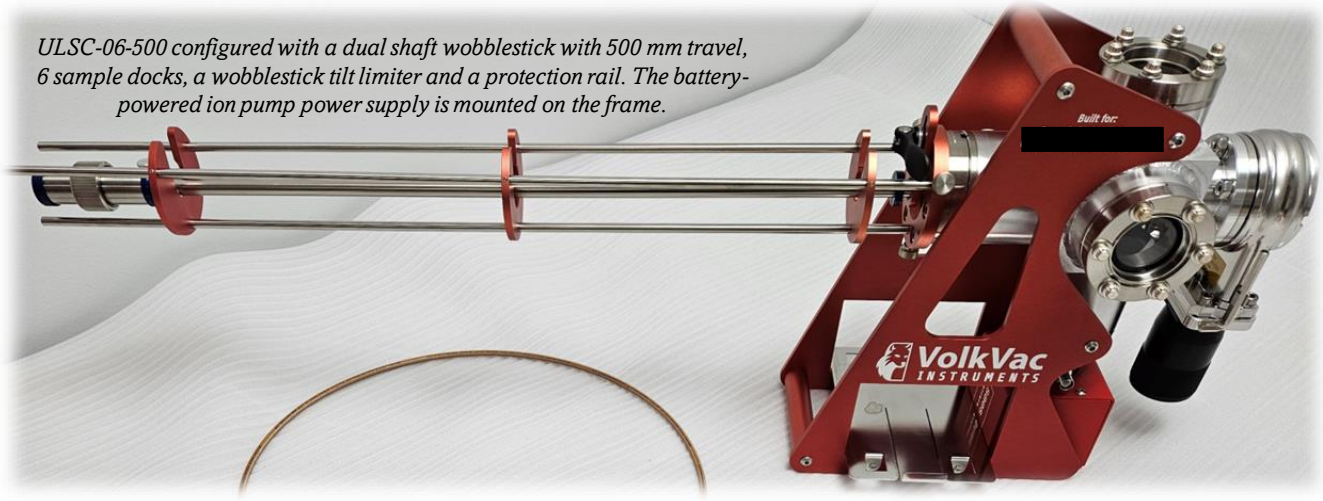
VolkVac INSTRUMENTS

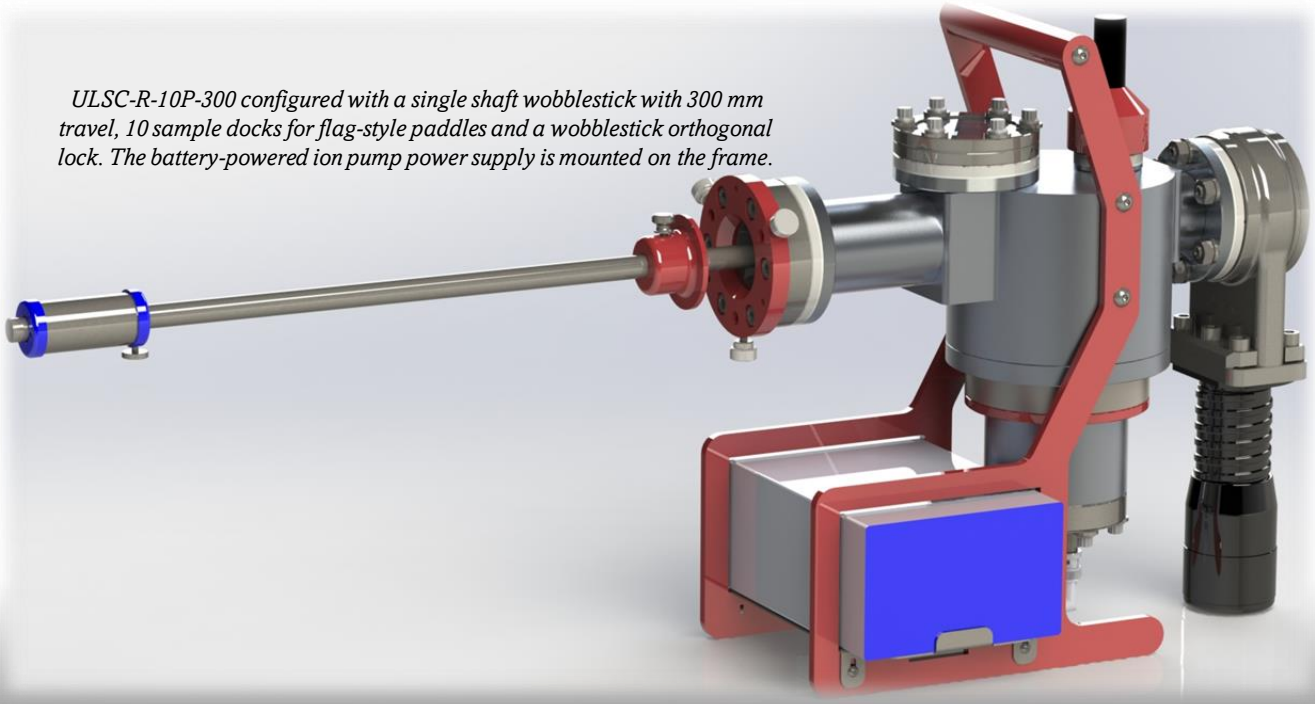
UHV Suitcase

Lightest and most portable system of its class

Modern research groups commonly require to transport their samples between deposition, preparation, and analysis UHV systems throughout the duration of the project. These systems are often not connected to each other, located in different rooms, buildings, or even continents! To overcome this challenge, the industry created a UHV 'suitcase': a portable chamber which can maintain a true UHV environment while disconnected from an electrical power outlet. While some individual system were built by researchers for a long time, such UHV 'suitcases' did not become truly portable until compact non-evaporable getter (NEG) pumps with integrated ion pumps and battery-power controllers became available. The NEG element passively pumps gasses such as H_2, N_2 and others after an initial thermal activation in vacuum, while the ion pump actively pumps the remaining gases (such as CH_4 and Ar) while simultaneously acting as a pressure gauge. The portable ion pump controller is battery powered and can operate the pump for a few days between recharges at base pressure.



ULSC-06-500 configured with a dual shaft wobblestick with 500 mm travel, 6 sample docks, a wobblestick tilt limiter and a protection rail. The battery-powered ion pump power supply is mounted on the frame.

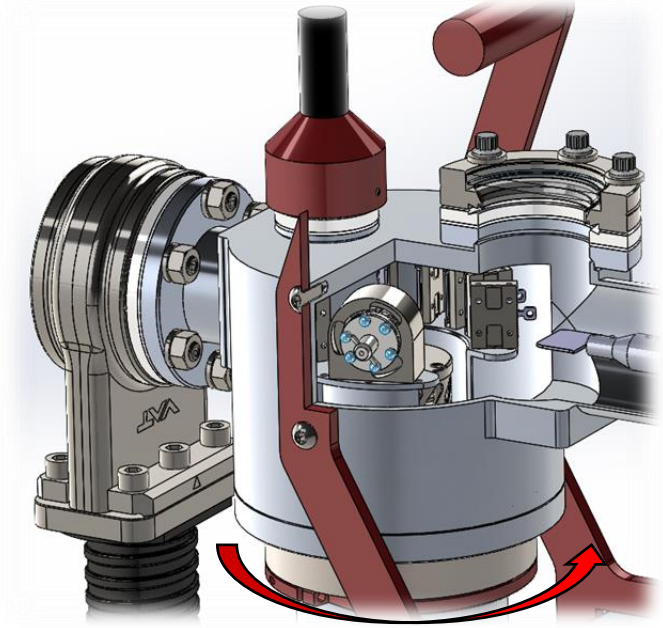


ULSC-R-10P-300 configured with a single shaft wobblestick with 300 mm travel, 10 sample docks for flag-style paddles and a wobblestick orthogonal lock. The battery-powered ion pump power supply is mounted on the frame.

Rethink Portability – The Aluminum Difference

VolkVac Instruments' UHV Suitcases are engineered to offer maximum functionality to its users in an extremely compact size. Minimal system weight and superior vacuum performance is achieved by constructing the chamber body out of aluminum (flange faces are either stainless steel or titanium). When properly manufactured, aluminum chambers offer significantly lower outgassing of H_2 at UHV pressures compared to ones made from stainless steel (some synchrotron beamlines which need to operate in the XHV vacuum range only use aluminum chambers). Combined with the fact that aluminum also has 1/3 the density of stainless steel, it makes it the perfect UHV suitcase material due to limited getter pump capacities and desire to be as light as possible.

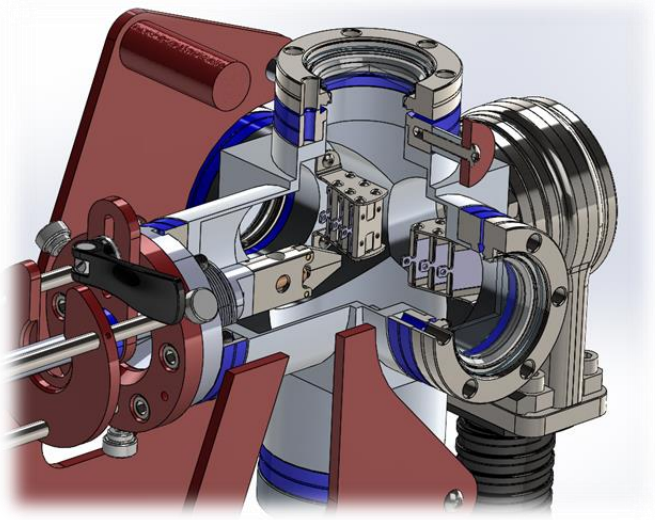
Cutaway view showing the arrangement of various sample holder options. The red arrow shows the direction of sample carousel rotation.



ULSC-R: Ultimate flexibility

This suitcase is equipped with a rotatable sample storage carousel actuated by the user through a custom magnetically-coupled rotary feedthrough built into the suitcase body. This design allows for various types of sample holders to be installed into the carousel, such as PHI sample pucks, Unisoku STM sample holders and flag-style paddles. Custom sample holders are available on user request.

Cutaway view showing the arrangement of 6 sample docks.



ULSC: Economical, with maximum transfer arm reach

The system contains 6 paddle docks as standard, which can be further upgraded to 10 without changing the system footprint. The sample clearance height varies between 3 mm and 12 mm depending on which holder the paddle is stored in.

The length of the transfer wobble stick can vary between 300 mm (most compact system footprint) and 700 mm (maximum reach into customer system) travel and should be specified during the ordering process.

Specifications	ULSC	ULSC-R
Overview	Economical system with maximum reach into customer system in a light (<10 kg) total package.	An ultra-light (~7 kg) system with multiple storage option for multiple types of sample holders.
Weight	~8.5 kg without ion pump controller	~5.8 kg without ion pump controller
Dimensions	580 mm – 980 mm (L), 151 mm (W) x 300 mm (H)	650 mm – 1050 mm (L), 123 mm (W) x 300 mm (H)
Sample storage (standard)	6 docks for 15 mm X 18 mm flag-style paddles	10 docks for 15 mm X 18 mm flag-style paddles
Base pressure	$<1x10^{-10}$ Torr	
Reach into customer system	~580 mm maximum, depending on transfer wobble stick length	~510 mm maximum, depending on transfer wobble stick length
Pumping	SAES NEXTorr Z 100 combination NEG/Ion pump	Gamma HyTan 200HP combination NEG/Ion pump
Ion pump controller	+5 kV, 20 uA maximum, battery powered portable supply, 1.2 kg	
Maximum bakeout temperature	150 °C	
Cables	HV cable for the ion pump and power cable for the NEG activation	
Name Plate	Laser-engraved label to show who the suitcase belongs to.	
Option: Flight case	For secure worldwide shipping	
Option: Sample storage	Up to 10 paddle dock can be installed in various configurations	Other types of sample holder can be installed e.g. for 1" OD PHI puck, Unisoku STM holder, etc.
Option: Transfer	Single or dual shaft wobblestick, grabber or pincer type.	Single or dual shaft wobblestick, grabber or pincer type. Single or dual shaft linear transfer arm with various sample grabbers.

Additional customization options are available, please consult VolkVac Instruments with any unique requirements.

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