

# NEMA 4X AC Drives



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# NEMA 4X AC Drives

When you need a washdown rated AC drive without paying a high price.

*AutomationDirect's IronHorse ACN, DURApulse GS20X and WEG CFW500 IP66 AC drives are feature-rich drives in a washdown rated enclosure.*

AutomationDirect now offers two general purpose NEMA 4X VFDs in the DURApulse GS20X and IronHorse ACN series, as well as a high-performance NEMA 4X VFD in the WEG CFW500 series.

At AutomationDirect it is important to us that we provide high-quality products, at the best price possible and that we have them in stock and ready to ship to you. We also want to make sure that we provide a great selection of products as well as several choices when it comes to sizing and functionality.

In addition to getting a high-quality drive loaded with features in a NEMA 4X rated enclosure, you also get a lot more when you buy drives from AutomationDirect.



## Why would I need an AC drive?

- Reduce start up current - controlling the inrush current at motor start-up allows the use of smaller fuses, and reduces electrical peak load
- Reduce mechanical stress - controlled/smooth starting and stopping minimize mechanical shock and wear and tear on the system
- Power Factor - Motors have very poor power factors (especially at light loading). Drives significantly increase power factor (even at light loading) and can eliminate the need for power factor correction capacitors and/or utility power factor charges
- Variable Speed and integrated functionality - AC drives can vary motor speed and direction by operator input (keypad buttons/speed control knob) or by digital and analog inputs (from pushbuttons/switches/pots or PLC outputs) or by communication from a PLC or master controller. Basic machine control can be performed in the drive on some models (limit switches/sensors can be wired to the drive's inputs to control motor speed or direction).

## What are the benefits of a NEMA 4X rated enclosure?

The NEMA 4X environmental rating is given to enclosures and in this case, specifically drive enclosures that are washdown duty and built to withstand a harsh environment. Food and beverage processing and water treatment facilities (both indoors and outdoors) are examples of harsh environments where the equipment will be subject to repeated high-pressure washdowns daily. The NEMA 4X enclosure also allows you to mount the VFD directly to a machine and outside of an electrical panel. This can eliminate long runs of expensive VDF cable for motor wiring, reduce the need for external VFD output filters and in some cases simply provide a convenient, self-contained motor control at the machine or conveyor with an optional OSHA certified lock-out/tag-out disconnect.



Food and beverage processing, such as this bottling line are great applications to use NEMA 4X drive as they require regular washdowns



Water and wastewater applications can be indoors and outdoors so are exposed to wet environments and often direct sunlight



Machine Mounted VFD

## Why buy drives from us?

There are several distinct advantages to purchasing a drive from AutomationDirect:



### Price

As with all of our product lines, our prices are often well below the list prices of traditional automation suppliers. Our direct business model allows us to operate more efficiently than other suppliers and pass the savings on to you.



### Quality

All of the AC drives we sell have a 1 or 2-year warranty and a 30-day moneyback guarantee. If for any reason you are not satisfied with your purchase, send it back and we will refund your money.



### Service

We give you options for self-service but at the same time, we are there when you need us. You can place your order online or call our customer service. Have a technical question about one of our products or need help gathering up a bill of materials for one of your projects? You can call our Free Technical Support.

**Not sure that this is the right AC Drive series you need?** [Click for a complete selection guide](#)



# IronHorse® ACN Series NEMA 4X AC Drives

The ACN (with disconnect) and ACNND (without disconnect) series of NEMA 4X sensorless vector AC drives bridge the gap between a micro drive and high-performance VFD. The ACN series AC drives have features normally only found on more expensive drives but in a NEMA 4X enclosure and at a great price.

Internal cooling fans on all models. Additional external forced fans on larger frame sizes

Built-in keypad with display. Remote advanced keypad is optional.

Built-in disconnect

Built-in dynamic braking circuitry supporting 150% braking torque at a 5% duty cycle. No need for an external braking unit.

Safe Torque Off (STO) provides an additional level of safety EN 61508 SIL2

Rugged NEMA 4X enclosure protects internal electronics from the elements as well as high-pressure washdowns.

QR Code for remote access to product details (online)



RJ45 connection for built-in Modbus RTU communications. (Optional Ethernet module for Modbus TCP and EtherNet/IP support)

Spacious power wiring terminals

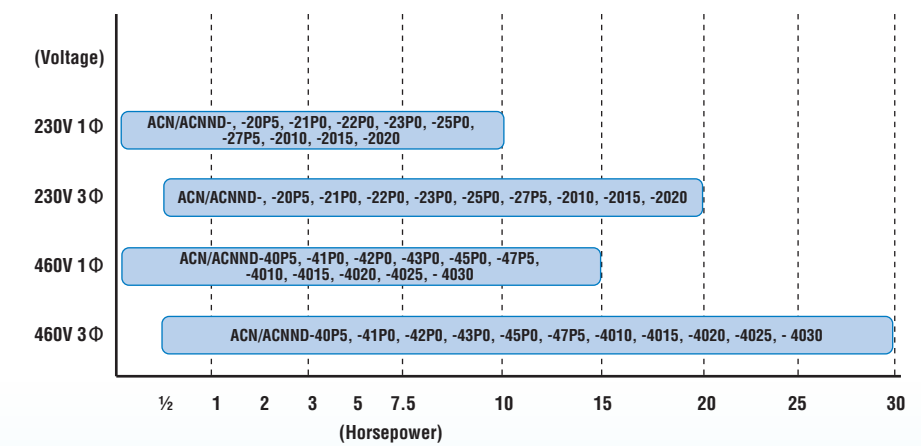
Screw terminals for reliable wiring termination.



	230V 1-ph	230V 3-ph	460V 1-ph	460V 3-ph
Frame 1 - HP	1/2	1/2, 1	1/2	1/2, 1
Frame 2 - HP	1, 1-1/2, 2	2, 3, 5	3/4, 1, 2	2, 3, 5
Frame 3 - HP	3, 5	7.5, 10	3, 5	7.5, 10
Frame 4 - HP	7.5	15	7.5, 10	15, 20
Frame 5 - HP	10	20	10, 15	25, 30
Part #s	ACN/ACNND-2	ACN/ACNND-2	ACN/ACNND-4	ACN/ACNND-4

**ACN(ND)-47P5**

- Motor HP: 0P5: 0.5hp, 1P0: 1.0hp, 2P0: 2.0hp, 3P0: 3.0hp, 5P0: 5.0hp, 7P5: 7.5hp, 010: 10hp, 015: 15hp, 020: 20hp, 025: 25hp, 030: 30hp
- Input Volts: 2: 230VAC, 4: 460VAC
- Model Line: blank: With built-in disconnect, ND: no disconnect
- Series Name: ACN\_ = AC Drive NEMA 4X



## Optional Keypad Accessories

In addition to the built-in keypad, the ACN series drives offer the ACN-LCD, an optional, advanced function display. This supports additional monitoring and status display on a single screen, plus simplified parameter navigation.



## Option Cards

Option cards can be used to expand the available hardwired I/O on an ACN series drive or add Ethernet communications. The ACN-EIO adds 2 analog input channels, 1 analog output channel, 3 discrete input points and 2 relay output points. The ACN-ETH adds Ethernet communications support which allows the drive to communicate using EtherNet/IP or Modbus TCP protocols.



**Not sure that this is the right AC Drive series you need?**  
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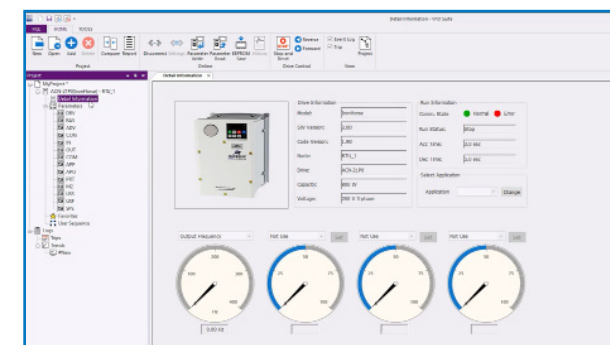
## Additional ACN Series Features

These are just some of the features for the ACN series drives. You will be hard-pressed to find a drive for the same price with all of the features it supports.

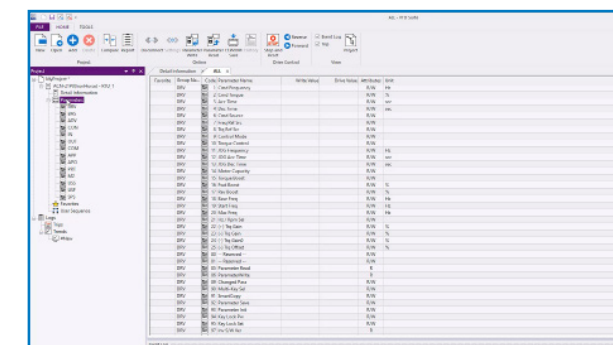
- Broad offering from 1/2 to 30 hp NEMA 4X
- 230VAC: three-phase up to 20Hp, single phase up to 10hp
- 460VAC: three-phase up to 30HP, single-phase up to 15hp
- Single-phase UL Ratings – 230 or 460 VAC input
- Supports several different control modes including V/Hz, slip compensation, sensorless vector and torque control
- Can be used with AC induction motors or permanent magnet AC motors (PMAC)
- Lockable, integrated disconnect or no disconnect models
- Constant Torque (Heavy Duty) ratings only
- Flexible carrier frequency to 15khz
- Output frequency to 400Hz (120Hz sensorless vector)
- STO – Safe Torque Off (SIL2)
- Built-in user sequence programming of 18 steps
- Built-in RJ45 port for fast & easy programming
- Free downloadable software for drive configuration
- Optional LCD text-based advanced keypad can be remotely mounted with IP66 case
- Local/Remote control mode selection or digital/comm input with Hand/Off/Auto control
- Momentary power loss restarts
- PCB conformal coating
- 100kA Short Circuit Current Rating
- DC Bus Connection Terminals
- Analog I/O – configurable 2 Inputs and 1 output
- 2-Motor Control
- Built-in Dynamic Braking
- PID Controller – including sleep and wake
- Password protection
- RTD and/or PTC input motor protection
- High speed communication interfaces with MODBUS RTU built-in, with optional EtherNet/IP and Modbus TCP Communication Card
- Fire Mode – Run fire mode during emergencies to have uninterrupted smoke removal and system pressure
- 18-month warranty
- CE, TÜV Nord, UL, cUL

## ACN Series Programming

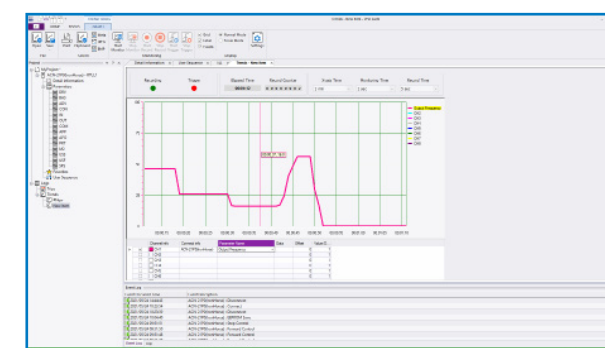
The ACN series VFDs support creating new drive configurations, upload/download new drive configurations, edit/compare drive configurations and more using VFD Suite (available as a free download). The software is also available on a USB card if needed. VFD Suite also includes the ACN manual for complete instructions and parameter explanations.



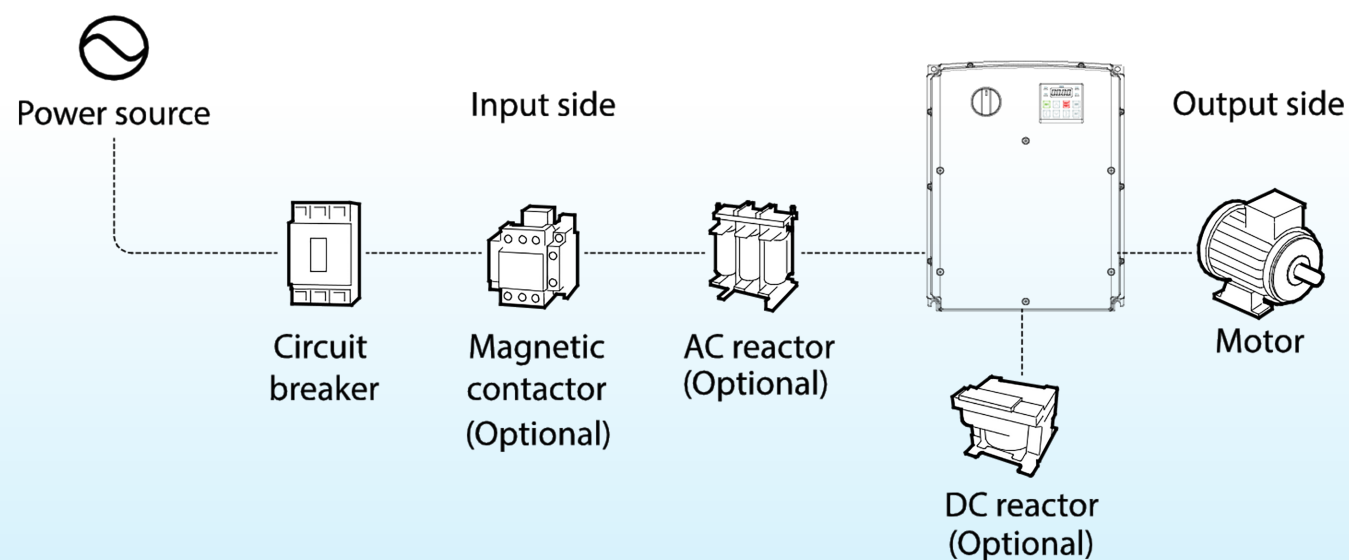
VFD Suite allows you to see everything there is to know about the connected drive



See all parameters available in the connected ACN series drive

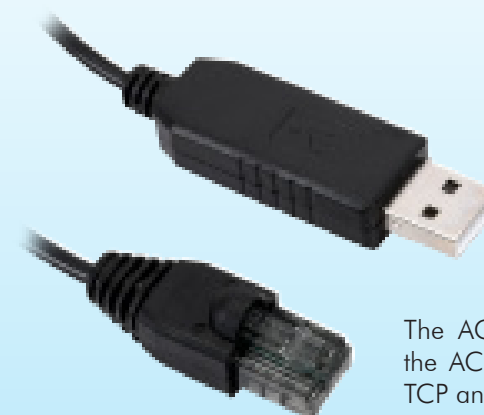


VFD Suite supports advanced functionality such as trending and programming of the built-in sequence controller



## Additional Features of VFD Suite

- Utilize Parameter Wizard for easy configuration
- Archive/Store multiple drive configurations on your PC
- Trend drive operation parameters
- Tune the drive PID loop
- View real-time key operating parameters
- Start/Stop drive and switch directions, provided drive is set up for remote operation
- View drive faults
- Program Function blocks for simple control applications (18 steps maximum)



The ACN-232C allows for a quick and simple connection for programming the ACN series drives. Programming the drives is also supported over Modbus TCP and EtherNet/IP if an ACN-ETH is installed.

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# DURAPULSE® GS20X AC Drives

## DURA IIIIPULSE GS20X

### DURAPULSE GS20X NEMA 4X AC Drives

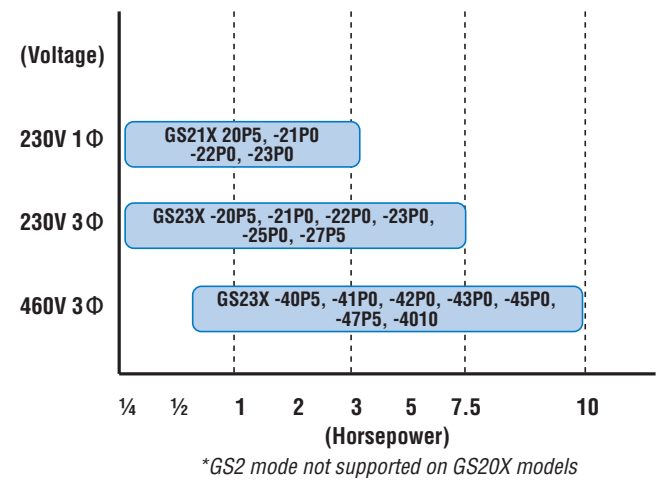
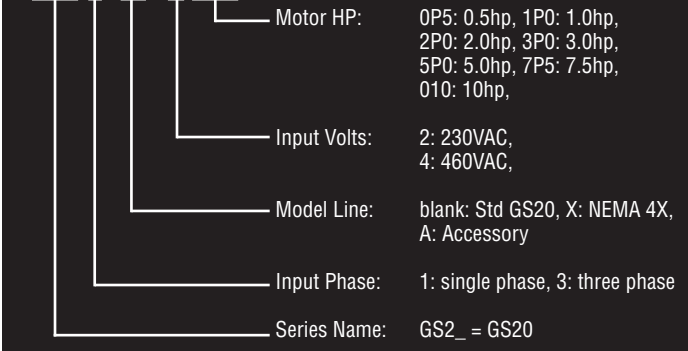
The DURApulse GS20X series line of NEMA 4X sensorless vector AC drives delivers all of the features and performance of the GS20 drive\* including PID, sensorless vector and field oriented control modes but adds a washdown rating up to 10hp. The GS20X comes in a NEMA 4X/IP66 enclosure to withstand the rigors of extreme environments. The GS20X also offers an optional NEMA 4X disconnect to make installation simple.



	230V 1-ph	230V 3-ph	460V 3-ph
Frame A - HP	½, 1, 2	½, 1, 2	½, 1, 2, 3
Frame B - HP	3	3, 5	5
Frame C - HP		7.5	7.5, 10
Part #s	GS21X	GS23X	GS23X

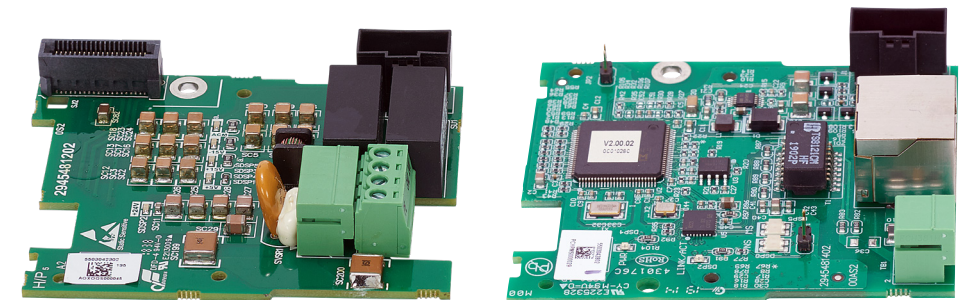


### GS23(X)-47P5



### Option Cards

Option cards are available for the GS20X to add features like Ethernet communications over Ethernet/IP and Modbus TCP or add a backup to the built-in 24VDC power supply.



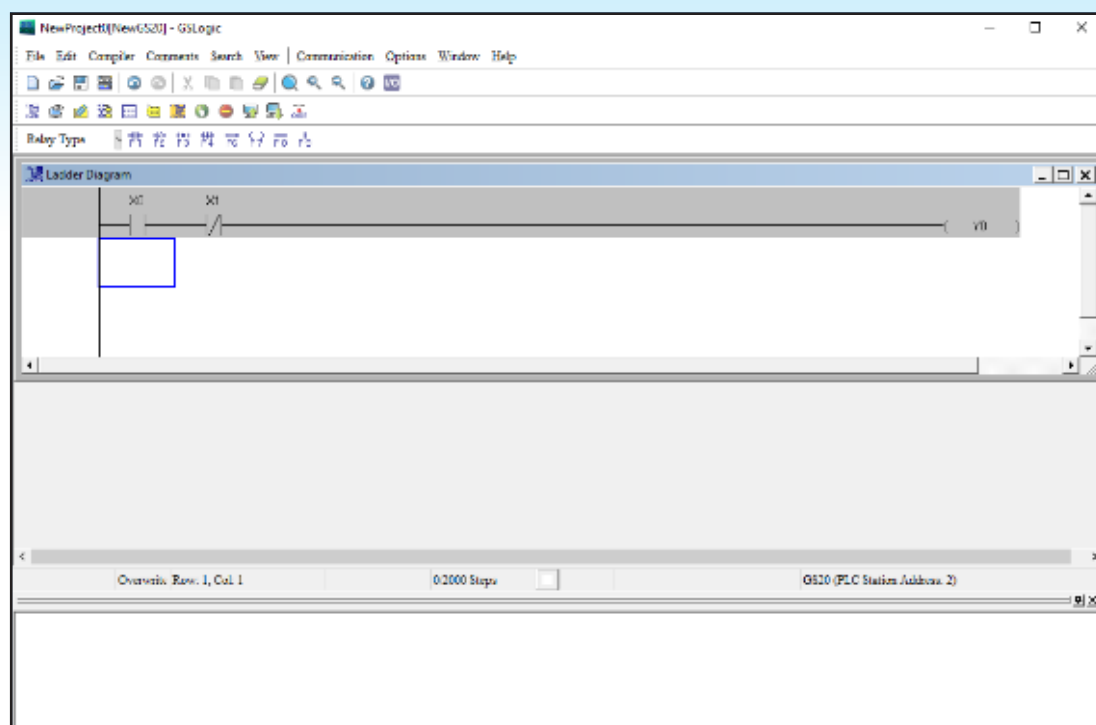
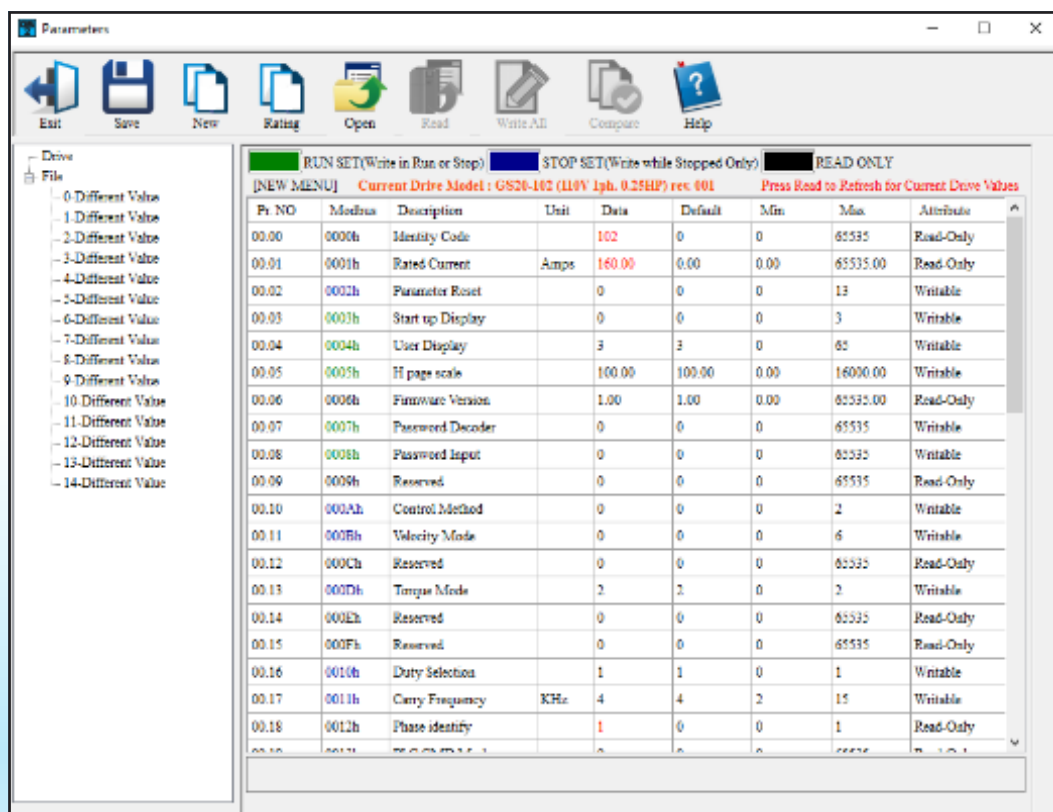
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## GS20X Programming

The GS20X VFDs support parameter configuration, setup and troubleshooting via the GSOFT2 software. In addition to this, the GS20X has a built-in PLC that is programmed with GSLOGIC software.

GSOFT2 – for parameter configuration, setup, troubleshooting & FW upgrade



GSLOGIC – for the built-in PLC ladder program

## GS20X Control Modes

The GS20X supports three different control modes offering various levels of torque output control at different speed ranges. Also available is torque control mode that allows the drive to control the level of torque as opposed to speed. Torque control mode is a feature usually only found on higher cost drives.

		V/F Mode (+encoder)	SVC Mode	FOC Mode
Induction Motor (IM)	Torque	150% @ 3Hz	150% @ 3Hz	200% @ 0.5Hz
	Accuracy	1:50 speed control	1:50 speed control	1:100 speed control
Permanent Magnet (PM)	Torque	NA	100% @ 1/20 rated Hz	NA
	Accuracy		1:20 speed control	

## GS20X Additional Features

These are just some of the features that the GS20X has. You will be hard-pressed to find a drive for the same price with all of the features it supports. In addition to what was mentioned the GS20X also supports.

- V/Hz Control, Sensorless Vector Control, Field Oriented Control
- Torque Control Mode
- Maximum frequency 0-599Hz
- Multiple motor support, supports up to 4 induction motor switching control from a single VFD
- Built-in braking chopper
- DEB, deceleration energy backup, controls motor deceleration during power loss
- 100kA short circuit current rating
- STO – Safe Torque Off
- 100% Conformal coating (IEC 60721-3-3 class 3C2) on PCBs provides moisture, corrosion & dustproof in critical environments
- Built-in PLC (up to 2,000 steps)
- USB programming
- Built-in RS485 communications (Modbus RTU)
- Optional Ethernet communications Modbus TCP and Ethernet/IP
- Generous built-in I/O
- Analog inputs +/- 10VDC, 0-10VDC, 0-20mA/4-20mA
- 7 Digital inputs, 2 relay outputs
- Pulse in/out 33KHz pulse input & output
- Compact size
- One-year warranty
- UL, CE listed

## GS Drive Accessories

- Line reactors
- VTF output filters
- High speed Class J fuses and fuse holders
- Dynamic braking resistors and DBUs
- EMI and RFI filters
- Replacement cooling fans



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# WEG CFW500 IP66/NEMA 4X AC Drives

The WEG CFW500 Wash series is a redesign of the most successful high performance CFW500 series product line. The CFW500 washdown version is one of the most compact and full-featured washdown drives on the market. One of the key "new" advantages of the redesigned CFW500 NEMA 4X is the outdoor rated keypad. (most keypads on NEMA 4X VFDs are NOT outdoor rated)

The new version with IP66/NEMA 4X protection rating increases the product robustness, ensuring protection against the ingress of dust and water jets from any direction, which allows its use and installation both indoors and outdoors.



Cooling fans on all models

Built-in keypad with display. Standard and advanced with fill text remote keypads are optionally available.

Rugged NEMA 4X enclosure protects internal electronics from the elements as well as high-pressure washdowns.

Built-in disconnect with lock out tag out provisions and do not require an additional external disconnect. (non-disconnect models available)

Built-in dynamic braking chopper. No need for an external braking unit.

QR Code for remote access to product details (online)



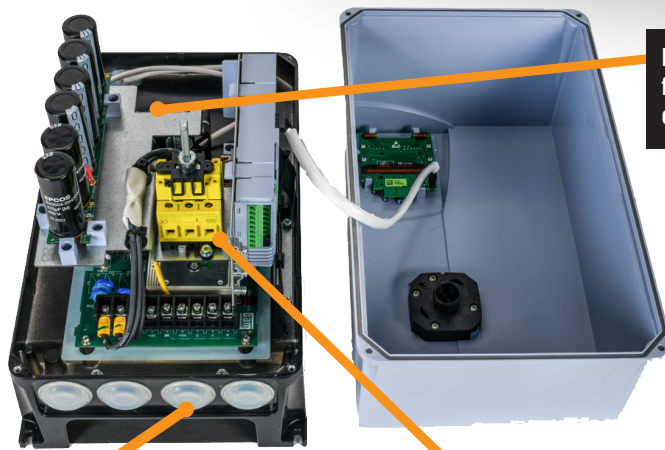
IP66/NEMA 4X enclosure provides protection from the elements yet is spacious to allow for ease of wiring and maintenance of components

## NEMA 4X Applications

- Pumps
- Fans
- Blowers
- Conveyors
- Rollout tables
- Agitators
- Mixers
- Any washdown application requiring a high-performance VFD or closed-loop vector control

Sealed conduit knockouts for a secure connection

integrate disconnect switch shuts power off to internal electronics for safe servicing



	230V 1-ph	230V 3-ph	460V 3-ph
Frame A - HP	¼, ½, 1, 2, 3	¼, ½, 1, 2, 3, 5	1/3, ½, 1, 2, 3, 5
Frame B - HP	1	7.5, 10	10, 15, 20

## Optional Accessories



## Embedded Safety Functions

Many optional modules are available to enhance the performance of the CFW500 VFDs. The CFW500-SFY2 is used to reduce risk and to guarantee the safety of personnel if there is a hazardous event due to a fault in operating machines. The embedded safety functions STO and SS1 provide machine builders a cost-effective solution to design protective measures and reduce the risk from unexpected and hazardous movement in industrial machines and processes.

- Safety functions integrated in the CFW500 drive, making it easier to comply with the machine and application safety requirements
- Fewer components, no need for additional wiring, saving space and installation costs
- Easier installation, commissioning and maintenance
- No electromechanical components, meaning faster responses and a higher degree of productivity
- Due to the high safety performance level SIL3, the CFW500 with Safety module may avoid the use of external safety relays for cables and emergency pushbuttons monitoring

## CFW500(A/B)02P6B2DB66DSG2

Options:

- DB: Dynamic Brake
- 66: NEMA4X/IP66
- DS: With Disconnect Switch (Blank, no disconnect switch)
- G2: Generation-2

Supply Voltage: 2: 200-240VAC, 4: 380-480VAC

Supply Phases: B: 1 or 3 Phase, T: Three Phase

Rated Current: 01P0: 1.0 Amps, 01P6: 1.6 Amps, 02P6: 2.6 Amps, 04P3: 4.3 Amps, 06P5: 6.5 Amps, 07P3: 7.3 Amps, 10P0: 10 Amps, 14P0: 14.0 Amps, 16P0: 16 Amps, 24P0: 24 Amps, 28P0: 28 Amps, 31P0: 31 Amps

Frame: A, B

## Other Optional Modules

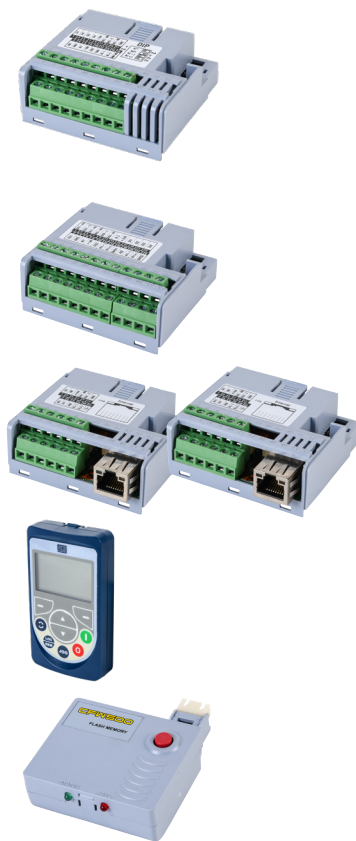
I/O plug-in modules such as the CFW500-IOS, CFW500-IOD, CFW500-IOAD, CFW500-IOR-B and CFW500-ENC allow for additional I/O to be expanded or an encoder to be used with the VFD.

Communications modules such as the CFW500-CUSB, CFW500-CRS232 and CFW500-CRS485-B expand serial communication functionalities.

While ethernet communications modules such as the CFW500-CETH-IP and CFW500-CEMB-TCP allow the drive to communicate over the Ethernet protocols EtherNet/IP and Modbus TCP, respectively.

The advanced remote keypad HMI-01 is a text keypad and a basic, non-text keypad, the CFW500-HMIR is also available. As well as connection cables and a mounting frame for these optional keypads.

The CFW500-MMF flash memory module allows the download and upload of all VFD settings with the need to power the drive up or connect using the software.



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## Additional CFW500 IP66/NEMA 4X Features

The IP66 models of the CFW500 line have the following features:

- Broad offering from 1/4 to 20 hp IP66/NEMA 4X
- 200-240V (single-phase/3-phase and 3-phase only models) and 380-480V input voltage
- 230VAC: three-phase up to 10Hp, single phase input up to 5hp
- 460VAC: three-phase up to 20HP
- NEMA 4X(IP66) Enclosure
- Available with and without disconnect switch
- Suitable for indoor and outdoor use (including direct sunlight)
- Heavy Duty rated - 150% current overload capacity
- Speed and torque control down to 0 (zero) rpm
- Precision of 0.01% for speed control
- Same programming as other WEG VFDs including CFW500-IP20, CFW300 and CFW100
- Built-in SoftPLC
- Scalar, Vector Control (Sensorless and closed-loop with encoder feedback) & VVW PM (suitable for fan, Pump and compressor)
- 0 to 500 Hz output frequency
- 2.5 to 15 kHz adjustable switching frequency (5 kHz standard)
- Built-in 24Vdc Power supply (max. 150 mA)
- Built-in RS-485 (Modbus RTU) communication
- Four isolated programmable digital inputs
- One programmable relay output (1NO, 1NC, 240vac 0.5A)
- One programmable transistor output
- One isolated programmable analog input (0-10V, 0/4-20mA)
- One isolated programmable analog output (0-10V, 0/4-20mA)
- Protective features: Over current (Phase-Phase short circuit in the output or phase-ground short circuit in the output), Under/overvoltage, overtemperature in heatsink, motor overload, IGBT overload and external fault
- Control features: Linear and "S" ramp acceleration and deceleration, local/remote control, DC braking, torque boost, motor slip compensation, electronic pot, preset speeds, adjustable V/Hz profile, maximum and minimum adjustable frequency limits, two skip frequencies, adjustable output current limit, JOG, ride-thru, flying start and PID regulator
- Same keypad with backlight as of CFW500 product line with Main display line, secondary display line and bar graph display
- Ambient: 14°F (-10°C) to 104°F (40°C), 3300ft (1000m) altitude, 5-95% humidity, non-condensing
- WPS compatible

## Free WPS Programming Suite Software

That's right! The WPS software is a free download. This is a fully featured software suite for drive configuration, monitoring AND for programming the built-in PLC – it's all in one easy-to-use package.



Filter and download parameters by group, or use the powerful search function to create your own parameter groups

Quick Start

Welcome to WPS!

Quick Parameters Monitoring, New Configuration, Open Configuration, Import Configuration

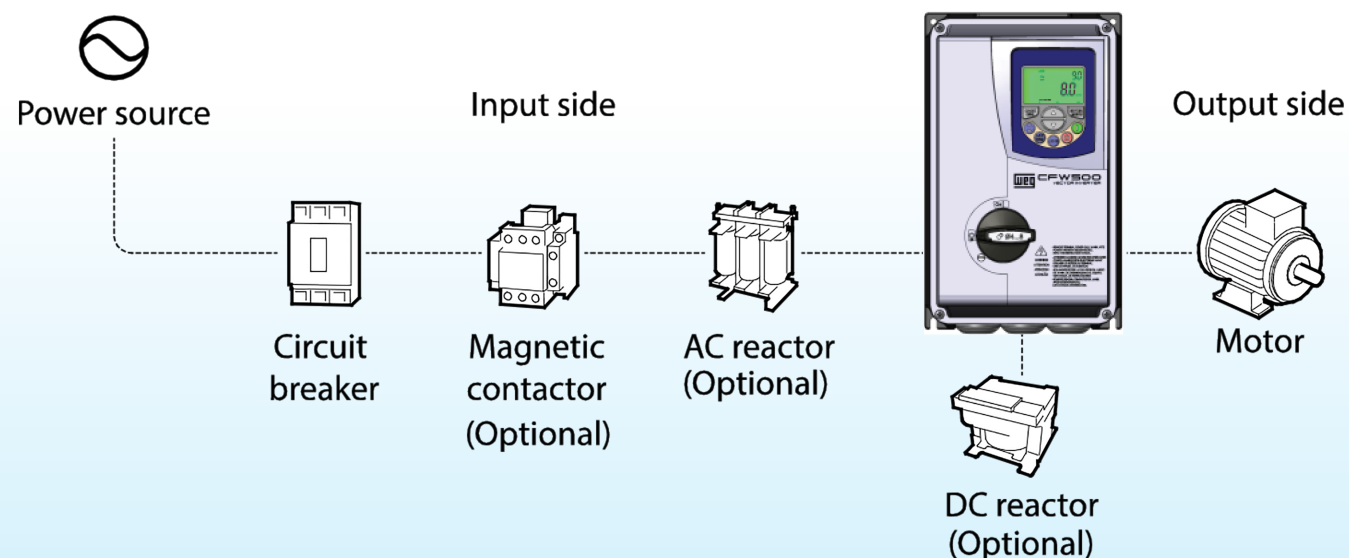
Welcome screen takes new users right to the most common activities

Changed parameters (awaiting download) are highlighted

Para...	Description	Offline	Online
P100	Acceleration Time	5.0	2.0
P101	Deceleration Time	10.0	3.0
P102	Acceleration Time 2 Ramp	5.0	3.0
P103	Deceleration Time 2 Ramp	10.0	3.0
P104	S-Ramp	0. Off	0. Off
P105	1st/2nd Ramp Set.	0: First ramp	0: First Ramp
P106	Emer. R. Acceleration Time	5.0	5.0
P107	Emer. R. Time Deceleration	5.0	5.0

### Other great Quick Start features include:

- Monitoring Wizards
- Configuration Wizards
- Custom Monitoring Windows
- Trending
- Diagnostics
- And MORE!



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