



Corning® Varioptic® C-S-25H0-096 Auto Focus Lens Module

Overview

The Corning® Varioptic® C-S-25H0-096 auto focus lens module integrates a fixed lens module with a Corning® Varioptic® A-25H0 variable focus lens in an M12x0.5 receptacle (S-mount). The C-S-module has an FPC cable and can be connected to a standard 1 mm pitch FPC connector. It can be easily integrated in a standard M12 sensor board. The C-S-module is compatible with most imaging sensor formats, from 1/4" to 1/1.8". This C-S-module can be controlled by the same drivers as the A-25H0. For more information on this module, please refer to the C-S-25H0-096 Technical Datasheets (TEDS).

Ordering Information

- **Corning® Varioptic® C-S-25H0-096-03 auto focus lens module:** 4-pin, 1 mm pitch bent flex cable (FPC-A-3) without IR-cut filter.
- **Corning® Varioptic® C-S-25H0-096-03I auto focus lens module:** 4-pin, 1 mm pitch bent flex cable (FPC-A-3) with IR-cut filter.

Performance Summary

- | | |
|--------------------------|------------------|
| • Effective focal length | 9.6 mm |
| • F number | 3.7 |
| • Image circle diameter | 9.1 mm |
| • Focus range | 7 cm to infinity |

Example of Applications

- Industrial cameras
- Medical imaging
- Biometrics
- Machine vision
- Industrial endoscopes



Contents

Opto-Electrical Performance.....	2
Electrical Specifications.....	2
Absolute Maximum Ratings	3
Mechanical Dimensions.....	3
Module Setting Recommendations	4

Opto-Electrical Performance

Performances described below are for 25°C and for the lens setting described in the ‘Module Setting Recommendations’ section of this document.

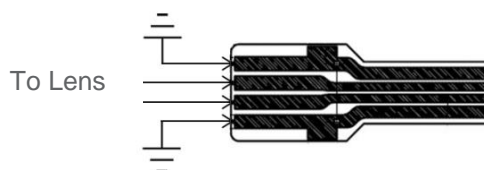
<i>Optical Performances at V_{∞}</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Notes</i>
Voltage for infinite focus	V_{∞}		39.5		V	(1)
Focal length at V_{∞}	EFL		9.6		mm	
Image circle diameter			9.1		mm	
Corner Chief Ray Angle	CRA			12.5	°	
Mechanical back focal length at V_{∞} , without IR-cut filter			6.12		mm	
Mechanical back focal length at V_{∞} , with IR-cut filter			6.3		mm	
F- number	F#		3.7		-	
Diagonal Field of view	DFOV			51	°	(2)
IR filter cut-off wavelength	λ_c	640	650	660	nm	
<i>Focus control performances</i>						
Focus distance	x	7		∞	cm	(1)
Voltage for x= 7 cm	V_{7cm}		54	60	V	(3)
Slope	S	0.7	0.85	1.0	m^{-1}/V	(1)

Notes:

- (1) For more information on the behavior of the A-25H0 lens with voltage, please refer to the A-25H TEDS.
- (2) For a sensor size of 1/1.8".
- (3) For shorter focusing distances, see “Module Setting Recommendations”.

Electrical Specifications

Electrical Connection



The following FPC connectors are compatible with the FPC tip:

- SFW4S-2STE9LF from Amphenol FCI
- 04FMN-BTK-A (LF)(SN) from JST

Driver

Several drivers have been qualified for use with Corning Varioptic variable focus lenses (See A-25H Data Sheet). The customer should choose the driver depending on its application. It is important to check the resolution of the driver compared to the depth of field of the system. See driver datasheets for more details.

Absolute Maximum Ratings

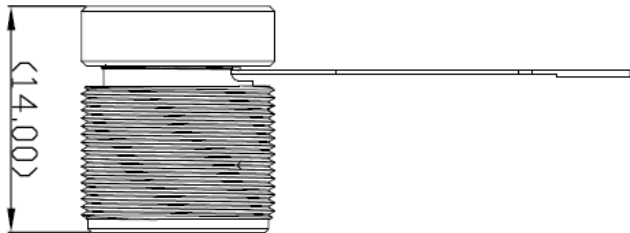
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Temperature	T	-30	..	85	°C	
Storage Temperature	T _{stg}	-40	..	85	°C	
AC Input RMS Voltage	V _{max}			60	V	(1)
Input Voltage Frequency	f		1		kHz	(1)

Notes:

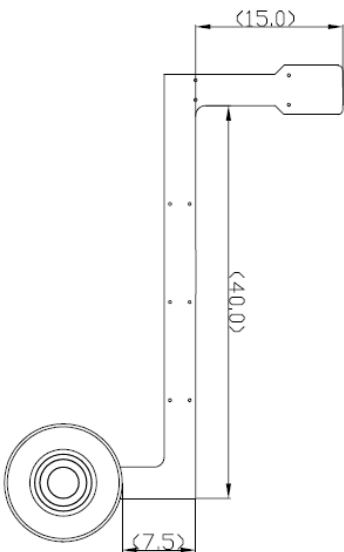
(1) For more information on A-25H electrical driving, please refer to the A-25H TEDS.

Mechanical Dimensions

Module



FPC Details



Module Setting Recommendations

Use caution when configuring the initial lens module settings. Although the user has complete control over module configuration settings, only a limited number of configurations will provide optimum image quality.

Setting Procedure Without Voltage:

Here is a simple procedure to set the C-S-25H-096 module for a 7 cm to ∞ usage:

1. Set a scene at a distance of at least 5 m from the camera.
2. Insert and slightly screw the C-S-module on the M12 camera lens holder (C-S-module unpowered).
3. The image should be out of focus.
4. Screw the C-S-module clockwise until the center of the image becomes sharp.
5. From this position, screw the C-S-module clockwise an additional 2 turns with accuracy of $\pm 1/4$ turn: the image becomes out of focus again.
6. Fix the C-S-module in this position.
7. Power the C-S-module: the infinite focus will be obtained for V_{∞} and the focus at a closer position will be obtained by applying a higher voltage, up to V_{\max} .

To use the C-S-25H-096 module for a maximum focus of distance x_0 , modify the above steps:

1. Set a scene at a distance of x_0 from the camera.
2. Power the C-S-module: the focus at x_0 will be obtained for V_{∞} and the focus at a closer position will be obtained by applying a higher voltage, up to V_{\max} .

With this setting, the minimum object distance is reduced from 7 cm to:

$$\frac{1}{14 + \frac{1}{x_0}}$$

in meters, with x_0 in meters.

Setting Procedure with Voltage:

1. Connect the C-S-module to the driver and adjust the voltage control to $39.5 V_{\text{rms}}$
2. Turn on the camera, and point the camera in the direction of a scene that is at least 5 m from the module, or at a distance of x_0 if using at the maximum focus distance x_0 .
3. Screw the C-S-module clockwise until the image becomes sharp.
4. Optional: Block the C-S-module in that position.

Corning reserves the right to change its product specifications at any time without notice. Please ensure you have the latest applicable specification before purchasing a Corning product. It is customer responsibility to determine the suitability of Corning's product to its own application. Corning does not provide any warranty of merchantability or fitness for a particular purpose. Product specifications are available upon request at varioptic@corning.com.