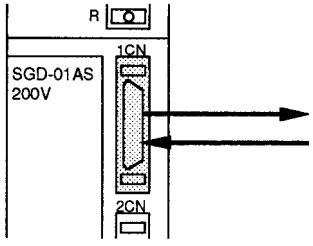
Appendix C

List of I/O Signals

This appendix lists I/O signal terminals (connector 1CN) on Servopacks which connect to a host controller or external circuit.



NOTE 1) The meanings of some signals for speed/torque control and position control are different. Always refer to the correct list for the Servopack type.

2) Refer to *Chapter 3* for details of how to use I/O signals.

3) Note that the functions of I/O signal terminals differ according to the memory switch (Cn-01, Cn-02) settings.

SGDA-□□□S

Speed/Torque

List of Input Signals for Speed/Torque Control (1)

Specifications	Standard Specifications	Absolute Encoder	Torque Limit Output	Zero-clamp	Contact Input Speed Control		Speed Control with Torque Restriction by Analog Voltage Reference
Memory Switch Setting	Standard Setting	Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-01 Bit A = 1 Bit B = 0	Cn-02 Bit 2 = 1		Cn-02 Bit F = 1
					Cn-01 Bit B = 0	Cn-01 Bit B = 1	
1	--- (Unused)						T-REF Torque limit input 3.2.9
2	--- (Unused)					3.2.6	SG-T Signal ground for torque limit input
3	V-REF Speed reference input 3.2.1				--- (Unused)	V-REF Speed reference	V-REF Speed reference 3.2.9
4	SG-V Signal ground for speed reference input				--- (Unused)	SG-V Signal ground for speed reference 3.2.6	SG-V Signal ground for speed reference
5	--- (Unused)	SEN Sensor ON 3.8.5					
6	--- (Unused)	0SEN Signal ground for sensor ON signal					
7	$\overline{BK}$ Brake interlock output 3.4.4						
8	$\overline{V\text{-}CMP}$ Speed coincidence output 3.7.4						
9	$\overline{TGON}$ Running output 3.7.5		$\overline{TGON}$ Torque limit detection 3.1.3				
10	SG-COM Signal ground common 3.2.4						
11	$\overline{P\text{-}CL}$ Forward rotation torque limit 3.1.3				$\overline{P\text{-}CL}$ Contact input speed control 1	$\overline{P\text{-}CL}$ Contact input speed control 1	
12	$\overline{N\text{-}CL}$ Reverse rotation torque limit 3.1.3			3.2.6	$\overline{N\text{-}CL}$ Contact input speed control 2	$\overline{N\text{-}CL}$ Contact input speed control 2 3.2.6	

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1CN Terminal No.	Specifications	Standard Specifications		Absolute Encoder	Torque Limit Output	Zero-clamp	Contact Input Speed Control		Speed Control with Torque Restriction by Analog Voltage Reference
	Memory Switch Setting	Standard Setting		Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-01 Bit A = 1 Bit B = 0	Cn-02 Bit 2 = 1		Cn-02 Bit F = 1
							Cn-01 Bit B = 0	Cn-01 Bit B = 1	
13	+24VIN I/O power supply		*3.2.4*						
14	$\overline{\text{S-ON}}$ Servo ON		*3.7.2*						
15	$\overline{\text{P-CON}}$ Proportional control		*3.2.1*		$\overline{\text{P-CON}}$ Zero-clamp operation reference	$\overline{\text{P-CON}}$ Rotation direction reference	$\overline{\text{P-CON}}$ Rotation direction reference		
16	P-OT Forward rotation prohibited		*3.1.2*		*3.4.3*	*3.2.6*	*3.2.6*		
17	N-OT Reverse rotation prohibited		*3.1.2*						
18	$\overline{\text{ALMRST}}$ Alarm reset		*3.7.1*						
19	SG-PG Signal ground for PG signal output		*3.2.3*						
20	PAO Phase A	PG signal output							
21	*PAO Phase $\overline{\text{A}}$								
22	PBO Phase B								
23	*PBO Phase $\overline{\text{B}}$		*3.2.3*						
24	PCO Phase C								
25	*PCO Phase $\overline{\text{C}}$								
26	--- (Unused)			PSO Phase S output	*3.8.5*				
27	--- (Unused)			*PSO Phase $\overline{\text{S}}$ output					
28	--- (Unused)			BAT Backup battery (+) input	*3.8.5*				
29	--- (Unused)			BAT0 Backup battery 0 V input	*3.8.5*				

Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, *3.2.1* represents Section 3.2.1.

Specifications	Standard Specifications	Absolute Encoder	Torque Limit Output	Zero-clamp	Contact Input Speed Control		Speed Control with Torque Restriction by Analog Voltage Reference
Memory Switch Setting	Standard Setting	Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-01 Bit A = 1 Bit B = 0	Cn-02 Bit 2 = 1		Cn-02 Bit F = 1
					Cn-01 Bit B = 0	Cn-01 Bit B = 1	
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30	ALO1 Alarm code output						
31	ALO2 Alarm code output						
32	ALO3 Alarm code output						
33	SG-AL Signal ground for alarm code output						
34	ALM Alarm output						
35	ALM-SG Signal ground for alarm output						
36	FG Frame ground						

3.7.1

3.7.1

3.2.3

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Note Information described in the “Standard Specifications” column is also applicable to blank columns.
Number “x.x.x” in box represents a section number corresponding to each signal name. For example, *3.2.1* represents Section 3.2.1.

SGDA-□□□S

Speed/Torque

List of Input Signals for Speed/Torque Control (2)

Specifications	Standard Specifications	Speed Control with Torque Feed-forward	Torque Control I	Torque Control II			
Memory Switch Setting	Standard Setting	Cn-01 Bit F = 1	Cn-01 Bit A = 0, B = 1	Cn-01 Bit A = 1, B = 1			
				$\overline{\text{P-CON}}$ = OFF	$\overline{\text{P-CON}}$ = ON		
				---	Cn-01 Bit F = 0, Cn-02 Bit F = 0	Cn-01 Bit F = 0, Cn-02 Bit F = 1	Cn-01 Bit F = 1, Cn-02 Bit F = 0 or 1
1	--- (Unused)	T-REF Torque feed-forward reference 3.2.8	T-REF Torque reference 3.1.3	T-REF Torque reference 3.2.7	--- (Unused)	T-REF Torque limit value 3.2.7	T-REF Torque feed-forward reference
2	--- (Unused)	SG-T Signal ground for torque feed-forward reference	SG-T Signal ground for torque reference	SG-T Signal ground for torque reference	--- (Unused) 3.2.7	SG-T Signal ground for torque limit value 3.2.7	SG-T Signal ground for torque feed-forward reference
3	V-REF Speed reference input 3.2.1	V-REF Speed reference 3.2.8	--- (Unused)	V-REF Speed limit value	V-REF Speed reference	V-REF Speed reference	V-REF Speed reference
4	SG-V Signal ground for speed reference input	SG-V Signal ground for speed reference		SG-V Signal ground for speed limit value	SG-V Signal ground for speed reference 3.2.7	SG-V Signal ground for speed reference 3.2.7	SG-V Signal ground for speed reference
5	--- (Unused)						
6	--- (Unused)						
7	$\overline{\text{BK}}$ Brake interlock output 3.4.4						
8	$\overline{\text{V-CMP}}$ Speed coincidence output 3.7.4						
9	$\overline{\text{TGON}}$ Running output 3.7.5						
10	SG-COM Signal ground common 3.2.4						
11	$\overline{\text{P-CL}}$ Forward rotation torque limit 3.1.3						
12	$\overline{\text{N-CL}}$ Reverse rotation torque limit 3.1.3						

1CN Terminal No.

Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, 3.2.1 represents Section 3.2.1.

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1CN Terminal No.	Specifications	Standard Specifications		Speed Control with Torque Feed-forward	Torque Control I	Torque Control II			
	Memory Switch Setting	Standard Setting		Cn-01 Bit F = 1	Cn-01 Bit A = 0, B = 1	Cn-01 Bit A = 1, B = 1			
	Memory Switch Setting					$\overline{\text{P-CON}}$ = OFF	$\overline{\text{P-CON}}$ = ON		
						---	Cn-01 Bit F = 0, Cn-02 Bit F = 0	Cn-01 Bit F = 0, Cn-02 Bit F = 1	Cn-01 Bit F = 1, Cn-02 Bit F = 0 or 1
13		+24VIN I/O power supply		*3.2.4*					
14		$\overline{\text{S-ON}}$ Servo ON		*3.7.2*					
15		$\overline{\text{P-CON}}$ Proportional control		*3.2.1*					
16		P-OT Forward rotation prohibited		*3.1.2*					
17		N-OT Reverse rotation prohibited		*3.1.2*					
18		$\overline{\text{ALMRST}}$ Alarm reset		*3.7.1*					
19		SG-PG Signal ground for PG signal output		*3.2.3*					
20		PAO Phase A	PG signal output						
21		*PAO Phase $\overline{\text{A}}$							
22		PBO Phase B							
23		*PBO Phase $\overline{\text{B}}$		*3.2.3*					
24		PCO Phase C							
25		*PCO Phase $\overline{\text{C}}$							
26		--- (Unused)							
27		--- (Unused)							
28		--- (Unused)							
29		--- (Unused)							

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1CN Terminal No.	Specifications	Standard Specifications	Speed Control with Torque Feed-forward	Torque Control I	Torque Control II		
	Memory Switch Setting	Standard Setting	Cn-01 Bit F = 1	Cn-01 Bit A = 0, B = 1	Cn-01 Bit A = 1, B = 1		
					$\overline{\text{P-CON}}$ = OFF	$\overline{\text{P-CON}}$ = ON	
					---	Cn-01 Bit F = 0, Cn-02 Bit F = 0	Cn-01 Bit F = 0, Cn-02 Bit F = 1	Cn-01 Bit F = 1, Cn-02 Bit F = 0 or 1
30		ALO1 Alarm code output						
31		ALO2 Alarm code output						
32		ALO3 Alarm code output						
33		SG-AL Signal ground for alarm code output	*3.7.1*					
34		ALM Alarm output						
35		ALM-SG Signal ground for alarm output	*3.7.1*					
36		FG Frame ground	*3.2.3*					

Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, *3.2.1* represents Section 3.2.1.

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SGDA-□□□P

Positions

List of I/O Signals for Position Control

Specifications	Standard Specifications		Absolute Encoder	Torque Limit Output	Contact Input Speed Control		CCW Pulse + CW Pulse Reference	90° Different Two-phase Pulse Reference
Memory Switch Setting	Standard Setting		Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-02 Bit 2 = 1 Cn-01 Bit F = 0	Cn-02 Bit 2 = 1 Cn-01 Bit F = 1	Cn-02 Bits 5, 4, 3 = 0, 0, 1	Cn-02 Bits 5, 4, 3 = 0, 1, 0 (x 1 multiplication) = 0, 1, 1 (x 2 multiplication) = 1, 0, 0 (x 4 multiplication)
1	PULS	Reference pulse input	3.2.2		--- (Unused)	PULS Reference pulse input 3.2.2	PULS Forward rotation (CCW) reference pulse input	PULS Phase A reference pulse input 3.2.2
2	*PULS					*PULS Reference pulse input 3.2.2	*PULS Forward rotation (CCW) reference pulse input	*PULS Phase A reference pulse input 3.2.2
3	SIGN	Reference sign input	3.2.2		--- (Unused)	SIGN Reference pulse input 3.2.2	SIGN Reverse rotation (CW) reference pulse input	SIGN Phase B reference pulse input 3.2.2
4	*SIGN					*SIGN Reference pulse input 3.2.2	*SIGN Reverse rotation (CW) reference pulse input	*SIGN Phase B reference pulse input 3.2.2
5	CLR	Error counter clear signal input	3.2.2					
6	*CLR		3.4.4					
7	$\overline{BK}$ Brake interlock output		3.7.3					
8	$\overline{COIN}$ Positioning complete signal							

1CN Terminal No.

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Specifications	Standard Specifications	Absolute Encoder	Torque Limit Output	Contact Input Speed Control		CCW Pulse + CW Pulse Reference	90° Different Two-phase Pulse Reference
Memory Switch Setting	**Standard Setting**	**Cn-01 Bit E = 1**	**Cn-01 Bit 4 = 1**	**Cn-02 Bit 2 = 1 Cn-01 Bit F = 0**	**Cn-02 Bit 2 = 1 Cn-01 Bit F = 1**	**Cn-02 Bits 5, 4, 3 = 0, 0, 1**	**Cn-02 Bits 5, 4, 3 = 0, 1, 0 (x 1 multiplication) = 0, 1, 1 (x 2 multiplication) = 1, 0, 0 (x 4 multiplication)**
9	$\overline{\text{TGON}}$ Running output	*3.7.5*	$\overline{\text{TGON}}$ Torque limit output *3.1.3*				
10	SG-COM Signal ground common	*3.2.4*					
11	$\overline{\text{P-CL}}$ Forward rotation torque limit	*3.1.3*	*3.2.6*	$\overline{\text{P-CL}}$ Contact input speed control mode 1	$\overline{\text{P-CL}}$ Contact input speed control mode 1	*3.2.6*	
12	$\overline{\text{N-CL}}$ Reverse rotation torque limit	*3.1.3*	*3.2.6*	$\overline{\text{N-CL}}$ Contact input speed control mode 2	$\overline{\text{N-CL}}$ Contact input speed control mode 2	*3.2.6*	
13	+24VIN I/O power supply	*3.2.4*					
14	$\overline{\text{S-ON}}$ Servo ON	*3.7.2*					
15	$\overline{\text{P-CON}}$ Proportional control	*3.2.1*	*3.2.6*	$\overline{\text{P-CON}}$ Rotation direction command at contact input speed control mode	$\overline{\text{P-CON}}$ Rotation direction command at contact input speed control mode	*3.2.6*	
16	P-OT Forward rotation prohibited	*3.1.2*					

1CN Terminal No.

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Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, *3.2.1* represents Section 3.2.1.

1CN Terminal No.	Specifications	Standard Specifications		Absolute Encoder	Torque Limit Output	Contact Input Speed Control		CCW Pulse + CW Pulse Reference	90° Different Two-phase Pulse Reference
	Memory Switch Setting	Standard Setting		Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-02 Bit 2 = 1 Cn-01 Bit F = 0	Cn-02 Bit 2 = 1 Cn-01 Bit F = 1	Cn-02 Bits 5, 4, 3 = 0, 0, 1	Cn-02 Bits 5, 4, 3 = 0, 1, 0 (x 1 multiplication) = 0, 1, 1 (x 2 multiplication) = 1, 0, 0 (x 4 multiplication)
17		N-OT Reverse rotation prohibited	*3.1.2*						
18		$\overline{\text{ALMRST}}$ Alarm reset	*3.7.1*						
19		SG-PG Signal ground for PG signal output	*3.2.3*						
20		PAO Phase A	PG signal output						
21		*PAO Phase $\overline{\text{A}}$							
22		PBO Phase B	*3.2.3*						
23		*PBO Phase $\overline{\text{B}}$							
24		PCO Phase C							
25		*PCO Phase $\overline{\text{C}}$							

Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, *3.2.1* represents Section 3.2.1.

1CN Terminal No.

Specifications	Standard Specifications		Absolute Encoder	Torque Limit Output	Contact Input Speed Control		CCW Pulse + CW Pulse Reference	90° Different Two-phase Pulse Reference
Memory Switch Setting	Standard Setting		Cn-01 Bit E = 1	Cn-01 Bit 4 = 1	Cn-02 Bit 2 = 1 Cn-01 Bit F = 0	Cn-02 Bit 2 = 1 Cn-01 Bit F = 1	Cn-02 Bits 5, 4, 3 = 0, 0, 1	Cn-02 Bits 5, 4, 3 = 0, 1, 0 (x 1 multiplication) = 0, 1, 1 (x 2 multiplication) = 1, 0, 0 (x 4 multiplication)
26	--- (Unused)		PSO Phase S output					
27	--- (Unused)		*PSO Phase $\overline{S}$ output	3.8.5				
28	--- (Unused)		BAT Backup battery (+) input	3.8.5				
29	--- (Unused)		BAT0 Backup battery (–) input	3.8.5				
30	ALO1	Alarm code output						
31	ALO2							
32	ALO3			3.7.1				
33	SG-AL Signal ground for alarm code output							
34	ALM Alarm output			3.7.1				
35	ALM-SG Signal ground for alarm output							
36	FG Frame ground			3.2.3				

Note Information described in the "Standard Specifications" column is also applicable to blank columns.
Number "x.x.x" in box represents a section number corresponding to each signal name. For example, 3.2.1 represents Section 3.2.1.

C