



Leica DMi1

Instructions for use

CE

Leica Microsystems CMS GmbH. Instructions for use, 11934049, Revision 1.0, 2014-04-15

Living up to Life

Leica
MICROSYSTEMS

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The instructions contained in the following documentation reflect state-of-the-art technology. We have compiled the texts and illustrations as accurately as possible. Still, we are always grateful for comments and suggestions regarding potential mistakes within this documentation.

The information in this instructions for use is subject to modification at any time and without notification.

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1. Important Notes about this Instructions for use



Caution!

This Instructions for use is an essential component of the product; it must be read carefully before the product is assembled, put into operation or used, and must be kept for later reference.

This instructions for use contains important instructions and information for the operational safety and maintenance of the microscope and accessories.

Text symbols, pictograms and their meanings:

(1.2)

Numbers in parentheses such as “(1.2)”, correspond to illustrations (in the example, Figure 1, Item 2).

→ p.20

Numbers with an arrow, e.g. → p. 20, refer to a specific page of the manual.



WARNING indicates a hazard with a medium degree of risk that, if not avoided, can result in death or serious injury.



CAUTION indicates a hazard with a low degree of risk that, if not avoided, can result in minor or moderate injury.



Caution!

Special safety instructions within this Instructions for use are indicated with the triangle symbol shown here, and have a gray background.



Notice! The macroscope and accessories can be damaged when operated incorrectly.

1. Important Notes about this Instructions for use



Warning of hazardous electrical voltage! Risk of electrical shock!



Warning of optical radiation! Never look directly into the light beam! Wear safety goggles!



Warning of electromagnetic field



Instructions for disposing of the instrument, its accessories and consumables.



Connection to ground!



Explanatory note.

*

Item not contained in all configurations.



Device for in vitro diagnostics (IVD).



IVD manufacturing date, example 11 / 2011 for November 2011.



China RoHS 50 years EFUP
(Environmentally friendly use period)

2. Intended Purpose of Microscopes

The Leica DMI1 microscope is an inverted light microscope and is intended for use as a general laboratory microscope suitable for routine examinations of biological samples. It is also designed and approved for applications in industrial laboratory environment.

Indications for use

Inspection, counting, classifying, identifying and controlling cell and tissue cultures, Reviewing biological samples, liquids and sediments resulting in information regarding the physiological and/or pathological conditions inborn anomalies, monitoring therapeutic measures.

Any resulting actions are based on the interpretation by the clinician.

Contra indications

Not suitable for examining potentially infectious specimens.

Three basic microscope stands are available for biological applications. One is the standard bright field version with fixed eyepieces using the bright field (BF), phase contrast (Phaco) methods. One is the standard bright field version with exchangeable eyepieces using the bright field (BF), phase contrast (Phaco) methods. The other is the camera stand with exchangeable eyepieces, which also offers camera module in addition to the two transmitted light contrast methods.

All microscopy methods and the necessary accessories for the Leica DMI1 are described and explained in the operation section of this instructions for use, including their function and operation.

Directives of European Community (EC-Directives)

The named microscope complies with and is declared according to the Council Directive 98/79/EC concerning in vitro diagnostics.

It also meets the requirements of the Council Directives 2006/95/EC concerning electrical apparatus and 2004/108/EC concerning electromagnetic compatibility.

2. Intended Purpose of Microscopes

Reasonably foreseeable misuse

The following are prohibited:

- To use the microscope for any purpose not in accordance with the declaration of conformity.
- To use combinations with non-Leica components that go beyond the scope of this manual.
- For unauthorized personnel to open the instruments.
- To use cables that Leica has not provided or permitted.
- To clean the microscope in a way other than specified in the manual.
- To operate the microscope in a slope position.
- To use the illumination arm as handle to carry the microscope.
- To use the camera with wrong size camera chip



Caution!

The manufacturer assumes no liability for damage caused by, or any risks arising from using the microscopes for other purposes than those for which they are intended or not using them within the specifications of Leica Microsystems CMS GmbH. In such cases the conformity declaration shall cease to be valid.



Caution!

This (IVD) instrument is not intended for use in a patient environment and not intended to be combined with medical devices as defined by EN 60601-1. If a microscope is electrically connected to a medical instrument in accordance with EN 60601-1, the requirements defined in EN 60601-1-1 shall apply. Not suitable for examining potentially infectious specimens.



Notes on handling laser devices

This microscope is not suitable for coupling laser radiation (such as to the camera ports), since this radiation poses a hazard for the user (eye injury in particular). Laser couplings require corresponding safety devices that have to be inspected and installed by trained personnel. For further information, please contact your authorized Leica Microsystems representative.

3. Safety Notes

3.1 General Safety Notes

This product of protection class 1 is built and inspected in accordance with IEC / EN61010-1 - Safety requirements for electrical equipment for measurement, control and laboratory use - and IEC / EN 61010-2-101

It also meets the EMC-standards IEC / EN 61326-1 and IEC / EN 61326-2-6 for electrical equipment for measurement, control and laboratory use and particular requirements for IVD-Medical Devices and corresponds to the CE Directives.

It fulfills IEC / EN 62471, Photobiological safety of lamps and lamp systems. This product is classified according to this into the exempt level (no risk).



Caution!

In order to maintain this condition and to ensure safe operation, the user must follow the instructions and warnings contained in this instructions for use.



Caution!

The devices and accessories described in this instructions for use have been tested for safety and potential hazards.

The responsible Leica affiliate or the main plant in Wetzlar must be consulted whenever the device is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this instructions for use .

Unauthorized alterations to the device or noncompliant use shall void all rights to any warranty claims and product liability!

3.2 Electrical Safety

General specifications

Microscope

For indoor use only.

Input:

Supply voltage: 100-240V AC

Max. Power 18VA

Frequency: 50/60Hz

Fuses: 5x20, T1.6A H 250 VAC

Output:

Output voltage: 5V DC

Max. Power: 10W

Ambient temperature: 15-35°C

Relative humidity: max 80% to 30°C

Overvoltage category: II

Pollution degree: 2



Use only original power cables or alternative cables with a VDE / HAR logo, which at least fulfill the requirement of 3x0.75 mm² and 10A/250V.



Caution!

Plugging or unplugging of cables is to take place in the de-energized state!



By definition, the main circuit breaker of this instrument is the connection between the power cable and device port. The user must ensure unobstructed access to the main circuit breaker at all times.



The power plug may only be plugged into an outlet equipped with a grounding contact.

Do not interfere with the grounding function by using an extension cord without a ground wire. Any interruption of the ground wire inside or outside of the device, or release of the ground wire connection, can cause the device to become hazardous. Intentional ground interruption is not permitted!



Caution!

Do not use this instrument near sources of high electromagnetic radiation (for example, unshielded, intentionally operated ultra-high frequency sources), because these can disrupt proper operation.

We recommend assessing the electromagnetic environment before operation of this instrument and then giving corresponding instructions.

3. Safety Notes



Caution!

Do not use the microscope in altitudes exceeding 2000 m ASL/NL.



Caution!

Transport and storage in a range of -20° – +85°C and at a humidity not exceeding 90%.



Caution!

The microscope's electrical accessory components are not protected against water. Water can cause electric shock.



Caution!

Protect the microscope from excessive temperature fluctuations. Such fluctuations can lead to the accumulation of condensation, which can damage the electrical and optical components.
Ambient temperature: 15-35°C.

3.3 Type Labels

Fig. 1 Type label – 11526200
Leica DMi1 with fixed eyepieces

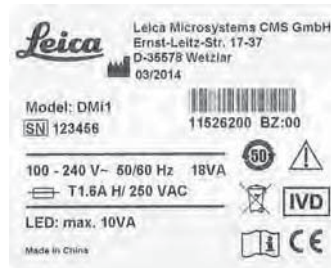


Fig. 2 Type label – 11526201
Leica DMi1 without eyepieces



Fig. 3 Type label – 11526203
Leica DMi1 without eyepieces with MC170 HD

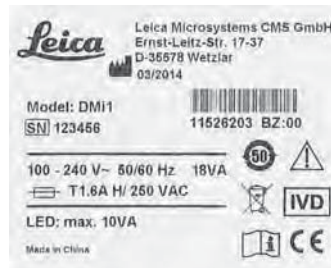
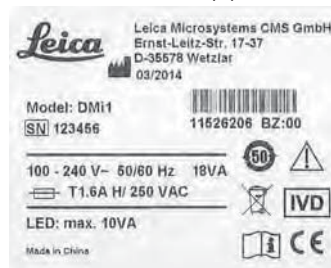


Fig. 4 Type label – 11526206
Leica DMi1 without eyepieces with MC120 HD



3.4 Notes on Handling Light Sources



Light sources pose a potential irradiation risk, therefore never look directly into the light beam!

3.5 Notes on handling immersion oil



Caution!

When using immersion oil, take care to avoid skin contact! Ask the supplier for a safety data sheet!

3.6 Notes on handling acids and bases

For examinations using acids or other aggressive chemicals, particular caution must be taken.



Caution!

Be absolutely certain to avoid direct contact with these chemicals.

3.7 Disposal

After the end of the product's life, please contact Leica Service or Leica Sales on how to dispose of it.

Please observe the national laws and ordinances which, for example, implement and ensure compliance with EU directive WEEE.



Note!

Like all electronic instruments, the microscope, its components and expendables may not be disposed of as general household waste!

4. Overview of the Instrument

4. Overview of the Instrument

Specification	Leica DMI1
Contrast methods	<ul style="list-style-type: none">• Transmitted light: Bright field, phase contrast
Optics	<ul style="list-style-type: none">• Infinity corrected (HCS)
Transmitted light axis	Integrated LED Illumination manual adjustment of <ul style="list-style-type: none">• Brightness• Aperture diaphragm• Automatic shutoff (adjustable)
Tube	optionally with <ul style="list-style-type: none">• Fixed eyepieces FOV 18 tube (ordered together with stand)• Exchangeable eyepieces FOV 20 tube (ordered together with stand)
Objective nosepiece	<ul style="list-style-type: none">• Manual• 4-fold for objectives with M25 thread
Stage	<ul style="list-style-type: none">• Fixed stage (L*W) 262 x 212 mm• Option: Attachable object guide for fixed stage
Condensers	optionally with <ul style="list-style-type: none">• S80/0.30 condenser• S40/0.45 condenser
Phase contrast slider	optionally with <ul style="list-style-type: none">• 2 position slider (BF, Ph1) for S40• 2 position slider (BF, Ph1) for S80• 4 position slider (BF, Ph0,Ph1,Ph2) for S40• 4 position slider (BF, Ph0,Ph1,Ph2) for S80
Focus	<ul style="list-style-type: none">• Focus dial for coarse and fine focusing• Height adjustment• Stroke distance is 9mm• Min. Adjustment 2 μm
Camera	optionally with <ul style="list-style-type: none">• Leica MC120 HD (2.5 M pixel) or MC170 HD (5 M pixel) camera• HDMI port• SD card• Independent On/off button for Camera

Important assembly groups

The following overall views illustrate and list important assembly groups of the microscopes and its accessory components.

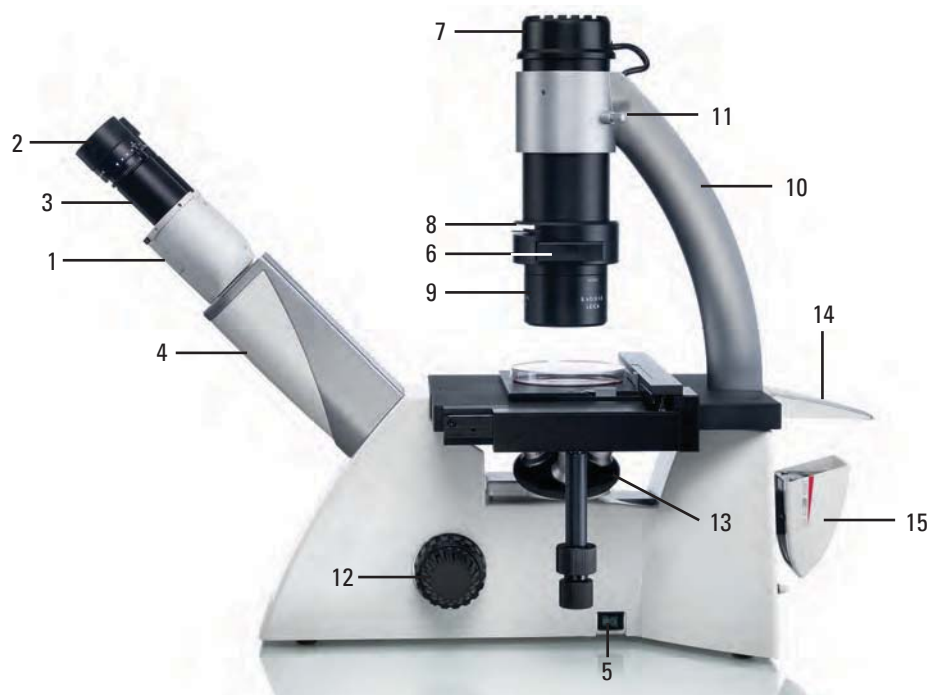


Fig. 5 Right side of the Leica DMi1 stand

- 1 Binocular tube upper part
- 2 Eyepieces
- 3 Eyepiece tube
- 4 Tube Neck
- 5 Main power switch
- 6 Phase contrast slider insert slot
- 7 Integrated LED lamp housing
- 8 Insert for filter, Ø 43 mm
- 9 Condenser
- 10 Transmitted light illumination arm
- 11 Stop screw for condenser height adjustment
- 12 Coarse and fine focusing
- 13 Objective nosepiece and objectives
- 14 Camera protection shield
- 15 Camera

4. Overview of the Instrument



Fig. 6 Left side of the Leica DMi1 stand

- 1 Brightness control
- 2 Integrated LED lamp housing
- 3 Aperture diaphragm
- 4 Condenser
- 5 Coarse and fine focusing
- 6 Fixed stage
- 7 Stage insert
- 8 Object guide

4. Overview of the Instrument

Fig. 7 Front view of the Leica DMi1 stand
1 Binocular tube upper part
2 Eyepieces

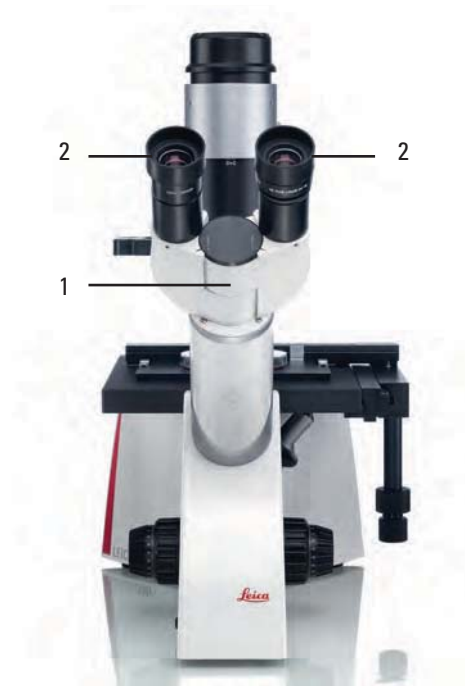


Fig. 8 Rear view of the Leica DMi1 stand
1 Integrated C-Mount
2 Power supply connection
3 Connection to earth/ground!
4 Camera USB power supply port
5 Identification label
6 Camera protection shield fix points



4. Overview of the Instrument

Stand

The Leica DMI1 stand offers high stability due to the low center of gravity. It offers solid design and simple ergo controls

Tube Neck

The tube neck is the interface between the microscope stand and the tube.

Tube

The tube contains a 1x tube lens which creates the primary image in conjunction with the objective.

The tube for the Leica DMI1 comes together with the stand. Tubes cannot be changeable.

Eyepieces

The eyepiece creates a magnified, virtual image of the real intermediate image that is projected by the objective. In this process, the eyepiece works as a magnifying lens.

Brightness controller

The stand has built-in electronics for adjusting the brightness via the brightness controller.

Integrated C-mount*

The integrated C-mount is consist in the stand, with 0.5x magnification, only suitable for 1/2" size camera chip, if mount with other size camera will cause the problem.

Main power switch

The illuminated main power switch is used to switch the power supply of the microscope on and off. The illumination allows you to tell immediately whether the microscope is switched on, even in darkened rooms.

Transmitted light illumination unit

The transmitted light illumination unit consists of the transmitted light illumination arm and the transmitted light illumination column. The transmitted light illumination column includes a pre-centered, high-intensity LED illuminator, a fixture for a diaphragm slide, a fixture for a light filter, a condenser and an aperture diaphragm.

Filters

The green and yellow filter are generally used to improve the contrast of the specimen. They are firmly mounted in a spoon-shaped holder (Ø 43 mm).

Different filters can be inserted into the filter holder of the transmitted light illumination unit.

The day light filter will change the color of the image.

Additionally, yellow filter Ø 43mm with round mounting can be put in the BF position of slider, only for change the color for BF image.

Aperture diaphragm

The aperture diaphragm defines the resolution, focus depth and contrast of the microscopic image. The best resolution is obtained when the apertures of the objective and the condenser are roughly the same.



Caution!

The aperture diaphragm in the illumination light path is not for setting the image brightness. Only the rotary brightness adjustment knob or the neutral density filter should be used for this purpose.

Condenser

The condenser is a lens system that collects the light and directs it to the specimen from the top. The condenser serves to utilize the numerical aperture in the objective.

Stop screw for condenser height adjustment

The stop screw is used for fixing condenser height adjustment by moving the transmitted light illumination column. The markings on the transmitted light column indicate the proper height to be set for the condenser used.

For S40 condenser, the working distance can be changed between 40mm and 50 mm. The S80 condenser, has a fixed working distance of 80mm.

Specimen stages and accessories

The specimen stage is used to support the specimens to be subjected to microscopic examination. For microscopy with the different specimens, multiple options are available, such as the attachable object guide and inserts.

Fig. 9 Insert of transmitted light filter



Fig. 10 Transmitted light illumination system



4. Overview of the Instrument

Objective nosepiece and objectives

The objective nosepiece is designed to hold the objectives. Especially the L-type objectives with long working distance are able to compensate for the different thicknesses of flask bottoms.

All microscope objectives with magnifications 2.5x to 100x can be used. All objectives with a 25 mm thread are compatible. For additional information about objectives, refer to the "Technical Description" chapter or the respective objective lists.

(www.leica-microsystems.com ->Products->Light Microscopes->Accessories->Objectives)

Coarse and fine focus adjustment

The coarse and fine focus adjustment enables you to adjust the microscopic image quickly and accurately. The focus is adjusted by moving the objective nosepiece vertically. The stroke length 9mm, minimum adjustment is 2 µm.

Object guide and inserts

Object guide is the accessory mounted on the fixed stage, with the handle it can carries the sample move in the X-Y direction. It offers different inserts (holding frame) to hold different size petri dishes, slides, multiwell plate or flasks etc.

Camera device*

The camera stand version with camera device contains the integrated lens (Similar function as C-mount, 0.5x).

Phase contrast slider**

The phase contrast slider is part of a contrast method.

For the S40/0.45 and S80/0.30 condensers, four different sliders are used for the phase contrast, each condenser can use 2 different sliders. In each case, there are one or three phase rings are integrated on the sliders.

2 position slider contains one Brightfield (BF) and one Ph1 phase ring, 4 position slider contains one Brightfield (BF), one Ph0, one Ph1 and one Ph2 phase ring

*Camera stands

5. Unpacking

First, carefully remove all components from the transportation and packaging materials.



Note:

If at all possible, avoid touching the lens surfaces of the objectives. If fingerprints do appear on the glass surfaces, remove them with a soft leather or linen cloth. Even small traces of finger perspiration can damage the surfaces in a short time. See the chapter, "Care of the Microscope", for additional instructions.



Caution!

Do not yet connect the microscope and peripherals to the power supply at this point under any circumstances!

The following parts can be included in the delivery:

- Leica DMI1 stand, including fixed stage, illumination and condenser holder
- Tube
- Eyepieces
- Objectives
- Condenser
- Dust cover
- Power supply and cable
- Instructions for use

Optional components:

- Phase contrast slider
- Focusing telescope
- Filters for transmitted light
- Camera
- Specimen stage accessories
- Object guide and inserts
- Additional components from the Leica DM IL LED as eyepieces

5. Unpacking the Microscope

Installation location

Work with the microscope should be performed in a dust-free room, which is free of oil vapors and other chemical vapors, as well as extreme humidity. At the workplace, large temperature fluctuations, direct sunlight and vibrations should be avoided. These conditions can distort measurements and micrographic images.

Allowable ambient conditions

Temperature 15-35°C
Relative humidity maximum 80% up to 30°C

Microscopes in warm and warm-damp climatic zones require special care in order to prevent the build up of fungus.

See the chapter, "Care of the Microscope" for additional instructions.



Caution!

When installing the microscope, make sure the power inlet is freely accessible so that the instrument can be quickly disconnected from the mains if necessary.



Caution!

Electrical components must be placed at least 10 cm from the wall and away from flammable substances.

Transport

For shipping or transporting the microscope and its accessory components, the original packaging should be used.

As a precaution to prevent damage from vibrations, the following components should be disassembled and packaged separately:

- Unscrew the objectives.
- Remove the condenser.
- Remove the camera and the camera shield.
- Remove the eyepieces if not integrated.
- Remove all moving or loose parts.
- Lower the transmitted light illumination arm to the S40 position. Fix the screw for height adjustment

Weight

The weight of the microscope depends on the particular equipment.

Storage

Put a dust cover over your microscope after use to protect it from dust.

6. Assembling the Microscope

6.1 Attaching the condensers

- Screw the S80/0.30 (Fig. 11.2) or S40/0.45 (Fig. 11.1) condenser from below into the condenser holder (Fig. 12) of the transmitted light illumination column.

6.2 Adjusting the transmitted light illumination column

- Position the transmitted light illumination column (Fig. 12.3) depending on the condenser used (S40/0.45 or S80/0.30).
- Use one hand to hold the condenser holder of the lower part of illumination column, and use another hand to loose the screw.
- The Marks indicate the 40mm to 50 mm working distance position for S40 condenser and 80mm position for S80 condenser.
- For 40mm, 50mm and 80 mm position, when it fix into the right position, the click will be heard
- Make sure that the transmitted light illumination column is locked in place.
- Tight the stop screw



Caution!

A screw on the transmitted light illumination column tight the condenser not fall off. If changing the condenser between S40/0.45 or S80/0.30, please use the hand to hold the condenser in case it falls off and hurt yourself or consolidate the sample.

Do not put the hand on the upper part of transmitted light illumination column. In case when the transmitted light illumination column falling off, and hurt the hands.

Fig. 12 Transmitted light illumination unit with condenser
 1 Condenser
 2 Condenser holder
 3 Transmitted light illumination column
 4 Stop screw for condenser height adjustment
 5 Marks

Fig. 11 Condensers
 1 S40/0.45 condenser
 2 S80/0.30 condenser



6. Assembling the Microscope

6.3 Eyepieces and graticules*

Inserting the eyepieces

The eyepieces are inserted into the eyepiece tubes.

The following eyepieces are offered:

- Eyepieces 10x Non Focusing
- Eyepieces 10x Focusing

For information on the diameter, the viewable specimen area and the total magnification of the microscope, refer to the "Technical Description" chapter.

Positioning the graticules*

Basically, graticules can be used only with eyepieces with adjustable eyelens = Type M.



! Important:

Be extremely careful to maintain cleanliness. Otherwise, dust particles and fingerprints will appear in the field of view.

HC PLAN eyepieces have a uniform graticule diameter of 26 mm.

Fig. 13 Rear view of the stand

- 1 Power supply for camera



Fig. 14 Eyepieces

- 1 Eyepieces 10x Non Focusing
- 2 Eyepieces 10x Focusing



6. Assembling the Microscope

HC PLAN 10x/20 M and HC PLAN 12.5x/16 M:

- Unscrew the retainer sleeve from the lower part of the eyepiece 12.5x/16M, remove the plastic part of the eyepiece 10x/20M.
- Insert the graticule so that the coated side faces downward (toward the objective) and any marking appears laterally correct when viewed in the later observation direction.
- Bring it back in.

6.4 Objectives

- Remove the screw caps on the objective threads.
- Screw the objectives into the nosepiece opening so that incremental change of the magnification levels is possible (e.g. in the sequence 4x, 10x, 20x, 40x).
- If objective threads are left unused, cover these with screw caps to protect the microscope optics against dust.

6.5 Inserting the filter

- Insert the filter (Fig. 15) into the filter slot (Fig. 15.1) on the transmitted light illumination carrier.

6.6 Object guide

- Attach the attachable object guide to the right or left side of the stage to accommodate brackets for different culture flasks (Fig. 16).
- Mount the attachable object guide with the 3 mm hexagon socket wrench.



Note:

Some holders come with self-adhesive scale for reading the coordinate adjustment. Attach these in the recesses on the attachable mechanical stage.

Fig. 15 Insert of transmitted light filter
1 Transmitted light filter slot



Fig. 16 Object guide



6. Assembling the Microscope

6.7 Light source for the transmitted light axis



Note:

The Leica DMI1 is equipped with integrated LED illumination. The service life of the LED is about above 35000 hours. If, despite this, it should be necessary to change the LED, this task must be carried out by Technical Service only.

6.8 Electrical connection of the microscope



Caution!

Do not connect the microscope and supply unit* to the power supply until all options are installed.

The power plug may only be plugged into an outlet equipped with a grounding contact. Do not interfere with the grounding function by using an extension cord without a ground wire.

If you purchased additional options with the microscope, install these options first (see next chapter).

7. Assembling the Options



Note:

These assembly tasks are omitted if no additional accessory components were purchased with the microscope.

7.1 Inserting the phase contrast slider on the transmitted light illumination carrier*

Depending on whether the S40/0.45 or S80/0.30 condenser is used, 2 kind of phase contrast sliders exist. 2 position slider contains Brightfield(BF) and Phase 1(Ph1), 4 position slider contains Brightfield(BF) and Phase 0(Ph0), Phase 1(Ph1), Phase 2(Ph2).



Caution!

The phase contrast slider is not protected against inadvertently sliding out.

- Remove the dummy slide, where applicable.
- Hold the light ring slide so that the marking "TOP LEFT" is at the top left and the marking of light rings 5, 10/20 and 40 is facing you. The click stops are on the front longitudinal side of the slide.
- Insert the light ring slide laterally into the transmitted light illumination carrier. The keyways should click in place when the slide is inserted.

7.2 Mount the camera system

- Loosen the screw of the camera mount on the rear side of the microscope.
- Position the camera and tight the screw of the camera mount.
- Connect the USB cable with camera and the Camera USB power supply port (PWR port) on the back side of the microscope.
- Mount the camera protection shield with two screws.

Fig. 17 Phase contrast sliders



Fig. 18 Inserting the phase contrast slider
1 Phase contrast slider



7. Assembling the Options

- Camera position should face upright, if not will cause the image has certain angle. Loosen the ring on the camera to adjust the position of camera, and tight the ring afterwards



Note:

The port on the rear side of the stand is for power supply for the camera, not for data transmission purpose.

The infrared signal receptor of camera is on the back side of the stand. If the camera is connected with a monitor, the monitor needs to put at least 10 cm beside Microscope, to allow the space for infrared signal to pass through.

7.3 Mount the camera IR reflection shield

The camera shield is an IR reflection shield for the camera remote control.

- Place the IR reflection shield left or right in the back of the instrument in an angle of 45°.
- Insert the quick start guide of camera or a white paper into the IR reflection shield

Fig. 19 Rear view of the stand
1 Camera USB power supply port (PWR port)
2 Integrated C-Mount



Fig. 20 Camera mount



Fig. 21 Rear view of the stand

- 1 Camera
- 2 Camera protection shield



Fig. 22 Mounting camera IR reflection shield
1 IR reflection shield



8. Operation



Caution!

For examinations using acids or other aggressive chemicals, particular caution must be taken. Avoid direct contact of these substances with optical and mechanical parts.

8.1 Basic settings for transmitted light

Switching on the transmitted light LED illumination

- Switch on the power switch.
- Adjust the brightness using the knob.



Note:

Auto-off function

The LED flashes briefly three times to indicate activation. The LED flashes twice for a longer time to indicate deactivation. By rotating the brightness controller once (up to three seconds after switching on the microscope) from the zero position to maximum brightness and back, you

can activate or deactivate the automatic shutoff of the LED. This means that after two hours, the LED shuts off automatically and is reenabled only by turning the brightness controller.

Adjustment specimen

For initial setting of the microscope, we recommend using a specimen that has both high-contrast and low-contrast areas.

Focusing the specimen

- Position the desired objective. When doing this, the objective nosepiece should be lowered first. The objective is swung into place by turning the black knurled ring of the nosepiece. Be sure that each nosepiece audibly clicks into place.
- Bring the image into focus using the coarse and fine adjustment, which adjusts the height of the objective nosepiece. The level of the stage remains unchanged. The total adjustment is 9 mm. The focusing range extends (in air) from 1.0 mm below the stage surface to 8 mm above it.



Caution!

Depending on the objective used, the objective nosepiece must be lowered before turning over the objective. Otherwise, there is a risk that the objective will collide with the stage.

Fig. 23 Left side of the Leica DMi1
1 Brightness control
2 Focus drive



8. Operation

Adjusting the tubes and eyepieces

For microscopy work with glasses, the protection screen on the eyepieces must be removed or inverted, but it should always be used when observing without glasses.

- Adjust the interpupillary distance on the tube by pulling the eyepiece tube or pushing them together so that when viewing with both eyes, a congruent total image is seen and not a double image.
- Note your personal interpupillary distance.
- Close any unused tube openings, as otherwise stray light can interfere with observation.

Only if no graticule is inserted in both eyepieces:

- Bring the specimen very much out of focus or remove it from the beam path.
- Adjust the eyelens so that the limit of the field of view appears sharp. When you adjust the eyelens, a bright line is visible along the outer perimeter of the eyepiece body. It indicates the correct position of the eye lens for normal eyesight and for users wearing glasses during microscopy work with corrective glasses.



Note:

Eyeglasses with multifocal lenses (bifocals and smooth view glasses) must be removed while operating the microscope.

- Focus on the object through the eyepieces.

Only if one eyepiece does not have an adjustable eyelens:

- First focus the specimen through this eyepiece exactly (close the other eye).
- Then, likewise focus the image by adjusting the eyelens of the second eyepiece.

Correction for vision problems

- With your right eye, look through the right eyepiece and bring the specimen into sharp focus using the fine adjustment.
- Then, with your left eye, view the same position of the specimen and rotate the left eyepiece tube until this position is brought into sharp focus. While doing so, do not use the fine adjustment.
- If using eyepieces with adjustable eyelenses, do not compensate for vision problems by adjusting an eyepiece tube, but by adjusting the eyelens of the eyepiece.

Fig. 24 Adjusting the eyepieces



8.2 Objectives

Immersion objectives

- For immersion objectives use the appropriate immersion medium.
 - OIL: only use optical immersion oil according to DIN/ISO standards
 - W: Water immersion
 - IMM: Universal objective for water, glycerol, oil immersion



Caution!

Follow safety data sheet for immersion oil!

Locking objectives

For some immersion objectives (with knurled wheel), the objective can be "shortened" (locked). Then, drops of immersion oil that have not been wiped off do not accidentally wet objectives and other specimens when the objective nosepiece is turned.

- Push the front part approx. 2 mm towards the nosepiece.
- Lock the objective in place with a small rotational movement.



Caution!

When you use the immersion objective again, be absolutely certain to release the lock, as otherwise the spring action to protect the specimen and objective is disabled and, furthermore, the other objectives are no longer parfocal to the immersion objective.

CORR objectives

These are special objectives that can be adjusted to the thickness of the cover slip.

- By turning the knurled ring, set the corrective mount roughly to a middle or estimated value.
- Optimize the focus on the specimen.
- Adjust the corrective mount until optimum contrast appears; refocus using fine adjustment if necessary.

The following objectives are particularly well suited:

- HI PLAN 4x
- N PLAN 5x
- HI PLAN I 10x
- HI PLAN I 20x
- HI PLAN I 40x

And the corresponding phase contrast objectives:

- N PLAN 5x PH0
- HI PLAN I 10x PH1
- HI PLAN I 20x PH1
- HI PLAN I 40x PH1
- HI PLAN I 40x PH2

8. Operation

8.3 Transmitted light

Bright field illumination

Illumination methods in which the empty areas of the specimen make up the brightest areas of the image are called bright field. Bright field observation requires absorbent specimen structures, i.e. most specimens will need specimen staining. Alternatives are optical contrast methods such as phase contrast.

Adjusting the condenser

For correct height adjustment of the S80/0.30 and S40/0.45 condensers, the stand has marks (Fig. 25.3). The marks indicate the 40mm to 50 mm working distance position for S40 condenser and S80 position for S80 condenser.

For S40 condenser, the condenser can move from 40 mm to 50 mm to achieve different working distance. And can stop in any where between.

For S80 condenser the also have on mark indicated the fix position for S80.

For 40mm, 50mm and 80 mm position, when it fix into the right position, a "click" will be heard.

Adjusting the aperture diaphragm

The aperture diaphragm (Fig. 25.5) determines the resolution, the focus depth and the contrast of the microscope image. The best resolution is obtained when the apertures of the objective and the condenser are roughly the same.

When the aperture diaphragm is stopped down to be smaller than the objective aperture, resolution is reduced, but the contrast is enhanced. A noticeable reduction in the resolution is observed when the aperture diaphragm is stopped down to less than 0.6x of the objective aperture and should be avoided where possible.

Fig. 25 Transmitted light illumination unit with condenser

- 1 Condenser
- 2 Condenser holder
- 3 Stop screw for condenser height adjustment
- 4 Marks
- 5 Aperture diaphragm



- Adjust the aperture diaphragm subjectively, according to your opinion of the image.
- In principle, you can carry out a calibration yourself by comparing with the apertures of different objectives.
- You can visually compare the apertures of objective and condenser as follows:
 - Remove the eyepiece from the eyepiece tube or use a focusing telescope and focus.
 - Open or close the aperture diaphragm just enough for your image to be visible in the eyepoint (= illuminated circle) of the objective. This position is considered the normal position, i.e. condenser aperture = objective aperture.
 - Reinsert the eyepiece.

For specimens with lower contrast, you can close the aperture diaphragm further to make structure elements with lower contrast more clearly visible.



Caution!

The aperture diaphragm in the illumination light path is not for setting the image brightness. Only the rotary brightness adjustment knob or the neutral density filter should be used for this.



Caution!

When you presses the head of the illumination column down to lower position, be careful of your hands position. No not put your hand between the empty place.

An aperture diaphragm in the objective is normally fully opened. The reduction in image brightness caused by stopping down results in:

- Greater focus depth
- Less cover slip sensitivity
- Dark field impression
- Change in contrast

Possible faults

Incorrect thickness of the cover slip or incorrect objective. Specimen positioned with cover slip facing upwards rather than downwards.

- Aperture diaphragm opened or closed too far.
- Condenser in incorrect height position.
- Light ring switched on by mistake.
- Optics dirty.

8. Operation

8.4 Phase contrast

Phase contrast is for contrasting unstained specimens.

- Adjust the condenser height.
- Insert the phase contrast light ring slide into the fixture (Fig. 26.1).
(Caution: There are different sliders for the condensers!)
- Swing the phase contrast objective (engraved PH) with the weakest magnification into place using the objective nosepiece.
- Open the aperture diaphragm (Fig. 26.2).
- Bring the specimen into focus using the coarse and fine adjustment. If you have difficulties finding the specimen plane: Stop down the aperture diaphragm temporarily or use a stained specimen. To do so, move slider into the BF position or remove light ring slider. Open the aperture diaphragm.
- Use the light ring of the light ring slide that corresponds to the magnification (5, 10, 20 or 40).

The phase contrast light ring slide is encoded. As soon as the slider is taken out of the bright field position (available opening) and engaged in a phase contrast position (any light ring), the brightness increases. Conversely, switching from phase contrast to bright field decreases the brightness.



Note:

The light rings do not need to be centered. The superimposition of light rings and phase rings is adjusted at the factory.

Possible faults

Specimen too thick, too thin or too brightly stained; refractive indexes of the mounting medium and specimen are identical, so that there is no phase jump.



Caution!

Cover slip placed in a wedge-shaped position, so that the centering of the light and phase ring is no longer effective.

- Incorrect light ring.
- Aperture diaphragm not open.
- Condenser in incorrect height position. Slide the condenser further up or down to obtain optimum phase contrast.
- Incorrect light ring slide (There is one slide each for the S80/0.30 and S40/0.45 condenser.).
- Optics dirty.

8.5 Camera

For detailed information how to use the Camera, please check the user manual on the LAS CD.

Fig. 26 Phase Contrast

- 1 Phase contrast slider
- 2 Aperture diaphragm



9. Trouble Shooting

Problem	Cause/remedy
Stand	
The microscope does not respond.	<p>Ensure that the AC outlet has power.</p> <p>Make sure that the stand is connected to the power supply.</p> <p>Check the cable connections.</p>
Illumination	
The image is completely dark.	<p>Make sure that the LED in the built-in transmitted light illuminator is not defective.</p> <p>Make sure that the aperture diaphragm is open.</p> <p>Notify technical service if necessary.</p>
The image is not uniformly illuminated.	Remove all unneeded filters from the light path.
Focus	
The specimen cannot be brought into focus.	<p>Use the correct immersion medium.</p> <p>Lay the specimen with the cover slip toward the bottom.</p> <p>Make sure that the cover slip thickness is correct and that it meets the specifications on the objective.</p>
Transmitted light	
The image is not uniformly illuminated.	<p>Be sure that the right objective is being used.</p> <p>Aperture diaphragm opened or closed too far.</p> <p>Condenser in incorrect height position.</p>
Unwanted stray light.	Clean the specimen and neighboring lens surfaces.

9. Trouble Shooting

Problem	Cause/remedy
Phase contrast	
Phase contrast cannot be adjusted.	The specimen is too thick, too thin or too brightly stained. Refractive indexes of the mounting medium and specimen are identical, so that there is no phase jump. The cover slip is not placed uniformly. Check that the correct light ring is positioned. Check that the correct light slider is positioned. Open the aperture diaphragm completely.
Camera's remote control is not sensitive	The battery of remote control is low, battery needs to be changed. The IR reflection shield does not be placed correctly to reflect the IR signal to the sensor.

10. Care of the Microscope



Caution!

Unplug the power supply before performing cleaning and maintenance work!
Protect electrical components from moisture!

Microscopes in warm and warm-damp climatic zones require special care in order to prevent fungus contamination.

The microscope should be cleaned after each use, and the microscope optics should be kept strictly clean.

10.1 Dust Cover



Note:

To protect against dust, cover the microscope and accessories with the dust cover after each use.

10.2 Cleaning

Cleaning Coated Parts

Dust and loose dirt particles can be removed with a soft brush or lint-free cotton cloth.

Clinging dirt can be cleaned with a little soapy water or alcohol.

For cleaning coated parts, use a linen or leather cloth that is moistened with one of these substances.



Caution:

Acetone, xylene or nitro-containing thinner can harm the microscope and thus may not be used.

Test cleaning solutions of unknown composition first on a less visible area of the unit. Be sure that coated or plastic surfaces do not become matted or etched.

Cleaning the Stage

Remove light-colored spots on the stage by rubbing with paraffin oil or acid-free Vaseline.

10. Care of the Microscope

Cleaning Glass Surfaces and Objectives

Glass surfaces, and particularly objectives, are always to be cleaned as described in the brochure "Cleaning of Microscope Optics". You can download the information from

<http://www.leica-microsystems.com/products/light-microscopes/life-science-research/upright-microscopes>

Select the type of your microscope and switch to the "Download" page.

You can also contact our Technical Service with any questions.

Removing Immersion Oil



Caution!

Follow safety instructions for immersion oil!

First, wipe off the immersion oil with a clean cotton cloth, and then re-wipe the surface several times with ethyl alcohol.

12.3 Handling Acids and Bases

For examinations using acids or other aggressive chemicals, particular caution must be taken.



Caution:

Be absolutely certain to prevent the optics and mechanical parts from coming into contact with these chemicals.

11. Technical Description

Due to basic principles of physics and the physiology of the eye, all methods – not just those in microscopy – have performance limits. Therefore, observe the following information for correct use of the microscope.

Performance data of the objectives

The Leica DMI1 microscope is based on the tube length ∞ (infinity) and a tube lens focal length of $f = 200$ mm.



Caution:

Therefore, only objectives with the engraving ∞ and the thread dimension M 25 may be used.

Objective marking

Examples and meaning of the symbols:

$\infty / -$

HI PLAN 10x/0.22

$\infty / 0.17$

N PLAN 40x/0.65

$\infty / 0 / D$

N PLAN 50x/0.75

- ∞ Objective for infinite tube length (∞).
- The objective can be used with and without cover slip.
- 0.17 The objective may be used with a cover slip of the standard thickness 0.17 mm only. If the cover slip is missing or the thickness of the cover slip deviates greatly, significantly decreased performance will result, particularly for high objective apertures (see below).
- 0 Application without cover slip, e.g. for cell smears, incident light. Not suited for inverted microscopes.
- D or (A, B, C) Eyepoint of the objective (important for Modulation Contrast IMC, for example)
- L Long working distance.
- 10x/0.22 Magnification and aperture. The aperture determines the resolution, focus depth, contrast and brightness of the microscope image. Objectives with built-in iris diaphragm have the maximum and minimum aperture engraved, e.g. 0.85-0.55.

11. Technical Description

Color-coding of the objectives

In accordance with DIN/ISO standards, the magnification of each objective is indicated by a color ring along the outer edge.

100x 125x 150x 160x	63x	40x 50x	25x 32x	16x 20x	10x	6.3x	4x 5x	2.5x	1.6x
white	dark blue	light blue	dark green	bright green	yellow	orange	red	brown	gray

Immersion objectives are also marked by a second, lower color ring:

Black Oil or Imm (= universal objective for oil, water, glycerin)

White Water

Orange Glycerin

Performance data of the eyepieces

The following eyepieces are in the product line for the Leica DMI1:

Leica eyepiece type	Magnification/ Field number	Characteristics ⁺⁾
HC PLAN	10x/20	M
HC PLAN	10x/20	
HC PLAN	12.5x/16	M
HC PLAN	10x/20	MF

Eyepiece tube diameter: 30 mm

- ⁺⁾ = With removable or invertible protection screen for eyeglass wearers and non-eyeglass wearers
- M = Adjustable eyelens (dioptric equalization) and fixture for graticules with diameter of 19 mm or 26 mm for HC eyepieces.
- MF = With illuminated graticule

Eyepiece field number

For a certain microscope configuration, a certain eyepiece field number (see below), e.g. 20, must not be exceeded. If the maximum field number is exceeded, unwanted blurring may occur on the image field border and/or shading (vignetting) of the edge of the image.

The eyepiece field number (FOV, field of view) designates the diameter of the intermediate image in the eyepiece in mm, i.e. the diameter of the circular diaphragm that limits the image and is located within the eyepiece.

This FOV is specified on the eyepiece after the magnification, e.g. 10x/20. For the Leica DMi1 microscope, the recommended maximum is **FOV 20**.



Note:

The maximum permitted eyepiece field number for a given equipment configuration is calculated from the following instrument data:

- Field performance of objectives** see below
- Field performance of intermediate module(s)**
- Field number of tube**
- Condenser properties**

The **lowest** occurring value is always decisive. If, for example, the intermediate modules allow a field number of only 20, but the objectives and tube allow 25, only eyepieces up to FOV 20 are permitted. In this case, eyepieces with FOV 25 can lead to vignetting. Specifically, the following applies:

The diameter of the **viewable specimen area** is calculated by dividing the diameter of the field of view by the magnification of the objective and the magnification factor of the stand optics.

Example:
 10x/20 eyepiece
 PLAN 4/0.10 objective
 Magnification factor of the Leica DMi1
 1x stand optics
 Viewable specimen area

$$\frac{20 \text{ mm}}{4 \times 1} = \varnothing 5 \text{ mm}$$

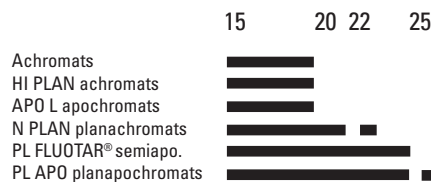
The **total magnification** of the microscope is calculated by multiplying the eyepiece magnification by the magnification of the objective and the magnification factor of the stand optics.

Example:
 10x/20 eyepiece
 PLAN 4/0.10 objective
 1x magnification factor
 Total magnification 10 x 4 x 1 = 40x

Field performance of objectives

The field performance of objectives is not engraved on the objectives. It can fluctuate somewhat within a class, e.g. the low objective magnifications may well have slightly higher values than the guiding values listed below:

Objective series Max. recommended Eyepiece field number



11. Technical Description

Performance data of the filters

Filter	Application
Green or yellow filters for filter slot	Contrast enhancement for black/white images
Day light filter for bright field position of the slider	Change the color of the image to a more blue

Performance data of the tube

Fixed eyepieced binocular tube

The binocular tube consists of a body that carries the tube change ring on the bottom. The tube lens has a factor of 1x. The Siedentopf binocular head allows the interpupillary distance to be adjusted from 55 mm to 75 mm while maintaining a constant tube length. The viewing angle is 45°. The tube has an adjustable eyepiece tube that enables a field number of 20.

Fig. 27 Condensers

- 1 S40/0.45 condenser
- 2 S80/0.30 condenser



Performance data of the condensers

S80/0.30 condenser

For vials up to 80 mm in height and objectives with a numerical aperture up to 0.30. In the phase contrast method, the adjustment of the light ring to the phase ring is optimal up to a liquid height of 2 mm.

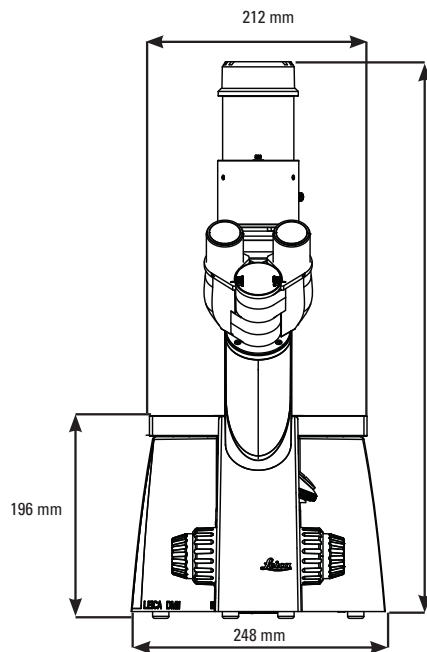
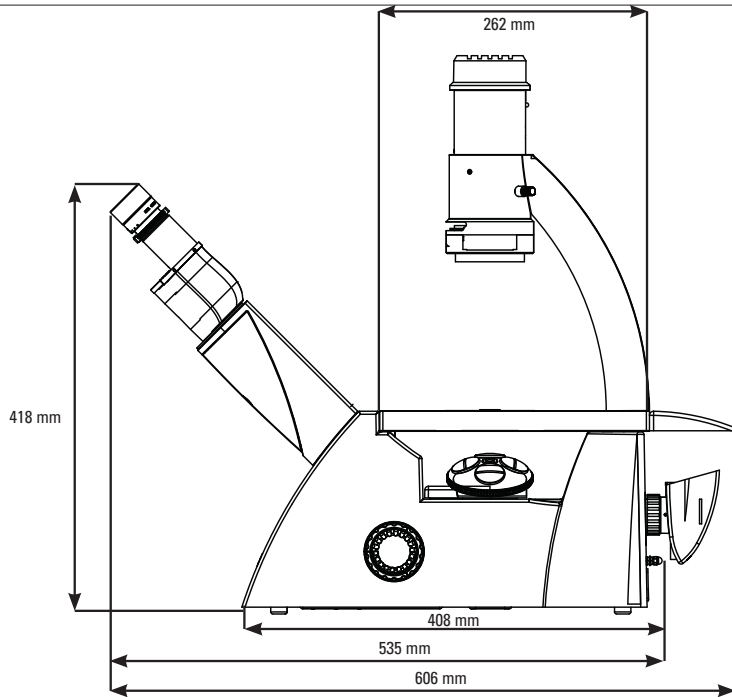
S40/0.45 condenser

For vials up to 50 mm in height and objectives with a numerical aperture up to 0.45. In the phase contrast method, the adjustment of the light ring to the phase ring is optimal up to a liquid height of 2 mm.

Application options of the S80/0.30 and S40/0.45 condensers:

Illumination Method	S80/0.30 Objectives	Light rings/ accessories	S40/0.45 Objectives	Light rings/ accessories
Bright field	4x-100x	–	4x-100x	–
Phase contrast	5x 10x, 20x, 40x 40x	Phaco 0 Phaco 1 Phaco 2	5x 10x, 20x, 40x 40x	Phaco 0 Phaco 1 Phaco 2

11. Technical Description



485-543 mm
(depending on condenser)

Weight: approx. 8.5 kg
(without lenses and camera):

12. EU Declaration of Conformity

To download the EU Declaration of Conformity for your product use the link

<http://www.leica-microsystems.com/products/light-microscopes/clinical/inverted-microscopes/>

Select the type of your microscope and switch to the "Download" page.

- Administrative Measures on the Control of Pollution Caused by Electronic Information Products -

部件名称 Name of the part	有毒有害物质或元素 Hazardous substances						
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	
印刷电路板 printed circuit boards	X	0	0	0	0	0	
电子元器件 electronic components	X	0	0	0	0	0	
机械部件 mechanical parts	X	0	0	X	0	0	
光学元器件 optical components	X	0	X	0	0	0	
电缆 cables	0	0	0	0	X	X	
光源 light sources	0	X	0	0	0	0	

0: 表示该有害物质在该部件中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。

Indicates that the concentration of the hazardous substance in all materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.

X: 表示该有害物质至少在该部件的某一材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。

Indicates that the concentration of the hazardous substance of at least one of all materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

Note: The actual product may or may not include in all the part types listed above



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