

Non-Invasive RF Lifting Console - Clinical Architecture & Performance
Reference Manual

NON-INVASIVE RF LIFTING CONSOLE: CLINICAL ARCHITECTURE &
PERFORMANCE REFERENCE MANUAL

EXECUTIVE SUMMARY

This document provides a comprehensive technical and clinical overview of the Non-Invasive RF Lifting Console, a next-generation monopolar and bipolar radiofrequency (RF) system engineered for dermal remodeling, subdermal adipose contraction, and facial/body lifting without surgical intervention. The platform delivers controlled volumetric heating (40–45°C target dermis) while preserving the epidermal barrier via an integrated sapphire-contact thermoelectric cooling engine. Designed for high-volume medical spas, dermatology clinics, and plastic surgery centers, the console achieves clinically significant collagen denaturation and neocollagenesis with zero patient downtime.



CLINICAL ARCHITECTURE & DESIGN

The system employs a closed-loop impedance feedback architecture with dual-channel RF generation (1.0 MHz and 2.5 MHz selectable carriers). The power amplification stage utilizes gallium nitride (GaN) switching transistors, achieving >88% electrical efficiency and minimizing thermal drift. A 10.4-inch capacitive touchscreen houses treatment protocols segmented by anatomical zone (periorbital, midface, submentum, abdomen, thighs, upper arms).

The handpiece integrates a 6 cm² treatment window with continuous real-time temperature monitoring via four independent thermistors. The sapphire contact plate maintains epidermal cooling between 5°C and 15°C, adjustable in 1 ° C increments, enabling aggressive subdermal heating (up to 4 mm penetration depth). A footswitch interlock and motion-sensing safety cutout

(stasis >1.5 seconds triggers power reduction) meet IEC 60601-2-2 requirements.

KEY INDICATIONS & CAPABILITIES

- Mild-to-moderate skin laxity on face and neck (Fitzpatrick II-V inclusive)
- Reduction of submental fat (double chin) – monopolar lifting mode
- Upper arm and medial thigh circumference reduction via bipolar adipose heating
- Periorbital fine lines and lower lid festoons (0.5 cm² micro-spot applicator accessory)
- Post-liposuction skin retraction and contour irregularity correction

Contraindications: active implants (pacemakers, cochlear devices, metal fixation plates within RF field), pregnancy, active cutaneous infection, collagen vascular disease, or recent dermal fillers (<6 weeks).

TECHNICAL SPECIFICATIONS

RF GENERATOR: Dual-frequency selectable (1.0 MHz \pm 5% / 2.5 MHz \pm 5%)

OUTPUT POWER: 0–200 W continuous, 0–300 W pulsed (10 ms–1 s on-time)

IMPEDANCE COMPATIBILITY: 50–800 Ohms with automatic matching (<0.5 sec

adaptation)

PENETRATION DEPTH: Selectable: superficial mode ~1.5 mm (2.5 MHz), deep mode ~4 mm (1.0 MHz)

TEMPERATURE CONTROL: Epidermal cooling 5–15 °C (Sapphire TEC), target dermis 38–45°C

PULSE PROTOCOLS: Continuous, burst (2–10 pulses/cycle), ramp (linear power increase)

TREATMENT INTERFACES: 1x monopolar handpiece (return pad included), 1x bipolar multi-electrode array, 1x micro-spot (0.5 cm²) for periorbital use

SAFETY INTEGRATION: Motion sensor, impedance out-of-range lockout, overtemperature shutdown (>46°C dermis proxy measurement)

ELECTRICAL INPUT: 100–240 VAC, 50/60 Hz, 650 VA max

DIMENSIONS (console): 450mm W x 550mm D x 1100mm H | WEIGHT: 38 kg

CERTIFICATIONS: CE MDR (Class IIa), FDA 510(k) cleared (K212345, simulation), ISO 13485:2016 manufacturing

| Parameter | Specification |
|------------------------|--|
| RF Frequency Selection | 1.0 MHz (deep volumetric) / 2.5 MHz (superficial tightening) |
| Maximum Output Power | 300W (pulsed mode, 1.0 MHz) |
| Epidermal Cooling | Sapphire TEC + water circulation, 5 °C to 15°C adjustable |

| | |
|-----------------------------|--|
| Impedance Matching Range | 50–800 Ohms, adaptive <0.5 sec |
| Penetration Depth (Thermal) | Selectable: 1.5mm (2.5MHz) / 4.0mm (1.0MHz) |
| Safety Certifications | CE MDR Class IIa, FDA 510(k) cleared, IEC 60601-2-2, ISO 13485 |

CLINICAL PROTOCOLS

Pre-treatment: Standard skin cleansing, remove all metal jewelry. Apply ultrasound gel as conductive interface. For monopolar lifting, place dispersive return pad on lower back or sacrum ensuring >70% contact surface.

Facial lifting protocol (3 sessions, 4 weeks apart):

- Mode: Monopolar, 1.0 MHz
- Power: Start at 50W, titrate upward by 5W increments until patient reports deep warming without sharp pain (typical end power: 90–110W)
- Temperature target: 40–42°C dermis proxy via cutaneous thermography
- Movement technique: Grid overlapping with 5mm spacing, 20–30 seconds per 6cm² area
- Total session: 25 minutes (full face + submentum)

Body skin tightening (abdomen / thighs):

- Mode: Bipolar, 2.5 MHz (superficial tightening) or 1.0 MHz (deeper contraction)
- Power: 80–150W depending on adipose thickness (caliper >2cm → use 1.0 MHz, higher power)
- Movement: Continuous slow circular motion, 5 minutes per 15cm x 15cm grid
- Cooling: Set to 10°C for patient comfort, auto-adjusts based on handpiece movement velocity

Post-treatment: Erythema lasting 30 – 90 minutes is expected. Apply post-procedural hyaluronic acid serum and mineral SPF 30+. Patients may resume normal activities immediately. Full collagen remodeling visible at 12 weeks following final session.

