YASKAWA

INVERTERS FOR ELEVATOR DRIVES
Varispeed L7

VECTOR CONTROL FOR BOTH INDUCTION AND SYNCHRONOUS MOTORS

200V CLASS 3.7kW to 55kW
400V CLASS 3.7kW to 55kW

A Comfortable Elevator Ride around the World

Certified for
ISO9001 and
ISO14001

JQA-0422 JQA-EM0498

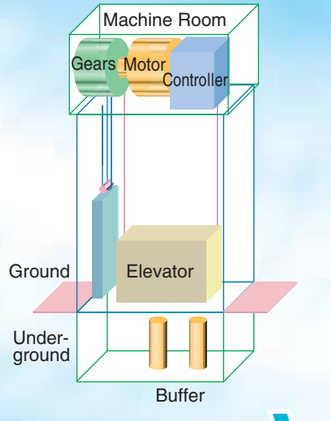
Going up in Comfort and Economy in New or Conventional Elevators

The Varispeed L7 controls not only induction motors (IM) for conventional elevators but also permanent-magnet synchronous motors (PM): the new trend in elevator drives. Use Varispeed L7!
It has just what you're looking for in an inverter!

Varispeed L7, the inverter for both IM and PM drives

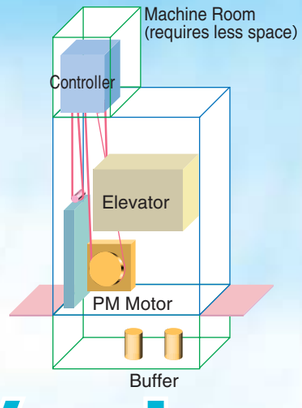
◆ With an induction motor (IM)

The motor, gear, and inverter are installed in a machine room.



◆ With a permanent-magnet synchronous motor (PM) (Note)

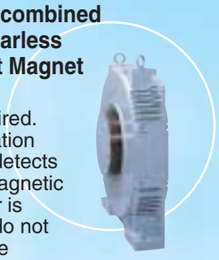
No gears required.
The motor and inverter are installed in a machine room.
The motor can be separately installed in a corner as shown in the figure below.



Note:Under development

Advantages when combined with Yaskawa's gearless Interior Permanent Magnet (IPM) motor

No pole sensor required.
The Initial Magnetization Estimation function detects the position of the magnetic pole when the power is turned on. So, you do not have to reposition the magnetic pole after replacing the encoder.



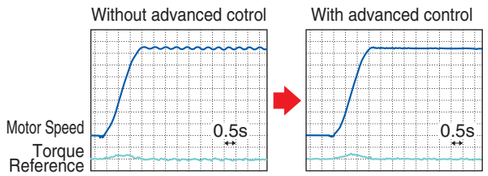
Varispeed L7

Advanced Functions and Performance for a Ride in Comfort

The Varispeed L7 has enhanced functions to assure a smooth, quiet, and safe ride in an elevator and it has a high-operation efficiency for energy savings.

Smooth and Safe

- The Zero-servo function and the Starting Torque Compensation control (requires a load sensor) realize smooth start-ups.
- The S-curve operation realizes smooth acceleration and deceleration.
- The advanced control suppresses vibration.



- The alarm detection prevents an elevator from moving unexpectedly in case of incorrect constant settings, incorrect wiring, or motor failure.
- The backup battery ensures safe elevator travel in case of power loss.
  (An optional battery unit (Note) ensures the 48/96 VDC input.)

Note: Under Development

Quiet

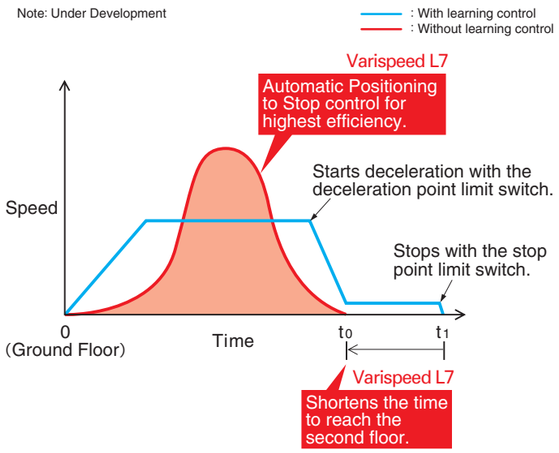
The carrier frequency (fc) can be set to the optimum value for the application (Note). For smooth operation in passenger elevators, set the frequency to 15kHz.

Note: Derating may be required.

High Speeds (High Efficiency)

The Automatic Positioning to Stop control (learning control) automatically measures the distance between floors to implement the operation with the highest efficiency. (Note) The level of comfort increases because creeping is not used, and the installation and running costs are reduced.

Note: Under Development

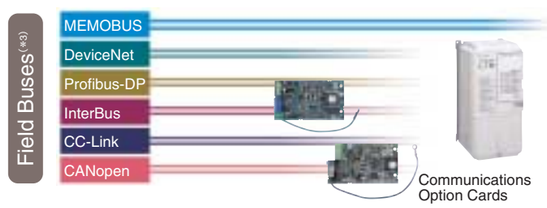


Easy-to-use Features for Simplified Adjustments and Maintenance

The Varispeed L7 has been developed not only for the comfort of passengers but also for the comfort of the inverter user. Its global specifications and easy-to-use features reduce the adjustment and maintenance time, which leads to the reduction of total costs.

Global Specifications

- Certified by UL/cUL and CE marking.
- Meets a variety of world power supply.
  Three-phase 200V series (200V to 240V)
  Three-phase 400V series (380V to 480V)
- Supports global field networks.
  All models are fully compliant with RS-422/485 (MEMOBUS/Modbus protocol) standards*1. The networks are available by using communications option cards*2. Now you can connect to hosts and PLC, implement centralized management of production equipment and reduce wiring easily.



*1 : Used only for the CIMR-L7C model (with built-in PG interface).
*2 : Communication cards for various field networks are under development.
*3 : Devicenet is a registered trademark of Open DeviceNet Vendors Association.
InterBus is a registered trademark of Phoenix Contact Inc.

Easy Tuning

- Three tuning methods are included for selecting the most efficient adjustment of the induction motor (IM):
  ① Dynamic Autotuning
  All required motor data is automatically measured.
  ② Static Autotuning
  All required motor data is automatically measured while the motor is stopped.
  ③ Static Autotuning for Line-to-line Resistance only
  Reduces cable errors if motor cables are 50m or more in length.

Easy Maintenance

- "DriveWizard™", the inverter-supporting tool for the PC, is available.
  The management of inverter constants on your personal computer reduces the time required for maintenance.

- The copy unit (optional) enables the constants to be quickly uploaded or downloaded.
  It's useful when copying the constants to multiple inverters.

Standard Specifications

200V Class	Inverter Model CIMR-L7 ☐ ☐		23P7	25P5	27P5	2011	2015	2018	2022	2030*2	2037*2	2045*2	2055*2
	Output Characteristics	Nominal Motor Output kW	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		Rated Current A (3 min.,50%ED) fc=8kHz*1	17.5	25	33	49	64	80	96	130	160	183	224
		Rated Current A (3 min.,50%ED) fc=15kHz	12	17.5	25	33	49	64	80	96	130	160	183
	Power Supply	Rated Input Voltage and Frequency	Three-phase 200/208/220/230/240V 50/60Hz										
		Allowable Voltage Fluctuation	±10%, −15%										
		Allowable Frequency Fluctuation	±5%										
		Reactor for Harmonic Wave Prevention(Optional)	DC Reactor						AC Reactor				
		Braking Transistor	Built-in (30% ED, 30s)						Optional				
400V Class	Inverter Model CIMR-L7 ☐ ☐		43P7	44P0	45P5	47P5	4011	4015	4018	4022	4030*2	4037*2	4045*2	4055*2
	Output Characteristics	Nominal Motor Output kW	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
		Rated Current A (3 min.,50%ED) fc=8kHz*1	8.5	11	14	18	27	34	41	48	65	80	96	128
		Rated Current A (3 min.,50%ED) fc=15kHz	6.2	8.5	11	14	18	27	34	41	48	65	80	96
	Power Supply	Rated Input Voltage and Frequency	Three-phase 380/400/415/440/460/480V 50/60Hz										
		Allowable Voltage Fluctuation	±10%, −15%										
		Allowable Frequency Fluctuation	±5%										
		Reactor for Harmonic Wave Prevention(Optional)	DC Reactor						AC Reactor				
		Braking Transistor	Built-in (30% ED, 30s)						Optional				
Control Characteristics	Control Method		Vector controlled high frequency sine wave PWM										
	Speed Control Accuracy		±0.2% (Open loop vector control), ±0.01% (Vector control with PG)										
	Speed Control Range		1:100 (Open loop vector control), 1:1000(Zero-speed operation available) (Vector control with PG)										
	Frequency Control Range		0.01 Hz to 120Hz										
	Overload Capacity / Max. Current		150% of rated current in output characteristics for 30s										
	Speed Setting Signal		0V to 10V (Can be used as load input.)										
	Accel/Decel Time		Accel/Decel time setting independently (4 steps can be changed.) Setting unit 0.1s/0.01s can be changed.										
	S-curve Setting		Starting, acceleration completion, deceleration start, stop setting independently.										
	Major Control Functions		· Starting torque compensator (load detection method of signal input) · Hardware baseblock(Gate power supply is OFF when motor is stopped.) · Backup battery in case of power loss · Multi-step speed selection (17 steps) · Non-brake hold operation(Zero-servo function) · Automatic S-curve acceleration/deceleration										
Protective Functions	Motor Overload Protection		Electronic thermal overload relay										
	Instantaneous Overcurrent		Motor coasts to stop at approx. 200% inverter rated output current.										
	Fuse Protection		Motor coasts to stop at blown fuse.										
	Overvoltage		Motor coasts to stop if main circuit voltage exceeds 410 VDC in 200V class (approx. 820 VDC in 400V class)										
	Undervoltage		Motor coasts to stop if main circuit voltage drops to 190 VDC or below in 200V class(approx. 380 VDC or below in 400V class).										
	Momentary Power Loss		Stops if power loss is 15ms or longer.										
	Fin Overheat		Thermostat										
	Stall Prevention		Stall prevention during accel/decel and constant speed operation										
	Ground Fault		Provided by electronic circuit (overcurrent level).										
	Power Charge Indication		Charge LED stays ON until bus voltage drops below 50VDC.										
Environmental Conditions	Location		Indoor (protected from corrosive gases and dust)										
	Humidity		90% RH and below (non-condensing)										
	Storage Temperature		−20℃ to +60℃										
	Ambient Temperature		−10℃ to +40℃ for enclosed types, −10℃ to +45℃ for open chassis types										
	Altitude		1000m or below										
	Vibration		9.81 m/s² at 20 Hz or below and 1.96 m/s² at 20 Hz to 50 Hz.										

∗1 : The factory setting for the carrier frequency (fc) is 8 kHz (5 kHz for inverters of 30 kW or greater).
∗2 : For inverters of 30 kW or greater, a rated current shows at the carrier frequency of 5 kHz/10 kHz.
Note : Inverters of 30 kW to 55 kW in the 200V and 400V classes will be available soon.

Applications (Varispeed L7 with Yaskawa gearless IPM motors)

Load Capacity kg	Elevator Speed m/min	Motor Output*1 kW	Motor Speed*2 min^{-1}	Motor Model SSE4-□	Inverter Model CIMR-L7□□	DC Reactor for Harmonic Wave Prevention UZDA-B□
200V Class						
450	45	2.1	72	22P1072	237P(17.5A)	X010049(18A, 3mH)
	60	2.8	96	22P8096		
	90	4.2	144	24P2144	25P5(25A)	X010050(36A, 1mH)
600	45	2.8	72	22P8072		
	60	3.7	96	23P7096		
	90	5.6	144	25P6144	27P5(33A)	
	105	6.5	168	26P5168		
750	45	3.5	72	23P5072	25P5(25A)	
	60	4.6	96	24P6096		
	90	6.9	144	26P9144	2011(49A)	X010051(72A, 0.5mH)
	105	8.1	168	28P1168		
900	45	4.2	72	24P2072	27P5(33A)	X010050(36A, 1mH)
	60	5.6	96	25P6096		
	90	8.3	144	28P3144	2011(49A)	X010051(72A, 0.5mH)
	105	9.7	168	29P7168		
1,000	45	4.6	72	24P6072	27P5(33A)	X010050(36A, 1mH)
	60	6.2	96	26P2096		
	90	9.2	144	29P2144	2015(64A)	X010051(72A, 0.5mH)
	105	11	168	2011168		
400V Class						
450	45	2.1	72	42P1072	44P0(9.0A)	X010054(12A, 6.3mH)
	60	2.8	96	42P8096		
	90	4.2	144	44P2144	45P5(14A)	X010055(23A, 3.6mH)
600	45	2.8	72	42P8072		
	60	3.7	96	43P7096		
	90	5.6	144	45P6144	47P5(18A)	
	105	6.5	168	46P5168		
750	45	3.5	72	43P5072	45P5(14A)	
	60	4.6	96	44P6096		
	90	6.9	144	46P9144	4011(27A)	X010056(33A, 1.9mH)
	105	8.1	168	48P1168		
900	45	4.2	72	44P2072	47P5(18A)	X010055(23A, 3.6mH)
	60	5.6	96	45P6096		
	90	8.3	144	48P3144	4011(27A)	X010056(33A, 1.9mH)
	105	9.7	168	49P7168		
1,000	45	4.6	72	44P6072	47P5(18A)	X010055(23A, 3.6mH)
	60	6.2	96	46P2096		
	90	9.2	144	49P2144	4015(34A)	X010056(33A, 1.9mH)
	105	11	168	4011168		

*1 : When the elevator speed is below 105m/min and the load capacity is under 1000 kg.
*2 : Based on a sheave diameter of 400 mm and a roving ratio of 2:1.
Note: For a load capacity is greater than 1150 kg, a base-mounted model is available. Contact your Yaskawa representative for more information.

Model Designation

CIMR - L7 □ 2 3P7 0

Inverter

L7 Series

Specifications
B: With IM drives (PG cards are optional.)
C: With convertible drives for IM and PM (With built-in PG interface)

Voltage
2: 200V class
4: 400V class

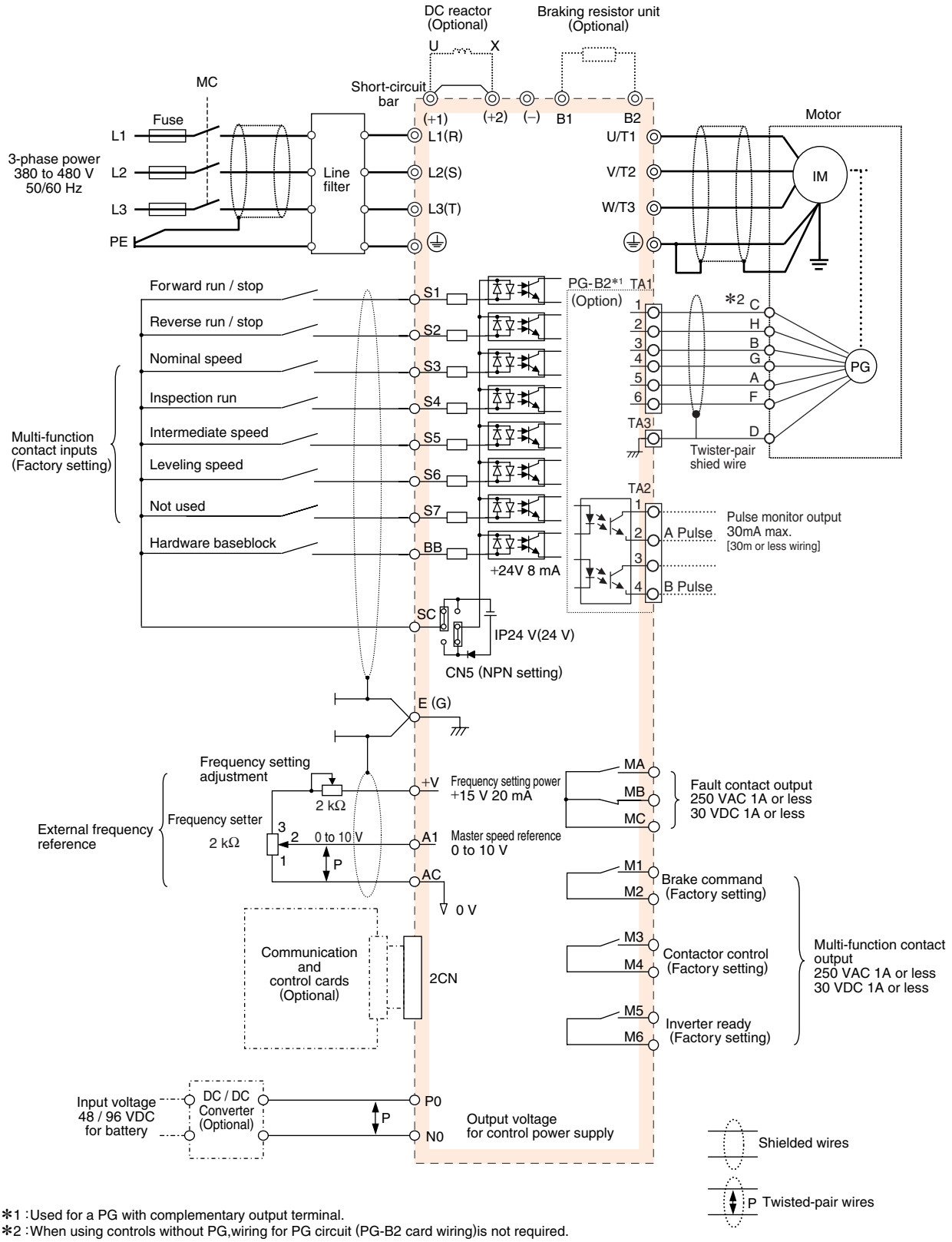
Max. Applicable Motor Output
3P7 : 3.7kW
to
055 : 55kW
("P" indicates a decimal point.)

Protective Enclosure
0: Open chassis
1: Enclosed (NEMA1)
7: For Europe (IP20)

Standard Connection

■ Wiring Example for IM Drive (with optional PG card)

3.7kW in the 400V class, CIMR-L7B43P7

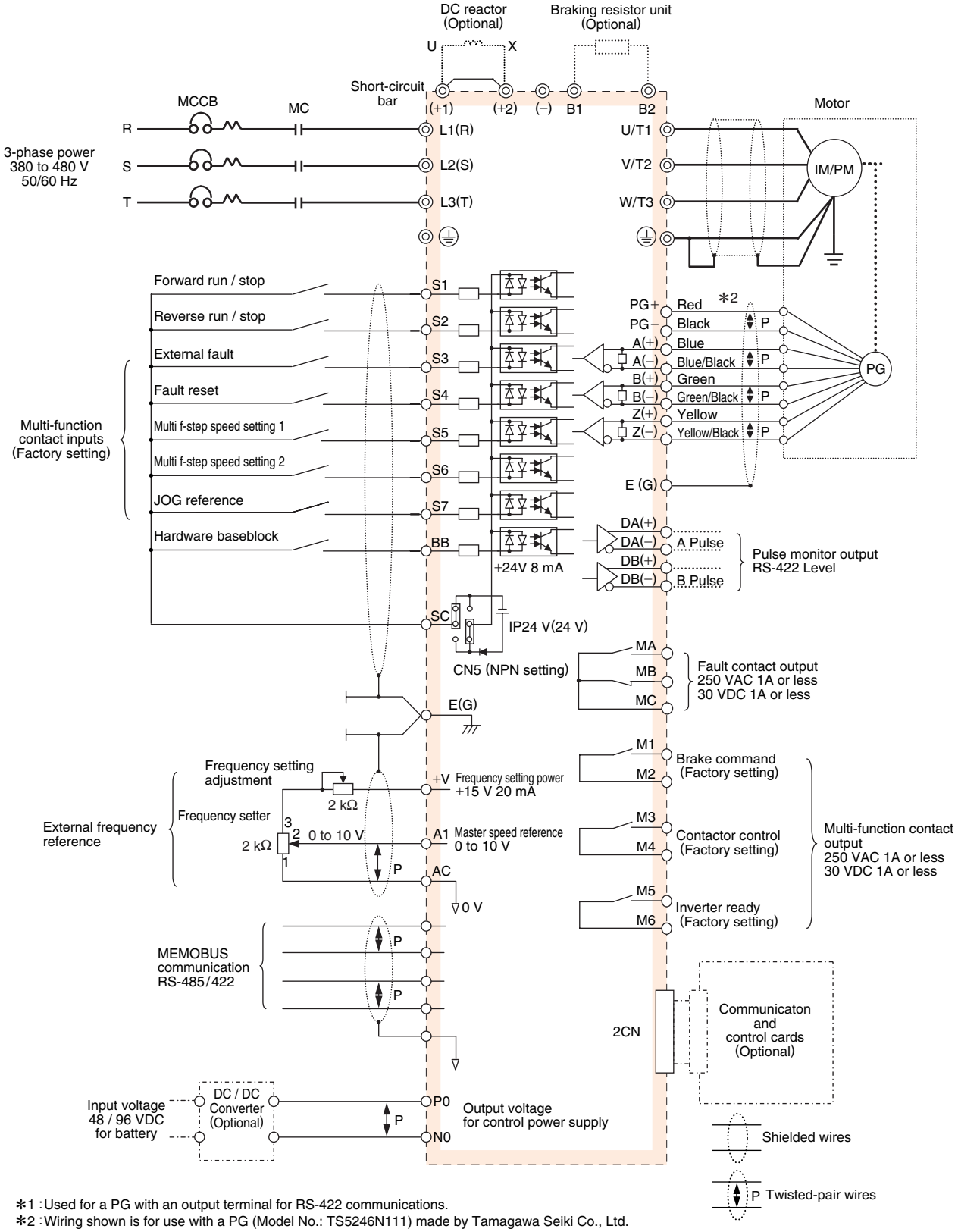


*1 :Used for a PG with complementary output terminal.
*2 :When using controls without PG,wiring for PG circuit (PG-B2 card wiring)is not required.

Notes: 1 Main circuit terminals are indicated with double circles and control circuit terminals are indicated with a single circle.
2 The output current capacity of the +V terminal is 20mA.
3 Sequence input signals S1 to S7 and BB are labelled for sequence connections for no-voltage contacts or NPN transistors as the factory setting.
4 The master frequency reference is set to a voltage input reference as the factory setting.

■ Wiring Example with IM/PM Drives (with built-in PG interface*1)

3.7kW in the 400V class, CIMR-L7C43P7

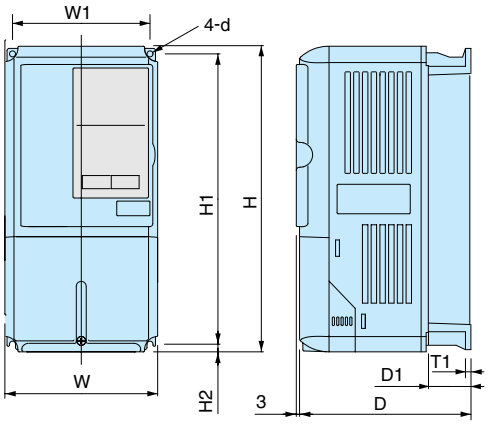


*1 : Used for a PG with an output terminal for RS-422 communications.
*2 : Wiring shown is for use with a PG (Model No.: TS5246N111) made by Tamagawa Seiki Co., Ltd.

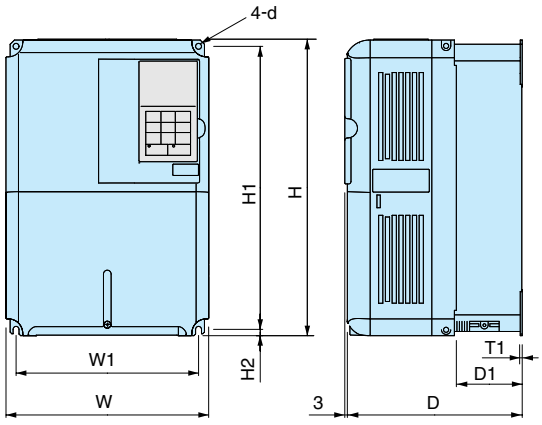
Notes:
1 Main circuit terminals are indicated with double circles and control circuit terminals are indicated with a single circle.
2 The output current capacity of the +V terminal is 20mA.
3 Sequence input signals S1 to S7 and BB are labelled for sequence connections for no-voltage contacts or NPN transistors as the factory setting.
4 The master frequency reference is set to a voltage input reference as the factory setting.

Dimensions Units : mm

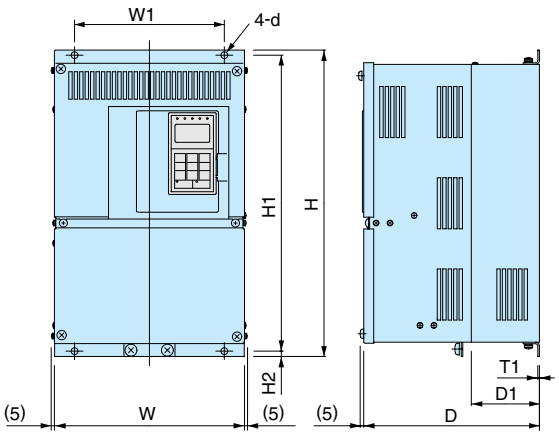
■ Inverter（Open-chasis Model）



Drawing 1



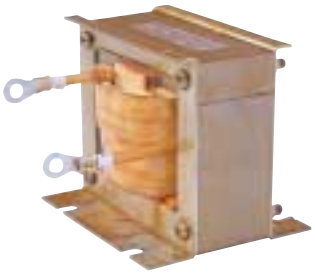
Drawing 2

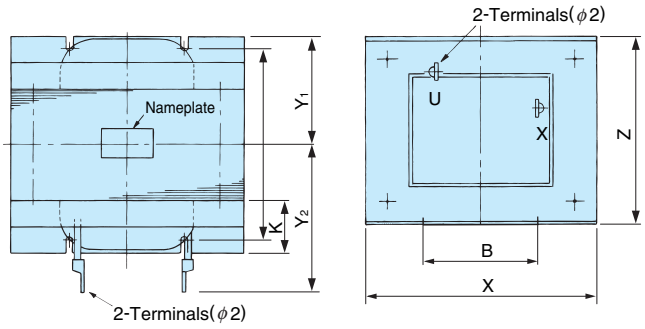


Drawing 3

Voltage	Max. Applicable Motor Output kW	Inverter CIMR-L7	DWG	Dimensions mm									Approx. Mass kg	Cooling Method
				W	H	D	W1	H1	H2	D1	T1	d		
200 V Class (3-phase)	3.7	23P7	1	140	280	177	126	266	7	59	5	M5	4	Fan cooled
	5.5	25P5												
	7.5	27P5	2	200	300	197	186	285	8	65.5	2.3	M6	6	
	11	2011											7	
	15	2015		240	350	207	216	335	7.5	78			11	
	18.5	2018												
	22	2022	3	250	400	258	195	385		100			21	
	30	2030		275	450		220	435					24	
	37	2037		375	600	298	250	575	12.5	100	3.2	M10	57	
	45	2045				328				130			63	
	55	2055		450	725	348	325	700					86	
400 V Class (3-phase)	3.7	43P7	1	140	280	177	126	266	7	59	5	M5	4	Fan cooled
	5.5	45P5												
	7.5	47P5	2	200	300	197	186	285	8	65.5	2.3	M6	6	
	11	4011												
	15	4015		240	350	207	216	335	7.5	78			10	
	18.5	4018												
	22	4022	3	275	450	258	220	435		100			21	
	30	4030												
	37	4037		325	550	283	260	535		105			36	
	45	4045												
	55	4055												

■ DC Reactor

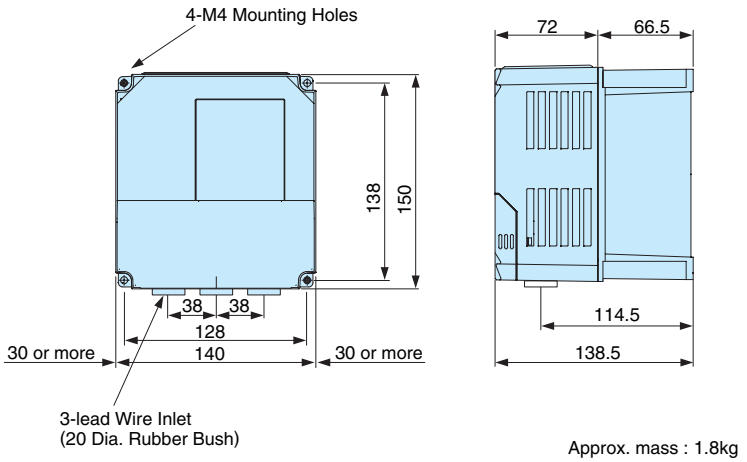




Voltage	Max. Applicable Motor Output kW	Inverter CIMR-L7□□	Current Value A	Inductance mH	Code No.	Dimensions mm									Approx. Mass kg	Loss W	Wire Size mm²
						X	Y_2	Y_1	Z	B	H	K	ϕ1	ϕ2			
200 V Class (3-phase)	3.7	23P7	18	3	X010049	86	80	36	76	60	55	18	M4	M5	2.0	18	5.5
	5.5	25P5	36	1	X010050	105	90	46	93	64	80	26	M6	M6	3.2	22	8
	7.5	27P5															
	11	2011	72	0.5	X010051	105	105	56	93	64	100	26	M6	M8	4.9	29	30
	15	2015															
	18.5	2018	90	0.4	X010176	133	120	52.5	117	86	80	25	M6	M8	6.5	45	30
	22	2022	Connect an AC reactor.														
	30	2030															
	37	2037															
	45	2045															
	55	2055															
400 V Class (3-phase)	3.7	43P7	12	6.3	X010054	86	80	36	76	60	55	18	M4	M5	2.0	16	2
	5.5	45P5	23	3.6	X010055	105	90	46	93	64	80	26	M6	M5	3.2	27	5.5
	7.5	47P5															
	11	4011	33	1.9	X010056	105	95	51	93	64	90	26	M6	M6	4.0	26	8
	15	4015															
	18.5	4018	47	1.3	X010177	115	125	57.5	100	72	90	25	M6	M6	6.0	42	14
	22	4022	Connect an AC reactor.														
	30	4030															
	37	4037															
	45	4045															
	55	4055															

■ Braking Unit (Optional)

CDBR-2015B, -2022B
CDBR-4030B, -4045B



Approx. mass : 1.8kg

Varispeed L7

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