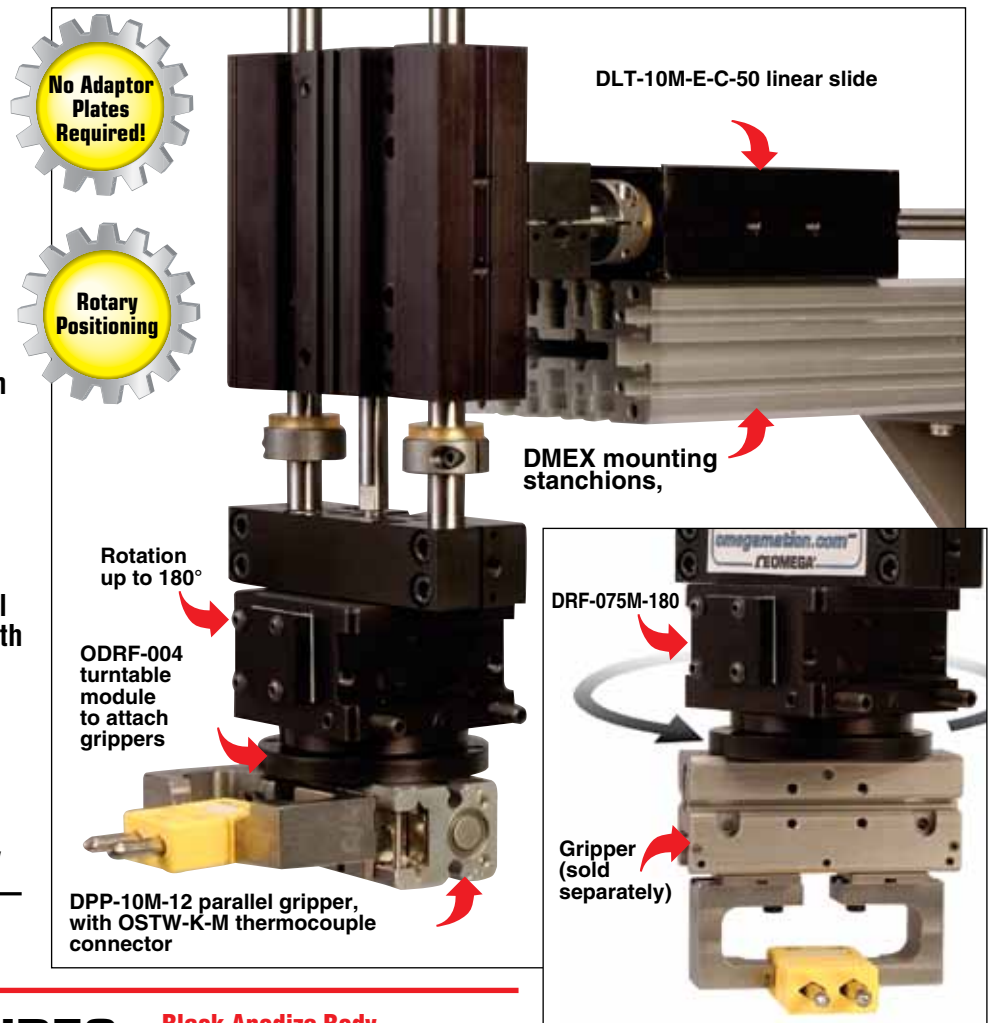


ROTARY ACTUATORS—PNEUMATIC, FLANGE MOUNTABLE DRF DIRECTCONNECT™ SERIES

TRODEKS®

DRF Series

- Rotary Motion Actuator—Precision End Stop Position and Zero Backlash
- Adjustable Rotation with a Maximum of 180° Full Rotation
- Repeatability $\pm 0.02^\circ$ of Rotation
- Highly Configurable Modular Automation, Exclusive DirectConnect Technology
- Multiple Mounting Locations—Tapped and Through the Flange on Top and Bottom Surfaces
- Up to 5 Million Cycles in Typical Application, Up to 10 Million with Maintenance
- Temperature Operating Range -35 to 80°C (-30 to 180°F)
- Double Acting Air Cylinder
- System Requires 3 to 7 bar (40 to 100 psi) Dry Filtered (40 Micron or Better) Air Supply
- Accessory Equipment Required—4-Way, 2 Position Pneumatic Direction Control Valve



PRODUCT FEATURES

Sensor Mounting Slots

Standard mounting slots for Magneto Resistive Sensors magnet mounted in piston standard (sensors sold separately).

Extremely Rugged Design

Pinion is supported with upper and lower sealed ball bearings.

End Stop Deceleration (-A Option)

Shock absorbers decelerates load at end of stroke.

Case Hardened

Rack and pinion are case hardened for wear and long life.

Black Anodize Body

The body and End Plates are Black anodized, steel parts are black oxide.

Flange Mounting

Turntable has DIRECTCONNECT mounting pattern

One Piece Body

One piece lightweight aircraft quality aluminum body.

Dowel Holes

Slip fit dowel pin holes in bottom body, and on turntable.

Piston

Made of Delrin® for extended life.

DRF-075M-90-A shown close to actual size.

DIRECTCONNECT™

Mounting Patterns

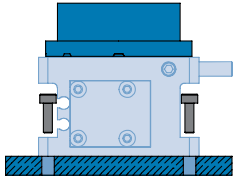
Tapped and Dowel mounting surface on bottom of body and on turntable.

Rotational Adjustments

All rotational adjustments made from front face. Adjustments are locked with set screw on side.

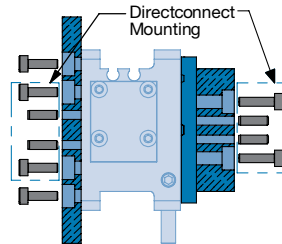
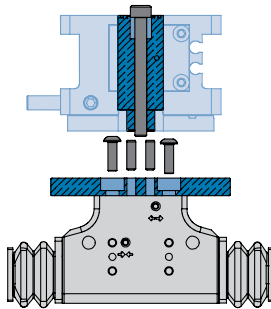
MOUNTING INFORMATION

Rotaries can be mounted and operated in any orientation.

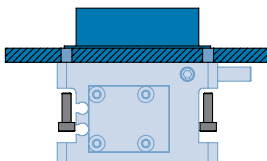


Mounting through bottom flange clearance holes into tapped holes in customer application.

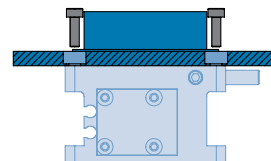
DIRECTCONNECT Mounting: Gripper is mounted from the under side of Turntable with Button Head screws and slip fit dowels. Turntable is then mounted to rotary with one screw through the center of the pinion and two slip fit dowel pins.



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



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



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

SPECIFICATIONS

PNEUMATIC SPECIFICATIONS

Pressure Operating Range: 3 to 7 bar
(40 to 100 psi)

Cylinder Type: Double acting

Dynamic Seals: Internally lubricated buna-N

Valve Required to Operate: 4-way, 2-position

AIR QUALITY REQUIREMENTS

Air Filtration: 40 micron or better

Air Lubrication: Not necessary*

Air Humidity: Low moisture content (dry)

Temperature Operating Range:

Buna-N Seals (Standard): -35 to 80°C
(-30 to 180°F)

With Shocks: 0 to 66°C (32 to 150°F)

MAINTENANCE SPECIFICATIONS

Expected Life:

Normal Application: 5 million cycles

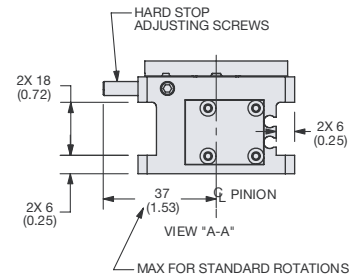
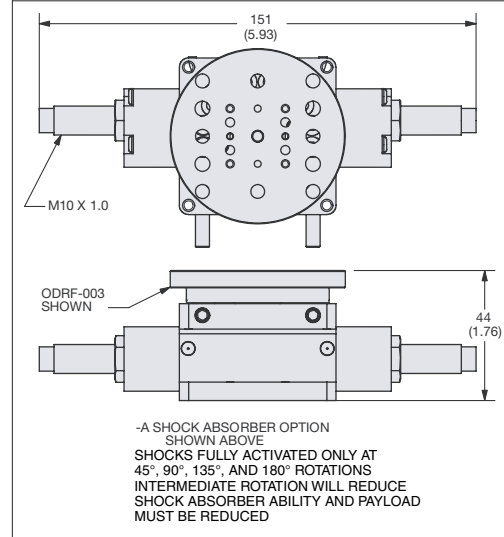
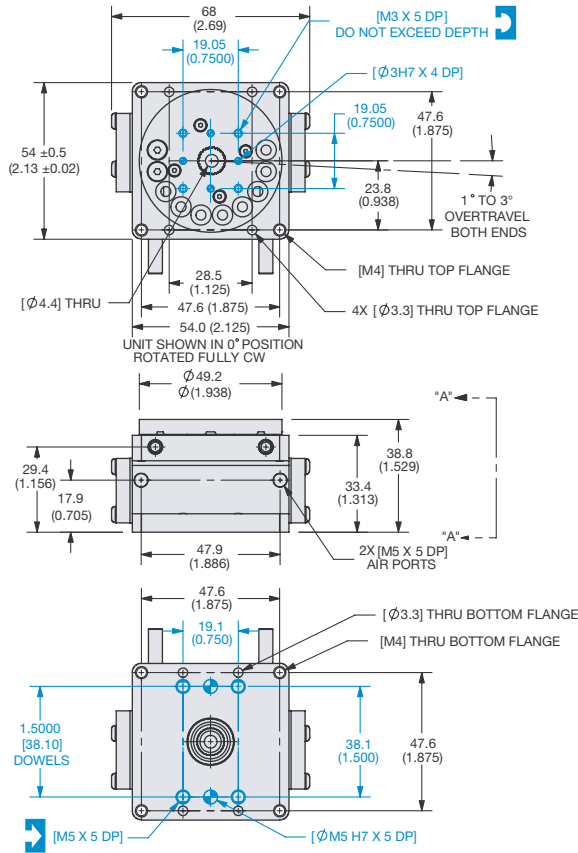
With Preventative Maintenance:
10+ million cycles*

Field Repairable: Yes

Seal Repair Kits Available: Yes

* Addition of lubrication will greatly increase service life.

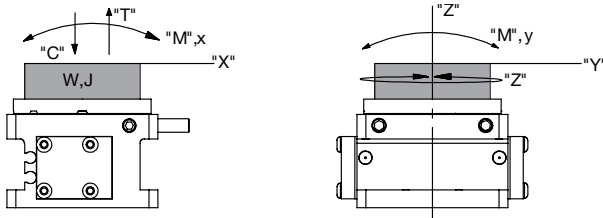
DRF-075M



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

| | | | | | |
|---|------------------------|--|-----------------------------|----------------------|--------------------|
| | | | | Imperial inch | Metric mm |
| Dimensions are symmetrical about centerline | Third Angle Projection | All Dowel Holes are SF (Slip Fit). Locational Tolerance $\pm 0.0005"$ or ± 0.013 mm] | Metric Threads Course Pitch | 0.00 = ± 0.01 | 0. = ± 0.25 |
| | | | | 0.000 = ± 0.005 | 0.0 = ± 0.13 |
| | | | | 0.0000 = ± 0.000 | 0.00 = ± 0.013 |

Dimensions: mm (inch)
DIRECTCONNECT™ dimensions shown in blue



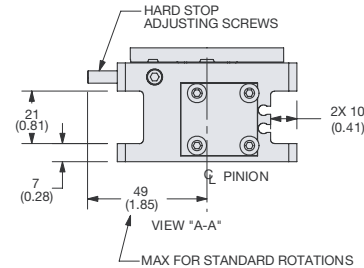
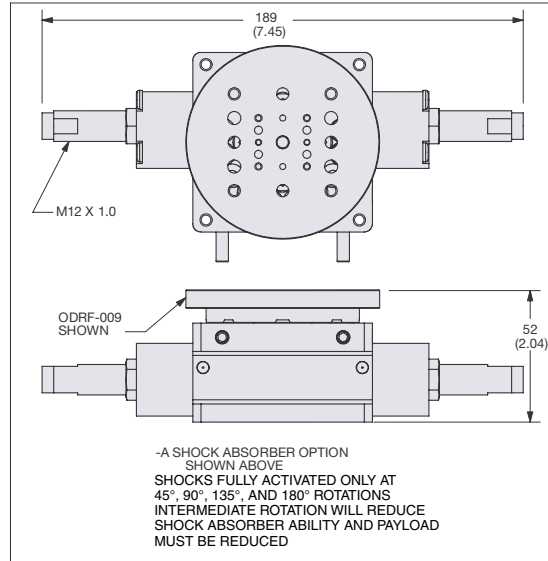
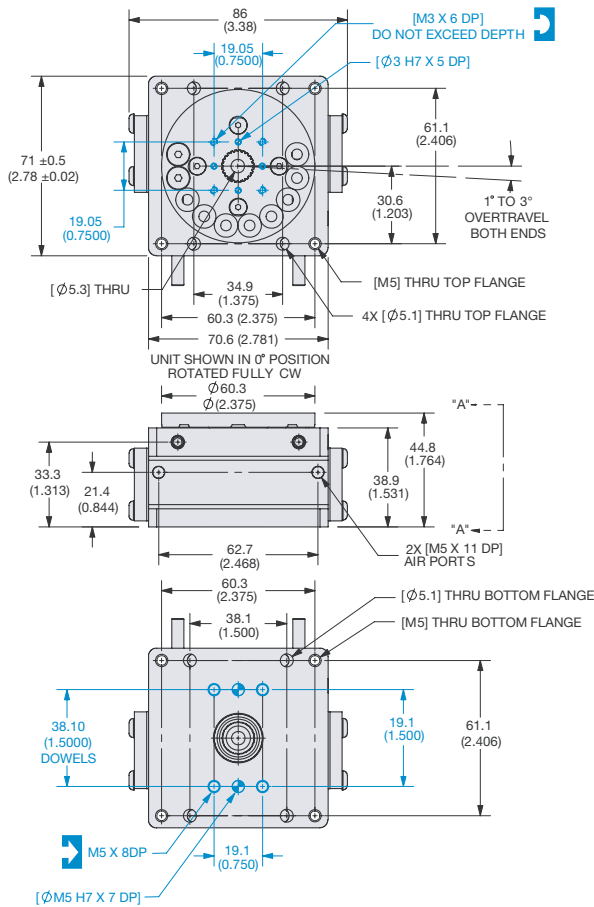
| Loading Capacity | Static | Dynamic |
|---------------------------------|-------------------|--|
| Maximum Tensile T | 44 N (10 lb) | 9 N (2 lb) |
| Maximum Compressive C | 89 N (20 lb) | 18 N (4 lb) |
| Maximum Moment Mx | 2.3 Nm (20 in-lb) | 0.5 Nm (4 in-lb) |
| Maximum Moment My | 2.3 Nm (20 in-lb) | 0.5 Nm (4 in-lb) |
| Maximum Payload W (with Shocks) | | 0.45 kg (1.0 lb) |
| Maximum Inertia J (with Shocks) | | 1.8×10^{-4} N-m-sec ² (0.0016 in-lb-sec ²) |

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

SPECIFICATIONS

Maximum Payload with Shocks (-A): 0.45 kg (1 lb)
Maximum Payload without Shocks: 0.23 kg (0.5 lb)
Maximum Payload Inertia with Shocks (-A):
 1.8×10^{-4} N-m-sec² (0.0016 in-lb-sec²)
Maximum Payload Inertia without Shocks:
 9.0×10^{-5} N-m-sec² (0.0008 in-lb-sec²)
Maximum Torque @ 7 bar (100 psi): 0.9 N-m (8.3 lb-in)
Maximum Rotation: 180°
Pitch Diameter of Pinion: 9.5 mm (0.375")
Weight with Shocks (-A Option): 0.34 kg (0.72 lb)
Weight without Shocks: 0.24 kg (0.54 lb)
Pressure Range: 3 to 7 bar (40 to 100 psi)
Bore: 19.1 mm (0.750")
Displacement (180°): 5.1 cm³ (0.31 in³)
Actuation Time [180° @ 7 bar (100 psi)]: 0.38 sec (0.38 sec)
Actuation Time [90° @ 7 bar (100 psi)]: 0.29 sec (0.29 sec)
Over Travel (Each End): 1 to 3°
Temperature Range without Shocks: -35 to 82°C (-30 to 180°F)
Temperature Range with Shocks (-A): 0 to 66°C (32 to 150°F)
End Stop Adjustability (Each End): 23°
Repeatability: $\pm 0.02^\circ$
Valve Required to Actuate: 4-way, 2-position

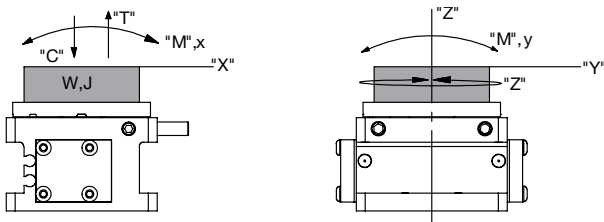
DRF-094M



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

| Imperial inch | Metric mm |
|-----------------|---------------|
| 0.00 = ±0.01 | 0. = ±0.25 |
| 0.000 = ±0.005 | 0.0 = ±0.13 |
| 0.0000 = ±0.000 | 0.00 = ±0.013 |

Dimensions: mm (inch)
DIRECTCONNECT™ dimensions shown in blue



| | Static | Dynamic |
|--|-------------------|--|
| Loading Capacity | | |
| Maximum Tensile T | 67 N (15 lb) | 13 N (3 lb) |
| Maximum Compressive C | 133 N (30 lb) | 27 N (6 lb) |
| Maximum Moment Mx | 5.6 Nm (50 in-lb) | 1.1 Nm (10 in-lb) |
| Maximum Moment My | 5.6 Nm (50 in-lb) | 1.1 Nm (10 in-lb) |
| Maximum Payload W (with Shocks) | | 1.4 kg (3 lb) |
| Maximum Inertia J (with Shocks) | | 1.3 x 10 ⁻³ N-m-sec ² (0.0111 in-lb-sec ²) |

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

SPECIFICATIONS

Maximum Payload with Shocks (-A): 1.4 kg (3 lb)

Maximum Payload without Shocks: 0.68 kg (1.5 lb)

Maximum Payload Inertia with Shocks (-A): 1.3 x 10⁻³ N-m-sec² (0.0111 in-lb-sec²)

Maximum Payload Inertia without Shocks: 6.3 x 10⁻⁴ N-m-sec² (0.0056 in-lb-sec²)

Maximum Torque @ 7 bar (100 psi): 1.9 N-m (17.3 lb-in)

Maximum Rotation: 180°

Pitch Diameter of Pinion: 12.7 mm (0.500")

Weight with Shocks (-A Option): 0.64 kg (1.4 lb)

Weight without Shocks: 0.50 kg (1.1 lb)

Pressure Range: 3 to 7 bar (40 to 100 psi)

Bore: 23.8 mm (0.938")

Displacement (180°): 9.0 cm³ (0.55 in³)

Actuation Time [180° @ 7 bar (100 psi)]: 0.38 sec (0.38 sec)

Actuation Time [90° @ 7 bar (100 psi)]: 0.29 sec (0.29 sec)

Over Travel (Each End): 1 to 3°

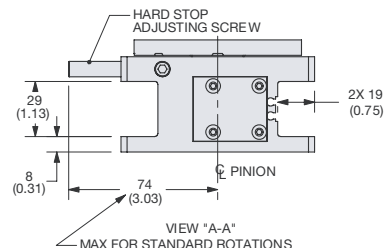
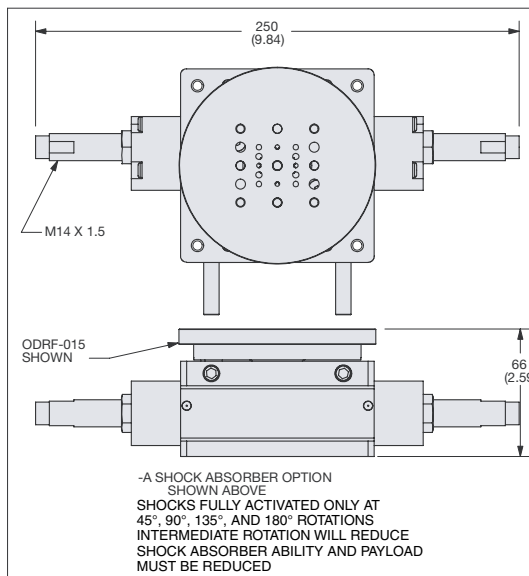
Temperature Range without Shocks: -35 to 82°C (-30 to 180°F)

Temperature Range with Shocks (-A): 0 to 66°C (32 to 150°F)

End Stop Adjustability (Each End): 23°

Repeatability: ±0.02°

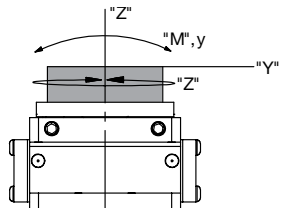
Valve Required to Actuate: 4-way, 2-position



Q

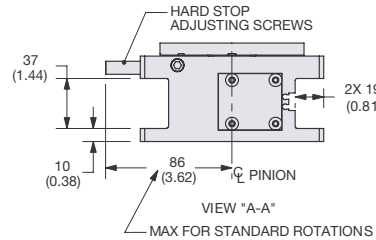
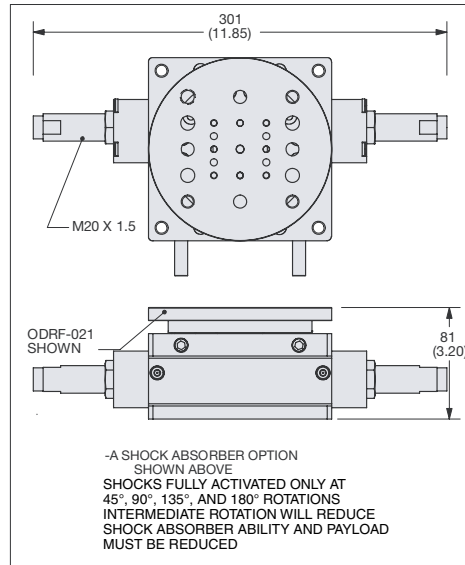
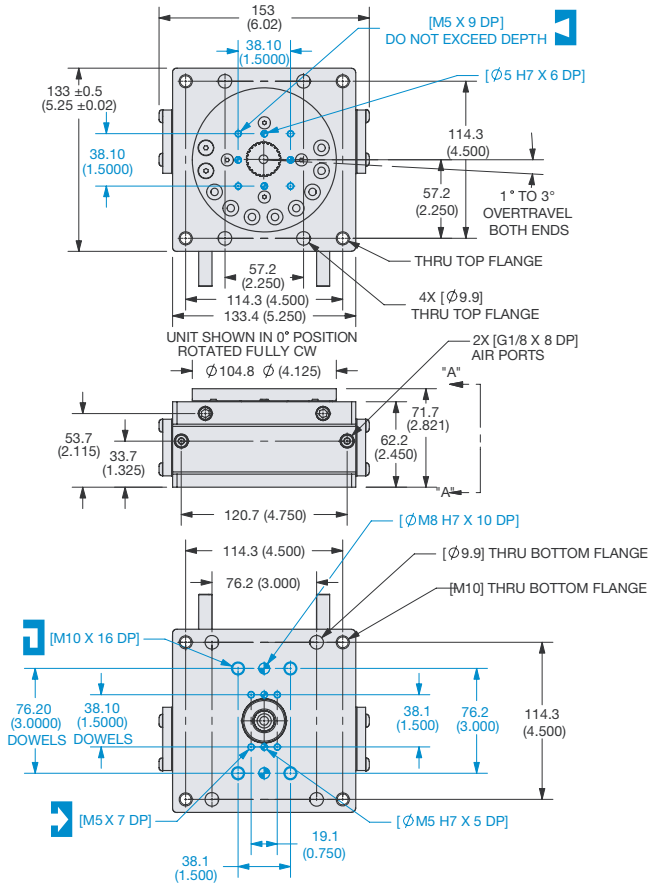
Imperial inch

Metric mm

$$0.00 = +0.01$$
 $0 = +0.25$
$$0.000 = \pm 0.005$$
$$0.0 = \pm 0.13$$
$$0.0000 = \pm 0.000$$
$$0.00 = \pm 0.013$$


C-19

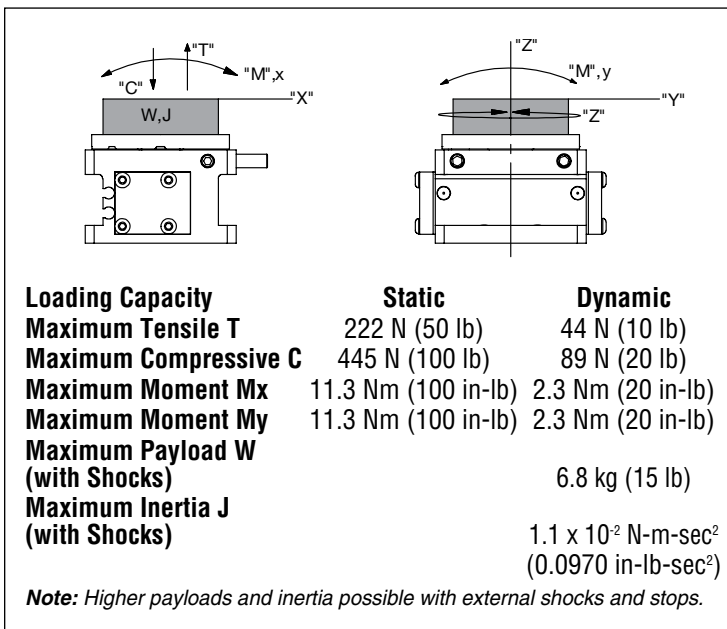
DRF-131M



UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

| Imperial inch | Metric mm |
|-----------------|---------------|
| 0.00 = ±0.01 | 0. = ±0.25 |
| 0.000 = ±0.005 | 0.0 = ±0.13 |
| 0.0000 = ±0.000 | 0.00 = ±0.013 |

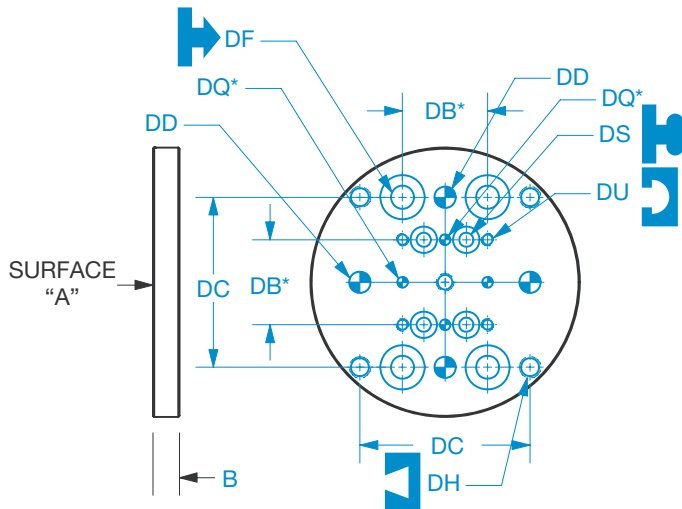
Dimensions: mm (inch)
DIRECTCONNECT™ dimensions shown in blue



SPECIFICATIONS

Maximum Payload with Shocks (-A): 6.8 kg (15 lb)
Maximum Payload without Shocks: 3.4 kg (7.5 lb)
Maximum Payload Inertia with Shocks (-A): 1.1 x 10⁻² N-m-sec² (0.0970 in-lb-sec²)
Maximum Payload Inertia without Shocks: 5.5 x 10⁻³ N-m-sec² (0.0485 in-lb-sec²)
Maximum Torque @ 7 bar (100 psi): 7.6 N-m (67.6 lb-in)
Maximum Rotation: 180°
Pitch Diameter of Pinion: 25.4 mm (1.000")
Weight with Shocks (-A Option): 3.1 kg (6.8 lb)
Weight without Shocks: 2.9 kg (6.3 lb)
Pressure Range: 3 to 7 bar (40 to 100 psi)
Bore: 33.4 mm (1.313")
Displacement (180°): 34.6 cm³ (2.11 in³)
Actuation Time [180° @ 7 bar (100 psi)]: 0.87 sec (0.87 sec)
Actuation Time [90° @ 7 bar (100 psi)]: 0.68 sec (0.68 sec)
Over Travel (Each End): 1 to 3°
Temperature Range without Shocks: -35 to 82°C (-30 to 180°F)
Temperature Range with Shocks (-A): 0 to 66°C (32 to 150°F)
End Stop Adjustability (Each End): 23°
Repeatability: ±0.02°
Valve Required to Actuate: 4-way, 2-position

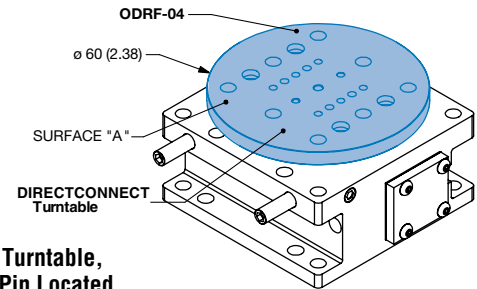
DRF-075M, 094M, 106M



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

Turntable

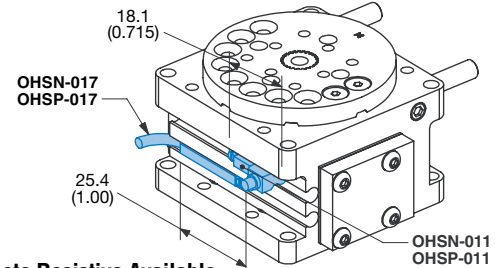
Dimensions:
mm (inch)



- DIRECTCONNECT Turntable, Easily Removed, Pin Located
- High Quality Aircraft Aluminum, Black Anodized Finish
- Mounts Through Pinion with One Screw and Two Dowels
- No Machining Required, DIRECTCONNECT Grippers Mount Directly
- 90° and 180° Orientations in Stock

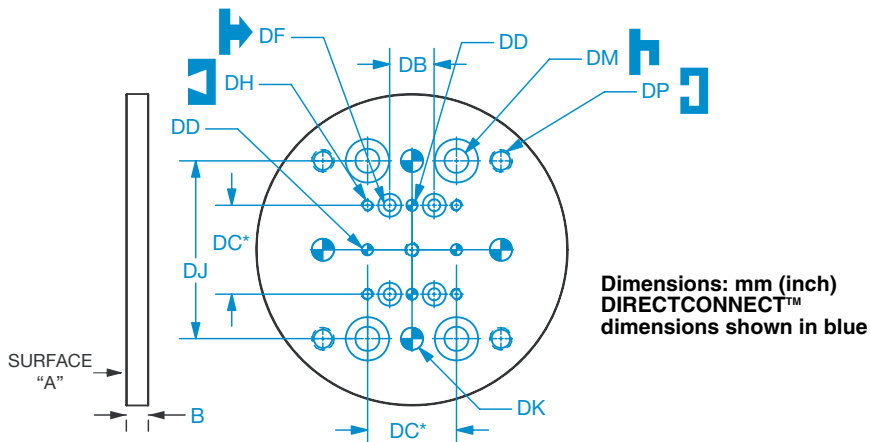
Sensor and Flow Controls

Dimensions:
mm (inch)



- PNP and NPN Magneto Resistive Available
- Sensors Are Slot Mounted, No Mounting Kits Required
- Precision Rotary Adjustments Made from Face and Locked with Set Screws

DRF-131M



Dimensions: mm (inch)
DIRECTCONNECT™
dimensions shown in blue

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

DIRECTCONNECT DIMENSIONS STANDARD MOUNTING PATTERN FOR ALL SIZES

| | |
|----|---------------------------------------|
| DA | 9.5 mm |
| DB | 19.1 mm |
| DC | 38.1 mm |
| DD | 5 mm THRU |
| DF | C'BORE FOR M5 BUTTON HEAD SCREW |
| DH | M5 THRU |
| DJ | 76.2 mm |
| DK | 10 mm THRU |
| DM | C'BORE FOR 10 mm BUTTON HEAD SCREW |
| DP | M10 THRU |
| DQ | 3 H7 THRU |
| DS | C'BORE FOR M3 BUTTON HEAD SCREW |
| DU | M3 THRU |

TURNABLE PLATE DIAMETER AND THICKNESS "B"

| MODEL NO. | TURNABLE NO. | THICKNESS mm (inch) | DIAMETER mm (inch) |
|-----------|--------------|------------------------|-----------------------|
| DRF-075M | ODRF-002/004 | 5.9 (0.23) | 60 ±0.8 (2.38 ±0.03) |
| DRF-094M | ODRF-008/010 | 7.1 (0.281) | 76 ±0.8 (3.00 ±0.03) |
| DRF-106M | ODRF-014/016 | 7.9 (0.313) | 102 ±0.8 (4.00 ±0.03) |
| DRF-131M | ODRF-020/022 | 9.5 (0.375) | 133 ±0.8 (5.25 ±0.03) |

| To Order | | | | | | |
|----------------|--------------------|--------------------|---------------------|-------------------------|-----------------|--------------------|
| MODEL NO. | DEPTH mm (inch) | WIDTH mm (inch) | HEIGHT mm (inch) | MAX PAYLOAD Kg (lbs) | MAX ROTATION | WEIGHT Kg (lbs) |
| DRF-075M-90 | 54 (2.13) | 69 (2.69) | 37 (1.52) | 0.23 (0.5) | 90° | 0.24 (0.54) |
| DRF-075M-180 | 54 (2.13) | 69 (2.69) | 37 (1.52) | 0.23 (0.5) | 180° | 0.24 (0.54) |
| DRF-075M-90-A | 54 (2.13) | 151 (5.93) | 37 (1.52) | 0.45 (1) | 90° | 0.34 (0.72) |
| DRF-075M-180-A | 54 (2.13) | 151 (5.93) | 37 (1.52) | 0.45 (1) | 180° | 0.34 (0.72) |
| DRF-094M-90 | 71 (2.78) | 86 (3.36) | 49 (1.76) | 0.68 (1.50) | 90° | 0.50 (1.10) |
| DRF-094M-180 | 71 (2.78) | 86 (3.36) | 49 (1.76) | 0.68 (1.50) | 180° | 0.50 (1.10) |
| DRF-094M-90-A | 71 (2.78) | 189 (7.45) | 49 (1.76) | 1.4 (3.00) | 90° | 0.64 (1.40) |
| DRF-094M-180-A | 71 (2.78) | 189 (7.45) | 49 (1.76) | 1.4 (3.00) | 180° | 0.64 (1.40) |
| DRF-106M-90 | 100 (3.94) | 115 (4.54) | 58 (2.28) | 1.8 (4.00) | 90° | 1.1 (2.50) |
| DRF-106M-180 | 100 (3.94) | 115 (4.54) | 58 (2.28) | 1.8 (4.00) | 180° | 1.1 (2.50) |
| DRF-106M-90-A | 100 (3.94) | 250 (9.84) | 58 (2.28) | 3.6 (8.00) | 90° | 1.4 (3.10) |
| DRF-106M-180-A | 100 (3.94) | 250 (9.84) | 58 (2.28) | 3.6 (8.00) | 180° | 1.4 (3.10) |
| DRF-131M-90 | 133 (5.25) | 153 (6.02) | 72 (2.82) | 3.4 (7.50) | 90° | 2.9 (6.30) |
| DRF-131M-180 | 133 (5.25) | 153 (6.02) | 72 (2.82) | 3.4 (7.50) | 180° | 2.9 (6.30) |
| DRF-131M-90-A | 133 (5.25) | 301 (11.85) | 72 (2.82) | 6.8 (15.00) | 90° | 3.1 (6.80) |
| DRF-131M-180-A | 133 (5.25) | 301 (11.85) | 72 (2.82) | 6.8 (15.00) | 180° | 3.1 (6.80) |

Ordering Example: DRF-075M-90-A, precision rotary actuator with 90° of rotation and built in shock absorber. Recommend accessories include 2 sensors and 2 pneumatic flow controls for each slide, along with a 4-way 2 position valve. **DRF-075M** models: actuation time [180° @ 7 bar (100 psi) 0.38 seconds], actuation time [90° @ 7 bar (100 psi) 0.29 seconds]. **DRF-094M** models: actuation time [180° @ 7 bar (100 psi) 0.38 seconds], actuation time [90° @ 7 bar (100 psi) 0.29 seconds]. **DRF-106M** models: actuation time [180° @ 7 bar (100 psi) 0.38 seconds], actuation time [90° @ 7 bar (100 psi) 0.29 seconds]. **DRF-131M** models: actuation time [180° @ 7 bar (100 psi) 0.38 seconds], actuation time [90° @ 7 Bar (100 psi) 0.29 seconds]. All models end stop adjustability 23°, over travel (each end) 1 to 3°.

Accessories

| MODEL NO. | DESCRIPTION |
|-------------------------------|--|
| SENSOR ACCESSORIES | |
| OHSP-011 | PNP magneto resistive sensor 90° barrell with quick disconnect fitting |
| OHSN-011 | NPN magneto resistive sensor 90° barrell with quick disconnect fitting |
| OHSP-017 | PNP magneto resistive sensor short barrell with quick disconnect fitting |
| OHSN-017 | NPN magneto resistive sensor short barrell with quick disconnect fitting |
| CABL-010 | Quick disconnect cable 2 m (6.6') long |
| CABL-013 | Quick disconnect cable 5 m (16') long |
| PNEUMATIC ACCESSORIES | |
| Pneumatic Tubing | Polyurethane tubing in multiple diameters and colors available, |
| Pneumatic Fittings | Rotary sizes 075M to 106M use M5 threads, 131M use 1/8G threads |
| Pneumatic Flow Controls | Adjustable flow control fittings and directional control valves |
| MECHANICAL ACCESSORIES | |
| ODRF-002 | Rotary size 075M blank turn table, machining required |
| ODRF-004 | Rotary size 075, DirectConnect turntable metric, direct mounting for gripper, no machining necessary |
| ODRF-008 | Rotary size 094M blank turn table, machining required |
| ODRF-010 | Rotary size 094, DirectConnect turntable metric, direct mounting for gripper, no machining necessary |
| ODRF-014 | Rotary size 106M blank turn table, machining required |
| ODRF-016 | Rotary size 106M, DirectConnect turn table, direct mounting for grippers, no machining necessary |
| ODRF-020 | Rotary size 131M blank turn table, machining required |
| ODRF-022 | Rotary size 131M, DirectConnect turn table, direct mounting for grippers, no machining necessary |
| DMM Series | Aluminum extruded mounting stanchions for slides and thrusters |