



Zhuhai Wanlida Electric Co.,Ltd.

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Wanlida Series Medium Voltage Variable Frequency Drives

(Voltage: 3KV~11KV Power: 250KW to 8MW)



Our Offering for MV Drives Customer:

- Free Plant study to analyze the Energy saving
- Supply of a complete set of Medium Voltage Variable Frequency Drives Product (Inbuilt By-pass cabinet + Inbuilt Transformer + VFD)
- Flexible purchase scheme
- After Sales Services
- Training and Education
- Assistance in getting Clean Development Mechanism (CDM) benefits



Wanlida Industrial Park I



Wanlida Industrial Park II

We have two industrial parks over 60,000 Square meters.

Stock Name: Wanlida

Share Code: 002180



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Dear Customer,

We are pleased to introduce the Wanlida Series Cost effective and a mature technology Energy Saving Medium Voltage Variable Frequency Drives in Iran.

The Medium Voltage Drives has been proved to be beneficial and competent enough to reduce the cost of electricity in Process Industries. It has advantage over other speed control techniques like Inlet Guide van or Damper control.

At present, we are capable to offer you a VFD suitable for Motor Voltage range 3.3 KV/ 6.6KV/ 6.9 KV/ 11KV and Power range 125 KW to 8 MW. Our VFD includes a By-Pass control system (optional) and the integrated Transformer. The 48 pulse MV Drive offers a sinusoidal output with excellent speed control and 150% starting Torque. We don't need any extra output sine filter. The cell by-pass facility in our Drives is another outstanding advantage which provides absolute reliability. So we are offering a guarantee period on our products.

We are committed to offer the best technology at reasonable price in Iran. We have a flexible scheme and we are open for the discussion on payment terms of our products.

Our after sales services includes free of cost commissioning and servicing during warranty period, free of cost customer Training and Education for our products and Technology, operation and maintenances. These training can be available at on site or at our training center. We handle the repair, migration and modification of our products and systems.

Please go through the details of our products and system and Please manage some time to have the discussion in the view of offering our services. We are also interested in visiting your plant to study it.

We hope to have our Services with your esteemed company.

Thanks and Best Regards,

Sadegh Kahkesh

NADER PARDAZ CO.

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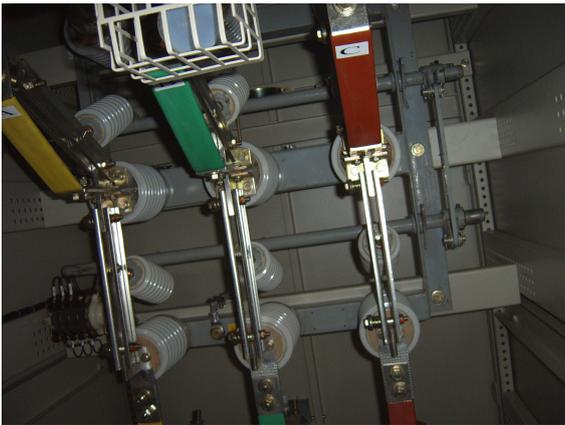
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Wanlida Series Medium Voltage Drives Description

Wanlida Series Medium Voltage Drives System consists of a By-pass cabinet, 3-phase shifting Transformer and Converter. By-pass cabinet and Transformers are inbuilt with the Converter. There is no output transformer required and we offer power cells to build the converter side and each power cell has by-pass facility inside. This is a much matured technology.



Working Principle

WLD-HVF (Wanlida High Voltage Frequency) series medium voltage inverter adopts Power Units in series and overlapping technology to obtain MV directly by means of overlap wave. Low voltage power unit is an actually improved motor variable frequency inverter, which takes full advantage of mature technology. WLD-HVF belongs to High-high voltage source inverter, the customer can connect high voltage (3/6/10KV) directly to WLD-HVF, and then WLD-HVF output high voltage (3/6/10KV) correspondingly. WLD-HVF consists of phase-shifting transformer, power unit cabinet and controller.

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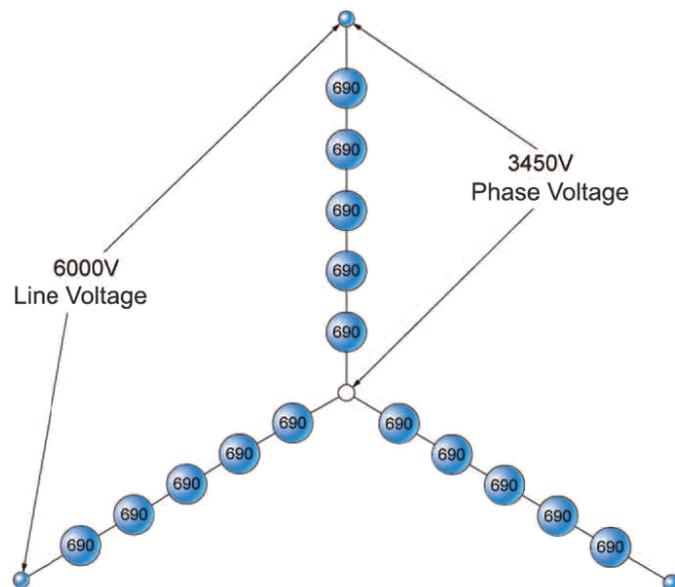
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Inverter Series	Quantity of Series Units for Each Phase	Unit Rated Voltage (V)	Unit Working Voltage (V)	Output Phase Voltage (V)	Output Line Voltage (kV)	Number of Voltage Level for Each Phase
6kV	5	690	690	3450	6	11
10kV	9	690	641	5770	10	19

For example:

6KV Series: Consisting of 15 AC power units with 690V. Every 5 power units are connected in series to form one phase (phase voltage 3450V), 3-phase Y-type connection, so the Line voltage can reach to 6KV.



6kV Series

Developing High Voltage using series connection of power Cells

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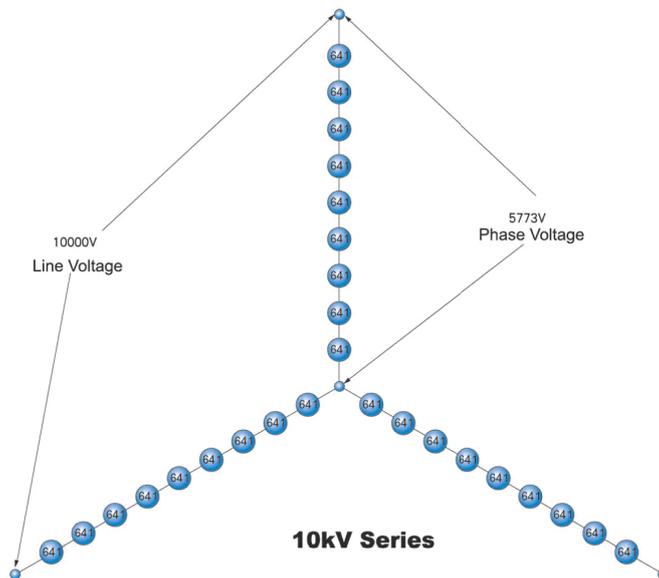
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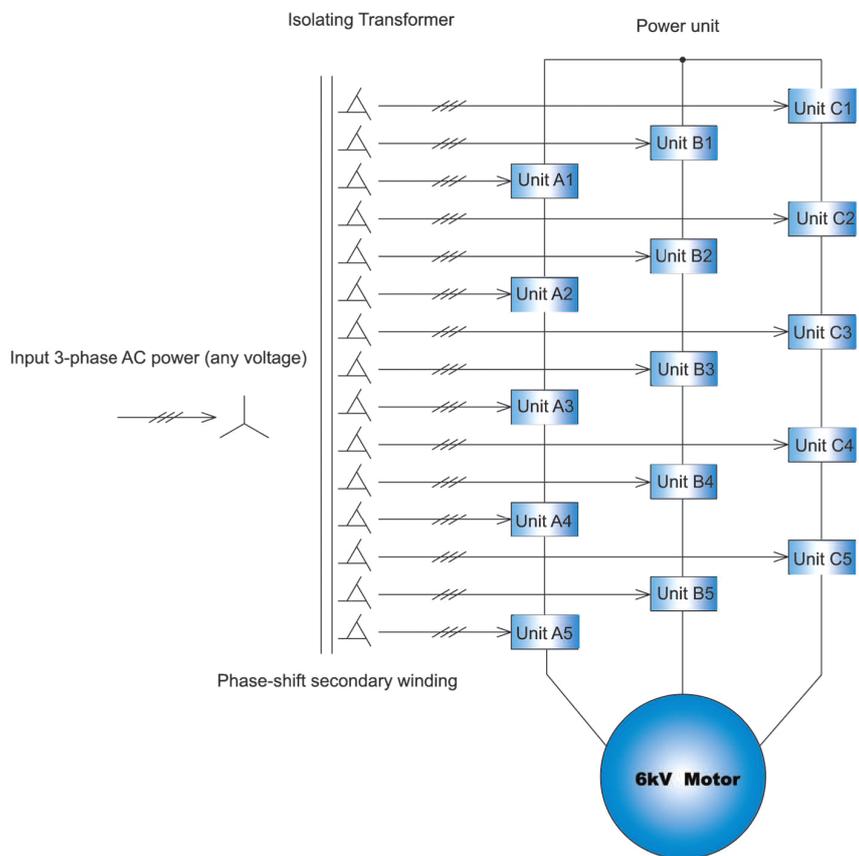
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Developing High Voltage using series connection of power cells



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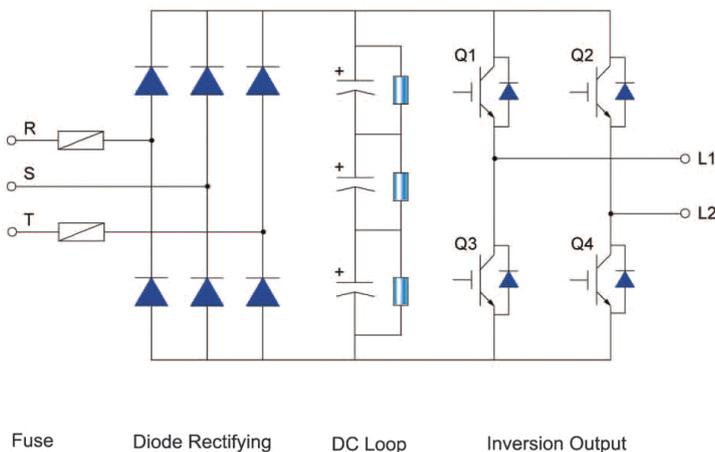
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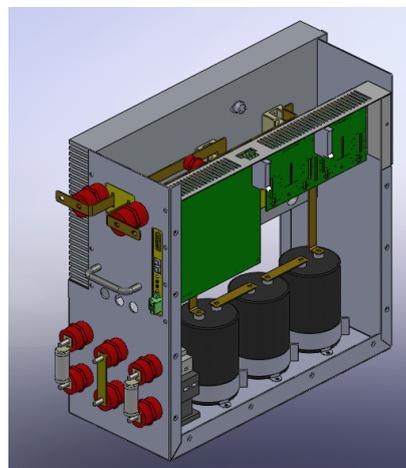
Arrangement of Power Cells

From the above, different voltage output, the quantity of power units is different, but the working theory is exactly identical. All power units receive the indicator from same central process controller. There is a phase difference in secondary windings of transformer which provide energy for power unit, in this way, most of the harmonics current caused by independent power unit will be eliminated, so the primary winding current is approximately sine wave, the harmonics current flowing into power grid are so few, even under the rated load, the harmonics contents is lower of 3%.

The power unit is AC-DC-AC structure, equivalent to a low-voltage power source inverter of 3-phase input single-phase output. The rectifier side is diode three-phase full bridge circuit and the IGBT inverter bridge can be controlled through sine PWM mode to output single-phase AC. All power units are fully identical in structure and electrical performance, very easy for maintenance and replacement.



Fuse Diode Rectifying DC Loop Inversion Output



Power Unit Structure

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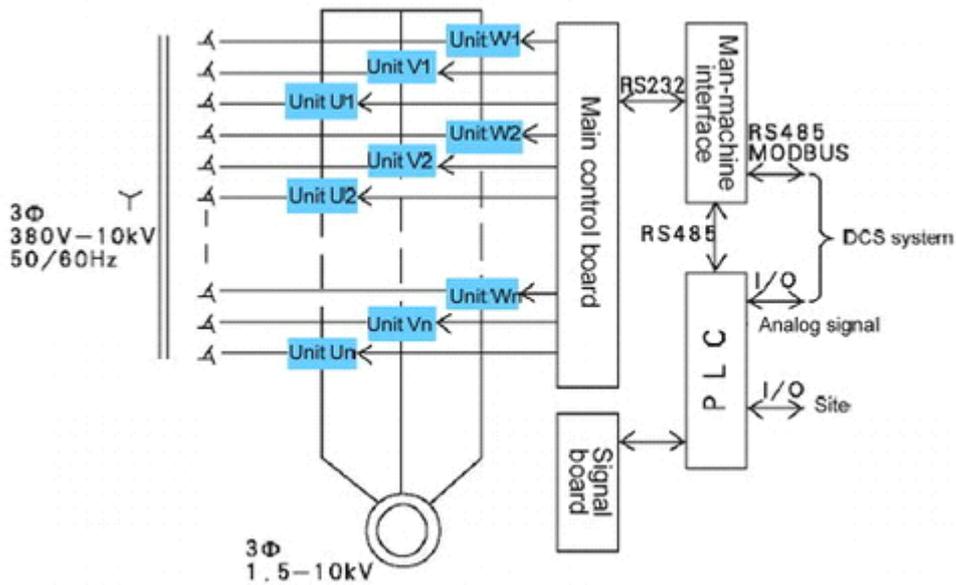
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Internal Architecture of Wanlida Series Medium Voltage Drives



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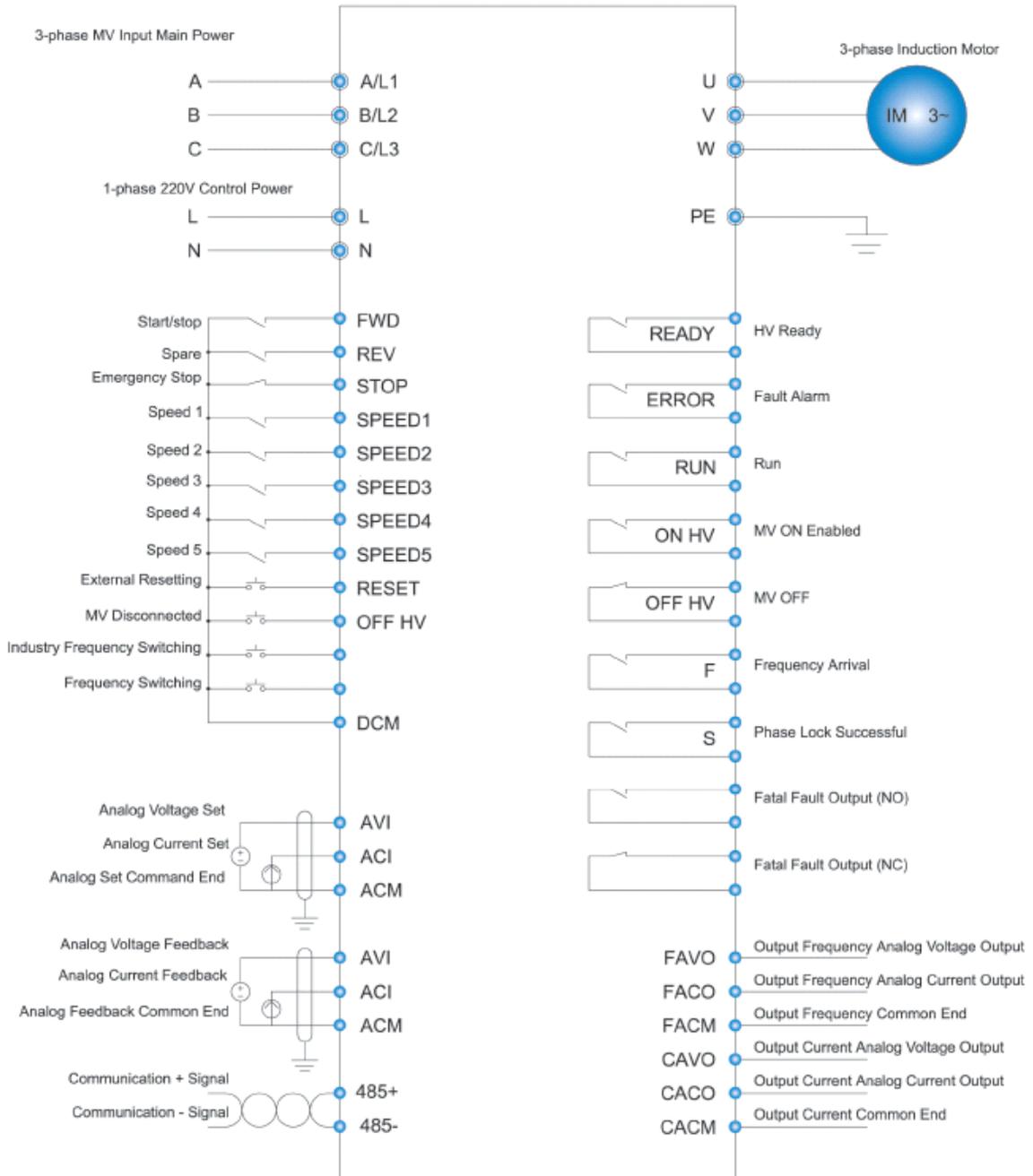


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External system diagram



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Technical Features of Wanlida Series MV Drives

- Voltage source High-high frequency inverter, it can realize No-step speed regulation, which makes the typical motors into intelligent motors.
- Low harmonics input and high power factor, the typical value for power factor is 0.95 through whole speed regulation, even more higher, no need for power factor compensation.
- WLD-HVF output few harmonics, the motor does not generate extra heat and noise.
- Modularized design of power units, interchangeable and easy to produce and repair, the equipment can find any fault exactly based on advanced diagnostic procedures in MPU.
- The inverter still can operate even the faults for part of power units exists, if there are faults happen for inverter, the system can switch to power frequency through bypass function.
- Applicable to all kinds of power grid at home and abroad and suitable for typical high voltage motor.
- Colorful touch screen, easy to operate and maintenance.
- Able to realize remote control, DCS operation and communications with Host, and support all kinds of communications interfaces such as CAN, Profibus, Modbus, RS232, RS485 etc.
- Applied latest components, master control chip adopted TI's DSP F28335 and ALTERA's FPGA of EP3C to realize powerful processing capacity; Sampling adopted AD's AD7606 with 16 bit to ensure control accuracy of the system.
- The switchgear can satisfy safety requirements, and the pressure-relief channel of high voltage switch can ensure safe use of operators.

Technical advantages for Wanlida Series Medium voltage variable frequency drives

1. Wanlida MV VFD employs IGBT power units in series, obtaining MV by means of overlap wave, so it has perfect output performance without harmonics, at the same time, Wanlida MV VFD adopts advanced IGBT, rectifier bridge, PLC and electrolytic capacitor etc main components from Germany, which ensure advanced technology and reliability.
2. Wanlida MV VFD adopts USA DSP F28335 of TI company as CPU, so the system have powerful processing ability and control accuracy.
3. Zhuhai Wanlida Electric Co., Ltd is the only factory in domestic to produce motor protection relays, Medium voltage VFD, Static var compensator and Active power filter professionally at the same time, we have very rich experiences in motor protection technology and power electronics technology.
4. Wanlida is an expert of motor protection above 20 years with CE certificates, the controller have perfect motor protection functions, meanwhile, we add functions of negative sequence and overheat etc after installation of MV VFD,
5. The power cell has bypass function, at the same time, the power cell and control system have a very good protective design to dust, ferrum pulveratum, acid mist, moisture etc.
6. The bypass cabinet of Wanlida MV VFD has a function of "five-protection", meanwhile, it has a pressure relief channel, so it can rival the Medium voltage switchgear.

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Technical Specifications of Wanlida Series

Medium Voltage Drives

Parameter	Value
Output	250 - 8750 KVA
Input Voltage	3.3 KV/ 6.6 KV/ 6.9 KV/ 11 KV
Input Frequency	45-65 Hz
Input Power Factor	> 0.96 (> 20% of Rated Load)
System Efficiency	> 96% (Under a rated Load)
Output Frequency	0.5 to 120 Hz
Output Frequency Resolution	0.01 Hz
Overload Facility	120 % (1 min), 150% (3 s), 200% (immediate)
Analogue Input	0-10V/ 4-20 mA
Analogue Output	0-10 V/ 4-20 mA optional (2Channel)
Accel / Decel Time	01-3000s
Starting Torque	150%
Logical control I/O signals	16channels respectively
Power Semiconductor	LV IGBT
Power Ride Through	50 ms
Output Sine Filter	Not Required
Output Waveform	Sinusoidal
Output Choke	Not required for 1 KM dist betn drive and motor
No of pulses	48
Star -Delta Connection	Not Required
Input Transformer	Inbuilt 3-phase shifting Transformer
Output Transformer	Not Required
Input by Pass	
Cabinet	Inbuilt

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Parameter	Value
MTBF	50000h
Successful Cases	More than 20
THD at output side	< 2%
Ambient Temperature	-35℃ to +45℃
Storage Temperature	0-45℃
Cooling Methods	Forced Air Cooling
Ambient Humidity	95%, no condensation
Altitude	< 1000 m
Enclosure	IP 40
Communication	CAN/Profibus/Modbus/RS 232/RS 485 etc
Noise	< 70 DB
Boolean Input / Output	Communications/ Default Point (expandable)
Control Mode	V/F, Vector Control
Operating Environmental Temp	0-400C
Transformer Winding	Y/△
Control cable	Optical Fiber
Fuse withstand capability (KV)	2 KV
Static Speed Error accuracy	0.01 Hz
Torque Ripple	No

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Applications of Wanlida Series Medium Voltage Drives

- Power Generation: Induced draft fan, forced draft fan, condensate pump, feed pump, primary air fan, secondary air fan, booster fan, circulating pump, mill fan, slurry pump etc
- Cement: draft fan, high-temperature fan, air blower, dust collection fan, grinding machine etc.
- Metallurgy: blast furnace blower, slurry pump, feed water pump, dust fan, compressor etc.
- Petroleum&Chemical: Water injection pump, crude oil pump, Compressor, fan, circulation pump, etc
- Urban water supply: Water delivery pump, water intake pump, water supply pump, sewage treatment industry, self-fractionating pump etc
- Minerals & Mining: Mud pump, ventilation fan, belt conveyor, slurry pump etc
- Others: Loads such as fan, pump and compressor in pharmaceutical, paper making and wind tunnel test.

Especially for: Fan and Pump

Power Plant	Pump, Fans
Steel Plant	Fans
Cement Plant	Fans



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The relationship between speed regulation and energy saving

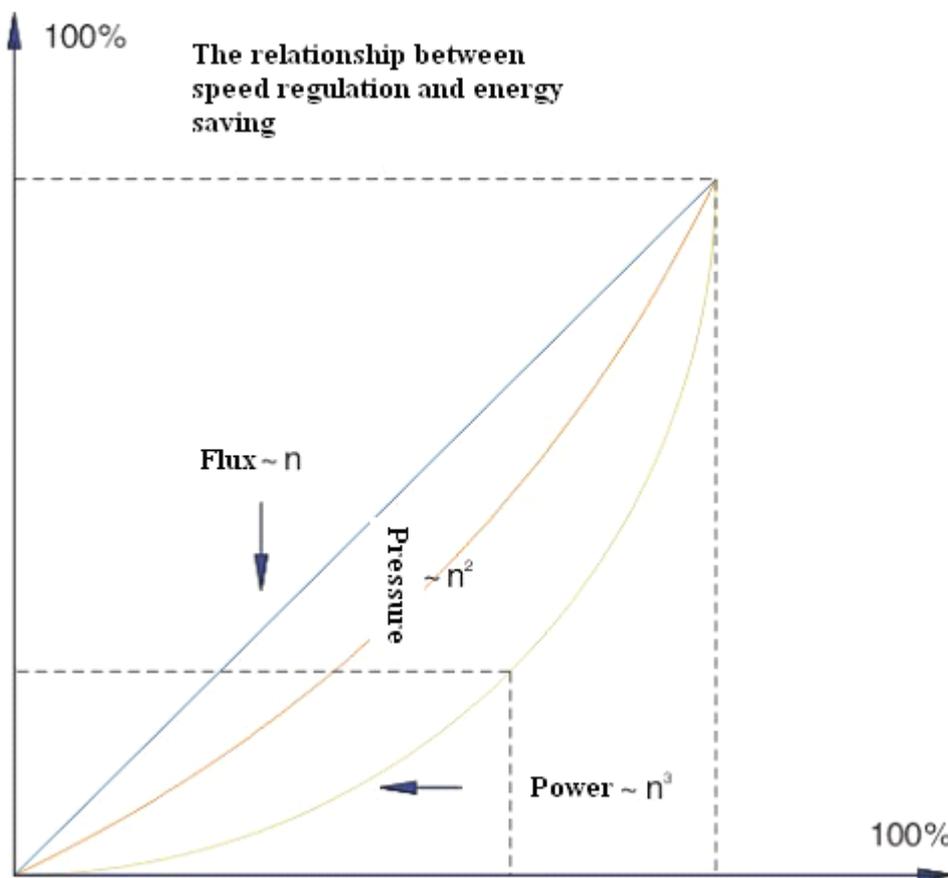
Adopting variable frequency speed regulation technology, WLD-HVF can adjust pressure and flux of fan/pump, this is an advanced control mode.

As we known, $Q1/Q2=N1/N2$; $H1/H2=(N1/N2)^2$; $P1/P2=(N1/N2)^3$

Where,

$Q1, H1, P1$ are respectively flux, pressure, and power under the $N1$ of motor speed.

$Q2, H2, P2$ are respectively flux, pressure, and power under the $N2$ of motor speed.



Thus, as long as the motor rotation is slow down, the shaft power of motor will be reduced dramatically, energy saving result is very clear.

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Power saving rate calculating table (Experienced value) for Fan

Air Valve Opening (°)	Air Valve Opening (%)	Flow (%)	Pressure (%)	Power saving rate (%)
10°	11.1 %	25.0 %	10.0 %	95 %
15°	16.7 %	35.0 %	15.0 %	90 %
20°	22.2 %	45.0 %	22.0 %	80 %
25°	27.7 %	55.0 %	32.0 %	70 %
30°	33.3 %	61.7 %	42.0 %	60 %
35°	38.9 %	68.3 %	50.0 %	48 %
40°	44.4 %	76.7 %	60.0 %	31 %
45°	50.0 %	81.7 %	68.0 %	20 %
50°	55.6 %	83.3 %	75.0 %	16 %
55°	61.1 %	85.5 %	80.0 %	13 %
60°	66.7 %	88.3 %	84.0 %	10 %
65°	72.2 %	90.8 %	87.3 %	7 %
70°	77.8 %	93.1 %	90.4 %	5 %
75°	83.3 %	95.1 %	93.3 %	3 %
80°	88.9 %	96.7 %	95.8 %	2 %
85°	94.4 %	98.8 %	98.0 %	0 %
90°	100.0 %	100.0 %	100.0 %	-4 %

Power saving rate calculating table (Experienced value) for Water pump

Flow Net Head		Zer o flow	10%	20%	30%	40%	50%	60%	70%	80%	90%
		10%	Rotation speed %	31.6	37.1	42.8	48.5	54.8	61.3	68.4	75.8
	Shaft	3.16	4.27	7.84	11.4	16.5	23.1	32.0	43.6	57.8	75.9

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	power %										
	Power saving rate %		90.5	86.7	82.2	75.5	70.4	62.5	51.2	38.3	20.9
20%	Rotation speed %	44.7	49.5	54.4	59.4	64.5	69.6	74.8	80.1	85.8	92.1
	Shaft power%	8.93	12.1	16.1	21.0	26.8	33.7	41.9	51.4	63.2	78.1
	Power saving rate%		79.4	75.2	70.8	65.3	59.2	51.5	42.4	31.2	17.0
30%	Rotation speed %	54.8	58.6	62.5	66.5	70.6	74.7	78.9	83.4	88.1	93.0
	Shaft power%	16.5	20.1	24.4	29.4	35.2	41.7	49.1	58.0	68.4	80.4
	Power saving rate%		65.6	62.2	59.1	53.4	49.5	42.6	35.0	25.8	14.5
40%	Rotation speed %	63.2	66.2	69.3	72.5	75.8	79.2	82.7	86.3	90.0	93.9
	Shaft power%	25.2	29.0	33.3	38.1	43.6	49.7	56.6	64.3	72.9	82.8
	Power saving rate%		55.8	53.5	49.9	46.0	40.5	34.5	28.0	20.9	12.0
50%	Rotation speed %	70.7	73.1	75.6	78.1	80.7	83.4	86.2	88.9	91.8	94.8

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	Shaft power%	35.5	39.1	43.2	47.6	56.7	58.0	64.1	70.3	77.4	85.2
	Power saving rate%		43.6	41.5	36.0	32.7	29.5	25.8	21.3	16.1	9.4
60%	Rotation speed %	77.5	79.2	80.9	82.6	84.5	86.6	88.8	91.0	93.3	95.7
	Shaft power%	46.6	49.7	52.9	56.4	60.3	65.0	70.1	75.4	81.2	87.7
	Power saving rate%		30.1	28.4	26.6	24.5	22.2	18.9	15.5	11.9	6.8
70%	Rotation speed %	83.7	85.0	86.3	87.6	88.9	90.3	91.8	93.3	94.8	96.6
	Shaft power%	58.6	61.4	64.3	67.2	70.3	73.6	77.4	81.2	85.2	90.2
	Power saving rate%		12.4	11.4	10.3	9.3	8.3	7.2	6.2	5.1	4.2
Valve	Adjusting power	%	73	77	80	84	87	90	93	96	98



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Customer Facilities: Guarantees, payment Terms, Training and Education

Guarantee

a) **The grantee period of products:** The Supplier shall hereby guarantee that the products will be in operating condition for at least two (2) years without any disturbance as long as the products are correctly installed, used and maintained according to the stipulations in the User's Manual strictly.

b) **Guarantee principle:** If the Products get out of order or do not perform efficiently due to quality problems including materials defect, manufacture defect and/or design defect during the guarantee period, the supplier will supply the service of reprocessing or send similar products to the customer at free of cost to reinstall the same in place of defective one, the supplier will also absorb the shipping and forwarding cost for replacing.

1) **Reprocessing:** The following products shall only be reprocessed but not be replaced by the similar products,

·The unconventional type of products of high-power manufactured at the Customer's special request

·The product that presents a quality problem beyond ninety (90) days after installation but can be repaired successfully.

·The product that presents a quality problem within ninety (90) days after installation but can be repaired on condition that the customer has agreed and permitted the supplier to repair the it.

2) **Replacing:** According to the following terms, the supplier shall replace the defective products with new same/similar type of products.

·The product that presents a quality problem within ninety (90) days after installation.

·The product that presents a quality problem but cannot be repaired.

c) **Exception Terms:** The following cases are not within the guarantee range, for which Supplier shall not guarantee the service of repair or replace.

1) The failure happens due to the product not being installed used or maintained according to User's Manual strictly.

2) The failure happens due to the disassembly, repair or reconstruction by user himself without permission by the supplier.

3) The parts/components or the whole product presents a failure due to actual working conditions not conforming to the requirements of installation and/or operation by the supplier listed in the User's Manual or related documents.

4) The failure/ damage to the products caused by force majeure, such as earthquake, unforeseen events and/or power distribution failure.

d) **Service life of the product:** The supplier shall also guarantee that the service life of the products must be for a minimum period of fifteen (15) years.



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Payment Terms

a) **Test project:** The Supplier shall supply one set of **Medium voltage VFD**, or one set of **Static var compensator** for a test project to the customer at much discounted price.

b) **Purchase orders:**

1) Orders for supply of the products shall be receivable by the Supplier directly from the Customer and/or consultant of the customer and/or any other Company authorized by the Customer.

2) The Customer and/or Consultant of the Customers and/or any other Company authorized by the Customer shall send out written Purchase Order by Fax and E-mail with signatures and stamps. The Supplier shall confirm its validity on receipt of the Purchase Order.

The Purchase Order is a valid and independent sales contract once its validity is confirmed. The stipulations in this Agency Agreement are also binding to this independent contract

PAYMENT PROCEDURE

The Supplier shall receive the payment for the ordered products through T/T or through L/C depending on the Discussion.

► We usually adopt the following payment terms:

30% Deposit, 60% before delivery, 10% after installation and commissioning.

SUPPLY of Medium Voltage VFD

a) **Supply of the products:** The Supplier shall supply the products throughout the agreement term according to the customer's requirement. The Suppliers will supply the ordered products with in four (8) working weeks on the receipt and confirmation of T/T and L/C.

b) **Supply of the accessories / spare parts:** The Supplier shall supply accessories / spare parts of the products at very reasonable price according to the need of the customers for ensuring quality after sales service and uninterrupted operation of the products in the territory.

c) **Quality/Quantity Discrepancy:** In case of quality discrepancy, claim should be raised by the Buyers within 30 days after the arrival of the goods at port of destination, while for quantity discrepancy; claim should be raised by the Buyers within 15 days after the arrival of the goods at port of destination. It is understood that the Supplier shall not be liable for any discrepancy of the goods shipped due to causes for which the Insurance Company, Shipping Company, other transportation organization and/or Post Office are liable.

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TRAININGS AND EDUCATION FACILITIES FOR CUSTOMERS:

a) **Key Personnel:** The Supplier shall cooperate with the customer by conducting a training program at free of cost or at minimum charges for the key personnel just to enhance the understanding about the products and its products. Venue of the training program would be either customer place or suppliers training center. The Supplier shall send an expert or send experienced engineer to customer each time with order.

b) **Employee:** The Supplier shall conduct a training program at free of cost or at minimum charges for the engineer(s)/technician(s) /employee(s) designated by the Customer. The objective of the training program shall be just to make the Customer's employee competent in implementation of The Manufacturer's Power Electronics Products and installation of its products.

c) **Operating Assistance:** During the terms of this Agreement, the Supplier shall furnish to the Customer such continuing advice and guidelines as is from time to time reasonably required by the sole Distributor with respect to the marketing and promotion as well as after sale services to the Products sold in the territory.

Send Your Inquiries Or Contact us for Technology&Commercial Discussion

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