

Dynaspede

Drive Products Division

Eddy Current Drives for Industrial Automation



- INTEGRAL DESIGN
- MODULAR DESIGN
- DRIVE-BRAKE COMBINATIONS
- AIR-COOLED DRIVES
- WATER-COOLED DRIVES
- HIGH SPEED DRIVES
- TOTALLY ENCLOSED
- EDDY CURRENT BRAKES
- GEARED DRIVES
- ELECTRONICS to match

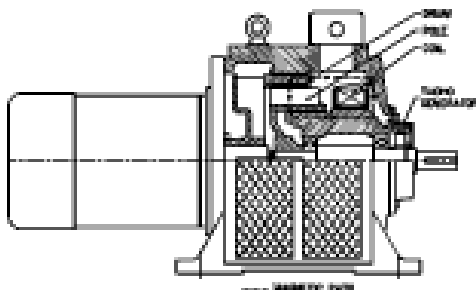


Eddy Current Adjustable Speed Drives

Dynaspede series of eddy current drives forms a family of AC adjustable speed drives, offered as a cost effective solution to almost every industrial application requiring accurate, easily controllable, infinitely variable speed from an AC power source. These high torque, low inertia eddy current drives are mated with a variety of electronic feedback control options for precise control of machine speed or torque in single or multiple motor applications.

EDDY CURRENT DRIVE is a combination of a constant speed AC induction motor, coupled to an eddy current clutch. The function of an eddy current clutch is to transmit a controlled torque from the induction motor, (prime mover) to the load (driven machine). The medium of torque transmission is a controlled magnetic field, generated by a stationary field coil. A thyristor based electronic controller is used to convert a relatively small amount of AC power into a DC power in order to excite the field coil.

The principle of operation is explained overleaf with reference to the following cut-away view of a standard, air-cooled eddy current drive.



Design Features

The following figures-of-merit may be compared for an objective study of eddy current drives of different brands.

- **Stationary Field**
No slip-rings or brushes to wear. Coil is glass taped and epoxy moulded to prevent ingress of moisture or dust. All coils are made of high grade polyester coated copper conductors. Insulation resistance guaranteed to be > 500 MW
- **Low Residual Torque**
The active members of the coupling are of specially alloyed, metallurgically controlled steel. Maximum residual torque is <10% of rated torque; typical value being < 5%.
- **Low Slip Loss**
Single most important figure-of-merit is the minimum slip loss needed to transmit the rated torque. Our Product Data figures reveal the Dynaspede advantage over competitive products.
- **Operates Cooler**
Lower losses in the coil and improved ventilation to enhance power dissipation.
- **Branded Motors**
Dynaspede drives come with the best known brands induction motors.
- **Service Backup**
Extensive all-India service back-up and customer support.

Principle of Operation

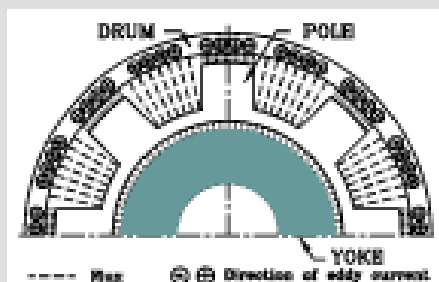
The Drum-Fan assembly, forming the input member, is driven at a constant speed, by a fixed speed prime-mover which, in this case, is a flanged AC motor. The output member consists of a low inertia pole assembly, connected to the output shaft of the drive. Thus there is no mechanical linkage between the driving and driven members to cause any mechanical wear and tear.

When the stationary field coil is excited by a low voltage, (typically 45 volts DC, from the solid state electronic controller) a strong magnetic field is developed around the coil. The magnetic lines of force from the coil are guided to the pole pieces, through the working air gaps, into the drum assembly and back to the coil thus forming a closed magnetic circuit. The flux path through the working gaps between the pole and the drum is shown in the adjoining figure.

The flux lines (---) are seen concentrated in the air gap near the pole faces resulting in a varying magnetic field around the periphery of the drum. Since the drum rotates in relation to the pole assembly, the surface of the drum experiences a time rate of change of magnetic field. Depending on the relative speed between these members, the induced cross currents (eddy currents), flow in the drum material.

The direction of flow of these induced currents, is perpendicular to the magnetic flow lines, as shown with conventional \otimes and \odot signs. The reactive magnetic field caused by these cross currents is responsible for the torque transmission from the input to the output members, in these forms of torque transmitters.

The extent of torque transmission, depends both on the magnetic field strength and the relative speed (slip speed) between the drum and the pole. An increase in excitation, therefore, can correspondingly reduce the slip required to transmit a desired level of torque, thus providing an easy electrical means to control the drive speed.



Eddy Current Brakes,

work much the same way, except that one of the torque transmitting members is rigidly attached to the casing and is thus held stationary. Such a device therefore can exert a controlled braking torque, when the brake shaft is externally driven.



Clutch Brake Units,

have an eddy current brake in addition to a clutch. When used with solid-state Dual-Channel controllers, **eddy current transmissions** can enforce close control of both acceleration and deceleration or other programmes of a rapidly changing nature of load.

Speed Control

is by a closed-loop speed feedback from an AC Tachogenerator of 48 poles, integrally mounted to the drive. Speed is maintained to the set value, despite load changes.

Torque Control

is easy and straight forward. The intrinsic nature of an eddy current drive lends itself admirably to applications as constant torque or constant tension winding or unwinding.

Standard Electronic Controls

The modular design, add-on concept of the control units permit most control requirements from simple speed or torque control to complex systems to be effected with maximum economy.

The basic control unit...is an **Electronic Controller** containing all necessary operator controls...common for use with all ratings from 0.5 to 75 HP. Speed holding ability (against load) is better than 2%.

Speed Controller Model AC40



General Purpose

Electronic Speed Controller... with tacho feedback, common for drives up to and including 75 HP.

Standard features include Soft Start 0-30 sec, Preset Overload limit & Operator Controls

Specifications:

Input : 240 V. AC; $\pm 15\%$, 1 ϕ

Output : 85 V DC(nom), 5A

Speed Holding : Better than 2%

- **ON/OFF** switch with Indicator
- **Set Speed** Potentiometer, single turn.
- **Speed Indicator**..Analogue
- **Ambient :** 50°C
- **Construction :** Wall /Desk mounting:

Standard Options.

AC40-7...with multi-turn potentiometer

AC40-16...with LCD display.

AC40-8...with multi-turn pot & LCD display

AC40-10...features as in standard with JOG push button and JOG/RUN selector switch

AC40-11...multi-turn pot, JOG push button and JOG/RUN selector switch

AC40-12...with LCD display, JOG push button and JOG/RUN selector switch

AC40-13...with multi-turn Pot, JOG push button and JOG/RUN selector switch

AC40-3...with AUTO/MANUAL selector switch for accepting external speed reference voltage signal

AC40-15...with AUTO/MANUAL selector switch and multi-turn Potentiometer.

Electrical Specifications

Drives	For Standard Ratings (HP)			
	0.5 to 15	20 to 75	100	75 to 150
Parameters				
Cooling	Air cooled-Self Ventilated			Water
Coil Voltage DC (max.) short time	85V	85V	180V	180V
Coil Voltage DC (nom.) rated	50V	50V	110V	110V
Current DC (nom) rated	2.5A	5A	2.5A	5.0A
Resistance W (nom) $\pm 7.5\%$	22	11	11	10
T.G. Voltage	20 Volts AC rms. @ 1000 rpm(nom)			
T.G frequency	400 Hz. (near sine) @ 1000 rpm			
Protection	IP-21			IP54
Insulation	Class F			
Temperature	Rise Limited to Class B			
Ambient	40°C			
Altitude	Upto 1000 Mts. above sea level			

Notes:

- Speed Range of 120-1200 rpm (continuous) is standard. For optimum results, consult relevant **Product Data** on individual ratings.
- Electronic Controllers used are common for all ratings up to and including 75 HP. For 75 HP model, speed range can be enhanced using special controllers with output of 180 Volts.
- High-speed drives in speed ranges 120 to 2700 rpm are restricted up to 15 HP due to air noise considerations.

Control of Eddy Current Drives

Eddy current drives are amenable for automatic feedback control of speed or torque. Please consult relevant publications for the type of control and regulation needed for your application or contact us for details.

Some Typical Options

The following illustrate some of the options available. Contact us for variations not listed below.



Integral Design

Compact design, stationary field, air-cooled drives with built-in flanged motors, for ratings from 0.5 HP to 100 HP.

Transmissions

Clutch-brake combinations...needed for tight control of speed or where overhauling loads are involved.



T.E. Drives

Increased protection, totally enclosed, fin-cooled designs, with limited speed ranges are offered upto 15 HP.

Modular Design

Independent modular design construction upto 100 HP, for user-arranged A.C. motors.




Fast Stopping

Drives can be supplied with built-in electromagnetic brakes for instantaneous stopping of machines.

Flanged Drive

Vertical mounting is permitted...if no external axial thrust is impressed on the drive shaft.



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