Measuring systems

Page

Microscopes

Projectors

Video systems

Illuminators

Accessories

Measuring microscopes

MA 331ES-113EG

- Base MA 331ES with transmitted and incident light illuminator
- Column MA 331-S1-030, height 300 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Digital micrometers Sylvac
- Microscope MA 113G-77
- Goniometer "G" 360°, reading 5’
- 1 objective on choice
- Real image
- LED incident light MA 114a-08

	Magnification				
	10x	**20x**	**30x**	**50x**	**100x**
Ø of field of view in mm	13.8	6.9	4.6	2.7	1.3
Max. work piece size in mm	68	63	67	61	61

MA 331ES-130EGWZ

- Base MA 331ES with transmitted and incident light illuminator
- Column MA 331-S4-040, height 400 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Digital micrometers Sylvac
- Zoom microscope MA 130GW-Z1-014
- Goniometer "G" 360°, reading 5’
- Zoom objective, magnification 10-65x
- Working distance 92 mm
- Real image
- Cold light source MA 1100
- Fibre optic ringlight GRL 40

Ø of field of view in mm	20 - 3
Max. work piece size in mm	143

Measuring microscopes

MA 173ES-130EGW

- Base MA 173ES with transmitted and incident light illuminator
- Column MA 173-S2-003, vertical displacement 100 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Digital micrometers Sylvac
- Microscope MA 130GW
- Goniometer "G" 360°, reading 5’
- 1 objective on choice
- Real image
- LED incident light MA 114a-08

	Magnification				
	10x	**20x**	**30x**	**50x**	**100x**
Ø of field of view in mm	22.5	11.25	7.5	4.5	2.25
Max. work piece size in mm	82	91	92	81	91

MA 185S-130EGWZ

- Granite base MA 185S-001
- Column MA 335-S4-040, height 400 mm
- Co-ordinate table MA 145-15 (150x70 mm)
  with 2 scales Heidenhain
- Programmable calculator Quadra-Check 220 HH
- Zoom microscope MA 130GW-Z1-014
- Goniometer "G" 360°, reading 5’
- Zoom objective 10-65x
- Working distance 92 mm
- Real image
- Cold light source MA 1100
- Fibre optic ringlight GRL 40

Ø of field of view in mm	20 - 3
Max. work piece size in mm	146

Measuring projectors

MA 173S-240-5x

- Base MA 173S without electrical equipment
- Transmitted light illuminator with power unit
- Column MA 173-S7-001, vertical displacement 130 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Rotary table MA 143-6-70
- Digital micrometers Mitutoyo
- Projector MA 240P-5x (large field of view)
- 1 objective 5x
- Real image
- Cold light source MA 1300
- Fibre optic ringlight GRL 66

	Magnification
	5x
Ø of field of view in mm	30
Max. work piece size in mm	120

MA 173ES-240EG

- Base MA 173ES with transmitted and incident light illuminator
- Column MA 173-S2, vertical displacement 100 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Digital micrometers Sylvac
- Projector MA 240G
- Optical goniometer "G" 360°, reading 10’
- 1 objective on choice
- Real image
- Incident light illuminator MA 213-4V

	Magnification				
	10x	**20x**	**30x**	**50x**	**100x**
Ø of field of view in mm	15	7.5	5	3	1.5
Max. work piece size in mm	95	95	95	95	95

Measuring projectors

MA 175ES-240EG

- Base MA 175ES with transmitted and incident light illuminator
- Column 175-S2, vertical displacement 100 mm
- Co-ordinate table MA 145-15 (150x70 mm)
  with 2 scales Heidenhain
- Programmable calculator Quadra-Chek 220 HH
- Projector MA 240G
- Optical goniometer "G" 360°, reading 10’
- 1 objective on choice
- Real image
- Incident light illuminator MA 213-13V-100W

	Magnification				
	10x	**20x**	**30x**	**50x**	**100x**
Ø of field of view in mm	15	7.5	5	3	1.5
Max. work piece size in mm	95	95	88	87	95

MA 175ES-250EG

- Base MA 175ES with transmitted and incident light illuminator
- Column MA 175-S2, vertical displacement 100mm
- Co-ordinate table MA 145-15 (150x70 mm)
  with 2 scales Heidenhain
- Programmable calculator Quadra-Chek 220 HH
- Projector MA 250G
- Optical goniometer "G" 360°, reading 10’
- 1 objective on choice
- Real image
- Incident light illuminator MA 213-13V-100W

	Magnification				
	10x	**20x**	**30x**	**50x**	**100x**
Ø of field of view in mm	25	12.5	8.3	5	2.5
Max. work piece size in mm	95	95	88	87	95

Video measuring systems

MA 331S-705-110

- Base MA 331S without electrical equipment
- Column MA 331-S1-030, height 300 mm
- Video optics MA 705-110
- Colour video equipment
- Cold light source MA 1100
- Fibre optic ringlight GRL 25

⌀ of field of view in mm	14 x 19	7 x 9.5	4.6 x 6.3	2.8 x 3.8	1.4 x 1.8
Max. work piece size in mm	70	70	70	70	70

MA 331ES-705-Z1

- Base MA 331ES with transmitted and incident light illuminator
- Column MA 331-S4-030, height 300 mm
- Co-ordinate table MA 142-2 (25x25 mm)
- Digital micrometers BST
- Zoom video optics MA 705-Z1-054
- Colour video equipment
- Working distance 92 mm
- Crosswire generator MA 1600
- Cold light source MA 1200
- Fibre optic ringlight GRL 40

⌀ of field of view in mm	13.6 x 10.2 - 2.1 x 1.6
Max. work piece size in mm	39

Video measuring systems

MA 183S-705-Z2

- Granite base MA 183S
- Column MA 333-S5-040, height 400 mm
- Co-ordinate table MA 143-6 (50x50 mm)
- Rotary table MA 143-6-70
- Digital micrometers Sylvac
- Zoom video optics MA 705-Z2-014
- Colour video equipment
- Crosswire generator MA 1600
- Cold light source MA 1200
- Fibre optic ringlight GRL 40

⌀ of field of view in mm	16.5 x 12.4 - 1.4 x 1.0
Max. work piece size in mm	130

MA 175S-705-Z2 / QC 200

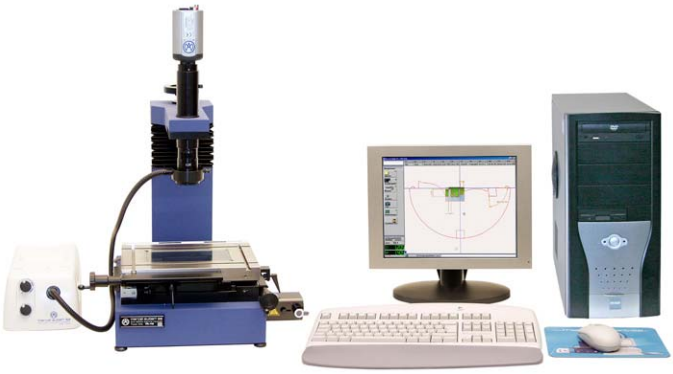
- Base MA 175S without electrical equipment
- Transmitted light illuminator with power unit
- Column MA 175-S5-011,
  vertical displacement 100 mm
- Co-ordinate table MA 145-15 (150x70 mm)
  with 2 scales Heidenhain
- Programmable calculator Quadra-Chek 220 HH
- Zoom video optics MA 705-Z2-014
- Colour video equipment
- Crosswire generator MA 1600
- Cold light source MA 1200
- Fibre optic ringlight GRL 40

⌀ of field of view in mm	16.5 x 12.4 - 1.4 x 1.0
Max. work piece size in mm	100

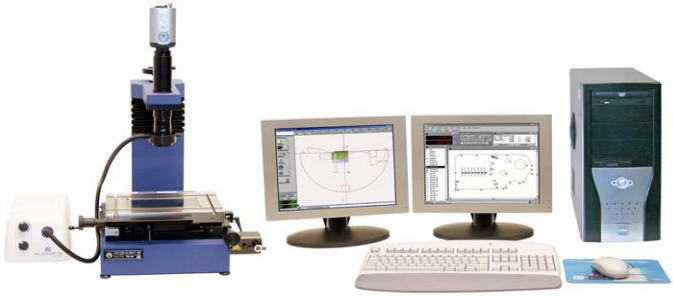
Measuring systems with software

MA 175S-705-Z2 / Metric / VideoCAD / QC 4000

Metric



VideoCAD



VideoCAD and QC 4000

- Base MA 175S with transmitted and incident light illuminator
- Rotary table MA 145-15 (150x70 mm) with 2 scale Heidenhain
- Industrial PC-system with 1 (2) TFT-flat screen(s)
- Software Metric / VideoCAD / VideoCAD and QC 4000
- Zoom video optics MA 705-Z2
- Colour video equipment
- Cold light source MA 1200
- Fibre optic ringlight GRL 40

Metric

(Measuring software)

- Display and measuring of video images on the PC, both in live and in still (freeze) mode.
- The displayed images can be measured and added with text, circles, lines, saved in standard file formats (*.jpg, *.tif, *.bmp etc.) and processed in other Window-programs.
- The value for measuring can be saved in an ASCII-file.
- 3 different thicknesses of lines and 6 measuring colours are at disposal. After each measurement a new colour can be chosen.
- For creating an own mask, the dimensioning can switched off.
- Languages: English, German, French, Italian, Spanish, Portuguese and Dutch.

VideoCAD

(Measuring and comparison software)

- Simple and fast comparison of the CAD files.
- Free positioning of the work pieces as so as alignment and positioning of the drawings.
- High accuracy of measurement with magnifications adapted at your needs.
- High capacity of measurement, defined by the measuring range of the co-ordinate table.
- Optical magnification from 5x to 800x.
- Numerical Zoom with automatical adaptation of the drawing and of the video image.
- Digitalisation, display and memorisation of the form deviation.
- Maximal contrast with incident light illuminator given by the sensibility of the video equipment.
- Direct access to the most important functions (individual programmable) with the keys F1 to F12.
- Digital read out of the start point co-ordinates of the co-ordinate table or the work piece.
- Memorisation of the video image in the format *. bmp.

QC 4000

(Measuring software)

- Simple and fast with programmable measuring procedure.
- Automatically correction of reference (alignment and origin).
- High accuracy of measurement with magnifications adapted at your needs.
- High capacity of measurement, defined by the measuring range of the co-ordinate table.
- Optical magnification from 5x to 800x.
- Export of the measured values in format *.dxf.
- 100% compatible export by VideoCAD.
- Display of the attributes (good / bad) in form of drawing.
- Maximal contrast with incident light illuminator given by the sensibility of the video equipment.
- Export of the results: Printer / Files / Clipboard.
- DDE connection, as for ex. with Excel or other statistic software.

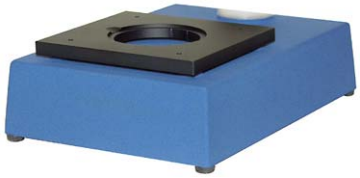
Measuring systems, components

Bases

MA 173ES / MA 175ES
Electrical equipment for transmitted and incident light

MA 173S / MA 175SW
Without electrical equipment
(transmitted light illuminator with power unit)

MA 331ES
Electrical equipment for
transmitted and incident light



MA 331S
Without electrical equipment

MA 183S / MA 185S / MA 186S (Granite base)
Without electrical equipment

Columns

MA 173 - Vertical displacement 100 mm or 160 mm
MA 175 - Vertical displacement 100 mm or 160 mm

For all bases, except MA 331

MA 331 / MA 333 / MA 335 / MA 336
- Displacement with geared drive, range 40 mm
- Normal displacement or normal and fine displacement
- Column length 300 mm, quick displacement 130 mm
- Column length 400 mm, quick displacement 230 mm
- Column length 500 mm, quick displacement 330 mm

For all bases

Co-ordinate tables

MA 142-2
Measuring range 25x25 mm,
micrometers

MA 143-5 / MA 143-6
Measuring range 50x50 mm,
micrometers

MA 143-8-003
Measuring range 70x70 mm, scales

MA 145-15
Measuring range 150x70 mm, scales

MA 146-1
Measuring range 200x100 mm, scales

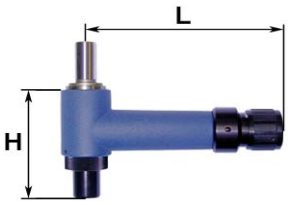
MA 147-1
Measuring range 300x200 mm, scales

Microscopes

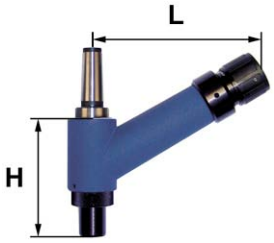
Our microscopes are distinguished by:
- **High precision**
- **Supreme optical and mechanical quality**
- **Real image** (model MA 121 on request)

All microscopes are supplied accurately centered

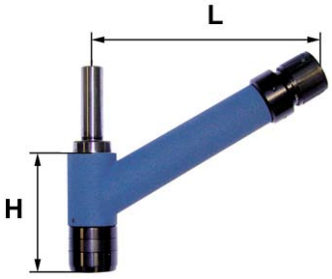
The centering accuracy can not, however, exceed that of the microscope holder. A centering adjustment can easily by made on the mounted microscope following the centering instruction.



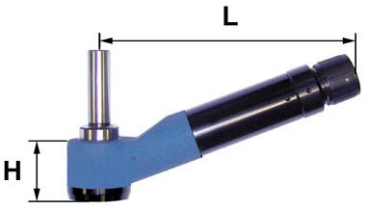
MA 111



MA 112



MA 112-2E



MA 117SZ-E

MA 113

MA 116

MA 118

MA 121

MA ... G
Goniometer

Magnification	**10x**	**15x**	**20x**	**25x**	**30x**	**40x**	**50x**	**60x**	**75x**	**100x**	
Ø of field of view in mm	**13.8**	**9.2**	**6.9**	**5.5**	**4.6**	**3.4**	**2.7**	**2.3**	**1.8**	**1.3**	Working distance
MA 111	147	102	72	55	47	34	32	18		13	
MA 112	145	100	78	65	54	40	31	16		14	
MA 112-2	185	145	100	77	65	53	40	33	25	15	
MA 113	260	160	115	90	80	60	50	45	35	28	
MA 116	230	162	120	97	80	55	47	40	30	22	
MA 117SZ-1	53	45	33	32							
MA 117SZ-2	76	43	33	42	27						
MA 117SZ-3	94	55	40	51	26						
MA 118	109		107		106		62			33	
MA 121	168	125	92	73	60	48	35	30	23	16	

The dimensions (in mm) are approximate and may be altered. Other dimensions and magnifications on request.

Cylindrical and taper mounting holders (with thread M20x0.75)

Cylinder
Ø 4x20 mm to
Ø 25x120 mm

ISO taper
DIN 2080
20/25/30/40/50

ISO taper
DIN 69871A
(Japan BT)
30/40/50

Morse taper
Schaublin:
SV / SW / B-..
HSK taper

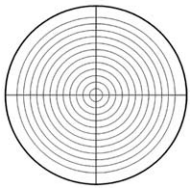
Microscopes

Type-MA	111	112	112-2	112-2E	113	116	118	121
Angle of view	90°	120°	120°	120°	120°	90°	135°	0°
Tube Ø 25h7x110 mm					x	x	x	x
Tube Ø 30h5x110 mm								
Illumination integrated				x				
Distance "L" in mm	125	110	150	150				
Height "H" in mm	77	77	77	75.5				
Real image	x	x	x	x	x	x	x	x

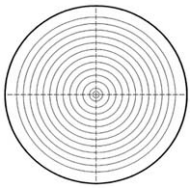
Type-MA	117 SZ/1	117 SZ/2	117 SZ/3	117 SZ-E1	117 SZ-E2	117 SZ-E3
Angle of view	110°	110°	110°	110°	110°	110°
Lenght of eyepiece tube in mm	50	70	90	50	70	90
Illumination integrated				x	x	x
Distance "L" in mm	150	170	190	150	170	190
Height "H" in mm	34.5	34.5	34.5	44	44	44
Real image	x	x	x	x	x	x

Reticles

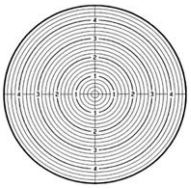
Microscopes are normally supplied with reticles **R 1**. Any of the reticles shown below can be supplied. ***They are not interchangeable.*** Other designs can be supplied to customers specification at en extra charge.



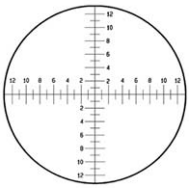
R 1 (12 circles)



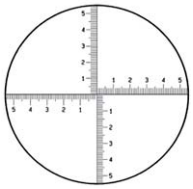
R 1-1



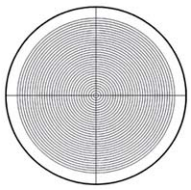
R 1-2 (23 circles)



R 3

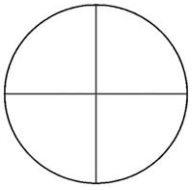


R 3-4

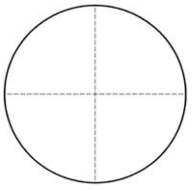


R 4 (32 circles)

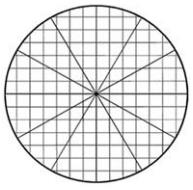
R 5-7



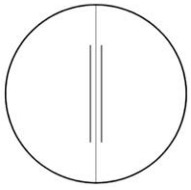
R 6



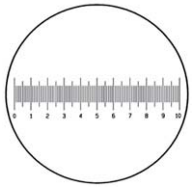
R 6-1



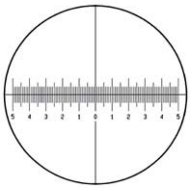
R 13



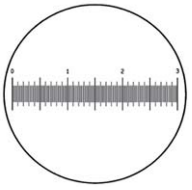
R 14



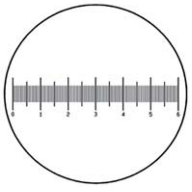
R-M (100 divisions)



R-M-6 (100 divisions)



R-M-11 (150 divisions)



R-M-12 (120 divisions)

The table shows the space (in mm) between 2 division lines or 2 circles for each indicated magnification. Advantageous divisions can be obtained for other reticles by the choice of suitable magnification.

Magnification	10x	12.5x	15x	20x	25x	42x	50x	62.5x	75x	100x	125x
R 1 / R 1-1	0.5			0.25	0.2		0.1			0.05	
R 4			0.125		0.075				0.025		
R 3-4 / R-M / R-M 6	0.125	0.1			0.05		0.025	0.02		0.0125	0.01
R-M-11						0.02					
R-M-12	0.1			0.05			0.02			0.01	

Microscopes

MA 130W / MA 130GW

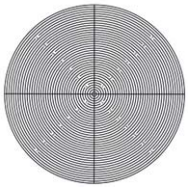
Angle of view 120° / Fixing Ø 30 mm

Magnification	Ø of field of view in mm	Working distance in mm
10x	22.5	95
20x	11.25	90
30x	7.5	80
50x	4.5	75
100x	2.25	40

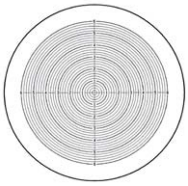
The dimensions (in mm) are approximate and may be altered.
Other dimensions and magnifications on request.

Reticles

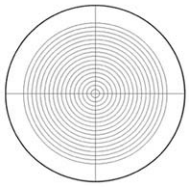
The microscopes MA 130W and MA 130GW are normally supplied with reticles **R 2-1-4-2**. Any of the reticles shown below can be supplied. ***They are not interchangeable.*** Other designs can be supplied to customers specification at an extra charge.



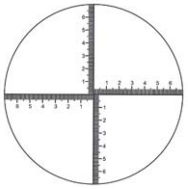
R 2-1-4-2 (38 circles)



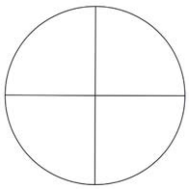
R 2-1 (30 circles)



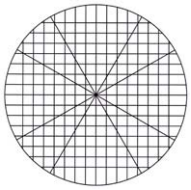
R 7 (17 circles)



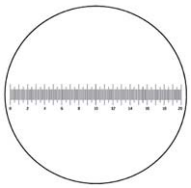
R 3-4W



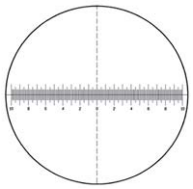
R 9



R 13-3W



R-M 4 (200 divisions)



R-M 5 (200 divisions)

The table shows the space (in mm) between 2 division lines or 2 circles for each indicated magnification. Advantageous divisions can be obtained for other reticles by the choice of suitable magnification.

Magnification	12.5x	15x	25x	30x	50x	60x	75x	100x	120x	125x
R 2-1-4-2		0.2		0.1		0.05			0.025	
R-M 4 / R-M 5	0.1		0.05		0.025			0.0125		0.01
R 7	0.5		0.25		0.125					0.05
R 3-4W		0.1		0.05	0.03		0.02			

Microscopes

Zoom microscopes MA 130W-Z1 / MA 130GW-Z1

Angle of view 120° / Fixing Ø 39.65 mm / with or without 4 position-settings / Zoom 1:6.5

- Continuously magnification changement
- With or without goniometer (reading 5')
- Possible reticles: R9 and R7
  (no possiblity to calibrate the reticles)

Lens	Magnification	Field of view Ø in mm	Working distance in mm
0.25x	2.5 - 16x	85.2 - 13.2	356
0.5x	5 - 33x	42.6 - 6.6	175
0.75x	8 - 49x	28.4 - 4.4	113
-----	10 - 65x	21.3 - 3.3	92
1.5x	15 - 98x	14.2 - 2.2	51
2x	20 - 130x	10.7 - 1.7	36

The dimensions (in mm) are approximate and may be altered. Other dimensions and magnifications on request.

Zoom microscopes MA 130W-Z2 / MA 130GW-Z2

Angle of view 120° / Fixing Ø 45.3 mm / with 8 position-settings / Zoom 1:12

Lens	Magnification	Field of view Ø in mm	Working distance in mm
0.25x	2 - 28x	97.0 - 8.1	352
0.5x	5 - 56x	48.5 - 4.0	167
0.75x	7 - 84x	32.3 - 2.7	109
-----	9 - 111x	24.2 - 2.0	87
1.5x	14 - 167x	16.2 - 1.3	50
2x	19 - 223x	12.1 - 1.0	37

The dimensions (in mm) are approximate and may be altered. Other dimensions and magnifications on request.

Projectors

Our projection heads can be supplied for incident "E" (examination of the surface) and transmitted "D" (examination of the profile, outline) light. The following advantages make their use on various machine-tools possible:

- **Small size**
- **Light weight**
- **Simple tube attachment (Ø 25 or Ø 30 mm)**
- **Other means of attachment on request**
- **Real image**

Our optical system guarantees a very good **distortionless** optical image. All types are equipped with light shields to assure their use in brightly lit rooms.
Our illuminators for transmitted "D" and incident "E" light make the solution of a difficult projection problem easier (small space, dark coloured objects, working conditions).

Typ-MA	**200 / 220**	**230**	**240**	**250**
Screen Ø in mm **"E"**	80	110	150	250
Magnifications *	10 - 100x	10 - 100x	10 - 100x	10 - 100x
Observations angles in °	80 / 90 / 100 / 120	80 / 90 / 100	80 / 90 / 100	80 / 90 / 100
Goniometer **"G"**	**x**	**x**	**x**	**x**
Comparison template **"P"**	**- / x**	**x**	**x**	**x**
Angle device 90° **"C"**	**x**	**x**	**x**	**x**
Weight approx.	1.5 kg	3 kg	4.5 kg	10 kg

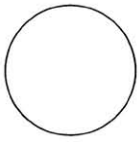
* Other magnifications on request

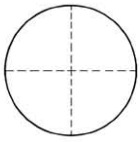
		MA 200/220		**MA 230**		**MA 240**		**MA 250**	
Magnification		A	Ø	A	Ø	A	Ø	A	Ø
With transmitted light illuminator	**10x**	100	8	100	11	100	15	100	25
	20x	100	4	100	5.5	100	7.5	100	12.5
	30x	90	2.6	80	3.6	95	5	80	8.3
	50x	60	1.6	55	2.2	70	3	70	5
	100x	35	0.8	30	1.1	40	1.5	40	2.5
With incident light illuminator	**10x**	60	8	60	11	60	15	60	25
	20x	60	4	60	5.5	60	7.5	60	12.5
	30x	50	2.6	40	3.6	55	5	40	8.3
	50x	20	1.6	15	2.2	30	3	30	5

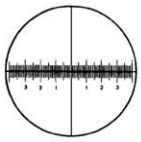
A = Distance between the object and the objective (transmitted light) or object and incident light illuminator
Ø = Field of view
The measurements in mm are approximate and can be altered. **Other measurements and magnifications on request.**
With magnification **100x** you need a coaxial **incident** light illuminator.

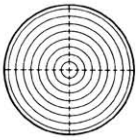
Projectors

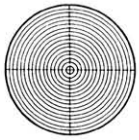
Screens and comparison templates:

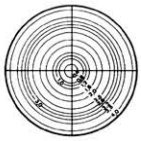

E ...-0

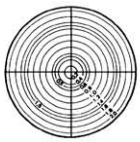

E ...-1


E ...-15


E ...-4


E ...-5


E ...-40
10x


E ...-41
20x

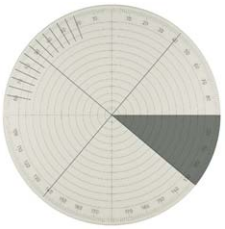

E ...-42
30x

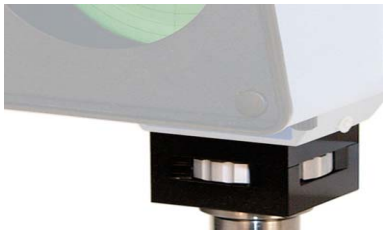
"E"
The illustrated screens are the most generally used from our standard range. Other standard types are also available on request.

"P" / "F"
The same symbols as on the screens are offered on comparison templates or films.

Optional:

Goniometer (MA... - G)
Measurement with built-in optical angle measuring unit**,**
direct on the screen.
Read out accuracy 10'.
Projector with a second optical goniometer available.
(MA...-GG).





Digital-goniometer (MA... - GI)
Read-out 5' or decimal 0.1°
(Only for projectors MA 240 and MA 250)

Comparison templates (MA...-P)
A special guide allows the use of comparison templates.
Mat films with all standard symbols are available. These films are placed in a double plexi glas-plate. They make comparison measurements possible even during a machining process (e.g. profile comparison on tool grinders).
A simple coincidence system allows the centering of these comparison templates in the projectors.
Angle measuring device (MA...-G) and (MA...-GI) may be combined with comparison template (MA...-P), (MA...-GP) or (MA...-GIP).

Angled projector (MA...-C)
All projectors of the MA 200 / 220 / 230 / 240 and 250 series can be supplied with a 90° angle plate (in front, on behind or lateral).

Video systems

MA 705-110

Optics with tube Ø 25 mm, CCD-camera, monitor, black/white or colour

CCD-camera 1/2"	
Field of view in mm	**Working distance in mm**
19 x 14	100
9.5 x 7	100
6.3 x 4.6	102
3.8 x 2.8	74
1.9 x 1.4	46

CCD-camera 1/3"	
Field of view in mm	**Working distance in mm**
14.2 x 10.5	100
7 x 5.2	100
4.7 x 3.4	102
2.8 x 2.1	74
1.4 x 1	46

MA 705C-3

Optics, angle device 90° with cylinder or taper on choice, CCD-camera, monitor, black/white or colour, real image

CCD-camera 1/2"	
Field of view in mm	**Working distance in mm**
9.5 x 7	100
6.3 x 4.6	103
3.8 x 2.8	78
1.9 x 1.4	47

CCD-camera 1/3"	
Field of view in mm	**Working distance in mm**
7.1 x 5.3	100
4.7 x 3.5	103
2.8 x 2.1	78
1.5 x 1.1	47

MA 705-Z1

Zoom optics 6.5x (with or without 4 position-settings), CCD-camera, monitor, black/white or colour, adapter 0.67x, fixing Ø 39.7 mm

MA 705C-Z1

Zoom optics 6.5x (with or without 4 position-settings), angle device 90° with cylinder or taper on choice, CCD-camera, monitor, black/white or colour

CCD-camera 1/2“

Additional lens	Field of view in mm		Working distance in mm
	Minimum	**Maximum**	
0.25	8.38 x 6.29	54.4 x 40.8	356
0.5	4.19 x 3.14	27.2 x 20.4	175
0.75	2.79 x 2.09	18.1 x 13.61	113
Without	2.1 x 1.57	13.6 x 10.2	92
1.5	1.4 x 1.05	9.1 x 6.8	51
2	1.05 x 0.79	6.8 x 5.1	36

CCD-camera 1/3“

Additional lens	Field of view in mm		Working distance in mm
	Minimum	**Maximum**	
0.25	6.27 x 4.7	40.8 x 30.6	356
0.5	3.14 x 2.35	20.4 x 15.3	175
0.75	2.09 x 1.57	13.6 x 10.21	113
Without	1.57 x 1.18	10.2 x 7.7	92
1.5	1.05 x 0.79	6.8 x 5.11	51
2	0.78 x 0.59	5.1 x 3.8	36

Video systems

MA 705-Z2

Zoom optics 12x (8 position-settings), CCD-camera, monitor, black/white or colour, adapter 0.67x, fixing Ø 39.7 mm

CCD-camera 1/2“

Additional lens	Field of view in mm		Working distance in mm
	Minimum	Maximum	
0.25	5.5 x 4.13	65.9 x 49.4	336
0.5	2.75 x 2.06	32.9 x 24.7	160
0.75	1.83 x 1.37	22.0 x 16.5	107
Without	1.38 x 1.03	16.5 x 12.4	86
1.5	0.9 x 0.69	11.0 x 8.2	50
2	0.69 x 0.52	8.2 x 6.2	37

CCD-camera 1/3“

Additional lens	Field of view in mm		Working distance in mm
	Minimum	Maximum	
0.25	4.13 x 3.1	49.4 x 37.1	336
0.5	2.06 x 1.55	24.7 x 18.5	160
0.75	1.38 x 1.03	16.5 x 12.4	107
Without	1.03 x 0.77	12.4 x 9.3	86
1.5	0.69 x 0.52	8.2 x 6.2	50
2	0.52 x 0.39	6.2 x 4.6	37

Video objectives

MA 715

Tube Ø 30g6 with lengths 78 mm, 95 mm and 128 mm with C-mount

MA 715-078-...	Field of view in mm		Working distance in mm	Overall height in mm
	1/3"	1/2"		
-001	96 x 72	128 x 96	1350	1428
to				
-010	2.4 x 2.8	3.2 x 2.4	35	113
MA 715-095-...	**Field of view in mm**		**Working distance in mm**	**Overall height in mm**
	1/3"	1/2"		
-001	16 x 12	21.3 x 16	288	383
to				
-010	1.9 x 1.4	2.6 x 2.0	28	123
MA 715-128-...	**Field of view in mm**		**Working distance in mm**	**Overall height in mm**
	1/3"	1/2"		
-001	6.0 x 4.5	8.0 x 6.0	135	263
to				
-010	1.2 x 0.9	1.6 x 1.2	32	160

All video systems can be equipped with the software, METRIC, VIDEOCAD and QC4000

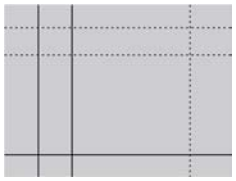
Ask for our actual product informations for CCD-cameras and monitors

Video systems

MA 1500 line generator

This generator permits to superpose 3 pairs of horizontal and vertical lines on a video image. It is 100% digital, no deviation.

- Command by keyboard with 12 keys (lockable)
- Intensity adjustable of the tint of superposed lines (from black to white)
- Separate choice of lines: continuous or dotted, thin or large
- Erasing of superposed lines possible (also particular)
- Continuous or step by step displacement of the selected line



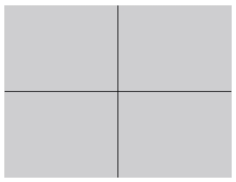
Option:
- With symmetrical and parallel displacement
- Memory for 39 different windows

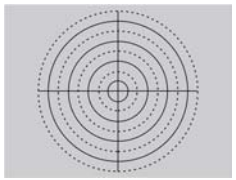
Characteristics:

Dimensions (h x w x d)	120x260x270 mm
Power requirements	90-250V, 50-60Hz
Weight	2.6 kg

MA 1600 symbol generator

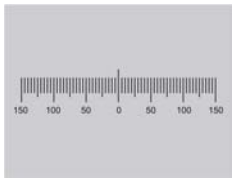
- Allows the superimposition of a cross wire, circles, a cross wire with circles or a scale on a video image
- Possibility of centering the symbols on the screen
- Possibility to vary the contrast of the lines from black to white, independent of the contrast of the image





Multi symbol generator

- Data bank version. Allows the projection of 16 different symbols on a video image
- One cross wire as standard and 4 symbols according to description (circles, circles and cross wire or scales)
- Choise of the symbols by switch



Characteristics:

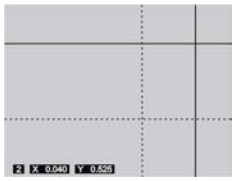
Dimensions (h x w x d)	48x125x190 mm
Weight	0.5 kg

MA 1710 measuring generator

The MA 1710 unit is used for the measurement of pieces that are visible on the screen of a video monitor.
Lengths and heights can be measured on the X and Y axes between two vertical lines and two horizontal lines. The length and the angle of a diagonal (distance between two points) can be equally measured and displayed on the screen.
The intensity of the tint of superposed lines is adjustable from black to white.
A 32 keys keyboard is used with the standard model to enter commands, move the measuring points and modify parameters.
In the set ups for which different objectives are used, an integrated data base allows to recall the calibration parameters.

Characteristics:

Dimensions (h x w x d)	115x260x265 mm
Weight	3.1 kg
Keyboard dimensions (h x w x d)	45x170x175 mm
Keyboard weight	0.6 kg
Video port	CCIR interlinked, 75 Ohms, monochrom or colour



Illuminators

Transmitted halogene (Projectors)

✶ **MA 212-2**
(6V+12V/20W)

✶ **MA 212-2b**
(6V+12V/20W)

✶ **MA 212-10**
(6V+12V/20W)

○ **MA 212-18**
(6V+12V/20W)

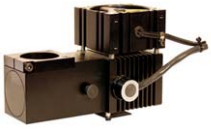
○ **MA 212-19b**
(6V+12V/20W)

○ **MA 212-19bV**
(12V/50W)

Incident halogene (Projectors)

✶ **MA 213-4**
(6V+12V/20W)

✶ **MA 213-4V**
(12V/50W)



✶○ **MA 213-13V-100W**
(12V/100W)

✶ **for projectors MA 200 - 240**

○ **for projectors MA 250**

Power units for halogene illuminators

MA 350-1:	6V/20W,	20VA
MA 350-2:	6V/20W,	20VA, with potentiometer
MA 360-1:	12V/100W,	110VA
MA 370-1:	12V/50W,	60VA
MA 370-4:	12V/50W,	60VA, with potentiometer
MA 380-1:	2x 6V/30W,	30VA
MA 380-2:	2x 6V/30W,	30VA, 1x with potentiometer
MA 355-004:	12V/50W,	60VA, plug-in transformer

MA 350-1

MA 380-2

LED (Microscopes / Videos)

MA 114a-08
(detachable)

MA 114b-01
(fixed)

MA 114p-005
(coaxial)

Power units for LED illuminators

MA 355-025

MA 355-019
(adjustable)

Fluorescent circular light (Videos / Stereomicroscopes)

MA 114 FL-6

Circular light with mounting ring and transformer apart

MA 114 FL-8

Circular light with mounting ring and transformer apart, with intensity regulator from 10 to 100%

Fibre optic (Cold light illuminators)

Cold light sources

MA 1100 (power 35W) / MA 1200 (power 100W) / MA 1300 (power 150W)

Light guides / Circular lights

Light guide single arm flexible

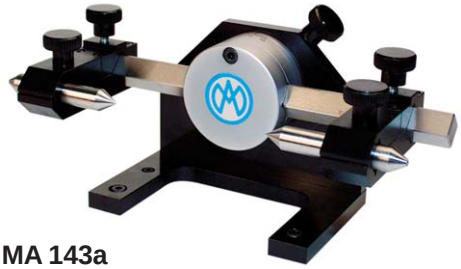
Light guide twin arm flexible

Circular light flexible guide GRL 18 / 25 / 40 / 66

Incident light guide lexible guide twin arm swan necks semi rigid

Swan neck light guides single or twin arm semi rigid

Accessories



MA 143a
Universal holder, distance between points max. 150 mm, for pieces up to Ø 50 mm

MA 143b
Crocodile-pliers for quick assembly
(swivel angle 90° to right and left)

MA 143b-1
Pliers with parallel jaws
(swivel angle 90° to right and left)

MA 145a / MA 146a / MA 147a
Universal holder, distance between points max. 200 mm, for pieces up to Ø 50 mm

MA 143bZ
Collet holder with support

MA 143c
V-blocks with spring clip, suitable horizontally or vertically

MA 143p / MA 146p
Centres male and female

MA 143v / MA 146v
V-supports

MA 143aZ
Collet holder MA 143a / MA 145a / MA 146a / MA147a, with 6 collets P6 (Ø 0.5 / 1 / 1.5 / 2 / 3 / 4 mm)

MA 145e / MA 146e / MA 147e
V-block with clamp and mounting plate, for pieces up to Ø 35 mm

Concentricity Pro
for concentricity measuring, tool shank Ø 1 to 25.4 mm, tool shank length from 28 to 100 mm