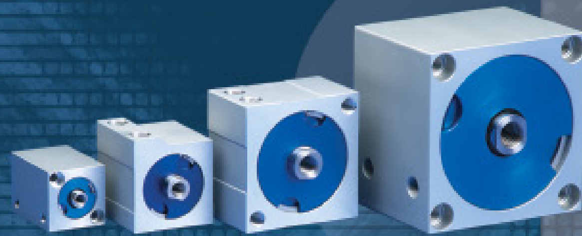
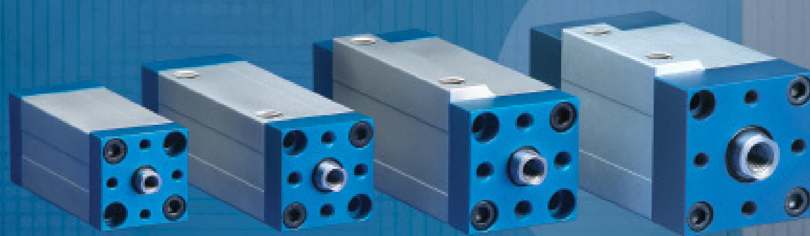
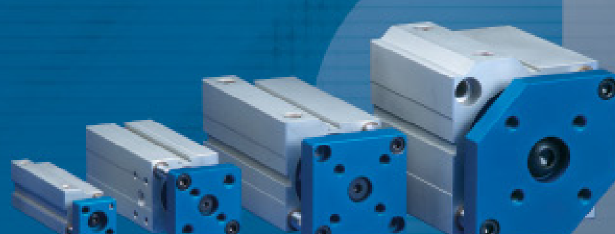
Rotary Actuators



PNEUMATIC AND HYDRAULIC AUTOMATION PRODUCTS

Space Saving Engineered Solutions





NASON

NEW THINKING

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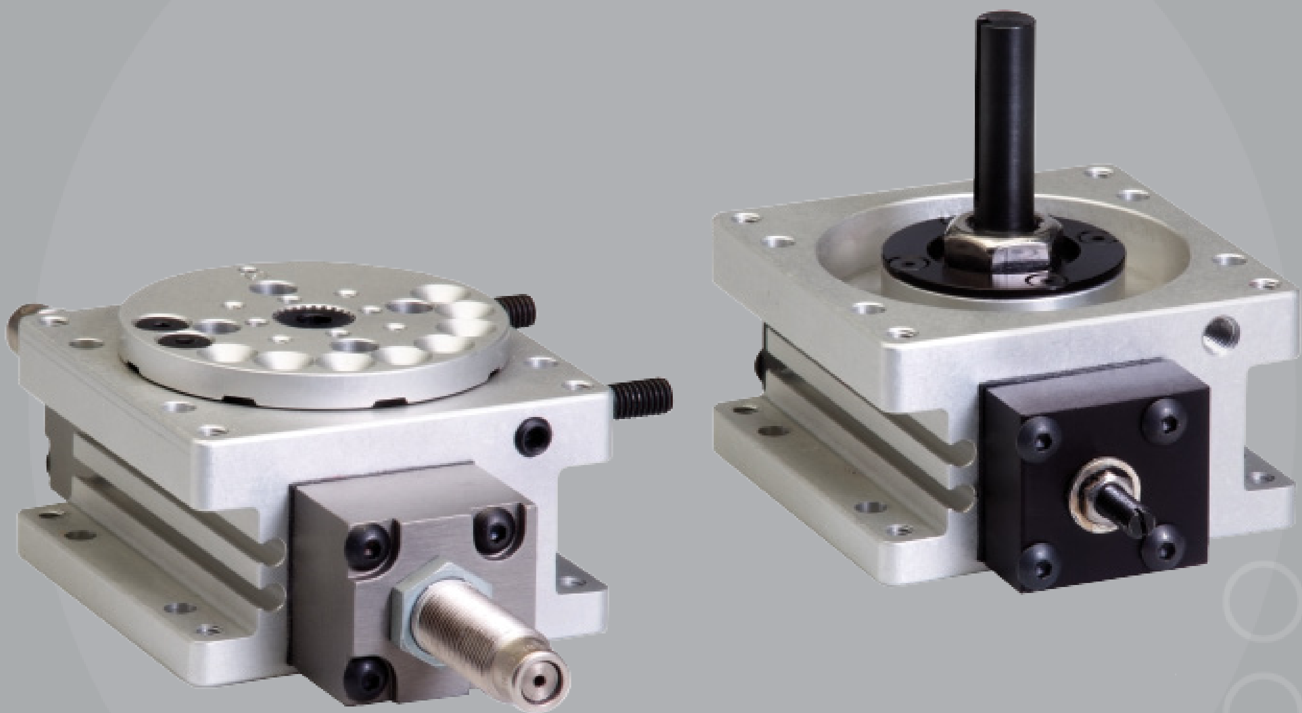
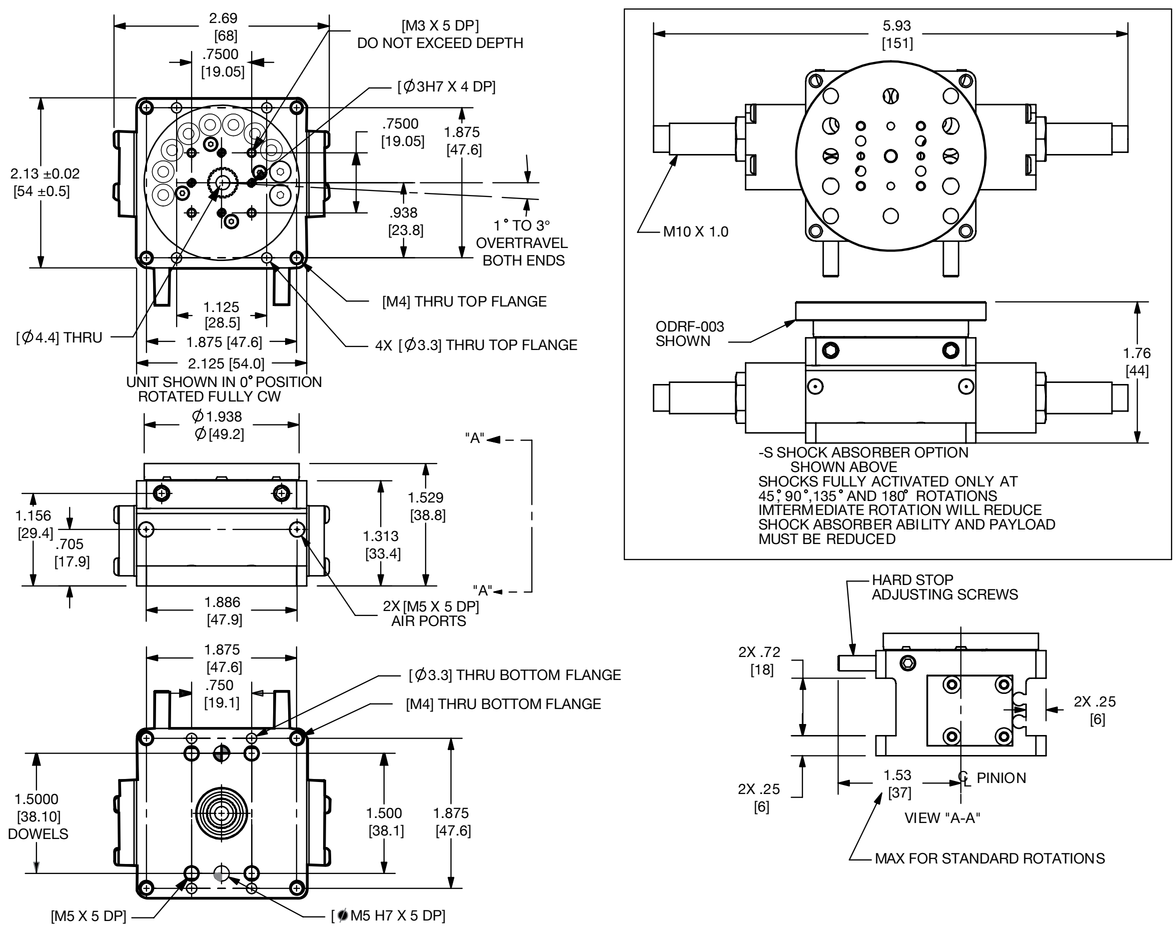


ROTARY ACTUATORS

Nason Rotary Actuators are available in two series. The NRF series is a flange output with precision end stop positioning, and the NRS series is a shaft output for simple rotary applications such as diverter gates, escapements and ejection stations.

Both the NRF and NRS series have rotational capabilities up to 180 degrees, torque ranges from 8 in-lbs up to 68 in-lbs and are manufactured from 7000 series aluminum. The NRF has payload capabilities from 1 lb up to 15 lbs and all rotaries are field repairable.



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

℄				Imperial in.	Metric [mm]
Dimensions are symmetrical about centerline	Third Angle Projection	All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]	Metric Threads Course Pitch	0.00 = ±.01 0.000 = ±.005 0.0000 = ±.0005	[0.] = [±.25] [0.0] = [±.13] [0.00] = [±.013]

How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRF - 19 M - [ ] - S

SHOCK ABSORBERS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(Consult factory for intermediate degrees of rotation)

ROTARY ACCESSORIES	**ORDER #**	**QTY/UNIT**
Turntable Blank, Metric	**RBTT - 19**	**1**
SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair Kit (Standard Buna-N)	**KR - NRF19**	**1**
Shock Seal Repair Kit	**KR - SNRF19**	**1**

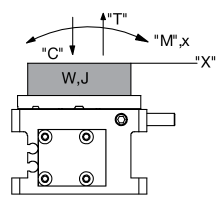
*Sensor and cable sold separately

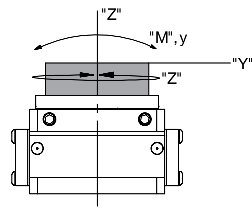
Specifications	NRF-19M	
Maximum Payload with shocks (-S)	1 lbs.	0.45 kg
Maximum Payload without shocks	0.5 lbs.	0.23 kg
Maximum Payload Inertia with shocks (-S)	0.0016 in-lbs.-sec.^{2}	1.8 X10^{-4} N-m-sec.^{2}
Maximum Payload Inertia without shocks	0.0008 in-lbs.-sec.^{2}	9.0 X10^{-5} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	8.3 lbs.-in.	0.9 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.375 in.	9.5 mm
Weight with shocks (-S Option)	0.72 lbs.	0.34 kg
Weight without shocks	0.54 lbs.	0.24 kg
Pressure Range	40-100 psi	3-7 bar
Bore	0.750 in.	19.1 mm
Displacement (180°)	0.31 in^3.	5.1 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.38 sec.	0.38 sec.
Actuation Time (90° @ 100psi/7 bar)	0.29 sec.	0.29 sec.
Over Travel (each end)	1° to 3°	1° to 3°
Temperature Range without Shocks	-30°~180° F	-35°~82° C
Temperature Range with Shocks (-S)	32°~150° F	0°~66° C
End Stop Adjustability (each end)	23°	23°
Repeatability	±0.02°	±0.02°
Valve required to actuate	4-way, 2-position	

Loading Capacity

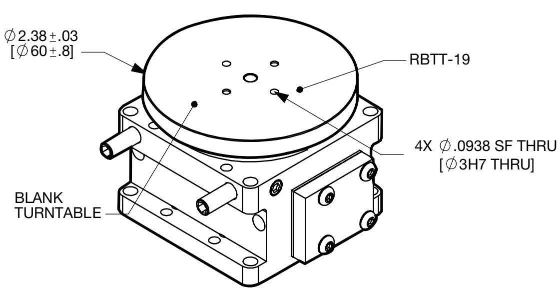
	Static	Dynamic
Maximum Tensile **T**	10 lbs. [44 N]	2 lbs. [9 N]
Maximum Compressive **C**	20 lbs. [89 N]	4 lbs. [18 N]
Maximum Moment **M$_x$**	20 in-lbs. [2.3 Nm]	4 in-lbs. [0.5 Nm]
Maximum Moment **M$_y$**	20 in-lbs. [2.3 Nm]	4 in-lbs. [0.5 Nm]
Maximum Payload **W (with shocks)**		1.0 lbs. [0.45 kg]
Maximum Inertia **J (with shocks)**		0.0016 in-lbs.-sec.^{2} (1.8 X 10^{-4} N-m-sec.^{2})

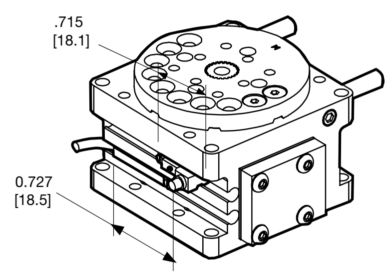
Note: Higher payloads and inertia possible with external shocks and stops.





Accessory Mounting Technical Data



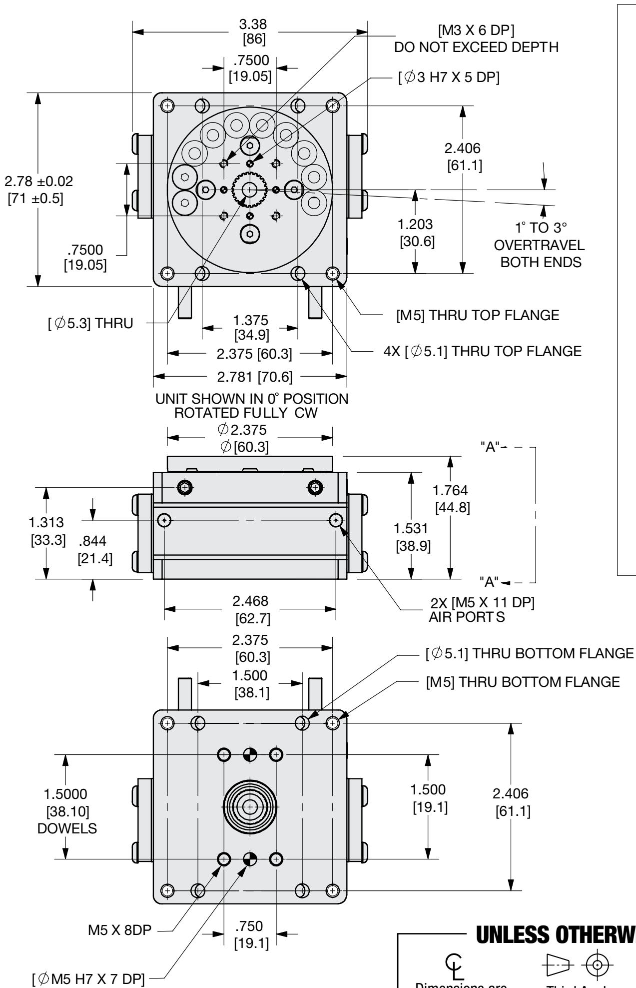


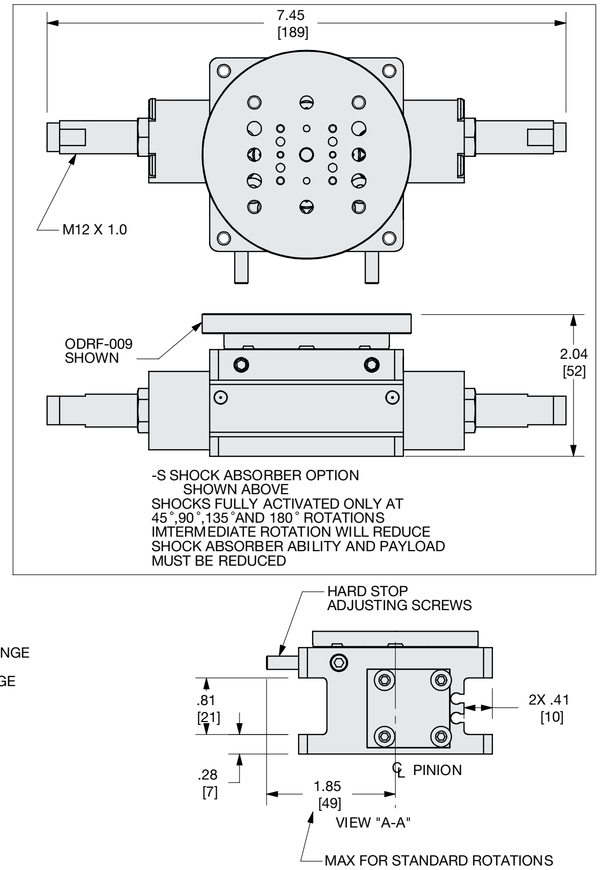
Flanged Output Options

- Easily machinable by customer
- Blank Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels

Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard





UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

℄	Third Angle Projection	All Dowel Holes are SF (Slip Fit).	Metric Threads	Imperial in.	Metric [mm]
Dimensions are symmetrical about centerline	Third Angle Projection	All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]	Metric Threads Course Pitch	0.00 = ±.01 0.000 = ±.005 0.0000 = ±.0005	[0.] = [±.25] [0.0] = [±.13] [0.00] = [±.013]

How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL ROTATION

NRF - 24 M - ___ - S

SHOCK ABSORBERS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(Consult factory for intermediate degrees of rotation)

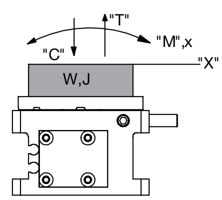
ROTARY ACCESSORIES	**ORDER #**	**QTY/UNIT**
Turntable Blank, Metric	**RBTT - 24**	**1**
SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair Kit (Standard Buna-N)	**KR - NRF24**	**1**
Shock Seal Repair Kit	**KR - SNRF24**	**1**

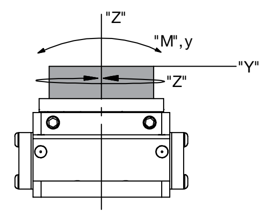
*Sensor and cable sold separately

Specifications	NRF-24M	
Maximum Payload with shocks (-S)	3 lbs.	1.4 kg
Maximum Payload without shocks	1.5 lbs.	0.68 kg
Maximum Payload Inertia with shocks (-S)	0.0111 in-lbs.-sec.^{2}	1.3 X10^{-3} N-m-sec.^{2}
Maximum Payload Inertia without shocks	0.0056 in-lbs.-sec.^{2}	6.3 X10^{-4} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	17.3 lbs.-in.	1.9 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.500 in.	12.7 mm
Weight with shocks (-S Option)	1.4 lbs.	0.64 kg
Weight without shocks	1.1 lbs.	0.50 kg
Pressure Range	40-100 psi	3-7 bar
Bore	0.938 in.	23.8 mm
Displacement (180°)	0.55 in^3.	9.0 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.38 sec.	0.38 sec.
Actuation Time (90° @ 100psi/7 bar)	0.29 sec.	0.29 sec.
Over Travel (each end)	1° to 3°	1° to 3°
Temperature Range without Shocks	-30°~180° F	-35°~82° C
Temperature Range with Shocks (-S)	32°~150° F	0°~66° C
End Stop Adjustability (each end)	23°	23°
Repeatability	±0.02°	±0.02°
Valve required to actuate	4-way, 2-position	

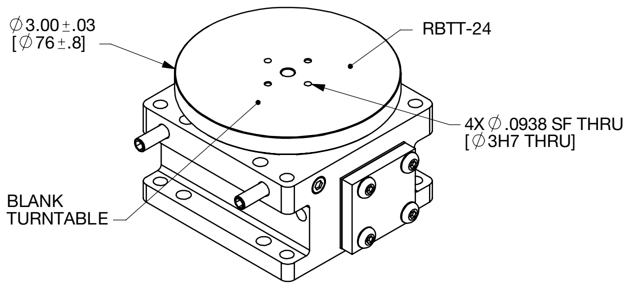
Loading Capacity

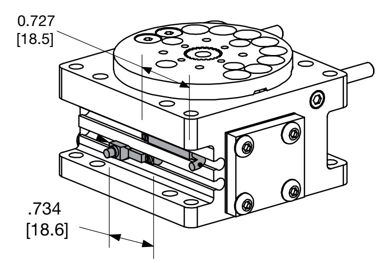
	Static	Dynamic
Maximum Tensile **T**	15 lbs. [67 N]	3 lbs. [13 N]
Maximum Compressive **C**	30 lbs. [133 N]	6 lbs. [27 N]
Maximum Moment **M_X**	50 in-lbs. [5.6 Nm]	10 in-lbs. [1.1 Nm]
Maximum Moment **M_Y**	50 in-lbs. [5.6 Nm]	10 in-lbs. [1.1 Nm]
Maximum Payload **W (with shocks)**		3 lbs. [1.4 kg]
Maximum Inertia **J (with shocks)**		0.0111 in-lbs.-sec.^{2} (1.3 X 10^{-3} N-m-sec.^{2})
Note: Higher payloads and inertia possible with external shocks and stops.		





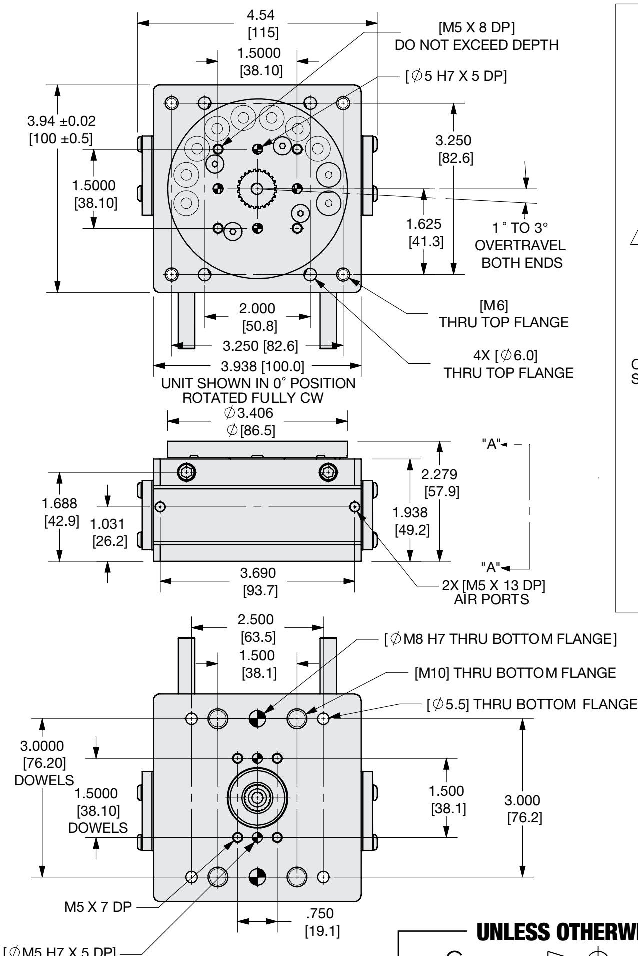
Accessory Mounting Technical Data

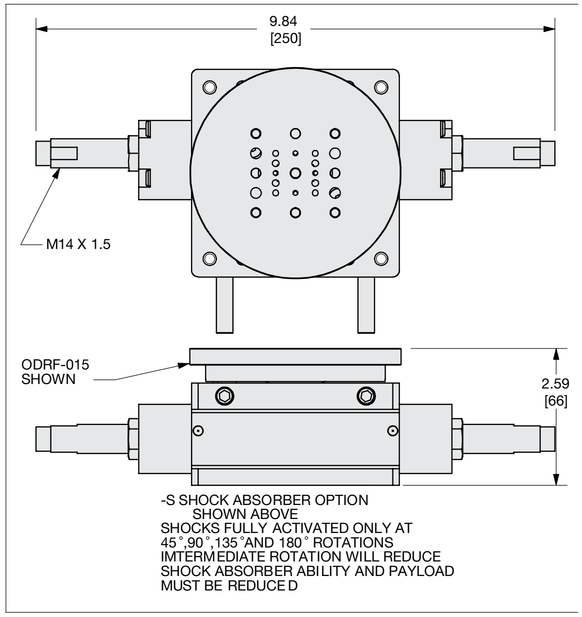


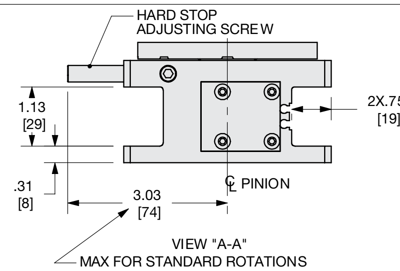


Flanged Output Options
- Easily machinable by customer
- Blank Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels

Sensors
- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard







UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

℄	Third Angle Projection	All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]	Metric Threads Course Pitch	Imperial in.	Metric [mm]
Dimensions are symmetrical about centerline				0.00 = ±.01 0.000 = ±.005 0.0000 = ±.0005	[0.] = [±.25] [0.0] = [±.13] [0.00] = [±.013]

How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRF -27 M - ____ - S

SHOCK ABSORBERS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(Consult factory for intermediate degrees of rotation)

ROTARY ACCESSORIES	**ORDER #**	**QTY/UNIT**
Turntable Blank, Metric	**RBTT - 27**	**1**
SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair Kit (Standard Buna-N)	**KR - NRF27**	**1**
Shock Seal Repair Kit	**KR - SNRF27**	**1**

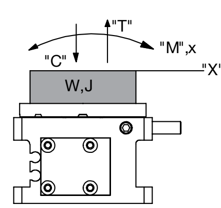
*Sensor and cable sold separately

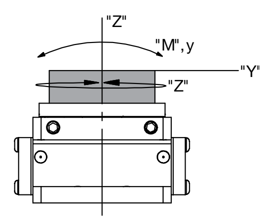
Specifications	**NRF-27M**	
Maximum Payload with shocks (-S)	8 lbs.	3.6 kg
Maximum Payload without shocks	4 lbs.	1.8 kg
Maximum Payload Inertia with shocks (-S)	0.0414 in-lbs.-sec.^{2}	4.7 X10^{-3} N-m-sec.^{2}
Maximum Payload Inertia without shocks	0.0207 in-lbs.-sec.^{2}	2.3 X10^{-3} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	33.2 lbs.-in.	3.8 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.750 in.	19.1 mm
Weight with shocks (-S Option)	3.1 lbs.	1.4 kg
Weight without shocks	2.5 lbs.	1.1 kg
Pressure Range	40-100 psi	3-7 bar
Bore	1.063 in.	27.0 mm
Displacement (180°)	1.16 in^3.	19.0 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.60 sec.	0.60 sec.
Actuation Time (90° @ 100psi/7 bar)	0.45 sec.	0.45 sec.
Over Travel (each end)	1° to 3°	1° to 3°
Temperature Range without Shocks	-30°~180° F	-35°~82° C
Temperature Range with Shocks (-S)	32°~150° F	0°~66° C
End Stop Adjustability (each end)	23°	23°
Repeatability	±0.02°	±0.02°
Valve required to actuate	4-way, 2-position	

Loading Capacity

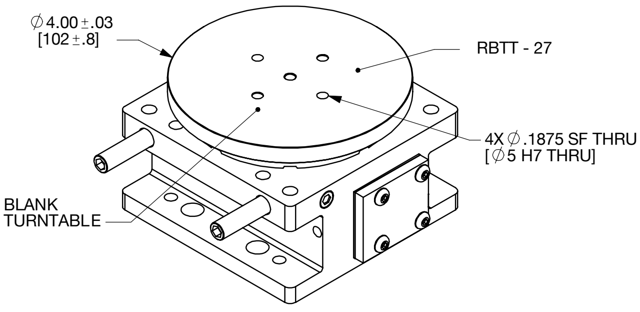
	Static	**Dynamic**
Maximum Tensile **T**	25 lbs. [111 N]	5 lbs. [22 N]
Maximum Compressive **C**	50 lbs. [89 N]	10 lbs. [44 N]
Maximum Moment **M_x**	75 in-lbs. [8.5 Nm]	15 in-lbs. [1.7 Nm]
Maximum Moment **M_y**	75 in-lbs. [8.5 Nm]	15 in-lbs. [1.7 Nm]
Maximum Payload **W (with shocks)**		8 lbs. [3.6 kg]
Maximum Inertia **J (with shocks)**		0.0414 in-lbs.-sec.^{2} (4.7 X 10^{-3} N-m-sec.^{2})

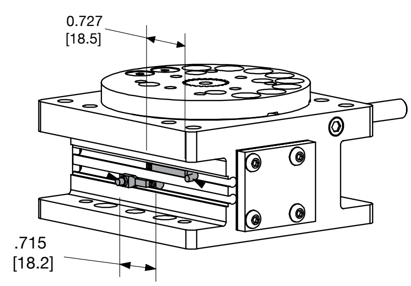
Note: Higher payloads and inertia possible with external shocks and stops.





Accessory Mounting Technical Data



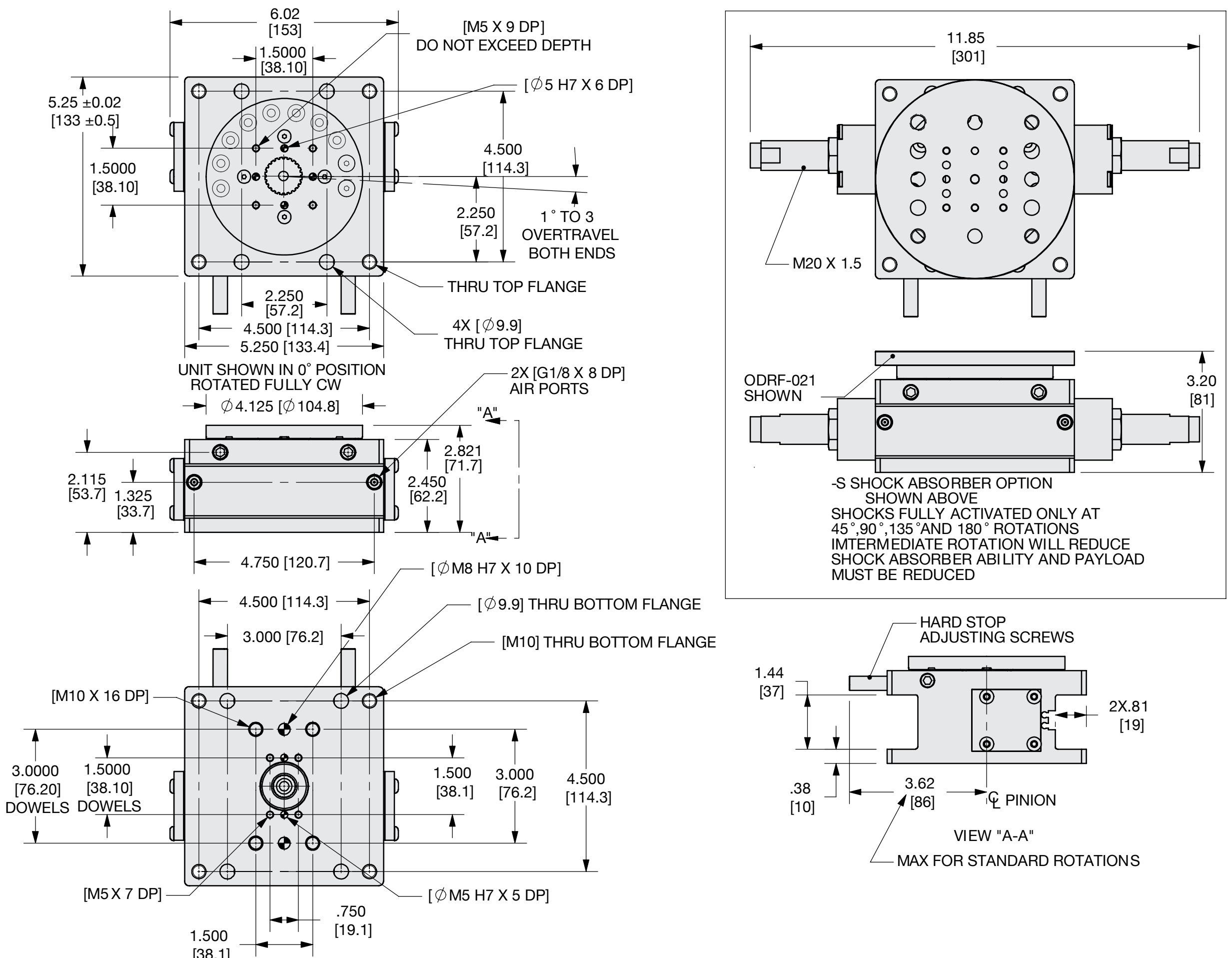


Flanged Output Options

- Easily machinable by customer
- Blank Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels

Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

℄				Imperial in.	Metric [mm]
Dimensions are symmetrical about centerline	Third Angle Projection	All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]	Metric Threads Course Pitch	0.00 = ±.01 0.000 = ±.005 0.0000 = ±.0005	[0.] = [±.25] [0.0] = [±.13] [0.00] = [±.013]

How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL ROTATION

NRF - 33 M - [ ] - S

SHOCK ABSORBERS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(Consult factory for intermediate degrees of rotation)

ROTARY ACCESSORIES	**ORDER #**	**QTY/UNIT**
Turntable Blank, Metric	**RBTT - 33**	**1**
SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair Kit (Standard Buna-N)	**KR - NRF33**	**1**
Shock Seal Repair Kit	**KR - SNRF33**	**1**

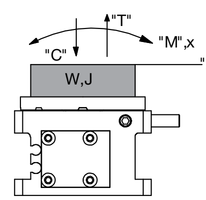
*Sensor and cable sold separately

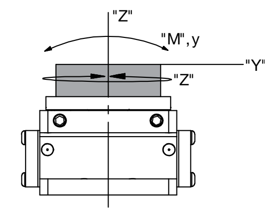
Specifications	**NRF-33M**	
Maximum Payload with shocks (-S)	15 lbs.	6.8 kg
Maximum Payload without shocks	7.5 lbs.	3.4 kg
Maximum Payload Inertia with shocks (-S)	0.0970 in-lbs.-sec.^{2}	1.1 X10^{-2} N-m-sec.^{2}
Maximum Payload Inertia without shocks	0.0485 in-lbs.-sec.^{2}	5.5 X10^{-3} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	67.6 lbs-in.	7.6 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	1.000 in.	25.4 mm
Weight with shocks (-S Option)	6.8 lbs.	3.1kg
Weight without shocks	6.3 lbs.	2.9 kg
Pressure Range	40-100 psi	3-7 bar
Bore	1.313 in.	33.4 mm
Displacement (180°)	2.11 in^3.	34.6 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.87 sec.	0.87 sec.
Actuation Time (90° @ 100psi/7 bar)	0.68 sec.	0.68 sec.
Over Travel (each end)	1° to 3°	1° to 3°
Temperature Range without Shocks	-30°~180° F	-35°~82° C
Temperature Range with Shocks (-S)	32°~150° F	0°~66° C
End Stop Adjustability (each end)	23°	23°
Repeatability	±0.02°	±0.02°
Valve required to actuate	4-way, 2-position	

Loading Capacity

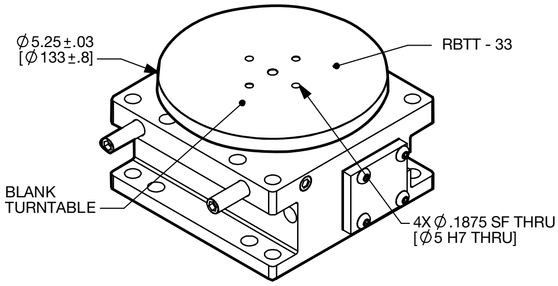
	Static	**Dynamic**
Maximum Tensile **T**	50 lbs. [222 N]	10 lbs. [44 N]
Maximum Compressive **C**	100 lbs. [445 N]	20 lbs. [89 N]
Maximum Moment **M_x**	100 in-lbs. [11.3 Nm]	20 in-lbs. [2.3 Nm]
Maximum Moment **M_y**	100 in-lbs. [11.3 Nm]	20 in-lbs. [2.3 Nm]
Maximum Payload **W (with shocks)**		15 lbs. [6.8 kg]
Maximum Inertia **J (with shocks)**		0.0970 in-lbs.-sec.^{2} (1.1 X 10^{-2} N-m-sec.^{2})

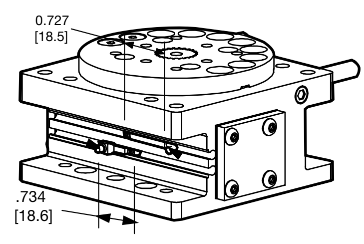
Note: Higher payloads and inertia possible with external shocks and stops.





Accessory Mounting Technical Data





Flanged Output Options

- Easily machinable by customer
- Blank Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels

Sensors

- PNP and NPN Magneto Resistive available
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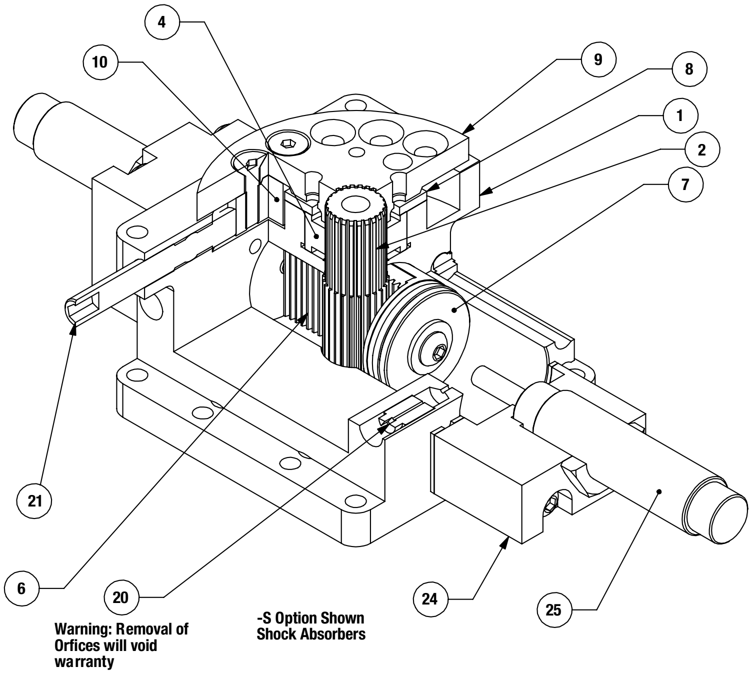
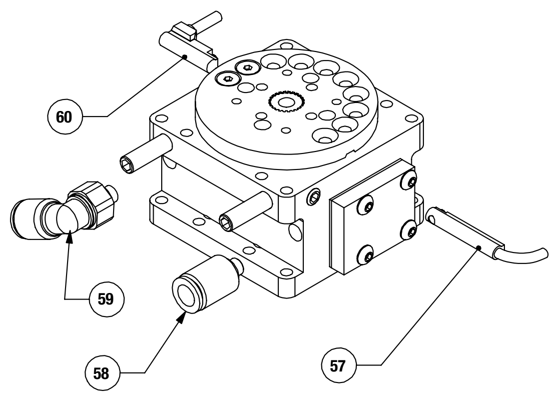
- Sensor Magnet standard

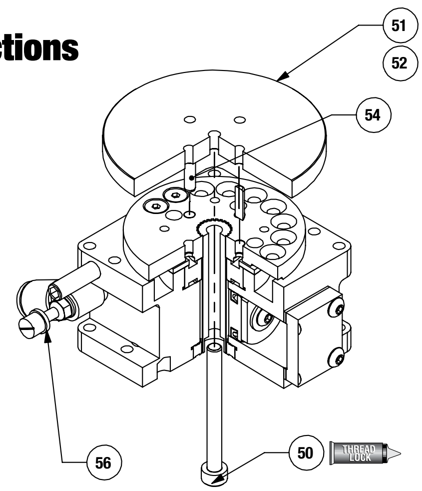


Item	Qty	Name
01	1	Body
02	1	Pinion Shaft
04	1	Upper Bearing
06	1	Rack
07	1	Piston
08	1	Upper Bearing Retainer
09	1	Hub
10*	2	Stop Pucks
20	2	Fixed Orifices
21	2	Stop Screws
24	2	Shock Blocks
25	2	Shocks

***NOTES:**
1) Contact the Nason Sales Department for a complete spare parts list with order numbers and prices.
2) Item #10 Quantity 1 for 180° rotations, all other rotations Quantity 2.

Accessory Installation & Adjustment Instructions

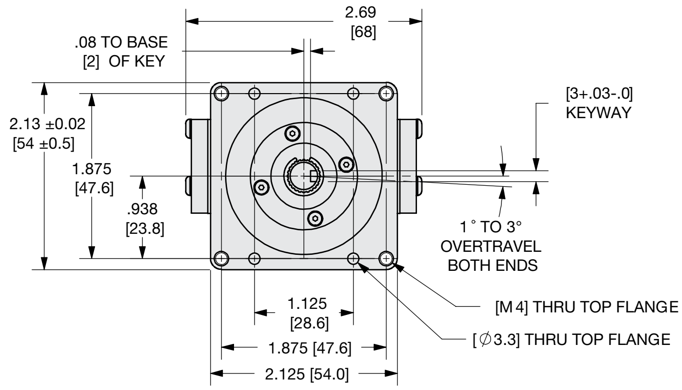




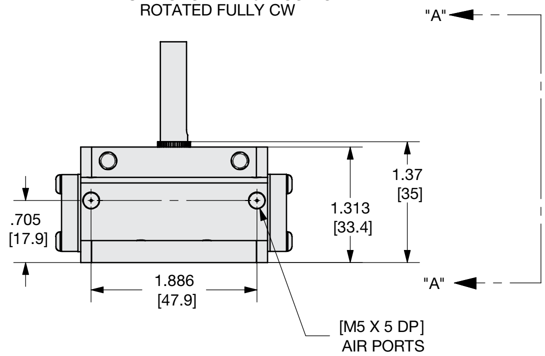
Item	Qty	Name
50	1	Soc Head Cap Screw
51	1	Blank Turntable
52	1	DIRECTCONNECT Turntable
54	2	Dowel Pins
57	1 or 2	Magneto Resistive Sensor, with Quick Disconnect

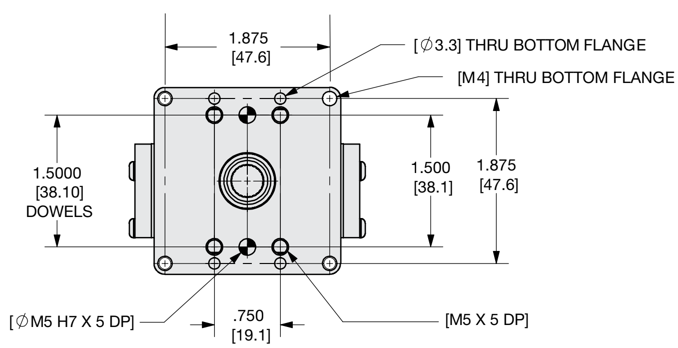
Magneto Resistive Sensors
1) Insert sensors #57 or #60 from either end of the profile slots and set the sensor with the integrated slotted screw set.

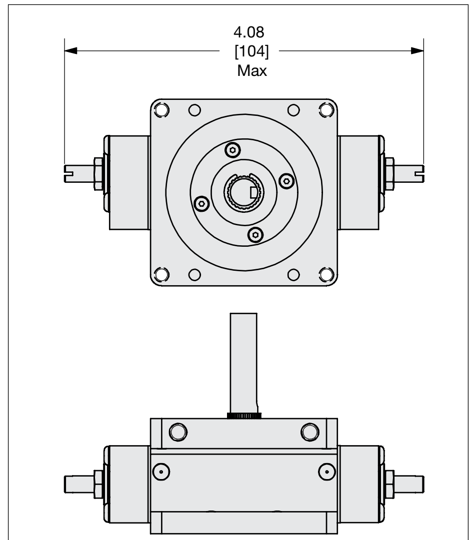
Turntable
1) Insert the two Dowel Pins #54 into the hub (slip fit).
2) Attach the turntable #51 or #52, onto the dowel Pins.
3) Put thread lock on the Socket Head Screw #50, insert it through the Pinion and tighten.



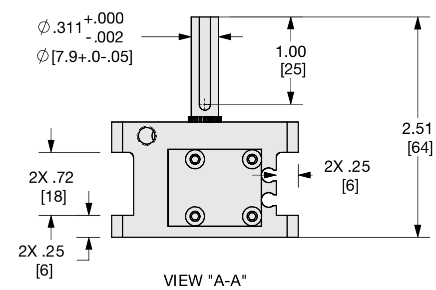
UNIT SHOWN IN 0˚ POSITION
ROTATED FULLY CW







-ADJ ROTATIONAL ADJUSTMENT OPTION
SHOWN ABOVE
ALLOWS UP TO 23˚ ADJUSTMENT
EACH SIDE



VIEW "A-A"

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline	Third Angle Projection	All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]
Metric Threads Course Pitch	**Imperial in.** 0.00 = ±.01 0.000 = ±.005 0.0000 = ±.0005	**Metric [mm]** [0.] = [±.25] [0.0] = [±.13] [0.00] = [±.013]

How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRS-19M - ____ - ADJ

ROTATIONAL ADJUSTMENTS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(for intermediate degrees of rotation use **-ADJ** option)

SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**

REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair kit (Standard Buna-N)	**KR-NRS19**	**1**
Rotational Adjustment Seal Kit (Standard Buna-N)	**KR-ADJNRS19**	**1**

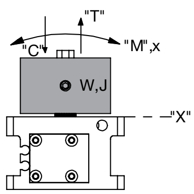
*Sensor and cable sold separately

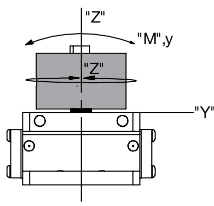
Specifications	NRS-19M	
Maximum Payload	0.5 lbs.	0.23 kg
Maximum Payload Inertia	0.0008 in-lbs.-sec.^{2}	9.0 X10^{-5}N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	8.3 lbs.-in.	0.9 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.375 in.	9.5 mm
Weight without rotational adjuster	0.52 lbs.	0.24 kg
Weight without rotational adjuster (-ADJ option)	0.72 lbs.	0.33 kg
Pressure Range	40-100 psi	3-7 bar
Bore	0.750 in.	19.1 mm
Displacement (180°)	0.31 in^3	5.1 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.38 sec.	0.38 sec.
Actuation Time (90° @ 100psi/7 bar)	0.29 sec.	0.29 sec.
Temperature Range: Standard Seals	-30°~180° F	-35°~82° C
End Stop Adjustability (-ADJ option)	23°	23°
Over Travel (each end)	1° to 3°	1° to 3°
Valve required to actuate	4-way, 2-position	

Loading Capacity

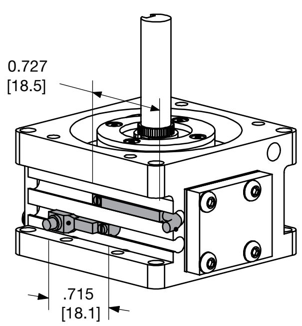
	Static	Dynamic
Maximum Tensile **T**	10 lbs. [44 N]	2 lbs. [9 N]
Maximum Compressive **C**	20 lbs. [89 N]	4 lbs. [18 N]
Maximum Moment **M_x**	20 in-lbs. [2.3 Nm]	4 in-lbs. [0.5 Nm]
Maximum Moment **M_y**	20 in-lbs. [2.3 Nm]	4 in-lbs. [0.5 Nm]
Maximum Payload **W**		0.5 lbs. [.23 kg]
Maximum Inertia **J**		.0008 in-lbs.-sec.^{2} [9.0 X 10^{-5} N-m-sec.^{2}]

Note: Higher payloads and inertia possible with external shocks and stops.



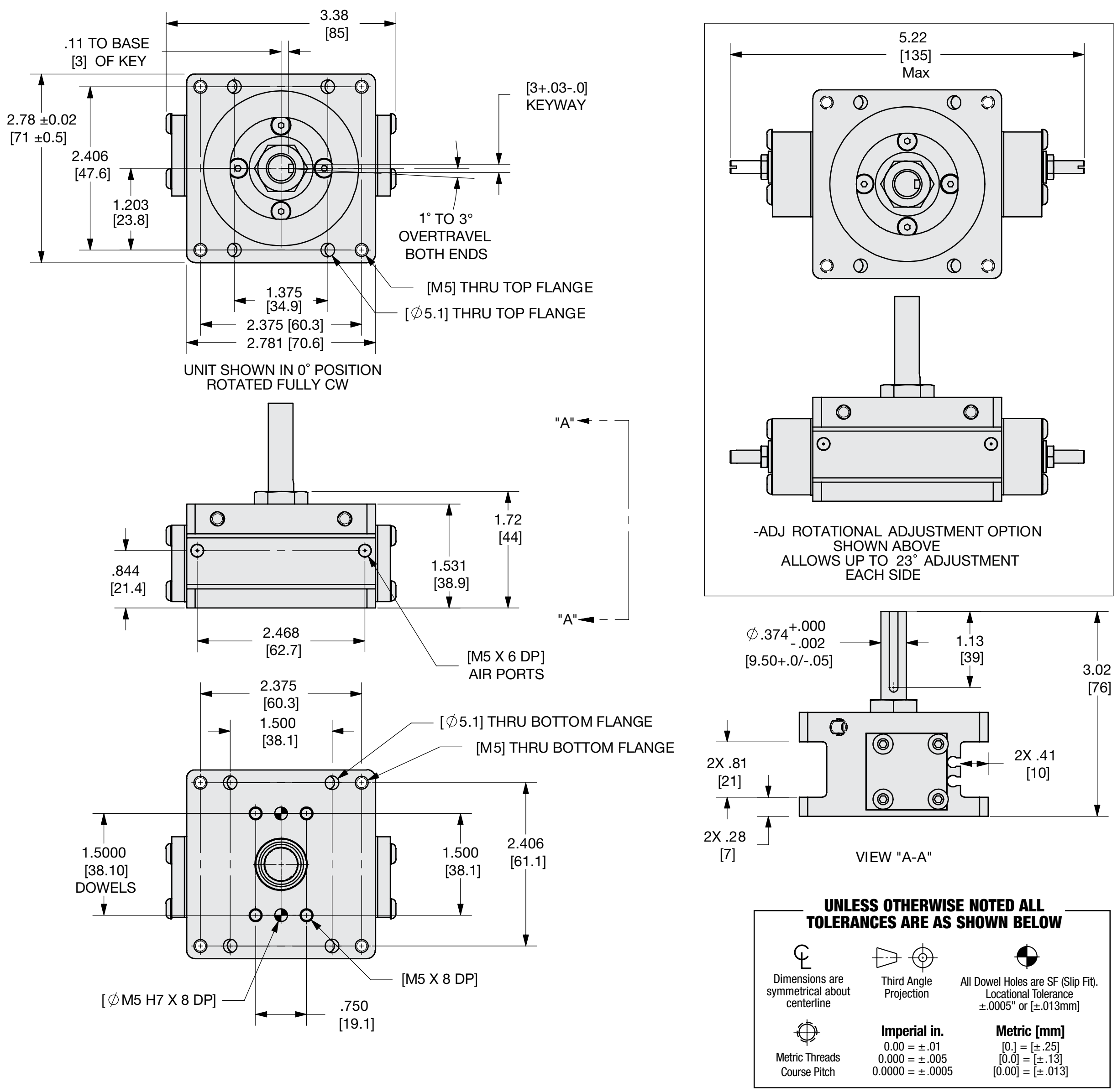


Accessory Mounting Technical Data



Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard



How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRS-24M - ____ - ADJ

ROTATIONAL ADJUSTMENTS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(for intermediate degrees of rotation use **-ADJ** option)

SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**

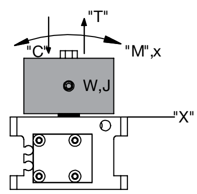
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair kit (Standard Buna-N)	**KR-NRS24**	**1**
Rotational Adjustment Seal Kit (Standard Buna-N)	**KR-ADJNRS24**	**1**

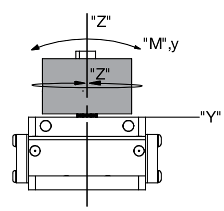
*Sensor and cable sold separately

Specifications	NRS-24M	
Maximum Payload	1.5 lbs.	0.68 kg
Maximum Payload Inertia	0.0056 in-lbs.-sec.^{2}	6.3 X10^{-4} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	17.3 lbs.-in.	1.9 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.500 in.	12.7 mm
Weight without rotational adjuster	1.0 lbs.	0.45 kg
Weight without rotational adjuster (-ADJ option)	1.2 lbs.	0.54 kg
Pressure Range	40-100 psi	3-7 bar
Bore	0.938 in.	23.8 mm
Displacement (180°)	0.55 in^3.	9.0 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.38 sec.	0.38 sec.
Actuation Time (90° @ 100psi/7 bar)	0.29 sec.	0.29 sec.
Temperature Range: Standard Seals	-30°~180° F	-35°~82° C
End Stop Adjustability (-ADJ option)	23°	23°
Over Travel (each end)	1° to 3°	1° to 3°
Valve required to actuate	4-way, 2-position	

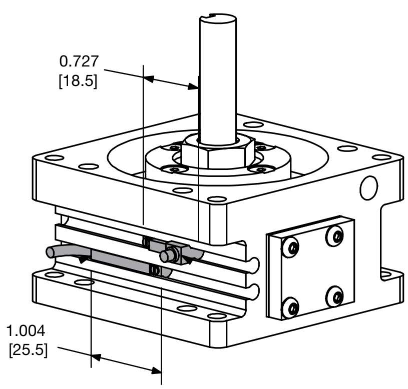
Loading Capacity	Static	Dynamic
Maximum Tensile **T**	15 lbs. [67 N]	3 lbs. [13 N]
Maximum Compressive **C**	30 lbs. [133 N]	6 lbs. [27 N]
Maximum Moment $\mathbf{M_x}$	50 in-lbs. [5.6 Nm]	10 in-lbs. [1.1 Nm]
Maximum Moment $\mathbf{M_y}$	50 in-lbs. [5.6 Nm]	10 in-lbs. [1.1 Nm]
Maximum Payload **W**		1.5 lbs. [0.68 kg]
Maximum Inertia **J**		0.0056 in-lbs.-sec.^{2} [6.3 X 10^{-4} N-m-sec.^{2}]

Note: Higher payloads and inertia possible with external shocks and stops.



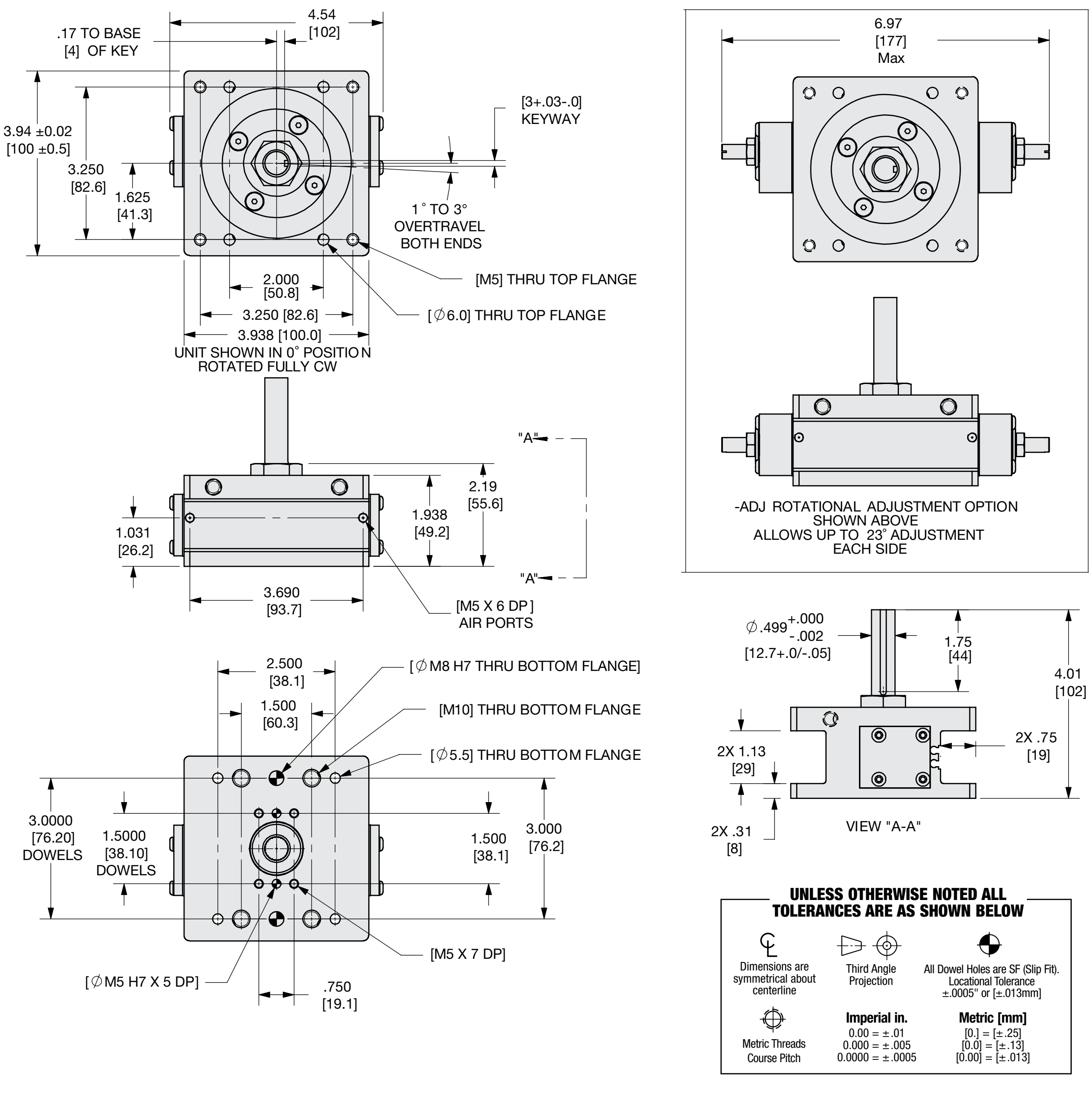


Accessory Mounting Technical Data



Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard



How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRS - 27M - ___ - ADJ

ROTATIONAL ADJUSTMENTS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(for intermediate degrees of rotation use **-ADJ** option)

SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**

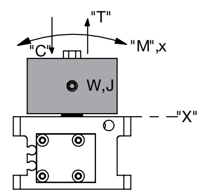
REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair kit (Standard Buna-N)	**KR-NRS27**	**1**
Rotational Adjustment Seal Kit (Standard Buna-N)	**KR-ADJNRS27**	**1**

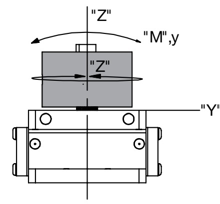
*Sensor and cable sold separately

Specifications	NRS-27M	
Maximum Payload	4 lbs.	1.8 kg
Maximum Payload Inertia	0.0207 in-lbs.-sec.^{2}	2.3 X10^{-3} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	33.2 lbs.- in.	3.8 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	0.750 in.	19.1 mm
Weight without rotational adjuster	2.5 lbs.	1.1 kg
Weight without rotational adjuster (-ADJ option)	2.7 lbs.	1.2 kg
Pressure Range	40-100 psi	3-7 bar
Bore	1.063 in.	27.0 mm
Displacement (180°)	1.16 in^3.	19.0 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.60 sec.	0.60 sec.
Actuation Time (90° @ 100psi/7 bar)	0.45 sec.	0.45 sec.
Temperature Range: Standard Seals	-30°~180° F	-35°~82° C
End Stop Adjustability (-ADJ option)	23°	23°
Over Travel (each end)	1° to 3°	1° to 3°
Valve required to actuate	4-way, 2-position	

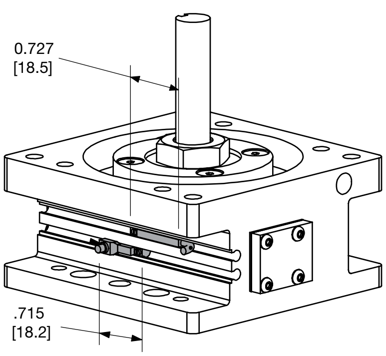
Loading Capacity	Static	Dynamic
Maximum Tensile **T**	25 lbs. [111 N]	5 lbs. [22 N]
Maximum Compressive **C**	50 lbs. [222 N]	10 lbs. [44 N]
Maximum Moment **Mx**	75 in-lbs. [8.5 Nm]	15 in-lbs. [1.7 Nm]
Maximum Moment **My**	75 in-lbs. [8.5 Nm]	15 in-lbs. [1.7 Nm]
Maximum Payload **W**		4 lbs. [1.8 kg]
Maximum Inertia **J**		0.0207 in-lbs.-sec.^{2} [2.3 X 10^{-3} N-m-sec.^{2}]

Note: Higher payloads and inertia possible with external shocks and stops.



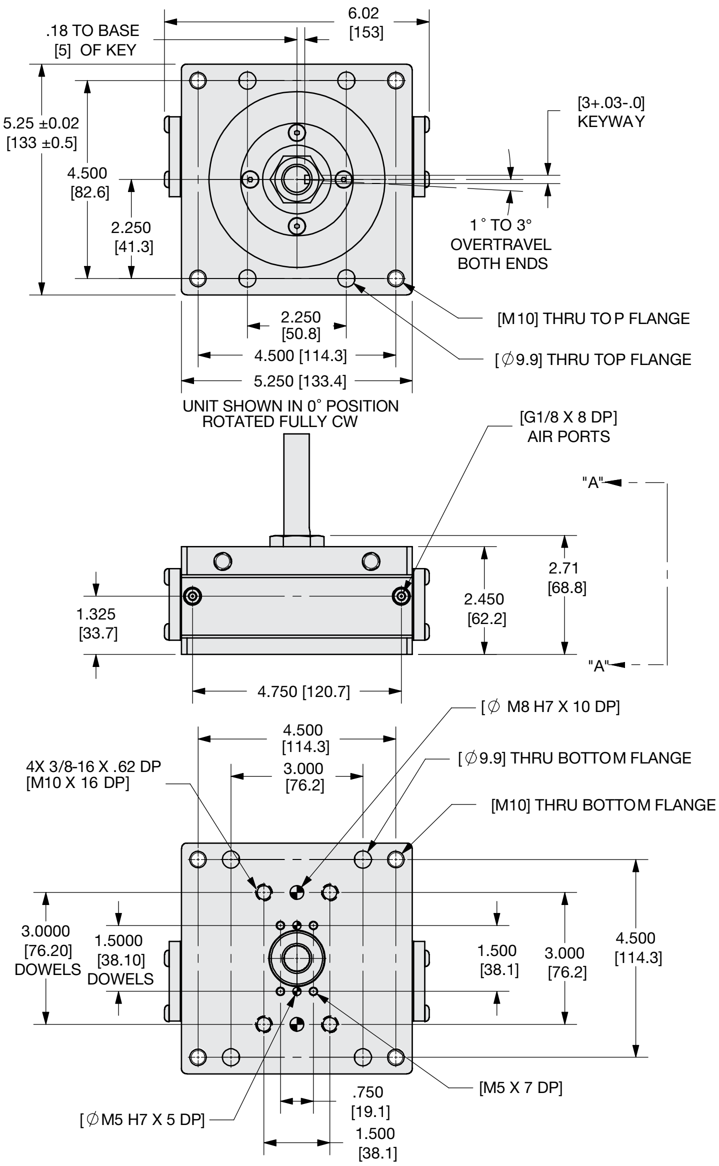


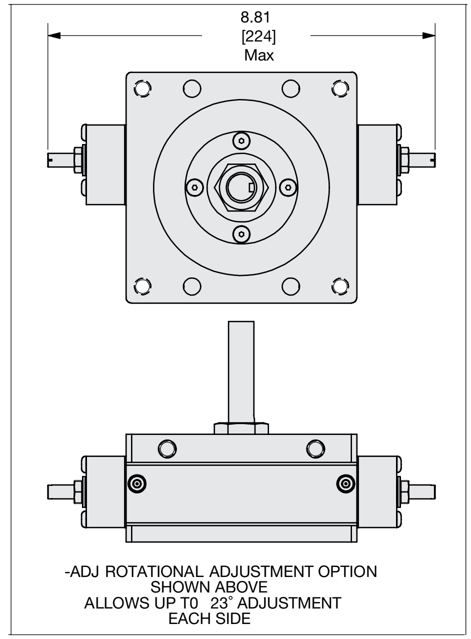
Accessory Mounting Technical Data

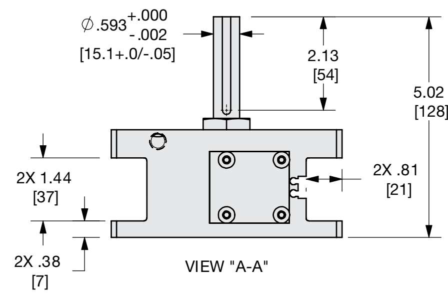


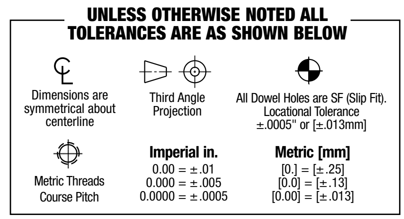
Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard









How to Order: (Order Accessories separately from Basic Model)

BASIC MODEL — ROTATION

NRS-33M - ___ - ADJ

ROTATIONAL ADJUSTMENTS

DEGREES OF ROTATION: 45°, 90°, 135°,180°
(for intermediate degrees of rotation use **-ADJ** option)

SENSOR ACCESSORIES	**ORDER #**	**QTY/UNIT**
Magneto Resistive Sensor (PNP)*	**Consult Factory**	**1 or 2**
Magneto Resistive Sensor (NPN)*	**Consult Factory**	**1 or 2**

REPAIR KITS	**ORDER #**	**QTY/UNIT**
Seal Repair kit (Standard Buna-N)	**KR-NRS33**	**1**
Rotational Adjustment Seal Kit (Standard Buna-N)	**KR-ADJNRS33**	**1**

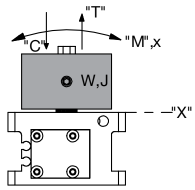
*Sensor and cable sold separately

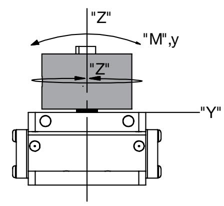
Specifications	NRS-33M	
Maximum Payload	7.5 lbs.	3.4 kg
Maximum Payload Inertia	0.0485 in-lbs.-sec.^{2}	5.5 X10^{-3} N-m-sec.^{2}
Maximum Torque @ 100psi/7 bar	68 lbs-in.	7.6 N-m
Maximum Rotation	180°	180°
Pitch Diameter of Pinion	1.000 in.	25.4 mm
Weight without rotational adjuster	5.4 lbs.	2.4 kg
Weight without rotational adjuster (-ADJ option)	5.6 lbs.	2.5 kg
Pressure Range	40-100 psi	3-7 bar
Bore	1.313 in.	33.4 mm
Displacement (180°)	2.11 in^3.	34.6 cm^3
Actuation Time (180° @ 100psi/7 bar)	0.87 sec.	0.87 sec.
Actuation Time (90° @ 100psi/7 bar)	0.68 sec.	0.68 sec.
Temperature Range: Standard Seals	-30°~180° F	-35°~82° C
End Stop Adjustability (-ADJ option)	23°	23°
Over Travel (each end)	1° to 3°	1° to 3°
Valve required to actuate	4-way, 2-position	

Loading Capacity

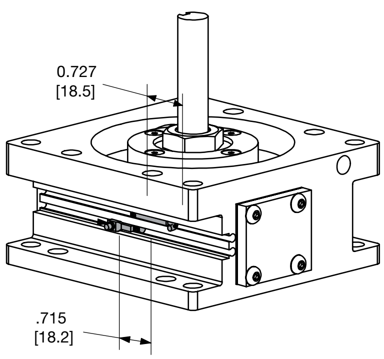
	Static	Dynamic
Maximum Tensile **T**	50 lbs. [222 N]	10 lbs. [44 N]
Maximum Compressive **C**	100 lbs. [445 N]	20 lbs. [89 N]
Maximum Moment **M_X**	100 in-lbs. [11.3 Nm]	20 in-lbs. [2.5 Nm]
Maximum Moment **M_Y**	100 in-lbs. [11.3 Nm]	20 in-lbs. [2.5 Nm]
Maximum Payload **W**		7.5 lbs. [3.4 kg]
Maximum Inertia **J**		0.0485 in-lbs.-sec.^{2} [5.5 X 10^{-3} N-m-sec.^{2}]

Note: Higher payloads and inertia possible with external shocks and stops.



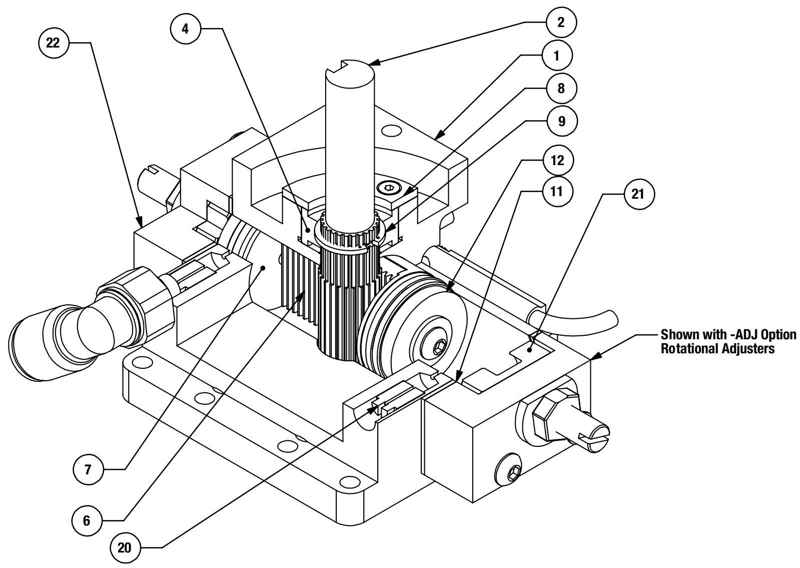


Accessory Mounting Technical Data



Sensors

- PNP and NPN Magneto Resistive available
- Sensors are slot mounted, no mounting kits required
- Simple adjustment with slotted screw driver
- Built-in LED for ease of positioning and troubleshooting
- Sensor Magnet standard



Warning: Removal of Orifices will void warranty.

Item	Qty	Name
01	1	Body
02	1	Pinion Shaft
04	1	Upper Bearing
06	1	Rack
07	1	Piston
08*	1	Bearing Retainer
09*	1	Retaining Ring
11	2	Gasket
12	2	Bumper
20	2	Fixed Orifice
21	2	Angle Adjuster
22	2	End Plate Rotational Adjuster

***NOTES:**

1) Contact the Nason Sales Department for a complete spare parts list with order numbers and prices.
2) Item #09 is for size -075 only.

NASON

NEW THINKING

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WARRANTY:

It is the sole responsibility of the user to determine the suitability of any product or information supplied by Nason for any application or use by the user.

THE FOLLOWING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The Nason Company warrants each product to be free from defects in material and workmanship under normal use and service. Nason's obligation under this warranty is limited to repairing of or supplying, at our option, a part or parts to replace any defective part(s) within one (1) year from the date of original sale. Wear components including but not limited to seals, wear bands, and bearings are excluded from this warranty. No product will be returned without prior authorized approval. If authorized, the transportation charges are to be prepaid to The Nason Company, Walhalla, SC. Unauthorized returns will be returned freight collect. The provisions of this warranty will not apply to any part(s) which have been subject to misuse, negligence, or accident, or which have been repaired or altered outside of The Nason Company service department in any way so as in the judgement of Nason to adversely affect its performance, stability, or reliability. The Nason Company neither assumes nor authorizes anyone to assume for it any other obligation or liability for any loss or damage either direct, incidental or consequential resulting from or arising out of or in connection with any of its defective part(s). Nason will not be responsible for any labor or other charges in connection with the removal of a product deemed to be defective or for installation or replacement of a defective or repaired product. Buyer's sole remedies are as provided herein. In no event shall Nason be liable for any cost of Buyer's cover, or for any indirect, special, consequential, incidental, or punitive damages of any sort, whether based on tort or breach of contract and/or warranty.

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