

2018 Data Pages



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EM1-S-0

EDGE Motor

ORDERING INFORMATION

Part Number: EM1-S-0
EDGE Standard Motor

Part Number: EM1-V-0
EDGE-Vacuum Rated Motor

RELATED PRODUCTS/ ACCESSORIES

Part Number: ASIC-1E-00
ASIC Edge X 1 Driver Component
Open Loop

Part Number: ASIC-1E-BD-00
ASIC Edge X 1
Driver Board Open Loop

Part Number: EDGE150001-01
ASIC-1e-00 Motherboard

Part Number: ASIC-E2-00
ASIC Edge X 2 Dual Axis
Controller/Driver

Part Number: ASIC-E2-BD-00
ASIC Edge X 2 Dual Axis
Controller/Driver Board Closed Loop

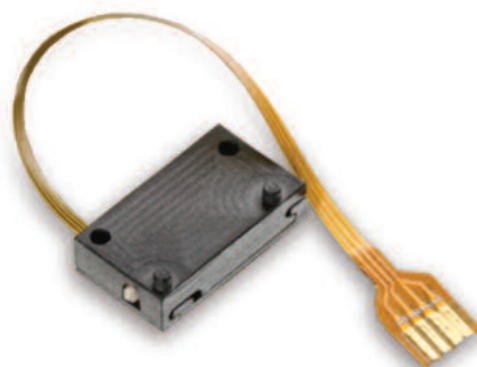
Part Number: XCD-EDGE-BD-00
Xcd Edge Controller/Driver Board

Part Number: XCDE150100-00
XCD-EDGE-BD-00 Motherboard

Application Recommendations

The EDGE motor is well suitable for a large range of applications, excelling in those where weight, form factor and power consumption are of prominence, such as:

- NUC Shutters
- Shutter & Aperture Control Components
- Filter Changer Components
- Auto Focus Modules
- Unattended Ground Sensor Modules
- Optical Image Stabilization Modules
- Mirrors Positioning

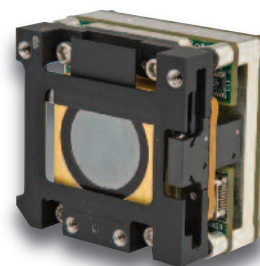


Product Description

Nanomotion's Edge motor is the smallest industrial motor of its kind available in the marketplace today. Providing unlimited linear or rotary motion, the Edge motor offers extensive opportunities in applications that suit a wide range of industries. The Edge motor works with a uniquely designed, compact ASIC-based driver, and can be operated with any servo controller. The Edge can be easily integrated into most bearing structures, and is ideal for mass production opportunities.

Edge Motor Key Features:

- Extremely small dimensions
- Excellent move and settle characteristics
- Mil-rated
- ASIC drive and control
- Wide dynamic velocity range
- High resolution
- Zero backlash
- Holds position at power off
- Silent operation
- Negligible EMI



Example of EDGE
Motor/Shutter

TECHNICAL SPECIFICATIONS

Mechanical
Weight/Mass: 0.55 gr
Dimensions: 13.5 x 7.6 x 3.15 mm

DYNAMIC

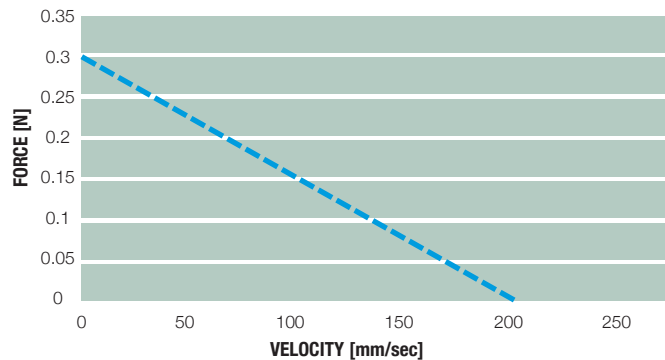
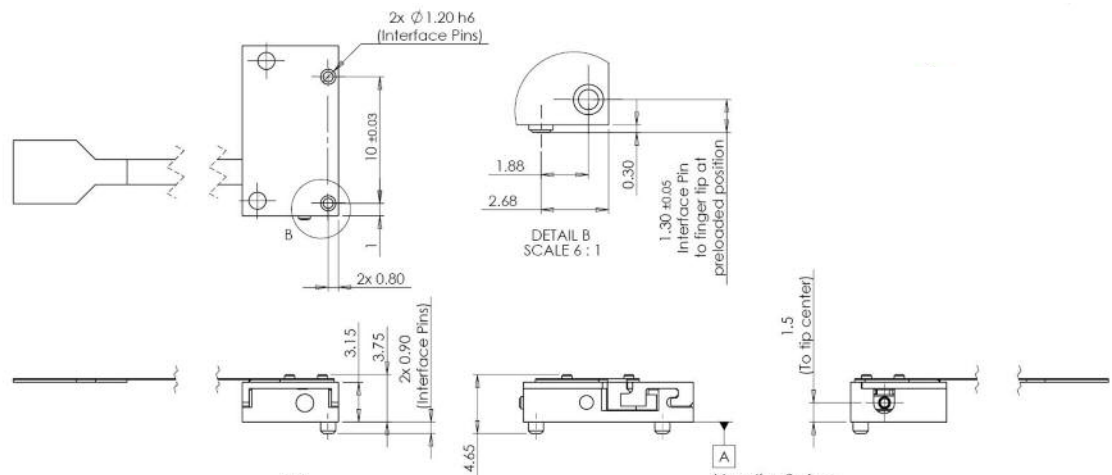
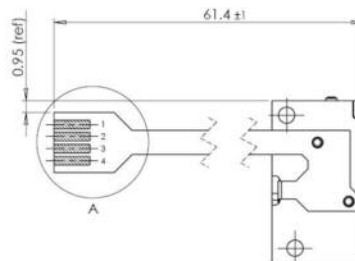
Driving Force (max): 0.32N
Velocity (max): 200 mm/sec

ENVIRONMENTAL

Operation Temperature:
-40 °C ÷ 80 °C
Vibrations: 10 g rms
Shock: 350 g

ELECTRICAL

Motor Voltage (max):
8.5 ÷ 11 V AC
Motor Current (max):
130 mA AC

VELOCITY/LOAD CHARACTERISTICS**MECHANICAL DRAWINGS AND INTERFACE****ELECTRICAL INTERFACE**

pin number	pin name	description
1	P_1	NM MOTOR PHASE 1
2	P_2	NM MOTOR PHASE 2
3,4	COM	NM MOTOR COMMON

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EM4X-S-1

EDGE-4X Motor

ORDERING INFORMATION

Part Number: EM4X-S-1-0

EM4X-S-1-0 (50mm FPC)

EM4X-S-1-10 (100mm FPC)

Part Number: EM4X-V-1-0

EDGE-4X Vacuum Rated Motor

RELATED PRODUCTS/ ACCESSORIES

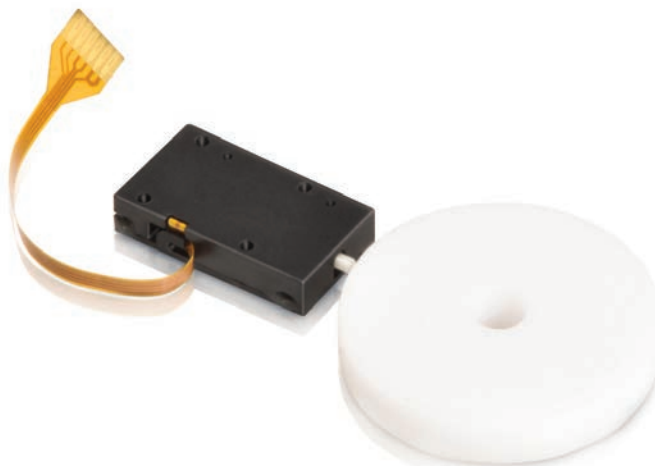
Part Number: XCD-E4X-BD1-01
Controller/Driver for 1 EDGE-4X Motor

Part Number: XCD-E4X-BD2-01
Controller/Driver for 2 EDGE-4X
Motors in parallel

Application Recommendations

The EDGE-4X motor expands the Nanomotion's product line of low voltage piezo motors, bringing 4 times the force of the Edge motor. The EDGE-4X provides up to 1.3N force with unlimited travel for linear or rotary applications. Continuing to optimize size, weight and power, the EDGE-4X is well suited to:

- Auto Focus & Zoom Requirements
- Pan & Tilt Gimbal Drive
- Optical Image Stabilization Modules

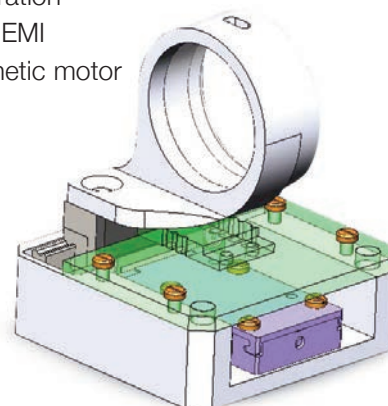


Product Description

The EDGE-4X motor offers a small footprint for unlimited linear and rotary motion. The EDGE-4X provides 1.3N max force and is capable of achieving 200mm/sec maximum velocity. The EDGE-4X can easily adapt to numerous bearing structures to provide high resolution motion control for a wide range of applications in defense optronics, medical and semiconductor markets.

EDGE-4X Moto Features:

- Small operating footprint
- Wide dynamic velocity range
- Zero backlash
- Holds position at power off
- Silent operation
- Negligible EMI
- Non-magnetic motor



EM4X-S-1

EDGE-4X Motor

TECHNICAL SPECIFICATIONS

Mechanical

Weight/Mass: 2.2g

Dimensions: 22.8 x 12.4 x 4.3 mm

DYNAMIC

Driving Force (max): 1.3N

Velocity (max): 200mm/sec

ENVIRONMENTAL

Operation Temperature:

-40 °C to 80 °C

Vibrations: 10g rms

Shock: 350g, 0.8ms half sine

ELECTRICAL

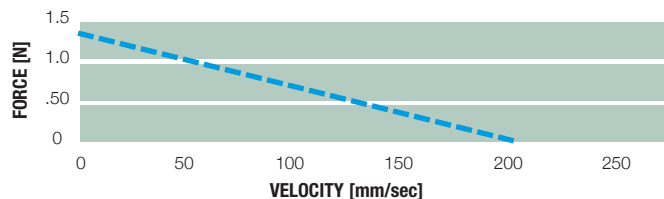
Motor Voltage (max): 14VAC

Motor Current (max): 250mA AC

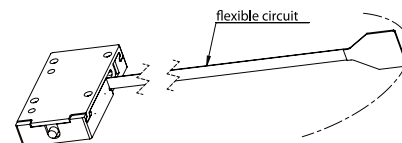
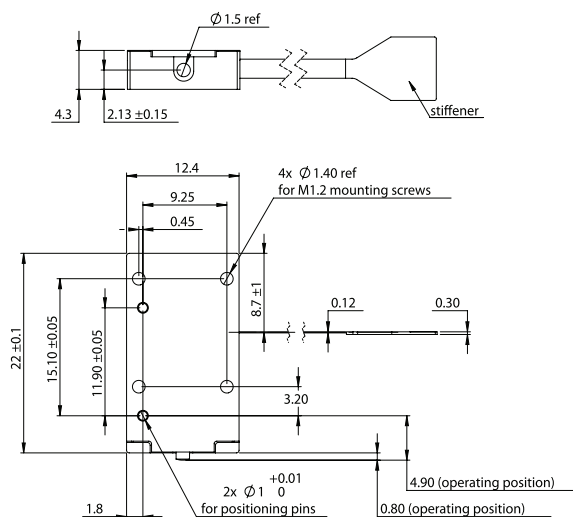
*5V DC Drive Circuitry Available

VELOCITY/LOAD CHARACTERISTICS

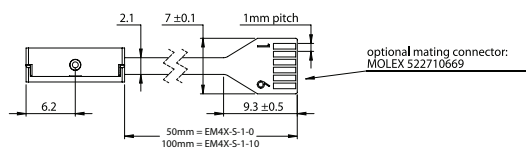
Load/Speed Characteristics



MECHANICAL DRAWINGS AND INTERFACE



ELECTRICAL INTERFACE



pin number	pin name	description
1	NTC OUT	TERMINAL RESISTOR
2	NTC IN	TERMINAL RESISTOR
3	P2	NM MOTOR
4	P1	NM MOTOR
5	COM	NM MOTOR COMMON
5	COM	NM MOTOR COMMON

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RS08

Rotary Shutter

Product Features

- Silent operation – undetectable
- Low surge current
- Best SWaP Performance
 - Mass: 2g
 - Embedded drive & control electronics in shutter body
- Holding and braking without power consumption
- MIL-STD-810F Compliant for shock, vibration, and temperature – Safe & Reliable



Product Description

The RS08 is the first shutter of its kind, utilizing a silent, miniature piezo actuator in an 8mm x 20mm package including the drive electronics. The RS08 is designed to work from a 3.3v battery and supports travel ranges from 35° to 120°. Shutter blades can vary in size and material, up to a 25mm diameter paddle. Using Nanomotion's proprietary feedback system, the shutter is fully operational as a closed loop device, stopping on electrical limits to avoid any noise from a mechanical hardstop.

ORDERING INFORMATION

Part Number:	RS080350AA-01
35° Stroke	
Part Number:	RS080450AA-01
45° Stroke	
Part Number:	RS080550AA-01
55° Stroke	
Part Number:	RS080700AA-01
70° Stroke	
Part Number:	RS080900AA-01
90° Stroke	
Part Number:	RS081200AA-01
120° Stroke	

RELATED PRODUCTS/ ACCESSORIES

Part Number:	RS08-EVAL-035
35° Kit	
Part Number:	RS08-EVAL-040
45° Kit	
Part Number:	RS08-EVAL-055
55° Kit	
Part Number:	RS08-EVAL-070
70° Kit	
Part Number:	RS08-EVAL-090
90° Kit	
Part Number:	RS08-EVAL-120
120° Kit	

Optronics Systems

- Thermal imaging (NUC) shutters
- Laser Shutters
- Filters



TECHNICAL SPECIFICATIONS

- Mechanical**
- Weight: 2 gr
 - Dimensions: $\varnothing 8\text{mm} \times 20\text{mm}$ Long
- Performance**
- Drive Mode: Closed Loop
 - Stroke Angle: up to $120^\circ \pm 2^\circ$
 - Stroke Time: <50msec for 90°
 - Operating Temperature: -40°C to 70°C

ELECTRICAL

- Drive/Control Board Embedded
- Drive Voltage: 3.3V

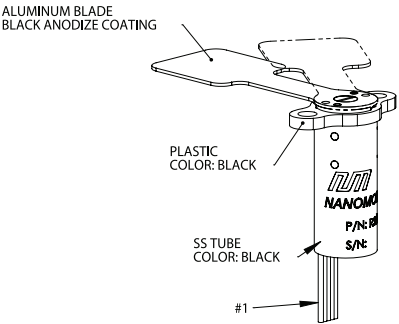
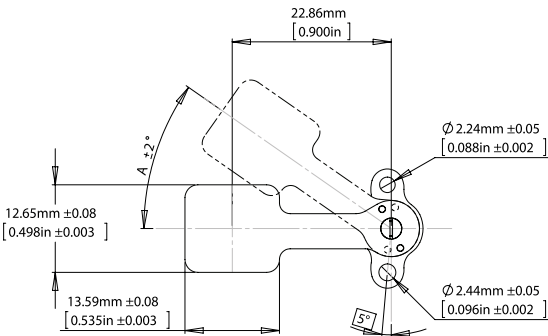
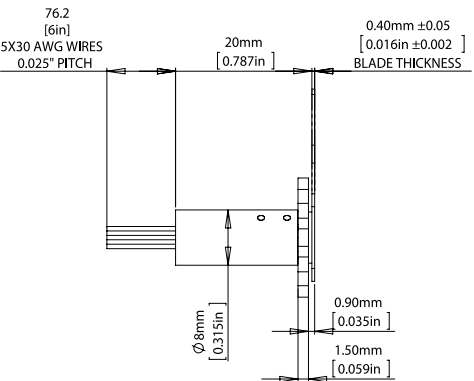
Power Consumption

- Max: 400mW
- Idle (on): 8mW

Communication

- IIC

MECHANICAL DRAWINGS AND INTERFACE



pin number	description
1	VCC 3.3V
2	GND
3	RESET
4	SDA
5	SCL

ORDERING INFORMATION

RS08A Actuator consists of the shutter body with grid and mounting screw (no blade)

Part Number:	RS080350KA-01
35° Stroke	
Part Number:	RS080450KA-01
45° Stroke	
Part Number:	RS080550KA-01
55° Stroke	
Part Number:	RS080700KA-01
70° Stroke	
Part Number:	RS080900KA-01
90° Stroke	
Part Number:	RS081200KA-01
120° Stroke	

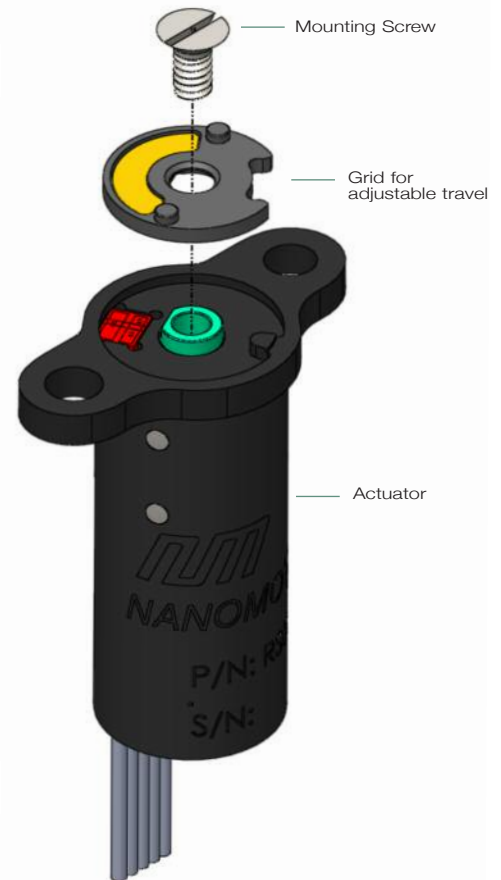
Product Features

- Blade-less actuator for shutter or filter change operation
- Silent operation – undetectable
- Low surge current
- Best SWaP Performance
 - Mass: 2g
 - Embedded drive & control electronics in shutter body
- Holding and braking without power consumption
- MIL-STD-810F Compliant for shock, vibration, and temperature – Safe & Reliable

Product Description

The RS08A is the first actuator of its kind, utilizing a silent, miniature piezo actuator in an 8mm x 20mm package including the drive electronics. The RS08A is designed to work from a 3.3v battery and supports travel ranges from 35° to 120°.

The RS08A allows for user definable shutter blade or filter changer, based on appropriate motion analysis of mass and moment of inertia. Nanomotion's proprietary feedback system is integrated into the grid, for closed loop device operation, stopping on electrical limits to avoid any noise from a mechanical hardstop.



Optronics Systems

- Thermal imaging (NUC) shutters
- Laser Shutters
- Filters



TECHNICAL SPECIFICATIONS

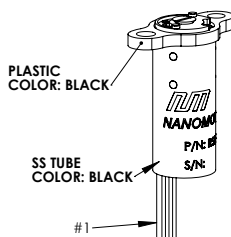
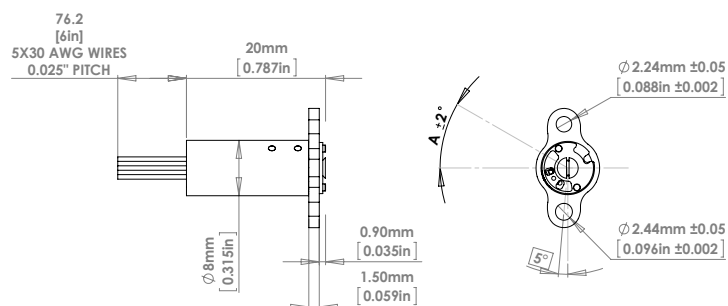
Mechanical

- Weight: 2 gr
- Dimensions: $\varnothing 8\text{mm} \times 20\text{mm}$ Long

Performance

- Drive Mode: Closed Loop
- Stroke Angle: up to $120^\circ \pm 2^\circ$
- Stroke Time: <50msec for 90°
- Operating Temperature: -40°C to 70°C
- Vibration: 10g rms hold position without power
- MTBF: 50,000

MECHANICAL DRAWINGS AND INTERFACE



pin number	description
1	VCC 3.3V
2	GND
3	RESET
4	SDA
5	SCL

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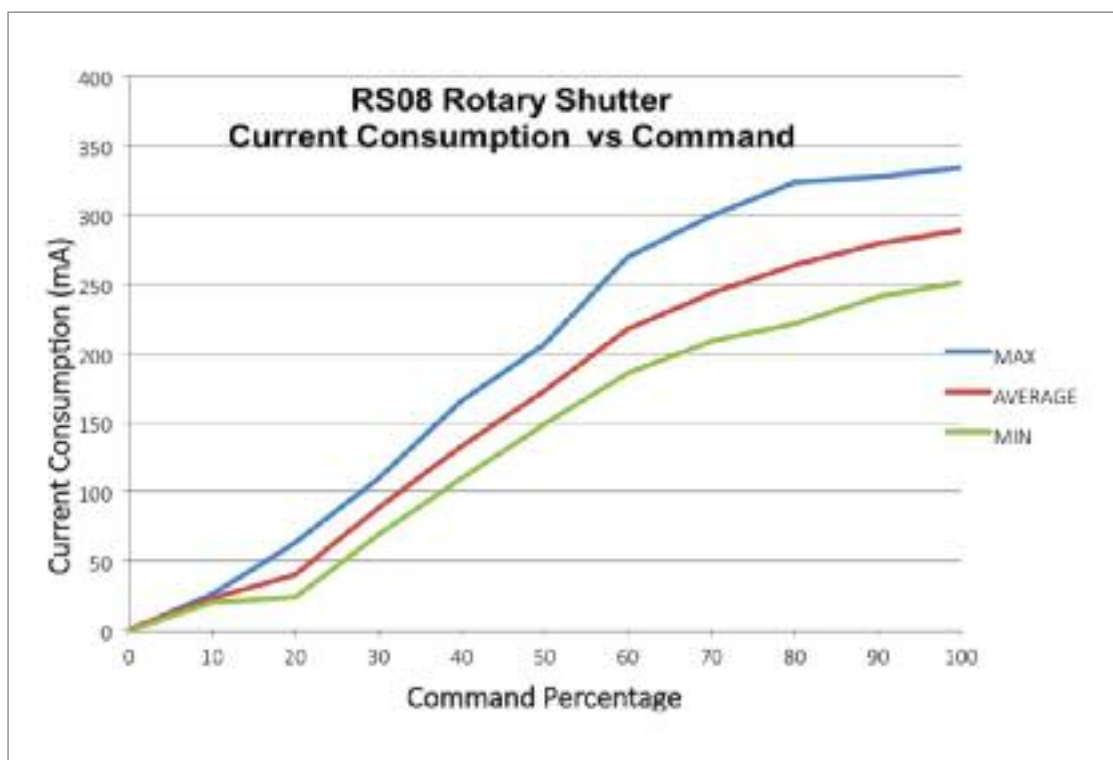
RS08

Rotary Shutter Current Consumption

Product Description

The RS08 Rotary Shutter is designed to operate with the lowest power consumption, over all other shutter technologies. The normal force of the piezo actuator, inside the shutter body, provides built-in holding and braking without power consumption. This eliminates the need for any 'magnetic latching' to hold position (which requires a peak current to overcome, resulting in reduced battery life).

The chart below reflects the minimum, maximum and average power consumption relative to data points taken at different PWM values. At 40% PWM, the expected shutter actuation time is approximately 70msec. At 60% PWM, the expected actuation time is 55msec.

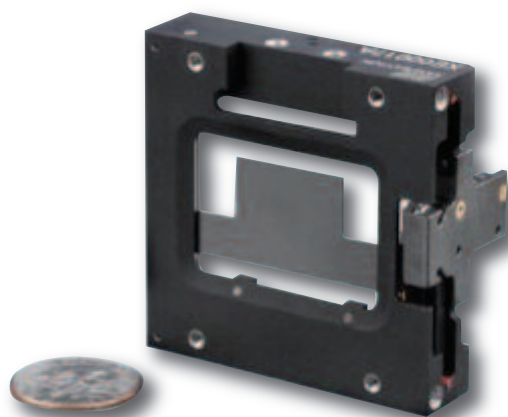


S787

NUC Shutter

Application Recommendations

- NUC Shutters for thermal sensors



ORDERING INFORMATION

Part Number: S787ARSHTR-00

RELATED PRODUCTS/ ACCESSORIES

Part Number: ASIC-1E-01

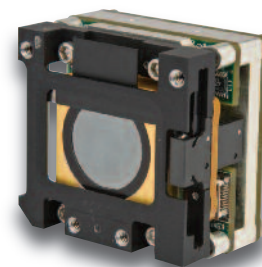
ASIC Drive/Control Component
for S787 Shutter

Product Description

Nanomotion's S787 series of NUC shutter is designed to meet the most challenging operating conditions of infrared imaging systems. The S787 shutter operates linearly with a direct drive EDGE motor, providing the lightest weight configuration while maintaining the closest proximity to the FPA.

The S787 series is provided with a 17mm x 15mm leaf that is capable of moving 15mm in 100mseconds. The moving blade is supported by the Edge – Actuator bearing structure on one side and an outboard shaft bearing to eliminate any blade deflection and vibration

Standard configurations utilize Nanomotion's Edge motor with a miniature position sensor, integral to the shutter assembly, for closed loop operation. The shutter is supported by our ASIC that closes the position loop and serves as a drive & control.



Example of S787
NUC Shutter

S787

NUC Shutter

TECHNICAL SPECIFICATIONS

Mechanical
Weight: 15 gr
Dimensions:
Aperture area: 14.7 x 17.0 mm
Moving mass of 1.5 gr
Back working distance: 2.2 mm

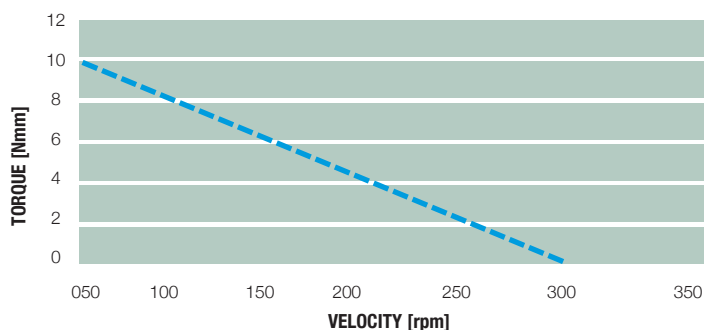
PERFORMANCE

Stroke time: 150msec
Operation from -40 °C to 70 °C
Vibration: 10 g rms (holds position without power)
Shock: 300 g, any orientation
Position holding @ power off:
10g linear acceleration
MTBF: 50,000 hours

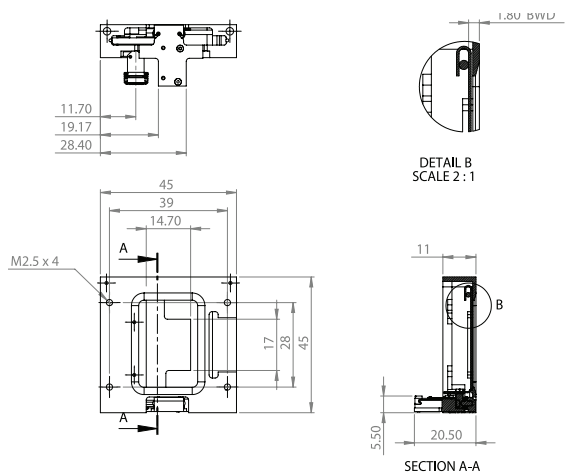
ELECTRICAL

Drive voltage: 4.2V
Power consumption at idle:
Max: 500mW
Idle: 8mW (keeps position)

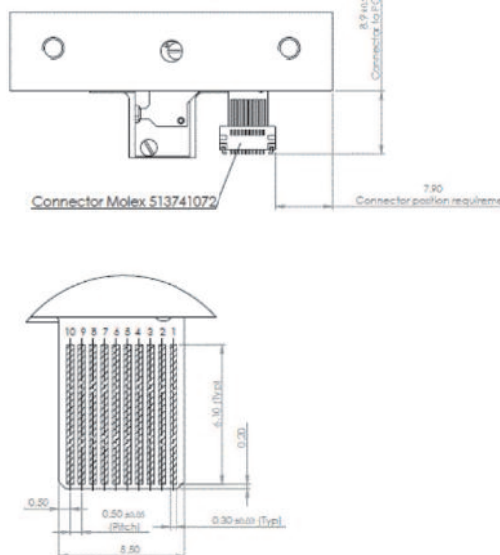
VELOCITY/LOAD CHARACTERISTICS



MECHANICAL DRAWINGS AND INTERFACE



ELECTRICAL INTERFACE



pin number	pin name	description
1	NC	DISCONNECTED
2	SC_1	PR1 COLLECTOR
3	GND	GROUND
4	SA_1	PR1 ANODE LED
5	COM	NM MOTOR COMMON
6	P_2	MN MOTOR PHASE 2
7	P_1	NM MOTOR PHASE 1
8	SA 2	PR2 ANODE LED
9	GND	GROUND
10	SC_2	PR2 COLLECTOR

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LF14

Linear Filter Changer

ORDERING INFORMATION

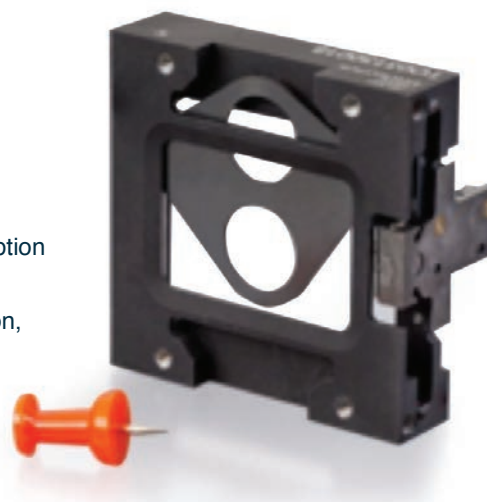
Part Number: LF140110AA-00
Linear Filter Changer

RELATED PRODUCTS/ ACCESSORIES

Part Number: ASIC-1E-01

Product Features

- Silent operation – undetectable
- Best SWaP Performance
- Closest Back Working Distance
- Negligible EMI/RFI signature – no distortion
- Holding and braking without power consumption
- MIL-STD-810F Compliant for shock, vibration, and temperature – Safe & Reliable



Product Description

Nanomotion's LF14 Linear Filter Changer is designed to meet the most challenging operating conditions of optical systems. The LF14 operates linearly with a direct drive Edge motor, providing the lightest weight configuration while maintaining the closest back working distance.

The LF14 is provided with a blade that can accommodate different filter diameters and is capable of moving 14mm in 100 msec. The filter housing is supported by the Edge-Actuator bearing structure on one side and an outboard shaft bearing on the other, to eliminate any deflection or vibration.

Standard configurations utilize the Edge motor with a miniature position sensor, integral to the filter changer assembly, for closed loop operation. The filter changer is supported by our ASIC that closes the velocity loop and serves as a drive & control.

MECHANICAL DRAWINGS AND INTERFACE

TECHNICAL SPECIFICATIONS

Mechanical

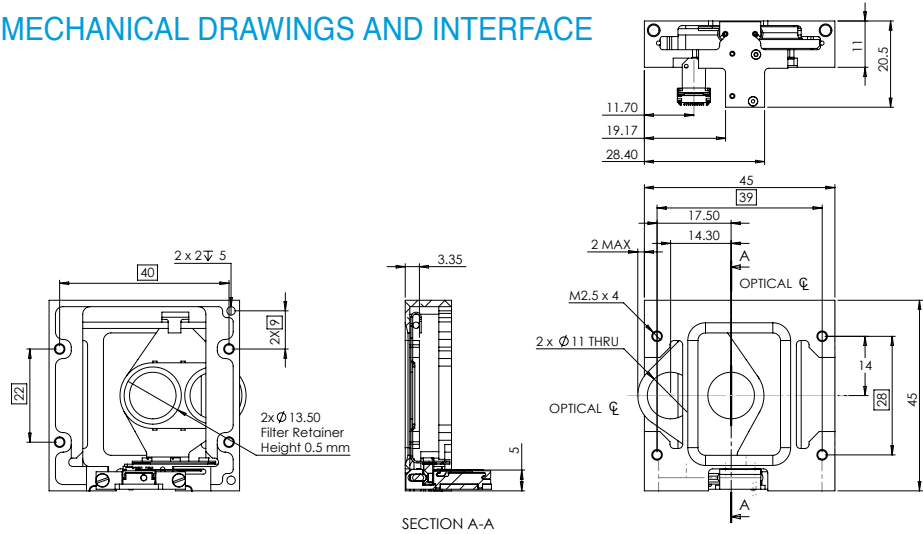
Retainer Diameter: \varnothing 11 mm
 Total weight: 15 gr
 Moving mass of 1.5 gr
 Back working distance: 3.5mm

Performance

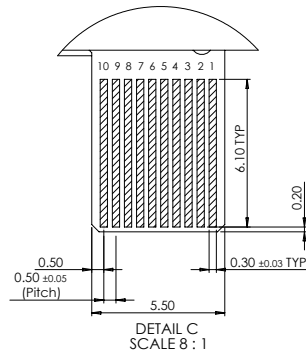
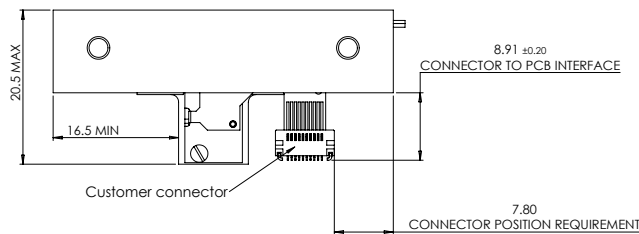
Stroke time: 150msec
 Operation from -40 °C to 70 °C
 Vibration: 10 g rms (holds position without power)
 Shock: 300 g, any orientation
 Position holding @ power off:
 10g linear acceleration
 MTBF: 50,000 hours

Electrical

Drive voltage: 4.2V
 Power consumption at idle:
 Max: 500mW
 Idle: 8mW (keeps position)



ELECTRICAL INTERFACE



pin number	pin name	description
1	N.C.	DISCONNECTED
2	SC_1	PR1 COLLECTOR
3	GND	GROUND
4	SA_1	PR1 ANODE LED
5	SCL	NM MOTOR COMMON
6	P_2	NM MOTOR PHASE 2
7	P_1	NM MOTOR PHASE 1
8	SA_2	PR2 ANODE LED
9	GND	GROUND
10	SC_2	PR2 COLLECTOR

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S840

Miniature Precision Rotary Stage

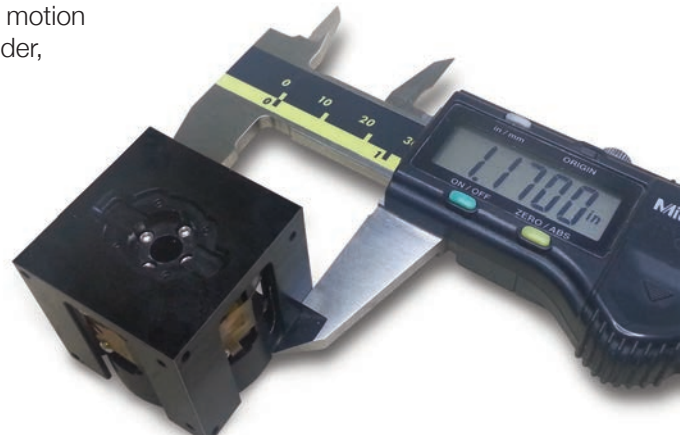
Application Recommendations

The S840 Rotary module contains a 50,000 cpr precision optical encoder (external interpolator), with Nanomotion's Edge motor technology and the XCD drive/control.

This integrated design consists of a complete motion solution, including the motors, bearings, encoder, drive & control captured in a 30mm cube.

This miniature rotary module can be adapted for:

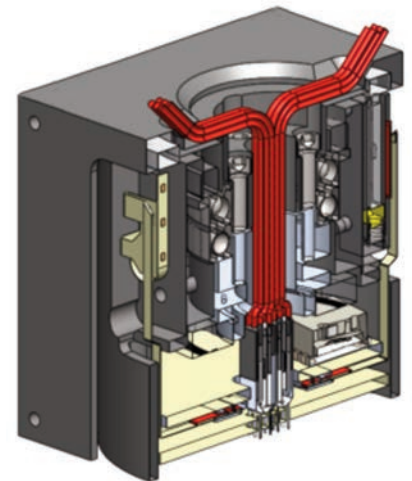
- Hand-held (soldier carry) use
- Integration to LTLN / CLRF devices
- Vehicle use
- Other mechanisms



Product Description

The outside configuration can be adapted to support different customer electronics (Mounting Orientation), while the rotary module moves 90° - for a precise quartering process.

The S840 is designed for a calibration process of an IMU (inertial measurement unit) to eliminate the drift and improve north finding precision. It is intended to reduce the cycle time and improve the precision based on current IMU availability.



The S840 has the control card completely integrated into the rotary module. The module construction consists of a (2) angular contact bearings with (4) Edge motors and a 50,000 cpr quadrature encoder (external interpolation). The control is based on Nanomotion's XCD chip and can be provided as an integrated solution or on a chip level for customer integration.

TECHNICAL SPECIFICATIONS

Stage Travel: Continuous Rotation

Velocity: 180°/sec.

Resolution: 26 arc seconds

Torque: 14mNm

Typical MoveProfile:

180° in less
than 1 second

Position Repeatability:

+/- 52 arc seconds

Assembly Weight:

Less than 50g

Power Consumption:

<500mW

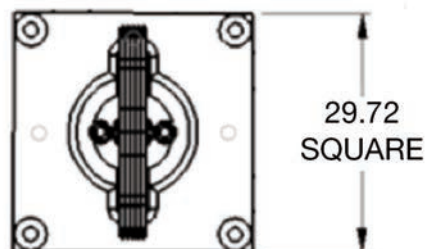
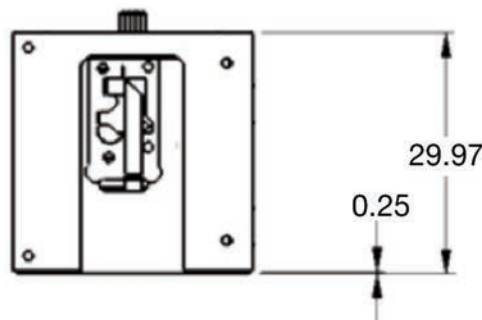
Operating Temperature:

-20°C to 70°C

Lifetime:

>20,000 hours

MECHANICAL DRAWINGS AND INTERFACE



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S851

Steering Module Stage

Application Recommendations

The S851 Steering Module is a precision tilt stage, used as a stand-alone axis or in pairs for beam steering. This module utilizes a precision, absolute encoder with resolution down to $0.1\mu\text{rad}$, with positional accuracy to $14\mu\text{rad}$.

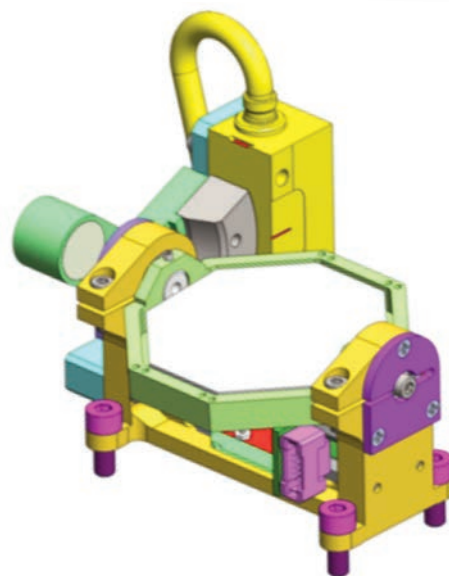
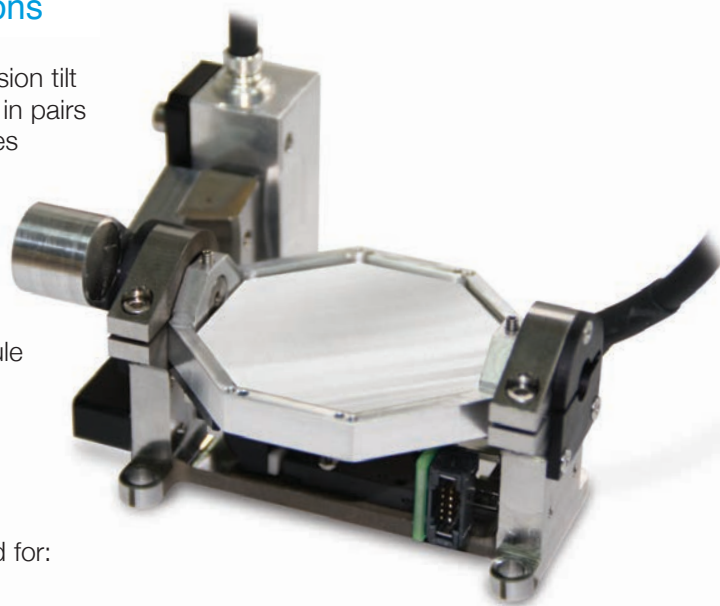
The mounting surface can be configured to support a mirror or other optical components. The module is driven by Nanomotion's Edge-4X motor and capable of operation during 30g's of vibration.

This steering module can be adapted for:

- Ground based laser steering
- Flight based steering

Product Description

The S851 uses the Edge-4X motor to achieve $\pm 3^\circ$ travel operation at 8Hz, with total travel of 8° (or more). Designed to work with Nanomotion's XCD2 board level, dual axis controller, precision motion can be supported for working as a single axis or in pairs.



S851

Steering Module Stage

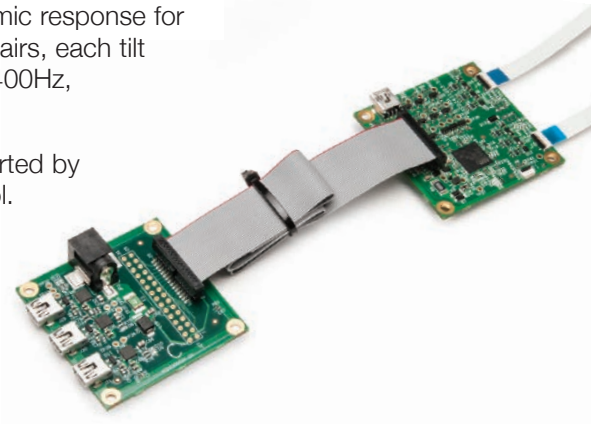
TECHNICAL SPECIFICATIONS

Stage Travel:	8° standard, (10K with modification)
Velocity:	1° in 30msec
Resolution:	0.1μrad (Absolute encoder)
Position Accuracy:	14μrad
Typical Move For Steering:	1° in 30msec.
Operating Temperature:	-40°C to 70°C
Lifetime:	>20,000 hours

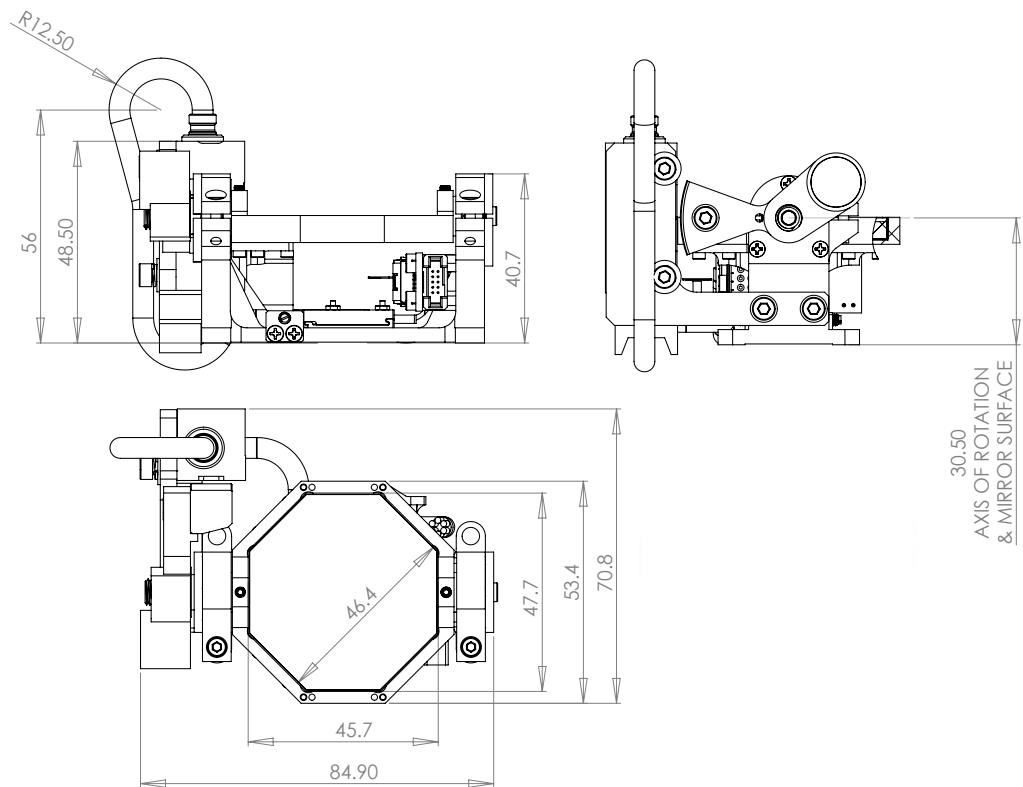
Dual Axis Drive & Control

The S851 is designed for extremely high dynamic response for rapid steering of a laser beam. While used in pairs, each tilt stage has a natural frequency of greater than 400Hz, allowing for high speed motion control.

As a pair of steering stages the S851 is supported by Nanomotion's XCD2 dual axis drive and control. The XCD2 can support a variety of Edge & Edge-4X motor configurations (power stage) and supports both absolute and incremental encoders. The XCD2 can be provided on board level or chip level, depending on integration requirements.



MECHANICAL DRAWINGS AND INTERFACE



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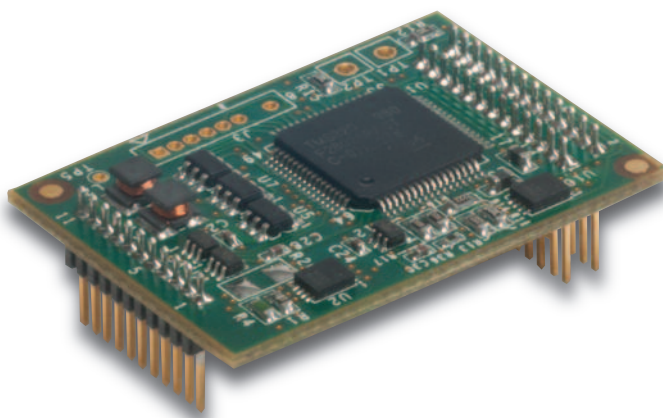
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XCD-EDGE-BD-03

Drive and Control

Application Recommendations

- Auto Focus/Zoom Modules
- Shutter & Aperture Control
- Filter Changers
- Pan and Tilt Modules



ORDERING INFORMATION

Part Number: XCD-EDGE-BD-03

Drive and Control

RELATED PRODUCTS/ ACCESSORIES

Part Number: EM1-S-0

EM1-V-0

EDGE motor

Part Number: XCDE150100-00

XCD EDGE Motherboard Assembly

Product Description

Nanomotion's XCD – Drive & Control redefines the art of miniaturized drive and control electronics with the smallest hardware for operating piezo ceramic servo motors. The XCD provides complete servo control for the OEM market, coupled with the power stage and drive electronics on one board. XCD will have an OEM specific, motherboard for connecting to the motor, position sensor, communication and power.

The XCD for the Edge motor is provided as a single axis board which can operate in the 'AB5' mode with brake on/off, or in the more traditional AB1A mode. The XCD for the Edge motors accepts a single ended encoder signal and is programmed via an IIC interface and the NanoCommander user software.

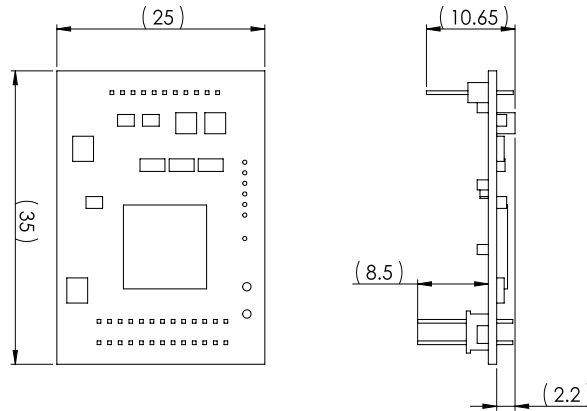
MECHANICAL DRAWINGS AND INTERFACE

TECHNICAL SPECIFICATIONS

Dimensions:
 35.0 x 25.0 x 10.65 mm
 Motors supported : EDGE
 Input Power: 5 V
 Drive Mode AB5
 (brake on/off) or AB1A mode
 Communication IIC
 Operating Temperature:
 -40 to 85 °C

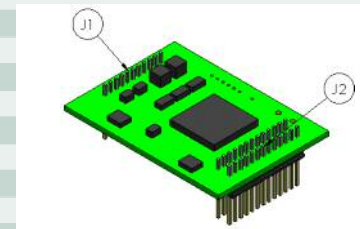
ELECTRICAL

Power Consumption:
 500 mW (max)



ELECTRICAL INTERFACE

J2 Main Connector			J1 Motor and Encoder Connector	
pin number	pin name	pin description	pin name	pin description
1	+5v	5vdc pc:mer input	+5v	5vdc power out
2	+5v	5vdc pc:mer input	a	encoder incremental signals
3	spi clk	spiclock	b	encoder incremental signals
4	spi en	spi enable	index	encoder reference mark
5	miso	master in slave out	gnd	system ground
6	mosi	master out slave in	urn it sw right	limit switch right
7	n.c.	not connected	lim sw len	limit switch length
8	n.c.	not connected	gnd	system ground
9	rx	rs232 receive	p1	motor phase 1
10	tx	rs232 transmit	com	motor common
11	sda	i2c serial data	p2	motor phase 2
12	scl	i2c serial clock		
13	gpi01	ppw		
14	gpi02	n/a		
15	gpi03	general purpose digital output 3		
16	gpi04	general purpose digital output 4		
17	an2	analog input 1		
18	an1	analog input 2		
19	emergency	emergency stop		
20	an3	analog input 3		
21	anlg out2	analog output 2		
22	anlg out1	analog output 1		
23	n.c.	n/a		
24	pwm out	keep alive		
25	gnd	system ground		
26	gnd	system ground		



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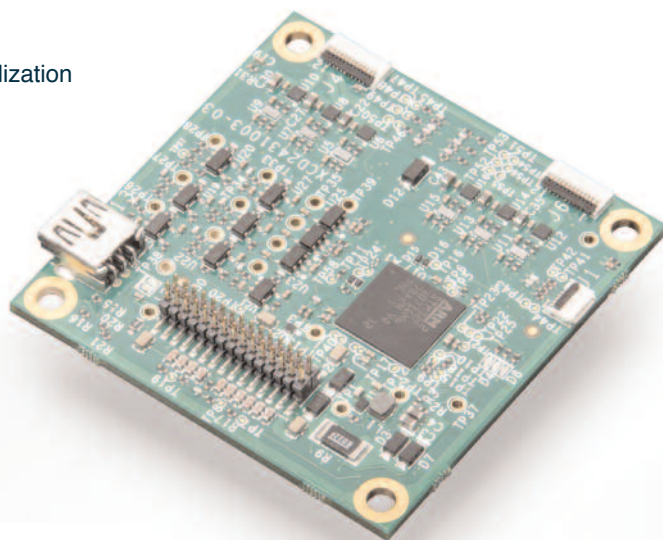
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XCD2

Dual Axis Drive and Control

Application Recommendations

- Auto Focus/Zoom Modules
- Pan & Tilt Gimbal with Gyro Stabilization
- Beam Steering & Stabilization
- Target Acquisition Devices



ORDERING INFORMATION

Part Number: XCD2150003-02
(main board)

RELATED PRODUCTS/ ACCESSORIES

Communication Host Adaptor Boards:

XCD215002A-00
RS232/485 HOST adapter
XCD215002B-00
General HOST adapter
XCD2150002C-00
USB to UART/SPI/I2C adapter

Motor Adaptor Boards:

XCD215002A-00
RS232/485 HOST adapter

Encoder Interface Boards

- A Quad B
- BiSS encoder

Product Description

XCD2 Multi axis amplifier & control board is a dual axis OEM amplifier and control board designed for applications using the Edge & Edge-4X motors. The board level product serves as a dual axis controller and can support a mixture of motor configurations, with multiple Edge motors or multiple Edge-4X motors per axis.

The XCD2 also supports Nanomotion's gyro input for dual axis stabilization. The XCD2 is programmed via IIC and can support quadrature (incremental) encoder input as well as BiSS (absolute) encoder input.

The XCD2 supports 2 axes of motion in the AB1 or AB5 mode of operation. It is an advanced 32-bit ARM 168MHz floating point processor with a configurable servo rate, up to 20KHz.

Communications via UART, I2C, SPI and USB are supported, along with an embedded gyro interface using the SPI port.

Advanced I/Os with (8)GPIO, (16) ADC and (2) DACs, with configurable parameters.

XCD2

Drive and Control

MECHANICAL DRAWINGS AND INTERFACE (Dimensions in mm)

TECHNICAL SPECIFICATIONS

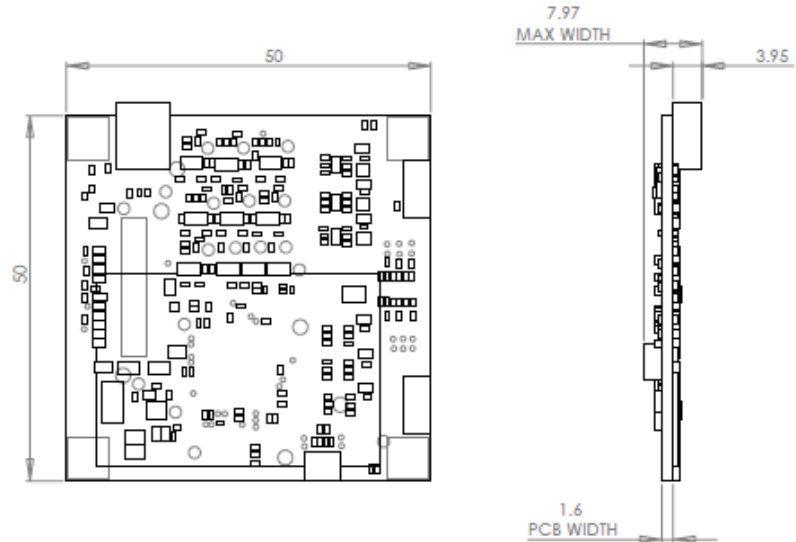
Mechanical
Dimensions: 50mm x 50mm

PERFORMANCE

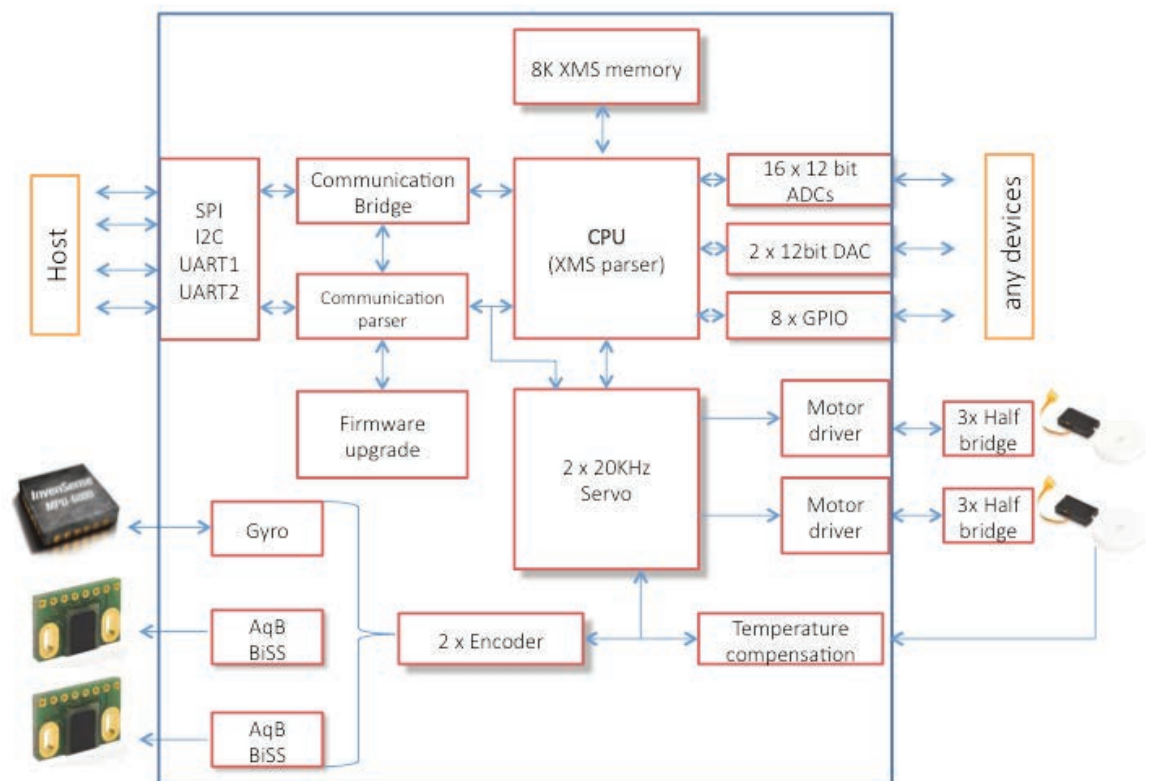
- Motors Supported: 1, 2, 3, or 4 Edge Motors per axis
- 1 or 2 Edge-4X Motors per axis
- Drive mode : AB1 or AB5 (Brake on/off)
- Communication: IIC, UART, SPI and USB
- Operating Temperature: -40°C to 70°C

POWER CONSUMPTION

Input: 5V 5% tolerance
CPU: 100mA
Edge-4X: 300mA per motor
Edge: 100mA per motor
Inputs & Outputs are 3.3V



BLOCK DIAGRAM

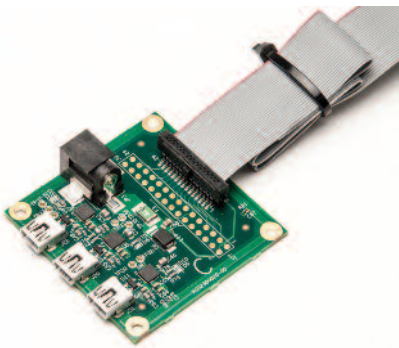


POWER STAGE & CONNECTION OPTIONS

The XCD2 drive/control board offers a variety of options to connect:

- Host Adapter Board
- Motor power stage
- Incremental or Absolute Encoders
- Gyro (Nanomotion defined)

HOST ADAPTER BOARD

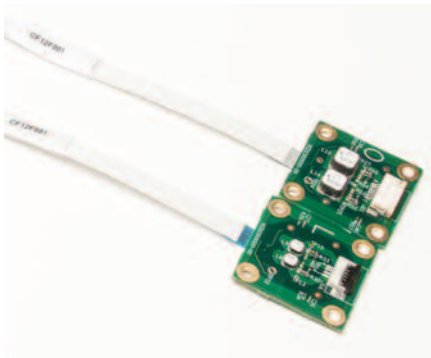


The host adaptor board provides an easy way to connect to the XCD2 main board. A standard header connector has pin to pin connection to HOST connector and has the same signals as the small HOST connector. In addition the board has a power jack connector to supply 5V.

Three boards are available:

- A – RS232 and RS485 communication interfaces
- B – Contains pin to pin connection between the HOST connector and a 100mill header
- C – I2C, SPI and UART communication interfaces

MOTOR POWER STAGE

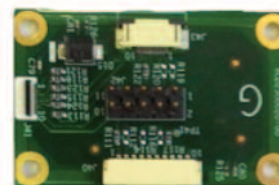


The XCD2 is designed to work with Nanomotion's Edge and Edge-4X motors. The controller can support two axes with any configuration of 1 through 4 Edge motors and 1 to 2 Edge-4X motors.

Each power stage board is available with standard flat ribbon cables and connectors.

ENCODER INTERFACE

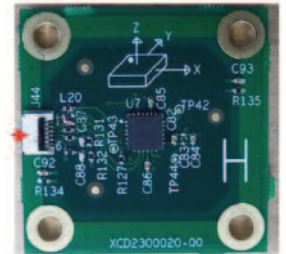
The XCD2 supports either an incremental, A-quadrature-B encoder or an absolute, BiSS encoder. Both connection boards are available.



GYRO INTERFACE

The embedded gyro interface uses the SPI port and provides (8) stabilized presets allowing for easy transition between modes (encoder + gyro).

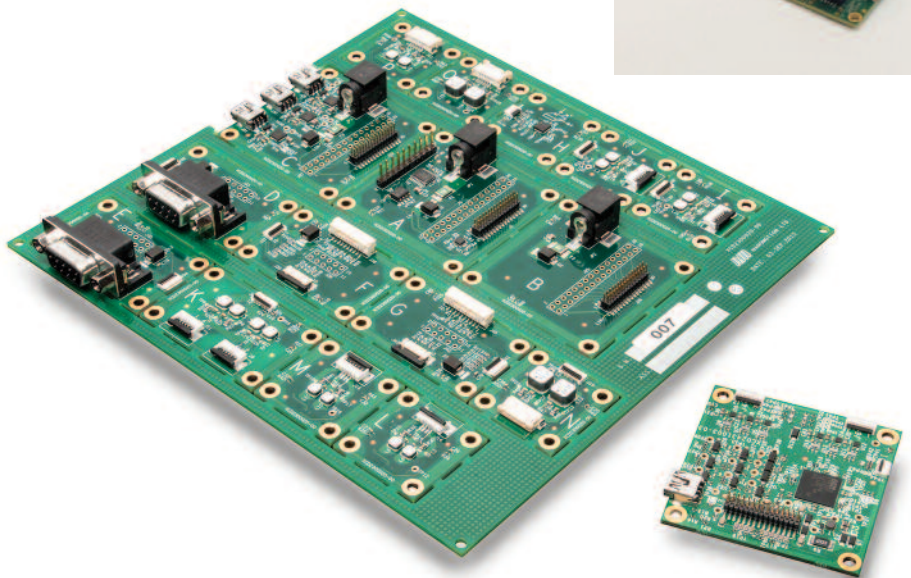
The gyro interface only supports the InvenSense MPU-6000 gyro.



EVALUATION KITS

For application development, Nanomotion offers a variety of development kits that consist of both motor/mechanical axes and the various board configurations. Nanomotion can also supply a single XCD2 board, providing all of the component options, in a 'snap-off' board configuration, allowing flexibility to change between power stage, encoder choices and communications.

Most applications ultimately lead to the integration of our XCD2 chip or power stage being integrated into customer electronics, to save space. However, all applications can be supported through the use of various evaluation boards and even custom production board based on specific requirements.



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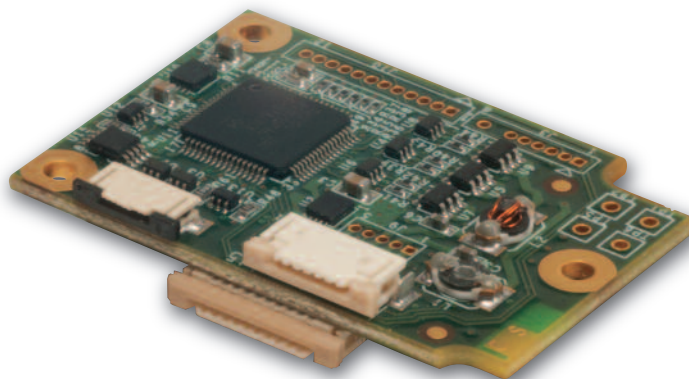
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S77515X000-03

Controller Driver

Application Recommendations

- Auto Focus/Zoom Modules
- Shutter & Aperture Control
- Filter Changers
- Pan and Tilt Modules



ORDERING INFORMATION

Part Number: S775150000-03
Drives 4 EDGE Motors in parallel or 1 x ER-15-4 Motor

Part Number: S775151000-03
Drives 1 EDGE Motor

Part Number: S775152000-03
Drives 2 EDGE Motors in parallel

Part Number: S775153000-03
Drives 3 EDGE Motors in parallel

RELATED PRODUCTS/ ACCESSORIES

Part Number: EM1-S-0
EM1-V-0
ER-15-4 Motor

Product Description

S775150000-03 controller driver is designed to support the ER-15 rotary motor, as a closed loop drive/control for (4) Edge motor elements. The drive/control board is based on Nanomotion's XCD chip, with an expanded power stage. The S775 board takes a single ended quadrature encoder input and is fully programmable via the

Nano-Commander software and IIC user interface.

- Can drive and control ER-15 rotary motor or up to (4) EDGE motors
- PC interface through Nanocommander
- Interfaces with host through IIC

MECHANICAL DRAWINGS AND INTERFACE

TECHNICAL SPECIFICATIONS

Mechanical

Dimensions: 45.7 x 33.3 x 7.2 mm

PERFORMANCE

Motors supported: ER-15-4, XE
EDGE motors

Encoder Input: Quadrature

Input Power 5 V

Power Consumption: 2 W (max)

Drive Mode: AB5 (brake on/off)
or AB1A mode

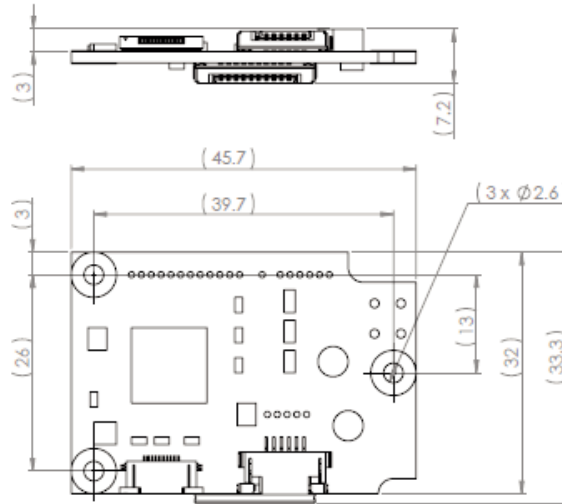
Communication: IIC

Safety End of travel limits and
E-Stop

Digital Inputs 3 – TTL 3.3 to 5 V

Operating Temperature:

-40 to 85 °C



ELECTRICAL INTERFACE

type	motor molex 0522070685	host controller molex 522071085	encoder molex 0527451097
1	NTC OUT	VCC 5V	GND
2	NTC IN	XDA	N/C
3	P2/PHASE 2	SCL	N/C
4	P1/PHASE 1	UART RXD	N/C
5	COM	UART TXD	+5V
6	COM	GPIO 3	0V
7	–	GPIO 4	A SIGNAL
8	–	TDO	ISIGNAL
9	–	RESET	B SIGNAL
10	–	GND	GND

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IC000028

XCD Component

Application Recommendations

- Auto Focus/Zoom Modules
- Shutter & Aperture Control
- Filter Changers
- Pan and Tilt Modules
- OEM Stages



ORDERING INFORMATION

Part Number: IC000028
NM XCD BLANK

Part Number: XCD-XX-03
XCD SW/VER:1.4.0.7

RELATED PRODUCTS/ ACCESSORIES

All Nanomotion motors

- EDGE motor
- ER-15-4 motor
- HR Motors

Product Description

Nanomotion's XCD drive & control is a miniature closed loop servo control with the smallest hardware for operating piezo ceramic servo motors. The XCD provides complete servo control for Security market applications with a built in motor driver.

The XCD component is provided on a chip level and can be integrated into user electronics with the addition of a motor power stage. The component level product will accept single ended or differential encoder input (motor size dependent) and is programmed via an IIC interface and our NanoCommander user software.

XCD Component

TECHNICAL SPECIFICATIONS

Mechanical:

Dimensions: 12mm x 12mm

height : 1.2 mm

Functional:

Motors supported:

All Nanomotion motors

Drive mode : AB5 , AB1

Support AQB sensor

(Single ended 5V/3.3V)

Communication: IIC, SPI (slave, master), Uart (LVTTTL).

Limit switch: left limit, right limit

Emergency (optional)

2 x input TTL (5v/3.3v)

2 x Input/Output LVTTTL (3.3v)

3 x Analog input: NTC, Joystick, Potentiometer

(Vin range: 0V to 3.3V)

2 x Analog out (pwm)

ELECTRICAL

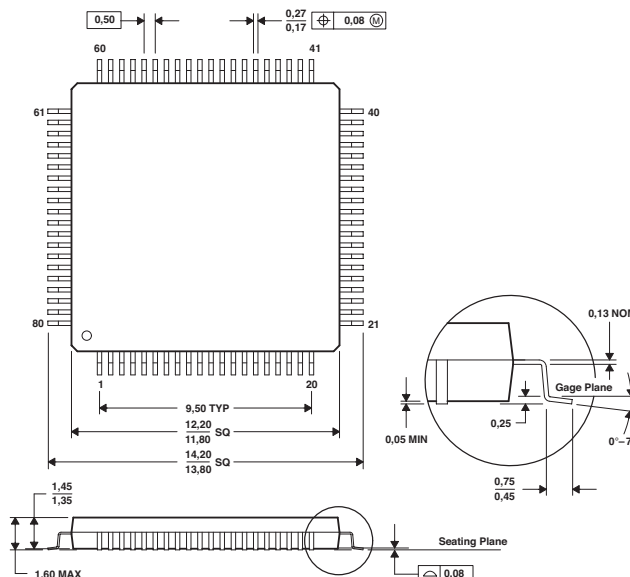
Main power: 5V

ENVIRONMENTAL

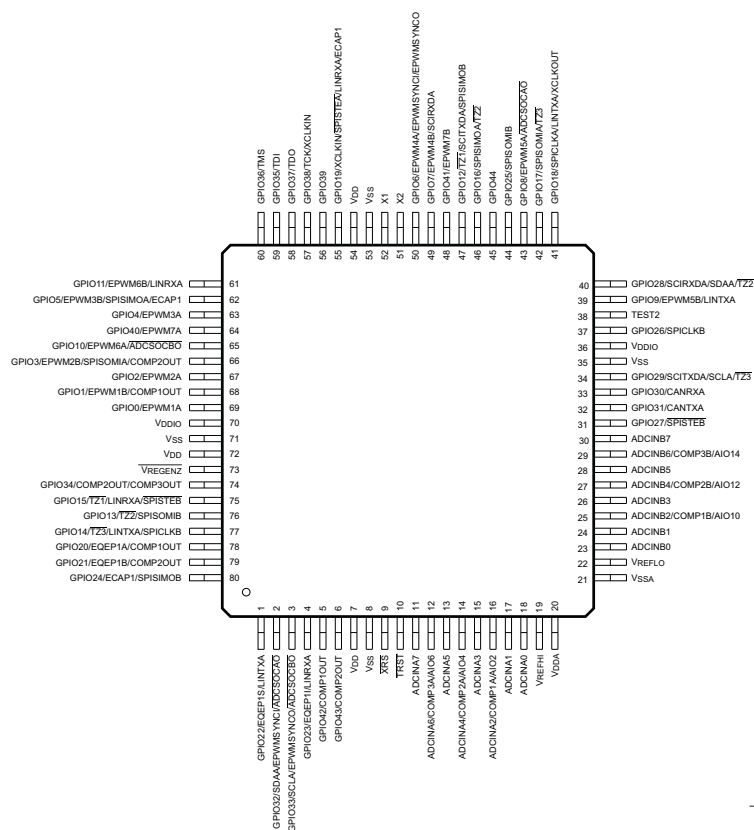
Operating Temperature :

-40°C- 85°C

MECHANICAL DRAWINGS AND INTERFACE



ELECTRICAL INTERFACE



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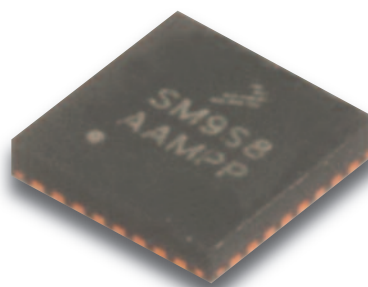
www.nanomotion.com

ASIC-1E-00

ASIC Component

Application Recommendations

- Auto Focus/Zoom Modules
- Shutter & Aperture Control
- Filter Changers
- Pan and Tilt Modules



ORDERING INFORMATION

Part Number: ASIC-1E-00
ASIC Driver For 1 EDGE Motor

Part Number: ASIC-1E-01
ASIC Controller Driver For S787
Shutter

Part Number: ASIC-E2-00
ASIC Driver For 2 Axis EDGE
Motors

RELATED PRODUCTS/ ACCESSORIES

Part Number: EM1-S-0
EM1-V-0

Product Description

Nanomotion's ASIC controller/driver component can support the Edge motor and Edge based modules working in either the traditional AB1A mode or in AB5 mode (linear voltage to velocity profile). The AB1A mode supports up to two motors in parallel, doubling the force output.

The ASIC component can be provided for integration in customer electronics and supports open loop operation, as a driver only or closed loop operation based on Nanomotion's proprietary analog position sensor.

The ASIC driver board is configured for open loop, driver operation only.

MECHANICAL DRAWINGS AND INTERFACE

TECHNICAL SPECIFICATIONS

Mechanical

Package: 32-pin QFN,

5mm x 5mm height 1.2mm

Functional:

Controller/Driver, or driver only

Motors supported: up to 2 EDGE motors

Drive mode : AB5 , AB1

IIC interface at max 100 KHz

3 OPAMPs inputs

2 A/D inputs

ELECTRICAL

Supply voltage:

2.7V to 4.2V

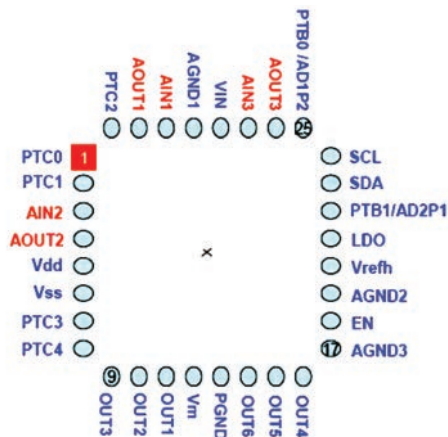
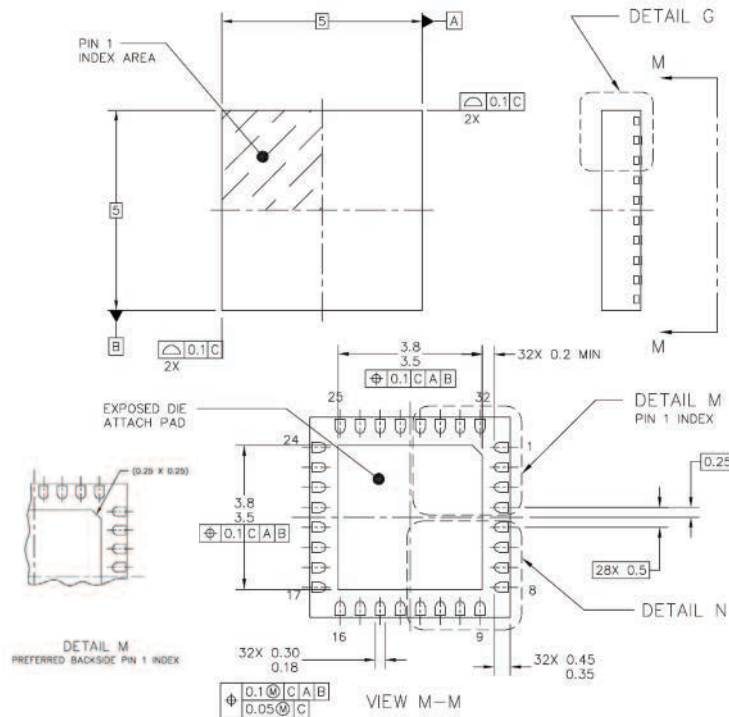
25ua leakage current at sleep mode (at 3.7V)

ENVIRONMENTAL

Operating Temperature:

-40°C – 85°C

ELECTRICAL INTERFACE



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