

MAGNASTART

SLIPRING
MOTOR
STARTERS



Magnastart is a unique Inducer system for starting slipping induction motors, offering considerable improvements in maintenance, reliability and cost-effectiveness.

Magnastart is used extensively both as a component in new equipment and as a quick and effective replacement for existing resistance and liquid starters. Wide flexibility of tapings allow the impedance to be matched on commissioning.

APPLICATIONS

Crushers Pumps Fans Conveyers Cranes Mills Presses etc.



Automatic Starter for Slipring Motors

The Magnastart product line consists of a range of steel cored Inducers from 37 to 370kW, each individual model spanning a variety of machine sizes. When built into rotor starter equipment, the Inducer acts as the current-limiting rotor impedance during run-up, and is bypassed by a shorting contactor when near full speed is reached.

A number of advantages to the manufacturer and maintainer of starters results from this approach:

Size

Though physically smaller than conventional systems of resistors and contactors, the large thermal capacity of Magnastart permits the starting of difficult and high inertia loads without problems.

Simplicity

Magnastart requires only one shorting contactor, reducing the system complexity, size and cost.

Performance

Magnastart is ideal for inching, reversing, and plug braking without any additional rotor controls.

Maintenance

Magnastart Inducers have no moving parts, and do not use liquids or chemicals. Magnastart will give many years of service without any maintenance or adjustment.

Reliability

The robust construction permits heavy usage under the most arduous conditions. Built-in thermal cut-out provides protection against damage.

Flexibility

Each Inducer model is designed to start a wide range of motors. The front panel allows the user to select the exact starting torque and stator current required, on commissioning if appropriate. Unlike resistors, the total energy capacity of Magnastart remains constant regardless of the impedance tapping selected.

Smooth acceleration.

Smooth acceleration to full speed reduces electrical and mechanical stresses in the motor and drive.

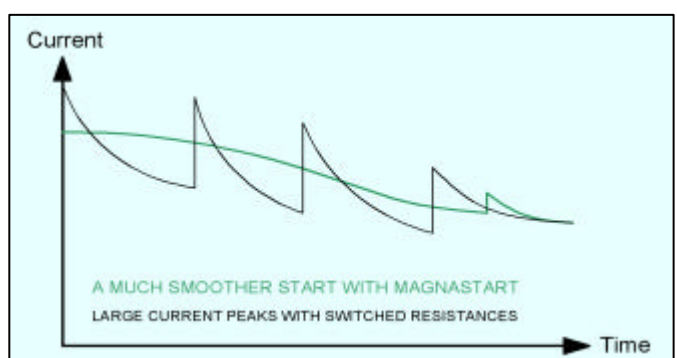
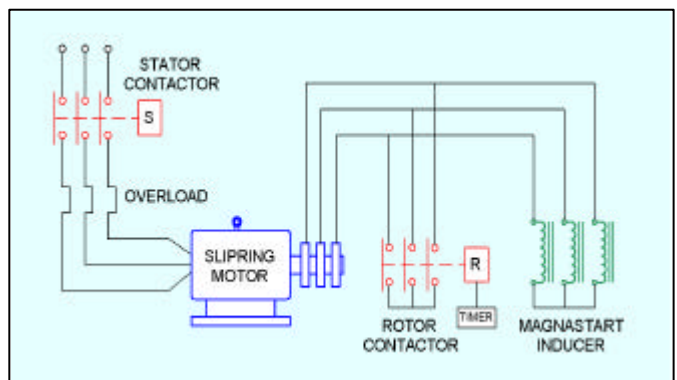
How Magnastart Works

The Magnastart Inducer consists of 3 coils wound on specially shaped steel cores. Eddy currents in these cores are reflected in the windings as an impedance which is dependent on rotor frequency. This is connected across the rotor windings on starting (top figure).

When power is applied to the stationary motor, the frequency in the rotor is the same as the stator resulting in the maximum Inducer impedance. As the machine accelerates, the rotor frequency (the slip frequency) and Inducer impedance decrease. This results in a smooth acceleration (bottom figure) to nearly full speed at which point the rotor is short circuited by the rotor contactor.

The starting power is dissipated in the heavy mass of the steel cores, which allows the inducer to absorb a considerable amount of energy. Advanced thermal insulation protects the coils which remain relatively cool, and several consecutive starts may be obtained on drives with high inertial loads.

Each of the coils has four connections brought out to studs on the front panel. By using various star and delta combinations up to 17 different starting impedances are available, to provide the exact starting characteristics required on a wide range of motors.

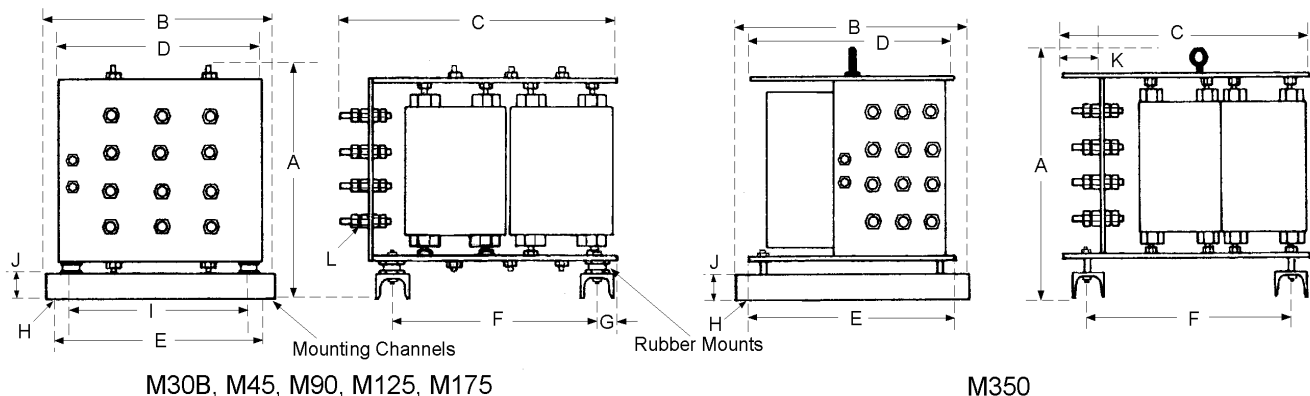


Magnastart Technical Data

Model No		M30B	M45	M90	M125	M175	M350
Max Motor Size ¹	kW HP	37 55	55 75	110 150	150 200	200 270	370 500
Max Starts/Hr ²		9	7	6	7	5	4
Max Consecutive Starts ³		4	4	4	5	4	4
Max Rotor Starting Current	Amps	140	275	425	525	625	1100
Max Rotor Voltage ⁴	Volts	600	600	800	800	1000	1200
Max Rotor Voltage (HD) ⁵	Volts	500	500	550	600	750	900
Impedance ⁶	Ohms	7.0	4.0	3.5	2.5	3.0	2.3
Coil Insulation Rating		Class F (150°C), 4,000Vac winding-ground proof test					
Thermal Overload Cut-out ⁷		250Vac, 10A or 30Vdc, 5A max Normally closed					
Dimensions ⁸	mm						
Height	A	250	260	255	360	360	430
Width	B	305	325	365	365	365	500
Depth	C	320	330	420	425	420	500
Body Width	D	250	270	320	320	320	420
Fixings Holes Side to Side	E	280	300	340	340	340	470
Fixings Front to Back	F	233	257	320	320	320	360
Rear Fixings	G	25	25	30	30	30	70
Fixing Hole Size	H	10	10	10	10	10	12
Fixing Studs Side to Side	I	215	247	285	285	285	370
Channel Height	J	37	37	37	37	37	37
Front Panel Inset	K	-	-	-	-	-	95
Load Studs	L	M8	M8	M10	M10	M12	M12
Overload Cut-out Studs	L	M6	M6	M6	M6	M6	M6
Weight ⁹	kg	27	36	54	75	81	165
Operating Environment		-25°C to +50°C ambient, 0-95% RH (non-condensing)					

Notes:

- With 50Hz, 3 phase supply. For other supply arrangements contact ADWEL.
It may be possible to parallel models for greater capacity in particular circumstances. Please consult ADWEL with specific details.
- This is based on the maximum motor size starting against 1.5 x full load torque for 15 secs, mounted in a typical unventilated metallic enclosure. For heavier duties extra or forced ventilation may be required, or a larger Inducer chosen.
- Maximum consecutive starts are from cold. Note that the motor rating may also limit consecutive starts.
- Normal starting duties, occasional inching in both directions.
- Heavy inching, and plug braking.
- Impedance is approximate per coil at 50Hz, full load, 100% tapping. Typical PF is 0.8.
Tappings at 100%, 84% and 56% per coil allow a choice of star and delta impedances from 100% down to 3% in 17 steps.
- The Thermal Overload Cut-out should be wired to trip the starting system in case of overload (contacts open).
- On the M30, M45, M90, M125 and M175 the mounting channels can be removed and the Inducer mounted on the M8 studs protruding from the bottom of the rubber mounts. This allows these Inducers to be mounted in a 400mm deep enclosure.
- Weight is without packing. For normal road shipment, the Inducers are mounted on 50 x 75 x 430mm wooden bearers (to allow fork-lift carriage) and shrink wrapped. For air/sea export, extra packing can be arranged.



The Magnastart System – Application

Magnastart Inducers are intended to be built in to slipring motor starter equipment by the customer to satisfy the technical requirements of the specific motor and load. They may also be retro-fitted into existing rotor starter systems to replace failed starter equipment.

In normal application the Magnastart is connected across the rotor windings, selecting the impedance to suit the starting current/torque requirements. A shorting contactor operated by a timer is connected across the Magnastart, to short out the rotor once near full speed is reached. During commissioning, test starts followed by adjustment of Magnastart tapplings allow the best balance between start current and run-up time to be achieved.

Like all purpose-built electrical control systems, the system design requires the consideration of an experienced electrical engineer. Magnastart design aspects that should be addressed include:

- Stator current overload protection and co-ordination with starting surge
- Matching rating of Magnastart Inducer to rotor and duty cycle
- Setting Magnastart impedance to meet run-up time, current and torque requirements
- Timing of rotor shorting contactor for full-speed operation
- Controls and protection in case of rotor stall or overload during starting

Further guidance notes on application and selection of tapplings are provided with each unit, and are available on request.

ADWEL has designed and manufactured complete Slipring Motor Starters utilising Magnastart Inducers for many Industries, and is able to provide this service to customer specification. Please contact your nearest ADWEL office or agent for further details.

Equipment intended to be sold or operated in the European Union needs to be compliant with the applicable CE Directives, which may include the Low Voltage Directive, EMC Directive and Machinery Directive. Magnastart cannot itself be compliant, since it is a component intended for incorporation into equipment. However if a Magnastart Inducer is built into starter equipment in conformity with applicable standards (such as EN60947), compliance may be declared. Magnastart is not a Safety Component within the terms of the Machinery Directive.

Magnastart is a Tradename of ADWEL International Ltd

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TYPICAL INSTALLATION IN
A 300kW STARTER

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