



Corning® Varioptic® C-H-16F0-036 C-Series Module

Overview

The Corning® Varioptic® C-H-16F0-036 C-Series module integrates a fixed lens module with a Corning® Varioptic® A-16F0 variable focus adjustable lens in an M8x0.35 receptacle. The C-H-module has an FPC cable and can be connected to a standard 1 mm pitch FPC connector. It can be easily integrated into a standard M8 sensor board. The C-H-module is compatible with imaging sensor formats, up to 1/3". The C-H-module can be controlled by the same driver as the A-Series lenses.

Ordering Information

- **Corning® Varioptic® C-H-16F0-036-12 auto focus lens module:** 4-pin, 1 mm pitch, straight flex cable (FPC-A-12) without IR-cut filter.
- **Corning® Varioptic® C-H-16F0-036-12I auto focus lens module:** 4-pin, 1 mm pitch, straight flex cable (FPC-A-12) with IR-cut filter.

Performance Summary

- | | |
|--------------------------|------------------|
| • Effective focal length | 3.64 mm |
| • F number | 2.3 |
| • Image circle diameter | 5.9 mm |
| • Focus range | 7 cm to infinity |

Applications

Corning Varioptic C-H-16F0-036 liquid lens modules have been used in:

- Industrial cameras
- Biometrics
- Machine vision
- Industrial endoscopes
- ...



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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.

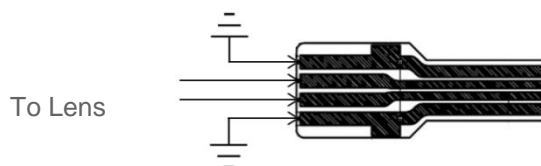
<i>Optical Performances at V_{∞}</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Notes</i>
Voltage for infinite focus	V_{∞}		42		V	(1)
Focal length at V_{∞}	EFL		3.64		mm	
Image circle diameter			5.9		mm	
Corner Chief Ray Angle	CRA			33.7	°	
Mechanical back focal length at V_{∞} , without IR-cut filter			0.35		mm	
Mechanical back focal length at V_{∞} , with IR-cut filter			TBC		mm	
F- number	F#		2.3		-	
Diagonal field of view	DFOV			80	°	(2)
IR filter cut-off wavelength	λ_c		650		nm	
Focus control performances						
Focus distance	x	7		∞	cm	(1)
Voltage for x= 7 cm	V_{7cm}			60	V	(3)
Slope	S		1.1		m^{-1}/V	(1)

Notes:

- (1) For more information on the behavior of the A-16F0 lens with voltage, please refer to the A-16F TEDS.
- (2) For a sensor size of 1/3”.
- (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 FCI
- 04FMN-BTK-A (LF)(SN) from JST

Driver

A dedicated compact IC has been designed to drive Corning Varioptic Lenses, namely the Maxim MAX14574. For details, please contact your local sales channel.

Important note:

Corning Varioptic Lenses are sensitive to electrostatic discharge (ESD). Use caution when handling.

Absolute Maximum Ratings

<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Notes</i>
Operating Temperature	T	-20	..	60	°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:

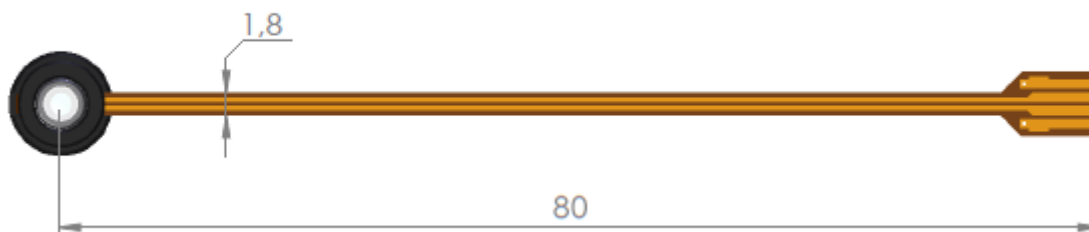
- (1) For more information on A-16F0 electrical driving, please refer to the A-16F Technical Data Sheet.

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-H-16F0-036 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-H-module on the M8 camera lens holder (C-H-Module unpowered).
3. The image should be out of focus.
4. Screw the C-H-module clockwise until the center of the image becomes sharp.
5. From this position, screw the C-H-module clockwise an additional one turn with accuracy of $\pm 1/4$ turn: the image becomes out of focus again.
6. Fix the C-H-module in this position.
7. Power the C-H-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-H-16F0-036 module for a maximum focus distance of x_0 , modify the above steps:

1. Set a scene which is at a distance x_0 from the camera.
2. Power the C-H-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-H-module to the driver and adjust the voltage control to $42 V_{\text{rms}}$.
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-H-module clockwise until the image becomes sharp.
4. Optional: Block the C-H-module in that position.

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