

SMART D



Clean Power VFD^{MC}

Not All Drives Are Created Equal.

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Clean Power VFD™ What is Clean Power?

Clean Power Variable Frequency Drive with Active Front End (AFE) is a compact AC drive utilizing SmartD's patented own algorithms combined with SiC MOSFET technology.

Producing a clean and pure sine wave has never been easier. A Clean Power Variable Frequency Drive has essential features built-in for space, wiring and time savings, it eliminates the need for filters on the output, and guarantees longer motor lifetime. Discover the drive without drawbacks...

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All Sines Point to “Yes”

The benefits of Clean Power

Embedded Active Front End (AFE)

- Ultra low harmonics
- Regenerative capability
- Power Factor near unity

Pure sine wave 3-phase output

- Fully integrated filters
- Maximized motor lifetime
- Increased efficiency

Easy setup

- Mobile App with natural language
- Set, monitor and control from the App.

Secret sauce

SiC Tech

The Clean Power VFD design is based on the latest generation of power components: Silicon Carbide (SiC) Mosfets.

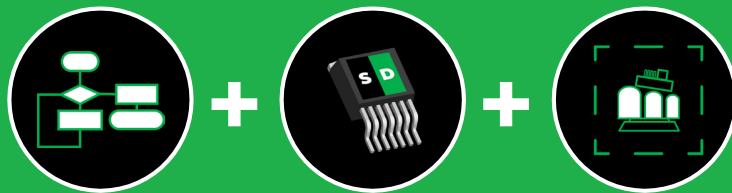
SiC Mosfets permit high frequency switching with fewer losses while being able to withstand higher temperatures than IGBTs.

Integration of the SiC transistors, patented algorithm for multilevel architecture and embedded filters allows the Clean Power VFD to deliver a pure sine wave to control speed and torque of the AC motor.

PATENTED
ALGORITHMS
for MULTI-LEVEL
ARCHITECTURE

SiC
TRANSISTORS

PATENTED
400X SMALLER
FILTERS



PURE SINE WAVE SIGNAL

All Sines Point to “Yes”

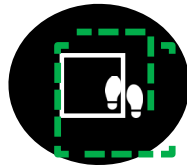
The benefits of Clean Power



EMBEDDED FILTERS



1/2 THE FOOTPRINT



LONGER MOTOR LIFESPAN



MORE ENERGY SAVINGS



OPTIMAL SYSTEM COST



The first-ever truly filterless VFD.

Ordinary drives require the installation of dv/dt filters or sinus wave filters on the motor-side in order to mitigate motors and cables issues, as well as passive filters on the grid-side limiting distortion created. The Clean Power VFD does not generate a high rate of voltage rise nor spike, thus the motor can be wired directly to the VFD power output without additional filters. Its converter stage is also Clean Power architecture, producing harmonic distortion lower than IEEE519 recommendations. There is no need to add any filters on the input side to protect your installation, cables and transformers.

Low harmonics.

With the embedded Active Front End (AFE), the Clean Power VFD keeps distortion at less than 5%. Harmonics are lower than the recommended IEEE519 level.

Long-lasting motor lifetime.

Thanks to the true sine wave output of the Clean Power VFD, the motor's insulation material is not prematurely aging from overheating. Moreso, when retrofitting a motor system from fixed speed to variable speed with a Clean Power VFD, there's no need to update the motor to a VFD-grade insulated motor.

The balanced 3-phase clean sinus wave does not create a destructive common mode voltage. Therefore, the special attention and protections usually applied to the motor bearings are not necessary.

As a benefit, the Clean Power VFD ensures the motor's maximum life expectancy, and the required maintenance operations of the motor can be done between longer time intervals.

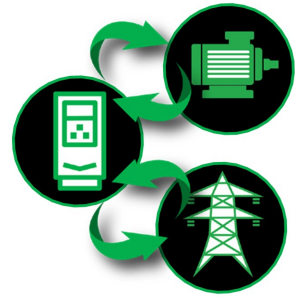
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Power factor near unity.

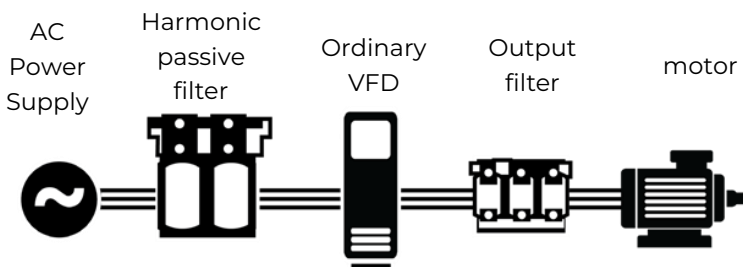
Ordinary VFDs have a power factor between 0.75 and 0.85. The Clean Power VFD has a power factor of 0.98. High Power Factor is beneficial in that there is no need to oversize the power supply and cable capacity, plus financial benefits from the power provider.

Fully-regenerative drive.

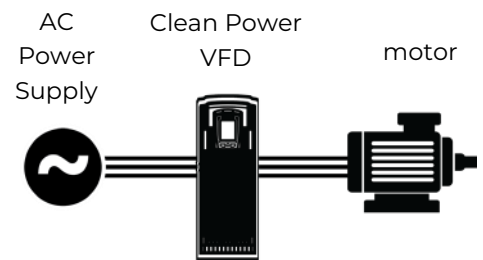
The Clean Power VFD is regenerative by default. When decelerating, the motor's regenerated energy is fed to the grid instead of vanishing in a braking resistor.



Ordinary VFD system



Clean Power System



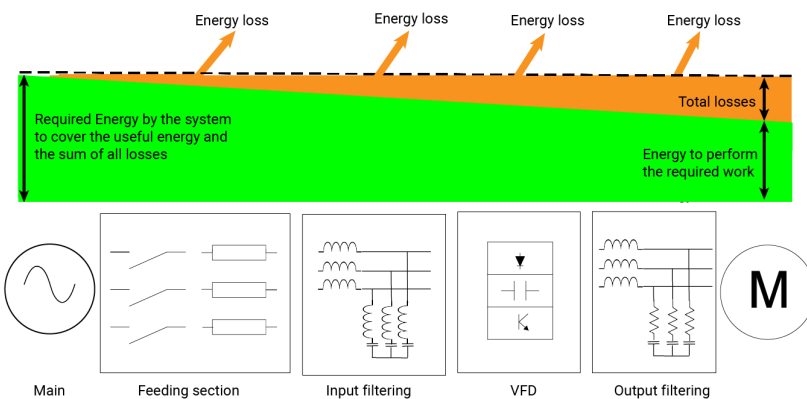
Improved efficiency.

The Clean Power VFD increases the efficiency of every system it is properly deployed in.

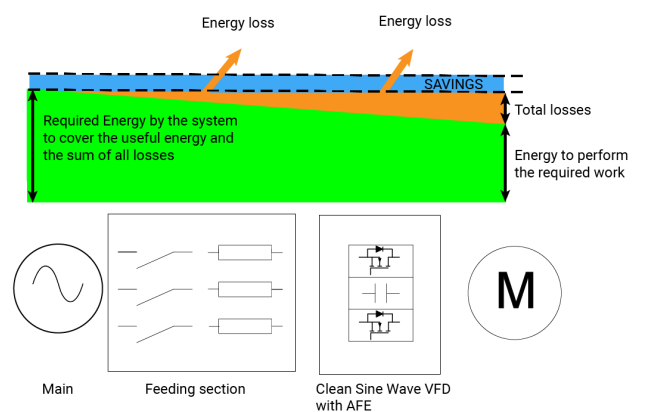
First, by decreasing the expensive energy losses: The Clean Power VFD itself has an efficiency higher than 98% full speed / full torque, and higher than 97% at 50% speed/ full torque. The typical energy losses from mitigating devices no longer exist for the filter-less Clean Power VFD. A motor running on Clean Power faces 30% less thermal losses when compared with an ordinary VFD.

Secondly, by increasing the availability of your production resources, not generating any drawbacks, the Clean Power VFD is harmless to the motors and other equipment connected to the same power grid. This drastically decreases the risk of failures, any potential sources of costly and unexpected production downtime.

Ordinary VFD system



Clean Power System



Meet the Products Family

Sizes, types and Voltages

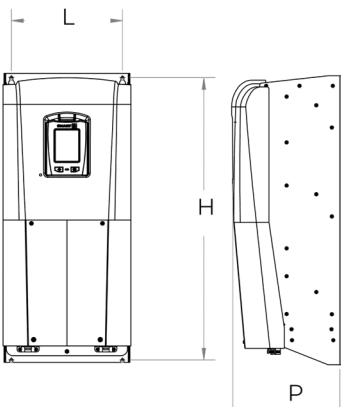
Order
NOW



Coming
end 2023



Coming
2024



Rated output current (Normal duty)	Input Voltage	Suitable for Motor	Part Number
34A	3 x 400 to 480 V	400 V - 18.5kW/25hp	SDB-1-2185-A
	3 x 600 V	460 V - 18.5kW/25hp	SDB-2-2220-A
45A	3 x 400 to 480 V	575 V - 22 kW/30hp	SDB-1-2220A
	3 x 600 V	400 V - 22kW/30hp	SDB-2-2300-A
55A	3 x 400 to 480 V	575 V - 30kW/40hp	SDB-1-2300A
	3 x 600 V	400 V - 30kW/40hp	SDB-2-2375-A
70A	3 x 400 to 480 V	575 V - 37.5kW/50hp	SDB-1-2375-A
	3 x 600 V	400 V - 37.5kW/50hp	SDB-2-2450-A
85A	3 x 400 to 480 V	575 V - 45kW/60hp	SDB-1-2450-A
	3 x 600 V	400 V - 45kW/60hp	SDB-2-2550-A
100A	3 x 400 to 480 V	575 V - 55kW/75hp	SDB-1-2550-A
	3 x 600 V	400 V - 55kW/75hp	SDB-2-2750-A
130A	3 x 400 to 480 V	575 V - 75kW/100hp	SDB-1-2750-A
	3 x 600 V	400 V - 75kW/100hp	SDB-2-2900-A
165A	3 x 400 to 480 V	575 V - 90kWW/125hp	SDB-1-2900-A
	3 x 600 V	400 V - 90kW/125hp	SDB-2-3110-A

	Width L	Height H	Depth P
Up to 35A	11.85 in (30.1 cm)	25.59 in (65 cm)	9.88 in (25.1 cm)
Up to 85A	12 in (30.48 cm)	28 in (71.12 cm)	10 in (25.4 cm)
Up to 165A	12 in (30.48 cm)	42 in (106.68 cm)	12 in (30.48cm)



Technical Specs

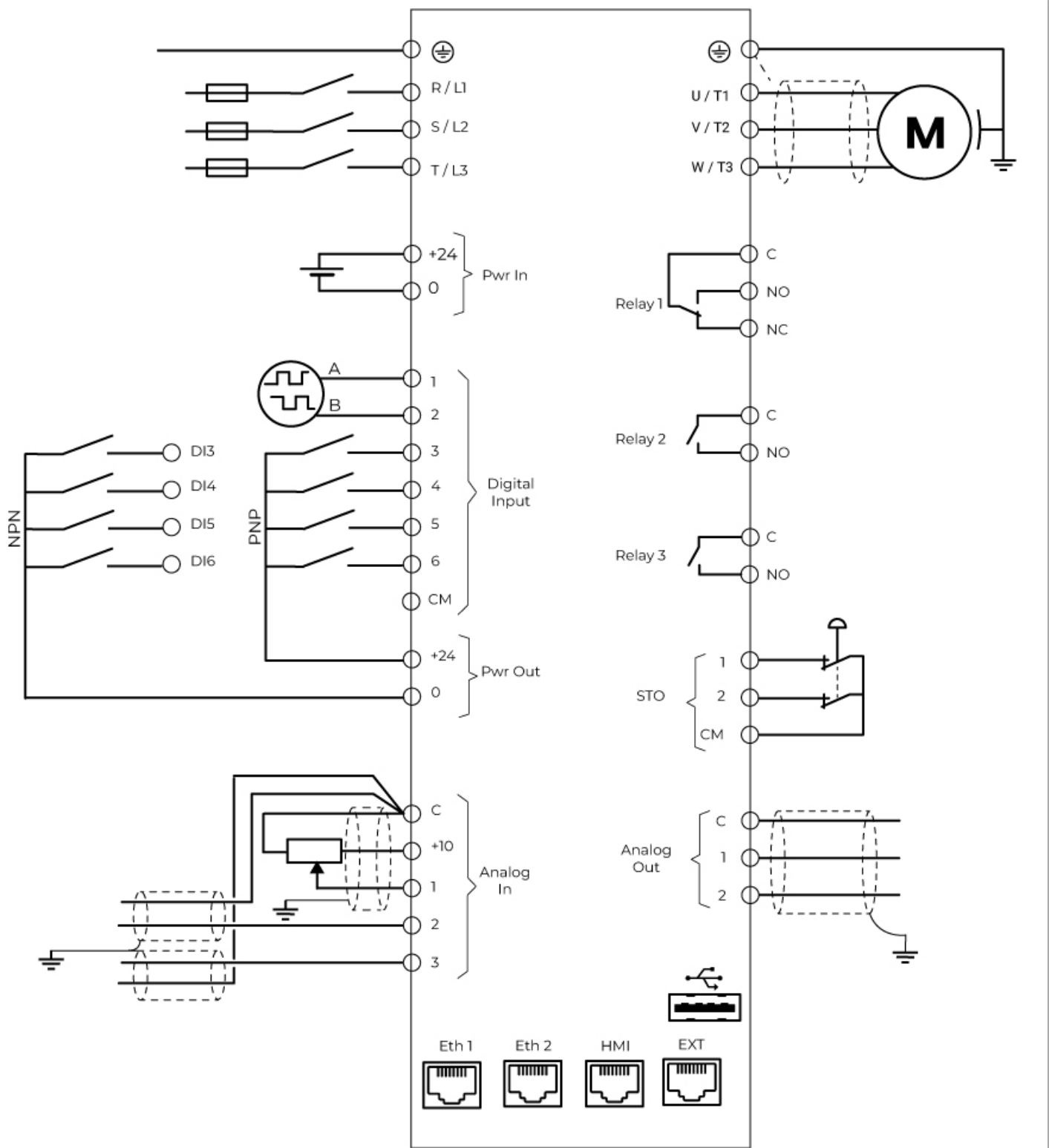
What sets us apart

ATTRIBUTES	SDB-1-2185-A	SDB-2-2220-A	SDB-1-2220-A	SDB-2-2300-A	SDB-1-2300-A	SDB-2-2375-A	SDB-1-2375-A	SDB-2-2450-A	SDB-1-2450-A	SDB-2-2550-A	SDB-1-2550-A	SDB-2-2750-A	SDB-1-2750-A	SDB-2-2900-A	SDB-1-2900-A	SDB-2-3110-A
Power Input																
Rated Voltage <i>U_{in}</i>	3 x 400 .. 480VAC -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%	3 x 400 .. 480VA C -15%/ +10%	3 x 600VA C 15%/ +10%
Frequency <i>f_n</i>	50 et 60 Hz +/-5%															
Rated Current <i>I_{in}</i>	36 A	36 A	40 A	40 A	49 A	49 A	62 A	62 A	75 A	75 A	95 A	95 A	115 A	115 A	147 A	147 A
Harmonics (THDi)	5 %															
Power Factor	Neat unity															
Power Output																
Rated Current <i>I_{out}</i>																
Normal Duty	34 A	34 A	45 A	45 A	55 A	55 A	70 A	70 A	85 A	85 A	100 A	100 A	1340 A	130 A	165 A	165 A
Heavy Duty	24 A	24 A	33 A	33 A	40 A	40 A	50 A	50 A	62 A	62 A	75 A	75 A	95 A	95 A	120 A	120 A
Transient current																
Normal Duty	110% of Normal Duty current during 60s every 10 min at 40 °C (104 °F)															
Heavy Duty	150% of Heavy Duty current during 60s every 10 min at 50 °C (122 °F)															
VFD output Frequency	0.1 to 120 HZ up to 1000 Hz with dedicated firmware															
Effective switching frequency	210 kHz															
Efficiency	97 %															

SmartD Technologies Inc. can accept no responsibility for possible errors in this catalogue. SmartD Technologies Inc. reserves the right to alter its products without notice. Motor power values are indicative. They vary with the motor type, technology, and manufacturer. The Clean Power VFD must not be selected from the motor power rating. The Clean Power VFD must be selected by skilled and experienced personnel.

Installation

Wiring



24VDC Power in

A 24VDC external power supply can be connected to the terminals Pwr In (terminals +24VC and 0). The 24VDC auxiliary supply will power the Clean Power VFD control board in the absence of line power, allowing both communications and the HMI to continue to operate

24VDC Power out

Clean Power VFD provides the user with a 24VDC power out on the terminals Pwr Out (terminals +24VC and 0). This power is used to energize the digital inputs, or to energize some sensors.

Digital Input Terminals

Marking	Name	Default Operation
1	Digital input 1	User settable. Can be assigned to phase B of an encoder. Default: not used
2	Digital input 2	User settable. Can be assigned to phase B of an encoder. Default: not used
3	Digital input 3	Run forward
4	Digital input 4	Run reverse
5	Digital input 5	Stop
6	Digital input 6	Sélection de la commande de vitesse.
+24	Common terminal for digital inputs	

STO Terminals

The Clean Power VFD is providing users with 2 Safe Torque Off (STO) inputs.

The SIL capacity level is 3 and the stop category is 0, conformed to IEC6800-5-2

Marking	Name
STO 1	Safe torque off — input 1
STO 2	Safe torque off — input 2
+24	Safe torque off 24 V power supply

Relay Output Terminals

The operation of the 3 independent relay outputs of the Clean Power VFD can be set by the user.

Marking	Name	Default Operation
C	Common	Relay 1: alarm relay
NO	Normally opened contact	The relay is energized (C & NO connected) when there is no alarm
NC	Normally closed contact	The relay is de-energized (C & NC connected) when there is an alarm or loss of power supply

Marking	Name	Default Operation
C	Common	Relay 2: Closed when the VFD is ready to run
NO	Normally opened contact	Relay 3: Closed when the VFD is running

Analog Input Terminals

Analog inputs from AI1 to AI3 can be assigned by the user to various functions and various electrical signals.

Available functions:

- Speed (frequency Hz) setpoint
- Velocity (RPM) setpoint
- PTC motor thermal sensor
- Unused

Marking	Name	Default Operation
1	Analog input 1	Speed reference. Preset used as potentiometer input.
2	Analog input 2	Un-assigned
3	Analog input 3	Un-assigned
+10	Reference power supply 10 VCC / 20 mA max.	
C	Common terminal for analog inputs	

Analog inputs can be used for electrical signals: 0..10VDC, 4..20mA, 0..20mA, PTC.

Analog Output Terminals

Analog outputs 1 and 2 can be assigned by the user to various functions and various electrical signals.

Marking	Name	Default Operation
1	Analog output 1	Factory preset to the motor frequency. The preset signal is 0..10VDC
2	Analog output 2	Factory preset to the motor current Irms total. The preset signal is 0..10VDC
C	Common terminal for analog outputs	

Available choices for the functions :

- Motor Current
- Motor Frequency
- Motor Torque
- Motor Power
- Drive thermal state
- Unused

Signal delivered by Analog output :

- 0..10VDC,
- 0..20mA,
- 4..20mA



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Easy setup

Smartphone application

SmartDrive Manager

From purchasing to operations, simplify your deployment and decrease your expenses with a Clean Power VFD: less equipment, less-maintenance, more energy efficiency.

Install the Clean Power VFD with just 3 cables in, 3 cables out. Connect to the app and configure Clean Power in the palm of your hand. Experience true sine wave output first- hand.

Quick

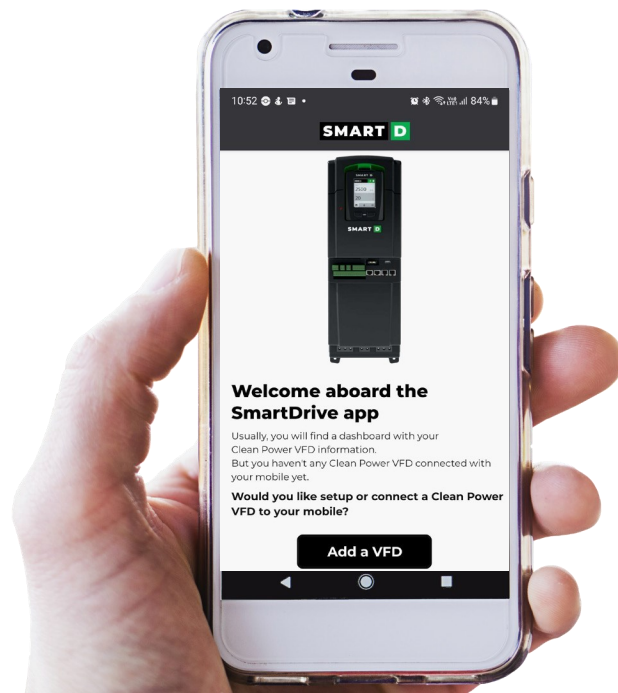
The integrated assistant enables even first- time users to quickly set the configuration of the Clean Power VFD

Convenient

The Clean Power VFD can be configured, controlled and monitored by using the app, pairing it via Bluetooth®..



- ✓ Speaks natural user language
- ✓ Assists user during setup process
- ✓ Save, Copy, Clone VFD configurations
- ✓ Control drive operation dashboard
- ✓ Manage alarms



Main Functions

Key Functions and features of the Clean Power VFD

Main controls

Control Mode	V/f, indirect field oriented control (Vector control)
Acceleration and Deceleration	Linear and S curve, user settable up to 3600s
Low speed torque	Automatic compensation
Slip	Automatic compensation
Speed setting methods	Either in RPM or in Hz. Setting from analog inputs, preset speed (up to 8), communication port, HMI, mobile App.
Control Source	switchable between local and remote

Main Protections and Alarms

Alarm trips prevention	Acceleration automatically paused when needed to prevent overcurrent
Load monitoring	Application overload and underload prevention.
DC bus	Overvoltage and prevention of this overvoltage by automatic limitation of the deceleration rate
Motor	Phase loss, overload, overheating
VFD	CPU and memory usage monitoring, temperature, boot state .

Environment

Ambient temperature	operating is -15 to 50 °C (without derating) if not specified otherwise.
Relative humidity	Below 95% non-condensing
Altitude	Lower than 2000 m/6600 ft.

Main Pumping Applications

Potential Clean Power VFD applications

Water and wastewater



Pumps for intake, boosting, lifting, and aeration blower, ...

Agriculture



Pumps for well lifting, draining, watering live-stock, slurry, ...

Mining



Dewatering, mineral transfer, raw water supply, ...

Buildings



Fans, fluid circulating and boosting, fire sprinkler pressure control, ...



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1-866-7-SMART-D

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