



## QTH Sources

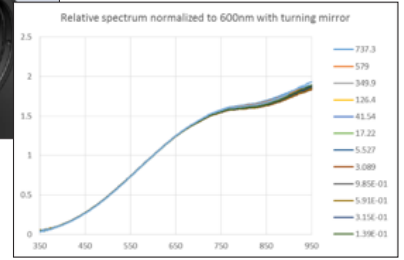
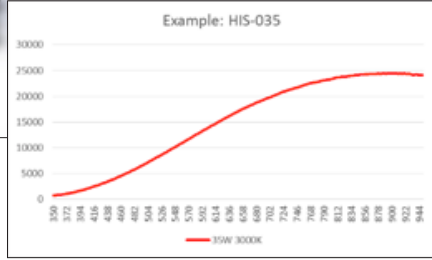
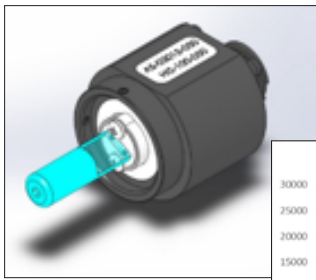


### Great flexibility

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.

### Substantial lifetime

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.

### Features

- 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
- Cable for HIS Lamp sold separately. Please speak to your Labsphere Sales Representative for more information.

## 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.

### Features

- 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 Planckian 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.

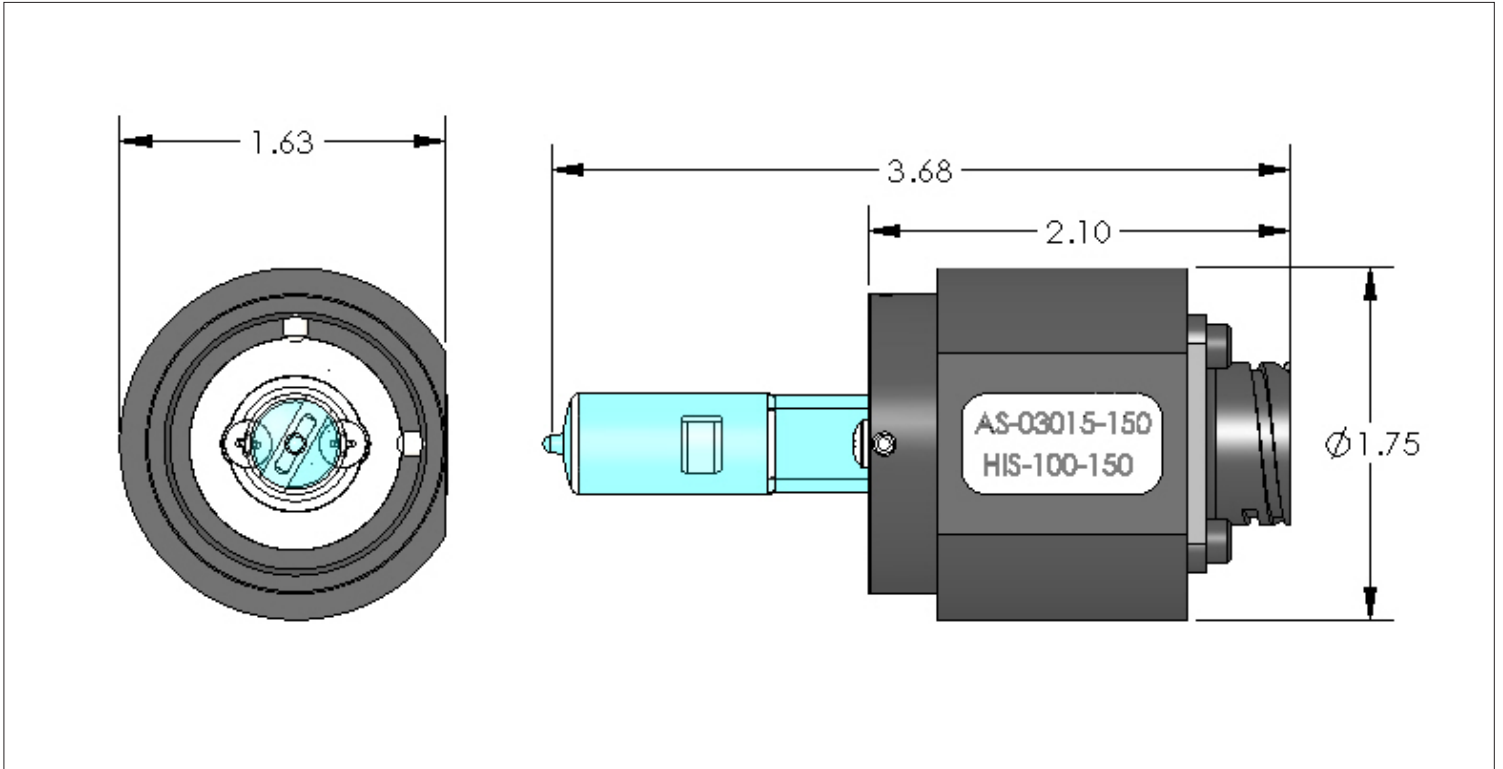
## QTH Calibration

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 3000 K +/-25 K	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	
Rated Lifetime:	Set current dependant (given for 3000 K)	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:	Required model to run lamp (LPS-400/LPS-850)	400	400	400	400	400	400	400	400	400	400	850	850	850	
Rated AC Input/Frequency:	100-240 VAC, 47-63 Hz														
Operating Temperature Range:	-10 C to 150 C														
Storage Temperature Range:	-20 C to 170 C														
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 hours														

## HIS Dimensional Drawing



## HES Dimensional Drawing

