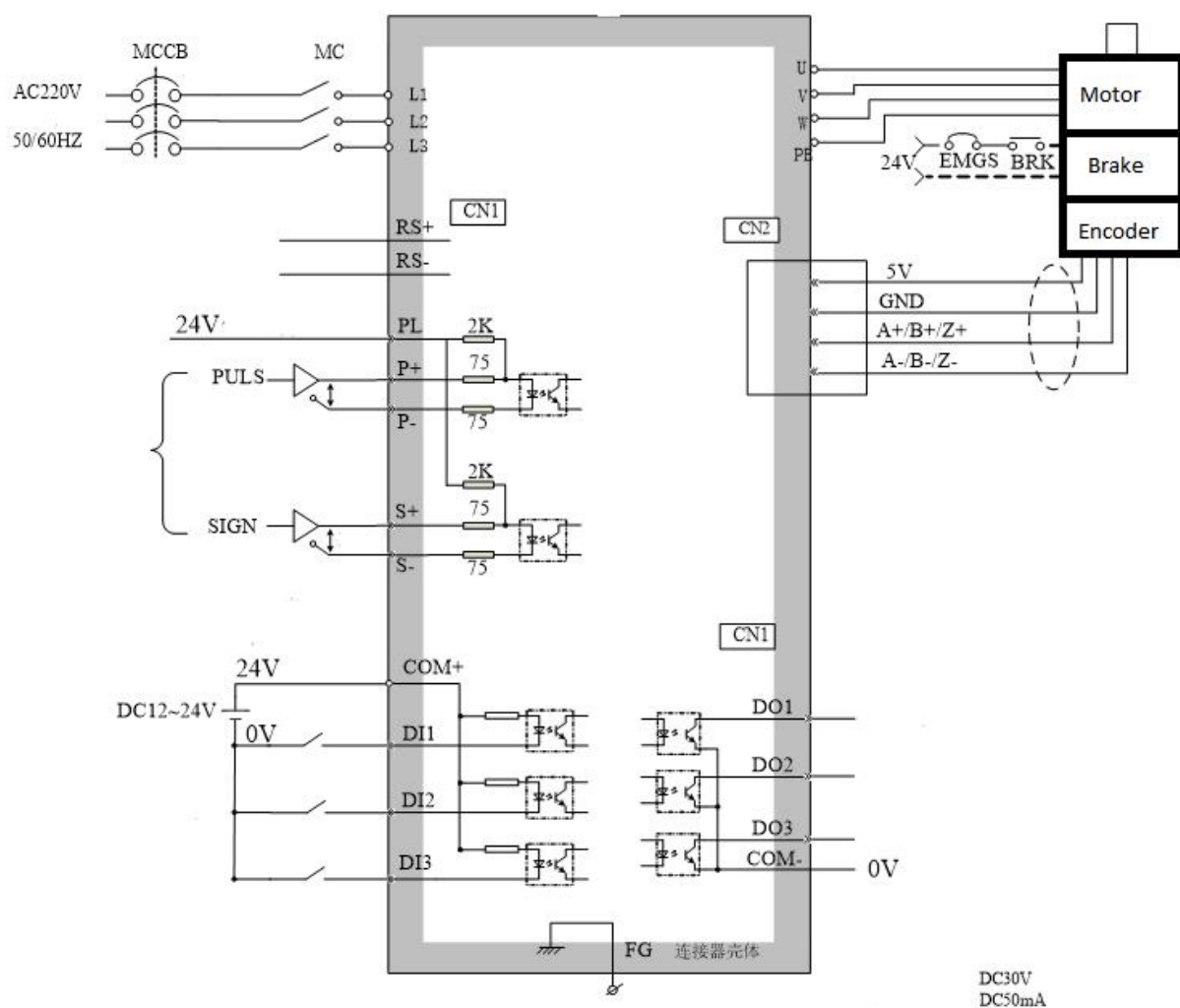


EPS-BS SERIES AC SERVO SYSTEM USER MANUAL

Contents

STANDARD WIRING DIAGRAM.....	1
SPECIAL PARAMETERS.....	2
DISPLAY PARAMETERS.....	2
STANDARD PARAMETERS.....	2
ALARMS.....	8
MODBUS COMMUNICATION.....	8

STANDARD WIRING DIAGRAM



SPECIAL PARAMETERS

- EEPOP→EE-0→(press and hold SET button): save parameter changes
- EEPOP→EE-1→(press and hold SET button): reset parameters to factory default
- PA064/PA066:

$$PA64 = b_{15} \times 2^{15} + b_{14} \times 2^{14} + \dots + b_2 \times 2^2 + b_1 \times 2 + b_0$$

$$PA66 = b_6 \times 2^6 + b_5 \times 2^5 + \dots + b_2 \times 2^2 + b_1 \times 2 + b_0$$

DISPLAY PARAMETERS

Display Parameter	Display content	Unit	Communication address
dP 00	Motor speed	【r/min】	0X0600
dP 01	Encoder feedback	1 pulse	0X0601
dP 02	Encoder feedback	10000 pulses	0X0602
dP 03	Input pulse count	1 pulse	0X0603
dP 04	Input pulse count	10000 pulses	0X0604
dP 05	Pulse deviation	1 pulse	0X0605
dP 06	Pulse deviation	10000 pulses	0X0606
dP 07	Reserved	【0.0025V】	0X0607
dP 08	Internal speed instruction	【r/min】	0X0608
dP 09	Reserved	【0.0025V】	0X0609
dP 10	Internal torque instruction	【%】	0X060A
dP 11	Internal torque feedback	【%】	0X060B
dP 12	Input signal monitor	---	0X060C
dP 13	Output signal monitor	---	0X060D
dP 14	Input pulse frequency	【Khz】	0X060E
dP 15	Load current	【A】	0X060F
dp16	DC bus voltage	V	0X0610
dp17	Motor rotational angle	deg	0X0611
dP 19	Z signal count	---	0X0613
dP 21	Servo drive capacity		0X0615
dP 25	Alarm 1 log (latest)	---	0X0619
dP 26	Alarm 2 log	---	0X061A
dP 27	Alarm 3 log	---	0X061B
dP 28	Alarm 4 log	---	0X061C

STANDARD PARAMETERS

Parameter	Function	Range	Unit	Default	Effective
PA000	Password setting Set this parameter to 58 before editing parameters	0~9999	-	58	Immediate
PA001	Carrier wave frequency	5~15	KHz	12	Restart
PA002	Motor pole pair selection	4~5	-	5	Restart
4 pole pair motor, PA2=4; 5 pole pair motor, PA2=5.					
PA003	Initial display selection To select what is shown after power-on: 0: DP0 1: DP1 2: DP2etc.	0~80		0	Restart
PA004	Control mode selection 0: Position control mode 7: Internal speed control mode	0~7		0	Restart

Parameter	Function	Range	Unit	Default	Effective
PA006	Function selection parameter: bit0: CWL & CCWL signal (0: valid; 1: invalid) bit1: PULSE signal negation (0: invalid; 1: valid) bit2: SIGN signal negation (0: invalid; 1: valid) bit 3: Power failure parameter storage (0: invalid; 1: valid) bit 4: Parameter edit real-time saving (0: invalid; 1: valid) bit 5: DP0 negation (0: invalid; 1: valid) bit 6: ZEROSPD signal (0: invalid; 1: valid) bit 7: INH signal (0: invalid; 1: valid) bit 8: - bit 9: ZEROSPD edge selection bit A: Dividing machine (0: zero torque; 1: rated torque) bit B: Position control & internal torque control switch (0: normal output; 1: not output position control) bit C: Position & torque control switch (0: internal torque 1 only; 1: switch to 4 internal torques) bit D: Internal speed control reciprocate movement (0: electrical level; 1: rising edge)	0~65535		0	Restart
PA007	Servo drive capacity selection	0~6		0	Restart
PA008	Motor encoder type selection: 0: Magnetic 1024*4 ppr (H) 1: Magnetic 2500*4 ppr (P) 2: Incremental 2500*4 ppr (E) 3: Incremental 5000*4 ppr (K) or Magnetic 5000*4 ppr (Q)	0~3		3	Restart
PA009	Servo motor capacity parameter	0~35		10	Restart
To change PA2, PA7~9, first set PA0=1234, then edit parameters and set EEPOP→EE-1, then restart.					
PA010	Parameter management 0: parameter saving (same as EE-00) 1: parameter reset (same as EE-01) 2: no operation	0~2		2	Restart
PA011	Position loop gain	100~9900		2000	Immediate
PA012	Speed feedforward gain	0~100	%	0	Immediate
PA013	Speed feedforward filter	0~8150	0.1ms	0	Immediate
PA014	Speed loop gain	300~8000		1000	Immediate
PA015	First speed loop time integral constant	0~1000	0.1 ms	200	Immediate
PA019	Parameter function selection: bit0: Restart without full discharge except PA2, PA4, PA6, PA7, PA8, PA9. (0: Cannot restart; 1: Can restart). bit1: - bit2: Electronic gear ratio switch (0: Can switch; 1: Cannot switch) bit3: - bit4: CLE signal function (0: Clear DP5~DP6; 1: Clear DP1~DP6) bit5: - bit6: Internal position loop run (0: Invalid; 1: Valid) bit7: - bit8: -	0~65535		0	Immediate
PA020	Acceleration/deceleration type selection 0: linear 1: S-curve	0~1		0	Immediate
PA021	S-curve coefficient	1~100		1	Immediate

Parameter	Function	Range	Unit	Default	Effective
PA022	Pulse input filter time constant	1~127		1	
	PA022 Filter frequency (KHz)				
	20 200				
	40 100				
	60 67				
	80 50				
	100 40				
	120 33				
PA023	Second speed loop integral time constant	0~1000	0.1 ms	10	Immediate
PA027	Pulse input logic negation Can use this parameter to change motor rotation direction.	0~1		0	Immediate
PA028	Pulse input form selection 0: Pulse + Sign 1: CW/CCW 2: A+B	0~2		0	Restart
PA029	CLE signal trigger selection 0: by electric level; 1: by edge			0	Immediate
PA030	Z Pulse output width	1~6500		4000	Restart
	PA030 Z Pulse width (ms)				
	500 4				
	1000 8				
	2000 16				
	4000 32				
	6000 48				
PA031	First electronic gear ratio numerator	1~65535		1	Immediate
PA032	First electronic gear ratio denominator	1~65535		1	Immediate
PA035	Pulse input filter	1~1000		1	Restart
PA038	Current loop gain	100~9000		1000	Immediate
PA039	Acceleration time constant	1~9000	ms	200	Immediate
PA040	Deceleration time constant	1~9000	ms	200	Immediate
PA041	Current integral constant	0~100		30	Restart
PA044	Speed instruction input logic negation	0~1		0	Immediate
PA047	Torque instruction input logic negation	0~1		0	Immediate
PA048	Torque limit constant This parameter is to limit the maximum torque output compared to motor rated torque.	0~300		250	Immediate
PA050	COIN signal threshold When position deviation is less than this parameter, COIN signal will output.	0~9000	pulse	50	Immediate
PA051	ZSP (zero speed) signal setting	0~3000	rpm	50	Immediate
PA052	ZSP (zero speed) signal time setting	0~9000	0.1ms	50	Immediate
PA053	Position deviation alarm threshold at S-ON	0~500	0.01*enc oder ppr	300	Immediate
PA054	Position deviation alarm 0: ERR09 will output if deviation is larger than PA053 1: No alarm will output even if deviation is larger than PA053	0~1		0	Immediate
PA055	TLC (torque reached) signal threshold	0~300	1% rated torque	50	Immediate
PA056	TLC (torque reached) signal time setting	0~9000	ms	50	Immediate
PA058	Internal position start delay time (PA200=12)		PA117		Immediate
PA060	Time from BRK signal to motor free run	0~9000	ms	150	Immediate
PA061	Motor speed at BRK	0~100	rpm	10	Immediate
PA062	Internal position stop delay time (PA200=12)		PA117		Immediate

Parameter	Function	Range	Unit	Default	Effective
PA063	Motor stop mode after servo off 0: decelerate to PA61, then power off after PA060 1: coast to stop	0~1		0	Immediate
PA064	Input signal electrical level logic selection	0~65535		0	Immediate
PA065	Delay time between S-ON and BRK off.	0~9000	ms	150	Immediate
PA066	Output signal electrical level logic selection	0~65535		0	Immediate
PA070	RS485 communication standard 0: RTU 1: ASCII	0~1		0	Restart
PA072	RS485 communication address	1~31		1	Restart
PA073	RS485 bit rate 0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps 4: 38400bps 5: 57600bps 6: 115200bps	0~6		5	Restart
PA074	RS485 protocol: 0: 7, N, 2 1: 7, E, 1 2: 7, O, 1 3: 8, N, 2 4: 8, E, 1 5: 8, O, 1 6: 8, N, 1	0~6		5	Restart
PA075	Dynamic brake selection 0: Brake to stop when speed is below PA76 after PA77; 1: coast to stop	0~1		0	Immediate
PA076	Dynamic brake speed	0~3000	rpm	1000	Immediate
PA077	Dynamic brake delay time	0~9000	ms	10	Immediate
PA078	COIN signal threshold Valid when speed is below this parameter in speed control				Immediate
PA081	Overload alarm threshold 1 (ERR 01)	1~300	%	130	Immediate
PA082	Overload alarm time 1 (ERR 01)	1~120	S	30	Immediate
PA083	Internal position 0: number of turns	-9999~9999	turn	1	Immediate
PA084	Internal position 0: number of pulses	-9999~9999	pulse	0	Immediate
PA085	Internal position 1: number of turns	-9999~9999	turn	1	Immediate
PA086	Internal position 1: number of pulses	-9999~9999	pulse	0	Immediate
PA087	Internal position 2: number of turns	-9999~9999	turn	1	Immediate
PA088	Internal position 2: number of pulses	-9999~9999	pulse	0	Immediate
PA089	Internal position 3: number of turns	-9999~9999	turn	1	Immediate
PA090	Internal position 3: number of pulses	-9999~9999	pulse	0	Immediate
PA091	Internal position 4: number of turns	-9999~9999	turn	1	Immediate
PA092	Internal position 4: number of pulses	-9999~9999	pulse	0	Immediate
PA093	Internal position 5: number of turns	-9999~9999	turn	1	Immediate
PA094	Internal position 5: number of pulses	-9999~9999	pulse	0	Immediate
PA095	Internal position 6: number of turns	-9999~9999	turn	1	Immediate
PA096	Internal position 6: number of pulses	-9999~9999	pulse	0	Immediate
PA097	Internal position 7: number of turns	-9999~9999	turn	1	Immediate
PA098	Internal position 7: number of pulses	-9999~9999	pulse	0	Immediate
PA099	Valid internal positions	1~8		1	Immediate
PA100	Internal parameter	0~2		0	Immediate

Parameter	Function	Range	Unit	Default	Effective
PA101	Internal position settings 0: turns, pulses (incremental) 1: negative turns, negative pulses (incremental) 2: low 16-bits, high 16-bits (incremental) 3: negative low 16-bits, negative high 16-bits (incremental) 4: low 16-bits, high 16-bits (absolute) 5: negative low 16-bits, negative high 16-bits (absolute) 6: turns, pulses (absolute) 7: negative turns, negative pulses (absolute)	0~7		0	Immediate
PA102	Internal position 0 speed	0~5000	rpm	120	Immediate
PA103	Internal position 1 speed	0~5000	rpm	130	Immediate
PA104	Internal position 2 speed	0~5000	rpm	140	Immediate
PA105	Internal position 3 speed	0~5000	rpm	150	Immediate
PA106	Internal position 4 speed	0~5000	rpm	160	Immediate
PA107	Internal position 5 speed	0~5000	rpm	170	Immediate
PA108	Internal position 6 speed	0~5000	rpm	180	Immediate
PA109	Internal position 7 speed	0~5000	rpm	190	Immediate
PA110	Position control selections (PA004=0) 0: external position control (pulse train) 2: switch between internal position control & external JOG 4: switch between position control & internal torque control	0~4		0	Immediate
PA111	Stall alarm threshold (ERR 08)	0~9000	rpm	600	Immediate
PA112	Stall alarm time (ERR 08)	0~9000	0.1S	10	Immediate
PA113	Internal parameter	0~65535		12288	Immediate
PA115	I/O terminal input filter	0~2000		1	Immediate
PA116	Internal position completion waiting time	1~9000	ms	1	Immediate
PA117	Internal position start/stop delay time	1~9000	ms	1	Immediate
PA118	Top seed coefficient (compared to rated speed)	50~300	%	150	Restart
PA119	Over-speed alarm threshold 1 (ERR 05)	50~300	%	150	Restart
PA120	Overload alarm threshold2 (ERR 06)	1~300	%	160	
PA121	Overload alarm time 2 (ERR 06)	1~60	S	10	Immediate
PA122	Overload alarm threshold 3 (ERR 07)	1~300	%	200	Immediate
PA123	Overload alarm time 3 (ERR 07)	1~30	S	5	Immediate
PA128	Torque control 1	0~300		0	Immediate
PA129	Torque control 2	0~300		0	Immediate
PA130	Torque control 3	0~300		0	
PA131	Internal speed 0 External JOG speed at internal position mode	-5000~ 5000	rpm	100	Immediate
PA132	Internal speed 1 Homing speed at internal position mode	-5000~ 5000	rpm	200	Immediate
PA133	Internal speed 2	-5000~ 5000	rpm	300	Immediate
PA134	Internal speed 3	-5000~ 5000	rpm	400	Immediate
PA135	Internal speed 4	-5000~ 5000	rpm	500	Immediate
PA136	Internal speed 5	-5000~ 5000	rpm	600	Immediate
PA137	Internal speed 6	-5000~ 5000	rpm	700	
PA138	Internal speed 7	-5000~ 5000	rpm	0	Immediate
PA139	Automatic saving parameter 1 at power failure	0~249		0	Immediate
PA140	Automatic saving parameter 2 at power failure	0~249		0	Immediate
PA141	Second electronic gear ratio numerator	1~65535		1	Immediate
PA142	Second electronic gear ratio denominator	1~65535		1	Immediate
PA143	IGBT alarm temperature threshold (over 2.2kw model)	0~120		100	Immediate

Parameter	Function	Range	Unit	Default	Effective
PA145	DI1 function selection 【0】 Control mode switch (C-MODE) 【1】 Positive rotation prohibited (CWL) / Internal torque selection 1 【2】 Negative rotation prohibited (CCWL) / Internal torque selection 2 【3】 Deviation Clearance (CLE) / Internal position homing / Internal speed selection 1 【4】 Alarm Clearance (A-CLR) / Internal speed selection 3 【5】 Pulse input prohibited (INH) / Internal position stop/ Internal speed selection 2 【6】 Servo enabled (S-ON) 【7】 Zero speed clamp (ZEROSPD) / Internal position pause 【8】 Forward JOG 【9】 Reverse JOG / Internal position selection 1 【10】 Internal position start 【11】 Homing start signal 【12】 Home signal input signal / torque signal negation 【13】 Internal position selection 2 【14】 Gear ratio switch / Internal position signal negation 【15】 Internal position selection 3			6	Immediate
PA146	DI2 function selection			4	Immediate
PA147	DI3 function selection			3	Immediate
PA148	DO1 signal selection 【0】 Servo ready (S_RDY) 【1】 Alarm (ALM) 【2】 Holding brake signal (BRK) 【3】 Position reached (COIN) 【4】 Torque reached (TLC) 【5】 Zero speed (ZSP) 【6】 Z signal (need restart)			1	Restart
PA149	DO2 signal selection			2	Restart
PA150	DO2 signal selection			3	Restart
PA151	Regenerative circuit duty cycle	0~100		50	Immediate
PA152	Regenerative threshold compensation	-20~25	V	0	Immediate
PA153	Control circuit under-voltage alarm time	1~2000	ms	40	Immediate
PA154	Control circuit under-voltage alarm time threshold	0~9000	-	2000	Immediate
PA155	Alarm parameter 1	-	-	-	-
PA156	Alarm parameter 2	-	-	-	-
PA157	Alarm parameter 3	-	-	-	-
PA158	Alarm parameter 4	-	-	-	-
PA160	Waiting time after internal position 0	1~9000	PA116	100	Immediate
PA161	Waiting time after internal position 1	1~9000	PA116	100	Immediate
PA162	Waiting time after internal position 2	1~9000	PA116	100	
PA163	Waiting time after internal position 3	1~9000	PA116	100	Immediate
PA164	Waiting time after internal position 4	1~9000	PA116	100	Immediate
PA165	Waiting time after internal position 5	1~9000	PA116	100	Immediate
PA166	Waiting time after internal position 6	1~9000	PA116	100	Immediate
PA167	Waiting time after internal position 7	1~9000	PA116	100	Immediate

ALARMS

Error code	Name	Remarks	Can clear
ERR.01	Overload 1	Refer to PA081, PA082	Yes
ERR.02	Under voltage		No
ERR.03	Over voltage		No
ERR.04	AC detection error	Input phase loss	-
ERR.05	Over speed	Refer to PA119	Yes
ERR.06	Overload 2	Refer to PA120, PA121	Yes
ERR.07	Overload 3	Refer to PA122, PA123	Yes
ERR.08	Motor stall		Yes
ERR.09	Position deviation 1	Refer to PA053	Yes
ERR.12	Extremely overload	Motor current is over 250% rated current	Yes
ERR.16	Parameter error		Yes
ERR.20	IGBT alarm	Caused by over-current	No
ERR.21	Current detection abnormality 1	Internal circuit error	No
ERR.22	Current detection abnormality 2	Internal circuit error	No
ERR.26	Encoder AB Pulse loss		No
ERR.27	Encoder UVW error		No
ERR.28	Encoder UVW broken cable		No
ERR.29	Encoder ABZ broken cable		No
ERR.30	Encoder Z Pulse loss		No
ERR.31	Encoder status error	Magnetic encoder wrong initial position	No
ERR.32	Electronic gear protection	Gear ratio too large	Yes
ERR.33	Input signal error	Input pin duplicate or meaningless	Yes
ERR.34	Output signal error	Output pin duplicate or meaningless	Yes
ERR.36	Servo drive wrong capacity		Yes
ERR.37	Matching error	Servo drive & motor do not match	Yes

MODBUS COMMUNICATION

- COMMUNICATION ADDRESS

PA0 address: 0x0000 (HEX) ... PA31 address: 0x001F (HEX)

- INSTRUCTIONS

INSTRUCTION	CONTENT
03H	Read N words, N<=29
06H	Write 1 word
10H	Write N words, N<=29