

LT SERIES DISC PUMP

The Lee Company's award-winning disc pumps generate pressure and vacuum in a small, silent, vibration-free form factor and are available with or without integrated electronics for added simplicity. The disc pump family is differentiated into various product series, with the LT Series designed for conditions that maximize pump life, delivering in excess of 17,000⁸ hours of continuous operation before the onset of performance degradation. Unlike the more traditional motor driven pump technology, the disc pumps very rarely suffer catastrophic failures that causes them to stop pumping. Since the piezo actuator driving the pumping motion is far more robust than any motor, the life of the pump is referred to as the time it takes for the pump's performance to drop by a figure roughly 10% below the production-level test acceptance criteria. Designed for highly precise, ultra smooth, gas and liquid⁵ flow control, our ultrasonic piezoelectric micropumps deliver unrivaled pneumatic performance and enable innovation wherever precision control of small volumes is critical. Their applications span medical, scientific, and industrial sectors, including:

- Long service life
- True pulsation-free flow
- Ultra fast millisecond response
- Silent: sound level <10 dB³
- Lightweight: 5 g
- Compact size: 29 mm diameter
- Exceptional power efficiency
- Operating temperature range: -13°F to 104°F (-25°C to 40°C)
- Humidity range⁴: 0 to 95% RH
- Pumping medium⁵: air. Liquids can be controlled indirectly
- Control precision⁶ less than 0.1%
- Infinite turndown ratio⁷
- RoHS compliant

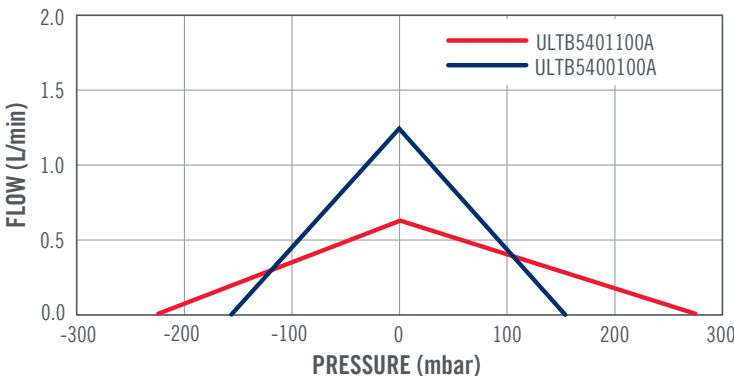


PART NUMBER	CONFIGURATION	STALL PRESSURE ^{1,2}	FREE FLOW ^{1,2}	STALL VACUUM ^{1,2}
ULTB5401100A	Series	270 mbar	0.55 L/min	220 mbar
ULTB5400100A	Parallel	150 mbar	1.20 L/min	150 mbar

For fourth letter in part number: B = pump only, C = pump mounted on Smart Pump Module (SPM).
For more information on the SPM, please see PDS 196.

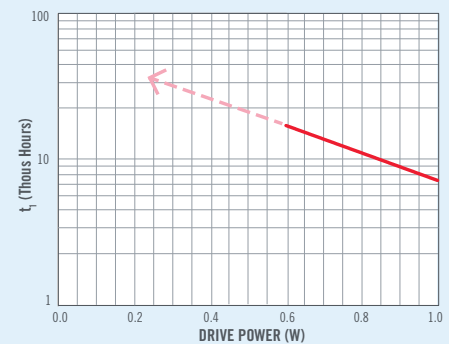
- Air quality monitoring
- Compression therapy
- Point-of-care diagnostics
- Gas detection & analysis
- Leak detection
- Microfluidics
- Liquid handling
- Inkjet pressure control

The Lee Company is actively developing higher performance pump designs; if the performance listed is not sufficient for your application, please contact us to discuss your requirements.



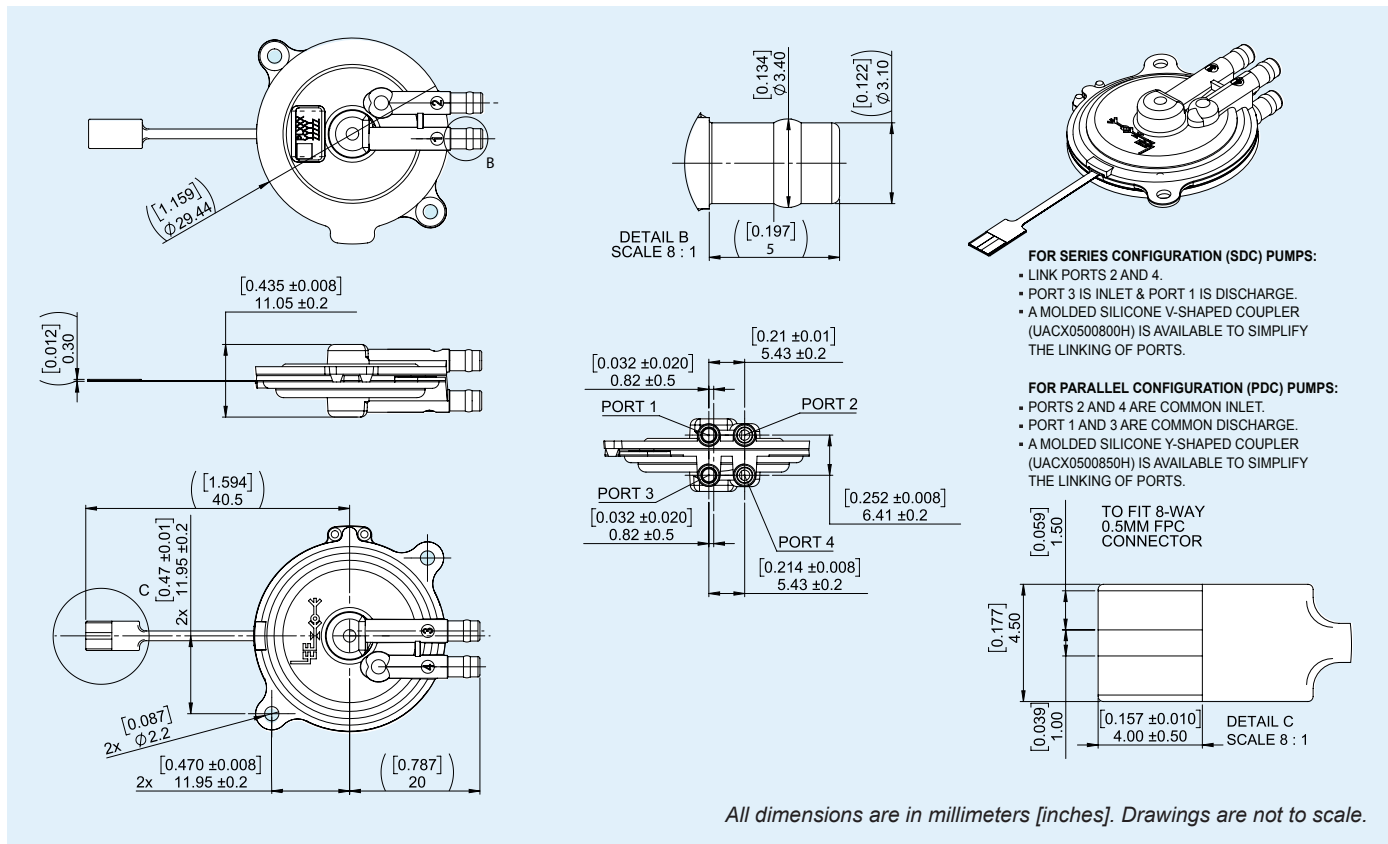
See dimensional drawings on reverse.

TYPICAL LIFETIME CHARACTERISTICS



The LT Series Disc Pump has no prevalent sudden failure mode. Instead, the operational wear processes in the pump eventually contribute to a gradual reduction in peak pressure capacity and efficiency. The Lee Company defines a point in time, t₁, at which these wear processes start to affect pump performance. In many cases, the pump continues to meet application requirements beyond t₁. t₁ varies with drive power (amongst other operational parameters).

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All dimensions are in millimeters [inches]. Drawings are not to scale.

FOR SERIES CONFIGURATION (SDC) PUMPS:

- LINK PORTS 2 AND 4.
- PORT 3 IS INLET & PORT 1 IS DISCHARGE.
- A MOLDED SILICONE V-SHAPED COUPLER (UACX0500800H) IS AVAILABLE TO SIMPLIFY THE LINKING OF PORTS.

FOR PARALLEL CONFIGURATION (PDC) PUMPS:

- PORTS 2 AND 4 ARE COMMON INLET.
- PORT 1 AND 3 ARE COMMON DISCHARGE.
- A MOLDED SILICONE Y-SHAPED COUPLER (UACX0500850H) IS AVAILABLE TO SIMPLIFY THE LINKING OF PORTS.

TO FIT 8-WAY 0.5MM FPC CONNECTOR

MOUNTING GUIDANCE

Mount in any orientation using compliant materials. If using mounting eyes on pump body, it is recommended to use a compliant O-ring (e.g. 1.42 mm ID x 1.78 mm CS nitrile 70 Shore A), nylon M2 bolt, and a 4.35 mm x 5 mm threaded mounting stud. This mounting scheme isolates high frequency vibration and prevents audible noise. Note that metal bolts are not recommended for this reason.

ELECTRICAL OPERATION

- Typical driver requires 3.5 to 5 V supply
- Pump requires AC drive waveform of 20 to 22 kHz
- Pump drive voltage must not exceed 48 Vrms (where a typical square-wave drive $V_{rms} \approx V_{pk}$)
- Power: 0 to 1 W (continuous)
- Pump efficiency is application dependent
- Drive PCB and evaluation electronics available
- Reference circuits and firmware available to support product integration

FILTRATION

The use of an inlet filter with a pore size of 3 μm or less is strongly recommended to prevent the ingress of particulates that might otherwise limit the lifetime of the pump.

Notes

1. Continuous operation at 1 W drive power (into the pump).
2. Performance data presented collected under normal temperature and pressure and ambient humidity conditions. Performance under other conditions may vary. In particular, note that performance decreases with altitude and may decrease at elevated temperature.
3. Per ISO 226:2003 and related studies; 30 cm equivalent measurement distance.
4. Non-condensing; ingress of liquid-phase water will halt pump operation.
5. Liquid may be pumped indirectly in a "pressure driven flow" / "air displacement" regime.
6. Pressure and flow: requires pump under closed-loop control with suitable sensor and drive electronics.
7. The disc pump's piezoelectric drive actuator has no stall speed.
8. The pump will continue to operate beyond this point at a reduced performance level. Reference Technical Guide TG005 Disc Pump Wear Characteristics for more information.

The information presented herein is based on engineering data and test results of nominal preliminary units. It is believed to be accurate and reliable and is offered as an aid to guide in the selection of Lee products. It is the responsibility of the customer to determine the suitability of the product for the intended use and the customer assumes all risk and liability whatsoever in connection therewith. The Lee Company does not warrant, guarantee, or assume any obligation or liability in connection with this information. Product specifications may change without notice.

DEVELOPMENT KIT

This versatile plug and play kit (part number UEKA0500300A) enables control of solenoid valves and up to five disc pumps. With a user-friendly GUI, easily accessible software, onboard pressure sensors, and integrated valve drivers, the kit offers advanced fluidic control and allows you to quickly create functional prototypes for a wide range of applications, from microfluidic and liquid handling systems to medical devices and industrial instruments.



Pump(s) and valves sold separately. Contact your local Lee Sales Engineer, or visit our website at theleeco.com/devkit to learn more.