



Energy Infrastructure & Industrial Solutions

Medium Voltage Drives

Drive Greener, Drive Together



Heating & Power
Generation



Metallurgy



Cement



Petrochemical
& Gas



Mining





DELTA JOINS RE100

100% Renewable Electricity and Carbon Neutrality Targets for Its Global Operations by 2030.



2015

Commitments for "We Mean Business"

- Science-based emissions reduction targets (SBT)
- Climate change information in main reports (TCFD)
- Responsible corporate engagement in climate policy

2018

Commitments for EV100

- Scope:**
Delta's major operation sites
- Commitment:**
- Expansion of EV charging facilities
 - Switch to using EVs for company vehicles by 2030
 - Incentives for employees and customers to use EVs

2021

Commitments for RE100

- Use 100% renewable electricity in global operations by 2030
- Carbon Neutrality**
- Achieve carbon neutrality by 2030
- Race to Zero**
- Signed business ambition to meet the 1.5°C target

ABOUT DELTA

Delta was founded in 1971 and has been the global leader in switching power supply solutions since 2002 and DC brushless fans since 2006. Delta offers some of the most energy efficient power products in the industry, including switching power supplies with efficient over 90%, telecom power with up to 98%, and PV inverters with up to 98.8% efficient. We have also developed the world's first server power supply certified as 80 Plus Titanium with over 96% efficient. We regularly invest around 8% of our annual sales revenues in R&D and have worldwide R&D facilities in Taiwan, China, Europe, India, Japan, Singapore, Thailand, and the U.S.

BUSINESS CATEGORIES



Power Electronics

- Components
- Power and System
- Fan & Thermal Management
- Automotive Electronics



Automation

- Industrial Automation
- Building Automation



Infrastructure

- ICT Infrastructure
- Energy Infrastructure & Industrial Solutions
- Display Solutions



FOCUSED ON SEVEN UN SUSTAINABLE DEVELOPMENT GOALS





Drive Greener, Drive Together

Delta Medium Voltage Drives

Delta’s medium voltage drives (MVDs) are reliable, high-performance drives that can provide enterprises with substantial energy savings while increasing equipment productivity

High Efficiency, Broad Application

- System efficiency higher than 98.5% (excludes phase-shift transformer)
- Optimized fan and pump operations ensure energy savings and shorten return on investment
- Each output phase consists of multiple power modules connected in series to achieve a wide range of output voltage levels
- The drive is suitable for long cable applications without needing to configure the output filter

Enhanced Process, International Certification

- Advanced megawatt-level testing facility established for full load testing capability
- Motor drive guaranteed to operate as predicted during full load testing
- ISO 9001, ISO 14001 international certification

Leading Technology, Exceptional Reliability

- Efficient grid current harmonic control in line with IEEE 519- 1992
- Supplies nearly sinusoidal motor voltages
- Advanced control functions enhance adaptability against unstable grids and ensure higher motor control performance
- Diversity bypass systems to support all customer requirements and maintain motor operation when the system is shutting down

Global Service, Instant Support

- Quick response during emergencies and efficient support during planned production breaks
- High-quality spares and consumables with quick delivery
- Organized maintenance and support over the life cycle of your assets

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| 10-11 | Drives Designed with You in Mind | 22-23 | Successful Story-Metallurgy |
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Our Manufacturing Base

Over the years, Delta's MVDs have been designed and produced OEM for European and American brands with one-stop professional services. Our manufacturing base has ISO9001, ISO14001, OHSAS18001, and CNAS certifications and is equipped with a multi-functional assembly test platform and megawatt-level test laboratory. The test capacity, which can cover insulation testing, function testing, protection testing, and full load testing, can meet the requirements of 2.3–11kV voltage systems and ensure that each set of systems undergoes strict functional verification and quality inspection before shipping.

Scientific Research Center

We have a variety of analytical laboratories, including:

• Solder Technology Laboratory

Delta has started its own production of PCB plug-ins from the front end. Our solder technology laboratory can analyze PCB solder-related problems and improve product quality

• Semiconductor Failure Analysis Laboratory

Delta can analyze IGBT and diodes to determine the root-cause of when power cell failure occurs and take necessary steps to enhance product quality



One-stop Production

1 PCB Production

The surface is sprayed with a double-coating to resist harsh environments

3 Power Cell Test

Covers insulation testing, functional testing, and full load testing

5 System Test

Equipped with motor pair drag and an adjustable reactor load test platform to meet long-term full load test requirements

2 Power Cell Assembly

A barcode tracking mechanism is in place between each assembly station, and the IGBT assembly process is introduced into automated production operations

4 System Assembly

Build IQC, IPQC, PQC, FQC quality control and inspection systems for complete control of individual assembly links

6 Packaging

Uses a VCI bag to inhibit corrosion due to oxygen, water, and contaminants



Megawatt-level Testing Facility

- Delta's factory is capable of full load testing, and each system is required to pass a full load burn-in test before shipment
- Long-term full load burn-in operation capability is verified for at least 8 hours for each system
- Systems are tested under rated input voltage conditions, and system efficiency, power factor, transformer temperature rise, input current harmonics, output voltage harmonics, and waveforms recorded during the test process



System Efficiency Test



Power Factor > 0.96



Transformer Temperature Rise Test



THDi < 5%



Output Voltage Waveforms Check

Effectively reduce 40%+ industrial and commercial electricity consumption

Industrial activity accounts for a third of the world's electricity consumption, with motors globally consuming 65% of all industrial electricity. Using MVDs to adjust motor speed can significantly reduce the electricity consumption of industrial applications by more than 40%, which in turn enhances energy efficiency, optimizes production processes, reduces motor electricity consumption, and reduces carbon emissions. This helps corporations keep pace with energy conservation trends and improve their sustainable competitiveness.

Product Value from Using Medium Voltage Drives



Reduce Electricity Costs



Reduce Carbon Emission



Extend Motor Life



Processing Optimization



Automatic Control



Major Application



Heating & Power Generation

Induced draft fans
Primary air fans
Booster fans
Condensate pumps
Feed-water pumps
Circulation water pumps



Metallurgy

Gas fans
Dust removal fans
Blast furnace fans
Phosphorus removal pumps
Boiler feed-water pumps



Cement

High-temperature fans
Raw mill fans
Kiln head fans
Kiln tail fans
Dust removal fans



Petrochemical & Gas

Water injection pumps
Compressors oil pumps



Mining

Ventilation fans
Belt conveyors
Feed pumps
Drain pumps



Municipal Engineering

Water supply pumps
Sewage pumps
Heat pumps



Papermaking

Pulping machines
Vacuum pumps



Pharmaceutical

Cleaning pumps
Fermentation tube mixers



Other

Ball mills
Mixers
Belt conveyors
Reciprocating compressors
Crushers
Variable frequency power supplies

Delta MVD System Efficiency is Higher than 98.5%

Delta MVDs are high-voltage alternating current speed regulating devices developed and produced by Delta Electronics. Their features include excellent performance as well as easy and convenient operation, giving complete digital control in a wide range of applications with the newest IGBT devices to enhance reliability and efficiency. The drives meet IEEE 519- 1992 with system efficiency higher than 98.5%. (excludes phase-shift transformer)



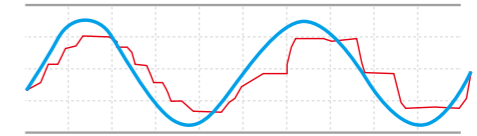
Exceptional Performance for MVDs

Advanced Architecture

- Leverages a multi-pulse input rectification transformer that efficiently lowers the power side distortion current to less than 5% while enhancing the power factor to more than 0.96 lagging
- Utilizes cell cascaded multilevel technology without requiring an output filter and with a nearly sinusoidal output voltage waveform to keep the dv/dt small
- Adopts vector control and provides constant torque and constant speed control modes with a fast dynamic response and high-precision speed control

| Output Voltage class | Cell per phase (Standard /Redundant) | Input rectified pulse number (Standard / Redundant) |
|----------------------|--------------------------------------|---|
| 3.3kV | 3/4 | 18/24 |
| 6kV | 5/6 | 30/36 |
| 6.6kV | 6/7 | 36/42 |
| 10kV | 8/9 | 48/54 |
| 11kV | 9/10 | 54/60 |

Other voltage, please contact Delta Electronics



Input current waveform

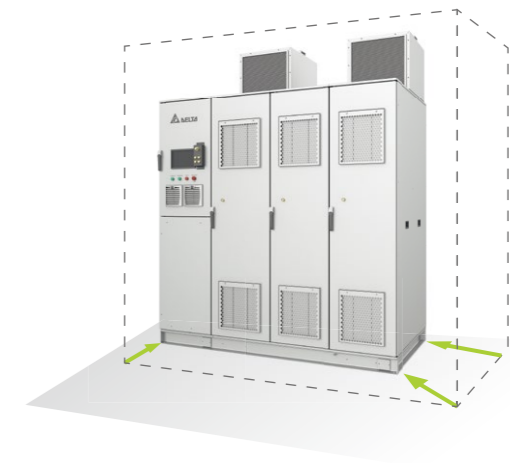
Power Cell Modular Design

- The modular design of the power cell effectively shortens the installation and maintenance time; MTTR < 30 minutes
- **Power cell bypass design (optional):**
Power cell bypass ensures that any failed power cell can be bypassed to keep the system operating until maintenance can be scheduled
- **Power cell redundant design (optional):**
An additional power cell is configured for each phase, and the system can still maintain full-load output capability when a power cell bypass occurs



Compact Design

- The compact structure reduces space requirements for on-site installation



Stable Cooling

- The system uses a high-efficiency centrifugal fan with good heat dissipation
- **Fan redundancy design (optional):**
The fan of each cabinet is equipped a backup fan for stable operation. If a fan is abnormal, the system will automatically turn on the backup fan to maintain cooling
- Intelligent control enables the fan running cycle to be set in order to extend the service life



- Normal
- Operation
- Abnormal

Complete Protection

- Redundant design on auxiliary control power
- Built-in UPS system that can keep the control system operating for 30 minutes when the control power is cut off
- The system provides a diagnosis function that warns users about any fault occurrences and shows the position and type of failure



Product Series

MVF 23

Suitable for medium and low-power motors

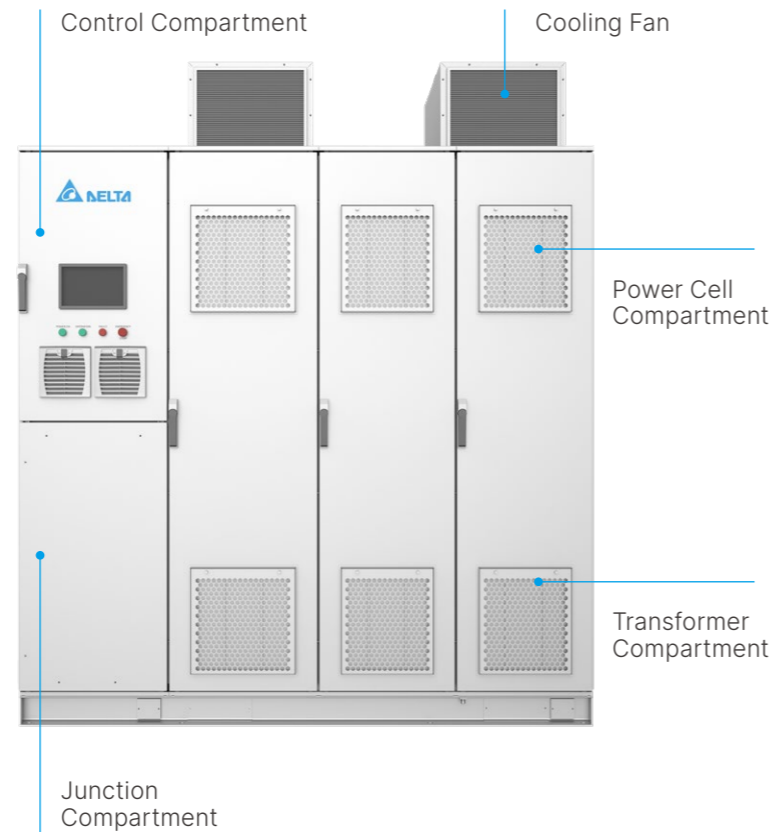
System Voltage

3.3 - 6.6 kV

Motor Shaft Power Range

135 - 2,115 kW

- Compact design
- Front access
- All-in-one design
- Motor cable entry is possible from the top or bottom



MVF 20

Suitable for medium and high-power motors

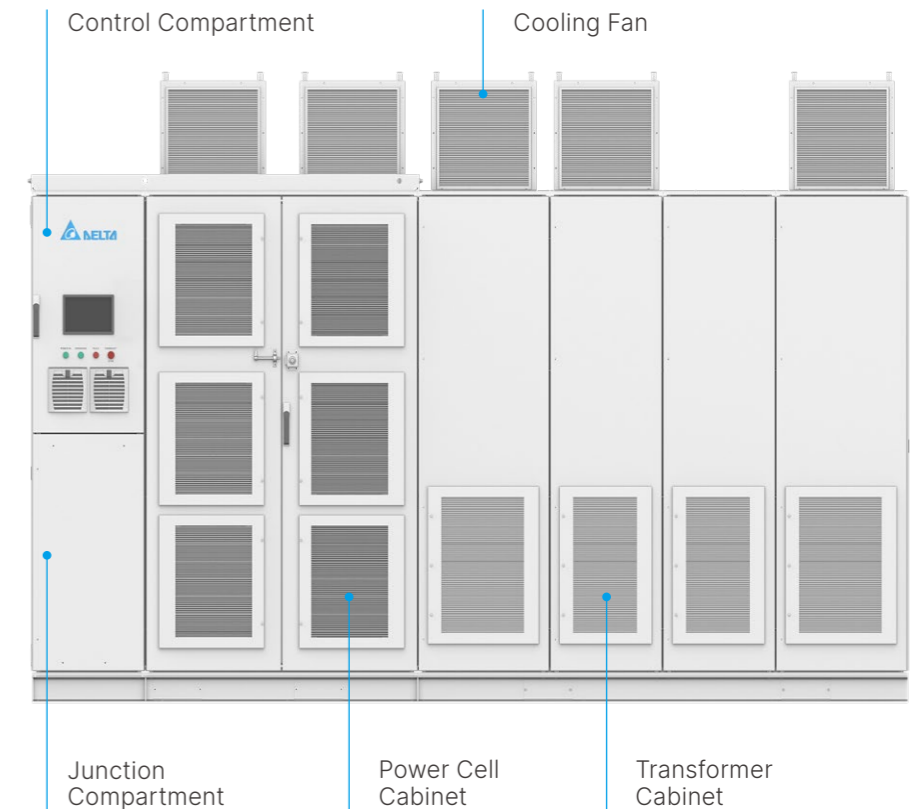
System Voltage

3.3 - 11 kV

Motor Shaft Power Range

250 - 10,900 kW

- High power density
- Front access
- In-line design
- Motor cable entry is possible from the top or bottom



MVD 22

Suitable for low-power motors

System Voltage

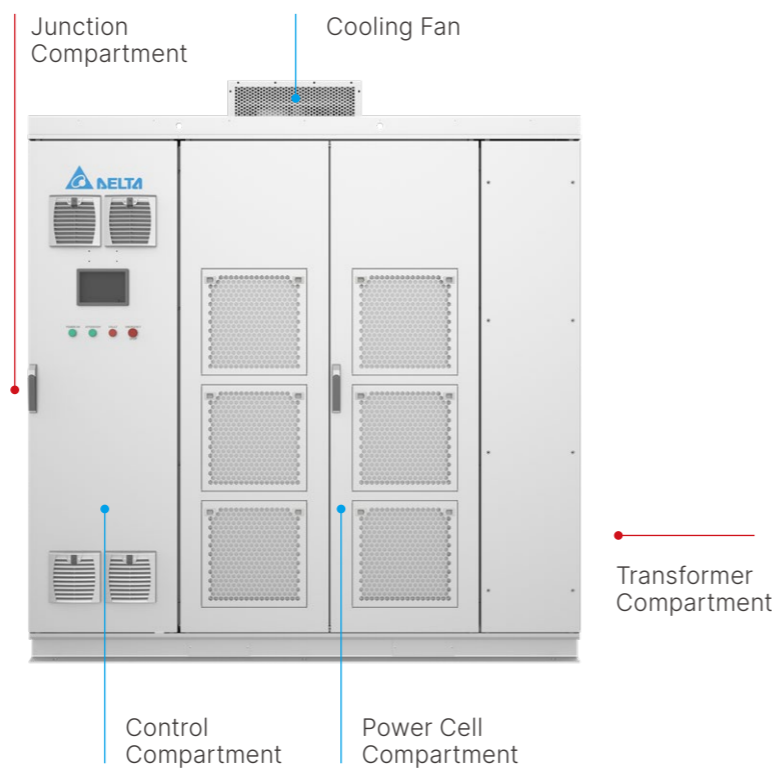
3.3 - 10 kV

Motor Shaft Power Range

135 - 1,325 kW

- Most cost effective
- Front & rear access
- All-in-one design
- Motor cable entry is from the bottom

— Front of the cabinet
— Back of the cabinet



Control Compartment

- Touchscreen display for system monitoring and parameter adjustment
- Analog and digital signal I/Os for different types of applications
- High-performance DSP for reliable control
- UPS for control system backing during an emergency

Power Cell Cabinet/Compartment

- Modular power cell allows for easy replacement and maintenance
- Optical fiber between low voltage and high voltage sections
- Multi-level inverter technology supplies nearly sinusoidal motor voltages and reduces impacts on the motor

Cooling Fan

- Effective air-cooling design
- Easy maintenance

Transformer Cabinet/Compartment

- The transformer secondary windings provide isolated phase-shifting power for improved input current waveforms
- Built-in temperature monitoring sensors and protection mechanisms

Junction Compartment

- Motor cable entry is possible from the top or bottom

General Specification

| Items | Specification |
|--|---|
| Input Voltage | 3.3 kV, 6 kV, 6.6 kV, 10 kV, 11 kV. For other voltage, please contact Delta Electronics |
| Input Voltage Range | -10% ~ +10% normal operation; -30% ~ -10% de-rating operation |
| Input Frequency | 50 Hz / 60 Hz |
| Input Frequency Range | -2% ~ +2% |
| Input Voltage THD | THD < 5% (at rated load and speed) |
| Input Current THD | THD < 5% (at rated load and speed) |
| Customer Control Power | Standard: Single-phase 220 Vac, 5 kVA Optional: Single-phase 600, 480, 400, 347, 277, 240, 208, 120 Vac selectable |
| Backup Control Power | Supplied by aux-winding of phase-shift transformer |
| Cooling Fan Power | Supplied by aux-winding of phase-shift transformer |
| Power Factor | > 0.96 (at rated load and speed) |
| System Efficiency | > 98.5% (at rated load and speed, excludes transformer) |
| Output Voltage Range | 3.3 kV, 6 kV, 6.6 kV, 10 kV, 11 kV. For other voltage, please contact Delta Electronics |
| Output Current Range | Max. 680 A |
| Output Frequency Range | 0.5 ~ 75 Hz |
| Output Motor Power Range | 3.3 kV : 135 ~ 3,280 kW , 6 kV : 160 ~ 6,000 kW , 6.6 kV : 200 ~ 6,800 kW 10 kV : 250 ~ 9,915 kW , 11 kV : 250 ~ 10,900 kW |
| Output Voltage THD | Cascaded multi-level topology with nearly sinusoidal output voltage waveforms. Low output voltage THD |
| Support Motor Type | Induction motor: squirrel cage motor, slip-ring motor; Synchronous motor: brush type synchronous motor |
| Overload Capability | 110% 1 min / 10 min. For other overload requirements, please contact Delta Electronics |
| Type Of Transformer | Phase-shift transformer, dry type |
| Transformer Insulation Class | H class |
| System IP Level | Standard: IP31; Optional: IP42 |
| System Cooling Method | Forced air cooling |
| Cabinet Painting | RAL7035 |
| Storage/Transportation Ambient Temperature | -40°C ~ +70°C. the package of the MVD is NOT waterproof, DO NOT store it outdoors |
| Operation Ambient Temperature | 0°C ~ +40°C, normal operation ; +40°C ~ +50°C, de-rating operation |
| Environment | The MVD must be stored / installed indoors. There must be no dripping water or other fluids in the room. Avoid direct sunlight, corrosive flammable gas (sulfide, chloride, etc.), salt fog, conductive dust, and so on |
| Humidity | Relative humidity 5%~95%, no condensation |
| Pollution Degree | Pollution Degree 2 |
| Altitude | < 1000 m, normal operation; 1000 ~ 2000 m, de-rating operation; > 2000 m, special design upon request |
| Control Methods | Scaler control (V/F), vector control with speed sensor (SVC), vector control without speed sensor (SLVC) |
| Modulation Method | SVPWM |
| Frequency Resolution | 0.01 Hz |
| Speed Control Range | 1%~100% (with speed sensor) 5%~100% (without speed sensor) |
| Speed Control Accuracy (Steady State) | ± 0.01% (with speed sensor, depending on the speed sensor accuracy); ± 0.5% (without speed sensor) |
| Digital Input/Output | 7 DI / 10 DO, dry contact |
| Analog input/output | 2 AI / 4 AO, 4 mA ~ 20 mA or 0 V ~ 10 V |

| Items | Specification |
|----------------------------|---|
| Control Functions | Forward/reverse run, speed ramp selection, S curve, frequency skipping, multi-point V/F, torque boost, AVR, dead zone compensation, flying start, DC braking, field weakening, motor energy saving control, droop control, speed feedforward control, adaptive deceleration, de-rating output with input under voltage, LVRT, auto restart, multi-motor parameter storage, system auto bypass (optional), synchronous transfer (optional), low-temp start (optional), control cabinet temp control (optional), PID control (optional), power cell bypass (optional), master-slave control (optional), and more |
| Protection Functions | Input over current, input phase loss, input power loss, input under voltage, input over voltage, input grounding fault, input phase sequence fault, output over current, output over load, output phase loss, output grounding fault, output voltage unbalance, output under load, electric motor thermal protection, motor stall, motor reverse, motor over speed, motor under speed, air filter clogged, MCB abnormal open, cabinet door open, control power loss, UPS battery under voltage, transformer over temp, cooling fan over temp, communication fault, power cell abnormal, encoder protection (optional), motor winding over temp (optional), motor bearing over temp (optional), and more |
| Operation Interface | Standard: 7-inch, multi-language touchscreen. Optional: 10-inch, multi-language touchscreen. |
| Communication Protocol | Standard: Modbus RTU Optional: PROFIBUS DP (DPV0), DeviceNet™, Modbus TCP, ProfiNet IO, EtherNet/IP™, EtherCAT, CANopen , PowerLink, ControNet™ |
| Optional Cabinet | Manual bypass cabinet, auto bypass cabinet, synchronous transfer cabinet, startup cabinet, output filter cabinet |
| Other Configurable Options | Power cell bypass, power cell redundancy, fan redundancy, surge arrester, space heater, motor temp module |
| Compliance & Certification | IEC \ IEEE \ GB \ CE \ GOST |

Compliance

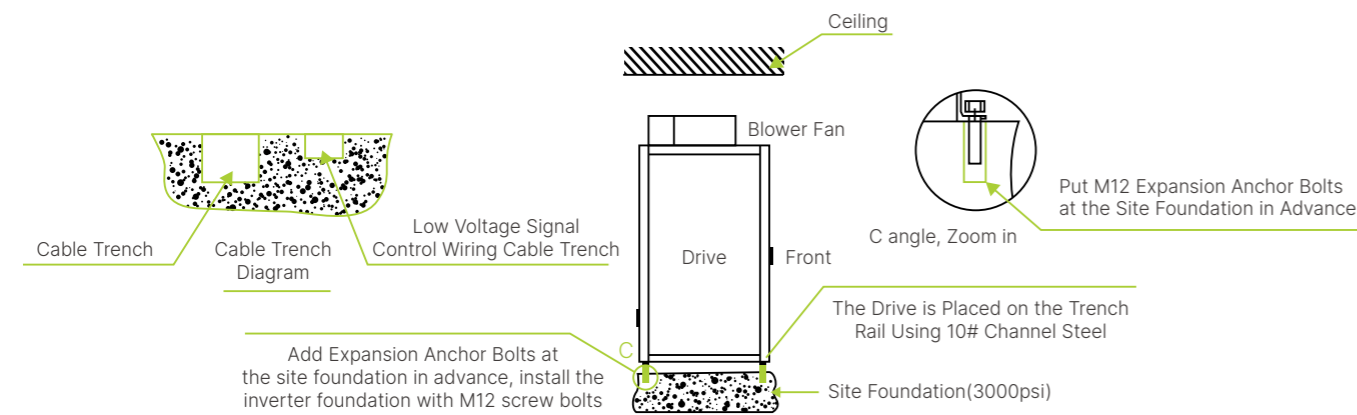
| Standard | Content |
|---------------|---|
| IEEE 519-1992 | IEEE recommended practices and requirements for harmonic control in electrical power systems |
| IEC 60038 | IEC standard voltages |
| IEC 60076-1 | Power transformers - Part 1: General |
| IEC 60076-11 | Power transformers - Part 11: Dry-type transformers |
| IEC 60076-12 | Power transformers - Part 12: Loading guide for dry-type power transformers |
| IEC 60076-2 | Power transformers - Part 2: Temperature rise |
| IEC 60076-3 | Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air |
| IEC 60721-3-1 | Classification of environmental conditions - Part 3 Classification of groups of environmental parameters and their severities - Section 1: Storage |
| IEC 60721-3-2 | Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation |
| IEC 60721-3-3 | Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weatherprotected locations |
| IEC 61000-2-4 | Electromagnetic compatibility (EMC) Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances |
| IEC 61800-3 | Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods |
| IEC 61800-4 | Adjustable speed electrical power drive systems - Part 4: General requirements - Rating specifications for a.c. power drive systems above 1000V a.c. and not exceeding 35kV |
| IEC 61800-5-1 | Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical , thermal and energy |

System Model Names

| MV | | | | | | |
|--|---|---|------------------------------|---|---|--|
| MVD Series Code | Input Voltage | Output Voltage | Output Current | Bypass Cabinet | Optional Cabinet | Version No. |
| F23: Sahara D22: Alishan F20: Himalaya | A: 3.3 kV C: 6 kV D: 6.6 kV E: 10 kV F: 11 kV | A: 3.3 kV C: 6 kV D: 6.6 kV E: 10 kV F: 11 kV | 036 A 680 A | A: Automatic B: Manual S: Synchronous transfer N: No configuration | S: Start-up cabinet F: Filter cabinet M: Filter and start-up cabinet N: No configuration | 01-99: Induction motor A1-ZZ: Synchronous motor |

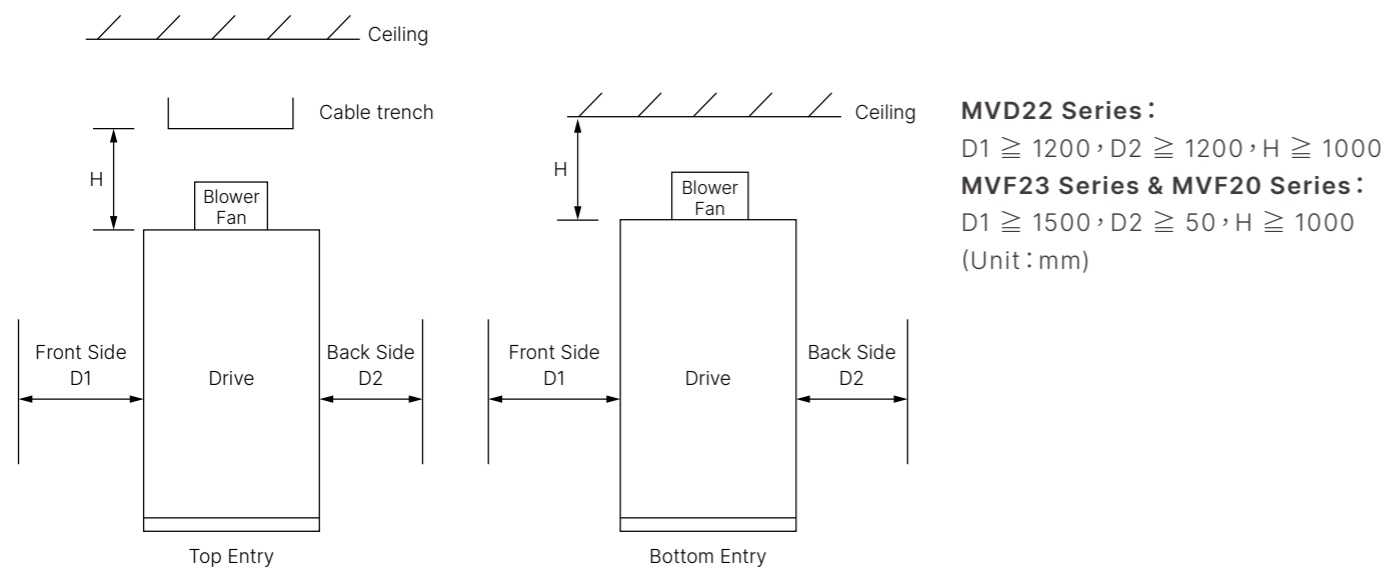
Installation Diagram

The MVD is placed on the trench rail using 10# channel steel (use 16# channel steel if the MVD power is higher than 1600 kW, and use 18# I-beam steel when higher than 4000 kW)



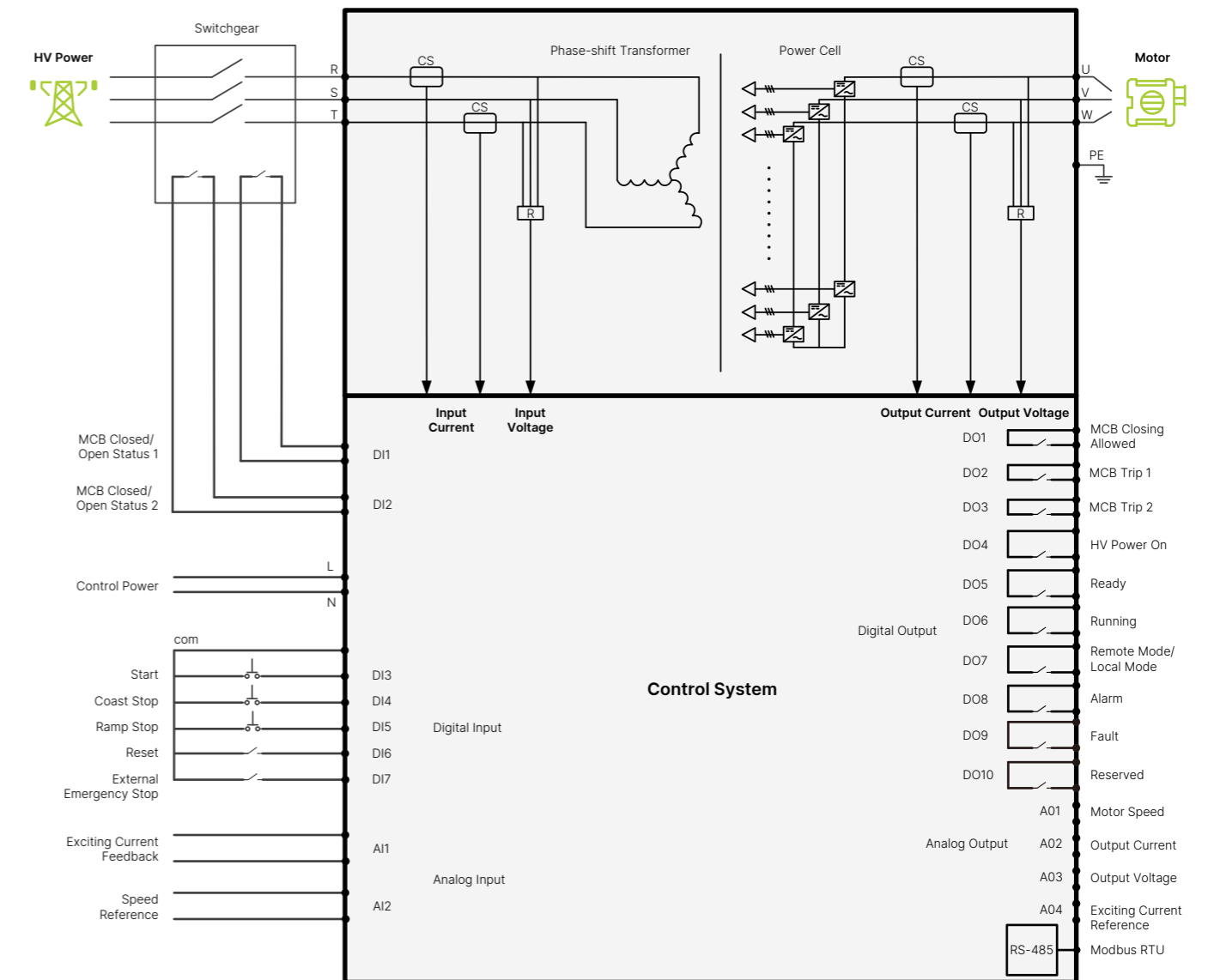
System Maintenance Space

It is recommended to reserve minimum space for MVD maintenance:



Wiring Diagram

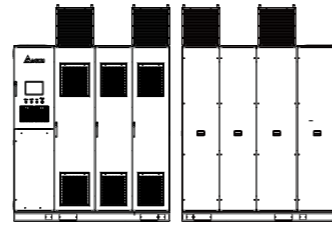
MVD I/O can be set according to customer requests. The standard interface is as follows:



MVF23 Series Outlook and Selection table

Cabinet type: All-in-one design

Maintenance: Front access

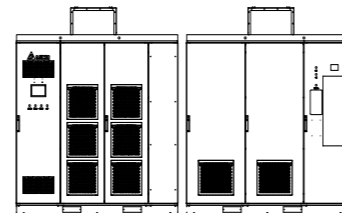


| Series | Input voltage | Output voltage | Rated current (A) | Capacity (kVA) | Type Code | Width(mm) | Depth(mm) | Height with fan(mm) | Weight(kg) |
|--------------|---------------|----------------|-------------------|----------------|--------------|-----------|-----------|---------------------|------------|
| MVF23 Series | 3.3 kV | 3.3 kV | 36 | 210 | MVF23AA036NN | 1,210 | 1,250 | 2,796 | 2,200 |
| | | | 50 | 290 | MVF23AA050NN | 1,210 | 1,250 | 2,796 | 2,250 |
| | | | 70 | 400 | MVF23AA070NN | 1,210 | 1,250 | 2,796 | 2,300 |
| | | | 100 | 580 | MVF23AA100NN | 1,610 | 1,250 | 2,888 | 3,100 |
| | | | 140 | 800 | MVF23AA140NN | 1,610 | 1,250 | 2,888 | 3,200 |
| | | | 180 | 1050 | MVF23AA180NN | 1,910 | 1,250 | 2,888 | 4,600 |
| | | | 215 | 1250 | MVF23AA215NN | 1,910 | 1,250 | 2,888 | 4,700 |
| | 6 kV | 6 kV | 36 | 375 | MVF23CC036NN | 2,310 | 1,250 | 2,796 | 3,500 |
| | | | 50 | 540 | MVF23CC050NN | 2,310 | 1,250 | 2,796 | 3,550 |
| | | | 70 | 750 | MVF23CC070NN | 2,310 | 1,250 | 2,796 | 3,600 |
| | | | 100 | 1070 | MVF23CC100NN | 2,710 | 1,250 | 2,888 | 4,900 |
| | | | 140 | 1460 | MVF23CC140NN | 2,710 | 1,250 | 2,888 | 5,000 |
| | | | 180 | 1900 | MVF23CC180NN | 3,010 | 1,250 | 2,888 | 5,900 |
| | | | 215 | 2275 | MVF23CC215NN | 3,010 | 1,250 | 2,888 | 6,000 |
| | 6.6 kV | 6.6 kV | 36 | 420 | MVF23DD036NN | 2,310 | 1,250 | 2,796 | 3,700 |
| | | | 50 | 585 | MVF23DD050NN | 2,310 | 1,250 | 2,796 | 3,750 |
| | | | 70 | 820 | MVF23DD070NN | 2,310 | 1,250 | 2,796 | 3,800 |
| | | | 100 | 1170 | MVF23DD100NN | 2,710 | 1,250 | 2,888 | 5,100 |
| | | | 140 | 1600 | MVF23DD140NN | 2,710 | 1,250 | 2,888 | 5,200 |
| | | | 180 | 2080 | MVF23DD180NN | 3,010 | 1,250 | 2,888 | 6,100 |
| | | | 215 | 2460 | MVF23DD215NN | 3,010 | 1,250 | 2,888 | 6,200 |

MVD22 Series Outlook and Selection table

Cabinet type: All-in-one design

Maintenance: Front & rear access

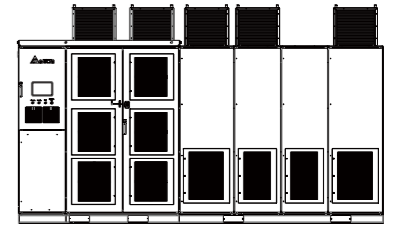


| Series | Input voltage | Output voltage | Rated current (A) | Capacity (kVA) | Type Code | Width(mm) | Depth(mm) | Height with fan(mm) | Weight(kg) |
|--------------|---------------|----------------|-------------------|----------------|--------------|-----------|-----------|---------------------|------------|
| MVD22 Series | 3.3 kV | 3.3 kV | 45 | 260 | MVD22AA045NN | 2,210 | 1,500 | 2,668 | 2,200 |
| | | | 70 | 400 | MVD22AA070NN | 2,210 | 1,500 | 2,668 | 2,200 |
| | | | 90 | 515 | MVD22AA090NN | 2,410 | 1,500 | 2,668 | 2,500 |
| | | | 135 | 775 | MVD22AA135NN | 2,410 | 1,500 | 2,668 | 2,500 |
| | 6 kV | 6 kV | 45 | 470 | MVD22CC045NN | 2,210 | 1,500 | 2,668 | 2,500 |
| | | | 70 | 750 | MVD22CC070NN | 2,210 | 1,500 | 2,668 | 2,500 |
| | | | 90 | 940 | MVD22CC090NN | 2,410 | 1,500 | 2,668 | 3,000 |
| | | | 135 | 1405 | MVD22CC135NN | 2,410 | 1,500 | 2,668 | 3,500 |
| | 6.6 kV | 6.6 kV | 45 | 515 | MVD22DD045NN | 2,210 | 1,500 | 2,668 | 2,700 |
| | | | 70 | 820 | MVD22DD070NN | 2,210 | 1,500 | 2,668 | 2,700 |
| | | | 90 | 1030 | MVD22DD090NN | 2,410 | 1,500 | 2,668 | 3,200 |
| | | | 135 | 1545 | MVD22DD135NN | 2,410 | 1,500 | 2,668 | 3,500 |
| | 10 kV | 10 kV | 45 | 790 | MVD22EE045NN | 2,410 | 1,500 | 2,668 | 3,000 |
| | | | 70 | 1250 | MVD22EE070NN | 2,410 | 1,500 | 2,668 | 3,500 |
| | | | 90 | 1600 | MVD22EE090NN | 2,910 | 1,500 | 2,668 | 4,000 |

MVF20 Series Outlook and Selection table

Cabinet type: In-line design

Maintenance: Front access



| Series | Input voltage | Output voltage | Rated current (A) | Capacity (kVA) | Type Code | Width(mm) | Depth(mm) | Height with fan(mm) | Weight(kg) |
|--------------|---------------|----------------|-------------------|----------------|--------------|-----------|-----------|---------------------|------------|
| MVF20 Series | 3.3 kV | 3.3 kV | 250 | 1450 | MVF20AA250NN | 4,110 | 1,400 | 2,796 | 5,300 |
| | | | 305 | 1750 | MVF20AA305NN | 4,110 | 1,400 | 2,796 | 5,800 |
| | | | 350 | 2000 | MVF20AA350NN | 4,110 | 1,400 | 2,796 | 6,100 |
| | | | 438 | 2515 | MVF20AA438NN | 4,710 | 1,400 | 2,796 | 7,450 |
| | | | 560 | 3200 | MVF20AA560NN | 5,010 | 1,400 | 2,796 | 8,700 |
| | | | 680 | 3890 | MVF20AA680NN | 5,010 | 1,400 | 2,796 | 9,950 |
| | | | 250 | 2600 | MVF20CC250NN | 5,160 | 1,400 | 2,796 | 7,700 |
| | 6 kV | 6 kV | 305 | 3200 | MVF20CC305NN | 5,160 | 1,400 | 2,796 | 8,600 |
| | | | 350 | 3650 | MVF20CC350NN | 5,160 | 1,400 | 2,796 | 9,200 |
| | | | 438 | 4550 | MVF20CC438NN | 6,410 | 1,400 | 2,796 | 11,500 |
| | | | 560 | 5850 | MVF20CC560NN | 6,610 | 1,400 | 2,796 | 13,750 |
| | | | 680 | 7100 | MVF20CC680NN | 7,210 | 1,600 | 2,796 | 15,500 |
| | | | 250 | 2860 | MVF20DD250NN | 5,410 | 1,400 | 2,796 | 8,800 |
| | | | 305 | 3500 | MVF20DD305NN | 5,410 | 1,400 | 2,796 | 9,800 |
| | 6.6 kV | 6.6 kV | 350 | 4050 | MVF20DD350NN | 5,410 | 1,400 | 2,796 | 10,700 |
| | | | 438 | 5050 | MVF20DD438NN | 6,810 | 1,400 | 2,796 | 13,050 |
| | | | 560 | 6400 | MVF20DD560NN | 7,010 | 1,400 | 2,796 | 15,050 |
| | | | 680 | 7900 | MVF20DD680NN | 7,610 | 1,600 | 2,796 | 18,550 |
| | | | 100 | 1735 | MVF20EE100NN | 3,910 | 1,250 | 2,888 | 6,550 |
| | | | 140 | 2425 | MVF20EE140NN | 3,910 | 1,250 | 2,888 | 7,250 |
| | | | 180 | 3120 | MVF20EE180NN | 4,660 | 1,250 | 2,888 | 10,400 |
| | 10 kV | 10 kV | 215 | 3725 | MVF20EE215NN | 4,660 | 1,250 | 2,888 | 11,100 |
| | | | 225 | 3900 | MVF20EE225NN | 5,560 | 1,250 | 2,766 | 9,200 |
| | | | 270 | 4680 | MVF20EE270NN | 5,760 | 1,250 | 2,766 | 10,400 |
| | | | 310 | 5400 | MVF20EE310NN | 5,960 | 1,250 | 2,766 | 11,600 |
| | | | 350 | 6100 | MVF20EE350NN | 5,960 | 1,250 | 2,766 | 12,800 |
| | | | 438 | 7600 | MVF20EE438NN | 9,810 | 1,400 | 2,796 | 18,200 |
| | | | 560 | 9700 | MVF20EE560NN | 10,610 | 1,400 | 2,796 | 21,900 |
| | | | 680 | 11800 | MVF20EE680NN | 11,010 | 1,400 | 2,796 | 25,350 |
| | | | 36 | 700 | MVF20FF036NN | 3,410 | 1,250 | 2,796 | 4,400 |
| | | | 50 | 1000 | MVF20FF050NN | 3,410 | 1,250 | 2,796 | 4,800 |
| | 11 kV | 11 kV | 70 | 1400 | MVF20FF070NN | 3,410 | 1,250 | 2,796 | 5,200 |
| | | | 100 | 1910 | MVF20FF100NN | 3,910 | 1,250 | 2,888 | 6,850 |
| | | | 140 | 2700 | MVF20FF140NN | 3,910 | 1,250 | 2,888 | 7,550 |
| | | | 180 | 3450 | MVF20FF180NN | 4,660 | 1,250 | 2,888 | 10,900 |
| | | | 215 | 4100 | MVF20FF215NN | 4,660 | 1,250 | 2,888 | 11,500 |
| | | | 250 | 4770 | MVF20FF250NN | 6,810 | 1,400 | 2,796 | 12,950 |
| | | | 305 | 5810 | MVF20FF305NN | 7,010 | 1,400 | 2,796 | 14,750 |
| | | | 350 | 6670 | MVF20FF350NN | 7,010 | 1,400 | 2,796 | 16,750 |
| | | | 438 | 8350 | MVF20FF438NN | 10,810 | 1,400 | 2,796 | 20,550 |
| | | | 560 | 10670 | MVF20FF560NN | 11,410 | 1,400 | 2,796 | 24,550 |
| | 680 | 12960 | MVF20FF680NN | 12,210 | 1,600 | 2,796 | 28,600 | | |

For other power, please contact Delta Electronics

Success Story

References - Heating & Power Generation

Efficient Power Generation to Start a Low-Carbon Future

Delta's MVDs have been successfully used to assist a renowned large-scale waste treatment company in Taiwan, replacing the traditional damper control method and using a medium-voltage inverter to control the motor speed of induced exhaust fans at the power plant of its incineration plant. This achieved an energy-saving effect of 54%, reducing annual microgrid electricity consumption by 1,700,000 kWh. Relative to actual electricity expenses saved, this solution is providing a considerable return on investment.



Success Story

References - Heating & Power Generation



Taiwan | Power Plant

• 4.16 kV / 3,169 kW

Delta's MVDs have been applied to circulating fans for boiler combustion and exhaust gas in power plants in Taiwan. The original damper opening control has been replaced with variable frequency speed control to provide efficient and reliable dynamic air extraction. The main benefits of this solution are reduced energy consumption and system operating costs.



Gansu | Heating Plant

• 10 kV / 560 kW - 1,250 kW



Delta's MVDs perform frequency conversion and regulate the speed of induced draft fans to maintain negative pressure in furnaces and improve production efficiency. MVDs are also used to adjust the circulating water pump speed via frequency conversion, with the pressure and flow of the circulating water based on the heating load demand.

Success Story

References - Metallurgy

Low Energy Consumption and Low Maintenance Cost

Taiwan's leading steel group uses Delta's medium voltage drives to regulate the speed of the motor, providing the precise speed control required by the process, which can not only greatly reduce the power loss, but also reduce the impact of the starting current on the power grid, as well as the impact of the motor and other mechanical equipment. wear and tear, thereby reducing maintenance costs.



Success Story

References - Metallurgy



Vietnam | Steel Plant

• 6 kV / 250 kW - 520 kW

Delta's MVDs have been successfully introduced into coal-fired systems, gas-fired systems, and water treatment applications in both steel and steam power plants in Vietnam. In their coal-fired and gas-fired systems, frequency converters were used to vary the intake air volume through stable control of the fan speed to ensure adequate intake air for boiler combustion. In their pump system, frequency converters were also employed to vary the water volume. After optimizing the operation of their pumps, they reduced mechanical stress, eliminated the water hammer effect on pipelines, and reduced maintenance costs.



Shanghai | Steel Group

• 10 kV / 315 kW - 450 kW

Delta's MVDs have been used in inverter energy-saving renovations for the production water system of a steel group in Shanghai. The system has achieved remarkable power-saving effects and considerably reduced maintenance costs for machinery and equipment.

Success Story

References - Cement

From Big Electricity Consumer to Big Electricity Saver

In the cement industry, Delta's MVDs are used to replace the traditional damper and valve control of industrial fans. This inverter-controlled application method is widely used by large businesses in the upper, middle, and lower reaches of Taiwan's cement industry to prevent power loss and improve the life cycle of critical equipment.



Success Story

References - Cement



India | Cement Plant

• 6.6 kV / 1,350 kW

In a system application of Delta's MVDs at an Indian cement plant, the original direct-on-line method used for motor control was successfully switched to frequency conversion to more efficiently control the damper and regulate the speed of the dust removal fan. This improved the linearity of air volume adjustment while extending the life cycle of the equipment.



Hubei | Cement Group

• 10 kV / 4,500 kW

Delta's MVDs have improved processes in a new dry-process cement kiln production line in Hubei. An inverter was employed to adjust the air volume and pressure more smoothly and stably, thus improving energy efficiency.

Success Story

References - Municipal Engineering

Automatic Control Improves Production Efficiency

Whether it is for water plants, wastewater treatment plants, or chiller compressors, Delta can provide complete solutions, such as MVDs and PLC-integrated control, for customers to choose from. This system was designed using a synchronous transfer method to optimize process efficiency. With PID control, the inflow water can be maintained at stable levels and the inflow pump can run continuously and reliably to achieve automatic process control and optimization.



Success Story

References - Municipal Engineering



Malaysia | Water Plant

• 11 kV / 850 kW

Delta's MVDs have been employed in water plants in Malaysia as an efficient solution to control and optimize water pump operation. An inverter system was successfully implemented to adjust the water flow and reduce high energy consumption due to frequent starts and stops.



Kaohsiung | International Airport

• 4.16 kV / 500 kW

Delta's MVDs combined with PLC controllers are an energy-saving solution that can be widely used in chiller compressors in large shopping malls or factories. It can also be utilized for speed control in indoor air-conditioning systems to save energy while ensuring customer comfort.

Product Selection

Delta's MVDs can be used in various load situations, such as for fans, pumps, mixers, and compressors in different sectors including power, civil infrastructure, metallurgy, oil & gas, and petrochemical. Please refer to the table below for product selection and scan the QR code to the right to complete the MVD sizing evaluation form. Delta will help you size a suitable MVD for your application.



Delta MVD Sizing Evaluation Form

| Item | Description |
|---|---|
| Input Voltage (kV) | MVD input voltage is 3.3 kV, 6 kV, 6.6 kV, 10 kV, 11 kV or others |
| Output Voltage (kV) | Motor output voltage is 3.3 kV, 6 kV, 6.6 kV, 10 kV, 11 kV or others |
| Motor Rated Power (kW) | Motor rated power marked on nameplate |
| Motor Rated Current (A) | Motor rated current marked on nameplate |
| Motor Type | 1. Induction motor 2. Synchronous motor |
| Grid Frequency | 1. 50 Hz 2. 60 Hz |
| Requirement to Enlarge System Capacity | 1. Check if periodical overload condition is required for process, ex. 120% 1 min / 10 min or 150% 1 min / 10 min periodical overload 2. Check if ambient temperature is over standard 0°C ~ +40°C. If MVD is required to be operated under ambient temperature +40°C ~ +50°C, MVD capacity needs to be enlarged |
| Optional System Bypass Cabinet | 1. System can be selected between manual bypass and auto bypass 2. If MVD is used as soft-starting only, synchronous transfer bypass can be selected |
| Optional Startup Cabinet | Select when power cell is greater than 250 A |
| Optional Output Filter Cabinet | Select when cable distance between MVD to motor is greater than 500 m |
| Other Optional Configurations | Power cell bypass, power cell redundancy, fan redundancy, surge arrester, space heater for dehumidification, space heater for low temp start, motor winding and bearing temp modules or others |

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All information and specifications are subjected to change without prior notice.

