



# Caspian S-25H0-026

## Overview

This Caspian module integrates a fixed lens module and an Arctic 25H0 variable focus liquid lens in an M12x0.5 receptacle (S-mount). The module is built-in with an FPC cable, and can be connected to a standard 1 mm pitch FPC connector. It can therefore be very easily integrated in a standard M12 sensor board. The module is compatible with imaging sensor formats up to 1/2.5". This module can be driven by the same drivers as the Arctic 25H lens. For more information on this module, please refer to TEDS- Caspian S-25H-026.

## Ordering information

- **C-S-25H0-026-06:** bent flex cable (FPC-A-6) without IR-cut filter.
- **C-S-25H0-026-06I:** bent flex cable (FPC-A-6) with IR-cut filter.
- **C-S-25H0-026-07:** straight flex cable (FPC-A-7) without IR-cut filter.
- **C-S-25H0-026-07I:** straight flex cable (FPC-A-7) with IR-cut filter.

## Performance summary

- |                          |                  |
|--------------------------|------------------|
| ○ Effective Focal Length | 2.6 mm           |
| ○ F number               | 2.5              |
| ○ Image circle diameter  | 7.2 mm           |
| ○ Focus range            | 4 mm to infinity |

## Example of applications

- Close focus applications
- Surveillance
- Industrial endoscopes

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## Opto-Electrical performance

Performances described below are for 25°C and for a lens setting as described in this specification (see 'Module Setting' conditions).

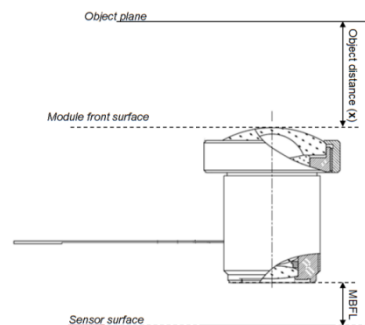
<b>Optical Performances at <math>V_{\infty}</math></b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Notes</b>
Voltage for infinite focus	$V_{\infty}$		39.5		V	(1)
Focal length at $V_{\infty}$	EFL		2.6		mm	
Image circle diameter			7.2		mm	
Corner Chief Ray Angle	CRA			17	°	
Mechanical back focal length at $V_{\infty}$ , without IR-cut filter			5.26		mm	(5)
Mechanical back focal length at $V_{\infty}$ , with IR-cut filter			5.36		mm	(5)
F- number	F#		2.5		-	
Relative Illumination	RI	69			%	
Diagonal Field of view	DFOV			160	°	(2)
IR filter cut-off wavelength	$\lambda_c$		650		nm	
<b>Focus control performances</b>						
Focus distance	x	0.4		$\infty$	cm	(1)
Voltage for x= 4 mm	$V_{4\text{mm}}$		54		V	(4);

### Notes:

- (1) For more information on the behavior of Arctic 25H0 lens with voltage, please refer to Arctic 25H Technical Data Sheet
- (2) For a sensor size of 7.2 mm diagonal (1/2.5")
  - ⊙ For other sensor sizes, the Field of View (FOV) and distortion is:

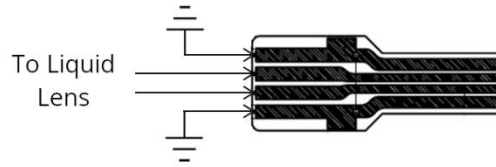
Sensor diagonal	Sensor format	Diagonal FOV	Horizontal FOV	Vertical FOV	Radial distortion (%)
4 mm	1/4"	86°	68°	52°	-21%
5.7 mm	1/3.2"	126°	100°	74°	-47%
6 mm	1/3"	134°	116°	76°	-53%
6.7 mm	1/2.7"	152°	120°	88°	-67%
7.2 mm	1/2.5"	160°	128°	94°	-77%

- (4) Refer to drawing page 6
- (5) Definition of x and MBFL:



## 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

Varioptic has qualified several drivers for variable focus liquid lenses (see Arctic 25H Data Sheet). The customer should choose the driver depending on its application. One important item to be checked is the resolution of the driver, compared to the sensitivity of the voltage versus focusing distance. See driver datasheets for more details.

## Absolute Maximum Ratings

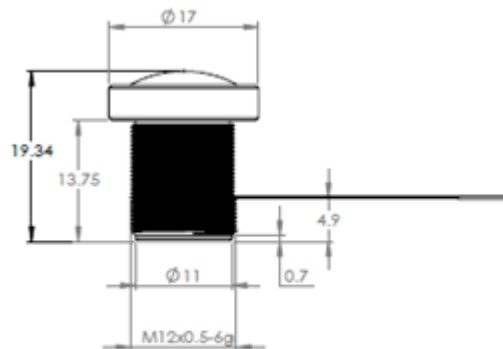
<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Notes</i>
Operating Temperature	T	-30	..	85	°C	
Storage Temperature	T <sub>stg</sub>	-40	..	85	°C	
AC Input RMS Voltage	V <sub>max</sub>			60	V	(1)
Input Voltage Frequency	f		5		kHz	(1)

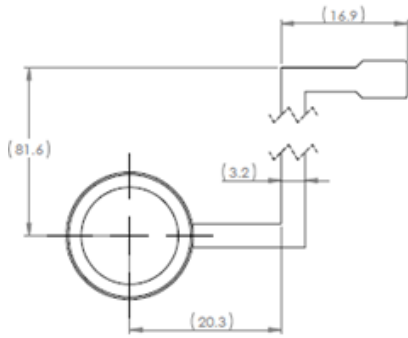
#### Notes:

- (1) For more information on Arctic 25H0 electrical driving, please refer to Arctic 25H Technical Data Sheet.

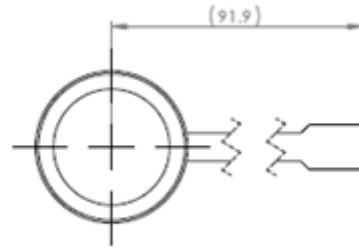
## Mechanical dimensions

### C-S-25H0-026-06 and C-S-25H0-026-07



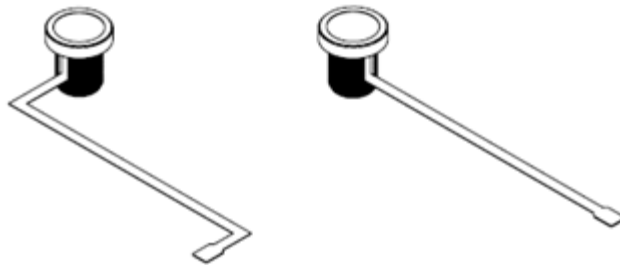


Bent FPC (C-S-25H0-026-06)



Straight FPC (C-S-25H0-026-07)

### 3D View :



## Module setting recommendations


The customer should take care about the initial setting of the lens module; indeed, there are infinity of configurations to set the module by playing both on the back focal distance and the voltage of the lens. However, only a limited number of configurations will provide optimum image quality.

### Setting procedure without voltage:

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

## Setting procedure with voltage

1. Plug the module on the driver and adjust the voltage control to  $39.5V_{rms}$
1. Switch on the camera and orientate the camera in the direction of a scene which is at a distance of at least 5m from the camera.
2. Screw the module clockwise until the image becomes sharp.
3. Optionally, block the module in that position.



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