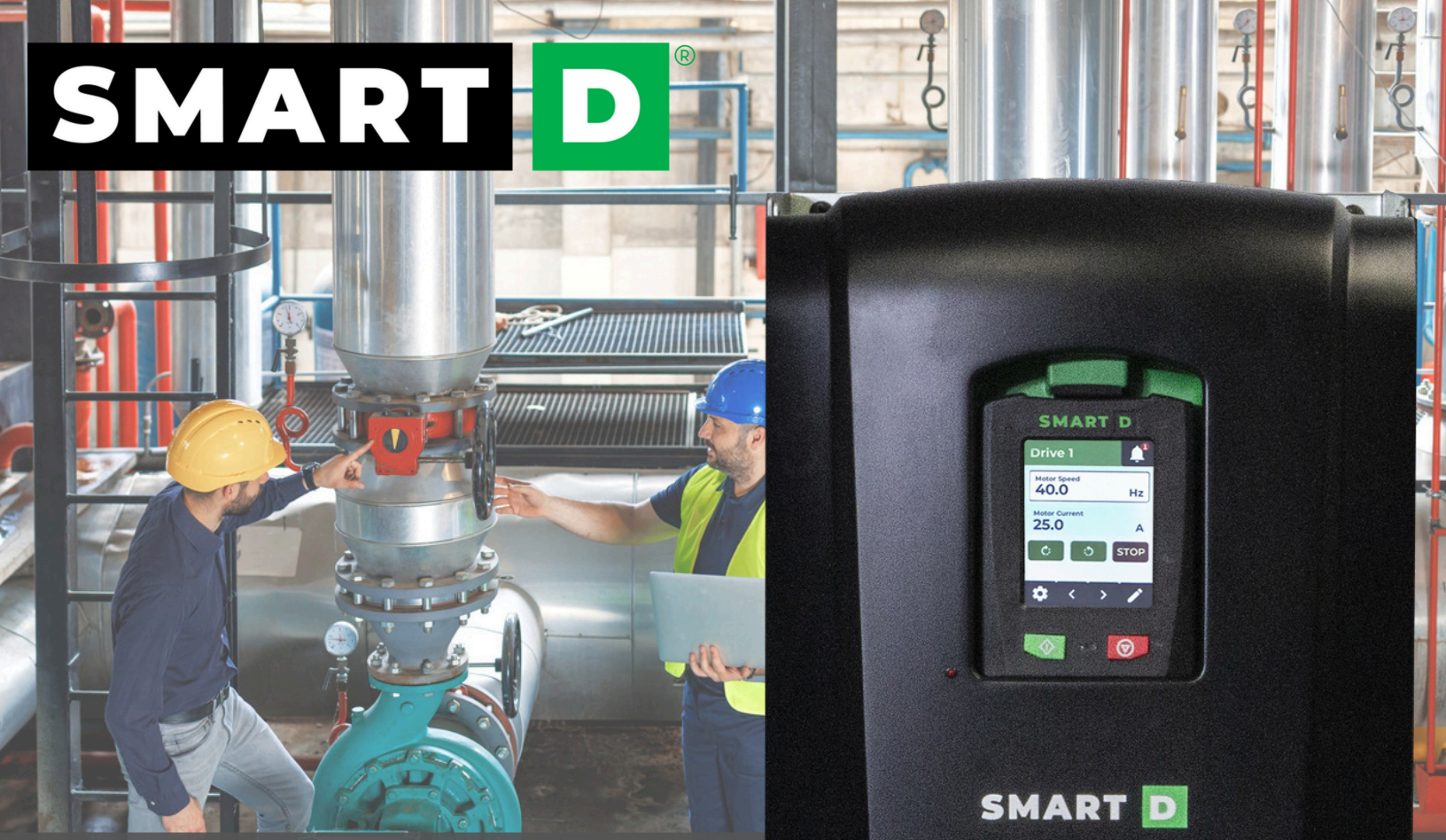
SMART D®



Clean Power VFD™

Not All Drives Are Created Equal

smartd.tech

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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 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 life. Discover the drive without drawbacks...

SMART D

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 life
- 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.

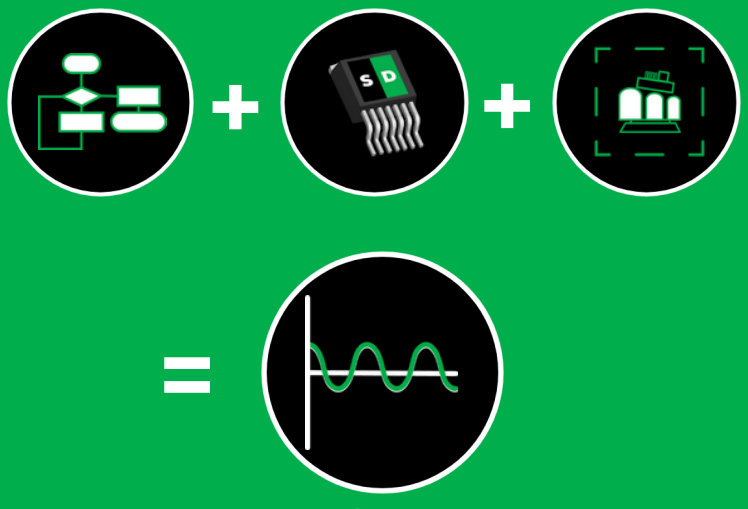
SiC MOSFETs permit **high-frequency switching above 100kHz with fewer losses** while being able to withstand higher temperatures than IGBTs.

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

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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 filterless VFD.

Ordinary drives require the installation of dv/dt filters or sine wave filters on the motor side in order to mitigate motor and cable issues, as well as passive or active harmonic filters on the grid side, limiting the distortion created.

The Clean Power VFD does not generate a high rate of voltage rise or spike, thus, the motor can be wired directly to the VFD power output without additional filters. Its converter stage is also Clean Power’s architecture, producing harmonic distortion lower than IEEE 519 recommendations. There is no need to add any filters on the input side to protect your installation, cables, and transformers.

Ultra-Low harmonics.

With the embedded Active Front End (AFE), the Clean Power VFD ensures Total Harmonic Current Distortion (THDi) remains below 5% under nominal conditions, exceeding industry standards for harmonic compliance.

Extended motor life & lower maintenance

Thanks to the true sine wave output of the Clean Power VFD, the motor’s insulation material is not prematurely aging from overheating. Moreover, 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 sine 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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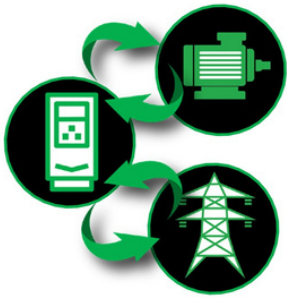
Power factor near unity.

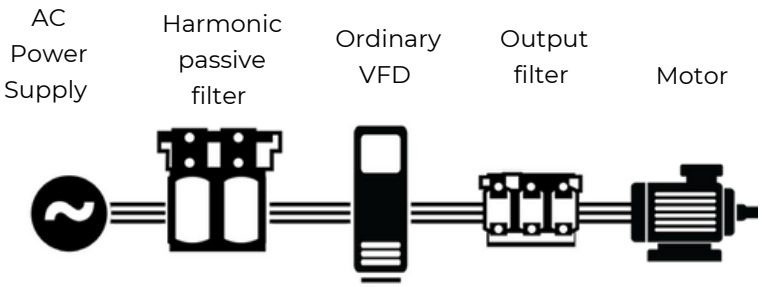
The Clean Power VFD maintains new unity powerfactor (>0.99) at loads of 65% and above. High Power Factor is beneficial in that there is no need to oversize the power supply and cable capacity, plus financial benefits from the power provider.

Fully-regenerative drive.

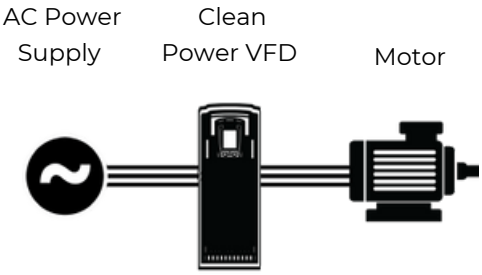
The Clean Power VFD is regenerative by default. When decelerating, the motor's regenerated energy is fed to the grid instead of vanishing in a braking resistor.



Ordinary VFD system



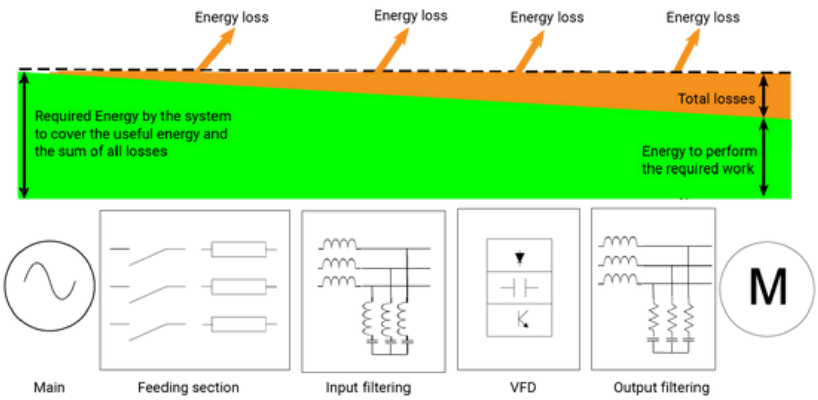
Clean Power System



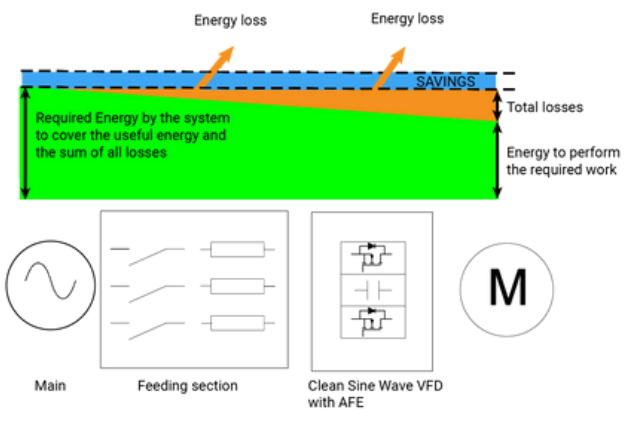
Improved efficiency.

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 97% 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 filterless 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



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Meet the Clean Power VFD Family

Sizes, Types and Voltages

CLEAN POWER

VARIABLE FREQUENCY DRIVE

Example:

SD B-1-2150-A

Product Family:	SD: SmartD	VFD Type:	Ex: A: Integrated AFE
Enclosure Type:	B: UL Type 1	Suitable Motor:	Ex: 1750: 7.5kW / 10 HP Ex: 2150: 15kW / 20 HP Ex: 2220: 22kW / 30 HP
Input Voltage Rating:	1: 400 to 480V 2: 600V		

Accessories and spare parts Genuine* accessories to adapt or maintain your Clean Power VFDs.

*Using a non-approved accessory may create issues and void your Clean Power VFD warranty.

Designation	Part Number
Human-Machine Interface (HMI)	**SD-HM-01**
standard HMI cable	**SD-HC-A**
5m (16.4 ft) HMI cable	**SD-HC-5M**
Fans Kit for size S3	**SD-MF-S3**
Fans Kit for size S4	**SD-MF-S4**

Standard Compliance

Item	Specification
Functional Safety	UL / IEC 61800-5-1 :2007+AMD:2016CSV
EMC	IEC 61800-3 : 2017 emissions IEC 61000-4 immunity
Harmonics	IEC 61000-3-12 IEEE 519
Generic	IEC 61800-2 : 2021
EcoDesign / Energy Efficiency	IEC 61800-9
Safety Standard (STO)	IEC 61508 part 1 and part 2 IEC 62061 : 2021
Cybersecurity	IEC 62443
Environmental	IEC 60068-2 WEEE directive RoHS

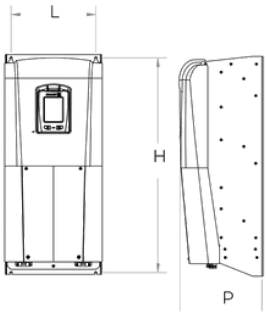
SMART D®

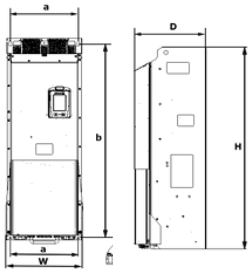
Meet the Product Family

Sizes, types and Voltages

Rated output current (Normal duty service)	Input Voltage (VAC)	Suitable for Motor 400V	Part Number
23 A	3 ~ 400 V	11 kW	**SDB-1-2110A**
29 A	3 ~ 400 V	15 kW	**SDB-1-2150A**
35 A	3 ~ 400 V	18.5 kW	**SDB-1-2185-A**
43 A	3 ~ 400 V	22 kW	**SDB-1-2220-AL**

Rated output current (Normal duty service)	Input Voltage (VAC)	Suitable for Motor 400V	Part Number
43 A	3 ~ 400 V	22 kW	**SDB-1-2220-A**
57 A	3 ~ 400 V	30 kW	**SDB-1-2300-A**
71 A	3 ~ 400 V	37.5 kW	**SDB-1-2375-A**
85 A	3 ~ 400 V	45 kW	**SDB-1-2450-A**





Frame Size	Width L	Height H	Depth P	Weight
S3- up to 34 A	30.1 cm	65 cm	25.1 cm	30 Kg
S4- up to 82 A	35 cm	92.5 cm	32.95 cm	60.4 Kg

Technical Specs

What sets us apart

		SDB-1-2110-A	SDB-1-2150-A	SDB-1-2185-A	SDB-1-2220-AL[1]	SDB-1-2220-A	SDB-1-2300-A	SDB-1-2375-A	SDB-1-2450-A
Current Input	Rated Voltage (VAC)	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%	3 ~ 400 –15%/ +10%
	Frequency (Hz)	50 Hz +/- 5%							
	Rated Current (A)	23	30	36	43	43	58	71	86
	Harmonics THDi (%)	< 5 under nominal conditions, exceeding industry standards for harmonic compliance.							
	Power Factor	Near Unity							
Current Output	Rated Current (A) at 50 °C [1] — Normal Duty Service	23	29	35	43	43	57	71	85
	Rated Current (A) at 50 °C [1] — Heavy Duty Service	18	23	29	35	35	43	57	71
	Transient current (A) during 60s every 10 min at 50 °C — Normal Duty Service	26	32	39	48	48	63	79	94
	Transient current (A) during 60s every 10 min at 50 °C — Heavy Duty Service	26	32	39	48	48	63	79	94
	VFD output Frequency (Hz)	0.1 to 120							
	Effective switching frequency (kHz)	210							
	Efficiency (%)	96 %							
	Standards and certifications	cULus							

[1]SDB-1-2220-AL values @ 40°C (104°F)

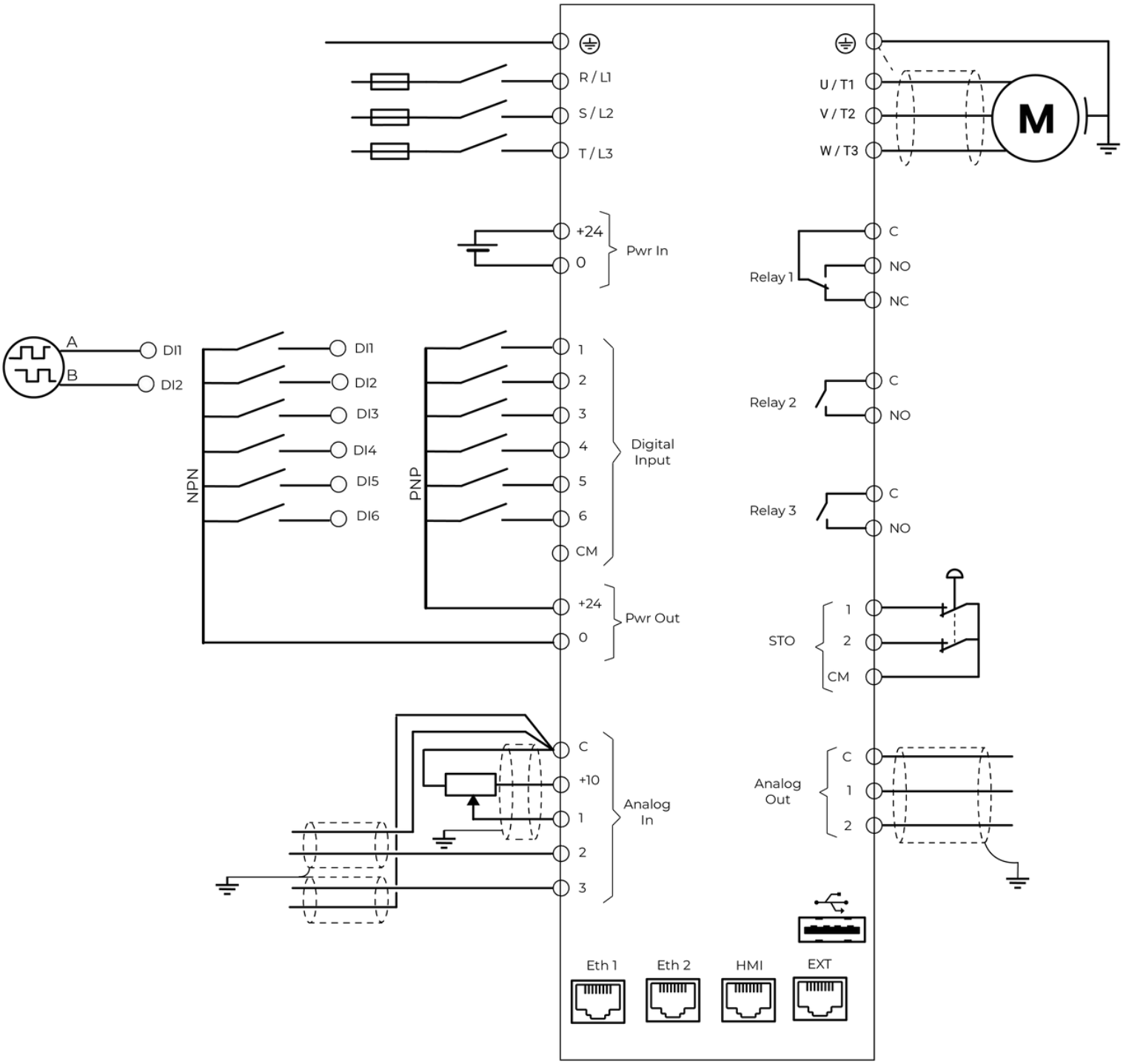
SmartD Technologies Inc. can accept no responsibility for possible errors in this catalogue. SmartD Technologies Inc. reserves the right to alter its products without notice. Motor power values are indicative. They vary with the motor type, technology, and manufacturer. The Clean Power VFD must not be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

Installation

Wiring

Install a ferrite ring around the three-phase grid conductors before connecting them to the VFD terminal block. This significantly reduces high-frequency noise transmission and improves electromagnetic compatibility (EMC).

SmartD recommends the part number T60006 L2045-V118 from VAC MAGNETICS LLC or equivalent.



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 output 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 A of an encoder.
2	Digital input 2	User settable. Can be assigned to phase B of an encoder.
3	Digital input 3	Run forward
4	Digital input 4	Run reverse
5	Digital input 5	Stop
6	Digital input 6	Speed Control Selection
+24	Common terminal for digital inputs	

STO Terminals

The Clean Power VFD is providing users with 2 built-in torque deactivation inputs. to prevent the VFD from generating torque to the motor and forbid the motor from restarting as long as the Torque Deactivation function is activated.

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
- Torque (%) 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 input 1	Factory preset to the motor frequency.
2	Analog input 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

Easy setup

Smartphone application:

Clean Power VFD mobile application

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 the Clean Power VFD 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®.

Download on the App Store

GET IT ON Google Play

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

EASY CONFIGURATION

SPECIALIZED SUPPORT

CONFIGURE ON THE GO

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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 multi-segments curves, 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

Enviroment

Ambient temperature	V/f, indirect field oriented control (Vector control)
Relative humidity	Linear and multi-segments curves, user settable up to 3600s
Altitude	Automatic compensation

Main 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.

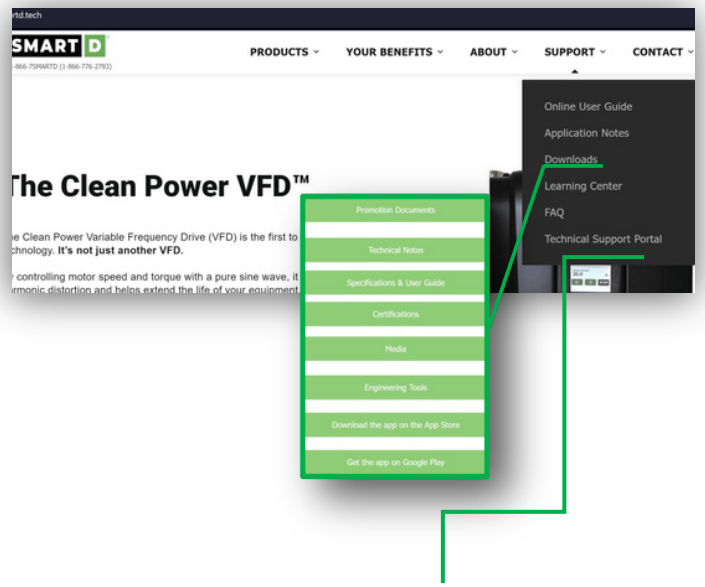
Buildings

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

How to find and download SmartD resources ?

Path: https://smartd.tech/smartd-downloads-resources-you-need/

smartd.tech

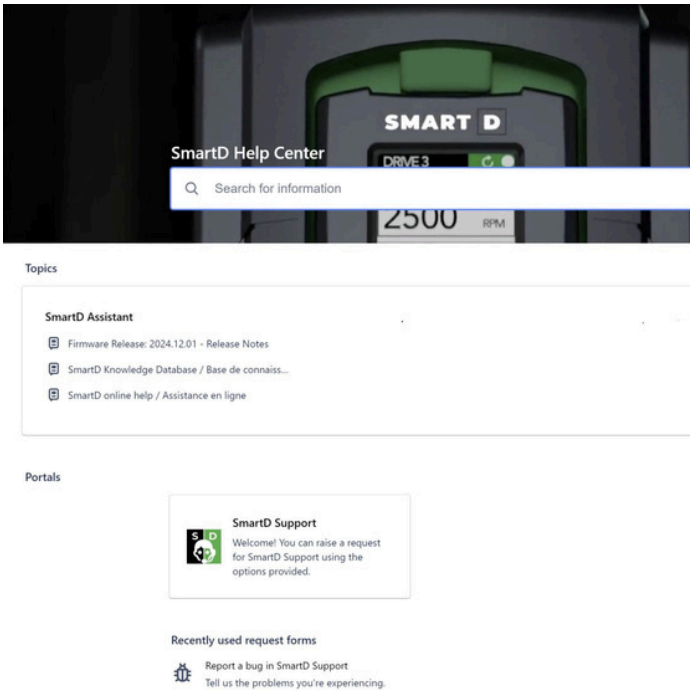


Access a wide range of resources in the download area, including:

- **Promotional assets**: Find catalogs to help with product selection, as well as promotional leaflets and brochures.
- **Technical notes**: Download detailed information on specific technical topics and concepts.
- **Product documentation**: Get product datasheets, engineering specifications, and user guides.
- **Certifications**: Access certifications applicable to your variable frequency drives.
- **Articles and whitepapers**: Explore articles and in-depth white papers to learn about the full benefits of the Clean Power VFD.
- **Mobile app and CAD files**: Get everything you need to build, configure, control, and monitor your SmartD VFDs on the go with our mobile app, along with downloadable CAD files.

Your Gateway to personalized support

Path: https://smartd.tech/technical-support-portal-smartd-technologies/



Unlock expert assistance and tailored resources with the **SmartD Help Center**—designed to support you at every step of your SmartD VFD journey.

- **Firmware Updates**: Access the latest firmware to keep your systems running smoothly.
- **Access a wealth of technical resources** and receive real-time, personalized assistance to help you with any issues.
- **SmartD Support:** Submit and track support requests easily, ask for new features and enhancements.

How to Get Started?

To experience personalized support, simply create an account. Once registered, you'll have access to:
· In-depth technical documentation and release notes.
· Customized help tailored to your specific needs.
· Direct communication with our SmartD experts for faster problem-solving.

Sign up today and make the most of the SmartD Help Center—**your gateway to personalized support** for all things SmartD VFD!

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