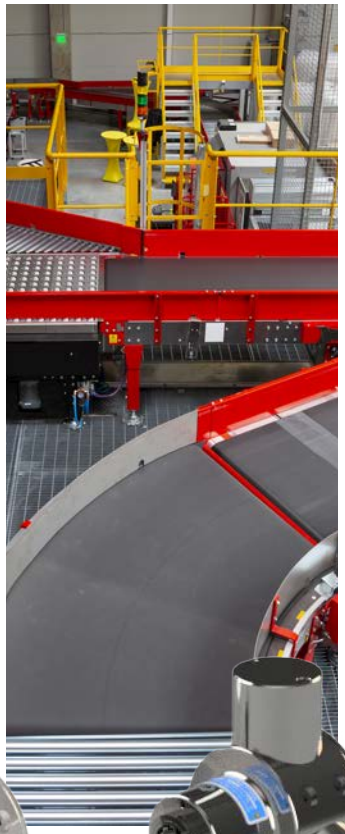
ALTRA MOTION

Piston Air Motors



Huco®
Altra Industrial Motion

Huco

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The Case for Piston Air Motors

Electric motors – the choice is phenomenal. At the heavyweight end of the scale they drive ships. And quite unbelievably one of the smallest electric motors ever produced operates by shuttling atoms between two metal droplets, one large and other small, residing on the back of a carbon nanotube through which an electric current is transmitted.

AC / DC, brush and brushless, servo and stepper; the list goes on. And then there's how they are powered – from the mains, the sun, battery, clockwork or via generator. With all these options one could easily ask: "why do we need any other type of motor?" But, there is a motor that has found its niche and continues to grow in popularity. It's the Air Motor.

For applications such as paint-stirring the air motor has become an industry standard and when you consider its credentials it's easy to understand why. Other markets also understand the benefits of air motors, so under what circumstances would you choose air over electric?

The first and obvious answer is when other power sources are not suitable for the application. Hazardous areas are clearly prime sites for air motors as there is no danger of sparks. Of course there are ATEX-rated electric motors available to meet this need but the shielding required makes them expensive.

The benefits of air motors certainly become apparent where harsh duty cycles are involved. Hold a powered AC or DC motor shaft with a brake and it will soon burn out. An air motor, on the other hand will just stop, and then continue when the brake is released. There is no component to damage, it just stops and starts again with no ill effect.

Stepper motors are of course ideal for stop/start applications under load but not in the hazardous or sensitive environments involved in hydrocarbon engineering, paint systems, paper converting, wood working and food processing. And these are the sectors that are increasingly turning to the air motor as a viable alternative to an electrical, variable speed drive.

Air motors are also ideal where magnetic fields and electro-magnetic interference are design issues – in MRI scanners for example – for use underwater and in stealth applications where a stray signal could give away your position. However not all air motors provide the same performance and here again the specifier needs to consider the options.

Some air motors don't have a good reputation for efficiency but this is a criticism that can only be levelled at vane type motors. In simple terms the vane air motor comprises a cylinder inside which is rotor with vanes that spins like a windmill. There clearly needs to be gap between the edge of vane and the casing to allow its free movement and it's this aspect that makes the vane motor very difficult to seal. As result a lot of air is wasted.

The unique free-floating piston in a Dynatork Air motor is much easier to seal. It is therefore far more cost efficient as most of the energy stored up in the compressed air is converted into motion. It consumes up to 80% less air than a vane motor providing significant cost savings even at maximum torque.

Aside from energy costs, the vane motor remains a good choice if the speed requirement is above 800 rpm and the application calls a steady duty cycle. However if the application involves fast acceleration, stop/start and reverse at lower speeds then a Dynatork piston motor is the answer. Its free-floating pistons transmit maximum torque on start-up that can be adjusted via a pressure regulator. Speed is adjusted to fine limits by restrictors on the exhaust port. Pulse counters can also be specified to programme direction of rotation, speed and number of revolutions.

So, for flexibility, reliability and cost efficiency the case for the piston air motor is proven. QED

Applications

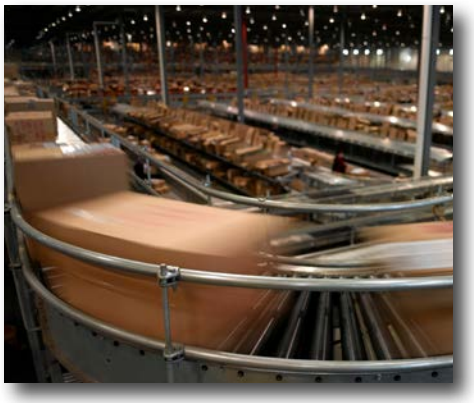
Agriculture
- Portable Conveyor Drive
- Cattle Gate Drive

Aerospace
- Work Platform Positioning Units
- Scissor Lifts
- Portable equipment
- Antenna Drive Systems
- Mechanical Handling
- Sand / Shot Blasting Table Drivers

Automotive
- Paint Stirring
- Assembly Line
- Trolley Drive
- Life Testing Components
- Tyre Carousels Drive
- Lube Pump Drive

Chemical Industry
- Stirring
- Agitation
- Valve Modulation
- Dispensing Machines
- Volumetric Filling
- Conveyor Drive
- Indexing
- Process Plant
- Peristaltic Pump Drive
- Dosing Plant Drive

Food
- Small Conveyors
- Agitative
- Mixing
- Rotating Tables
- Labelling Machines
- Brushing
- Peristaltic Pump Drive
- Modulating Valve Control Drive
- Carton Filling Machines
- Bucket Elevators
- Cap Applications
- Slow Feed - Fast Return Wrapping

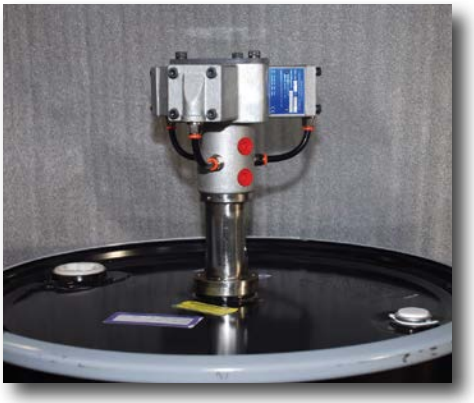


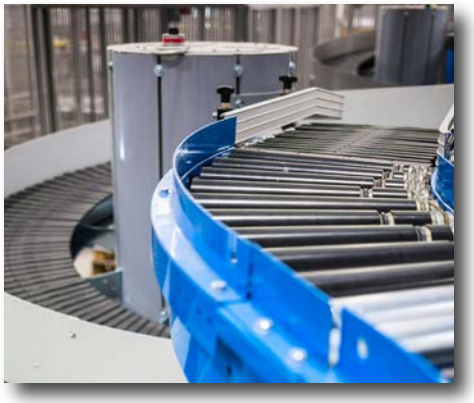
General Engineering
- High Pressure Water Jet
- Life Testing Equipment
- Conveyor Belt and Roller
- Stirrers
- Winding, Unwinding
- Constant Reversal Applications

Machine Tool
- Clamping
- Capston Drive
- Bar Feed Drive
- Lead Screw Drive
- Slow Speed Positional Drive
- Sheet Steel Press Feeding & Tensioning System

Marine
- Submerged Propeller Drive
- Bow / Stern Servo Control Drive
- Diesel Engine Speed Control (remote)
- Boarding Ladder Control Drive
- Windscreen Wiper Drive

Mechanical Handling
- Conveyor Drive
- Indexing Tables
- Clamping
- Scissor Lifts
- Lead Screw Drive
- Heavy Vehicle Drive
- Chute Positioning
- Stacking Machines
- Un-stacking Machines
- Nip Roller Drive
- Heavy Trolley Drives (up to 30 tonnes)





Medical

- Auxiliary Drive running on Nitrogen
- Scanning Machine Drive
- Peristaltic Pump Gear Pump

Oil Industry

- Back Flush Filter Drive
- Valve Modulation
- Cable Winding / Unwinding
- Pipe Launching
- Pipe Welding Drive Systems

Packaging and Labelling

- Labelling Machine Conveyors
- Wind Up of Label Backing Strips
- Conveyor Drive
- Back Tensioning on Label Reels
- Clamping
- Staple Gun Positioning
- Filling Machines
- Carousel Drive
- Volume Adjustment
- Conveyors
- Cap Tightening
- Slow Feed - Fast Return Bagging

Paper and Printing Industry

- Solvent Pump Drive
- Ink Pump Drive
- Paper Mill Belt Cleaning in High Temperature
- Oscillating Drive
- Paper Reel Drive Roller
- Conveyor (Stop / Start)

Steel Industry

- Nip Roller Drive
- Modulating Drive for Steel Casting
- Spray Nozzle Drive
- Slow Rotation of Large Ingots
- Clamping / Positioning Large Ingots
- Ladle Pouring Controller Drive
- Conveyor Drives
- Heavy Trolley Drive

Textile

- Carpet Winding on Drums
- Dying Process Plant for Winding off
- Stenter Machines
- Webb Tracking Drives with Modulating Control
- Handling Equipment Drives

Unique Features of Huco Air Motors

Controllable Speed & Torque

Speed control can be adjusted to fine limits by the use of restrictors on the exhaust ports. The speed can be instantly changed to a higher or lower speed due to fast response times.

Instant Stop-Start

Dynatork motors can stop-start and drive under load with characteristics similar to a Stepping Motor.

Environmental Benefits

Energy Saving

Air consumption of piston motor is positive as leakage is negligible giving maximum torque at minimum air consumption.

Quiet Operation

Dynatork air motors have very low noise levels when compared with standard air motors. They can operate in harsh environmental conditions and are unaffected by airline condensate.

Clean Environment

Dynatork Air Motors can be supplied for a non-lubricated gas supply in clean areas so eliminating contamination in a clean environment.

Max Torque at Start

Floating pistons transmit the maximum torque at start which can be adjusted by the use of a pressure regulator.

Reversing

The reversing of the Dynatork Air Motors is achieved by using 5 port control valves, giving near instant response even under load.

Programmed Control

Dynatork air motors can be fitted with sensors to enable programmed control by pulse counters to control rotation direction, speed and number of revolutions.

High Torque Output

Torques up to 4,865 lb.in. achievable using reduction gearboxes.

ATEX Approved available

Safe for use in hazardous areas

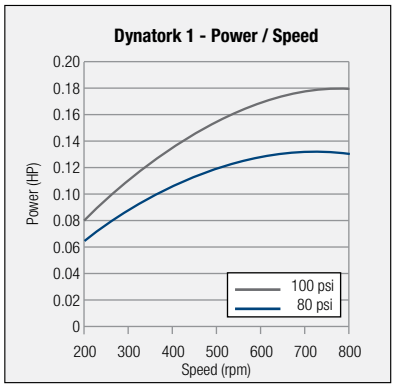
Corrosion Resistant

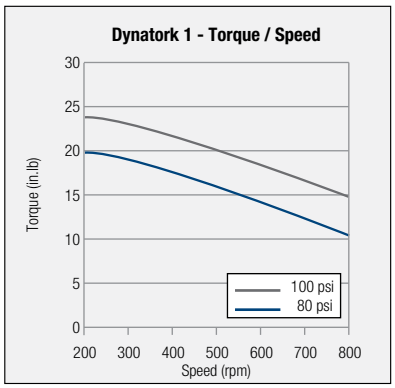
Ideal for the food and pharmaceutical industry. Can even be used fully submerged.

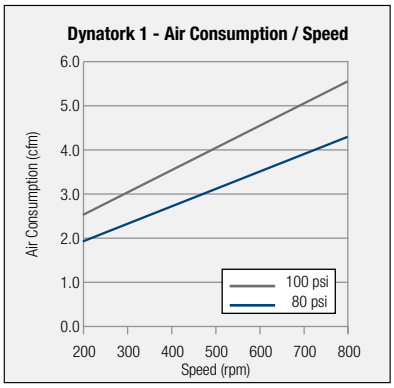
Dynatork 1 **Aluminium**

Key Data: Dynatork 1 Motor Ref: 970.15.A	
Speed range	200 - 800 rpm
Torque at 200 rpm / 100 psi	24.7 in.lb
Torque at 800 rpm / 100 psi	14.7 in.lb
Max air consumption 800 rpm / 100 psi	5.70 ft^3/min
Shaft Diameter	0.394”
Weight	3.3 lb
Ports	1/8” BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

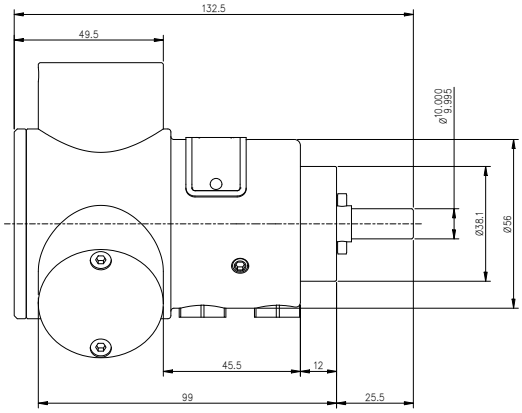
Performance

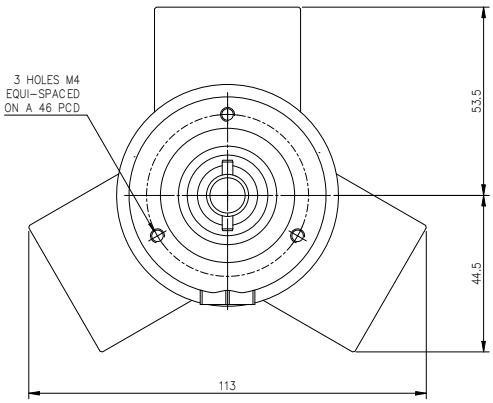






Body Mounting Drawing Dimensions in mm





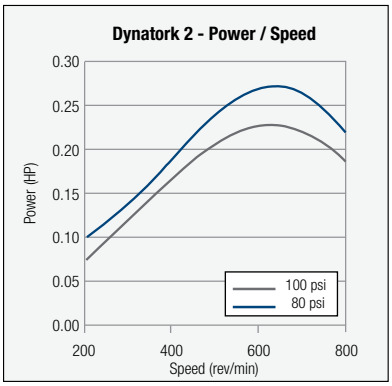
Piston Service Kit

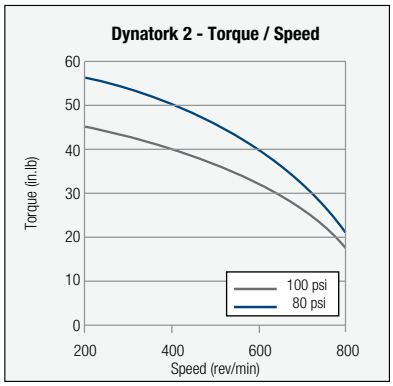
Order Ref. 959.15

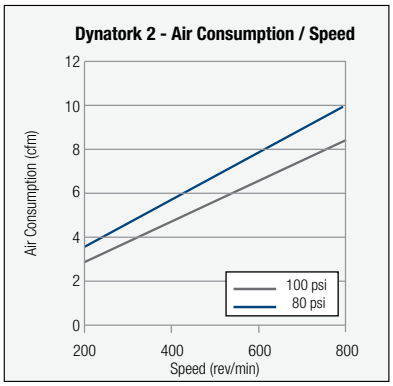
For alternative mounting option, see page 23

Key Data: Dynatork 2 Motor Ref: 970.25.A or 970.25.AM	
Speed range	200 - 800 rpm
Torque at 200 rpm / 100 psi	55.3 in.lb
Torque at 800 rpm / 100 psi	20.3 in.lb
Max air consumption 800 rpm / 100 psi	10 ft^3/min
Shaft Diameter	970.25.A: 0.500" / 970.25.AM: 0.551"
Weight	4.4 lb
Ports	1/4" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

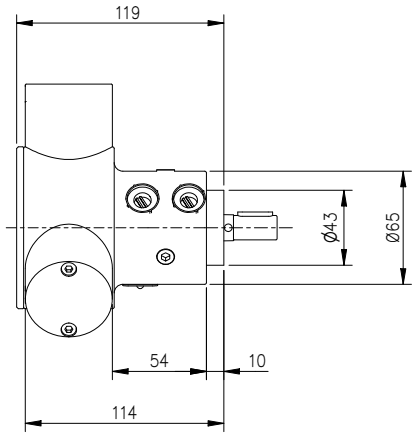
Performance

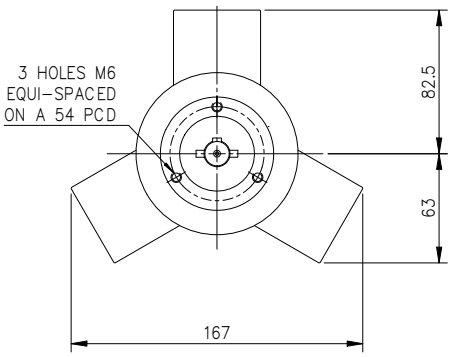




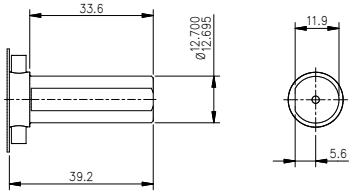


Body Mounting Drawing Dimensions in mm

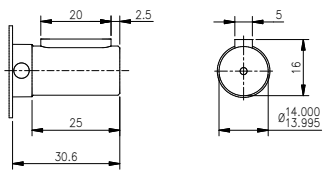




970.25.A



970.25.AM



Piston Service Kit

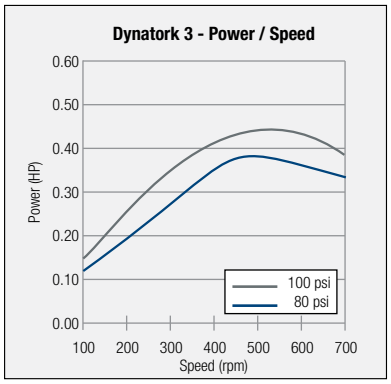
Order Ref. 959.25

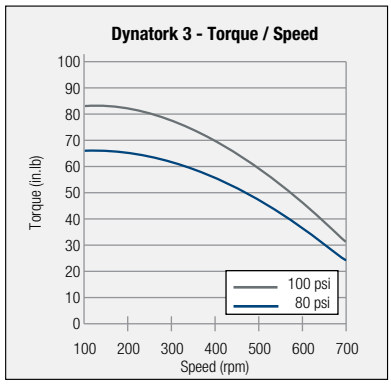
For alternative mounting option, see page 23

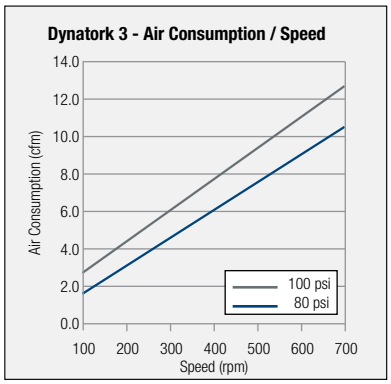
Dynatork 3 **Aluminium**

Key Data: Dynatork 3 Motor Ref: 970.35.A or 970.35.AM	
Speed range	150 - 700 rpm
Torque at 150 rpm / 100 psi	87 in.lb
Torque at 700 rpm / 100 psi	41 in.lb
Max air consumption 700 rpm / 100 psi	12.7 ft³/min
Shaft Diameter	970.35.A: 0.500" / 970.35.AM: 0.551"
Weight	8.2 lb
Ports	1/4" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

Performance

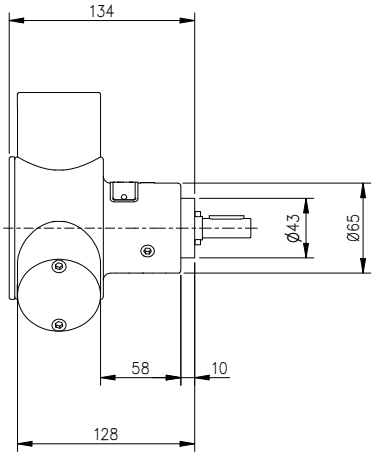


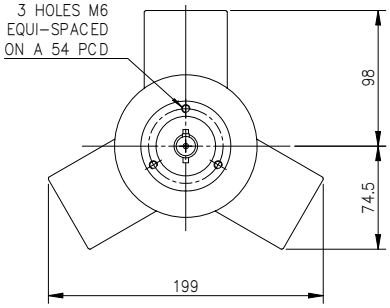




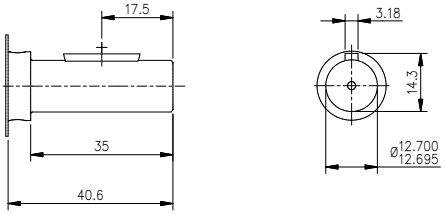
Body Mounting

Drawing Dimensions in mm

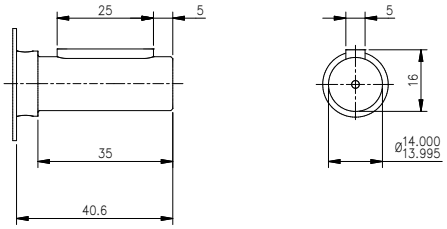




970.35.A



970.35.AM



*NEMA Flanges available

Piston Service Kit

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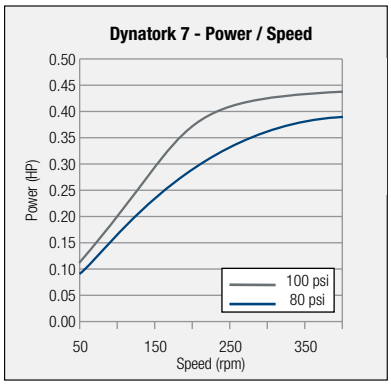
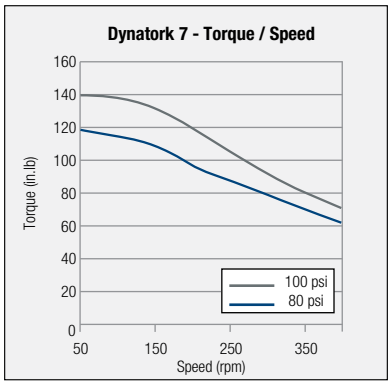
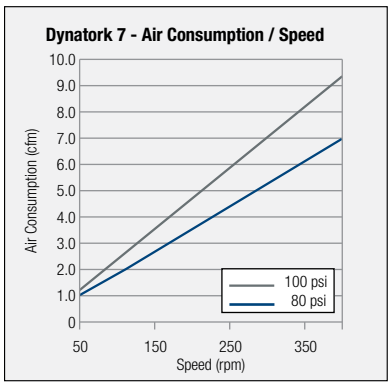
For alternative mounting option, see page 24

Key Data: Dynatork 7 Motor Ref: 930.75	
Speed range	100 - 400 rpm
Torque at 100 rpm / 100 psi	139 in.lb
Torque at 400 rpm / 100 psi	69 in.lb
Max air consumption 400 rpm / 100 psi	7.0 ft^3/min
Shaft Diameter	0.500"
Weight	10 lb
Ports	1/4" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

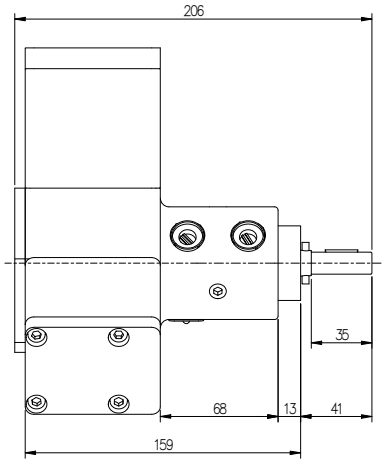
Performance

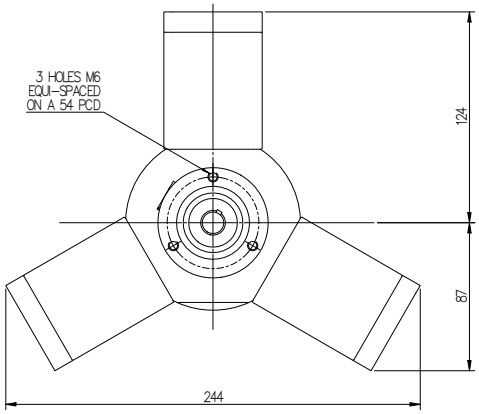


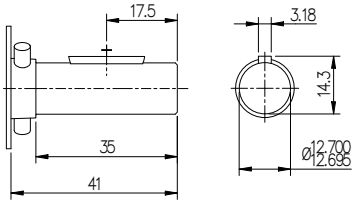




Body Mounting Drawing Dimensions in mm







Piston Service Kit

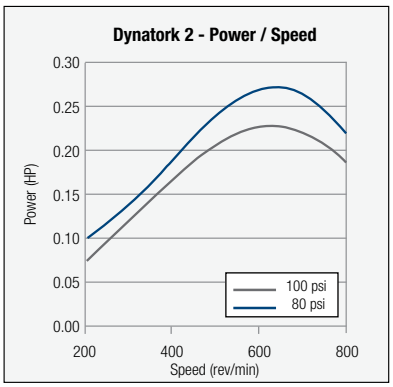
Order Ref. 959.35

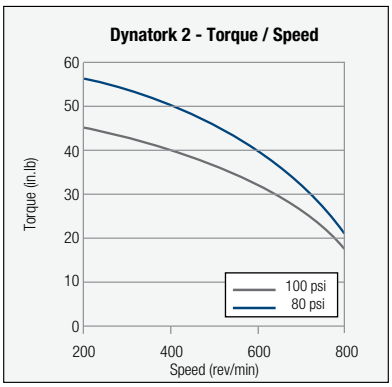
For alternative mounting option, see page 24

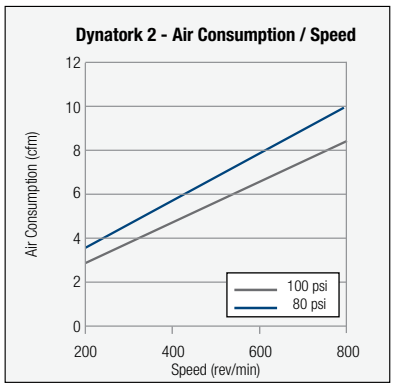
Dynatork 2 **Stainless Steel**

Key Data: Dynatork 2 Motor Ref: 980.25.A or 980.25.AM	
Speed range	200 - 800 rpm
Torque at 200 rpm / 100 psi	55.3 in.lb
Torque at 800 rpm / 100 psi	20.3 in.lb
Max air consumption 800 rpm / 100 psi	10 ft^3/min
Shaft Diameter	980.25.A: 0.500" / 980.25.AM: 0.551"
Weight	4.4 lb
Ports	1/4" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

Performance

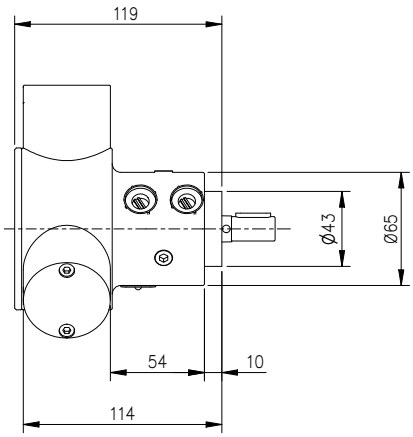


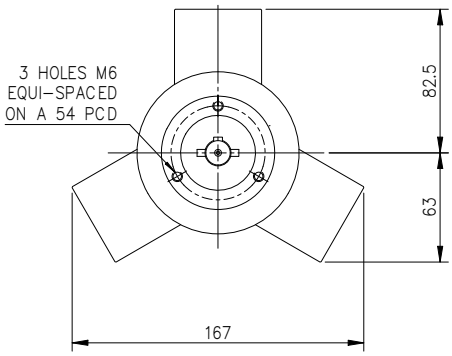




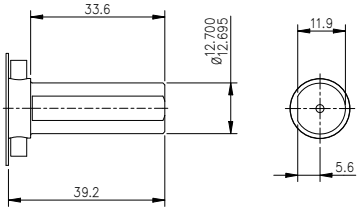
Body Mounting

Drawing Dimensions in mm

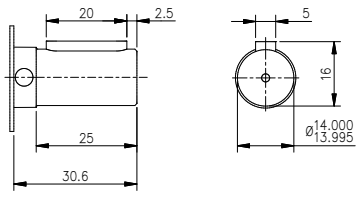




980.25.A



980.25.AM



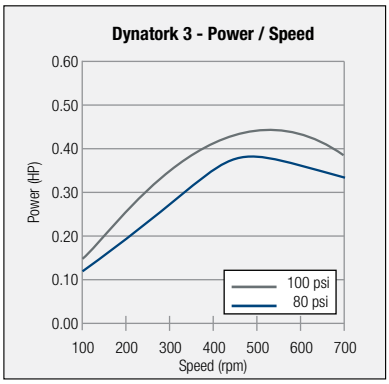
Piston Service Kit

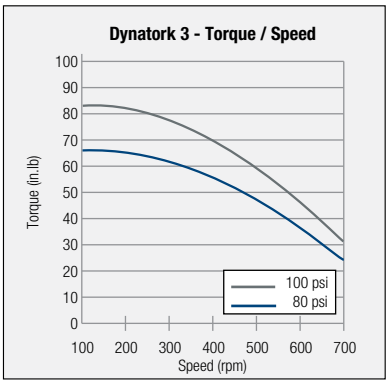
Order Ref. 959.25

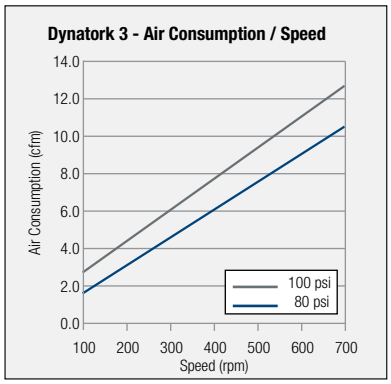
For alternative mounting option, see page 25

Key Data: Dynatork 3 Motor Ref: 980.35.A or 980.35.AM	
Speed range	150 - 700 rpm
Torque at 150 rpm / 100 psi	87 in.lb
Torque at 700 rpm / 100 psi	41 in.lb
Max air consumption 700 rpm / 100 psi	12.7 ft^3/min
Shaft Diameter	980.35.A: 0.500" / 980.35.AM: 0.551"
Weight	8.27 lb
Ports	1/4" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

Performance

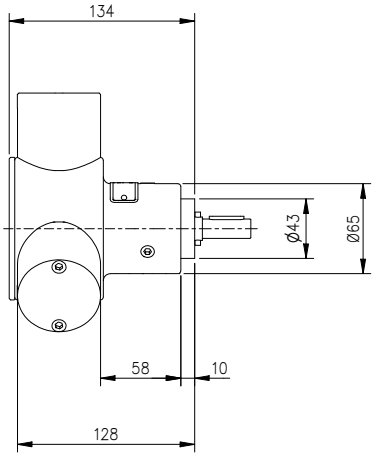


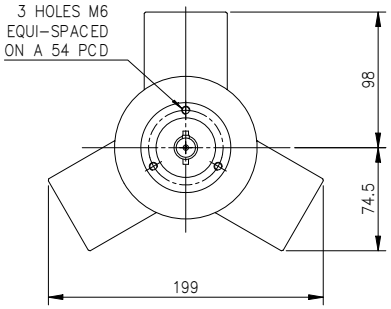




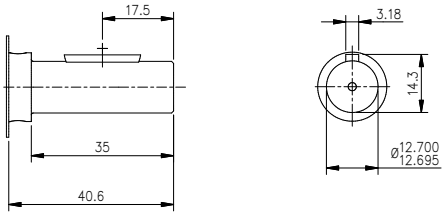
Body Mounting

Drawing Dimensions in mm

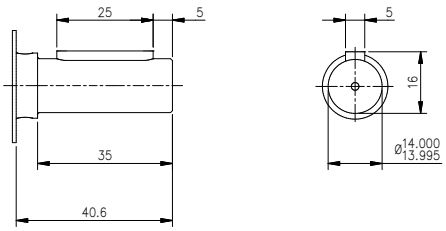




980.35.A



980.35.AM



*NEMA Flanges available

Piston Service Kit

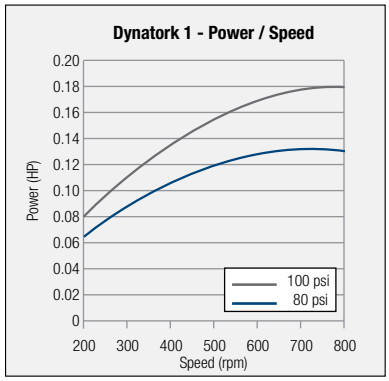
Order Ref. 959.35

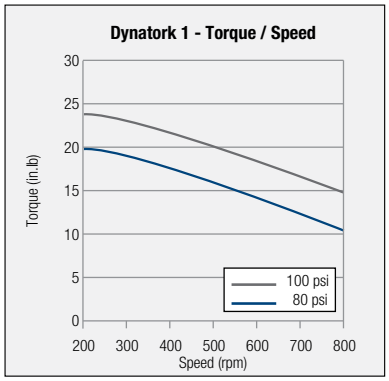
For alternative mounting option, see page 25

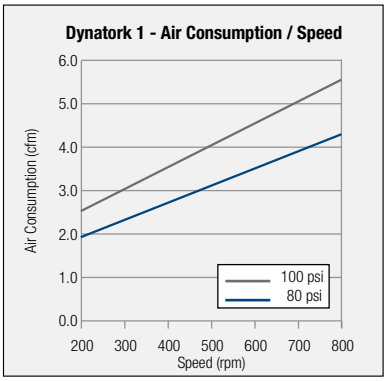
Dynatork 1 **Acetal**

Key Data: Dynatork 1 Acetal - Motor Ref: 910.15	
Speed range	200 - 800 rpm
Torque at 200 rpm / 100 psi	24.7 in.lb
Torque at 800 rpm / 100 psi	14.7 in.lb
Max air consumption 800 rpm / 100 psi	5.70 ft³/min
Shaft Diameter	0.394"
Weight	2.5 lb
Ports	1/8" BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

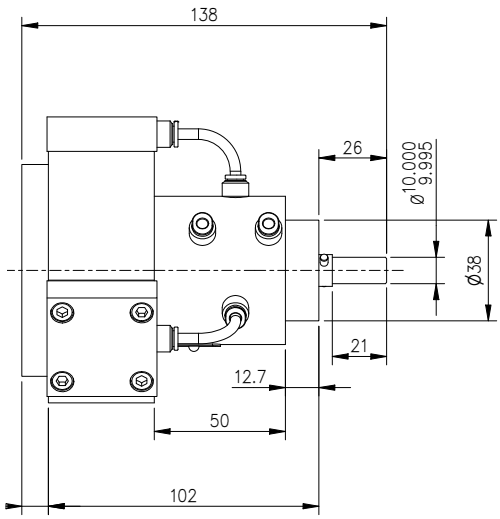
Performance

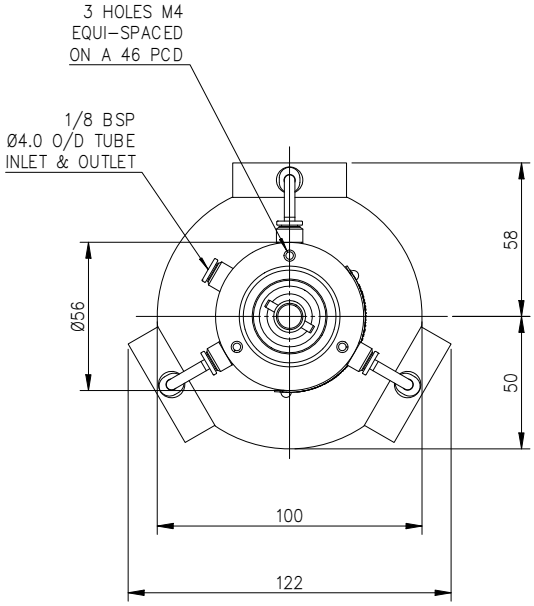






Body Mounting Drawing Dimensions in mm





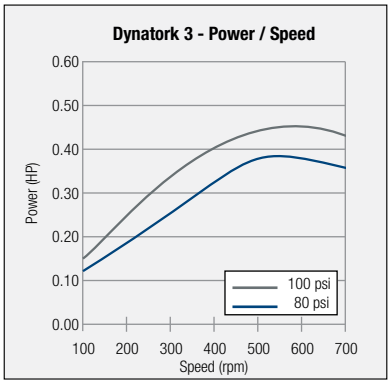
Piston Service Kit

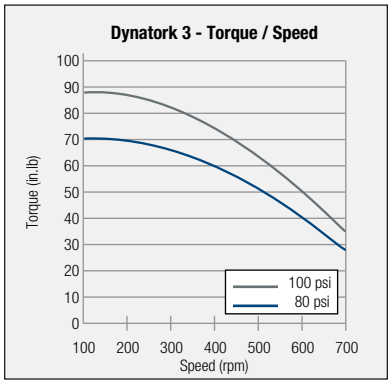
Order Ref. 909.15

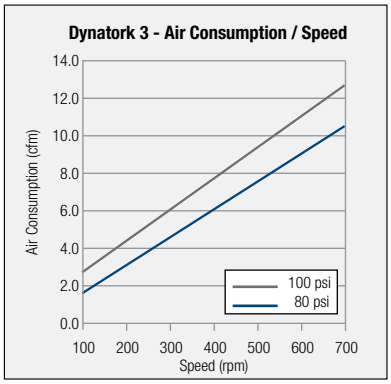
For alternative mounting option, see page 25

Key Data: Dynatork 3 Acetal- Motor Ref: 910.35	
Speed range	150 - 700 rpm
Torque at 150 rpm / 100 psi	87 in.lb
Torque at 700 rpm / 100 psi	41 in.lb
Max air consumption 700 rpm / 100 psi	12.7 ft^3/min
Shaft Diameter	0.500”
Weight	8.6 lb
Ports	1/4” BSP
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

Performance

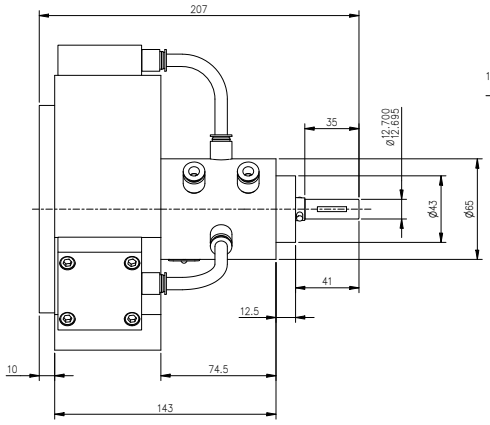


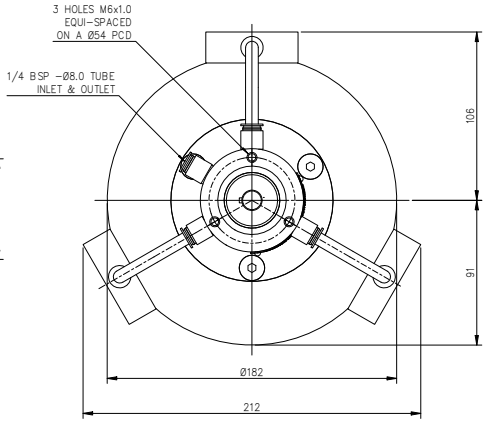


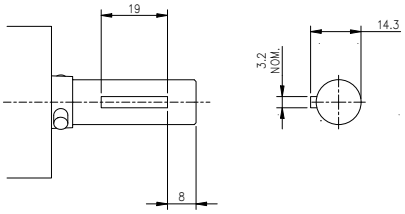


Body Mounting

Drawing Dimensions in mm







Piston Service Kit

Order Ref. 909.35

For alternative mounting option, see page 25

Key Data: Dynatork 1 Aluminium - Motor Ref: 971.15

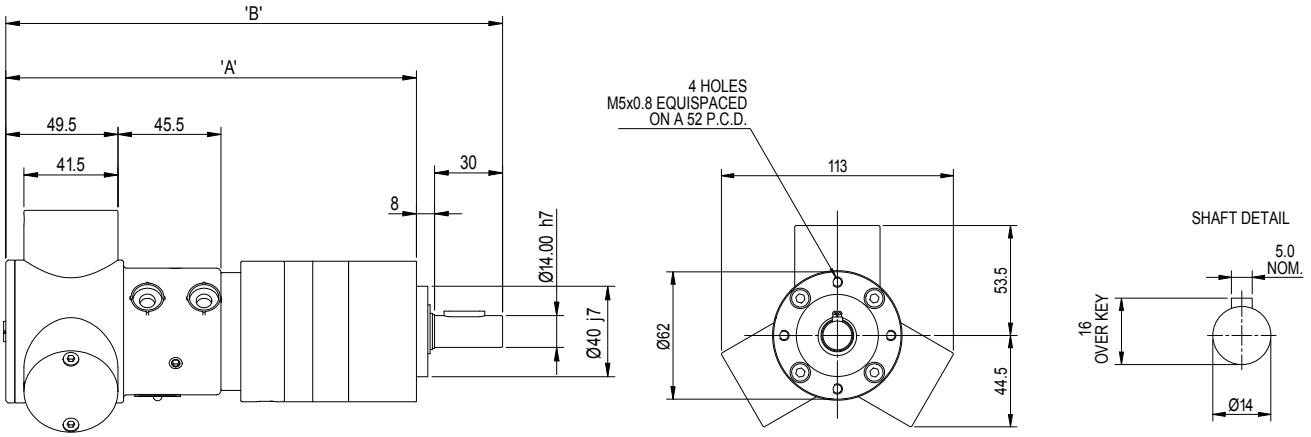
Maximum diameter (in)	5.12
Output shaft dia.(in)	0.55
Output shaft effective length (in)	1.181
Maximum radial shaft load (lb)	166
at (L) distance from face (in)	0.394
Max. continuous output torque (in.lb)	354
Weight 1 stage (lb)	10.73
Weight 2 stage (lb)	11.84
Weight 3 stage (lb)	12.94
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

- **Robust, Compact and efficient planetary gear units**
- **Ratios from 3.7:1 to 308:1**
- **Output speeds from 0.6 to 162 rev/min**
- **Maximum continuous output torque for single stage gearboxes is 7 in.lb, two stage 221 in.lb and three stage 354 in.lb**

Piston Service Kit

Order Ref. 959.15

Drawing Dimensions in mm



Dynatork 1	Dim A	Dim B
1-Stage	181mm	219mm
2-Stage	197mm	235mm
3-Stage	213mm	251mm

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **971.15.09 = non lube, three stage, 93:1 ratio**

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	971.15	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		3.7	6.75	13.73	19.2	25	29	46	51	93	169	308
600	•	162.2	88.9	43.7	31.3	24	20.7	13.0	11.8	6.5	3.6	1.9
500	•	135.1	74.1	36.4	26.0	20	17.2	10.9	9.8	5.4	3.0	1.6
400	•	108.1	59.3	29.1	20.8	16	13.8	8.7	7.8	4.3	2.4	1.3
300	•	81.1	44.4	21.8	15.6	12	10.3	6.5	5.9	3.2	1.8	1.0
200	•	54.1	29.6	14.6	10.4	8	6.9	4.3	3.9	2.2	1.2	0.6
		Single Stage		Two Stage					Three Stage			

For Output Torque

1 Locate the motor speed on the torque/speed graph on page 4 (size 1) or page 6 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 2 Aluminium - Motor Ref: 971.25

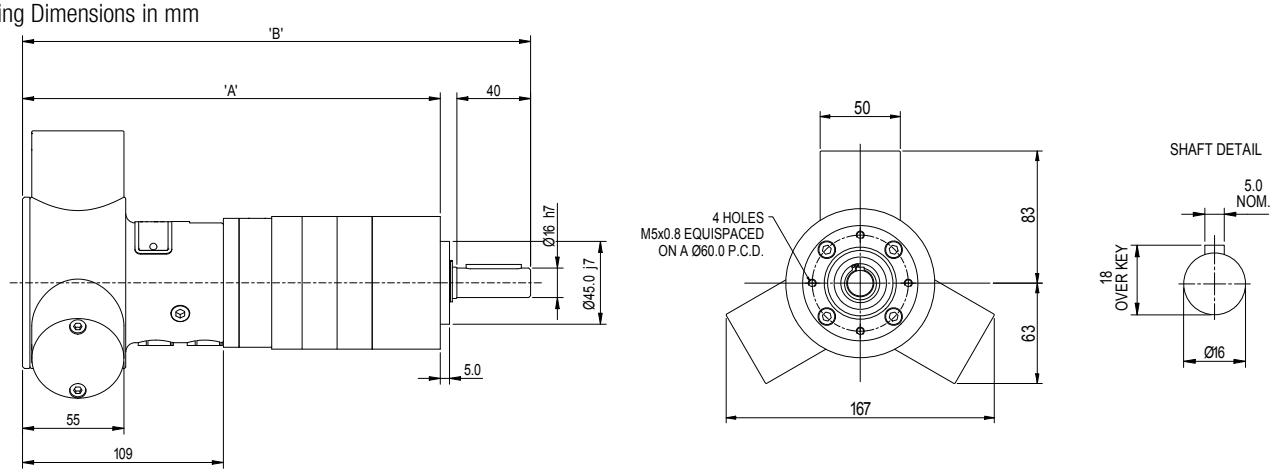
Maximum diameter (in)	8.27
Output shaft dia.(in)	0.6299
Output shaft effective length (in)	1.57
Maximum radial shaft load (lb)	135
at (L) distance from face (in)	0.787
Max. continuous output torque (in.lb)	708
Weight 1 stage (lb)	12.9
Weight 2 stage (lb)	15.1
Weight 3 stage (lb)	19.5
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

- **Robust, Compact and efficient planetary gear units**
- **Ratios from 3.7:1 to 308:1**
- **Output speeds from 0.32 to 135 rev/min**
- **Maximum continuous output torque for single stage gearboxes is 177 in.lb, two stage 531 in.lb and three stage 708 in.lb**

Piston Service Kit

Order Ref. 959.25

Drawing Dimensions in mm



Dynatork 2	Dim A	Dim B
1-Stage	207.75mm	256.75mm
2-Stage	226.75mm	275.75mm
3-Stage	245.75mm	294.75mm

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **971.25.09**
= non lube, three stage, 93:1 ratio

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	971.25	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		3.7	6.75	13.73	19.2	25	29	46	51	93	169	308
500	•	135.1	74.1	36.4	26.0	20	17.2	10.9	9.8	5.4	3.0	1.6
400	•	108.1	59.3	29.1	20.8	16	13.8	8.7	7.8	4.3	2.4	1.3
300	•	81.1	44.4	21.8	15.6	12	10.3	6.5	5.9	3.2	1.8	1.0
200	•	54.1	29.6	14.6	10.4	8	6.9	4.3	3.9	2.2	1.2	0.6
100	•	27.0	14.8	7.3	5.2	4	3.4	2.2	2.0	1.1	0.6	0.3
		Single Stage		Two Stage					Three Stage			

For Output Torque

1 Locate the motor speed on the torque/speed graph on page 4 (size 1) or page 6 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 3 Aluminium - Motor Ref: 971.35

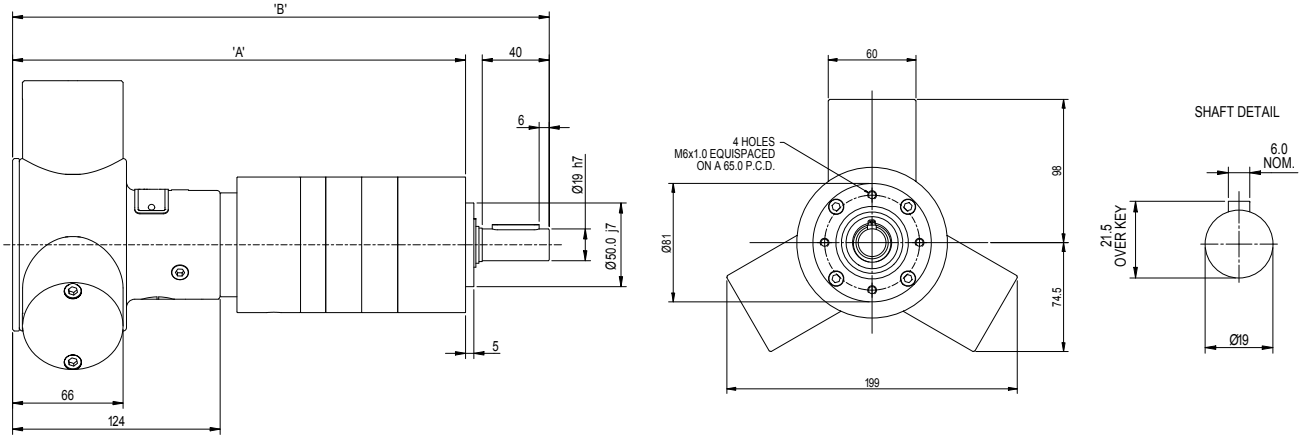
Maximum diameter (in)	8.27
Output shaft dia.(in)	0.748
Output shaft effective length (in)	1.575
Maximum radial shaft load (lb)	135
at (L) distance from face (in)	0.787
Max. continuous output torque (in.lb)	708
Weight 1 stage (lb)	12.9
Weight 2 stage (lb)	15.1
Weight 3 stage (lb)	19.5
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

- **Robust, Compact and efficient planetary gear units**
- **Ratios from 3.7:1 to 308:1**
- **Output speeds from 0.32 to 135 rev/min**
- **Maximum continuous output torque for single stage gearboxes is 177 in.lb, two stage 531 in.lb and three stage 708 in.lb**

Piston Service Kit

Order Ref. 959.35

Drawing Dimensions in mm



Dynatork 3	Dim A	Dim B
1-Stage	249mm	298mm
2-Stage	270.5mm	319.5mm
3-Stage	292mm	341mm

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/Ratio selection table, eg - **971.35.09**

= non lube, three stage, 93:1 ratio

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	971.35	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		3.7	6.75	13.73	19.2	25	29	46	51	93	169	308
500	•	135.1	74.1	36.4	26.0	20	17.2	10.9	9.8	5.4	3.0	1.6
400	•	108.1	59.3	29.1	20.8	16	13.8	8.7	7.8	4.3	2.4	1.3
300	•	81.1	44.4	21.8	15.6	12	10.3	6.5	5.9	3.2	1.8	1.0
200	•	54.1	29.6	14.6	10.4	8	6.9	4.3	3.9	2.2	1.2	0.6
100	•	27.0	14.8	7.3	5.2	4	3.4	2.2	2.0	1.1	0.6	0.3
		Single Stage		Two Stage					Three Stage			

For Output Torque

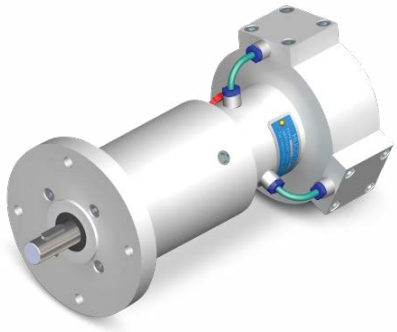
1 Locate the motor speed on the torque/speed graph on page 4 (size 1) or page 6 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 1 Acetal - Motor Ref: 911.15

Maximum diameter (in)	4.80
Output shaft dia.(in)	0.551
Output shaft effective length (in)	1.42
Maximum radial shaft load (lb)	117
at (L) distance from face (in)	0.394
Max. continuous output torque (in.lb)	354
Weight 1 stage (lb)	9.9
Weight 2 stage (lb)	11.0
Weight 3 stage (lb)	12.1
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

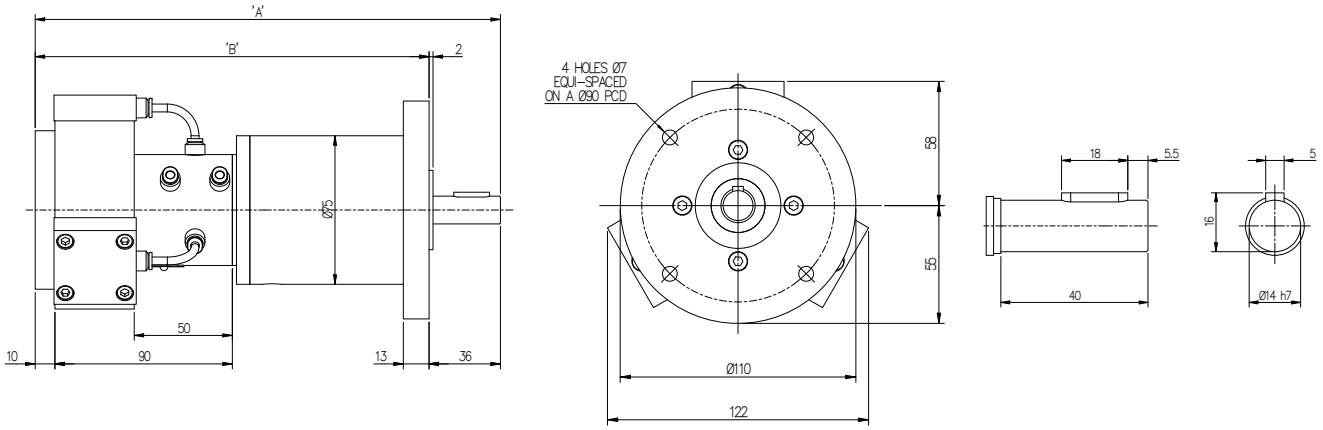


- **Robust, Compact and efficient planetary gear units**
- **Ratios from 3.7:1 to 308:1**
- **Output speeds from 0.64 to 162 rev/min**
- **Maximum continuous output torque for single stage gearboxes is 70 in.lb two stage 221 in.lb and three stage 354 in.lb**

Piston Service Kit

Order Ref. 909.15

Drawing Dimensions in mm



911.15	Dim A	Dim B
1-Stage	225mm	199mm
2-Stage	241mm	215mm
3-Stage	257mm	231mm

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **911.15.09 = non lube, three stage, 93:1 ratio**

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	911.15	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		3.7	6.75	13.73	19.2	25	29	46	51	93	169	308
600	•	162.2	88.9	43.7	31.3	24	20.7	13.0	11.8	6.5	3.6	1.9
500	•	135.1	74.1	36.4	26.0	20	17.2	10.9	9.8	5.4	3.0	1.6
400	•	108.1	59.3	29.1	20.8	16	13.8	8.7	7.8	4.3	2.4	1.3
300	•	81.1	44.4	21.8	15.6	12	10.3	6.5	5.9	3.2	1.8	1.0
200	•	54.1	29.6	14.6	10.4	8	6.9	4.3	3.9	2.2	1.2	0.6
		Single Stage		Two Stage					Three Stage			

For Output Torque

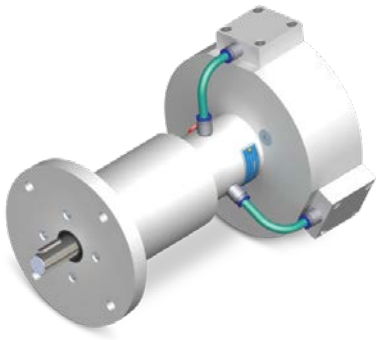
1 Locate the motor speed on the torque/speed graph on page 6 (size 1) or page 8 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 3 Acetal - Motor Ref: 911.35

Maximum diameter (in)	8.35
Output shaft dia.(in)	0.748
Output shaft effective length (in)	1.575
Maximum radial shaft load (lb)	135
at (L) distance from face (in)	0.787
Max. continuous output torque (in.lb)	708
Weight 1 stage (lb)	12.1
Weight 2 stage (lb)	14.3
Weight 3 stage (lb)	18.7
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

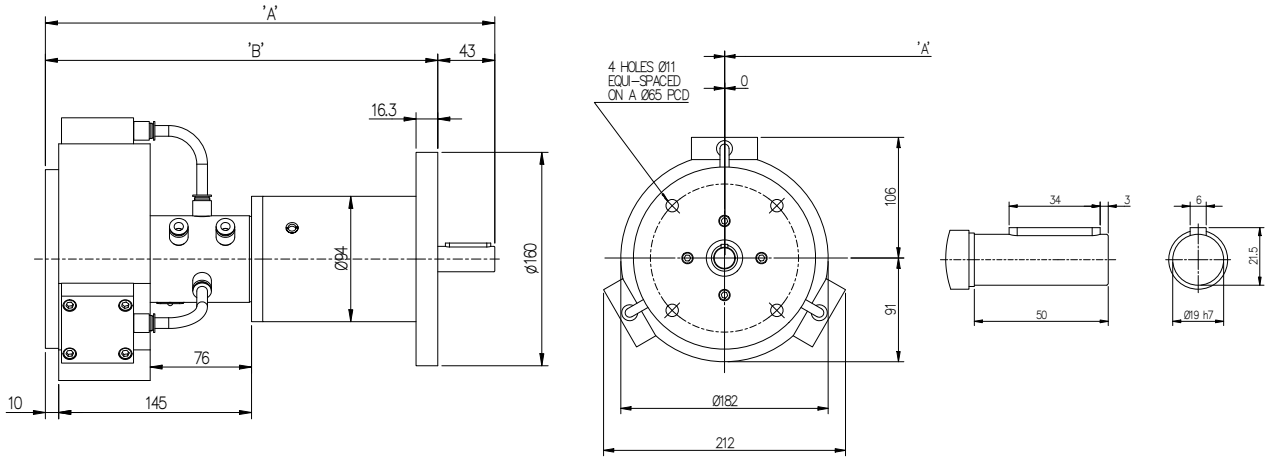


- **Robust, Compact and efficient planetary gear units**
- **Ratios from 3.7:1 to 308:1**
- **Output speeds from 0.6 to 162.2 rev/min**
- **Maximum continuous output torque for single stage gearboxes is 177 in.lb, two stage 531 in.lb and three stage 708 in.lb**

Piston Service Kit

Order Ref. 909.35

Drawing Dimensions in mm



911.35	Dim A	Dim B
1-Stage	337mm	295mm
2-Stage	359mm	316mm
3-Stage	380mm	338mm

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **911.35.09**

= non lube, three stage, 93:1 ratio

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	911.35	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		3.7	6.75	13.73	19.2	25	29	46	51	93	169	308
600	•	162.2	88.9	43.7	31.3	24	20.7	13.0	11.8	6.5	3.6	1.9
500	•	135.1	74.1	36.4	26.0	20	17.2	10.9	9.8	5.4	3.0	1.6
400	•	108.1	59.3	29.1	20.8	16	13.8	8.7	7.8	4.3	2.4	1.3
300	•	81.1	44.4	21.8	15.6	12	10.3	6.5	5.9	3.2	1.8	1.0
200	•	54.1	29.6	14.6	10.4	8	6.9	4.3	3.9	2.2	1.2	0.6
		Single Stage		Two Stage					Three Stage			

For Output Torque

1 Locate the motor speed on the torque/speed graph on page 6 (size 1) or page 8 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 1 - Motor Ref: 974 • 984 • 994

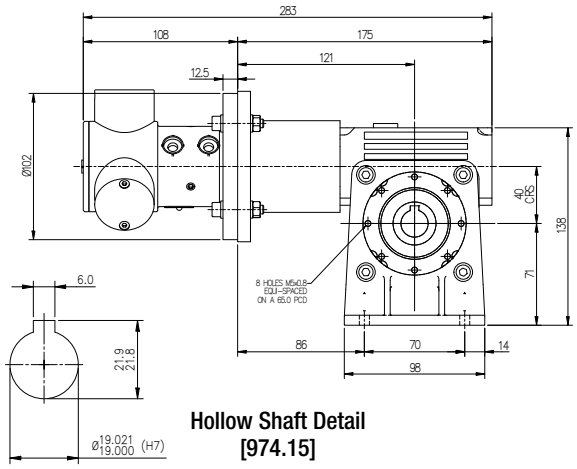
Output shaft diameter (in)	0.748
Output shaft effective length (in)	1.575
Maximum radial shaft load (lb)	29.4
at (L) distance from face (in)	0.787
Max. continuous output torque (in.lb)	354
Weight (lb)	9.6
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

- **High strength aluminium worm gearboxes**
- **Ratios from 7:1 to 100:1**
- **Output speeds from 2 to 100 rev/min**
- **Maximum continuous output torque up to 354 in.lb**

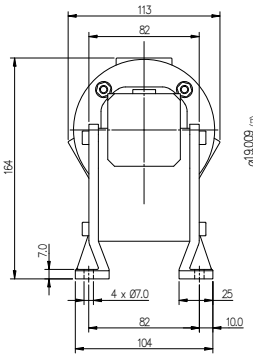
Piston Service Kit

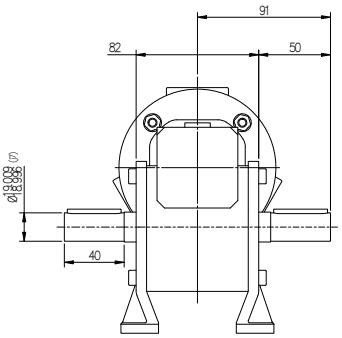
Order Ref. 959.15

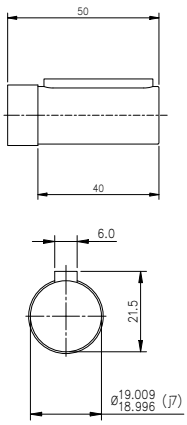
Drawing Dimensions in mm



Hollow Shaft Detail [974.15]







Solid Shaft Detail
Single Male Shaft [984.15]
Double Male Shaft [994.15]

	Hollow Shaft	Single Shaft	Double Shaft
Non-Lube	974.15	984.15	994.15

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **974.15.09 = non lube, hollow shaft, 70:1 ratio**

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	974.15	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		7	10	15	25	30	40	50	60	70	80	100
700	•	100	70	47	28	23	17.5	14	11.67	10	8.75	7
600	•	86	60	40	24	20	15	12	10	8.57	7.5	6
500	•	71	50	33	20	17	12.5	10	8.33	7.14	6.25	5
400	•	57	40	27	16	13	10	8	6.67	5.71	5.	4
300	•	43	30	20	12	10	7.5	6	5	4.29	3.75	3
200	•	29	20	13	8	7	5	4	3.33	2.86	2.50	2

For Output Torque

1 Locate the motor speed on the torque/speed graph on page 8

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 3 - Motor Ref: 974 • 984 • 994

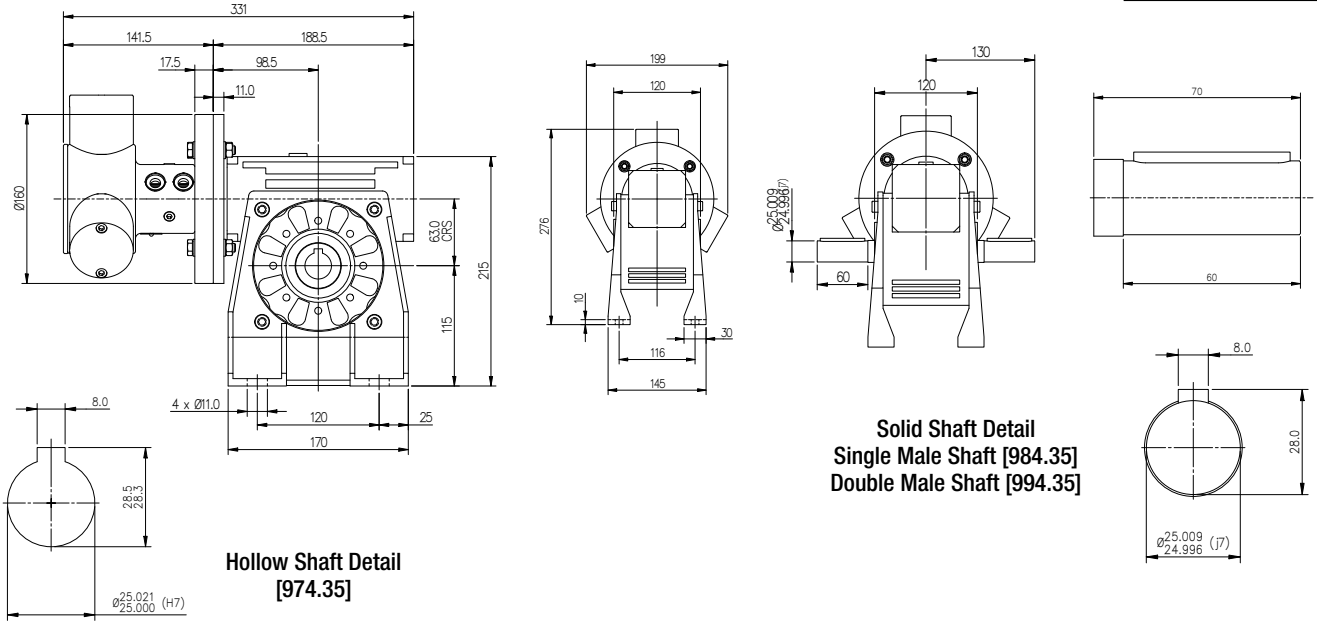
Shaft (in)	0.984
Output shaft effective length (in)	2.36
Maximum radial shaft load (lb)	0.56
at (L) distance from face (in)	1.181
Max. continuous output torque (in.lb)	1327
Weight (lb)	27.2
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

- **High strength aluminium worm gearboxes**
- **Ratios from 7:1 to 100:1**
- **Output speeds from 1 to 71 rev/min**
- **Maximum continuous output torque up to 1327 in.lb**

Piston Service Kit

Order Ref. 959.35

Drawing Dimensions in mm



Hollow Shaft Detail [974.35]

Solid Shaft Detail
Single Male Shaft [984.35]
Double Male Shaft [994.35]

	Hollow Shaft	Single Shaft	Double Shaft
Dynatork 3 Non-Lube	974.35	984.35	994.35

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **974.35.06**

= non lube, hollow shaft version, 40:1 ratio

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	974.35	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		7	10	15	25	30	40	50	60	70	80	100
500	•	71	50	33	20	17	12.5	10	8.33	7.14	6.25	5
400	•	57	40	247	16	13	10	8	6.67	5.71	5	4
300	•	43	30	20	12	10	7.5	6	5	4.29	3.75	3
200	•	29	20	13	8	7	5	4	3.33	2.86	2.50	2
100	•	14	10	7	4	3	2.5	2	1.67	1.43	1.25	1

Key Data: Dynatork 7 - Motor Ref: 934 • 944 • 954

Shaft (in)	1.378
Output shaft effective length (in)	2.36
Maximum radial shaft load (lb)	0.595
at (L) distance from face (in)	1.181
Max. continuous output torque (in.lb)	3540
Weight (lb)	88.9
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)

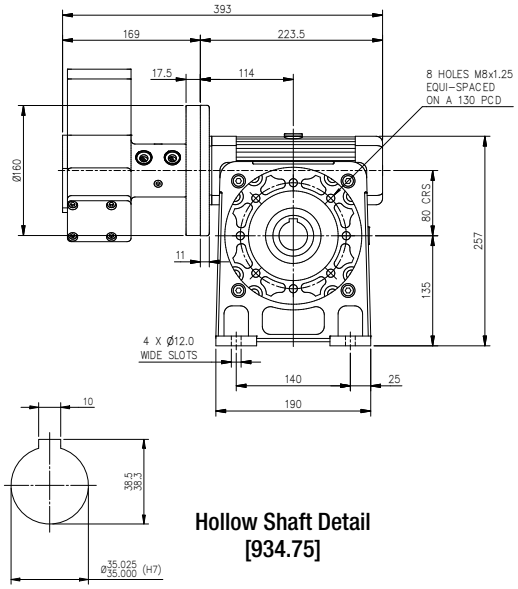
- **High strength aluminium worm gearboxes**
- **Ratios from 7:1 to 100:1**
- **Output speeds from 1 to 57 rev/min**
- **Maximum continuous output torque up to 3540 in.lb**

Piston Service Kit

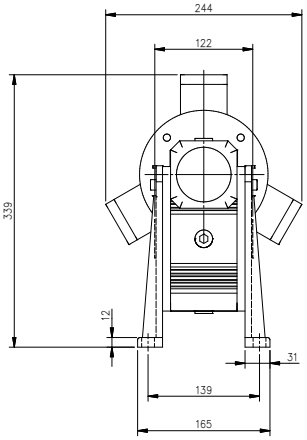
Order Ref. 959.75

934 • 944 • 954 with size 7 motor

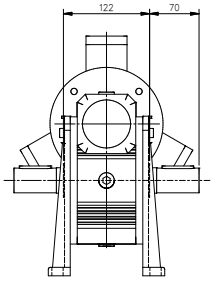
Drawing Dimensions in mm



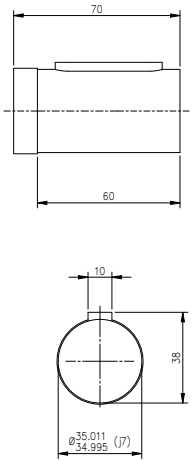
Hollow Shaft Detail [934.75]



STANDARD Hollow Shaft Detail [934]



Solid Shaft Detail Shaft One Side [944] or Both Sides [954]



	Hollow Shaft	Single Shaft	Double Shaft
Dynatork 7 Non-Lube	934.75	944.75	954.75

HOW TO ORDER

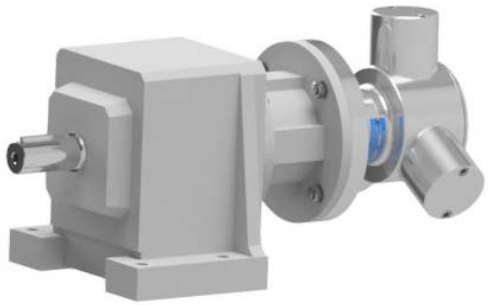
Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/ Ratio selection table, eg - **934.75.09**

= non lube, hollow shaft version, 70:1 ratio

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	934.75	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		7	10	15	25	30	40	50	60	70	80	100
400	•	57	40	27	16	13	10	8	6.67	5.71	5	4
300	•	43	30	20	12	10	7.5	6	5	4.29	3.75	3
200	•	29	20	13	8	7	5	4	3.33	2.86	2.50	2
100	•	14	10	7	4	3	2.5	2	1.67	1.43	1.25	1

Key Data: Dynatork 3 - Motor Ref: 975.35

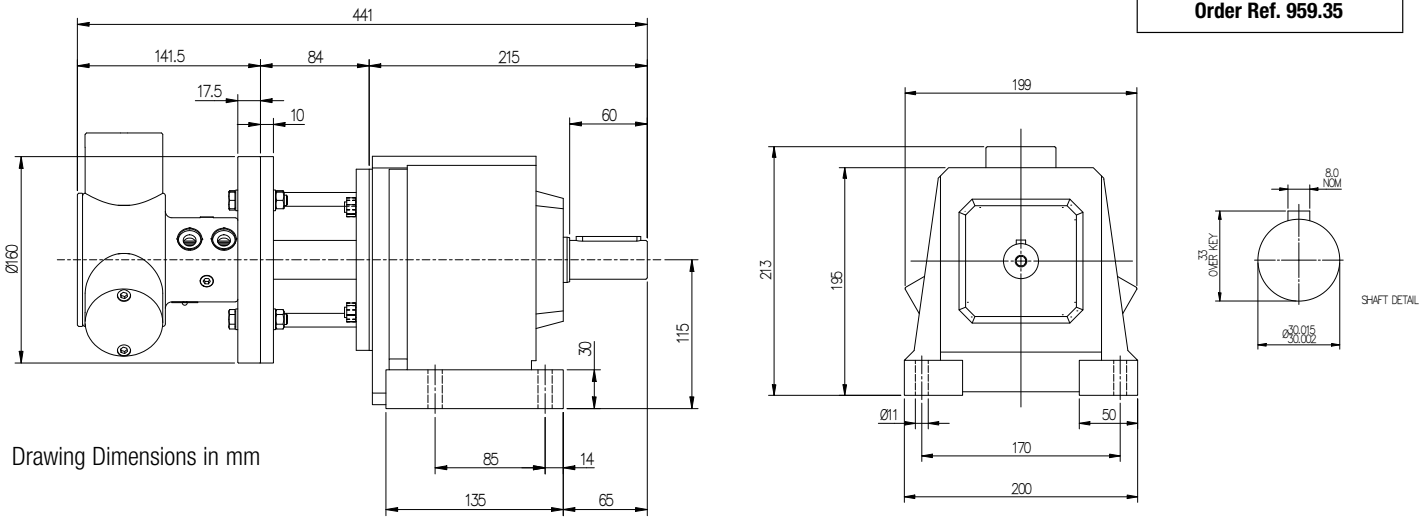
Output shaft diameter (in)	1.181
Output shaft effective length (in)	2.36
Maximum radial shaft load (lb)	674
at (L) distance from face (in)	1.181
Max. continuous output torque (in.lb)	1770
Weight (kg)	73.5
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)



- **Helical gears for arduous and continuous running**
- **Ratios from 4.67:1 to 70.32**
- **Output speeds from 1.42 to 107.1 rev/min**
- **Maximum continuous output torque 1770 in.lb**

Piston Service Kit

Order Ref. 959.35



Drawing Dimensions in mm

Speed/Ratio Selection		Ratio Order Ref										
Motor ref:	975.35	01	02	03	04	05	06	07	08	09	10	11
Ratio:1 / rev/min		4.67	8.2	10.26	12.3	15.3	20.58	24.64	30.60	40.85	56.42	70.32
500	•	107.1	61.0	48.7	40.7	32.7	24.3	20.3	16.3	12.2	8.86	7.11
400	•	85.7	48.8	39.0	32.5	26.1	19.4	16.2	13.0	9.8	7.09	5.69
300	•	64.2	36.6	29.2	24	19.61	14.6	12.2	9.8	7.3	5.32	4.27
200	•	42.8	24.4	19.5	16.3	13.1	9.7	8.1	6.5	4.9	3.54	2.84
100	•	21.4	12.2	9.7	8.1	6.5	4.9	4.1	3.3	2.4	1.7	1.42

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/Ratio selection table, eg - **975.35.06 = non lube, 20.58:1 ratio**

For Output Torque

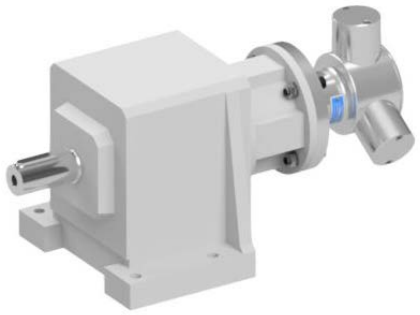
1 Locate the motor speed on the torque/speed graph on page 6 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 3 - Motor Ref: 976.35

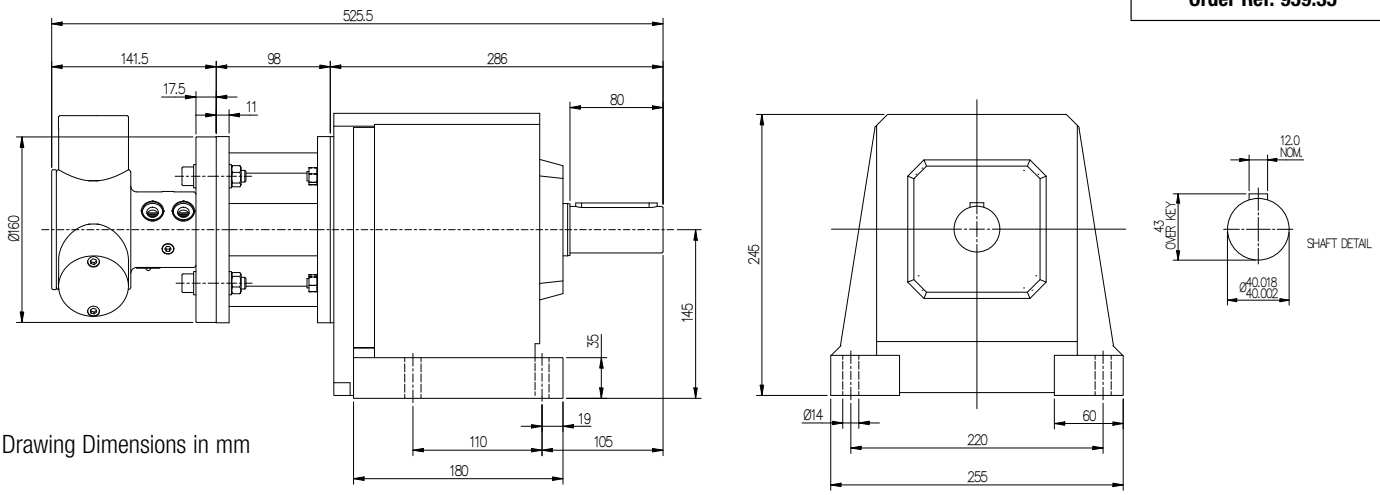
Output shaft diameter (in)	1.575
Output shaft effective length (in)	3.15
Maximum radial shaft load (lb)	15.73
at (L) distance from face (in)	1.575
Max. continuous output torque (in.lb)	4865
Weight (lb)	107
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)



- **Helical gears for arduous and continuous running**
- **Ratios from 25:1 to 69.88:1**
- **Output speeds from 1.43 to 20 rev/min**
- **Maximum continuous output torque 4865 in.lb**

Piston Service Kit

Order Ref. 959.35



Drawing Dimensions in mm

Speed/Ratio Selection		Ratio Order Ref								
Motor ref:	976.35	01	02	03	04	05	06	07	08	09
Ratio:1 / rev/min		25	31	34.8	41.71	46.67	50.2	56.1	62.5	69.88
500	•	20	16.1	14.4	12.0	10.7	9.96	8.91	8.00	7.16
400	•	16	12.9	11.5	9.6	8.6	7.97	7.13	6.40	5.72
300	•	12	9.7	8.6	7.2	6.4	5.98	5.35	4.80	4.29
200	•	8	6.5	5.7	4.8	4.3	3.98	3.57	3.20	2.86
100	•	4	3.2	2.9	2.4	2.1	1.99	1.78	1.60	1.43

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/Ratio selection table, eg - **976.35.06**

= non lube, 50.2:1 ratio

For Output Torque

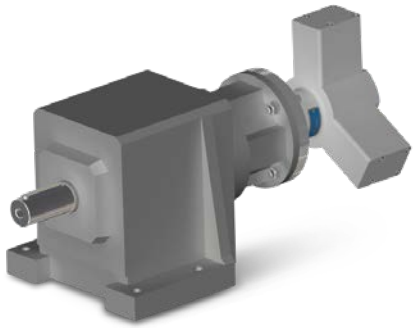
1 Locate the motor speed on the torque/speed graph on page 6 (size 3)

2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Key Data: Dynatork 7 - Motor Ref: 937.75

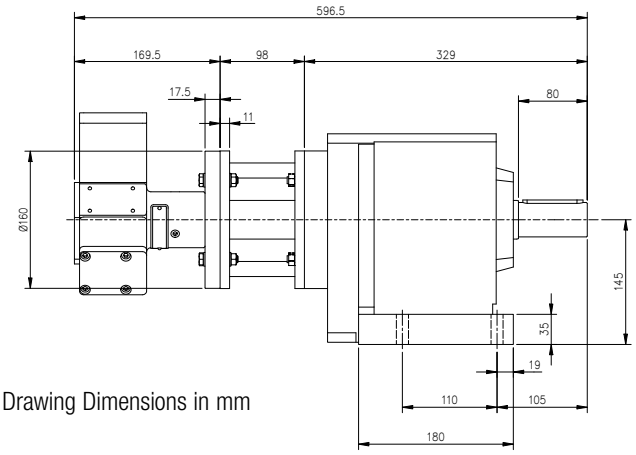
Output shaft diameter (in)	1.575
Output shaft effective length (in)	3.15
Maximum radial shaft load (lb)	1573
at (L) distance from face (in)	1.575
Max. continuous output torque (in.lb)	4865
Weight (lb)	107
Lubrication	Non-Lube: for use with a dry, clean, non-lubricated air supply (can be used in lubricated system)



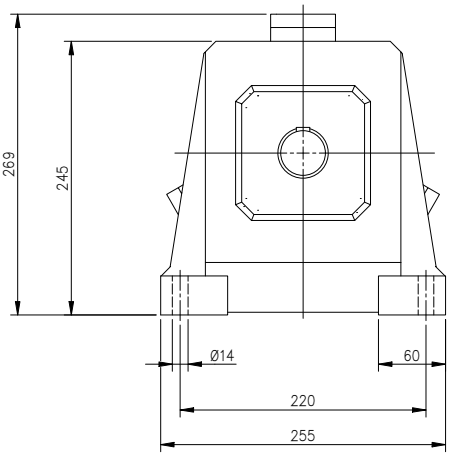
- **Helical gears for arduous and continuous running**
- **Ratios from 80:81 to 270.2:1**
- **Output speeds from 0.37 to 4.95 rev/min**
- **Maximum continuous output torque 4865 in.lb**

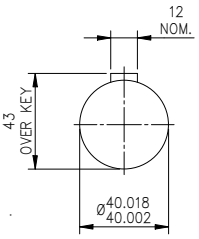
Piston Service Kit

Order Ref. 959.75



Drawing Dimensions in mm





SHAFT DETAILS

Speed/Ratio Selection		Ratio Order Ref						
Motor ref:	937.75	01	02	03	04	05	06	07
Ratio:1 / rev/min		80.81	90.32	107.7	134.6	180.4	216.9	270.2
400	•	4.95	4.43	3.71	2.97	2.22	1.84	1.48
300	•	3.7	3.32	2.79	2.23	1.66	1.38	1.11
200	•	2.47	2.21	1.86	1.49	1.11	0.92	0.74
100	•	1.24	1.11	0.93	0.74	0.55	0.46	0.37

HOW TO ORDER

Combine the MOTOR REF. with the RATIO ORDER REF. found in the Speed/Ratio selection table, eg - **937.75.06 = non lube, 216.9:1 ratio**

For Output Torque

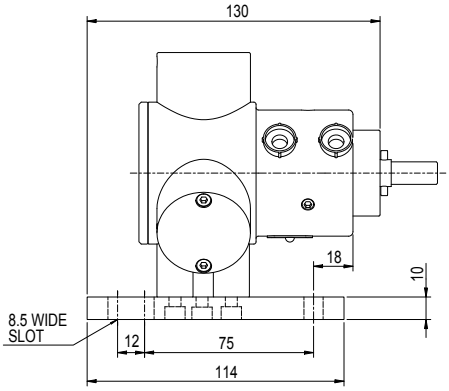
1 Locate the motor speed on the torque/speed graph on page 8

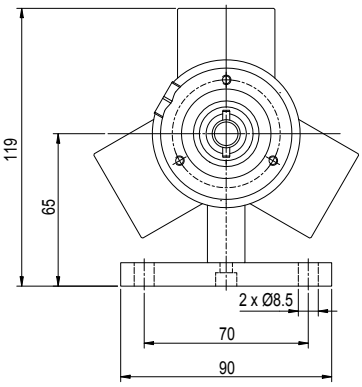
2 Select the appropriate input air pressure curve and, for the chosen speed, read off the torque on the vertical axis

3 Multiply this value by the chosen ratio to give the output torque

Basic Motor Type 970.15.A

All Drawing Dimensions in mm



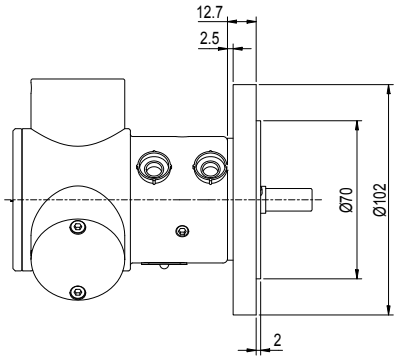


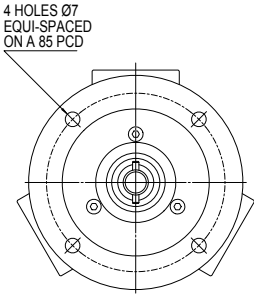
Mounting Kit Options

Convert 970.15.A Motor to B or C Types with conversion kits.

Order Ref 946.10.B

Complete Motor Ref: 970.15.B

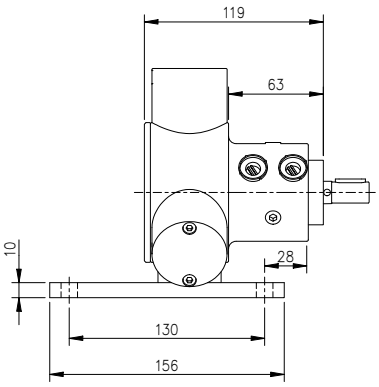


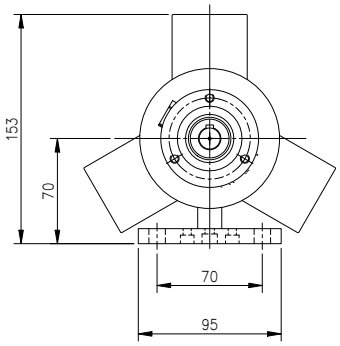


Order Ref 945.10.C

Complete Motor Ref: 970.15.C

Basic Motor Type 970.25.A (or AM)



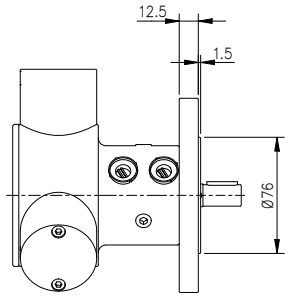


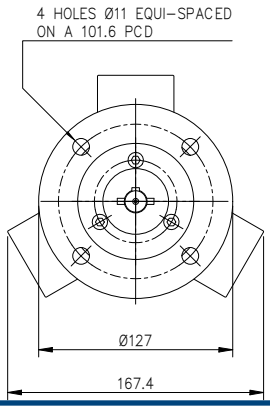
Mounting Kit Options

Convert 970.25.A(M) Motor to B(M) or C(M)Types with conversion kits.

Order Ref 946.20.B

Complete Motor Ref: 970.25.B (or BM)





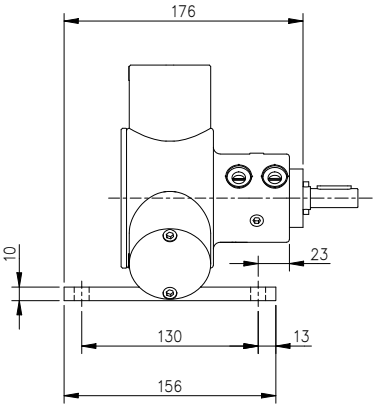
Order Ref 945.30.C

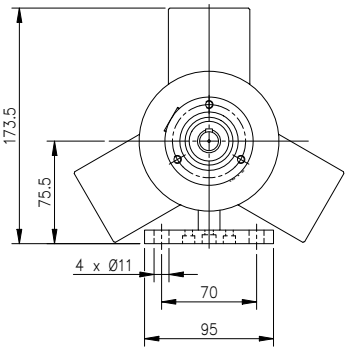
Complete Motor Ref: 970.25.C (or CM)

Mounting Options

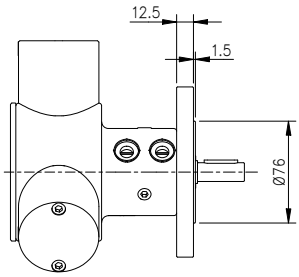
Basic Motor Type 970.35.A (or AM)

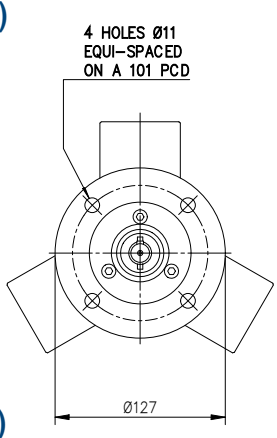
All Drawing Dimensions in mm





Complete Motor Ref: 970.35.B (or BM)





Complete Motor Ref: 970.35.C (or CM)

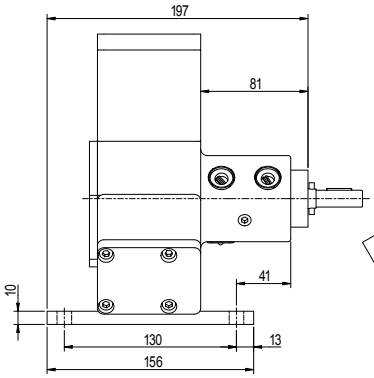
Mounting Kit Options

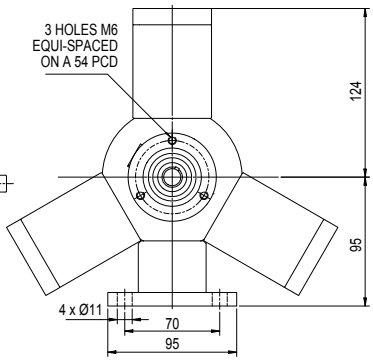
Convert 970.35.A(M) Motor to B(M) or C(M) Types with conversion kits.

Order Ref 946.30.B

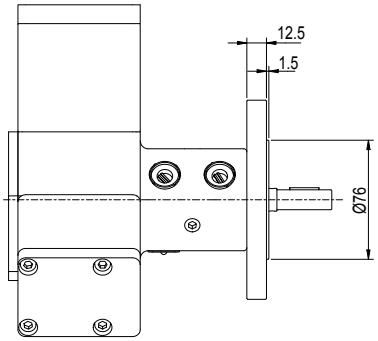
Order Ref 945.30.C

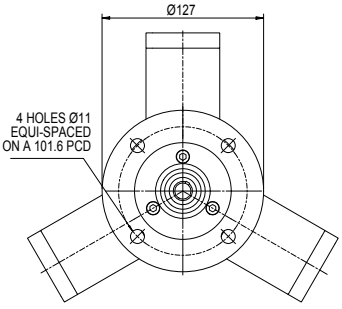
Basic Motor Type 930.75.A





Complete Motor Ref: 930.75.B





Complete Motor Ref: 930.75.C

Mounting Kit Options

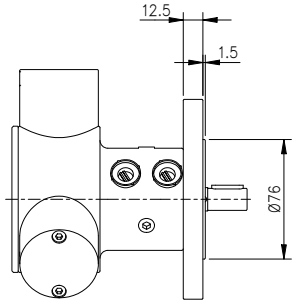
Convert 930.75.A Motor to B or C Types with conversion kits.

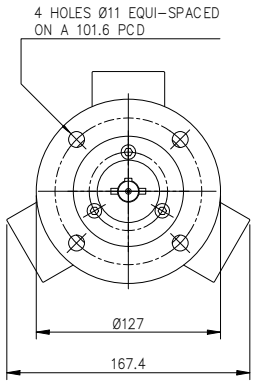
Order Ref 945.70.B

Order Ref 945.30.C

Basic Motor Type 980.25.A

All Drawing Dimensions in mm





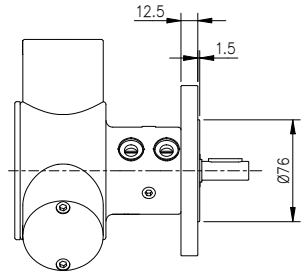
Complete Motor Ref: 980.25.C

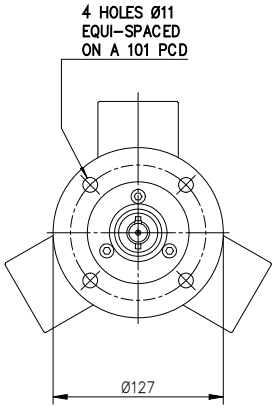
Mounting Kit Options

Convert 980.25.A Motor to C Types with conversion kits.

Order Ref 945.20.CS

Basic Motor Type 980.35.A





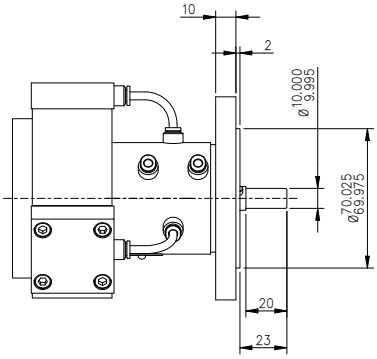
Complete Motor Ref: 980.35.C

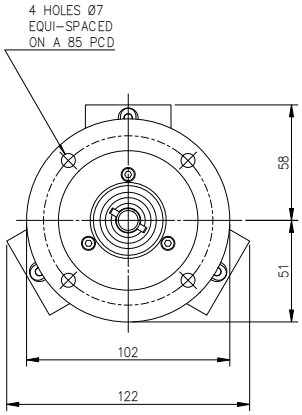
Mounting Kit Options

Convert 980.35.A Motor to C Types with conversion kits.

Order Ref 945.30.CS

Basic Motor Type 910.15.A





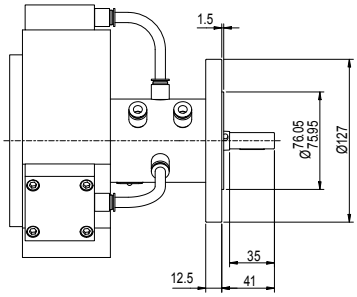
Complete Motor Ref: 910.15.C

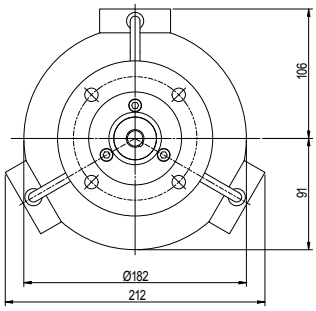
Mounting Kit Options

Convert 910.15.A Motor to C Types with conversion kits.

Order Ref 945.10.CA

Basic Motor Type 930.35.A





Complete Motor Ref: 910.35.C

Mounting Kit Options

Convert 930.35.A Motor to C Types with conversion kits.

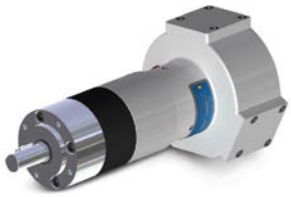
Order Ref 945.30.CA

Dynatork Series II Models / Service Kits

Contact Huco Sales for availability of Series II motors listed below

Size 1

930.15



931.15

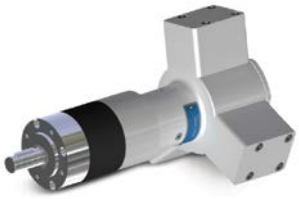
934.15

Service Kit
909.15

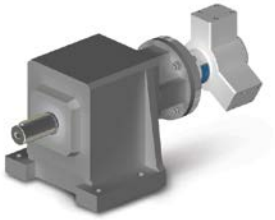
Size 3

930.35

935.35



931.35



936.35

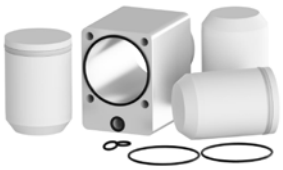
934.35

Service Kit
909.35

Size 7

Development of Size 7 motors resulted in changes the service kits available

If you have arrangement
909.75M



(No piston liners)

You can update the latest spec using update kit
939.75

2017 production motors and motors updated with kit 939.75

959.75

Fitting Procedure

- Remove back flange.
- Remove all three piston caps.
- Push out Pistons and liners and ensure old O ring is removed.
- Check for any debris before fitting new pistons.
- Fit new Liners, Pistons and O rings assembly, ensuring piston slides when fitted.
- Refit Piston Caps.
- Refit Flange plate.
- Test run motor.

Visit **Huco.com** to download maintenance documents

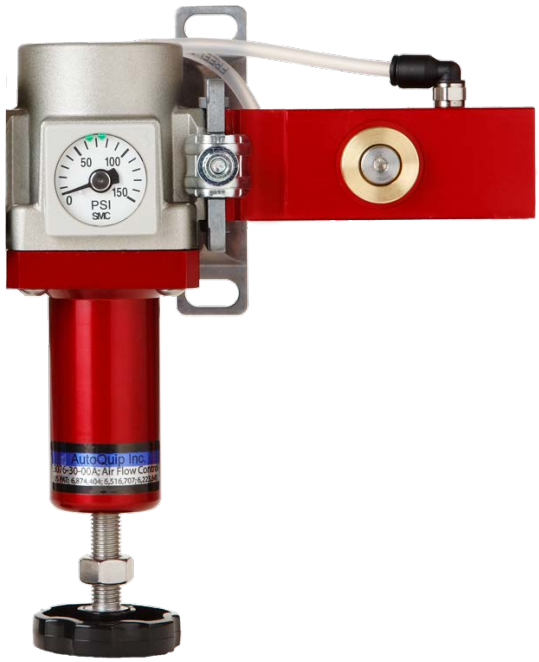
Constant Speed Control		
Dynatork 1, 2 and 3	Ports	3/8" BSP (T)
Order Code 926.3114-CLR3-100	Weight	2 lb
	Flow rate ft^3/min	2.2
Dynatork 3 and 7	Ports	1/2" BSP (T)
Order Code 926.3114-CLR4-100	Weight	2.5 lb
	Flow rate ft^3/min	6
Dynatork 3 motors can be used with either unit depending on Flow rate required		

Pneumatic Regulator System

System Description

The Closed Loop RPM Control regulates air flow to mechanisms like pneumatically driven motors and cylinders. The device is designed to eliminate problems associated with efficiently transferring energy.

The Closed Loop RPM Control incorporates a flow regulator to accomplish the control. When air flow is sensed, the flow regulator modulates the output pressure of the Closed Loop RPM Control to maintain a specific flow rate and torque.



Standard Features

- Automatically controls air pressure and flow rate.
- Dynamic control during working cycle.
- Independent adjustment of pressure and flow rate.
- Minimises effect of pressure drop in air supply.

Applications

- Paint agitator motor speed control
- Paint pump cycle limit control
- Paint spray gun atomization rate control
- Air sander speed control
- Air tool torque control
- Air cylinder rate and pressure control

Dynatork Motor Control

Electrical Option

Dynatork Motors use three cylinders with alternative reciprocating pistons, this motion easily allows the incorporation of a Inductive Proximity Sensor. These can be fitted to one or all three Cylinders depending on the required accuracy. The principle of operation:

- **Dynatork Air motors adapted to accept M8 proximity sensors to each Cylinder cap.**
- **When each piston reaches top dead centre the Proximity Sensor passes a “1” signal to the Programming/Computer device.**
- **The Programmer/Computer counts the pulses, either 3 pulses or 1 pulse per revolution.**
- **After “X” number of pulses the programming unit changes the Air Motor mode of operation, from Stop - Reverse - Delay and/or start another function.**

Pneumatic option

By replacing the Proximity Sensor with a Pressure Sensor the basic Motor operation pressurises each cylinder in turn to drive the pistons, alternating condition on each cylinder will give an output signal to be used in the same way, the advantage of this method over the Proximity Sensor is that special pistons are not required.

HOW TO ORDER

All Dynatork motors can be produced with fittings to accept Proximity Sensors, due to the wide variety of sensors we supply the motors with special pistons, and the cylinder cap filled with a blanking bolt.

Motors with sensors are treated as special applications due to the wide variations.

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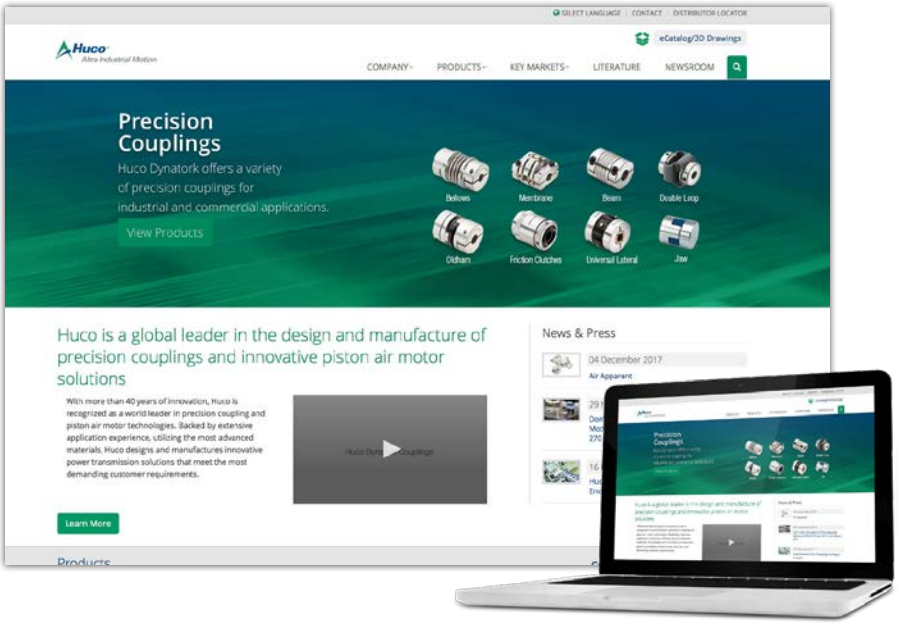

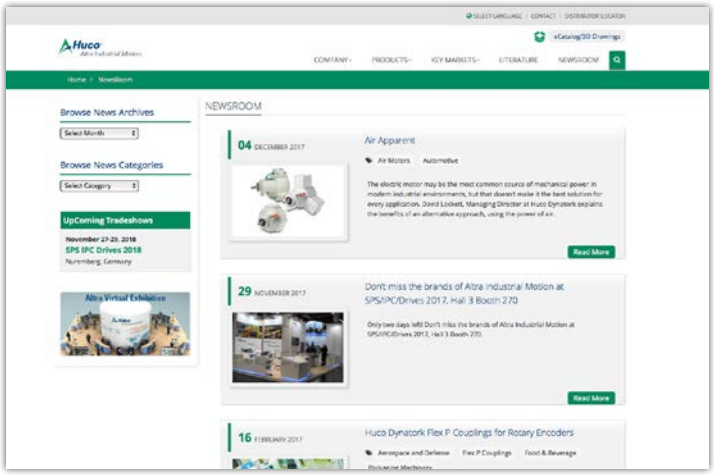

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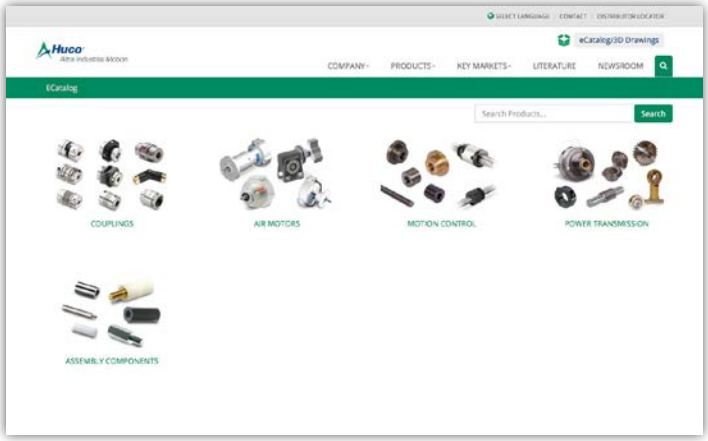

Huco Facilities

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Hertfordshire SG13 7BL - England
+44(0)1992 501900
Precision Couplings and Air Motors

North America

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440 North Fifth Avenue
Chambersburg, PA 17201 - USA
888-829-6637 or 717-264-7161
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