Saftronics Inc.

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PC10 Product Specifications

PC10

Mini Vector AC Drive

PC10 Specifications

(1) Three-phase 230V input

Item		Detail specifications								
Drive Hp		1/8	1/4	1/2	1	2	3	5	7.5	10
Nominal applicable motor[1] [Hp]		1/8	1/4	1/2	1	2	3	5	7.5	10
Output ratings	Rated capacity[2] [kVA]	0.3	0.6	1.2	2.0	3.2	4.4	6.8	9.9	13.1
	Rated Voltage[3] [V]	Three-phase 200V / 50 Hz, 200V, 220V, 230V / 60 Hz (with AVR[12] function)								
	Rated current [A][4]	0.7	1.4	2.5	4.0	7.0	10.0	16.5	23.5	31.0
		(0.8)	(1.5)	(3)	(5)	(8)	(11)	(17)	(25)	(33)
	Overload current rating	150% of rated output current for 1 min.								
		200% of rated output current for 0.5 s								
	Rated frequency [Hz]	50, 60Hz								
Input ratings	Number of phases, voltage, frequency	Three-phase 200 to 230 V / 50 to 60 Hz[11]								
	Voltage and frequency fluctuation	Voltage:	+10 to -15%, Voltage unbalance 2% or less[10]							
		Frequency:	+5 to -5%							
	Resistance to instantaneous voltage drop[5]	Operation continues at 165V or higher voltage. When the input voltage drops below 165V, operation continues for 15 ms.								
	Rated input current [A] (With DCR)	0.59	0.94	1.6	3.1	5.7	8.3	14	19.7	26.9
	Rated input current [A] (Without DCR)[9]	1.1	1.8	3.4	6.4	11.1	16.1	25.5	40.8	52.6
	Power requirement[6] [kVA]	0.3	0.4	0.6	1.1	2.0	2.9	4.9	6.9	9.4
Braking	Braking torque[7] [%]	100		70			40		20	
	Braking torque[8] [%]	150								
	DC braking	Starting frequency: 0.2 to 60.0 Hz, braking current (0 to 100% in 1% increment), braking time (0.0 to 30.0 s)								
Enclosure (IEC60529)		IP20								
Cooling method		Self-cooling				Fan cooled				
Weight (lbs)		2.4	2.4	2.8	3.1	5.1	5.1	7.9	17.7	17.7

*1 The applicable standard motor refers to a 4 pole standard motor.

*2 The rated capacity indicates a 230V input rating.

*3 Voltages greater than the source voltage cannot be output.

*4 Amperage values in parentheses ( ) are applicable to operation with 3 kHz or lower carrier frequencies (F26 = 3 or less). These values also apply when the ambient temperature is below 40°C.

*5 Tests are performed under standard load conditions (load equivalent of 85% with an applicable standard motor) defined by JEMA.

*6 Data is with DC reactor (DCR) installed.

*7 Indicates the average braking torque for decelerating and stopping one motor from 60 Hz. (Varies according to the efficiency of the motor.)

*8 Indicates the value with an external braking resistor (option).

*9 Calculated on assumption that the drive is connected to 500 kVA power supply.

*10 Refer to IEC61800-3 5.2.3.

*11 Safe separation for control interface of this drive is provided when this drive is installed in overvoltage category II (CE Standard). Basic insulation for control interface of this drive is provided when this drive is installed in overvoltage category III (CE Standard).

*12 Automatic voltage regulator. (FO5)

(2) Single-phase 230V input

Item		Detail specifications					
Drive Hp		1/8	1/4	1/2	1	2	3
Nominal applied motor[1] [Hp]		1/8	1/4	1/2	1	2	3
Output ratings	Rated capacity[2] [kVA]	0.3	0.6	1.2	2.0	3.2	4.4
	Rated Voltage[3] [V]	Three-phase 380,400, 415V / 50 Hz, 380, 400, 440 / 60 Hz (with AVR[11] function)					
	Rated current [4] [A]	0.7	1.4	2.5	4.0	7.0	10
		(0.8)	(1.5)	(3.0)	(5.0)	(8.0)	(11)
	Overload capability	150% of rated output current for 1 min. 200% of rated output current for 0.5 s					
	Rated frequency [Hz}	50, 60Hz					
Input ratings	Phases, Voltage, Frequency	Single-phase 200 to 240 V / 50 to 60 Hz[10]					
	Voltage/frequency fluctuation	Voltage: +10 to -15%, Voltage unbalance 2% or less Frequency: +5 to -5%					
	Momentary voltage dip capability[5]	Operation continues at 165V or a higher voltage. When the input voltage drops below 165V, operation continues for 15 ms.					
	Rated current [A] (With DCR)	1.2	2.0	3.5	6.5	11.8	17.7
	Rated current [A] (Without DCR)[9]	2.3	3.9	6.4	11.4	19.8	28.5
	Required power supply capacity[5] [kVA]	0.3	0.4	0.7	1.3	2.4	3.6
Braking	Braking torque [7] [%]	100		70			40
	Braking torque [8] [%]	150					
	DC braking	Starting frequency: 0.2 to 60.0 Hz, braking current (0 to 100% in 1% increment), braking time (0.0 to 30.0 s)					
Enclosure(IEC60529)		IP20					
Cooling method		Natural cooling				Fan cooling	
Weight (lbs)		2.4	2.8	2.8	4.7	7.1	7.5

*1 The applicable standard motor refers a 4 pole standard motor made.

*2 The rated capacity indicates a 230V input voltage.

*3 Voltages greater than the source voltage cannot be output.

*4 Amperage values in parentheses ( ) are applicable to operation with 3 kHz or lower carrier frequencies (F26 = 3 or less). These values also apply when the ambient temperaute is below 40°C.

*5 Tests at standard load condition (85% load)

*6 Data is with DC reactor (DCR) installed.

*7 Indicates the average braking torque for decelerating and stopping one motor from 60 Hz. (Varies according to the efficiency of the motor.)

*8 Indicates the value with an external braking resistor (option).

*9 Calculated on assumption that the drive is connected to a 500kVA power supply.

*10 Safe separation for control interface of this drive is provided when this drive is installed in overvoltage category II (CE Standard). Basic insulation for control interface of this drive is provided when this drive is installed in overvoltage category III (CE Standard).

*11 Automatic voltage regulator (FO5).

(3) Three-phase 460V input

Item		Detail specifications						
Drive Hp		1/2	1	2	3	5	7.5	10
Nominal applicable motor[1] [Hp]		1/2	1	2	3	5	7.5	10
Output ratings	Rated capacity[2] [kVA]	1.2	2.0	2.9	4.4	7.2	10.3	14.3
	Rated Voltage[3] [V]	Three-phase 380,400, 415V / 50 Hz; 380, 400, 440 / 60 Hz (with AVR[12] function)						
	Rated current[4] [A]	1.4	2.1	3.7	5.3	8.7	12	16
		(1.5)	(2.5)	(3.7)	(5.5)	(9)	(13)	(18)
	Overload current rating	150% of rated output current for 1 min.						
		200% of rated output current for 0.5 s						
	Rated frequency [Hz]	50, 60Hz						
Input ratings	Number of phases, voltage, frequency	Three-phase 380 to 480 V / 50 to 60 Hz[11]						
	Voltage and frequency fluctuation	Voltage:		+10 to -15% Voltage unbalance 2% or less[10]				
		Frequency:		+5 to -5%				
	Resistance to instantaneous voltage drop[5]	Operation continues at 300V or a higher voltage. When the input voltage drops below 300V from the rated voltage, operation continues for 15 ms.						
	Rated input current [A] (With DCR)	0.82	1.5	2.9	4.2	7.1	10	13.5
	(Without DCR)[9]	1.8	3.5	6.2	9.2	14.9	21.5	27.9
	Power requirement[6] [kVA]	0.3	0.4	0.6	1.1	2.0	2.9	4.9
Braking	Braking torque[7] [%]	70			40		20	
	Braking torque[8] [%]	150						
	DC braking	Starting frequency: 0.2 to 60.0 Hz, braking current (0 to 100% in 1% increment), braking time (0.0 to 30.0 s)						
Protective structure (IEC60529)		IP20						
Cooling method		Self-cooling		Fan cooled				
Weight (lbs)		4.3	4.7	5.1	5.5	7.5	17.7	17.7

*1 The applicable standard motor refers to a 4 pole standard motor.

*2 The rated capacity indicates a 460V input voltage.

*3 Voltages greater than the source voltage cannot be output.

*4 Amperage values in parentheses ( ) are applicable to operation with 3 kHz or lower carrier frequencies (F26 = 3 or less). These values also apply when the ambient temperaute is below 40°C.

*5 Tests at standard load conditions (85% load)

*6 Indicates the value when using a DC reactor (DCR).

*7 Indicates the average braking torque for decelerating and stopping a discrete motor from 60 Hz. (Varies according to the efficiency of the motor.)

*8 Indicates the value with an external braking resistor (option).

*9 Calculated on assumption that the drive is connected to a 500kVA power supply.

*10 Refer to IEC61800-3 5.2.3.

*11 Safe separation for control interface of this inverter is provided when this inverter is installed in overvoltage category II (CE Standard). Basic insulation for control interface of this inverter is provided when this inverter is installed in overvoltage category III (CE Standard).

*12 Automatic voltage regulator (F05).

Common Specifications

Item			Detail specifications
Output frequency	Adjustment	Maximum frequency	50 to 400 Hz adjustable
		Base frequency	25 to 400 Hz adjustable
		Starting frequency	0.1 to 60.0 Hz adjustable, Holding time : 0.0 to 10.0s.
		Carrier frequency	0.75 to 15 kHz (The carrier frequency may automatically drop to 0.75 kHz to protect the drive.)
	Accuracy		Analog reference: Within ± 0.2 % (25¡ ± 10¡ C) Digital reference: Within 0.01% (-10¡ to +50¡ C)
	Reference resolution		Analog reference: 1/3000 of maximum output frequency Keypad panel reference: 0.01 Hz (99.99 Hz or lower), 0.1 Hz (100.0 to 400.0 Hz) LAN reference : 1/20000 of Maximum frequency (0.003Hz at 60Hz, 0.006Hz at 120Hz, 0.02Hz at 400Hz), or 0.01Hz (Fixed)
Control	Voltage/freq. Characteristics		Adjustable at base and maximum frequency, with AVR control : 80 to 240 V(200V rating), 160 to 480V(400V rating)
	Torque boost		Automatic: Automatic torque boost can be selected with a function code setting. Manual: Setting by codes 1 to 31 (Boost for Variable torque available)
	Starting torque		Starting torque 200% or above (with dynamic torque vector turned on, during 0.5 Hz operation)
	DC braking		Braking time (0.0 to 30.0 s), braking current (0 to 100%), braking starting frequency (0.0 to 60.0 Hz) adjustable
	Control method		Sinusoidal PWM (Dynamic torque vector control) with "current vibration suppression function" and "dead time compensation function"
	Operation method		Keypad operation: starting and stopping with RUN and STOP keys. (Keypad panel) Digital input signal: forward (reverse) operation, stop command (3-wire operation possible), coast-to-stop command, external alarm, error reset, etc. Link operation: RS485 Modbus RTU (Standard) Profibus-DP, Interbus-S, DeviceNet, Modbus Plus, CAN open (Options)

*1 Automatic voltage regulator (FO5).

	Item	Detail Specifications
Control	Frequency reference	Keypad operation: UP key and DOWN key. Potentiometer (external potentiometer: 1 to 5 k ohm 1/2 W) 0 to ± 5 Vdc. 0 to ± 10 Vdc. 4 to 20 mAdc. 0 to +10 Vdc / 0 to 100% speed can be switched externally to +10 to 0 Vdc / 0 to 100% speed. 4 to 20 mAdc / 0 to 100% speed can be switched externally to 20 to 4 mAdc / 0 to 100% speed.
	(UP/DOWN control)	An external signal can be used to control the UP or DOWN command.
	(Multistep frequency)	Up to 16 different frequencies can be selected by digital input signals.
	(Link operation)	Link operation: RS485 (Standard) Profibus-DP, Interbus-S, DeviceNet, Modbus Plus, CAN open (Options)
	Acceleration / deceleration time (Mode select)	Adjustable in 0.01 to 3600s range. (2 sets of time parameters can be set internally for each acceleration and deceleration.) Linear, S-curve (weak, strong), Non-linear available.
	Frequency limiter	The high and low frequency limits can be set in Hz.
	Bias frequency	Can be set in -400 to 400 Hz range.
	Gain (frequency setting)	Can be set in a 0 to 200% range.
	Jump frequency control	Three jump frequencies and jump width (0 to 30 Hz) can be set.
	Rotating motor pickup (Flying start)	Operation without shock is possible.
	Auto-restart after momentary power failure	The motor speed can be detected after power recovery so that the drive is started at that speed.
	Slip compensation control	The load can be detected for the control of the output frequency. The compensation value can be set in a 0.00 to +15.00 Hz range of the rated frequency.
	Droop operation	The load can be detected for the control of the frequency. The compensation value can be set in a -9.9 to 0.0 Hz range of the rated frequency. (Speed droop characteristics)
	Torque limiter	When the load torque in the driving or braking mode exceeds the setting, the output frequency is adjusted to control the load torque to an almost constant level. The limiting torque can be set brtween 20 to 200% and the driving and braking torque values can be set independently. The second torque limits can also be set.

	Item	Detail specifications
Control	PID control	This function can control flowrate, pressure, etc. with analog feedback signal. The reference and feedback values are displayed in %. Reference signal Keypad operation UP key and DOWN key. : 0.0 to 100% Voltage input (Terminal 12) : 0 to 10Vdc Current input (Terminal C1) : 4 to 20mAdc Multistep frequency setting : Setting freq./Max. freq.x100% RS485 : Setting freq./Max. freq.x100% Feedback signal Terminal 12 (0 to +10Vdc or +10 to 0Vdc) Terminal C1(4 to 20mAdc or 20 to 4mAdc
	Second motorG setting	The V/f pattern of the second motor can be selected by means of an external signal. The motor constants of the second motor can be set by means of an external signal. The electronic thermal overload relay of the second motor can be internally set for selection by means of an external signal.
	Energy saving operation	Weak magnetic flux can be set for light loads which allows operation with an increased motor efficiency.
Display	During operation/stop	The keypad panel can be extended. (Optional 5m extension cable is available.) 7-segment LED display items ¥ Set frequency ¥ Output frequency ¥ Output current ¥ Motor r/min ¥ Output voltage ¥ Line speed ¥ PID setting/feedback values (A soft filter is provided to attenuate the fluctuation in the displayed value.) A charge lamp indicates power supply is energized.
	When setting When tripped	The function code and data code are displayed. [The cause of trip is displayed.] ¥ OC1 (overcurrent: during acceleration) ¥ OC2 (overcurrent: during deceleration) ¥ OC3 (overcurrent: during constant speed operation) ¥ OU1 (overvoltage: during acceleration) ¥ OU2 (overvoltage: during deceleration) ¥ OU3 (overvoltage: during constant speed operation) ¥ LU (undervoltage) ¥ Lin (input phase loss) ¥ dbH (external braking resistor overheated (thermal overload relay)) ¥ OH1 (overheat: heat sink) ¥ OH2 (overheat: external thermal overload relay) ¥ OL1 (overload: motor 1) ¥ OL2 (overload: motor 2) ¥ OLU (overload: drive) ¥ Er1 (memory error) ¥ Er2 (keypad panel communication error) ¥ Er3 (CPU error) ¥ Er4 (option error) ¥ Er5 (option error) ¥ Er6 (operating error) ¥ Er7 (output wiring error) (impedance imbalance) ¥ Er8 (RS485 communication error)
	During operation, when tripped	The last four records of trip history are stored and displayed.

Overload protection	Drive electronic thermal overload relay
Overvoltage protection	A high voltage in the DC link circuit (approx. 400 Vdc for 230V class, approx. 800Vdc for 460V class) is detected.
Overcurrent protection	The drive is protected against an overcurrent on the output.
Surge protection	The drive is protected against a surge voltage between the power cable of the main line and ground.
Undervoltage protection	Voltage level (approx. 200 Vdc for 230V class, approx. 400Vdc for 460V class) in the DC link circuit is detected.
Overheat protection	The drive is protected against failure and overload of the cooling fan.
Short-circuit protection	The drive is protected against an overcurrent caused by a short-circuit on the output.
Ground fault protection	The drive is protected against an overcurrent caused by ground fault in the output wiring. * Detection when starting
Motor protection	Electronic thermal overload relays protect general purpose motors and forced air motors. The thermal time constant can be adjusted from 0.5 to 10.0 min. Second electronic thermal overload relay can be provided. (Switched with external signal)
Braking resistor protection	Upon overheating of the braking resistor (external unit),the drive operation stops.
Stall prevention (simple torque limit)	¥ When the output current exceeds the setting during acceleration, the speed change is stopped to avoid an overcurrent fault. ¥ When the output current exceeds the setting during constant speed operation, the frequency is decreased to maintain constant torque. ¥ When the DC voltage exceeds the limit during deceleration, the speed change is stopped to avoid an overvoltage fault.
Input phase loss protection	The drive is protected against input voltage phase loss.
Output phase loss protection	An unbalance in the impedance of the output circuit is detected and outputs an alarm. (Error during tuning only)
Auto reset	The number of retries and wait time can be set before an alarm stop.
Installation ¥ location	Indoors ¥ Locations without corrosive gases, flammable gases or dust (degree of pollution: 2) ¥ Locations without direct sunlight
Ambient temperature	-10 to +50 ¡C
Relative humidity	5 to 95% RH (without condensation)
Altitude	1000 m Max. (Atmospheric pressure 86 to 106 kPa)
Vibration	3mm 2 to 9 Hz 9.8m/s^2 9 to 20 Hz 2m/s^2 20 to 55 Hz 1m/s^2 55 to 200 Hz
Storage temperature	-25 to +65 ¡C
Storage humidity	5 to 95% RH (without condensation)

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