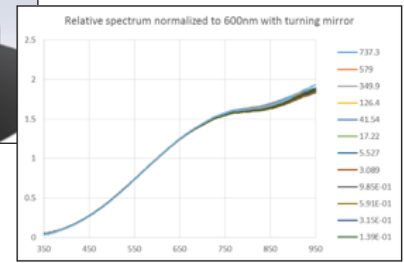
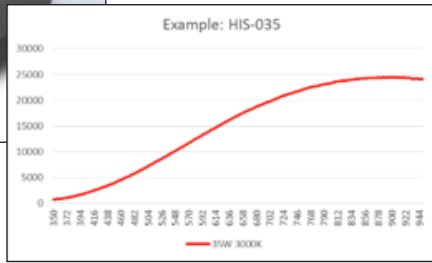
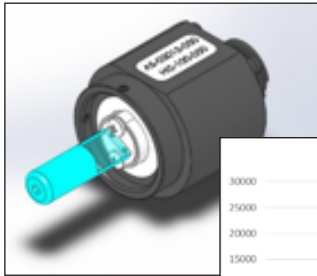




# QTH Sources

The core of HELIOS USLR Systems is Quartz-Tungsten Halogen (QTH) lamps. Labsphere has chosen lamps for their similar omni-directional orientation, lifetime, common base type and color temperature. These features allow HELIOS Systems great flexibility in levels and lamps to suit any application. The lamps have been chosen to be as close as possible to a 3000K radiance temperature (and CCT) and to ensure a substantial lifetime at that nominal output. There are two main categories of halogen lamps within the HELIOS modular light sources: Halogen Internal Sources (HIS) and Halogen External Sources (HES).



## HIS – Halogen Internal Sources

HIS Lamps are an essential component in most HELIOS Systems providing a well regulated, efficient, extremely stable spectral source of 3000K radiance at a single constant current value. Current can be changed to the lamps to effect color temperatures from the range of 1900K to 3200K, but a nominal range is 2900K to 3100K to minimize impact to halogen cycle performance. A Labsphere technical associate should be consulted for proper use at the desired output CCT. For lamps ranging from 5W to 150W the lamp socket that fits our standard 1" port frame is identical to allow users to be able to change lamp wattage or replace lamps with relative ease. All lamps between 5W and 150W may be run by the HELIOS LPS-400 Power Supply. Higher wattage options (200W, 300W and 600W) have different sockets for our 2" ports and different lamps to allow for higher heat loads and best lamp type match to performance at 3000K. A LPS-850 Power Supply is required for the higher wattage lamps. The HIS Source System provides a easy, flexible approach to achieve static levels within the HELIOS architecture.

### VALUE

5W, 10W, 20W, 30W, 35W, 50W, 75W, 100W, 150W HIS Lamps available in 1" sockets

200W, 300W, and 600W lamps available with 2" sockets

Common lamp base type for lamp interchangeability

Common socket for Labsphere standard 1.0" port:  
Slotted Socket G4-G6.35

Well understood stable output and characterized QTH 3000K radiance temperature performance

HIS assemblies include a lamp cable – same interface to rack and lamp

## HES – Halogen External Sources

The new HES Sources are the operative solution to translate light levels without changing current and spectrum. These newly designed light units are thermally stabilized, quiet, almost completely light tight and provide a stable spectrum at 3000K from 300-2400 nm. HES also has similar CCT range to the HIS Sources by adjustment of current, however, the HES Lamps sit outside the sphere on a 1.5" port and are reflectorized to direct a large portion of their energy towards the sphere. An optical relay provides uniform distribution, spectral homogeneity and heat dispersion before the light reaches a variable attenuator. The attenuators are chosen by the unit for dynamic range and automation and provide the ability to change the light level in the sphere, and thus, the radiance of the sphere without shifting spectrum or color temperature. The unit is fan cooled and the fan is powered from internal systems within the HELIOS Rack. The HES Source is the common core for achieving dynamic range and precision control of the radiance of the HELIOS Systems.

### VALUE

150W is the standard HES Source Assembly on all systems  
100W also available

Common lamp base type for lamp interchangeability  
Same socket as 1" HIS Sources

Assembly designed for Labsphere standard 1.5" port

Well understood stable output and characterized QTH 3000K radiance temperature performance

Adapter needed for 1" port or to replace EHLS assemblies on USS or LR systems

Systems include optical relay assembly to minimize spectral changes, heat loading and spatial variance for use with variable attenuators and HSA Spheres.



## Notes on HIS & HES and QTH Stability

### Normal Operation

QTH has been a workhorse of the optics calibration world for over 50 years due to its extremely stable output and its very close similarity to a 3000K Plankian blackbody radiator. When run in DC constant current mode at nominal wattage ratings typical short term stability levels are <0.02%/hr. CCT variance on the same time scale is almost immeasurable.

### Long Term Performance

Assuming normal operation, QTH lamp outputs tend to drop about -10% over their rated lifetimes (typically 2000hrs MTBF). Lamp color temperature is a function of the lamp halogen cycle which depends on tungsten filament evaporation and thermal convection of the inert halogen gas within the lamp. Filament evaporation drives the color temperature higher over time, but this tungsten also deposits on the internal quartz envelope of the lamps “reddening” the lamps and driving color temperature lower. Both mechanisms are very slow processes that result in CCT changes of +/-200K over the lamp lifetime. The positive or negative CCT direction which greatly depend on how the lamp is operated (current) and the lamp’s ambient environment during use.

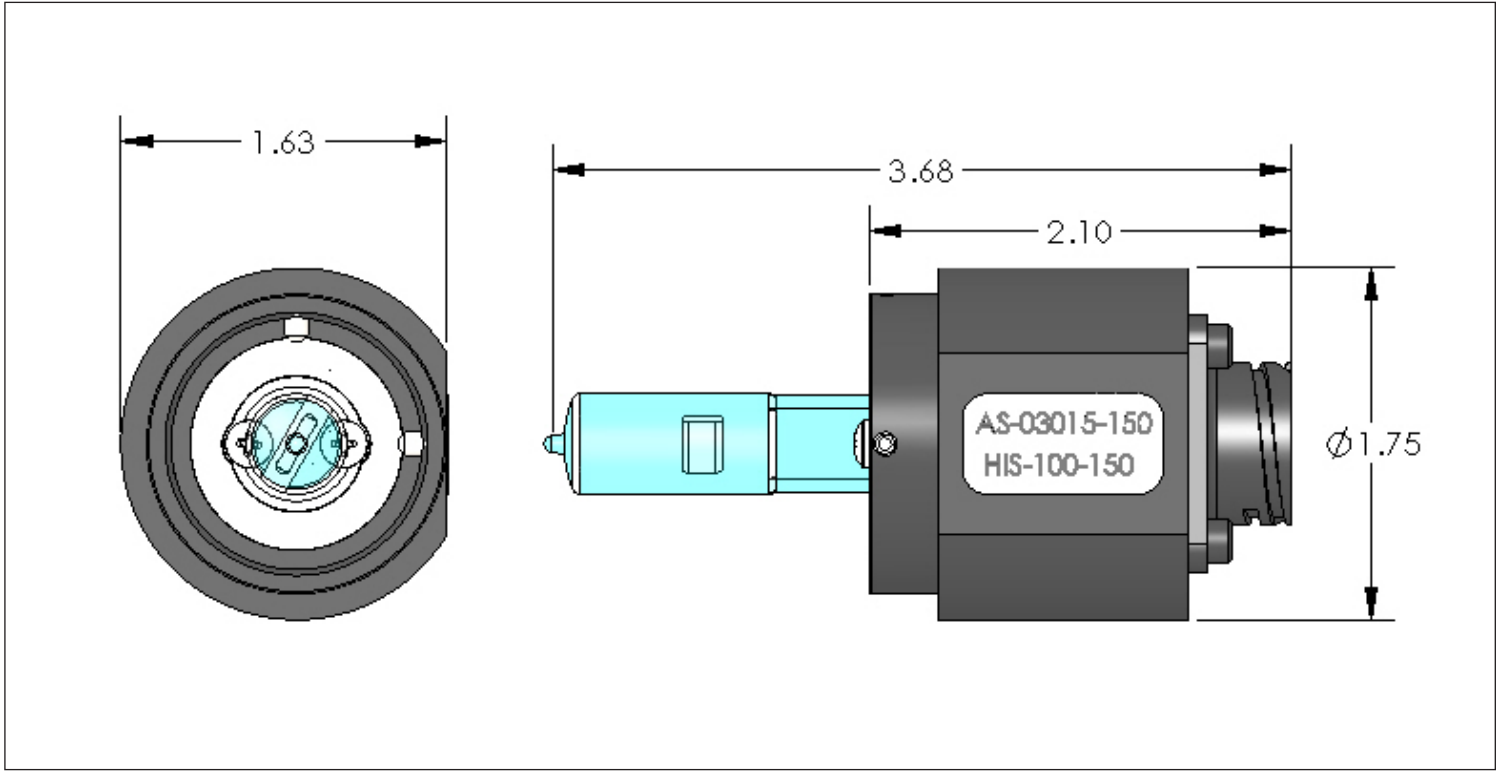
### QTH Calibration

Ideally QTH lamp measurements and calibrations are considered valid for 50 hrs for the purposes of most optical calibration uncertainty statements. As such, Labsphere recommends evaluation of QTH-based calibrations every 50 hrs.

## Specifications

HELIOS HIS & HES LAMP SPECIFICATIONS		INDIVIDUAL MODEL SPECIFICATIONS												
Electrical Power Ratings	Wattage (Nominal)	5	10	20	35	50	75	100	150	100	150	200	300	600
Voltage Rating	Voltage (Free-floating)	6.000	5.800	6.46	14.41	13.11	11.86	25.35	20.76	27.24	23.00	120	120	120
Current Rating (approximate)	Constant Current (for 3000K)	0.833	1.565	3.313	3.126	4.390	6.190	4.250	6.250	4.430	6.470	1.667	2.500	5.000
HIS Lamp Models	HIS-xxx Fits 1.0” Port frame xxx-->	005	010	020	035	050	075	100	150	100	150			
HIS High Wattage Models	HIS-xxx Fits 1.75” Port frame xxx-->											200	300	600
HES Models	HES-xxx Fits 1.5” Port Frame xxx-->									100	150			
Approximate CCT	Approximately 3000K +/-25K	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Rated Lifetime	Set current dependant (given for 3000K)	500	500	2300	500	700	2400	1200	1000	1100	500	1000	1000	1000
Short Term Stability	<+/-0.02% per Hour													
Long Term Stability	-10% over rated MTBF lifetime													
CCT Stability	+/-200K over MTBF lifetime													
LPS Power Supply (LPS-400/LPS-850)	Required Model to Run Lamp	400	400	400	400	400	400	400	400	400	400	850	850	850
Rated AC Input/Frequency	100-240VAC, 47-63Hz													
Operating Temperature Range	-10C to 150C													
Storage Temperature Range	-20C to 170C													
Operating Temperature RH%	30-90% (no condensation)													
Storage Temperature RH%	10-95% (no condensation)													
Recommended Warm Up Time	20 Minutes													
HES Required Accessories	Mirror Tube, Diffuser Baffle													
Lamp Cable Included	Yes - All Lamps HIS & HES													
HIS Cooling	Passive Convection & Conduction													
HES Cooling	Forced Air Internal Fan													
CoC / Test / Cal report	Use dependant													
Compliance	CE, RoHS													
Replacement Lamp Model	RLH-xxx xxx-->	005	010	020	035	050	075	100	150	100	150	200	300	600
Standard Warranty	1 year (Un-used) or By Calibration Hrs													

## HIS Dimensional Drawing



## HES Dimensional Drawing

