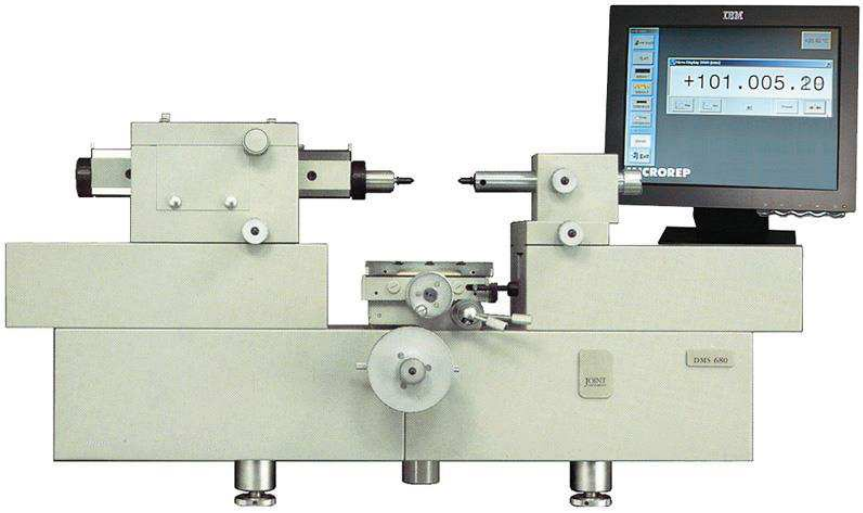
DMS 680 Universal Measuring System

The system is composed of the unit DMS 680 for the direct measurement of gages and a powerful gage management & measurement software Micro*Net*. The measurement unit and the software are highly integrated so to cover gages measurement and management needs, arising from the application of norms *ISO 9001* and *IATF 16949*.
The temperature compensation device guarantee high stability of the results in marginal environmental conditions.



Applications DMS 680

Main applications of the DMS 680 are the inspection of:

- plain plug gage
- plain ring gage
- thread plug gage
- thread ring gage
- workshop slip gage
- snap gage
- pipe thread plug and ring gage
- bore gage
- external micrometer
- internal micrometer
- comparators
- electronic probe
- lever type comparator
- spline gage with involute profile and tooth gage

Characteristics of DMS 680

The high accuracy of the DMS 680 measuring system is obtain trough the following:

- full respect of the Abbe comparators principle
- Heidenhain scale with special accuracy
- constant measurement pressure
- environmental temperature compensation device
- adjustable work table for the inversion point detection
- automatic computer reading system
- gage management & measurement software
- adjustable tips

Technical specifications DMS 680

Reading system	direct PC reading		
Measuring unit	mm | inches (switchable)		
Resolution	standard	0.1 μm	0.000005"
	optional	0.01 μm	0.000001"
		0.05 μm	0.000002"
Measuring field standard	absolute:	100 mm	4 "
	differential (external):	680 mm	27 "
	external plain:	0 ÷ 680 mm	0 ÷ 27 "
	internal plain:	1 ÷ 480 mm	0.04 ÷ 19 "
	external thread:	0 ÷ 480 mm	0 ÷ 19 "
	internal thread:	14 ÷ 90 mm	0.55 ÷ 3.5 "
optional	internal thread T-sphere:	3 ÷ 90 mm	0.12 ÷ 3.5 "
	internal thread Big Ring:	90 ÷ 400 mm	3.5 ÷ 16 "
Measuring load	0÷2.5 N optional up to 11 N | 0÷0.55 lb optional up to 2.5 lb		
Work table	work top surface:	160 x 160 mm	6.2 x 6.2 "
	extension table surface:	400 x 100 mm	
	vertical travel (Z axis):	100 mm	4 "
	traversal travel (Y axis):	25 mm	1 "
	tilting (about Y axis):	± 3°	
	rotation (about Z axis):	± 4°	
	load capacity:	11 Kg	25 lb

Size

Dimensions	(l × d × h) 1.300×400×480 mm | 51×16×19 "	
Weight (basic unit)	110 Kg	240 lb

Accuracy

The **DMS 680** "accuracy" is given in terms of **Uncertainty** (U95).

MPE $_{E1}$ in the absolute range	$0.18 + \frac{L(mm)}{1200}\ \mu m$	0.000010 "

Environmental conditions with temperature compensation device (included):

- temperature	20.0 °C ± 1.0 °C	68.0 °F ± 1.8 °F
- gradient	0.20 °C per hour	0.36 °F per hour

The environmental temperature compensation device allows the extend the temperature range to 15 ÷ 30°C with a minimum influence on the measurement uncertainty.

DMS 680 uncertainty of measurement is calculated with a 95% level of confidence when measuring with radius contact tips a plain external gage block with thermal expansion coefficient equal to $11.5 \times 10^{-6}\ K^{-1}$, at 20.0 °C in inspection room having above indicated conditions. Master uncertainty not considered. Deviation test to be done in accordance with Microrep procedure and conditions, based on below listed norms.

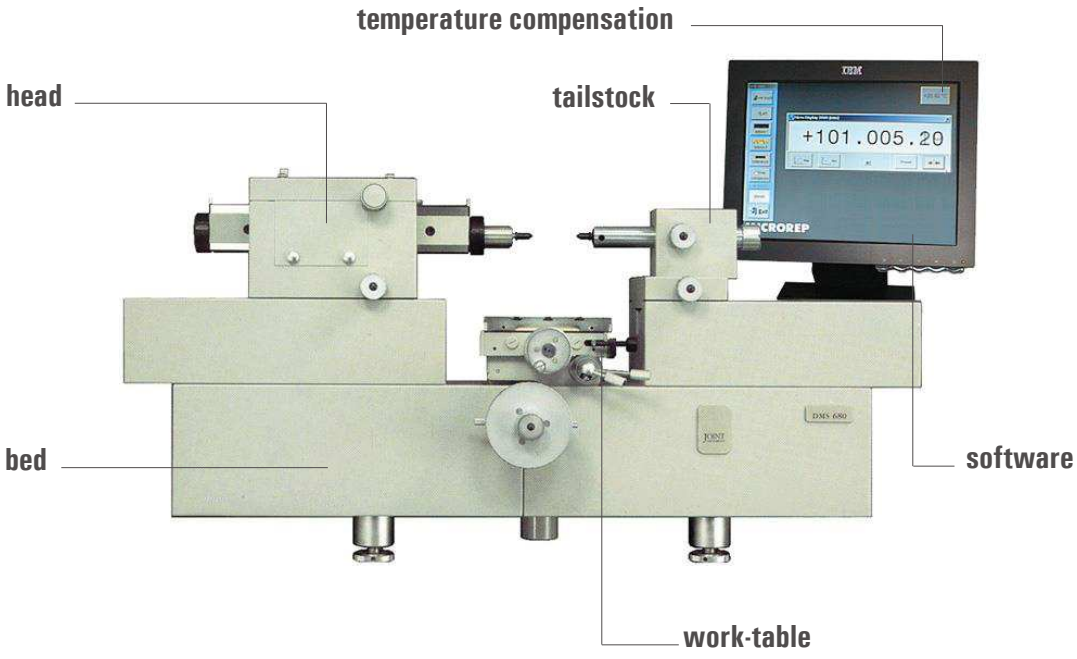
Reference standards:

VDI/VDE 2617	Accuracy of Coordinate Measuring Machines
BSI6808	Coordinate measuring machines: methods for verifying performance

Main unit DMS 680

Base unit	Cast iron bed with guide-ways for the measuring head and the tailstock positioning.
Measuring head	Built in the full respect of Abbe's principle, it is equipped with an Heidenhain reading system.
Temperature compensation	The measuring head temperature is compensated through a sensor so to **minimize the problems related to the fluctuation of the environmental conditions.**
Tailstock	Equipped with adjustable tips so to allow **easy alignment of the tips.**
Work table	Adjustable in **all directions**, so to allow the gage alignment: - vertical travel (Z axis): 100 mm | 4 " - traversal travel (Y axis): 25 mm | ¼" - tilting (about Y axis): ± 3° - rotation (about Z axis): ± 4°
Measuring load	The measuring force is constant at all positions of the measuring field. Standard load 0 ÷ 2.5 N | 0.55 lb.
Reading system	Direct on-line reading on the PC screen via Heidenhain board plugged into the PC.

The Unit



Standard Equipment of DMS 680

Plain Plug gage and Rod measurement device

Max length up to 680 mm | 27 "
Plug gage holder [I]: gage in horizontal position with maximum diameter 180 mm | 7 "
Radius tips [I]: radius 20 mm | 0.79"
Knife tips large edge : length 8 mm | 0.31"
Knife tips small edge: length 2 mm | 0.08"

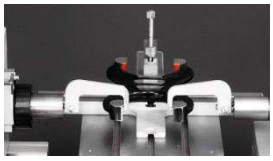
Center cradle

Max distance between centers: 200 mm | 8 "
Max piece diameter: 180 mm | 7"

Plain Ring gage measurement device

Gage diameter 14÷480[II] mm | 0.55÷19 "
Big contact arms [I]: diameters bigger than 45 mm | 2", max depth 50 mm | 2"
Radius tips for big contact arms : ø 8 mm | 0.31"
Small contact arms [I]: diameters bigger than 14 mm | 0.55", max depth 12 mm | 0.5"
Special tailstock spindle for small contact arms
Radius tips for small contact arms: ø 6 mm | 0.23"
Small parallels [I] : height 20 mm | 0.79", length 160 mm | 6.29"
Precision setting rings ø 14 mm | 0.55" and 50 mm | 2"

Snap gage measurement device



Cross holder
Clamping device
Big contact arms [I] : min ø 45 mm | 2", max depth 50 mm | 2"
Small contact arms[I]: min ø 14 mm | 0.55", max depth 12 mm | 0.5"

Small Plain Holes measurement device

Gage diameter 1÷30 mm | 0.04÷1.2 "
Mounting table
Contact tip holder
Spherical end stylus contact tip: ø 0.8 mm | 0.035"
Spherical end stylus contact tip: ø 3 mm | 0.12"
Battery power supply (8 batteries AA – 1.5V each)

[II] some limitations might apply due to gage outside diameter
[I] component common to other devices, included in the standard equipment.

Standard Equipment of DMS 680

Thread Plug gage measurement device

Gage diameter 0÷480 mm | 0÷19 "
Flat contact tips small size : ø 2 mm | 0.08"
Flat contact tips medium size [I] : ø 8 mm | 0.31"
Flat contact tips large size: ø 14 mm | 0.55"
Calibrated wires holder
Plug gage holder [I] : gage in horizontal position, max ø 180 mm | 7"
Set of 16 calibrated wires terns
millimeters | inches : 0.335|0.01318, 0.390|0.01535, 0.455|0.01791, 0.530|0.02086, 0.620|0.02440, 0.725|0.02854, 0.895|0.03523, 1.100|0.04330, 1.350|0.05315, 1.650|0.06496, 2.050|0.08070, 2.550|0.10039, 3.200|0.12598, 4.000|0.15748, 5.050|0.19881, 6.350|0.25000 - special diameters on request

Note: the Thread plug gage device can be used to check the pitch diameter of **Pipe Thread plug gage**. In this case it is required the Height device and software (not included – see options).

Thread Ring gage measurement device

Gage diameter 14÷90[II] mm | 0.55÷3.55"
Floating table with clamping device
Big contact arms [I] : min ø 45 mm | 2", max depth 50 mm | 2"
Spheres for big contact arms (couples):
ø 0.8 mm | 0.00314" short
ø 0.8 mm | 0.00314" long
ø 1.35 mm | 0.05315"
ø 1.8 mm | 0.07086"
ø 2.3 mm | 0.09055"
ø 3.1 mm | 0.12204"
Small contact arms[I]: min ø 14 mm|0.55", max depth 12 mm|0.5"
Spheres for small contact arms (couples):
ø 0.8 mm | 0.00314" short
ø 0.8 mm | 0.0031" long
ø 1.35 mm | 0.05315"
ø 1.8 mm | 0.07086"
ø 2.3 mm | 0.09055"
special diameters on request

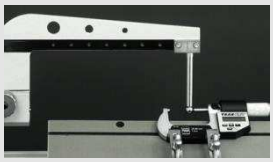
Workshop gage block measurement device

Small parallels [I] : height 20 mm | 0.79", length 160 mm | 6.29"
Radius tips [I] : radius 20 mm | 0.79"
Clamping device

[II] some limitations might apply due to gage outside diameter

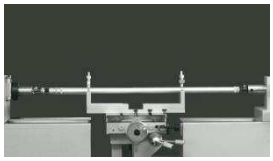
Standard Equipment of DMS 680

External Micrometer measurement device



Micrometers up to 300 mm | 12". Travel 100 mm | 4"
To check the division of the micrometer head.
Micrometer table
Contact arm
Spherical end contact tip : ø 4 mm | 0.16"
Spherical end contact tip: ø 12 mm | 0.47"
Flat contact tip : support length 120 mm | 4.7"

Internal Micrometer Rod and Bars measurement device



To check bars and internal micrometers up to 600 mm | 24". Absolute travel 100 mm | 4"
Gage support [I]
Flat contact tips medium size [I] : ø 8 mm | 0.31"
Radius tips [I] : radius 20 mm | 0.79"

Indicator measurement device

To check analogue and digital both plunger and lever type indicators
Travel 100 mm | 4"
Indicator holder with mounting diameters 8 mm and 3/8"
Support table [I]
Flat contact tips medium size [I] : ø 8 mm | 0.31"

"V" bearing device

Double side "V" bearing, adjustable [I] 12÷400 mm | 0.47÷15.7"
Used to hold rod, internal micrometer and extension bar.

Quick Locking devices

Long and short spring locking devices for fast clamping of gages. Height 60 and 90 mm. Supplied in couples.

Spline with involute and Tooth gage measurement device

To measure inside and outside gages with involute profile (software not included – see options).
Floating table [I] with clamping device [I]
Small and Big contact arms [I] with spheres [I] (see Thread Ring gage measurement device for list of included spheres)
Calibrated wires [I] (see Thread Plug gage measurement device for list of included wires)
spheres and wires with other diameters on request

Bore gage measurement device

To measure the travel of the movable anvil.
Gage holder [I]

[I] component common to other devices, included in the standard equipment.

Computer

PC and Monitor	PC IBM compatible. PC spec might change upon availability. Minimum characteristics are: Intel®i5 3 GHz, 8 Gb Ram, 500 Gb HD, Keyboard, Mouse. Windows 10 Pro 64bit authentic preloaded on the PC (no media), USB 2.0, Graphic accelerator, Ethernet integrated, Smps 230W. Monitor 19" **LCD** with **flat screen** Reading Heidenhain board integrated in the PC
Operating System	Windows 10 in English.
Documentation	Instruction books DMS 680 in English.

Temperature compensation device

Temperature sensor	Built into the measuring head, it reads the DMS 680 measuring element temperature so to compensate the environment in the range of 15 ÷ 30°C | 60 ÷ 85 °F.
Software	Direct reading and compensation of the DMS 680 temperature with 0.01°C | 0.01°F resolution

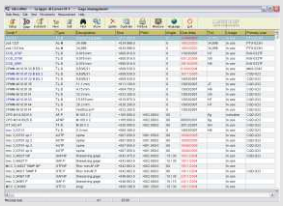
Calibration Report

Traceable Report	Traceable calibration report to national standards, for the absolute measuring range of the system.

Micro*Net* 8 Software

The DMS 680 measuring system is supplied with software Micro*Net* to **Manage** and **Measure** gages.
Works in Windows environment and is supplied in English (other languages available upon request – please enquiry for details).

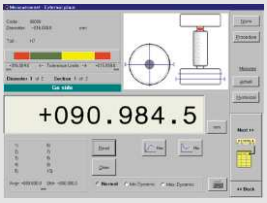
Management Software



Allows to manage and store solid gages and instruments, creating for each of them a detailed file, listing all main characteristics.
Main features are:

- automatic tolerances[1] calculation for gages;
- instrument inspection plan includes Visual Inspections (qualitative tests) and Dimensional Inspections (quantitative tests);
- listing criteria and sorting functions (ex. For due date, location, type, dimension, etc.);
- possibility to export data in PDF.
- solution to ISO9001 / IATF16949 requirements: complete measurement traceability, easy location of the gage into the structure;
- master gage management with automatic due date notification;
- visualization of standards and procedures during the measurement;
- cost centers to monitor the "cost of the quality"
- active management of the gage states (in use, non-in use, reparation, lost, etc.);
- works in network environment.

Measurement Software



The DMS 680 measuring system is directly integrated with the software allowing fast and reliable measurements.
Main features:

- on screen direct reading of the current measurement value
- solid gage measurement procedures (plain plug and ring, thread plug and ring, snap gage, reference gage, rod, etc.)
- instruments measurement procedures (indicators, lever type indicator, probe, bore gage, external micrometer, internal micrometer, depth gage, vernier caliper, etc.
- automatic detection of the inversion point;
- automatic formulae evaluation for the pitch diameter for thread gage;
- automatic evaluation of the instrument limits in terms of Fu (hysteresis), Fmax (max error), repeatability and of the gage state in relation to its tolerances[1].

Note: software licenses managed with Usb dongle

[1] The module includes automatic tolerances calculation for gages according to following standards (for other standards see software options):

Plain gage ISO-Metric

- ISO/R - 1938
- ISO 286

Thread gage ISO-Metric

- ISO 965/1
- ISO 1502