

# 14



VIDEO INSPECTION SYSTEMS

14 - 2

MICROSCOPES SWISSMETROLOGIE® "PREMIUM"

14 - 10

MICROSCOPES SWISSMETROLOGIE® "SILVER"

14 - 14

ERGO AND DISCUSSION SWISSMETROLOGIE® MICROSCOPES

14 - 16

LIGHTING

14 - 17

CAMERA

14 - 21

Video inspection system HD SMV-1.

SWISS METROLOGIE



MSA	Stand and screen
14.160 (1)	Stand with geared column MSA14.471 Screen 10"
14.161 (2)	Stand with detached arm MSA14.472 Screen 10"
14.162	Stand with extension arm MSA14.399 Screen 10"

The SMV-1 HD video inspection system combines the latest high-definition video technology with the best macro lens providing an exceptionally fluid image quality.

- The integrated 10" flat screen improves image quality and operator comfort
- The dome lighting technique by reverberation enables an optimised surface inspection even on polished and glazed parts
- The macro zoom 10x (13-130 mm) ensures intuitive and fast ease of use.

Key features :

- HD Camera 720P with an integrated 10" flat screen
- Image is captured directly onto the SD memory card
- Remote screen control with a pointing sight
- Indirect LED lighting dimmer by reverberation
- Optical zoom Computar 10x (13-130 mm) providing excellent quality and a working distance from 152 mm to 450 mm
- Zoom magnification from 3x up to 55x, with a wide field of view.

Technical characteristics :

- Digital sensor CMOS 1/2.5"
- Resolution 1280 x 800 @ 60 fps (24 bits), 16.10 aspect ratio
- 2 megapixels
- Individual adjustment of the screen colours : Red, Green and Blue
- Automatic or manual white balance
- Automatic or manual image contrast.

Items included in the delivery, in addition to the following compositions :

- MSA14.150-E : Dome lighting with LED + lighting intensity dimmer
- MSA14.151-P : Protection cover in semi-transparent PVC-Foil
- MSA14.150-SD : - SD memory card 8 GB.

SMV-1	Stand	Camera (with screen)	Optical zoom
MSA14.160 (1) =	MSA14.471 +	MSA14.150-C (10") +	MSA14.151-Z : 3x ... 55x
MSA14.161 (2) =	MSA14.472 +	MSA14.150-C (10") +	MSA14.151-Z : 3x ... 55x
MSA14.162 =	MSA14.399 +	MSA14.150-C (10") +	MSA14.151-Z : 3x ... 55x

**Video inspection system FULL HD SMV-2.**

SWISS METROLOGIE



(1)



(2)

MSA	Stand and screen
14.163 (1)	Stand with geared column MSA14.471 Screen 13.3"
14.164 (2)	Stand with detached arm MSA14.472 Screen 13.3"
14.165	Stand with extension arm MSA14.399 Screen 13.3"
14.168	Stand with geared column MSA14.471 Free-standing screen 23.8"

The SMV-2 FULL HD video inspection system is an intuitive inspection device, capable of filming with an exceptional image quality and fluidity on any HDMI-linked screen.

- New Full HD 13.3" flat screen for unrivalled image quality and operator comfort
- Recording of films and pictures to SD card or USB stick.

Key features :

- Full HD camera 1080P-HDMI controlled by a wireless mouse
- LED incident lighting with an intensity dimmer
- Optical zoom Computar 10x (13-130 mm) provides excellent quality and a working distance from 152 mm to 450 mm
- Zoom magnification from 3x up to 55x, with a wide field of view.

Technical characteristics :

- Digital sensor CMOS 1/3" colour
- Full HD resolution 1920 x 1080 @ 30 fps (12 bit), 16.10 aspect ratio
- 2 megapixels
- Individual adjustment of the screen colours : Red, Green and Blue
- Automatic or manual white balance
- Automatic or manual image contrast
- HDMI connection.

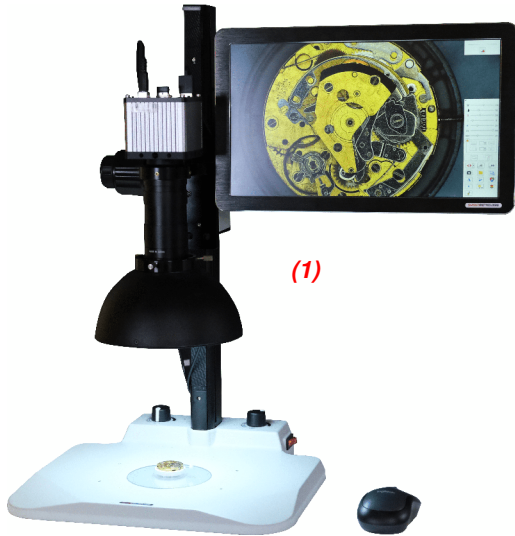
Items included in the delivery, in addition to the following compositions :

- MSA14.150-E : Dome lighting with LED + lighting intensity dimmer
- MSA14.151-P : Protection cover in semi-transparent PVC-Foil
- DOCPUB.USBKEY : USB key 4 Gb with lanyard 80 cm
- MSA14.150-S : Wireless mouse.

SMV-2	Stand	Screen	Camera	Optical zoom
MSA14.163 (1) =	MSA14.471 +	MSA14.151-M (13.3") +	MSA14.151-D +	MSA14.151-Z : 3x ... 55x
MSA14.164 (2) =	MSA14.472 +	MSA14.151-M (13.3") +	MSA14.151-D +	MSA14.151-Z : 3x ... 55x
MSA14.165 =	MSA14.399 +	MSA14.151-M (13.3") +	MSA14.151-D +	MSA14.151-Z : 3x ... 55x
MSA14.168 =	MSA14.471 +	MSA14.153-M (23.8") +	MSA14.151-D +	MSA14.151-Z : 3x ... 55x

Video inspection system HD SMV-3 "Focus Stacking".

SWISS METROLOGIE



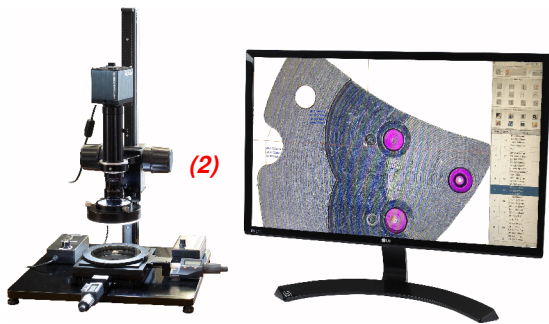
(1)



With "Focus Stacking" function



Without "Focus Stacking" function



(2)

MSA	Stand and screen
14.170 (1)	Stand with geared column MSA14.473 Screen 13.3"
14.171	Stand with geared column MSA14.473 Screen 23.8"
14.180 (2)**	Stand with geared column MSA14.400 (black base) Screen 23.8"

The SMV-3 video inspection system "Focus Stacking" is the latest intuitive solution from HOROTEC SA.

The "Focus Stacking" is a process in which several photos with different focus are merged to obtain an image with a large depth of field.

Main features :

- "Focus Stacking" function operational without a PC
- Full HD-5 MP camera, 1920 x 1080P @60 fps
- Full HD 13.3" flat screen
- Image storage on Ethernet network or USB stick
- New ergonomic stand with integrated wiring
- Transmitted and incident lighting as standard equipment
- Connection type : HDMI
- Zoom magnification from 3x up to 55x, with a wide field of view (from 30x up to 200x for MSA14.180).

\*\* Graphic measurement software, PC-free, with automatic edge detection function

MSA14.170 : Without measuring functions / Without measuring table

MSA14.171 : With measuring functions / Without measuring table

MSA14.180 : With measuring functions / With measuring table

Main measurement functions of the camera MSA14.153-C :

- Calibration according to the type of measurement : linear or diameter.
- Measurement types :
  - Distance between 2 points, 1 line/1 point and 2 lines
  - Angular between 2 lines - Circle, arc of circle
  - Distance between 1 point/1 circle, 1 line/1 circle and 2 circle centers
  - Concentricity - Rectangle, polygon.
- Capture point :
  - Automatic or manual edge detection function.

Items included in the delivery, in addition to the following compositions :

\*\* - MSA15.614 : Measuring table "X-Y" with rotating circular plate in glass (delivered without stops)

- MSA14.150-E : Dome lighting with LED + lighting intensity dimmer
- MSA14.151-P : Protection cover in semi-transparent PVC-Foil
- DOCPUB.USBKEY : USB key 4 Gb with lanyard 80 cm
- MSA14.150-S : Wireless mouse.

SMV-3	Statif	Screen	Camera	Optical zoom
MSA14.170 (1) =	MSA14.473	+ MSA14.151-M (13.3")	+ MSA14.153-CSM	+ MSA14.151-Z : 3x ... 55x
MSA14.171 =	MSA14.473	+ MSA14.153-M (23.8")	+ MSA14.153-C	+ MSA14.151-Z : 3x ... 55x
MSA14.180 (2) =	MSA14.471	+ MSA14.153-M (23.8")	+ MSA14.153-C	+ MSA14.153-Z : 30x ... 200x (*)
Optical zoom :	(*) 6-position indexable 6000 optical zoom with zoom position memory in software			

**Video inspection system FULL HD SMV-B.**

SWISS METROLOGIE



**MSA**

**14.154**

The video inspection system SMV-B FULL HD is an intuitive and compact inspection device, capable of filming a meticulous operation live, thanks to a large field depth and an exceptional image fluidity on any screen with an HDMI connection.

- Live viewing in FULL HD quality on any screen with an HDMI connection ; video projector, TV, PC monitor, etc.
- Possibility of streaming via an optional PC converter
- Recording of films and photos on SD card or USB key
- Viewing captured photos directly on the screen.

**Key features :**

- Full HD 1080P-HDMI camera controlled by wireless mouse
- Optical Zoom Macro 10x (13-130mm) providing an excellent quality and a working distance from 160 mm to 500 mm.

**Technical characteristics :**

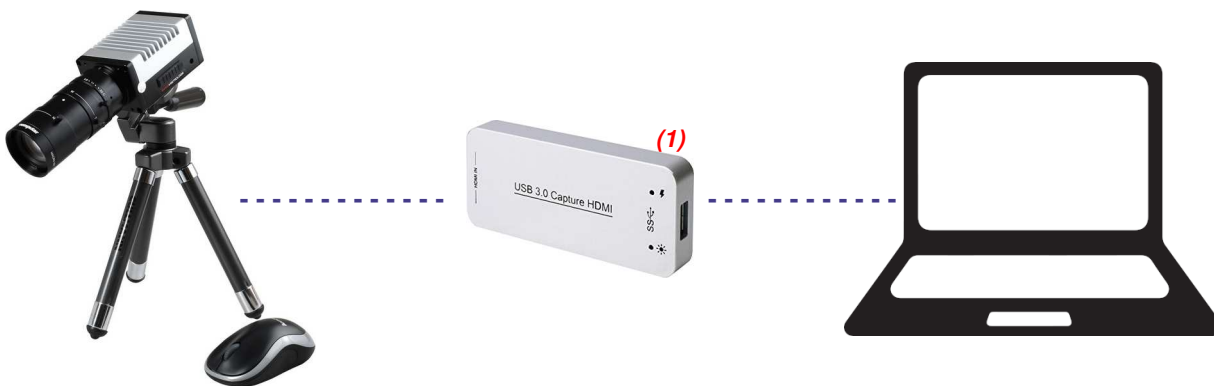
- Digital sensor CMOS 1/3" colour
- Full HD resolution 1920 x 1080 @ 30 fps (12bits), 16.10 aspect ratio
- 2 Megapixels
- Adjustment of the screen colours : Blue - Red - Green
- Automatic or manual white balance
- Automatic or manual image contrast
- Backup : 8 GB SD card or USB stick (not included)
- Connection type : HDMI.

**Items included in the delivery :**

- 1 FULL HD camera
- 1 HDMI cable 70 cm
- 1 wireless mouse
- 1 Optical zoom Macro 10x (13-130 mm)
- 1 SD memory card
- 1 Z-tripod 200 mm.

**Optional :**

MSA	Item
14.151-U	(1) HDMI-USB signal converter for PC connection



Connect your HOROTEC inspection system (SMV-B / SMV-2 / SMV-3) with the HDMI/USB 3.0 signal converter (MSA14.151-U) and share your video inspection system camera live using the following video conferencing applications :



Stands.

SWISS METROLOGIE



MSA	Kg
14.471	5.300

Stand with 520 mm geared column in "Z" with fine adjustment.

Optional :  
 - MSA14.150-A, arm to detach the screen  
 - MSA14.471-A, optical head support.

SWISS METROLOGIE



MSA	Kg
14.473	5.300

Stand with 520 mm geared column, transmitted lighting with integrated LED (without zoom support).

SWISS METROLOGIE



MSA	Kg
14.472	18.430

Stand with a horizontal movement and a 370 mm column in "Z" and an arm to detach up to 422 mm.

Optional :  
 - MSA14.150-A, arm to detach the screen  
 - MSA14.471-A, optical head support.

Accessories.



MSA		Size	Kg
14.156	(1)	123 x 115 x 150 mm	0.630
14.157	(2)	123 x 115 x 250 mm	0.770

Transparent protective cover for video inspection and measuring systems.



MSA		Length	Kg
14.150-A		500 mm	0.560

Articulated arm for detaching the screen of the camera from the SMV-1 MSA14.150.

*Delivered without screen.*



MSA		Kg
14.471-A		0.330

Optical head support for stands MSA14.471 and 14.472.



MSA		Length	Kg
14.150-Y		300 mm	0.035

Connection "X" HDMI cable to connect a second external screen for a synchronized picture.

*1x male and 2x female.*



MSA	Type
14.151-Y2	1 input-2 output
14.151-Y4 (1)	1 input-4 output
14.151-Y8	1 input-8 output

HDMI splitter with amplifier, Full HD signal.



MSA	Type
14.151-W3	2 input-1 output

HDMI switch for distribution of Full HD signal.



MSA	Type
14.151-H1.5 (1)	HDMI, length 1.50 m
14.151-H2	HDMI, length 2 m
14.151-I (2)	HDMI 4K High Speed, length 5 m
14.151-H	HDMI 4K High Speed, length 10 m
14.151-H20	HDMI 4K High Speed, length 20 m

HDMI shielded cable.



MSA
14.150-L

SD Memory card reader.



MSA	Magnification	Kg
14.150-1.5X (1)	1.5x	0.055
14.150-2.0X	2.0x	0.055
14.150-3.0X	3.0x	0.030
14.150-5.0X	5.0x	0.036

Magnifying lens with C-mounting male/female.





**MSA**

**15.614**

Measuring table "X-Y" with rotating circular plate in glass for alignment of the parts.

- Travel 50 x 50 mm
- Clamping device for micrometres Ø 18 mm
- For stand MSA14.400.

*Delivered without stops (optional).*



**MSA**

**Size**

**Kg**

**14.150-T**

115 x 115 x 15 mm  
Ø 95 mm

0.440

Black aluminium table support for transmitted lighting MSA14.150-G.

*Delivered without lighting.*



**MSA**

**Size of items**

**Kg**

**14.447**

Base Ø 95 mm  
Top plate Ø 75 mm

0.265

Adjustable aluminium table on swivel to observe movements or components under a binocular, a trinocular or an inspection system.

- The base is compatible with the stands of the SwissMetrologie® range
- The top plate is covered with an anti-skid coating MSA14.447-A (replaceable when worn).

**Spare part :**

**MSA**

**Item**

**Kg**

**14.447-A**

Anti-skid coating, Ø 70 mm

0.005

**2 series of stereoscopic binocular and trinocular microscopes associated to the latest Full HD cameras.**



**SWISSMETROLOGIE**  
Premium



**SWISSMETROLOGIE**  
Silver



**"PREMIUM" range optical features :**

Auxiliary objective	0.5x	0.75x	1.0x	1.5x	2.0x
Working distance	200 mm	120 mm	100 mm	47 mm	26 mm
-					
Magnification 10x	3.4x ... 22.5x	4.7x ... 31.5x	6.7x ... 45.0x	10.1x ... 67.5x	13.4x ... 90.0x
Field of view (mm)	65.7 ... 9.8	46.9 ... 7.0	32.8 ... 4.9	21.9 ... 3.3	16.4 ... 2.4
-					
Magnification 15x	5.0x ... 33.8x	7.0x ... 47.3x	10.1x ... 67.5x	15.1x ... 101.3x	20.1x ... 135.0x
Field of view (mm)	47.8 ... 7.1	34.1 ... 5.1	23.9 ... 3.6	15.9 ... 2.4	11.9 ... 1.8
-					
Magnification 20x	6.7x ... 45.0x	9.4x ... 63.0x	13.4x ... 90.0x	20.1x ... 135.0x	26.8x ... 180.0x
Field of view (mm)	35.8 ... 5.3	25.6 ... 3.8	17.9 ... 2.7	11.9 ... 1.8	9.0 ... 1.3

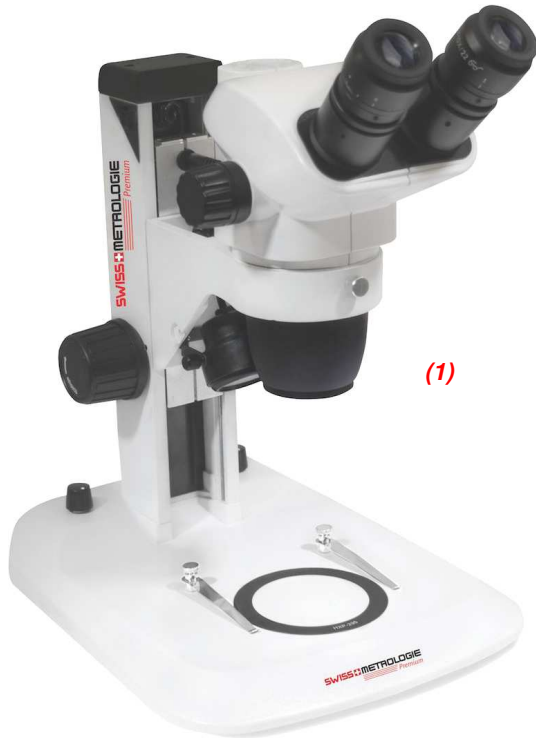
"PREMIUM" series. Stereoscopic binocular and trinocular microscopes.

A new design more ergonomic - Compact and lightweight - Cleaner image in the periphery - Large coverage of magnification - Long working distance.

Main features :

- Powerful and advanced optical system for a better rendering of stereoscopic image
- Working distance of 104 mm, can be extended from 26 mm to 200 mm with optional lenses
- Magnification domain from 2x to 180x using optional objectives and eyepieces.

SWISSMETROLOGIE  
Premium



MSA		Type	Stand	Voltage	Kg
14.430	(1)	Binocular	Rack and pinion	110 / 220 V	5.800
14.431	(2)	Binocular	Detached	-	20.400

Stereo binocular microscope with zoom magnification variable from 0.67x to 4.5x.

Eyepieces : Pair of eyepieces WF10x/22 mm in 45° inclined tubes with dioptre adjustment.

Objective : Standard total magnifications from 6.67 to 45x. Fields of view from 33 to 4.9 mm.

Working distance 110 mm.

Stand : Rack and pinion in metal, transmitted lighting with dimmer switch (1) or detached with 2 arms (2).

MSA14.430 only : delivered with 1 stage plate and 2 object clamps.

Lighting : see pages 14-17...14-20.





MSA	Type	Stand	Voltage	Kg
14.432	(1)	Rack and pinion	110 / 220 V	7.180
14.433	(2)	Detached	-	24.600

Stereo binocular microscope with zoom magnification variable from 0.67x to 4.5x.

Eyepieces : Pair of eyepieces WF10x/22 mm in 45° inclined tubes with dioptre adjustment.

Objective : Standard total magnifications from 6.67 to 45x. Fields of view from 33 to 4.9 mm.  
Working distance 110 mm.

Stand : Rack and pinion in metal, transmitted lighting with dimmer switch (1) or detached with 2 arms (2).

MSA14.432 only : delivered with 1 stage plate and 2 object clamps.

Lighting : see pages 14-17...14-20.



Accessories for "PREMIUM" stereoscopic microscopes.



MSA	Type	Kg
14.440-10	HWF 10x / 22 mm	0.188
14.440-15	HWF 15x / 16 mm	0.145
14.440-20 (1)	HWF 20x / 12 mm	0.224

Pair of eyepieces.



MSA	Type
14.441	HWF 10x / 22 mm

Micrometric eyepiece.



MSA	Kg
14.442	0.006

Pair of retractable eyeshades.



MSA	Magnification	Working distance	Kg
14.443-05	0.50x	185 mm	0.094
14.443-07 (1)	0.75x	125 mm	0.109
14.443-15	1.50x	50 mm	0.120
14.443-20	2.00x	33 mm	0.130

Additional lens.



MSA
14.444

Pair of object clamps.



MSA	Type	Ø
14.445-C (1)	Transparent	94 mm
14.445-D (2)	Black / White	94 mm

Spare stage plate.



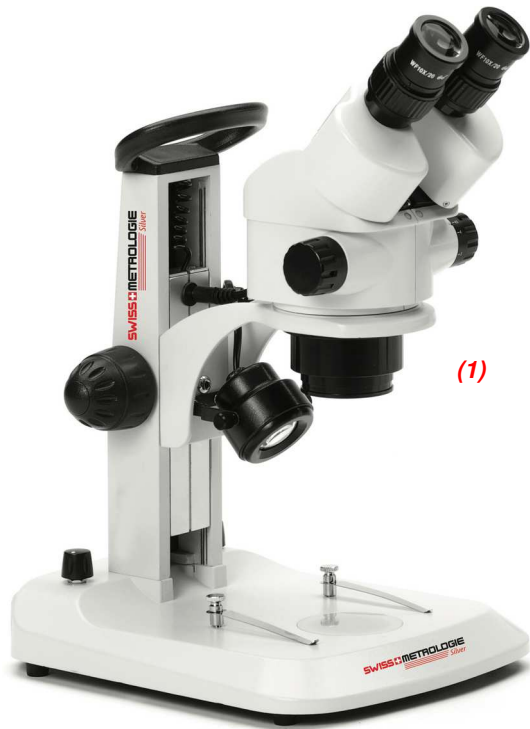
MSA
14.446

F250 V1 amp glass fuse for stereoscopic microscopes SWISSMETROLOGIE® "PREMIUM" and "SILVER".  
Set of 10 pieces.

**"SILVER" series. Stereoscopic binocular microscopes for demanding professionals.**  
**Modern design, more ergonomic - Compact and complete - Variable magnifications Zoom - 360° optical head - LED transmitted lighting.**

**Main features :**

- **Powerful stereoscopic optical system for demanding industrial applications**
- **Working distance of 100 mm, can be extended up to 170 mm with the optional lenses and the stand with detached arm**
- **Magnification domain variable by zoom from 6.7x to 45x zoom and expandable up to 135x using optional lenses and eyepieces.**



MSA		Type	Stand	Voltage	Kg
14.434	(1)	Binocular	Rack and pinion	110 / 220 V	4.540
14.435	(2)	Binocular	Detached	-	15.400

Stereomicroscope with 45° binocular head and zoom objective with variable magnifications from 0.7x to 4.5x.

Eyepieces : Pair of eyepieces wide field WF10x / 20 mm, secure and delivered with eyeshades.

Head : Binocular with 45° inclined tubes, rotating at 360°. Two dioptre adjustments. Inter-pupillary distance from 55 to 75 mm.

Objective : A continuous Zoom objective with variable magnification from 0.7x to 4.5x for magnifications from 7x and 45x with fields of view from 28 to 4.4 mm.

Working distance 100 mm.

Other magnifications and working distances are possible using eyepieces WF 5x/18, WF 15x/15 or WF 20x/10 and additional lenses of 0.75x or 1.5x.

Stand : Rack and pinion in metal, large and ergonomic (1) or detached with 1 arm (2).

*MSA14.434 only : delivered with transparent and black/white stage plates. Coarse adjustment with tension setting.*

**Lighting : see pages 14-17...14-20.**



Accessories for "SILVER" stereoscopic microscopes.



MSA	Type
14.450-10	HWF 10x / 21 mm
14.450-15	HWF 15x / 16 mm
14.450-20	HWF 20x / 12 mm

Pair of eyepieces.



MSA	Type
14.451	HWF 10x / 22 mm

Micrometric eyepiece.



MSA	Kg
14.452	0.012

Pair of ergonomic eyeshades.



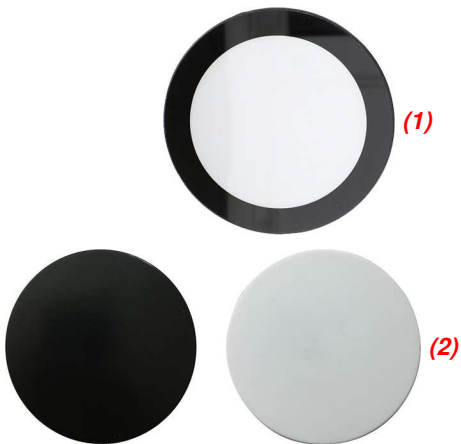
MSA	Magnification	Working distance	Kg
14.453-05	0.50x	170 mm	0.109
14.453-07	0.75x	114 mm	0.109

Additional lens.



MSA
14.454

Pair of object clamps.



MSA	Type	Ø
14.445-A	Transparent	60 mm
14.445-B	Black / White	60 mm

Spare stage plate.



MSA
14.446

F250 V1 amp glass fuse for stereoscopic microscopes SWISSMETROLOGIE® "PREMIUM" and "SILVER".  
Set of 10 pieces.

**Stereoscopic binocular microscopes ERGO range, ideal for combating musculoskeletal disorders (MSD).**

SWISSMETROLOGIE



MSA	Magnification	Kg
14.241	5...50x	6.000
14.242	8...80x	6.000

Stereoscopic binocular microscope.

- Compact and lightweight
- Rack and pinion stand with fine adjustment
- Eyepieces 10x with 2 positions (high and low) for maximum comfort
- Ergonomic optical head, tilting from 0 to 35°
- The working distance of 80 mm can be extended to 160 mm with optional lenses
- Diascopic and incident LED lighting with intensity dimmer.

**ERGONOMICS**

**Lighting : see pages 14-17...14-20.**

**Accessory for ERGO stereoscopic microscopes.**

SWISSMETROLOGIE



MSA	Kg
14.243	0.250

Camera tube.

**Stereoscopic binocular discussion microscope.**

SWISSMETROLOGIE



MSA	Kg
14.457	?

Dual viewing stereoscopic binocular microscopes, without lighting.

- Equipped with a variable magnification Zoom from 8x to 50x (with eyepieces WF10x/22)
- Two binocular heads with individual adjustment of the interpupillary distance from 54 to 76 mm
- Adjustment of dioptres : +/-5.0.

*Items included in the standard equipment :*

- Cast iron large base (400 x 400 mm), rectified column length 450 mm and fine focusing drive
- Modular design discussion tube
- Two binocular heads with individual adjustment of the interpupillary distance and dioptre correction
- Two pairs of eyepieces WF 10x with eyeshades
- Indicator with adjustable luminous arrow
- Protection cover
- Glas plate 255 x 255 mm.

**Lighting : see pages 14-17...14-20.**



Lighting for binocular and trinocular microscopes.



MSA	Kg
14.150-G	0.325

LED transmitted lighting with dimmer.  
External Ø 98 mm.



MSA	Size	Kg
14.150-T	115 x 115 x 15 mm Ø 95 mm	0.440

Black aluminium table support for transmitted lighting MSA14.150-G.  
Delivered without lighting.



MSA	Voltage	Kg
14.313	220 V	0.700
14.313-110	110 V	0.700

Neon incident lighting fluorescent ring.  
- 85 kHz  
- Power 8 W  
- Colour temperature 6000 K.  
Maximum internal Ø 62 mm. External Ø 98 mm.  
Delivered with additional neon.



MSA	LED	Voltage	Kg
14.312	60	90 - 260 V	0.360

Incident illumination ring of white LED.  
- Dimmable from 0 to 100%  
- Working distance 80...130 mm  
- Colour temperature 6000 K  
- Brightness 1400 lux at 100 mm  
- LED lifetime up to 20'000 hours.  
Maximum internal Ø 44.50 mm. External Ø 85 mm.



MSA	LED	Voltage	Kg
14.311	144	90 - 250 V	0.445

Incident illumination LED ring divided in 4 segments.  
 - Dimmable from 0 to 100 %  
 - Colour temperature 6500 K  
 - Emits 20000 lux at 100 mm  
 - Usable for working distances from 50 to 200 mm  
 - LED lifetime up to 10'000 hours.  
*Maximum internal Ø 61 mm. External Ø 98 mm.*



**ANTIREFLECTING**

MSA	LED	Voltage	Kg
14.317	164	90 - 240 V	0.463
14.317-5000K	164	90 - 240 V	0.463

Incident illumination LED ring divided in 3 segments.  
 - Dimmable from 0 to 100 %  
 - Colour temperature 5000 K (MSA14.317-5000K)  
 - Emits 33'500 lux at 50 mm  
 - Double diffuser.  
*Maximum internal Ø 63 mm. External Ø 105 mm.*



MSA	LED	Voltage	Kg
14.315	8	95 - 265 V	0.850

Polarizing incident illumination ring of white LED with high brightness.  
 - 1 W per LED  
 - Dimmable from 0 to 100%  
 - Colour temperature 6000 to 7000 K  
 - Brightness 1800 lux.  
*Maximum internal Ø 62 mm. External Ø 90 mm.*



MSA	Voltage	Kg
14.349	110 - 240 V	2.300

Multifunctional dual LED light source equipped with :  
 - 2 flexible Gooseneck arms with a 1 W LED mounted at each end  
 - 1 condenser lens  
 - 1 dimmer switch.  
 Each LED color temperature is 6500 K and emits 6500 lux at 100 mm.  
 Network auto switching 110/240 V.  
*Size : 120 x 160 x 75 mm.  
 Length of Gooseneck arms : 440 mm (LED included).*



MSA	Voltage	Kg
14.354	90 - 240 V	1.500

Multifunctional dual LED light source equipped with :  
 - 2 flexible Gooseneck arms with a 3 W LED mounted at each end  
 - 1 dimmer switch.  
 Each LED colour temperature is 6500 K and emits 12'000 lux at 100 mm.



MSA	LED	Voltage	Kg
14.150-E	120	110 - 240 V	1.205

Dome lighting with LED.  
 - Dimmable from 0 to 100 %  
 - Colour temperature 6500 K  
 - Brightness 2000 lux.  
 Maximum internal Ø 66 mm. External Ø 160 mm. Height 86 mm.



MSA	Voltage
14.423	220 V

System of incident illumination ring LED over three rings.  
 - Diffuser and intensity dimmer of 120'000 lux at 40 mm without heat release  
 - Mobile and adjustable thanks to its support, fits the stands MSA14.400, MSA14.471 and MSA14.473 of the inspection systems SMV.  
 Maximum internal Ø 143 mm. External Ø 165 mm.  
 (Illumination available without mobile support).

**ANTIREFLECTING**

LESS



MSA	Voltage
14.319	220 V

Fibre optic lighting kit, incident BF and grazing DF. 2 lighting systems in 1 (bright field and dark field). Easy to set up and assemble, this lighting system fits all our types of microscopes of the PREMIUM and SILVER ranges, as well as all our video inspection systems SMV-1, SMV-2, SMV-3, etc.

The "ShadowLESS" concept combines high uniformity and high directional light in a unique way. These properties allow an unprecedented inspection comfort with high contrast images, a negligible presence of stray light reflections, therefore a lower eye fatigue and no heat dissipation.

The colour temperature is 5400 K. It remains constant throughout the system longevity, independently of the number of hours the product is used. This consistency enables the users to maintain a stable quality standard over time.

Working distance : BF = 50...150 mm / DF = 0...15 mm.  
Lifetime : 20'000 hours.



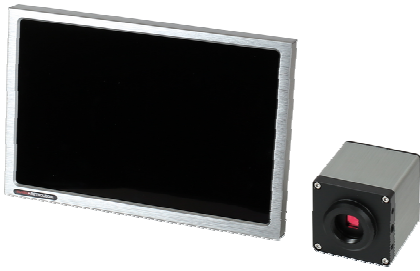
**BF**  
Incident lighting



**DF**  
Grazing lighting



**BF + DF**  
Incident and grazing lighting

**FULL HD camera with HDMI connection (use without PC).**

MSA	Kg
14.150-C	1.265

HD camera with 10" flat screen.

Technical characteristics :

Digital sensor .....	CMOS 1/2.5" Colour
HD resolution .....	1280 x 800 @ 60 fps (24 bits), 16.10 aspect ratio
Number of pixels .....	1 megapixel
Colour screen .....	Individual colour adjustment : Blue - Red - Green
White balance .....	Automatic or manual
Image contrast .....	Automatic or manual
Backup .....	Picture on SD memory card
Connection type .....	HDMI
Control .....	By wired remote control

NOTES

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---