TORONTECH

INDUSTRIAL ULTRASONIC CLEANER

Industrial Ultrasonic Cleaner – ToronUC™ I Series

ToronUC™ I Series Industrial Ultrasonic Cleaner is a heavy-duty, large-format industrial ultrasonic cleaning platform engineered for high-volume manufacturing, automotive overhaul, aerospace maintenance, metal fabrication, and industrial production environments demanding the highest levels of cleaning throughput and process reliability. Available in six tank capacities from 53 to 288 liters, the E Series covers every scale of industrial ultrasonic cleaning operation — from workshop-scale degreasing through production-line batch processing of large assemblies.

Each E Series unit is constructed entirely from SUS304 stainless steel with a 2mm-thick tank, industrial-grade ultrasonic transducers bonded directly to the tank base, and a moisture-proofed PCB control system designed to withstand the humidity, vibration, and chemical exposure of sustained industrial operation. Dual-frequency capability at 28 kHz and 40 kHz enables the E Series to function as both a maximum-power industrial ultrasonic parts cleaner for heavy contamination removal and a precision ultrasonic cleaning platform for complex precision assemblies.

The E Series is particularly well-suited to the most demanding industrial ultrasonic cleaning applications: engine block degreasing, transmission overhaul, aerospace component cleaning, large casting deflashing, medical device production line cleaning, and large-scale pharmaceutical equipment decontamination. With heating up to 110°C — exceeding the typical 80°C ceiling of benchtop units — the E Series supports aggressive hot-alkaline industrial cleaning processes and specialized high-temperature cleaning protocols. All models from 36L upward are equipped with heavy-duty caster wheels for safe repositioning, and each unit ships with a stainless steel SUS304 cleaning basket and lid as standard.

Customization is available to customer specifications, including modified tank dimensions, custom transducer frequency arrays, specialized drainage configurations, and integration with automated part-handling systems — making the ToronUC™ I Series the industrial ultrasonic cleaner platform of choice for OEM equipment builders and turnkey production line integrators across North America.

28/40 kHz DUAL FREQUENCY	**53–288 L** TANK VOLUME	**3000 W** MAX US POWER	**30–110°C** TEMP. RANGE	**Custom** CONFIGURATION

APPLICATIONS

Industrial Ultrasonic Cleaner – ToronUC™ I Series Applications

The ToronUC™ I Series industrial ultrasonic cleaner is purpose-built for the following high-volume and heavy-duty cleaning applications:

- Automotive Engine & Transmission Overhaul: Handles full engine blocks, cylinder heads, transmission cases, transfer cases, and differential assemblies — removing baked-on carbon, varnish, gasket compounds, bearing wear debris, and casting sand from complex casting geometries with channels and blind bores inaccessible to spray washers. The definitive industrial ultrasonic cleaner for professional engine rebuilding operations.
- Industrial Manufacturing Parts Cleaning: Production-scale degreasing and cleaning of machined components, stampings, castings, forgings, and weldments prior to coating, assembly, or quality inspection. Removes cutting fluids, drawing compounds, phosphate coatings, rust inhibitors, and handling soils at throughput rates matching automated production line demands.
- Aerospace Component Cleaning: Removes oxygen-incompatible hydrocarbon contamination, metallic particles, and process residues from aerospace components, assemblies, and tooling to the cleanliness specifications required by aerospace material and process standards. The 110°C heating capability supports aerospace-specified aqueous cleaning process temperatures.
- Heavy Equipment & Mining Maintenance: Cleans hydraulic valve bodies, pump components, control manifolds, and precision wear parts from heavy earthmoving, mining, and agricultural equipment during major overhaul. The large tank volumes accommodate the oversized components typical of heavy equipment maintenance.
- Medical Device Production Cleaning: Provides production-line ultrasonic cleaning of large medical device sub-assemblies, sterilization trays, and reusable surgical instruments at the scale and throughput required by hospital central sterile supply departments and medical device manufacturing facilities.
- Jewelry & Precious Metal Production: The E Series larger models serve high-volume precious metals manufacturing, electroplating pre-treatment, and casting production facilities requiring batch ultrasonic jewelry cleaner processing of hundreds of items per cycle — removing investment residues, buffing compounds, and plating pre-treatment soils

uniformly from large batches.

WARNING
TORONTECH
POWER
ToronUC™ J Series
Industrial Ultrasonic Cleaner

FEATURES

Industrial Ultrasonic Cleaner – ToronUC™ I Series Key Features

- Full SUS304 Stainless Steel Construction, 2mm Tank: The entire unit — outer cabinet, inner cleaning tank, lid, and basket — is fabricated from SUS304 stainless steel. The 2mm-thick tank wall provides structural integrity under heavy part loads and resistance to the acidic, alkaline, and neutral industrial cleaning chemistries used in production environments.
- Dual Frequency: 28 kHz & 40 kHz (A/B Variants): Available as 40 kHz (A variant) for precision industrial parts and 28 kHz (B variant) for maximum-intensity heavy-duty ultrasonic cleaning. The 28 kHz version delivers the strongest cavitation energy for the most demanding industrial ultrasonic parts cleaner applications including engine overhaul and aerospace degreasing.
- 0–100% Adjustable Ultrasonic Power: Full continuous power adjustment from 0% to 100% of rated output provides precise cavitation control for any substrate from sensitive precision components through heavy industrial assemblies requiring maximum cleaning power.
- 0–60 Min Timer + Continuous Operation: Programmable timer from 0 to 60 minutes, plus a continuous (unlimited duration) operation mode for extended production runs, overnight cleaning cycles, or long-duration decontamination programs.
- 30–110°C High-Temperature Heating: The extended heating range up to 110°C enables hot-alkaline and high-temperature industrial cleaning processes exceeding the capability of standard benchtop ultrasonic cleaners, supporting aerospace, automotive, and heavy industrial cleaning specifications that require elevated process temperatures.
- Industrial-Grade Transducers, Moisture-Proof PCB: Heavy-duty ultrasonic transducers are rated for sustained continuous-duty operation at full power. The moisture-proofed PCB control system provides protection against condensation, cleaning solution splashing, and the high-humidity environments typical of industrial washing operations.
- Caster Wheels (36L and Above): All E Series models are mounted on heavy-duty caster wheels, enabling safe repositioning of the fully loaded unit within the production facility or workshop without the need for mechanical lifting equipment.

- Lid and SUS304 Basket Included: Each unit ships complete with a stainless steel lid to minimize evaporative losses during heated cleaning cycles and reduce aerosol generation, plus a heavy-gauge SUS304 stainless steel cleaning basket for safe part handling and suspension in the bath.
- Customization Available: Tank dimensions, transducer frequency and power density, drainage configuration, heating capacity, and control interfaces can be modified to customer specifications for OEM integration, automated production line deployment, and specialized industrial ultrasonic cleaning process requirements.

THEORY & METHOD

Theory & Ultrasonic Cleaning Method

Ultrasonic cleaning operates on the principle of acoustic cavitation — the formation and violent implosion of microscopic vacuum bubbles generated by high-frequency sound waves transmitted through a liquid cleaning medium. Operating at 28 kHz or 40 kHz, the ToronUC™ ultrasonic generator drives bonded transducers that convert electrical energy into mechanical vibration, propagating pressure waves through the cleaning bath at rates of 28,000 or 40,000 cycles per second.

Each pressure wave cycle creates regions of alternating compression and rarefaction in the liquid. During rarefaction phases, dissolved gas is extracted and vacuum micro-bubbles are nucleated. These cavitation bubbles grow over successive cycles until they reach a critical size, then collapse violently — releasing localized energy in the form of shockwaves, micro-jets, and temperatures estimated at thousands of degrees Celsius (contained entirely within the microscopic bubble). The resulting implosion jets reach velocities of hundreds of meters per second and pressures exceeding 500 atmospheres, all at a scale far below the damage threshold of the parts being cleaned.

This cavitation mechanism enables ultrasonic cleaning to penetrate into surface features that no mechanical or spray cleaning method can access: threaded bores, blind holes, undercuts, mesh structures, hinged mechanisms, and complex casting geometries. Contaminants including oils, greases, lapping compounds, flux residues, scale, rust, biological debris, and carbon deposits are dislodged from the substrate and dispersed into the cleaning solution.

The choice of 28 kHz versus 40 kHz directly affects cleaning performance: 28 kHz generates larger, more energetic cavitation bubbles appropriate for heavy-duty industrial cleaning of robust metal parts, while 40 kHz produces smaller, denser bubbles with finer cleaning action better suited to precision parts with delicate surface finishes. Many ToronUC™ industrial models offer both frequencies, giving operators the flexibility to optimize cleaning for their specific application.

At the scale of the ToronUC™ I Series — with tank volumes up to 288 liters and ultrasonic power up to 3000 watts — acoustic cavitation engineering becomes critical. The transducer arrays are designed to produce overlapping cavitation fields with no dead zones throughout the full tank volume, ensuring that large assemblies loaded anywhere in the tank receive equivalent cleaning energy. The 30–110°C temperature range, which extends well above the typical 80°C ceiling of benchtop units, enables hot-alkaline industrial cleaning processes that accelerate the saponification of grease and the dissolution of oxide scale — combining the chemical action of hot cleaning chemistry with the mechanical action of ultrasonic cavitation for maximum industrial cleaning efficiency.

Ultrasonic Cleaning Process Steps

1. Solution Preparation — Fill the tank with an appropriate aqueous cleaning chemistry (alkaline degreaser, neutral detergent, or acidic descaler) at the recommended dilution. For industrial applications, match the chemistry to the contamination type — alkaline for oils and greases, acid for scale and rust.

2. Pre-Heat to Target Temperature — Activate heating and allow the bath to reach the programmed temperature before loading parts. Elevated temperature reduces contamination viscosity, improves chemical reactivity, and enhances cavitation intensity.

3. Degas the Bath — For fresh or replacement cleaning solution, run a short degas cycle to purge dissolved gases that would otherwise suppress cavitation formation and reduce cleaning effectiveness.

4. Load Parts & Run — Suspend parts in the stainless steel cleaning basket, ensuring adequate spacing for ultrasonic energy to reach all surfaces. Set the timer and power level; initiate the cleaning cycle.

5. Inspect & Rinse — On cycle completion, remove parts and inspect cleanliness. Rinse with clean water to remove loosened contamination and cleaning chemistry residues. Dry with compressed air, clean cloth, or drying oven as

appropriate.

6. Drain & Refresh Solution — Use the integrated drain valve (where fitted) to change the bath solution at the recommended interval, maintaining cleaning chemistry effectiveness and preventing re-deposition of dissolved contaminants.

TECHNICAL SPECIFICATIONS

Industrial Ultrasonic Cleaner – ToronUC™ I Series Technical Specifications

Model	Tank Size L×W×H (mm)	Unit Size L×W×H (mm)	Vol. (L)	US Power (W)	Freq. (kHz)	Heating Power (W)	Timer (min)	Temp. (°C)
ToronUC™ 53E	500×350×300	645×496×615	53	900	28/40	2000	0–60 / Cont.	30–110
ToronUC™ 77E	550×400×350	687×540×610	77	1200	28/40	3000	0–60 / Cont.	30–110
ToronUC™ 105E	600×500×350	745×645×665	105	1500	28/40	4000	0–60 / Cont.	30–110
ToronUC™ 144E	600×600×400	745×745×715	144	1800	28/40	5000	0–60 / Cont.	30–110
ToronUC™ 189E	700×600×450	845×745×765	189	2400	28/40	6000	0–60 / Cont.	30–110
ToronUC™ 288E	800×600×600	942×745×915	288	3000	28/40	7000	0–60 / Cont.	30–110

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