



Medium Voltage Variable Frequency Drive



Wolong Electric Group Co., Ltd

As a global well-known manufacturer of motor & drive solutions, Wolong Electric Group co., Ltd. was founded in 1984, after more than 30 years of innovation and development in China, Vietnam, England, Germany, Austria, Italy, Poland, Mexico, India and Serbia it has 39 manufacturing factories and three technology centers with more than 18000 staff. In 2018, total assets reaches CNY 30 billion, and annual sales revenue reaches CNY 36.5 billion. Wolong mainly manufacturers all types of motors, generators, control drive products, industrial automation products and so on to provide our customers optimal solution and service in oil & gas, petrochemicals, power, mining, rail transportation, building, water & waste water, automation, new energy vehicles and so on.



Wolong Electric Large Drive Business Group Drive Division

Wolong Electric Large Drive Business Group Drive Division (referred to as the Drive Division) focuses on the field of power electronics. With years of experience in high-voltage electrical product design, taking high reliability as designing principle and maintenance-free as designing goal, the company has developed the industry-competitive RMVC5000, RMVC5100 series high-voltage converter products, high-voltage solid-state soft start VFS series products and explosion-proof electrical series products, etc. Its technical strength has reached international leading level.

VFS series high-voltage solid-state soft starter is an advanced soft starting product independently developed by the company. Based on the technology of ordinary solid-state soft starter, this product is capable of realizing step-variable frequency conversion and stepless voltage-regulating start function. The equipment adopts a starting technology in-between the frequency conversion and voltage reducing start. It has applied for and obtained patents in many countries and regions such as China, the European Union, Japan, etc., and has been exported to Germany, the United Kingdom, Egypt, Iran, Indonesia, Australia, Poland, Russia, Vietnam, Sudan, India and other countries.

In order to meet the needs of different users, the products are continuously upgraded. The current products include: medium and small power type, high power type, integrated type, customized super high power type, marine type, vehicle type, long distance transmission type, mining general type, SFC variable frequency starting device, mine explosion-proof and intrinsically safe high-voltage AC soft start controller.





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RMVC 5100 - General information

The RMVC 5100 can be specified to control asynchronous or synchronous motors whether wound-rotor or permanent magnet.

The RMVC 5100 provides speed and/or torque control for motor-driven applications in the medium and high power range from 200kVA-40MVA motor voltages from 3.3kV to 13.8 kV.

It is available with air cooling in the lower power range and with optional water cooling in the medium to high power range. RMVC 5100 drives are also available mounted within a customised container, with self-contained sealed cooling systems, providing the highest IP class ratings for hostile environments as well as providing greater convenience and ease of installation and commissioning.

The RMVC 5100 family of drives is thus particularly suitable to retrofit applications as well as applications requiring long cables to the motor. The medium voltage output is achieved directly without the need for an output transformer, particularly important in order to achieve high motor torque at very low speeds.

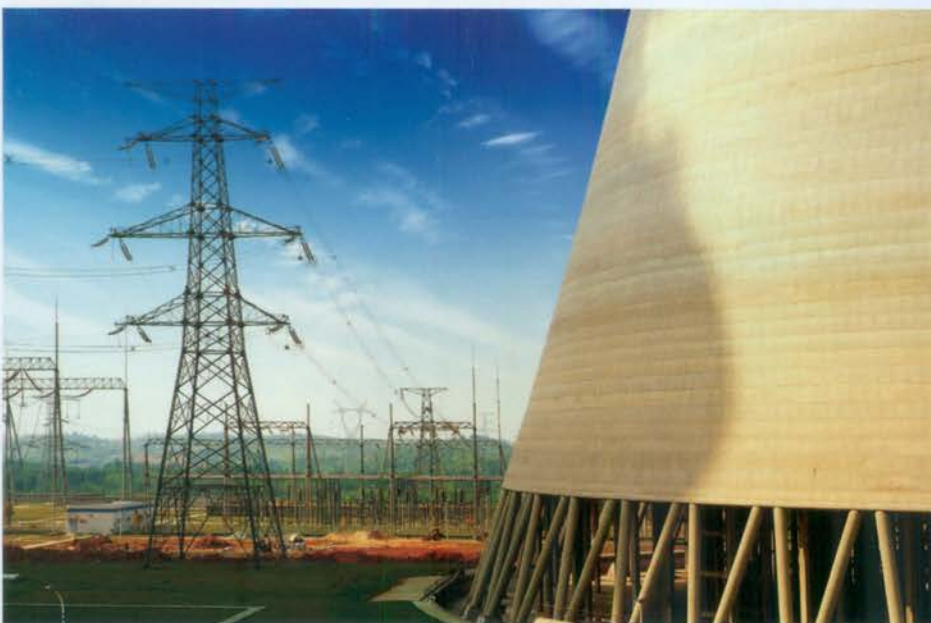
On the motor side, the drives provide almost perfectly sinusoidal motor current such that there are no concerns regarding overheating in the motor or torque pulsations on the motor shaft. The output voltage waveform is multi-level PWM such that it is close to sinusoidal and compatible with standard motor and cable insulation systems. It also does not induce any significant stray currents in motor bearings which can otherwise cause early motor bearing failure. This is all achieved without the need for sinusoidal output filters in all but the most exceptional circumstances (extreme cable length).

Solution for a wide range of industries

The application of advanced technology variable speed drives to motor control results in significant energy savings over fixed speed in a wide variety of applications. Since their introduction to the market in 2005, the RMVC range of variable frequency drives have provided reliable and highly efficient control of medium voltage AC motors for many applications in a wide range of industries. The RMVC 5100 series is the latest generation optimised for improved performance, reduced size and weight and even greater value for money.

Fields of application

Industries	Applications
Cement, mining and minerals	Grinding mills, conveyors, fans and pumps
Chemical, oil and gas	Compressors, extruders and pumps
Metals	Blast furnace blowers, fans and pumps
Pulp and paper	Fans and pumps
Power generation	Gas turbine starters, ID/FD fans and pumps
Water	Pumps
Renewable energy	Wind turbines, tidal and wave energy generation
Other applications	Test stands and wind tunnels



RMVC 5100 - Compact design and high performance

The RMVC 5100 is designed for maximum reliability, efficiency and versatility – features that have a direct impact on the customer's cost of ownership.

Clean Power

In the RMVC 5100 converter, the medium voltage output is constructed by connecting the outputs of single-phase low-voltage IGBT-based inverters in series, with an equal number per phase. Each individual single-phase inverter power module is powered by an internal rectifier, itself supplied from separate phase-displaced secondary windings of the integrated transformer.

An inherent feature of this technology is that a high pulse number rectifier is created resulting in a significant reduction of input current harmonic distortion. In the example shown below for a 6kV output, the diode rectifier is 30-pulse. The input Power Factor is also high at a minimum of 0.95 regardless of speed and power.

The PWM switching strategy ensures that sinusoidal current is supplied to the motor. The low levels of harmonic current in the motor ensure that both motor heating and shaft torque pulsations transmitted to the coupling and load are minimised.

Use of the multi-level PWM topology also results in a reduced size of voltage steps imposed on to the motor and cable insulation systems compared to 2 or 3-level inverters. The dV/dt is less than 1,000V/ μ S.

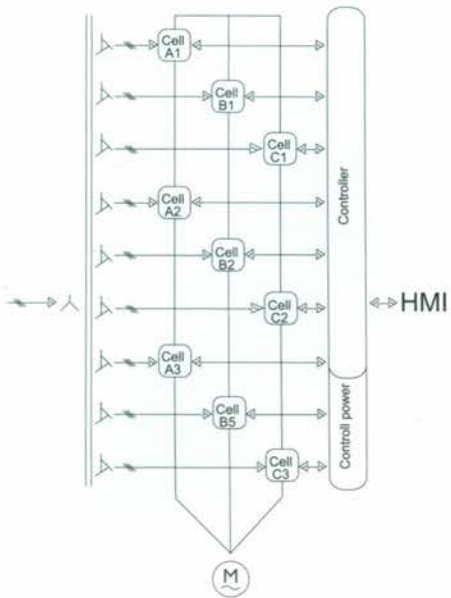
Multi-level features

- Very low levels of input current harmonics with high input power factor.
- Sinusoidal current output to motors – no significant temperature rise in the motor due to current harmonics.
- No significant motor shaft torque pulsations – kind to shaft coupling and mechanical load.
- Lower dV/dt voltage stress imposed on to the motor and cable insulation systems.
- Lower amplitude of PWM switching at the output significantly reduces potential transmission line effects when long output cables are used to the motor.
- Lower amplitude and frequency of PWM switching at the output significantly reduces potential for stray currents through the motor bearings.
- Use of low-voltage IGBTs which are easily obtainable, highly reliable and well-proven.
- Low losses since IGBTs do not need snubber circuits and require little switching power.
- Current can be switched off instantaneously in the event of a fault in the output circuit.
- Modular design.
- Medium voltage output achieved without output transformer

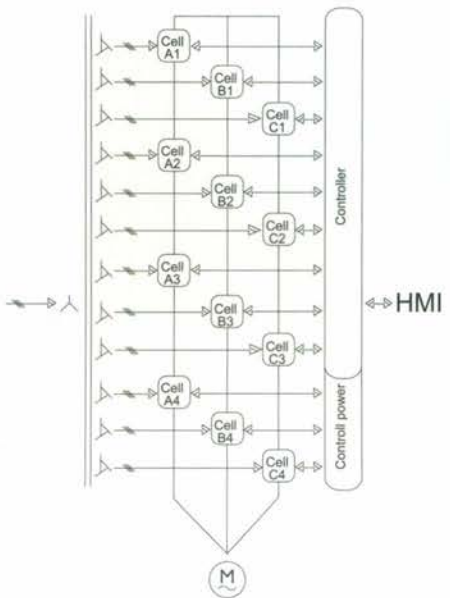


RMVC 5100 Multi-level topology

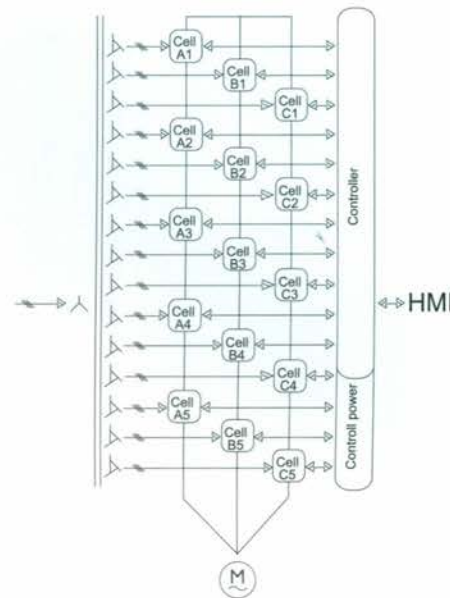
3/3.3kV VFD System



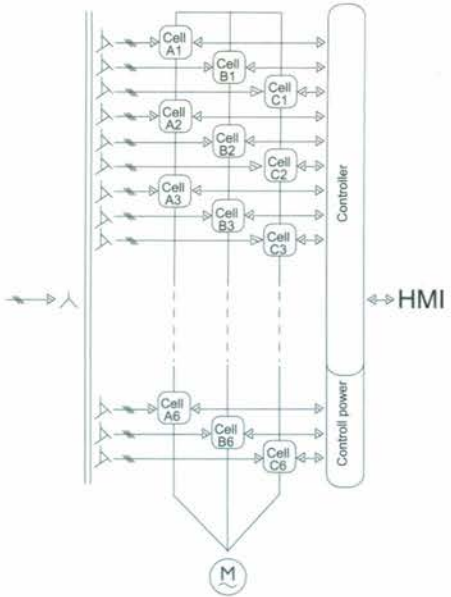
4.16kV VFD System



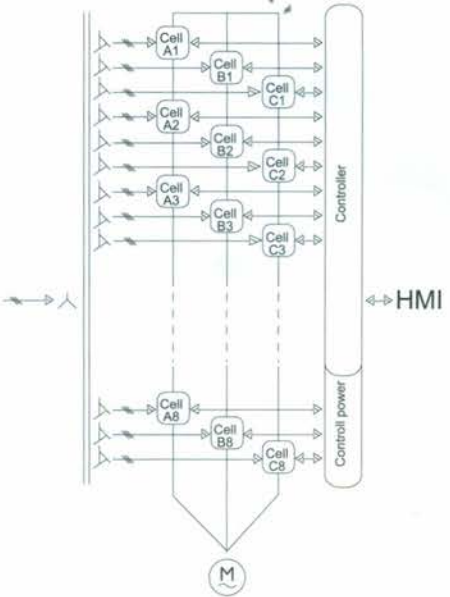
6/6.3kV VFD System



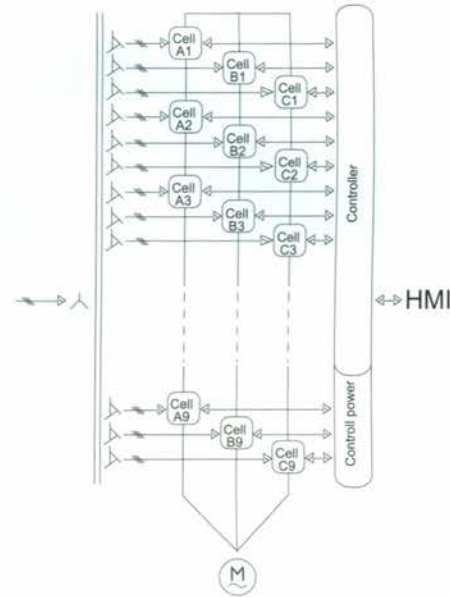
6.6kV VFD System



10kV VFD System



11kV VFD System



External View

RMVC 5100

**Compact design**

- Transformer integrated within cabinet
- Modular power module design
- Front access Current lower than 280A only for easy maintenance and replacement

Fully equipped

- HMI touch screen for status display and local control
- 30 min UPS to maintain control during a short-term power outage
- Internal cabinet lighting
- Visual and audible local alarm

Restricted access to medium voltage area

- Door interlock system prevents unauthorised access
- Special tools required to open doors
- Handle lock provided
- Fibre-optic communications for exchange of status and control between Medium Voltage Cabinets and Low Voltage Control Cabinet

Internal view

RMVC 5100



Transformer cabinet	Control cabinet	Inverter cabinet
Multi-winding phase-shift transformer	Master control module	Cell drive module
<ul style="list-style-type: none"> Multi-winding phase-shift transformer (48 pulse/24 winding) is in place with taps for change in input voltage. Reducing power harmonics with multi-pulse filtering in compliance with IEEE standards Eliminating need for harmonic filter and power factor improving condenser 	<ul style="list-style-type: none"> Master control module to control multi-level PWM output voltage with a total of 24 power cells and fiber optic communication link. User-centric HMI to support system diagnostics and monitoring 	<ul style="list-style-type: none"> Eight power cells per phase in series connection generating 17 level phase voltage output. It is designed to ensure easy cell maintenance. Each cell performs PWM switching in distributed control mode and has default built-in cell protection and bypass functions (Customized).

Power module

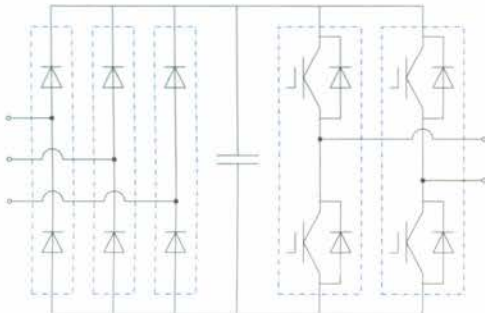
The inverter section within the drive is of a modular design using identical power modules connected in series to create the required medium voltage output. Each power module uses a well-proven low-voltage IGBT-based single-phase H-bridge architecture for added reliability, economy and ease of replacement.

The standard power module for two-quadrant control (bi-directional motor speed control without braking) uses a diode rectifier at the front end. An optional power module is available which uses an IGBT-based rectifier to allow power to be returned to the supply allowing full four-quadrant operation (motoring and braking in both directions). This "Active Front End" is modulated to draw sinusoidal current from the supply and control the input power factor to unity. The AFE version can also be used to continuously return power to the network for renewable energy generation applications such as for wind and tidal turbines.

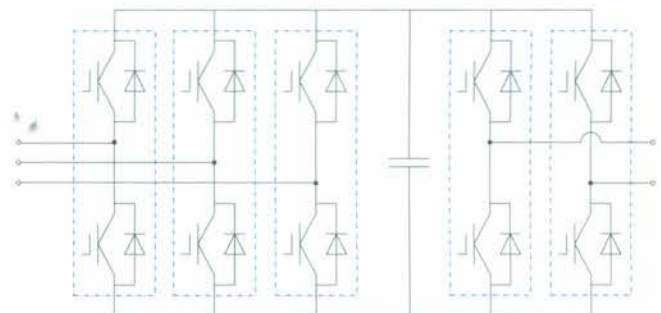
Features

- Front access design for easy maintenance of power modules that can be replaced in just a few minutes.
- Single power cell design for all modules allows reduced spare parts inventory cost.
- 2-Quadrant and 4-Quadrant versions available.
- Fibre-optic interface for safe control and feedback communication with controller.

Two quadrant topology



Four quadrant topology



RMVC 5100 Water cooling system



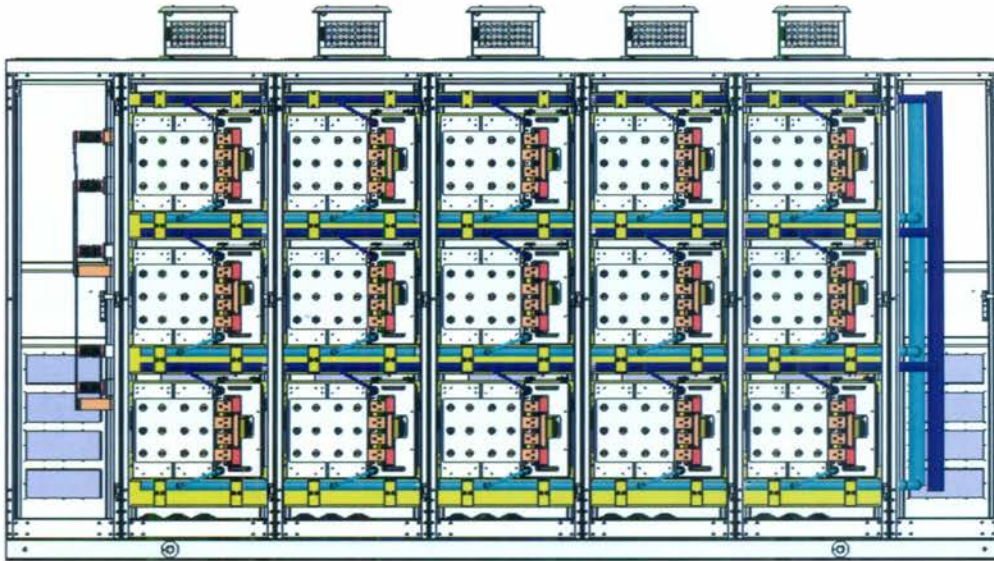
Power Cabinet	Control Cabinet	Water Cooling Cabinet
<p>The power cell adopts modular design and consists of rectifier module, capacitor module and inverter module. These modules are electrically connected by laminated busbars. The rectifier module integrates fuses, rectifier bridge, and power supply unit; The capacitors adopt long-life film type; the inverter module includes control driver boards, and IGBT modules (3300V,4500V).</p> <p>The power cell is designed in parallel with two valves. Single set capacity up to 40MVA (10KV voltage)</p>	<p>Control system is independently developed with adoption of all-digital signal processor</p>	<p>Water-cooling cabinet realizes water quality treatment, detection and protection of internal water</p>

Precharging cabinet is placed separately

The phase shifting transformer can be dry type or oil immersed type.



■ Cabint Genral View



● Parallel design of double water channels

The rectifier and inverter cooling water pipes are independent with higher heat dissipation efficiency.



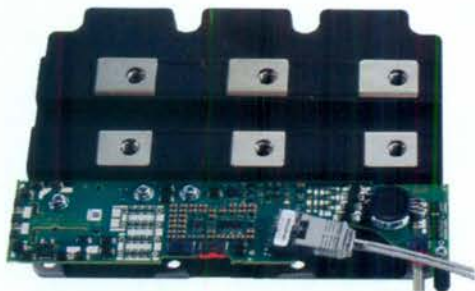
● Waterway

The design of waterway is reasonable and easy to maintain



● Using high voltage power devices

Make the main circuit of the system simpler by using 3300V/4500V IGBT devices.



● Water pipe joints plugged and unplugged online

The water inlet and outlet ports of all modules are equipped with quick connectors, which enable on-line plugging and unplugging to facilitate the maintenance and replacement of the inverter power cells.



Monitoring(HMI)

- Door-mounted easy color LCD touch-screen
- User-friendly interface with operational data at your fingertips
- Virtual meters display main VFD parameters
- System and status monitoring and manual controls
- Power module status monitoring
- Data logging, trending displays, diagnostic information available
- Multiple languages available
- Parameter adjustment and operation records
- Dedicated multi-level menu to guide user with different access levels for service and commissioning engineers (Operator, Manager and Administrator)

Main panel

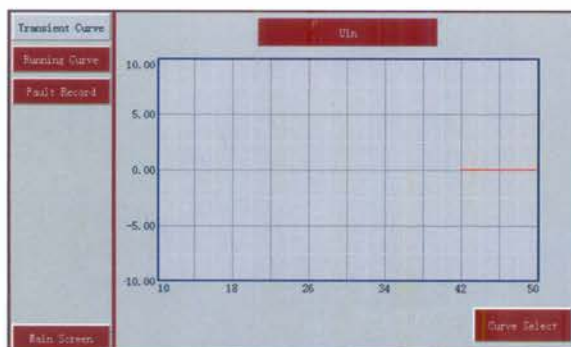


Standard HD HMI monitoring maximizes user convenience

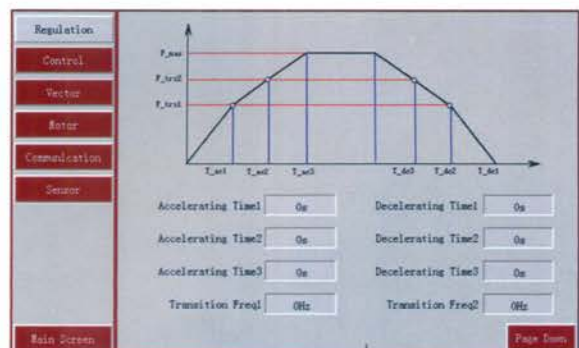
Inverter

System State	Phase U Cell State													
Inverter State	Position	U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13
Digital State	Down_Comp													
Analog State	Running													
Data State	IGBT 4													
Motor Parameter	IGBT 3													
	IGBT 2													
	IGBT 1													
	Temp_Over													
	V_Less													
	V_Over													
	Bypass													
	Voltage	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V

Trend



Speed



History

Fault Log	No.	Time	Fault Details
Warning Log	1	20****	Emergency stop
Operations Log			
Run Time Log			

Start Time: 20****
End Time: 20****





High Reliability and Easy Maintenance

WOLONG Company technologies, such as the use of a modular multi-level topology design and use of IGBT power semiconductors, provide a low parts count, which extends the Mean Time Between Failures (MTBF) and increases reliability.

Front access

The RMVC 5100 is designed to allow easy front access to the drives components thereby providing high availability.



Long lifetime

The DC bus capacitors provide an energy store and de-coupling buffer between the supply network and the load side converter. The high value of the capacitors almost eliminates the voltage ripple and stabilizes the DC bus voltage, suppressing disturbances caused by fluctuations of the load and supply side harmonics and switching transients.

Traditionally, the capacitors used for the DC bus have been of aluminium electrolytic type as the technology is mature and relatively low cost and also achieves a high energy density.

Disadvantages of electrolytic capacitors

However, electrolytic capacitors suffer from some disadvantages:

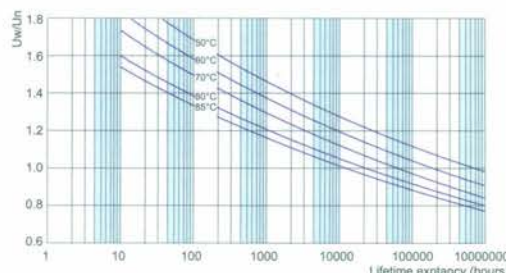
- Limited ability to handle large ripple current.
- Limited voltage rating and ability to handle voltage surges. It is necessary to connect capacitors in series and use voltage-sharing resistors, increasing system design complexity and reducing overall reliability.
- Limited lifetime.
- Unsuitability for long-term storage as spare parts.
- Failure modes may result in collateral damage to other components.

Advantages of metalized film capacitors

The RMVC 5100 uses metalized film capacitors which have the following advantages, despite having a lower power density:

- Ability to handle high ripple current.
- Self-healing with longer natural life.
- Improved performance at low temperatures.
- Higher voltage capability such that it is not necessary to mount in series and also non-polarised – both these factors simplify bus bar and system design with reduced effects of stray parameters and improved resultant reliability.
- Lower internal losses and stray than electrolytic capacitors.
- Generally fail to open-circuit without causing collateral damage.
- Can be stored for long periods without the need for re-forming.

Lifetime expectancy vs U_w/U_n



RMVC 5100 - Functions

RMVC 5100 offer highly reliable optimum solutions by providing spinning start, power cell bypass, sensorless vector control and many more functions.

Torque limiting function

The torque limit function is used to accurately control and limit the torque in order to prevent overload of the motor, electricity supply system or VFD itself. This prevents damage to the motor when stationary, for example, with a locked rotor, when starting with high inertia or high initial friction load.

The torque limit function can also be used to prevent or limit the return of power from the motor to the VFD in the event of an over-hauling load causing the motor speed to exceed the commanded speed.

Spinning start (Flying start)

The RMVC 5100 can automatically identify that the motor is already spinning at the moment of the start request and institute a controlled sequence to enable the drive to pick up the spinning motor without the need to stop the motor or the risk of a system trip. The sequence requires an initial estimate of the spinning motor speed by scanning the motor voltage while changing the output frequency. Steps are taken to reduce the time needed to estimate the motor speed.

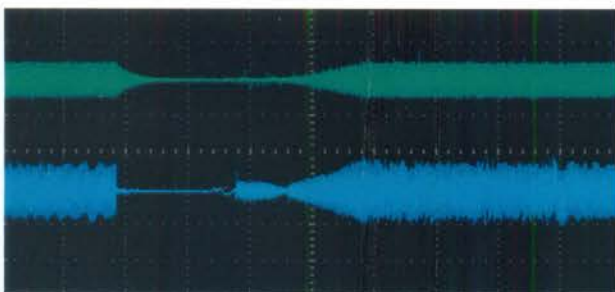
Examples of when a Flying Start would be used

- The mechanical load causes the motor to be spinning, even though no electric power is applied to the motor.
- Manual reset after trip
- Automatic restart after a shutdown.
- Restart after Low-Voltage Ride-Through (temporary loss of supply power).
- Restart after an automatic Power Cell Bypass.

Rapid Speed Estimation

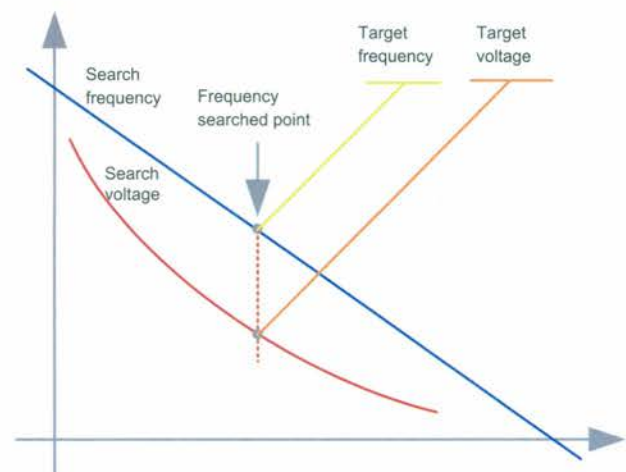
- Reduce speed estimation time by controlling the drive output frequency scanning rate
- Reduce estimation time by reducing output frequency
- Reducing estimation time by controlling voltage response

Spinning start waveform



Output voltage

Output current



Automatic power cell bypass option

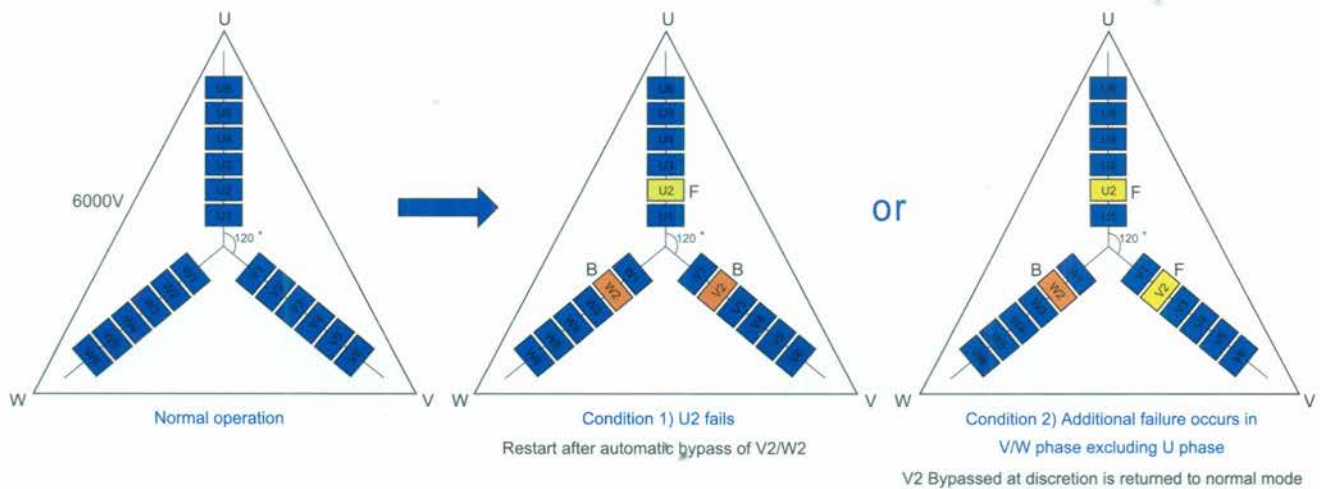
When a fault in a power module is detected, the RMVC 5100 shuts off current to the motor, bypasses the identified faulty power module, bypasses the equivalent power module in the other phases in order to maintain voltage balance, and automatically restarts current to the motor. This allows operation to continue without intervention of the operator.

If a power module in another phase were to fail, the system automatically re-organises the bypass to achieve the highest working voltage possible.

Note: This function is optional.

Operate cell bypass function (in auto setup)

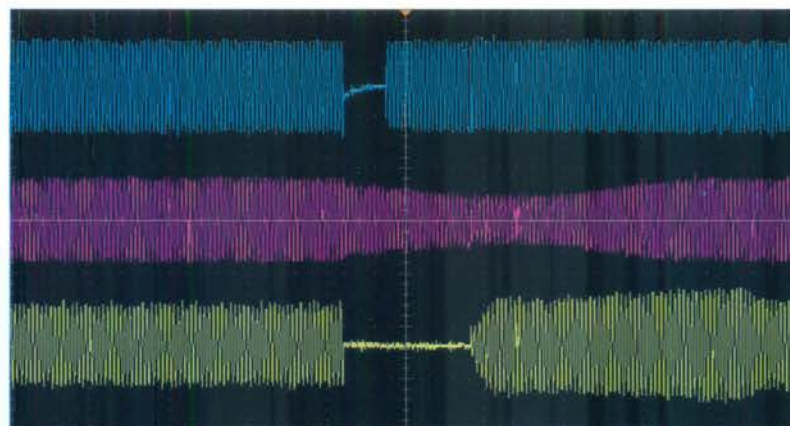
- F: Bypass following cell failure
- B: Auto bypass



Low voltage ride-through (LVRT)

In the event of a short-term dip in supply voltage, the vector control system maintains correct motor flux while allowing the motor to coast. If the supply voltage recovers within the stipulated period (e.g. up to 5 cycles of the supply power), normal speed and torque control are restored automatically. During the supply dip mechanical energy of the load may be regenerated in order to maintain the DC Link voltage, maintain control power and maintain control of the motor flux. The VFD is then able to ride through the under-voltage event and automatically continue normal operation without operator intervention. If the supply dip exceeds the stipulated period, the VFD will trip and a normal re-start is undertaken.

LVRT waveform

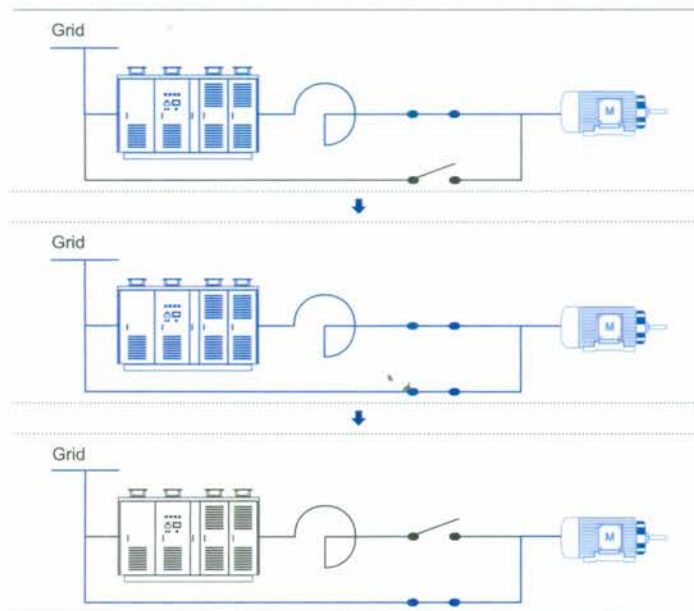


Input voltage ——— output voltage ——— Output current ———

Synchronous transfer

- Seamless switching of the source of motor power from the VFD to the local supply network (Synchronous Transfer to Bypass mode) or vice versa (switch to VFD mode).
- Synchronous transfer function synchronises the VFD output frequency, voltage and phase with the local supply network before operating the Bypass circuit breaker, enabling power transfer without over-current or motor torque disturbance.
- For transfer back to VFD mode, the VFD output is first synchronised to the supply network before opening the Bypass circuit breaker and assuming VFD control of motor torque and speed.
- Multi-motor operation: Synchronous transfer can be arranged for a single VFD to be used as a starter for several motors that do not need variable speed operation. Once the transfer of a motor onto the supply network has been completed, the VFD is then available to start another motor. The final motor to be started can remain on the VFD if variable speed is required.

Drive mode to grid mode



Sensorless vector control

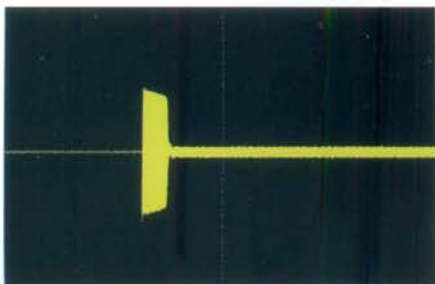
A speed sensor can be a source of potential unreliability so is avoided if possible. Traditionally, the only alternative to closed-loop speed control with a speed sensor was to use V/f control with subsequent loss of accuracy, loss of ability to control and limit torque and inability to control at close to zero speed.

Advantage

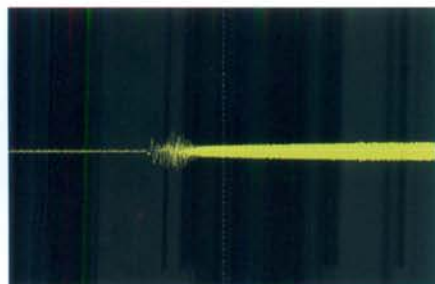
Sensorless Vector Control (Open-loop control) now provides improved starting torque and accurate control of speed and torque at low speed. Low-speed performance now approaches that of closed-loop control without the need for a sensor with the attendant maintenance cost.

Starting current in different control mode

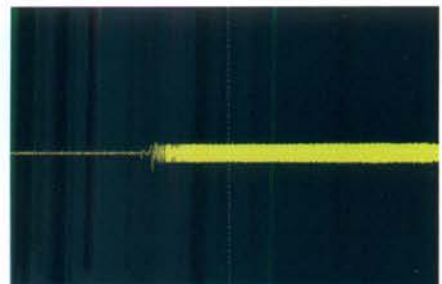
DOL



V/F control



Sensorless vector control

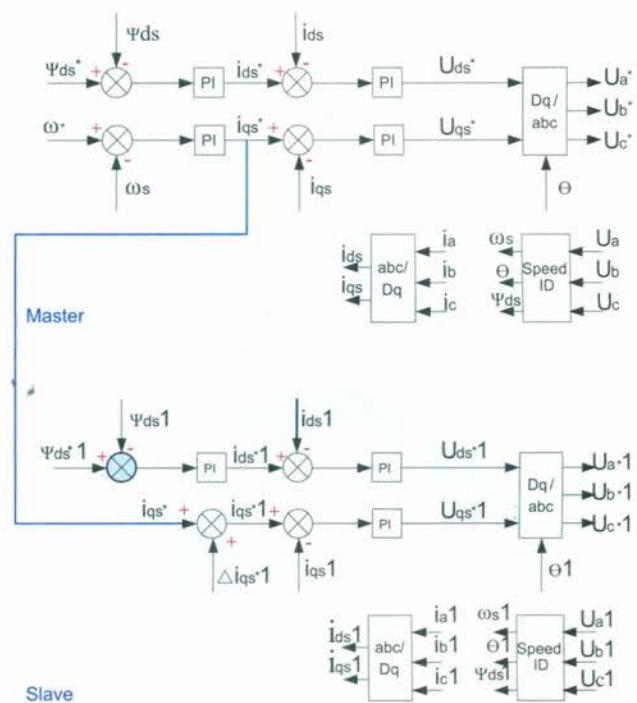
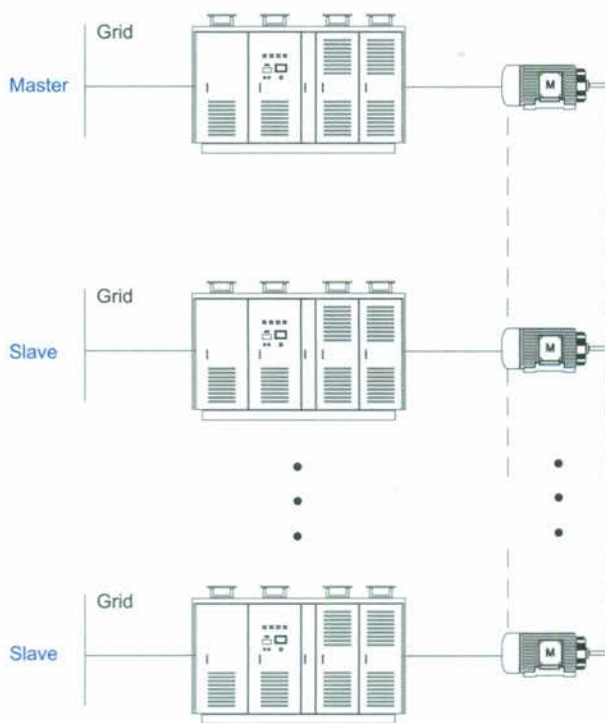


Master-Slave control

Some applications require that the load is driven by two or more motors that are mechanically coupled together. It is inherent that the motors run at the same speed but it is essential that they share the mechanical load equally or in a defined and stable manner. Even if each motor is driven from a separate VFD, only one speed regulator is required and steps must be taken to ensure that each motor takes the correct share of the mechanical load torque.

This requirement is satisfied by the Master-Slave system. VFD must be in Vector Control mode. One VFD is arbitrarily designated the Master and the Torque Command produced by the Speed Regulator in this Master VFD is transmitted to the other VFDs designated as Slaves. The Slave VFDs follow the Torque Command from the Master while their own Speed regulators are disabled. In the event that the Master VFD becomes unavailable, the system automatically re-assigns one of the former Slave VFDs to become the new Master. The medium used to transmit the Torque Command signal between the VFDs is either high-speed hard-wired analogue or via a high-speed digital network.

Vector logic drawing



Automatic parameter identification (Auto-tune)

The RMVC 5100 can automatically identify the required motor parameters allowing accurate control of the motor at low speed without the need for a sensor (Open-loop Control).





RMVC 5100 - How to chose

Identification code

RMVC 5100 - / -

Product series

WL MV drive 5100 series

Input voltage

3.3 - 3.3kV
6.3 - 6.6kV
.....
13.8 - 13.8kV
.....

Output current

0 - 15A
.....
900 - 2300A
.....

Motor type

A - asynchronous
S - synchronous

Cell type

T - two quadrant
F - four quadrant

Customized function

B - cell bypass (option)

Example

RMVC 5100 - 10 / 280 - AT

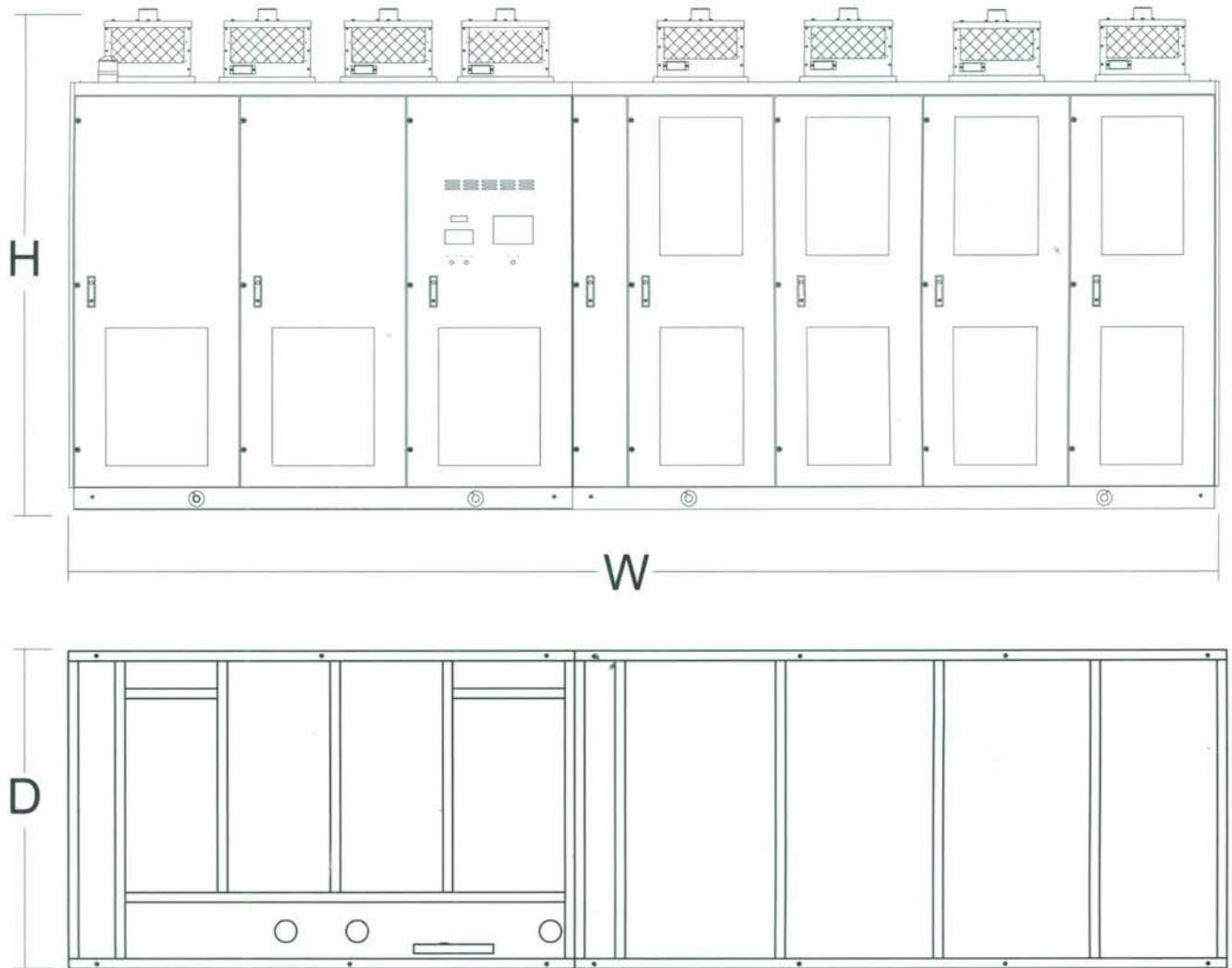
RMVC 5100 = WLRX medium voltage drive 5100 series
10 = input voltage 10kV, 280 = Output current 280A
A = asynchronous motor, T = two quadrant
Suitable for 4000kW motor.

RMVC 5100 - Ordering Data

Technical specification

Items	Parameter 1
Power supply	
Input voltage	3 phase, AC, 3kV / 3.3kV / 4.16kV / 6kV / 6.6kV / 10kV / 11kV / 13.8kV
Input voltage fluctuation tolerance	±10%
Control voltage	3 phase, AC, 380V / 400V / 415V / 480 V
Output	
Voltage	0 ~ 3kV / 3.3kV / 4.16kV / 6kV / 6.6kV / 10kV / 11 kV / 13.8kV
Current	0 ~ rated current
Frequency	0 - 50 / 60Hz (customized, maximum 120Hz)
Maximum length of cable permitted	1000m (customized)
Performance	
Input waveform	Current THD < 4%, input filter is not necessary
Efficiency	> 98.5% at 100% load(not including transformer)
Power factor	>0.95, (20% ~ 100% load) power factor compensator is not necessary
Ambient	
Installation	Indoor, no explosive and corrosive gas
Temperature	0 ~ 40°C
Humidity	< 95%, no condensation
Above sea level	Less than 1000m (customized)
Storage / transportation temperature	-25°C ~ +55°C
Control	
Control mode	Sensor less vector control / sensor vector control / V/F control
Load type	Synchronous or asynchronous motor (slip ring motor)
Control chip	DSP, FPGA
PID function	Programmable
Control features	Duplicate supply, fault diagnostic, torque and current limit, low voltage ride-through, synchronous-transfer and drive bypass, power module bypass (option), flying start, master-slave control, skip frequencies, motor parameter estimation
Frequency resolution	0.01Hz
Communication	RS485, Modbus-RTU / Profibus-DP (optionahdevicenet, profinet, ethernet)
HMI operation	Touch screen
HMI language	English / Russian / Chinese
Alarm annunciation	Audio visual
Noise level	<80dB
Protection	Over current, earth fault, over voltage, under voltage, phase loss, over temperature, fan failure, communication failure
Power cell bypass	Optional
Enclosure	
Cooled mode	Air cooled (optional: water cooled)
Ingress protection	IP20 (optional: IP30, IP31, IP41, IP42)
Painting	RAL7035 (customized)

Standard dimension drawing



3.3kV specification

Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
3.3	46	200	RMVC5100-3.3/46-AT	3075	1400	2872	3350
3.3	50	220	RMVC5100-3.3/50-AT	3075	1400	2872	3350
3.3	57	250	RMVC5100-3.3/57-AT	3075	1400	2872	3350
3.3	72	315	RMVC5100-3.3/72-AT	3075	1400	2872	3350
3.3	76	335	RMVC5100-3.3/76-AT	3075	1400	2872	3350
3.3	90	400	RMVC5100-3.3/90-AT	3075	1400	2872	3350
3.3	96	425	RMVC5100-3.3/96-AT	3075	1400	2872	3350
3.3	100	450	RMVC5100-3.3/100-AT	3075	1400	2872	3350
3.3	108	475	RMVC5100-3.3/108-AT	3075	1400	2872	3350
3.3	114	500	RMVC5100-3.3/114-AT	3075	1400	2872	3350
3.3	120	530	RMVC5100-3.3/120-AT	3075	1400	2872	3350
3.3	135	600	RMVC5100-3.3/135-AT	3075	1400	2872	3500
3.3	143	630	RMVC5100-3.3/143-AT	3075	1400	2872	3500
3.3	148	670	RMVC5100-3.3/148-AT	3375	1400	2872	3550
3.3	160	710	RMVC5100-3.3/160-AT	3675	1400	2872	4560
3.3	175	800	RMVC5100-3.3/175-AT	3675	1400	2872	4560
3.3	188	850	RMVC5100-3.3/188-AT	3675	1400	2872	4580
3.3	220	1000	RMVC5100-3.3/220-AT	4177	1400	2872	5840
3.3	245	1120	RMVC5100-3.3/245-AT	4177	1400	2872	5840
3.3	274	1250	RMVC5100-3.3/274-AT	4177	1400	2872	5840
3.3	282	1400	RMVC5100-3.3/282-AT	4854	1500	2872	7060
3.3	350	1600	RMVC5100-3.3/350-AT	4854	1500	2872	7060
3.3	395	1800	RMVC5100-3.3/395-AT	4854	1500	2872	7060
3.3	433	1980	RMVC5100-3.3/433-AT	5758	1700	2872	8160
3.3	438	2000	RMVC5100-3.3/438-AT	6583	1700	2872	8160
3.3	480	2240	RMVC5100-3.3/480-AT	6583	1700	2872	8160

Note:

- 1) Please contact WOLONG Company for other combinations of input and output voltage.
- 2) For higher drive capacity please contact WOLONG Company.

4.16kV specification

I Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
4.16	36	200	RMVC5100-4.16/36-AT	3275	1400	2872	3480
4.16	40	220	RMVC5100-4.16/40-AT	3275	1400	2872	3480
4.16	46	250	RMVC5100-4.16/46-AT	3275	1400	2872	3480
4.16	57	315	RMVC5100-4.16/57-AT	3275	1400	2872	3480
4.16	60	335	RMVC5100-4.16/60-AT	3275	1400	2872	3480
4.16	72	400	RMVC5100-4.16/72-AT	3275	1400	2872	3480
4.16	77	425	RMVC5100-4.16/77-AT	3275	1400	2872	3480
4.16	82	450	RMVC5100-4.16/82-AT	3275	1400	2872	3480
4.16	86	475	RMVC5100-4.16/86-AT	3275	1400	2872	3480
4.16	92	500	RMVC5100-4.16/92-AT	3275	1400	2872	3480
4.16	100	560	RMVC5100-4.16/100-AT	3275	1400	2872	3480
4.16	108	600	RMVC5100-4.16/108-AT	3275	1400	2872	3480
4.16	115	630	RMVC5100-4.16/115-AT	3275	1400	2872	3480
4.16	120	670	RMVC5100-4.16/120-AT	3575	1400	2872	4080
4.16	128	710	RMVC5100-4.16/128-AT	3575	1400	2872	4080
4.16	140	800	RMVC5100-4.16/140-AT	3575	1400	2872	4080
4.16	148	850	RMVC5100-4.16/148-AT	3575	1400	2872	4080
4.16	156	900	RMVC5100-4.16/156-AT	3977	1400	2872	5400
4.16	174	1000	RMVC5100-4.16/174-AT	3977	1400	2872	5400
4.16	218	1250	RMVC5100-4.16/218-AT	4677	1400	2872	5710
4.16	245	1400	RMVC5100-4.16/245-AT	4977	1500	2872	6350
4.16	278	1600	RMVC5100-4.16/278-AT	4977	1500	2872	6350
4.16	315	1800	RMVC5100-4.16/315-AT	5456	1700	2872	9200
4.16	345	2000	RMVC5100-4.16/345-AT	5456	1700	2872	9200
4.16	388	2240	RMVC5100-4.16/388-AT	5456	1700	2872	9200
4.16	435	2500	RMVC5100-4.16/435-AT	6360	1700	2872	11340

Note:

- 1) Please contact WOLONG Company for other combinations of input and output voltage.
- 2) For higher drive capacity please contact WOLONG Company.

6kV specification

Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
6	25	200	RMVC5100-6/25-AT	3677	1500	2872	3730
6	28	220	RMVC5100-6/28-AT	3677	1500	2872	3730
6	32	250	RMVC5100-6/32-AT	3677	1500	2872	3730
6	39	315	RMVC5100-6/39-AT	3677	1500	2872	3730
6	42	335	RMVC5100-6/42-AT	3677	1500	2872	3730
6	50	400	RMVC5100-6/50-AT	3677	1500	2872	3730
6	53	425	RMVC5100-6/53-AT	3677	1500	2872	3730
6	56	450	RMVC5100-6/56-AT	3677	1500	2872	3730
6	60	475	RMVC5100-6/60-AT	3677	1500	2872	3730
6	63	500	RMVC5100-6/63-AT	3677	1500	2872	3730
6	70	560	RMVC5100-6/70-AT	3677	1500	2872	3730
6	75	600	RMVC5100-6/75-AT	3677	1500	2872	3730
6	79	630	RMVC5100-6/79-AT	3677	1500	2872	3730
6	84	670	RMVC5100-6/84-AT	3977	1500	2872	4980
6	88	710	RMVC5100-6/88-AT	3977	1500	2872	4980
6	96	800	RMVC5100-6/96-AT	3977	1500	2872	4980
6	120	1000	RMVC5100-6/120-AT	3977	1500	2872	4980
6	135	1120	RMVC5100-6/135-AT	3977	1500	2872	4980
6	150	1250	RMVC5100-6/150-AT	3977	1500	2872	4980
6	170	1400	RMVC5100-6/170-AT	4577	1500	2872	5800
6	218	1800	RMVC5100-6/218-AT	5479	1500	2872	8700
6	240	2000	RMVC5100-6/240-AT	5479	1500	2872	8700
6	270	2240	RMVC5100-6/270-AT	5479	1500	2872	8700
6	305	2500	RMVC5100-6/305-AT	6056	1700	2872	10900
6	338	2800	RMVC5100-6/338-AT	6056	1700	2872	10900
6	360	3000	RMVC5100-6/360-AT	6356	1700	3172	12900
6	380	3150	RMVC5100-6/380-AT	6356	1700	3172	12900
6	430	3550	RMVC5100-6/430-AT	7262	1700	3172	13550
6	458	3800	RMVC5100-6/458-AT	8087	1700	3172	13550
6	480	4000	RMVC5100-6/480-AT	8087	1700	3172	13550
6	545	4500	RMVC5100-6/545-AT	8887	1700	3172	19300
6	600	5000	RMVC5100-6/600-AT	8887	1700	3172	19300
6	675	5600	RMVC5100-6/675-AT	9387	1700	3172	20460

Note:

1) Please contact WOLONG Company for other combinations of input and output voltage.

2) For higher drive capacity please contact WOLONG Company.

6.6kV specification

Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
6.6	23	200	RMVC5100-6.6/23-AT	3677	1400	2872	4600
6.6	25	220	RMVC5100-6.6/25-AT	3677	1400	2872	4600
6.6	28	250	RMVC5100-6.6/28-AT	3677	1400	2872	4600
6.6	36	315	RMVC5100-6.6/36-AT	3677	1400	2872	4600
6.6	38	335	RMVC5100-6.6/38-AT	3677	1400	2872	4600
6.6	45	400	RMVC5100-6.6/45-AT	3677	1400	2872	4600
6.6	50	425	RMVC5100-6.6/50-AT	3677	1400	2872	4600
6.6	52	450	RMVC5100-6.6/52-AT	3677	1400	2872	4600
6.6	54	475	RMVC5100-6.6/54-AT	3677	1400	2872	4600
6.6	58	500	RMVC5100-6.6/58-AT	3677	1400	2872	4600
6.6	64	560	RMVC5100-6.6/64-AT	3677	1400	2872	4600
6.6	70	600	RMVC5100-6.6/70-AT	3677	1400	2872	4600
6.6	72	630	RMVC5100-6.6/72-AT	3677	1400	2872	4600
6.6	77	670	RMVC5100-6.6/77-AT	3677	1400	2872	4600
6.6	80	710	RMVC5100-6.6/80-AT	3977	1400	2872	5900
6.6	88	800	RMVC5100-6.6/88-AT	3977	1400	2872	5900
6.6	95	850	RMVC5100-6.6/95-AT	3977	1400	2872	5900
6.6	100	900	RMVC5100-6.6/100-AT ¹	3977	1400	2872	5900
6.6	110	1000	RMVC5100-6.6/110-AT	3977	1400	2872	5900
6.6	125	1120	RMVC5100-6.6/125-AT	3977	1400	2872	5900
6.6	138	1250	RMVC5100-6.6/138-AT	3977	1400	2872	6200
6.6	175	1600	RMVC5100-6.6/175-AT	4877	1500	2872	7600
6.6	220	2000	RMVC5100-6.6/220-AT	5781	1500	2872	9520
6.6	245	2240	RMVC5100-6.6/245-AT	5781	1500	2872	9520
6.6	275	2500	RMVC5100-6.6/275-AT	5781	1500	2872	9520
6.6	306	2800	RMVC5100-6.6/306-AT	6357	1700	2872	11470
6.6	328	3000	RMVC5100-6.6/328-AT	6357	1700	2872	11470
6.6	345	3150	RMVC5100-6.6/345-AT	6658	1700	3172	12220
6.6	390	3550	RMVC5100-6.6/390-AT	6658	1700	3172	12220
6.6	416	3800	RMVC5100-6.6/416-AT	7861	1700	3172	16560
6.6	438	4000	RMVC5100-6.6/438-AT	7861	1700	3172	16560
6.6	495	4500	RMVC5100-6.6/495-AT	9364	1700	3299	17700
6.6	547	5000	RMVC5100-6.6/547-AT	9364	1700	3299	17700

Note:

- 1) Please contact WOLONG Company for other combinations of input and output voltage.
- 2) For higher drive capacity please contact WOLONG Company.

10kV specification

Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
10	19	250	RMVC5100-10/19-AT	4579	1500	2872	5780
10	24	315	RMVC5100-10/24-AT	4579	1500	2872	5780
10	25	335	RMVC5100-10/25-AT	4579	1500	2872	5780
10	29	400	RMVC5100-10/29-AT	4579	1500	2872	5780
10	32	425	RMVC5100-10/32-AT	4579	1500	2872	5780
10	34	450	RMVC5100-10/34-AT	4579	1500	2872	5780
10	36	475	RMVC5100-10/36-AT	4579	1500	2872	5780
10	38	500	RMVC5100-10/38-AT	4579	1500	2872	5780
10	42	560	RMVC5100-10/42-AT	4579	1500	2872	5780
10	45	600	RMVC5100-10/45-AT	4579	1500	2872	5780
10	47	630	RMVC5100-10/47-AT	4579	1500	2872	5780
10	49	670	RMVC5100-10/49-AT	4579	1500	2872	5780
10	53	710	RMVC5100-10/53-AT	4579	1500	2872	5780
10	58	800	RMVC5100-10/58-AT	4579	1500	2872	5780
10	73	1000	RMVC5100-10/73-AT	4879	1500	2872	7400
10	82	1120	RMVC5100-10/82-AT	4879	1500	2872	7400
10	91	1250	RMVC5100-10/91-AT	4879	1500	2872	7400
10	103	1400	RMVC5100-10/103-AT	4879	1500	2872	7400
10	115	1600	RMVC5100-10/115-AT	4879	1500	2872	7400
10	130	1800	RMVC5100-10/130-AT	4879	1500	2872	7700
10	145	2000	RMVC5100-10/145-AT	4879	1500	2872	7700
10	165	2240	RMVC5100-10/165-AT	5779	1700	2872	9780
10	180	2500	RMVC5100-10/180-AT	5779	1700	2872	9780
10	218	3000	RMVC5100-10/218-AT	7182	1800	3172	12369
10	230	3150	RMVC5100-10/230-AT	7182	1800	3172	12369
10	250	3550	RMVC5100-10/250-AT	7182	1800	3172	12369
10	275	3800	RMVC5100-10/275-AT	7182	1800	3172	12369
10	280	4000	RMVC5100-10/280-AT	7182	1800	3172	12369
10	320	4500	RMVC5100-10/320-AT	7860	1700	3172	18600
10	360	5000	RMVC5100-10/360-AT	7860	1700	3172	18600
10	400	5600	RMVC5100-10/400-AT	7860	1700	3172	18600
10	435	6000	RMVC5100-10/435-AT	9968	1700	3472	21050
10	455	6300	RMVC5100-10/455-AT	9968	1700	3472	21050
10	520	7100	RMVC5100-10/520-AT	11593	1700	3472	24700
10	578	8000	RMVC5100-10/578-AT	11593	1700	3472	24700

Note:

- 1) Please contact WOLONG Company for other combinations of input and output voltage.
- 2) For higher drive capacity please contact WOLONG Company.

11kV specification

Motor data			RMVC drive	RMVC drive data			
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
11	17	250	RMVC5100-1/17-AT	4579	1500	2872	6350
11	22	315	RMVC5100-1/22-AT	4579	1500	2872	6350
11	23	335	RMVC5100-1/23-AT	4579	1500	2872	6350
11	27	400	RMVC5100-1/27-AT	4579	1500	2872	6350
11	29	425	RMVC5100-1/29-AT	4579	1500	2872	6350
11	30	450	RMVC5100-1/30-AT	4579	1500	2872	6350
11	32	475	RMVC5100-1/32-AT	4579	1500	2872	6350
11	34	500	RMVC5100-1/34-AT	4579	1500	2872	6350
11	38	560	RMVC5100-1/38-AT	4579	1500	2872	6350
11	41	600	RMVC5100-1/41-AT	4579	1500	2872	6350
11	43	630	RMVC5100-1/43-AT	4579	1500	2872	6350
11	46	670	RMVC5100-1/46-AT	4579	1500	2872	6350
11	48	710	RMVC5100-1/48-AT	4579	1500	2872	6350
11	53	800	RMVC5100-1/53-AT	4579	1500	2872	6350
11	56	850	RMVC5100-1/56-AT	4579	1500	2872	6350
11	60	900	RMVC5100-1/60-AT	4879	1500	2872	7850
11	65	1000	RMVC5100-1/65-AT	4879	1500	2872	7850
11	75	1120	RMVC5100-1/75-AT	4879	1500	2872	7850
11	83	1250	RMVC5100-1/83-AT	4879	1500	2872	7850
11	92	1400	RMVC5100-1/92-AT	4879	1500	2872	7850
11	105	1600	RMVC5100-1/105-AT	4879	1500	2872	7850
11	118	1800	RMVC5100-1/118-AT	4879	1500	2872	7850
11	132	2000	RMVC5100-1/132-AT	4879	1500	2872	8050
11	147	2240	RMVC5100-1/147-AT	5179	1700	2872	8750
11	165	2500	RMVC5100-1/165-AT	6079	1700	2872	10065
11	185	2800	RMVC5100-1/185-AT	6079	1700	2872	10115
11	206	3150	RMVC5100-1/206-AT	7683	1800	3172	12600
11	233	3550	RMVC5100-1/233-AT	7683	1800	3172	12600
11	250	3800	RMVC5100-1/250-AT	7683	1800	3172	12600
11	263	4000	RMVC5100-1/263-AT	7683	1800	3172	12600
11	295	4500	RMVC5100-1/295-AT	8460	1700	3172	19750
11	328	5000	RMVC5100-1/328-AT	8460	1700	3172	19750
11	368	5600	RMVC5100-1/368-AT	8460	1700	3172	19750
11	395	6000	RMVC5100-1/395-AT	8460	1700	3172	19750
11	415	6300	RMVC5100-1/415-AT	10570	1700	3474	21900
11	433	6600	RMVC5100-1/433-AT	10570	1700	3474	21900
11	475	7100	RMVC5100-1/475-AT	11395	1700	3474	21900

Note:

- 1) Please contact WOLONG Company for other combinations of input and output voltage.
- 2) For higher drive capacity please contact WOLONG Company.

1700VIGBT

10kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
10	280	4000	RMVC5100-10/280-AT	5731	1700	2300	5500
10	400	5600	RMVC5100-10/400-AT	5731	1700	2300	5500
10	450	6500	RMVC5100-10/450-AT	5731	1700	2300	5500
10	500	7000	RMVC5100-10/500-AT	6031	1700	2300	5700
10	550	8000	RMVC5100-10/550-AT	6031	1700	2300	5700
10	600	8500	RMVC5100-10/600-AT	6031	1700	2300	5700
10	650	9000	RMVC5100-10/650-AT	6031	1700	2500	5700
10	700	10000	RMVC5100-10/700-AT	6731	1700	2500	6300
10	800	11000	RMVC5100-10/800-AT	9539	1700	2500	6300
10	900	13000	RMVC5100-10/900-AT	9539	1700	2500	6300
10	1000	14000	RMVC5100-10/1000-AT	9739	1700	2500	6500
10	1100	16000	RMVC5100-10/1100-AT	9739	1700	2500	6500
10	1200	17000	RMVC5100-10/1200-AT	9739	1700	2500	6500

6kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
6	280	2500	RMVC5100-6/280-AT	4831	1700	2300	4500
6	400	3500	RMVC5100-6/400-AT	4831	1700	2300	4500
6	500	4000	RMVC5100-6/500-AT	4831	1700	2300	4700
6	600	5000	RMVC5100-6/600-AT	4831	1700	2300	4700
6	700	6000	RMVC5100-6/700-AT	5829	1700	2500	5300
6	800	7000	RMVC5100-6/800-AT	7132	1700	2500	5300
6	950	8000	RMVC5100-6/950-AT	7132	1700	2500	5300
6	1050	9000	RMVC5100-6/1050-AT	7332	1700	2500	5500
6	1200	10000	RMVC5100-6/1200-AT	7332	1700	2500	5500

Note:

1) The above dimension is only the dimension of the inverter, not including the transformer, and the transformer needs to be manufacture according to the project.

3300VIGBT

10kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
10	900	12000	RMVC5100-10/900-AT	7339	1800	2620	10700
10	1000	14000	RMVC5100-10/1000-AT	8339	1800	2620	12200
10	1200	16000	RMVC5100-10/1200-AT	8639	1800	2620	12500
10	1600	22000	RMVC5100-10/1600-AT	10139	1800	2620	14000
10	1800	25000	RMVC5100-10/1800-AT	11439	1800	2620	15900
10	2000	28000	RMVC5100-10/2000-AT	11939	1800	2620	16200
10	2300	32000	RMVC5100-10/2300-AT	12939	1800	2620	17200

3300VIGBT

6kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
6	900	7000	RMVC5100-6/900-AT	5535	1800	2620	7500
6	1000	8000	RMVC5100-6/1000-AT	6135	1800	2620	8400
6	1200	10000	RMVC5100-6/1200-AT	6335	1800	2620	8600
6	1600	13000	RMVC5100-6/1600-AT	6935	1800	2620	9200
6	1800	15000	RMVC5100-6/1800-AT	7835	1800	2620	10600
6	2000	17000	RMVC5100-6/2000-AT	8335	1800	2620	11100
6	2300	19000	RMVC5100-6/2300-AT	8935	1800	2620	11700

Note:

1) The above dimension is only the dimension of the inverter, not including the transformer, and the transformer needs to be manufacture according to the project.

4500VIGBT

10kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
10	560	8000	RMVC5100-10/560-AT	5739	1800	2620	9000
10	850	12000	RMVC5100-10/850-AT	6839	1800	2620	10000
10	1000	14000	RMVC5100-10/1000-AT	8539	1800	2620	12500
10	1100	15000	RMVC5100-10/1100-AT	8539	1800	2620	12500
10	1250	18000	RMVC5100-10/1250-AT	9839	1800	2620	14000
10	1450	20000	RMVC5100-10/1450-AT	9839	1800	2620	14000
10	1700	24000	RMVC5100-10/1700-AT	11139	1800	2620	16280
10	2000	28000	RMVC5100-10/2000-AT	11939	1800	2620	17450
10	2300	32000	RMVC5100-10/2300-AT	11939	1800	2620	18450

6kV Specification Water cooling system

Motor data			RMVC drive(1700V IGBT)				
Voltage	Current	Power	Type mode	Width	Depth	Height	Weight
kV	A	kW	Standard	mm	mm	mm	kg
6	560	5000	RMVC5100-6/560-AT	4535	1800	2620	6300
6	850	7000	RMVC5100-6/850-AT	5235	1800	2620	7650
6	1000	8500	RMVC5100-6/1000-AT	6335	1800	2620	9200
6	1100	9000	RMVC5100-6/1100-AT	6335	1800	2620	9200
6	1250	10000	RMVC5100-6/1250-AT	7235	1800	2620	10500
6	1450	12000	RMVC5100-6/1450-AT	7235	1800	2620	10500
6	1700	14000	RMVC5100-6/1700-AT	8135	1800	2620	11890
6	2000	17000	RMVC5100-6/2000-AT	8535	1800	2620	12470
6	2300	19000	RMVC5100-6/2300-AT	8535	1800	2620	12970

Note:

1) The above dimension is only the dimension of the inverter, not including the transformer, and the transformer needs to be manufacture according to the project.

RMVC 5100 - Installation

In order to ensure stable and reliable operation over the entire long lifetime of the VFD, attention should be paid to maintaining the correct environmental conditions.

Environmental conditions

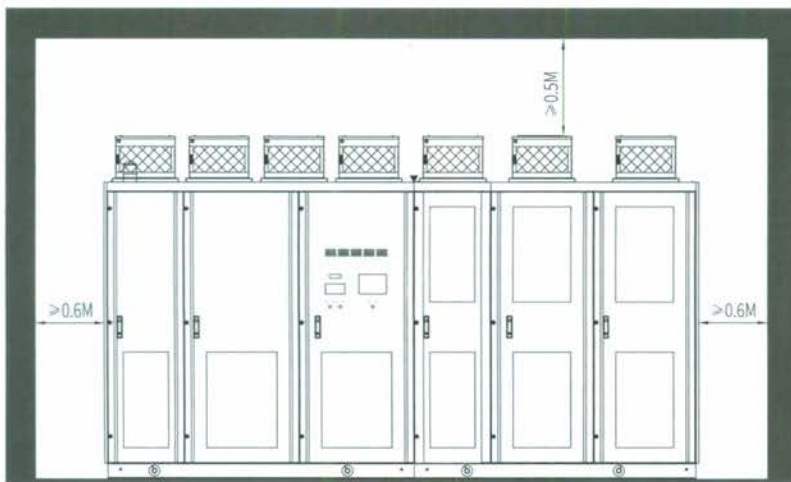
- Ambient temperature: 0~40°C
- Transportation / Storage temperature: -25°C~55°C
- Relative humidity: less than 90%, no condensation
- Free of corrosive gas or liquids
- Air supply free of dust and metallic dust
- Low levels of electric and magnetic field strength and of radiation
- Low levels of vibration

Installation space

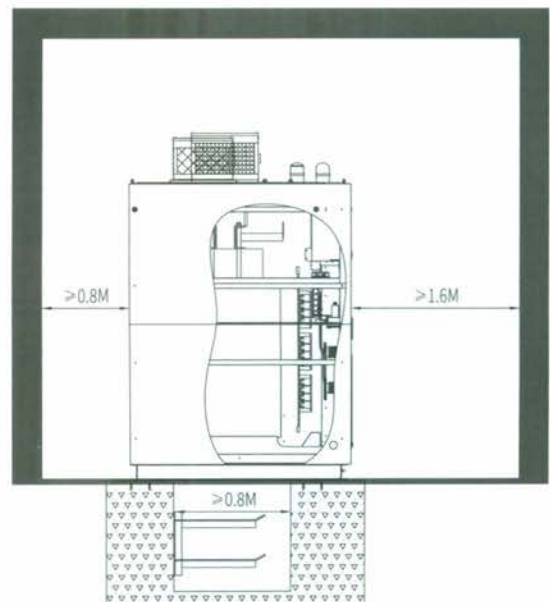
It is important to allow sufficient space around the VFD for heat dissipation, air circulation and convenient routine maintenance. Please ensure that the following clearances are maintained as a strict minimum:

Diagram showing the installation space requirement.

View from front



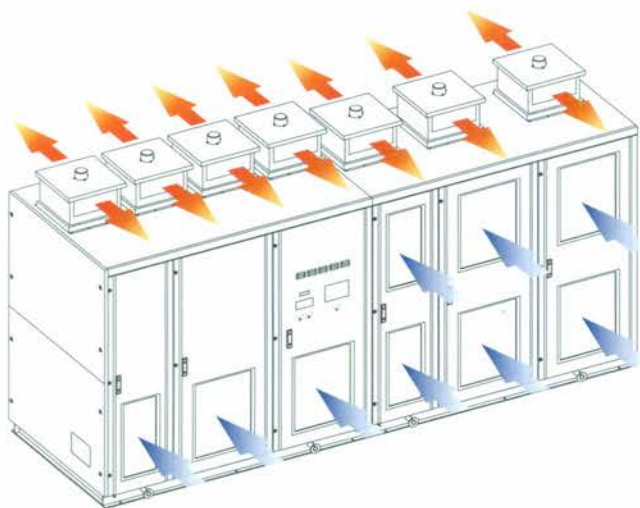
View from side



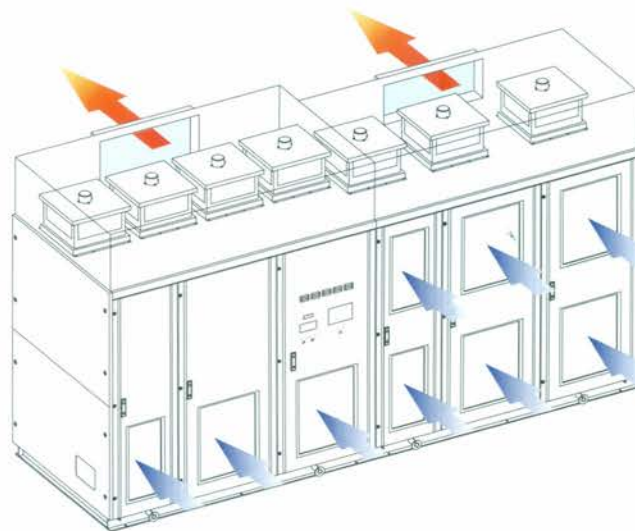
- Top of the cabinets to the ceiling 0.5m
- Space behind all of the cabinets to the rear wall 0.8m
- Space between cabinet sides and adjacent walls 0.6m
- Space in front of drive cabinets is at least 1.6m

Construction of duct for extracted air (optional)

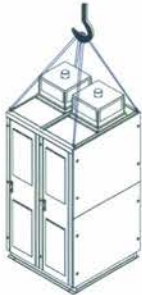
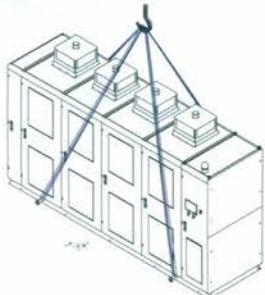
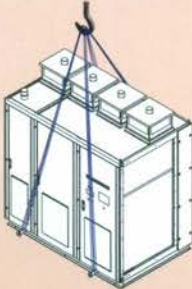
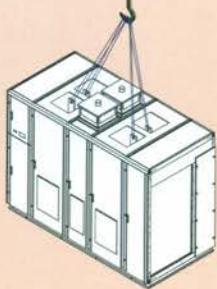
Sketch of standard ventilation method



Sketch of optional duct for extracted air

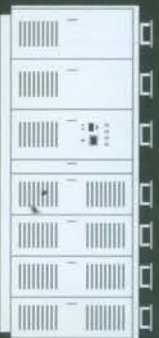


Lifting methods

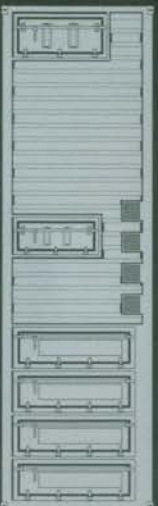
Lifting methods	Power and control cabinet	Lifting methods	Transformer
The width of the power cabinet and control cabinet sections for lifting must not exceed 900mm.		Here, the width of power cabinet and control cabinet section exceeds 900mm and is not allowed without a "spreader bar".	
Where the size of transformer does not exceed 3500kVA, the cabinet may be lifted normally.		Where the size of transformer exceeds 3500kVA, use should be made of lifting rings which are fixed directly to the transformer and accessible by removing the access covers provided in the roof of the cabinet.	



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Standard MV Drive - RMVC 5100



Specialized MV Drive - RMWC



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