Electromagnetic Muscle Stimulation Device - Official Clinical Overview & Technical Datasheet

ELECTROMAGNETIC MUSCLE STIMULATION (EMS) DEVICE: OFFICIAL CLINICAL OVERVIEW & TECHNICAL DATASHEET

EXECUTIVE SUMMARY

The next-generation Electromagnetic Muscle Stimulation (EMS) Device represents a paradigm shift in non-invasive body contouring and muscle conditioning. Utilizing high-intensity focused electromagnetic fields (HI-EMF), the system induces supramaximal muscle contractions that are not achievable through voluntary exercise. This whitepaper details the clinical architecture, treatment parameters, safety mechanisms, and technical specifications of the OEM platform, intended for deployment in dermatology clinics, med spas, and sports medicine facilities. The device delivers simultaneous fat apoptosis and muscle hypertrophy, addressing the core demands of the modern aesthetic patient.

CLINICAL ARCHITECTURE & DESIGN

The system generates a time-varying magnetic field (up to 2.5 Tesla peak intensity) via a proprietary copper coil array housed within the treatment applicator. This field penetrates dermal and subcutaneous tissues without impedance, depolarizing motor neuron axons and inducing involuntary muscle contractions at a frequency of 10 Hz to 100 Hz. Key architectural elements include:

- PULSE GENERATION UNIT: High-voltage capacitor discharge module producing microsecond-duration pulses.
- REAL-TIME IMPEDANCE MATCHING: Adaptive circuitry maintaining field homogeneity across varying tissue densities.
- INTEGRATED THERMAL MONITORING: Non-contact infrared sensors on the

applicator face to prevent superficial overheating.

- PATIENT SAFETY INTERLOCK: Automatic field termination upon applicator lift-off or thermal threshold exceedance.

KEY INDICATIONS & CAPABILITIES

PRIMARY INDICATIONS:

- Abdominal muscle toning and strengthening (rectus abdominis, obliques).
- Gluteal augmentation and lift (gluteus maximus, medius).
- Limb contouring (quadriceps, hamstrings, biceps, triceps).
- Diastasis recti rehabilitation (mild to moderate separation).
- Supportive treatment for urinary incontinence (pelvic floor protocols).

TREATMENT CAPABILITIES:

- Simultaneous muscle building (15-25% increase in muscle cross-sectional area) and fat reduction (15-20% reduction in subcutaneous fat layer).
- Treatment sessions: 30 minutes per anatomical zone.
- Recommended protocol: 4-6 sessions over 2-3 weeks.
- Maintenance schedule: 1 session per month.

COMPLIANCE & STANDARDS

- Medical Device Directive: CE 0459 (Class IIa) under EU MDR 2017/745.

- FDA Regulatory Status: 510(k) cleared for muscle toning and strengthening.

- Electrical Safety: IEC 60601-1, IEC 60601-1-2 (EMC).

- Electromagnetic Field Exposure: ICNIRP guidelines for static and time-varying fields.

- ISO 13485:2016 certified manufacturing facility.

- Biocompatibility: Applicator contact surface meets ISO 10993-5 (non-cytotoxic).

TECHNICAL SPECIFICATIONS

Parameter	**Specification**
Technology	High-Intensity Focused Electromagnetic Field (HI-EMF)
Magnetic Field Strength	2.5 Tesla (peak)
Pulse Frequency Range	1 Hz – 100 Hz (programmable)
Pulse Width	250 µs – 450 µs (biphasic waveform)
Applicator Active Area	75 cm² (abdominal) / 45 cm² (gluteal/limb)
Cooling System	Forced air + passive heatsink (no liquid cooling)
Power Supply	Input: 100-240 VAC, 50/60 Hz, 15A ;

	Output: 48 VDC, 40A
Dimensions (Base Unit)	42 cm (W) x 35 cm (D) x 28 cm (H)
Weight (Base Unit)	12.5 kg
Display	10.1-inch capacitive touchscreen, 1280 x 800 px
Connectivity	USB-A for data export, Ethernet for remote diagnostics
Sound Level	< 55 dBA during operation
Operating Environment	15 °C – 30 °C, 30% – 75% relative humidity

CLINICAL PROTOCOLS

PRE-TREATMENT:

- Patient screening: Exclude metallic implants, active neoplasm, pregnancy, cardiac pacemakers, epilepsy.

- Skin preparation: Remove any transdermal patches; clean the target zone with non-alcoholic wipes.

- Positioning: Place patient supine (abdomen) or prone (glutes); maintain neutral spine alignment.

TREATMENT PARAMETER GUIDELINES:

- Abdominal protocol: 100% intensity, 30 Hz frequency, 30 minutes.

- Gluteal protocol: 90-100% intensity, 25 Hz frequency, 30 minutes per side.

- Arm/Leg protocol: 70-90% intensity, 40 Hz frequency, 20 minutes per limb.

POST-TREATMENT:

- No downtime; encourage immediate hydration (minimum 500 mL water).

- Recommend light stretching of treated muscles.

- Document patient tolerance and contractile response (visible fasciculations observed).

CONTRAINDICATIONS:

- Active implanted electronic devices (pacemaker, ICD, neurostimulator).

- Metal hardware (plates, screws, IUDs with copper) directly in the field path.

- Malignancy within treatment zone.

- Pregnancy or lactation.

- Febrile illness or acute infection.


80%
12
Hz