CORNING

Varioptic® Lenses

Marketing Datasheet

Corning® Varioptic® C-T-39N0-A1-005 Auto Focus Telecentric Lens Module

Overview

The Corning® Varioptic® C-T-39N0-A1-005 auto focus telecentric lens module is an electronically controllable focus C-Mount telecentric lens based on the Corning® Varioptic® A-39N0-A1 variable focus lens. It incorporates the necessary electronic components to drive the lens and only needs a DC power supply. Focus can be controlled through either an RS232 or I2C input. With a x0.5 magnification and 1" sensor compatibility, it is specifically designed for inspection applications.

Ordering Information

- **Corning® Varioptic® C-T-39N0-A1-005 auto focus telecentric lens module** : 0.5 magnification

Key Features

- Variable focus from 116 mm to 128mm
- Functions quietly
- Supports I2C and RS232 interfaces
- Supports closed loop operation

Example of Applications

- Inspection
- Metrology

Contents

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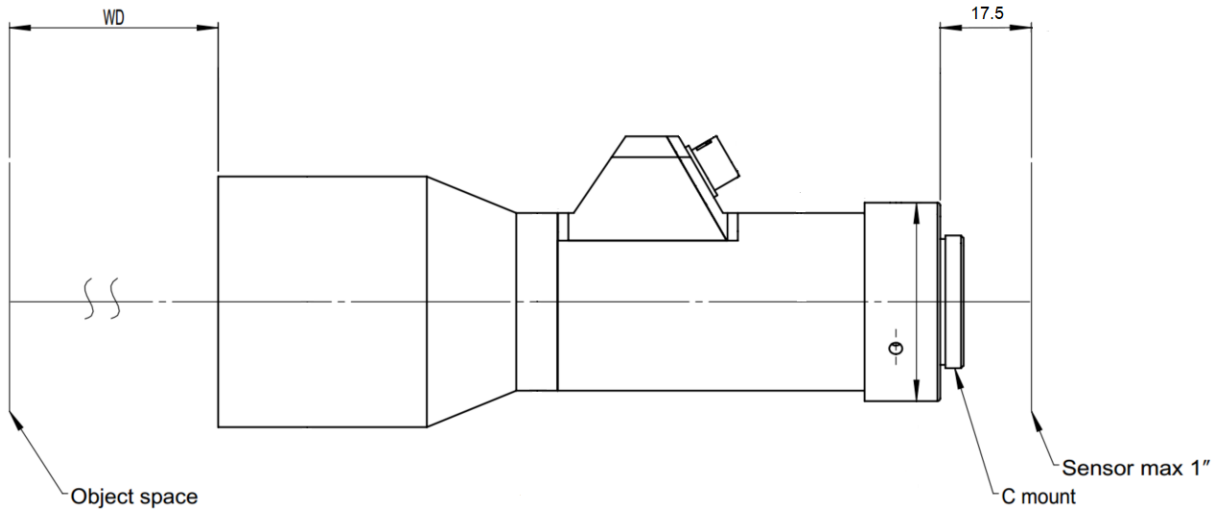
Opto-Electrical Performance

Performances described below are for 25°C

Optical Performances	*Symbol*	*Min*	*Typ*	*Max*	*Unit*	*Notes*
Magnification			0.5			
Image circle diameter			16.6		mm	
Corner Chief Ray Angle	CRA			5	°	
Flange distance			17.5		mm	(1) (2)
Working F- number	WFNO		9.2		-	
Telecentricity				0.1	°	
Focus control performances						
Focus distance	x	116		128	mm	(1)

Notes:

(1) Distance to object refers to the principal plane of the objective lens as shown below:

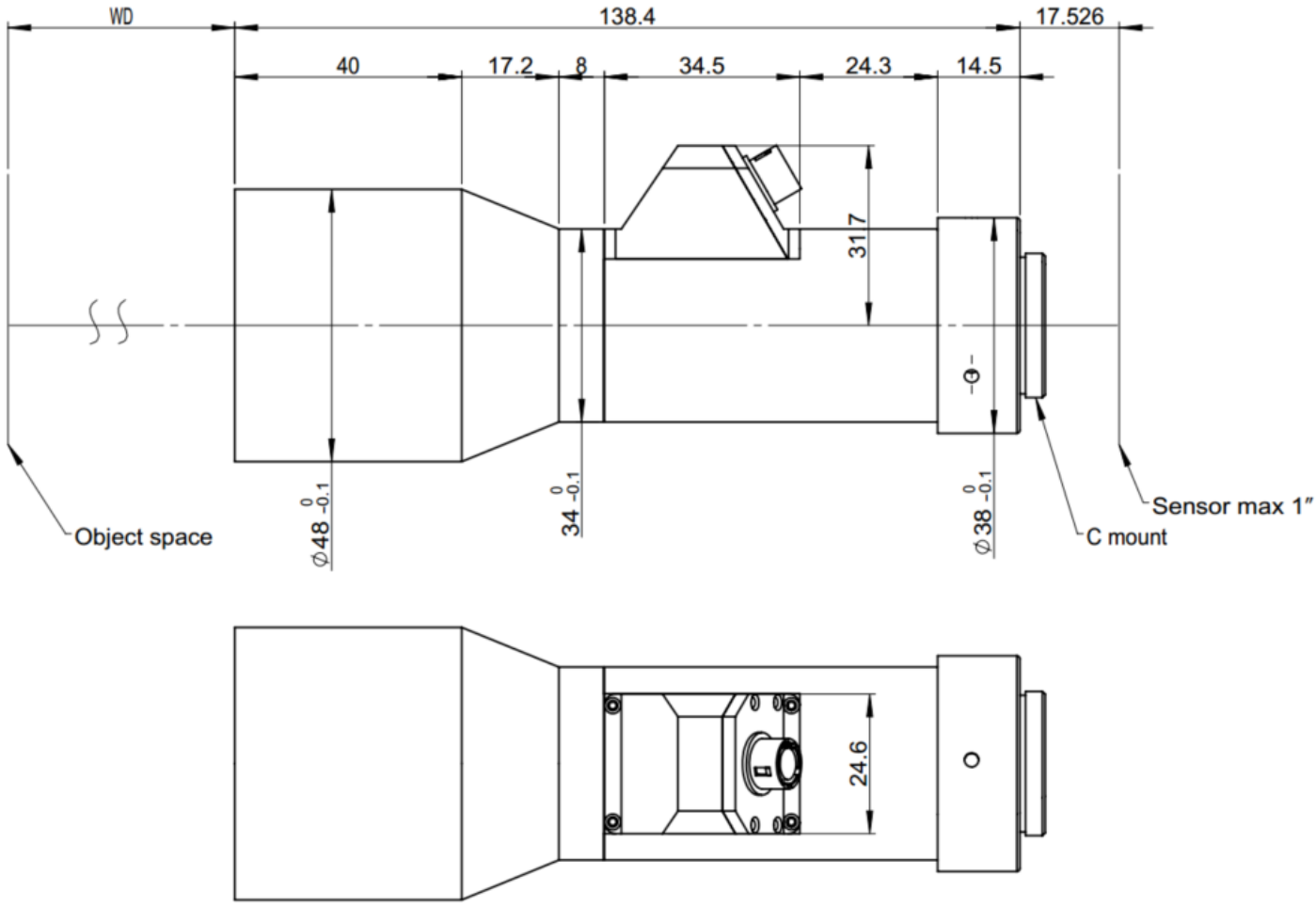


(2) Refer to ISO 10935.

Temperature Range

Parameter	*Unit*	*Min*	*Typ*	*Max*
Operating temperature range	°C	-10°C	25	+50°C
Storage temperature range	°C	-20°C	25	+60°C

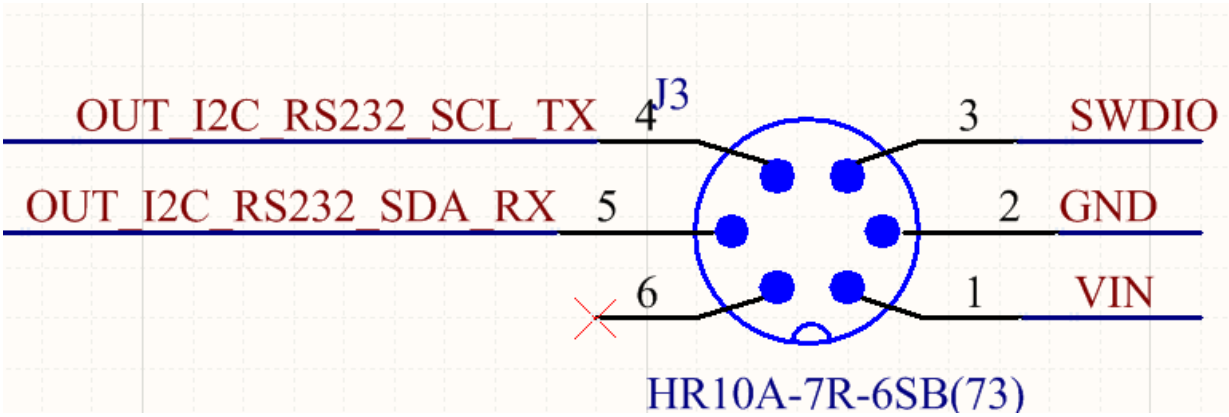
Mechanical Dimensions



Weight: TBC

Electrical Connection

The C-T-module has a Hirose 6-pin HR10A-7R-6SB connector for power and control.



Electrical Specifications

Parameter	*Min*	*Typ*	*Max*	*Unit*
Power supply				
Input voltage	3.3	5	24	V
Control voltage				
Out_I2C_RS2323_SCL_Tx / Out_I2C_RS232_SDA_Rx	-0.3		3.6	V

Register Definition

Field name	Bit	Description
Focus		*address: 0x0000*
Foc [15:0]	[15:0]	The focus value is a 16 bit integer corresponding to the following V_{rms} value: Code 0x0000 = 24Vrms … Code 0xB3B0 = 70Vrms V_{rms} = N x 0.001 + 24 (in Volts) where N = code from 0x 0000 to 0x B3B0
SW Version		*address: 0x0004*
VER	[7:0]	Software version: this register indicates the version of the module firmware.

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UART Protocol (RS232)

Hardware settings

Baud rate	57 600 Bds
Parity	No parity
Data length	32 bits
Number of stop bits	1 bit

Writing frame

STX	0x37	Add_LSB	Add_MSB	Nb_data	Data_1_1	Data_1_2	…	Data_2_1	…	Data_n	CRC

STX = 0x02

0x37 = Write command

Add_LSB

& Add_MSB = Address from first register to be written (if there are several data to write, the address will be automatically incremented).

Nb_data = Number of 32-bits words to be written

Data_1 to n = Registers value

CRC = 1 control byte calculated as follow:

Sum of all bytes (STX, CDE, ADD, NB_DATA, DATA)

Ex :

0x02	0x37	0x03	0x00	0x01	0x12	0x34	0x56	0x78	0xCA

Response of the board if transmission is successful:

STX	0x37	ACK	CRC

With ACK = 0x06

Response of the board if transmission is not successful:

STX	0x37	NACK	CRC

With NACK = 0x15

In this case the application should send again the same frame.

Reading frame

STX	0x38	Add_LSB	Add_MSB	Nb_data	CRC

STX = 0x02

0x38 = Read command

Add_MSB

& Add_LSB = Address of the first register to be read (if more than one register, the address will be automatically incremented).

Nb_data = Number of 32-bits word to be read

CRC = 1 control byte calculated as follow:

Sum of all bytes (STX, CDE, ADD, NB_DATA, DATA)

Ex:

0x02	0x38	0x03	0x00	0x01	0xB5

Response if transmission is successful:

STX	0x38	Data_1	Data_2	Data_3	Data_4	CRC

Response if transmission is not successful:

STX	0x38	NACK	0x15

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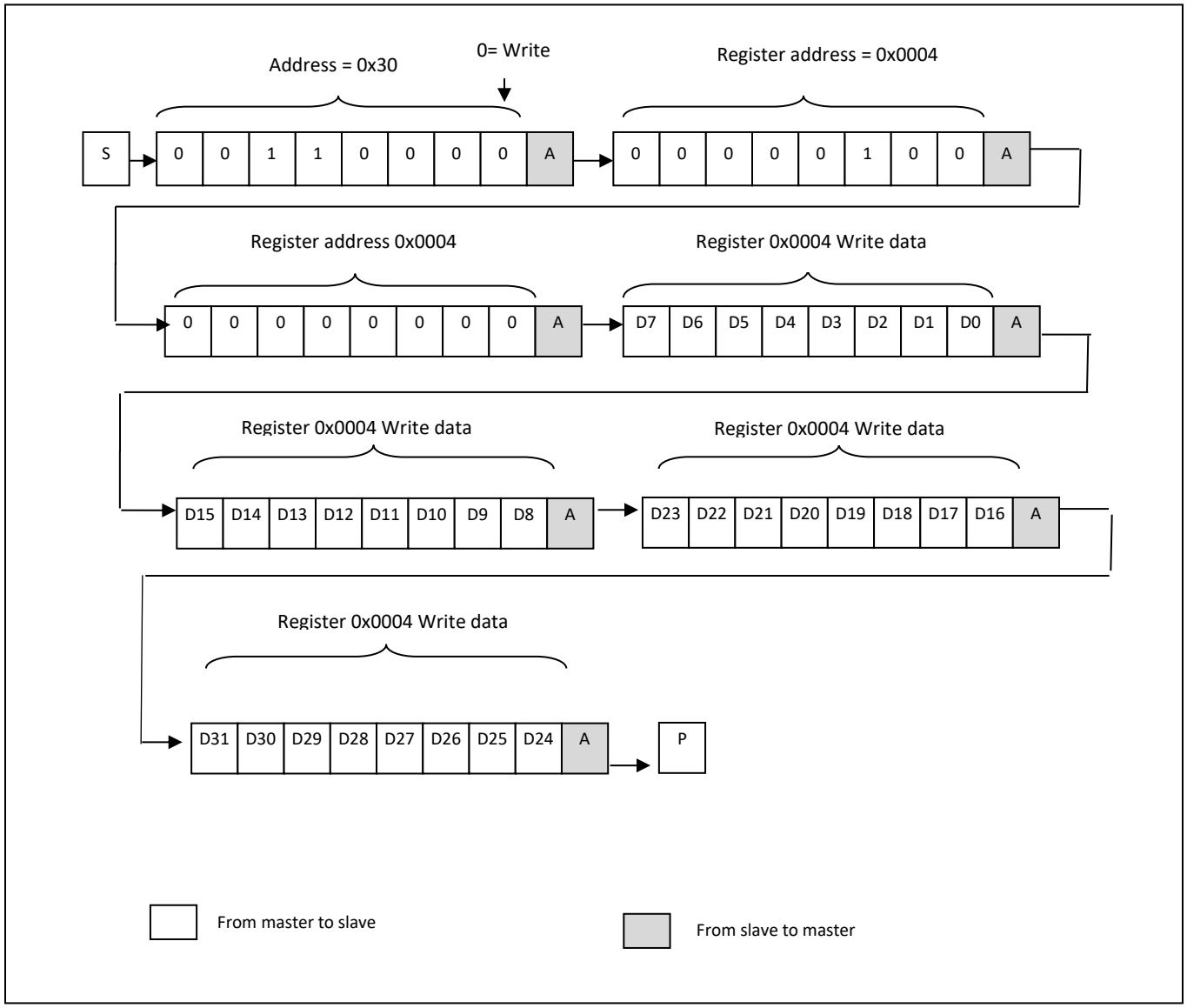
I2C Protocol

Maximum frequency of SCL is 400 KHz.
The lens is a slave device, its address is 0x30 for writing and 0x31 for reading.

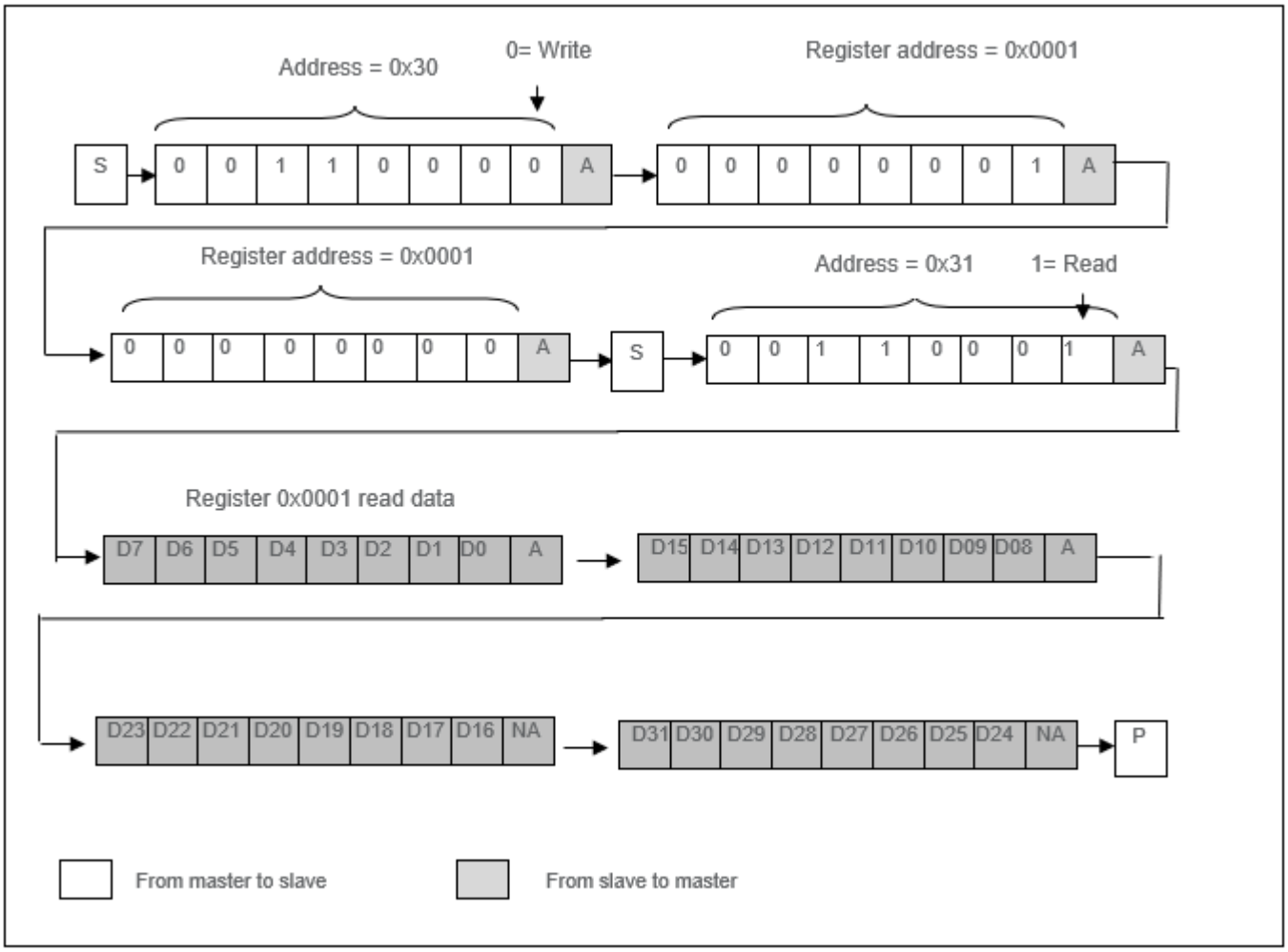
Writing frame

To write to the device, the master generates a START condition and then transmits the slave address with the R/W bit set to zero, followed by at least one data byte. The 2-first data byte is the register address, which determines which register is to be written. The device asserts an ACK on SDA if a valid register address is detected. 32 bits data received after the register address goes into the selected register. For each additional 32 bits word received from the master, the device auto-increments the register address. After all bytes are written, the master generates a STOP condition. The following examples shows a single-register I2C write.



Reading frame

To read from the device, the master generates a START condition and then transmits the slave address with the R/W bit set to zero. The master then sends the registers address to be read. After the device asserts an ACK on SDA, the master sends a repeated START condition followed by the slave address with the R/W bit set to one. The device then sends an ACK followed by the bytes contained in the register. The device auto increments the register address, and, if the master asserts an ACK, the device sends the next bytes. To end the read transaction, the master must generate a NACK followed by a STOP condition.



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