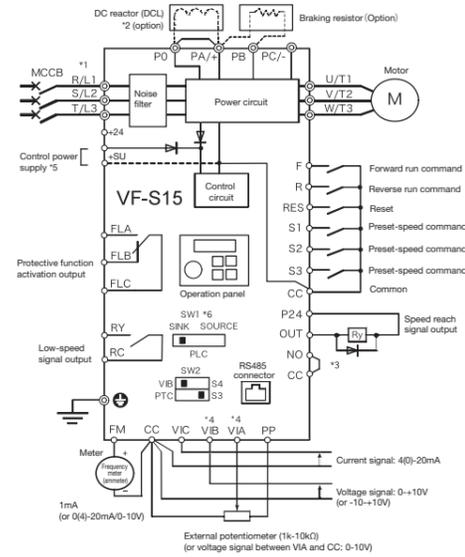
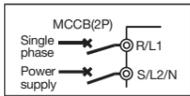


# Connection diagram

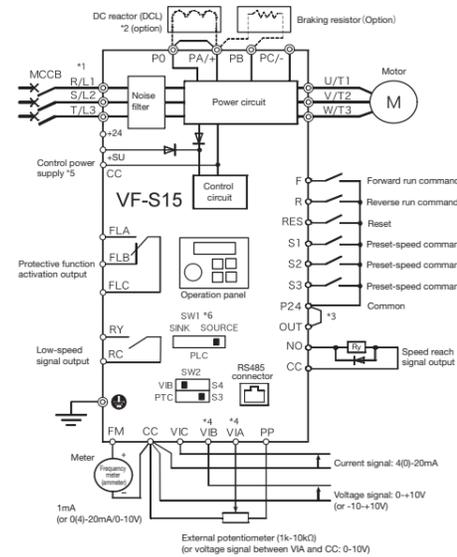
Standard connection diagram - SINK (Negative) (common:CC)



Main circuit power supply  
 3ph-240V class: three-phase 200-240V-50/60Hz  
 1ph-240V class: single-phase 200-240V-50/60Hz  
 3ph-500V class: three-phase 380-500V-50/60Hz  
 \*1: The T/L3 terminal is not provided for single-phase models.  
 Use the R/L1 and S/L2/N terminals as input terminals.  
 \*2: The inverter is supplied with the PO and the PA/+ terminals shorted by means of a shorting bar.  
 Before installing the DC reactor (DCL), remove the bar.



Standard connection diagram - SOURCE (Positive) (common:P24)



\*3: When using the OUT output terminal in sink logic mode, short the NO and CC terminals. When using the NO output terminal in source logic mode, short the P24 and OUT terminals.  
 \*4: When VIA or VIB terminal is used as logic input terminal, refer to the instruction manual.  
 \*5: To supply control power from an external power supply for backing up the control power supplied from the inverter, an optional control power backup device (CPS002Z) is required. In such a case, the backup device is used at the same time with the internal power supply of the inverter.  
 The optional control power backup unit can be used with both 240V and 500V models.  
 \*6: Set the slide switch SW1 to sink side or source side. Refer to the instruction manual for details. Default setting is PLC side.

## Wiring devices

Voltage class	Applicable motor (kW)	Inverter type	Input current (A)		Molded-case circuit breaker (MCCB) Earth leakage circuit breaker (ELCB) Note3)		Magnetic contactor (MC) Note1)2)		Wire size (mm <sup>2</sup> ) Note5)7)				
			Without DCL	With DCL	Without DCL	With DCL	Without DCL	With DCL	Power circuit Note4)			DC reactor (optional)	Grounding cable Note6)
									Rated current (A)	Rated current (A)	Without DCL		
3-phase 240V	0.4	VFS15-2004PM-W	3.6	1.8	5	5	20	20	1.5	1.5	1.5	1.5	2.5
	0.75	VFS15-2007PM-W	6.3	3.4	10	5	20	20	1.5	1.5	1.5	1.5	2.5
	1.5	VFS15-2015PM-W	11.1	6.5	15	10	20	20	1.5	1.5	1.5	1.5	2.5
	2.2	VFS15-2022PM-W	14.9	9.2	20	15	20	20	2.5	1.5	1.5	1.5	2.5
	4.0	VFS15-2037PM-W	23.8	15.9	30	20	32	20	4.0	2.5	2.5	4.0	4.0
	5.5	VFS15-2055PM-W	35.6	21.5	50	30	50	32	10	4.0	6.0	6.0	10
	7.5	VFS15-2075PM-W	46.1	28.9	60	40	60	32	16	6.0	10	10	16
1-phase 240V	15	VFS15-2110PM-W	63.1	41.5	100	60	80	50	25	10	16	16	16
	0.2	VFS15-2150PM-W	82.1	55.7	125	75	100	60	35	16	25	25	16
	0.2	VFS15S-2002PL-W	3.4	2	5	5	20	20	1.5	1.5	1.5	1.5	2.5
	0.4	VFS15S-2004PL-W	5.9	4	10	5	20	20	1.5	1.5	1.5	1.5	2.5
	0.75	VFS15S-2007PL-W	10.0	7.6	15	10	20	20	1.5	1.5	1.5	1.5	2.5
	1.5	VFS15S-2015PL-W	17.8	14.6	30	20	32	20	2.5	2.5	1.5	2.5	2.5
	2.2	VFS15S-2022PL-W	24	20.1	30	30	32	32	4.0	4.0	1.5	4.0	4.0
3-phase 500V	0.4	VFS15-4004PL-W	2.1	0.9	5	5	20	20	1.5	1.5	1.5	1.5	2.5
	0.75	VFS15-4007PL-W	3.6	1.8	5	5	20	20	1.5	1.5	1.5	1.5	2.5
	1.5	VFS15-4015PL-W	6.4	3.4	10	5	20	20	1.5	1.5	1.5	1.5	2.5
	2.2	VFS15-4022PL-W	8.8	4.8	15	10	20	20	1.5	1.5	1.5	1.5	2.5
	4.0	VFS15-4037PL-W	13.7	8.3	20	15	20	20	2.5	1.5	1.5	1.5	2.5
	5.5	VFS15-4055PL-W	20.7	11.2	30	15	32	20	4.0	1.5	2.5	2.5	4.0
	7.5	VFS15-4075PL-W	26.6	15.1	40	20	32	20	6.0	2.5	2.5	4.0	6.0
3-phase 500V	11	VFS15-4110PL-W	36.6	21.7	50	30	50	30	10	4.0	6.0	6.0	10
	15	VFS15-4150PL-W	47.7	29	60	40	60	32	16	6.0	10	10	16

Note 1: Be sure to attach a surge absorber to the exciting coil of the relay and the magnetic contactor.  
 Note 2: When using the auxiliary contacts 2a of the magnetic contactor MC for the control circuit, connect the contacts 2a in parallel to increase reliability.  
 Note 3: Select an MCCB with a rated interrupting current appropriate to the capacity of the power supply, because short-circuit currents vary greatly depending on the capacity of the power supply and the condition of the wiring system.  
 The MCCB, MC and ELCB in this table were selected, on the assumption that a power supply with a normal capacity would be used.  
 Note 4: Sizes of the wires connected to the input terminals R/L1, S/L2 and T/L3 and the output terminals U/T1, V/T2 and W/T3 when the length of each wire does not exceed 30m. The numeric values in parentheses refer to the sizes of wires to be used when a DC reactor is connected.  
 Note 5: For the control circuit, use shielded wires 0.75 mm<sup>2</sup> or more in diameter.  
 Note 6: For grounding, use a cable with a size equal to or larger than the above.  
 Note 7: The wire sizes specified in the above table apply to HV wires (copper wires shielded with an insulator with a maximum allowable temperature of 75°C) used at an ambient temperature of 50°C or less.

## Power circuit

Terminal symbol	Terminal function
⏚	Grounding terminal for connecting inverter. There are 3 terminals in cooling fin or mounting part of EMC plate.
R/L1, S/L2, T/L3	240V class : Three-phase 200 to 240V-50/60Hz : Single-phase 200 to 240V-50/60Hz 500V class : Three-phase 380 to 500V-50/60Hz * Single-phase inputs are R/L1 and S/L2/N terminals.
U/T1, V/T2, W/T3	Connect to three-phase motor.
PA/+, PB	Connect to braking resistors. Change parameters <i>F 304</i> , <i>F 308</i> , <i>F 309</i> if necessary.
PA/+	This is a positive potential terminal in the internal DC main circuit. DC common power can be input with PC/- terminal.
PC/-	This is a negative potential terminal in the internal DC main circuit. DC common power can be input with PA/+ terminal.
PO, PA/+	Terminals for connecting a DC reactor (DCL: optional external device). Shorted by a short bar when shipped from the factory. Before installing DCL, remove the short bar.

The arrangements of power circuit terminals are different from each range. Refer to the instruction manual for details.

## Control circuit terminals

Terminal symbol	Input / output	Function	Electrical specifications
F	Input	Shorting across F-CC or P24-F causes forward rotation; open causes deceleration stop. (When Standby ST is always ON) 3 different functions can be assigned.	No voltage logic input 24Vdc-5mA or less  Sink/Source and PLC selectable using slide switch SW1 (Default setting is PLC side)  Pulse train input (S2 terminal) Pulse frequency range: 10pps-2kpps  PTC input (S3 terminal)
R	Input	Shorting across R-CC or P24-R causes reverse rotation; open causes deceleration stop. (When Standby ST is always ON) 3 different functions can be assigned.	
RES	Input	This inverter protective function is reset if RES-CC or P24-RES is connected. Shorting RES-CC or P24-RES has no effect when the inverter is in a normal condition. 2 different functions can be assigned.	
S1	Input	Shorting across S1-CC or P24-S1 causes preset speed operation. 2 different functions can be assigned.	
S2	Input	Shorting across S2-CC or P24-S2 causes preset speed operation. By changing parameter <i>F 145</i> setting, this terminal can also be used as a pulse train input terminal.	
S3	Input	Shorting across S3-CC or P24-S3 causes preset speed operation. By changing slide switch SW2 and parameter <i>F 147</i> setting, this terminal can also be used as a PTC input terminal.	
CC	Common to Input / output	Control circuit's equipotential terminal (3 terminals)	
PP	Output	Analog power supply output	10Vdc (permissible load current: 10mAdc)
VIA	Input	Multifunction programmable analog input. Default setting: 0-10Vdc (1/1000 resolution) and 0-60Hz (0-50Hz) frequency input (1/2000 resolution). By changing parameter <i>F 109</i> , this terminal can also be used as a multifunction programmable logic input terminal.	10Vdc (internal impedance: 30kΩ)
VIB	Input	Multifunction programmable analog input. Default setting: 0-10Vdc (1/1000 resolution) and 0-60Hz (0-50Hz) frequency input. The function can be changed to -10-+10V input by parameter <i>F 107</i> = 1 setting. By switching slide switch SW2 and changing parameter <i>F 109</i> setting, this terminal can also be used as a multifunction programmable logic input terminal.	10Vdc (internal impedance: 30kΩ)
VIC	Input	Multifunction programmable analog input. 4-20mA (0-20mA) input.	4-20mA (internal impedance: 250Ω)
FM	Output	Multifunction programmable analog output. Default setting: output frequency. The function can be changed to ammeter, 0-10Vdc voltage or 0-20mAdc (4-20mA) current output by parameter <i>F 58</i> setting. Resolution Max. 1/1000.	1mAdc full-scale ammeter or QS60T (option) 0-20mA (4-20mA) DC ammeter Permissible load resistance: 600Ω or less 0-10V DC volt meter Permissible load resistance: 1kΩ or more
P24	Output	24Vdc power output	24Vdc-100mA Note 2)
	Input	This terminal can be used as a common terminal when an external power supply is used by changing SW1 to PLC side.	-
+24	Output	24Vdc power output	24Vdc-100mA Note 2)
+SU	Input	DC power input terminal for operating the control circuit. Connect a control power backup device (option or 24Vdc power supply) between +SU and CC.	Voltage: 24Vdc±10% Current: 1A or more
OUT	Output	Multifunction programmable open collector output. Default setting detect and output speed reach signal. Multifunction output terminals to which two different functions can be assigned. The NO terminal is an equipotential terminal. It is isolated from the CC terminal. By changing parameter <i>F 58</i> settings, these terminals can also be used as multifunction programmable pulse train output terminals.	Open collector output 24Vdc-100mA To output pulse trains, a current of 10mA or more needs to be passed. Pulse frequency range: 10-2kpps
FLA FLB FLC	Output	Multifunction programmable relay contact output. Detects the operation of the inverter's protection function. (Default setting) Contact across FLA-FLC is closed and FLB-FLC is opened during protection function operation.	Max. switching capacity 250Vac-2A 30Vdc-2A (cosφ=1) : at resistive load 250Vac-1A (cosφ=0.4) 30Vdc-1A (L/R=7ms) Min. permissible load 5Vdc-100mA 24Vdc-5mA
RY RC	Output	Multifunction programmable relay contact output. Default settings detect and output low-speed signal output frequencies. Multifunction output terminals to which two different functions can be assigned.	Max. switching capacity 250Vac-2A (cosφ=1) : at resistive load 30Vdc-1A 250Vac-1A (cosφ=0.4) Min. permissible load 5Vdc-100mA 24Vdc-5mA

Note 1) When VIA terminal is used as logic input terminal, be sure to connect a resistor between P24 and VIA in case of sink logic, between VIA and CC in case of source logic. (Recommended resistance: 4.7kΩ-1/2W) It is not needed for VIB terminal.  
 Note 2) 100mA is the sum of P24 and +24.  
 Note 3) A chattering (momentary ON/OFF of contact) is generated by external factors of the vibration and the impact, etc. In particular, please set the filter of 10ms or more, or timer for measures when connecting it directly with input unit terminal of programmable controller. Please use the OUT terminal as much as possible when the programmable controller is connected.