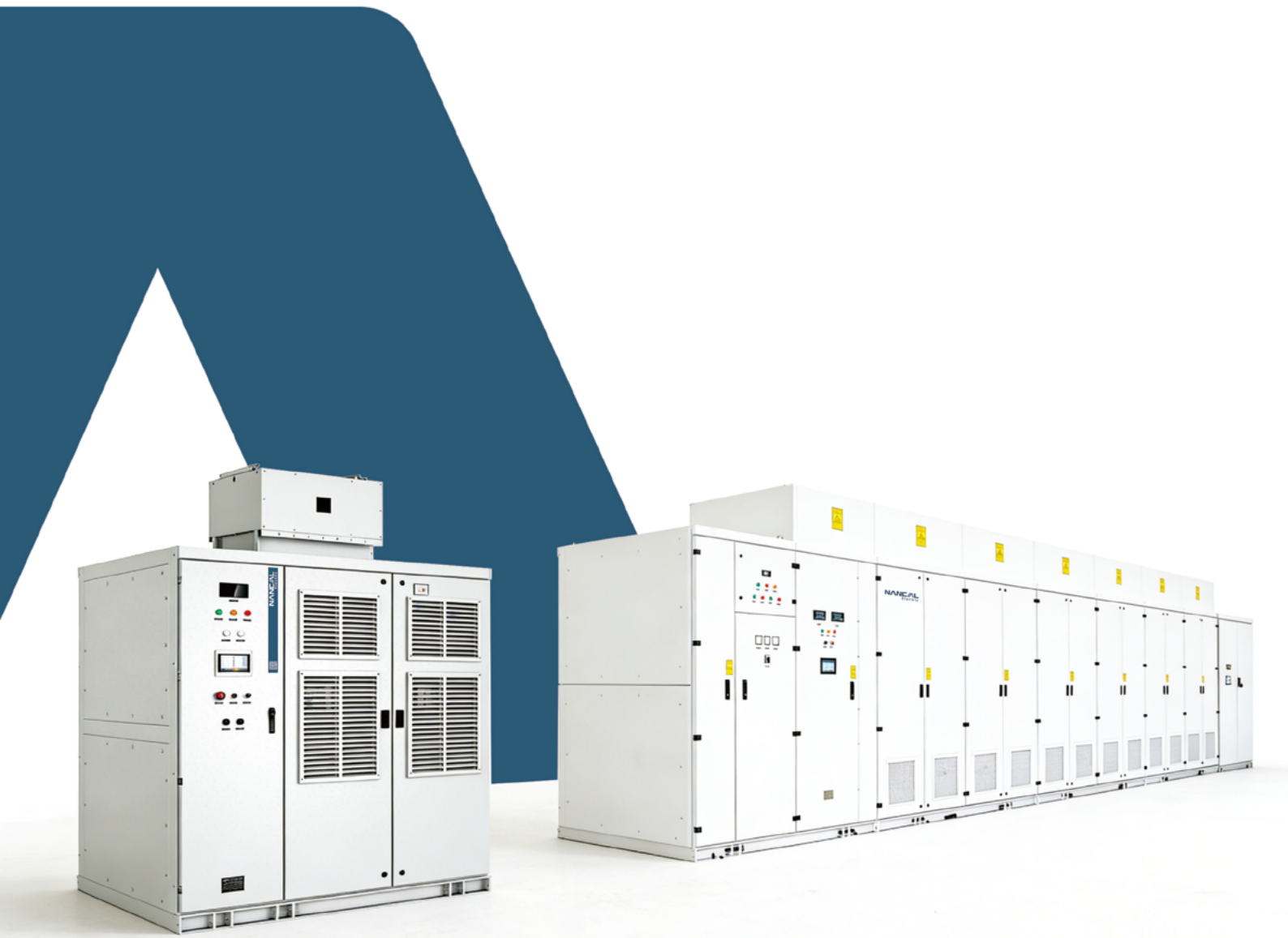
Together, We Drive The Future

Medium Voltage AC Drives



NANCAL Electric

Contents

Company Profile 01

Product Family 03

Product Introduction 05

Features and Functions 07

Air-Cooling Medium Voltage AC Drives 19

Water-Cooling Medium Voltage AC Drives 24

Application Scenarios 29

Typical Application Schemes 31

Application Cases 33

Full Lifecycle Services 40

Milestones of Medium Voltage Drives



World's Largest Capacity MV Drive
for compressed air energy storage

2025



World's Largest Capacity MV Drive
for fully electric-driven million-ton class ethylene three-machine unit

2024



China's First MV Drive
for mining dual-drive ball mill

2024



China's First MV Drive
for third-generation nuclear power AP1000 reactor coolant pump

2023



China's First MV Drive
for extruder

2023



China's First MV Drive
for fourth-generation nuclear power HTR main helium fan

2022



World's Largest Capacity 130MVA MV drive
(ISTIS2026210080027405H, as of April 2026)

2020



World's First
integrated MV variable speed and SVG device

2017



China's First
water-cooling MV drive

2011



China's First
speed sensorless vector control MV drive

2005

Company Profile

Shanghai Nancal Electric Co., Ltd. specializes in the R&D, engineering design, production, sales and service of power electronic products, providing customers in various industries with products such as Medium Voltage AC drives, Low Voltage Industrial AC Drives, Medium Voltage Soft Starters, Power Quality Products, as well as customized solutions.

Nancal Electric developped China's first water-cooling medium voltage drive (the West-East Gas Transmission Pipeline Project) and the world's largest capacity (as of April 2026) 130 MVA medium voltage drive.

Adhering to the values of "Quality, Speed, Innovation", Nancal Electric focuses on import substitution and high-end applications to promote the localization of major equipment, striving to become a leader in high-capacity medium voltage drives. Nancal Electric has installed over 200 units water-cooling medium voltage drives, maintaining a leading industry installed capacity scale. Nancal Electric's products are widely used in national energy and key infrastructure sectors such as nuclear power, mining, metallurgy, natural gas pipelines, LNG, chemical, gas storage and large test benches. These products are exported to more than 30 countries and regions.

QUALIFICATIONS

National Specialized and Sophisticated Key "Little Giant" Enterprise

High-Tech Enterprise

Member of National Technical Committee 518 on Variable Frequency Regulating Speed Equipment of Standardization Administration of China

Shanghai Center for Enterprise Technology

Shanghai Manufacturing Single Item Champion Demonstration Enterprise

Testing center accredited by CNAS (China National Accreditation Service for Conformity Assessment)
(Registration No.: CNAS L23597)

AWARDS

China Machinery Industry Science and Technology Award
Grand Prize
"Development and industrial application of 20 MW class variable frequency drive for electric compressor unit"

Shanghai Science and Technology Progress Award
Second Prize
"Key technologies and engineering applications of medium voltage large-capacity frequency conversion and power quality control systems"

China Nuclear Energy Association Science and Technology Award
Second Prize
"Localized R&D and Application of Reactor Coolant Pump (RCP) Drives"

CERTIFICATIONS











Shanghai Lingang Manufacturing Base



Shanghai Zhangjiang R&D Center



Automated UV Conformal Coating Line



Power Cell Assembly Line



Power Cell Test Bench



Drive Test Station

R&D

An experienced R&D team in the industry
Independent R&D of core algorithms and key technologies
Integrated Product Development (IPD) process

ENGINEERING DESIGN

Professional electrical, structural, and thermal design team
Customized system solutions and complete drive engineering design

PRODUCTION

20000 ㎡ modernized manufacturing base in Lingang, Shanghai
ISO9001, ISO14001, ISO45001

SALES

Large capacity
High performance
Non-standard customized
Products covering more than 30 countries and regions

SERVICE

24/7 localized service centers for rapid response
Full lifecycle support

Medium Voltage AC Drives (Air-cooling)



Output Voltage

3 kV** to **13.8 kV

Rated Capacity

220 kVA** to **30 MVA

Features

- Speed sensorless/ speed sensor vector control
- Integrated main control board
- Main control system redundancy design
- Power cell fast automatic bypass (centralized bypass technology)
- Low Voltage Ride Through (LVRT)
- Torsional vibration identification and active suppression
- Prognostic and Health Management (PHM)

Medium Voltage AC Drives (Water-cooling)



Output Voltage

3 kV** to **18 kV

Rated Capacity

7 MVA** to **180 MVA

Low Voltage Industrial AC Drives



Output Voltage

400 V/480 V/690 V

Rated Power

37 kW** to **8 MW

Features

- High-performance vector control
- Common DC bus, multi-machine drive
- High power density, high reliability
- Modular redundancy design, supporting up to 12 parallel units
- Independent cooling duct design
- Easy maintenance

Medium Voltage Soft Starters



Output Voltage

3 kV** to **13.8 kV

Rated Current

70 A** to **600 A

Features

- Positive/negative/adaptive phase sequence control
- 50 Hz/60 Hz/adaptive frequency control
- Various curves available (customizable, stepped variable frequency & stepless voltage regulation)
- Smooth start/stop of multiple motors

Power Quality Products



Rated Voltage

400 V/480 V/690 V

Rated Current

50 A** to **1600 A

Features

- Harmonic suppression
- Reactive power compensation
- Three-phase unbalance compensation
- Modular design for easy expansion

Shore Power



Output Voltage

MV ***6 kV** to **11 kV***

LV ***380 V** to **690 V***

Rated Capacity

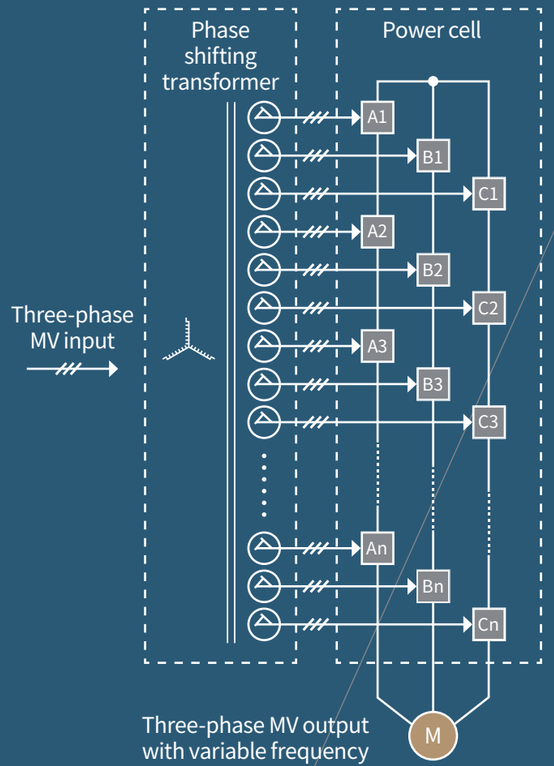
MV ***300 kVA** to **20 MVA***

LV ***40kVA** to **8MVA***

Frequency ***50Hz/60Hz***

Features

- Sine wave output
- Reverse power suppression, non-disturbed transfer between shore and ship
- Classification society certified (CCS)
- Corrosion protection class C5



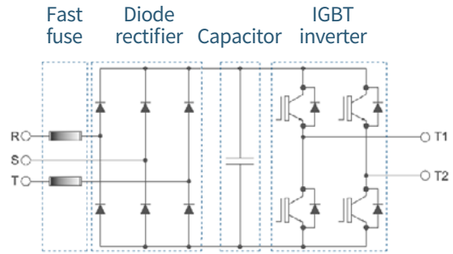
- NC HVVF series medium voltage drives are based on IGBT power cells in series topology, adopt high-performance vector control algorithms, and combine multi-level PWM technology to achieve direct drive control of asynchronous motors, excitation synchronous motors, or permanent magnet synchronous motors
- On the input side, a phase-shifting transformer is used to achieve multi-pulse rectification (30 pulses and above), resulting in low input current harmonics and eliminating the need for input filters and reactive power compensation devices
- On the output side, the cells in series multi-level topology produces output waveforms close to sine waves, eliminating the need for du/dt filters or output transformers
- NC HVVF series air-cooling medium voltage drive (10 kV, 18 MVA) and water-cooling medium voltage drive (18 kV, 130 MVA) have passed type test certification from national authoritative organizations

Modular Series Topology

- **High-reliability operation guarantee**
  Standardized power cell design supports N+1 redundancy configuration; the drive continues to operate without shutdown in the event of cell failure
- **Flexible and scalable configuration**
  Power cell voltage/current ratings and the number of cells in series can be combined as required to meet different voltage and power levels
- **Multi-mode braking adaptability**
  Supports both chopper braking and four-quadrant regenerative braking, flexibly configurable according to grid conditions and operating requirements

Power Cell Circuit Topology

- The standard power cell of NC HVVF series medium voltage drives adopts a highly reliable diode rectifier topology, converting the AC output from the transformer secondary side to DC, and then inverting DC back to AC, achieving unidirectional power transmission. During system operation, energy can flow from the grid side to the motor side to drive the load, but energy from the motor side cannot be fed back to the grid. Therefore, the device does not have regenerative energy feedback capability

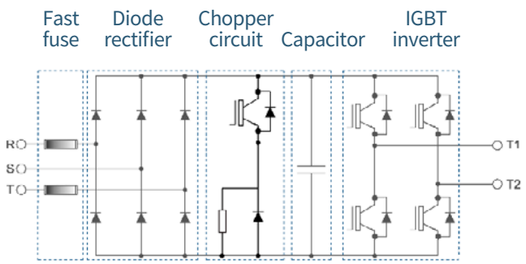


Diode Rectifier Two-Quadrant Power Cell

- For applications requiring fast motor braking or long-term braking torque output, two optional extension schemes are available:

01 .

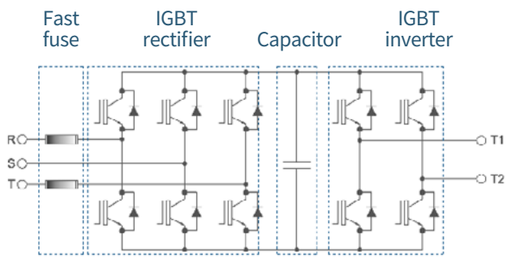
- Configure IGBT chopper circuit and braking resistor unit to dissipate the energy fed back from the motor as heat through the braking resistor. It's suitable for grids that do not allow energy feedback and where fast braking is required



IGBT DC Chopper Braking Power Cell

02 .

- Replace the rectifier diodes with IGBT devices to achieve bidirectional active current control, allowing braking energy from the motor side to be fed back to the grid. It's suitable for applications where energy feedback is permitted



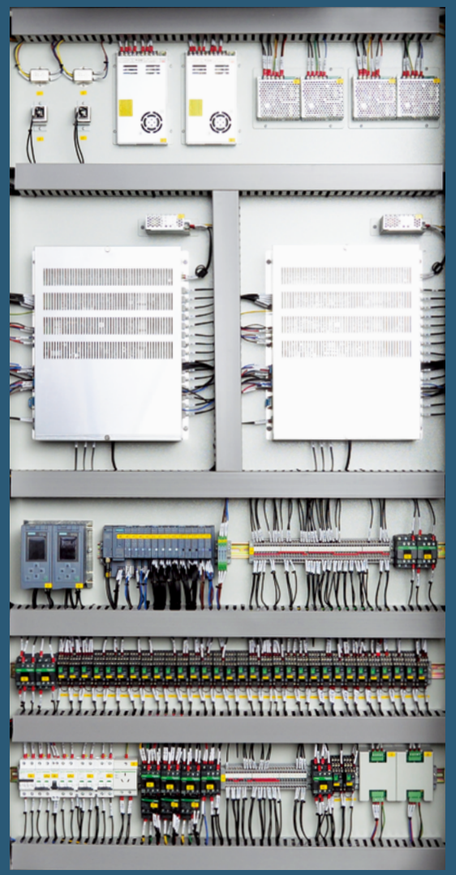
IGBT Rectifier Four-Quadrant Power Cell

Integrated Design of Main Control Board

- All-digital control board (DSP + FPGA + ARM) with high integration and strong anti-interference capability
- Integrated structural design eliminates the risk of loose or oxidized plug-in components, ensuring high operational reliability
- Low power consumption and low heat generation of the board; no cooling fan required, allowing the control cabinet to adopt a fully enclosed dustproof design
- 32-bit floating-point high-speed digital signal processor (DSP) with higher clock frequency and better performance
- High-speed fiber optic communication between main control board and power cells with fault-tolerant design, strong anti-interference capability
- Control platform and software have accumulated over 10^8 hours of field operation
- Third-party reliability testing and verification



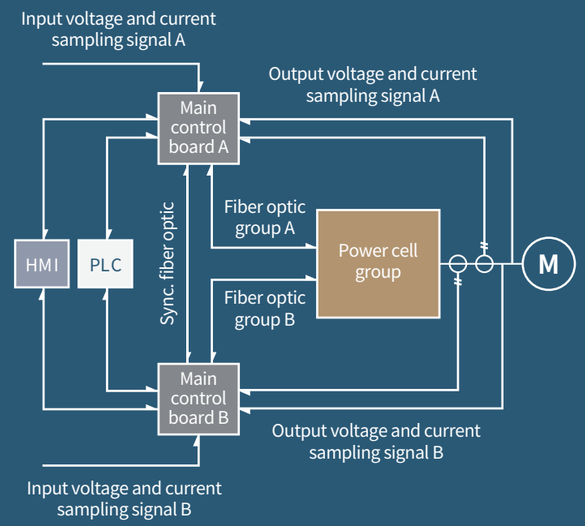
Integrated Main Control Board



Redundant Main Control System Layout

Main Control System Redundancy Design (optional)

- Fully redundant design for main control board, fiber optic communication, control power supply, sensors, etc.
- Main control board hot standby, supporting online replacement
- Automatic switching within 1 ms, no shutdown during faults



Power Cell Reliability Design

- Integrated designwith no plug-in components in the power circuit, ensuring high reliability
- Modular design, interchangeable, easy maintenance
- Laminated composite busbar design, low stray inductance, moisture-proof and dust-proof, high insulation performance
- Metalized film capacitors with self-healing function, wide temperature range, strong over-voltage capability, long service life
- Integrated IGBT and freewheel diode package, excellent parameter matching, short commutation path
- Optional power cell fast automatic bypass function

Air-Cooling Power Cells



- Optional 7th generation IGBT with 175 °C junction temperature
- Board sealed design for long maintenance intervals
- High IP rating for stable operation

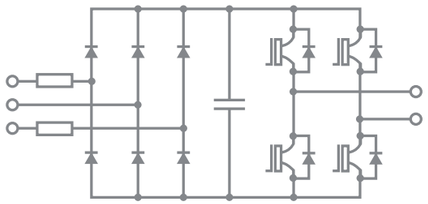
Water-Cooling Power Cells



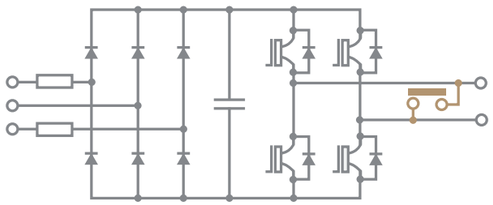
- Locomotive-grade medium voltage IGBT
- Gate drive resistor multi-stage switching technology
- Active clamping technology
- Switching loss and du/dt reduced by approximately 10%
- Each water-cooling power cell has only one water-cooling plate and two water pipe joints, featuring low leakage risk and balanced flow rate

Power Cell Fast Automatic Bypass Design (optional)

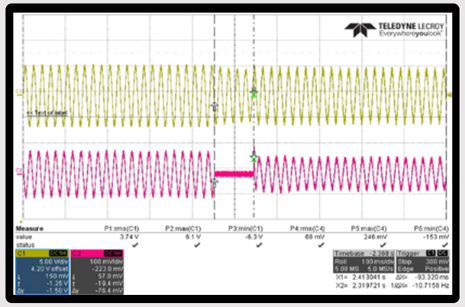
- When one or more power cells fail, the faulty cells can be automatically bypassed quickly to ensure continuous drive operation without shutdown
- The power cell bypass uses mechanical contactor, offering high reliability and strong anti-interference capability
- New generation high-reliability centralized bypass control technology: the bypass power supply, bypass board, and fiber optics are completely independent of the power cell control, enabling reliable bypass even under extreme power cell failure (e.g. complete power loss)
- Neutral point shift technology maximizes output voltage capability; full voltage output is still possible after bypassing one cell
- Dual bypass control fiber optic interfaces, compatible with main control system redundancy technology



Without Power Cell Bypass

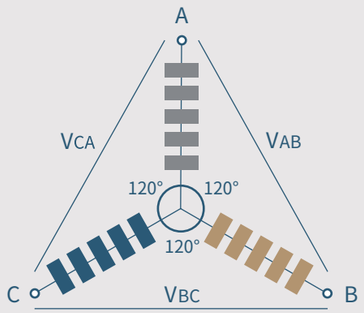


With Power Cell Bypass

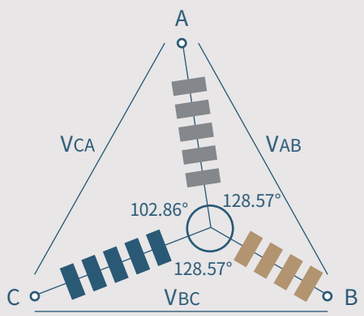


Output voltage Output current

Waveform of Power Cell Bypass



Before Power Cell Bypass

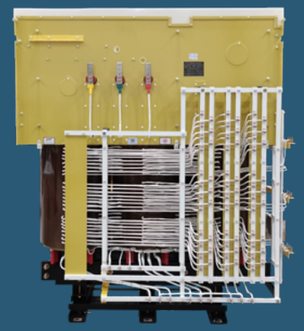


After Power Cell Bypass

Features and Functions Advanced Design for High Reliability

Transformer Integrity Protect Module (TIPM) for Phase-Shifting Transformer Secondary Windings

- Accurately identifies faults such as short circuit and ground fault in secondary windings, and quickly initiates protection to prevent fault escalation and eliminate safety hazards



Highly Targeted
Specifically designed for phase-shifting transformers, avoiding maloperation and non-operation of traditional protection

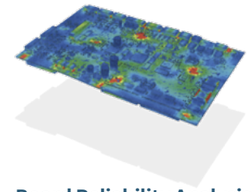
Fast Response
Millisecond-level fault identification and protection activation

Reliable & Stable
Strong anti-interference, stable operation, reduced maintenance costs

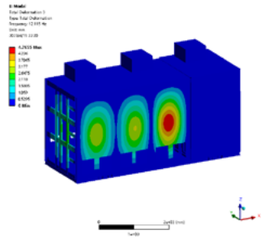
Simple & Efficient
No additional equipment required, no complex commissioning

Multi-Dimensional Reliability Verification Authoritative Third-Party Reports

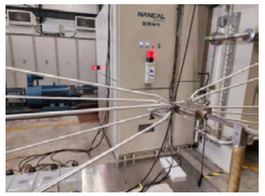
- Board reliability analysis report
- Overall seismic analysis report
- Information security assessment report
- EMC test report
- Type test report

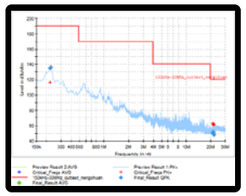


Board Reliability Analysis



Overall Seismic Analysis





EMC Test



Type Test Report

High-Performance Vector Control

Adopting high-performance vector control technology broadens the application range of the drive. It is suitable not only for energy-saving applications with square-torque loads such as fans and pumps, but also for process speed control fields requiring high starting torque, high speed accuracy, and high dynamic performance.

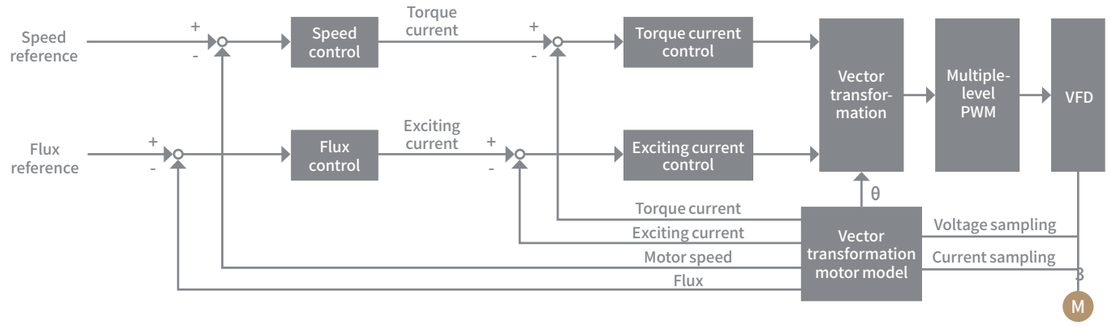
- Speed sensorless vector control

100:1 speed range　　**0.5%** speed accuracy

- Closed-loop vector control

1000:1 speed range　　**0.01%** speed accuracy

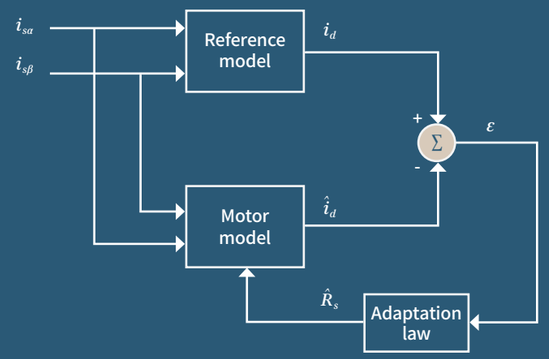
- Load observer function minimizes speed fluctuations during sudden load changes
- Initial rotor position detection for synchronous motors prevents reverse rotation during startup



Speed Sensorless Vector Control

Motor Parameter Self-Measurement and Online Identification

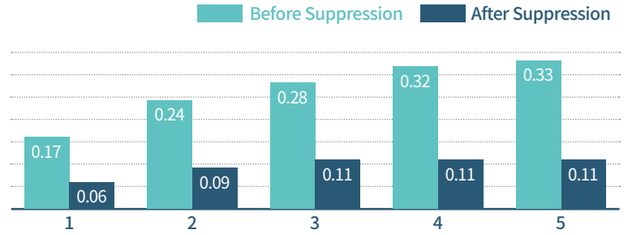
- Motor key parameters are self-measured upon startup, with automatic optimization by the controller, significantly reducing commissioning time
- Online calibration of stator resistance (Rs) and rotor time constant (Tr) to address motor parameter changes caused by heating or inductance saturation
- Unique moment of inertia self-measurement (under load without removing the coupling)



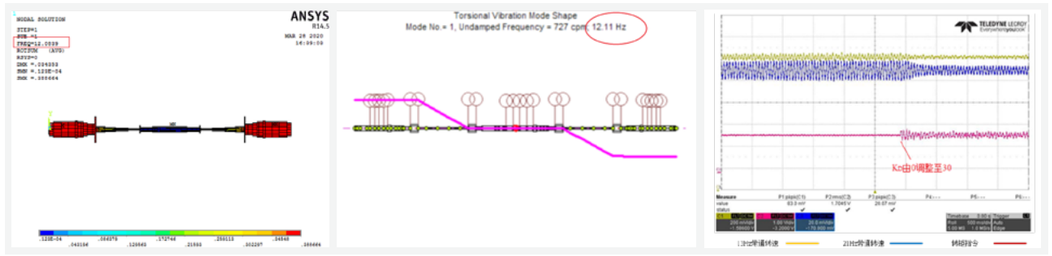
Motor Parameter Online Identification

Torsional Vibration Identification and Active Suppression

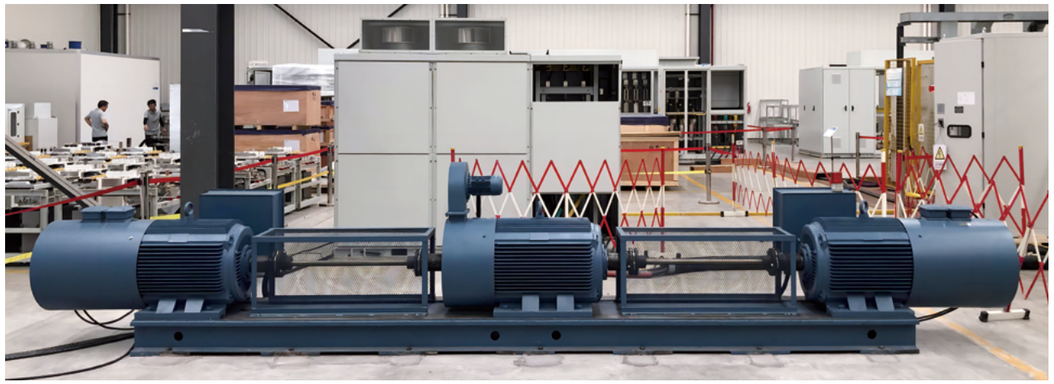
- Developed torsional vibration identification and active suppression algorithm to address issues like torsional vibration and shaft breakage in complex shaft systems
- No need for shaft system analysis, effectively suppress torsional vibration, ensuring safe and stable operation at the critical torsional vibration speed point
- Suppress sub-synchronous torsional interactions under islanded power generation



Torsional Vibration Amplitude Comparison: Before vs. After Suppression



Torsional Vibration Identification and Active Suppression

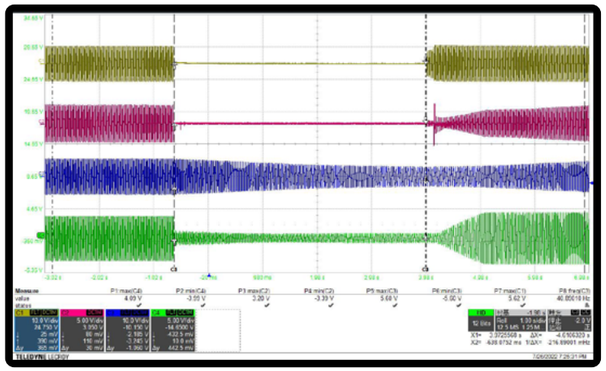


Test Bench for Torsional Vibration Identification and Active Suppression

Low Voltage Ride Through (LVRT)

When grid experiences short-term fluctuations, voltage dips, or even interruptions, LVRT technology enhances the drive's ability to maintain operation

- LVRT function automatically activates when the power cell bus voltage drops below a threshold
- The system enters torque limiting and kinetic energy buffering modes to maintain bus voltage stability
- It exits and resumes normal operation automatically after grid recovery, achieving a full low voltage (even zero voltage) ride through
- Zero voltage ride through duration depends on load and moment of inertia

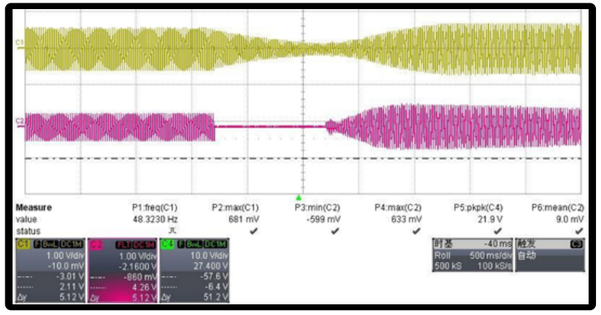


Input phase A voltage　Input phase A current
Output phase A voltage　Output phase A current

LVRT Test Waveform Under Load

Speed Tracking Restart (Flying Start)

- **Automatic speed detection**
  When the motor is not completely stopped, the drive automatically detects the motor's actual speed and phase
- **Bumpless restart**
  After accurately matching the motor speed, the drive output frequency synchronizes with the motor speed for smooth restart
- **Ensuring production continuity**
  It supports fast recovery after power failure or fault



Output voltage　Output current

Speed Tracking Restart Waveform

Motor Fast Braking Technology

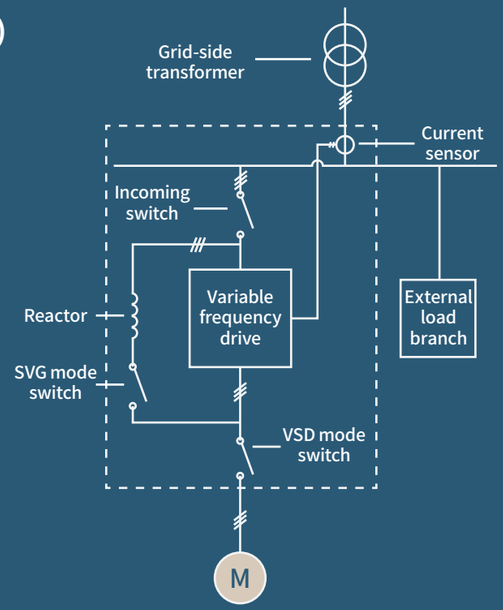
- Provide multiple fast braking technologies: four-quadrant regenerative braking, DC chopper braking, flux-enhanced braking, dual-frequency braking, and low-speed DC braking
- Maximize the drive's braking capability through advanced software control algorithms without adding hardware, shortening motor deceleration time

Integrated Variable Speed and SVG Device (VSV) (optional)

Patented technology of Nancal Electric.
When motor drive is not required, it operates in SVG mode for reactive power compensation and harmonic suppression.

VSV	01	02
two modes Dual function	**VSD mode** Motor drive	**SVG mode** Dynamic reactive power compensation

- No additional reactive power compensation devices needed on site, no extra maintenance costs
- Utilize the existing drive with only the addition of a reactor and switchgear, allowing small occupied space
- In SVG mode, the drive remains in running status, which helps improve equipment reliability



Synchronous Transfer Technology

Smooth and bumpless transfer
protect the motor, drive, and grid

Transfer under load without shutdown
ensure production continuity for critical processes

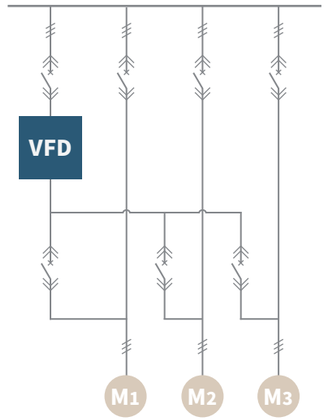
Support starting multiple motors with one drive
improve equipment utilization by enabling sequential synchronous start-up and transfer of multiple motors

Synchronous up transfer
(variable frequency soft start → power frequency operation)

- **Precise synchronization:** align VFD output frequency, voltage and phase with grid parameters
- **Close first, then open:** after synchronization confirmation, close power frequency circuit first, then disconnect VFD circuit
- **Seamless transfer:** no shutdown, ensuring stable motor speed and current

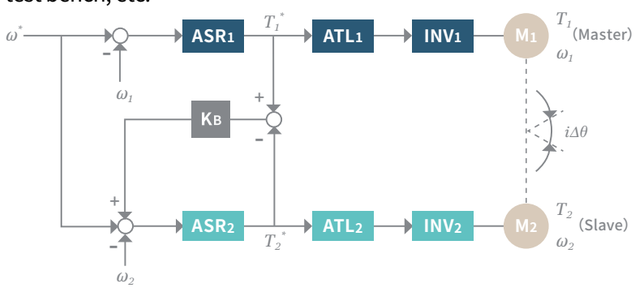
Synchronous down transfer
(power frequency operation → variable frequency operation)

- **Automatic tracking:** connect VFD circuit, synchronize with grid parameters
- **Torque takeover:** adjust the output to take over motor load torque
- **Stable transfer:** disconnect power frequency circuit and complete the transfer, ensuring smooth load operation

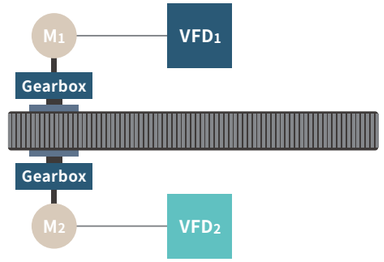


Master-Slave Control Load Distribution

Through the load balancing master-slave system, it achieves synchronized speed and balanced torque distribution of dual-motor or multi-motor drive systems, with torque imbalance less than 1%. It's suitable for mill, belt conveyor, test bench, etc.



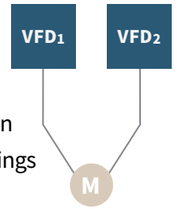
Dual-Motor Master-Slave Control Load Distribution



Belt Conveyor Application

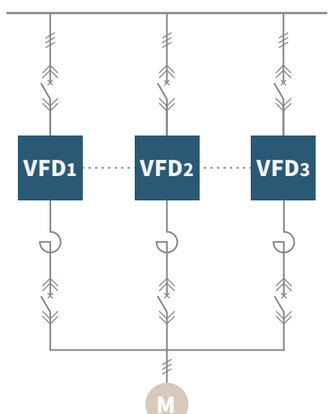
Dual-Winding Motor Control

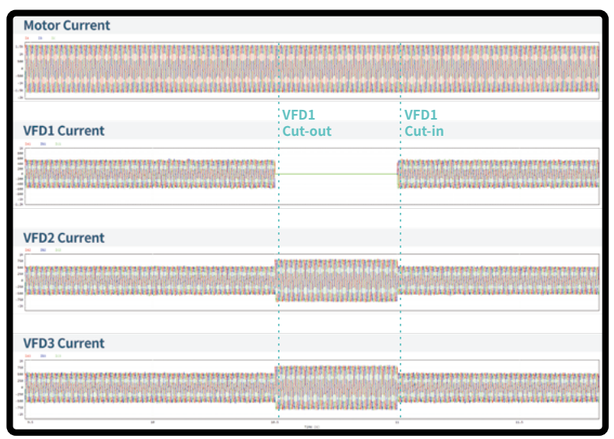
- Two drives with identical structure, each with three-phase output connected to the two stator windings of the motor
- The control systems of the two drives are synchronized via high-speed fiber optic communication
- Master-slave control achieves complete decoupling and optimized control of independent windings
- Applicable to multi-winding motors



Multi-Drive Parallel Technology

- Parallel connection of multiple drives breaks the power limit of a single drive, meeting the drive requirements of large motors
- Supporting N+1 redundancy design: a faulty drive can be automatically exit, allowing the system to continue running without shutdown risk
- High-precision power balancing control strategy achieves current sharing among parallel drives
- A repaired drive can be put into operation online while the system is running
- Motor current keeps uninterrupted during both cut-out and cut-in





Multi-Drive Parallel Under Load Cut-out /Cut-in Waveform

Multiple-Operation One-Standby Fast Switching Technology

Adopting industry-leading "multiple-operation one-standby" fast switching technology, it provides system-level redundancy, completely eliminating unplanned shutdown and ensuring continuous and stable operation for critical processes.

Significant reduction of shutdown risk

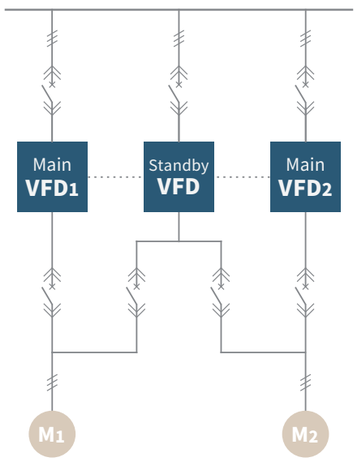
- In normal operation, the standby drive remains in hot standby, synchronizing operating parameters with the main drives in real time
  If any main drive fails, automatic switching to the standby drive occurs within 200 ms
- The switching process incorporates comprehensive electrical isolation and protection mechanisms, ensuring safety for the motor, drive, and grid throughout
- Support N+1 redundancy for multiple main drives, flexibly adapting to different system scales
- Especially suitable for industries with extremely high requirements for production continuity, such as nuclear power, mining, metallurgy, chemical, etc.

Online maintenance capability

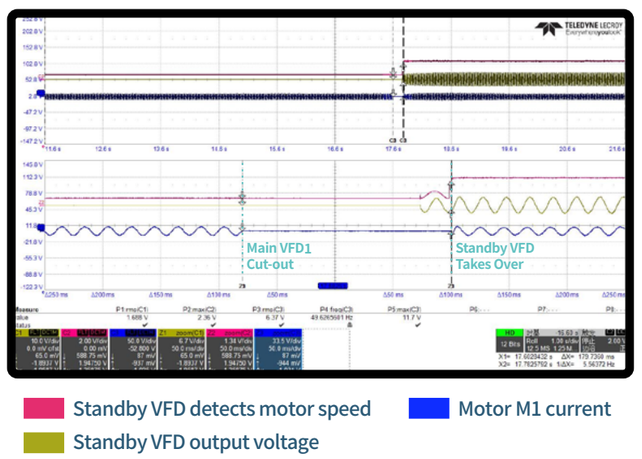
- The standby drive can quit running for maintenance without stopping the system, solving the pain point of "shutdown for maintenance" in traditional solutions
- It eliminates the risk of unplanned shutdown, providing 100% production continuity assurance for critical processes

Switchback after fault repair

- After a main drive is repaired, it can switch back and take over from the standby drive, and the standby drive returns to hot standby
- The online switchback process is bumpless, ensuring continuous and stable load operation without affecting production



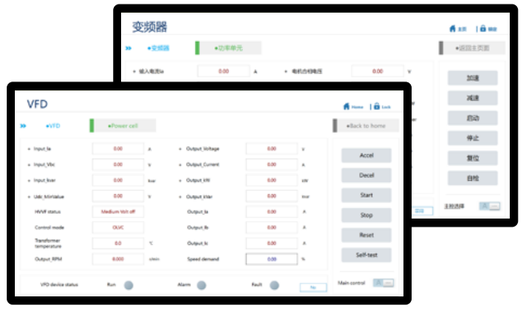
Two-Operation One-Standby



Waveform During Main-Standby Switching

High-Resolution Color HMI

- 7/10/15 inches color touch screen, graphical interface, easy to operate
- Parameter setting and real-time status monitoring
- Alarm/fault messages, logging, and fault waveform recording
- Multiple languages available: Chinese, English, Russian, Spanish, etc.



Pre-Commissioning Function

- For applications with complex timing logic such as main-standby drive switching and VFD soft start transfer, the pre-commissioning function allows verification of system logic functions, switch status feedback, communication data flow, and control performance before energizing the drive and running the motor. This enables relevant logic commissioning to be completed in advance



- Pre-commissioning greatly improves on-site commissioning efficiency, shortens the commissioning cycle, and reduces risks associated with commissioning under medium voltage with the motor

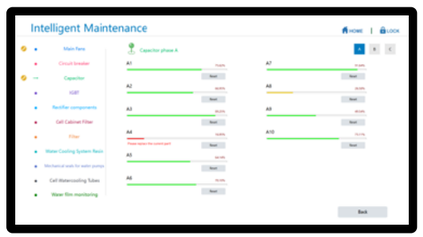
Remote Commissioning & Monitoring Software (Eagle Eye)

- PC-based commissioning and monitoring software with a graphical interface, displaying real-time parameter variables and waveforms
- Support remote communication connection for easy remote commissioning and maintenance
- The real-time waveform display is similar to an oscilloscope, enabling oscilloscope-free commissioning
- Intelligent fault diagnosis record with automatic waveform capture before and after faults, facilitating fault analysis



Prognostic and Health Management (PHM)

- Full-lifecycle intelligent maintenance
- Timely maintenance alerts, improving system perational reliability
- Replace conventional extensive periodic maintenance, avoiding under-maintenance and over-maintenance
- Real-time condition prediction for critical components such as IGBTs and capacitors



Advanced Design

Superior topology
- ✓ cells in series multi-level
- ✓ transformer multi-pulse design

Integrated design
- ✓ main control board
- ✓ power cells

Redundancy design of key components
- ✓ main control system
- ✓ power cells
- ✓ cooling system

High-reliability cooling and protection design
- ✓ highly reliable water-cooling cells & system
- ✓ high IP rating air-cooling cells

Reliable Hardware

- ✓ UV conformal coating on boards
- ✓ locomotive-grade IGBT, with high withstand voltage and high junction temperature
- ✓ laminated composite busbar design
- ✓ metallized film capacitors

Excellent Control

- ✓ high-performance speed sensorless vector control
- ✓ motor parameter self-measurement and online identification
- ✓ torsional vibration identification and active suppression
- ✓ low voltage ride through (LVRT)
- ✓ prognostic and health management (PHM)

Comprehensive Test and Verification

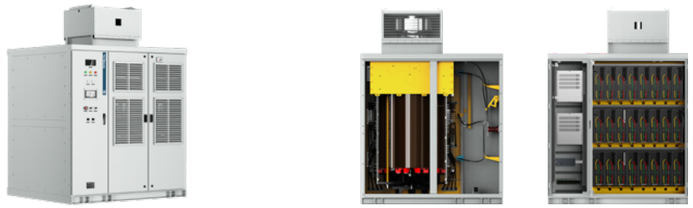
Self-developed automated test systems
- ✓ board test
- ✓ power cell test

Rigorous testing at pilot stage
- ✓ medium/low temperature test
- ✓ salt spray test
- ✓ dustproof test of power cells
- ✓ vibration test

Authoritative third-party reports
- ✓ reliability analysis report
- ✓ overall seismic analysis report
- ✓ information security assessment report
- ✓ EMC test report
- ✓ type test report

Low Power Range

Integrated design
Higher power density, smaller cabinet, less occupied space



Medium Power Range

Multiple cabinet sizes available for the same rating
Adaptable to flexible layout needs in different industrial scenarios



High Power Range

MV pre-charge as standard
Wide capacity coverage
Meet a broader range of industrial needs



Control System

- Integrated main control board
- Touch screen

Power Cells

- Voltage: **690 V**
- Current range: **40 A** to **1250 A**
- **Film capacitors** as standard
- Cooling method: **air-cooling**

Phase-Shifting Transformer

- H-class insulation impregnated as standard; epoxy casting optional
- Secondary windings adopt phase-shifting design for multi-pulse rectification (⩾30 pulses), reducing input harmonics and improving power factor
- Transformer integrity protect module (TIPM) for effective secondary windings fault protection



Dry-Type
Phase-Shifting
Transformer

Pre-Charge Cabinet

- This provides current-limiting pre-charging function for large-capacity medium voltage drives, effectively suppressing inrush current during power on, protecting the grid and equipment

Excitation Cabinet

- Brush excitation or brushless excitation, full digital control, working with the drive to achieve optimal power factor control for synchronous motors

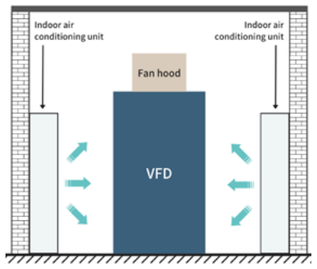
Power Frequency Bypass Cabinet

- Optional manual or automatic bypass, with advanced bumpless up/down transfer technology for synchronous phase-locked transfer between variable frequency operation and power frequency operation

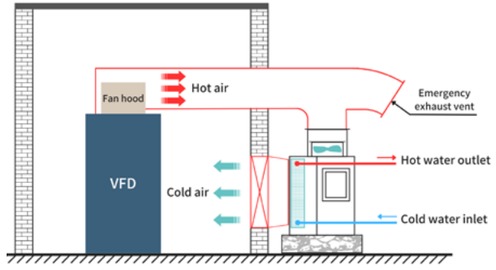
Cooling System

- Cabinet-top aluminum alloy external rotor fans for high reliability, free maintenance, and efficient cooling
- Power cells use separate air ducts for effective dust protection of boards and electrical components
- Optional N+1 redundant fan design, fan failure does not affect drive operation
- Optional air-water cooling HEX, adopting external cooling water for indirect cooling; drive's air ducts are sealed for overall dustproofing and effective cooling

01 Indoor Circulation



02 Air-Water Cooling HEX



Input	Rated Voltage	3-phase, 3 kV to 35 kV
	Frequency	50/60 Hz ± 5%
	Voltage Fluctuation	± 10% full load output, -10% to -40% long-term derating output
	Power Factor	>0.95 (30% to 100% load)
	Current Harmonics	Meets IEEE519, GB/T14549
Output	Voltage	0 to 13.8 kV
	Capacity	220 kVA to 30000 kVA
	Frequency	0.5 Hz to 260 Hz (others customizable)
	Overload Capacity	Standard: 120%/1 min (others customizable)
	Inverter Efficiency	⩾98.5%
Control	Control Method	Speed sensorless vector control/closed-loop vector control/VVVF control
	Motor Types	Asynchronous motors, excitation synchronous motors, permanent magnet synchronous motors
	Speed Range	1000:1 (closed-loop); 100:1 (open-loop)
	Speed Accuracy	0.01% (closed-loop); 0.5% (open-loop)
	Acceleration/Deceleration Time	0.1 s to 3200 s (load dependent)
	Operation Mode	Remote/Local, Auto/Manual
	Control Power Supply	AC 220 V/DC 220 V/ DC 110 V optional
	Digital Inputs/Outputs	16 channels, relay dry contacts (expandable) 10 channels, relay dry contacts (expandable)
	Analog Inputs/Outputs	1 channel, 4 to 20 mA/0 to 10 V (expandable); 4 channels, 4 to 20 mA (expandable)
	Fieldbus	Modbus-RTU/Modbus-TCP/Profinet optional (others customizable)
HMI	Panel Display	Color touch screen, multi-language support (Simplified Chinese, English, Russian, Spanish, etc.)
Environment	Altitude	Below 1000 m, derating above 1000 m or customizable
	Ambient Temperature	-15 °C to 40 °C (derating above 40 °C, max. 50 °C)
	Ambient Humidity	Max. 95% relative humidity, no condensation
	Storage Condition	-40 °C to 70 °C
	Equipment Noise	<80 dB (as standard)
	Cooling Method	Air-cooling
	Protection Rating	IP31 (other IP ratings customizable)
	Installation Site	Indoor, free from explosive or corrosive gases, conductive dust, oil mist (special environments customizable)
Others	Protection Functions	Overvoltage, overcurrent, motor overload, power cell overload, transformer overheating, ground fault, fan failure, medium voltage cabinet door interlock, etc.
	Reference Standards	IEC 60529, IEC 61800-3, IEC 61800-4, IEC61800-5-1, IEEE 519 and equivalent GB

NC HVVF 10/10-5000(S/SS/R/C/1000SV)

① ② ③ ④ ⑤ ⑥

①	NC	Nancal Electric	
②	HVVF	Medium Voltage Variable Frequency Drive	
③	10/10	Input/Output Voltage(kV)	
④	5000	Output Capacity (kVA)	
⑤	S	Synchronous Motor	Default: Asynchronous motor
	SS	Soft Start Function	Default: N/A
	R	Four-quadrant Function	Default: N/A
	C	Chopper Function	Default: N/A
⑥	1000	Reactive Power Compensation Capacity (kvar)	
	SV	Reactive Power Compensation Function	Default: N/A

Output Voltage 6 kV

Rated Capacity (kVA)	**Adapted Standard Motor Power** (kW)	**Reference Output Current** (A)	**Standard Dimensions** (incl. fan) **W*D*H** (mm)	**Weight** (kg)	**Airflow** (m^3/min)
275-1000	220-800	27-98	1960*1700*2692	2500-3100	142
1125-2000	900-1600	109-184	2200*1700*2792	3850-5000	200
2250-2800	1800-2240	212-263	4100*1700*2550 (Design A)	5500-6200	333
			4995*1500*2550 (Design B)	5800-6500	
3150-3950	2500-3150	293-369	4475*1700*3076 (Design A)	8050-8400	378
			5427*1500*3076 (Design B)	8450-8800	
4200-5650	3350-4500	393-528	6900*1700*3276	12650-14000	541
6250-7500	5000-6000	576-691	7300*1800*3276	15100-15800	779
7900-9400	6300-7500	725-850	7400*2000*3276	16200-20700	764
8900-10700	8000-8800	907-997	11700*2400*3276	26000-28000	1585

For higher capacity or current ratings, please consult our sales/technical support team.

Output Voltage 10 kV					
Rated Capacity (kVA)	**Adapted Standard Motor Power** (kW)	**Reference Output Current** (A)	**Standard Dimensions** (incl. fan) **W*D*H** (mm)	**Weight** (kg)	**Airflow** (m^3/min)
275-1560	220-1250	16-91	1960*1700*2692	2550-4400	142
1750-3150	1400-2500	101-176	2900*1700*2792	5700-7500	283
3500-4750	2800-3800	197-267	4900*1700*2826 (Design A)	8600-9400	402
			6065*1500*2826 (Design B)	8950-9700	
5000-6250	4000-5000	282-348	4900*1700*3236 (Design A)	10650-12000	721
			6172*1500*3076 (Design B)	11000-12500	
7000-9400	5600-7500	389-521	8300*1700*3276	17250-19200	837
10000-12500	8000-10000	556-686	8500*1800*3276	22550-26000	1202
14000-16900	11200-13500	746-883	9000*2000*3276	27000-29450	1415
17300	15000	981	15800*2600*3276	34000	3000

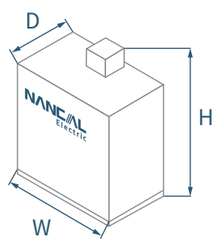
For higher capacity or current ratings, please consult our sales/technical support team.

Note:

The above tables are for reference only.
Actual dimensions are subject to final design.

Design A – Power cells arranged back-to-back on front and rear sides
Design B – All power cells arranged on the front side
Not labeled – Same as Design B

For other voltage classes, please consult our sales/technical support team.





Control System

- Integrated main control board
- Touch screen
- PLC

Power Cells

- Voltage: **1450 V/1750V**
- Current range: **465 A** to **3000 A**
- **Film capacitors** as standard
- Cooling method: **water-cooling**

Phase-Shifting Transformer

- Secondary windings adopt phase-shifting design for multi-pulse rectification (⩾30 pulses), reducing input harmonics and improving power factor
- Combined with power-on pre-charge circuit to reduce closing inrush
- Transformer integrity protect module (TIPM) for effective secondary windings fault protection
- Optional Ex p explosion-proof transformer



Oil-Immersed Phase-Shifting Transformer



Explosion-Proof Oil-Immersed Phase-Shifting Transformer

Pre-Charge Cabinet

- This provides current-limiting pre-charging function for large-capacity medium voltage drives, effectively suppressing inrush current during power on, protecting the grid and equipment

Excitation Cabinet

- Brush excitation or brushless excitation, full digital control, working with the drive to achieve optimal power factor control for synchronous motors

Power Frequency Bypass Cabinet

- Optional automatic bypass, with advanced bumpless up/down transfer technology for synchronous phase-locked transfer between variable frequency operation and power frequency operation

Cooling System

- Closed circulation with deionized water for high efficiency heat dissipation, high reliability, low noise
- Plate heat exchanger isolates and exchanges heat with user-side external water
- Optional external air-water cooling HEX or chiller
- One-operation pump and one-standby pump with periodic switching
- Redundancy design of sensors, ion exchange tanks, etc. (optional)
- Integrated metal welded water-cooling plate with fewer water pipes for lower leakage probability, realizing balanced flow
- Stainless steel piping



Input	Rated Voltage	3-phase, 3 kV to 35 kV
	Frequency	50/60 Hz ± 5%
	Voltage Fluctuation	± 10% full load output, -10% to -40% long-term derating output
	Power Factor	>0.95 (30% to 100% load)
	Current Harmonics	Meets IEEE519, GB/T14549
Output	Voltage	0 to 18 kV
	Capacity	7000 kVA to 180000 kVA
	Frequency	0.5 Hz to 260 Hz (others customizable)
	Overload Capacity	Standard: 120%/1 min (others customizable)
	Inverter Efficiency	⩾98.5%
Control	Control Method	Speed sensorless vector control/closed-loop vector control/VVVF control
	Motor Types	Asynchronous motors, excitation synchronous motors, permanent magnet synchronous motors
	Speed Range	1000:1 (closed-loop); 100:1 (open-loop)
	Speed Accuracy	0.01% (closed-loop); 0.5% (open-loop)
	Acceleration/Deceleration Time	0.1 s to 3200 s (load dependent)
	Operation Mode	Remote/Local, Auto/Manual
	Control Power Supply	AC 220 V/DC 220 V/DC 110 V optional
	Digital Inputs/Outputs	16 channels, relay dry contacts (expandable) 10 channels, relay dry contacts (expandable)
	Analog Inputs/Outputs	1 channel, 4 to 20 mA/0 to 10 V (expandable); 4 channels, 4 to 20 mA (expandable)
	Fieldbus	Modbus-RTU/Modbus-TCP/Profinet optional (others customizable)
HMI	Panel Display	Color touch screen, multi-language support (Simplified Chinese, English, Russian, Spanish, etc.)
Environment	Altitude	Below 1000 m, derating above 1000 m or customizable
	Ambient Temperature	-15 °C to 40 °C (derating above 40 °C, max. 50 °C)
	Ambient Humidity	Max. 95% relative humidity, no condensation
	Storage Condition	-40 °C to 70 °C
	Equipment Noise	<75 dB (as standard)
	Cooling Method	Water-cooling
	Protection Rating	IP31 (other IP ratings customizable)
	Installation Site	Indoor, free from explosive or corrosive gases, conductive dust, oil mist (special environments customizable)
Others	Protection Functions	Overvoltage, overcurrent, motor overload, power cell overload, transformer overheating, ground fault, fan failure, medium voltage cabinet door interlock, etc.
	Reference Standards	IEC 60529, IEC 61800-3, IEC 61800-4, IEC61800-5-1, IEEE 519 and equivalent GB

NC HVVF 10/10-20000(SLO/SS/R/C/5000SV)

① ② ③ ④ ⑤ ⑥

①	NC	Nancal Electric	
②	HVVF	Medium Voltage Variable Frequency Drive	
③	10/10	Input/Output Voltage(kV)	
④	20000	Output Capacity (kVA)	
⑤	S	Synchronous Motor	Default: Asynchronous motor
	L	Water-cooling	
	O	Oil-immersed transformer	Default: Dry-type transformer
	SS	Soft Start Function	Default: N/A
	R	Four-quadrant Function	Default: N/A
	C	Chopper Function	Default: N/A
⑥	5000	Reactive Power Compensation Capacity (kvar)	
	SV	Reactive Power Compensation Function	Default: N/A

Output Voltage 6 kV

Rated Capacity (kVA)	Adapted Standard Motor Power (kW)	Reference Output Current (A)	Standard Dimensions (incl. fan) W*D*H (mm)	Weight (kg)
4150-4400	3600-3800	422-446	6100*1800*3002	9500
4600-6450	4000-5600	469-645	6100*2000*3002	10700
6900-7850	6000-6800	691-771	6100*2000*3002	11200
8200-10200	7100-8800	805-991	6100*2000*3002	11500
11000-12700	9500-11000	1065-1225	6300*2000*3202	11800
13800-15600	12000-13500	1329-1450	8500*2200*2971	13500
16100-19000	14000-16500	1501-1750	8500*2200*3202	15500
19600-23000	17000-20000	1803-2089	9200*2400*3202	17200

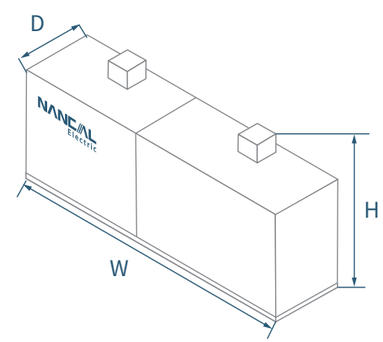
For higher capacity or current ratings, please consult our sales/technical support team.

Output Voltage 10 kV

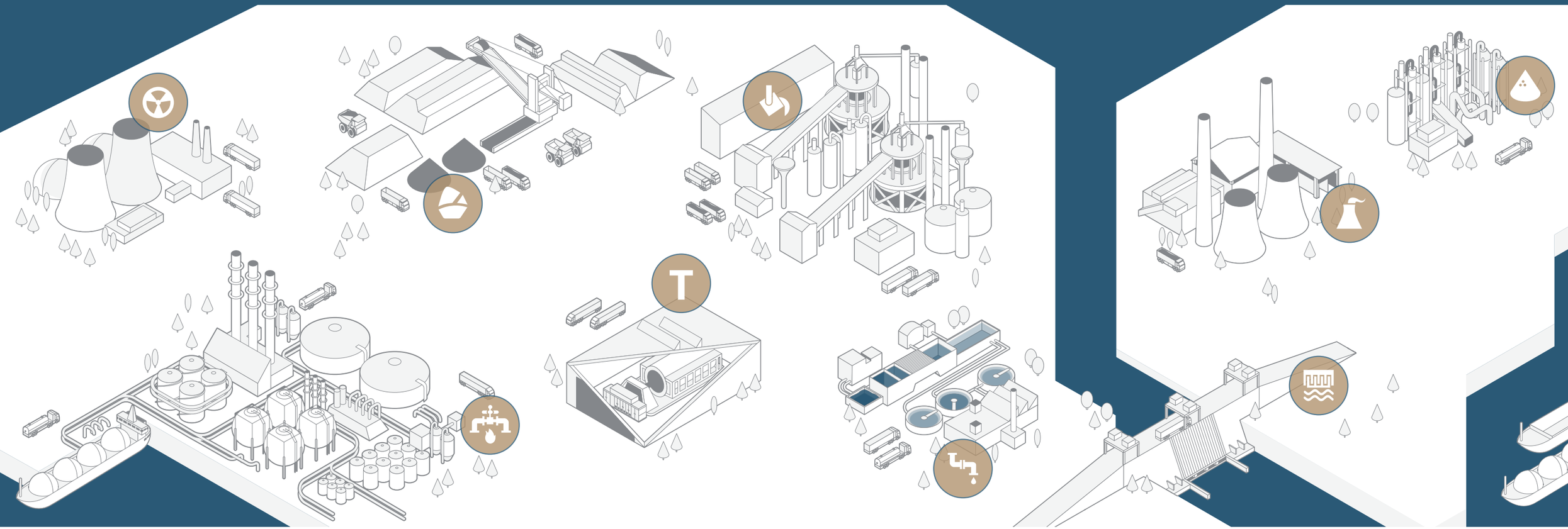
Rated Capacity (kVA)	Adapted Standard Motor Power (kW)	Reference Output Current (A)	Standard Dimensions (incl. fan) W*D*H (mm)	Weight (kg)
6900-7850	6000-6800	417-473	8200*2000*3002	12200
8200-10400	7100-9000	493-626	8200*2200*3002	12500
11000-11500	9500-10000	660-686	8200*2200*3002	13500
12900-13500	11200-11700	746-779	8200*2200*3002	14200
14400-17300	12500-15000	832-965	8200*2200*3002	14800
19600-21900	17000-19000	1082-1209	8200*2200*3002	15000
23000-26500	20000-23000	1253-1441	8200*2200*3202	15800
27600-32200	24000-28000	1480-1727	12100*2200*2971	23200
34000-39100	30000-34000	1831-2076	12100*2200*3202	24700
40300-48300	35000-42000	2115-2500	12800*2600*3202	31000

For higher capacity or current ratings, please consult our sales/technical support team.

Note:
The above tables are for reference only. Actual dimensions are subject to final design.
Transformers are configured according to specific project requirements.
For other voltage classes, please consult our sales/technical support team.



Application Scenarios



Nuclear Power

main helium circulator,
reactor coolant pump,
circulating pump,
desalination pump

Mining

ball mill, semi-autogenous grinding mill,
hoist, grinding roll, crusher,
belt conveyor, slurry pump,
diaphragm pump, main fan

Metallurgy

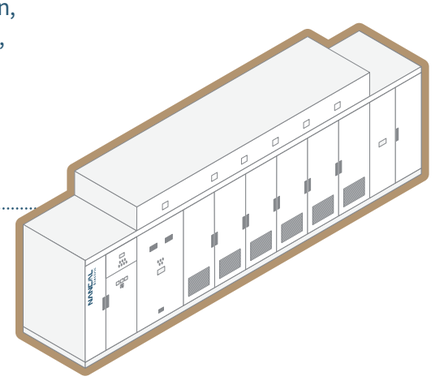
sintering main exhaust fan,
blast furnace blower,
air separation compressor,
rolling mill, dedusting fan,
descaling pump

Power Generation

induced fan, supply fan,
primary/secondary fan,
circulating pump,
condensate pump,
feed pump

Cement

kiln exhaust fan, kiln head exhaust fan,
circulating fan, high-temperature fan,
vertical mill



Natural Gas Pipelines, LNG, Chemical

pipeline compressor, cracked gas compressor, propylene compressor,
ethylene compressor, nitrogen compressor, LNG refrigerant compressor,
BOG compressor, syngas compressor, gas blower, water injection pump,
oil transfer pump, electric submersible pump

Large Test Benches

wind tunnel test bench,
compressor test bench,
pump test bench,
motor test bench

Municipal

water intake pump,
water supply pump,
fresh water pump,
desalination pump,
booster pump

Water Conservancy

large vertical single-stage
single-suction centrifugal pump,
horizontal single-stage double-suction
centrifugal pump

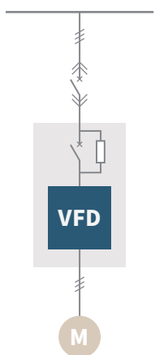
Standard Speed Regulation



Speed Regulation with Medium Voltage Pre-Charging

Suitable for

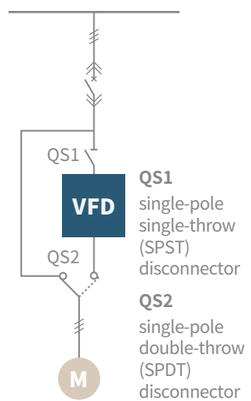
- ✓ Large motor power
- ✓ Limited grid capacity



One-Drive-One with Manual Power Frequency Bypass

Suitable for

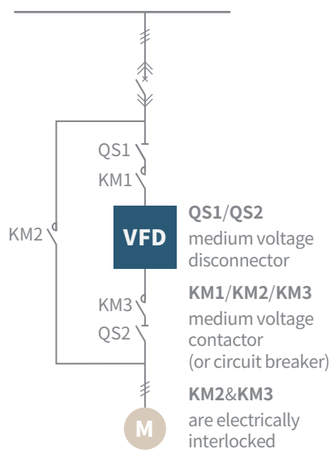
- ✓ Short-term shutdowns for switching possible
- ✓ Direct power frequency start possible



One-Drive-One with Automatic Power Frequency Bypass

Suitable for

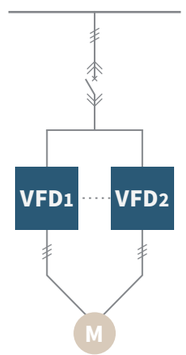
- ✓ High continuity requirements
- ✓ Direct power frequency start possible



Dual-Winding or Multi-Winding Motor Control

Suitable for

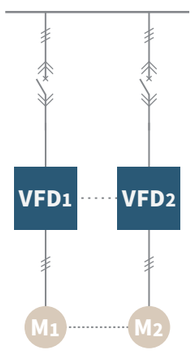
- ✓ High-power motor drive
- ✓ Independent power supply for dual or multiple windings



Master-Slave Control Dual or Multiple Drives

Suitable for

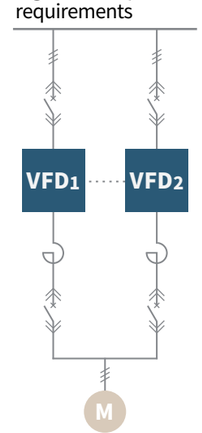
- ✓ Synchronized drive of dual or multiple motors
- ✓ Precise speed and torque coordination
- ✓ Heavy loads requiring high synchronization accuracy



Dual or Multiple Drives in Parallel

Suitable for

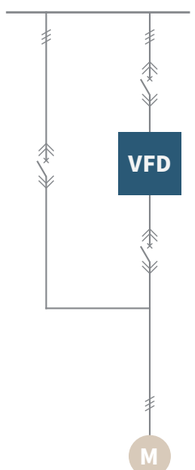
- ✓ Ultra-high power load drive
- ✓ Multi-drive coordination and current sharing
- ✓ High reliability and redundancy requirements



One-Drive-One Variable Frequency Soft Start

Suitable for

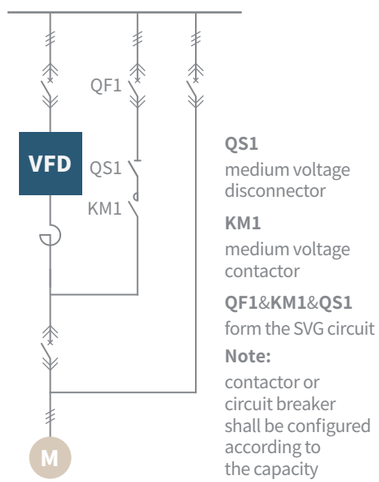
- ✓ Large motor power or limited grid capacity
- ✓ Soft start application and speed regulation



One-Drive-One Variable Frequency Soft Start + SVG

Suitable for

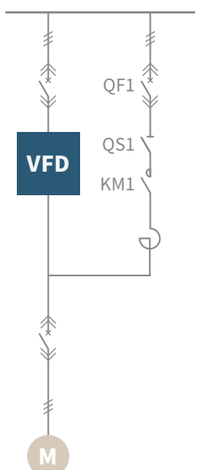
- ✓ Motor soft start application
- ✓ Reactive compensation function required



One-Drive-One Speed Regulation + SVG

Suitable for

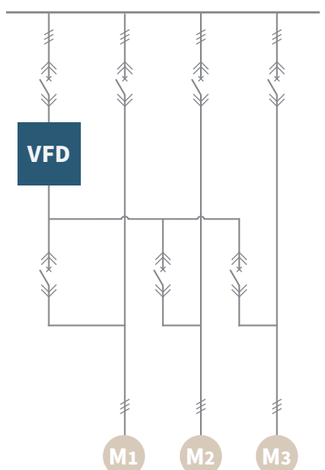
- ✓ When motor drive is not required, the equipment performs reactive power compensation and harmonic suppression



One-Drive-Multiple Variable Frequency Soft Start

Suitable for

- ✓ Sequential soft start and synchronous transfer of multiple motors
- ✓ Balance investment cost and grid capacity

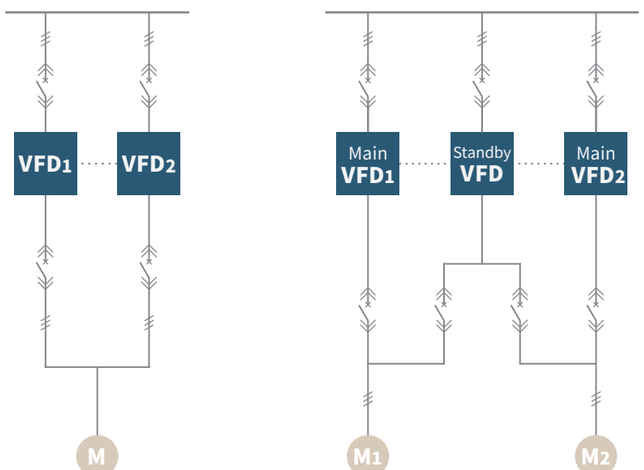


Dual-Drive Mutual Standby / Two-Operation and One-Standby (2+1)

(expandable to 3+1, 4+1)

Suitable for

- ✓ High production continuity and operational stability requirements
- ✓ Fast switchover between main and standby drives
- ✓ Support operation without shutdown; individual equipment can be connected or disconnected and maintained during production



Third-Generation Nuclear Power AP1000 Reactor Coolant Pump Drive



In 2023, the Nancal Electric MV drive (10.5 kV/50 Hz input, 6.9 kV/60 Hz output, 10500 kVA capacity) was successfully commissioned as the hot standby drive for the "four-operation and one-standby" configuration of the third-generation AP1000 reactor coolant pump (RCP) imported drives. In 2024, Nancal Electric directly replaced the original imported drive, completing the first localization replacement of an RCP drive. In 2025, the remaining three imported RCP drives on the unit 2 were fully localized, all full-load tests passed on first attempt, making it China's first AP1000 unit operating under full load relying entirely on localized RCP drives. In 2026, the localization replacement of four imported RCP drives for unit 1 was smoothly accomplished, achieving grid connection on the first trial. With this, Nancal Electric has successfully completed the localization substitution of 8 sets of imported RCP drives for the two units at phase I. The Nancal Electric localized RCP drive has been included in the National Energy Administration's list of First Major Technical Equipment in the Energy Sector. The project won the Second Prize for Science and Technology Progress from the China Nuclear Energy Association (CNEA).

- Main control system redundancy design, supporting online replacement
- The standby drive can take over within 370 ms in case of main drive's fault, ensuring continuous unit operation
- Switchback within 30 ms after main drive repairing, ensuring long-term hot standby availability
- Centralized power cell bypass technology improves unit reliability
- Low voltage ride through (LVRT) for strong grid voltage fluctuation tolerance
- Highly reliable water-cooling system significantly reduces risk of water leakage shutdown
- Prognostic and health management (PHM) ensures reliable equipment operation and optimizes maintenance strategies

Fourth-Generation Nuclear Power HTR Main Helium Fan MV Drive



With 10 kV input and 6 kV output, this highly reliable MV drive (rated capacity 6000 kVA) drives a 4500 kW asynchronous motor. It provides stable variable frequency speed control for the main helium fan, the core equipment of the fourth-generation high temperature gas-cooled reactor, ensuring safe operation of the nuclear power system.

- Dry-type transformer, 36-pulse rectification
- 9-level line voltage output, output frequency 0 to 63.5 Hz, perfectly matching motor operation requirements
- 1750 V/660 A highly reliable water-cooling power cell with two-quadrant chopper design
- Multiple reliability features: main control system redundancy design, low voltage ride through (LVRT), etc.
- Innovative medium voltage DC chopper fast braking technology fully meets the fast and reliable braking requirements of the main helium fan with magnetic bearings

Large Mining Dual Pinion Mill MV Drive



Each large dual pinion mill is equipped with two MV drives with 10 kV/9000 kW, each driving a brushless excitation low-speed synchronous motor. The two drives communicate via fiber optic for master-slave control, automatically achieving load balancing.

- Master-slave control load balancing, imbalance <1%
- Closed-loop vector control, high starting torque, excellent low-speed characteristics, overload capability 150%/1 min
- Frozen charge detection and remove function
- Real-time torque deviation detection at both ends of the coupling to protect equipment safety
- Automatic positioning control for easy maintenance

Steel Sintering Fan MV Drive Import Substitution



The project involves four 6200 kW synchronous motors for sintering fans (including expansion reserve). The original drive system used imported 7.2 kV drives with step-up transformers to soft start the motors before switching them to steam turbine drive. The new system has equipped with Nancal Electric MV drives, featuring direct 10 kV input and 10 kV output, eliminating the need for additional step-up transformers.

- Simple topology, no step-up transformer, lower system losses
- Fewer fault points, higher reliability
- Smaller footprint, lower civil/installation costs, and lower overall cost
- Excellent output waveform, no stress on motor insulation, smoother starting and grid transfer

Coking Plant Induced Fan MV Drive System Retrofit



A coking plant has four 6 kV induced fans (motor powers: 500 kW, 2*800 kW, and 1400 kW) used to guide coking flue gas into the desulfurization tower and denitrification reactor. Under normal operating conditions, the fans do not run at full load all the time; most of the time hydraulic couplings and air valves are used to regulate air intake. The project has adopted Nancal Electric MV drives to adjust motor speed and precisely control air intake, significantly reducing power consumption.

- Variable frequency drive for speed regulation with wide speed range, precise control and fast response
- Bypass system for fast motor-to-grid switching, enabling non-stop operation

Natural Gas Pipeline Electric-Driven Compressor High-Speed Motor Direct-Drive MV Drive



The first station of a natural gas pipeline adopts four electric-driven compressor units, each equipped with a 10 kV/23 MVA water-cooling large-capacity MV drive, driving a 20 MW positive-pressure explosion-proof brushless excitation synchronous motor.

- First successful application of a localized large-capacity water-cooling MV drive in an extreme cold environment as low as -40 °C
- Built-in VSV function enables time-shared motor speed regulation and reactive power compensation
- Oil-immersed transformer, 36-pulse rectification, low input harmonics
- Water-cooling power cells, 17-level line voltage output, good waveform
- Rated output frequency 80 Hz, motor rated speed 4800 r/min, maximum speed 5040 r/min
- Power cell fast automatic bypass for improved reliability

Natural Gas Pipeline Compressor Station MV Drive Import Substitution



This project marks the first successful replacement of an imported drive with a 20 MW-class localized MV drive. With 10 kV input and 8.2 kV output, it drives an original imported 18.5 MW/8.2 kV positive-pressure explosion-proof brushless excitation synchronous motor. Third-party comparison tests showed that Nancal Electric's drive outperformed the imported drive in several metrics, including harmonics, efficiency, noise, and output du/dt, offering significant reference value for large-scale import substitution.

- Typical application of localized drive replacing imported drive and adapting to imported motor
- Successful low voltage ride through (LVRT) after an 18.8% voltage dip
- Rated output frequency 80 Hz

Natural Gas Ethane Recovery Project MV Drive



The natural gas ethane recovery project has two 27 MW electric-driven compressor units, each equipped with a 10 kV/32 MVA MV drive. This continuous process requires high stability. Due to local grid instability and frequent voltage dips, the drives are equipped with low voltage ride through (LVRT) capability. On-site measurement showed a 2.069 s grid voltage loss, during which the drive successfully achieved zero voltage ride through. After grid recovery, the drive speed returned to the value before the voltage loss and remained stable.

- Oil-immersed transformer, 36-pulse rectification, low input harmonics
- Water-cooling power cells, 17-level line voltage output, good waveform
- Low voltage ride through (LVRT) for strong grid voltage fluctuation tolerance
- Prognostic and health management (PHM) for reliable operation and optimized maintenance

59 MVA Petrochemical Fully Electric-Driven Ethylene Three-Machine MV Drive



A large petrochemical electric-driven ethylene three-machine unit is equipped with four sets of 46 MW electric-driven compressor units with 35 kV input and 13.8 kV output. To ensure high reliability, the drive's main control system, PLC, and control power supply all adopt redundancy design. The project has adopted a highly reliable "two-operation and one-standby" complete drive redundancy configuration, i.e., one standby drive serves as a hot standby for two main drives, enabling fault switching within 200 ms.

- World's largest capacity MV drive for fully electric-driven million-ton class ethylene three-machine unit
- 35 kV MV pre-charging technology reduces impact on grid and power cell components
- Centralized power cell bypass technology ensures continuous stable operation
- Torsional vibration identification and active suppression technology extends mechanical lifespan of the unit
- Mature hot standby application experience, switching within 200 ms with speed drop arrested

Million-Ton Class Aromatics Propylene Compressor MV Drive



This MV drive is used for the propylene compressor of a 1.6 million tons/year aromatics plant. With 10 kV input and 10 kV output, it is equipped with a 37500 kVA oil-immersed transformer and drives a 30 MW brushless excitation synchronous motor. The main control system, sensors, fiber optic communication, etc., all adopt redundancy design, enabling automatic switching within 1 ms in case of fault, ensuring continuous, stable and safe operation of the unit.

- 1450 V/2100 A highly reliable water-cooling power cells, 17-level line voltage output
- Power cell supports automatic bypass upon fault, allowing full-load operation even with one faulty cell, significantly enhancing continuous operation capability
- Low voltage ride through (LVRT) effectively copes with grid fluctuations and voltage dips, supporting zero voltage ride through
- Bumpless synchronous transfer capability enables smooth switching between variable frequency and power frequency without current impact

Nitric Acid 4-in-1 Gas-to-Electric High-Speed Motor MV Drive



This project for a 360,000 tons/year nitric acid plant converts the 4-in-1 unit from steam drive to electric drive. It adopts a 10 kV/11,500 kW high-speed motor directly driven by a water-cooling MV drive with an oil-immersed transformer. Multiple redundancy designs ensure safe and stable operation of the unit.

- Direct drive of 6750 r/min high-speed motor
- 35 kV MV pre-charging technology, no current/voltage impact on power cells
- Main control system redundancy design
- Transformer secondary windings protection technology
- Full load output even after bypassing multiple power cells
- Low voltage ride through (LVRT) for strong grid voltage fluctuation tolerance

Polycarbonate Compressor Gas-to-Electric High-Speed PMSM Direct-Drive MV Drive



The polycarbonate 1600-unit mechanical vapor recompression (MVR) gas-to-electric compressor unit adopts a 10 kV input/10 kV output MV drive to drive a 6800 kW high-speed permanent magnet synchronous motor (PMSM).

- Permanent magnet synchronous motor rated speed 7600 rpm, rated frequency 253 Hz; drive maximum output frequency 360 Hz
- Speed sensorless vector control with mature rotor initial position detection ensures no reverse rotation, high torque, smooth operation
- Main control system redundancy design
- Redundant hot standby fan design (N+1) with outlet check valves to prevent backflow

Electric Submersible Pump (ESP) / Submerged Pump with Long Cable MV Drive



Suitable for onshore deep-well oil extraction, offshore oil&gas production, chemical liquid medium transfer, long-distance transfer pumps and other scenarios. Applied in a chemical liquid propane transfer submerged pump project, the MV drive (3.3 kV/350 kW) powers a 261 kW downhole motor, with a power cable of approximately 1000 m between the drive and the motor. The drive effectively addresses key issues such as long-cable overvoltage, choke signal interference, and operation in harsh environments.

- Cell series multi-level topology with sine wave filter provides low output du/dt, suppressing voltage reflection at the source, filtering high-frequency harmonics, and eliminating overvoltage and system resonance risks
- Built-in automatic voltage drop compensation algorithm for long cables ensures stable motor voltage and high control accuracy
- Hardware DC bias isolation + software DC component rejection, compatible with periodic ± DC signals of the choke system, preventing false tripping of overcurrent and ground protection
- Redundant main control system automatic switching <1 ms, power cell automatic bypass, ensuring continuous system operation
- Board UV conformal coating and sealed power cell board design, suitable for harsh operating conditions such as offshore platforms

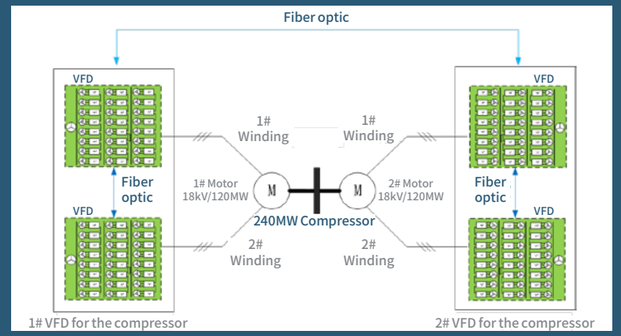
60 MW Compressed Air Energy Storage Project MV Drive



This large-capacity water-cooling MV drive for a 60 MW compressed air energy storage project is adapted to the harsh plateau environment at an altitude of 2780 m. It reliably drives three high-power synchronous motors (39 MW, 2*32 MW), achieving sequential soft start and bumpless synchronous transfer in a "one-drive-three" configuration, ensuring safe and stable operation of the compressor unit.

- One-drive-three time-sharing start + bumpless synchronous transfer; smooth transfer to power frequency after soft start, with no starting impact, the current remains stable during transfer
- MV pre-charging technology effectively suppresses inrush current, avoids closing surge, protecting grid and equipment safety
- Modular water-cooling power cells with a highly integrated main control system, easy maintenance, high reliability
- Seismic design for intensity 7 ensures stable equipment operation under harsh conditions

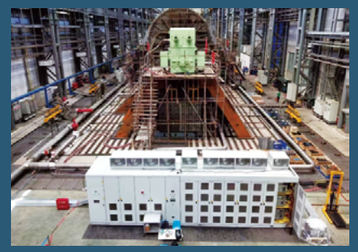
2*130 MVA High-Precision Variable Frequency Drive System for Power System



With 35 kV input and 18 kV output, 2 sets of 130 MVA ultra-large capacity water-cooling medium voltage drives use fiber optic master-slave control to drive two 18 kV/120 MW dual-winding synchronous motors. The two motors are coaxially coupled to drive a 240 MW compressor, achieving high-performance speed regulation. According to a novelty search (No. ISTIS202621008002740SH), this drive is the largest capacity unit in the world (as of April 2026).

- High-performance vector control, torque response <3 ms, speed accuracy <0.02%
- Coaxial drive for dual motors, power distribution deviation <1%
- Torsional vibration identification and active suppression for safe operation at critical speeds
- Motor parameter self-measurement and online identification, inertia self-measurement without removing the coupling

40 MW + 10 MW Four-Quadrant Large Compressor Test Bench MV Drive



The 40 MW large compressor test bench MV drive can drive both brush excitation and brushless excitation synchronous motors. It also features multi-drive synchronized control and torsional vibration identification and active suppression, meeting various complex test conditions.

- Non-standard customized design, adaptable to various special test conditions
- Maximum drive power 40 MW, maximum output voltage 11 kV
- Multi-drive synchronized control for power distribution balance
- Torsional vibration identification and active suppression for safe operation at critical speeds
- Full four-quadrant operation capability, precise load simulation, efficient regenerative braking

Waste Incineration Plant Axial Fan MV Drive System Retrofit



A waste incineration project with 10.5 kV input and 10 kV output drives axial fans with motor powers of 1120 kW and 450 kW. Two Nancal Electric MV drives have been equipped to power the axial fans, achieving energy saving and emission reduction.

- High-performance vector control for smooth speed regulation, optimizing air flow and combustion efficiency, reducing auxiliary power consumption, achieving energy saving and eco-friendly operation
- Power cells with high IP rating, suitable for harsh waste incineration environment, ensuring stable and reliable operation

Cement Kiln Exhaust Fan MV Drive System Retrofit for Energy Saving



A cement plant uses 10 kV, 500 kW kiln exhaust high-temperature fans. As operating conditions and production output change, the air flow needs to be adjusted accordingly. "Material collapse" in the duct can cause motor overcurrent or even tripping. The plant has adopted four Nancal Electric MV drives, which adjust output based on operating conditions, thereby reducing energy consumption. With the drive control retrofit, non-stop operation during material collapse is achieved, ensuring normal kiln production. Meanwhile, the drives can withstand a grid voltage dip of up to 40%, ensuring production continuity.

- Smooth and stable adjustment of air flow and pressure, improving process
- Fast response and strong overload capability to handle load shocks, solving trip shutdown and production interruption caused by material collapse
- Soft start of kiln fan motor with low starting current, reducing impact on grid and mechanical parts

Wastewater Treatment Plant Pump MV Drive



A wastewater treatment plant project with 10 kV input and 10 kV output drives a 400 kW motor for the treatment process. The plant has adopted Nancal Electric MV drive to achieve energy saving and consumption reduction through variable frequency speed regulation.

- 48-pulse rectification, low input harmonics
- Integrated main control board, low power consumption, no fan cooling required
- Fully enclosed control cabinet design with high protection rating, effectively resisting moisture erosion
- Power cell fast automatic bypass, fast bypass without shutdown in case of power cell fault, ensuring continuous operation of the wastewater treatment system

7×24 Rapid Response

- Immediate service response
- Fast solution development
- Efficient on-site handling

On-site Commissioning

- ✓ Professional Tuning
- ✓ Peformance Compliance

Installation Guidance

- ✓ Standard Installation
- ✓ Safe Delivery

Repair & Maintenance

- ✓ Rapid Response
- ✓ Hazard Elimination

Customer File Creation

Whole-Process Support

Regular Follow-Up Visits

- ✓ Proactive Care
- ✓ Operation & Maintenance Optimization

Product Upgrade

- ✓ Function Iteration
- ✓ Perfomance Improvement

Professional Customer Training

Flexible training formats

- ✓ On-site training
- ✓ Factory training
- ✓ Remote training

Full professional skills coverage

- ✓ Basic theory
- ✓ Practical operation
- ✓ Fault diagnosis

Multi-language support

- ✓ English
- ✓ Russian
- ✓ Spanish

Global Network

Domestic

- ✓ Localized after-sales service centers in major cities across China
- ✓ Comprehensive spare parts warehouse in Lingang, Shanghai for prompt delivery

Overseas

- ✓ Localized after-sales service centers in key overseas markets
- ✓ Authorized partners for nearby support in core regions

Shanghai Nancal Electric Co., Ltd.

Manufacturing Base
Unit 5, 1881 Zhengbo Rd., Lin-gang Special Area
of the Shanghai Pilot Free Trade Zone, Shanghai, China

R&D Center
Building 6, 899 Zuchongzhi Rd., Pudong New District,
Shanghai, China

Website
www.nancalelectric.com

E-mail
sales.sh@nancal.com

Website

Some functions are optional and subject to the technical proposal or technical agreement.

The content of this catalog is for reference only, the final interpretation right is reserved by Shanghai Nancal Electric Co., Ltd.

Copyright ©Shanghai Nancal Electric Co., Ltd.

Version: 202606