AUTOMATIONDIRECT.com

CLICK TO WATCH VIDEOS

AC Drives
Selection Guide

Order Online at AutomationDirect.com
BUY ONLINE
Available in the U.S. and Canada only

Huge Inventory for Fast Shipping

30-day Money-Back Guarantee
30 day

FREE Technical Support
Located in USA

FREE downloadable software
for many products
see website for details

DURA PULSE

weg

IRONHORSE

Up-to-date price list:
www.automationdirect.com/pricelist

FREE Technical Support:
www.automationdirect.com/support

FREE Videos:
www.automationdirect.com/videos

FREE Documentation:
www.automationdirect.com/documentation

FREE CAD drawings:
www.automationdirect.com/cad

For the latest prices, please check AutomationDirect.com.

MICRO AC DRIVES

starting at: $139.00

WEG CFW100

The smallest VFD in the world but still packed with features

Input/Output Voltages hp Range

120VAC 1-Phase/230VAC 0.25 - 0.5 hp

230VAC 1-Phase/230VAC 0.5 - 1 hp

Supported Control Modes

V/Hz

Sensorless vector

Built-in I/O

4 built-on digital inputs

1 built-in relay output

Optional I/O

4expandable to 4 additional digital inputs with optional expansion card

1 additional relay output with optional expansion card

1 analog input possible with optional expansion card

1 analog output possible with optional expansion card

Keypad

4expandable to 4 additional digital inputs with optional expansion card

Communication Supported

Optional Communications

Optional Modbus RTU communications module and USB programming module

Safety Ratings

Environmental Ratings

IP20 enrironmental rating

Additional Features

Built-in PLC

PID Control

Free WPS programming software for drive configuration and monitoring as well as PLC programming

Learn more about the WEG CFW100

starting at: $139.00

WEG CFW300

Still compact yet very powerful with built-in PLC and sensorless vector control

Input/Output Voltages hp Range

120VAC 1-Phase/230VAC 0.25 - 1.5 hp

230VAC 1-Phase/230VAC 0.25 - 3 hp

230VAC/230VAC 0.25 - 5 hp

Supported Control Modes

V/Hz

Sensorless vector

Built-in I/O

4 built-on digital inputs

1 built-in relay output

1 built-in analog input

Optional I/O

Expandable to 4 additional digital inputs with optional expansion card

Expandable to 3 additional relay outputs with optional expansion card

1 analog input possible with optional expansion card

2 analog outputs possible with optional expansion card

Keypad

Expandable to 4 additional digital inputs with optional expansion card

Communication Supported

Optional Communications

Option Modbus RTU communications modules and USB programming module

Safety Ratings

Environmental Ratings

IP20 enrironmental rating

Additional Features

Built-in dynamic braking on frame size B units

PID Control

Free WPS programming software for drive configuration and monitoring as well as PLC programming

Learn more about the WEG CFW300

starting at: $115.00

GS1

When all that is needed is basic V/Hz control and cost is a factor the GS1 is a reliable solution

Input/Output Voltages hp Range

120VAC 1-Phase/230VAC 0.25 - 0.5 hp

230VAC 1-phase/230VAC 0.25 - 1 hp

230VAC/230VAC 0.25 - 2 hp

Supported Control Modes

V/Hz

Built-in I/O

4 digital inputs

1 relay output

1 analog input

Optional I/O

Keypad

Communication Supported

Modbus RTU over RS485

Optional Communications

Direct ethernet to Productivity controllers or Modbus TCP using EDRV100

Safety Ratings

Environmental Ratings

IP20 enrironmental rating

Additional Features

Free GSOFT drive configuration and monitoring software

Learn more about the GS1

GENERAL PURPOSE AC DRIVES

starting at: $135.00

DURAPulse GS20

General purpose AC VFD that includes many features only found on more expensive and high-performance drives

Input/Output Voltages hp Range

120VAC 1-Phase/230VAC 0.25 - 1 hp

230VAC 1-phase/230VAC 0.25 - 3 hp

230VAC/230VAC 0.25 - 20 hp

460VAC/460VAC 0.5 - 30 hp

575VAC/575VAC 1 - 10 hp

Supported Control Modes

V/Hz

Sensorless vector

Field Oriented Control (FOC)

Torque control

Built-in I/O

7 digital inputs

3 digital outputs, 1 relay output

2 analog inputs

1 analog output

Optional I/O

Keypad

Removable and remote mountable keypad

Communication Supported

Modbus RTU over RS485

Optional Communications

EtherNet/IP and Modbus TCP with option card

Safety Ratings

Safe Torque Off (STO) SIL2

Environmental Ratings

IP20 rating, optional conduit box to rate assembly for NEMA 1

Additional Features

Built-in dynamic braking

Bulit-in PLC 2k steps

PID Control

Free GSOFT2 for configuration and GSLogic for PLC programming

Learn more about the GS20

starting at: $261.00

DURAPulse GS3

General purpose VFD with horsepower ratings up to 100 hp

Input/Output Voltages hp Range

230VAC 1-phase/230VAC 1 - 3 hp

230VAC/230VAC 1 - 50 hp

460VAC/460VAC 1 - 100 hp

Supported Control Modes

V/Hz

Sensorless vector

Sensorless vector with encoder

Built-in I/O

11 digital inputs

3 digital outputs, 1 relay output

Optional I/O

Keypad

Removable and remote mountable keypad.

Communication Supported

Modbus RTU over RS485

Optional Communications

Direct ethernet to Productivity controllers or Modbus TCP using EDRV100

Safety Ratings

Environmental Ratings

IP20 enrironmental rating

Additional Features

Built-in dynamic braking in lower hp ranges. Supported with external unit(s) in higher horespowers

PID Control

Free GSOFT drive configuration and monitoring software

Learn more about the GS3

HIGH PERFORMANCE AC DRIVES

starting at: $457.00

DURAPulse GS4

High-performance VFD loaded with all of the features you need. Available in horsepower ratings up to 300 hp

Input/Output Voltages hp Range

230VAC 1-phase/230VAC 1 - 25 hp

230VAC/230VAC 1 - 100 hp

460VAC/460VAC 1 - 300 hp

Supported Control Modes

V/Hz

Sensorless vector

Built-in I/O

8 digital inputs

2 digital outputs, 2 relay output

3 analog input channels

2 analog output channels

Optional I/O

Expandable to 6 additional digital inputs with optional expansion car

Expandable to 6 additional relay outputs or 2 digital outputs with optional expansion card

Keypad

Removable and remote mountable keypad.

Communication Supported

Modbus RTU and BACnet

Optional Communications

EtherNet/IP and Modbus TCP with option card

Safety Ratings

Safe Torque Off (STO) SIL2

Environmental Ratings

Open and IP20 models available

Additional Features

Built-in dynamic braking in lower hp ranges. Supported with external unit(s) in higher horespowers

Bulit-in PLC 10k rungs

PID Control

Free GSOFT2 for configuration and GSLogic for PLC programming

Learn more about the GS4

NEMA 4X RATED AC DRIVES

starting at: $216.00

DURAPulse GS20X

Washdown rated general purpose VFD loaded with the same features as the GS20 but able to handle the toughest environments

Input/Output Voltages hp Range

230VAC 1-phase/230VAC 0.5 - 3 hp

230VAC/230VAC 0.5 - 7.5 hp

460VAC/460VAC 0.5 - 10 hp

Supported Control Modes

V/Hz

Sensorless vector

Field Oriented Control (FOC)

Torque control

Built-in I/O

7 digital inputs

3 digital outputs, 1 relay output

2 analog inputs

1 analog output

Optional I/O

Keypad

Non-removable keypad. Optional advanced keypad can be remotely mounted

Communication Supported

Modbus RTU over RS485

Optional Communications

EtherNet/IP and Modbus TCP with option card

Safety Ratings

Safe Torque Off (STO) SIL2

Environmental Ratings

NEMA 4X/IP66 environmental rating

Additional Features

Built-in dynamic braking

Bulit-in PLC 2k steps

PID Control

Free GSOFT2 for configuration and GSLogic for PLC programming

Learn more about the GS20X

starting at: $189.00

IronHorse ACN

Washdown rated general purpose VFD built to handle harsh installations. Available in horsepower ratings up to 30 hp

Input/Output Voltages hp Range

230VAC 1-phase/230VAC 0.5 - 3 hp

230VAC/230VAC 0.5 - 20 hp

460VAC 1-phase/460VAC 1/6 - 15 hp

460VAC/460VAC 0.5 - 30 hp

Supported Control Modes

V/Hz

Sensorless vector

Slip compensation

Torque control

Built-in I/O

5 digital inputs

1 digital output, 1 relay output

2 analog inputs

1 analog output

Optional I/O

expandable to 3 additional digital inputs with optional expansion card

2 additional relay outputs with optional expansion card

2 additional analog inputs possible with optional expansion card

1 additional analog output possible with optional expansion card

Keypad

Non-removable keypad. Optional advanced keypad can be remotely mounted

Communication Supported

Modbus RTU over RS485

Optional Communications

EtherNet/IP and Modbus TCP with option card

Safety Ratings

Safe Torque Off (STO) SIL2

Environmental Ratings

NEMA 4X/IP66 environmental rating

Additional Features

Built-in dynamic braking

Built-in function block sequence controller, 18 steps max

PID control with sleep and wake

Free VFD Suite for configuration, programming and monitoring

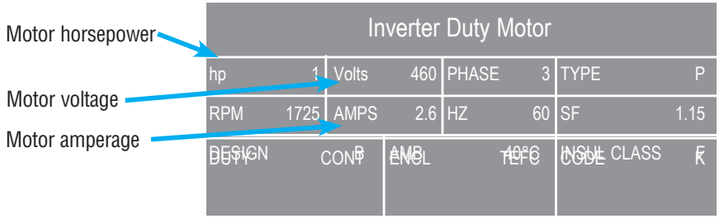
Learn more about the ACN and ACNND

3 Steps to Selecting the Right AC Drive

STEP 1 - Select The Right AC Drive Series

A. Determine motor voltage, horsepower and full-load amperage

Check the nameplate on the motor for specs needed:



Motor voltage, horsepower, and amperage can be found on the motor's nameplate.

Note: Most motors can be connected for multiple voltages and will have multiple amperages listed.

In the example to the left the motor can be connected for 460V only. The 460V amperage is 2.6.

B. Select your control mode

Choose the control mode that fits your application and corresponds to the performance chart below. Variable torque applications such as fans and pumps work fine with V/Hz control mode as do most general purpose constant torque applications such as conveyors that aren't going much slower than base speed. Applications that require 100% or close to 100% torque through their speed range should use sensorless vector or FOC modes. Torque control mode is used when the motor torque will be controlled as opposed to speed.

	Control Mode			
	Volts/Hertz	**Sensorless Vector**	**Encoder Feedback**	**Field Oriented**
Complexity	Low	Moderate	Complex	Moderate
Performance	Good	Good	High	High
Starting Torque	150%	200%	200%	200%
Speed Regulation	+/- 2%	+/- 1%	+/- 0.2%	0.5%

Larger systems require external braking units

For the latest prices, please check AutomationDirect.com.

C. Determine the I/O requirements of the AC drive

Digital inputs are used to interface the AC drive with devices such as pushbuttons, selector switches and PLC digital output modules, either DC or relay. These signals are typically used for functions such as Start/Stop, Forward/Reverse, External Fault, Preset Speed selection, Fault Reset, etc.

Digital outputs are typically used to connect the AC drive to devices such as pilot lights, alarms, auxiliary relays, solenoids, and PLC digital input modules. Relay outputs are rated for both AC and DC voltages. Transistor outputs are rated for only DC voltages.

The analog input is used to interface the AC drive with an external 0-10 VDC or 4-20 mA signal. This signal can represent either a speed setpoint or if available, PID feedback.

D. Determine location of AC drive's keypad

If the AC drive is installed in a location that the operator cannot easily access, its keypad could be relocated to a more suitable location. Remote mounting may require the purchase of the appropriate cable or other accessories. Note from chart on previous pages that some drive series support remote keypad with various installation options.

E. Determine communications requirements

A communication interface can be used to connect the AC drive to other devices. The device can control the AC drive with this interface instead of using the digital and analog I/O. The device can also use this interface to monitor the status of various AC drive parameters, speed, current, fault status, etc.

Most AC drives have a standard Modbus RS-485 interface. As noted in the chart on the previous page many newer drives also have the optional capability to communicate over Ethernet. The *DURA*pulse GS4 drive also has the BACnet protocol built-in. Drives that can communicate over Ethernet support either Modbus TCP or EtherNet/IP, sometimes both.

F. Determine Enclosure Requirements

As noted in the selection chart there are options for the drive's enclsoure. Most are an IP20 finger safe enclosure intended to be mounted n an enclosure or drive room. Some are an open style while there are NEMA 4X models available that are machine mountable and rated for washdown environments.

G. Select the proper series

Once you have gathered your motor information, your application informationad determined your control mode, Noted your I/O count, communications requirements and enclosure enivronmental ratings you can use the chart of the previous page to narrow down which series will work for you. After you have selected the AC drive series that meets your requirements, you need to determine the correct rating. Proceed to Step two.

STEP 2 - Select the Proper Rating

STEP 1 | STEP 2 HERE | STEP 3

A. Determine motor full load amperage (FLA)

Motor FLA is located on the nameplate of the motor.
Note: FLA of motors that have been rewound may be higher than stated.

B. Determine overload requirements

Many applications experience temporary overload conditions due to starting requirements or impact loading. Most AC drives are designed to operate at 150% overload for 60 seconds. If the application requires an overload greater than 150% or longer than 60 seconds, the AC drive must be oversized. *NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.*

C. Installation altitude

AC drives rely upon the cooling properties of air for cooling. As the altitude increases, the air becomes less dense. This decrease in air density decreases the cooling properties of the air. Therefore, the AC drive must be oversized to compensate for the decrease in cooling. Most AC drives are designed to operate at 100% capacity up to altitudes of 1000 m. Above 1000 m, the AC drive must be derated.

D. Determine max enclosure internal temp

AC drives generate a significant amount of heat and will cause the internal temperature of an enclosure to exceed the rating of the AC drive. Enclosure ventilation and/or cooling may be required. Ambient temperature measurements/calculations should be made for the maximum expected temperature.

E. Calculate required output amperage

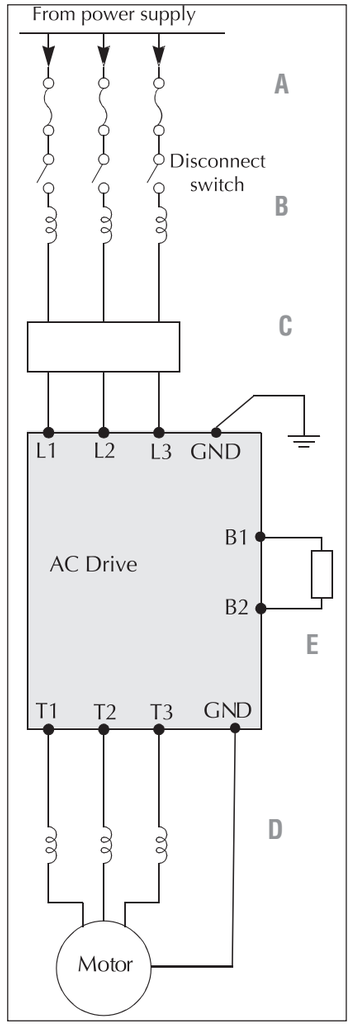
Use the chart below to calculate the required FLA of the AC drive. Select the rating that equals the motor's voltage and equals or exceeds the calculated amperage.

		Ex. 1	Ex. 2	Ex. 3	Ex. 4
Example 1: Motor FLA=4, Overload=200%@45 secs, Altitude=800m, MEIT=45° C, **GS1**			WEG	DURAPULSE	
Example 2: Motor FLA=6, Overload=120%@80 secs, Altitude=326m, MEIT=45° C, **CFW300**				GS20 zero-stack/	GS20 open style/
Example 3: Motor FLA=8, Overload=135%@75 secs, Altitude=1100m, MEIT=35° C, **GS3**		*GS1*	*CFW300/100*	*GS20X/GS3*	*GS4*
Example 4: Motor FLA=12, Overload=145%@45 secs, Altitude=800m, MEIT=55° C, **GS4 Open Type***	**ENTER Motor FLA**	**4**	**6**	**8**	**12**
Overload Derate (overload %)	If *Overload is less than 150% and less than 60 seconds,* Then **ENTER 1**				
	If *Overload is greater than 150% and less than 60 seconds,* Then **ENTER (overload/150%)**	**1.33**	**1.333**		**1**
	If *Overload is greater than 60 seconds,* Then **ENTER (overload/100%)**		**1.20**	**1.35**	
	Multiply FLA x overload entry (This entry is the overload result)	**5.32**	**7**	**10.8**	**12**
Altitude Derate (meters)	If *Altitude is less than 1000m* Then **ENTER 1**	**1**	**1**	**1**	**1**
	If *Altitude is more than 1000m and less than 3000m* Then **ENTER 1+ ((altitude -1000) x 0.0001)**			**1.01**	
	Multiply overload result x altitude entry (This entry is the altitude result)	**5.32**	**7**	**10.91**	**12**
Ambient Temperature (°Celsius)	If *Max enclosure internal temperature (MEIT) is less than 40° C* Then **ENTER 1**			**1**	
	If *40° C < MEIT< 50° C and CFW300 or GS4 Open Type** Then **ENTER 1**		**1**		
	If *40° C < MEIT< 50° C and GS1 up to 2 hp* Then **ENTER 1**	**1**			
	If *40° C < MEIT< 50° C and GS20 zero-stack, GS20X or GS3* Then **ENTER 1.2**				
	If *40° C < MEIT< 50° C and GS4 Type 1* Then **ENTER 1 + ((MEIT - 40) x 0.2)**				
	IF *50° C < MEIT< 60° C and GS20 opebn style or GS4 Open Type** Then **ENTER 1 + ((MEIT - 50) x 0.2)**				**1.08**
	Multiply altitude result x MEIT entry (This result is the required drive FLA)	**5.32**	**7**	**10.91**	**12.96**

*Open Type temperature ratings apply to GS4 frame sizes A–C with top covers removed, and frame sizes D–G without conduit boxes.

STEP 1 | STEP 2 | STEP 3 HERE

STEP 3 - Options, Options, and more Options



A. Input fuses

Input fuses protect the AC drive from excessive input current due to line surges, short circuits, and ground faults. They are recommended for all installations and may be required for UL-listed installations. Input fuse kits and replacement fuses are available for IronHorse ACN/ACNND, GS series and ***DURAPULSE*** AC drives.

B. Input line reactor

Input line reactors protect the AC drive from transient overvoltage conditions, typically caused by utility capacitor switching. The input line reactor also reduces the harmonics associated with AC drives. Input line reactors are recommended for all installations.

C. Input EMI filter

Input EMI filters reduce electromagnetic interference or noise on the input side of the inverter. They are required for CE compliance and recommended for installations prone to or sensitive to electromagnetic interference.

D. Output line reactor

Output line reactors protect the motor insulation against drive short circuits and IGBT reflective wave damage. Output line reactors also "smooth" the motor current waveform, allowing the motor to run cooler. The line reactor can be used for either input or output applications.

Output line reactors are recommended for operating "noninverter-duty" motors and when the length of wiring between the AC drive and motor is longer than the recommended max length of a given motor model. Inverter-duty rated motors support longer lead length than do non-inverter duty motors.

E. Dynamic braking

Dynamic braking allows the AC drive to produce additional braking (stopping) torque. AC drives can typically produce between 15% and 20% braking torque without the addition of any external components. The GS3 AC drives have built-in braking circuits on all units below 15 hp, the IronHorse ACN/ACNND, GS20, GS20X and GS4 drives have built-in braking on units up to 30 hp (up to 40 hp for 480VAC models). These drives usually require the addition of a braking resistor to increase their braking torque capability. Larger drives require separate braking units in addition to the braking resistors to increase their braking torque capability. Dynamic braking may be required for applications requiring rapid deceleration or high inertia loads.

Now's the time.

Don't put off until tomorrow what you can buy direct today.


Programmable Controllers


Universal Field I/O

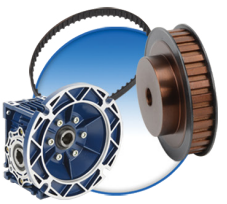

Software


Operator Interface


AC Drives

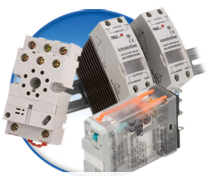

Motors and Motor Controls


Motion Control


Power Transmission

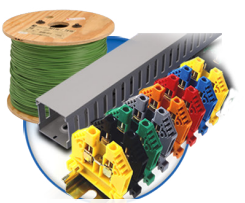

Pneumatics


Process


Relays & Timers


Sensors


Pushbuttons, Switches and Lights


Terminal Blocks & Wire


Safety

For over 25 years we've been saving our customers time and money on industrial automation products including PLCs and HMIs, pneumatics, sensors and even wire. We have a huge inventory that is constantly growing in order to provide you with the quality components you need to keep your projects moving. We have also invested heavily in new infrastructure that will allow us to continue offering the service and support you deserve. So don't put that project off any longer...buy direct today and save with AutomationDirect!