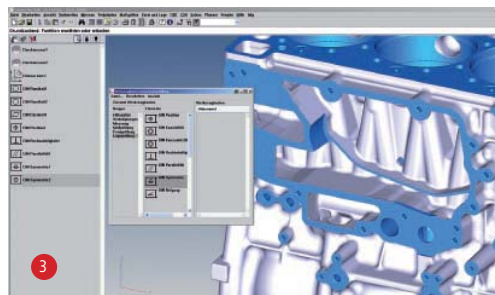
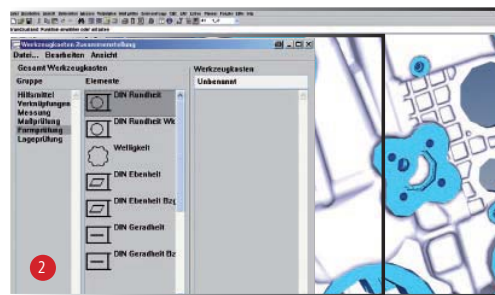
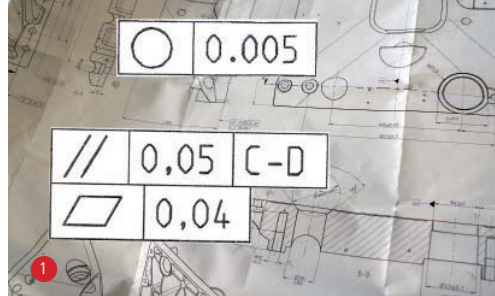
Measure without programming.

Anyone making the move to a coordinate measuring machine expects to deal with new software and training before the machine can be used. With DuraMax and CALYPSO, simply turn on the machine and start measuring.

Measure what you see.

CALYPSO is based on the principle of visual metrology: you measure what you see – without extensive programming or complicated code and text input. All part features from a drawing or a CAD model are stored as icons in CALYPSO. Select the icons you need and your measurement plan is finished. CALYPSO automatically calculates the ideal measuring run and travel paths.

The flexible design of a measurement plan is a key benefit for monitoring production steps. You can quickly extract any number of sequences from a complete measuring run and perform them as a partial measurement.



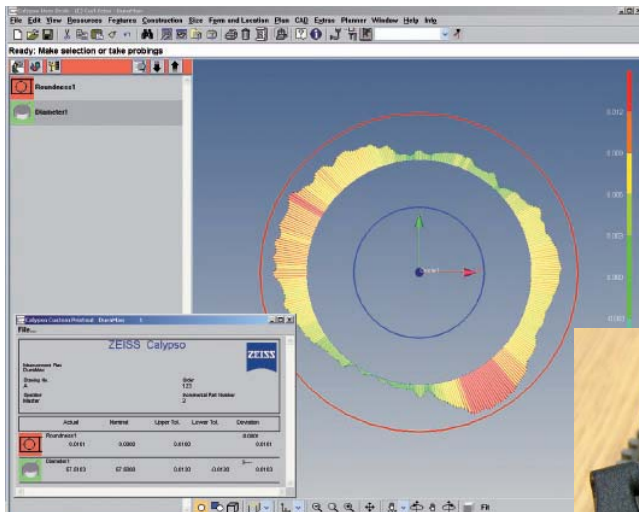
Measuring in 4 steps

DuraMax. Measuring can be that simple.

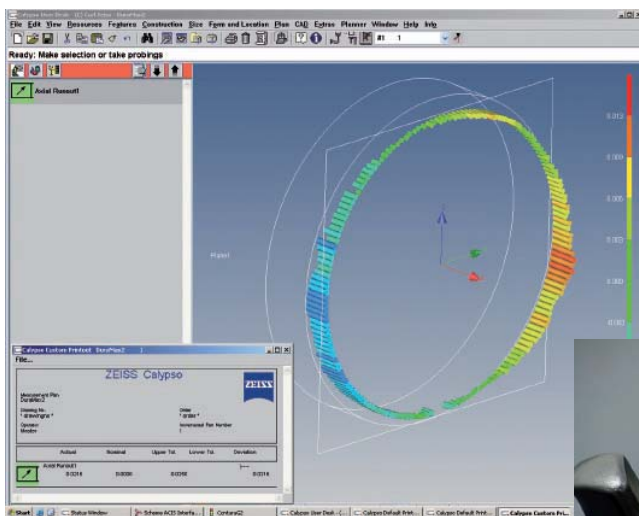
- Programming errors are reduced to a minimum
 - CALYPSO automatically fine tunes the measurement, generating travel paths and calculating the optimal measuring run
- Object-oriented
 - Single elements can be selected
- Easy interpretation of the results
 - All measuring results can be visualized
- Automatically to the measuring program
 - CALYPSO automatically guides each user to the right measuring run using the AutoRun function
- Fast error recognition
 - If an error is detected in the production process, you can measure just these part features without having to perform the complete measuring run

Immediate results with the latest measuring technology.

No complex programming with DuraMax!



Unlike a micrometer that measures a 2-point diameter, DuraMax delivers the functional size of the part feature. Quickly and easily.



DuraMax quickly and automatically shows the precise form deviation. Handheld gauges do not provide this information.

DuraMax. In a nutshell.

Key features



Made for production

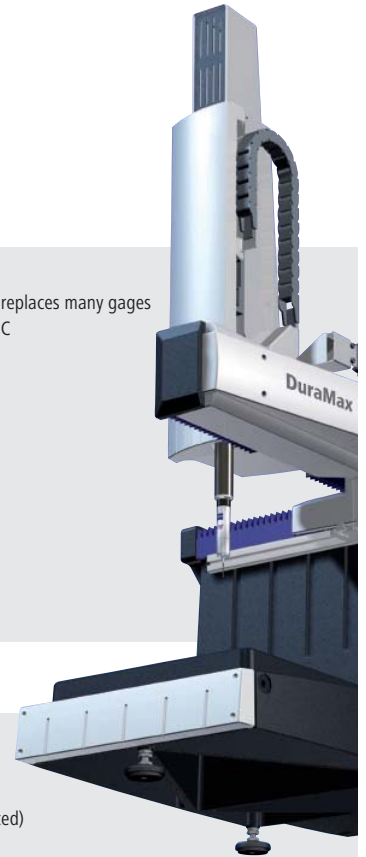
- Complete CNC coordinate measuring machine; replaces many gages
- Measure with temperature stability up to +30°C
- Passive vibration damping
- Minimal space requirements; easy set up

Well-equipped standard configuration

- Configured with scanning
- Extensive stylus selection possible

Made to measure

- Easy to use; can be loaded from three sides
- Practical stylus rack
- Low space requirements; more room to work



Machine technology



Reliable drive technology

- Completely covered guideways
- Integrated damping system
- Compensation of guideway errors (CAA corrected)

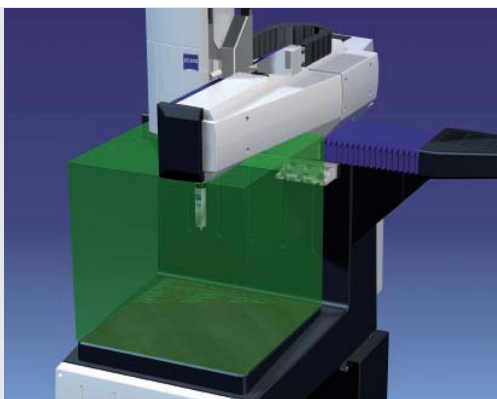
Technology from Carl Zeiss, the market leader

- C99 controller technology
- VAST XXT scanning sensor
- CALYPSO measuring software

Easy installation

- Ready for use
- Fast startup
- No special installation or power requirements

Measuring range



Designed for a variety of parts

- 500 x 500 x 500 mm

Max. workpiece weight

- 100 kg

Wide range of uses

- Replaces many gages, multi-location measuring equipment, manual inspection equipment
- Perfectly suited for small and mid-sized companies
- Can be used in the mechanical engineering, plastics and automotive industries

Sensor systems

VAST XXT scanning sensor from the technology leader

- Probe for single-point measuring and scanning
- Stylus receptacle for CNC-guided stylus change
- Adapter plate with 25 mm diameter for optimal reproducibility
- Stylus system length: 30-125 mm axial, up to 40 mm radial
- Large deflection range (± 3 mm) for maximum collision protection
- Lowest measuring force for a wide range of workpieces



Operation

Simple and easy to use

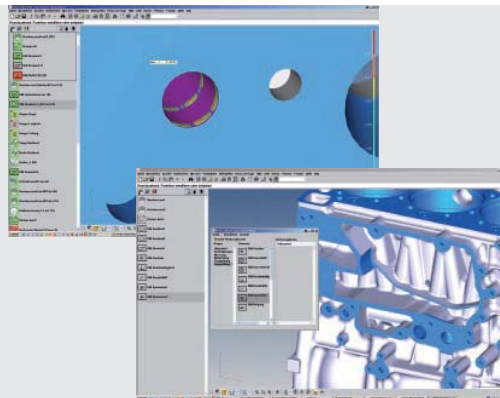
- Standard control panel for manual control
- Speed control for CNC operations
- Metrology evaluation in CALYPSO: easy-to-use standard measuring software from ZEISS
- Easy operation and loading from all sides



Software

Easy measuring with CALYPSO

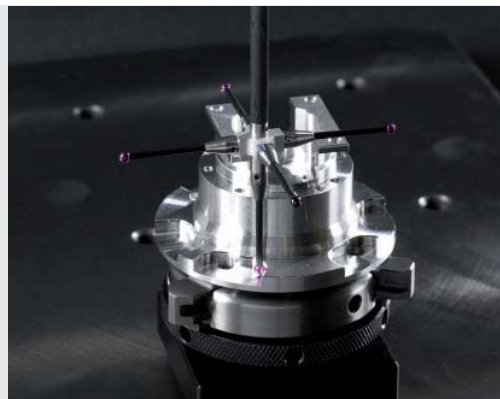
- Proven software from ZEISS
- CAD-based 3D measuring software
- Object-oriented programming
- Graphic display of the measuring results
- Easy to follow menus and context-sensitive help
- Automatic stylus calibration
- Flexible adjustment of the measuring run when changes are made to the workpiece
- Fast manual measurements when needed
- Fully automatic CNC run



Precision

Temperature Variable Accuracy (TVA) –
the new dimension in precision

You can specify the required accuracy depending on the temperature range of the installation site. It is very easy: you receive the specific accuracy of your DuraMax® in the respective environment.



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Some of the options shown are not included in the basic package. Subject to change in design and scope of
delivery and as a result of ongoing technical development. Printed on chlorine-free bleached paper.
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