BROCHURE

Low voltage AC drives

Industries and applications
Capabilities guide

Overview

ABB has designed an extensive portfolio of variable speed drives that is available through its sales offices and channel partners around the world. Applications where drives are used vary widely in terms of control requirements and environmental conditions.

To meet the varying requirements of its customers, ABB offers a wide range of application specific solutions, ranging from pump, fan, conveyor and compressor applications through to demanding machinery and marine solutions.

How to use the guide
We want to make it easy for you to match your application needs with our Drives products. Using the information contained in this document, you will be able to review feature requirements unique to your industry and application and select the ABB Drive products most appropriate for you.

Material Handling

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Cooling / Baking Conveyor
A device for baking or cooling product on wire rack type material rather than a belt.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Required Drive features / Application	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor				✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Diverter								✓			✓		✓								✓		40:1	SV, DTC or DC	Torque
Palletizer				✓				✓		✓	✓		✓		✓						✓		10:1	SV	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓			✓							✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Hoist				✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓		DTC or DC	Speed & Torque

Textile

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Textile Machines
Spinning and traverse motions are combined in smooth operation and coordination to produce synthetic yarn.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Required Drive features / Application	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Palletizer					✓				✓	✓	✓		✓			✓						✓		10:1	SV	Speed
Centrifugal Fan / Pump		✓		✓				✓	✓	✓		✓			✓			✓						4:1	V/Hz	Speed
Centrifugal Pumps		✓		✓			✓	✓	✓			✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors		✓		✓			✓	✓	✓			✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor											✓							✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Center Driven Winder		✓		✓	✓		✓		✓	✓	✓			✓			✓	✓		✓	✓	✓		100:1	FV, DTC or DC	Speed
Textile Machines					✓						✓			✓				✓		✓		✓			DTC	Speed & Torque
Engine / Transmission Test Stand	✓				✓	✓	✓	✓	✓	✓	✓						✓	✓	✓			✓		100:1	DTC or DC	Torque
Hoist					✓		✓		✓	✓	✓					✓	✓	✓		✓		✓	✓	100:1	DTC or DC	Torque
Crane					✓		✓		✓	✓	✓					✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Mining and Cement

Belt Conveyor
A device for moving product from one place to another using a continuous belt rotated by rollers on each end.

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Ball Mill
A large rotating drum filled with steel balls used to pulverize rock or ore in preparation for mineral extraction or processing.

Rotary Kiln
A long, large-diameter, horizontal cylinder used as a continuous oven to cause a chemical reaction between ingredients.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Required Drive features / Application	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Long Motor Cable Length	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor	✓			✓					✓		✓	✓					✓	30:1	FV, DTC or DC	Speed
Auger Conveyor			✓						✓		✓	✓		✓	✓		✓	20:1	V/Hz, DTC or DC	Speed
Ball Mill							✓	✓	✓			✓					✓	10:1	SV	Speed
Rotary Kiln	✓		✓				✓	✓	✓			✓			✓		✓	10:1	SV, DTC or DC	Speed
Induced Draft Fan	✓		✓			✓		✓		✓			✓					10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓			✓	✓	✓		✓	✓		✓					4:1	V/Hz	Speed
Beater Type Mixer									✓			✓					✓	40:1	SV or DTC	Speed
Centrifugal Pumps	✓		✓		✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓		✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed
Crusher / Pulverizer							✓		✓			✓						60:1	FV, DTC or DC	Speed

Rubber and Plastics

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous loop chain used to suspend product and move it from point to point or through a process.

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Blown Film
A machine used to shape a material into a thin sheet by blowing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Blow Molding
A machine used to shape material by blowing it into a mold.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Application / Required Drive features	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor	✓			✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Auger Conveyor			✓								✓			✓		✓		✓	✓		✓		20:1	V/Hz	Speed
Induced Draft Fan	✓		✓				✓			✓		✓					✓						10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Blown Film			✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding			✓					✓			✓					✓					✓		60:1	FV or DTC	Torque
Blow Molding			✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Beater Type Mixer											✓					✓					✓		40:1	SV, DTC or DC	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓			✓							✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor											✓						✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Center Driven Winder	✓		✓	✓		✓		✓		✓	✓		✓			✓	✓		✓	✓	✓		100:1	FV, DTC or DC	Speed
Hoist				✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Food and Beverage

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Sugar Centrifuge
A large rotating drum that rapidly spins to separate liquid from solid in the sugar-refining process.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Cooling / Baking Conveyor
A device for baking or cooling product on wire-rack-type material rather than a belt.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Required Drive features / Application	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Preset Speeds	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor	✓			✓							✓				✓		✓						✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓				✓		✓	✓					✓		40:1	FV, DTC or DC	Torque
Auger Conveyor			✓								✓				✓		✓		✓	✓			✓		20:1	V/Hz	Speed
Diverter								✓			✓		✓										✓		40:1	SV	Torque
Palletizer				✓				✓		✓	✓		✓			✓							✓		10:1	SV	Speed
Induced Draft Fan	✓		✓				✓			✓		✓						✓							10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓			✓			✓							4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓						✓						✓		60:1	FV, DTC or DC	Torque
Sugar Centrifuge	✓		✓		✓			✓		✓	✓			✓			✓			✓	✓	✓	✓		20:1	SV, DTC or DC	Speed
Beater Type Mixer											✓						✓						✓		40:1	SV, DTC or DC	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓				✓								✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓			✓			✓		✓		✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓							✓		✓	✓		✓					10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓			✓			✓		✓		✓			2:1	V/Hz	Speed
Screw Compressor											✓							✓					✓		10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓							✓		✓	✓		✓					10:1	V/Hz or SV	Speed
Hoist				✓		✓		✓		✓	✓					✓	✓	✓		✓			✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓					✓	✓	✓	✓	✓			✓	✓	100:1	DTC or DC	Speed & Torque

Consumer Goods

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Punch Press
A machine used to shape or cut material, typically metal, by forcing a die down onto the material.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Required Drive features / Application	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor	✓			✓							✓				✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓				✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Palletizer				✓				✓		✓	✓		✓			✓						✓		10:1	SV	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓			✓			✓						4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓						✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding			✓					✓			✓						✓					✓		60:1	FV or DTC	Torque
Beater Type Mixer											✓						✓					✓		40:1	SV	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓							✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor											✓							✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓							✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Center Driven Winder	✓		✓	✓		✓		✓		✓	✓			✓			✓	✓		✓	✓	✓		100:1	FV, DTC or DC	Speed
Hoist				✓		✓		✓		✓	✓					✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Punch Press			✓							✓	✓	✓					✓			✓		✓		30:1	SV or DTC	Speed
Crane				✓		✓		✓		✓	✓					✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Automotive

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Engine / Transmission Test Stand
Machine with an opposing motor used to test engines or transmissions by loading them at different speeds.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Punch Press
A machine used to shape or cut material, typically metal, by forcing a die down onto the material.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Application / Required Drive features	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor		✓			✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors			✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Diverter									✓			✓		✓								✓		40:1	SV	Torque
Centrifugal Fan / Pump		✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Extruder				✓	✓				✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding				✓					✓			✓					✓					✓		60:1	FV or DTC	Torque
Extruder				✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Centrifugal Pumps		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor												✓						✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Engine / Transmission Test Stand	✓				✓	✓	✓	✓	✓		✓	✓					✓	✓	✓			✓		100:1	FV, DTC or DC	Torque
Hoist					✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Punch Press				✓							✓	✓	✓				✓			✓		✓		30:1	SV, DTC, or DC	Speed
Crane					✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Oil and Gas

Centrifugal Pumps
A pump whose load characteristics vary proportional to speed.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Recirculation Fans
A fan whose load characteristics vary proportional to speed.

Compressors
A machine with an auger shaped shaft used to compress a gas.

Required Drive features / Application	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Centrifugal Pumps		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Recirculation Fans		✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Compressors									✓			✓						✓				✓		10:1	V/Hz	Speed

Pulp and Paper

Mixing
A machine used to mix ingredients including pulp and dyes.

Pumps
A pump whose load characteristics vary proportional to speed.

Converting
A machine used to change the shape or size/format of materials such as slitting, embossing, and laminating.

Web Handling
A machine that transports and/or stores web materials. It may also involve additional web processes, such as coating and drying.

Chipper
A machine that uses large blades to 'chip' logs into smaller pieces for use in making pulp.

Required Drive features / Application	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Chipper				✓					✓		✓	✓					✓			✓		✓		10:1	SV	Speed
Mixing				✓					✓				✓				✓							10:1	SV or DTC	Speed & Torque
Flow / Pumps		✓		✓			✓	✓	✓					✓		✓		✓						4:1	V/Hz	Speed
Converting		✓		✓	✓		✓		✓	✓	✓						✓	✓		✓	✓	✓		100:1	SV, DTC or DC	Speed
Web Handling		✓		✓	✓		✓		✓	✓	✓						✓	✓		✓	✓	✓		100:1	SV, DTC or DC	Torque

Water / Waste Water

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Required Drive features / Application	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Long Motor Cable Length	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Speed Range	Motor Control Type	Regulation Type
Auger Conveyor			✓					✓		✓	✓		✓	✓		✓	20:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓		✓	✓	✓		✓	✓		✓					4:1	V/Hz	Speed
Beater Type Mixer								✓			✓					✓	40:1	SV or DTC	Speed
Centrifugal Pumps	✓		✓	✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓	✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓	✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Screw Compressor								✓				✓				✓	10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓	✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed

Drive Features and Performance Explanation

The applications listed on the previous pages generally require specific performance and features from an AC drive. Below are brief explanations of those features.

Feature	Explanation	Choose...
4 Quadrant Line Regeneration	Some applications have significant inertia that ‚overhauls' the motor or layouts that allow gravity to accelerate the load faster than the commanded speed, causing energy to be sent back to the drive. The Line Regeneration feature allows the drive to send that energy back to the incoming line supply.	A 4-Quadrant Drive
Long Accel / Decel	The drive can control the rate of acceleration and deceleration of the motor and load. These features control the amount of time the drive takes to increase or decrease the output during speed control.	A drive with programmable times sufficient for the application.
Selectable / Multiple Accel / Decel Rates	The drive can control multiple independent rates of acceleration and deceleration for the motor and load. These features control the amount of time the drive takes to increase or decrease the output during speed control.	A drive with multiple independent accel / decel times.
Analog I/O	Each application has specific requirements for I/O. Analog I/O is generally used to read process signals and output signals proportional to drive status. Analog I/O is generally Voltage (0-10V) or Current (0(4)-20mA). The type and number required by the application must match the drive.	A drive with sufficient number and type of analog I/O.
Closed Loop	Applications often require a precise measurement of load speed. Typically, an encoder is mounted to the motor shaft and its signal is used to indicate shaft speed. The drive can then adjust its output to the desired condition. Closed loop offers the highest accuracy and performance.	A drive with feedback capability, either as standard or as a plug-in option card.
Common Bus	Applications that involve multiple drives in a coordinated system often benefit from a common bus configuration. Drives are connected via their DC bus rather than the AC line. It allows energy to be shared between drives and reduces the number of components.	A drive that has the DC link terminals available and have been tested for common bus.
Communications	Applications that involve multiple drives or drives controlled by PLC or other supervisory device often require communications via a defined network.	A drive that has a standard or optional connection to the desired network.
Critical Avoidance Frequencies	Some applications have mechanical resonance points that cause the mechanics (shafts, belts, etc.) to oscillate. These oscillations can rapidly cause mechanical failure.	A drive that, through programming, can assure that these critical speeds are ‚skipped' over and avoided.
Digital I/O	Each application has specific requirements for I/O. Digital I/O is generally used to control the drive (Start, Stop, Jog, etc.) and annunciate the drive status.	A drive that offers sufficient I/O and needed flexibility to perform all required functions.
Droop	Specifies the amount of base speed that the speed reference is reduced when at full load torque. Use the droop function to cause the motor speed to decrease when an increase in load occurs.	This function is normally associated with master/follower application. When required, a drive that provides master/follower firmware must be specified.
Dynamic Brake	Applications that require rapid deceleration or quick stops can regenerate energy back to the drive. A dynamic brake dissipates this energy through a resistor as heat.	A drive that has an internal DB chopper and connectable resistor or has an external DB kit.
Dynamic Response	High performance applications often demand nearly instant response to changes in speed or torque commands or input status changes. The higher the dynamic response, the more capable the drive is in meeting these demands.	A drive that meets the response demands.
Fan / Pump Control	Many fan or pump installations have a wide spectrum of flow variations. These include water and sewage systems, process, and other industrial applications. Excellent flow control can be achieved by using a variable speed drive on one fan or pump and using the drive to control other units at fixed speed.	A drive with built-in Fan/Pump Control software.
Function Blocks	Some processes require some basic logic functions (timers, boolean (and/or) logic, etc.) but are too small for a PLC or other logic controller.	A drive with internal function blocks that can be programmed to achieve the timer, etc. requirements.
High Maximum Frequency	Most applications operate at speeds at or below the motor rated speed (typically 1800 RPM (60Hz)) for the US and 1500 RPM (50Hz) elsewhere. Other applications such as high speed grinders and winders need to operate at much higher speeds, sometimes with special motors.	A drive that has a high enough maximum frequency to allow outputs high enough to achieve the needed motor speed.

Drive Features and Performance Explanation

Feature	Explanation	Choose...
Long Motor Cable Length	Motors are rated by the manufacturer for the voltage resistance of the insulation system. If this insulation system voltage is too low, voltage reflection from the drive could cause motor failure. This is particularly important if the motor is a long distance from the drive and if the motor is an older motor being retained for the application.	A drive that has the lowest dv/dt or long cable mode of operation.
Mechanical Brake Control	A mechanical brake is used for holding the motor and driven machinery at zero speed when the drive is stopped or not powered.	A drive with mechanical brake control.
Overload Torque	Applications may require varying degrees of overload capacity for starting, accelerating, or intermittent duty. This overload capacity must be supplied by the drive as current and by the motor as torque.	A drive that has sufficient overload capacity.
PID Loop	An internal function provides closed loop process control with proportional, integral and derivative (PID) control. The PID function reads an analog input to the drive and compares it to a desired setpoint. The PID loop adjusts the drive output frequency (and therefore the process) to make the input value equal the setpoint.	A drive with one or more internal PID loops to eliminate the need for external hardware.
Position Regulation	A feedback device on the motor or machine, typically an encoder or resolver, feeds position information to the drive. The drive compares this information to a desired setpoint and adjusts its output to place the load in the desired position.	A drive that offers this control method when positioning without a separate positioning controller is needed.
Power Loss Ride-Through	Applications that control a continuous process cannot afford to stop because of short power outages or dips. The process must continue to run through these outages, typically 2 to 3 cycles long.	A drive that has sufficient power loss ride-through capability.
Preset Speeds	A drive is typically speed controlled using a potentiometer or analog input device. If specific repeatable speeds are required, parameters can be used to preset operation of the drive at a pre-determined speed using a digital input.	A drive that provides preset speeds.
Reconnect to a Spinning Motor (Flying Start)	Applications with significant inertia and low friction tend to coast when stop commands, power interruptions or fault conditions occur. Many of these application require that when the condition disappears, the load must be reconnected at the ‚coasting' speed / direction and returned to normal operation.	A drive with spinning motor reconnect or ‚flying' start.
Motor Control Type	**Explanation**	**Choose...**
Volts per Hertz (V/Hz)	Applications that do not require significantly more torque than the original motor rating can most often be addressed by a drive using V/Hz algorithms. Loads, such as centrifugal fans and pumps or simple conveyors, are difficult to overload and therefore do not require the performance of other motor control algorithms. Simply maintaining a fixed ratio between drive output voltage and frequency is sufficient.	A drive that offers this motor control method when simple speed control with rated torque is required.
Sensorless Vector (SV)	Sensorless Vector is a motor control method that is often used to maximize torque production in the motor for loads that have significant overload requirements. It is NOT a torque control (regulation) method. This algorithm maintains a constant magnetizing (flux) current from zero to base motor speed. The output voltage is increased proportional to load. Automatic or manual tuning identifies key motor parameters including IR drop and nominal flux current, allowing automatic voltage boost at low speeds proper flux current maintenance.	A drive that offers this motor control method when torque production must be maximized.
Direct Torque Control (DTC)	High-performance applications often require precise torque control at any speed and often in the face of power dips, load changes and other transients. They require excellent dynamic response and World Class torque regulation. This control may have to be exercised without the use of an encoder on the motor.	A drive with ABB's Direct Torque Control (DTC) technology.

Drive Features and Performance Explanation

Regulation Type	Explanation	Choose...
Speed	Applications that depend on accurate speed to accomplish the task require a drive that can control or ‚regulate' speed.	A drive that regulates speed to the needed accuracy. Methods include open loop, slip compensation and encoder feedback.
Torque	Applications that depend on accurate torque to accomplish the task require a drive that can control or ‚regulate' torque. These applications typically control tension or force to produce a high quality product. The motor slip plus magnitude and phase angle of the output current are controlled to produce the commanded torque.	A drive that offers this motor control method when torque control is required.
Slip Compensation	A squirrel-cage motor slips under load. To compensate for this, the frequency can be increased as the motor torque increases.	A drive that provides adjustable slip compensation.
Speed Range	All applications operate over a given speed range, defined as the ratio of maximum continuous speed to minimum continuous speed and is expressed as 10:1, 100:1, etc.	A drive that can produce the needed torque and speed torque regulation (accuracy) over the required speed range.
Torque Proving	Some applications, like cranes, hoists and elevators, use mechanical brakes to hold the motor and driven machinery stationary while the drive is stopped. Prior to the release of this brake, the drive senses adequate current supplied to the motor to prevent dropping the driven machinery when the mechanical brake is released.	A drive that provides torque proving.
Other Factors	**Explanation**	**Choose...**
Altitude	All drives are rated for specific altitudes. Higher elevations may require derating from the standard rating because of thinner air and subsequent loss of cooling.	A drive rating plus derating to match the application.
EMC Filter	Many applications must meet local, national or global noise standards so they do not interfere with other equipment. EMC filters aid in meeting these standards.	A drive that meets the desired standard with either internal or external filters.
Enclosure Rating	The application's environment determines the amount of protection the drive requires. Elements such as dust, moisture, rain and others can damage an improperly selected drive enclosure.	A drive with the needed IP or NEMA rating to protect itself from the environment.
Operating Temperature	The environment in which the drive must operate may have excessive ambient temperature. Foundries, steel plants and other applications can often have operating ambients that exceed the drive rating.	A drive whose standard or derated power rating meets the need, even in the higher ambient temperature.
Programming Interface	The type of user interface in an application often determines the ease of use and accuracy of performance. The clarity of data and ease of programing make the operation better.	A drive with an operating panel that provides ease of use and precise drive status data.

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