



Rotary Actuator - DRF DIRECTCONNECT Flange Output Rotaries

DRF SERIES

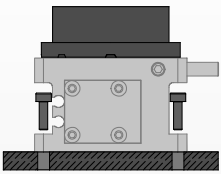
3.14



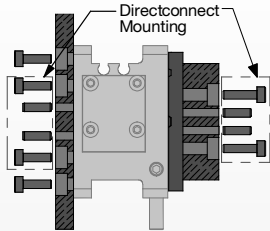
**NO
ADAPTER
PLATES!**

Mounting Information:

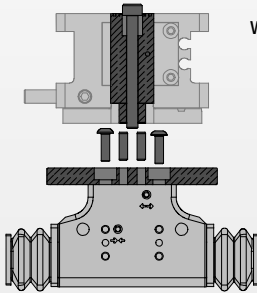
Rotaries can be mounted & operated in any orientation



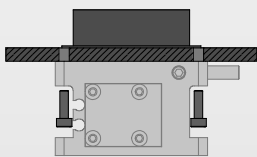
Mounting thru bottom flange clearance holes into tapped holes in customer application.



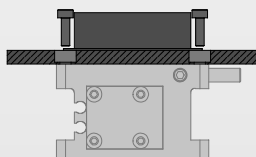
Body mounts with screws and slip fit dowels from bottom. Payload is attached with screw and slip fit dowels.



DIRECTCONNECT Mounting: Gripper is mounted from the under side of Turntable with Button Head screws and slip fit dowels. Turntable is then mounted to rotary with one screw thru the center of the pinion and two slip fit dowel pins.



Mounting thru top flange clearance holes into tapped holes in customer application.



Top mounting from underside of table using tapped holes in body top flange.

Application: Use in applications where precision end stop position and zero backlash are required.

Multiple Mounting Locations: Tapped and thru flange on top and bottom mounting surfaces, DIRECTCONNECT tapped pattern on bottom flange.

Turntable: Has DIRECTCONNECT mounting pattern.

Technical Specifications:

Pneumatic Specifications

Pressure Operating Range
Cylinder Type
Dynamic Seals
Valve Required to Operate

Imperial
40-100 psi

Metric
3-7 bar
Double Acting
Internally Lubricated Buna-N
4-way, 2-position

Air Quality Requirements

Air Filtration
Air Lubrication
Air Humidity

40 Micron or Better
Not Necessary*
Low Moisture Content (dry)

Temperature Operating Range

Buna-N Seals (standard)
with shocks

-30°~180° F
32°~150° F

-35°~80° C
0°~66° C

Maintenance Specifications

Expected Life
Normal Application
w/ Preventative Maintenance
Field Repairable
Seal Repair Kits Available

5 million cycles
10+ million cycles*
Yes
Yes

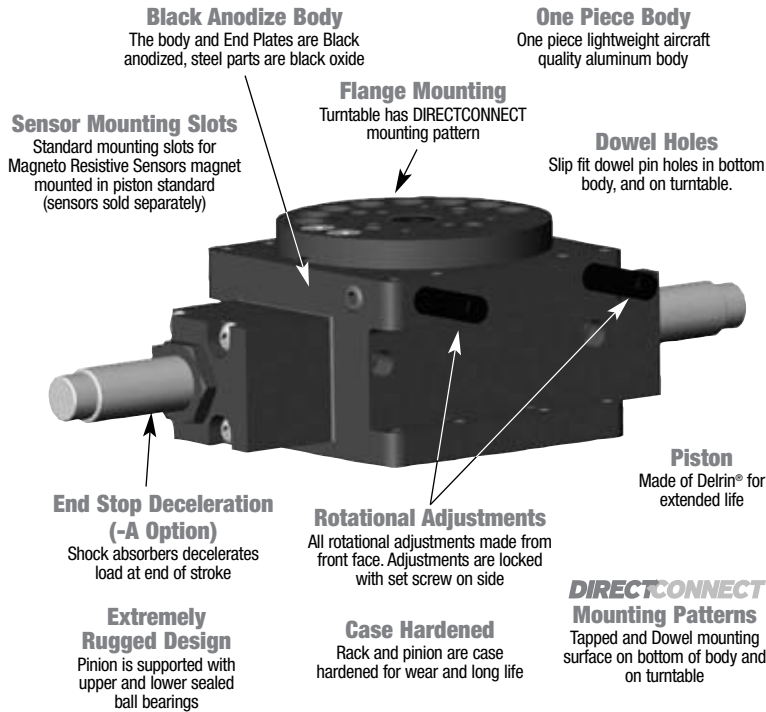
*Addition of lubrication will greatly increase service life

Please see back cover for DE-STA-CO Global Locations. www.destaco.com

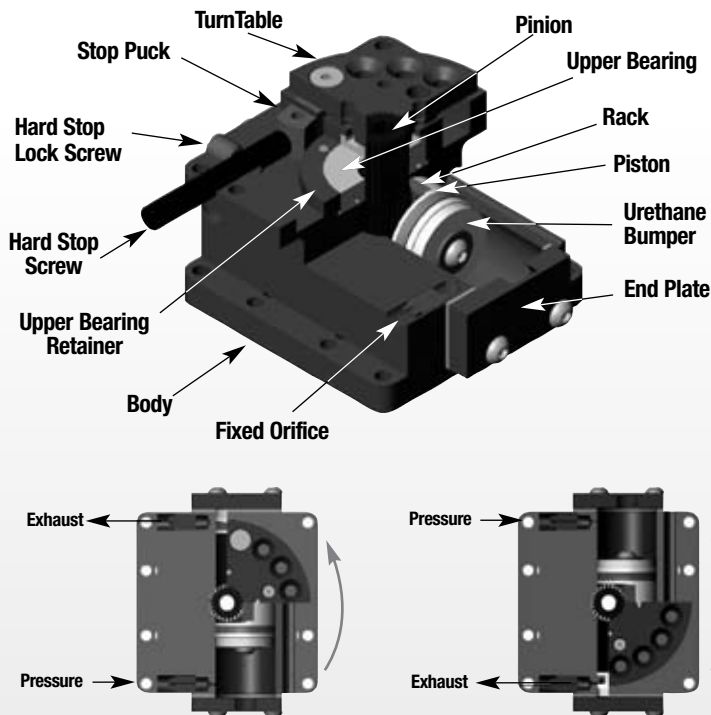
www.comoso.com

DIRECTCONNECT™

Product Features



Operating Principle



- Air pressure supplied to one port causing the piston/rack to move.
- The rack drives the pinion which is mounted to the output flange and by two sealed ball bearings.
- The turntable has a stop puck mounted on its underside which hits the hard stop screw at end of stroke.

Designed and manufactured in the USA

Style - DRF Rotary Actuator

Size -075M

Style: DRF-075M
Max. Payload:* 1 lbs. 0.45 kg
Torque: 8 in.-lbs. 0.9 N-m
Weight: 0.54 lbs. 0.24 Kg
 *Max. payload based on -A shock option.



See Page **3.16**

Style - DRF Rotary Actuator

Size -094M

Style: DRF-094M
Max. Payload:* 3 lbs. 1.4 kg
Torque: 17 in.-lbs. 1.9 N-m
Weight: 1.1 lbs. 0.50 Kg
 *Max. payload based on -A shock option.



See Page **3.18**

Style - DRF Rotary Actuator

Size -106M

Style: DRF-106M
Max. Payload:* 8 lbs. 3.6 kg
Torque: 33 in.-lbs. 3.8 N-m
Weight: 2.5 lbs. 1.1 Kg
 *Max. payload based on -A shock option.

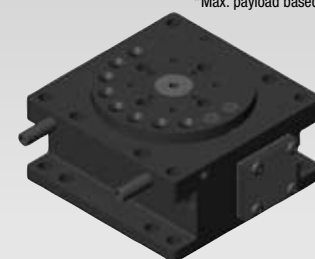


See Page **3.20**

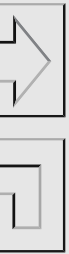
Style - DRF Rotary Actuator

Size -131M

Style: DRF-131M
Max. Payload:* 15 lbs. 6.8 kg
Torque: 68 in.-lbs. 7.6 N-m
Weight: 6.3 lbs. 2.9 Kg
 *Max. payload based on -A shock option.



See Page **3.22**



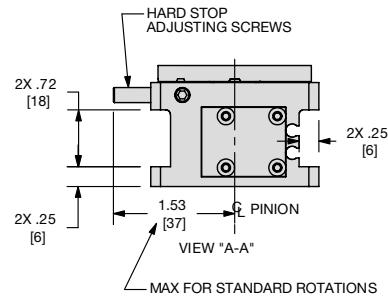
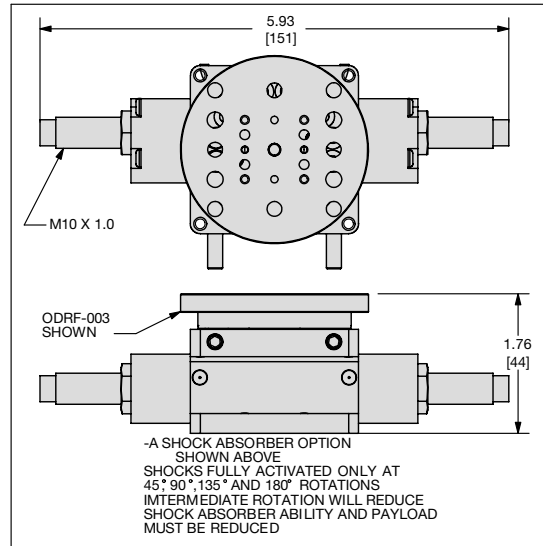
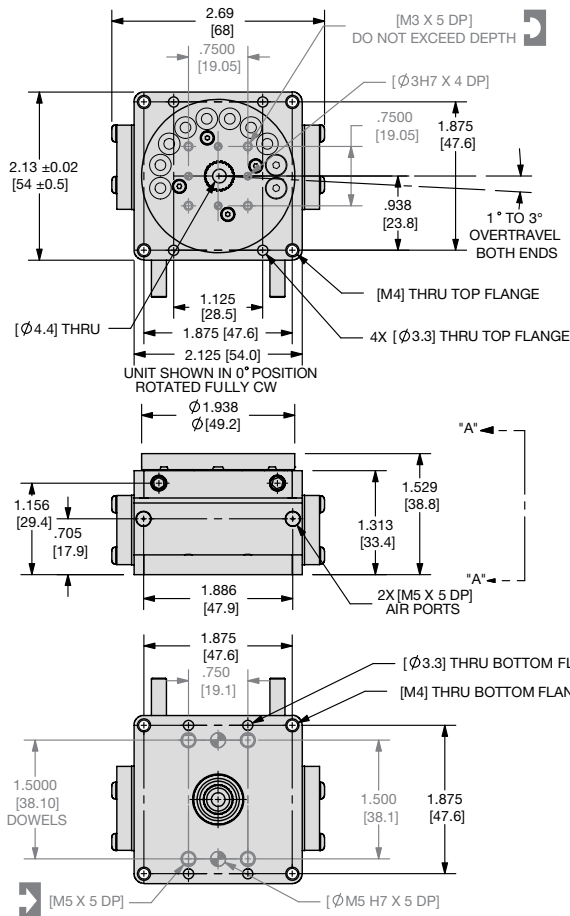
DRF SERIES

3.15



DIRECTCONNECT™

ROTARY ACTUATOR DRF-075M FLANGED SERIES



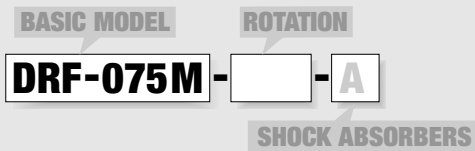
DRF SERIES
3.16

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Imperial in.	Metric [mm]
0.00 ± .01	[0.] = [±.25]
0.000 ± .005	[0.0] = [±.13]
0.0000 ± .0005	[0.00] = [±.013]

NOTE: DIRECTCONNECT™ DIMENSIONS ARE SHOWN IN BLUE

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



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

ROTARY ACCESSORIES

Turntable Blank, Metric
DIRECTCONNECT Turntable

ORDER # QTY/UNIT

ODRF-002 1
ODRF-003 1

SENSOR ACCESSORIES

Magneto Resistive Sensor (PNP)*
Magneto Resistive Sensor (NPN)*
Magneto Resistive Sensor 90° Barrel (PNP)*
Magneto Resistive Sensor 90° Barrel (NPN)*
Quick Disconnect Cable (2 meters long)*
Quick Disconnect Cable (5 meters long)*

ORDER # QTY/UNIT

OHSP-017 1 or 2
OHSN-017 1 or 2
OHSP-011 1 or 2
OHSN-011 1 or 2
CABL-010 1 or 2
CABL-013 1 or 2

PNEUMATIC ACCESSORIES

Seal Repair Kit (Standard Buna-N)
Shock Seal Repair Kit
Flow Control Push-in 90° Elbow M5-6mm O.D. Tube**

ORDER # QTY/UNIT

SLKT-210 1
SLKT-214 1
VLVF-008 1 or 2

*Sensor and cable sold separately

**Flow Controls recommended for most applications

SAMPLE ORDER: DRF-075M-180-A

Ex: DRF Rotary, size 075, metric, 180° rotation with Shock Absorbers

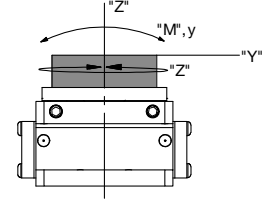
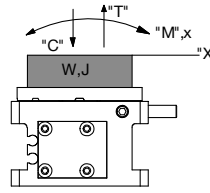


ROTARY ACTUATOR DRF-075M FLANGED SERIES

Specifications

DRF-075M

Maximum Payload with shocks (-A).....	1 lbs.	0.45 kg
Maximum Payload without shocks	0.5 lbs.	0.23 kg
Maximum Payload Inertia with shocks (-A)	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 (-A 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 (-A)	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	

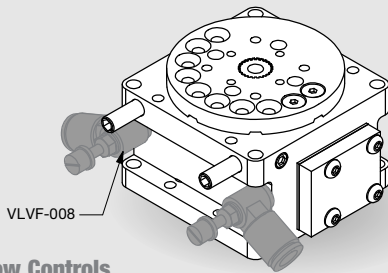


Loading Capacity

	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)	

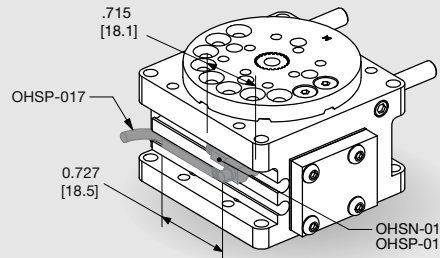
Note: Higher payloads and inertia possible with external shocks and stops.

Accessory Mounting Technical Data



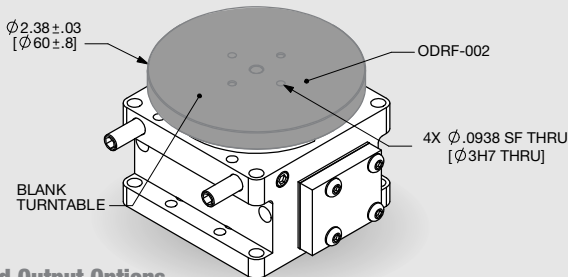
Flow Controls

- Flow controls for adjusting rotational speed



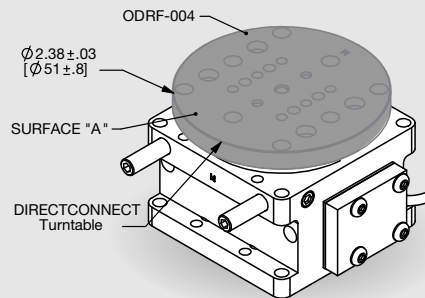
Sensors

- 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
- Low profile underflush sensor version or 90° wire exit sensor version
- Available with 2M or 5M Quick Disconnect mating cable (order separately)
- Sensor Magnet standard



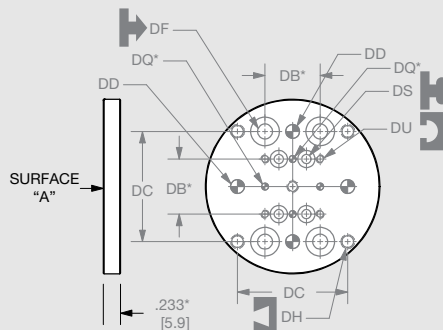
Flanged Output Options

- 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



Flanged Output DIRECTCONNECT Turntable

- DIRECTCONNECT Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels
- No machining required, DIRECTCONNECT Grippers mount directly
- 90° orientations



DIRECTCONNECT DIMENSIONS STANDARD MOUNTING PATTERN FOR ALL SIZES

	Imperial (inches)	Metric (mm)
DA	.375	9.5
DB	.750	19.1
DC	1.500	38.1
DD		5 mm THRU
DF		C'bore for M5 Button head screws
DH		M5 THRU
DQ		3 H7 THRU
DS		C'bored for M3 Button head screws
DU		M3 THRU

* DIMENSIONS ALSO APPLY TO BLANK
TURNTABLE
C'BORE FOR BUTTON HEAD SCREWS

Please see back cover for DE-STA-CO Global Locations. www.destaco.com

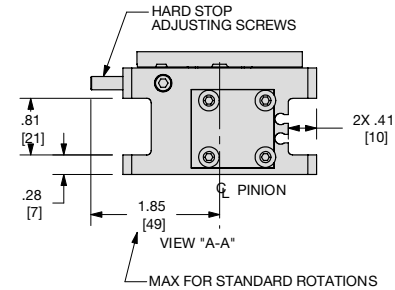
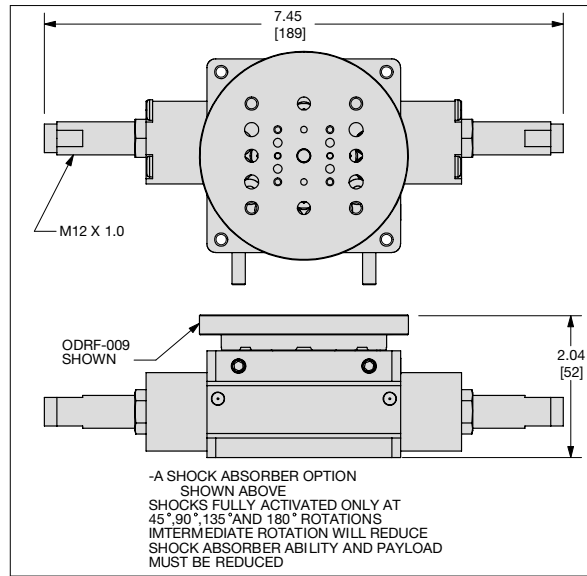
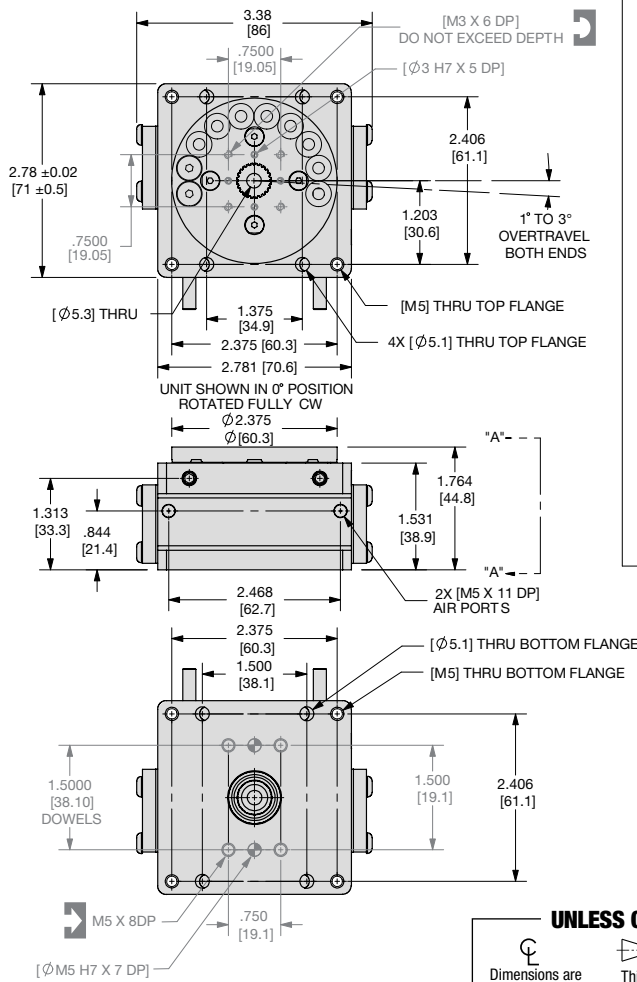
www.comoso.com

DRF SERIES

3.17

DIRECTCONNECT™

ROTARY ACTUATOR DRF-094M FLANGED SERIES

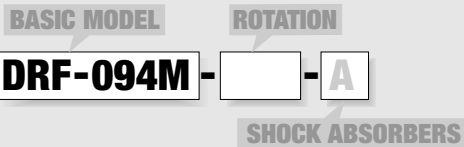


UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Imperial in.	Metric [mm]
0.00 ± .01	[0.] = ± .25
0.000 ± .005	[0.0] = ± .13
0.0000 ± .0005	[0.00] = ± .013

NOTE: DIRECTCONNECT™ DIMENSIONS ARE SHOWN IN BLUE

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



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

ROTARY ACCESSORIES

Turntable Blank, Metric
DIRECTCONNECT Turntable, Metric

ORDER # QTY/UNIT

ODRF-008 1
ODRF-010 1

SENSOR ACCESSORIES

Magneto Resistive Sensor (PNP)*
Magneto Resistive Sensor (NPN)*
Magneto Resistive Sensor 90° Barrel (PNP)*
Magneto Resistive Sensor 90° Barrel (NPN)*
Quick Disconnect Cable (2 meters long)*
Quick Disconnect Cable (5 meters long)*

ORDER # QTY/UNIT

OHSP-017 1 or 2
OHSN-017 1 or 2
OHSP-011 1 or 2
OHSN-011 1 or 2
CABL-010 1 or 2
CABL-013 1 or 2

PNEUMATIC ACCESSORIES

Seal Repair Kit (Standard Buna-N)
Shock Seal Repair Kit
Flow Control Push-in 90° Elbow M5-6mm O.D. Tube**

ORDER # QTY/UNIT

SLKT-216 1
SLKT-219 1
VLVF-008 1 or 2

*Sensor and cable sold separately

**Flow Controls recommended for most applications

SAMPLE ORDER: DRF-094M-180-A

Ex: DRF Rotary, size 094, metric, 180° rotation with Shock Absorbers

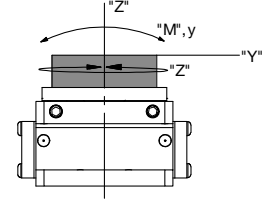
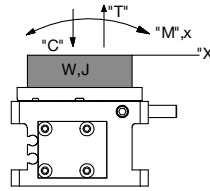


ROTARY ACTUATOR DRF-094M FLANGED SERIES

Specifications

DRF-094M

Maximum Payload with shocks (-A).....	3 lbs.	1.4 kg
Maximum Payload without shocks	1.5 lbs.	0.68 kg
Maximum Payload Inertia with shocks (-A).....	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 (-A 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 (-A)	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	

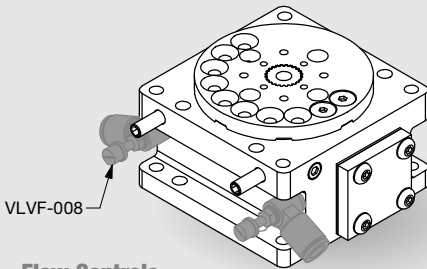


Loading Capacity

	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)

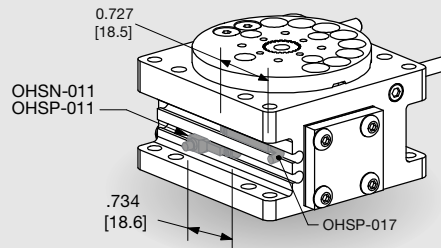
Note: Higher payloads and inertia possible with external shocks and stops.

Accessory Mounting Technical Data



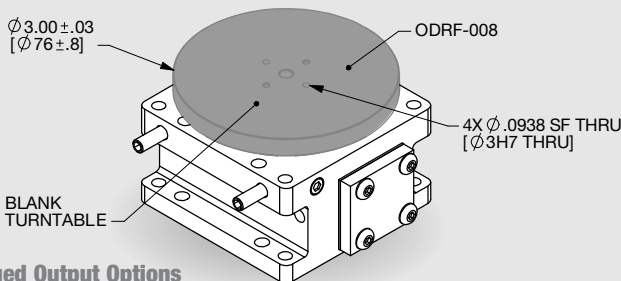
Flow Controls

- Flow controls for adjusting rotational speed



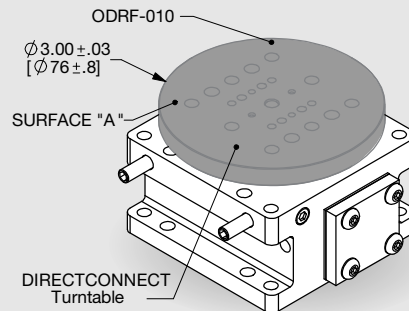
Sensors

- 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
- Low profile underflush sensor version or 90° wire exit sensor version
- Available with 2M or 5M Quick Disconnect mating cable (order separately)
- Sensor Magnet standard



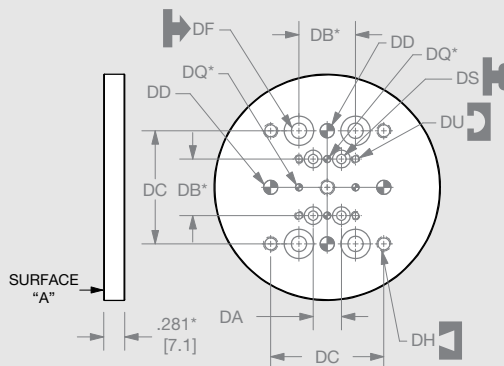
Flanged Output Options

- 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



Flanged Output DIRECTCONNECT Turntable

- DIRECTCONNECT Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels
- No machining required, DIRECTCONNECT Grippers mount directly
- 90° orientations

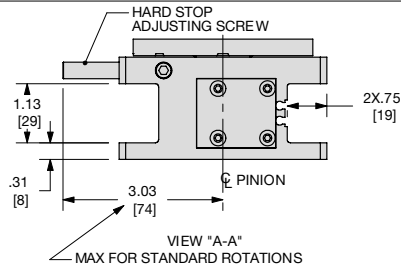
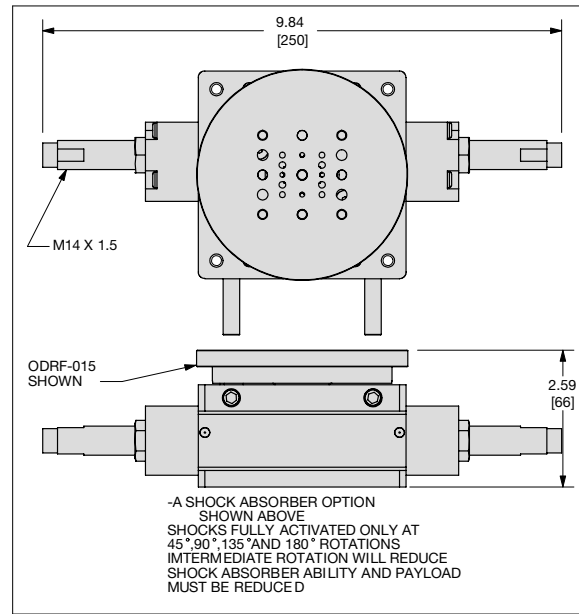
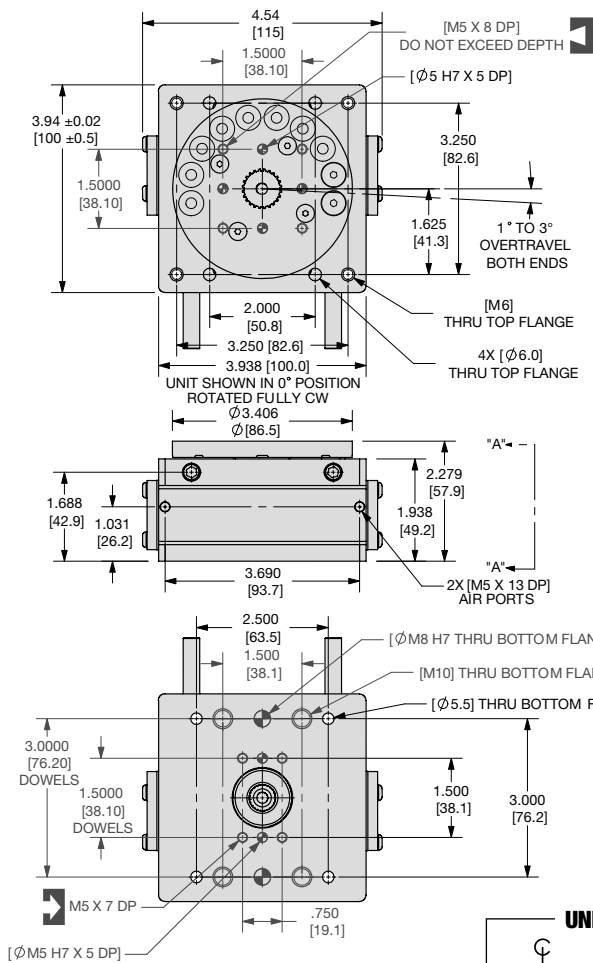


* DIMENSIONS ALSO APPLY TO BLANK TURNTABLE
C'BORE FOR BUTTON HEAD SCREWS

DIRECTCONNECT DIMENSIONS STANDARD MOUNTING PATTERN FOR ALL SIZES

	Imperial (inches)	Metric (mm)
DA	.375	9.5
DB	.750	19.1
DC	1.500	38.1
DD		5 mm THRU
DF		C'bore for M5 Button head screws
DH		M5 THRU
DQ		3 H7 THRU
DS		C'bored for M3 Button head screws
DU		M3 THRU

ROTARY ACTUATOR DRF-106M FLANGED SERIES

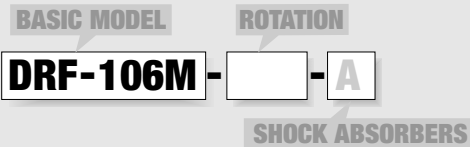


UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Imperial in.	Metric [mm]
0.00 = ±.01	[0.] = ±.25
0.000 = ±.005	[0.0] = ±.13
0.0000 = ±.0005	[0.00] = ±.013

NOTE: DIRECTCONNECT™ DIMENSIONS ARE SHOWN IN BLUE

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



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

ROTARY ACCESSORIES

- Turntable Blank, Metric
- DIRECTCONNECT Turntable, Metric

ORDER #	QTY/UNIT
ODRF-014	1
ODRF-016	1

SENSOR ACCESSORIES

- Magneto Resistive Sensor (PNP)*
- Magneto Resistive Sensor (NPN)*
- Magneto Resistive Sensor Short Barrel (PNP)*
- Magneto Resistive Sensor Short Barrel (NPN)*
- Magneto Resistive Sensor 90° Barrel (PNP)*
- Magneto Resistive Sensor 90° Barrel (NPN)*
- Quick Disconnect Cable (2 meters long)*
- Quick Disconnect Cable (5 meters long)*

ORDER #	QTY/UNIT
OHSP-017	1 or 2
OHSN-017	1 or 2
OHSP-017	1 or 2
OHSN-017	1 or 2
OHSP-011	1 or 2
OHSN-011	1 or 2
CABL-010	1 or 2
CABL-013	1 or 2

PNEUMATIC ACCESSORIES

- Seal Repair Kit (Standard Buna-N)
- Shock Seal Repair Kit
- Flow Control Push-in 90° Elbow M5-6mm O.D. Tube**

ORDER #	QTY/UNIT
SLKT-222	1
SLKT-225	1
VLVF-008	1 or 2

*Sensor and cable sold separately

**Flow Controls recommended for most applications

SAMPLE ORDER: DRF-106M-180-A

Ex: DRF Rotary, size 106, metric, 180° rotation with Shock Absorbers



DRF SERIES

3.20



DIRECTCONNECT™

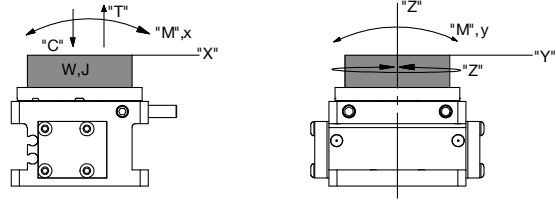


ROTARY ACTUATOR DRF-106M FLANGED SERIES

Specifications

DRF-106M

Maximum Payload with shocks (-A)	8 lbs.	3.6 kg
Maximum Payload without shocks	4 lbs.	1.8 kg
Maximum Payload Inertia with shocks (-A)	0.0414 in-lbs.-sec. ²	4.7 X 10 ⁻³ N-m-sec. ²
Maximum Payload Inertia without shocks	0.0207 in-lbs.-sec. ²	2.3 X 10 ⁻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 (-A 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 (-A)	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	

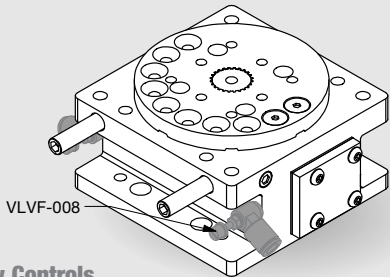


Loading Capacity

	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)	

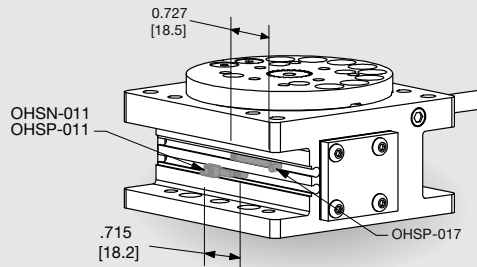
Note: Higher payloads and inertia possible with external shocks and stops.

Accessory Mounting Technical Data



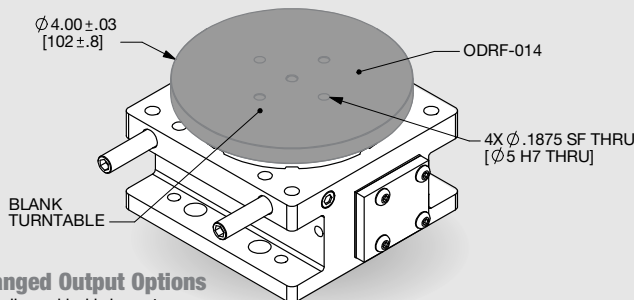
Flow Controls

- Flow controls for adjusting rotational speed



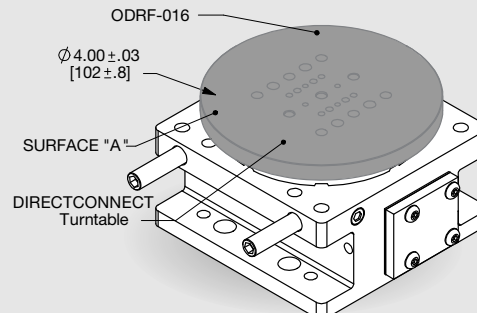
Sensors

- 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
- Low profile underflush sensor version or 90° wire exit sensor version
- Available with 2M or 5M Quick Disconnect mating cable (order separately)
- Sensor Magnet standard



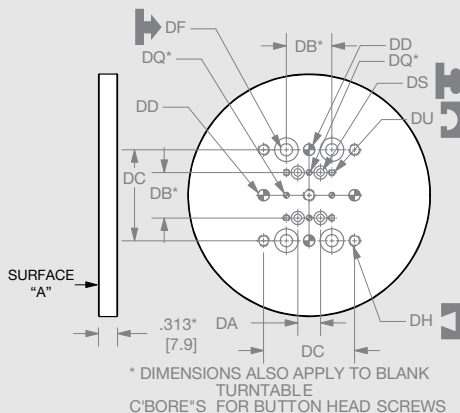
Flanged Output Options

- 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



Flanged Output DIRECTCONNECT Turntable

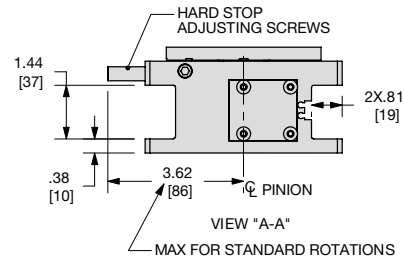
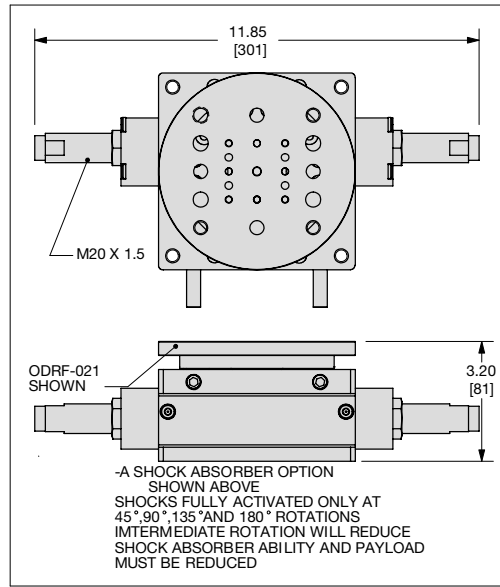
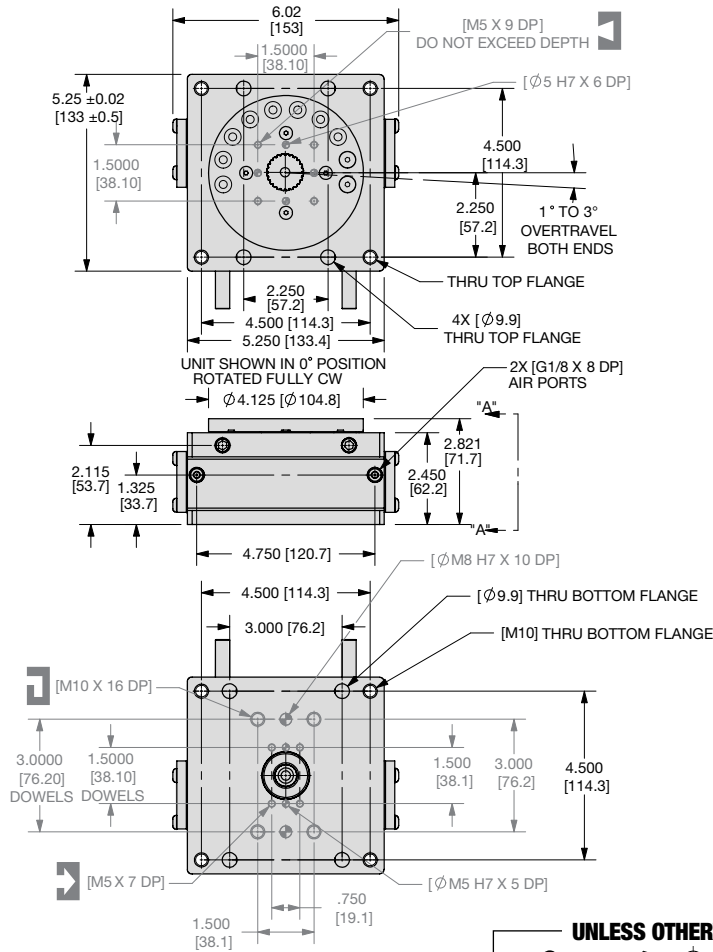
- DIRECTCONNECT Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels
- No machining required, DIRECTCONNECT Grippers mount directly
- 90° orientations



DIRECTCONNECT DIMENSIONS STANDARD MOUNTING PATTERN FOR ALL SIZES

	Imperial (inches)	Metric (mm)
DA	.375	9.5
DB	.750	19.1
DC	1.500	38.1
DD		5 mm THRU
DF		C'bore for M5 Button head screws
DH		M5 THRU
DQ		3 H7 THRU
DS		C'bored for M3 Button head screws
DU		M3 THRU

ROTARY ACTUATOR DRF-131M FLANGED SERIES



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Imperial in.	Metric [mm]
0.00 = ± .01	[0.] = [± .25]
0.000 = ± .005	[0.0] = [± .13]
0.0000 = ± .0005	[0.00] = [± .013]

NOTE: DIRECTCONNECT™ DIMENSIONS ARE SHOWN IN BLUE

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

BASIC MODEL

ROTATION

DRF-131M - [] - A

SHOCK ABSORBERS

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

ROTARY ACCESSORIES

Turntable Blank, Metric
DIRECTCONNECT Turntable, Metric

ORDER #

QTY/UNIT

ODRF-020 1
ODRF-022 1

SENSOR ACCESSORIES

Magneto Resistive Sensor (PNP)*
Magneto Resistive Sensor (NPN)*
Magneto Resistive Sensor 90° Barrel (PNP)*
Magneto Resistive Sensor 90° Barrel (NPN)*
Quick Disconnect Cable (2 meters long)*
Quick Disconnect Cable (5 meters long)*

ORDER #

QTY/UNIT

OHSP-017 1 or 2
OHSN-017 1 or 2
OHSP-011 1 or 2
OHSN-011 1 or 2
CABL-010 1 or 2
CABL-013 1 or 2

PNEUMATIC ACCESSORIES

Seal Repair Kit (Standard Buna-N)
Shock Seal Repair Kit
Fitting Push-in Straight G1/8-6mm O.D. Tube
Fitting Push-in Straight G1/8-8mm O.D. Tube
Flow Control Push-in 90° Elbow G1/8, 6MM O.D. Tube**

ORDER #

QTY/UNIT

SLKT-228 1
SLKT-232 1
PLFT-038 1 or 2
PLFT-045 1 or 2
VLVF-005 1 or 2

*Sensor and cable sold separately

**Flow Controls recommended for most applications

SAMPLE ORDER: DRF-131M-180-A

Ex: DRF Rotary, size 131, metric, 180° rotation with Shock Absorbers

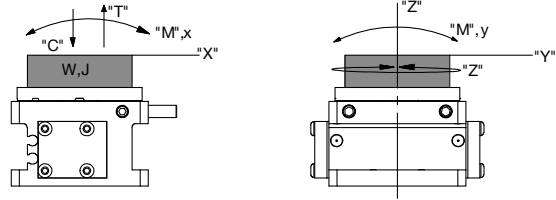


ROTARY ACTUATOR DRF-131M FLANGED SERIES

Specifications

DRF-131M

Maximum Payload with shocks (-A)	15 lbs.	6.8 kg
Maximum Payload without shocks	7.5 lbs.	3.4 kg
Maximum Payload Inertia with shocks (-A)	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 (-A 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 (-A)	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	

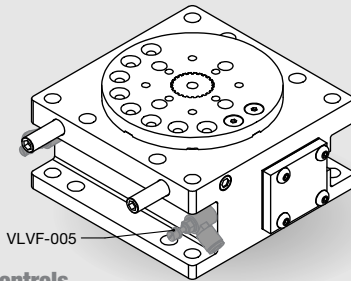


Loading Capacity

	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)	

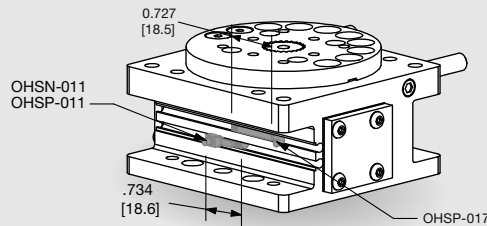
Note: Higher payloads and inertia possible with external shocks and stops.

Accessory Mounting Technical Data



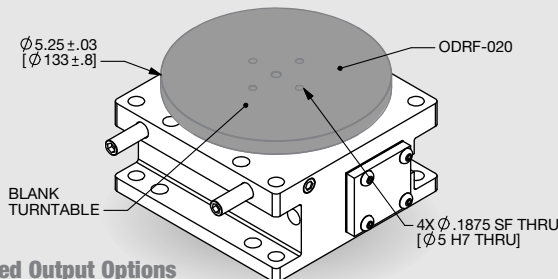
Flow Controls

- Flow controls for adjusting rotational speed



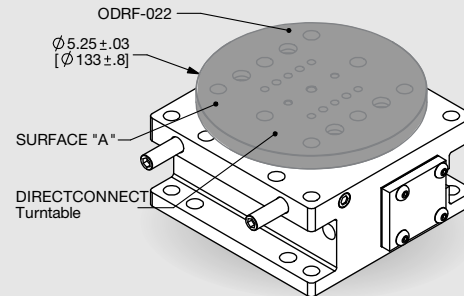
Sensors

- 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
- Low profile underflush sensor version or 90° wire exit sensor version
- Available with 2M or 5M Quick Disconnect mating cable (order separately)
- Sensor Magnet standard



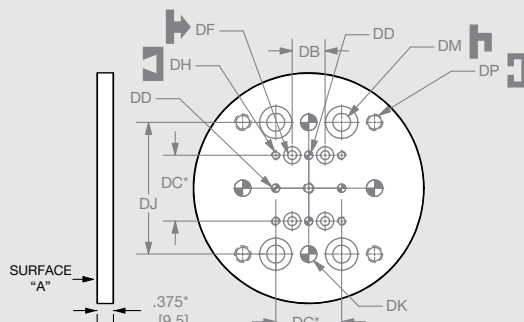
Flanged Output Options

- 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



Flanged Output DIRECTCONNECT Turntable

- DIRECTCONNECT Turntable, easily removed, pin located
- High quality aircraft aluminum, Black anodize finish
- Mounts through pinion with one screw & two dowels
- No machining required, DIRECTCONNECT Grippers mount directly
- 90° orientations



* DIMENSIONS ALSO APPLY TO BLANK TURNTABLE C'BORE'S FOR BUTTON HEAD SCREWS

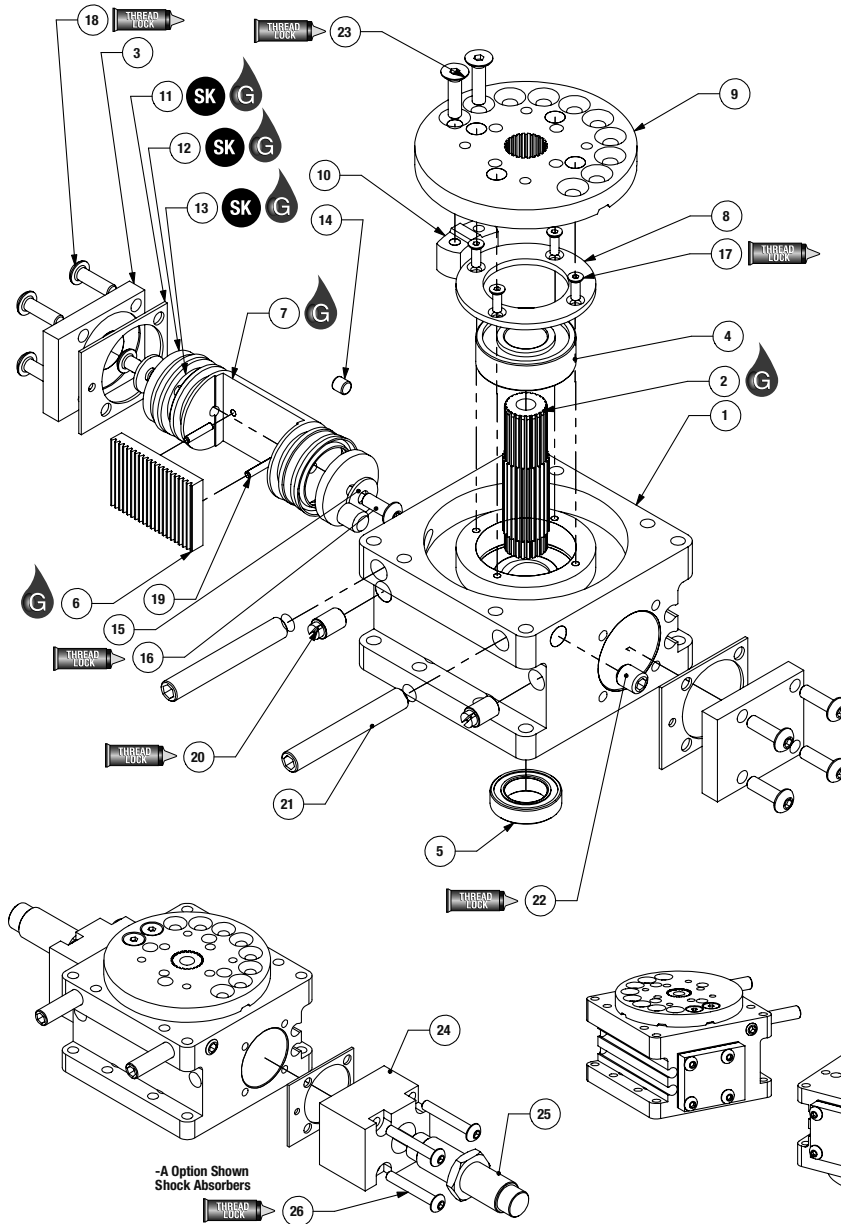
DIRECTCONNECT DIMENSIONS STANDARD MOUNTING PATTERN FOR ALL SIZES

	Imperial (inches)	Metric (mm)
DB	.750	19.1
DC	1.500	38.1
DD	.1880 THRU	5 mm THRU
DF		C'bore for M5 Button head screws
DH		M5 THRU
DJ		76.2
DK		10mm THRU
DM		C'bore for M10 Button head screws
DP		M10 THRU

DRF SERIES EXPLODED VIEW

DRF SERIES
MAINTENANCE

3.24



Item	Qty	Name
01	1	Body
02	1	Pinion Shaft
03	2	End Plates
04	1	Upper Bearing
05	1	Lower Bearing
06	1	Rack
07	1	Piston
08	1	Bearing Retainer
09	1	Hub
10*	1	Stop Puck
11	2	Gaskets
12	2	Urethane Bumpers
13	2	U-cups
14	1	Magnet
15	2	Bumper Washers
16	2	Bumper Screws
17	4	Retainer Screws
18	8	End Plate Screws
19	2	Roll Pins
20*	2	Fixed Orifices
21	2	Stop Screws
22	2	Stop Screw Locking Screws
23	2	Stop Puck Screws
24	2	Shock Block
25	2	Shocks
26	8	Shock Block Mounting Screws

***NOTES:**

- 1) Contact the Robohand 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
- 3) Item #20 not in size -131

Assembly Procedure

- 1) Press the Upper Bearing #4 onto the Pinion #2.
- 2) Install the Bearing Retainer #8 onto the Pinion #2 and press the Hub #9 onto the pinion: install the Stop Puck #10 onto the Hub with the stop puck Screws #23.
- 3) Assemble the Rack #6 to the Piston #7 with Roll Pins #19.
- 4) Grease the U-Cups #13 and install them onto the Piston #7.
- 5) Press the Magnet #14 into the Piston #7.
- 6) Assemble the Bumper #12, Washers #15 and Bumper Screw #16 onto the Piston #7.
- 7) Lubricate the Body #1 bore and install the Piston Assembly into the body.
- 8) Press the Lower Bearing #5 into the Body #1.
- 9) Locate the Piston assembly so it is aligned with an outer edge of the body.

- 10) Lubricate the Pinion assembly and align the key with the same edge of the Body as the Piston and Press the Pinion into the Body.
- 11) Rotate the Hub Assembly through the full travels and insure that the Piston is correctly located in the Body, adjust the travel of the Piston if necessary.
- 12) Grease the Gasket #11 and install the End Plate #3 onto the Body #1.
- 13) Install the 2 Orifices #20 into the Body #1 screw them in until they bottom.
- 14) Install the Bearing Retainer Screws #17.

-A Option Assembly Procedure:

- 1) Install the Shock Absorber #25 in to the Shock Blocks #24, use Teflon® tape to seal and tighten the lock nut if shock comes with one.
- 2) Screw the Shock Block onto the Body using the



Seal Kit Items



Thread Locker



Krytox™ Lubricant



Lightweight Machine Oil



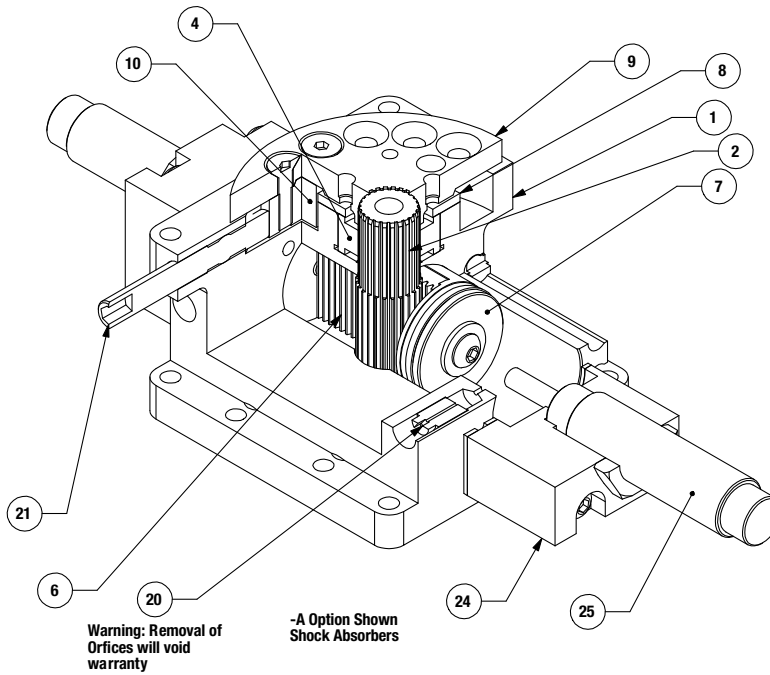
Teflon™ Based Grease



Super Bonder



Third Angle Projection

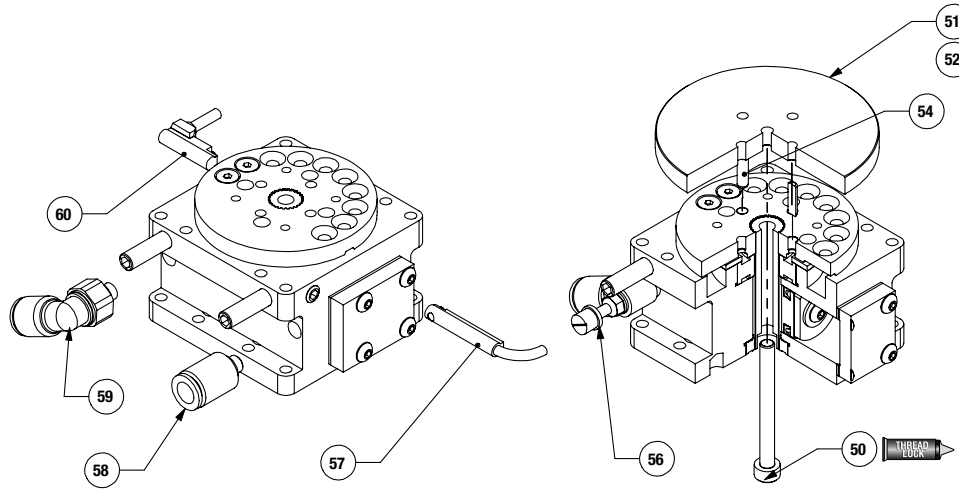


Item	Qty	Name
01	1	Body
02	1	Pinion Shaft
04	1	Upper Bearing
06	1	Rack
07	1	Piston
08	1	Upper Bearing Retainer
09	1	Hub
10*	2	Stop Pucks
20	2	Fixed Orifices
21	2	Stop Screws
24	2	Shock Blocks
25	2	Shocks

***NOTES:**

- 1) Contact the Robohand 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
56	1 or 2	Adjustable Flow Control
57	1 or 2	Magneto Resistive Sensor, with Quick Disconnect
58	1 or 2	Plumbing Fitting, Push-in straight
59	1 or 2	Plumbing Fitting, Push-in 90° Elbow
60	1 or 2	Magneto Resistive Sensor, 90° barrel, 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.

Plumbing Fittings

- 1) Plumbing fittings #58 & #59 can be used in any airport.
- 2) Flow controls #56 can be inserted and used in any airport.

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.

Seal Kit Items	Thread Locker	Krytox™ Lubricant	Lightweight Machine Oil	Teflon™ Based Grease	Super Bonder	Third Angle Projection