

**MEIDEN**

Quality connecting the next

**Power Regeneration Converter**

# THYFREC CV240S

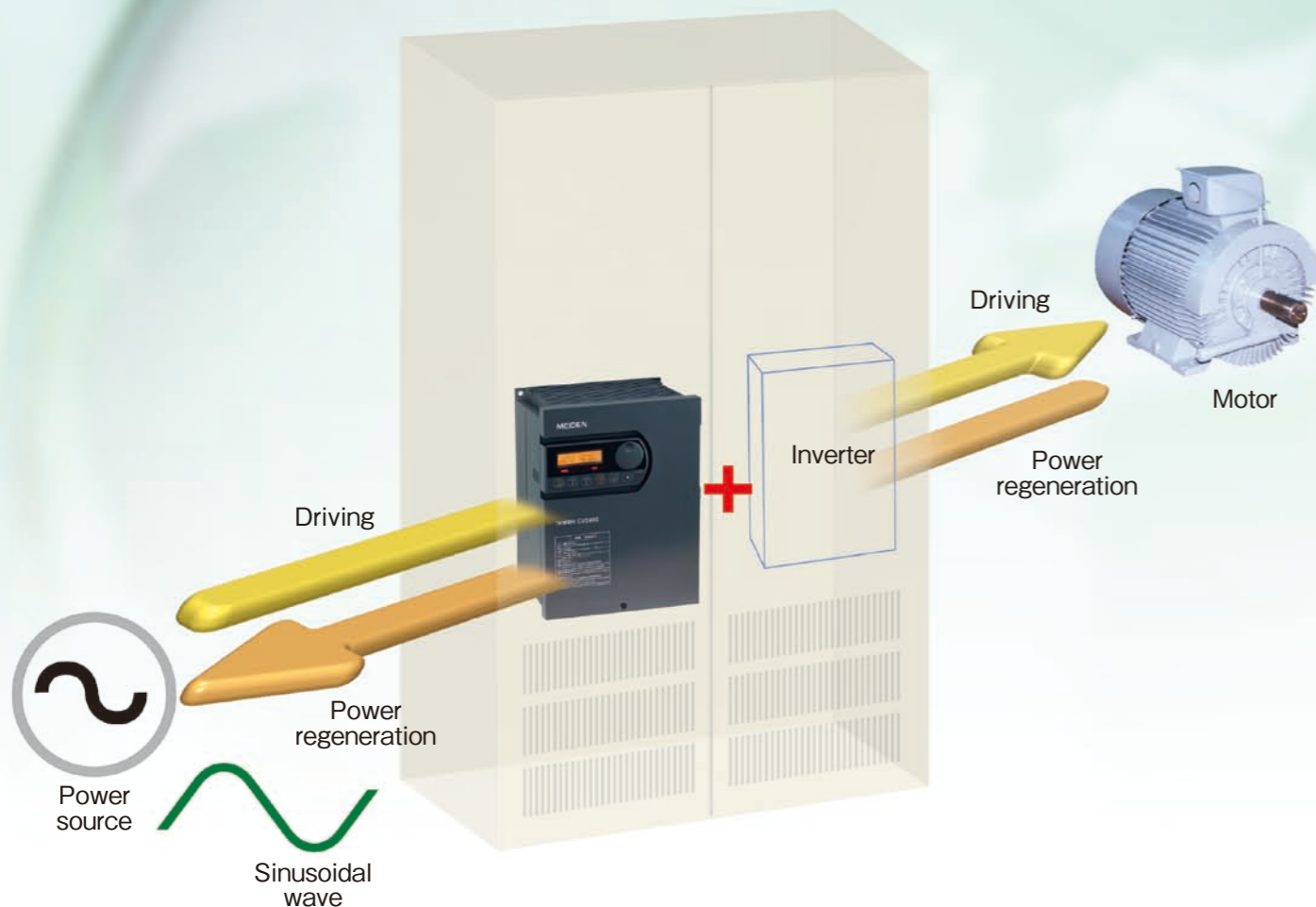
Sustaining Worldwide Efforts for

## Power Saving

Suppression of Harmonics and  
Regeneration of Source Power



The **THYFREC CV240S Series** solves the problems of harmonics caused on the power source side. It utilizes the regenerative energy effectively.



## Features:

### Suppression of harmonic currents on the power source side

PWM current control produces output voltage that is extremely close to sine wave, causing the suppression of Harmonics of power source side.

The converter clears METI\* Harmonics Guidelines/self-excited three phase bridge(K5=0).

METI : Ministry of Economy, Trade and Industry

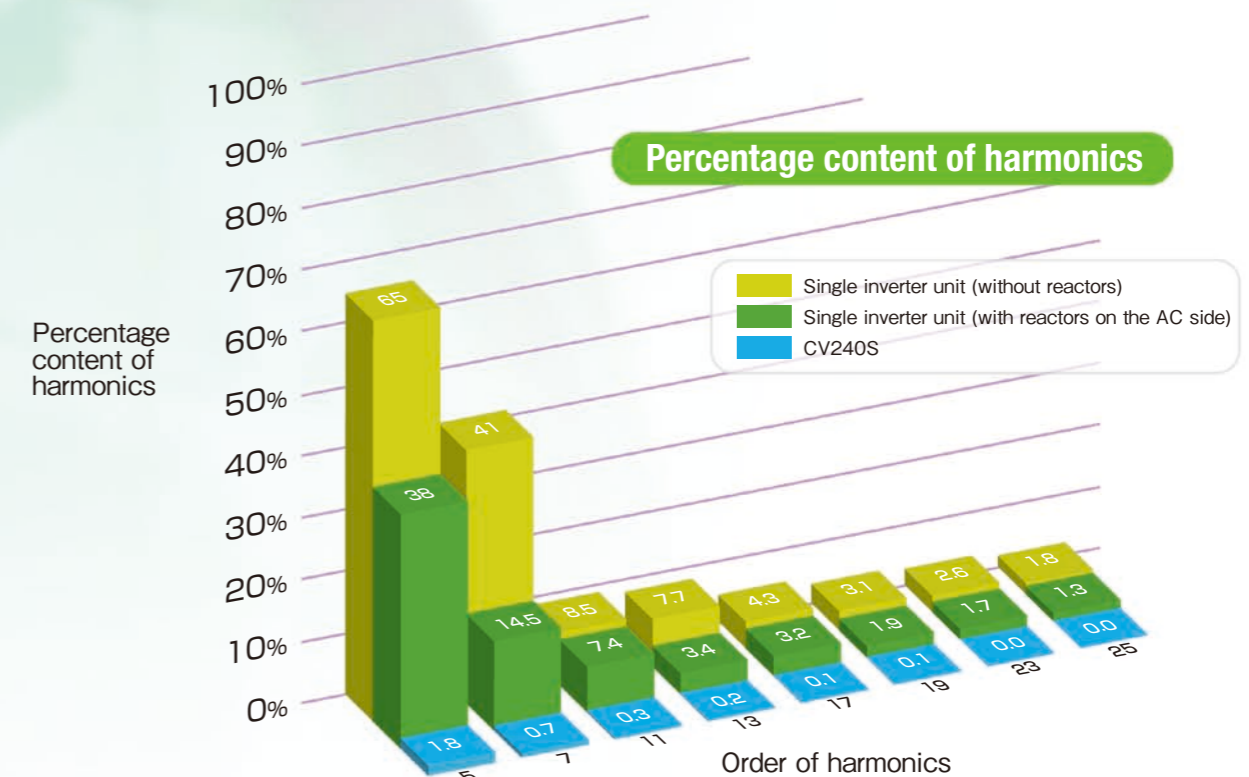
### High power factor control

Usually the power factor of inverter itself with reactor is approx.0.85.

PWM control method reduces the capacity of power source through the control of high power factor of approx.1.0.

Even in the case of a configuration with an inexpensive input filter enabled by the 120 ° degree current control method, the input power factor becomes 0.9 or higher.

Note: Single inverter unit used (with reactors on the AC side)



Note: The above data are based on the assumption of 11kW (100% load) of the 400V class. This can be changed by the capacity and load factor.

### Applications

- Suppression of harmonics and regeneration of power source  
Fans, pumps, blowers, elevators, cranes, etc.

### Applicable inverters

- High-performance inverters  
THYFREC VT350

### Energy saving by power regeneration

In addition to PWM control method, even the method of 120 degrees current control method that requires no high-priced filter, the regeneration energy from the motor can be returned to the power source. It has the effect of energy saving by regeneration of power source.

(100% continuous power regeneration is also possible.)

### Mutual converter method

One converter connects to a number of inverters, the multi-axis system is available.

## New Functions and Environmental Responsiveness

### Function of serial communication

Standard equipment is provided with an RS485 serial communication port.

Therefore, it is easy to make connections with any host computer or a controller. In addition, parameter read/write operation is possible.

Note: Operation of RUN/STOP is impossible.

### Operation panel

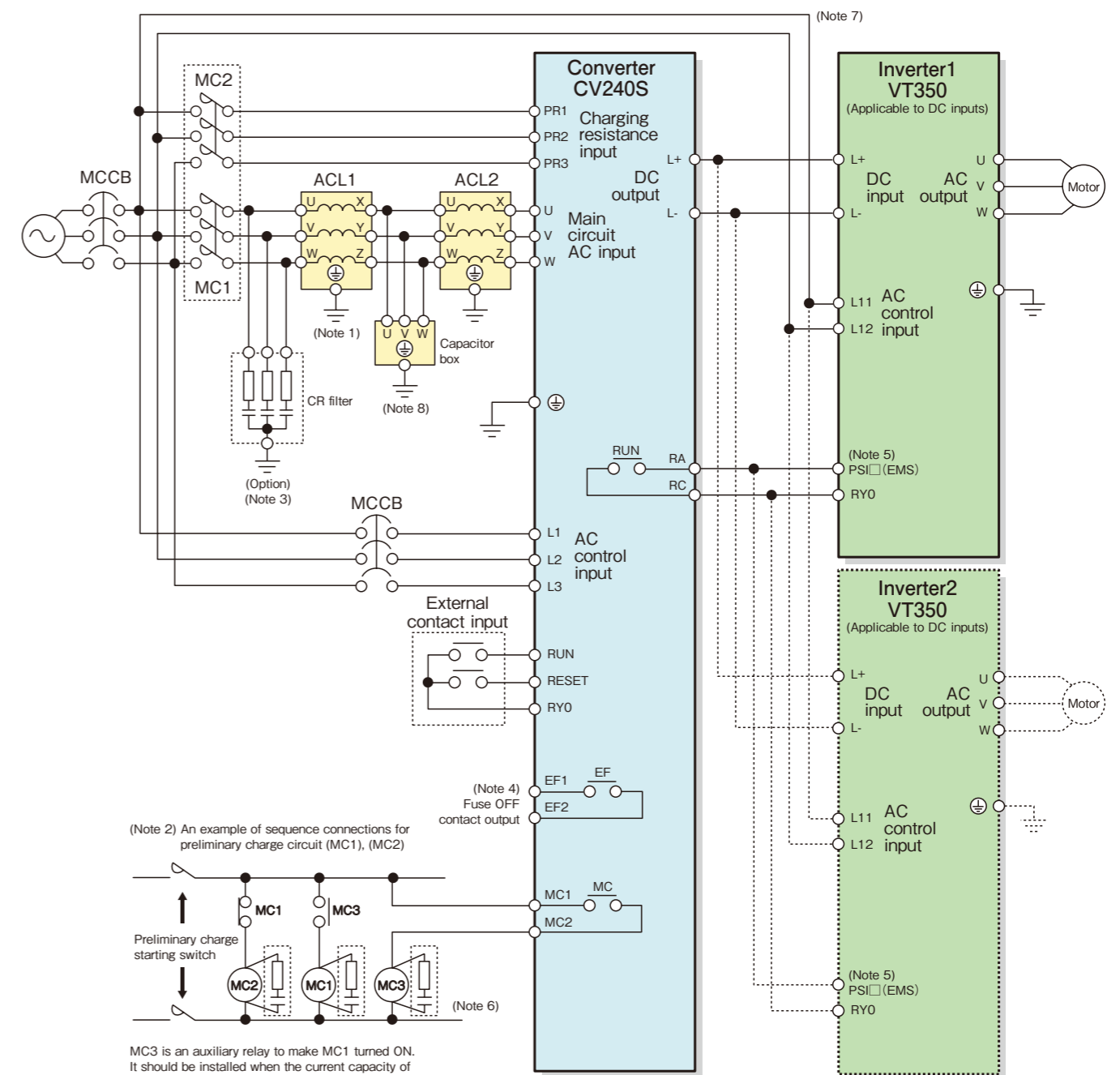
The operation panel is available : a LCD panel. The LCD panel is Provided with the operational function of a jog dial.



## Comparison of inverter units

Item	Converter CV240S + inverter	Single inverter unit
Main circuit	<b>Connection diagram</b> 	<b>Connection diagram</b> 
	<b>Conversion</b> IGBT + diode	Diode
	<b>Inversion</b> IGBT + diode	IGBT + diode
Control system	<b>Conversion</b> Sine wave approximating PWM control	No control measures
	<b>Inversion</b> Sine wave approximating PWM control	Sine wave approximating PWM control
Input power factor	Approx. unity (0.98 or above under condition of 100% load)	Approx. 0.85
Control system	Power regeneration (Motor energy feed back to the power source)	No measures or dynamic braking (Motor energy consumed with rheostat)
Input current waveform		

## Examples of Connections



## Standard Specifications

### Ratings of 200V Class 011L ~ 090L Equipment

Type : CV240S-□□□□		011 L	018L	030L	045L	075L	090L	
Equipment ratings	Standard overloading	Rated output capacity (kW) (Note 1)	14	22	37	55	89	107
		Inverter capacity for connection (kW)	7.5/11	15/18.5	22/30	37/45	55/75	90
		Rated input current (A)	44	69	116	173	281	338
		Overload durability	120%-1min 140%-2.5sec (both driving and power regeneration)					
		Rated output capacity (kW) (Note 1)	9	18	27	45	66	89
	Heavy overloading	Inverter capacity for connection (kW)	7.5	11/15	18.5/22	30/37	45/55	75
		Rated input current (A)	30	58	85	143	209	281
		Overload durability	150%-1min 175%-2.5sec (both driving and power regeneration)					
		DC output voltage (V)	317.5 ~ 360VDC variable					
		Input power factor	0.98 or above (under condition of 100% load)					
Power source	Voltage/frequency (Hz)	3-phase 200 ~230V ± 10% / 50Hz or 60Hz ± 5%						
Construction	Installation system (Note 2)	Wall type						
	Protective construction	IP00						
	Approx. weight (kg) (Note 3)	7.5	12	25	40	80	200	
	Cooling system	Forced-air cooled						
	Color of coating	Munsell N4.0 (gray)						
Operating environment:	Indoor ambient temperature: -10 ~ 50°C, Relative humidity: 95% max. (There must be no dew condensation.) Altitude: 1000m or below. Vibration: 4.9m/s <sup>2</sup> or less Freedom from corrosive and/or explosive gases, dust, oil mist, lint, etc.							

### Ratings of 400V Class 011H ~ 132H Equipment

Type : CV240S-□□□□		011H	018H	037H	055H	075H	110H	132H	
Equipment ratings	Standard overloading	Rated output capacity (kW) (Note 1)	14	21	44	66	90	133	158
		Inverter capacity for connection (kW)	7.5/11	15/18.5	22/30/37	45/55	75	90/110	132
		Rated input current (A)	22	34	69	104	142	211	250
		Overload durability	120%-1min 140%-2.5sec (both driving and power regeneration)						
		Rated output capacity (kW) (Note 1)	9	18	35	54	66	109	133
	Heavy overloading	Inverter capacity for connection (kW)	7.5	11/15	18.5/22/30	37/45	55	75/90	110
		Rated input current (A)	15	29	56	85	104	172	211
		Overload durability	150%-1min 175%-2.5sec (both driving and power regeneration)						
		DC output voltage (V)	635 ~ 720VDC variable						
		Input power factor	0.98 or above (under condition of 100% load)						
Power source	Voltage/frequency (Hz)	3-phase 380 ~460V ± 10% / 50Hz or 60Hz ± 5%							
Construction	Installation system (Note 2)	Wall type							
	Protective construction	IP00							
	Approx. weight (kg) (Note 3)	7.5	12	25	42	45	65	90	
	Cooling system	Forced-air cooled							
	Color of coating	Munsell N4.0 (gray)							
Operating environment:	Indoor ambient temperature: -10 ~ 50°C, Relative humidity: 95% max. (There must be no dew condensation.) Altitude: 1000m or below. Vibration: 4.9m/s <sup>2</sup> or less Freedom from corrosive and/or explosive gases, dust, oil mist, lint, etc.								

### Ratings of 400V Class 200H ~ 660H Equipment

Type : CV240S-□□□□		200H	250H	315H	400H	475H	550H	660H	
Equipment ratings	Standard overloading	Rated output capacity (kW) (Note 1)	237	294	370	468	558	646	775
		Inverter capacity for connection (kW)	160/185/200	250	280/315	355/400	450/475	550	660
		Rated input current (A)	375	466	586	741	912	1056	1267
		Overload durability	120%-1min 140%-2.5sec (both driving and power regeneration)						
		Rated output capacity (kW) (Note 1)	189	237	294	370	470	558	646
	Heavy overloading	Inverter capacity for connection (kW)	132/160	185/200	220/250	280/315	355/400	450/475	550
		Rated input current (A)	300	375	466	586	768	912	1056
		Overload durability	150%-1min 175%-2.5sec (both driving and power regeneration)						
		DC output voltage (V)	635 ~ 720VDC variable						
		Input power factor	0.98 or above (under condition of 100% load)						
Power source	Voltage/frequency (Hz)	3-phase 380 ~ 460V ± 10% / 50Hz or 60Hz ± 5%							
Construction	Installation system (Note 2)	Wall type							
	Protective construction	IP00							
	Approx. weight (kg) (Note 3)	200	285	290	295	285×2	290×2	295×2	
	Cooling system	Forced-air cooled							
	Color of coating	Munsell N4.0 (gray)							
Operating environment:	Indoor ambient temperature: -10 ~ 50°C, Relative humidity: 95% max. (There must be no dew condensation.) Altitude: 1000m or below. Vibration: 4.9m/s <sup>2</sup> or less Freedom from corrosive and/or explosive gases, dust, oil mist, lint, etc.								

Note 1: Values of 220V and 440V inputs are indicated when the source voltage is 200V and 400V, respectively. For lower values, reduced rating has to be adopted.

Note 2: AC reactors and capacitor boxes (capacitors and resistors for 045L/055H or above) near the unit are separately installed.

Note 3: This weight is of the main unit only.

### Common Control Specifications

	PWM control	120°commutation control
Control system (Note)	Digital sine wave approximating PWM control	Digital 120°commutation control
Operation panel	V24-OP1A: LCD panel	
Retry function	Arbitrary setting of 1 ~ 10 times	
Protective functions	AC input overcurrent (OC), overload (OL), DC overvoltage (OV), undervoltage (UVT), radiator fin overheating (UOH), IGBT failure (PM), other self-diagnosis (CN/IO/CPU/DER) Ground fault detection (GRD) ..... ON/OFF selection possible with parameters Source overvoltage (LOV), source undervoltage (LUV) ..... Heavy/minor fault selection possible with parameters Fuse OFF (EF) ..... Contact outputs only	
Fault history	Recording of the last four faults. Contents of record: Primary and secondary factors, source frequency, current, and DC voltage observed shortly before interruption, H/W detection error, accumulated current carrying time, accumulated operating time.	
Others	Cooling fan ON/OFF control, standard serial transmission	

Note: Selection of the PWM control system or the 120°commutation control system is defined at the time of shipment.

### Type

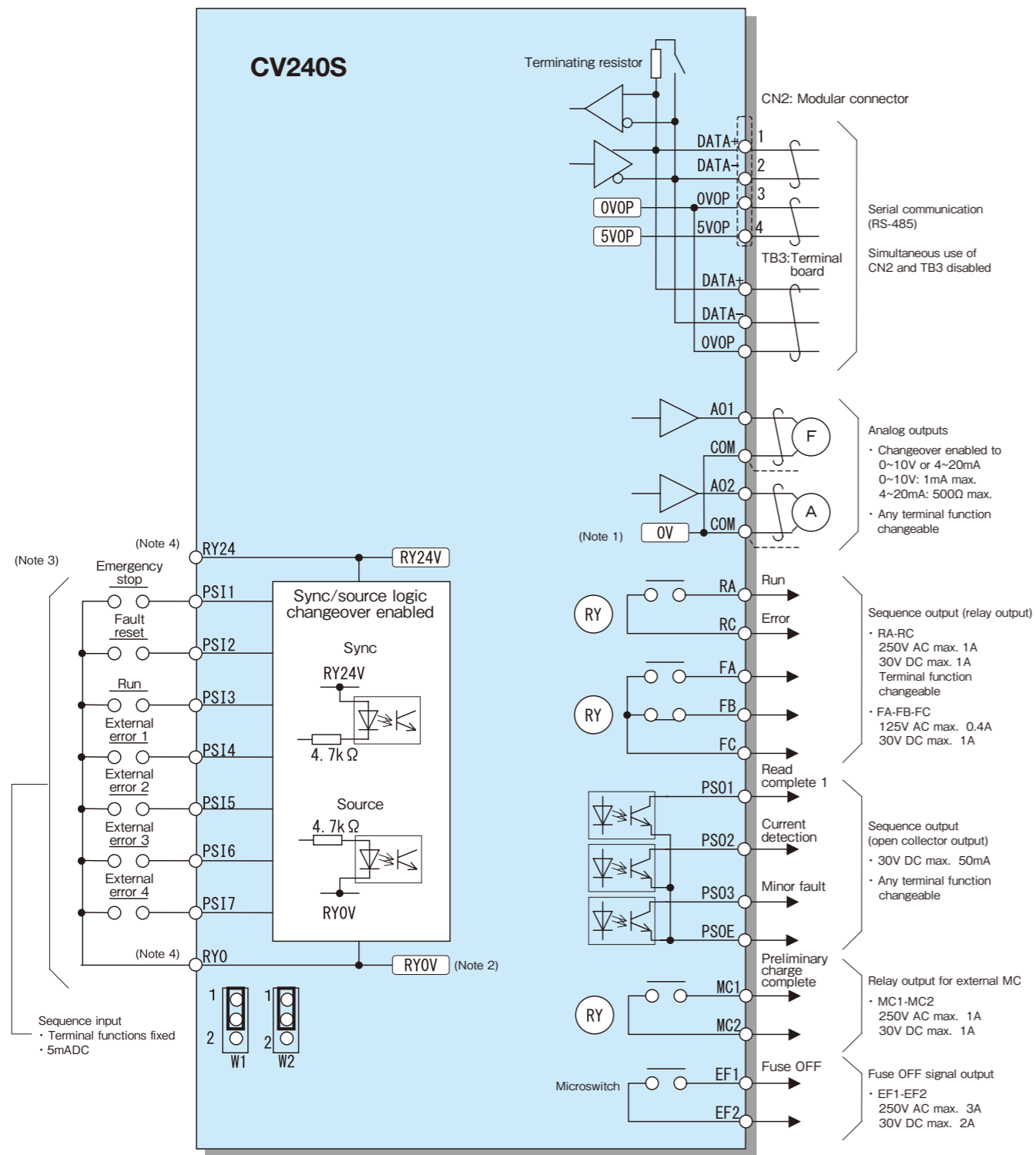
CV240S - 018H 4

Indicating the operation panel selection  
0 : Nil  
4 : LCD type

Indicating the input voltage and inverter capacity for connection

# Control Circuit

## Circuit Diagram



Note 1: The two COM terminals are internally connected.

Note 2: Since RYO, 0VOP and COM are insulated, no connections should be made.

Note 3: This diagram shows an example of sync logic connections.

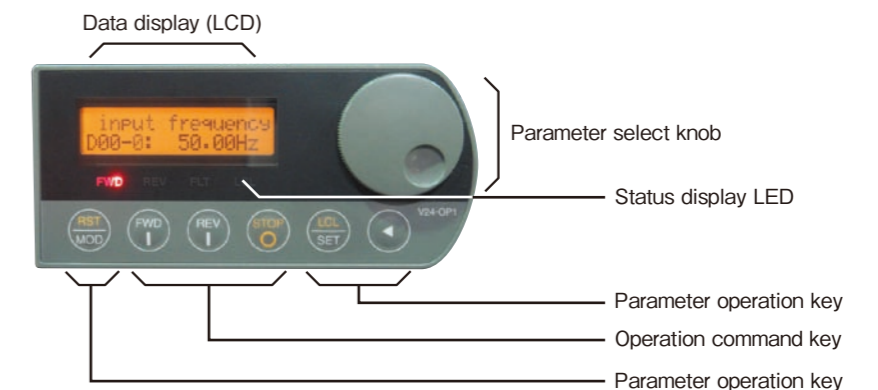
Note 4: Do not short-circuit RY24 and RYO.

## Terminal Functions

Marking	Name	Functions
Sequence input	PSI1~PSI7	Sequence input PSI1: Emergency stop    PSI3: Run    PSI5: External error 2    PSI7: External error 4 PSI2: Fault reset    PSI4: External error 1    PSI6: External error 3
	RY0, RY24	Sequence input common These are the common terminals for PSI 1~7 signals. Two types are available for sync/source logic changeover. Make sure not to short-circuit them.
Analog output	AO1 AO2	Programmable analog output These are the analog output terminals for meters. A changeover can be made between voltage output and current output. When an output terminal function (C13-0, C13-1) is set up, an output signal can be arbitrarily generated from the control unit. AO1: On the side of Elbit W3=1: Voltage output with C14-7=1/2 On the side of Elbit W3=2: Current output with C14-7=3 AO2: On the side of Elbit W4=1: Voltage output with C14-8=1/2 On the side of Elbit W4=2: Current output with C14-8=3 By the way, the converter resolution is 10 bits.
	COM	Analog output common This is a common terminal for the AC1 and AC2 signals.
Sequence output	RC, RA	Programmable sequence output (1 a-contact) This is a relay output through the relay contact. When an output terminal function (C13-2) is set up, an output signal can be arbitrarily generated from the control unit.
	FC, FA, FB	Sequence error output (1 c-contact) This is a sequence error output from a relay.
	PSO1 PSO2 PSO3	Programmable sequence output (open collector) This is a sequence output from an open collector. When an output terminal function (C13-3, 4, 5) is set up, an output signal can be arbitrarily generated from the control unit.
	PSOE	Open collector output common This is a common terminal for the PSC1, 2, 3 signals.

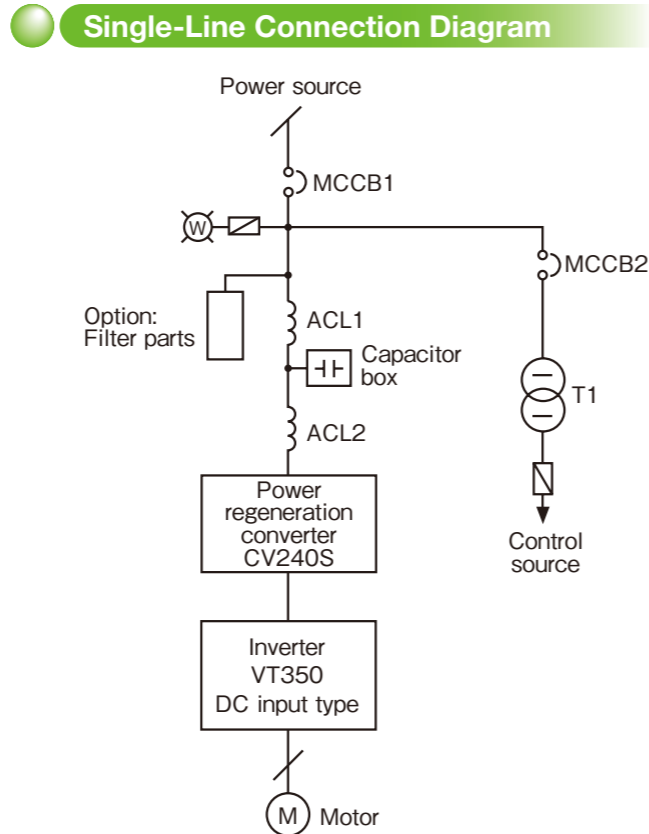
## Operation Panel (LCD)

### LCD Panel (V24-OP1)



## External Dimensions of the Standard Panel

This is an example of the Meidensha standard panel size including an induction motor driving sequence circuit assuming that the inverter type is VT350. There can be a change according to specifications.



## For Front Door and Detachable Rear panel

When the external dimension diagram falls under Fig. A:

### 200V class

Motor capacity (kW)	External dimensions (mm)				Approx. weight (kg)
	W1	W2	H	D	
1.5 2.2 3.7	600		2350	600	400
5.5 7.5					450
11 15	800	-	2350	600	500
18.5 22	900				600
30	1200		900	900	750
37 45					800
55	800	600			900

### 400V class

Motor capacity (kW)	External dimensions (mm)				Approx. weight (kg)
	W1	W2	H	D	
2.2 3.7	600		2350	600	400
5.5 7.5					420
11 15	800	-	2350	600	450
18.5 22 30	900				550
37 46 55	1200		900	900	750
75 90 110					800
132 160	1000	700			1100

## For Front and Rear Doors

When the external dimension diagram falls under Fig. B:

### 200V class

Motor capacity (kW)	External dimensions (mm)				Approx. weight (kg)
	W1	W2	H	D	
1.5 2.2 3.7	600		2350	640	400
5.5 7.5					450
11 15	900	-	2350	640	500
18.5 22					600
30	800		1040	1040	750
37 45					800
55					1240
					900

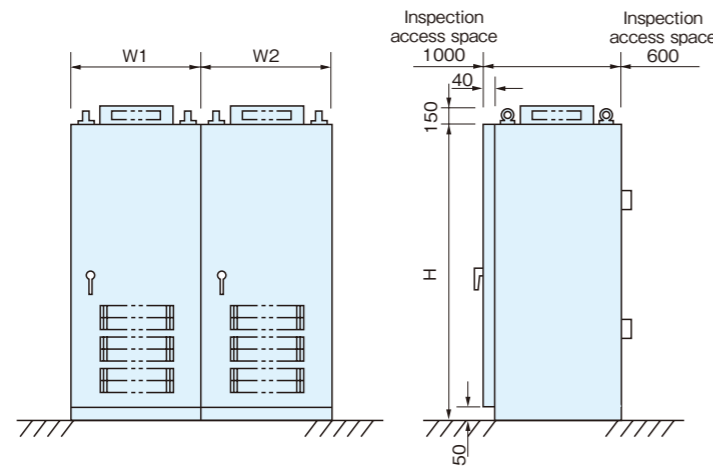
### 400V class

Motor capacity (kW)	External dimensions (mm)				Approx. weight (kg)
	W1	W2	H	D	
2.2 3.7	600		2350	640	400
5.5 7.5					420
11 15	900	-	2350	640	450
18.5 22 30					550
37 45 55 75	800		2350	1040	650
90 110					800
132	700	900	1240	1240	900
160					1100
200	700	1000			1200
315	800	1100			1700

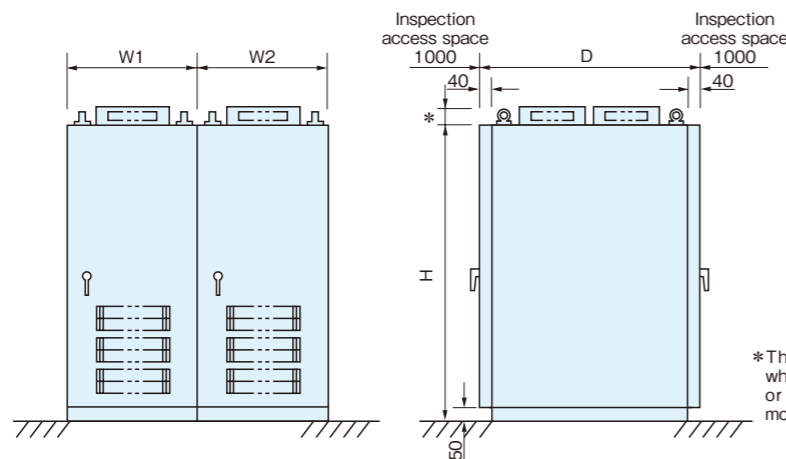
Note: For 3.7kW or below, two circuits can be accommodated in the front and rear doors.

## External Dimension Diagram (Unit: mm)

[Fig. A]



[Fig. B]



\*This dimension becomes 150 when the motor capacity is 200kW or smaller, and 350 when the motor capacity exceeds 200kW.

# Queries for Ordering:

At the time of ordering, please give us your detailed information about the items below.

## 1. General items

Equipment name: \_\_\_\_\_

Applications: Fans, pumps, etc.: \_\_\_\_\_

### Operating environment

Ambient temperature: \_\_\_\_\_ ~ \_\_\_\_\_ °C

Dust, etc.: \_\_\_\_\_

Others: \_\_\_\_\_

## 2. Load conditions

### Load torque characteristics

Constant torque, reduced torque, others: \_\_\_\_\_

Starting torque: \_\_\_\_\_ %

Overload conditions \_\_\_\_\_ % for one minute,  
others ( \_\_\_\_\_ % for \_\_\_\_\_ minute/sec.)

Moment of inertia of the load (converted into motor shaft):  
\_\_\_\_\_ kg · m<sup>2</sup>

Braking force:  
Required, not required ( \_\_\_\_\_ % of rated motor torque)

### Operation pattern

Continuous: \_\_\_\_\_ hours/day

Repeated operation time: \_\_\_\_\_ minutes

Stop time: \_\_\_\_\_ minutes

Acceleration time setting: Required, not required  
(Acceleration \_\_\_\_\_ seconds, deceleration \_\_\_\_\_ seconds)

## 3. Motor specifications

Setting place: Indoors, outdoors

Type: \_\_\_\_\_

Output: \_\_\_\_\_ kW

No. of poles: \_\_\_\_\_ P

Voltage: \_\_\_\_\_ V

Frequency: \_\_\_\_\_ Hz

Current: \_\_\_\_\_ A

Revolving speed range: \_\_\_\_\_ min<sup>-1</sup> ~ \_\_\_\_\_ min<sup>-1</sup>

Load connection system: (Direct coupling, belt)  
\_\_\_\_\_ type \_\_\_\_\_ pcs. PCD \_\_\_\_\_ mm

Speed sensor: Required, not required (Type \_\_\_\_\_ )

## 4. Control unit specifications

Output: \_\_\_\_\_ kW or \_\_\_\_\_ kW

Input source: \_\_\_\_\_ V ± \_\_\_\_\_ %

\_\_\_\_\_ Hz ± \_\_\_\_\_ %

Source transformer capacity: \_\_\_\_\_ kVA

Source transformer impedance: \_\_\_\_\_ %

Frequency control range: \_\_\_\_\_ Hz ~ \_\_\_\_\_ Hz  
(or revolution control range: \_\_\_\_\_ min<sup>-1</sup> ~ \_\_\_\_\_ min<sup>-1</sup>)

Voltage dip restart: Required, not required (within \_\_\_\_\_ sec.)

Place of operation control:  
Panel side (local) or outside (remote)  
Changeover between panel side and outside (local/remote)

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### Cautions for Safety:

- Please read through the relevant [Instruction Manual] or related materials for correct usage.
- This product has been manufactured under rigorous quality control. When the inverter is applied to important facilities where inverter malfunction is considered to lead to a serious fatal injury or where the occurrence of serious losses is anticipated, the user is requested to provide for any adequate safety installations to prevent serious accidents.
- If the inverter is used for any loads other than 3-phase AC motors, please contact our business contact window.



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