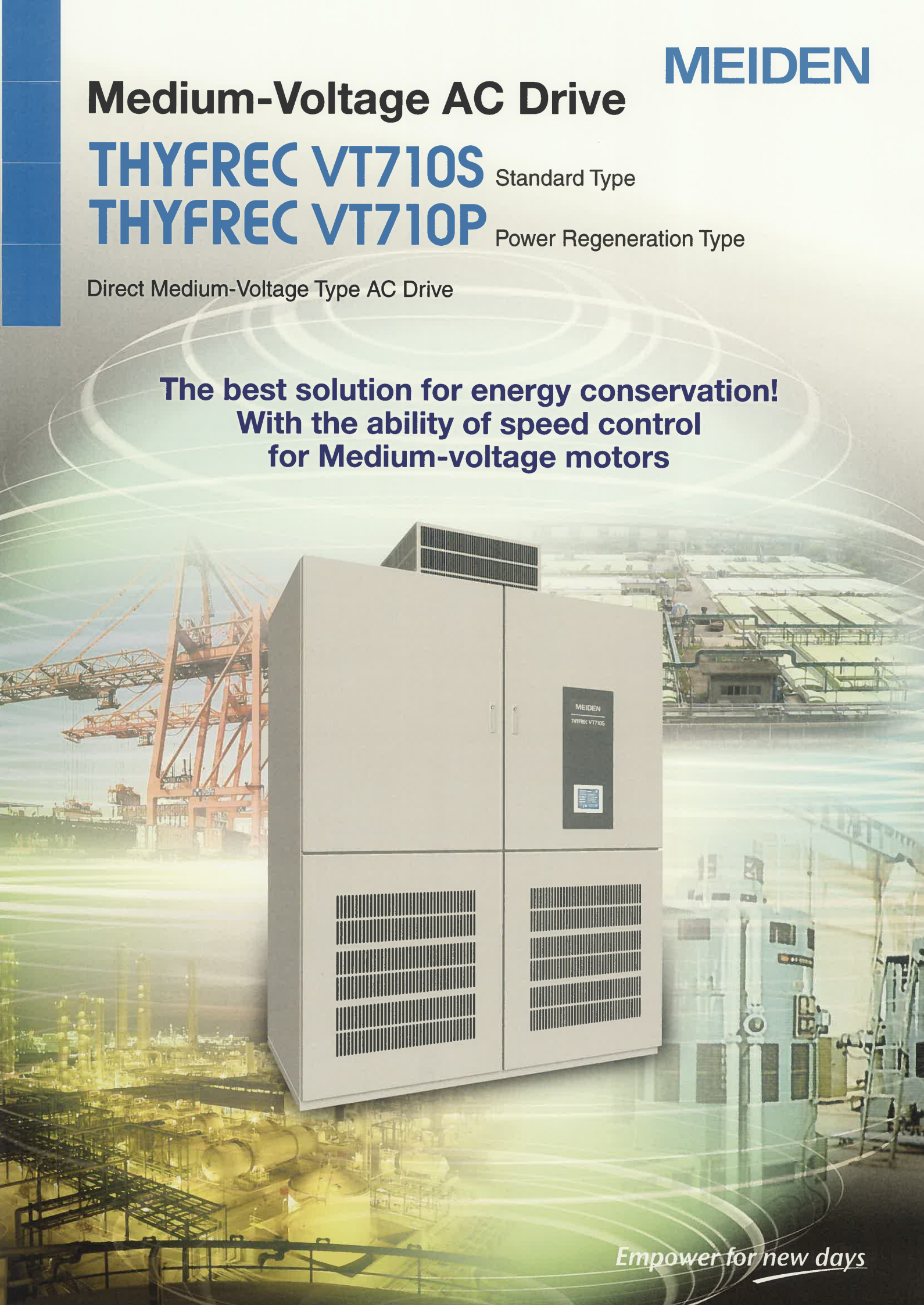
MEIDEN

Medium-Voltage AC Drive

THYFREC VT710S Standard Type
THYFREC VT710P Power Regeneration Type

Direct Medium-Voltage Type AC Drive

The best solution for energy conservation!
With the ability of speed control
for Medium-voltage motors

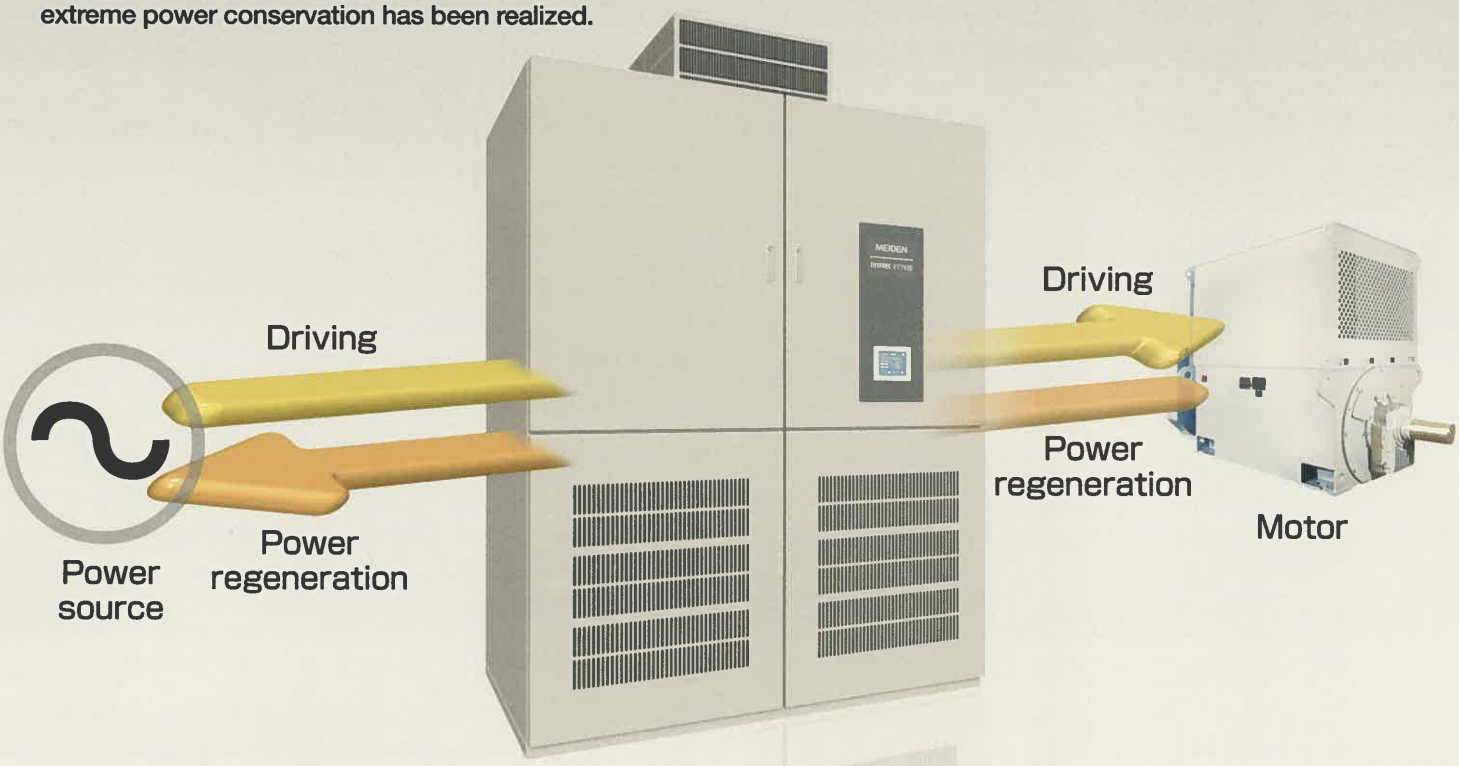


Empower for new days

High efficiency + Power regeneration = Extreme power conservation

Our product lineups include the Direct medium-voltage-type drives where a combined inverter efficiency of 97% has been attained. In addition, the power regeneration type has been added. This is the first such achievement in this business field.
Energy is more efficiently utilized here and extreme power conservation has been realized.

Standard type	THYFREC VT710S
Power regeneration type	THYFREC VT710P



First achievement in business field

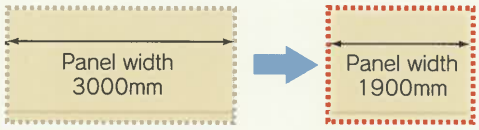
Power regenerative function loaded (VT710P)

- Rapid deceleration is possible by generating a brake torque while the motor needs to reduce speed. The regenerated energy produced at that time can be returned to the power source. Therefore, ultimate energy conservation can be achieved.
- Since a 100% motor rating can be continuously regenerated, this equipment is applicable where acceleration and deceleration are repeated frequently or regeneration is performed for a long time.

Smallest class in business field

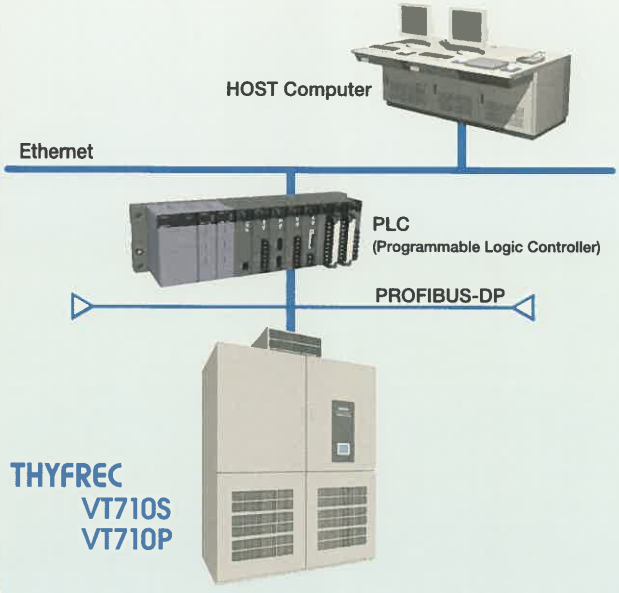
Compactness

The installation space for VT710S is smaller by a maximum of 35%, compared with the conventional model VT710.



VT710 — VT710S
※For 3kV, 475kW

Meidensha's Drive & Control System ; Supporting total energy conservation



Features

High efficiency and high power factor

■ A combined efficiency of 97% has been attained for drives. (This efficiency includes that of the input transformer.)

■ A power factor of 95% has been attained for the power source. No additional equipment is needed for the improvement of the power factor.

Friendly to peripheral equipment and motors

■ An 18-pulse rectification system is adopted for the input transformer. This technology can achieve a great reduction of low-order harmonic currents.

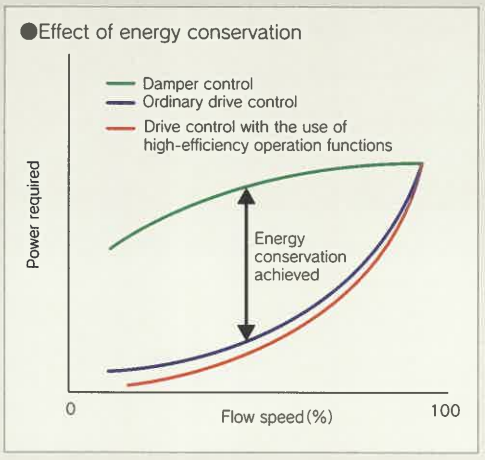
■ Meidensha's unique PWM system has been developed to restrain the generation of surge voltages. Therefore, even existing standard motors can be operated safely.

Energy conservation

■ The loads of square-law reduction torques such as fans and pumps can be speed-controlled by drives. This can realize marked energy conservation.

■ Since the waveforms of output voltage and output current are close to sinusoidal, the losses due to motor harmonics can be reduced. There is no chance for wasteful use of electricity.

■ Thanks to high-efficiency operation functions, no-load losses of motors are reduced when the loads are light. As a result, the combined efficiency is improved.



Powerful and smooth operation

■ In addition to standard V/f control, vector control with speed sensors (optional) can also be selected. Powerful and steady operation is possible without being affected by variations in the load.

■ In addition to the loads of square-law reduction torques such as fans, pumps, etc., this drive may also be used for constant-torque loads. It can be applied to industrial machines such as extruders, agitators, mixers, and so on.

■ Thanks to the feature of the auto-tuning function, troublesome work like the motor's circuit constant setup and others can be eliminated. Optimal tuning is always possible irrespective of motors and motor manufacturers.

Applications

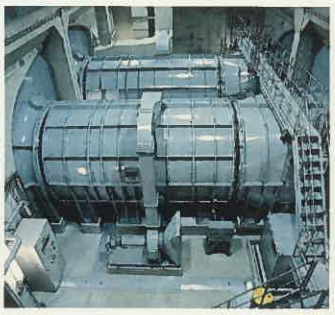
■ For fans, pumps, etc., to emphasize energy conservation

■ Industrial machines such as extruders, agitators, mixers, conveyors and the like

■ For rapid deceleration or frequent acceleration / deceleration of vehicle speed following blower, etc. (VT710P)

■ Cranes, centrifugal separators, centrifugal loaders, etc., requiring long-time regeneration (VT710P)

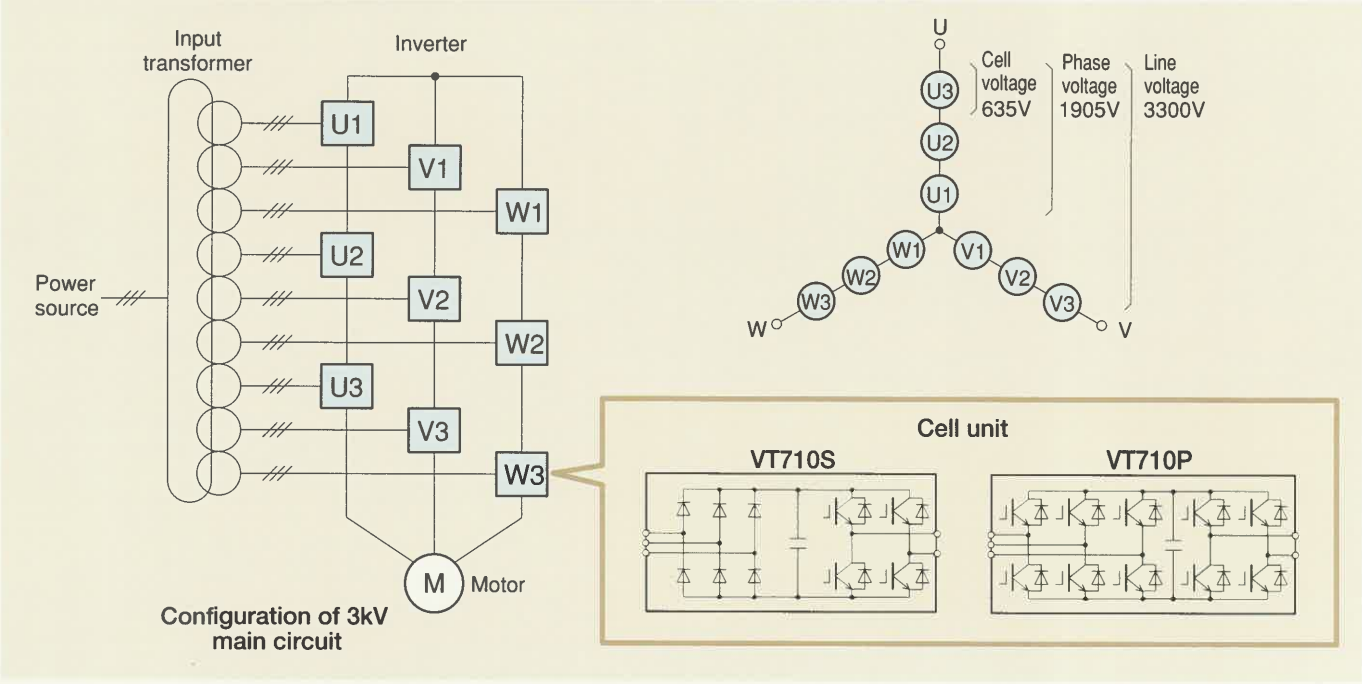





Circuit Configuration

Main circuit configuration

THYFREC VT710S/VT710P is a series-cell multiplex type drive that generates an output of 3-phase AC high voltages. Each phase of this drive consists of single-phase output inverters (cell units) connected in series and these phases are connected in a star (wye). Each phase of the 3kV version involves three tiers of cells, while that of the 6kV version consists of six tiers of cells.



Operation and Supervision

Outstanding operationability

THYFREC VT710S/VT710P uses a large-sized jog dial type operation panel favorably accepted by our customers. This panel assures a high operationability.
An LCD touch panel type color display (optional) is also available. This will improve the said operationability further.

Operation panel

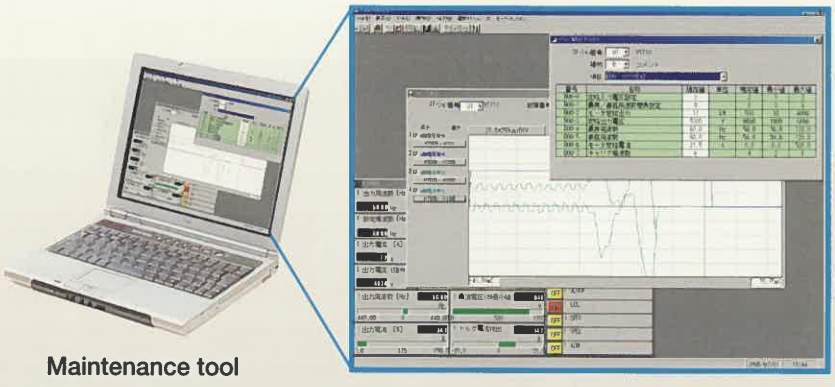
Touch panel

Easy maintenance and management

A maintenance tool (optional) with the use of a general-purpose personal notebook computer makes it possible to perform drive parameter control and trend display for operational data.
Maintainability is also assured, supported by the accumulation and indication of maintenance info such as working hours, expected replacing time for maintenance parts, and others.

Recovery supporting function

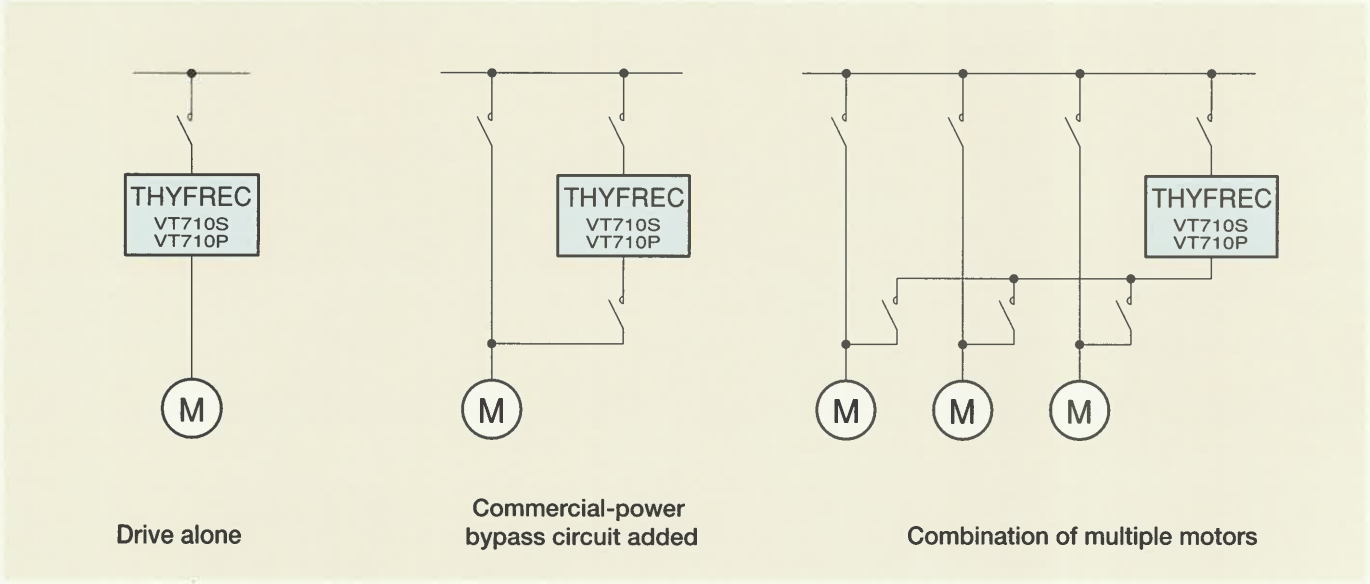
Operational data trace back, trouble-shooting diagnosis, and such recovery supporting functions are available, so that the recovery time is minimized even upon the occurrence of unexpected errors. (This service, however, requires an optional maintenance tool.)

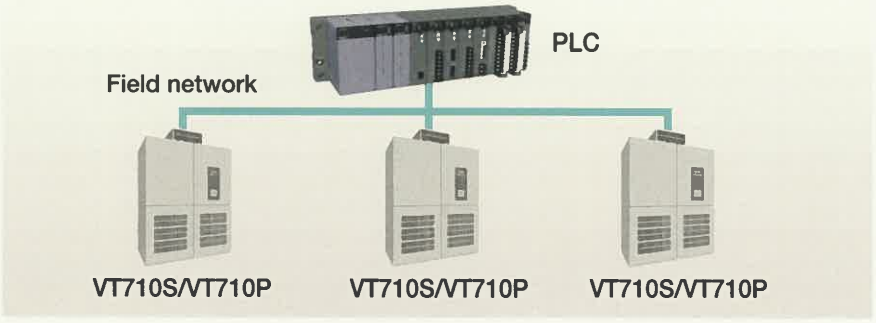


Maintenance tool

System configuration

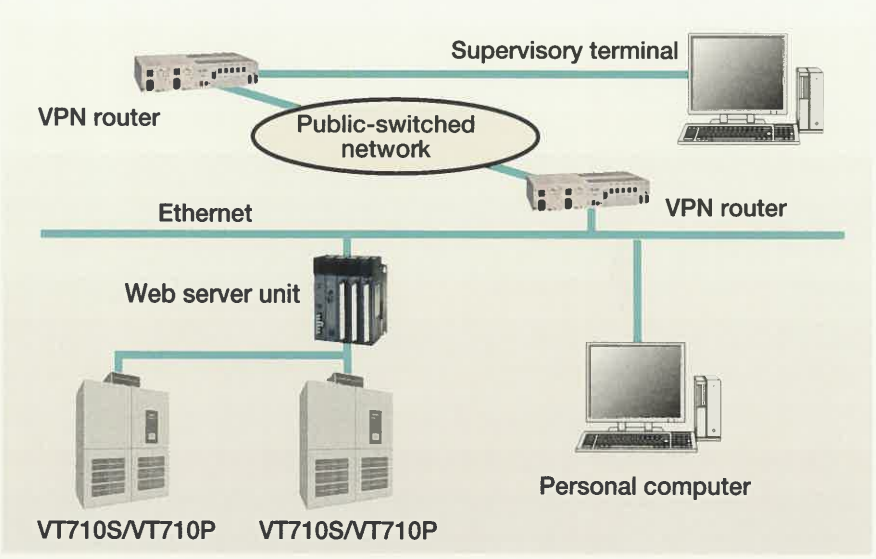
THYFREC VT710S/VT710P can be used for operation by drive alone. If a commercial-power bypass circuit is added, however, the motor driving power source can be duplicated or it is applicable to operation on a commercial power source. Thanks to the commercial-power synchronous changeover function (optional), it is possible to realize a shockless changeover of running motors from inverter to commercial power source and vice versa. By virtue of this function, THYFREC VT710S/VT710P may be used as a soft starter to reduce the required capacity of the power source. If the system is combined with multiple motors, it is possible to carry out a complex control in terms of motor quantity and speeds.





Communication function

The RS-485/422 serial transmitter function unit is provided normally for the operation panel and the maintenance tool. If this interface is used, it is possible to make a connection with a host computer. It is applicable to Industrial Standard PROFIBUS-DP. (In any case, application to the field network is optional.)



Applicable to remote supervision

For remote supervision, a Web server unit and an Ethernet interface (both optional) are available. From a remote personal computer, it is possible to perform the retrieval of drive parameters, operational data, and operation trace back data, or to receive error notifications by e-mail service.

Standard Specifications

Standard type / VT710S 3kV series

Item				Specifications						
System				3kV series						
Type (VT710S-□□□□□)				110L	235L	335L	475L	950L	1400L	1800L
Equipment rating	Normal duty Standard overload	Rated capacity (kVA)	Note 1	149	314	457	634	1217	1829	2286
		Max. Continuous rated current (A)	Note 2	26	55	80	111	213	320	400
		Max. Applicable motors (kW)	Note 3	110	235	335	475	950	1400	1800
		Overload currentrating		120% for 1 minute						
	Duty Heavy overload	Rated capacity (kVA)	Note 1	114	252	366	503	972	1463	1829
		Max. Continuous rated current (A)	Note 2	20	44	64	88	170	256	320
		Max. Applicable motors (kW)	Note 3	90	185	270	380	760	1120	1440
		Overload current rating		150% for 1 minute						
Power supply		Main circuit		3-phase 3000/3300V ± 10% 50/60Hz ±5 %						
		Control circuit	Note 4	3-phase 200/220V ± 10% 50/60Hz ± 5% (Standard) 3-phase 400/440V ± 10% 50/60Hz ± 5% (Optional)						
Output		Rated output voltage	Note 5	3-phase 3000/3300V						
		Output frequency range		0.1 ~ 120Hz						

Standard type / VT710S 6kV series

Item				Specifications										
System				6kV series										
Type (VT710S-□□□□□)				110H	220H	330H	475H	710H	1000H	1500H	2000H	2500H	3000H	3750H
Equipment rating	Normal duty Standard overload	Rated capacity (kVA)	Note 1	149	297	446	629	915	1269	1909	2435	3041	3658	4573
		Max. Continuous rated current (A)	Note 2	13	26	39	55	80	111	167	213	266	320	400
		Max. Applicable motors (kW)	Note 3	110	220	330	475	710	1000	1500	2000	2500	3000	3750
		Overload currentrating		120% for 1 minute										
	Duty Heavy overload	Rated capacity (kVA)	Note 1	114	229	354	503	732	1006	1520	1943	2423	2926	3658
		Max. Continuous rated current (A)	Note 2	10	20	31	44	64	88	133	170	212	256	320
		Max. Applicable motors (kW)	Note 3	90	160	250	380	560	750	1200	1570	2000	2400	3000
		Overload current rating		150% for 1 minute										
Power supply		Main circuit		3-phase 6000/6600V ± 10% 50/60Hz ±5 %										
		Control circuit	Note 4	3-phase 200/220V ± 10% 50/60Hz ± 5% (Standard) 3-phase 400/440V ± 10% 50/60Hz ± 5% (Optional)										
Output		Rated output voltage	Note 5	3-phase 6000/6600V										
		Output frequency range		0.1 ~ 120Hz										

Power regeneration type / VT710P 3/6kV series

Item				Specifications						
System				3kV series			6kV series			
Type (VT710P-□□□□□)				235L	475L	950L	475H	1000H	1500H	2000H
Equipment rating	Normal duty Standard overload	Rated capacity (kVA)	Note 1	314	634	1217	629	1269	1909	2435
		Max. Continuous rated current (A)	Note 2	55	111	213	55	111	167	213
		Max. Applicable motors (kW)	Note 3	235	475	950	475	1000	1500	2000
		Overload currentrating		Drive 120% for 1 minute, regeneration 100% continuous						
	Duty Heavy overload	Rated capacity (kVA)	Note 1	252	503	972	503	1006	1520	1943
		Max. Continuous rated current (A)	Note 2	44	88	170	44	88	133	170
		Max. Applicable motors (kW)	Note 3	185	380	760	380	750	1200	1570
		Overload current rating		Drive 150% for 1 minute, regeneration 100% continuous						
Power supply		Main circuit		3-phase 3000/3300V ± 10% 50/60Hz ±5 %			3-phase 6000/6600V ± 10% 50/60Hz ±5 %			
		Control circuit	Note 4	3-phase 200/220V ± 10% 50/60Hz ± 5% (Standard) 3-phase 400/440V ± 10% 50/60Hz ± 5% (Optional)						
Output		Rated output voltage	Note 5	3-phase 3000/3300V			3-phase 6000/6600V			
		Output frequency range		0.1 ~ 120Hz						

Notes:
1. Indicates the output capacities when output voltages are 3300V and 6600V.
2. Indicates the total rms values including harmonics.
3. Indicates when Meiden standard 4P cage-type induction motors are operated at an output voltage of 3300V or 6600V.
4. In the case of restarting from a momentary voltage sag, it is necessary to provide for an additional uninterrupted control source of single-phase AC100V or DC 100V.
5. It is impossible to obtain a voltage output exceeding the power source voltage.

Common Specifications

Item			Specifications
Control specifications	Control system		All-digital control Multi-level PWM
	Control mode		V/f (reduced torque, constant torque) control (standard), Vector control with speed sensors (optional)
	Frequency accuracy		±0.01Hz (digital setup), ±0.5%FS (analog setup) at 25 ± 10℃
	Voltage/frequency characteristic		Reduced torque, constant torque, constant output
	Acceleration/deceleration time		0.1 ~ 60,000s
	Acceleration/deceleration mode		Linear / "S-curve" / Free ramp
	Major control functions		Restarting from momentary voltage sag, free-run pickup, high efficiency run, multi-speed setup, frequency jump, interlocked ratio setup, commercial power sync changeover (optional)
Control I/O	Screen panel		Jog dial type operation panel (standard) LCD 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
	Transmission functions	Standard	RS-485/422
		Optional	PROFIBUS-DP, Ethernet
Protective functions	Prevention		Overcurrent control, overvoltage control, overload prediction
	Tripping		Overcurrent, overvoltage, fuse OFF, undervoltage, IGBT fault, overload, temperature rise, ground fault, communication error, self-diagnosis, etc.
	Fault history		Last eight items are recorded. Contents of record: Primary factors, secondary factors, and output frequency, current, and time at the time of tripping.
	Recovery support		Fault diagnosis (Maintenance tools required) Trace-back functions (Optional maintenance tools or remote supervision required)
Construction	Panel construction		Steel-fabricated, enclosed, self-standing type
	Protective construction		IP20 (standard), IP40 (optional)
	Maintenance		Front maintenance (standard), front-back maintenance (optional)
	Cable intake		Bottom entry for both main and control circuits, top entry (optional)
	Cooling system		Forced-air cooled
	Color of coating		Munsell 5Y7/1
Operating environment	Installation place		Indoors
	Ambient temperature		0 ~ 40℃
	Relative humidity		85% Max. (No dew condensation permissible)
	Altitude		1000m or Lower
	Vibration		4.9m/s^2 or less
	Atmospheric conditions		Freedom from corrosive or explosive gases, metallic powder, vapor, dust, oil mist, lint, etc.
Input transformer			Dry type (standard), molded type (optional) Exciting inrush current: Not specified (standard), specified (optional)
Applicable standards			JIS, JEC, JEM

External Dimensions

Fig. 1

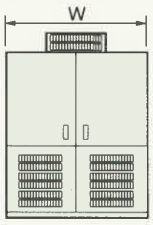
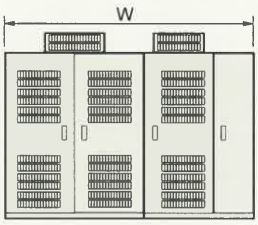


Fig. 2



Side view (common)

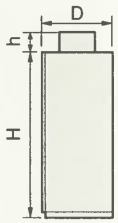
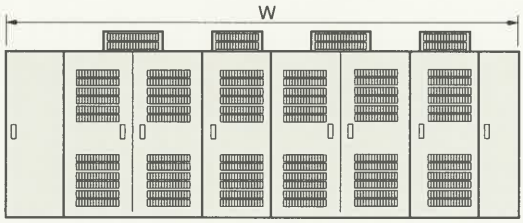


Fig. 3



Standard type VT710S

Type		Panel width W (mm)	Panel depth D (mm)	Panel height		Mass (kg)	Fig.
				H (mm)	h (mm)		
3kV series	110L	1900	1000	2350	350	2000	Fig.1
	235L	1900	1000	2350	350	2000	
	335L	1900	1000	2350	350	2300	
	475L	1900	1000	2350	350	2600	
	950L	3500	1200	2350	350	6000	Fig.2
	1400L	4500	1300	2350	350	7200	
	1800L	4700	1300	2350	350	8100	
6kV series	110H	3100	100	2350	350	3500	
	220H	3100	1000	2350	350	3500	
	330H	3300	1000	2350	350	3500	
	475H	3300	1000	2350	350	4100	
	710H	3700	1000	2350	350	5000	
	1000H	3900	1000	2350	350	6000	
	1500H	4600	1200	2350	350	7100	
	2000H	5200	1200	2350	350	8400	
	2500H	9800	1300	2350	350	10700	Fig.3
	3000H	9800	1300	2350	350	11200	
	3750H	10600	1300	2350	350	14000	

Power regeneration type VT710P

Type		Panel width W (mm)	Panel depth D (mm)	Panel height		Mass (kg)	Fig.
				H (mm)	h (mm)		
3kV series	235L	3000	1000	2350	350	3100	Fig.2
	475L	3400	1000	2350	350	3700	
	950L	3900	1200	2350	550	6100	
6kV series	475H	3800	1000	2350	350	4400	
	1000H	4100	1000	2350	350	6100	
	1500H	4800	1200	2350	350	7300	
	2000H	5400	1200	2350	350	8500	

Note: Standard values are specified in the tables above. They are subject to change according to the optional conditions.

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