

THYFREC VT730S

MV Inverters Conforming to the International IEC Standard



Medium-Voltage Inverters Conforming to the International IEC Standard

Meidensha is proud of a long history of exporting high-voltage inverters. We have a number of model lineups designed and manufactured in accordance with international standards. Our standard equipment is applicable to 36-phase rectification systems (6kV class) and is very effective against harmonics issues.



THYFREC VT730S

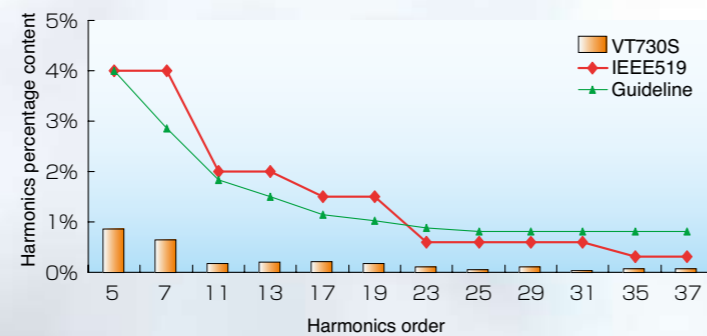
Features

Conformance to international standard specifications

In addition to conformance to domestic standards like JIS, JEC, and JEM, VT730S conform to EMC directive of IEC as standard. Further, VT730S conform to CE marking if requested. Our products based on standard specifications can be used both in Japan and internationally.

Reduction of harmonics

This equipment is very effective in reducing harmonics. Even our standard product can be applied in 36-phase rectification systems (6kV class) that have been devised to cope with harmonics problems internationally. Without any externally installed harmonics reducing devices, this equipment clears the requirements of IEEE519-1992 and the guidelines regarding countermeasures against harmonics as stipulated by the Ministry of Economy, Trade and Industry by an ample margin.



Note: The VT730S data are the values actually measured from the VT730S-1500H. These figures may change according to system conditions such as capacity, load factor, etc.

Easy operation and convenient functions

Outstanding display functions and operability

This equipment uses an operation panel that offers an abundance of useful display functions and operability. An LCD touch-panel type color display (optional) is available. The panel improves operability. Display language: English, Japanese.

Easy maintenance and management

If you use a maintenance tool (optional) on a general-purpose notebook computer, it is possible to manage inverter parameters and manipulate trend displays for operational data. Maintainability can be improved through the accumulation and display of maintenance info such as operation time, replacement timing for maintenance parts, and others. language: English, Japanese.



THYFREC VT730S

Highest level in business field High efficiency and high power factor

- Since a direct MV inverter system is adopted, higher than 97% of combined efficiency can be attained for inverters.
- A power factor is higher than 0.95 is used for the power source. Therefore, it is unnecessary to install any power factor improving equipment like phase advancing capacitors.

Energy conservation

- When a load with a variable torque like a fan or a pump is driven by an inverter system under speed control, remarkable energy saving can be realized.
- Thanks to unique features in high-efficiency operation, the combined efficiency can be raised at a light load by reducing the motor's no-load loss.

Easy maintenance

- An inverter cell unit is used. The control circuit is assembled in a unit. Since the unit can be drawn out easily, parts can be replaced in a short time.
- Parts with a relatively shorter replacement time can be replaced easily.
- For instance, the panel cooling fan has a comparatively short replacement time. If a redundant installation method is adopted, replacement work can be simplified (optional).

Easy installation

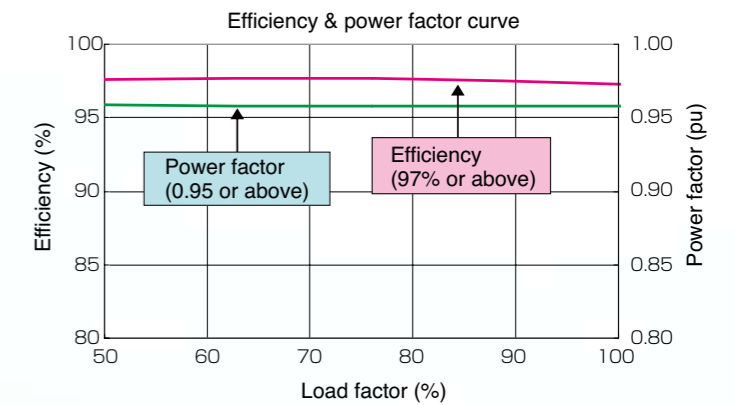
- Equipment can be transported in a state that the input transformer and cells are accommodated inside the panel. Installation on the site can be carried out easily.

Recovery support functions

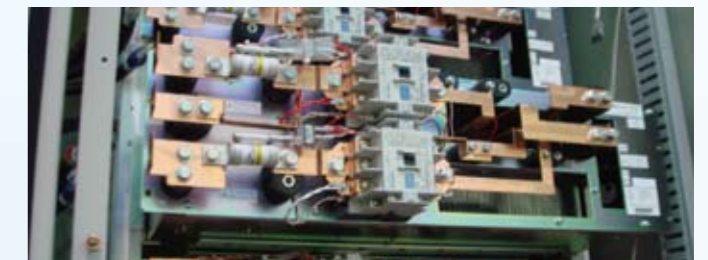
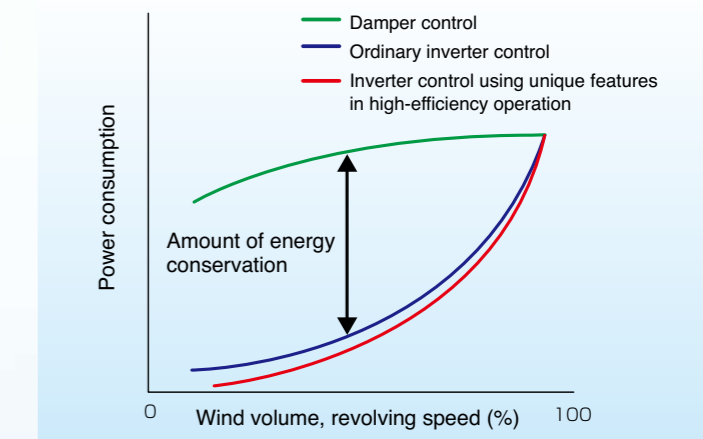
- Recovery support functions such as operational data tracing back and fault diagnosis are available. Such features can shorten the recovery time in the case of a system failure. (Optional maintenance tools are required.)

Transmitter function

- Standard equipment is provided with an RS-485/422 serial transmission function for the operation panel and maintenance tools. Using this interface, it is possible to establish a connection with a host computer. This equipment is applicable to the PROFIBUS-DP, standard equipment popular in this field, and the IO Link II Optical and the IO Link II Metal of Meidensha field network. (Equipment applicable to the field network is optional.)



Effect of energy conservation



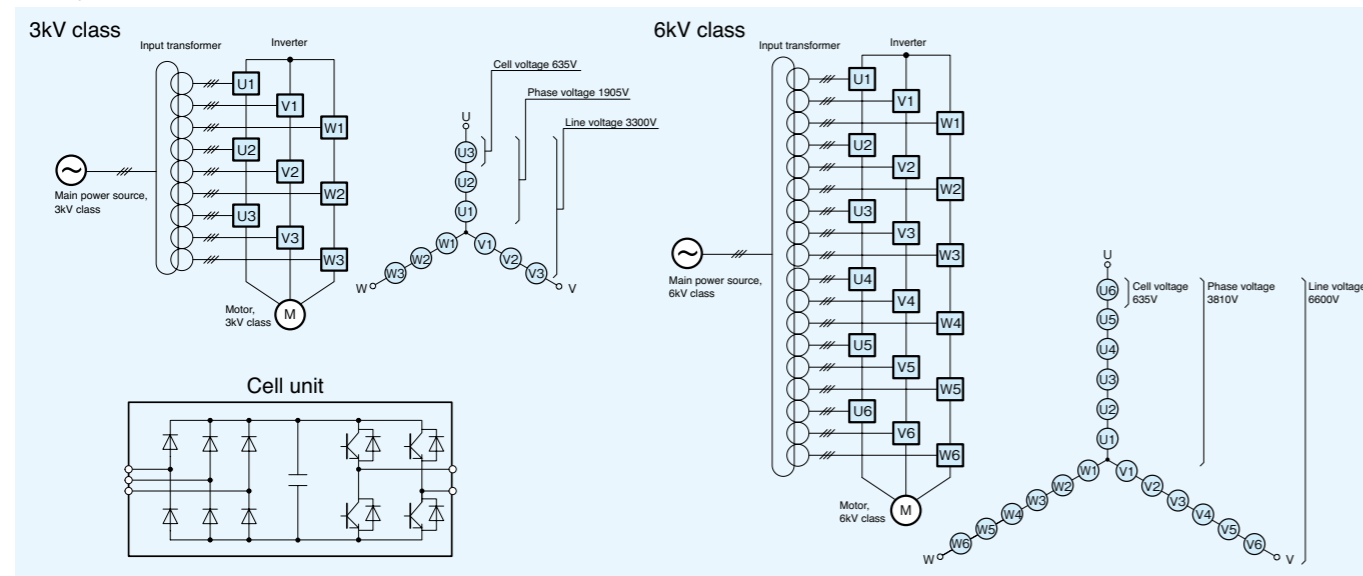
Remote supervision available

- For remote supervisory services, the web server unit and Ethernet interface (optional) are offered. For a computer in a remote place, inverter parameters, operational data, and operation trace-back data can be retrieved. Fault warnings can be sent via e-mail. We have a customer support desk for the use of remote supervisory systems. Countermeasures can be taken against faults and errors on an around-the-clock basis, all year round. (A contract with Meidensha Customer Center is necessary for remote supervisory services.)

Circuit configuration

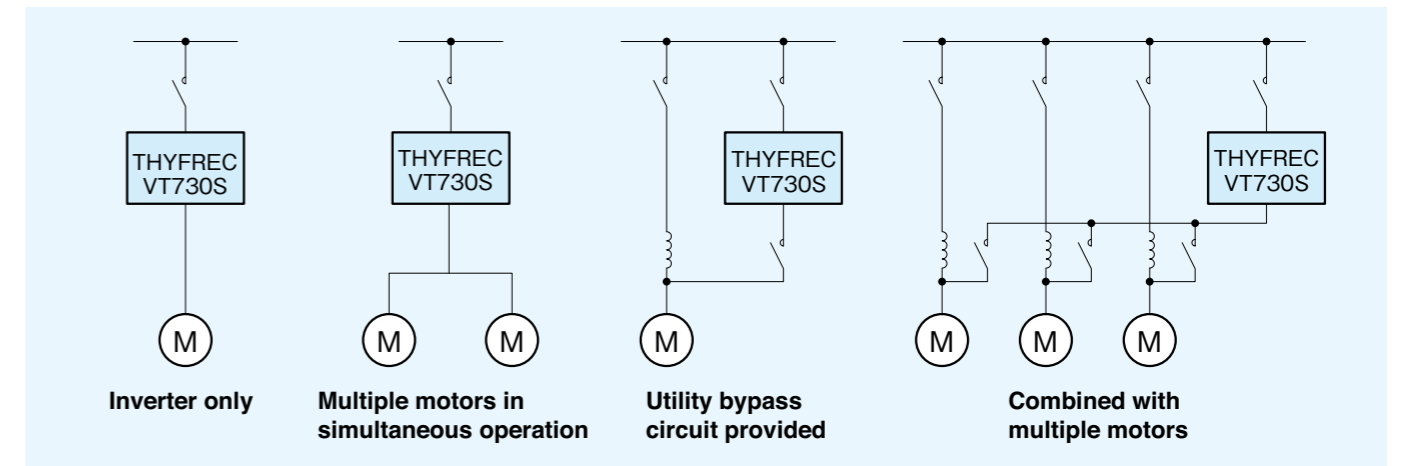
Main circuit configuration

This equipment is composed of an input transformer and 9 single-phase output inverters for a 3kV system or 18 inverters for a 6kV system.



System configuration

In addition to independent operation on inverters, the THYFREC VT730S is applicable to duplex operation of motors through a bypass circuit or on a commercial utility source if a bypass circuit is provided. If a utility sync changeover function (optional) is used, running motors can be switched over from inverters to utility power, and vice versa, without any shocks. If the THYFREC VT730S is used as the starter inverter in the above case, it is possible to reduce the power source capacity or to control the number of motors or carry out complex speed controls through a combination of multiple motors.

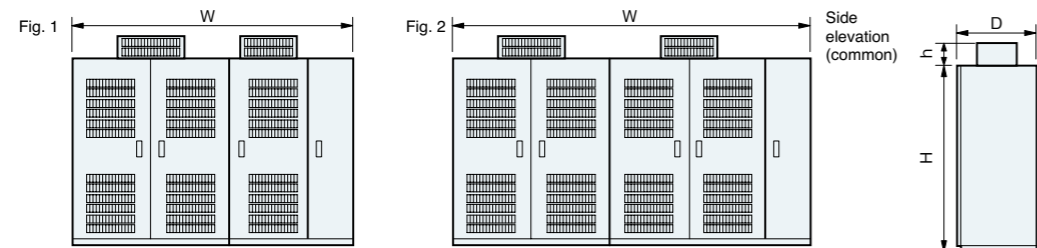


Standard specifications

System		3kV class					6kV class						
Type (VT730S - □□□□)		235L	335L	475L	950L	1250L	330H	500H	710H	1000H	1500H	2000H	2500H
Standard overload	Rated capacity [kVA] Note 1	332	457	634	1217	1520	446	663	914	1269	1909	2435	3041
	Rated current [A] Note 2	58	80	111	213	266	39	58	80	111	167	213	266
Heavy overload	Applicable motor [kW] Note 3	235	335	475	950	1250	330	500	710	1000	1500	2000	2500
	Overload durability	120% for 1 minute											
Power source	Rated capacity [kVA] Note 1	263	366	503	972	1212	354	526	732	1006	1520	1943	2423
	Rated current [A] Note 2	46	64	88	170	212	31	46	64	88	133	170	212
Output	Applicable motor [kW] Note 3	190	270	380	750	950	250	390	560	750	1200	1570	2000
	Overload durability	150% for 1 minute											
Main circuit	Rated output voltage	3000/3300V ± 10%					6000/6600V ± 10%						
	Control circuit	200/200V ± 10% 50/60Hz ± 5% (standard) or 400/440V ± 10% 50/60Hz ± 5% (optional)											
Output	Rated output voltage	3000/3300V					6000/6600V						
	Output frequency range	In the range of 0.1~120Hz											

Notes: 1. Output capacities are shown where the output voltage is 3300V or 6600V. 2. Overall rms values including harmonics are shown. 3. The values shown are for Meidensha standard 4-pole cage-rotor type induction motors where the output voltage is 3300V or 6600V. 4. For restarting after a momentary service interruption, a backup single-phase AC 100V or a DC 100V power supply is needed additionally. 5. The output voltage cannot exceed the source voltage.

External dimensions



Type	Width W mm	Depth D mm	Panel height H mm	Fan cover height h mm	Approx. weight kg	Outline view
3kV class	235L	2400	1100	2350	450	Fig. 1
	335L	2500	1100	2350	450	
	475L	2500	1100	2350	450	
	950L	3500	1200	2350	450	
	1250L	3600	1300	2350	450	
6kV class	330H	3400	1000	2350	450	Fig. 2
	500H	3400	1000	2350	450	
	710H	3900	1000	2350	450	
	1000H	4000	1000	2350	450	
	1500H	4800	1200	2350	450	
	2000H	4800	1200	2350	450	
	2500H	4900	1300	2350	450	

Notes: 1. Standard dimensions are given here. They may be subject to change according to any optional conditions. 2. A maintenance space of 180mm is needed in front of the panel. 3. A space of 500mm is needed behind the panel rear surface during installation work. (standard) In case the transformer can be drawn out, the inverter panel rear surface can be set close to the wall.

Guide to capacity selection

Guide 1: Reasonable use of overload durability

The THYFREC VT730S has two patterns of capacity series, heavy overload durability (150% for 1 minute) and standard overload durability (120% for 1 minute). If the overload capacity is unclear from actual loads, refer to the descriptions below.
Variable torque loads such as fans, motors, blowers, etc.: Standard overload (120% for 1 minute)
Constant-torque loads such as extruders, press machines, etc.: Heavy overload (150% for 1 minute)

Guide 2: Constant-torque loads, Case 1

When the required overload durability is less than 150% for one minute for a constant-torque load, the closest capacity of the heavy overload series is the best choice where the rated current of the inverter unit is above that of the motor being driven.
 (Example)
 Where the motor ratings are 710kW – 6P – 3.3kV and its rated current is 153A, the VT730S-950L (unit rated current: 170A) is known to have optimal capacity according to the closest capacity selection exceeding the rated motor current in the heavy overload series.

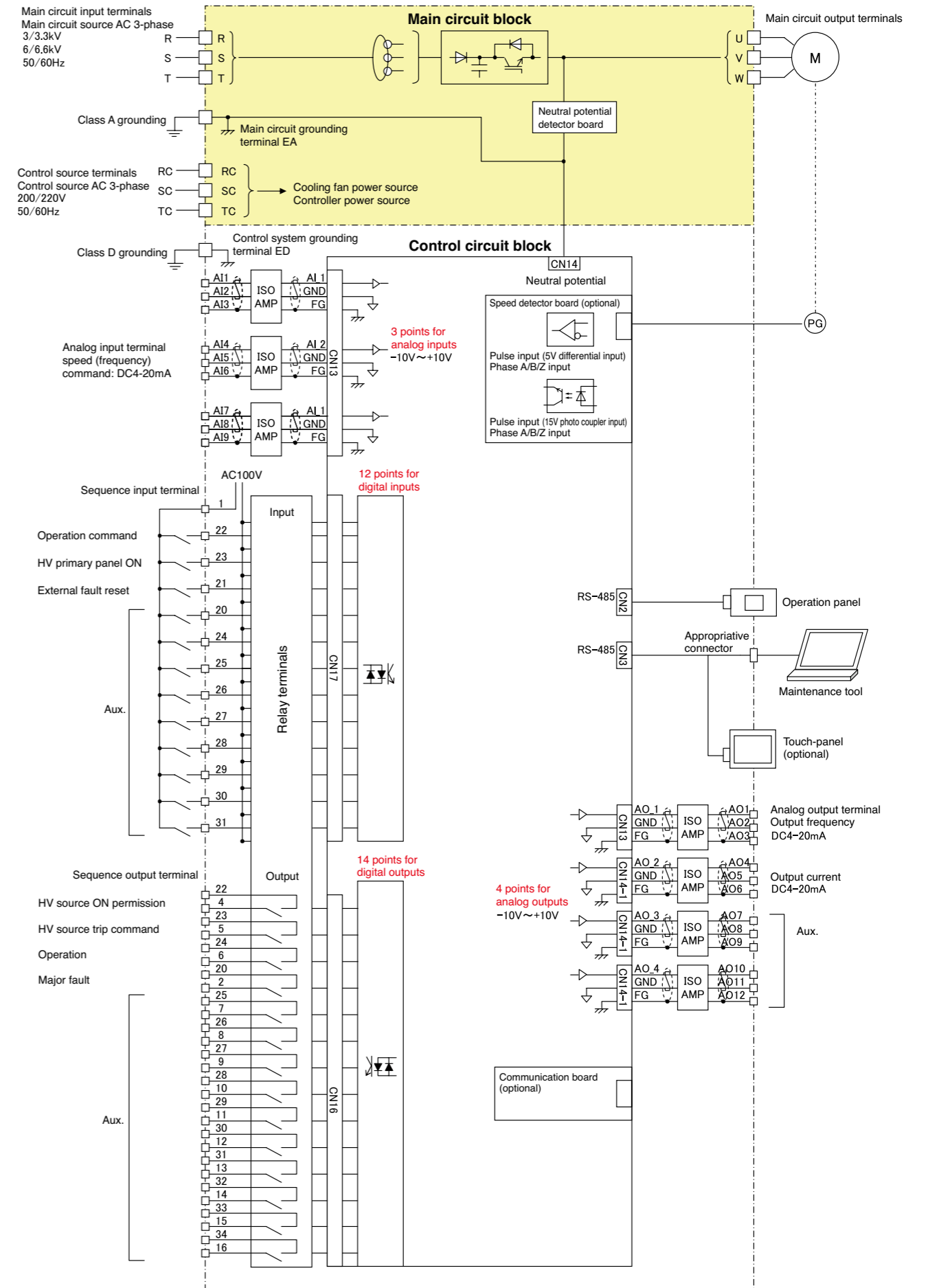
Guide 3: Constant-torque loads, Case 2

When the required overload durability is above 150% for one minute for a constant-torque load, the optimal capacity is selected from the heavy overload series based on the overload durability.
 (Example)
 Assume that the motor ratings are 1400kW – 4P – 6.6kV and its rated current is 147A, and that the overload durability is 200% for one minute. The VT730S-2000H (unit rated current: 170A) may be acceptable if selection is based on motor rated current. However,
 Unit overload: $170A \times 1.5 = 255A$
 Required overload: $147A \times 2.0 = 294A$
 This would mean that the selected value is insufficient for the required overload, and this selection is **not acceptable**.
 Reviewing the capacity on the overload basis, the VT730S-2500H (unit overload: $212A \times 1.5 = 318A$) is an acceptable selection.

Guide 4: Variable torque load

The closest capacity of the standard overload series is the best choice where the rated current of the inverter unit is above that of the motor being driven.
 (Example)
 Assume that the motor ratings are 280kW – 10P – 3.0kV and its rated current is 75A. The VT730S-335L (unit rated current: 80A) is known to have optimal capacity according to the closest capacity selection exceeding the rated motor current in the standard overload series.

Item	Specifications	
Control specifications	Control system	All-digital control, multi-level PWM
	Control mode	V/f (variable torque, constant torque) control (standard), vector control with sensors (optional)
	Frequency accuracy	$\pm 0.01\text{Hz}$ (digital setup), $\pm 0.5\%\text{FS}$ (analog setup), at $25\pm 10^\circ\text{C}$
	Voltage/frequency accuracy	Reduced torque, constant torque, constant output (constant output range 1:2)
	Acceleration / deceleration time	0.1 ~ 60,000 sec.
	Acceleration / deceleration mode	Linear, s-ramp, free ramp
	Major control functions	Restarting from momentary voltage sag(option), free-run pickup, high efficiency operation, multi-speed setting, frequency jump, operational ratio setup, sync utility changeover (optional)
Control I/O	Panel surface	Operation panel with numeric keypad (standard) / LED touch-panel type color display (optional)
	Control input	12 points (3 points fixed, 9 points arbitrarily set); Forward operation, reverse operation, inching, input CB conditions and such arbitrary control allotment enabled.
	Control output	14 points (4 points fixed, 10 points arbitrarily set); Run, Ready, Error, and such arbitrary control allotment enabled.
	Analog input	3 points Frequency setup, interlocked ratio bias setup, and such arbitrary control allotment enabled.
	Analog output	4 points Output frequency, output current, output voltage, and such arbitrary control allotment enabled.
Transmitter functions	Standard	RS-485/422 (for touch panel)
	Options	PROFIBUS-DP, IO link II Light, IO link II Metal, Ethernet (for PC, remote supervision)
Protective functions	Prevention	Overcurrent limitation, Overvoltage limitation, Overload prediction
	Interruption	Overcurrent, overvoltage, fuse OFF (in cell unit), undervoltage, IGBT fault (in cell unit), overload, temperature rise (in cell unit), ground fault, cooling fan error, transformer temperature rise, output voltage deviation (optional), self-diagnosis, etc.
	Error history	Recording of past 8 errors / Contents of recording: time occurred (calendar features loaded), primary factor, secondary factor, faulty cells, fault detectors, output current shortly before interruption, output frequency, set frequency, latest operation time
	Recovery support	Fault diagnosis (maintenance tool required) Trace-back functions (optional maintenance tool or remote supervision required)
Construction	Panel structure	Enclosed self-standing steel fabrication
	Protective construction	IP20 (standard), IP40 (optional)
	Maintenance	Front maintenance (standard), front-rear maintenance (optional)
	Cable lead-in	Lower position (standard), upper position (optional), for both main and control circuits
	Cooling system	Forced-air cooled
Operating environment	Color of coating	Munsell 5Y7/1
	Installation place	Indoors
	Ambient temperature	0 ~ 40°C
	Relative humidity	85% or below (without dew condensation)
	Altitude	1000m or below
Vibration		0.1G during installation (10 ~ 200Hz), 1.5G during transport (10 ~ 200Hz)
	Environmental conditions	Freedom from corrosive or explosive gases, metallic dust, steam, dust, oil mist, lint, etc.
Input transformer	Type: dry type (standard), molded (optional) / Inrush current: not specified (standard), specified (optional) Draw-out wheels: 9 times or less (standard), provided (optional)	
Applicable standard	JIS, JEC, JEM, IEC	
Accessories	Cell draw-out lifter, cell draw-out carriage (optional)	

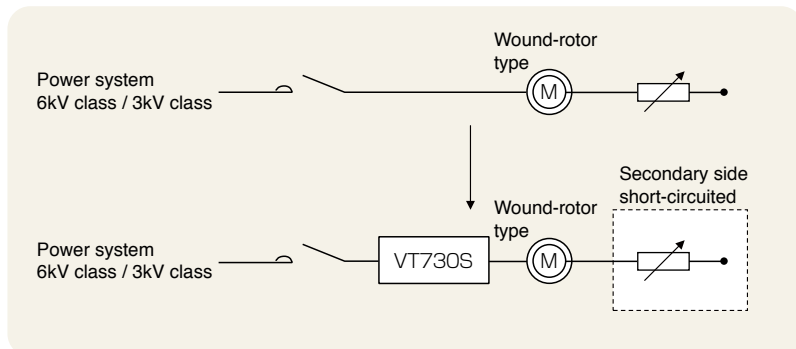


Examples of configurations

(Example Case 1)

Wound-rotor type motor driven by inverters

Speed-controlled operation becomes possible if the secondary circuit of an existing wound-rotor type motor is short-circuited and inverters are set up. Such a usage will result in a variety of advantages such as improvement of maintenance procedures, energy saving thanks to speed-controlled operation, saving of electricity charges as a result of improvement of power factor, and others.

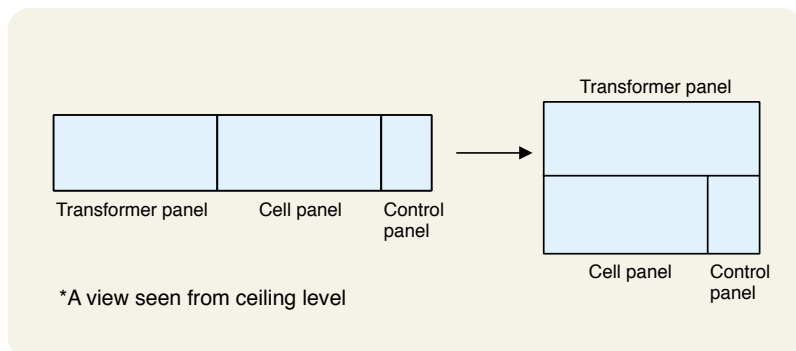


(Example Case 2)

Modification of panel array configuration

If the transformer panel is installed back to back with the cell panel and the control panel, the installation style can be flexible.

In a small space where panel arrays cannot be installed, such a panel array configuration would fit.



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