I&R Tender Specifications EMEA

The intent of this document is to provide a comprehensive list of product specifications and features for Imaging & Resection products.

The document is intended for internal use only and must not be forwarded to third parties including customers.

If you have any questions, feel free to reach out to SynergyPM@arthrex.de.

Content

1   Synergy Imaging Systems

1.1   Synergy Vision™ Imaging System

- Combined camera system, LED light source, and image management system (documentation system) featuring:
    - 4K imaging
    - High dynamic range (HDR) imaging
    - Wide-view imaging (Pano™ scope)
    - Near-infrared (NIR) 4K fluorescence imaging
    - Support of the NanoNeedle scope
    - Integrated Vision Connect™ video routing
- All-in-one housing
    - Space saving
    - Improved system stability due to reduced cabling
    - Better hygiene conditions
- Intuitive tablet user interface

1.1.1   Synergy Vision Consoles (AR-3200-0026 / AR-3200-0027)

General Information

- Computer type: camera control unit (CCU)
- Brand: Arthrex Synergy Vision
- Operating system: Embedded Linux, Version: Yocto 4.x distribution ("Kirkstone")
- Access authorization:
    - Normal user login for surgeon and case management
    - Administrator login for advanced user management and system settings
    - Option to use surgeon logins for individual case and PHI access
    - Active Directory (AD) authentication
    - Complex password can be enforced for secure user login
    - "Remember password" option for normal users (can be enabled/disabled permanently)
- System updates (software / firmware) possible via USB (new features and performance improvements)
- System boot time (CCU + tablet) until completely ready for use: approx. 65 sec. (based on software version 1.1)
- Dimensions: 40.64 cm [W] x 12.7 cm [H] x 43.7 cm [D]
- Weight: approx. 10.9 kg
- Power supply: 100 – 240 V; 50/60 Hz
- Power consumption: 160 W (AR-3200-0026) / 250 W (AR-3200-0027)
- Noise level: Startup: approx. 46.5 dB(A); standard operating mode: < 42 dB(A)
- Appliance / protection class: I
- Ingress protection class: IPX0
- Operating temperature: 10 – 23°C
- Classification per Medical Device Regulation "MDR" (EU) 2017/745: Class I
- Notified body: BSI / CE2797
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA
- Delivery contents: 1x power cord, 1x DisplayPort cable, 2x HDMI cables, 1x 12G-SDI cable

Light Source

- Technology: LED (cold light source)
- Lifespan: at least 30,000 operating hours
- 7-year-warranty on the LED light source
- Light output/light flux: Minimum: 1650 Lumens / Typical: 1900 Lumens
  Note: Power consumption (in Watts) is not an applicable specification for the LED light engine and can therefore not be provided. Power consumption is meaningless because the Synergy LED light engine does not have its own power supply and the much more appropriate measurement for the performance of LED technology is Lumens.
- Color temperature: 5,500 – 8,400 K nominal
- Color rendering index (CRI): 66 typ. / 61.5 min.
- Light color: white
- Spare lamp: N/A (LED technology)
- Automatic light output control: synchronized pulse width modulated light output
- Light guide port turret for connecting the following cable standards: ACMI™, Storz™, Wolf™, Olympus™
- Ready to use in < 1 sec.
- User interface
  - CCU button (on/off)
  - Programmable camera buttons (on/off)
  - Tablet graphical user interface (on/off, enable/disable automatic light output control, set max. light output in three steps)

Camera Control Unit / Video Processing – General Information

- 4K vision:
  - 4K UHD-capable, 2D-capable
  - White balance button on console
  - White balance range (using CCU light source): 3200 – 11800 K
  - High Dynamic Range (HDR) with HDR10
  - Near-infrared fluorescence imaging support
- Nano Vision™
- Applied parts type CF (cardiac floating)
- Defibrillation proof
- Video outputs:

Qty.	Video output	Resolution [px]	Vert. scan. freq.	Color depth
1	DisplayPort 1.2 MST/SST	3840 x 2160	59.94 Hz	10 bit
2	HDMI 2.0	3840 x 2160	59.94 Hz	10 bit
4	3G-SDI / 12G-SDI	1920 x 1080 / 3840 x 2160	59.94 Hz	10 bit

- Video input: 1 x HDMI 2.0, supporting:
  - 1920 x 1080 px. @ 59.94 Hz / 60 Hz
  - 1920 x 1200 px. @ 59.95 Hz
  - 3840 x 2160 px. @ 59.94 Hz / 60 Hz
  - 4096 x 2160 px. @ 59.94 Hz / 60 Hz
- Laser connector (proprietary D-sub9 communication bus for Synergy Laser Light Source)

- Screen layouts:

Number of images on the screen (sources)	Description
1	Full screen image of a certain source / input
2	PAP ("picture and picture") / side-by-side view
2	PIP ("picture-in-picture")
3	3 images (primary + 2 x PIP)
4	4 images ("quad view")

- Gain settings: Low (0 dB), Medium (+9 dB), High (+ 18 dB)
- Augmented reality imaging, including:
  - BioOptico (Spectral Mode, Texture Mode)
  - Color Filters (RED+, RED-)
  - Highlight (dynamic range filter)
- Near-infrared fluorescence imaging support
  - 3 different fluorescence imaging display modes:
    - COLOR (visible light imaging in color with NIR overlay)
    - MONOCHROME (visible light imaging in B/W with NIR overlay)
    - NIR ONLY (NIR imaging only, without visible light information)
  - 7 different NIR overlay colors to choose from (Green, Cyan, Blue, Magenta, Red, Yellow, White), customizable / programmable per surgeon and procedure
  - Ability to adjust dedicated NIR image settings: NIR Brightness, NIR Contrast, NIR Background; customizable / programmable per surgeon and procedure

Image Management / Documentation System – General Information

- Possibility to annotate photos at the end of a case
- ACC (accessory) ports: 2 x 3.5 mm mini stereo jacks, usable as output or input:
  - Input: allow for control of the Camera Control Unit (CCU) with a footswitch
  - Output: allow for controlling external devices using the camera head buttons
- Audio-In: Mini stereo connector to connect a microphone / headset
- Audio-Out: Mini stereo connector
- Ethernet connector RJ45, isolated (1500 V), 10/100/1000 MB/s
- Integrated Wi-Fi (Client or Hotspot)
  - Frequency and standard: 2.4 GHz or 5 GHz, 802.11 ac/a/b/g/n
  - Technology: Wireless LAN (IEEE 802.11)
  - Encryption modes: WPA-PSK, WPA2, WPA2-Enterprise
  - Encryption standards: WPA with TKIP, WPA2 with AES
  - WPA2-Enterprise certificates supported: ".p7b" and ".cer"
- 2 x USB 2.0 connectors
- 4 x USB 3.0 connectors (2 x front, 2 x back)
- MFi-certified (Apple®)
- USB-C connector for tablet: 1 x
- Arthrex Control Bus (ACB) connectors:
  - ACB 1.0: 1 x RS-232 connector, isolated
  - ACB 2.0: 2 x RJ45 connector, isolated (1500 V)
- Internal storage: 1 TB SSD
- Automatic or manual export: USB, iPad® / iPhone®, File server, PACS (DICOM)
- Possibility to export to the Synergy Surgeon2 app via cable or wirelessly
- Supported USB formatting: exFAT, FAT32, HFS
- Pre-installed printer driver for Sony UP-DR80MD
- DICOM 3.0, EDP link digitally via Ethernet or Wi-Fi, incl. the following functionalities:
  - DICOM Storage (Send/Receive)
  - DICOM Storage Commitment
  - DICOM Worklist Management

- Fileserver export using Samba protocol SMBv2.0, SMBv2.1, SMBv3
- Network streaming

Synergy Vision Connect™ Integration Console (AR-3200-0027 only)

- Up to 4 individual video streams on up to 7 displays allow for in-room surgical video routing
- Additional video inputs:

Qty.	Video Input	Type	Supported Resolution	Vert. scan. freq.
1	C-Video	Composite	NTSC	60.000
			PAL	50.000
1	3G-SDI	3G-SDI	720 x 480	59.939i
			720 x 576	50.000i
			1280 x 720	50.000
			1280 x 720	60.000
			1920 x 1080	50.000i
			1920 x 1080	60.000i
			1920 x 1080	59.940i
			1920 x 1080	23.976
			1920 x 1080	24.000
			1920 x 1080	25.000
			1920 x 1080	29.970
			1920 x 1080	30.000
			1920 x 1080	50.000
			1920 x 1080	59.940
			1920 x 1080	60.000
2	HDMI 1.4	HDMI	640 x 480	59.941
			720 x 480	60.000
			800 x 600	60.317
			1024 x 768	60.004
			1280 x 720	50.000
			1280 x 720	60.000
			1920 x 1080	50.000i
			1920 x 1080	60.000i
			1920 x 1080	50.000
			1920 x 1080	59.940
			1920 x 1080	60.000
			1920 x 1200	59.950
1	HDMI 2.0	HDMI	3840 x 2160	60.000
			3840 x 2160	59.940
			4096 x 2160	60.000
			4096 x 2160	59.940
1	S-Video (Y/C)	VGA (YPbPr)	NTSC	60.000
			PAL	50.000

On-Screen Information on Surgical Monitor

Before starting the procedure:

- Assignment of camera button functions
- Name of surgeon, procedure, patient name
- System status und settings of printer, iPad® / iPhone®, network (LAN/Ethernet), Wi-Fi, USB storage devices, pump, shaver, insufflator, RF device
- Surgical timeout questions (facility option)
- Indicator for white balance

During the procedure:

- Display of either the last taken picture or picture history
- Image count
- Recording indicator icon (video recording on/off)
- Surgical display („Heads-up display") for Arthrex devices: showing current values for pump, shaver, RF and insufflator settings
- Laser icon, whenever fluorescence imaging / laser is active
- Pano scope map, whenever Pano scope imaging is enabled

1.1.2   Synergy Vision Digital Documentation Tablet (AR-3200-1016)

Specifications

- Screen diagonal: 13 inches
- Screen resolution: 1920 x 1080 pixel
- Screen ratio: 16:9
- Display Type: TFT LCD capacitive touchscreen
- Brightness: Typ. 350 nits, Max. 400 nits
- Dimensions (W x H x D): 284.9 mm x 179.9 mm x 17 mm
- Weight approx.: 0.9 kg
- Connected to the Synergy Vision console via cable (USB-C)
- Tablet boot time / standby readiness for use: approx. 20 sec.
- Ingress protection: Front of the device: IP-44 / Back and sides of the device: IP-23
- Backside mount: VESA 75 x 75 mm
- No operating system, no battery, no tablet cradle
- Classification per Medical Device Regulation "MDR" (EU) 2017/745: Class I
- Notified body: BSI / CE2797
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA
- Delivery content:
    - 1 x USB 3.1 cable, C-type, male/male with single screw locking, length 2.0 m
    - 4 x screws, UNC 6-32 x 5/16, Phillips pan head stainless steel

Functions

- Administrator settings:
    - Facility: facility name, required fields for case start
    - Data management / data cleanse
    - Facility printing: select information appearing on printout and PDF (facility name, logo, surgeon name, patient name and DOB, patient ID, procedure type, date, notes)
    - Logs: Audit logs, support logs, device logs to Arthrex remote support
    - System update (software and firmware), performed via USB or remote (IOT)
    - User management to assign admin roles and password
    - Network storage: destination/path for video and image storage, secondary location for PDF files (optional)
    - DICOM: Modality Worklist Server & PACS Server (Send/Commitment)
    - Choose name display format, date format and set date/time
    - Languages: Croatian, Czech, Danish, Dutch, English, Finnish, French, German, Italian, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian, Slovak, Slovenian, Spanish, Swedish
    - Ethernet and Wi-Fi settings
    - Routing input and output re-naming

- Surgeon-specific settings:
  - Create a list of surgeons with their specific settings
  - Assigning procedures to a surgeon with specific procedure settings
  - Clone surgeon profiles
  - Individual assignment of camera button functions, separate button assignment for each camera head type (Vision / Visionary / Nano)
  - Max. video recording time, create video chapters with specific length
  - Print settings: photos per page, number of copies, auto-print, orientation, format, print as PDF
  - Photo and video recording settings
  - Selection of auto export destinations: iPad® / iPhone®, USB or network (file server)
- Procedure-specific settings:
  - Create a list of procedures with specific settings
  - Clone procedures
  - Image settings: brightness, zoom, contrast, color, gain, auto-exposure window, dynamic range ("Highlight"), light source settings
- Planning, beginning, and ending a case via tablet:
  - Select surgeon and procedure from drop-down list
  - Enter patient data (name, patient ID, DOB, gender, procedure date, notes)
  - Patient data can be retrieved from a worklist (MWL/DICOM)
  - Multiple cases can be added and stored
  - Start procedure with white balance
  - After ending the case, stills and videos can be reviewed
  - Annotate photos with text and graphical shapes (arrow, circle)
  - Photos and videos can be exported to different destinations (USB, iPad® / iPhone®, network file server, **only photos:** PACS via DICOM)
  - Automatic or manual export
- Display information on the tablet during the procedure:
  - Device status of printer, iPad® / iPhone® USB, network (Ethernet/Wi-Fi), DICOM
  - Captured photos and recorded videos
- Functions on tablet during the procedure:
  - Change camera button assignment
  - Change image settings (brightness, zoom, enhancement, scene, auto-exposure window)
  - Change augmented reality imaging settings (NIR, Highlight, color filters, BioOptico)
  - Pano scope imaging settings
  - Light source: intensity, automatic intensity control, on/standby, white balance
  - Change display layout (e.g., PIP, PAP, …) settings of cameras and video inputs
  - Print settings
  - Settings of secondary source documentation

1.1.3 Synergy Vision Camera Heads and Couplers

Camera head specifications*

	Synergy Visionary	Synergy Vision
Item code	AR-3210-0034	AR-3210-0035
Number of sensors	3	1
HDR support	yes	no
NIR support	yes	no
Pano Scope support	yes	yes
Coupling mechanism	C-mount according to SMPTE 76 / ISO 10935	
Image sensor technology	CMOS	
Image sensor diagonal	1/3 inch	
Scan method	progressive	
Aspect ratio / format	16:9	
Image resolution	3840 x 2160 pixel	
Color depth	10 bit per color channel	
Image refresh rate	59.94 Hz (vertical scanning frequency)	
Shutter speed	1/59.89s to 1/67500s (67,500 steps)	
Signal-to-noise ratio (SNR)	> 52 dB	
Digital zoom	1.5 x	
Buttons	3 programmable buttons (per surgeon preference), controllable functions: 7 (incl. white balance at beginning of case)	
Housing material	welded titanium	
Camera cable	copper cable w/ sheath for insulation	
Sterilization	Steam sterilization (autoclave, 7-year-warranty on autoclaving), hydrogen peroxide sterilization (Steris®, Sterrad®)	
Anti-glare effect	Tilted window in the front as part of the housing design	
Ingress protection	IPX7 (waterproof and disinfectant-proof)	
Applied part type	CF for applications near the heart	
Appliance / protection class	Protection class I	
Housing dimensions	91 mm [L] x 53 mm [W] x 41 [H] mm	
Weight w/ cable**	0.544 kg	0.534 kg
Classification	Class 1 per Medical Device Regulation "MDR" (EU) 2017/745	
Notified body	BSI / CE2797	
Manufacturer:	Arthrex, Inc.	1370 Creekside Blvd.	Naples, FL 34108, USA	

* This section does not include specifications for the Nano Vision camera. For Nano specifications, please refer to the Nano chapter in this document.
** Standard cable weight is 390 g (10 ft cable)

C-mount coupler specifications (AR-3210-0012)

- Focal length: 19.65 mm (fixed focal length)
- Ring for focus adjustment
- Camera connection: C-mount according to SMPTE 76 / ISO 10935
- Endoscope connection: Grasping mechanism according to DIN 58105
- Scope locking mechanism
- Sterilization methods: steam sterilization (autoclave), hydrogen peroxide sterilization (Steris®, Sterrad®)
- Weight: 112 g

1.2   Synergy*ID*™ Imaging System

Combined ultra-high-definition camera system, LED light source, and image management system (documentation system) with near-infrared fluorescence imaging support

- All-in-one housing
    - o Lean and therefore space saving
    - o Improved system stability due to reduced cabling
    - o Better hygiene conditions
- Intuitive tablet user interface

1.2.1   Synergy*ID* Console (AR-3200-0025)

General Information

- Computer type: camera control unit (CCU)
- Brand: Arthrex Synergy*ID*
- Operating system: Embedded Linux
- Access authorization:
    - o Normal user login for authentication
    - o Administrator login for user management and advanced (system) settings
    - o Active Directory (AD) authentication
    - o Complex password for secure user login
    - o "Require Password" feature for normal users (can be enabled/disabled permanently)
- Remote access:
    - o Secure management of settings and adding of patient information data by means of a network computer
    - o Centralized (web browser, IP-based)
    - o Compliant with data privacy standards
- Software updates possible via USB (new features and performance improvements)
- Boot times, based on software version 4.17.5:
    - o Console until ready for use (without tablet): approx. 110 sec.
    - o Console until camera live image is generated: < 5 sec.
    - o System (CCU + tablet) until completely ready for use: approx. 160 sec.
- Measurements: 43.2 cm [W] x 8.9 cm [H] x 34.3 cm [D]
- Weight: approx. 6.8 kg
- Power supply: 100 – 240 V; 50/60 Hz
- Power consumption: 174 W
- Noise level: Startup: approx. 46.5 dB(A); standard operating mode: < 42 dB(A)
- Appliance/protection class: I
- Ingress protection class: IPX0
- Operating temperature: 10 – 23 °C
- EU medical device class according to Medical Device Directive (MDD) 93/42/EEC: IIa
- Notified body: BSI / CE2797
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA
- Delivery contents: video cables, 1 x power cord

Light Source

- Technology: LED (cold light source)
- Lifespan: at least 30,000 operating hours
- 7-year-warranty on the LED light source
- Light output/light flux: 1,800 Lumens (typical)
  Note: Power consumption (in Watts) is not an applicable specification for the LED light engine and can therefore not be provided. Power consumption is meaningless because the Synergy LED light engine does not have its own power supply and the much more appropriate measurement for the performance of LED technology is Lumens.
- Color temperature: 5,500 – 8,500 K nominal
- Color rendering index (CRI): 70 typ. / 60 min.
- Light color: white
- Spare lamp: N/A (LED technology)
- Automatic light output control: synchronized pulse width modulated light output
- Light guide port turret for connecting the following cable standards: ACMI™, Storz™, Wolf™, Olympus™
- Ready to use in < 1 sec.
- User interface
  - CCU button (on/off)
  - Programmable camera buttons (on/off)
  - Tablet graphical user interface (on/off, enable/disable automatic light output control, set max. light output in three steps)

Camera Control Unit / Video Processing – General Information

- 4K UHD-capable, 2D-capable
- Applied part type CF (cardiac floating)
- Defibrillation proof
- White balance button on device
- Image mirror or image rotation
- Video outputs:
  - 2 x DisplayPort 1.1/1.2, MST/SST [2160p max., 10-bit-color, 59.94 Hz]
  - 4 x 3G-SDI [1080p, 8-bit-color] **or** 1 x Quad-SDI 2SI [2160p, 10-bit-color, 59.94 Hz]
  - 2 x DVI-D [1080p, 8-bit-color, 59.94 Hz]; one of the two DVI outputs also functions as laser connection for the Synergy Laser Light Source
- Video input: 1 x DVI-D (1080p, 59.94 Hz)
- Picture-in-picture (PiP) functionality of video input
  - PiP window size on HD monitor: 480 x 270 px
  - PiP window size on 4K monitor: 960 x 540 px
- Gain settings: Low (0 dB), Medium (+9 dB), High (+ 18 dB)
- Augmented reality imaging, including:
  - BioOptico (Spectral Mode, Texture Mode)
  - Color Filters (RED+, RED-)
  - Highlight (dynamic range filter)
- Near-infrared fluorescence imaging support
  - 3 different fluorescence imaging display modes:
    - COLOR (visible light imaging in color with NIR overlay)
    - MONOCHROME (visible light imaging in B/W with NIR overlay)
    - NIR ONLY (NIR imaging only, without visible light information)
  - 7 different NIR overlay colors to choose from (Green, Cyan, Blue, Magenta, Red, Yellow, White), customizable/programmable per surgeon and procedure
  - Ability to adjust dedicated NIR image settings: NIR Brightness, NIR Contrast, NIR Background; customizable/programmable per surgeon and procedure

Image Management / Documentation System – General Information

	Resolution	File size	File type	Comment
Photo (HD)	1920 x 1080	1.1 ± 0.3 MB	JPEG	
Photo (4K)	3840 x 2160	3.5 ± 1.0 MB		
Photo (RAW)	1920 x 1080	6.1 MB	RAW	Only via DICOM
Video (standard)	640 x 360	9 ± 2 MB/minute	MP4	Video codec: H.264 MPEG-4 AVC image refresh rate: 30 Hz; Secondary capture video qualities only "standard" and "medium"
Video (medium)	1280 x 720	24 ± 3 MB/minute		
Video (high)	1920 x 1080	44 ± 4 MB/minute		
PDF	corr. photos	≈ photos total	PDF	

- Possibility to annotate photos at the end of case
- ACC (accessory) ports: 2 x 3.5 mm mini stereo jacks, usable as output or input:
    - Input: allow for control of the Camera Control Unit (CCU) with a footswitch
    - Output: allow for controlling external devices using the camera head buttons
- Audio-In: Mini Stereo Connector
- Parallel documentation of two video sources and audio; video recording of 2nd source (DVI input) in qualities „standard" or „medium" (cf. table)
- Ethernet connector RJ45 isolated 10/100/1000 MB/s
- Integrated Wi-Fi (Client or Hotspot)
    - Frequency and standard: 2.4 GHz or 5 GHz, 802.11 ac/a/b/g/n
    - Technology: Wireless LAN (IEEE 802.11)
    - Encryption modes: WPA-PSK, WPA2, WPA2-Enterprise
    - Encryption standards: WPA with TKIP, WPA2 with AES
    - WPA2-Enterprise certificates supported: ".p7b" and ".cer"
- 3 x USB 2.0 connectors (1 x front, 2 x back)
- 3 x USB 3.0 connectors (1 x front, 2 x back)
- USB connector for tablet: 1 x
- RS-232 connector, isolated
- Internal storage: 128 GB SSD
- Automatic or manual export: USB, iPad® / iPhone®, File server, PACS (DICOM)
- MFi certified (Apple®)
- Possibility to export to the Synergy Surgeon2 app
- Supported USB formatting: VFAT / FAT32, NTFS, HFS-PLUS / HFS+
- Pre-installed printer driver for Sony UP-DR80MD
- DICOM 3.0, EDP link digitally via Ethernet or Wi-Fi, incl. the following functionalities:
    - DICOM Storage (Send/Receive)
    - DICOM Storage Commitment
    - DICOM Worklist Management
- Fileserver export using Samba protocol SMBv1, SMBv2.0 and SMBv2.1

Network Streaming and Communication Functions

- Password-protected access to camera live stream and captured images
- WebRTC, HTML5-based
- Streaming codec: H.264 with MPEG4 container at 30 Hz
- Streaming quality levels:
    - Standard (640x360 px. at 1 Mbit/s)
    - Medium (896x504 px. at 2,5 Mbit/s)
    - High (1920x1080 px. at 6 Mbit/s)
- Audio streaming
- Remote access via web browser (IP based)

On-Screen Information on Surgical Monitor

Before starting the procedure:

- Assignment of camera button functions
- Name of surgeon, procedure, patient name
- System status und settings of printer, iPad® / iPhone®, network (LAN/Ethernet), Wi-Fi, USB storage devices, pump, shaver, insufflator, RF device
- Surgical timeout questions (facility option)
- Indicator for white balance

During the procedure:

- Display of either the last taken picture or picture history
- Image count
- Recording indicator icon (video recording on/off)
- Surgical display („Heads-up display") for Arthrex devices: showing current values for pump, shaver, RF and insufflator settings
- Icon indicating the name/number of remote accessing devices (live stream status)
- Text chat messages from live stream viewers
- Laser icon, whenever fluorescence imaging / laser is active

1.2.2 Synergy^{UHD4} Digital Documentation Tablet (AR-3200-1021)

Specifications

- Screen diagonal: 10.5 inch
- Screen resolution: 1200 x 1920 pixel / 216 ppi
- Screen ratio: 16:10
- Display Type: TFT LCD capacitive touchscreen
- Dimensions tablet (W x H x D): 246.8 mm x 161.9 mm x 6.9 mm
- Dimensions tablet with cradle (W x H x D): 308.1 mm x 215.0 mm 23.6 mm
- Weight approx.: 0.51 kg
- Weight with cradle and cable approx.: 0.96 kg
- Installed and connected via USB or can be used wirelessly
- Boot time until ready for use (when CCU is already running): approx. 75 sec.
- Standby function readiness for use in approx. < 1 sec.
- Tablet operating system: Android 13; Arthrex Controller running in Kiosk (closed) mode
- EU medical device class according to Medical Device Regulation (MDR) 2017/745: I
- Legal Manufacturer: Foreseeson Custom Displays, Inc. | 2210 East Winston Road | Anaheim, California 92806 | USA

Functions

- Clinic-specific settings:
  - <u>Languages:</u> EN, GER, FR, ES, IT, NLD, SWE, DK, NO, FI, CHN, JAP, KOR, RU
  - <u>Streaming quality:</u> set live stream bitrate to "Standard", "Medium" or "High"
  - <u>Print settings:</u> select information appearing on printout and PDF (facility name, logo, surgeon name, patient name and DOB, patient ID, procedure type, date, notes)
  - <u>Network settings:</u> static IP address or DHCP; LDAP settings
  - <u>Network storage:</u> destination/path for video und image storage, secondary location for PDF files (optional)
  - <u>DICOM:</u> Modality Worklist Server & PACS Server (Send/Commitment)
- Surgeon-specific settings:
  - Create a list of surgeons with their specific settings
  - Assigning procedures to a surgeon with specific procedure settings
  - Individual assignment of camera button functions, separate button assignment for NIR and non-NIR camera heads
  - Max. video recording time, create video chapters with specific length
  - Print settings: photos per page, number of copies, auto-print, orientation, format, print as PDF
  - Photo and video recording settings
  - Settings and create a password for live stream access
  - Selection of auto export destinations: iPad® / iPhone®, USB or network (file server)
- Procedure-specific settings:
  - Create a list of procedures with specific settings
  - Image settings: brightness, zoom, color/gamma curve settings, gain, auto-exposure window, dynamic range ("Highlight"), contrast, light source settings
- Planning, beginning and ending a case via tablet:
  - Select surgeon and procedure from drop-down list
  - Enter patient data (name, patient ID, DOB, gender, procedure date, notes)
  - Patient data can be retrieved from a worklist (MWL/DICOM)
  - Multiple cases can be added and stored
  - Start procedure with white balance
  - After ending the case, stills and videos can be reviewed
  - Annotate photos with text and graphical shapes (arrow, circle)
  - Photos and videos can be exported to different destinations (USB, iPad®, network file server, **only photos:** PACS via DICOM)
  - Automatic or manual export
- Display information on the tablet during the procedure:
  - Device status of printer, iPad® / iPhone®, USB, network (Ethernet/Wi-Fi), DICOM
  - Captured photos and recorded videos
- Functions on tablet during the procedure:
  - Change camera button assignment
  - Change image settings (brightness, zoom, enhancement, scene, auto-exposure window)
  - Light source: intensity, automatic intensity control, on/standby, white balance
  - Change Picture-in-Picture settings of video input
  - Print settings (photos per page, number of copies, auto-print, orientation, format)
  - Settings of secondary source documentation

1.2.3 Synergy^{UHD4} and Synergy^{ID} Camera Heads

- Image sensor technology: CMOS
- Sensor diagonal: 1/3 inch per sensor
- Scan method: progressive
- Aspect ratio/format: 16:9
- Image resolution: 3840 x 2160 pixels
- Color depth: 10-bit-color per color channel
- Image refresh rate: 59.94 Hz (vertical scan)
- Shutter speed: 1/59.89s to 1/67500s (67,500 steps)
- Digital zoom: 1.5 x
- 2 programmable camera head buttons:
    - number of controllable functions: 5 (incl. white balance at beginning of case)
    - number of programmable functions: 15 (Synergy^{UHD4} camera heads) / 19 (Synergy^{ID} camera head)
    - controllable NIR functions: NIR mode, NIR brightness, NIR contrast, NIR background (only for Synergy^{ID} camera head)
- Housing / material: welded titanium housing
- Camera cable: copper cable w/ sheath for insulation
- Autoclavable, 7-year-warranty on autoclaving
- Anti-glare effect: Tilted window in the front as part of the housing design
- Waterproof and disinfectant-proof (IPX7)
- Applied part type CF for applications near the heart
- Appliance/protection class: I (compare to Synergy^{ID} CCU AR-3200-0025)
- EU medical device class according to Medical Device Directive (MDD) 93/42/EEC: IIa
- Notified body: BSI / CE2797
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA

4K Camera Heads	Integrated Heads (with Ocular)			C-Mount Heads	
	Synergy^{ID}	Synergy^{UHD4} Broadband	Synergy^{UHD4} Ultra	Synergy^{UHD4} Broadband	Synergy^{UHD4} Ultra
Item code: AR-3210-…	…-0033	…-0029	…-0031	…-0030	…-0032
Number of sensors	4	3	1	3	1
Focal length	19.65 mm			14 – 29 mm (AR-3210-0006); 15 mm (AR-3210-0009)	
Signal-to-noise ratio (SNR)	> 52 dB		> 50 dB	> 52 dB	> 50 dB
Optical zoom	-	-	-	2.07 × (AR-3210-0006)	
Coupling mechanism	DIN-58105-compliant scopes with eye-piece connector			C-mount scopes / C-mount couplers	
Dimensions in mm (L x W x H)	140 x 64 x 64	99 x 46 x 46		71 x 42 x 43	
Weight w/ 10 ft cable*	640 g	590 g		500 g	

* Standard cable weights incl. plug are 400 g (10 ft cable) and 680 g (20 ft cable)

1.3 Synergy Surgeon2™ App(lication) for iPad® and iPhone®

The Synergy Surgeon2 application provides physicians with tools to manage image and video recordings and perform patient education. Utilizing an iPad or iPhone, physicians can review, edit, annotate and tag still and video recordings, as well as create and instantly transmit images, videos and educational postoperative reports to patients.

- Direct transfer of images and videos to iPad or iPhone during or after the procedure
- Export of images and videos to iPadOS (iOS) camera roll for further use
- Surgeons can quickly and easily create and send custom patient reports.
- Global templates offer prepared content to send reports on first log-in.
- Improved communication with patients promotes improved patient satisfaction scores.
- Reducing face-to-face outpatient appointments (and the associated patient journeys) is a recognized way to reduce greenhouse gas (GHG) emissions.
- "Surgeon profile" to populate surgeon information into templates
- Surgeon's social media section to add to templates
- Modular template sections for easy template customization
- "Add case" feature
- Latest encryption technology including a "biometrics access" option (Face ID / Touch ID)
- Can be downloaded free of charge from the Apple App Store
- The Synergy Surgeon2 app is not a medical device

1.4　Synergy Laser Light Source (AR-3200-1018)

- Technology: Laser diode
- Light guide port: Keyed Arthrex / Wolf type to ensure safety, compatible with AR-3240-5045 and AR-3240-5090
- Compatible with Synergy^{ID}™- and Synergy Vision™ imaging systems
- User interface: activation is controlled via the Synergy video system
- Mode of laser operation: continuous (CW, not pulsed)
- Laser maximum output power: < 62 mW
- Laser wavelength: 785 nm
- Safety Measures: To ensure that the Synergy Laser Light System is only activated when required, the following conditions will automatically turn off the laser if it is active or prevent activation of the laser if it is not active:
    - The control cable between the Synergy Laser Light System and the Synergy console is disconnected.
    - The Synergy console is powered off.
    - A camera head that is not capable of NIR imaging is connected to the Synergy camera control unit.
    - The Synergy LED light engine is powered off.
    - The Synergy system fluorescence imaging mode is not active.
    - The Synergy system is not in an active case.
- Measurements: 22.9 cm [W] x 6.7 cm [H] x 15.3 cm [D]
- Weight: approx. 2.8 kg
- Power requirements: 12 V DC, 1.5 A
- External power adapter:
    - Input: 100-240 V AC, 50/60 Hz, 1.0-0.5 A
    - Output: 12 V DC, 3.34 A, 40W max.
- Power consumption: 18 W
- Appliance/protection class: I
- Ingress protection class: IPX0
- EMC Certification: EN 60601-1-2:2015 (4th edition)
- Laser class accord. to IEC 60825-1:2007-3 (Ed.2.0) and IEC 60825-1:2014-5 (Ed.3.0): 1
- Operating temperature: 10 – 35 ℃
- Life expectancy: approx. 5 years under normal use and standard of care
- EU medical device class according to Medical Device Directive (MDD) 93/42/EEC: IIa
- Notified body: BSI / CE2797
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA
- Delivery contents: power adapter, custom laser control cable, instructions for use

2 Endoscopes

Please note that only the most common endoscopes of our portfolio are listed below. Please check the I&R product catalogue or the I&R configuration chart for additional endoscope versions as well as accessories.

Valid for all endoscopes listed in this section:

- Optimized for Synergy Imaging System
- Three tube construction for unique resistance to bending and lens breakage
- Fiber optic for light transmission incorporated
- Cover glass made of high-quality sapphire for maximum scratch resistance
- Light guide connection compatible with the three major connector styles:
  - ACMI/Olympus/Zimmer
  - Wolf/Dyonics
  - Storz
- Sterilization:
  There is no limitation concerning the number of sterilization cycles within the warranty period. The endoscopes are tested and validated with the very demanding French autoclave cycle (18 min, 134 °C, 2.3 bar). A minimum lastingness of 500 cycles is defined.
- MDD Class: IIa

2.1 Arthroscopes

Valid for all arthroscopes listed in this section:

- DIN-58105 (eye-cup) camera coupling (also available with c-mount camera coupling, cf. I&R configuration chart)
- Light guide connector features a glass cone construction
- Compatible with Arthrex Synergy connection style inflow sheaths

Item Number	Diameter	Direction of view	Working length	Total length	Field of view	Miscellaneous
AR-3350-1930	1.9 mm	30°	58 mm	118 mm	65°	-
AR-3350-2430	2.4 mm	30°	72 mm	129 mm	80°	-
AR-3350-2730	2.7 mm	30°	72 mm	129 mm	80°	-
AR-3350-3030	3 mm	30°	138 mm	202 mm	100°	-
AR-3350-4031	4 mm	30°	153 mm	223 mm	105°	4K
AR-3350-4071	4 mm	70°	156 mm	225 mm	105°	4K
AR-3350-5230	4.8 mm	30°	153 mm	226 mm	105°	4K

2.2   Laparoscopes/VIS-NIR Laparoscopes

Valid for all laparoscopes/VIS-NIR laparoscopes listed in this section:

- Available only with DIN-58105 (eye-cup) camera coupling

Valid for all 5.5 mm laparoscopes/VIS-NIR laparoscopes listed in this section:

- Light guide connector features a glass cone construction

Laparoscopes

Item Number	Diameter	Direction of view	Working length	Total length	Field of view	Miscellaneous
AR-3351-5500	5.5 mm	0°	300 mm	365 mm	75°	4K
AR-3352-5500	5.5 mm	0°	300 mm	360 mm	75°	4K, Hi-Mag*
AR-3351-5530	5.5 mm	30°	300 mm	365 mm	75°	4K
AR-3352-5530	5.5 mm	30°	300 mm	360 mm	75°	4K, Hi-Mag*
AR-3351-1000	10 mm	0°	330 mm	405 mm	75°	4K
AR-3351-1030	10 mm	30°	330 mm	405 mm	75°	4K

VIS-NIR Laparoscopes

Item Number	Diameter	Direction of view	Working length	Total length	Field of view	Miscellaneous
AR-3352-5501	5.5 mm	0°	300 mm	366 mm	75°	4 K, Hi-Mag*
AR-3352-5531	5.5 mm	30°	300 mm	366 mm	75°	4 K, Hi-Mag*
AR-3351-1001	10 mm	0°	330 mm	409 mm	75°	4K
AR-3351-1031	10 mm	30°	330 mm	410 mm	75°	4K

*Hi-Mag denotes laparoscopes with an extended apparent field of view (AFOV). The AFOV corresponds to the image size in the camera plane. Consequently, Hi-Mag laparoscopes yield a bigger image size as compared to the corresponding Non-Hi-Mag endoscope version. The Hi-Mag version has been introduced as many general surgeons prefer this bigger image. Therefore, the Hi-Mag version is our recommended first choice for the 5.5 mm laparoscopes.

2.3   Pano™ Scope

Valid for the Pano™ scope:

- Available only with c-mount camera coupling
- Ultra-wide-view* arthroscope
- Allows for three viewing modes*:
    - 30° traditional
    - 70° traditional
    - 45° ultra-wide-view
- Unique markers in scope mask to indicate when scope rotates (Arthrex IP)
- Dome window shaped cover glass
- Light guide connector features a glass cone construction
- Compatible with dedicated Pano accessories featuring Arthrex Synergy connection

Item Number	Diameter	Direction of view	Working length	Total length	Field of view	Miscellaneous
AR-3355-4050	4.25 mm	45°	161 mm	238 mm	140°	4K, c-mount

* Requires Synergy Vision Imaging System

3 Monitors

3.1 LG Monitors 27" HD & 4K

	27" HD	27" 4K
Part Number	27HK510S	27HQ710S-W EU
Branding	LG	LG
Panel Size	27 inch / 68.58 cm	
Screen Technology	TFT-LCD with White LED Backlight	TFT-LCD with Mini-LED Backlight
Aspect Ratio	16:9	
Brightness (Typ.)	1000cd/m²	800cd/m²
Color Depth / Bit	1.07 billion (8bit + FRC)	1.07 billion /10 bit
Color Gamut (Typ.)	sRGB 115%(Area) sRGB over 99%(Coverage)	DCI-P3 110.9% (Area) DCI-P3 98% (Coverage) sRGB 139% (Area) sRGB 100% (Coverage)
Contrast Ratio (Typ.)	1000:1	
Panel Type	IPS	VA (Vertical Alignment)
Resolution	1920x1080	3840x2160
Pixel Pitch	0.3113 mm	0.1554 mm
Response Time (GtG)	14ms (Off-setting), 5ms (Faster-setting)	
Protection glass	Protection Glass (1.3t, Anti-Reflection, Anti-Fingerprint)	
Viewing Angle	178° horizontally and vertically	
Hot Key	Yes(2keys)	
Brightness stabilization	Yes	
Black Stabilizer	Yes	
H/W Calibration	Yes	
DICOM Compliant	Yes	
Color Temperature	6500K / 8500K / 9300K / Manual (5000K ~ 10000K)	
HDR 10	No	Yes
HDR Effect	No	Yes
Gamma	1.8, 2.0, 2.2, 2.4, 2.6, DICOM	
PbP	Yes – 2PbP	Yes – 4PbP
PiP	Yes	
Rotation/Mirror Mode	No	Yes
Smart Energy Saving	Yes	
OSD languages	17	
OSD lock	Yes	
Video Inputs 4K / 60Hz	-	1x Display Port 1.2, 1x HDMI 2.0
Video Inputs HD / 60 Hz	2x DVI-D, 1x Composite (BNC), 1x 3G-SDI, 1x HDMI	1x DVI-D, 1x 3G-SDI
Video Outputs	1x DVI-D, 1x 3G-SDI	1x Display Port, 1x DVI-D, 1x 3G-SDI
Failover Mode	Yes (Autosource)	Yes – Failover Input Switch
RS-232	Yes(1ea)	
USB Downstream Port	Yes (1ea/ver2.0)	Yes (1ea/ver3.0)
USB Upstream Port	Yes (1ea/ver2.0)	Yes (1ea/ver3.0)
AC Input	100-240 VAC, 50/60 Hz	
DC Output	19-24VDC, 6.32-5A	19VDC, 6.32A
Power Consumption	Standby: < 0.3 W; Max.: 120 W	
Type	External Power (Adapter)	

Mount	VESA 100 / VESA 200x100	
Dimension (W x H x D)	656.4 x 412.9 x 62.2 mm	650.8 x 411.7 x 66.6 mm
Weight	7.7 kg	8.0 kg
MDR Class	I	
Green compliance	ROHS-3, REACH, WEEE	
IP (Front/Except for front)	IP35/IP32	IP45/IP32
Impact Protection	IK06	

3.2   LG Monitors 32" 4K

	31.5" 4K	31.5" 4K w/ 12G-SDI w/HDR
Part Number	32HL710S-W	AR-3250-3212 / 32HL714S-W
Branding	LG	AR-3250-3212: Arthrex 32HL714S-W: LG
Panel Size	31.5 inch / 80.01 cm	
Screen Technology	TFT-LCD Active Matrix with White LED Backlight	
Aspect Ratio	16:9	
Brightness (Typ.)	800cd/m²	
Color Depth / Bit	1.07 billion / 10bit	
Color Gamut (Typ.)	sRGB 115%(Area), sRGB over 99%(Coverage)	
Contrast Ratio (Typ.)	1000:1	1300:1
Panel Type	IPS	IPS
Resolution	3840x2160	
Pixel Pitch	0.181mm	
Response Time (GTG)	14ms (Off-setting), 5ms (Faster-setting)	
Protection glass	Protection Glass (1.6t, Anti-Reflection, Anti-fingerprint)	
Viewing Angle	178° horizontally and vertically	
Hot Key	Yes(2keys)	
Brightness stabilization	Yes	
Black Stabilizer	Yes	
HW Calibration	Yes (True Color Pro)	
DICOM Compliant	Yes	
Color Temperature	6500K / 7500K / 9300K / Manual (5000K ~ 10000K)	
HDR 10	No	Yes
HDR Effect	No	Yes
PbP	Yes(2PbP/3PbP/4PbP)	
PiP	Yes	
Rotation/Mirror Mode	Yes	
Smart Energy Saving	Yes	
OSD languages	17	
OSD lock	Yes	
Video Inputs 4K / 60Hz	1x Display Port 1.2, 1x HDMI	1x Display Port 1.2, 1x HDMI 1x 12G-SDI, 4x Quad-Link 3G-SDI
Video Inputs HD / 60 Hz	1x DVI-D, 1x 3G-SDI	1x DVI-D, 4x 3G-SDI
Video Outputs	1x Display Port, 1x DVI-D, 1x 3G-SDI	1x Display Port, 1x DVI-D, 1x 12G-SDI or 4x 3G-SDI
Failover Mode	Yes	
RS-232	Yes (1ea)	
USB Ports	Downstream: Yes (1ea/ver2.0) / Upstream: (1ea/ver2.0)	
AC Input	100-240VAC, 50/60Hz	

DC Output	19 - 24VDC, 6.32A - 5.0A	
Power Consumption	Standby: <0.3W; Max.: 120W	DC Off: <0.3W; Max.: 180W
Type	External Power (Adapter)	
Mount	VESA 100 / VESA 200x100	
Dimensions (W x H x D)	764.6 x 480.8 x 94.4 mm	
Weight without Stand	12.4kg	13.5 kg
MDR Class	I	
Green compliance	ROHS-3, REACH, WEEE	
IP (Front/Except for front)	IP35/IP32	
Impact Protection	IK06	

3.3   BARCO Monitor 32" 4K

	32" 4K
Part number	AR-3250-3211
Branding	Arthrex / Synergy
LCD active panel size	32 inch / 813 mm
Screen technology	TFT AM LCD
Backlighting	LED backlight with light output stabilization
Aspect ratio	16:9
Resolution	3840 x 2160 pixel
Pixel pitch	0.1845 mm
Color support	1.073 billion colors (10 bit per color channel)
Color gamut	Native: 94% NTSC
Viewing angle	178° horizontally and vertically
Luminance / brightness	850 cd/m² typical
Contrast ratio	1350:1 typical
LCD response time (T_{on} + T_{off})	10 ms typical
White point / color temp.	calibrated: 5600 K, 6500 K, 7600 K, 9300 K
Gamma	Native, 1.8, 2.0, 2.2, 2.4, Video1, Video2, DICOM
Housing color	Black RAL 9004
Housing material	PC-ABS
Screen protection	2-sided, anti-reflective alkali-aluminosilicate glass with anti-fingerprint coating
Keyboard	Front: 5-key capacitive touch (programmable) Rear: 5-key membrane
Video input signals (UHD at 60 Hz)	1x DP; 2x HDMI
Video input signals (HD at 60 Hz)	1x DVI; 1x 3G-SDI
Scaling possible	FHD upscaled to UHD
Failover mode	Yes
Video output signals	1x DP 1.2 SST (main input copy) 1x 3G-SDI (loopthrough)
PbP	Yes
PiP	Yes
Mirror & Rotation	Yes
Power supply	100-240 VAC / 47-63 Hz
Power requirements display power input	25 VDC / 8 A
Type	External Power (Adapter)
Power consumption	Standby: 2 W; Typ.: 100 W
OSD languages	EN, DE, FR, IT, ES, SE, HUN, CN
Dimensions (W x H x D)	768 x 480 x 83 mm

Weight monitor	12.7 kg
Weight power supply	0.9 kg
Mounting standard	VESA 100
Operating temperature	0°C - +35°C
MDR class	I
IP class	IP21 (IP45 Front Side)

3.4   ADLINK Monitor 43" 4K

	43" 4K
Part Number	93-ASM43G-UH10
Branding	Adlink
LCD active panel size	43 inch
Screen technology	TFT LCD
Backlighting	LED backlight
Aspect ratio	16:9
Resolution	3840 x 2160 pixel
Pixel pitch	0.245 mm x 0.245 mm
Color support	1.073 billion colors (10 bit per color channel)
Color space	Native, BT.2020, BT.709, BT.601, sRGB, Adobe RGB
Viewing angle	178° horizontally and vertically
Luminance / brightness	700 cd/m² max.
Contrast ratio	1200:1 typical
LCD response time (gray to gray)	8 ms typical
Color Temperature	3200 to 9600 K
Gamma	1.8, 2.0, 2.2, 2.35, 2.4, 2.6, HLG, PQ
Housing material	Glass, aluminium, ABS, anti-bacterial
Screen protection	Front glass, anti-reflection coated, optically bonded, edge-to-edge glass surface
Keyboard	Front: 7-key illuminated touch buttons
Video input signals (UHD at 60 Hz)	2x HDMI 2.0, 1x DP 1.4, 2x 12G-SDI
Video input signals (HD at 60 Hz)	2x 3G-SDI
Scaling possible	FHD upscaled to UHD
Video output signals	1x HDMI 2.0, 1x DP 1.4, 1x 3G/12G-SDI
USB	1x USB downlink, 1x USB uplink
Power output	1x 5V/1A
PbP (Side-by-Side)	Yes
PiP	Yes
Mirror & Rotation	Yes
Power supply	100-240 VAC / 50/60 Hz
Power requirements display power input	24V DC / 10,41 A
Type	External Power (Adapter)
Power consumption	Standby: < 10 W; Max.: < 120W
OSD languages	EN, DE, FR, IT, ES, PT, RUS, CN, JP
Dimensions (W x H x D)	993 mm x 600 mm x 74 mm
Weight monitor	19 kg
Weight power supply	1,1 kg
Mounting standard	VESA 300x300, 400x400
Operating temperature	0°C - +30°C
MDR class	I
IP class	IP33

3.5 BARCO Monitors 55" 4K

	55" 4K	55" 4K w/ MNA	55" 4K w/12G-SDI
Part number	K9352360	K9352362	K9352361
LCD active panel size	54.6 inch / 1388 mm		
Screen technology	TFT AM LCD/IPS-technology		
Backlighting	LED backlight with automatic stabilization		
Aspect ratio	16:9		
Resolution	3840 x 2160 pixel		
Pixel pitch	0.315 mm		
Color support	1.073 billion colors (10 bit per color channel)		
Color gamut / calibration	ITU 709 (default), BT. 2020, DCI-P3 D65 Native: Close to ITU709		
Viewing angle	178° horizontally and vertically		
Luminance / brightness	500 cd/m² typical		
Contrast ratio	1100:1 typical		
LCD response time (Gray-to-Gray)	8 ms typical		
White point / color temp.	calibrated: 5600 K, 6500 K, 7600 K, 9300 K		
Gamma	Native, 1.8, Video 2.2, 2.4, DICOM		
Housing color	RAL 9003		
Screen protection	2-side anti-reflective laminated safety glass		
Keyboard	Membrane keyboard		
Video input signals (UHD at 60 Hz)	DisplayPort 1.1 or 1.2; 2x HDMI	DisplayPort 1.1 or 1.2; 2x HDMI,+; 2 x FO SFP+ for 4K/UHD-Nexxis-Link	DisplayPort 1.1 or 1.2; 2x HDMI; Quad-Link 3G-SDI; 2x 12G-SDI
Video input signals (HD at 60 Hz)	1x DVI, 1x 3G-SDI		
Nexxis 4K decoder integrated	No	Yes	No
Scaling possible	FHD upscaled to UHD		
Failover mode	Yes		
Video output signals	1 x 3G-SDI (loop-through) 1 x DVI (screen clone downscaled, FHD)		2 x 12G-SDI (loop-through) 1 x DVI (screen clone downscaled, FHD)
PaP	Yes		
PiP	Yes		
Mirror & Rotation	Yes		
Power supply	Internal		
Power requirements display power input	100-240 VAC / 50-60 Hz / 1.9-0.9 A		
Power consumption, max.	144 W	200 W	162 W
Low power mode/ Standby, typ.	18 W	52 W	33 W
Power-off	~ 1 W		
OSD languages	EN, DE, FR, IT, ES		
Dimensions (W x H x D)	1259 x 733 x 87 mm		
Weight monitor	33.2 kg	34.2 kg	33.5 kg
Mounting standard	VESA (200 / 600x200 mm)		
Operating temperature	0°C - +35°C		
MDR class	I		
IP class	IP20 (IP45 Front Side)		
Green compliance	ROHS-3, REACH, WEEE		

4 Carts

4.1 ArthroCart (AR-5995-16STI)

- Material: aluminum and steel components
- Shockproof powder-coating
- Color: grey
- Dimensions, total (H x W x D): 1500 x 624 x 668 mm
- Weight approx. 85 kg; Max. load capacity: 180 kg
- Rollers:
  - 4 rollers, anti-static, Ø 125 mm
  - with cable guards
  - lockable
- Isolating transformer 2000 VA / 230 V, 65x370x220 mm
- Earth leakage guard (display integrated in shelf, 25x55 mm)
- Fusing primary: 1.5 kV
- Central I/O switch
- Power column with 8x IEC outlets
- 10 equipotential bonding cables
- Cable channel, energy profile
- Shelves:
  - 5 shelves
  - adjustable in height
  - expandable
  - Dimensions shelves (H x W x D): 32 x 500 x 491 mm
  - 1 extendible storage shelf with handle approx. 150 mm
  - Load capacity per shelf: 30 kg (extendible shelf: 20 kg)
- Drawer
- Backdoor with louver, lockable
- Mounting position for central-monitor-mount
- Mounting position for articulation-monitor-arm
- Mounting position for tablet-arm
- Three-sided surrounding handle
- Cable winding aid
- 1x Foot pedal holder
- 1x Camera holder
- 1x Fluid bag holder, 1x Tubing clamp
- MDR Class: I

4.1.1 Accessories

- Power cable with integrated equipotential bonding cable 5 m
- Central monitor mount VESA75/100
- Articulating arm for monitor 8-14kg; approx. length: 0.9 m
- Articulating arm for monitor 8-14kg or 11-10kg; approx. length: 1m
- Swivel arm for tablet
- Set of side-mounted arms for 2 monitors option
- Sliding keyboard shelf
- Cart irrigation bag holder / infusion stand, adjustable height
  - with 4 hooks, weight per hook max. 1.25 kg
  - with 4 hooks, weight per hook max 2 kg (single hand use)
  - with 4 hooks, weight per hook max. 5 kg
- Gas bottle holder for 3-10 l or 20-50 l
- Camera cup holder

4.2   CompactCart Endo/Arthro for 55" Monitor (KU.5756.800)

- Material: aluminum and steel components
- Shockproof powder-coating
- Color: grey
- Dimensions, cart-total (H x W x D): 1500 x 668 x 624 mm
- Weight approx. 80 kg
- Max. load total 180 kg
- Rollers:
    - 4 rollers, anti-static, Ø 125 mm
    - with cable guards, cable guards detachable
    - lockable
- Isolating transformer 2000VA/230V, 65x370x220 mm
- earth leakage guard (display integrated in shelf, 25x55 mm)
- Fusing primary: 1,5 kV
- Central I/O switch
- Power column with 8x IEC outlets
- Plate with 8x equipotential-bonding connectors
- Included cables:
    - 5 x IEC cables
    - 5 x Equipotential-bonding cables
- Shelves:
    - 4 shelves
    - adjustable in height
    - expandable
    - Dimensions shelves (H x W x D): 32 x 500 x 491 mm
    - 1 extendable storage shelf with handle approx. 150 mm
    - Load capacity: 30 kg (extendible shelf: 20 kg)
- Drawer
- Backdoor with louvers, lockable
- Three-side surrounding handle
- Positioning handles on backside
- Cable and hose pass-through at backside
- Monitor-mount inclinable for 55" Barco monitor with handle
- Cable winding aid
- Foot pedal holder
- Camera holder
- Fluid bag holder
- MDR Class: I

4.2.1   Accessories

- Power cable with integrated equipotential bonding cable 5 m
- Sliding keyboard shelf
- Cart irrigation bag holder / infusion stand, adjustable height 130-210 cm
    - with 4 hooks, weight per hook max. 1.25 kg
    - with 4 hooks, weight per hook max 2 kg (single hand use)
    - with 4 hooks, weight per hook max. 5 kg
- Gas bottle holder for 3-10 l or 20-50 l
- Camera cup holder

4.3 Endo-Cart (KU.5875.800)

Simple cart with small footprint for endoscopic use for one monitor and 3 devices.
- Material: aluminum and steel components
- Shockproof powder-coating
- Color: grey
- Dimensions, total (H x W x D): 1762 x 649 x 620 mm
- Weight approx. 75 kg
- Rollers:
  - 4 rollers, anti-static, Ø 125 mm
  - with cable guards, cable guards detachable
  - lockable
- Isolating transformer 1200 VA / 230 V
- Central I/O switch
- Power column with 6x IEC outlets
- Plate with 6x equipotential-bonding connectors
- Shelves 3x:
  - Dimensions shelves (W x D): 424x 430 mm
  - 1 extendible storage shelf with handle approx. 150 mm
  - Load capacity per shelf: 10 kg
- Drawer
- Monitor mount: VESA 75/100
- Tablet arm
- Positioning handle
- Cable winding aid
- Camera holder
- MDR Class: I

4.3.1 Accessories

- Gas bottle holder 3-10 liters

4.4 Endo-Symbio-Cart (KU.8345.800)

- Simple cart with small footprint for endoscopic use for one monitor and 3 to 4 devices in standard-configuration. Additional accessories allow to extend the functionality of the cart.
-
  - Material: aluminum and steel components
  - Shockproof powder-coating
  - Dimensions, total (H x W x D): 1442 x 624 x 626 mm
  - Weight approx.: 80kg
  - Central media column with door
  - 2 lateral vertical profiles
  - Rollers:
    - 4 rollers, anti-static, Ø 100 mm
    - with cable guards
    - lockable
  - Isolating transformer 1600VA
  - Central I/O switch
  - Total 3 storage shelves, max. load: 30 kg + base
  - 1 storage shelf with handle
  - Shelves easy adjustable
  - Dimension shelves WxD: 450 x 490 mm
  - Total weight load: max. 180 kg

- Power distributor with 8x IEC outlets
- Panel with 8x equipotential-bonding connectors
- 3x IEC power cables included (1x 0.5m, 2x 1m)
- 3x Equipotential bonding cables included (1x 3m, 2x 1.5m)
- Mounting position for central-monitor-mount
- Mounting position for articulation-monitor-arm
- Mounting position for tablet-arm
- Positioning handle
- MDR Class: I

4.4.1   Accessories

- Central monitor mount VESA 75/100
- Articulating arm for monitor 8-14kg; approx. length: 0.9 m
- Swivel arm for tablet
- Cable winder
- Bag holder
- Shelf (easy mountable/adjustable)
- Shelf with handle (easy mountable/adjustable)
- irrigation bag holder / infusion stand, adjustable height 130-210 cm
  - with 4 hooks, weight per hook max 2 kg (single hand use)
  - with 4 hooks, weight per hook max. 5 kg
- Drawer / Drawer large
- Gas bottle holder for 3-10 l or 10-20 l
- Standard rail
- Foot pedal holder
- Extendable pump shelf
- Earth-leakage guard
- Camera cup holder
- Camera eye-piece holder

4.5   Monitor stand (KU.6997.903)

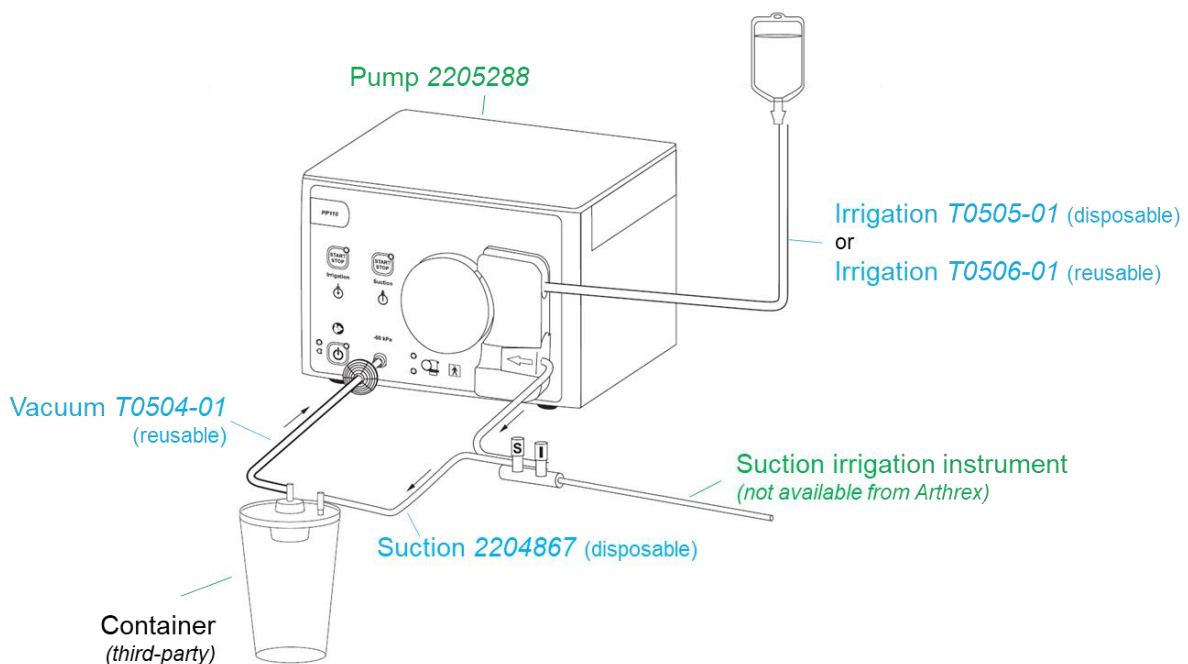Secondary monitor stand to host monitors from 24" to 55" size.

- Material: aluminum and steel components
- Shockproof powder-coating
- Color: grey
- Dimensions, total (H x W x D): 1770 x 610 x 620 mm
- Weight approx. 45 kg
- Rollers:
  - 4 rollers, anti-static, Ø 125 mm
  - with cable guards, cable guards detachable
  - lockable
- Central I/O switch
- Power column with 3x IEC outlets
- Plate with 6x equipotential-bonding connectors
- Monitor mounts:
  - VESA 75/100 for monitors < 10kg, e.g 26", 27"
  - VESA 100 for monitors > 10kg, e.g. 31", 32"
  - VESA 300/300 or 600/200 or 600/400 for e.g. 55" monitors
- Positioning handle
- Cable winding aid
- MDR Class: I

5   Synergy Insufflator (AR-3290-0004)

- Insufflation medium: Medical grade CO_2
- Maximum output pressure: 75 mmHg
- Maximum gas supply pressure: 80 bar/1160 PSI
- Minimum gas supply pressure (bottle): 15 bar/218 PSI
- Minimum gas supply pressure (house gas):3.4 bar/50 PSI
- 2 operating modes:
    - High Flow
    - Bariatric: performed on severely overweight (BMI > 30 kg/m²) adults for rapid insufflation of large volumes
- Maximum gas flow:
    - High Flow: 40 l/min
    - Bariatric: 50 l/min
- Automatic detection of Veres insufflation (flow of 1 to 5 l/min)
- Pressure range: 1-30 mmHg
- Pressure display resolution: 1 mmHg
- Gas flow display resolution: 1 l/min
- Volume display resolution:
    - from 0 to 9.9 l: 0.1 l
    - from 10 to 999 l: 1 l
- Communication: Arthrex control bus 2 x RJ45
- Controlled via an intuitive touchscreen
- Touchscreen size (diagonal): 5.7 inch
- Possibility of gas heating; heating not inside insufflator but within the tube set
- Possibility of using reusable tube sets
- Status icon of gas supply incl. filling level indicator when using a gas bottle
- Possibility of setting start values for pressure and flow (presets)
- Number of possible presets: 2 (Bariatric & High Flow)
- 3 gas flow rates with programmable values
- Safety inspection once a year, can be performed by hospital technician
- Maintenance every two years, must be performed by authorized service technician
- Safety features:
    - Automatic venting system (when pressure is exceeding target pressure by a certain value or time)
    - Occlusion warning
    - Contamination sensor
    - Temperature sensor integrated in heated tube set
- Power: 100-240 VAC; 50/60 Hz
- Max. power consumption: 150 VA
- Dimensions (W x H X D): 406 x 150 x 395 mm
- Weight: approx. 10 kg
- Noise level: < 33 dB(A)
- Protection class: I
- Water protection class: IP21
- Protection level (applied part): BF
- EU medical device class according to Medical Device Directive (MDD) 93/42/EEC: IIa
- Notified body: TÜV Rheinland / CE0197

6 Laparoscopic Suction/Irrigation Pump (2205288)

- Model "PP110"
- Safe & high-performance irrigation
  - Max. flow rates of 2 l/min
  - Accuracy flow: ± 10 %
  - Max. pressure of 450 mmHg
- RFID protected irrigation tube sets ensure proper use
- Safety through highly accurate pressure sensor
- Suction through integrated vacuum pump
  - Suction rate of 2 l/min
  - Negative pressure of -60 kPa max.
- Small & light weight plastic housing
  - Measurements: 210 x 148 x 260 mm
  - Weight: 3.7 kg
- No potential equalization plug necessary due to high quality plastic housing
- Possibility to mount onto pole or classic placement on cart or shelf
- Intuitive user interface with push buttons; LEDs indicate status of operation
- Possibility of disposable (single-use) or reusable (20 uses) tube sets for irrigation
- Safety features:
  - Pressure limitation at 450 mmHg
  - Motor cutout at 600 mmHg
  - Device self-test after powering on the pump
- EU medical device class according to Medical Device Directive (MDD) 93/42/EEC: IIa
- Notified body: TÜV Rheinland / CE0197
- Appliance/protection class: I
- Protection level (applied part): BF
- Ingress protection class: IP 41
- Max. sound level: < 80 dB (a)
- Mains voltage range: AC 100-240 V~
- Supply frequency range: 50/60 Hz
- Manufacturer: W.O.M. WORLD OF MEDICINE GmbH, Salzufer 8, 10587 Berlin, Germany

Pump *2205288*

Irrigation *T0505-01* (disposable)
or
Irrigation *T0506-01* (reusable)

Vacuum *T0504-01*
(reusable)

Suction irrigation instrument
(not available from Arthrex)

Suction *2204867* (disposable)

Container
(third-party)

7 Synergy Resection

7.1 Shaver Console (AR-8305)

- Dimensions (W x H X D): 40.6 x 13.3 x 31.7 cm
- Weight: 6.8 kg
- Water protection class: IP22
- AC input: 100 – 240 V; 50 / 60 Hz
- Max. power consumption: 6.3 A
- Power entry module: IEC 320/C13
- Fuse value: 6.3 A, 250 V~, 2.0 cm (0.75 inches) Type T
- Ambient conditions for operation: 10 – 40 °C
- Noise level: < 46 dB
- Applied part type: BF
- Medical device directive: Class IIa
- Medical device according to: 93/42/EEC
- Notified body: 0086
- Manufacturer: Arthrex, Inc. | 1370 Creekside Blvd. | Naples, FL 34108, USA
- Protection against electric shock according to IEC 60601-1: Class I
- EMC certification according to EN 60601-1-2
- Languages for graphical user interface: English, German, Spanish, French, Italian
- Delivery contents: video cables, 1 x power cord, instructions for use
- Functions: Oscillation, Forward, Reverse
- Oscillation Mode: Standard (STD), Efficient (EFF), Aggressive (AGG)
- Channels: 2 (multifunction shaver system (channel A and B))
- Max. RPM:
  - FWD/REV: 8,000 RPM
  - Oscillation: 3,000 RPM
  - Sag Saw FWD/REV: 1400 RPM
- Simultaneous use of 2 handpieces
- Intuitive touch-screen display
- Automatic handpiece recognition
- Control via hand-control buttons on probes, footswitch or touchscreen
- Hand control also available with footswitch connected
- Optional footswitch override functionality
- Can be operated with 1 or 2 footswitches
- Cleaning/Disinfection: Surface wipe-disinfection with commercially available surfactants or surface disinfectants

7.2 Shaver Handpieces

	Footswitch controlled	Hand controlled	Small Joint
Part number	AR-8330F	AR-8332H (normal) / AR-8332RH (backhand)	AR-8330SJ
Functions	- With integrated cable - Shaver blade hub with quick release - For cleaning: detachable suction lever		
FWD/REV	8,000 RPM		6,200 RPM
OSC	3,000 RPM		
Dimensions	Length: 20.3 cm; Diameter: 3.8 cm		Length: 13.25 cm Average diameter: 2.5 cm
Weight	0.8 kg (with cable)		0.54 kg (with cable)
Cable length	4.5 m		

7.3 Footswitch

	Standard footswitch	Multifunction footswitch with cable or wireless		Footswitch for pump and shaver
Part number	AR-8310	AR-8315C (cable)	AR-8315W (wireless)	AR-8310SP ("low profile")
Operation Mode	Standard	Gas pedal & Standard		Standard
Functions	Reverse, Forward, Oscillation, Speed Increase, and Toggle			Reverse, Forward, Oscillation, Lavage, Rinse
Dimensions (W x H X D)	23.6 x 2.5 x 20.8 cm	52 x 6 x 28 cm	44.4 x 5.7 x 22.8 cm (Transmitter) 6.1 x 3.8 x 3.5 cm (Receiver)	30.7 x 3 x 22 cm
Weight	2.2 kg	3.7 kg (without cable)	2.27 kg (Transmitter w/batteries) 90.72 g (Receiver)	2.7 kg
Cable length	365 cm	365 cm	N/A	320 cm
Water protection class:	IPX 8	IP68		IPX 8
Cleaning/ Disinfection	Surface wipe-disinfection with commercially available surfactants or surface disinfectants			

Additional information on wireless multifunction foot switch AR-8315W

- Range: Typically 60 feet (18.3 m)
- Frequency: 2.4GHz IEEE802.15.4
- Switch Functions: 3 Linear/Switch Pedals & 3 Pushbutton Switch(On/Off)
- Latency: 50 milliseconds Maximum
- Up to 5 systems working in the same room/area
- Auto sleep and extreme low power operation
- Battery life (2xAA Alkaline)
  - 1 year without any activation depending on environmental conditions
  - 2000 hours of operation typical @ 50% duty cycle depending on environmental conditions
- Power requirements (receiver): 12VDC @ 200mA Max.
- Receiver Output:
  - Linear VOUT = 0-10V
  - Switched VOUT = Active High Open Collector To GND
- EN 60529 Degree of Protection IP68 (Transmitter)

8 Arthroscopy Pumps

8.1 Continuous Wave 4 (AR-6485)

- Intuitive touchscreen control
- Presets: 4 (Shoulder, Knee, Small Joint, Hip)
- Flowrate: ≥ 1500 ml/min automatically adjusted
- Max. Flowrate setting: adjustable from 50% to 100% (increments of 10%)
- Pressure setting: 10 – 120 (increments of 5).
- Real time flow rate monitoring
- Estimated fluid usage information
- Shaver interface with Synergy Resection Shaver
- ShaverBoost functionality: automated pressure increase when shaver is utilized; 0 to 50% (10% increment steps)
- Lavage mode – increases pressure when utilized
- Lavage setting: adjustable 0 to 50% pressure increase (5% increment steps) for max. 2 minutes
- Tubing options: One piece tubing or 2 piece tubing (day tubing + patient-end tubing)
- Foot pedal control: Lavage
- Remote control: Lavage, Pressure increase, Pressure decrease, Shaver suction setting, Run/Stop
- Heads-up display of parameters on main monitor in combination with Synergy camera platform
- Overpressure control: 300 mmHg ± 5
- Dimensions: 42 cm (W) x 13,5 cm (H) x 29,2 cm (D)
- Weight: 6.24 kg
- Water protection class: IP22
- AC input: 100-240 V, 50/60 Hz, 1.5A Max/100VAC, 0.7A Max/240VAC
- Power entry module: IEC 320/C13
- Fuse value: T2AH250V (5 x 20 mm)
- Noise level: < 58dB
- Applied part type: BF
- Medical device directive: Class IIa
- Medical device according to: 93/42/EEC
- Notified body: 0086
- Protection against electric shock according to IEC 60601-1: Class I
- EMC certification according to EN 60601-1-2
- Languages for graphical user interface: English, German, Spanish, French, Italian
- Cleaning/Disinfection: Surface wipe-disinfection with commercially available surfactants or surface disinfectants

8.2 DualWave (AR-6480)

- Intuitive touchscreen control
- Presets: 4 (Shoulder, Knee, Small Joint, Hip)
- Operation modes: Inflow only or Inflow/Outflow
- Flowrate: ≥ 1500 ml/min automatically adjusted
- Pressure setting: 10 – 120 (increments of 5).
- Real time flow rate monitoring
- Estimated fluid usage information
- Shaver interface with Synergy Resection Shaver
- Shaver Boost functionality: automated pressure increase when shaver is utilized; 0 to 50% (10% increment steps)

- Lavage mode – increases pressure when utilized
- Lavage setting: adjustable 0 to 50% pressure increase (5% increment steps) for max. 2 minutes
- Rinse mode: increases suction on cannula tube
- Rinse setting: adjustable LOW: 150 ml/min; MED: 300 ml/min; HIGH 450 ml/min; MAX: 700 ml/min for max. 2 minutes
- Rinse setting with optional pressure increase: 0 to 50% (10% increment steps)
- Shaver suction: active outflow/suction on shaver tube when shaver is utilized
- Shaver suction settings: LOW: 150 ml/min; MED: 300 ml/min; HIGH 450 ml/min; MAX: 700 ml/min
- Cannula suction settings: OFF; LOW: 50ml/min; MED: 100ml/min; HIGH: 200 ml/min
- Alternate Suction Pathway mode: activation of increased cannula suction when shaver is utilized
- Tubing options:
  - Inflow: One piece tubing or 2 piece tubing (day tubing + patient-end tubing)
  - Outflow: Outflow tubing cassette with color-coded tubes for Shaver, Cannula and Waste
- Foot pedal control: Lavage & Rinse
- Remote control: Lavage, Rinse, Pressure increase, Pressure decrease, Shaver suction setting, Run/Stop
- Heads-up display of parameters on main monitor in combination with Synergy camera platform
- Overpressure control: 300 mmHg ± 5
- Dimensions: 42 cm (W) x 19 cm (H) x 35,5 cm (D)
- Weight: 12.25 kg
- Water protection class: IP22
- AC input: 100-240V, 50/60Hz, 8.0A
- Power entry module: IEC 320/C13
- Fuse value: T8LA250V (5 x 20 mm)
- Noise level: < 69dB
- Applied part type: CF
- Medical device directive: Class IIa
- Medical device according to: 93/42/EEC
- Notified body: 0086
- Protection against electric shock according to IEC 60601-1: Class I
- EMC certification according to EN 60601-1-2
- Languages for graphical user interface: English, German, Spanish, French, Italian, Russian
- Cleaning/Disinfection: Surface wipe-disinfection with commercially available surfactants or surface disinfectants.

8.3   Foot Switch (AR-6483) and Remote Control (AR-6482)

	Foot Switch AR-6483	Remote Control AR-6482
Dimensions (W x H x D)	33 x 17.8 x 0.76 cm	6.4 x 9.5 x 2.2 cm
Weight	2.77 kg	0.23 kg
Cable length	3 m	3 m
Water protection class	IP68	N/A
Cleaning/disinfection	Surface wipe-disinfection with commercially available surfactants or surface disinfectants	
Sterilization	no	Autoclavable

9 Synergy^{RF}

9.1 Console (AR-9800)

- Intuitive touchscreen control
- Automatic detection of connected probe
- Control via hand-control buttons on probes, foot pedal or touchscreen
- Hand control also available with foot pedal connected
- Optional foot pedal override functionality
- 3 button control with Ablation, Coagulation, Ablation-Power-Setting
- Heads-up display of parameters on main monitor in combination with Synergy camera platform
- Metal proximity detection: suspends power when close to metal objects
- No annual calibration necessary
- Probes can get unplugged and replugged during surgical time and system can therefore withstand power-interruptions
- Adjustable volume for acoustic feedback signals
- Working frequency: 100kHz
- Dimensions: 40,6 cm (W) x 13,3 cm (H) x 30,7 cm (D)
- Weight: 6.9 kg
- Water protection class: IP22
- AC input: AC input 100-240V~, 50/60Hz, 8.0A
- Power entry module IEC 320/C13
- Fuse value 8.0 A, 250 V~, 2.0 cm Type T
- Max. power consumption: 650 VA
- Noise level: < 42dB
- Applied part type: CF
- Medical device directive: Class IIb
- Medical device according to: 93/42/EEC
- Notified body (CE): 0086
- Protection against electric shock according to IEC 60601-1: Class I
- EMC certification according to EN 60601-1-2
- Languages for graphical user interface: English, German, Spanish, French, Italian
- Cleaning/disinfection: surface wipe-disinfection with commercially available surfactants or surface disinfectants

9.2 Foot Pedal (AR-9800F)

- Buttons: Ablation; Coagulation; Ablation power setting
- Dimensions: 23.6 cm (W) x 2.5 cm (H) x 20.8 cm (D)
- Weight 2.2 kg
- Water protection class: IP68
- Cleaning/disinfection:
    - Cleaning: enzymatic cleaner without subsequent acid neutralization
    - Surface wipe-disinfection with commercially available surfactants or surface disinfectants

10 DrillSaw Power™ System

10.1 General Information AR-300, AR-400, AR-600

- Housing material: PEEK, Aluminum (AR-400DS)
- Cordless battery powered tools for orthopedic surgery
- Modular handpieces for drilling, reaming and sawing
- Dedicated Saw handpiece (AR-400DS) for large bone sagittal sawing
- Handpiece has forward, reverse and safe mode
- *Only AR-400:* Dual trigger handpiece
    - Forward
    - Reverse
    - Oscillating
    - Safe Mode (against unintentional switching-on when changing attachments)
- Mode adjustment possible with one hand
- Color-coded attachments
- Only aseptic batteries available
- Intraoperative battery change by sterile person and unsterile person (detailed process described in DFU)
- Stepless speed adjustment
- Warranty time of 12 months included in the list price (also for batteries); optional extension of warranty time available
- Life span of equipment (not battery): 5 years
- Have recycled materials been used in the production: No

Labeling/Marking of instruments

- Individual marking (name of department, etc.) is **not** possible
- Arthrex is **not** capable of placing RFID components on the device

Anodization

- Not applicable to handpieces, because material is PEEK
- Door of AR-400UBH-1 made out of aluminum and coated with MICRALOX BLACK ULTRA (SURFACE THICKNESS: 50 +/- 10 μm)
- Housing of AR-400DS is made out of aluminum and coated with MICRALOX BLACK ULTRA (SURFACE THICKNESS: 45,72 - 66,04μm (1,8 - 2,6mil)

Regulatory

- Medical device according to 93/42/EEC
- CE Classification MDD 93/42/EEC: Annex IX Rule 9, Class IIa
- EU Safety Certification:
    - AR-300/400/600: EN/IEC 60601-1
- EMC Certification:
    - AR-300/400/600: EN/IEC 60601-1-2
- Applied part type: B
- Pollution level: 2
- Overvoltage category: II
- Notified body (CE): 2797

10.2 Handpiece Specifications

	AR-300	AR-400 Modular handpiece	AR-400DS Dedicated Saw handpiece	AR-600
Width	94 mm (3.7")	40 mm (1.574")	40 mm (1.574")	74 mm (2.913")
Height	47 mm (1.85")	141.5 mm (5.57")	163.5 mm (6.43")	200 mm (7.874")
Depth	175 mm (6.889")	121 mm (4.764")	170.7mm (6.72")	167 mm (6.574")
Weight	470g Handpiece 80g Battery	630g Handpiece 240g Battery housing 240g Battery	995g Handpiece 240g Battery housing 240g Battery	950g Handpiece 130g Battery housing 245g Battery
Total weight	550g	1110g	1475g	1325g
Water protection class	IPX0	IPX0 for Handpiece IPX4 for AR-400UBH-1		IPX0
	Built-in electronics are completely sealed to enable steam sterilization of instruments --> electronics have higher classification than IPX6			
Noise level	AR-300SAG: 74 [dB(A)]max	AR-400SAG: 79.4 [dB(A)]	Passed 60601-1 requirements	AR-600SAG: 88 [dB(A)]max
Vibration	< 2.5 [m/s2] Max. daily exposure No limitation			
Altitude	Up to 3,000 m [9,842 ft.] above sea level			
For operation:				
Temperature	+10 °C to +40 °C [50 °F to 104 °F]	+10 °C to +25 °C [50 °F to 77 °F]		+10 °C to +40 °C [50 °F to 104 °F]
Relative Humidity	15% to 80% (relative), non-condensing			
For storage:				
Temperature	-40 °C to +70°C (-40 °F to 158°F)			
Relative Humidity	8% to 80% (relative), non-condensing			
Power	60W	240 W	270W	150 W
Drill Speed	2,750 rpm / 1,300 rpm	1,330 rpm	N/A	950 rpm
Drill Torque	24 Ncm / 45 Ncm	3.2 Nm	N/A	4.5 Nm
Reamer Speed	500 rpm	330 rpm Power Reamer: 250 rpm	N/A	200 / 250 rpm
Reamer Torque	1.15 Nm	12.5 Nm Power Reamer: 16 Nm	N/A	17 Nm
Cutting Speed	15,000 cpm	Sagittal: 23,000 cpm Reciprocal: 15,400 cpm	13 000 cpm	13,000 cpm
Oscillation angle	AR-300SAG: 7.5°	AR-400SAG: 4.3°	4.8°	AR-600SAG: 4.4° AR-600SAGMIS: 3.3°
Burr Speed	15,000 rpm	21,300 / 5300 rpm	N/A	N/A

Mechanical

Cannulation of handpieces

AR-300 & AR-200M	AR-400	AR-600
Handpiece not fully cannulated, but Offset adapter AR-300CA & AR-200CA Ø 2.40 mm	Ø 3,2 mm [0.126 in]	Ø 4,0 mm [0.157 in]

Attachments can be connected to the hand piece in different positions.

AR-300	AR-400	AR-600
4 (90° increments)	4 (90° increments)	8 (45° increments)

Saw blades can be connected to the handpiece/attachment in different positions.

AR-300SAG	AR-400SAG/DS	AR-600SAG/SAGS/SAGMIS
4 (90° increments)	8 (45° increments)	8 (45° increments)

- System components can be cleaned with a thermo washer disinfector
- No lubrication necessary after reprocessing (optional lubrication: trigger AR-400DS)

Cases

AR-300

- **AR-300C**: Instrument Case (Aluminum)
  Dimensions: Length x width x height: 290 x 250 x 120 mm Including case lid

- **AR-300C-G**: Instrument Case (Stainless steel)
  Dimensions: Length x width x height: 390 x 250 x 135 mm Including case lid

AR-400

- **AR-400AC-1:** Standard instrument case
  Dimensions: Length x width x height: 430 x 250 x 155 mm Including case lid
  Not compatible with AR-400DS, AR-400PRAO/PRHU/PRMT, AR-400SR

- **220500799**: NTOC Cassette, for DrillSaw Sports 400 (Stainless steel)
  Dimensions: Length x width x height: 480 x 250 x 107 mm including lid
  For modular handpiece & attachments
- **220501330**: Lid for NTOC Cassette, DrillSaw Sports 400

- **220202293**: NTOC Cassette, for DrillSaw Sports 400, Dedicated Saw (Stainless Steel)
  Dimensions: Length x width x height: 240 x 250 x 107 mm including lid
  For dedicated saw handpiece
- **220501328:** Lid for NTOC Cassette, DrillSaw Sports 400, Dedicated Saw

AR-600

- **AR-600C**: Instrument Case (Aluminum)
  Dimensions: Length x width x height: 545 x 260 x 185 mm Including case lid
- **AR-600C-G**: Instrument Case (Stainless steel)
  Dimensions: Length x width x height: 540 x 250 x 145 mm Including case lid

Battery

- Li-Ion batteries

	AR-300	AR-400	AR-600
Volt	11,1 V	10,8 V	10,8 V
Nominal capacity	0,68 Ah	2,0 Ah	2,2 Ah
Nominal energy	7,6 Wh	21,6 Wh	23 Wh

- Battery continuous use time: ~ 10 min
- Battery lifetime: Minimum 1000 charging cycles
- Charging status of the battery not visible on battery itself, but when the battery is connected to the charger it is displayed in the charger display
- Charge time: ~ 60 min

10.3 Charging Station AR-400UBC

- 4 battery charging bays --> 4 batteries can be charged simultaneously
- One charger for all three systems (300/400/600), charging bay for each system needs to be ordered separately
- Touch screen display
- Display of the charger shows following information:
  - o Model number
  - o Serial number
  - o Manufacture date
  - o Firmware version
  - o Charging status (Charging/Fully charged)
  - o Error message with error code (different codes are explained in DFU)

  Additionally, only for AR-400-batteries
  - o Number of charging cycles
  - o State of capacity (error message if capacity is <70%)

- Batteries can remain in the charger after charge without self-discharge
- Charger has a fan with corresponding holes in the housing on the bottom

Technical specification AR-400UBC

	AR-400UBC
Nominal voltage	100- 240 V
Permitted Voltage fluctuation	+ /- 10%
Frequency	50 – 60 Hz
Rated current	3 A
Power	250 W
Water protection	IP30
Weight	2.65 kg (5.9 lbs.)
Width	330 mm (13 in)
Height	100 mm (4 in)
Depth	280 mm (11 in)
Mains Fuse	5A (Non-Replaceable)
Pollution Level	2
Altitude	4,500 m (15,000 ft)
Overvoltage Category	II
Ambient conditions for operation	
Temperature	0° to 35 °C (32° to 95 °F)
Relative Humidity	0% to 85% (relative), non-condensing
Air Pressure	700 hPa to 1060 hPa (21 in. Hg to 30.12 in. Hg)
Ambient conditions for storage	
Temperature	-20° to +60°C (-4° to 140°F)
Relative Humidity	10% to 85% (relative), non-condensing
Air Pressure	500 hPa to 1020 hPa (15 in. Hg to 30.12 in. Hg)

Regulatory

- Medical device according to 93/42/EEC
- CE Classification MDD 93/42/EEC: Annex IX Rule 9, Class IIa
- EU Safety Certification: EN/IEC 60601-1
- EMC Certification: IEC 60601-1-2
- Notified body (CE): 2797

10.4 Attachments

Attachments for AR-200/AR-300

AR-300SAG	Sagittal saw attachment
AR-300SR	Reciprocating saw attachment
AR-300B	Burr adapter Ø 2.35 mm (max. speed: 15 000 rpm)
AR-300B-2	Burr adapter Ø 2.35 mm (max. speed: 2750 rpm)
AR-300DJH	Drill hybrid chuck with key (accept intr. Ø 0,1mm up to 5mm)
AR-300DJ	Jacobs drill chuck with key (accept intr. Ø 0,1mm up to 4mm)
AR-300DK30	Drill keyless chuck (accept intr. Ø 0,1 mm up to 3 mm)
AR-300DK45	Drill keyless chuck (accept intr. Ø 2 mm up to 4,5 mm)
AR-300WD16	Pin driver attachment (accept intr. Ø 0,6 mm up to 1,6 mm)
AR-300PD24	Pin driver attachment (accept intr. Ø 1,2 mm up to 2,4 mm)
AR-300DAO-2	Drill adapter standard AO connection
AR-300RAO	Reamer adapter standard AO
AR-300RJ	Jacobs reamer chuck with key (accept intr. Ø 0,1mm up to 4 mm)
AR-200CA / AR-300CA	Offset Adapter

Attachments for AR-400

AR-400SAG	Sagittal saw attachment (for AR-300 saw blades)
AR-400SR	Saw Attachment Reciprocating
AR-400B	Burr adapter Ø 2.35 mm attachment
AR-400JLD	Burr adapter J-latch and dental
AR-400DJH50	Drill hybrid chuck with key (accept intr. Ø 0,1mm to 5mm)
AR-400DJH74	Drill hybrid chuck with key (accept intr. Ø 0,1mm to 7,4mm)
AR-400DJ40	Jacobs drill coupler with key (accept intr. Ø 0,1mm to 4mm)
AR-400DJ74	Jacobs drill coupler with key (accept intr. Ø 0,1mm to 7,4mm)
AR-400DK74	Drill keyless chuck (accept intr. Ø 0,1mm up to 7,4mm)
AR-400DZH	Zimmer / Hudson drill coupler attachment
AR-400DT	Drill attachment – Trinkle drill coupler attachment
AR-400DHA	Harris drill coupler attachment
AR-400DAO	Synthes Quick Co coupler drilling attachment AO/ASIF
AR-400RZH	Zimmer / Hudson reamer coupler attachment
AR-400RAOP	AO Protek reamer coupler attachment
AR-400RHU	Hudson style reamer coupler attachment
AR-400PRMT	Power Reamer Attachment, Style Hudson / Modified Trinkle
AR-400PRAO	Power Reamer Attachment, Style Large AO
AR-400PRHU	Power Reamer Attachment, Style Hudson
AR-400RJ74	Jacobs reamer coupler with key (accept intr. Ø 0,1mm up to 7,4mm)
AR-400RJH74	Hybrid chuck reamer with key (accept intr. Ø 0,1mm up to 7,4mm)
AR-400DHS	Reamer Attachment DHS (Dynamic Hip Screw)
AR-400ARL	Drill adapter for Synthes radiolucent angular drive
AR-400PD	Pin driver for sizes from 0,6 to 3,2 mm

AR-600SAG/SAGMIS	Sagittal saw attachment
AR-600SAGS	Sagittal saw attachment for small bone saw blades
AR-600SR	Reciprocating saw Attachment
AR-600SRS	Sternum adapter
AR-600DJH	Drill hybrid chuck with key (accept intr. Ø 0,1mm up to 7,4mm)
AR-600DJ	Jacobs drill coupler with key (accept intr. Ø 0,1mm up to 7,4mm)
AR-600DK	Drill keyless chuck (accept intr. Ø 0,1mm up to 7,4mm)
AR-600DZH	Zimmer / Hudson drill coupler attachment
AR-600DHU	Hudson drill coupler attachment
AR-600DAO	Synthes Quick Co coupler drilling attachment AO/ASIF
AR-600DAOP	AO Protek drill coupler attachment
AR-600DAOT	AO / Trinkle drill coupler attachment
AR-600RZH	Zimmer / Hudson reamer coupler attachment
AR-600RAOP	AO Protek reamer coupler attachment
AR-600RHU	Hudson style reamer coupler attachment
AR-600DHS	Reamer Attachment DHS (Dynamic Hip Screw)
AR-600RJ	Jacobs reamer coupler with key (accept intr. Ø 0,1mm up to 7,4mm)
AR-600ARL	Adapter for radiolucent angular drive
AR-600WD-2	Wire driver for sizes from 0,6 to 1,6 mm
AR-600PD-2	Pin driver for sizes from 1,6 to 4,0 mm
AR-600PD-3	Pin driver for all sizes from 0,8 to 4,0 mm

10.5 AR-200 DrillSaw HighSpeed 200™

- Foot pedal control (corded or wireless)
- Optional handle for AR-200M (change from a pencil style handpiece to pistol style Handpiece)
- On-Screen Information on Console display
- Irrigation tubing with Sprayclip available
- Automatic detection of used Motor
- AR-200M can be used with all DrillSaw Mini 300 Attachments
- Motor with cable is sterilizable
- Adjustable parameters:
  - Program (six programs, detailed information in DFU)
  - Motor speed
  - Torque
  - Coolant supply

Regulatory

- Medical device according to 93/42/EEC
- CE Classification MDD 93/42/EEC: Annex IX Rule 9, Class IIa
- EU Safety Certification: IEC 60601-1
- EMC Certification: EN 60601-1-2
- Notified body (CE): 2797

Console AR-200C

Width	256 mm (10 in.)
Height	109 mm (4.3 in.)
Depth	305 mm (12 in.)
Weight	7.0 kg (15.4 lbs.)
Maximum flow rate	≥ 90 ml/minute
Power supply	110-130 V / 220-240V, 50/60 Hz, 0.1-1.8A / 0.1-0.9A
Mains fuse	2 x 250V – T1.6AH
Sterilization	No
Pollution level	2
Overvoltage category	II
Altitude	Up to 3000 m [9842 ft] above sea level
Ambient Conditions for Operation	
Temperature	10° to 40 °C (50° to 104 °F)
Relative Humidity	15% to 80% (relative), non-condensing
Ambient Conditions for Storage (in shipping packaging)	
Temperature	-40° to +70°C (-40° to 158°F)
Relative Humidity	8% to 80% (relative), non-condensing
Atmospheric Pressure	860 hPa – 1060 hPa

Foot Control Unit S-N1

Width	207 mm (8.15in.)
Height	45 mm (1.77 in.)
Depth	198 mm (7.79 inches)
Weight	1.15 kg (2.2 lbs.)
Cable length	3.5 m (137.8 in.)
Cleaning	Surface cleaning with mild detergent
Sterilization	No
Protection	IPX8, 1 m depth of immersion, 1 hour (water-tight in accordance with IEC 60529)

Motor AR-200M

Diameter	26.3mm (1.04 in.)
Length	96 mm (3.78 in.)
Weight	0.42kg (0.93 lbs.)
Speed	300-15,000 rpm
Torque	7 Ncm
Cable length	3.5 m (137.8 in.)
Applied part type	Type BF

AR-300 Attachments

Drill Speed	2,750 rpm / 1,300 rpm
Reamer Speed	500 rpm
Cutting	15,000 cpm
Burr Speed	15,000 rpm
Sterilization	YES

11 NanoScope System

The NanoScope system is a medical-grade, all-in-one, endoscopy system that features a portable control unit and a disposable camera with chip-on-tip image sensor technology (cf. 11.2).

11.1 NanoScope Console

Features:

- Portable control unit – including documentation and data management
- Image and video acquisition
- Touch screen display
- Wi-Fi
- DICOM
- Rechargeable battery-powered
- MDD: Class I
- Ports: Ethernet, USB
- HDMI output
- Microphone for speech recording
- 1 Power button
- Power adapter

Specifications:

Width	35 cm (13.5 in.)
Height	6 cm (2.25 in.)
Depth	30 cm (11 in.)
Weight	4.5 kg (10 lbs.)
Water protection	IP20
Mains Cable	10 A/250 V
External Power Supply	Universal input 110/240V medical grade - 19 V /110 W
AC input	100-240V~, 50/60Hz, 8.0A, Class I
Applied part type	BF Isolation
Time to full charge	< 3 hours
Battery usage	A minimum of 100 minutes of use when new
Data storage	Non-volatile memory – 600 single frame images, 60 minutes video and 1500 minutes of audio
Display size	29.3 cm (horizontal) by 16.5 cm (vertical) 11.5 in. (horizontal) by 6.5 in. (vertical)
Video output	HDMI
Wi-Fi radio	IEEE 802.11 compatible network communications
VESA mount	100 mm x 100 mm (3.9 in. x 3.9 in.)

11.2 NanoNeedle Scope

Features:

- Includes camera sensor and LED light source
- Chip-on-tip image sensor technology
- 2 programmable handpiece buttons
- 3 controllable functions
- Single-use
- MDD Class: IIa
- Three length versions

Specifications:

Handpiece length (nominal)	7.6 cm (2.99 in.)
Handpiece diameter (nominal)	0.9 cm (.35 in.)
Handpiece weight (nominal)	25 gr (0.88 oz.)
Water protection	IPX4
Image sensor	1 MOS sensor
Image resolution	400 X 400 pixels
Frame rate	30 fps
Field of view	120 degrees
Direction of view	0 degrees
Illumination	≥2 lumens
Scope length (nominal)	AR-3210-0043: 125 mm (4.9 in.) AR-3210-0044: 180 mm (7.1 in.) AR-3210-0045: 250 mm (9.8 in.)
Scope diameter (nominal)	1.9 mm (.07 in.)