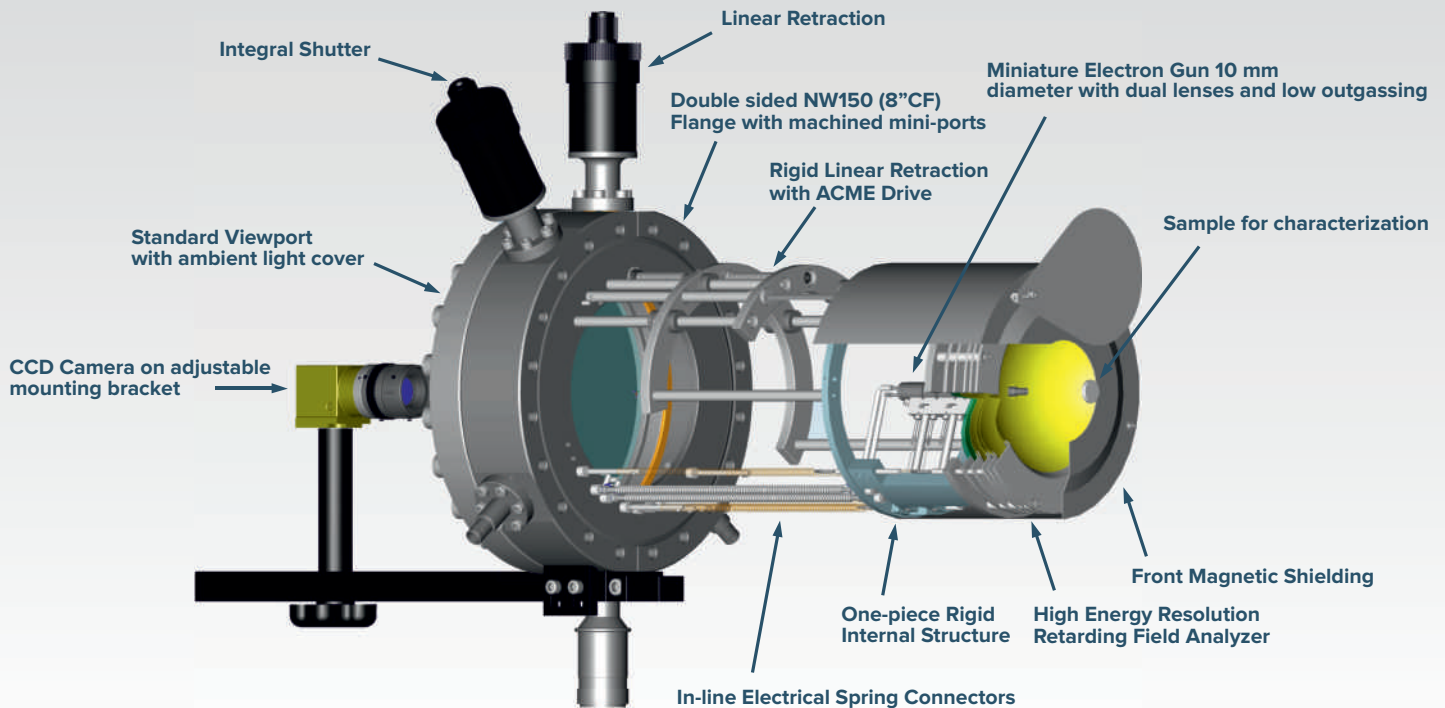


Surface Crystallography Spectrometer - IntegraLEED

based on Low Energy Electron Diffraction (LEED) and Auger Electron Spectroscopy (AES)

MODEL LEED 800 (BDL800IR) with Integral Retraction and Shutter



Features:

- High angular & energy resolution LEED & AES
- Miniature Electron Gun with double focusing
- Superior magnetic shielding
- Moiré pattern reduction
- Suitable for "in situ" epitaxial growth
- Integral Linear Motion and Shutter
- Low Outgassing Rate
- Easy add-on AES

Applications

Full size and high performance characterization tool for surface crystallography of single crystals and "in-situ" epitaxy.

The LEED 800 is capable of providing LEED and AES data for a wide range of samples.

The larger instrument size allows for higher angular and energy resolution.

Materials suitable for characterization should be single crystals and epitaxial films in categories such as: 2D materials, semiconductors, metals, oxides and magnetic films.

IntegraLEED - MODEL LEED 800

Specifications

LEED-AUGER OPTICS (Model BDL800IR)

Retarding Field Analyzer	Concentric assembly of hemispherical grids Working distance from sample 18 mm
Grid Material	Gold coated tungsten wire mesh (100 mesh, 81% transparency)
Energy Resolution	0.2% - 0.5% at low modulation volt.
Glass-Display	Fused silica glass coated with indium-tin oxide conductive layer and P31 phosphor (ZnS:Ag:Cu-green, 525 nm wavelength) 100° angle of acceptance from sample at a distance of 75 mm
Monitoring	Standard viewport on NW150 (8" CF) Flange
Linear Motion	Up to 150 mm retraction from sample (100 mm standard); linear ball bearing and acme thread with all spring electrical connections
Integral Shutter	Open and close at any position of the linear motion
Magnetic Shielding	Mu-metal cylinder with front cover for maximum magnetic field attenuation
Assembly	Extreme-high-vacuum compatibility with stainless steel, high alumina and gold-plated copper alloy materials
Mounting	8"(DN150CF) double sided conflat flange with port length range 145 mm - 500 mm
Bakeability	Under vacuum, 250°C maximum

Integral Miniature Electron Gun

Beam Energy	LEED 5 eV to 750 eV AES 5 eV to 3000 eV
Beam Current	LEED 2 μ A at 100 eV and 0.5 mm beam size AES up to 100 μ A at 3 keV
Beam Size	from 1 mm to 250 μ m - adjusted by wehnelt voltage
Electron Source	Tungsten-2%Thoriated filament standard, single crystal LaB6 filament optional
Energy Spread	0.45 eV (thoriated-tungsten filament)
Overall Size	10 mm lens diameter and 80 mm length

Ordering Guide

LEED Application:

BDL800IR	LEED optics with integral electron gun on 8" flange - 3 Grids
LMX	Linear motion (X=retraction distance)
ISH	Integral shutter
LPS075-D	Digital power supply with voltage range 0 - 750 V
LIM12	LEED imaging software with CCD camera, full version (optional)
LIM12B	LEED imaging software with CCD camera, basic version (optional)

LEED and AES Application:

BDL800IR	LEED optics with integral electron gun on 8" flange - 4 Grids
LMX	Linear motion (X=retraction distance)
ISH	Integral shutter
LPS300-D	Digital power supply with voltage range 0 - 3 kV
LOA10-AES	Digital AES controller with ramp voltage, sinewave oscillator, lock-in and AES software
LIM12	LEED imaging software with CCD camera, full version (optional)
LIM12B	LEED imaging software with CCD camera, basic version (optional)

Control Electronics

LPS075-D Digital LEED

Power supply (0-750 V) with USB interface and PC control software for Windows 10. True primary beam current and total emission measurements. Automatic start-up and shut down, 10 memory settings including standby and outgassing mode with timer, constant beam current mode.

LPS300-D Digital LEED-AES

Power supply (0-3.2 kV) with USB interface and PC control software for Windows 10. True primary beam current and total emission measurements. Automatic start-up and shut down, 10 memory settings including outgassing with timer, automatic switch from LEED to AES, constant beam current mode.

LOA10-AES

Digital AES controller with lock-in amplifier, AES high voltage ramp board 0-2.0 kV with precision sinewave oscillator (0.5-20 Vpk-pk) and AES software for Windows 10. USB communication to PC.

LEED Software

LIM12B

Basic LEED pattern measurements and analysis software and hardware for Windows 10 including:

- Automatic LEED pattern acquisition
- CCD camera
- Flange Mounting kit with ambient light cover and cables

LIM12

Full version LEED pattern measurements and analysis software and hardware for Windows 10 including:

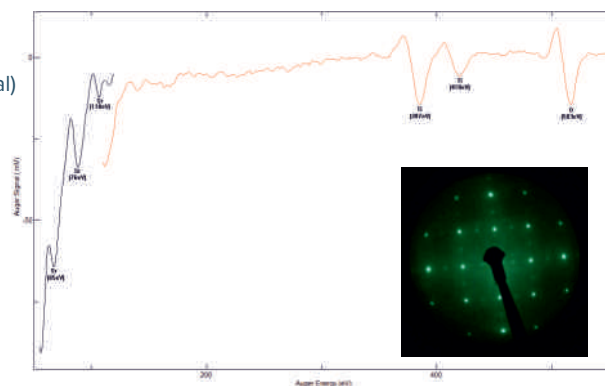
- CCD camera
- Flange mounting kit with ambient light cover and cables
- Software features:
 - Automatic LEED pattern acquisition
 - Automatic I-V analysis with spot tracking
 - Automatic I-T analysis
 - Automatic spot profile analysis

CCD Camera Specifications

- 12-bit colour high performance video CCD camera with sensitivity control and USB3.1 interface
- 1/3" CCD sensor size, image size: 1.3 MP (1288x964), 3.75 μ m pixel size, CS-mount lenses
- Linear Full Well: 9000e⁻, Dynamic Range: 59 dB

Data

LEED pattern and AES spectrum SrTiO₃ (100) - single crystal wafer after thermal annealing at 850°C in UHV



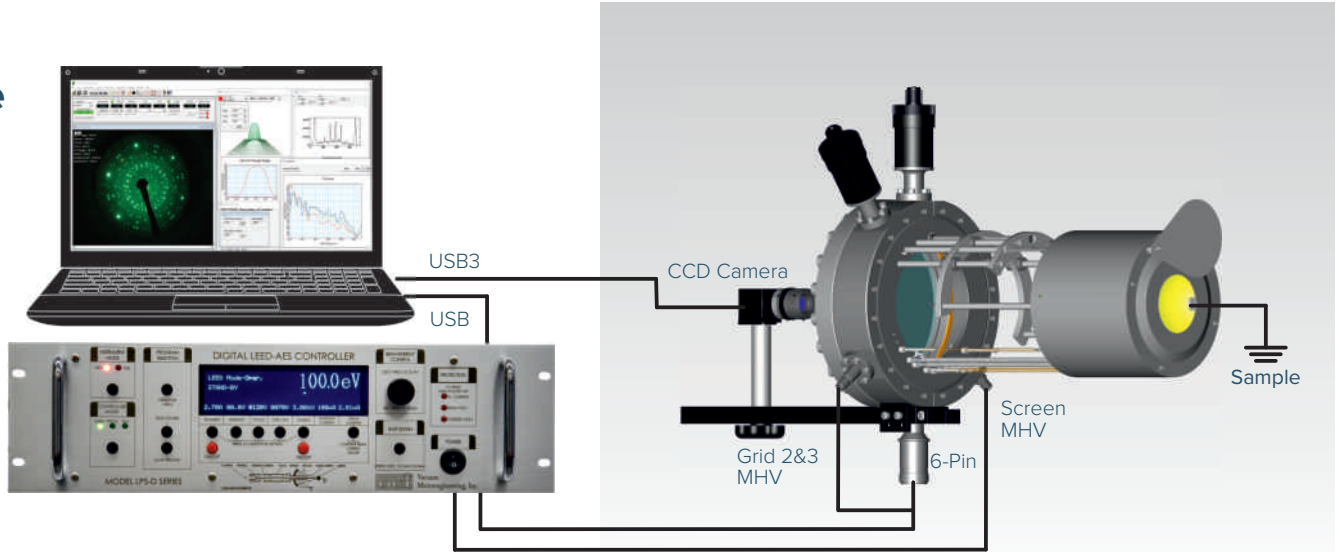
Link for more data:

<http://www.ocivm.com/leed-aes-data.html>

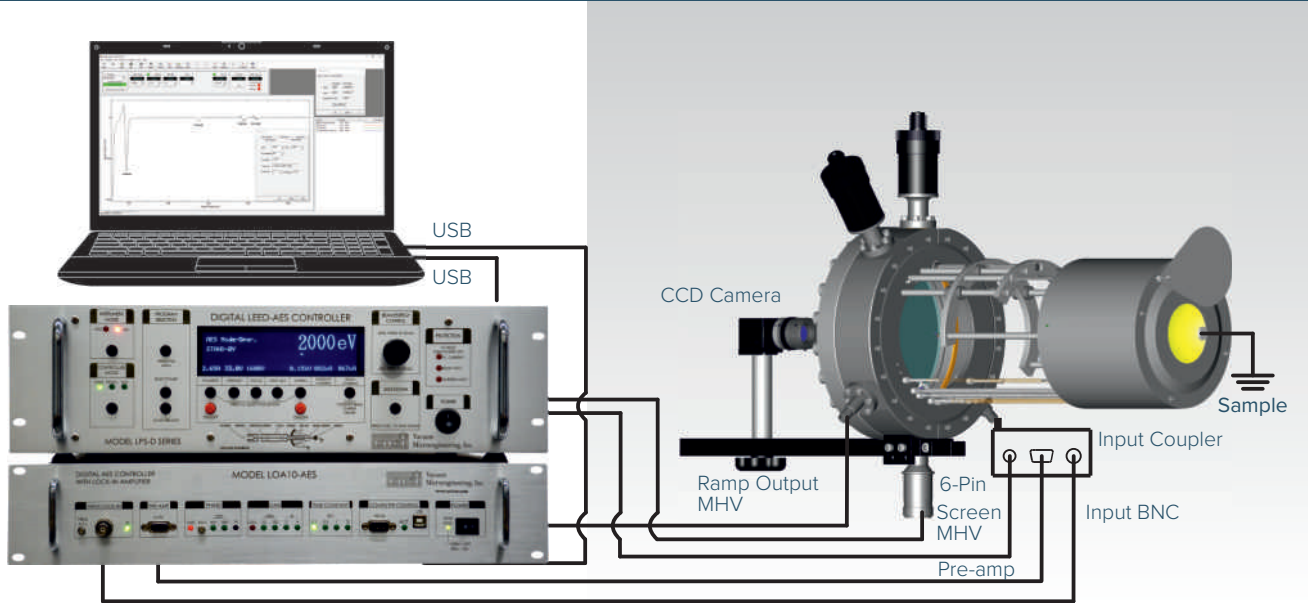
IntegraLEED - MODEL LEED 800

Connection Diagrams

LEED Mode

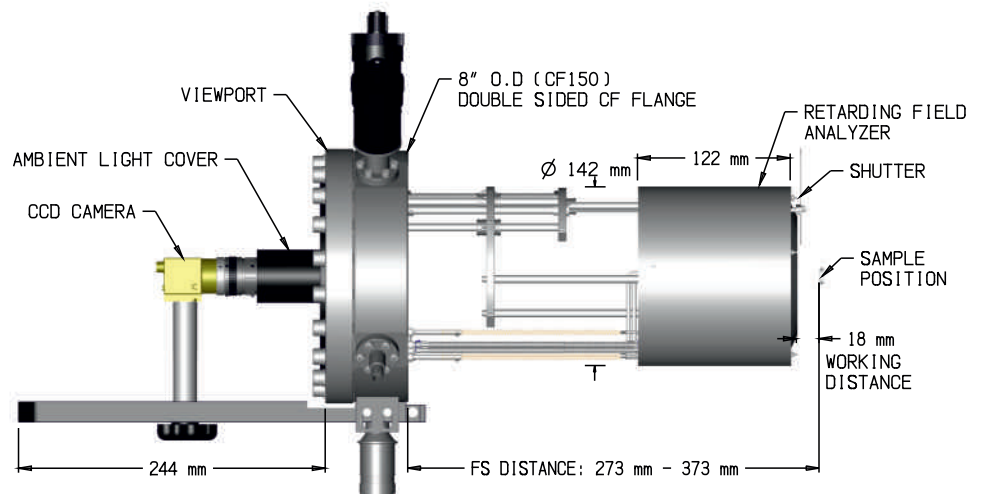


AES Mode



Schematic Drawings

BDL800IR-LMX-ISH SIDE VIEW WITH 100mm RETRACTION



IntegraLEED - MODEL LEED 800

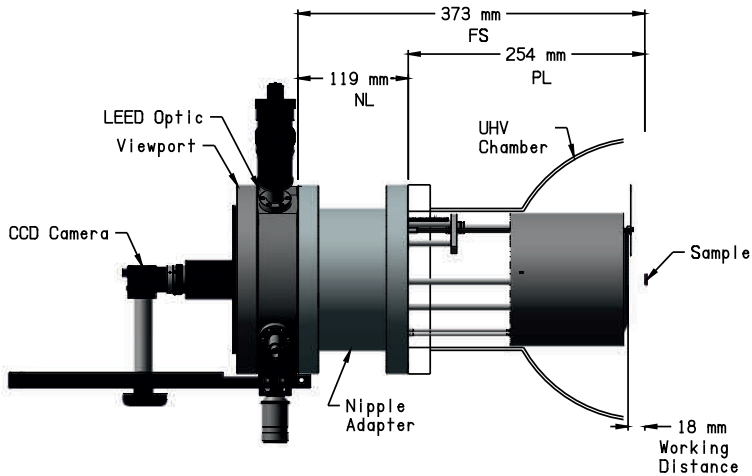
LEED Optics and UHV Chamber Configuration

Calculation formula for Flange-Sample distance and Retraction length:

$$FS = 173 \text{ mm} + 2 \text{ LMX} - \text{OV}$$

FS - flange to sample distance
LMX - retraction length
OV - overlapping length

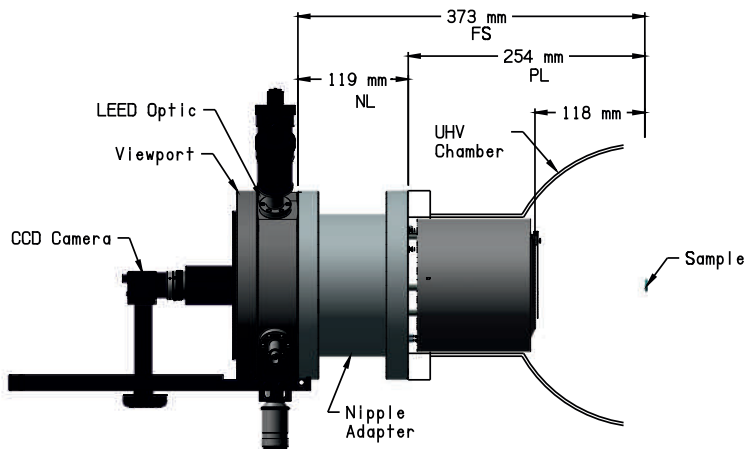
PL - port length
NL - nipple length



Example:

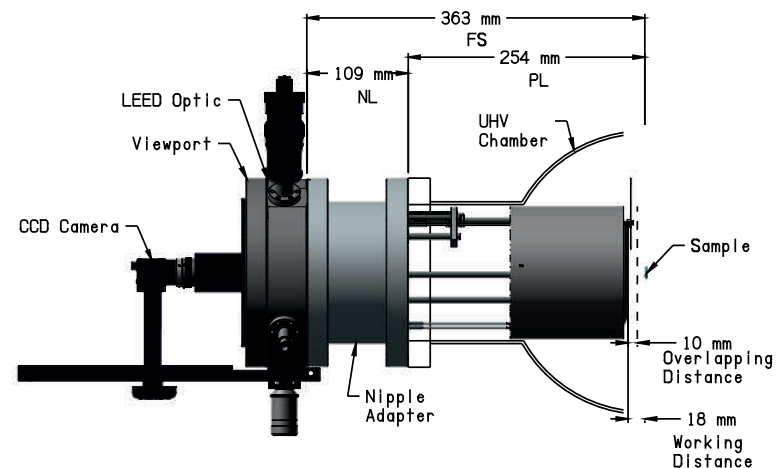
Operating (working) Position

FS: 373 mm PL: 254 mm
 LMX: 100 mm NL: 119 mm
 OV: 0 mm



Retracted (parking) Position

FS: 373 mm PL: 254 mm
 LMX: 100 mm NL: 119 mm
 OV: 0 mm



Operating (working) Position with Overlap

FS: 363 mm PL: 254 mm
 LMX: 100 mm NL: 109 mm
 OV: 10 mm

Schematic Diagrams for 100 mm Retraction