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*All specifications are subject to change without further notice. The information is only for reference only and Beacon reserves the right of interpretation.
2024 V2.0

SURGICAL IMAGING SOLUTION

The leader in integrated medical imaging display solutions in China

Global leader in medical display and human-machine interface (HMI) products

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20^{Year}

R&D and manufacturing experience

95%

Strategic partners - world-class medical device manufacturers

100⁺

Countries and regions to which our products are exported

8000⁺

End customers - hospitals in China

Shenzhen Beacon Display Technology Co., Ltd. is a national high-tech enterprise committed to intelligent medical imaging display and HMI technology innovation and application research, offering a wide range of products involving intelligent displays, HMIs, solutions and small and peripheral equipment. Beacon is a subsidiary of Zhejiang Jingxin Pharmaceutical Co., Ltd. (stock code 002020).

We are a strategic partner of many world-class medical device manufacturers such as GE, Philips, Siemens, Canon, United Imaging, and Mindray. Our medical imaging displays have a share of over 50% in the Chinese end market, with more than 8,000 hospital customers. Our products are exported to more than 100 countries.

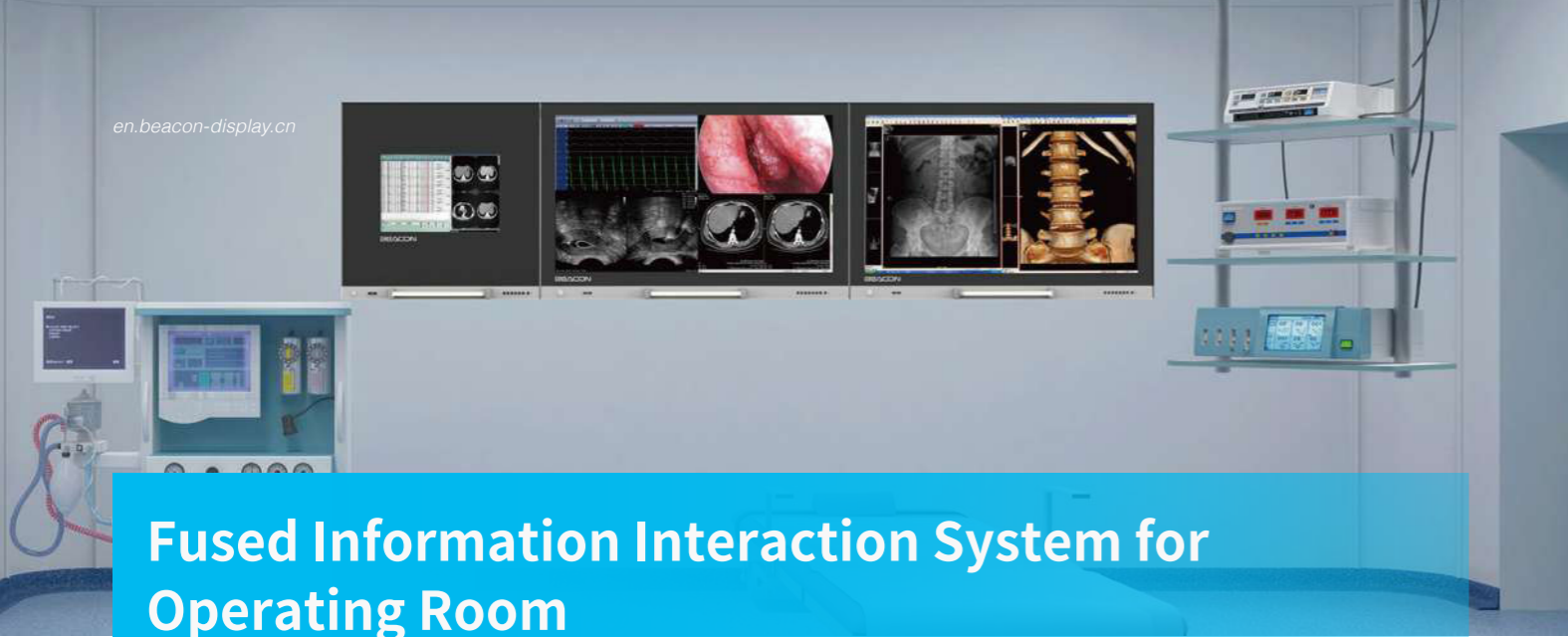
According to the Chinese Medical Display Market Research and Future Forecast Report (2019), Beacon's medical displays rank first in China in terms of production and sales volume, and top three globally in terms of sales volume.

GLOBAL LAYOUT



COOPERATIVE CLIENTS (Listed in no particular order)





Fused Information Interaction System for Operating Room

Our Fused Information Interaction System for Operating Room is made up of a 24" information interaction workstation and a 55" 4K comprehensive information workstation. Modular architecture design and integration with the matrix management platform, VM management platform and distributed IP management platform to achieve unified management and centralized display of all imaging information in the operating room.

A four-connecting-rod structure design leading to low weight and high stability and reliability, and the lockup function, for which it is safe and reliable, with an opening up to 70°, for which it is convenient for future maintenance. It can be mounted flush to the wall and sealed, meeting the IP65 rating requirements on effectively integrate the light box and film functions, realizing the front. It has the one-click viewbox control function to unified management of the picture archiving and communication system (PACS) in the operating room.

FEATURE HIGHLIGHTS

Scalability

Modular architecture design and integration with the matrix management platform, VM management platform and distributed IP management platform to achieve the uniform management and display of all imaging information in the operating room.

High maintainability

A four-connecting-rod structure design leading to light weight and high stability and reliability, and the lockup function, for which it is safe and reliable, with an opening up to 70 degrees, for which it is convenient for future maintenance.

Ultra-high Resolution and High Brightness

Energy-saving LED backlight to provide higher brightness and longer service life, and ultra-high-definition display of 3840 x 2160 pixels.

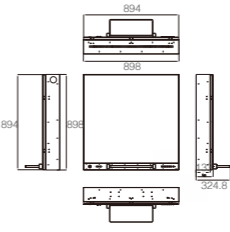
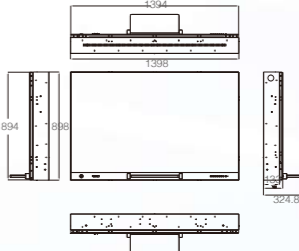
Film illuminator mode

Switch on the film illuminator mode by one click, (full-screen display, display on the left or right half screen), rendering convenient operations.

Independent Gamma Curves

To ensure precise view of PACS images during surgeries.

SPECIFICATION SHEET

Model		SP2421T(24")	SP5581T(55")	SP5581P(55")
LCD Screen	Resolution	1920x1200	3840x2160	3840x2160
	Pixel Pitch	0.270x0.270	0.315x0.315	0.315x0.315
	Contrast Ratio	1000:1	1100:1	1100:1
	Brightness(Typ.)	600cd/m ²	700cd/m ²	700cd/m ²
	View Angle(Typ.)	178° Typ	178° Typ	178° Typ
Video Signal	Input	DVI-D*1, VGA*1	HDMI2.0*2,DP1.2*2,DVI-D*1, 3G-SDI*1	HDMI2.0*2,DP1.2*2,DVI-D*1, 3G-SDI*1
	Output	-	3G-SDIx1	3G-SDIx1
	Clone Output	-	HDMI2.0x1	HDMI2.0x1
Touch screen	Type	P-Cap,support 10-point touch	P-Cap,support 10-point touch	Protective Screen
	Surface Treatment	AF	AR+AF	AR+AF
	Communication Processing	USB2.0	USB2.0	-
Appearance	Color	Black Panel	Black Panel	Black Panel
	IP Rating	IP65	IP65	IP65
PC Components (Optional)	Configuration	CPU: intel core i5-7400, 3.0 G; RAM: 8G DDR4; Hard disk: SSD, 256 G; Graphics card: discrete graphics card, Nvidia GT1030, 2 G graphics memory, supporting 4K@60 HZ display; Audio: Auido-out (3.5 mm) Mic-in (3.5 mm); network card: RJ45, 1000M network card, wifi, bluetooth; USB: USB 2.0 x 4, USB 3.0 x 5; Output interface: HDMI 2.0 x 1, DP 1.2 x 1, HDMI 1.4 x 1; Front panel: USB 2.0 x 2 (with dust cover);		
	Keyboard	Medical keyboard, all-in-one keyboard and touch pad, IP65, white	Medical keyboard, all-in-one keyboard and touch pad, IP65, white	Medical keyboard, all-in-one keyboard and touch pad, IP65, white
Features/Function		-	PIP, PaP1, PaP2, SBS, QUAD	PIP, PaP1, PaP2, SBS, QUAD
Remote Control		RS-232C	RS-232C	RS-232C
Installation Method		Embedded installation	Embedded installation	Embedded installation
Weight		50 kg	75 kg	75 kg
Power Supply		AC100-240V, 50/60Hz	AC100-240V, 50/60Hz	AC100-240V, 50/60Hz
Power		60W (Max)	260W (Max)	260W (Max)
Certification		CCC, CE, MDR, UKCA	CCC, CE, UKCA, MDR	CCC, CE, UKCA, MDR
Size				



Imaging Display Solution for DSA Operating Room

FEATURE HIGHLIGHTS

IPS display technology

With a higher contrast ratio and better display effect, IPS display technology is more advanced than those of competitive products, displaying dynamic images more clearly.

High safety

Dual power supply, signal backup, and liquid splash prevention.

Switchable main screen display layout

A 10.4" control panel is provided as a standard feature. Remote linkage between the main screen and the control panel is available. The main screen display layout can be switched easily. It is possible to touch the screen while wearing gloves.

Live image display

The FPGA-based implementation of signal processing and image splitting enables the surgical screen to be displayed in real time on the display, which is superior to imported products by 15% and more than twice superior to the video matrix technology.

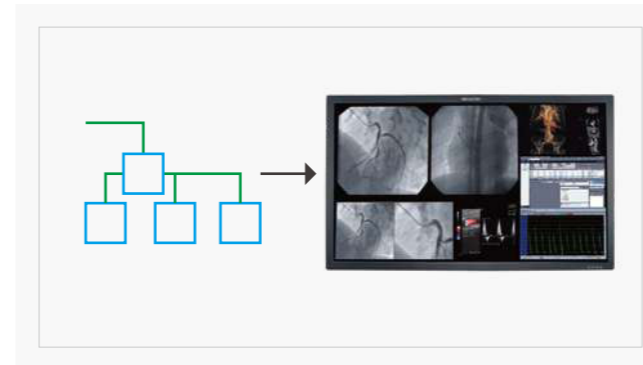
High compatibility

It is compatible with a wide range of high-end DSA equipment from GE, Philips, Siemens, Canon, Shimadzu and many other brands.

First export overseas

In December 2018, Beacon completed the installation of its DSA surgical display in Pakistan, pioneering the export of Chinese 8MP DSA surgical display to other countries.

A 55" high-performance big screen instead of multiple small screens



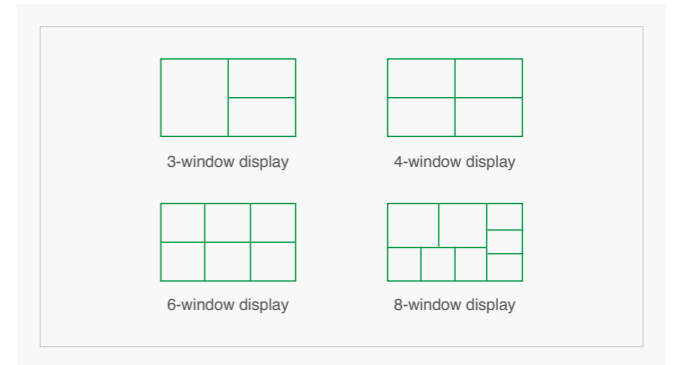
4K*2K display, with wide viewing angle for multi-angle viewing without distortion



Support for zooming in/out images

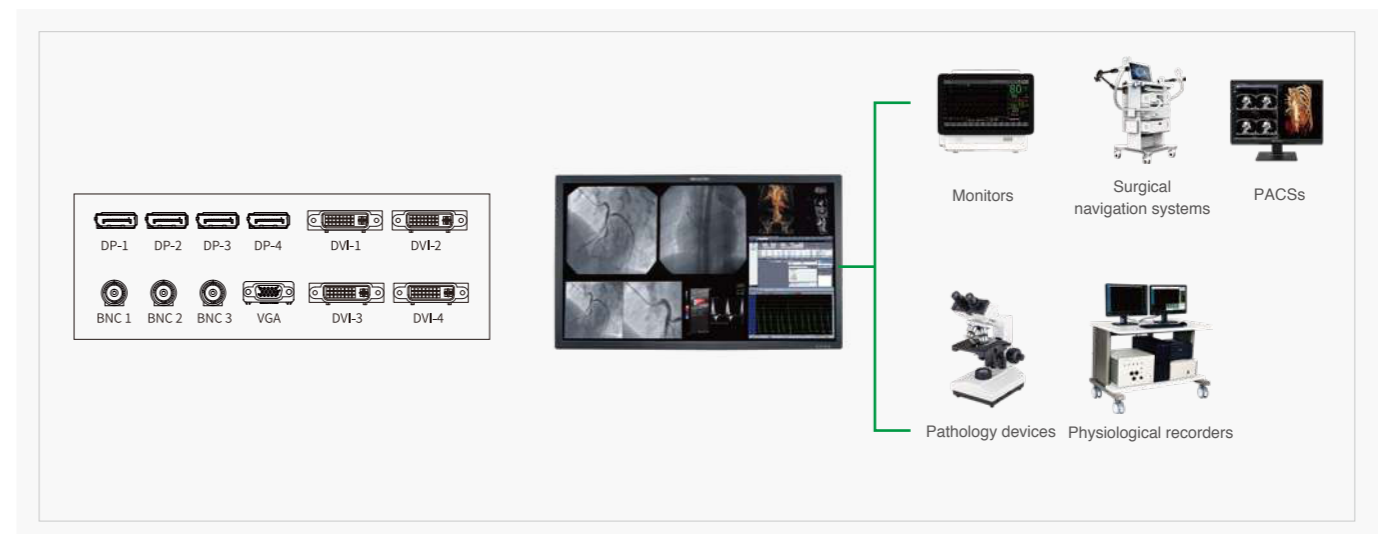


Flexible configuration in the size and number of windows



Abundant image information

Support 12-channel signal input and any 8-channel signal output supporting long line transmission (up to 30 meters); support access to a variety of auxiliary equipment, such as surgical navigation systems, monitors, multimode physiological recorders, PACS, pathology devices, etc.



UHD SURGICAL DISPLAY



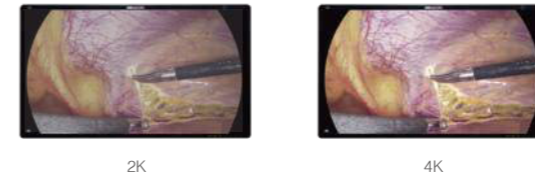
Beacon's 4K UHD surgical display is available in multiple sizes and is capable of accurately and realistically displaying 4K surgical images. Diverse display modes and functions are designed to provide physicians with sufficient choices.



FEATURE HIGHLIGHTS

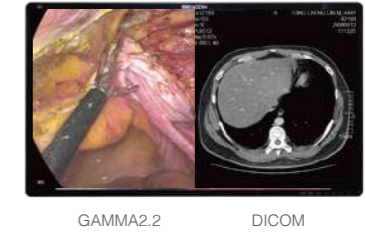
Ultra-high resolution and high brightness

The products use energy-saving LED backlight with lower power consumption, ensuring higher brightness while achieving longer life. They support 3840x2160 ultra-high resolution display, which is four times higher than Full HD, and can display 4K ultra-high definition endoscopic images realistically.



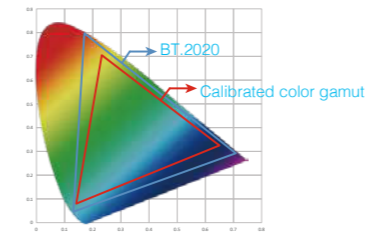
GAMMA split-screen display

In double-window mode, the GAMMA mode of each image can be adjusted without disturbing the other image, realizing accurate display of endoscopic, CT and MRI images on the same screen.



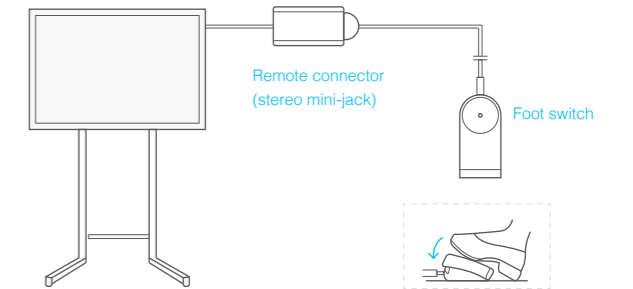
BT.2020 wide color gamut

The products support multiple color gamut modes such as AUTO, Native, BT709, BT2020, which can be used with different endoscopic systems according to the type of surgery.



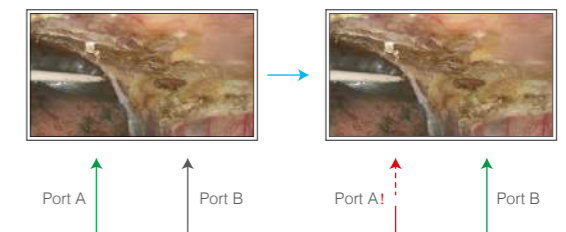
Pedal control

Effective control of the PIP, POP and SBS to turn on or off, and the signal channel switching.



Rapid switch to the panic pattern

If the current signal transmission is interrupted, the signal can be quickly switched to ensure that the operation is performed normally. The default signal sources are HDMI and 12G-SDI.



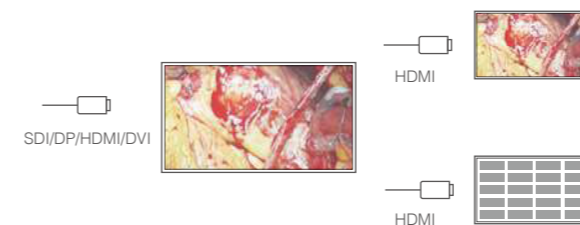
HDR

High dynamic range (HDR) technology to achieve a wider range of brightness and a higher contrast ratio so as to effectively enhance the detail display of an image with dark areas and improve surgery efficiency.

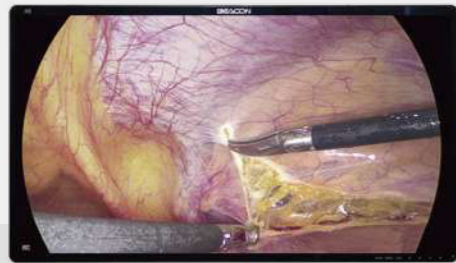


Cloning pattern

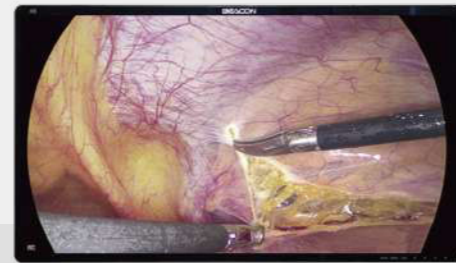
The current screen can be copied exactly and output to another screen or storage device, and output in FHD or UHD resolution is available.



S3285P



S3285P-3D



S3286P



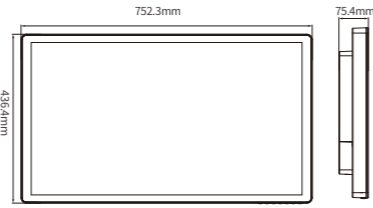
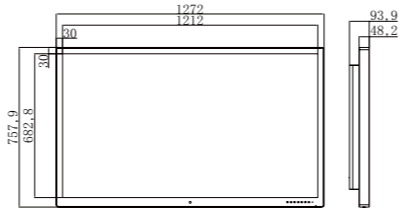
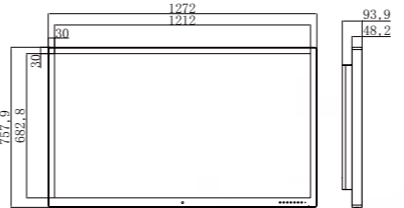
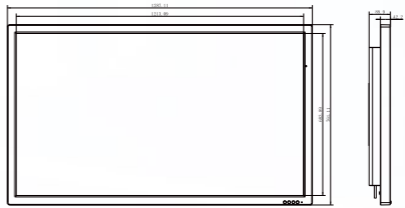
S5583P



Specification Sheet · UHD Surgical Display

Model		S2780P	S2785P	S3282P	S3285P	S3285P-3D
LCD Screen	Type	IPS	IPS	IPS	IPS	IPS
	Dimensions	27"	27"	31.5"	32"	32"
	Backlight	LED	LED	miniLED	LED	LED
	Resolution	3840×2160	3840×2160	3840×2160	3840×2160	3840×2160
	Pixel Pitch	0.15525×0.15525	0.1554×0.1554	0.18159×0.18159	0.1845×0.1845	0.1845×0.1845
	Support color	1.07 Billion	1.07 Billion	1.07 Billion	1.07 Billion	1.07 Billion
	View angle (Typ.)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)
	Brightness (Typ.)	500cd/m ²	800cd/m ²	1125 cd/m2 Typ, 1750 cd/m2 Typ (Peak)	850cd/m ²	850cd/m ²
	Contrast ratio (Typ.)	1000:1	1000:1	1000000:1	1500:1	1500:1
	Response time (Typ.)	16ms	16ms	14ms	18ms	20ms
Video Signal	Input	DVI-D (Single link)*1, DP 1.2*2, 3G-SDI*1, HDMI 2.0*1	DVI-D (Single link)*1, DP 1.2*2, 3G-SDI*1, HDMI 2.0*1	DVI-D (Single link)*1, DP 1.2*2, 3G-SDI*1, HDMI 2.0*1, 12G-SDI*1	DVI-D (Single link)*1, DP 1.2*2, 3G-SDI*1, HDMI 2.0*1, 12G-SDI/3G-SDI*4	DVI-D (Single link)*1, DP 1.2*1, 3G-SDI*1, HDMI 2.0*2 12G-SDI/3G-SDI*4
	Output	3G-SDI *1	3G-SDI *1	12G-SDI *1, 3G-SDI*1, DC 5V/1A	3G-SDI *1, 12G-SDI*1, HDMI2.0*A, DC 5V/1A	12G-SDI *1, 3G-SDI*1, HDMI2.0*1, DC 5V/1A
	Optional	-	12G-SDI *1	-	-	-
Appearance	Color	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)
	IP rating	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)
Protective Screen	Material	Glass	Glass	Glass	Glass	Glass
	Surface treatment	AR+AF	AR+AF	AR+AF	AR+AF	AR+AF
Full lamination		NO	Yes	Yes	Yes	Yes
Features/Funcyions		PIP, PaP, SBS	PIP, PaP1, PaP2 SBS	PIP, PaP1, PaP2, SBS	PIP, PaP1, PaP2, SBS	PIP, PaP1, PaP2, SBS, 3D/2D switching
Remote Control		RS-232C	RS-232C	RS-232C	RS-232C, RJ45	RS-232C, RJ45
Base		Optional	Optional	Optional	Optional	Optional
Installation	Standard	VESA100x100, 200x100, M4	VESA100x100, 200x100, M4	VESA100x100	VESA100x100	VESA100x100
	Method	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand
Weight		Without stand: 9.5 kg, with stand: 13.4 kg	Without stand: 9.5 kg, with stand: 13.4 kg	Without stand: 11.8 kg, with stand: 17.1 kg	Without stand: 12.5 kg, with stand: 17.8 kg	Without stand: 13.5 kg, with stand: 18.5 kg
Power supply		DC 24V	DC 24V	DC 24V	DC 24V	DC 24V
Power		80W (Max)	80W (Max)	200W (Max)	150W (Max)	150W (Max)
Certification		CCC, CE, KC, UKCA, MDR	CCC, CE, KC, MDR, UKCA	CCC, CE, FCC, CB, TUV, KC, UKCA, MDR	CCC, CE, FCC, CB, TUV, KC, MDR, UKCA	CCC, CE, FCC, CB, TUV, MDR, UKCA, KC
Size						

Specification Sheet · UHD Surgical Display

Model		S3286P	S5583P(L)	S5583P(H)	S556P	
LCD Screen	Type	IPS	IPS	IPS	IPS	
	Dimensions	31.5"	55"	55"	55"	
	Backlight	miniLED	LED	LED	LED	
	Resolution	3840×2160	3840×2160	3840×2160	3840×2160	
	Pixel Pitch	0.18159×0.18159	0.315×0.315	0.315×0.315	0.315×0.315	
	Support color	1.07 Billion	1.07 Billion	1.07 Billion	1.07 Billion	
	View angle (Typ.)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	
	Brightness (Typ.)	1125 cd/m2 Typ, 1750 cd/m2 Typ (Peak)	500 cd/m2	700cd/m ²	700cd/m ²	
	Contrast ratio (Typ.)	1000000:1	1100:1	1100:1	1100:1	
	Response time (Typ.)	14ms	8ms	8ms	8ms	
Video Signal	Input	DVI-D (Single link)*1, DP 1.2*1, 3G-SDI*1, HDMI 2.0*2 12G-SDI/3G-SDI*4	DVI-D (Single link)*2, DP 1.2*1, 3G-SDI*1, HDMI 2.0*1	DVI-D (Single link)*2, DP 1.2*1, 3G-SDI*1, HDMI 2.0*1, 12G-SDI*1,3G-SDI*4	DVI-D (Single link)*1, DP 1.2*4, VGA*1 BNC*3	
	Output	12G-SDI *1,3G-SDI *1, HDMI2.0*1, DC 5V/1A	DVI-D*1, 3G-SDI*1, DC 5V/1A	DVI-D*1, 12G-SDI*1, 3G-SDI*1, DC 5V/1A	-	
	Optional	-	-	-	-	
Appearance	Color	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)	Black 6C (Front), white (Back)	Black	
	IP rating	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX3	
Protective Screen	Mateiral	Glass	Glass	Glass	Glass	
	Surface treatment	AR+AF	AR+AF	AR+AF	AR+AF	
Full lamination		Yes	-	Yes	-	
Features/Funcyions		PIP, PaP1, PaP2, SBS	PIP, PaP1, PaP2, SBS, 4 Screens	PIP, PaP1, PaP2, SBS, 4 Screens	Support 2 to 8-screen image splitting and arbitrary arrangement of multiple screens	
Remote Control		RS-232C, RJ45	RS-232C,RJ45	RS-232C, RJ45	RJ11	
Base		Optional	-	-	-	
Installation	Standard	VESA100x100	VESA400x400	VESA400x400	VESA400x400	
	Method	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	
Weight		Without stand: 11.8 kg, with stand: 17.1 kg	40.2 kg	40.2 kg	38 kg	
Power supply		DC 24V	AC 100-240V, 50/60Hz	AC 100-240V, 50/60Hz	AC 100-240V, 50/60Hz	
Power		200W (Max)	200W (Max)	200W (Max)	350W (Max)	
Certification		CCC, CE, FCC, CB, TUV, KC, MDR, UKCA	CCC, CE, FCC, CB, TUV, KC, MDR, UKCA	CCC, CE, FCC, CB, TUV, KC, MDR, UKCA	CCC, CE, MDR, UKCA	
Size						

FHD SURGICAL DISPLAY

The medical imaging technology has developed into an essential surgical aid. This advanced technology has proven to be useful for the surgical team. Beacon's FHD surgical display can perfectly present surgical images used for surgical guidance in all types of procedures.

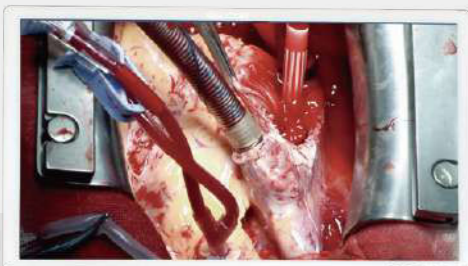
S271P



S3221P-3D



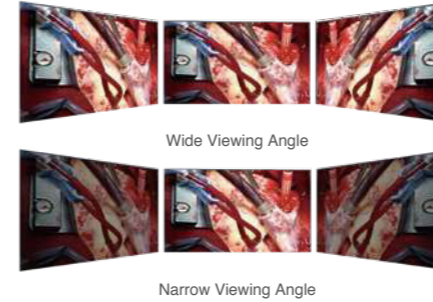
S3221P



FEATURE HIGHLIGHTS

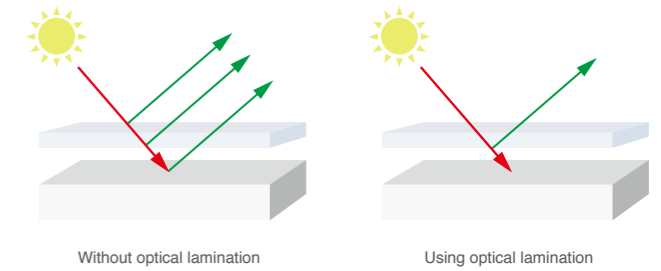
Ultra-wide viewing angle

A 178° ultra-wide viewing angle to display an image clearly from different angles and ensure the consistency of the image color.



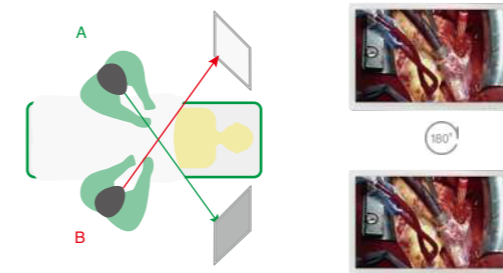
Low-reflection technology

The optical lamination and AR coating technologies can reduce screen reflection to less than 2% and display high-definition images.



180° rotation and mirror mode

Regardless of orientation and position, the image can be rotated 180° or mirrored to find an ideal viewing angle and make the surgery easier.



Condensation and mist resistance

The optical lamination technology is used to effectively prevent condensation and mist on the display caused by changes in the operating room environment, rendering clearer images and more realistic colors.



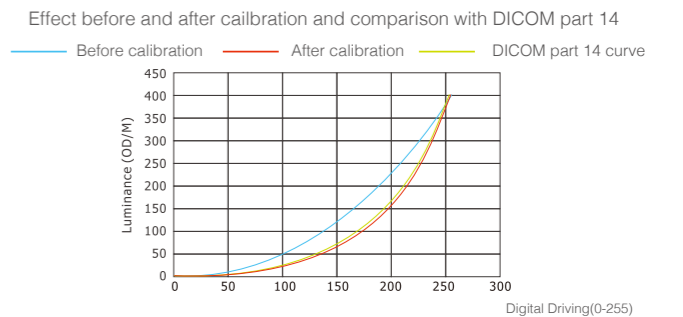
Full-range plane • high durability

Considering the risk of collision in the operating room due to a wide variety of equipment, the products adopt a new design of protective screen with full lamination to effectively enhance the frontal protection.



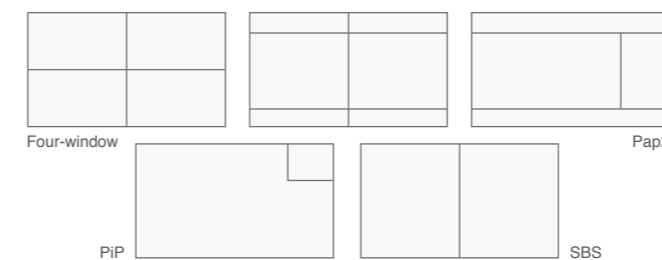
DICOM conformance

Conformance to DICOM 3.14, and satisfaction of display requirements for images from PCASs.



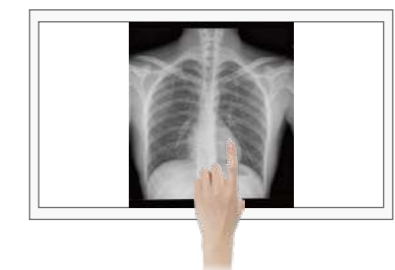
Display mode

In multi-signal-source mode, two or four different images can be displayed simultaneously on the same screen by using five display modes: SBS, PIP, PaP1, PaP2, and Quad, and both the main and slave windows support size scaling and GAMMA mode switching.



Viewbox mode

Support the one-click viewbox control function to effectively integrate the light box and film functions, realizing unified management of the picture archiving and communication system (PACS) in the operating theater.



Specification Sheet · FHD Surgical Display

Model		S2421P	S271P	S2720P	S3221P	S3221P-3D	S421
LCD Screen	Type	IPS	IPS	ADS	IPS	IPS	IPS
	Dimensions	24"	27"	27"	31.5"	31.5"	42"
	Backlight	LED	LED	LED	LED	LED	LED
	Resolution	1920×1200	1920×1080	1920×1080	1920×1080	1920×1080	1920×1080
	Pixel Pitch	0.27×0.27	0.3114×0.3114	0.3114×0.3114	0.364×0.364	0.364×0.364	0.4833×0.4833
	Support color	16.7 M	1.07 Billion	16.7 M	16.7 M	16.7 M	1.07 Billion
	View angle (Typ.)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)	L/R178°, U/D178° (CR>10)
	Brightness (Typ.)	600 cd/m2	1000 cd/m2	1000 cd/m2	700 cd/m2	700cd/m ²	700cd/m ²
	Contrast ratio (Typ.)	1000:1	1000:1	1000:1	1200:1	1200:1	1300:1
Response time (Typ.)	14ms	14ms	14ms	8ms	8ms	8ms	
Video Signal	Input	DVI-D (Single link)*1, VGA*1, 3G-SDI*1, RGBS*1, CVBS*1, S-video*1	DVI-D (Single link)*1, VGA*1, 3G-SDI*1, RGBS/SOG*1, HDMI*1, DP*1	DVI-D (Single link)*1, 3G-SDI*1, HDMI*1, DP*1	DVI-D (Single link)*1, VGA*1, 3G-SDI*1, RGBS/SOG*1, HDMI*1, DP*1	DVI-D (Single link)*2, DP 1.2*2, HDMI 1.4*1	DVI-D (Single link)*1, VGA*1, 3G-SDI*1, RGBS*1, CVBS*1, S-video*1
	Output	DVI-D (Single link)*1, 3G-SDI *1, DC 5V/2A	DVI-D*1, 3G-SDI *1, DC 5V/1A	DVI-D*1, 3G-SDI*1, DC 5V/1A	DVI-D*1, 3G-SDI*1, DC 5V/1A	DVI-D*1	DVI-D*1, 3G-SDI*1, DC 5V/2A
	Optional	-	-	-	-	-	-
Appearance	Color	white	white	white	white	Black 6C (Front), white (Back)	Silver 877C(Front), white(Back)
	IP rating	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IPX5 (Front), IPX2 (Back)	IP20
Protective Screen	Mateiral	Glass	Glass	Glass	Glass	Glass	-
	Surface treatment	AR+AF	AR+AF	AR+AF	AR+AF	AR+AF	-
Full lamination		Yes	Yes	Yes	Yes	Yes	Yes
Features/Funcyions		PIP, PaP, SBS	PIP, PaP, SBS, Mirror, Flip	PIP, PaP, SBS, Mirror, Fliop	PIP, PaP, SBS, Mirror, Fliop	PIP, PaP, SBS,3D/2D Switching	PIP, PaP, SBS
Remote Control		RS-232C	RS-232C	RS-232C	RS-232C	RS-232C	RS-232C
Base		Optional	Optional	Optional	Optional	Optional	Optional
Installation	Standard	VESA100x100, M4	VESA100x100, 200x200, M4	VESA100x100, 200x100, M4	VESA100x100, 200x100, M4	VESA100x100, 200x100, M4	VESA400x400, M4
	Method	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand	Arm; wall mount; stand
Weight		Without stand: 19.1 kg, with stand: 13 kg	Without stand: 9.7 kg, with stand: 13.6 kg	Without stand:9.7kg,with stand:13.5kg	Without stand:11.5 kg,with stand: 15.4kg	Without stand:12.9 kg,with stand:18.2kg	20 kg
Power supply		DC 24V	DC 24V	DC 24V	DC 24V	DC 24V	AC 100-240V, 50/60Hz
Power		60W (Max)	80W (Max)	80W (Max)	100W (Max)	100W (Max)	110W (Max)
Certification		CCC, CE, FCC, CB, TUV, KC, MDR, BIS, UKCA	CCC, CE, FCC, CB, TUV, KC, MDR, BIS, UKCA	CCC,CE,FCC,CB,TUV,MDR,UKCA	CCC,CE,FCC,CB,TUV,KC,MDR,BIS,UKCA	CCC, CE, UKCA, MDR	CCC, CE, FCC, CB, TUV, MDR, BIS, UKCA
Size							

ENDOSCOPY DISPLAY

Endoscopy has become an essential diagnostic adjunct. Beacon's endoscopy displays are designed for gastroscopy, enteroscopy, and otolaryngoscopy. With high brightness, high contrast, and wide viewing angle, they can truly and accurately display a variety of endoscopic images, providing reliable support for doctors to perform various endoscopic examinations.

FEATURE HIGHLIGHTS

Signal enhancement technology

A 178° ultra-wide viewing angle to display an image clearly from different angles and ensure the consistency of the image color.



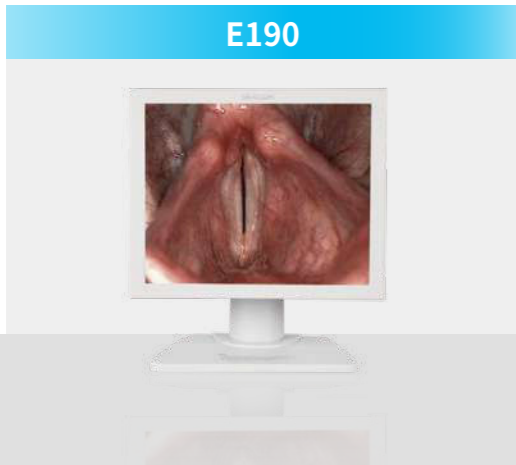
High compatibility

Compatible with DVI-D, 3G-SDI, RGB, CVBS, S-VIDEO and other different signal inputs; support gastroscopy, colonoscopy, and otolaryngoscopy.

Multiple installation methods

Support trolley arm, wall mount, desktop and other installation methods to adapt to different application scenarios.

E190



E2421



Specification Sheet · Endoscopy Display

Model		E150	E190	E2420	E2421
LCD Screen	Type	VA	IPS	IPS	IPS
	Size	15"	19"	24"	24"
	Backlight	LED	LED	LED	LED
	Resolution	1024x768	1280x1024	1920x1200	1920x1200
	Pixel Pitch	0.297x0.297	0.294x0.294	0.27x0.27	0.27x0.27
	Support Color	16.7M	16.7 M	16.7 M	16.7 M
	View Angle(Typ.)	L/R170°,U/D170° (CR >10)	L/R170°,U/D170° (CR >10)	L/R170°,U/D170° (CR >10)	L/R170°,U/D170° (CR >10)
	Brightness(Typ.)	350cd/m ²	300cd/m ²	600cd/m ²	600cd/m ²
	Contrast Ratio(Typ.)	2500:1	1000:1	1000:1	1000:1
	Response Time(Typ.)	25ms	25ms	14ms	14ms
Video Signal	Input	DVI-Dx1, VGAx1, RGBx1, CVBSx1, S-videox1	DVI-Dx1, VGAx1, RGBx1, CVBSx1, S-videox1	DVI-Dx1, HDMIx1	DVI-Dx1, VGAx1, RGBx1, CVBSx1, S-videox1
	Output	DVI-Dx1, RGBx1, CVBSx1, S-videox1	DVI-Dx1, RGBx1, CVBSx1, S-videox1	-	DVI-Dx1, DC 5V/2A
	Optional	-	-	-	3G-SDI IN/OUT*1
Appearance	Color	white	white	white	white
	IP Rating	IP20	IP20	IP20	IP20
Full Lamination		-	-	-	-
Features/Function		-	PIP	-	PIP, PaP, SBS
Remote Control		RS-232C	RS-232C	-	RS-232C
Stand		Yes	Yes	-	Yes
Installation Standard		VESA100x100, M4	VESA100x100, M4	VESA100x100, M4	VESA100x100, M4
Installation Method		Arm; Stand	Arm; Stand	Arm; Stand	Arm; Wall mount; Stand
Weight		4.8kg	8.9kg	TBD	11.6kg
Power Supply		AC100-240V 50/60Hz	DC 12V	DC 24V	DC 24V
Power		30W (Max)	40W (Max)	60W (Max)	60W (Max)
Certification		CCC, CE, MDR, UKCA	CCC, CE, FCC, CB, TUV, MDR, BIS, UKCA	CE, CCC, MDR, UKCA	CCC, CE, FCC, CB, TUV, KC, MDR, BIS, UKCA
Size					

TV-300/TV-300T(220V)/TV-300T(110V)/

TV-500/TV-500T(220V)/TV-500T(110V)

Mobile Trolley

Operator's Manual



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- Release time: 2023-5
- Revision: 1.0

2 Product Introduction

2.1 Intended Purpose

This product is used to carry endoscopic surgical devices, including monitor, endoscope camera system, light source, insufflator, hysteroscopy pump, video recorder, ultrasonic surgical & electrosurgical energy platform, light cable, footswitch, and cables. Except TV300, the mobile trolley can turn on or off mounted devices by pressing the power switch on the trolley.

2.2 Differences Among Models

Model	Applicable Monitor	110V Isolation Transformer	220V Isolation Transformer	Power Switch On the Trolley
TV-300	32-inch	x	x	x
TV-300T(200V)	32-inch	x	√	√
TV-300T(110V)	32-inch	√	x	√
TV-500	32-inch/55-inch	x	x	√
TV-500T(200V)	32-inch/55-inch	x	√	√
TV-500T(110V)	32-inch/55-inch	√	x	√

Note: The shelf materials of the TV -300 series are different from that of the TV-500 series.

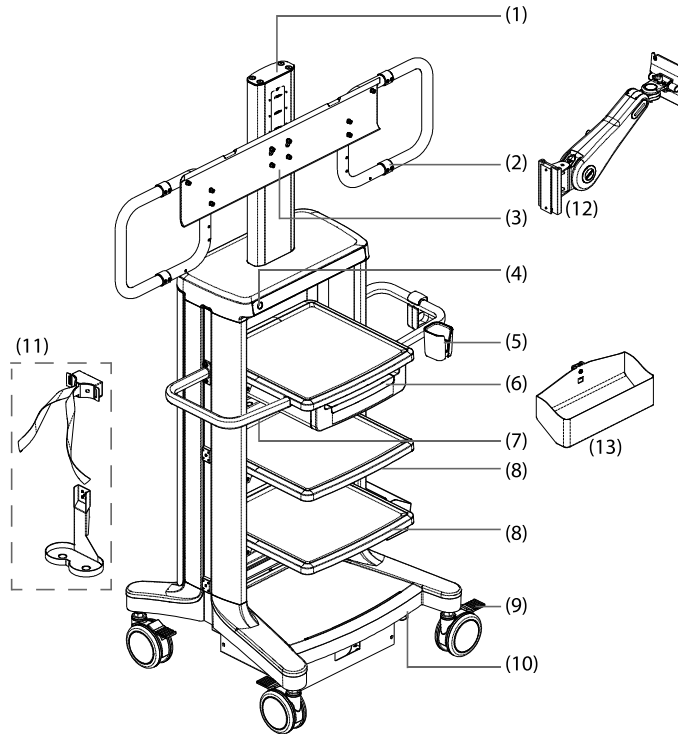
NOTE

- √ indicates "configured" while x indicates "not configured".

2.3 System Components

This product consists of shelves, open storage space, closed storage space, cable management box, handles, columns, castors, base plate, etc. Monitor arm, CO2 holder assembly, keyboard tray, and footswitch holder are also available for this product.

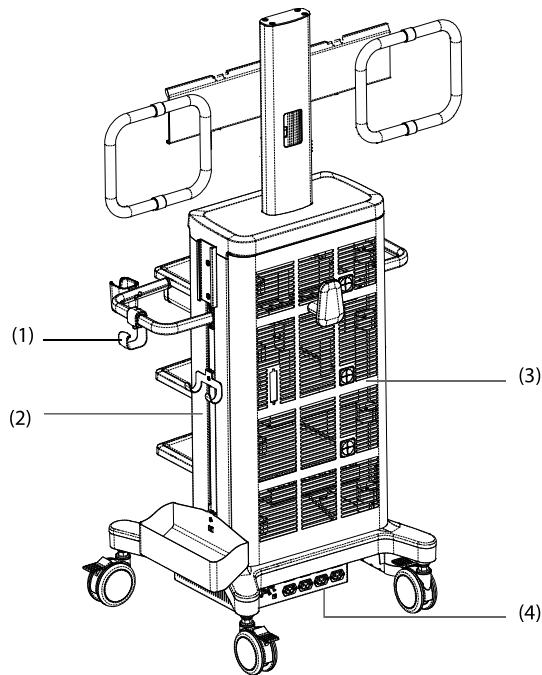
2.3.1 Front View of the Mobile Trolley



- (1) Monitor column: supports a monitor stand. For details about the monitor stands of different sizes for different models, refer to **3.5 Fixing Position of the Monitor Stand**.
- (2) Monitor stand handle: hold to adjust the monitor position, available only for 55-inch monitor stands.
- (3) Monitor stand: secures a monitor screen.
- (4) Power switch: press to turn on/off all powered medical devices on the trolley.
 - Orange: AC power is properly connected to the trolley with isolation transformer, but the power switch is off.
 - Green: AC power is properly connected, and the power switch is on.
- (5) Camera head holder: holds camera head.
- (6) Drawer: stores accessories, including keyboard tray (optional).
- (7) Drawer handle: hold to move the trolley.
- (8) Shelves: used to place main units, such as insufflator and light source.
- (9) Castor brake: apply the castor brake to lock or unlock the castors.

- (10) Base plate: an isolation transformer (if configured) is installed under the base plate.
- (11) CO2 holder assembly (optional): holds CO2 cylinders, and includes a cylinder strap rack and a cylinder holder.
- (12) Monitor arm (optional): secures a side-screen monitor.
- (13) Footswitch holder: stores footswitches.

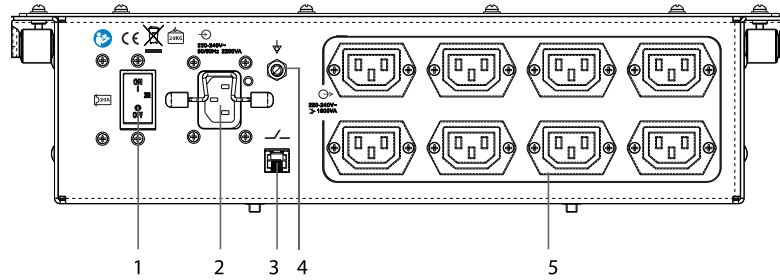
2.3.2 Back View of the Mobile Trolley



- (1) Hook: holds light cables and other cables.
- (2) Trolley column: accessories such as the monitor arm and footswitch holder are secured on the slide rail of the trolley column.
- (3) Rear door: lock it when moving the trolley.
- (4) Isolation transformer: if the trolley is equipped with an isolation transformer, you can connect the power connectors of the mounted devices to the output power sockets of the isolation transformer.

2.3.3 Back View of the Isolation Transformer

Taking TV-300T(220V)/ TV-500T(220V) as an example, the back view of the isolation transformer is as follows:



- (1) Circuit breaker: used to protect the circuit. It is turned on in normal status.
- (2) Input power socket: connects the AC Mains.
- (3) RJ11 connector: used to supply power to the power switch of the trolley.
- (4) Equipotential grounding terminal: when using the isolation transformer together with other devices on the trolley, connect their equipotential grounding terminals together to eliminate potential difference.
- (5) Output power socket: connects the devices on the trolley.

3 Equipment Preparation

3.1 Overview

This chapter describes the preparation and necessary check before putting the mobile trolley into use.

3.2 Safety Information About Equipment Preparation

CAUTION

- **The equipment should be installed by authorized Mindray personnel.**
- **Assemble the mobile trolley by using parts supplied by Mindray (such as screws and Allen key), or those with models and specifications specified in this manual. Using other parts may cause damage to the equipment or failure to meet the claimed specifications.**
- **Load devices onto the trolley properly and make sure they are adequately protected from potential damage caused by falling, hitting, strong vibration or other external mechanical force.**
- **Before moving the trolley, make sure all peripheral devices connected have been secured, in case of device falling and damage.**
- **Magnetic and electrical fields are capable of interfering with the proper performance of the equipment. For this reason, make sure that all external devices operated in the vicinity of the equipment comply with the relevant electromagnetic compatibility EMC requirements. Mobile phones, X-ray equipment or MRI devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.**
- **Do not use the system in strong electric or magnetic fields (where a transformer presents, for example), or near high-frequency devices (such as mobile phones). Performance degradation or system failure might occur.**
- **The equipment might be contaminated during storage and transport. Before use, verify whether the packages are intact. In case of any damage, do not apply it to patients.**
- **Make sure that the operating environment of the equipment meets the specific requirements. Otherwise unexpected consequences, e.g. damage to the equipment, could result.**

- **Keep the equipment dry. Do not move the equipment directly from a place of low temperature to a warm one, which may cause condensation or water drops, resulting in a short circuit.**

NOTE

- **Put the equipment in a location where you can easily view and operate the equipment.**
 - **Keep this manual in the vicinity of the equipment so that it can be obtained conveniently when needed.**
 - **Save the packing case and packaging materials for possible shipment or storage in the future.**
-

3.3 Unpacking and Checking

Before unpacking, examine the packing case carefully for signs of damage. If any damage is detected, contact the carrier immediately. Open the package and remove the equipment and accessories carefully. Check all materials against the packing list and check for any mechanical damage. Contact Mindray in case of any problems.

3.4 Environmental Requirements

The operating environment of the equipment must meet the requirements specified in this manual.

The environment where the equipment is used should be reasonably free from noises, vibration, dust, as well as corrosive, flammable, and explosive substances.

When the equipment is moved from one place to another, condensation may occur as a result of temperature or humidity difference. In this case, wait until the condensation disappears before using the equipment.

3.5 Fixing Position of the Monitor Stand

The mobile trolley can be configured with one of the following monitor stands:

Model	32-Inch Monitor Stand (Without Pan/Tilt Functions)	32-Inch Monitor Stand (With Pan/Tilt Functions*)	55-Inch Monitor Stand
TV-300	√	√	×
TV-300T(200V)	√	√	×
TV-300T(110V)	√	√	×
TV-500	×	√	√

Model	32-Inch Monitor Stand (Without Pan/Tilt Functions)	32-Inch Monitor Stand (With Pan/Tilt Functions*)	55-Inch Monitor Stand
TV-500T(200V)	×	√	√
TV-500T(110V)	×	√	√

*: The monitor stand provides up to 20° tilting movement and 75° panning movement.

NOTE

- √ indicates “configured” while × indicates “not configured”.

You can select the position of the monitor stand as needed. A 32-inch monitor stand can be adjusted to the following 3 heights:

- 1600 mm (center of the monitor)
- 1650 mm (center of the monitor)
- 1700 mm (center of the monitor)

A 55-inch monitor stand can be adjusted to the following 2 heights:

- 1650 mm (center of the monitor)
- 1630 mm (center of the monitor)

3.6 Fixing Position of the Shelves

The mobile trolley has 4 layers of space. The distance between shelves (excluding the thickness of the shelves) is as follows:

- Layer 1: 202 ±5 mm
- Layer 2: 200 ±5 mm
- Layer 3: 200 ±5 mm
- Layer 4: 200 ±5 mm

WARNING

- Stop using the equipment if you find that the equipment housing has signs of broken. Contact the service personnel for help in that case.
-
-

4.4 Using the Mobile Trolley

You can use the trolley to convey or transport devices. Take proper measures to prevent all devices on the trolley from moving, tipping, or falling. For example, you can use accessories such as straps to secure a device.

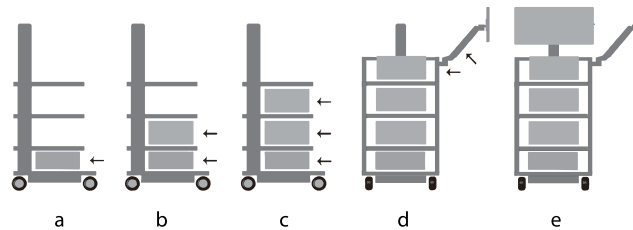
CAUTION

- Load and install devices onto the trolley only after they are powered off.
-
-

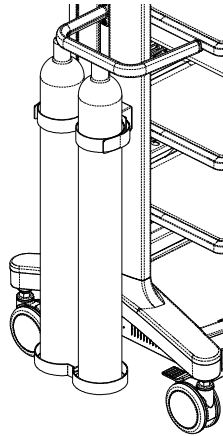
4.4.1 Loading Devices onto the Trolley

To load devices onto the trolley, follow the procedure below:

1. Place the trolley on a flat surface and lock all castors.
2. Load the trolley from bottom to top. For the load capacity of its each part, refer to **A.4 Physical Specifications**.
3. Mount the monitor arm and monitors. The following figure shows the loading sequence:



4. If a CO2 holder assembly is equipped, place the cylinders on the cylinder holder and fasten the straps, as shown in the following figure:



The optional CO2 holder assembly can support 2 E-size cylinders of 865 mm height and 102 mm diameter.

It is recommended that heavy components be loaded onto the trolley by 2 people. Note that the gravity center of the system will vary with the load weight on the trolley.

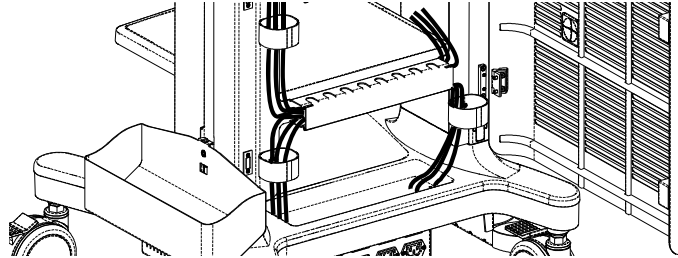
WARNING

- **Do not install or use the monitor arm and monitors on an empty trolley. Otherwise, the trolley may lose stability and fall over, causing equipment damage or injury to personnel.**
 - **Before using the medical devices on the trolley for medical purposes, check their electromagnetic compatibility.**
-
-

4.4.2 Routing Device Cables

To route cables of the devices on the trolley, follow the procedure below:

1. Place the trolley on a flat surface and lock all castors.
2. Open the rear door.
3. Connect cables of the mounted devices. Route the cables through the cable management box on the rear side of shelves, and secure the cables using cable ties on the trolley column, as shown in the following example:



4. Connect the mounted devices to the AC mains. For detailed operation, refer to **4.4.3 Connecting the Equipotential Line**.
5. Lock the rear door.

Pay attention to the following items when routing cables:

- The cable must be long enough to avoid cable damage or device failure when the trolley moves.
- When rotating the monitor arm, avoid contacting other connected cables.
- Do not pull or drag sagging cables.
- When adding or removing cables, avoid contacting other connected cables to avoid accidental power interruption.

4.4.3 Connecting the Equipotential Line

An equipotential terminal is used to balance the electric potential of the protective grounding between the electrical equipment in the system. If an isolation transformer is used in the system, connect the equipotential line to each equipotential terminal of the mounted devices and the isolation transformer, or an electrical shock will occur.

WARNING

- **When connecting or disconnecting the equipotential line, turn off the equipment power supply. Or an electrical shock will occur.**
-
-

4.4.4 Connecting the AC Mains

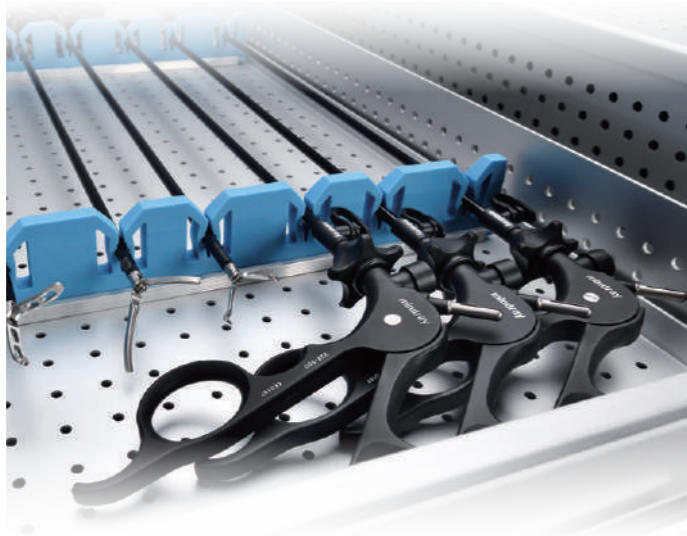
The electrical devices on the trolley are powered by AC power supply. Before connecting the devices to the AC mains, check that the voltage and frequency ratings of the power lines are the same as those indicated beside the AC power input of the devices.

For TV300 and TV500 trolleys, to connect the AC mains, follow the procedure below:

1. Place the trolley on a flat surface and lock all castors.

Reusable Laparoscopic Instruments

User Friendly & Future Proof



Trocars








Product	Description	Dimension	Code	
	Pyramidal Trocar	φ 5X95	221-51155	👍
		φ 10X95	221-01155	👍
		φ 12X95	221-81155	
		φ 5X150	221-53155	👍
		φ 10X150	221-03155	👍
		φ 12X150	221-83155	👍
	Auto Shield Trocar	φ 5X95	221-51255	
		φ 10X95	221-01255	
		φ 12X95	221-81255	
		φ 5X150	221-53255	
		φ 10X150	221-03255	
		φ 12X150	221-83255	
	Pyramidal Trocar with Screw	φ 5X95	221-51165	
		φ 10X95	221-01165	
		φ 12X95	221-81165	
	Auto Shield Trocar with Screw	φ 5X95	221-51265	
		φ 10X95	221-01265	
		φ 12X95	221-81265	

Trocars

- To avoid blood contamination when inserting the telescope and to reduce times of cleaning the tip of the telescope by controlling the sealing flap opening and closing.



Product	Description	Dimension	Code	
	Veress Needle	φ 2X120	221-21127	
		φ 2.7X150	221-27157	👍
	Reducer Sleeve	φ 10 - φ 5	221-01785	
		φ 12 - φ 5	221-81785	
	Sealing Cap	φ 5	221-50925	👍
		φ 10	221-00925	👍
		φ 12	221-80925	👍
	Reducer	φ 10 - φ 5	221-00725	👍
		φ 12 - φ 5	221-80725	👍
	Reducer	φ 10 - φ 5	221-00715	

The "Relia" Reusable Electrode Surgical Instruments



Safe

Insulated sleeve exposes a shorter metal base to avoid the accidental damage caused by electrical leakage.



Durable

Strictly selected materials plus special production processes greatly extend the product's life.




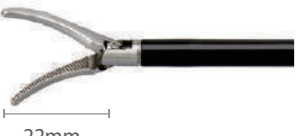


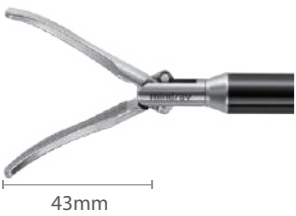

Ergonomic

One-click to disassemble into three parts for more thorough cleaning and sterilization.



Dissecting and Grasping Forceps

- **Diamond serration clamp teeth**
Stronger grasping force with less tissue damage
- **No obvious bulge at the opening joint**
Reduce blood and tissue residues, easy to clean and reduce cross infection
- **Shorter metal base**
Less unintentional electrical injury

Product	Description	Dimension	Code	
	KELLY Dissecting and Grasping forceps, Maryland	φ 5X360	222-5S3013	👍
		φ 5X360, With Ratchet	222-5T3013	
		φ 5X430	222-5S4013	
		φ 5X430, With Ratchet	222-5T4013	
	KELLY Dissecting and Grasping forceps, long, Maryland	φ 5X360	222-5S3023	👍
		φ 5X360, With Ratchet	222-5T3023	
		φ 5X430, With Ratchet	222-5T4023	
	Dissecting and Grasping forceps, right-angled	φ 5X360	222-5S3123	👍
		φ 5X360, With Ratchet	222-5T3123	
		φ 5X430, With Ratchet	222-5T4123	
	Straight Dissecting and Grasping forceps, atraumatic	φ 5X360	222-5S3043	
		φ 5X360, With Ratchet	222-5T3043	
	Dissecting and Grasping forceps, atraumatic	φ 10X360	222-0S3103	
		φ 10X360, With Ratchet	222-0T3103	
	Dissecting and Grasping forceps, right-angled	φ 10X360	222-0S3133	👍
		φ 10X360, With Ratchet	222-0T3133	

Grasping Forceps



No Ratchet



With Ratchet

Product	Description	Dimension	Code	
	Bowel Grasper, fenestrated, short	φ 5X360	222-5S3213	👍
		φ 5X360, With Ratchet	222-5T3213	
	Atraumatic Grasping forceps	φ 5X360	222-5S3633	👍
		φ 5X360, With Ratchet	222-5T3633	
		φ 5X430, With Ratchet	222-5T4633	
	CROCE-OLMI Grasping forceps, atraumatic, curved	φ 5X360	222-5S3453	👍
		φ 5X360, With Ratchet	222-5T3453	
		φ 5X430, With Ratchet	222-5T4453	
	Grasping forceps, w specially fine atraumatic serration	φ 5X360	222-5S3473	
		φ 5X360, With Ratchet	222-5T3473	
		φ 5X430, With Ratchet	222-5T4473	
	Bowel Grasper, fenestrated	φ 5X360	222-5S3303	👍
		φ 5X360, With Ratchet	222-5T3303	
	BABCOCK Grasping forceps	φ 5X360	222-5S3553	
		φ 5X360, With Ratchet	222-5T3553	👍
	Grasping forceps, 2X4 teeth	φ 5X360	222-5S3393	
		φ 5X360, With Ratchet	222-5T3393	

Grasping Forceps



No Ratchet



With Ratchet

Product	Description	Dimension	Code
 28mm	Grasping forceps, atraumatic	φ 5X360	222-5S3333
		φ 5X360, With Ratchet	222-5T3333
 15mm	VANCAILLIE Adhesion Forceps, one jaw fenestrated	φ 5X360	222-5S3493
		φ 5X360, With Ratchet	222-5T3493
 15mm	MANHES biopsy forceps	φ 5X360	222-5S3903
		φ 5X360, With Ratchet	222-5T3903
 14mm	MANHES Grasping forceps, "tiger-jaws", 2X4 teeth	φ 5X360	222-5S3363
		φ 5X360, With Ratchet	222-5T3363
 16mm	Claw forceps, 2X3 teeth, short	φ 10X360	222-0S3403
		φ 10X360, With Ratchet	222-0T3403
 34mm	SAWALHE Tissue Grasping forceps	φ 10X360	222-0S3423
		φ 10X360, With Ratchet	222-0T3423
 30mm	BABCOCK Grasping forceps	φ 10X360	222-0S3573
		φ 10X360, With Ratchet	222-0T3573

Grasping Forceps



No Ratchet



With Ratchet

Product	Description	Dimension	Code
 35mm	Claw forceps, 2X3 teeth	φ 10X360	222-0S3413
		φ 10X360, With Ratchet	222-0T3413 
 32mm	Spoon forceps	φ 10X360	222-0S4883
		φ 10X360, With Ratchet	222-0T4883 
 13mm	VANCAILLIE Oviduct Forceps	φ 5X360	222-5S3583 
		φ 5X360, With Ratchet	222-5T3583
 18mm	Dissecting and Grasping forceps, "alligator jaws"	φ 5X360	222-5S3773
		φ 5X360, With Ratchet	222-5T3773
 31mm	DeBAKEY Grasping forceps, curved and slender jaws	φ 5X360	222-5S3813
		φ 5X360, With Ratchet	222-5T3813
 19mm	Grasping forceps, atraumatic, spoon-shaped	φ 5X360	222-5S3223
		φ 5X360, With Ratchet	222-5T3223
 14mm	MANHES Dissecting and Grasping forceps, "duckbill"	φ 5X360	222-5S3283
		φ 5X360, With Ratchet	222-5T3283

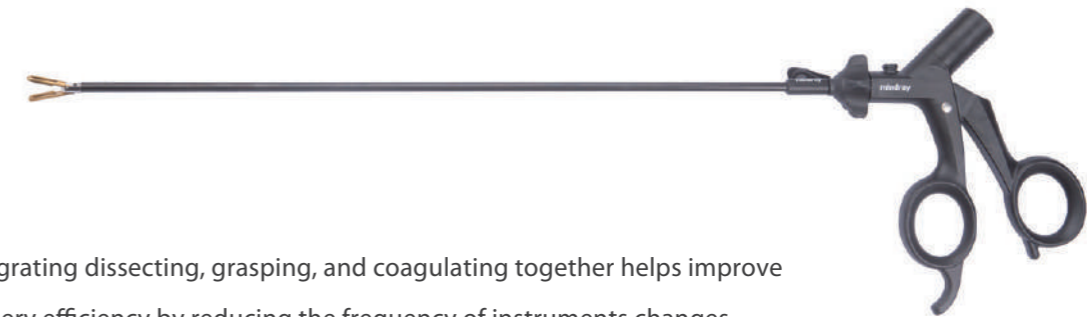
Monopolar Scissors



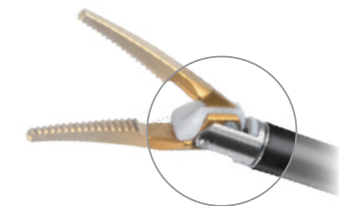
- Sharp**
 The sharpest blade enables fast cutting.
- Smooth**
 Involute design of blade line ensures more smooth cutting.
- Durable**
 The vacuum heat treatment process makes sure that the metal hardness control accuracy reaches HRC1 (Rockwell hardness), increasing the metal life by 3-4 times compared with the traditional method.

Product	Description	Dimension	Code	
 15mm	METZENBAUM Scissors, curved	φ 5X360	222-5S3022	👍
		φ 5X430	222-5S4022	👍
 20mm	Scissors, spoon-shaped blades, serrated, curved	φ 5X360	222-5S3012	
		φ 5X430	222-5S4012	
 15mm	Scissors, straight	φ 5X360	222-5S3092	
		φ 5X430	222-5S4092	

Bipolar Dissecting Forceps



Integrating dissecting, grasping, and coagulating together helps improve surgery efficiency by reducing the frequency of instruments changes.










- Innovative anti-sticking:**
 Sticking prevention with coated jaw.
- Strong grasping:**
 Enhanced force with wider opening angle to achieve better grasping.
- Guaranteed Safety:**
 Advanced insulation design guarantees the safety and reliability of bipolar coagulation.

Product	Description	Dimension	Code	
 15mm	Bipolar Straight Dissecting Forceps	φ 5X360	222-5S3011	👍
		φ 5X430	222-5S4011	👍
 15mm	Bipolar Curved Maryland Dissecting Forceps	φ 5X360	222-5S3021	👍
		φ 5X430	222-5S4021	





Monopolar Electrodes



Product	Description	Dimension	Code	
	Hook Tip Coagulation Electrode	φ 5X330	222-51110	
	Ball Tip Coagulation Electrode	φ 5X330	222-51220	
	Spatula Tip Coagulation Electrode	φ 5X330	222-51440	
	Rod Tip Coagulation Electrode	φ 5X330	222-51610	



Cables

All cables are autoclavable.

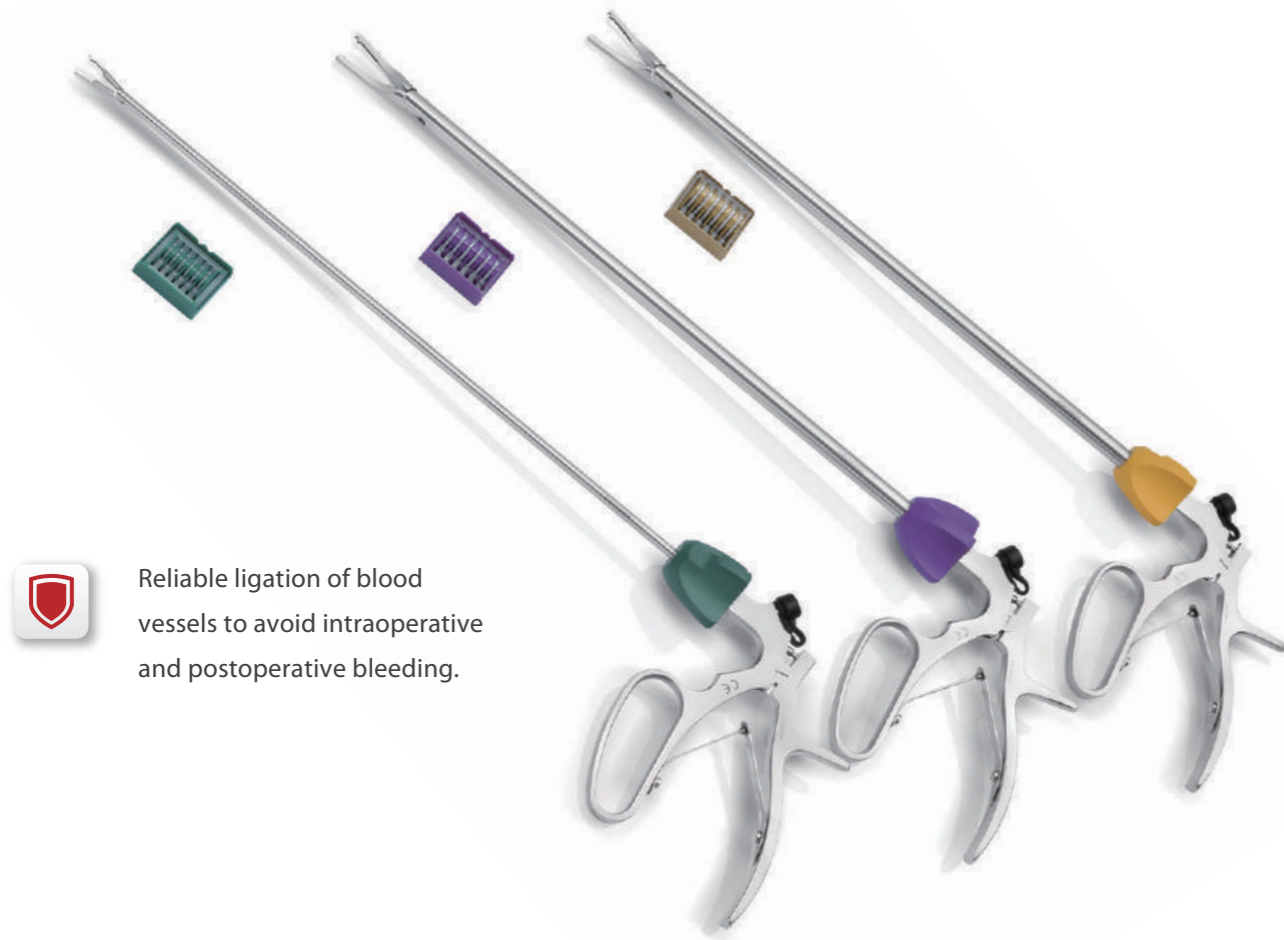
Product	Description	Dimension	Code	
	Monopolar cable	3200mm	999-030	
	Bipolar Cable	3200mm	999-031	


Instrument Trays





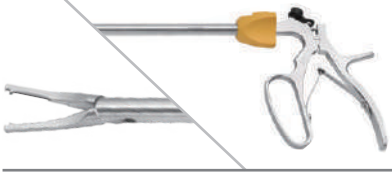



Product	Description	Dimension	Code	
	Double-decker Instrument Tray	540X250X100	X TR5425A0	
	Long Double-decker Instrument Tray	600X250X100	X TR6025A0	
	Long Three-decker Instrument Tray	600X250X140	X TR6025E4	


Clip Appliers





 Reliable ligation of blood vessels to avoid intraoperative and postoperative bleeding.

Product	Description	Dimension	Code	
	Endo Applier for Medium Large polymer locking Clip	φ 5X330	221-55636	
	Endo Applier for Large polymer locking Clip	φ 10X330	221-05646	
	Endo Applier for Extra Large polymer locking Clip	φ 10X330	221-05656	

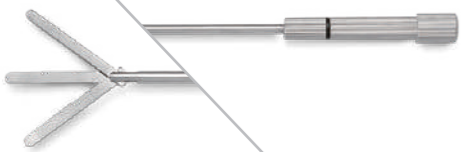

Clip Appliers

Product	Description	Dimension	Code	
	Endo Applier for Small Titanium Clip, Single action	φ 5X330	221-55116	
	Endo Applier for Medium Titanium Clip, Single action	φ 10X330	221-05126	
	Endo Applier for Medium Large Titanium Clip, Single action	φ 10X330	221-05136	
	Endo Applier for Large Titanium Clip, Single action	φ 10X330	221-05146	
	Open Surgery Applier for Small Titanium Clip	28 cm	221-00516	
	Open Surgery Applier for Small Titanium Clip	18 cm	221-01516	
	Open Surgery Applier for Medium Titanium Clip	28 cm	221-00526	
	Open Surgery Applier for Medium Titanium Clip	23 cm	221-01526	
	Open Surgery Applier for Medium Large Titanium Clip	28 cm	221-00536	
	Open Surgery Applier for Large Titanium Clip	28 cm	221-00546	

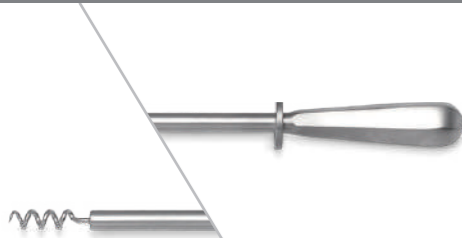
ENDO-Retractors

Product	Description	Dimension	Code	
	ENDO-Retractor	φ 5X360	221-53013	
	ENDO-Retractor	φ 5X360	221-53023	👍

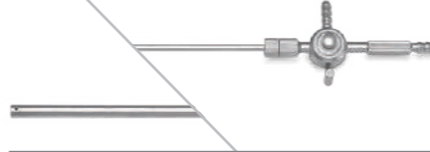

Fans Dissecting Forceps

Product	Description	Dimension	Code	
	3 Finger Retractor	φ 5X330	221-55923	
	5 Finger Retractor	φ 10X330	221-05923	👍

Myoma Drills

Product	Description	Dimension	Code	
	Myoma Drill	φ 5X330	221-53109	👍
		φ 5X420	221-54109	
		φ 10X330	221-03109	
		φ 10X420	221-04109	

Suction & Irrigation Apparatus

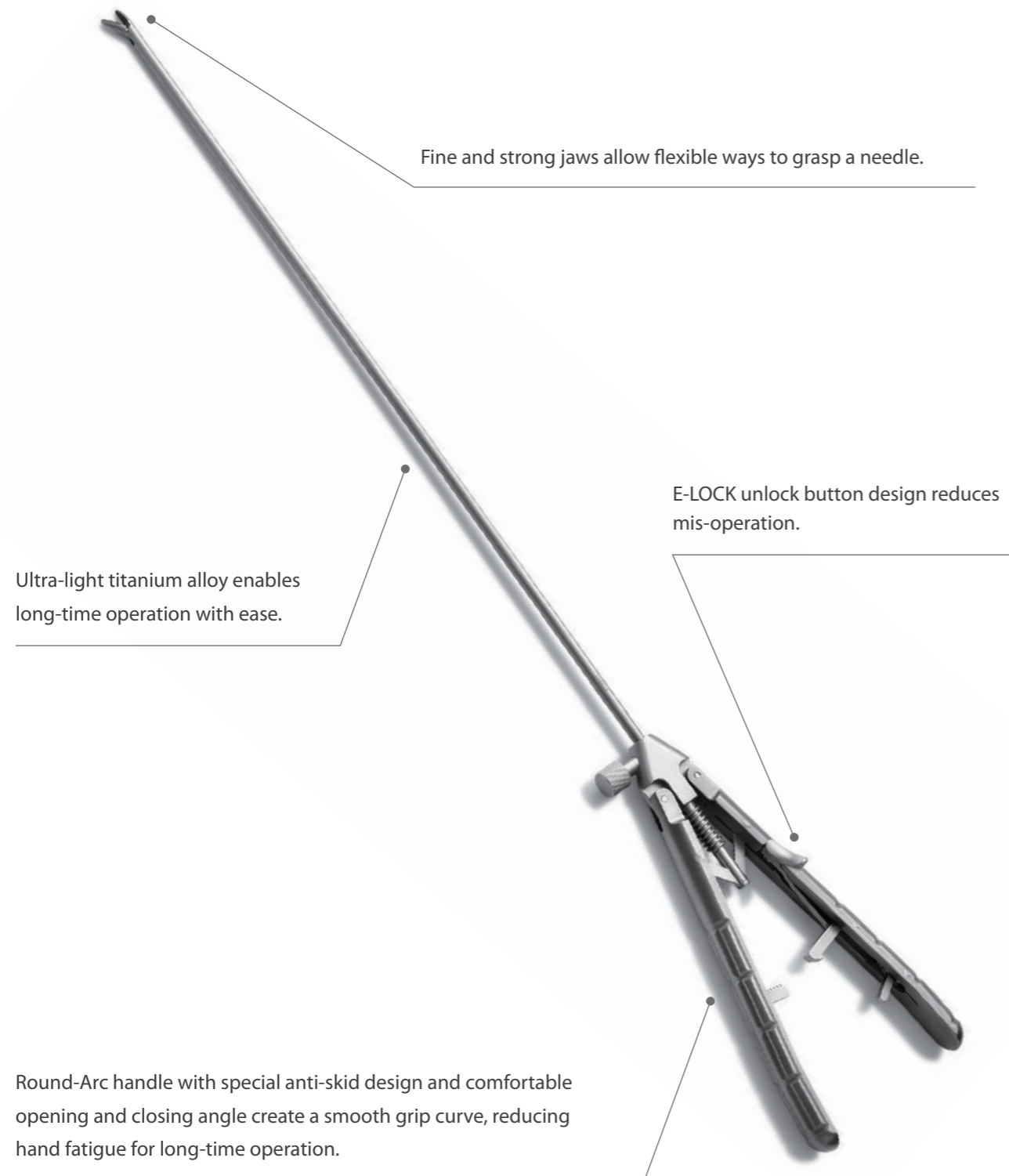
Product	Description	Dimension	Code	
	Suction and irrigation	φ 5X330	221-53114	
	Suction and irrigation	φ 5X330	221-53224	👍
		φ 10X330	221-03224	

Puncture Injection Needles


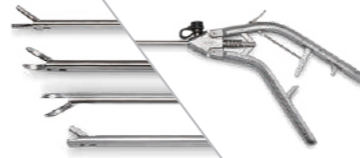



Description	Pinhead	Dimension	Code	
Puncture Injection Needle (7#)	0.7mm	φ 5X330	221-53015	
Puncture Injection Needle (9#)	0.9mm	φ 5X330	221-53025	
Puncture Injection Needle (13#)	1.3mm	φ 5X330	221-53035	👍
Puncture Injection Needle (16#)	1.6mm	φ 5X330	221-53055	
Puncture Injection Needle (18#)	1.8mm	φ 5X330	221-53065	

Needle Holders




Needle Holders

Product	Description	Dimension	Code	
	V Handle Straight Needle Holder	φ 5X330	221-56416	
	V Handle Left Curved Needle Holder	φ 5X330	221-56426	👍
	Pistol Handle Straight Needle Holder	φ 5X330	221-56516	
	Pistol Handle Left Curved Needle Holder	φ 5X330	221-56526	
	Pistol Handle Right Curved Needle Holder	φ 5X330	221-56536	
	Pistol Handle Needle Holder with Reposition Function	φ 5X330	221-56546	
	O Handle Straight Needle Holder	φ 5X330	221-56816	
		φ 5X450	221-56876	
	O Handle Left Curved Needle Holder	φ 5X330	221-56826	
		φ 5X450	221-56886	👍
	O Handle Right Curved Needle Holder	φ 5X330	221-56836	
	O Handle Needle Holder with Reposition Function	φ 5X330	221-56846	

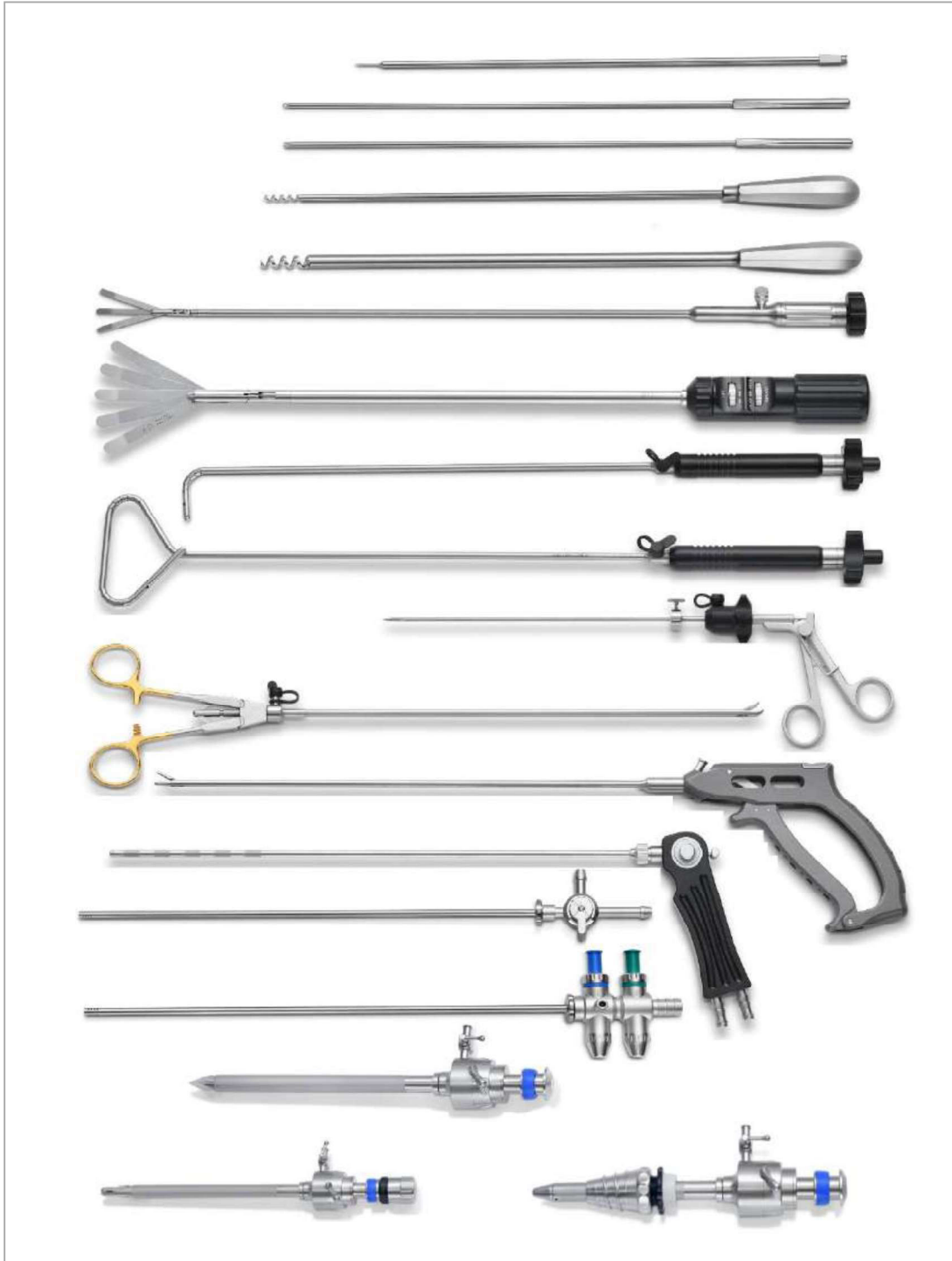
Suture Fascia Fix Forceps

Product	Description	Dimension	Code	
	Suture Fascia Fix Forceps	φ 3X200	221-32013	👍

Knot Pushers

Product	Description	Note	Dimension	Code	
	Knot Pusher	Half Ring	φ 4X330	221-43019	👍
		Full Ring	φ 4X330	221-43029	

Datasheet of Reusable Laparoscopic Instrument Kit



1. Product structure

The Reusable Laparoscopic Instruments Kit (“the instruments”) consists of titanium clip appliers, clip appliers, needle holder, suture fascia fix forceps, trocar, reducer, puncture fixator, puncture injection needle, suction & irrigation apparatus, forceps, ENDO-retractor, myoma drill, veress needle and knot pusher, with sealing elements as auxiliary components.

2. Materials Used in Patient-Contacted Parts

No.	Component Name	Parts	Material Grade	Applicable Standards	
1	Titanium Clip Appliers/Clip Appliers	Jaw	05Cr17Ni4Cu4Nb	YY/T 0294.1-2016	
		Rod	06Cr19Ni10	YY/T 0294.1-2016	
2	Needle Holder	Jaw	Available for Component Code: 221-56816、221-56876、221-56826、221-56886、221-56836、221-56516、221-56526、221-56536		
		Jaw	Available for Component Code: 221-56846、221-56546		
		Rod	Available for Component Code: 221-56816、221-56876、221-56826、221-56886、221-56836、221-56846、221-56516、221-56526、221-56536、221-56546		
		Jaw	Available for Component Code: 221-56416、221-56426		
		Rod			
3	Suture Fascia Fix Forceps	Jaw	20Cr13	YY/T 0294.1-2016	
		Forceps rod	06Cr19Ni10	YY/T 0294.1-2016	
		Stopper	Y12Cr18Ni9	GB/T 20878-2007	
			PEEK	/	
4	Trocar	Pyramidal tip	06Cr19Ni10	YY/T 0294.1-2016	
		Cannula	06Cr19Ni10	YY/T 0294.1-2016	
		Hasson element	Y12Cr18Ni9	GB/T 20878-2007	
5	Reducer	Tube	06Cr19Ni10	YY/T 0294.1-2016	
6	Puncture fixator	Tube	06Cr19Ni10	YY/T 0294.1-2016	
7	Puncture injection needle	Needle tube	06Cr19Ni10	YY/T 0294.1-2016	
		Rod	06Cr19Ni10	YY/T 0294.1-2016	
8	Suction & Irrigation Apparatus	Valve Handle Type	Suction & irrigation rod (all)	06Cr19Ni10	YY/T 0294.1-2016
			Valve (all)	CuZn39Pb3	See Table 1
		Plunger Type	Suction & irrigation rod (all)	06Cr19Ni10	YY/T 0294.1-2016
			Valve spool	CuNi7Zn39Mn5Pb3	See Table 1
			Valve seat upper and lower caps	Y12Cr18Ni9	GB/T 20878-2007
			Valve seat (including inlet and outlet connector)	CuZn39Pb3	See Table 1
			Spring	06Cr19Ni10	YY/T 0294.1-2016
		Handle Type	Suction & irrigation rod (all)	06Cr19Ni10	YY/T 0294.1-2016
			Suction & irrigation rod connector, inlet and outlet connector	Y12Cr18Ni9	GB/T 20878-2007
			Valve seat	PPSU	/
Valve spool, valve seat connector and valve seat cap	CuZn39Pb3		See Table 1		
9	Forceps	Jaw	Blades	20Cr13	YY/T 0294.1-2016

	(three-blade and five-blade forceps)		Connecti ng Rod	Available for Component Code:221- 05923	06Cr19Ni10	YY/T 0294.1-2016
				Available for Component Code:221- 55923	20Cr13	YY/T 0294.1-2016
				Rod	06Cr19Ni10	YY/T 0294.1-2016
10	ENDO- Retractor	Retractor Head		20Cr13	YY/T 0294.1-2016	
		Rod		20Cr13	YY/T 0294.1-2016	
11	Myoma Drill	Drill Bit		20Cr13	YY/T 0294.1-2016	
		Rod		06Cr19Ni10	YY/T 0294.1-2016	
12	Veress Needle	Inner Tube		06Cr19Ni10	YY/T 0294.1-2016	
		Outer Tube		06Cr19Ni10	YY/T 0294.1-2016	
13	Knot Pusher	Jaw		06Cr19Ni10	YY/T 0294.1-2016	
		Rod		06Cr19Ni10	YY/T 0294.1-2016	

Table 1: Material Compositions of Corresponding Grades listed in DIN17660 and DIN17663 Standards

Material Grade	Chemical Composition Mass Fraction (%)									
		Cu	Pb	Zn	Al	Fe	Ni	Sn	Mn	Total Impurities
CuZn39Pb3	Min	57.0	2.5	Margin	-	-	-	-	-	-
	Max	59.0	3.5	Margin	0.1	0.5	0.5	0.4	-	0.2
CuNi7Zn39Mn5Pb3	Min	44.0	2.0	Margin	-	-	6.0	-	4.0	-
	Max	48.0	4.0	Margin	-	0.3	8.0	-	6.0	0.4

3. Diagram of Patient-contacted Parts of the Instruments

The patient-contacted parts of the instruments are highlighted with the dotted lines below, with the corresponding structures and materials shown as follows:

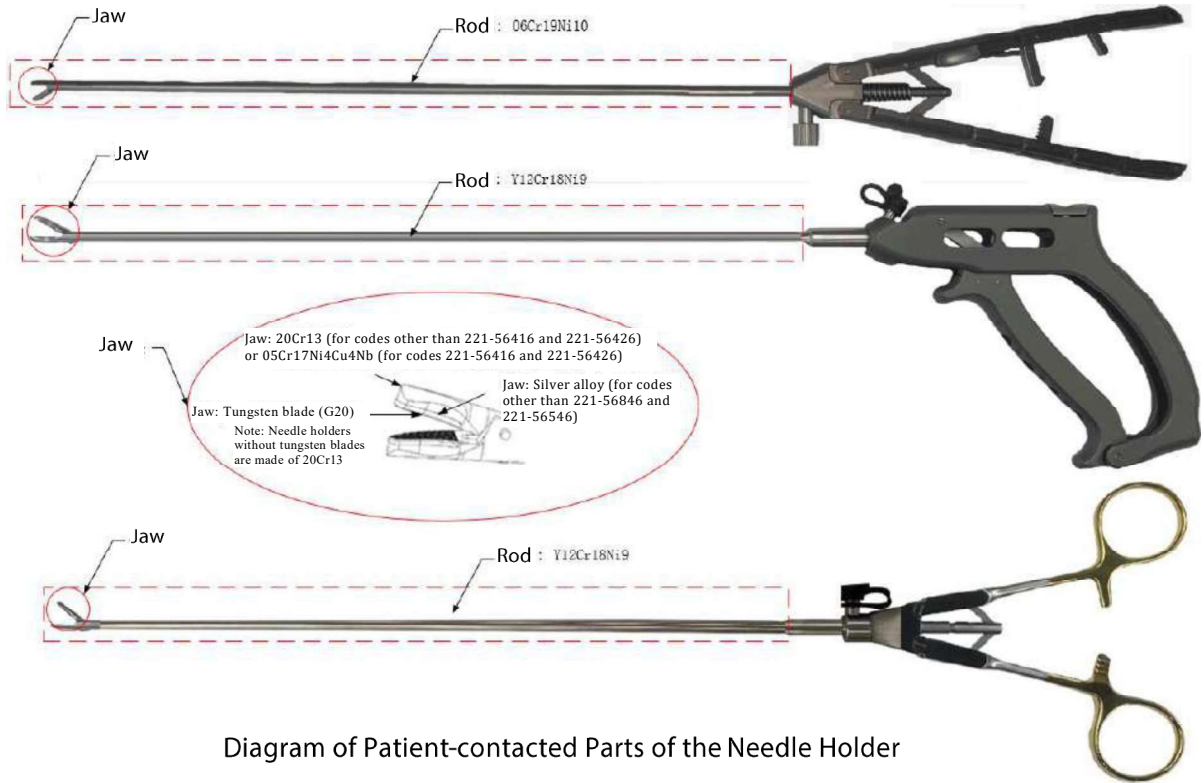


Diagram of Patient-contacted Parts of the Needle Holder

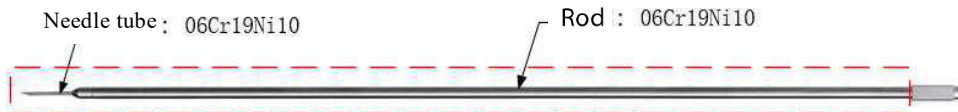


Diagram of Patient-contacted Parts of the Puncture Injection Needle

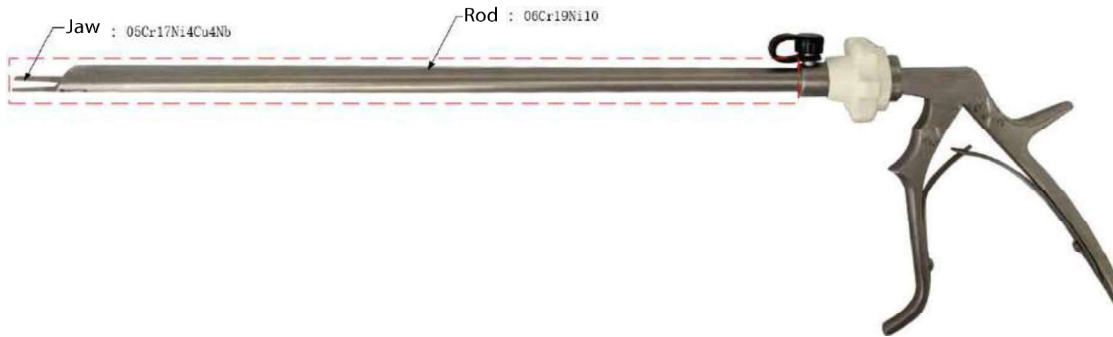


Diagram of Patient-contacted Parts of the Titanium Clip Appliers/Clip Appliers

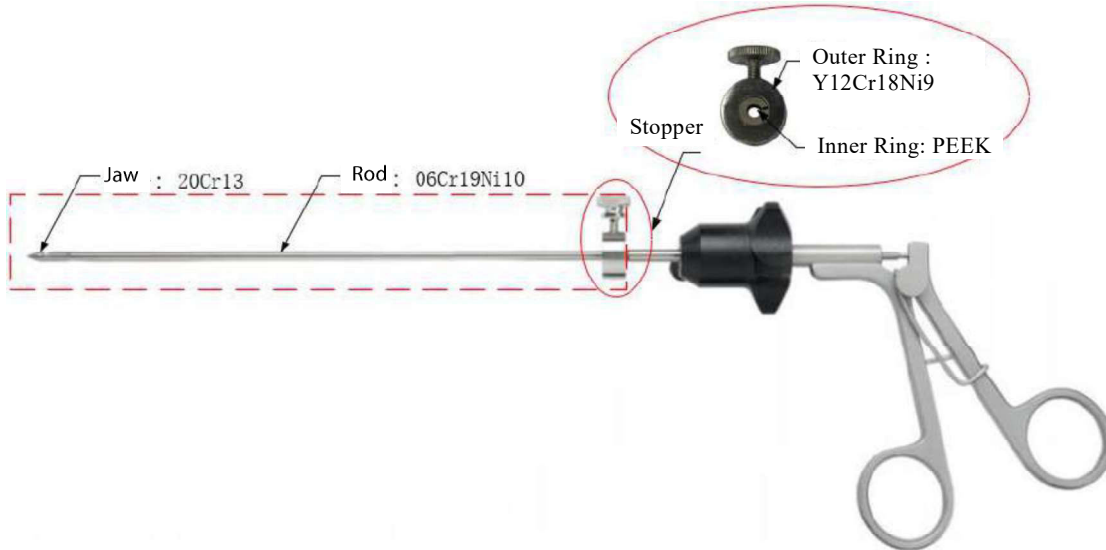
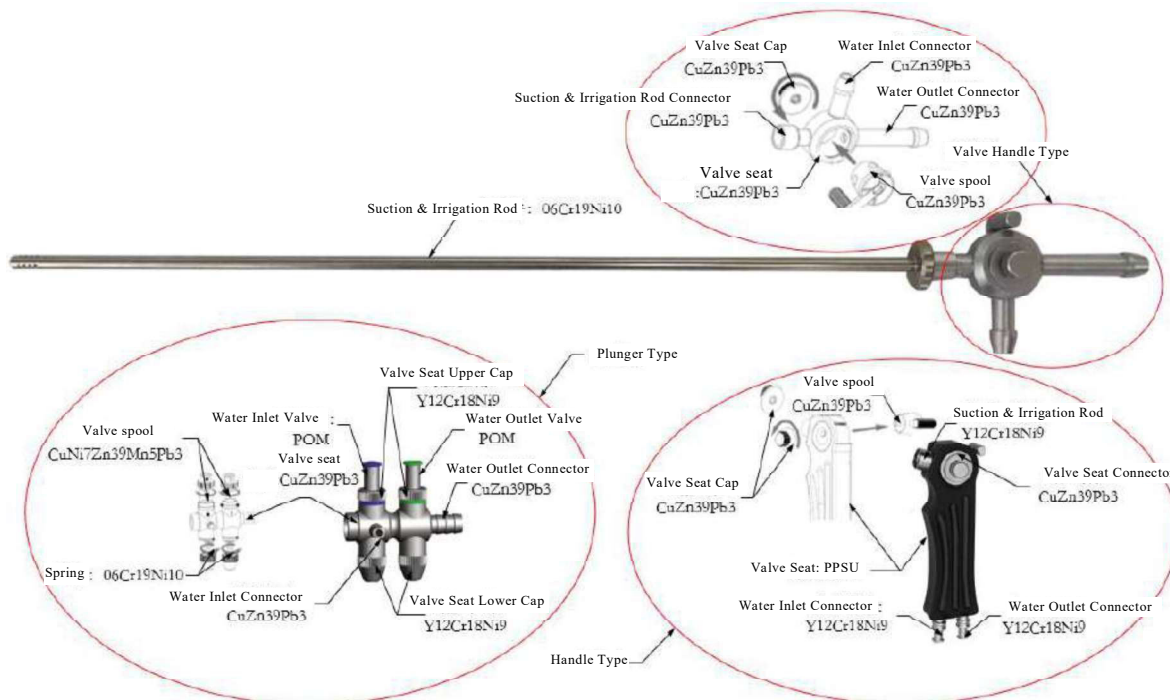


Diagram of Patient-contacted Parts of the Suture Fascia Fix Forceps





Reusable Laparoscopic Instruments Instruction Manual

Statement

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Mindray shall be responsible for the safety, reliability and performance of the product provided that the following conditions are met:

- This product is used in accordance with the Instruction Manual.
- Product damage caused by non-human factors (human factors refer to accidental falls, deliberate damage, etc.).

If you really need to return the product to Mindray, please contact the after-sales service department of Mindray, inform the product model and serial number, and briefly explain the reason. The "three guarantees" of the instrument and after-sales service will be implemented according to the product "three guarantees" and after-sales service contract agreed and signed between the distribution unit and the manufacturing company.

After-sales service unit: Hangzhou Mindray Medical Technology Co., Ltd.
After-sales unit address: No.2 Fengxiang Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou City
After-sales unit tel: 0571-58504222

Compilation date: 2024-11



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1. Product Structure

The instrument consists of Endo Applier for Clips (Endo Applier for Titanium Clips, clip applier), needle holder, Suture Fascia Fix Forceps, trocar, converter, Puncture Injection Needle, Suction and irrigation, Finger Retractor, ENDO-Retractor, Myoma Drill, veress needle and knot pusher, with seals as auxiliary components.

Collectively	Product Name	Specification	Product Model
Endo Applier for Titanium Clips	Endo Applier for Small Titanium Clip, Single action	φ5X330	221-55116
	Endo Applier for Medium Titanium Clip, Single action	φ10X330	221-05126
	Endo Applier for Medium Large Titanium Clip, Single action	φ10X330	221-05136
	Endo Applier for Large Titanium Clip, single action	φ10X330	221-05146
Clip applier	Endo Applier for Medium Large Hemolock Clip	φ5X330	221-55636
	Endo Applier for Large Hemolock Clip	φ10X330	221-05646
	Endo Applier for Extra Large Hemolock Clip	φ10X330	221-05656
Needle holder	O Handle Straight Needle Holder	φ5X330	221-56816
	O Handle Straight Needle Holder	φ5X450	221-56876
	O Handle Left Curved Needle Holder	φ5X330	221-56826
	O Handle Left Curved Needle Holder	φ5X450	221-56886
	O Handle Right Curved Needle Holder	φ5X330	221-56836
	O Handle Needle Holder with Reposition Function	φ5X330	221-56846
	Pistol Handle Straight Needle Holder	φ5X330	221-56516
	Pistol Handle Left Curved Needle Holder	φ5X330	221-56526
	Pistol Handle Right Curved Needle Holder	φ5X330	221-56536
	Pistol Handle Needle Holder with Reposition Function	φ5X330	221-56546
	V Handle Straight Needle Holder	φ5X330	221-56416
V Handle Left Curved Needle Holder	φ5X330	221-56426	
Suture Fascia Fix Forceps	Suture Fascia Fix Forceps	φ3X200	221-32013
Trocar	Trocar	φ5X95	221-51155
	Trocar	φ10X95	221-01155
	Trocar	φ12X95	221-81155
	Trocar	φ5X150	221-53155
	Trocar	φ10X150	221-03155
	Trocar	φ12X150	221-83155
	Trocar	φ5X95	221-51255
	Trocar	φ10X95	221-01255
	Trocar	φ12X95	221-81255
	Trocar	φ5X150	221-53255
	Trocar	φ10X150	221-03255
	Trocar	φ12X150	221-83255
	Trocar	φ5X95	221-51165
	Trocar	φ10X95	221-01165
	Trocar	φ12X95	221-81165

converter	Trocar	φ5X95	221-51265
	Trocar	φ10X95	221-01265
	Trocar	φ12X95	221-81265
	Reducer Sleeve	φ10-φ5	221-01785
	Reducer Sleeve	φ12-φ5	221-81785
	Reducer	φ10-φ5	221-00715
	Reducer	φ10-φ5	221-00725
Puncture Injection Needle	Reducer	φ12-φ5	221-80725
	Puncture Injection Needle (7#)	φ5X330	221-53015
	Puncture Injection Needle (9#)	φ5X330	221-53025
	Puncture Injection Needle (12#)	φ5X330	221-53035
	Puncture Injection Needle (15#)	φ5X330	221-53055
Suction and irrigation	Puncture Injection Needle (18#)	φ5X330	221-53065
	Suction and irrigation	φ5X330	221-53114
	Suction and irrigation	φ5X330	221-53224
Finger Retractor	Suction and irrigation	φ10X330	221-03224
	Three Finger Retractor	φ5X330	221-55923
ENDO-Retractor	Five Finger Retractor	φ10X330	221-05923
	ENDO-Retractor	φ5X360	221-53013
Myoma Drill	ENDO-Retractor	φ5X360	221-53023
	Myoma Drill	φ5X330	221-53109
	Myoma Drill	φ5X420	221-54109
	Myoma Drill	φ10X330	221-03109
Veress Needle	Myoma Drill	φ10X420	221-04109
	Veress Needle	φ5X330	221-21127
Knot Pusher	Veress Needle	φ2,7X150	221-27157
	Knot Pusher	φ4X330	221-43019
	Knot Pusher	φ4X330	221-43029
Sealing Cap	Sealing Cap	φ5	221-50925
	Sealing Cap	φ10	221-00925
	Sealing Cap	φ12	221-80925

2. Intend Use

For Suction and Irrigation Tube Set: It is used in the laparoscopic surgery to rinse the tissues, organs and suck away waste liquid.

For Trocar: It is used in clinical laparoscopic surgery in the hospital to establish access to the abdominal cavity for the instrument.

For Veress Needle: It is intended to establish pneumoperitoneum prior to trocar and cannula insertion in laparoscopic procedures by insufflations with carbon dioxide through percutaneous insertion.

For Needle Holder: It is intended to be used to place sutures in endoscopic surgery using suture material suitable for size of the needle holder.

For Endo Applier for Clips: Endoscopic for ligating and marking vessels and tubular structures whenever titanium clips are used/indicated.

For Puncture Injection Needle: Reusable surgically invasive device for temporary use. It is inserted via a trocar sleeve.

For Suture Fascia Fix Forceps: It is intended to be used to close the incision in the abdominal wall during surgery.

For ENDO-Retractor: ENDO-Retractors are designed to support and retract the liver during laparoscopic upper abdominal surgery.

For Finger Retractor: It is intended to be used to detach the organs and expose the surgical field during surgery.

For Knot Pusher: It is intended to be used to push and tighten the knot during surgery.

For Myoma Drill: It is intended to be used to fix and pull uterine fibroids during surgery.

3. Component Specification

For detailed component model and specification, please refer to the component label on the product component package.



- Please read this instruction manual carefully before using the product.
- Any violation or deviation from the manual could cause harm to the patient.
- The instrument should only be used by licensed physicians and medical professionals trained to operate it.
- The instrument must not be under pressure, overlapped, impacted, or bumped, so as to prevent deformation and damage.
- Before each use, the instrument inserted into the human body must be checked for rough surfaces, sharp edges or protrusions that could cause injury.



- The product has limited pressure bearing capacity and excessive application of force can result in breakage or impaired functionality of the device and endanger the patient.

NOTE

- After one year of use of the instrument, it is suggested that the instrument have a comprehensive inspection and maintenance by the manufacturer. If the instrument is found aged to the extent that it cannot be used, necessary measures can be taken to repair it, or just scrap it, so as to prevent the instrument from malfunctioning during the operation and endangering the patient.
- After the instrument is scrapped, it should be disposed of according to the disposal method for hospital medical waste to avoid pollution to the environment.
- The part of the needle holder that will be in contact with the patient is made of metal, and its surface material is consistent with the internal material.

4. Instructions for Use

- Make sure the product has been cleaned and sterilized prior to the first use and after every subsequent use.

- Inspect the instrument for overall condition and physical integrity. Do not use the instrument if any damage is noted.

5. Schematic Diagram

Needle holder

Note: There are many types of needle holder, which can be distinguished by the tip and handle

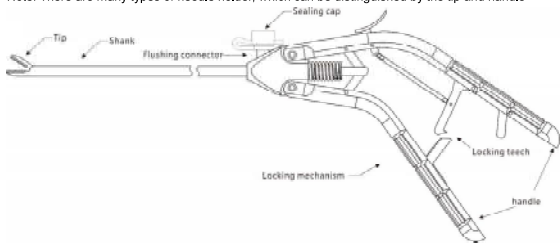


Table 1 Diagram of tip shape of needle holder



Table 2 Diagram of handle shape of needle holder



Endo Applier for Titanium Clips and clip applier

Note: The Endo Applier for Titanium Clips and clip applier can be distinguished by the tip and handle

Table 3 Diagram of Endo applier for titanium clips

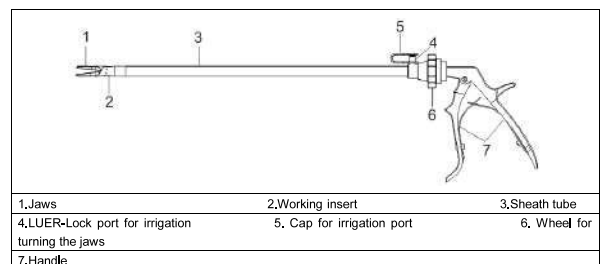


Table 4 Diagram of Clip applier

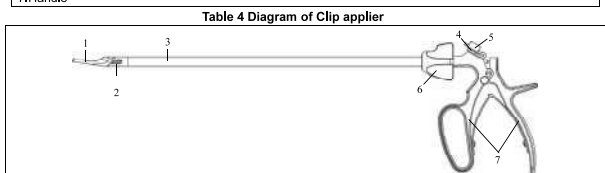
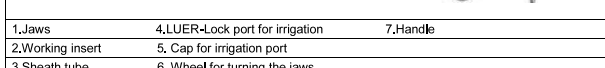
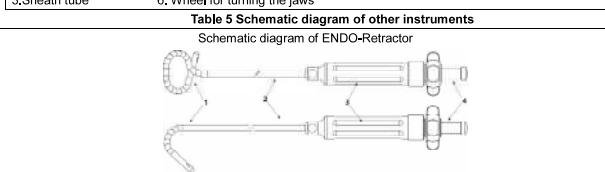


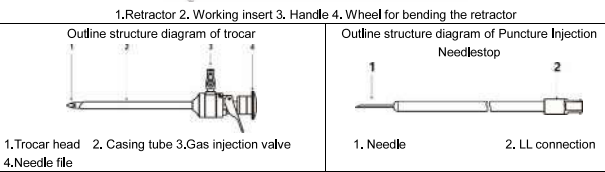
Table 5 Schematic diagram of other instruments



Schematic diagram of ENDO-Retractor



Outline structure diagram of trocar and Puncture Injection Needlestop



Outline structure diagram of trocar and Puncture Injection Needlestop

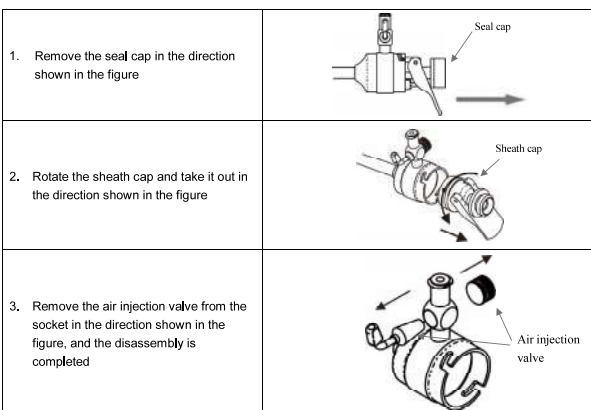
Outline structure diagram of Myoma Drill 1. Drill 2. Handle	Outline structure diagram of Suture Fascia Fix Forceps 1. Forceps holder 2. Working insert 3. Handle
Outline structure diagram of veress needle 1. Inner tube 2. Outer tube 3. Handle 4. Gas injection valve	Outline structure diagram of seals
Outline structure diagram of Suction and irrigation (plunger type) 1. External Tube 2. Handle	Outline structure diagram of Suction and irrigation (valve handle type) 1. External Tube 2. Valve
Outline structure diagram of Finger Retractor (five-Finger Retractor) 1. Forceps holder 2. Wheel for folding the retractor 3. Handle	Outline structure diagram of Finger Retractor (three-Finger Retractor) 1. Forceps holder 2. Handle 3. Wheel for folding the retractor
Outline structure diagram of converter	Outline structure diagram of knot pusher 1. Head of knot pusher 2. Handle

6. Disassembly and Assembly

Before cleaning and sterilization, check and confirm that the instrument is in good condition, and then disassemble the instrument. If some instruments are directly cleaned and sterilized without disassembly, the effect is not good.

6.1 Disassembly and assembly of trocars

6.1.1 Disassembly:

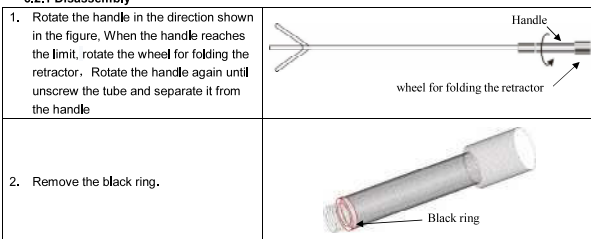


6.1.2 Assembly

The assembly steps of the instrument are the reverse of the disassembly steps.

6.2 Disassembly and Assembly of Three Finger Retractor

6.2.1 Disassembly

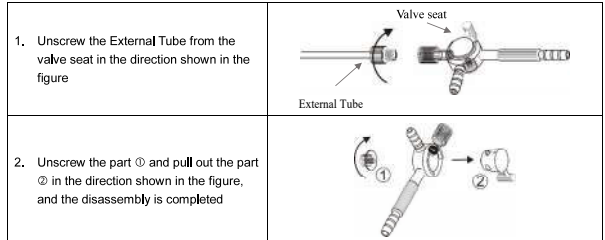


6.2.2 Assembly

The assembly steps of the instrument are the reverse of the disassembly steps.

6.3 Disassembly and Assembly of Suction and irrigation (Valve Handle Type)

6.3.1 Disassembly

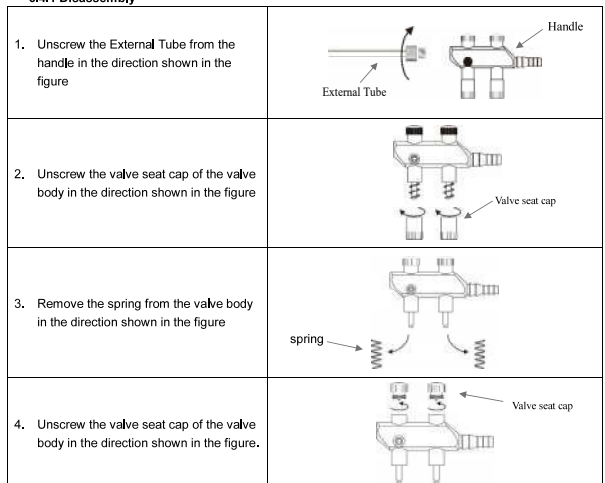


6.3.2 Assembly

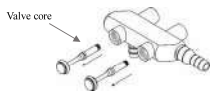
The assembly steps of the instrument are the reverse of the disassembly steps.

6.4 Disassembly and Assembly of Suction and irrigation (Plunger Type)

6.4.1 Disassembly



5. Take out the valve core from the valve body, and the disassembly is completed



6.4.2 Assembly

The assembly steps of the instrument are the reverse of the disassembly steps.

6.5 Disassembly and Assembly of Other Instruments

Instruments with flushable connectors, such as needle holder, clip applicator, clip applier, ENDO-Retractor, etc., can be cleaned through the flushing channel without disassembly.

The remaining instruments, such as trocar needle, seal, veress needle, converter, knot pusher, fibroids drill, Suture Fascia Fix Forceps, etc., can be cleaned directly

7. Cleaning and Sterilization

Instruments are reusable products and can be cleaned and sterilized as follows. Cleaning and sterilization methods need to be verified by the using unit.

7.1 Cleaning

- 1) Rinse the product with sufficient running water to remove residues such as blood, mucus and protein, and dry with a lint-free cloth;
- 2) The detachable parts need to be disassembled for cleaning;
- 3) Make an enzymatic cleaner solution in warm water (38°C -48°C) according to the manufacturer's instruction;
- 4) Soak the components in the soft enzymatic cleaner solution for 10 minutes;
- 5) Rinse the components in warm water and remove scaling and resistant dead cells from all surfaces with the soft enzymatic cleaner and a soft brush;
- 6) Clean the internal cavity and guide slot with an appropriate brush or cleaning spray gun (10 minutes);
- 7) Rinse off all detergent residues with pure water;
- 8) Visually inspect the components to ensure they are completely and thoroughly cleaned. Repeat steps 4) to 7) if residual and visible contamination exists;
- 9) Drying: wipe dry with clean gauze, and blow dry with clean compressed air for instruments with lumen, and then dry them in the oven at 60°C for 30 minutes.

7.2 Steam sterilization

Mindray has verified the following parameters:

Sterilization method	Item category	Temperature	Minimum time required	Pressure
Steam sterilization - forevacuum	Instrument	132-134°C	4 Min	205.8 kPa

For the loading method and selection of sterilization procedures for high temperature steam sterilization, please refer to the operation instructions of the corresponding sterilizer. As the selected sterilizer and its operating conditions may affect the final sterilization effect, the sterilization process should be re-confirmed and monitored before sterilization according to relevant international standards (such as ISO 17665), national standards or hospital sterilization management practices for high temperature steam sterilization.

8. Maintenance

The product should be adequately and regularly maintained to avoid accidents and damage caused by aging and wear. The functional security and operational security of the product must be checked and confirmed by experts. The interval for this check depends on the number of uses, and should not be less than once a year.

9. Contraindications

Coagulation dysfunction, pregnancy, cardiopulmonary dysfunction.

10. Storage conditions

Store in controlled environment, which should keep away from the sun, rats, fire, insects and caustic gas, as well as with good ventilation.

11. Transportation conditions

Temperature range: -20°C ~ 50°C; relative humidity range: 10% ~ 80%; atmospheric pressure: 500hpa-1060hpa.

12. Operating conditions

Temperature range: 10°C ~ 40°C; relative humidity range: 30% ~ 80%; atmospheric pressure: 700hpa-1060hpa.

13. Production Date: see label.

14. Service Life

Times of reuse: 200 times;

15. Abandonment

The instrument must be disposed of in accordance with local regulations or the hospital's waste disposal regulations when it reaches its expiration date. Please clean and disinfect it before discarding.

16. Symbol Description

Table 6 Symbol Description

Symbol	Meaning
	Prompt the operator to follow the instructions under the symbol, otherwise personal injury may result.
	Prompt the operator to follow the instructions under the symbol, otherwise may cause product failure, damage or affect the test results.
	Prompt the operator to follow the instructions under the symbol, emphasizing the important information from the operation steps or the content that requires the operator's special attention.

Table 7 Description of Symbols Used in Manuals and Labels



	Refer to instruction manual/booklet		Catalogue Number		Humidity limitation
	Atmospheric pressure limitation		Batch No.		Temperature limit
	Avoid rain		Avoid sun exposure		Fragile, handle with care
	Manufacturer		Stacking limit by mass		This way up
	Medical Device		Unique Device Identification		Authorized representative in the European Community
	Labelling for Class I products. Developed and marketed in compliance with medical device directive 93/42/EEC.		mindray	Trademark of manufacture, authorized by Shenzhen Mindray Bio-Medical Electronics Co., Ltd.	

Device Description

The name and identifier of products are referred to **Annex1**.

1. Device Description and features

Pictures of products:

Bipolar Dissecting Forceps	
 15mm	 15mm
Bipolar Straight Dissecting Forceps 222-5S3011, 222-5S4011	Bipolar Curved Maryland Dissecting Forceps 222-5S3021, 222-5S4021

Dissecting and Grasping Forceps		
 16mm	 22mm	 16mm
KELLY Dissecting and Grasping forceps, Maryland 222-5S3013, 222-5T3013, 222-5S4013, 222-5T4013	KELLY Dissecting and Grasping forceps, long, Maryland 222-5S3023, 222-5T3023, 222-5T4023	Dissecting and Grasping forceps, right-angled 222-5S3123, 222-5T3123, 222-5T4123,
 23mm	 43mm	 26mm
Straight Dissecting and Grasping forceps, atraumatic 222-5S3043, 222-5T3043	Dissecting and Grasping forceps, atraumatic 222-0S3103, 222-0T3103	Dissecting and Grasping forceps, right-angled 222-0S3133, 222-0T3133

b) Principles of operation or mode of action.

Reusable electrode surgical instruments are connected to the electrosurgical energy platform (generator) via high frequency cables. This set of devices can be divided into two categories according to the different working principle: reusable electrode surgical instruments (including monopolar forceps, monopolar scissors and monopolar electrodes) and reusable electrode surgical instruments (including bipolar forceps). The monopolar forms electrical circuit that flows between the patient's tissue and grounding pad, while the bipolar circuit forms electrical circuit that flows from one electrode through the patient's tissue to another electrode. Reusable electrode surgical instruments (monopolar) can be divided into coagulation electrode, grasping forceps, dissecting forceps and scissors. Reusable electrode surgical instruments (bipolar) can be divided into grasping forceps, dissecting forceps. Two different categories of instruments correspond to two types of high frequency cables. The set of devices are all reusable, and they are detachable for cleaning and sterilization after use. Reusable electrode surgical instruments are compatible with electrosurgical generators which must meet the requirements of EN 60601-1 and EN IEC 60601-2-2, and which should meet the compatible requirements. This set of devices should only be used in medical institutions and only be used by medical practitioners or medical staff with electrosurgical operational training. Additionally, the electrode surgical instruments are reusable, and must be cleaned and sterilized after every use. In order to achieve more thorough cleaning, the instruments must be dismantled.


c) A description of the accessories, other medical devices and other products that are not medical devices, which are intended to be used in combination with the medical device.

None

d) A description or complete list of the various configurations of the medical device to be registered.

Please refer to Annex 1

e) A complete description of the key functional elements (e.g. its parts or components, including software if appropriate), its formulation, its composition and its functionality Where appropriate, this will include labelled pictorial representation (e.g. diagrams, photographs and drawings), clearly indicating key parts/components, including sufficient explanation to understand the drawings and diagrams.

Structure of reusable electrode surgical instruments (including monopolar forceps, monopolar scissors)	
	
1. Tip (jaw or scissors)	2. Sheath tube
3. Wheel for turning the tip	4. Locking button (for releasing the insert)

5. High frequency (HF) connector	6. Handle
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Structure of reusable electrode surgical instruments (including monopolar electrode)



1. Tip (hook, ball, spatula or rod)	2. Sheath tube
3. Handle	4. HF connector

Structure of reusable electrode surgical instruments (bipolar)



1. Tip (jaws)	2. Sheath tube
3. Wheel for turning the tip	4. Locking button (for releasing the working insert)
5. HF connector	6. Handle

Structure of Insert/Insulated Shaft/ Handle:



1. Insert	2. Insulated Shaft	3. Handle
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Structure of monopolar cable:



1. Output connector	2. Input connector
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Structure of bipolar cable:



1. Output connector	2. Input connector
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