

# MagnaDrive

C O R P O R A T I O N

## MagnaDrive ASD Adjustable Speed Drive

This Chart is presented for illustration purposes only  
Please contact your MagnaDrive Distributor for ASD Sizing & Selection Assistance

Centrifugal Applications (Centrifugal Pumps, Fans, Blowers) Only

Motor hp	Motor KW	Motor rpm	3600	1800	1200	900
10	7		6.5	6.5	8.5	10.5
15	11		6.5	8.5	10.5	12.5
20	15		6.5	8.5	10.5	12.5
25	19		8.5	10.5	12.5	12.5
30	22		8.5	10.5	12.5	14.5
40	30		8.5	12.5	12.5	14.5
50	37		8.5	12.5	14.5	16.5
60	45		10.5	12.5	14.5	16.5
75	56		10.5	14.5	16.5	18.5
100	75		12.5	14.5	18.5	20.5
125	93		12.5	16.5	18.5	22.5
150	112		14.5	18.5	20.5	24.5
200	149		14.5	18.5	22.5	26.5
250	187		16.5	20.5	24.5	31
300	224		16.5	22.5	26.5	31
350	261		18.5	24.5	31	31
400	298		18.5	24.5	31	31
450	336		20.5	26.5	31	31
500	373		20.5	26.5	31	33
600	448		-	31	31	33
700	522		-	31	31	33
800	597		-	31	33	33
1000	746		-	31	33	33
1500	1119		-	33	33	35
2500	1865		-	33	35	35
4000	2984		-	-	35	-

MagnaDrive Corporation offers a family of products to accomplish a broad range of operating objectives:

Speed Control, Torque Management, Cushioned Start, Reliability,  
Vibration Control and Misalignment Tolerance.

### MagnaDrive Corporation

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# MagnaDrive™

RELIABILITY  
THROUGH  
INNOVATION



10 — 4,000 Hp, Up to 3,600 rpm

## MagnaDrive Adjustable Speed Drives

### Benefits:

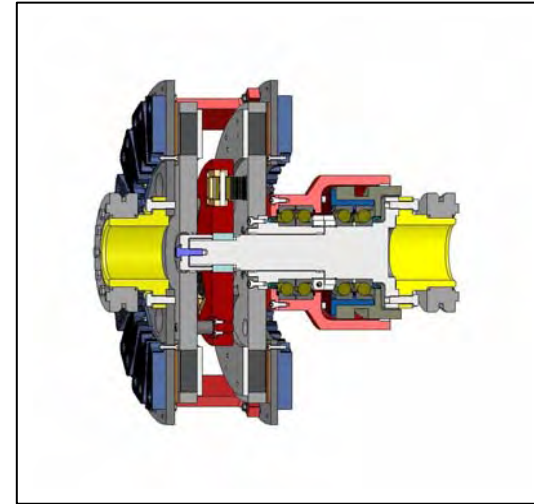
- Variable Speed Control
- Eliminates Valves & Dampers
- Eliminates Electronic Harmonics
- Significant Energy Savings
- Lowest Total Cost of Ownership
- Accepts Misalignment
- Eliminates Vibration Transfer
- Reduces Maintenance Costs
- Increases Seal & Bearing Life

### Ideal for Applications Subject To:

- Vibration
- Periodic Load Seizure
- Pulsating Loads
- Thermal Expansion
- Shock Loading
- High Starting Inertia/Torque
- High Energy Costs
- Frequent VFD Failure

# Principle of Operation

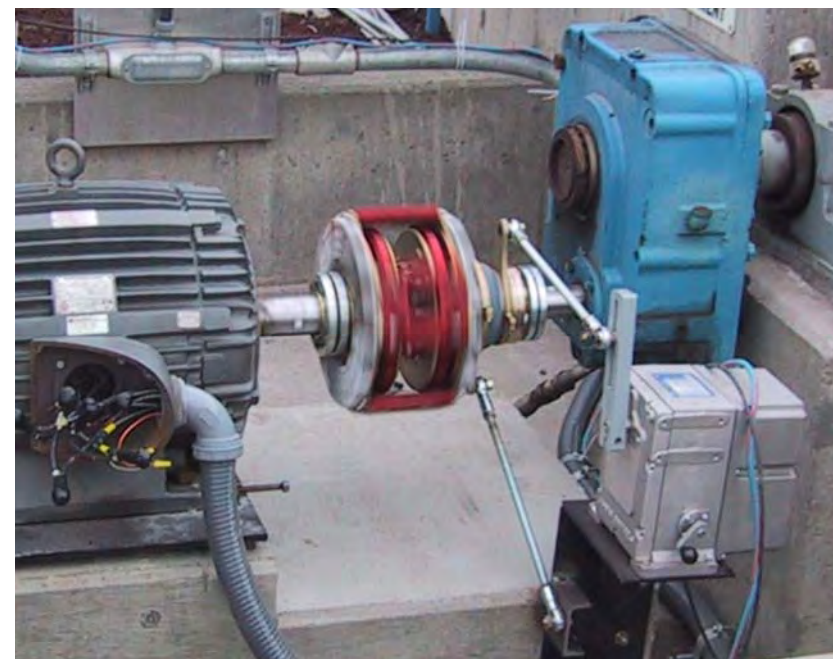
- The MagnaDrive ASD works by transmitting torque from the motor to the load across an air gap. There is no mechanical connection between the driving and driven side of the equipment. The torque is created by the interaction of powerful rare-earth magnets on one side of the drive with induced magnetic fields on the other side. By varying the air gap spacing, the amount of torque transmitted can be accurately controlled, thus permitting speed control.
- The MagnaDrive ASD consists of three sets of components:
  - A **magnet rotor assembly**, containing rare-earth magnets, is attached to the load.
  - A **copper conductor** rotor assembly is attached to the motor.
  - **Actuation components** control the air gap spacing between the magnet rotors and the conductor rotors.
- Relative rotation of the copper conductor and magnet rotor assemblies induces a powerful magnetic coupling across the air gap



- Varying the air gap spacing between the magnet rotors and the conductor rotors results in adjustable output speed.
- The principle of magnetic induction requires relative motion between the magnets and the conductors. This means that the output speed is always less than the input speed. The difference in speed is known as slip. Typically, when the MagnaDrive ASD is operating at full rated motor speed, the slip is between 1% and 4%.



- The output torque of a MagnaDrive ASD is always equal to the input torque. The motor is only required to produce the amount of torque needed by the load.
- The ability of the ASD to transmit power or control speed is not affected by minor angular or offset alignment between the motor and load. Vibration due to misalignment is virtually eliminated. Transmission of vibration across the drive is also eliminated due to the air gap.
- Vibration is the largest cause of bearing and seal failures. MagnaDrive products reduce harmful vibration and minimize these problems.
- When installed in a system the MagnaDrive ASD can respond to a process signal. The pressure, flow, level, or other process control signal is received and scaled by a control system, then provided to the MagnaDrive ASD actuator. The actuator adjusts the air gap, which modulates the speed of the load to satisfy the control needs.

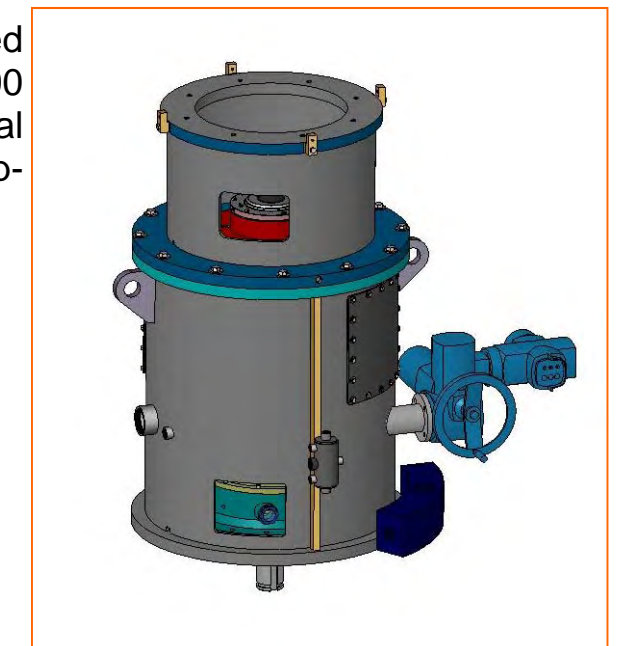
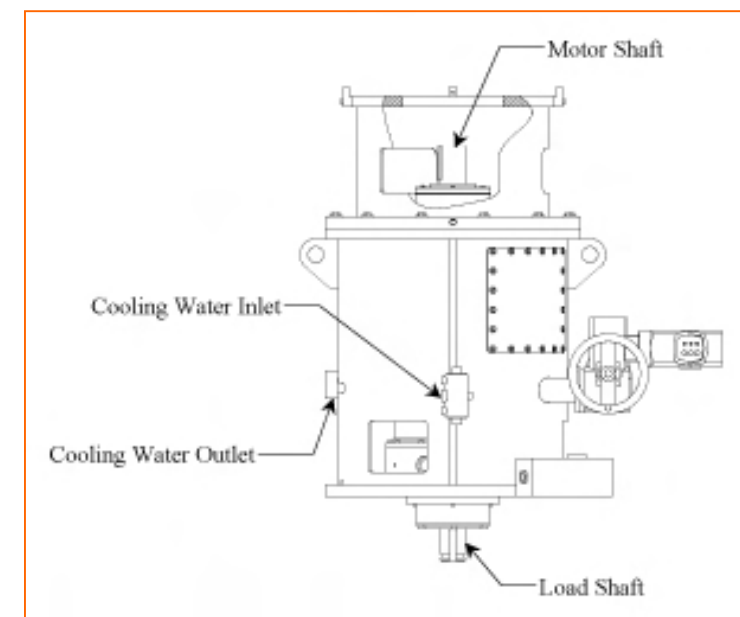


# MagnaDrive Water-Cooled ASD's



- MagnaDrive Corporation offers a Standard Closed Loop Coolant Circulating System for use with its Water-Cooled Drives. If this option is selected, MagnaDrive Corporation will provide a cooling system package design based on horsepower and speed of the application. Standard cooling system requirements include a minimum supply of clean water (25 gpm at 60 psi for 2500 Hp / 1800 rpm) and a maximum ambient cooling water temperature of 80° F. Additional features can be provided to meet customer specific requirements.
- MagnaDrive Corporation offers both Horizontal and Vertical Water-Cooled ASD configurations to meet your application needs.

- MagnaDrive Water-Cooled Adjustable Speed Drives are provided with an Oil Lubricated Gearbox and Output Shaft Assembly as standard equipment.
- For Vertical configurations, Oil Lubricated Thrust Bearings with an AFBMA 40,000 hour life and with 25,000 pounds of vertical down-thrust capacity are standard equipment.



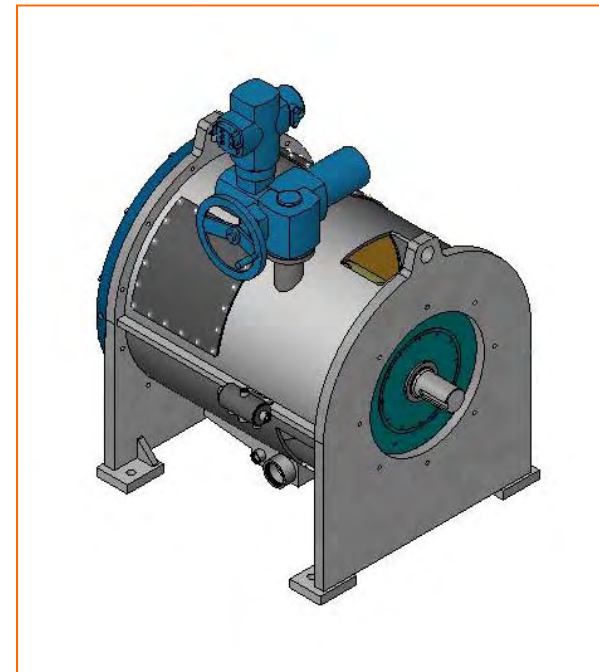
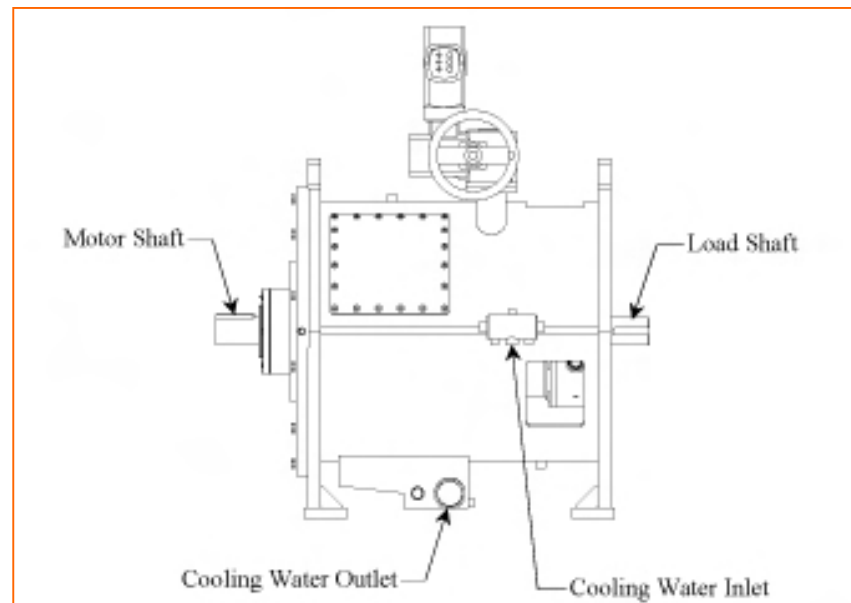
# MagnaDrive Water-Cooled ASD's

# Benefits of the MagnaDrive ASD



- MagnaDrive Water-Cooled Adjustable Speed Drives use the rotation of the magnet rotors and conductors to centrifugally draw a steady stream of cooling water over the drive components providing conductive cooling to dissipate the heat created by the “slip” between the magnet rotors and the conductors.

- Typically, Water-Cooled ASD's are used in applications where the motor horsepower ranges above 500 Hp and in applications where the rotational speed of the magnet rotors and the conductors is low enough that air cooling of these components is insufficient. MagnaDrive Corporation has successfully installed its Water-Cooled Adjustable Speed Drives on Water Supply Pump Stations, Induced Draft Fans, Slurry Pumps, Water Treatment Aeration Fans, and Cooling Tower Fans as well as many other applications.

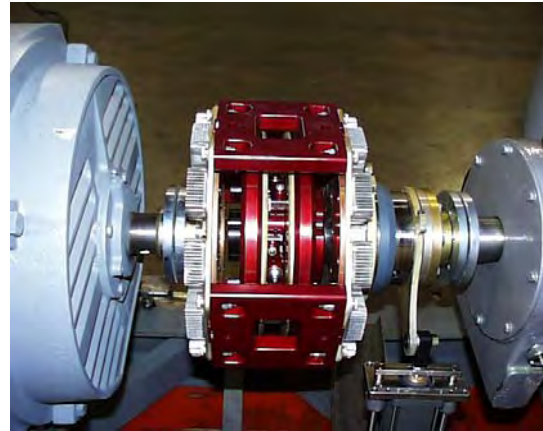


- MagnaDrive Corporation replaces the physical connection between motors and loads with a gap of air. This air gap eliminates harmful vibration, wear and tear, enhances energy efficiency, increases motor life and protects equipment from overload damage. The result is:
  - Increased reliability
  - Money saved on energy and maintenance every day
  - A big improvement in the way factories and other industrial and commercial facilities operate.
- The principal benefits offered by the MagnaDrive ASD are summarized in the following list. Any one of these benefits could justify installation of the MagnaDrive ASD:
  - Energy Savings
  - Increased Reliability
  - Reduced Maintenance Costs
  - Improved Process Control
  - No Harmonic Distortion
  - Ability to Operate in Harsh Environments
- MagnaDrive ASD's have been designed for users of Rotating Equipment who are dissatisfied with the high Total Cost of Ownership that comes with traditional adjustable speed products. MagnaDrive ASD's are a unique application of rare-earth magnetic technology that provides the Lowest Total Cost of Ownership for our customers by reducing the cost of maintenance, increasing process availability, and improving energy efficiency. In a departure from traditional adjustable speed technology, MagnaDrive Corporation has assembled a portfolio of torque transmission products that reduce vibration and harmonics, thereby increasing equipment life and improving energy efficiency.

## Applications

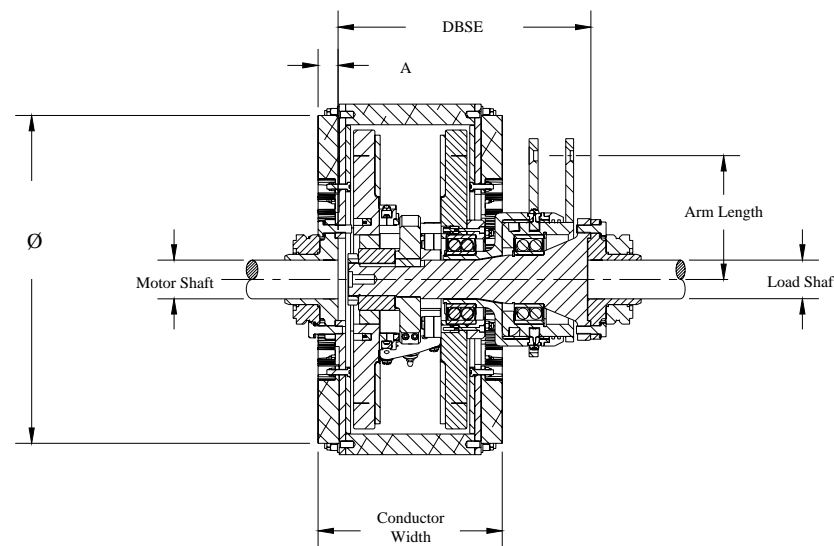
- MagnaDrive Corporation's technology is applicable to most companies. However, the following industries have demonstrated the most benefits by utilizing our magnetic technology:
  - **Water / Wastewater**
  - **Power Generation**
  - **Pulp & Paper**
  - **Mining**
  - **Cement**
  - **Oil & Gas**
  - **Building System & HVAC**
  - **Chemical Processing**
  - **Maritime**
  - **Irrigation**
- MagnaDrive Corporation products are used with a wide variety of rotating equipment in industry. The top applications of the MagnaDrive technology are as follows:
  - **Centrifugal Pumps**
  - **Fans**
  - **Centrifuges**
  - **Bulk Handling**
  - **Blowers**
  - **Dynamometers**

# MagnaDrive Air-Cooled ASD's



MagnaDrive Air-Cooled Adjustable Speed Drives use the movement of air over the spinning conductors to dissipate the heat that is created as a result of "slip" between the magnet rotors and the conductors. This slip is directly related to the amount of torque transmitted by the ASD and is adjusted by varying the air gap between the rotors and conductors.

Typically, Air-Cooled ASD's are used in applications where the motor horsepower ranges between 10 and 500 Hp. When the motor horsepower is greater than 500 Hp or when the speed of the motor is low, there is a possibility that MagnaDrive Corporation will recommend a Water-Cooled drive.



Size	DBSE (in)	Conductor Rotor Assembly						Magnet Rotor Assembly			Torque (ft-lb)		Actuation	
		Ø (in)	Width (in)	A (in)	Wt (lb)	Dist. to CG (in)	WR <sup>2</sup> (lbf*in <sup>2</sup> )	Wt (lb)	Dist. to CG (in)	WR <sup>2</sup> (lbf*in <sup>2</sup> )	Peak Linear	Per Slip rpm	Arm Length (in)	Linear Force (lbf)
6.5	8.60	8.0	6.11	.06	10	2.63	85	25	4.34	100	30	.108	5.0	20
8.5	8.60	10.0	6.11	.06	16	2.50	200	35	4.70	250	60	.291	5.0	20
10.5	12.10	13.5	8.98	1.0	50	3.36	875	85	5.45	500	90	0.52	6.0	60
12.5	12.10	15.75	8.98	1.0	65	3.36	1650	95	5.90	900	210	1.65	6.0	80
14.5	12.10	17.75	8.98	1.0	85	3.36	2750	120	6.54	2000	315	3.09	6.0	100
16.5	12.96	20.0	9.54	1.0	105	3.30	4550	170	7.15	4000	450	5.18	6.0	130
18.5	14.43	22.0	9.11	1.14	155	2.63	9700	197	7.60	4900	600	8.04	8.0	150
20.5	14.43	24.0	9.11	1.14	173	2.71	13400	227	8.17	7620	780	11.80	8.0	180
22.5	16.72	24.63	8.97	.69	165	2.74	12770	341	6.30	12175	1020	22.00	10.0	350
24.5	18.95	28.63	9.32	.31	221	2.40	23000	503	7.11	23233	1240	40.46	11.0	500
26.5	18.95	28.63	9.32	.31	221	2.40	23000	515	7.03	24576	1500	47.82	11.0	500

# Air-Cooled ASD Accessories



To meet our customers' varying application needs, MagnaDrive Corporation offers a wide selection of Air-Cooled Adjustable Speed Drive accessories.

- **Actuators** - We have selected a standard set of Electric Actuators to be used with our ASD's. These actuators are designed to accept an analog input signal from your control system and to position the ASD to give the right speed for your process.
- **Floating Shaft Kits** - This option is available for applications that require additional shaft support on the load side of the system. Thin shafts, split-case pumps, and high vibration applications will benefit from these kits.
- **Rigid Pedestal Mounts** - For larger ASD applications that require additional load shaft support, MagnaDrive Corporation offers the Rigid Pedestal Mount option.
- **Totally Enclosed Kits** - MagnaDrive Totally Enclosed Kits offer an additional level of value for our customers. By packaging the ASD and actuator in a single, pre-aligned, and easy to install unit, we provide a solution to high-speed and sleeve bearing applications.
- **Vertical Kits** - For vertical applications, a specially designed housing is provided for the ASD. An optional Thrust Pot is available and offers the ability to incorporate a non-reversing clutch and/or a shaft adjustment coupling option.
- **Machine Monitoring Instrumentation** - MagnaDrive Corporation will supply customer requested instrumentation including: Temperature Sensors, Speed Sensors, Position Indicators, and others.

