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Inverter Varispeed G7



Main Features of Varispeed G7 Inverter

Feature 1: 3 Level Control Technology

400V frequency inverter solution

The first 400V frequency inverters with 3 level control technology are now available to approach sinusoidal output voltage. This technology helps to solve problems such as stressing of the insulation of motor windings by overvoltages (caused by travelling waves), and electrolytic corrosion of the bearings (caused by leakage currents via the motor shaft). It also considerably reduces motor acoustical noise and leakage currents (particularly with long motor cables).

Advantages of 3 level control technology

1 Low voltage peaks

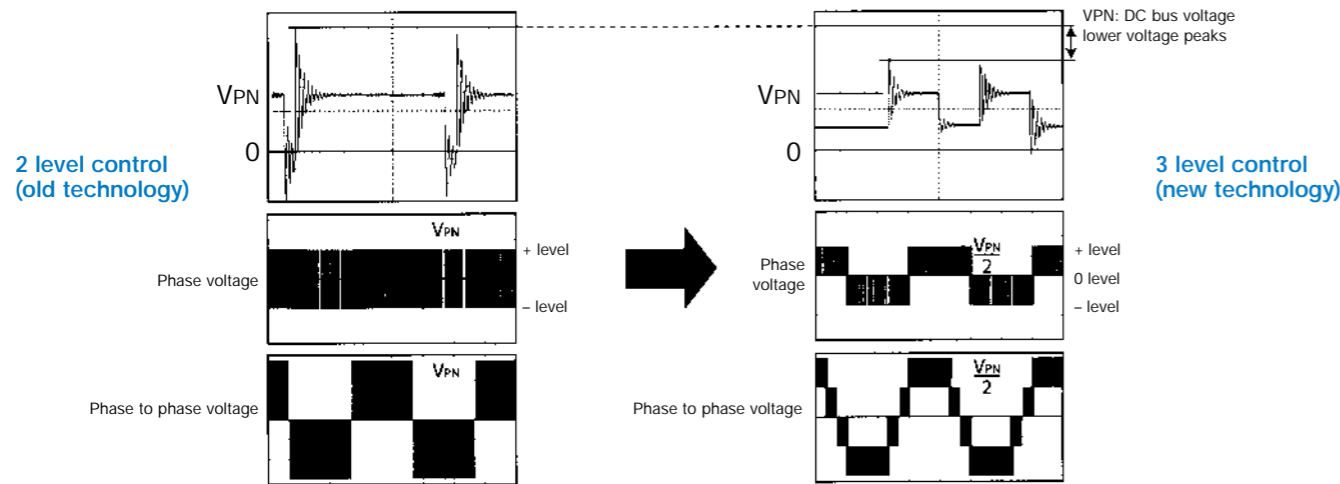
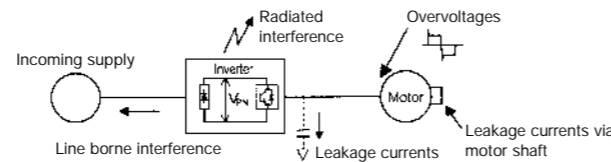
Lower voltage peaks increase the life of the motor by reducing the stress on the insulation of the motor windings. They also make operation with long cables readily possible.

2 Low level of radio interference

Considerably reduced conducted emission caused by the inverter reduces the cost of line filters.

3 Quiet motor operation

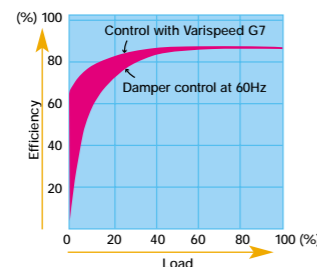
The 3 level technology drastically reduces the noise due to magnetic transients in the motor.



Feature 2: Ecologically friendly

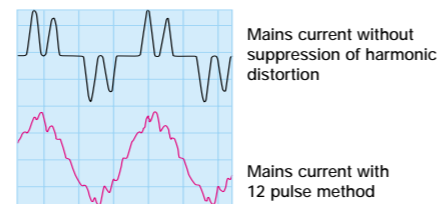
Effective energy saving function

The energy-saving control approaches the maximum efficiency. High efficient, energy-saving operations are achieved for any applications either in vector or V/F control.



Suppression of harmonic distortion

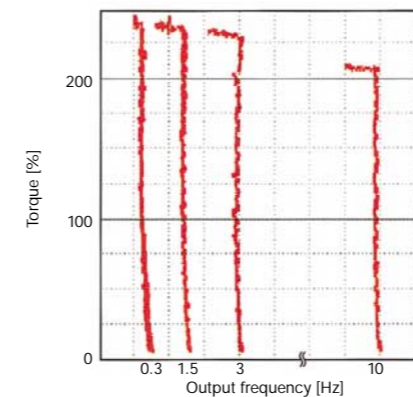
All inverters larger than 15kW are equipped with a DC bus reactor and second rectifier bridge as standard. In combination with a transformer with two secondary windings (star and delta), the harmonics can be suppressed to about 12% using the 12 pulse method.



Feature 3: Highly Dynamic and Precise Control

Excellent torque characteristic

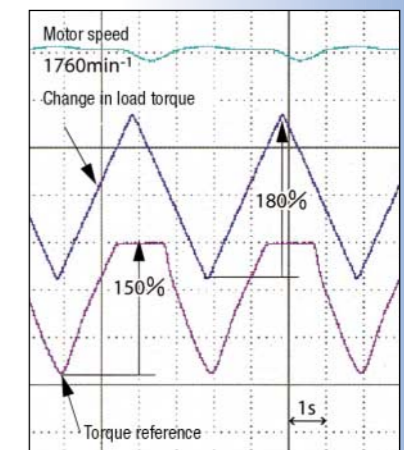
The new dual flux observation method improves the torque characteristic (150% at 0.3Hz for open loop vector control 2). 150% torque is available at 0rpm with pulse generator feedback.



High torque with a speed control range of 1:200 (after rotating autotuning in open loop vector mode) [speed control range with pulse generator feedback 1:1000]

Accurate torque control

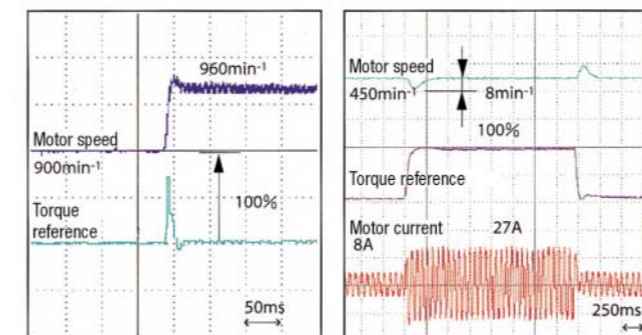
The precision of the limiting function allows accurate control of the output torque in order to protect machines and materials against sudden changes in load.



Torque control (torque limiting set to 150%)

Extremely fast response

The model tracking control assures fast response even without PG (doubled in in-house comparison). With a PG you can make use of our unique highspeed current vector, rapidly responses speed reference changes (speed response 40 Hz/motor unit). Speed keeps constant even if load fluctuates.

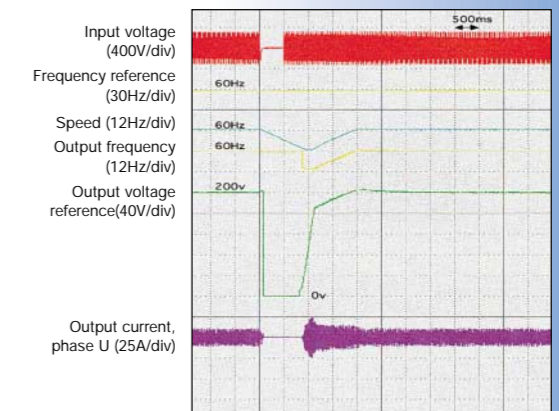


Fast response to changes in speed (reference speed step response)

Handles sudden changes in load (speed characteristic with change in load)

Very fast speed search function

This function reduces the recovery time after momentary power loss. Recovery is possible regardless of the direction of rotation.



Fast, smooth start (power loss ride-through)

Simple method of autotuning

Another method of autotuning, with the motor shaft stationary, is now available as an alternative to the established rotating technique. This allows the performance of any make of motor to be optimised.

Reliable protective function

Very fast and accurate current regulation functions support continuous operation by preventing overcurrent tripping. Power loss ride-through, motor stall prevention and automatic restart after fault also support the uninterrupted operation. A motor thermistor can be evaluated using an analog input and protects the motor against overheating.

Main Features of Varispeed G7 Inverter

Feature 4: User friendly

Easy to operate

The 5 line, illuminated LCD display allows easy operation. The copy function provided by the removable operator makes it easy to copy a set of parameters from one inverter to another. The Quick Programming Mode makes start up easier. Parameters differing from the factory defaults can be read and altered by choosing Modified Constants from the menu.



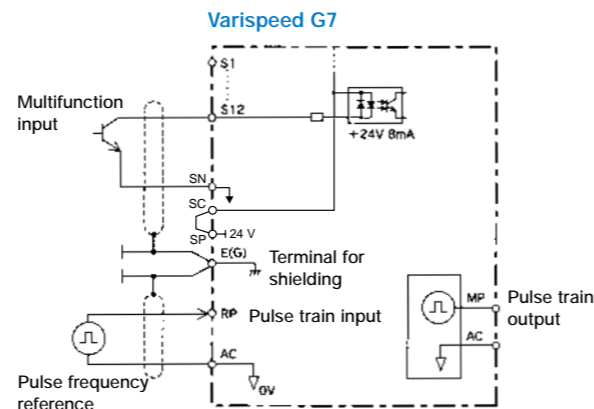
Straightforward maintenance and inspection

The removable control terminal block allows the inverter to be replaced without disconnecting the control lines. The cooling fans can be changed without dismantling the inverter. The operating time of the inverter and individual fans can be recorded and displayed.



Input and output terminals

The analog inputs and outputs are supplemented with a pulse train input and a pulse train output. 10 digital multifunction inputs and 5 digital multifunction outputs are available. Positive or negative (NPN/PNP) logic can be chosen for the digital inputs.



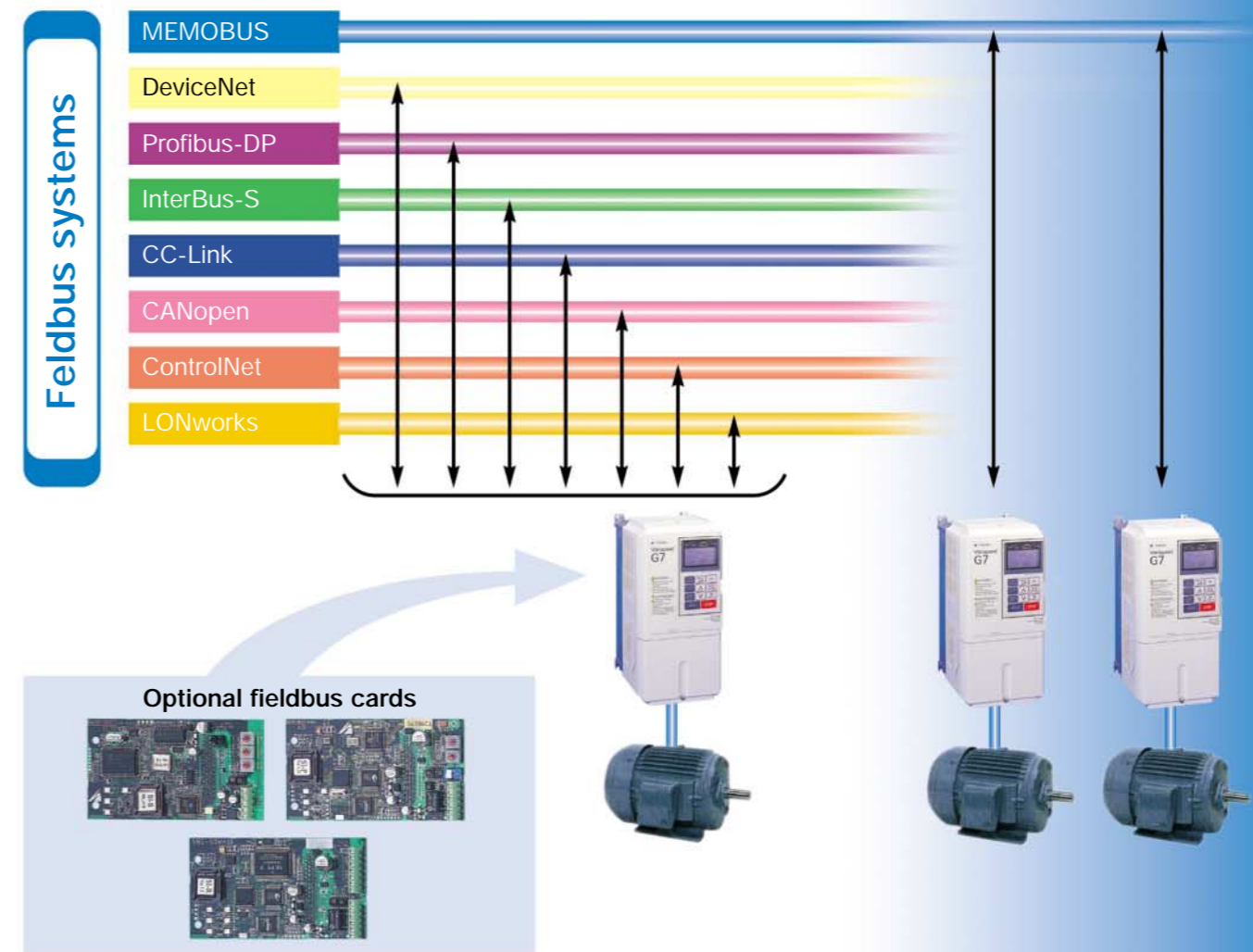
Feature 5: Customisable

- The internal flash memory allows enhanced configuration for special applications. (CASE = Custom Application Software Environment)

Feature 6: Global Specification

Support for global fieldbus standards

All inverters support the Memobus/Modbus protocol via an RS422/485 interface as standard. Optional fieldbus cards can be fitted to allow the Varispeed G7 to communicate with host systems for central control of production with minimum wiring.



Digital operator in seven languages

The illuminated 5 line LCD display allows operation in 7 languages: German, English, French, Italian, Japanese, Portuguese and Spanish.

Operation with power supplies in common use worldwide

400V (three phase) series; 380 to 480V +10% -15%
200V (three phase) series; 200 to 240V +10% -15%
DC supply and hence use of regenerative systems also possible

Conformity with global standards for worldwide use

Certified to UL/cUL and CE



Worldwide service network

Our service network covers the USA, Europe, China, South East Asia and other regions to support your activities all over the world.

Description of Digital Operator

Varispeed G7

Overview of display and keypad

Data display

MENU button

Switches menu within the hierarchy.

LOCAL/REMOTE button

Switches between control with the digital operator and control via the terminal block.

JOG button

Enables JOG speed, which has top priority.

FWD/REV button

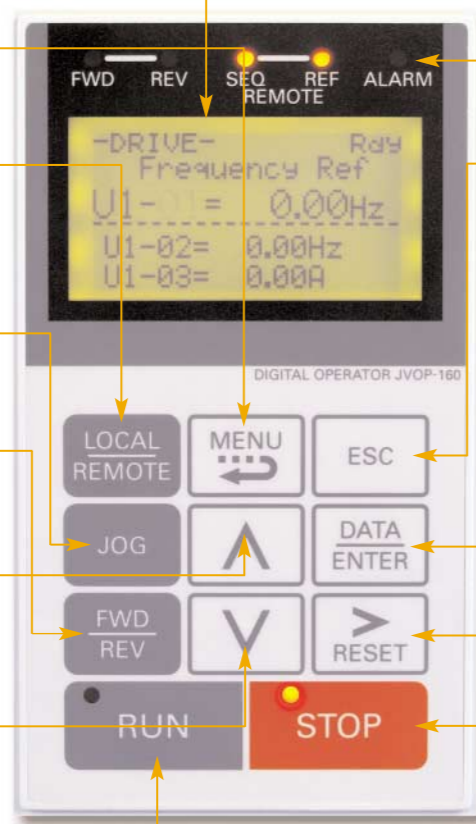
Reverses the direction of rotation of the motor.

ARROW UP button

Increases the parameter number or data value.

ARROW DOWN button

Decreases the parameter number or data value.



Status LEDs

Indicate the inverter status.

ESC button

Returns to previous menu in the hierarchy without saving.

ENTER button

Saves data when setting parameters. Entering a parameter number in the PRGM mode displays the associated data.

>/Reset button

Shifts the digit of the value to be changed. Pressing this button when a fault arises, resets the inverter (acknowledgement).

STOP button

Stops the motor.

RUN button

Starts the motor. The LED in the top left corner of the button lights up to indicate that the motor is running.

Specification/Nameplate

Inverter

CIMR - G7C40P41

Varispeed G7 series

Code	Specification
A	Japanese standard
C	European standard
U	American standard

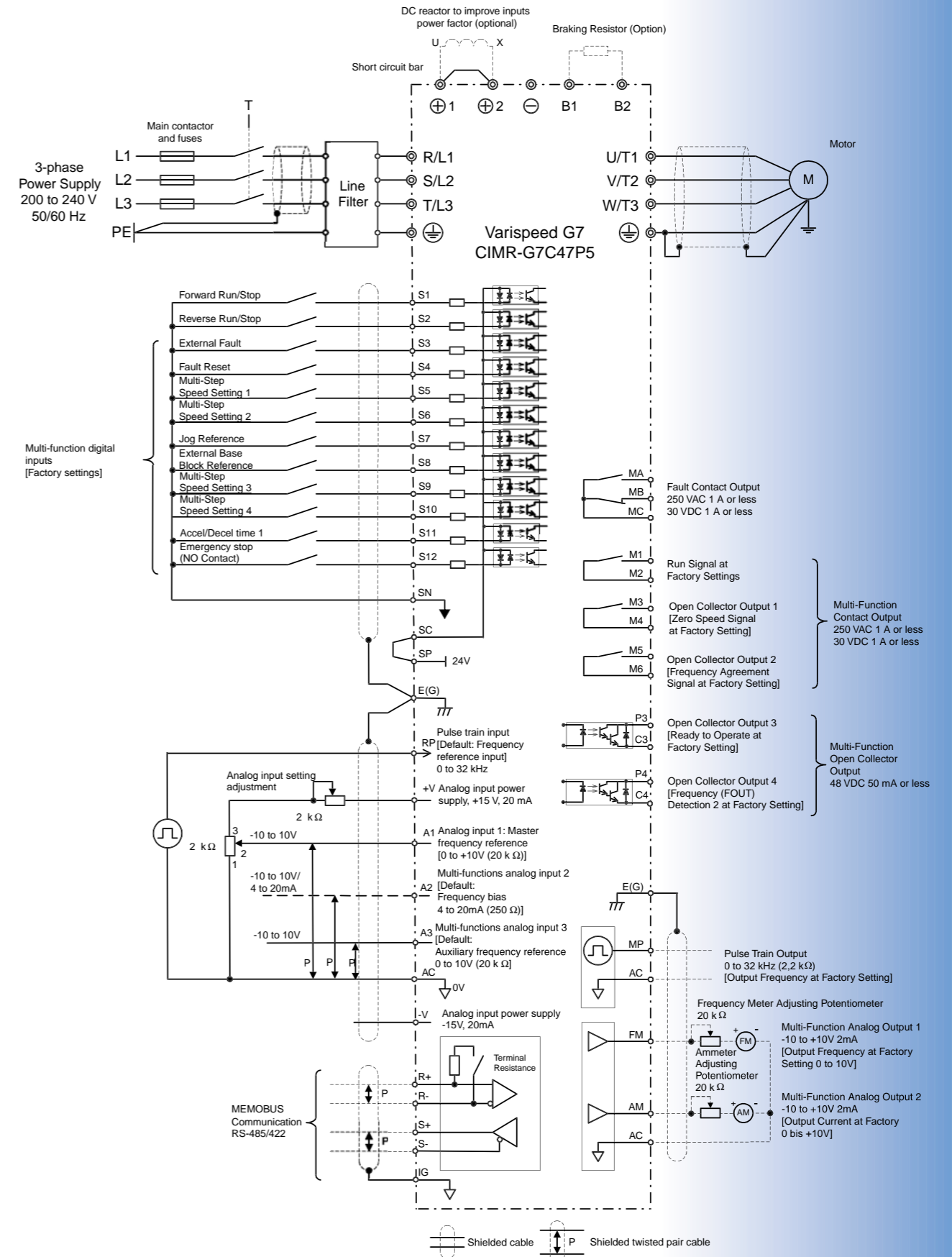
Code	Power supply
2	three phase 200V AC
4	three phase 400V AC

Code	Protection
0	IP00
1	NEMA 1/IP20

No.	Rated output of motor
0P4	0.55 kW
4P0	4.0 kW
7P5	7.5 kW
011	11 kW
045	45 kW
110	110 kW
160	160 kW
300	300 kW

Standard Connection Diagram for Varispeed G7

Varispeed G7



Radio Interference Suppression Filters for Conformity with the EMC Directive (CE) Varispeed G7

Inverter model	Filter model	Current (A)	Weight (kg)	Dimensions BxHxT (mm)	Fit under yes/no
CIMR-G7C20P4					
CIMR-G7C20P7					
CIMR-G7C21P5					
CIMR-G7C22P2					
CIMR-G7C23P7					
CIMR-G7C25P5					
CIMR-G7C27P5					
CIMR-G7C2011					
CIMR-G7C2015					
CIMR-G7C2018					
CIMR-G7C2022					
CIMR-G7C2030					
CIMR-G7C2037					
CIMR-G7C2045					
CIMR-G7C2055					
CIMR-G7C2075					
CIMR-G7C2090					
CIMR-G7C2110					
CIMR-G7C40P4					
CIMR-G7C40P7					
CIMR-G7C41P5					
CIMR-G7C42P2					
CIMR-G7C43P7					
CIMR-G7C44P0					
CIMR-G7C45P5					
CIMR-G7C47P5					
CIMR-G7C4011					
CIMR-G7C4015					
CIMR-G7C4018					
CIMR-G7C4022					
CIMR-G7C4030					
CIMR-G7C4045					
CIMR-G7C4055					
CIMR-G7C4075					
CIMR-G7C4090					
CIMR-G7C4110					
CIMR-G7C4132					
CIMR-G7C4160					
CIMR-G7C4185					
CIMR-G7C4220					
CIMR-G7C4300					

10 Hz

20 Hz

Filters under development

30 Hz

40 Hz

50 Hz

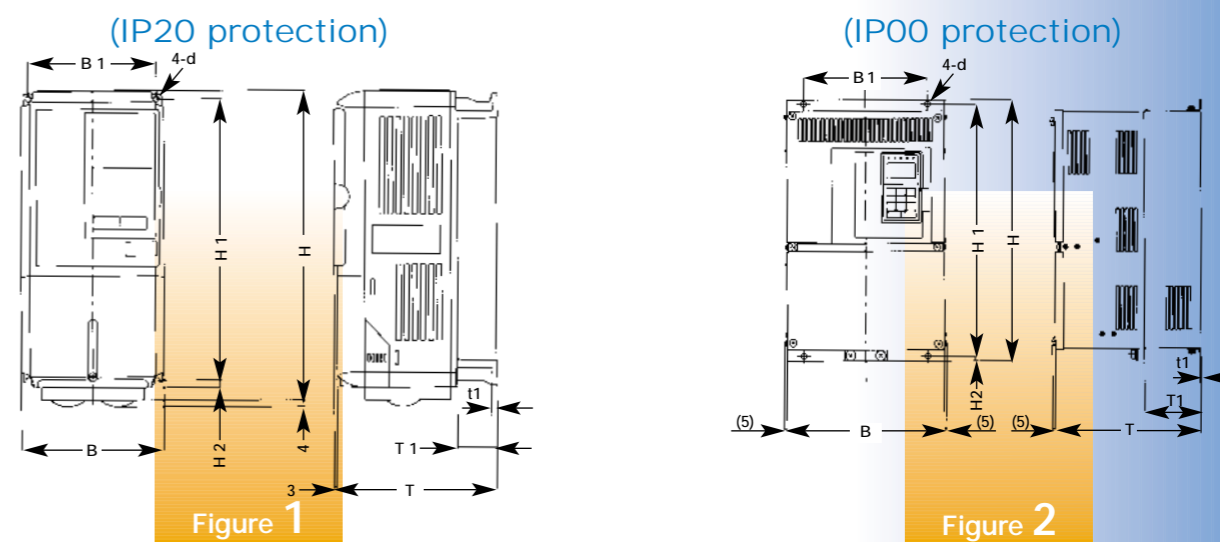
Heat loss

Voltage class		200V																	
Model: CIMR-G7C2		OP4	OP7	1P5	2P2	3P7	5P5	7P5	011	015	018	022	030	037	045	055	075	090	110
Heat loss in W	Heat sink	21	43	58	83	122	187	263	357	473	599	679	878	1080	1291	1474	2009	1660	2389
	Interior	36	42	47	53	64	87	112	136	174	242	257	362	434	510	607	823	871	1194
	Total	57	85	105	136	186	274	375	493	647	841	936	1240	1514	1801	2081	2832	2531	3583

Voltage class		400V																							
Model: CIMR-G7C		OP4	OP7	1P5	2P2	3P7	4P0	5P5	7P5	011	015	018	022	030	037	045	055	075	090	110	132	160	185	220	300
Heat loss in W	Heat sink	10	21	33	41	76	100	132	198	246	311	354	516	633	737	929	1239	1554	1928	2299	2612	3614			
	Interior	39	44	46	49	64	66	79	106	116	135	174	210	246	285	340	488	597	762	928	1105	1501			
	Total	49	65	79	90	140	166	211	304	362	446	528	726	879	1022	1269	1727	2151	2690	3227	3717	5115			

Inverters under development

Dimensions: Varispeed G7



Inverter voltage	Model: CIMR-G7C	B	H	T	B1	H1	H2	T1	t1	d	Weight kg	Drawing No.
200V	20P4	140	280	157	126	266	7	39	5	M5	3	1
	20P7	140	280	157	126	266	7	39	5	M5	3	1
	21P5	140	280	157	126	266	7	39	5	M5	3	1
	22P2	140	280	177	126	266	7	59	5	M5	4	1
	23P7	140	280	177	126	266	7	59	5	M5	4	1
	25P5	200	300	197	186	285	8	65.5	2.3	M6	6	1
	27P5	200	300	197	186	285	8	65.5	2.3	M6	7	1
	2011	240	350	207	216	335	7.5	78	2.3	M6	11	1
	2015	240	350	207	216	335	7.5	78	2.3	M6	11	1
	2018	250	400	258	195	385	7.5	100	2.3	M6	21	2
	2022	275	450	258	220	435	7.5	100	2.3	M6	24	2
	2030	375	600	300	250	575	13	100	3.2	M10	57	2
	2037	375	600	330	250	575	13	130	3.2	M10	63	2
	2045	450	725	350	325	700	13	130	3.2	M10	86	2
	2055	450	725	350	325	700	13	130	3.2	M10	87	2
	2075	500	850	360	370	820	15	130	4.5	M12	108	2
	2090	575	885	380	445	855	15	140	4.5	M12	150	2
	2110	575	885	380	445	855	15	140	4.5	M12	150	2
400V	40P4	140	280	157	126	266	7	39	5	M5	3	1
	40P7	140	280	157	126	266	7	39	5	M5	3	1
	41P5	140	280	177	126	266	7	59	5	M5	4	1
	42P2	140	280	177	126	266	7	59	5	M5	4	1
	43P7	140	280	177	126	266	7	59	5	M5	4	1
	44P0	140	280	177	126	266	7	59	5	M5	4	1
	45P5	200	300	197	186	285	8	65.5	2.3	M6	6	1
	47P5	200	300	197	186	285	8	65.5	2.3	M6	6	1
	4011	240	350	207	216	335	7.5	78	2.3	M6	10	1
	4015	240	350	207	216	335	7.5	78	2.3	M6	10	1
	4018	275	450	258	220	435	7.5	100	2.3	M6	21	2
	4022	275	450	258	220	435	7.5	100	2.3	M6	21	2
	4030	325	550	283	260	535	7.5	105	2.3	M6	36	2
	4037	325	550	283	260	535	7.5	105	2.3	M6	36	2
	4045	325	550	283	260	535	7.5	105	2.3	M6	36	2
4055	450	725	350	325	700	13	130	3.2	M10	88	2	
4075	450	725	350	325	700	13	130	3.2	M10	89	2	
4090	500	850	360	370	820	15	130	4.5	M12	102	2	
4110	500	850	360	370	820	15	130	4.5	M12	120	2	
4132	575	925	380	445	895	15	140	4.5	M12	160	2	
4160	575	925	380	445	895	15	140	4.5	M12	160	2	
4185												
4220												
4300												

under development

Dimensions in mm

Standard Specifications

Electrical Data

Varispeed G7

200V inverters

Model	CIMR-G7C	20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075	2090	2110	
Motor output in kW		0.55	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	
Rated output in kVA		1.2	2.3	3.0	4.6	6.9	10	13	19	25	30	37	50	61	70	85	110	140	160	
Rated output current in A		3.2	6	8	12	18	27	34	49	66	80	96	130	160	183	224	300	358	415	
Max output voltage		3 phase 200 / 208 / 220 / 230 / 240V AC (proportional to input voltage)																		
Max output frequency		400Hz																		
Power supply		3 phase 200 / 208 / 220 / 230 / 240V AC +10%, -15% 50/60Hz ±5%																		
DC bus reactor		optional									fitted									
12 pulse input		not possible									possible (transformer necessary)									
IP20 (NEMA1)		standard									optional									not possible
IP00		(After removal of top cover and bottom panel of IP20 model)									standard									

400V inverters

Model	CIMR-G7C	40P4	40P7	41P5	42P2	43P7	44P0	45P5	47P5	4011	4015
Motor output in kW		0.55	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15
Rated output in kVA		1.4	2.6	3.7	4.7	6.9	8.6	11	16	21	26
Rated output current in A		1.8	3.4	4.8	6.2	9	11	15	21	27	34
Max output voltage		3 phase 380 / 400 / 415 / 440 / 460 / 480V AC (proportional to input voltage)									
Max output frequency		400Hz									
Power supply		3 phase 380 / 400 / 415 / 440 / 460 / 480V AC +10%, -15% 50/60Hz ±5%									
DC bus reactor		optional									
12 pulse input		not possible									
IP20 (NEMA1)		standard									
IP00		(After removal of top cover and bottom panel of IP20 model)									

Model	CIMR-G7C	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4185	4220	4300
Motor output in kW		18.5	22	30	37	45	55	75	90	110	132	160	185	220	300
Rated output in kVA		32	40	50	61	74	98	130	150	180	210	250	280	340	460
Rated output current in A		42	52	65	80	97	128	165	195	240	270	325	370	450	605
Max output voltage		3 phase 380 / 400 / 415 / 440 / 460 / 480V AC (proportional to input voltage)													
Max output frequency		400Hz													
Power supply		3 phase 380 / 400 / 415 / 440 / 460 / 480V AC +10%, -15% 50/60Hz ±5%													
DC bus reactor		fitted													
12 pulse input		possible (transformer necessary)													
IP20 (NEMA1)		optional											not possible		
IP00		standard													

Standard Specifications

General Data

Varispeed G7

	Specification	
Control	Control method	Sinusoidal PWM, 400V inverters with 3 level control flux vector control with pulse generator feedback; open loop vector control 1 and 2 V/f control, V/f control with pulse generator feedback
	Carrier frequency	Up to 160kW: high carrier frequency 185 to 300kW: low carrier frequency
	Max output frequency	400Hz
	Speed control range	1:200 (open loop vector control 2) 1:1000 (flux vector control with pulse generator feedback)
	Speed control accuracy	±0.2% (open loop vector control), ±0.02% (flux vector control with pulse generator feedback) at 25° C ± 10° C
	Torque control	Possible with open loop vector control 2 and flux vector control with pulse generator feedback
	Starting torque	150% at 0.3Hz (open loop vector control 2) 150% at 0rpm (flux vector control with pulse generator feedback)
	Overload capacity	150% for 60 sec, 200% for 0.5 sec of the inverter rated current
	Important functions	Power loss ridethrough, speed search, overtorque/undertorque detection, torque limits, 17 multi-step speed settings, 4 acceleration and deceleration times with ramp change, S-curve, autotuning (rotating and non-rotating), dwell function, cooling fan ON/OFF control, motor slip compensation, jump frequencies, High Slip Braking, energy saving function, PID controller (with sleep function), MEMOBUS communication (RS422/485), automatic restart after fault, copy function, droop control, torque control, changing between torque and speed control 2 switchable sets of motor parameters, etc
	Analog inputs	2 x -10 to 10V, 1 x 4-20mA, 1 x pulse train input (11 bit + sign)
	Analog outputs	2 x -10 to 10V or 4-20mA (9 bit), 1 x pulse train output
	Digital inputs	12 inputs
	Digital outputs	4 relay contacts, 2 open collector outputs
	RS422/485	Provided, MEMOBUS protocol
	Protective functions	Control terminals
Fieldbus option		Possible
Digital operator		5 line LCD display with copy function
Motor protection		Electronic thermal overload relay (PTC evaluation possible)
Overload protection		150% of rated inverter current for 60 seconds
Overvoltage protection		200V inverter: trips if the DC bus circuit voltage exceeds 410V 400V inverter: trips if the DC bus circuit voltage exceeds 820V
Undervoltage protection		200V inverter: trips if the DC bus circuit voltage falls below 190V 400V inverter: trips if the DC bus circuit voltage falls below 380V
Earth fault		Protecting by electronic current monitoring
Overheating protection		Heat sink with thermistor monitoring
Charging indicator		Comes on if DC bus voltage exceeds 50V
Stall prevention	Stall prevention during acceleration and deceleration, and operation can be set separately	
Braking transistor	Up to 15kW standard, 18.5 to 300kW optional	
Ambient temperature during operation	-10 to +40°C (IP20) -10 to +45°C (IP00)	
Relative humidity	Maximum of 95% (non-condensing)	
Storage temperature	-20 to 60°C (briefly in transit)	
Installation	In enclosed spaces (protected against corrosive gases and dust)	
Installation altitude	Below 1000m (higher on request)	
Vibration	10 bis 20 Hz, 9.8m/s² max.; 20 to 50 Hz, 1.96 m/s²	