PHILIPS

MR systems

Sonalleve MR-HIFU

Innovative, fast, and patient-friendly therapy

Key advantages

A patient-friendly, non-invasive treatment

Operational flexibility with easy switching between diagnostic and therapeutic use of the scanner

New service to attract new patients and referrals

Sonalleve MR-HIFU from Philips is an exciting, innovative technology that offers important advantages to clinicians and patients while supporting healthcare institutions in expanding their therapy portfolio. Patient-friendly and fast, Sonalleve MR-HIFU is proving to be an excellent option from virtually any angle.

Philips Sonalleve MR-HIFU

Product images	 	
Clinical applications/ key benefits	Uterine fibroids and adenomyosis	- Out-patient procedure with short recovery time and symptom relief
	Bone metastasis	- Palliative treatments to relieve pain associated with bone metastases
Compatibility	Philips MR systems	- Achieva 1.5T, Achieva 3.0T and Achieva 3.0T TX. - Multiva 1.5T - Ingenia 1.5T and Ingenia 3.0T with dStream digital architecture and 70 cm gantry opening. - Achieva 1.5T and Achieva 3.0T TX SmartPath to dStream - Ingenia 1.5T CX and Ingenia 3.0T CX with dStream digital technology
Configuration overview	Dedicated trolley-tabletop combination	- Comes with its own trolley for transport and storage when the Philips MR system is in use for imaging - Allows patient preparation outside the MR room and saves valuable MR time - Table is positioned over the lowered MR patient support - Large treatment window gives great flexibility to position even extreme lateral anatomies, providing a wide treatment area - Robotic positioning system positions the HIFU transducer with five degrees of freedom and high accuracy, covering a large treatment field - Curved tabletop with a selection of mattresses of different types and shapes support various patient positions
	HIFU therapy transducer	- Philips proprietary design, model SX140 - Focal length 140 mm
	Direct Skin Cooling (DISC)	- Ultrasound window in the table is equipped with a double membrane and cooled water circulating in-between, providing an efficient heat sink and constant temperature to the patient's skin
	Dedicated RF receive coil	- SENSE parallel imaging coil designed for human pelvic and abdominal/body therapy applications. A two-element coil is integrated in the tabletop and a separate three-element coil is positioned on the patient
	Sonalleve therapy console	- Hardware and software for treatment planning, temperature mapping, ablation feedback, therapy guidance and communication with Philips MR scanner
	Electronics cabinet	- Located in the MR equipment room and includes power supplies, power electronics for the HIFU transducer and control units for precise mechanical positioning of the transducer
	Filter panel for the RF shield	- Separate filter panel for power to the transducer and control commands for the mechanical positioning system
Ultrasound transducer	Philips proprietary design	- Model SX140
	256 transmit elements	- Phased array technology with digital control of amplitude and phase of each element individually for a sharp focus and fast modulation of ultrasound field
	Operates at multiple frequencies between 1.2 MHz and 1.5MHz	- Modifies penetration depth and focus shape
	Focal length of 140 mm	- To reach target regions deep inside the body

Philips Sonalleve MR-HIFU

	Mechanical movement	- Five degrees of freedom: up/down range 50 mm, left/right range 135 mm, head/feet range 135 mm, tilting ±19°
	Electronic deflection	- Up to 20 mm in each direction
	Fast beam steering	- Continuous electrical movement of focus possible for volumetric heating
DISC	Direct Skin Cooling	- Patient's skin is kept at a constant temperature of about 20 °C
	Direct coupling	- For cooling efficiency, the patient is positioned directly onto the membrane; most patients don't require a gel pad
Heating method	Volumetric heating	- Focal spot is moved rapidly in concentric circles to reach homogenous temperature over macroscopic volume (treatment cell) in a short time
	Treatment cell sizes	- Focus trajectories utilize heat diffusion to reach maximal ablation efficiency. Multiple cell sizes with diameters of 4, 8, 12, 14 and 16 mm are available. The cell length is typically 2.5 times the diameter
Feedback	Real-time feedback	- Temperature and thermal dose are measured in real time and used to adjust sonication parameters during a sonication event to achieve desired ablation temperature and volume, independent of local variations in tissue properties
HIFU – MR interface	Fast, dedicated, real-time interface between Sonalleve MR-HIFU and Achieva MR console	- Allows fast scanner control and image retrieval to support real-time feedback
Imaging sequences	Treatment planning on 3D diagnostic MR images	- All standard diagnostic imaging sequences of the MR system are available for treatment planning - Dedicated ExamCards are provided for HIFU applications
DMT	Dual Mode Thermometry	- Full workflow integration of novel fat tissue thermometry based on T2 weighted MR imaging data measuring cumulative heating over the whole treatment duration together with Proton Resonance Frequency Shift thermometry for target heating.
PRFS temperature monitoring	FFE-EPI-based phase sensitive MR sequences	- Temperature and thermal dose maps are calculated based on the temperature sensitive Proton Resonance Frequency Shift induced phase difference
	Refresh rate of thermal images of six slices every 3.5 seconds	- Three coronal and one sagittal slice through focus, two slices freely positioned, such as near field and far field
	Accuracy	- Temperature changes ±1 °C
T2 based temperature monitoring	Reproducible, longterm temperature measurement in adipose tissue	- Based on T2 weighted MRI - Calibrated absolute temperature measurement, for adipose tissue - Fully integrated and automated treatment workflow
	Accuracy	- ±2 °C.
Software and user interface	Dedicated protocols and ExamCards for Philips MR systems	- Excellent scanning efficiency and ease of use
	Treatment planning	- Based on 3D diagnostic MR images - Tools for efficient planning of treatment volumes, beam paths, and transducer positions - Tools to verify a beam path free of obstruction to maintain patient safety
	Auto-population tool	- Calculates the size and position of multiple treatment cells to cover the desired treatment volume
	Beam Shaping	- OAR (Organ Avoidance Region) or Critical OAR regions can be drawn to protect sensitive regions, such as scars and skin folds from high ultrasound exposure
	Thermal maps	- Real-time PRFS temperature maps and thermal dose maps overlaid on anatomical MR images for continuous treatment monitoring
	Heating curve	- Displays the temperature and thermal dose over time during a single sonication

Philips Sonalleve MR-HIFU		
Software and user interface cont.	Near field and far field monitoring	- Two imaging slices can be freely positioned to monitor sensitive structures in real time
	Motion detection	- System monitors motion during sonication and issues a warning if it exceeds permitted limits
	Re-registration	- Adapt to possible patient movement between acquired planning images; re-register existing plan to new anatomical position and images
	Automatic overheating control	- System terminates the sonication if excessive heating is observed
	Fat tissue scan and cooling time estimation	- Automatic fat tissue temperature monitoring scan after each sonication - Estimates appropriate cool-down time before the next sonication should start
	Clinical report	- System generates a summary of the clinical treatment data after treatment is finished - Can be exported as PDF"
MR system requirements	MR system software	- Philips Achieva 1.5T, 3.0T or 3.0T TX: MR system software release R3.2.2, or higher - Philips Multiva 1.5T: MR system software release 5.1.7, or higher - Philips Ingenia 1.5T or 3.0T: MR system software release R4.1.2, or higher - Achieva 1.5T and Achieva 3.0T TX SmartPath to dStream: MR system software release R5.1.7, or higher - Ingenia 1.5T CX and Ingenia 3.0T CX: MR system software release R5.1.7, or higher
	Electricity	- Dedicated power line 3~ 380-415V~ / 480V~ / 5.5kW / 50/60 Hz

Dimensions and weights	Component	Dimensions (H x W x D in m) Dimensions (H x W x D in inches)	Weight
	Generator Cabinet	1.40 x 0.60 x 0.90 55 x 24 x 35	308 kg 739 lbs
	Sonalleve Tabletop	1.078 x 0.85 x 2.751 42 x 33 x 108	236 kg 520 lbs
	HIFU Filter Panel	0.55 x 0.46 x 0.25 22 x 18 x 10	13.6 kg 30 lbs

Note:
The Philips Sonalleve MR-HIFU system or some of its applications are not for sale in certain countries.
To determine availability in your area, please contact your local Philips representative.
This material is not intended for distribution in the U.S.A.

4522 991 06921 * NOV 2014

How to reach us
Please visit www.philips.com/healthcare
healthcare@philips.com