MITSUBISHI ELECTRIC

INVERTER
A800 Plus
LOGISTICS/TRANSPORT FUNCTION MANUAL

FR-A820-00046(0.4K)-04750(90K)-AWH
FR-A840-00023(0.4K)-02600(90K)-AWH

Logistics/Transport Function

The FR-A800-AWH inverter has dedicated functions for logistics/transport applications, in addition to the functions of the standard FR-A800 inverter.
This Logistics/Transport Function Manual explains the functions dedicated to the FR-A800-AWH inverter. For the functions not found in this Function Manual, refer to the FR-A800 Instruction Manual and the Ethernet Function Manual.
In addition to this Logistics/Transport Function Manual, please read the FR-A800 Instruction Manual and the Ethernet Function Manual carefully. Do not use this product until you have a full knowledge of this product mechanism, safety information and instructions.
Please forward this Function Manual to the end user.

A800-AWH

CONTENTS

1 INTRODUCTION

This chapter explains the outline of this product.

1.1 FR-A800-AWH overview

◆ FR-A800-AWH dedicated functions

The FR-A800-AWH inverter has the following dedicated functions for logistics/transport applications, in addition to the functions of the standard FR-A800 inverter.

- Full-closed control by directly inputting distance meter data
- Anti-sway control dedicated to logistics/transport application
- System failure function

For information on the other functional differences, refer to page 149.

Use either communication of CC-Link, CC-Link IE Field Network, and CC-Link IE Field Network Basic to specify the position/speed and input the start command by the host controller.

◆ Inverter model

Unpack the product and check the rating plate and the capacity plate of the inverter to ensure that the model agrees with the order and the product is intact.

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Description
00023 to 04750	Inverter SLD rated current (A)
0.4K to 90K	Inverter ND rated capacity (kW)

Symbol	Type	Communication type
1	FM	RS-485
2	CA	
E1	FM	Ethernet
E2	CA	

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Symbol	Circuit board coating *1	Plated conductor
Without	Without	Without
60	With	Without
06 *2	With	With

Symbol	Application
AWH	Logistics/transport model

*1 Conforming to IEC 60721-3-3:1994 3C2/3S2

*2 Applicable for the FR-A820-00340(5.5K) or higher, and the FR-A840-00170(5.5K) or higher.

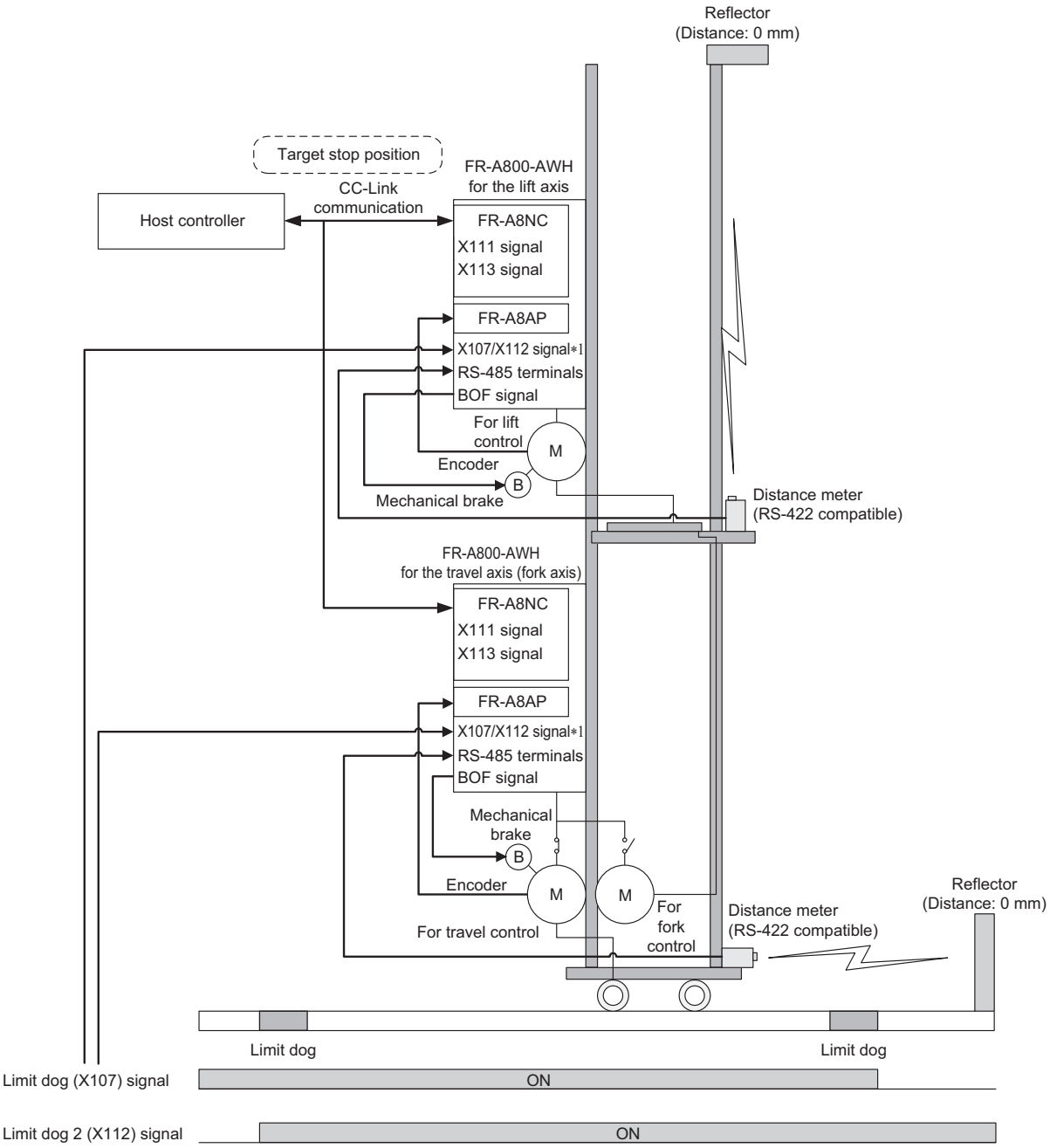
◆ Abbreviations

Abbreviation / generic name	Description
DU	Operation panel (FR-DU08)
Operation panel	Operation panel (FR-DU08) and LCD operation panel (FR-LU08)
Parameter unit	Parameter unit (FR-PU07)
PU	Operation panel and parameter unit
Inverter	Mitsubishi Electric FR-A800-AWH logistics/transport dedicated inverter
Vector control compatible option	FR-A8AP/FR-A8AL/FR-A8APR/FR-A8APS (plug-in option), FR-A8TP (control terminal option)
Pr.	Parameter number (Number assigned to function)

1.2 System configuration example

◆Configuration example of a stacker crane

- Communication with the host controller: CC-Link, communication with the distance meter: RS-422

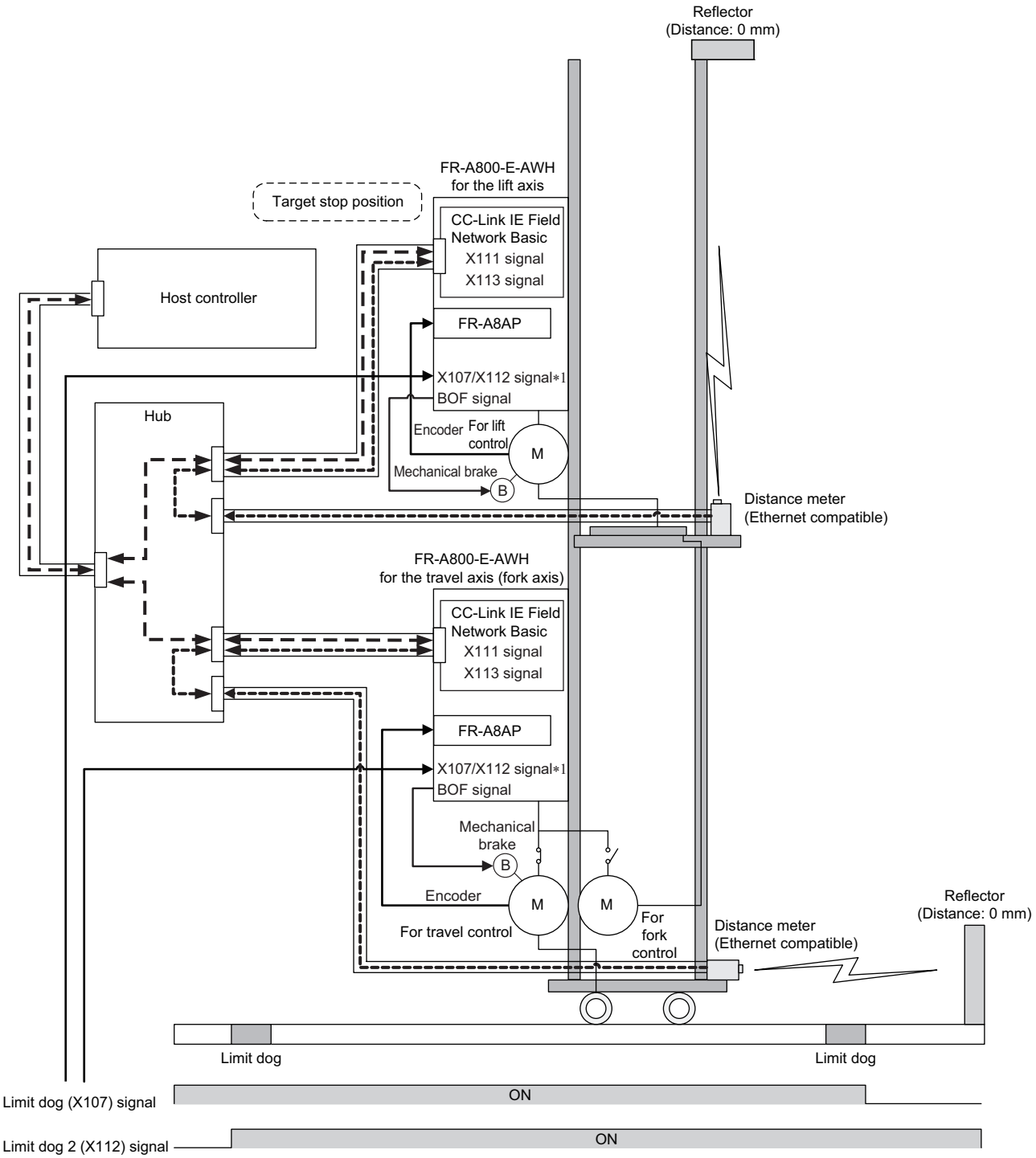


*1 To use the inverter safely, it is recommended to use the Limit dog (X107) signal and the Limit dog 2 (X112) signal.

NOTE

- The inverter uses data from the distance meter and other connected devices to perform control. Check the following points periodically to ensure safe operation (externally without using the inverter).
  Distance meters accurately recognize positions.
  Limit dogs are correctly recognized.
  Limit dogs and distance meters are connected correctly.
  Mechanical brakes operate correctly.

- Communication with the host controller: CC-Link IE Field Network Basic, communication with the distance meter: Ethernet



Communication (CC-Link IE Field Network Basic) between the host controller and each inverter

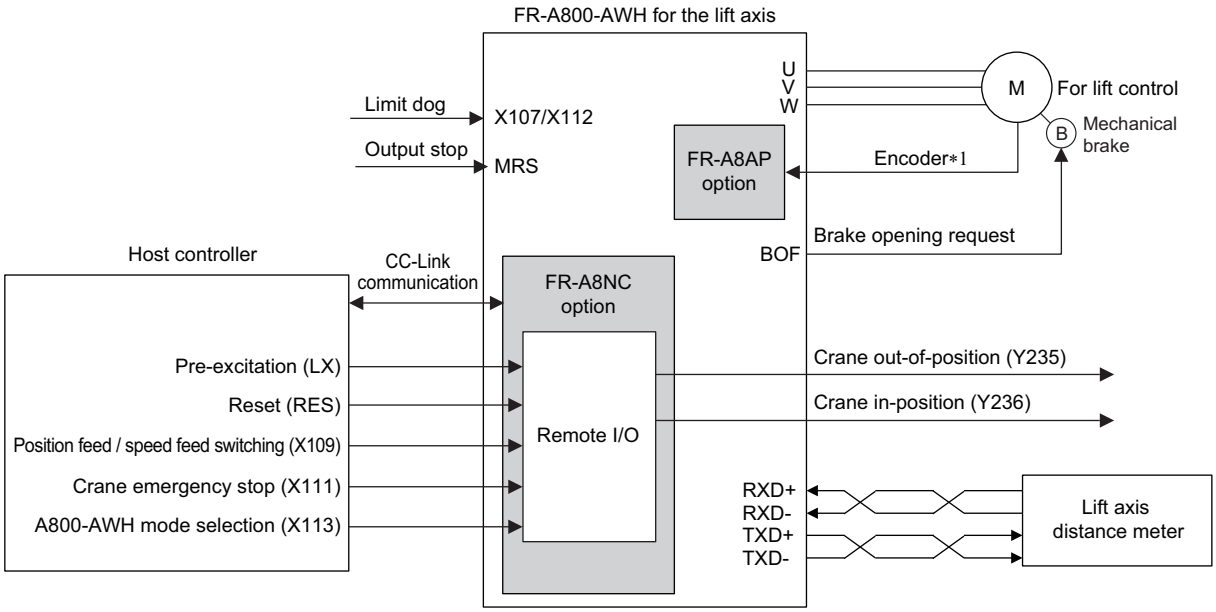
Communication between the inverter and the distance meter

*1 To use the inverter safely, it is recommended to use the Limit dog (X107) signal and the Limit dog 2 (X112) signal.

NOTE

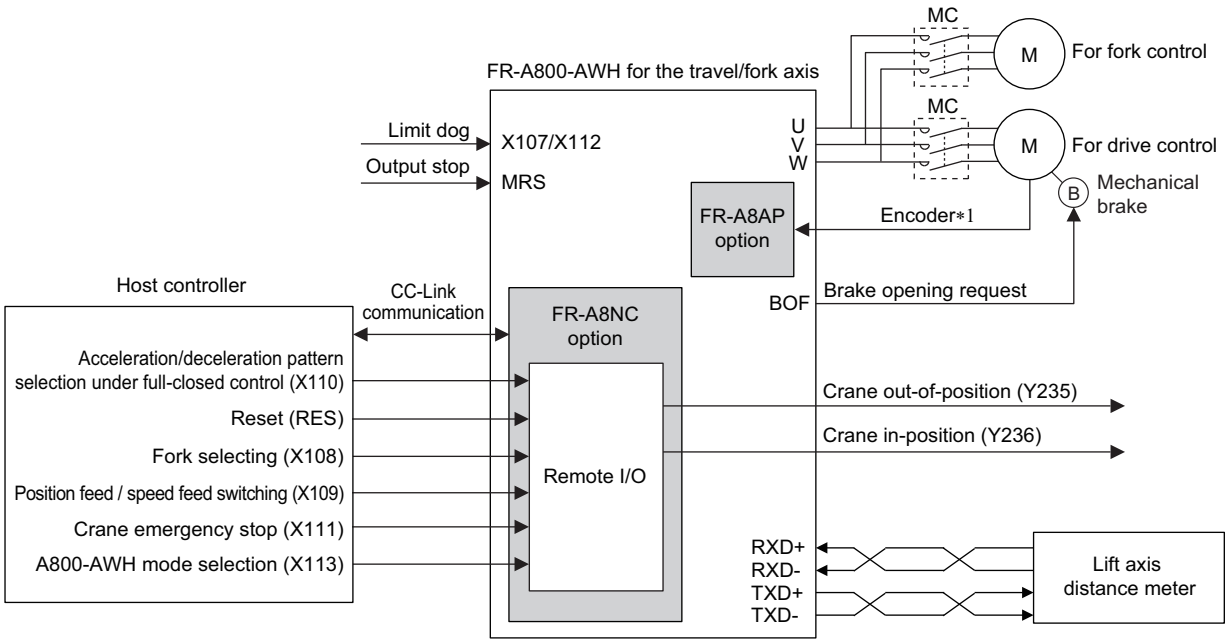
- The inverter uses data from the distance meter and other connected devices to perform control. Check the following points periodically to ensure safe operation (externally without using the inverter).
  Distance meters accurately recognize positions.
  Limit dogs are correctly recognized.
  Limit dogs and distance meters are connected correctly.
  Mechanical brakes operate correctly.

◆Wiring example of a lift axis inverter



*1 A separate power supply of 5 V /12 V /15 V /24 V is necessary according to the encoder power specification.

◆Wiring example of a travel/fork axis inverter



*1 A separate power supply of 5 V /12 V /15 V /24 V is necessary according to the encoder power specification.

1.3 Related manuals

Manuals related to this product are shown in the following table.

Name	Manual number
FR-A800-AWH Instruction Manual (Startup)	IB-0600891
FR-A800 Instruction Manual (Detailed)	IB-0600503ENG
Ethernet Function Manual	IB-0600628ENG
FR-A8NC Instruction Manual	IB-0600501ENG
FR-A8NCE Instruction Manual	IB-0600509ENG
FR-A8APS-02 Instruction Manual	IB-0600898ENG

2 PARAMETER LIST

The following marks are used to indicate the controls. (Parameters without any mark are valid for all the controls.)

Mark	Control method
V/F	V/F control
Magnetic flux	Advanced magnetic flux vector control
Sensorless	Real sensorless vector control
Vector	Vector control

2.1 Parameter list (by parameter number)

For simple variable-speed operation of the inverter, the initial values of the parameters may be used as they are. Set the necessary parameters to meet the load and operational specifications. Parameter's setting, change and check can be made on the operation panel (FR-DU08).

NOTE

- Simple indicates simple mode parameters. Use **Pr.160 User group read selection** to indicate the simple mode parameters only (initial setting is to indicate the extended mode parameters).
- The changing of the parameter settings may be restricted in some operating status. Use **Pr.77 Parameter write selection** to change the setting of the restriction.
- Refer to page 156 for instruction codes for communication and availability of Parameter clear, All parameter clear, and Parameter copy.
- The specification differs for some parameters depending on the date of manufacture of the inverter. For the details, refer to page 173.

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value FM	Initial value CA	Refer to page	Customer setting
0	G000	Torque boost Simple	0% to 30%	0.1%	6%*1 4%*1 3%*1 2%*1 1%*1		—*19	
1	H400	Maximum frequency Simple	0 to 120 Hz	0.01 Hz	120 Hz*2 60 Hz*3		—*19	
2	H401	Minimum frequency Simple	0 to 120 Hz	0.01 Hz	0 Hz		—*19	
3	G001	Base frequency Simple	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
4	D301	Multi-speed setting (high speed) Simple	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
5	D302	Multi-speed setting (middle speed) Simple	0 to 590 Hz	0.01 Hz	30 Hz		—*19	
6	D303	Multi-speed setting (low speed) Simple	0 to 590 Hz	0.01 Hz	10 Hz		—*19	
7	F010	Acceleration time Simple	0 to 3600 s	0.1 s	5 s*4 15 s*5		49	
8	F011	Deceleration time Simple	0 to 3600 s	0.1 s	5 s*4 15 s*5		49	
9	H000 C103	Electronic thermal O/L relay Simple Rated motor current Simple	0 to 500 A*2 0 to 3600 A*3	0.01 A*2 0.1 A*3	Inverter rated current		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
10	G100	DC injection brake operation frequency	0 to 120 Hz, 9999	0.01 Hz	3 Hz		—*19	
11	G101	DC injection brake operation time	0 to 10 s, 8888	0.1 s	0.5 s		—*19	
12	G110	DC injection brake operation voltage	0% to 30%	0.1%	4%*6 2%*6 1%*6		—*19	
13	F102	Starting frequency	0 to 60 Hz	0.01 Hz	0.5 Hz		—*19	
14	G003	Load pattern selection	0 to 5, 12 to 15	1	0		—*19	
15	D200	Jog frequency	0 to 590 Hz	0.01 Hz	5 Hz		—*19	
16	F002	Jog acceleration/ deceleration time	0 to 3600 s	0.1 s	0.5 s		—*19	
17	T720	MRS input selection	0, 2, 4	1	0		—*19	
18	H402	High speed maximum frequency	0 to 590 Hz	0.01 Hz	120 Hz*2 60 Hz*3		—*19	
19	G002	Base frequency voltage	0 to 1000 V, 8888, 9999	0.1 V	9999	8888	—*19	
20	F000	Acceleration/deceleration reference frequency	1 to 590 Hz	0.01 Hz	60 Hz	50 Hz	42	
21	F001	Acceleration/deceleration time increments	0, 1	1	0		—*19	
22	H500	Stall prevention operation level (Torque limit level)	0% to 400%	0.1%	150%		—*19	
23	H610	Stall prevention operation level compensation factor at double speed	0% to 200%, 9999	0.1%	9999		—*19	
24 to 27	D304 to D307	Multi-speed setting (speed 4 to speed 7)	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
28	D300	Multi-speed input compensation selection	0, 1	1	0		—*19	
30	E300	Regenerative function selection	0 to 2, 10, 11, 20, 21, 100 to 102, 110, 111, 120, 121	1	0		—*19	
31	W030	Crane creep speed	0 to 60 Hz	0.01 Hz	0 Hz		65	
32	W031	Travel distance at creep speed	0 to 6553.4 mm	0.1 mm	0 mm		65	
33	W032	Position loop compensation selection after crane decelerate to creep speed	0, 1	1	1		65	
34	W033	Stop position compensation width	0 to 200 mm	0.1 mm	100 mm		65	
37	M000	Speed display	0, 1 to 9998	1	0		—*19	
41	M441	Up-to-frequency sensitivity	0% to 100%	0.1%	10%		—*19	
42	M442	Output frequency detection	0 to 590 Hz	0.01 Hz	6 Hz		—*19	
43	M443	Output frequency detection for reverse rotation	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
44	F020	Second acceleration/ deceleration time	0 to 3600 s	0.1 s	5 s		45	
45	F021	Second deceleration time	0 to 3600 s, 9999	0.1 s	9999		45	
46	G010	Second torque boost	0% to 30%, 9999	0.1%	9999		—*19	
47	G011	Second V/F (base frequency)	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
48	H600	Second stall prevention operation level	0% to 400%	0.1%	150%		—*19	
49	H601	Second stall prevention operation frequency	0 to 590 Hz, 9999	0.01 Hz	0 Hz		—*19	
50	M444	Second output frequency detection	0 to 590 Hz	0.01 Hz	30 Hz		—*19	
51	H010 C203	Second electronic thermal O/L relay Rated second motor current	0 to 500 A, 9999*2 0 to 3600 A, 9999*3	0.01 A*2 0.1 A*3	9999		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
52	M100	Operation panel main monitor selection	0, 5 to 14, 17, 18, 20, 23 to 25, 32 to 36, 38 to 46, 50 to 52, 54 to 57, 61, 62, 64, 67, 71 to 74, 81, 87 to 98, 100	1	0		134	
54	M300	FM/CA terminal function selection	1 to 3, 5 to 14, 17, 18, 21, 24, 32 to 34, 36, 46, 50, 52, 61, 62, 67, 70, 81, 87 to 92, 98	1	1		135	
55	M040	Frequency monitoring reference	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
56	M041	Current monitoring reference	0 to 500 A*2	0.01 A*2	Inverter rated current		—*19	
			0 to 3600 A *3	0.1 A*3				
57	A702	Restart coasting time	0, 0.1 to 30 s, 9999	0.1 s	9999		—*19	
58	A703	Restart cushion time	0 to 60 s	0.1 s	1 s		—*19	
60	W000 W100	A800-AWH mode selection	0 to 2, 10*18, 11*18	1	0		42, 90	
65	H300	Retry selection	0 to 5	1	0		—*19	
66	H611	Stall prevention operation reduction starting frequency	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
67	H301	Number of retries at fault occurrence	0 to 10, 101 to 110	1	0		—*19	
68	H302	Retry waiting time	0.1 to 600 s	0.1 s	1 s		—*19	
69	H303	Retry count display erase	0	1	0		—*19	
70	G107	Special regenerative brake duty	0% to 100%	0.1%	0%		—*19	
71	C100	Applied motor	0, 1, 3 to 6, 13 to 16, 20, 23, 24, 30, 33, 34, 40, 43, 44, 50, 53, 54, 70, 73, 74	1	0		—*19	
72	E600	PWM frequency selection	2, 6, 10, 14*2	1	2		—*19	
			2, 6*3					
73	T000	Analog input selection	0 to 7, 10 to 17	1	1		—*19	
74	T002	Input filter time constant	0 to 8	1	1		—*19	
75	—	Reset selection/ disconnected PU detection/ PU stop selection	0 to 3, 14 to 17, 1000 to 1003, 1014 to 1017*2	1	14		—*19	
			0 to 3, 14 to 17, 100 to 103, 114 to 117, 1000 to 1003, 1014 to 1017, 1100 to 1103, 1114 to 1117*3					
	E100	Reset selection	0 to 3		0			
	E101	Disconnected PU detection	0, 1					
	E102	PU stop selection			1			
	E107	Reset limit	0*2	1	0			
			0, 1*3					
76	M510	Fault code output selection	0 to 2	1	0		—*19	
77	E400	Parameter write selection	0 to 2	1	0		—*19	
78	D020	Reverse rotation prevention selection	0 to 2	1	0		—*19	
79	D000	Operation mode selection Simple	0 to 4, 6, 7	1	0		—*19	
80	C101	Motor capacity	0.4 to 55 kW, 9999*2	0.01 kW*2	9999		—*19	
			0 to 3600 kW, 9999*3	0.1 kW*3				
81	C102	Number of motor poles	2, 4, 6, 8, 10, 12, 9999	1	9999		—*19	
82	C125	Motor excitation current	0 to 500 A, 9999*2	0.01 A*2	9999		—*19	
			0 to 3600 A, 9999*3	0.1 A*3				

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
83	C104	Rated motor voltage	0 to 1000 V	0.1 V	200 V[*7] 400 V[*8]		—[*19]	
84	C105	Rated motor frequency	10 to 400 Hz, 9999	0.01 Hz	9999		—[*19]	
85	G201	Excitation current break point	0 to 400 Hz, 9999	0.01 Hz	9999		—[*19]	
86	G202	Excitation current low-speed scaling factor	0% to 300%, 9999	0.1%	9999		—[*19]	
89	G932	Speed control gain (Advanced magnetic flux vector)	0% to 200%, 9999	0.1%	9999		—[*19]	
90	C120	Motor constant (R1)	0 to 50 Ω, 9999[*2] 0 to 400 mΩ, 9999[*3]	0.001 Ω[*2] 0.01 mΩ[*3]	9999		—[*19]	
91	C121	Motor constant (R2)	0 to 50 Ω, 9999[*2] 0 to 400 mΩ, 9999[*3]	0.001 Ω[*2] 0.01 mΩ[*3]	9999		—[*19]	
92	C122	Motor constant (L1)/d-axis inductance (Ld)	0 to 6000 mH, 9999[*2] 0 to 400 mH, 9999[*3]	0.1 mH[*2] 0.01 mH[*3]	9999		—[*19]	
93	C123	Motor constant (L2)/q-axis inductance (Lq)	0 to 6000 mH, 9999[*2] 0 to 400 mH, 9999[*3]	0.1 mH[*2] 0.01 mH[*3]	9999		—[*19]	
94	C124	Motor constant (X)	0% to 100%, 9999	0.1%[*2] 0.01%[*3]	9999		—[*19]	
95	C111	Online auto tuning selection	0 to 2	1	0		—[*19]	
96	C110	Auto tuning setting/status	0, 1, 11, 101	1	0		—[*19]	
100	W001	Reference travel speed	1 to 600 m/min, 9999	0.01 m/min	9999		42	
104	W040 W220	Crane in-position width	0 to 1000 mm	0.1 mm	10 mm		72	
105	W011	Crane position loop P gain 1	0 to 150 s^{-1}	0.1 s^{-1}	1 s^{-1}		67	
106	W012	Crane position loop P gain 2	0 to 150 s^{-1}, 9999	0.1 s^{-1}	9999		67	
107	W013	Crane position loop P gain corner frequency 1	0 to 200 Hz	0.01 Hz	0 Hz		67	
108	W014	Crane position loop P gain corner frequency 2	0 to 200 Hz	0.01 Hz	60 Hz		67	
109	W015	Crane position loop filter	0 to 5 s	0.001 s	0 s		67	
110	W070	Third acceleration/ deceleration time	0 to 3600 s	0.1 s	5 s		49	
111	W071	Third deceleration time	0 to 3600 s, 9999	0.1 s	9999		49	
112	W080	Distance measurement direction setting	0, 1	1	0		52	
113	W016	Crane position loop integral time	0 to 10 s	0.1 s	0 s		67	
114	W017	Compensation rate of crane position loop upper limit	0% to 100%, 9999	0.1%	9999		67	
115	W018	Compensation frequency of low-speed range crane position loop upper limit	0 to 200 Hz	0.01 Hz	5 Hz		67	
117	N020	PU communication station number	0 to 31	1	0		—[*19]	
118	N021	PU communication speed	48, 96, 192, 384, 576, 768, 1152	1	192		—[*19]	
119	— N022 N023	PU communication stop bit length / data length PU communication data length PU communication stop bit length	0, 1, 10, 11 0, 1 0, 1	1	1 0 1		—[*19]	
120	N024	PU communication parity check	0 to 2	1	2		—[*19]	
121	N025	PU communication retry count	0 to 10, 9999	1	1		—[*19]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
122	N026	PU communication check time interval	0, 0.1 to 999.8 s, 9999	0.1 s	9999		—*19	
123	N027	PU communication waiting time setting	0 to 150 ms, 9999	1 ms	9999		—*19	
124	N028	PU communication CR/LF selection	0 to 2	1	1		—*19	
125	T022	Terminal 2 frequency setting gain frequency Simple	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
126	T042	Terminal 4 frequency setting gain frequency Simple	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
127	W041	Crane in-position time	0 to 5 s	0.01 s	0 s		72	
128	W002 W320	Motion range 1	0 to 300 m	0.01 m	0.01 m		75	
129	W003 W321	Motion range 2	0 to 300 m	0.01 m	300 m		75	
130	W042	Crane position detection range	0 to 1000 mm	0.1 mm	10 mm		72	
131	W004	Motion range sign selection	0 to 2	1	0		75	
132	W005	Home position (upper digits)	0 to 300	1	0		75	
133	W006	Home position (lower digits)	0 to 999.9	0.1	0		75	
134	W043	Crane position detection range hysteresis	0 to 100 mm, 9999	0.1 mm	9999		72	
144	M002	Speed setting switchover	0, 2, 4, 6, 8, 10, 12, 102, 104, 106, 108, 110, 112	1	4		—*19	
145	E103	PU display language selection	0 to 7	1	—		—*19	
147	F022	Acceleration/deceleration time switching frequency	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
148	H620	Stall prevention level at 0 V input	0% to 400%	0.1%	150%		—*19	
149	H621	Stall prevention level at 10 V input	0% to 400%	0.1%	200%		—*19	
150	M460	Output current detection level	0% to 400%	0.1%	150%		—*19	
151	M461	Output current detection signal delay time	0 to 10 s	0.1 s	0 s		—*19	
152	M462	Zero current detection level	0% to 400%	0.1%	5%		—*19	
153	M463	Zero current detection time	0 to 10 s	0.01 s	0.5 s		—*19	
154	H631	Voltage reduction selection during stall prevention operation	0, 1, 10, 11	1	1		—*19	
155	T730	RT signal function validity condition selection	0, 10	1	0		—*19	
156	H501	Stall prevention operation selection	0 to 31, 100, 101	1	0		—*19	
157	M430	OL signal output timer	0 to 25 s, 9999	0.1 s	0 s		—*19	
158	M301	AM terminal function selection	1 to 3, 5 to 14, 17, 18, 21, 24, 32 to 34, 36, 46, 50, 52, 61, 62, 67, 70, 81, 87 to 92, 98	1	1		135	
160	E440	User group read selection Simple	0, 1, 9999	1	0		—*19	
161	E200	Frequency setting/key lock operation selection	0, 1, 10, 11	1	0		—*19	
162	A700	Automatic restart after instantaneous power failure selection	0 to 3, 10 to 13	1	0		—*19	
163	A704	First cushion time for restart	0 to 20 s	0.1 s	0 s		—*19	
164	A705	First cushion voltage for restart	0% to 100%	0.1%	0%		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
165	A710	Stall prevention operation level for restart	0% to 400%	0.1%	150%		—*19	
166	M433	Output current detection signal retention time	0 to 10 s, 9999	0.1 s	0.1 s		—*19	
167	M464	Output current detection operation selection	0, 1, 10, 11	1	0		—*19	
168	E000	Parameter for manufacturer setting. Do not set.						
	E080							
169	E001							
	E081							
170	M020	Watt-hour meter clear	0, 10, 9999	1	9999		—*19	
171	M030	Operation hour meter clear	0, 9999	1	9999		—*19	
172	E441	User group registered display/batch clear	9999, (0 to 16)	1	0		—*19	
173	E442	User group registration	0 to 1999, 9999	1	9999		—*19	
174	E443	User group clear	0 to 1999, 9999	1	9999		—*19	
178	T700	STF terminal function selection	0 to 8, 10 to 13, 15 to 20, 23 to 25, 27, 28, 32, 42 to 44, 46 to 48, 50 to 53, 57, 58, 60, 62, 65 to 67, 70, 71, 74, 82, 85, 88, 89, 92, 93, 107 to 113, 9999	1	60		139	
179	T701	STR terminal function selection	0 to 8, 10 to 13, 15 to 20, 23 to 25, 27, 28, 32, 42 to 44, 46 to 48, 50 to 53, 57, 58, 61, 62, 65 to 67, 70, 71, 74, 82, 85, 88, 89, 92, 93, 107 to 113, 9999	1	61		139	
180	T702	RL terminal function selection	0 to 8, 10 to 13, 15 to 20, 23 to 25, 27, 28, 32, 42 to 44, 46 to 48, 50 to 53, 57, 58, 62, 65 to 67, 70, 71, 74, 82, 85, 88, 89, 92, 93, 107 to 113, 9999	1	0		139	
181	T703	RM terminal function selection		1	1		139	
182	T704	RH terminal function selection		1	2		139	
183	T705	RT terminal function selection		1	3		139	
184	T706	AU terminal function selection		1	4		139	
185	T707	JOG terminal function selection		1	5		139	
186	T708	CS terminal function selection		1	6		139	
187	T709	MRS terminal function selection		1	24		139	
188	T710	STOP terminal function selection		1	25		139	
189	T711	RES terminal function selection		1	62		139	
190	M400	RUN terminal function selection	0 to 5, 7, 8, 10 to 13, 17, 20, 25, 26, 30 to 35, 39 to 42, 44, 45, 55, 64, 67, 68, 79, 80, 85, 90 to 99, 100 to 105, 107, 108, 110 to 113, 120, 125, 126, 130 to 135, 139 to 142, 144, 145, 155, 164, 167, 168, 179, 180, 185, 190 to 199, 206 to 208, 211 to 213, 231, 233 to 236, 242, 306 to 308, 311 to 313, 331, 333 to 336, 342, 9999*13	1	0		140	
191	M401	SU terminal function selection		1	1		140	
192	M402	IPF terminal function selection		1	2		140	
193	M403	OL terminal function selection		1	3		140	
194	M404	FU terminal function selection		1	4		140	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
195	M405	ABC1 terminal function selection	0 to 5, 7, 8, 10 to 13, 17, 20, 25, 26, 30 to 35, 39 to 42, 44, 45, 55, 64, 67, 68, 79, 80, 85, 90, 91, 94 to 99, 100 to 105, 107, 108, 110 to 113, 120, 125, 126, 130 to 135, 139 to 142, 144, 145, 155, 164, 167, 168, 179, 180, 185, 190, 191, 194 to 199, 206 to 208, 211 to 213, 231, 233 to 236, 242, 306 to 308, 311 to 313, 331, 333 to 336, 342, 9999*13	1	99		140	
196	M406	ABC2 terminal function selection		1	9999		140	
232 to 239	D308 to D315	Multi-speed setting (speed 8 to speed 15)	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
240	E601	Soft-PWM operation selection	0, 1	1	1		—*19	
241	M043	Analog input display unit switchover	0, 1	1	0		—*19	
242	T021	Terminal 1 added compensation amount (terminal 2)	0% to 100%	0.1%	100%		—*19	
243	T041	Terminal 1 added compensation amount (terminal 4)	0% to 100%	0.1%	75%		—*19	
244	H100	Cooling fan operation selection	0, 1, 101 to 105	1	1		—*19	
245	G203	Rated slip	0% to 50%, 9999	0.01%	9999		—*19	
246	G204	Slip compensation time constant	0.01 to 10 s	0.01 s	0.5 s		—*19	
247	G205	Constant output range slip compensation selection	0, 9999	1	9999		—*19	
249	H101	Earth (ground) fault detection at start	0, 1	1	0		—*19	
250	G106	Stop selection	0 to 100 s, 1000 to 1100 s, 8888, 9999	0.1 s	9999		—*19	
251	H200	Output phase loss protection selection	0, 1	1	1		—*19	
252	T050	Override bias	0% to 200%	0.1%	50%		—*19	
253	T051	Override gain	0% to 200%	0.1%	150%		—*19	
255	E700	Life alarm status display	(0 to 31)	1	0		—*19	
256	E701	Inrush current limit circuit life display	(0% to 100%)	1%	100%		—*19	
257	E702	Control circuit capacitor life display	(0% to 100%)	1%	100%		—*19	
258	E703	Main circuit capacitor life display	(0% to 100%)	1%	100%		—*19	
259	E704	Main circuit capacitor life measuring	0, 1	1	0		—*19	
260	E602	PWM frequency automatic switchover	0, 1	1	1		—*19	
267	T001	Terminal 4 input selection	0 to 2	1	0		—*19	
268	M022	Monitor decimal digits selection	0, 1, 9999	1	9999		—*19	
269	E023	Parameter for manufacturer setting. Do not set.						
270	A200	Stop-on contact/load torque high-speed frequency control selection	0 to 3, 11, 13	1	0		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
271	A201	High-speed setting maximum current	0% to 400%	0.1%	50%		—*19	
272	A202	Middle-speed setting minimum current	0% to 400%	0.1%	100%		—*19	
273	A203	Current averaging range	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
274	A204	Current averaging filter time constant	1 to 4000	1	16		—*19	
275	A205	Stop-on contact excitation current low-speed scaling factor	0% to 300%, 9999	0.1%	9999		—*19	
276	A206	PWM carrier frequency at stop-on contact	0 to 9, 9999*2 0 to 4, 9999*3	1	9999		—*19	
278	W221	Brake opening frequency	0 to 30 Hz	0.01 Hz	3 Hz		52	
279	W222	Brake opening current	0% to 400%	0.1%	130%		52	
280	W223	Brake opening current detection time	0 to 2 s	0.01 s	0.3 s		52	
281	W200	Brake operation time at start	0 to 5 s	0.01 s	0.3 s		52	
282	W201	Brake operation frequency	0 to 30 Hz	0.01 Hz	6 Hz		52	
283	W224	Brake operation time at stop	0 to 5 s	0.01 s	0.3 s		52	
285	A107	Overspeed detection frequency	0 to 30 Hz, 9999	0.01 Hz	9999		—*19	
	H416	Speed deviation excess detection frequency						
286	G400	Droop gain	0% to 100%	0.1%	0%		—*19	
287	G401	Droop filter time constant	0 to 1 s	0.01 s	0.3 s		—*19	
288	G402	Droop function activation selection	0 to 2, 10, 11, 20 to 22	1	0		—*19	
289	M431	Inverter output terminal filter	5 to 50 ms, 9999	1 ms	9999		—*19	
290	M044	Monitor negative output selection	0 to 7	1	0		—*19	
291	D100	Pulse train I/O selection	[FM type] 0, 1, 10, 11, 20, 21, 100 [CA type] 0, 1	1	0		—*19	
295	E201	Frequency change increment amount setting	0, 0.01, 0.1, 1, 10	0.01	0		—*19	
296	E410	Password lock level	0 to 6, 99, 100 to 106, 199, 9999	1	9999		—*19	
297	E411	Password lock/unlock	(0 to 5), 1000 to 9998, 9999	1	9999		—*19	
298	A711	Frequency search gain	0 to 32767, 9999	1	9999		—*19	
299	A701	Rotation direction detection selection at restarting	0, 1, 9999	1	0		—*19	
313*12	M410	DO0 output selection	0 to 5, 7, 8, 10 to 13, 20, 25, 26, 30 to 35, 39 to 42, 44, 45, 55, 64, 68, 79, 80, 85 to 99, 100 to 105, 107, 108, 110 to 113, 120, 125, 126, 130 to 135, 139 to 142, 144, 145, 155, 164, 168, 179, 180, 185 to 199, 206 to 208, 211 to 213, 231, 233 to 236, 242, 306 to 308, 311 to 313, 331, 333 to 336, 342, 9999*13	1	9999		140	
314*12	M411	DO1 output selection		1	9999		140	
315*12	M412	DO2 output selection		1	9999		140	
316*12	M413	DO3 output selection		1	9999		140	
317*12	M414	DO4 output selection		1	9999		140	
318*12	M415	DO5 output selection		1	9999		140	
319*12	M416	DO6 output selection		1	9999		140	
320*12	M420	RA1 output selection	0 to 5, 7, 8, 10 to 13, 20, 25, 26, 30 to 35, 39 to 42, 44, 45, 55, 64, 68, 79, 80, 85 to 91, 94 to 99, 206 to 208, 211 to 213, 231, 233 to 236, 242, 9999*13	1	0		140	
321*12	M421	RA2 output selection		1	1		140	
322*12	M422	RA3 output selection		1	2		140	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
331	N030	RS-485 communication station number	0 to 31 (0 to 247)	1	0		—*19	
332	N031	RS-485 communication speed	3, 6, 12, 24, 48, 96, 192, 384, 576, 768, 1152	1	96		79	
333	—	RS-485 communication stop bit length / data length	0, 1, 10, 11	1	1		79	
	N032	RS-485 communication data length	0, 1	1	0		79	
	N033	RS-485 communication stop bit length	0, 1	1	1		79	
334	N034	RS-485 communication parity check selection	0 to 2	1	2		79	
335	N035	RS-485 communication retry count	0 to 10, 9999	1	1		79	
336	N036	RS-485 communication check time interval	0 to 999.8 s, 9999	0.1 s	0 s		79	
337	N037	RS-485 communication waiting time setting	0 to 150 ms, 9999	1 ms	9999		—*19	
338	D010	Communication operation command source	0, 1	1	0		—*19	
339	D011	Communication speed command source	0 to 2	1	0		—*19	
340	D001	Communication startup mode selection	0 to 2, 10, 12	1	0		—*19	
341	N038	RS-485 communication CR/LF selection	0 to 2	1	1		—*19	
342	N001	Communication EEPROM write selection	0, 1	1	0		—*19	
343	N080	Communication error count	—	1	0		—*19	
349*18	—	Communication reset selection/Ready bit status selection	0, 1, 100, 101	1	0		—*20	
	N010	Communication reset selection	0, 1	1	0		—*20	
	N240	Ready bit status selection	0, 1	1	0		—*20	
350	W210	Brake operation time at deceleration	0 to 30 s	0.01 s	3 s		52	
351	W225	Brake operation time at start 2	0 to 2 s, 9999	0.01 s	9999		52	
352	W226	Brake operation position range	0 to 1000 mm, 9999	0.1 mm	9999		52	
353	W227	Brake release request signal output selection	1, 9999	1	9999		52	
355	W050	Crane vibration suppression frequency	0.1 to 10 Hz, 9999	0.01 Hz	9999		73	
356	W051	Crane vibration suppression gain	0% to 500%	1%	100%		73	
357	W052	Crane model adaptive position loop gain	0 to 150 s^{-1}	0.1 s^{-1}	1 s^{-1}		74	
359*9	C141	Encoder rotation direction	0, 1, 100, 101	1	1		—*19	
362	W060	Dual feedback filter	0 to 1 s	0.01 s	0 s		70	
363	W061	Crane position detection filter	0 to 0.5 s	0.01 s	0 s		71	
364	W062	Crane position data compensation judgment level	0 to 1000 mm, 9999	0.1 mm	9999		71	
365	W063	Upper limit of crane position data compensation	1 to 5	1	1		71	
367*9	G240	Speed feedback range	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
368*9	G241	Feedback gain	0 to 100	0.1	1		—*19	
369*9	C140	Number of encoder pulses	0 to 4096	1	1024		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
374	H800	Overspeed detection level	0 to 590 Hz, 9999	0.01 Hz	9999		101	
376*9	C148	Encoder signal loss detection enable/disable selection	0, 1	1	0		—*19	
384	D101	Input pulse division scaling factor	0 to 250	1	0		—*19	
385	D110	Frequency for zero input pulse	0 to 590 Hz	0.01 Hz	0 Hz		—*19	
386	D111	Frequency for maximum input pulse	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
393	W300	System failure detection	0 to 65535	1	65535		101	
394	W301	Operation selection after system failure detection	0 to 65535	1	0		101	
395	W302	Deceleration time after system failure detection	0 to 650 s, 9999	0.1 s	9999		49	
396	W303	Crane speed detection filter	0 to 1 s	0.01 s	0.3 s		101	
397	W304	Limit dog operation selection	0, 1	1	1		89, 101	
398	W322	Speed range excess fault detection frequency	0% to 100%, 9999	1%	9999		101	
399	W323	Speed range excess fault detection time	0 to 10 s	0.1 s	0 s		101	
413*9	M601	Encoder pulse division ratio	1 to 32767	1	1		—*19	
414	A800	PLC function operation selection	0 to 2, 11, 12	1	0		—*19	
415	A801	Inverter operation lock mode setting	0, 1	1	0		—*19	
416	A802	Pre-scale function selection	0 to 5	1	0		—*19	
417	A803	Pre-scale setting value	0 to 32767	1	1		—*19	
422	B003	Position control gain	0 to 150 s^{-1}	1 s^{-1}	25 s^{-1}		—*19	
432*9	D120	Pulse train torque command bias	0% to 400%	1%	0%		—*19	
433*9	D121	Pulse train torque command gain	0% to 400%	1%	150%		—*19	
450	C200	Second applied motor	0, 1, 3 to 6, 13 to 16, 20, 23, 24, 30, 33, 34, 40, 43, 44, 50, 53, 54, 70, 73, 74, 9999	1	9999		—*19	
451	G300	Second motor control method selection	0, 1, 6, 10, 11, 20, 9999	1	9999		—*19	
453	C201	Second motor capacity	0.4 to 55 kW, 9999*2	0.01 kW*2	9999		—*19	
			0 to 3600 kW, 9999*3	0.1 kW*3				
454	C202	Number of second motor poles	2, 4, 6, 8, 10, 12, 9999	1	9999		—*19	
455	C225	Second motor excitation current	0 to 500 A, 9999*2	0.01 A*2	9999		—*19	
			0 to 3600 A, 9999*3	0.1 A*3				
456	C204	Rated second motor voltage	0 to 1000 V	0.1 V	200 V*7		—*19	
					400 V*8			
457	C205	Rated second motor frequency	10 to 400 Hz, 9999	0.01 Hz	9999		—*19	
458	C220	Second motor constant (R1)	0 to 50 Ω, 9999*2	0.001 Ω*2	9999		—*19	
			0 to 400 mΩ, 9999*3	0.01 mΩ*3				
459	C221	Second motor constant (R2)	0 to 50 Ω, 9999*2	0.001 Ω*2	9999		—*19	
			0 to 400 mΩ, 9999*3	0.01 mΩ*3				
460	C222	Second motor constant (L1)	0 to 6000 mH, 9999*2	0.1 mH*2	9999		—*19	
			0 to 400 mH, 9999*3	0.01 mH*3				
461	C223	Second motor constant (L2)	0 to 6000 mH, 9999*2	0.1 mH*2	9999		—*19	
			0 to 400 mH, 9999*3	0.01 mH*3				

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
462	C224	Second motor constant (X)	0% to 100%, 9999	0.1%[*2] 0.01%[*3]	9999		—[*19]	
463	C210	Second motor auto tuning setting/status	0, 1, 11, 101	1	0		—[*19]	
495	M500	Remote output selection	0, 1, 10, 11	1	0		—[*19]	
496	M501	Remote output data 1	0 to 4095	1	0		—[*19]	
497	M502	Remote output data 2	0 to 4095	1	0		—[*19]	
498	A804	PLC function flash memory clear	0, 9696 (0 to 9999)	1	0		—[*19]	
502	N013	Stop mode selection at communication error	0 to 4	1	0		—[*19]	
503	E710	Maintenance timer 1	0 (1 to 9998)	1	0		—[*19]	
504	E711	Maintenance timer 1 warning output set time	0 to 9998, 9999	1	9999		—[*19]	
505	M001	Speed setting reference	1 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—[*19]	
516	W072	S-curve acceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	
517	W073	S-curve deceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	
518	W110	Second S-curve acceleration time	0.1 to 2.5 s	0.1 s	0.1 s		45	
519	W111	Second S-curve deceleration time	0.1 to 2.5 s	0.1 s	0.1 s		45	
539	N002	MODBUS RTU communication check time interval	0 to 999.8 s, 9999	0.1 s	9999		—[*19]	
541[*18]	N100	Frequency command sign selection	0, 1	1	0		—[*19]	
544[*18]	N103	CC-Link extended setting	0 to 2, 12, 14, 18, 24, 28, 100, 112, 114, 118, 128	1	0		114	
547	N040	USB communication station number	0 to 31	1	0		—[*19]	
548	N041	USB communication check time interval	0 to 999.8 s, 9999	0.1 s	9999		—[*19]	
549	N000	Protocol selection	0, 1, 1000, 1001, 1010, 1020, 1021, 1030, 1040, 1050, 1051	1	0		79	
550	D012	NET mode operation command source selection	0, 1, 5, 9999[*14]	1	9999		—[*19*20]	
551	D013	PU mode operation command source selection	1 to 3, 5, 9999[*14]	1	9999		—[*19*20]	
555	E720	Current average time	0.1 to 1 s	0.1 s	1 s		—[*19]	
556	E721	Data output mask time	0 to 20 s	0.1 s	0 s		—[*19]	
557	E722	Current average value monitor signal output reference current	0 to 500 A[*2] 0 to 3600 A[*3]	0.01 A[*2] 0.1 A[*3]	Inverter rated current		—[*19]	
560	A712	Second frequency search gain	0 to 32767, 9999	1	9999		—[*19]	
561	H020	PTC thermistor protection level	0.5 to 30 kΩ, 9999	0.01 kΩ	9999		—[*19]	
563	M021	Energization time carrying-over times	(0 to 65535)	1	0		—[*19]	
564	M031	Operating time carrying-over times	(0 to 65535)	1	0		—[*19]	
565	G301	Second motor excitation current break point	0 to 400 Hz, 9999	0.01 Hz	9999		—[*19]	
566	G302	Second motor excitation current low-speed scaling factor	0% to 300%, 9999	0.1%	9999		—[*19]	
569	G942	Second motor speed control gain	0% to 200%, 9999	0.1%	9999		—[*19]	
570	E301	Multiple rating setting	0 to 3	1	2		—[*19]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
573	T052	4 mA input check selection	1 to 4, 9999	1	9999		—[*19]	
574	C211	Second motor online auto tuning	0 to 2	1	0		—[*19]	
592	W324	Crane overspeed detection time	0 to 10 s	0.1 s	0 s		101	
593	W325	Speed deviation detection frequency	0 to 50 Hz, 9999	0.01 Hz	9999		101	
594	W326	Speed deviation detection time	0 to 10 s	0.1 s	0 s		101	
595	W327	Brake sequence fault detection time	0 to 10 s	0.1 s	2 s		101	
596	W328	Position deviation detection distance	0 to 50 m, 9999	0.01 m	9999		101	
597	W329	Position deviation detection time	0 to 10 s	0.1 s	0 s		101	
598	H102	Undervoltage level	175 to 215 VDC[*7]/350 to 430 VDC[*8], 9999	0.1 V	9999		—[*19]	
599	T721	X10 terminal input selection	0, 1	1	0		—[*19]	
600	H001	First free thermal reduction frequency 1	0 to 590 Hz, 9999	0.01 Hz	9999		—[*19]	
601	H002	First free thermal reduction ratio 1	1% to 100%	1%	100%		—[*19]	
602	H003	First free thermal reduction frequency 2	0 to 590 Hz, 9999	0.01 Hz	9999		—[*19]	
603	H004	First free thermal reduction ratio 2	1% to 100%	1%	100%		—[*19]	
604	H005	First free thermal reduction frequency 3	0 to 590 Hz, 9999	0.01 Hz	9999		—[*19]	
606	T722	Power failure stop external signal input selection	0, 1	1	1		—[*19]	
607	H006	Motor permissible load level	110% to 250%	1%	150%		—[*19]	
608	H016	Second motor permissible load level	110% to 250%, 9999	1%	9999		—[*19]	
609	W305	S-curve time after system failure detection	0.1 to 2.5 s, 9999	0.1 s	9999		49	
610	W306	Deceleration stop operation selection after system failure detection	0, 1	1	0		101	
611	F003	Acceleration time at a restart	0 to 3600 s, 9999	0.1 s	9999		—[*19]	
617	G080	Reverse rotation excitation current low-speed scaling factor	0% to 300%, 9999	0.1%	9999		—[*19]	
635[*9]	M610	Cumulative pulse clear signal selection	0 to 3	1	0		—[*19]	
636[*9]	M611	Cumulative pulse division scaling factor	1 to 16384	1	1		—[*19]	
637[*9]	M612	Control terminal option-Cumulative pulse division scaling factor	1 to 16384	1	1		—[*19]	
638[*9]	M613	Cumulative pulse storage	0 to 3	1	0		—[*19]	
653	G410	Speed smoothing control	0% to 200%	0.1%	0%		—[*19]	
654	G411	Speed smoothing cutoff frequency	0 to 120 Hz	0.01 Hz	20 Hz		—[*19]	
655	M530	Analog remote output selection	0, 1, 10, 11	1	0		—[*19]	
656	M531	Analog remote output 1	800% to 1200%	0.1%	1000%		—[*19]	
657	M532	Analog remote output 2	800% to 1200%	0.1%	1000%		—[*19]	
658	M533	Analog remote output 3	800% to 1200%	0.1%	1000%		—[*19]	
659	M534	Analog remote output 4	800% to 1200%	0.1%	1000%		—[*19]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
660	G130	Increased magnetic excitation deceleration operation selection	0, 1	1	0		—*19	
661	G131	Magnetic excitation increase rate	0% to 40%, 9999	0.1%	9999		—*19	
662	G132	Increased magnetic excitation current level	0% to 300%	0.1%	100%		—*19	
663	M060	Control circuit temperature signal output level	0 to 100°C	1°C	0°C		—*19	
665	G125	Regeneration avoidance frequency gain	0% to 200%	0.1%	100%		—*19	
673	G060	SF-PR slip amount adjustment operation selection	2, 4, 6, 9999	1	9999		—*19	
674	G061	SF-PR slip amount adjustment gain	0% to 500%	0.1%	100%		—*19	
675	A805	User parameter auto storage function selection	1, 9999	1	9999		—*19	
679	G420	Second droop gain	0% to 100%, 9999	0.1%	9999		—*19	
680	G421	Second droop filter time constant	0 to 1 s, 9999	0.01 s	9999		—*19	
681	G422	Second droop function activation selection	0 to 2, 10, 11, 20 to 22, 9999	1	9999		—*19	
682	G423	Second droop break point gain	0.1% to 100%, 9999	0.1%	9999		—*19	
683	G424	Second droop break point torque	0.1% to 100%, 9999	0.1%	9999		—*19	
684	C000	Tuning data unit switchover	0, 1	1	0		—*19	
686	E712	Maintenance timer 2	0 (1 to 9998)	1	0		—*19	
687	E713	Maintenance timer 2 warning output set time	0 to 9998, 9999	1	9999		—*19	
688	E714	Maintenance timer 3	0 (1 to 9998)	1	0		—*19	
689	E715	Maintenance timer 3 warning output set time	0 to 9998, 9999	1	9999		—*19	
690	H881	Deceleration check time	0 to 3600 s, 9999	0.1 s	1 s		—*19	
692	H011	Second free thermal reduction frequency 1	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
693	H012	Second free thermal reduction ratio 1	1% to 100%	1%	100%		—*19	
694	H013	Second free thermal reduction frequency 2	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
695	H014	Second free thermal reduction ratio 2	1% to 100%	1%	100%		—*19	
696	H015	Second free thermal reduction frequency 3	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
699	T740	Input terminal filter	5 to 50 ms, 9999	1 ms	9999		—*19	
707	C107	Motor inertia (integer)	10 to 999, 9999	1	9999		—*19	
724	C108	Motor inertia (exponent)	0 to 7, 9999	1	9999		—*19	
744	C207	Second motor inertia (integer)	10 to 999, 9999	1	9999		—*19	
745	C208	Second motor inertia (exponent)	0 to 7, 9999	1	9999		—*19	
753	W074	Third S-curve acceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	
754	W075	Third S-curve deceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	
757	W081	Distance meter selection	0 to 2*15	1	0*16 1*17		79, 86	
758	W082	Unit of measurement of distance meter	0, 1	1	1		79, 86	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
760	W084	Travel distance of absolute encoder	0 to 655.35 mm	0.01 mm	100 mm		79	
761	W085	Distance measurement fault detection interval	0, 0.1 to 999.8 s, 9999	0.1 s	0 s		79, 86	
762	W086	Absolute encoder count (upper digits) at zero position calibration	0 to 255	1	0		79	
763	W087	Absolute encoder count (lower digits) at zero position calibration	0 to 65535	1	0		79	
764	W088	Absolute encoder zero position calibration	0, 1 (3, 9)	1	0		79	
774	M101	Operation panel monitor selection 1	1 to 3, 5 to 14, 17, 18, 20, 23 to 25, 32 to 36, 38 to 46, 50 to 52, 54 to 57, 61, 62, 64, 67, 71 to 74, 81, 87 to 98, 100, 9999	1	9999		134	
775	M102	Operation panel monitor selection 2		1	9999		134	
776	M103	Operation panel monitor selection 3		1	9999		134	
777	T053	4 mA input fault operation frequency	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
778	T054	4 mA input check filter	0 to 10 s	0.01 s	0 s		—*19	
779	N014	Operation frequency during communication error	0 to 590 Hz, 9999	0.01 Hz	9999		—*19	
799	M520	Pulse increment setting for output power	0.1, 1, 10, 100, 1000 kWh	0.1 kWh	1 kWh		—*19	
800	G200	Control method selection	0, 1, 6, 9 to 11, 20	1	20		—*19	
801	H704	Output limit level	0% to 400%, 9999	0.1%	9999		—*19	
802	G102	Pre-excitation selection	0, 1	1	0		—*19	
803	G210	Constant output range torque characteristic selection	0 to 2, 10, 11	1	0		—*19	
804	D400	Torque command source selection	0 to 6, 20*18	1	0		91	
805	D401	Torque command value (RAM)	600% to 1400%	1%	1000%		—*19	
806	D402	Torque command value (RAM, EEPROM)	600% to 1400%	1%	1000%		—*19	
807	H410	Speed limit selection	0 to 2, 20*18	1	0		91	
808	H411	Forward rotation speed limit/ speed limit	0 to 400 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
809	H412	Reverse rotation speed limit/ reverse-side speed limit	0 to 400 Hz, 9999	0.01 Hz	9999		—*19	
810	H700	Torque limit input method selection	0 to 2	1	0		—*19	
811	D030	Set resolution switchover	0, 1, 10, 11	1	0		—*19	
812	H701	Torque limit level (regeneration)	0% to 400%, 9999	0.1%	9999		—*19	
813	H702	Torque limit level (3rd quadrant)	0% to 400%, 9999	0.1%	9999		—*19	
814	H703	Torque limit level (4th quadrant)	0% to 400%, 9999	0.1%	9999		—*19	
815	H710	Torque limit level 2	0% to 400%, 9999	0.1%	9999		—*19	
816	H720	Torque limit level during acceleration	0% to 400%, 9999	0.1%	9999		—*19	
817	H721	Torque limit level during deceleration	0% to 400%, 9999	0.1%	9999		—*19	
818	C112	Easy gain tuning response level setting	1 to 15	1	2		—*19	
819	C113	Easy gain tuning selection	0 to 2	1	0		—*19	
820	G211	Speed control P gain 1	0% to 1000%	1%	60%		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
821	G212	Speed control integral time 1	0 to 20 s	0.001 s	0.333 s		—[*19]	
822	T003	Speed setting filter 1	0 to 5 s, 9999	0.001 s	9999		—[*19]	
823[*9]	G215	Speed detection filter 1	0 to 0.1 s	0.001 s	0.001 s		—[*19]	
824	G213	Torque control P gain 1 (current loop proportional gain)	0% to 500%	1%	100%		—[*19]	
825	G214	Torque control integral time 1 (current loop integral time)	0 to 500 ms	0.1 ms	5 ms		—[*19]	
826	T004	Torque setting filter 1	0 to 5 s, 9999	0.001 s	9999		—[*19]	
827	G216	Torque detection filter 1	0 to 0.1 s	0.001 s	0 s		—[*19]	
828	G224	Model speed control gain	0% to 1000%	1%	60%		—[*19]	
829[*9]	A546	Number of machine end encoder pulses	0 to 4096, 9999	1	9999		—[*19]	
830	G311	Speed control P gain 2	0% to 1000%, 9999	1%	9999		—[*19]	
831	G312	Speed control integral time 2	0 to 20 s, 9999	0.001 s	9999		—[*19]	
832	T005	Speed setting filter 2	0 to 5 s, 9999	0.001 s	9999		—[*19]	
833[*9]	G315	Speed detection filter 2	0 to 0.1 s, 9999	0.001 s	9999		—[*19]	
834	G313	Torque control P gain 2 (current loop proportional gain)	0% to 500%, 9999	1%	9999		—[*19]	
835	G314	Torque control integral time 2 (current loop integral time)	0 to 500 ms, 9999	0.1 ms	9999		—[*19]	
836	T006	Torque setting filter 2	0 to 5 s, 9999	0.001 s	9999		—[*19]	
837	G316	Torque detection filter 2	0 to 0.1 s, 9999	0.001 s	9999		—[*19]	
840	G230	Torque bias selection	0 to 3, 24, 25, 9999	1	9999		—[*19]	
841	G231	Torque bias 1	600% to 1400%, 9999	1%	9999		—[*19]	
842	G232	Torque bias 2	600% to 1400%, 9999	1%	9999		—[*19]	
843	G233	Torque bias 3	600% to 1400%, 9999	1%	9999		—[*19]	
844	G234	Torque bias filter	0 to 5 s, 9999	0.001 s	9999		—[*19]	
845	G235	Torque bias operation time	0 to 5 s, 9999	0.01 s	9999		—[*19]	
846	G236	Torque bias balance compensation	0 to 10 V, 9999	0.1 V	9999		—[*19]	
847	G237	Fall-time torque bias terminal 1 bias	0% to 400%, 9999	1%	9999		—[*19]	
848	G238	Fall-time torque bias terminal 1 gain	0% to 400%, 9999	1%	9999		—[*19]	
849	T007	Analog input offset adjustment	0% to 200%	0.1%	100%		—[*19]	
850	G103	Brake operation selection	0 to 2	1	0		—[*19]	
851[*9]	C240	Control terminal option-Number of encoder pulses	0 to 4096	1	2048		—[*19]	
852[*9]	C241	Control terminal option-Encoder rotation direction	0, 1, 100, 101	1	1		—[*19]	
853[*9]	H417	Speed deviation time	0 to 100 s	0.1 s	1 s		—[*19]	
854	G217	Excitation ratio	0% to 100%	1%	100%		—[*19]	
855[*9]	C248	Control terminal option-Signal loss detection enable/disable selection	0, 1	1	0		—[*19]	
858	T040	Terminal 4 function assignment	0, 1, 4, 9999	1	0		—[*19]	
859	C126	Torque current	0 to 500 A, 9999[*2]	0.01 A[*2]	9999		—[*19]	
			0 to 3600 A, 9999[*3]	0.1 A[*3]				
860	C226	Second motor torque current	0 to 500 A, 9999[*2]	0.01 A[*2]	9999		—[*19]	
			0 to 3600 A, 9999[*3]	0.1 A[*3]				
862[*9]	C242	Encoder option selection	0, 1	1	0		—[*19]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
863[*9]	M600	Control terminal option-Encoder pulse division ratio	1 to 32767	1	1		—[*19]	
864	M470	Torque detection	0% to 400%	0.1%	150%		—[*19]	
865	M446	Low speed detection	0 to 590 Hz	0.01 Hz	1.5 Hz		—[*19]	
866	M042	Torque monitoring reference	0% to 400%	0.1%	150%		—[*19]	
867	M321	AM output filter	0 to 5 s	0.01 s	0.01 s		—[*19]	
868	T010	Terminal 1 function assignment	0 to 6, 9999	1	0		—[*19]	
869	M334	Current output filter	0 to 5 s	0.01 s	—	0.02 s	—[*19]	
870	M440	Speed detection hysteresis	0 to 5 Hz	0.01 Hz	0 Hz		—[*19]	
872	H201	Input phase loss protection selection	0, 1	1	0		—[*19]	
873[*9]	H415	Speed limit	0 to 400 Hz	0.01 Hz	20 Hz		—[*19]	
874	H730	OLT level setting	0% to 400%	0.1%	150%		—[*19]	
875	H030	Fault definition	0, 1	1	0		—[*19]	
876[*9]	H022	Thermal protector input	0, 1	1	1		—[*19]	
877	G220	Speed feed forward control/ model adaptive speed control selection	0 to 2	1	0		—[*19]	
878	G221	Speed feed forward filter	0 to 1 s	0.01 s	0 s		—[*19]	
879[*11]	G222	Speed feed forward torque limit	0% to 400%	0.1%	150%		—[*19]	
880	C114	Load inertia ratio	0 to 200 times	0.1 time	7 times		—[*19]	
881	G223	Speed feed forward gain	0% to 1000%	1%	0%		—[*19]	
882	G120	Regeneration avoidance operation selection	0 to 2	1	0		—[*19]	
883	G121	Regeneration avoidance operation level	300 to 1200 V	0.1 V	380 VDC[*7]		—[*19]	
					760 VDC[*8]			
884	G122	Regeneration avoidance at deceleration detection sensitivity	0 to 5	1	0		—[*19]	
885	G123	Regeneration avoidance compensation frequency limit value	0 to 590 Hz, 9999	0.01 Hz	6 Hz		—[*19]	
886	G124	Regeneration avoidance voltage gain	0% to 200%	0.1%	100%		—[*19]	
888	E420	Free parameter 1	0 to 9999	1	9999		—[*19]	
889	E421	Free parameter 2	0 to 9999	1	9999		—[*19]	
890	H325	Internal storage device status indication	(0 to 511)	1	0		152	
891	M023	Cumulative power monitor digit shifted times	0 to 4, 9999	1	9999		—[*19]	
892	M200	Load factor	30% to 150%	0.1%	100%		—[*19]	
893	M201	Energy saving monitor reference (motor capacity)	0.1 to 55 kW[*2]	0.01 kW[*2]	Inverter rated capacity		—[*19]	
			0 to 3600 kW[*3]	0.1 kW[*3]				
894	M202	Control selection during commercial power-supply operation	0 to 3	1	0		—[*19]	
895	M203	Power saving rate reference value	0, 1, 9999	1	9999		—[*19]	
896	M204	Power unit cost	0 to 500, 9999	0.01	9999		—[*19]	
897	M205	Power saving monitor average time	0 to 1000 h, 9999	1 h	9999		—[*19]	
898	M206	Power saving cumulative monitor clear	0, 1, 10, 9999	1	9999		—[*19]	
899	M207	Operation time rate (estimated value)	0% to 100%, 9999	0.1%	9999		—[*19]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
C0 (900)*10	M310	FM/CA terminal calibration	—	—	—		—*19	
C1 (901)*10	M320	AM terminal calibration	—	—	—		—*19	
C2 (902)*10	T200	Terminal 2 frequency setting bias frequency	0 to 590 Hz	0.01 Hz	0 Hz		—*19	
C3 (902)*10	T201	Terminal 2 frequency setting bias	0% to 300%	0.1%	0%		—*19	
125 (903)*10	T202	Terminal 2 frequency setting gain frequency	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
C4 (903)*10	T203	Terminal 2 frequency setting gain	0% to 300%	0.1%	100%		—*19	
C5 (904)*10	T400	Terminal 4 frequency setting bias frequency	0 to 590 Hz	0.01 Hz	0 Hz		—*19	
C6 (904)*10	T401	Terminal 4 frequency setting bias	0% to 300%	0.1%	20%		—*19	
126 (905)*10	T402	Terminal 4 frequency setting gain frequency	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
C7 (905)*10	T403	Terminal 4 frequency setting gain	0% to 300%	0.1%	100%		—*19	
C12 (917)*10	T100	Terminal 1 bias frequency (speed)	0 to 590 Hz	0.01 Hz	0 Hz		—*19	
C13 (917)*10	T101	Terminal 1 bias (speed)	0% to 300%	0.1%	0%		—*19	
C14 (918)*10	T102	Terminal 1 gain frequency (speed)	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
C15 (918)*10	T103	Terminal 1 gain (speed)	0% to 300%	0.1%	100%		—*19	
C16 (919)*10	T110	Terminal 1 bias command (torque/magnetic flux)	0% to 400%	0.1%	0%		—*19	
C17 (919)*10	T111	Terminal 1 bias (torque/ magnetic flux)	0% to 300%	0.1%	0%		—*19	
C18 (920)*10	T112	Terminal 1 gain command (torque/magnetic flux)	0% to 400%	0.1%	150%		—*19	
C19 (920)*10	T113	Terminal 1 gain (torque/ magnetic flux)	0% to 300%	0.1%	100%		—*19	
C8 (930)*10*11	M330	Current output bias signal	0% to 100%	0.1%	—	0%	—*19	
C9 (930)*10*11	M331	Current output bias current	0% to 100%	0.1%	—	0%	—*19	
C10 (931)*10*11	M332	Current output gain signal	0% to 100%	0.1%	—	100%	—*19	
C11 (931)*10*11	M333	Current output gain current	0% to 100%	0.1%	—	100%	—*19	
C38 (932)*10	T410	Terminal 4 bias command (torque/magnetic flux)	0% to 400%	0.1%	0%		—*19	
C39 (932)*10	T411	Terminal 4 bias (torque/ magnetic flux)	0% to 300%	0.1%	20%		—*19	
C40 (933)*10	T412	Terminal 4 gain command (torque/magnetic flux)	0% to 400%	0.1%	150%		—*19	
C41 (933)*10	T413	Terminal 4 gain (torque/ magnetic flux)	0% to 300%	0.1%	100%		—*19	
977	E302	Input voltage mode selection	0, 1	1	0		—*19	
989	E490	Parameter copy alarm release	10*2	1	10*2		—*19	
			100*3		100*3		—*19	
990	E104	PU buzzer control	0, 1	1	1		—*19	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
991	E105	PU contrast adjustment	0 to 63	1	58		—*19	
992	M104	Operation panel setting dial push monitor selection	0 to 3, 5 to 14, 17, 18, 20, 23 to 25, 32 to 36, 38 to 46, 50 to 52, 54 to 57, 61, 62, 64, 67, 71 to 74, 81, 87 to 98, 100	1	0		134	
994	G403	Droop break point gain	0.1% to 100%, 9999	0.1%	9999		—*19	
995	G404	Droop break point torque	0.1% to 100%	0.1%	100%		—*19	
997	H103	Fault initiation	0 to 255, 9999	1	9999		—*19	
999	E431	Automatic parameter setting Simple	10 to 13, 20, 21, 9999	1	9999		—*19	
1000	E108	Direct setting selection	0 to 2	1	0		—*19	
1003	G601	Notch filter frequency	0, 8 to 1250 Hz	1 Hz	0		—*19	
1004	G602	Notch filter depth	0 to 3	1	0		—*19	
1005	G603	Notch filter width	0 to 3	1	0		—*19	
1006	E020	Clock (year)	2000 to 2099	1	2000		—*19	
1007	E021	Clock (month, day)	Jan. 1 to Dec. 31	1	101		—*19	
1008	E022	Clock (hour, minute)	0:00 to 23:59	1	0		—*19	
1016	H021	PTC thermistor protection detection time	0 to 60 s	1 s	0 s		—*19	
1018	M045	Monitor with sign selection	0, 9999	1	9999		—*19	
1020	A900	Trace operation selection	0 to 4	1	0		—*21	
1021	A901	Trace mode selection	0 to 2	1	0		—*21	
1022	A902	Sampling cycle	0 to 9	1	2		—*21	
1023	A903	Number of analog channels	1 to 8	1	4		—*21	
1024	A904	Sampling auto start	0, 1	1	0		—*21	
1025	A905	Trigger mode selection	0 to 4	1	0		—*21	
1026	A906	Number of sampling before trigger	0% to 100%	1%	90%		—*21	
1027	A910	Analog source selection (1ch)	1 to 3, 5 to 14, 17, 18, 20, 23, 24, 32 to 36, 39 to 42, 46, 52, 61, 62, 64, 67, 71 to 74, 81, 87 to 98, 201 to 213, 230 to 232, 235 to 238	1	201		135	
1028	A911	Analog source selection (2ch)			202		135	
1029	A912	Analog source selection (3ch)			203		135	
1030	A913	Analog source selection (4ch)			204		135	
1031	A914	Analog source selection (5ch)			205		135	
1032	A915	Analog source selection (6ch)			206		135	
1033	A916	Analog source selection (7ch)			207		135	
1034	A917	Analog source selection (8ch)			208		135	
1035	A918	Analog trigger channel	1 to 8	1	1		—*21	
1036	A919	Analog trigger operation selection	0, 1	1	0		—*21	
1037	A920	Analog trigger level	600 to 1400	1	1000		—*21	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
1038	A930	Digital source selection (1ch)	1 to 255	1	1		—[*21]	
1039	A931	Digital source selection (2ch)			2		—[*21]	
1040	A932	Digital source selection (3ch)			3		—[*21]	
1041	A933	Digital source selection (4ch)			4		—[*21]	
1042	A934	Digital source selection (5ch)			5		—[*21]	
1043	A935	Digital source selection (6ch)			6		—[*21]	
1044	A936	Digital source selection (7ch)			7		—[*21]	
1045	A937	Digital source selection (8ch)			8		—[*21]	
1046	A938	Digital trigger channel	1 to 8	1	1		—[*21]	
1047	A939	Digital trigger operation selection	0, 1	1	0		—[*21]	
1048	E106	Display-off waiting time	0 to 60 min	1 min	0 min		—[*19]	
1049	E110	USB host reset	0, 1	1	0		—[*19]	
1103	F040	Deceleration time at emergency stop	0 to 3600 s	0.1 s	5 s		—[*19]	
1106	M050	Torque monitor filter	0 to 5 s, 9999	0.01 s	9999		—[*19]	
1107	M051	Running speed monitor filter	0 to 5 s, 9999	0.01 s	9999		—[*19]	
1108	M052	Excitation current monitor filter	0 to 5 s, 9999	0.01 s	9999		—[*19]	
1113	H414	Speed limit method selection	0 to 2, 10, 9999	1	0		—[*19]	
1114	D403	Torque command reverse selection	0, 1	1	1		—[*19]	
1115	G218	Speed control integral term clear time	0 to 9998 ms	1 ms	0 ms		—[*19]	
1116	G206	Constant output range speed control P gain compensation	0% to 100%	0.1%	0%		—[*19]	
1117	G261	Speed control P gain 1 (per-unit system)	0 to 300, 9999	0.01	9999		—[*19]	
1118	G361	Speed control P gain 2 (per-unit system)	0 to 300, 9999	0.01	9999		—[*19]	
1119	G262	Model speed control gain (per-unit system)	0 to 300, 9999	0.01	9999		—[*19]	
1121	G260	Per-unit speed control reference frequency	0 to 400 Hz	0.01 Hz	120 Hz[*2] 60 Hz[*3]		—[*19]	
1123[*18]	N680	Inverter-to-inverter link mode selection	0, 110, 111	1	0		127	
1124[*18]	N681	Station number in inverter-to-inverter link	0 to 5, 9999	1	9999		127	
1125[*18]	N682	Number of inverters in inverter-to-inverter link system	2 to 6	1	2		127	
1134	W330	Distance meter fault detection selection	0 to 1	1	0		101	
1135	W228	Brake opening current 2	0% to 400%, 9999	0.1%	9999		52	
1140	W076	Speed feed acceleration time	0 to 3600 s, 9999	0.1 s	9999		49	
1141	W077	Speed feed deceleration time	0 to 3600 s, 9999	0.1 s	9999		49	
1142	W078	Speed feed S-curve acceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	
1143	W079	Speed feed S-curve deceleration time	0.1 to 2.5 s	0.1 s	0.1 s		49	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
1144[*18]	**W065**	**Multi-axis synchronous control (torque control) speed limit width**	0 to 100 Hz	0.01 Hz	0 Hz		91	
1145[*18]	**W066**	**Multi-axis synchronous control (torque control) speed compensation P gain**	0% to 1000%	1%	0%		91	
1150 to 1199	**A810 to A859**	**PLC function user parameters 1 to 50**	0 to 65535	1	0		—[*19]	
1299	**G108**	**Second pre-excitation selection**	0, 1	1	0		—[*19]	
1300 to 1343	**N500 to N543**	Communication option parameters. For details, refer to the Instruction Manual of the option.						
1348	**G263**	**P/PI control switchover frequency**	0 to 400 Hz	0.01 Hz	0 Hz		—[*19]	
1349	**G264**	**Emergency stop operation selection**	0, 1, 10, 11	1	0		—[*19]	
1350 to 1359	**N550 to N559**	Communication option parameters. For details, refer to the Instruction Manual of the option.						
1404	**A164**	**Shortest-time torque startup selection**	0, 1	1	0		62	
1410	**A170**	**Starting times lower 4 digits**	0 to 9999	1	0		—[*19]	
1411	**A171**	**Starting times upper 4 digits**	0 to 9999	1	0		—[*19]	
1424[*18]	**N650**	**Ethernet communication network number**	1 to 239	1	1		—[*20]	
1425[*18]	**N651**	**Ethernet communication station number**	1 to 120	1	1		—[*20]	
1426[*18]	**N641**	**Link speed and duplex mode selection**	0 to 4	1	0		—[*20]	
1427[*18]	**N630**	**Ethernet function selection 1**	502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 45237, 61450	1	5001		—[*20]	
1428[*18]	**N631**	**Ethernet function selection 2**		1	45237		—[*20]	
1429[*18]	**N632**	**Ethernet function selection 3**	502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 10001, 45237, 61450	1	9999		86	
1431[*18]	**N643**	**Ethernet signal loss detection function selection**	0 to 3	1	0		—[*20]	
1432[*18]	**N644**	**Ethernet communication check time interval**	0, 0.1 to 999.8 s, 9999	0.1 s	9999		—[*20]	
1434[*18]	**N600**	**IP address 1 (Ethernet)**	0 to 255	1	192		86	
1435[*18]	**N601**	**IP address 2 (Ethernet)**	0 to 255	1	168		86	
1436[*18]	**N602**	**IP address 3 (Ethernet)**	0 to 255	1	50		86	
1437[*18]	**N603**	**IP address 4 (Ethernet)**	0 to 255	1	1		86	
1438[*18]	**N610**	**Subnet mask 1**	0 to 255	1	255		—[*20]	
1439[*18]	**N611**	**Subnet mask 2**	0 to 255	1	255		—[*20]	
1440[*18]	**N612**	**Subnet mask 3**	0 to 255	1	255		—[*20]	
1441[*18]	**N613**	**Subnet mask 4**	0 to 255	1	0		—[*20]	
1442[*18]	**N660**	**IP filter address 1 (Ethernet)**	0 to 255	1	0		—[*20]	
1443[*18]	**N661**	**IP filter address 2 (Ethernet)**	0 to 255	1	0		—[*20]	
1444[*18]	**N662**	**IP filter address 3 (Ethernet)**	0 to 255	1	0		—[*20]	
1445[*18]	**N663**	**IP filter address 4 (Ethernet)**	0 to 255	1	0		—[*20]	
1446[*18]	**N664**	**IP filter address 2 range specification (Ethernet)**	0 to 255, 9999	1	9999		—[*20]	
1447[*18]	**N665**	**IP filter address 3 range specification (Ethernet)**	0 to 255, 9999	1	9999		—[*20]	
1448[*18]	**N666**	**IP filter address 4 range specification (Ethernet)**	0 to 255, 9999	1	9999		—[*20]	
1449[*18]	**N670**	**Ethernet command source selection IP address 1**	0 to 255	1	0		—[*20]	

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value		Refer to page	Customer setting
					FM	CA		
1450*18	N671	Ethernet command source selection IP address 2	0 to 255	1	0		—*20	
1451*18	N672	Ethernet command source selection IP address 3	0 to 255	1	0		—*20	
1452*18	N673	Ethernet command source selection IP address 4	0 to 255	1	0		—*20	
1453*18	N674	Ethernet command source selection IP address 3 range specification	0 to 255, 9999	1	9999		—*20	
1454*18	N675	Ethernet command source selection IP address 4 range specification	0 to 255, 9999	1	9999		—*20	
1455*18	N642	Keepalive time	1 to 7200 s	1 s	3600 s		—*20	
1480	H520	Load characteristics measurement mode	0, 1 (2 to 5, 81 to 85)	1	0		—*19	
1481	H521	Load characteristics load reference 1	0% to 400%, 8888, 9999	0.1%	9999		—*19	
1482	H522	Load characteristics load reference 2	0% to 400%, 8888, 9999	0.1%	9999		—*19	
1483	H523	Load characteristics load reference 3	0% to 400%, 8888, 9999	0.1%	9999		—*19	
1484	H524	Load characteristics load reference 4	0% to 400%, 8888, 9999	0.1%	9999		—*19	
1485	H525	Load characteristics load reference 5	0% to 400%, 8888, 9999	0.1%	9999		—*19	
1486	H526	Load characteristics maximum frequency	0 to 590 Hz	0.01 Hz	60 Hz	50 Hz	—*19	
1487	H527	Load characteristics minimum frequency	0 to 590 Hz	0.01 Hz	6 Hz		—*19	
1488	H531	Upper limit warning detection width	0% to 400%, 9999	0.1%	20%		—*19	
1489	H532	Lower limit warning detection width	0% to 400%, 9999	0.1%	20%		—*19	
1490	H533	Upper limit fault detection width	0% to 400%, 9999	0.1%	9999		—*19	
1491	H534	Lower limit fault detection width	0% to 400%, 9999	0.1%	9999		—*19	
1492	H535	Load status detection signal delay time / load reference measurement waiting time	0 to 60 s	0.1 s	1 s		—*19	
1499	E415	Parameter for manufacturer setting. Do not set.						
Pr.CLR		Parameter clear	(0), 1	1	0		—*19	
ALL.CL		All parameter clear	(0), 1	1	0		—*19	
Err.CL		Fault history clear	(0), 1	1	0		—*19	
Pr.CPY		Parameter copy	(0), 1 to 3	1	0		—*19	
Pr.CHG		Initial value change list	—	1	0		—*19	
AUTO		Automatic parameter setting	—	—	—		—*19	
Pr.MD		Group parameter setting	(0), 1, 2	1	0		—*19	

*1 Differs depending on the capacity.
6%: FR-A820-00077(0.75K) or lower and FR-A840-00038(0.75K) or lower
4%: FR-A820-00105(1.5K) to FR-A820-00250(3.7K), FR-A840-00052(1.5K) to FR-A840-00126(3.7K)
3%: FR-A820-00340(5.5K), FR-A820-00490(7.5K), FR-A840-00170(5.5K), FR-A840-00250(7.5K)
2%: FR-A820-00630(11K) to FR-A820-03160(55K), FR-A840-00310(11K) to FR-A840-01800(55K)
1%: FR-A820-03800(75K) or higher and FR-A840-02160(75K) or higher

*2 The setting range or initial value for the FR-A820-03160(55K) or lower and FR-A840-01800(55K) or lower.

*3 The setting range or initial value for the FR-A820-03800(75K) or higher and FR-A840-02160(75K) or higher.

*4 The initial value for the FR-A820-00490(7.5K) or lower and FR-A840-00250(7.5K) or lower.

*5 The initial value for the FR-A820-00630(11K) or higher and FR-A840-00310(11K) or higher.

*6 Differs depending on the capacity.
4%: FR-A820-00490(7.5K) or lower and FR-A840-00250(7.5K) or lower
2%: FR-A820-00630(11K) to FR-A820-03160(55K), FR-A840-00310(11K) to FR-A840-01800(55K)
1%: FR-A820-03800(75K) or higher and FR-A840-02160(75K) or higher

*7 The value for the 200 V class.
*8 The value for the 400 V class.
*9 The setting is available only when a plug-in option that supports Vector control is installed. For details of the Vector control compatible options supporting the parameter, refer to the detail page.
*10 The parameter number in parentheses is that used (displayed) on the LCD operation panel and the parameter unit.
*11 The setting is available for the CA type only.
*12 The setting is available when the PLC function is enabled. (**Pr.313 to Pr.315** are always available for settings in the Ethernet models.)
*13 The setting values "242 and 342" are available for the Ethernet models only.
*14 The setting value "5" is available for the Ethernet models only.
*15 The setting value "1" is available for the Ethernet models only.
*16 The initial value for the RS-485 models.
*17 The initial value for the Ethernet models.
*18 The setting is available for the Ethernet models only.
*19 For the details, refer to the FR-A800 Instruction Manual (Detailed) in the enclosed CD-ROM.
*20 For the details, refer to the Ethernet Function Manual in the enclosed CD-ROM.
*21 The trace function is available in FR Configurator2 supporting the inverter used. For details on inverters supported by FR Configurator2, refer to the FR Configurator2 Instruction Manual.

2.2 Parameter list (by function group)

◆W: Parameters for logistics/ transport functions

Parameters for the logistics/transport functions.

Pr. group	Pr.	Name	Refer to page
W000	60	A800-AWH mode selection	42, 90
W001	100	Reference travel speed	42
W002	128	Motion range 1	75
W003	129	Motion range 2	75
W004	131	Motion range sign selection	75
W005	132	Home position (upper digits)	75
W006	133	Home position (lower digits)	75
W011	105	Crane position loop P gain 1	67
W012	106	Crane position loop P gain 2	67
W013	107	Crane position loop P gain corner frequency 1	67
W014	108	Crane position loop P gain corner frequency 2	67
W015	109	Crane position loop filter	67
W016	113	Crane position loop integral time	67
W017	114	Compensation rate of crane position loop upper limit	67
W018	115	Compensation frequency of low-speed range crane position loop upper limit	67
W030	31	Crane creep speed	65
W031	32	Travel distance at creep speed	65
W032	33	Position loop compensation selection after crane decelerate to creep speed	65
W033	34	Stop position compensation width	65
W040	104	Crane in-position width	72
W041	127	Crane in-position time	72
W042	130	Crane position detection range	72
W043	134	Crane position detection range hysteresis	72
W050	355	Crane vibration suppression frequency	73
W051	356	Crane vibration suppression gain	73
W052	357	Crane model adaptive position loop gain	74
W060	362	Dual feedback filter	70
W061	363	Crane position detection filter	71
W062	364	Crane position data compensation judgment level	71
W063	365	Upper limit of crane position data compensation	71
W065	1144*3	Multi-axis synchronous control (torque control) speed limit width	91
W066	1145*3	Multi-axis synchronous control (torque control) speed compensation P gain	91
W070	110	Third acceleration/ deceleration time	49
W071	111	Third deceleration time	49
W072	516	S-curve acceleration time	49
W073	517	S-curve deceleration time	49
W074	753	Third S-curve acceleration time	49
W075	754	Third S-curve deceleration time	49
W076	1140	Speed feed acceleration time	49
W077	1141	Speed feed deceleration time	49
W078	1142	Speed feed S-curve acceleration time	49
W079	1143	Speed feed S-curve deceleration time	49
W080	112	Distance measurement direction setting	52
W081	757	Distance meter selection	79, 86
W082	758	Unit of measurement of distance meter	79, 86
W084	760	Travel distance of absolute encoder	79
W085	761	Distance measurement fault detection interval	79, 86
W086	762	Absolute encoder count (upper digits) at zero position calibration	79
W087	763	Absolute encoder count (lower digits) at zero position calibration	79
W088	764	Absolute encoder zero position calibration	79
W100	60	A800-AWH mode selection	42, 90
W110	518	Second S-curve acceleration time	45
W111	519	Second S-curve deceleration time	45
W200	281	Brake operation time at start	52
W201	282	Brake operation frequency	52
W210	350	Brake operation time at deceleration	52
W220	104	Crane in-position width	72
W221	278	Brake opening frequency	52
W222	279	Brake opening current	52
W223	280	Brake opening current detection time	52
W224	283	Brake operation time at stop	52
W225	351	Brake operation time at start 2	52
W226	352	Brake operation position range	52
W227	353	Brake release request signal output selection	52
W228	1135	Brake opening current 2	52
W300	393	System failure detection	101
W301	394	Operation selection after system failure detection	101
W302	395	Deceleration time after system failure detection	49
W303	396	Crane speed detection filter	101
W304	397	Limit dog operation selection	89, 101
W305	609	S-curve time after system failure detection	49

Pr. group	Pr.	Name	Refer to page
W306	610	Deceleration stop operation selection after system failure detection	101
W320	128	Motion range 1	75
W321	129	Motion range 2	75
W322	398	Speed range excess fault detection frequency	101
W323	399	Speed range excess fault detection time	101
W324	592	Crane overspeed detection time	101
W325	593	Speed deviation detection frequency	101
W326	594	Speed deviation detection time	101
W327	595	Brake sequence fault detection time	101
W328	596	Position deviation detection distance	101
W329	597	Position deviation detection time	101
W330	1134	Distance meter fault detection selection	101

◆E: Environment setting parameters

Parameters for the inverter operating environment.

Pr. group	Pr.	Name	Refer to page
E000	168	Parameter for manufacturer setting. Do not set.	
E001	169	Parameter for manufacturer setting. Do not set.	
E020	1006	Clock (year)	—*6
E021	1007	Clock (month, day)	—*6
E022	1008	Clock (hour, minute)	—*6
E023	269	Parameter for manufacturer setting. Do not set.	
E080	168	Parameter for manufacturer setting. Do not set.	
E081	169	Parameter for manufacturer setting. Do not set.	
E100	75	Reset selection	—*6
E101	75	Disconnected PU detection	—*6
E102	75	PU stop selection	—*6
E103	145	PU display language selection	—*6
E104	990	PU buzzer control	—*6
E105	991	PU contrast adjustment	—*6
E106	1048	Display-off waiting time	—*6
E107	75	Reset limit	—*6
E108	1000	Direct setting selection	—*6
E110	1049	USB host reset	—*6
E200	161	Frequency setting/key lock operation selection	—*6
E201	295	Frequency change increment amount setting	—*6
E300	30	Regenerative function selection	—*6
E301	570	Multiple rating setting	—*6
E302	977	Input voltage mode selection	—*6
E400	77	Parameter write selection	—*6
E410	296	Password lock level	—*6
E411	297	Password lock/unlock	—*6
E415	1499	Parameter for manufacturer setting. Do not set.	
E420	888	Free parameter 1	—*6
E421	889	Free parameter 2	—*6
E431	999	Automatic parameter setting Simple	—*6
E440	160	User group read selection Simple	—*6
E441	172	User group registered display/ batch clear	—*6
E442	173	User group registration	—*6
E443	174	User group clear	—*6
E490	989	Parameter copy alarm release	—*6
E600	72	PWM frequency selection	—*6
E601	240	Soft-PWM operation selection	—*6
E602	260	PWM frequency automatic switchover	—*6
E700	255	Life alarm status display	—*6
E701	256	Inrush current limit circuit life display	—*6
E702	257	Control circuit capacitor life display	—*6
E703	258	Main circuit capacitor life display	—*6
E704	259	Main circuit capacitor life measuring	—*6
E710	503	Maintenance timer 1	—*6
E711	504	Maintenance timer 1 warning output set time	—*6
E712	686	Maintenance timer 2	—*6
E713	687	Maintenance timer 2 warning output set time	—*6
E714	688	Maintenance timer 3	—*6
E715	689	Maintenance timer 3 warning output set time	—*6
E720	555	Current average time	—*6
E721	556	Data output mask time	—*6
E722	557	Current average value monitor signal output reference current	—*6

◆F: Parameters for the settings of the acceleration/deceleration time and the acceleration/deceleration pattern

Parameters for the motor acceleration/deceleration characteristics.

Pr. group	Pr.	Name	Refer to page
F000	20	Acceleration/deceleration reference frequency	42

Pr. group	Pr.	Name	Refer to page
F001	21	Acceleration/deceleration time increments	—*6
F002	16	Jog acceleration/deceleration time	—*6
F003	611	Acceleration time at a restart	—*6
F010	7	Acceleration time Simple	49
F011	8	Deceleration time Simple	49
F020	44	Second acceleration/ deceleration time	45
F021	45	Second deceleration time	45
F022	147	Acceleration/deceleration time switching frequency	—*6
F040	1103	Deceleration time at emergency stop	—*6
F102	13	Starting frequency	—*6

◆D: Parameters for the setting of operation command and frequency command

Parameters for setting the command source to the inverter, and the motor driving frequency and torque.

Pr. group	Pr.	Name	Refer to page
D000	79	Operation mode selection Simple	—*6
D001	340	Communication startup mode selection	—*6
D010	338	Communication operation command source	—*6
D011	339	Communication speed command source	—*6
D012	550	NET mode operation command source selection	—*6*7
D013	551	PU mode operation command source selection	—*6*7
D020	78	Reverse rotation prevention selection	—*6
D030	811	Set resolution switchover	—*6
D100	291	Pulse train I/O selection	—*6
D101	384	Input pulse division scaling factor	—*6
D110	385	Frequency for zero input pulse	—*6
D111	386	Frequency for maximum input pulse	—*6
D120	432*1	Pulse train torque command bias	—*6
D121	433*1	Pulse train torque command gain	—*6
D200	15	Jog frequency	—*6
D300	28	Multi-speed input compensation selection	—*6
D301	4	Multi-speed setting (high speed) Simple	—*6
D302	5	Multi-speed setting (middle speed) Simple	—*6
D303	6	Multi-speed setting (low speed) Simple	—*6
D304 to D307	24 to 27	Multi-speed setting (speed 4 to speed 7)	—*6
D308 to D315	232 to 239	Multi-speed setting (speed 8 to speed 15)	—*6
D400	804	Torque command source selection	91
D401	805	Torque command value (RAM)	—*6
D402	806	Torque command value (RAM, EEPROM)	—*6
D403	1114	Torque command reverse selection	—*6

◆H: Protective function parameter

Parameters to protect the motor and the inverter.

Pr. group	Pr.	Name	Refer to page
H000	9	Electronic thermal O/L relay Simple	—*6
H001	600	First free thermal reduction frequency 1	—*6
H002	601	First free thermal reduction ratio 1	—*6
H003	602	First free thermal reduction frequency 2	—*6
H004	603	First free thermal reduction ratio 2	—*6
H005	604	First free thermal reduction frequency 3	—*6
H006	607	Motor permissible load level	—*6
H010	51	Second electronic thermal O/L relay	—*6
H011	692	Second free thermal reduction frequency 1	—*6
H012	693	Second free thermal reduction ratio 1	—*6
H013	694	Second free thermal reduction frequency 2	—*6
H014	695	Second free thermal reduction ratio 2	—*6
H015	696	Second free thermal reduction frequency 3	—*6
H016	608	Second motor permissible load level	—*6
H020	561	PTC thermistor protection level	—*6
H021	1016	PTC thermistor protection detection time	—*6
H022	876*1	Thermal protector input	—*6
H030	875	Fault definition	—*6
H100	244	Cooling fan operation selection	—*6
H101	249	Earth (ground) fault detection at start	—*6
H102	598	Undervoltage level	—*6
H103	997	Fault initiation	—*6
H200	251	Output phase loss protection selection	—*6
H201	872	Input phase loss protection selection	—*6
H300	65	Retry selection	—*6

Pr. group	Pr.	Name	Refer to page
H301	67	Number of retries at fault occurrence	—*6
H302	68	Retry waiting time	—*6
H303	69	Retry count display erase	—*6
H325	890	Internal storage device status indication	152
H400	1	Maximum frequency Simple	—*6
H401	2	Minimum frequency Simple	—*6
H402	18	High speed maximum frequency	—*6
H410	807	Speed limit selection	91
H411	808	Forward rotation speed limit/ speed limit	—*6
H412	809	Reverse rotation speed limit/ reverse-side speed limit	—*6
H414	1113	Speed limit method selection	—*6
H415	873*1	Speed limit	—*6
H416	285	Speed deviation excess detection frequency	—*6
H417	853*1	Speed deviation time	—*6
H500	22	Stall prevention operation level (Torque limit level)	—*6
H501	156	Stall prevention operation selection	—*6
H520	1480	Load characteristics measurement mode	—*6
H521	1481	Load characteristics load reference 1	—*6
H522	1482	Load characteristics load reference 2	—*6
H523	1483	Load characteristics load reference 3	—*6
H524	1484	Load characteristics load reference 4	—*6
H525	1485	Load characteristics load reference 5	—*6
H526	1486	Load characteristics maximum frequency	—*6
H527	1487	Load characteristics minimum frequency	—*6
H531	1488	Upper limit warning detection width	—*6
H532	1489	Lower limit warning detection width	—*6
H533	1490	Upper limit fault detection width	—*6
H534	1491	Lower limit fault detection width	—*6
H535	1492	Load status detection signal delay time / load reference measurement waiting time	—*6
H600	48	Second stall prevention operation level	—*6
H601	49	Second stall prevention operation frequency	—*6
H610	23	Stall prevention operation level compensation factor at double speed	—*6
H611	66	Stall prevention operation reduction starting frequency	—*6
H620	148	Stall prevention level at 0 V input	—*6
H621	149	Stall prevention level at 10 V input	—*6
H631	154	Voltage reduction selection during stall prevention operation	—*6
H700	810	Torque limit input method selection	—*6
H701	812	Torque limit level (regeneration)	—*6
H702	813	Torque limit level (3rd quadrant)	—*6
H703	814	Torque limit level (4th quadrant)	—*6
H704	801	Output limit level	—*6
H710	815	Torque limit level 2	—*6
H720	816	Torque limit level during acceleration	—*6
H721	817	Torque limit level during deceleration	—*6
H730	874	OLT level setting	—*6
H800	374	Overspeed detection level	101
H881	690	Deceleration check time	—*6

◆M: Item and output signal for monitoring

Parameters for the settings regarding the monitoring to check the inverter's operating status and the output signals for the monitoring.

Pr. group	Pr.	Name	Refer to page
M000	37	Speed display	—*6
M001	505	Speed setting reference	—*6
M002	144	Speed setting switchover	—*6
M020	170	Watt-hour meter clear	—*6
M021	563	Energization time carrying-over times	—*6
M022	268	Monitor decimal digits selection	—*6
M023	891	Cumulative power monitor digit shifted times	—*6
M030	171	Operation hour meter clear	—*6
M031	564	Operating time carrying-over times	—*6
M040	55	Frequency monitoring reference	—*6
M041	56	Current monitoring reference	—*6
M042	866	Torque monitoring reference	—*6
M043	241	Analog input display unit switchover	—*6
M044	290	Monitor negative output selection	—*6
M045	1018	Monitor with sign selection	—*6
M050	1106	Torque monitor filter	—*6
M051	1107	Running speed monitor filter	—*6
M052	1108	Excitation current monitor filter	—*6

Pr. group	Pr.	Name	Refer to page
M060	663	Control circuit temperature signal output level	—*6
M100	52	Operation panel main monitor selection	134
M101	774	Operation panel monitor selection 1	134
M102	775	Operation panel monitor selection 2	134
M103	776	Operation panel monitor selection 3	134
M104	992	Operation panel setting dial push monitor selection	134
M200	892	Load factor	—*6
M201	893	Energy saving monitor reference (motor capacity)	—*6
M202	894	Control selection during commercial power-supply operation	—*6
M203	895	Power saving rate reference value	—*6
M204	896	Power unit cost	—*6
M205	897	Power saving monitor average time	—*6
M206	898	Power saving cumulative monitor clear	—*6
M207	899	Operation time rate (estimated value)	—*6
M300	54	FM/CA terminal function selection	135
M301	158	AM terminal function selection	135
M310	C0 (900)*2	FM/CA terminal calibration	—*6
M320	C1 (901)*2	AM terminal calibration	—*6
M321	867	AM output filter	—*6
M330	C8 (930)*2*4	Current output bias signal	—*6
M331	C9 (930)*2*4	Current output bias current	—*6
M332	C10 (931)*2*4	Current output gain signal	—*6
M333	C11 (931)*2*4	Current output gain current	—*6
M334	869	Current output filter	—*6
M400	190	RUN terminal function selection	140
M401	191	SU terminal function selection	140
M402	192	IPF terminal function selection	140
M403	193	OL terminal function selection	140
M404	194	FU terminal function selection	140
M405	195	ABC1 terminal function selection	140
M406	196	ABC2 terminal function selection	140
M410	313*5	DO0 output selection	140
M411	314*5	DO1 output selection	140
M412	315*5	DO2 output selection	140
M413	316*5	DO3 output selection	140
M414	317*5	DO4 output selection	140

Pr. group	Pr.	Name	Refer to page
M415	318*5	DO5 output selection	140
M416	319*5	DO6 output selection	140
M420	320*5	RA1 output selection	140
M421	321*5	RA2 output selection	140
M422	322*5	RA3 output selection	140
M430	157	OL signal output timer	—*6
M431	289	Inverter output terminal filter	—*6
M433	166	Output current detection signal retention time	—*6
M440	870	Speed detection hysteresis	—*6
M441	41	Up-to-frequency sensitivity	—*6
M442	42	Output frequency detection	—*6
M443	43	Output frequency detection for reverse rotation	—*6
M444	50	Second output frequency detection	—*6
M446	865	Low speed detection	—*6
M460	150	Output current detection level	—*6
M461	151	Output current detection signal delay time	—*6
M462	152	Zero current detection level	—*6
M463	153	Zero current detection time	—*6
M464	167	Output current detection operation selection	—*6
M470	864	Torque detection	—*6
M500	495	Remote output selection	—*6
M501	496	Remote output data 1	—*6
M502	497	Remote output data 2	—*6
M510	76	Fault code output selection	—*6
M520	799	Pulse increment setting for output power	—*6
M530	655	Analog remote output selection	—*6
M531	656	Analog remote output 1	—*6
M532	657	Analog remote output 2	—*6
M533	658	Analog remote output 3	—*6
M534	659	Analog remote output 4	—*6
M600	863*1	Control terminal option-Encoder pulse division ratio	—*6
M601	413*1	Encoder pulse division ratio	—*6
M610	635*1	Cumulative pulse clear signal selection	—*6
M611	636*1	Cumulative pulse division scaling factor	—*6
M612	637*1	Control terminal option-Cumulative pulse division scaling factor	—*6
M613	638*1	Cumulative pulse storage	—*6

◆T: Multi-function input terminal parameters

Parameters for the setting of the input terminals via which commands are given to the inverter.

Pr. group	Pr.	Name	Refer to page
T000	73	Analog input selection	—*6
T001	267	Terminal 4 input selection	—*6
T002	74	Input filter time constant	—*6
T003	822	Speed setting filter 1	—*6
T004	826	Torque setting filter 1	—*6
T005	832	Speed setting filter 2	—*6
T006	836	Torque setting filter 2	—*6
T007	849	Analog input offset adjustment	—*6
T010	868	Terminal 1 function assignment	—*6
T021	242	Terminal 1 added compensation amount (terminal 2)	—*6
T022	125	Terminal 2 frequency setting gain frequency Simple	—*6
T040	858	Terminal 4 function assignment	—*6
T041	243	Terminal 1 added compensation amount (terminal 4)	—*6
T042	126	Terminal 4 frequency setting gain frequency Simple	—*6
T050	252	Override bias	—*6
T051	253	Override gain	—*6
T052	573	4 mA input check selection	—*6
T053	777	4 mA input fault operation frequency	—*6
T054	778	4 mA input check filter	—*6
T100	C12 (917)*2	Terminal 1 bias frequency (speed)	—*6
T101	C13 (917)*2	Terminal 1 bias (speed)	—*6
T102	C14 (918)*2	Terminal 1 gain frequency (speed)	—*6
T103	C15 (918)*2	Terminal 1 gain (speed)	—*6
T110	C16 (919)*2	Terminal 1 bias command (torque/magnetic flux)	—*6
T111	C17 (919)*2	Terminal 1 bias (torque/ magnetic flux)	—*6
T112	C18 (920)*2	Terminal 1 gain command (torque/magnetic flux)	—*6
T113	C19 (920)*2	Terminal 1 gain (torque/ magnetic flux)	—*6
T200	C2 (902)*2	Terminal 2 frequency setting bias frequency	—*6
T201	C3 (902)*2	Terminal 2 frequency setting bias	—*6
T202	125 (903)*2	Terminal 2 frequency setting gain frequency	—*6
T203	C4 (903)*2	Terminal 2 frequency setting gain	—*6
T400	C5 (904)*2	Terminal 4 frequency setting bias frequency	—*6
T401	C6 (904)*2	Terminal 4 frequency setting bias	—*6
T402	126 (905)*2	Terminal 4 frequency setting gain frequency	—*6
T403	C7 (905)*2	Terminal 4 frequency setting gain	—*6
T410	C38 (932)*2	Terminal 4 bias command (torque/magnetic flux)	—*6
T411	C39 (932)*2	Terminal 4 bias (torque/ magnetic flux)	—*6
T412	C40 (933)*2	Terminal 4 gain command (torque/magnetic flux)	—*6
T413	C41 (933)*2	Terminal 4 gain (torque/ magnetic flux)	—*6
T700	178	STF terminal function selection	139
T701	179	STR terminal function selection	139
T702	180	RL terminal function selection	139
T703	181	RM terminal function selection	139
T704	182	RH terminal function selection	139
T705	183	RT terminal function selection	139
T706	184	AU terminal function selection	139
T707	185	JOG terminal function selection	139
T708	186	CS terminal function selection	139
T709	187	MRS terminal function selection	139
T710	188	STOP terminal function selection	139
T711	189	RES terminal function selection	139
T720	17	MRS input selection	—*6
T721	599	X10 terminal input selection	—*6
T722	606	Power failure stop external signal input selection	—*6
T730	155	RT signal function validity condition selection	—*6
T740	699	Input terminal filter	—*6

◆C: Motor constant parameters

Parameters for the motor acceleration/deceleration characteristics.

Pr. group	Pr.	Name	Refer to page
C000	684	Tuning data unit switchover	—*6
C100	71	Applied motor	—*6
C101	80	Motor capacity	—*6
C102	81	Number of motor poles	—*6
C103	9	Rated motor current Simple	—*6
C104	83	Rated motor voltage	—*6
C105	84	Rated motor frequency	—*6
C107	707	Motor inertia (integer)	—*6
C108	724	Motor inertia (exponent)	—*6

Pr. group	Pr.	Name	Refer to page
C110	96	Auto tuning setting/status	—*6
C111	95	Online auto tuning selection	—*6
C112	818	Easy gain tuning response level setting	—*6
C113	819	Easy gain tuning selection	—*6
C114	880	Load inertia ratio	—*6
C120	90	Motor constant (R1)	—*6
C121	91	Motor constant (R2)	—*6
C122	92	Motor constant (L1)/d-axis inductance (Ld)	—*6
C123	93	Motor constant (L2)/q-axis inductance (Lq)	—*6
C124	94	Motor constant (X)	—*6
C125	82	Motor excitation current	—*6
C126	859	Torque current	—*6
C140	369*1	Number of encoder pulses	—*6
C141	359*1	Encoder rotation direction	—*6
C148	376*1	Encoder signal loss detection enable/disable selection	—*6
C200	450	Second applied motor	—*6
C201	453	Second motor capacity	—*6
C202	454	Number of second motor poles	—*6
C203	51	Rated second motor current	—*6
C204	456	Rated second motor voltage	—*6
C205	457	Rated second motor frequency	—*6
C207	744	Second motor inertia (integer)	—*6
C208	745	Second motor inertia (exponent)	—*6
C210	463	Second motor auto tuning setting/status	—*6
C211	574	Second motor online auto tuning	—*6
C220	458	Second motor constant (R1)	—*6
C221	459	Second motor constant (R2)	—*6
C222	460	Second motor constant (L1)	—*6
C223	461	Second motor constant (L2)	—*6
C224	462	Second motor constant (X)	—*6
C225	455	Second motor excitation current	—*6
C226	860	Second motor torque current	—*6
C240	851*1	Control terminal option-Number of encoder pulses	—*6
C241	852*1	Control terminal option-Encoder rotation direction	—*6
C242	862*1	Encoder option selection	—*6
C248	855*1	Control terminal option-Signal loss detection enable/disable selection	—*6

◆A: Application parameters

Parameters for the setting of a specific application.

Pr. group	Pr.	Name	Refer to page
A107	285	Overspeed detection frequency	—*6
A164	1404	Shortest-time torque startup selection	62
A170	1410	Starting times lower 4 digits	—*6
A171	1411	Starting times upper 4 digits	—*6
A200	270	Stop-on contact/load torque high-speed frequency control selection	—*6
A201	271	High-speed setting maximum current	—*6
A202	272	Middle-speed setting minimum current	—*6
A203	273	Current averaging range	—*6
A204	274	Current averaging filter time constant	—*6
A205	275	Stop-on contact excitation current low-speed scaling factor	—*6
A206	276	PWM carrier frequency at stop-on contact	—*6
A546	829*1	Number of machine end encoder pulses	—*6
A700	162	Automatic restart after instantaneous power failure selection	—*6
A701	299	Rotation direction detection selection at restarting	—*6
A702	57	Restart coasting time	—*6
A703	58	Restart cushion time	—*6
A704	163	First cushion time for restart	—*6
A705	164	First cushion voltage for restart	—*6
A710	165	Stall prevention operation level for restart	—*6
A711	298	Frequency search gain	—*6
A712	560	Second frequency search gain	—*6
A800	414	PLC function operation selection	—*6
A801	415	Inverter operation lock mode setting	—*6
A802	416	Pre-scale function selection	—*6
A803	417	Pre-scale setting value	—*6
A804	498	PLC function flash memory clear	—*6
A805	675	User parameter auto storage function selection	—*6
A810 to A859	1150 to 1199	PLC function user parameters 1 to 50	—*6
A900	1020	Trace operation selection	—*6
A901	1021	Trace mode selection	—*6
A902	1022	Sampling cycle	—*6
A903	1023	Number of analog channels	—*6
A904	1024	Sampling auto start	—*6
A905	1025	Trigger mode selection	—*6
A906	1026	Number of sampling before trigger	—*6
A910	1027	Analog source selection (1ch)	135
A911	1028	Analog source selection (2ch)	135
A912	1029	Analog source selection (3ch)	135
A913	1030	Analog source selection (4ch)	135

Pr. group	Pr.	Name	Refer to page
A914	1031	Analog source selection (5ch)	135
A915	1032	Analog source selection (6ch)	135
A916	1033	Analog source selection (7ch)	135
A917	1034	Analog source selection (8ch)	135
A918	1035	Analog trigger channel	—*6
A919	1036	Analog trigger operation selection	—*6
A920	1037	Analog trigger level	—*6
A930	1038	Digital source selection (1ch)	—*6
A931	1039	Digital source selection (2ch)	—*6
A932	1040	Digital source selection (3ch)	—*6
A933	1041	Digital source selection (4ch)	—*6
A934	1042	Digital source selection (5ch)	—*6
A935	1043	Digital source selection (6ch)	—*6
A936	1044	Digital source selection (7ch)	—*6
A937	1045	Digital source selection (8ch)	—*6
A938	1046	Digital trigger channel	—*6
A939	1047	Digital trigger operation selection	—*6

◆B: Position control parameters

Parameters for the position control setting.

Pr. group	Pr.	Name	Refer to page
B003	422	Position control gain	—*6

◆N: Communication operation parameters

Parameters for the setting of communication operation such as the communication specifications or operating characteristics.

Pr. group	Pr.	Name	Refer to page
N000	549	Protocol selection	79
N001	342	Communication EEPROM write selection	—*6
N002	539	MODBUS RTU communication check time interval	—*6
N010	349*3	Communication reset selection	—*7
N013	502	Stop mode selection at communication error	—*6
N014	779	Operation frequency during communication error	—*6
N020	117	PU communication station number	—*6
N021	118	PU communication speed	—*6
N022	119	PU communication data length	—*6
N023	119	PU communication stop bit length	—*6
N024	120	PU communication parity check	—*6
N025	121	PU communication retry count	—*6
N026	122	PU communication check time interval	—*6
N027	123	PU communication waiting time setting	—*6
N028	124	PU communication CR/LF selection	—*6
N030	331	RS-485 communication station number	—*6
N031	332	RS-485 communication speed	79
N032	333	RS-485 communication data length	79
N033	333	RS-485 communication stop bit length	79
N034	334	RS-485 communication parity check selection	79
N035	335	RS-485 communication retry count	79
N036	336	RS-485 communication check time interval	79
N037	337	RS-485 communication waiting time setting	—*6
N038	341	RS-485 communication CR/LF selection	—*6
N040	547	USB communication station number	—*6
N041	548	USB communication check time interval	—*6
N080	343	Communication error count	—*6
N100	541*3	Frequency command sign selection	—*7
N103	544*3	CC-Link extended setting	114
N240	349*3	Ready bit status selection	—*7
N500 to N543	1300 to 1343	Communication option parameters. For details, refer to the Instruction Manual of the option.	
N550 to N559	1350 to 1359	Communication option parameters. For details, refer to the Instruction Manual of the option.	
N600	1434*3	IP address 1 (Ethernet)	86
N601	1435*3	IP address 2 (Ethernet)	86
N602	1436*3	IP address 3 (Ethernet)	86
N603	1437*3	IP address 4 (Ethernet)	86
N610	1438*3	Subnet mask 1	—*7
N611	1439*3	Subnet mask 2	—*7
N612	1440*3	Subnet mask 3	—*7
N613	1441*3	Subnet mask 4	—*7
N630	1427*3	Ethernet function selection 1	—*7
N631	1428*3	Ethernet function selection 2	—*7
N632	1429*3	Ethernet function selection 3	86
N641	1426*3	Link speed and duplex mode selection	—*7
N642	1455*3	Keepalive time	—*7
N643	1431*3	Ethernet signal loss detection function selection	—*7
N644	1432*3	Ethernet communication check time interval	—*7
N650	1424*3	Ethernet communication network number	—*7
N651	1425*3	Ethernet communication station number	—*7
N660	1442*3	IP filter address 1 (Ethernet)	—*7

Pr. group	Pr.	Name	Refer to page
N661	1443*3	IP filter address 2 (Ethernet)	—*7
N662	1444*3	IP filter address 3 (Ethernet)	—*7
N663	1445*3	IP filter address 4 (Ethernet)	—*7
N664	1446*3	IP filter address 2 range specification (Ethernet)	—*7
N665	1447*3	IP filter address 3 range specification (Ethernet)	—*7
N666	1448*3	IP filter address 4 range specification (Ethernet)	—*7
N670	1449*3	Ethernet command source selection IP address 1	—*7
N671	1450*3	Ethernet command source selection IP address 2	—*7
N672	1451*3	Ethernet command source selection IP address 3	—*7
N673	1452*3	Ethernet command source selection IP address 4	—*7
N674	1453*3	Ethernet command source selection IP address 3 range specification	—*7
N675	1454*3	Ethernet command source selection IP address 4 range specification	—*7
N680	1123*3	Inverter-to-inverter link mode selection	127
N681	1124*3	Station number in inverter-to-inverter link	127
N682	1125*3	Number of inverters in inverter-to-inverter link system	127

◆ (G) Control parameters

Parameters for motor control.

Pr. group	Pr.	Name	Refer to page
G000	0	Torque boost Simple	—*6
G001	3	Base frequency Simple	—*6
G002	19	Base frequency voltage	—*6
G003	14	Load pattern selection	—*6
G010	46	Second torque boost	—*6
G011	47	Second V/F (base frequency)	—*6
G060	673	SF-PR slip amount adjustment operation selection	—*6
G061	674	SF-PR slip amount adjustment gain	—*6
G080	617	Reverse rotation excitation current low-speed scaling factor	—*6
G100	10	DC injection brake operation frequency	—*6
G101	11	DC injection brake operation time	—*6
G102	802	Pre-excitation selection	—*6
G103	850	Brake operation selection	—*6
G106	250	Stop selection	—*6
G107	70	Special regenerative brake duty	—*6
G108	1299	Second pre-excitation selection	—*6
G110	12	DC injection brake operation voltage	—*6
G120	882	Regeneration avoidance operation selection	—*6
G121	883	Regeneration avoidance operation level	—*6
G122	884	Regeneration avoidance at deceleration detection sensitivity	—*6
G123	885	Regeneration avoidance compensation frequency limit value	—*6
G124	886	Regeneration avoidance voltage gain	—*6
G125	665	Regeneration avoidance frequency gain	—*6
G130	660	Increased magnetic excitation deceleration operation selection	—*6
G131	661	Magnetic excitation increase rate	—*6
G132	662	Increased magnetic excitation current level	—*6
G200	800	Control method selection	—*6
G201	85	Excitation current break point	—*6
G202	86	Excitation current low-speed scaling factor	—*6
G203	245	Rated slip	—*6
G204	246	Slip compensation time constant	—*6
G205	247	Constant output range slip compensation selection	—*6
G206	1116	Constant output range speed control P gain compensation	—*6
G210	803	Constant output range torque characteristic selection	—*6
G211	820	Speed control P gain 1	—*6
G212	821	Speed control integral time 1	—*6
G213	824	Torque control P gain 1 (current loop proportional gain)	—*6
G214	825	Torque control integral time 1 (current loop integral time)	—*6
G215	823*1	Speed detection filter 1	—*6
G216	827	Torque detection filter 1	—*6
G217	854	Excitation ratio	—*6
G218	1115	Speed control integral term clear time	—*6
G220	877	Speed feed forward control/ model adaptive speed control selection	—*6
G221	878	Speed feed forward filter	—*6
G222	879*4	Speed feed forward torque limit	—*6
G223	881	Speed feed forward gain	—*6
G224	828	Model speed control gain	—*6
G230	840	Torque bias selection	—*6
G231	841	Torque bias 1	—*6
G232	842	Torque bias 2	—*6
G233	843	Torque bias 3	—*6

Pr. group	Pr.	Name	Refer to page
G234	844	Torque bias filter	—*6
G235	845	Torque bias operation time	—*6
G236	846	Torque bias balance compensation	—*6
G237	847	Fall-time torque bias terminal 1 bias	—*6
G238	848	Fall-time torque bias terminal 1 gain	—*6
G240	367*1	Speed feedback range	—*6
G241	368*1	Feedback gain	—*6
G260	1121	Per-unit speed control reference frequency	—*6
G261	1117	Speed control P gain 1 (per-unit system)	—*6
G262	1119	Model speed control gain (per-unit system)	—*6
G263	1348	P/PI control switchover frequency	—*6
G264	1349	Emergency stop operation selection	—*6
G300	451	Second motor control method selection	—*6
G301	565	Second motor excitation current break point	—*6
G302	566	Second motor excitation current low-speed scaling factor	—*6
G311	830	Speed control P gain 2	—*6
G312	831	Speed control integral time 2	—*6
G313	834	Torque control P gain 2 (current loop proportional gain)	—*6
G314	835	Torque control integral time 2 (current loop integral time)	—*6
G315	833*1	Speed detection filter 2	—*6
G316	837	Torque detection filter 2	—*6
G361	1118	Speed control P gain 2 (per-unit system)	—*6
G400	286	Droop gain	—*6
G401	287	Droop filter time constant	—*6
G402	288	Droop function activation selection	—*6
G403	994	Droop break point gain	—*6
G404	995	Droop break point torque	—*6
G410	653	Speed smoothing control	—*6
G411	654	Speed smoothing cutoff frequency	—*6
G420	679	Second droop gain	—*6
G421	680	Second droop filter time constant	—*6
G422	681	Second droop function activation selection	—*6
G423	682	Second droop break point gain	—*6
G424	683	Second droop break point torque	—*6
G601	1003	Notch filter frequency	—*6
G602	1004	Notch filter depth	—*6
G603	1005	Notch filter width	—*6
G932	89	Speed control gain (Advanced magnetic flux vector)	—*6
G942	569	Second motor speed control gain	—*6

*1 The setting is available only when a plug-in option that supports Vector control is installed.

*2 The parameter number in parentheses is that used (displayed) on the LCD operation panel and the parameter unit.

*3 The setting is available for the Ethernet models only.

*4 The setting is available for the CA type only.

*5 The setting is available when the PLC function is enabled. (**Pr.313 to Pr.315** are always available for settings in the Ethernet models.)

*6 For the details, refer to the FR-A800 Instruction Manual (Detailed) in the enclosed CD-ROM.

*7 For the details, refer to the Ethernet Function Manual in the enclosed CD-ROM.

3 A800-AWH MODE

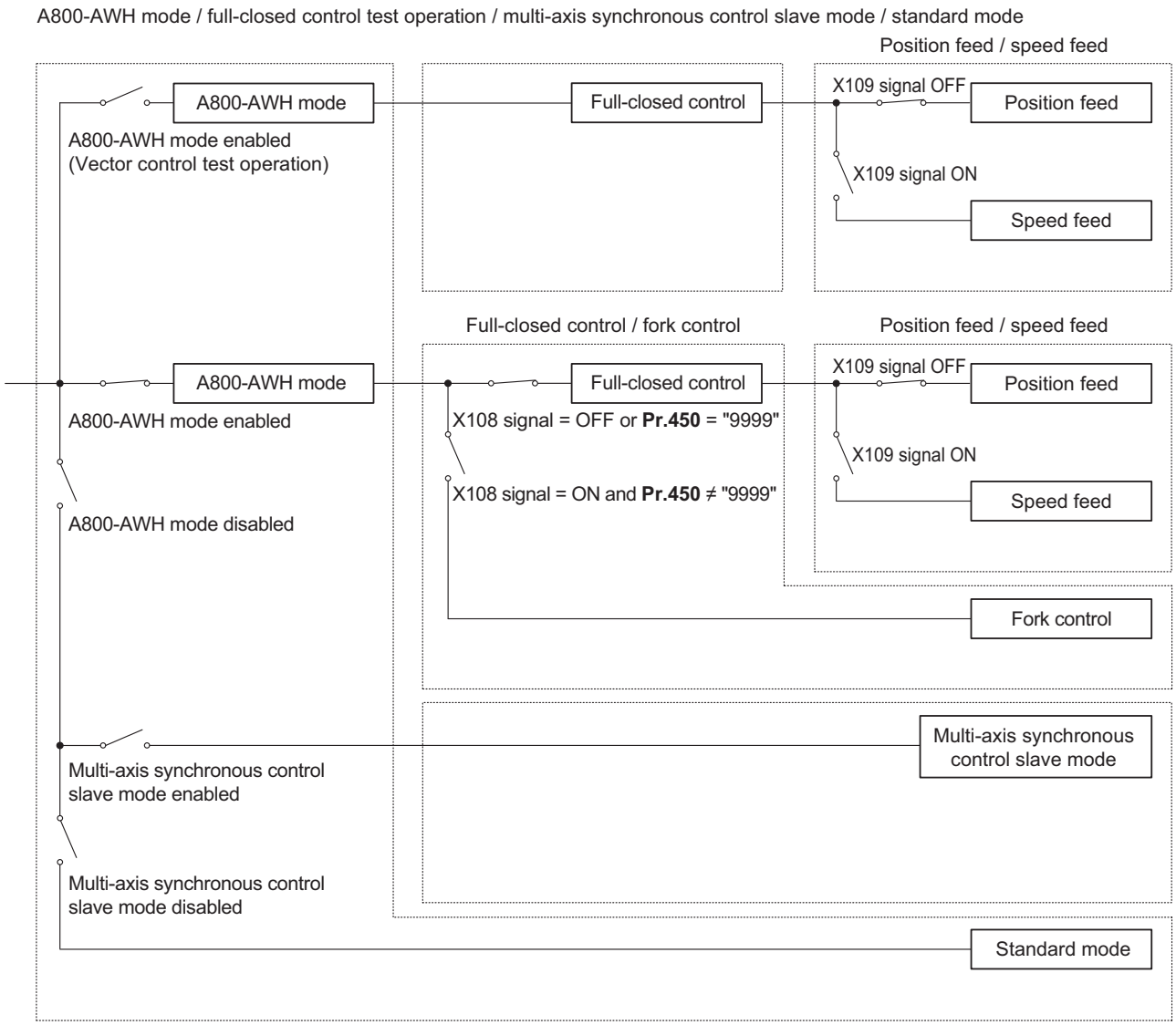
This chapter explains how to change the operation mode from the standard mode to the A800-AWH mode, and how to switch between each of operation modes.

3.1 Switching operation mode

The operation modes are as follows.

Operation mode	Description	Refer to page
Position feed	Move the crane toward the target position using the distance meter.	64
Speed feed	Move the crane in speed control according to the start command.	88
Fork control	Move the fork in speed control using the second motor. (Used only when one inverter is used to switch operation between two motors.)	44
Multi-axis synchronous control slave mode	Control multiple inverters in one system by synchronizing torque or speed.	90
Standard mode	Operation is the same as that of the FR-A800 standard inverter (some functions are unavailable).	149

Refer to the following for switching the operation mode. (Switch the operation mode when the inverter is stopped. When the operation mode is switched during inverter operation, the mode is changed after the inverter is stopped.)



3.2 Selecting A800-AWH mode

The following conditions must be satisfied to enable the A800-AWH mode. (When the A800-AWH mode is disabled, the standard mode is selected.)

- **Pr.60 A800-AWH mode selection** = "1"
- **Pr.100 Reference travel speed** ≠ "9999"
- The X113 signal is ON.
- Vector control ("0" is set in **Pr.800 Control method selection** or **Pr.451 Second motor control method selection**), Real sensorless vector control ("10" is set in **Pr.800** or **Pr.451**), Advanced magnetic flux vector control, or V/F control is selected.
- Network operation mode
- **Pr.338 Communication operation command source** = "0 (initial value)"
- **Pr.339 Communication speed command source** = "0 (initial value)"

NOTE

- In switchover mode (**Pr.79** = "6"), the operation mode can be changed from NET operation to PU operation during operation, and the setting frequency can be changed using the operation panel or parameter unit.

3.2.1 A800-AWH mode selection (Pr.60)

Set the availability of the A800-AWH mode (initial setting: A800-AWH mode disabled (standard mode)).

Pr.	Name	Initial value	Setting range	Description
60 **W000, W100**	**A800-AWH mode selection**	0	0	A800-AWH mode disabled
			1	A800-AWH mode enabled
			2	Full-closed control test operation (Refer to page 95.)
			10*1	Slave station torque control (Refer to page 91.)
			11*1	Slave station speed control (Refer to page 92.)

*1 The setting is available for the Ethernet models only.

3.2.2 Reference travel speed (Pr.100) and Acceleration/deceleration reference frequency (Pr.20)

Set the frequency that is the basis of acceleration/deceleration time and the crane travel speed.

Pr.	Name	Initial value		Setting range	Description
		FM	CA		
20 **F000**	**Acceleration/deceleration reference frequency**	60 Hz	50 Hz	1 to 590 Hz	Set the reference frequency for the acceleration/deceleration time and the crane travel speed. As acceleration/deceleration time, set the time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.20** and vice versa.
100 **W001**	**Reference travel speed**	9999		1 to 600 m/min	Set the crane travel speed when the operation is at the frequency set in **Pr.20**. (The setting is enabled regardless of the **Pr.760** setting.)
				9999	A800-AWH mode disabled

◆Reference travel speed (Pr.100) and Acceleration/deceleration reference frequency (Pr.20)

Use **Pr.100 Reference travel speed** to set the crane travel speed when the operation is at the frequency set in **Pr.20 Acceleration/deceleration reference frequency**. (In the initial setting (**Pr.100** = "9999"), the A800-AWH mode is disabled.)

3.2.3 A800-AWH mode selection (X113) signal

- Turning ON/OFF the X113 signal can switch the operation mode between the A800-AWH mode and standard mode. (The operation mode is changed to the A800-AWH mode by turning ON the X113 signal, and to the standard mode by turning OFF the X113 signal.)

3.3 Full-closed control / fork control

3.3.1 Second applied motor (Pr.450) and Fork selecting (X108) signal

- When the A800-AWH mode is enabled, the operation mode can be switched between full-closed control and fork control according to the combination of the **Pr.450 Second applied motor** setting and the X108 signal status as follows.

Pr.450 setting	X108 signal	Control method
Other than 9999	OFF	Full-closed control
Other than 9999	ON	Fork selecting
9999 (initial value)	OFF	Full-closed control
9999 (initial value)	ON	Full-closed control

- The parameters for the following functions differ depending on selected control.

Function	Full-closed control	Fork control
Torque boost	**Pr.0**	**Pr.46**
Base frequency	**Pr.3**	**Pr.47**
Acceleration time	**Pr.7, Pr.110**[*1]**, Pr.1140**	**Pr.44**
Deceleration time	**Pr.8, Pr.110**[*1]**, Pr.111**[*1]**, Pr.1141**	**Pr.44, Pr.45**[*2]
S-curve acceleration time	**Pr.516, Pr.753**[*1]**, Pr.1142**	**Pr.518**
S-curve deceleration time	**Pr.517, Pr.754**[*1]**, Pr.1143**	**Pr.519**
Electronic thermal O/L relay	**Pr.9**	**Pr.51**
Free thermal O/L relay	**Pr.600 to Pr.604**	**Pr.692 to Pr.696**
Motor permissible load level	**Pr.607**	**Pr.608**
Stall prevention	**Pr.22**	**Pr.48, Pr.49**
Applied motor	**Pr.71**	**Pr.450**
Motor constant	**Pr.80 to Pr.84, Pr.90 to Pr.94, Pr.298, Pr.707, Pr.724, Pr.859**	**Pr.453 to Pr.457, Pr.560, Pr.458 to Pr.462, Pr.744, Pr.745, Pr.860**
Excitation current low-speed scaling factor	**Pr.85, Pr.86**	**Pr.565, Pr.566**
Speed control gain (Advanced magnetic flux vector)	**Pr.89**	**Pr.569**
Offline auto tuning	**Pr.96**	**Pr.463**
Online auto tuning	**Pr.95**	**Pr.574**
Droop control	**Pr.286 to Pr.288, Pr.994, Pr.995**	**Pr.679 to Pr.683**
Motor control method	**Pr.800**	**Pr.451**
Speed control gain	**Pr.820, Pr.821**	**Pr.830, Pr.831**
Analog input filter	**Pr.822, Pr.826**	**Pr.832, Pr.836**
Speed detection filter	**Pr.823**	**Pr.833**
Torque control gain	**Pr.824, Pr.825**	**Pr.834, Pr.835**
Torque detection filter	**Pr.827**	**Pr.837**

*1 Switch ON/OFF the X110 signal to select the acceleration/deceleration time setting. (Refer to page 49.)
*2 When **Pr.45** = "9999", the **Pr.44** setting value is used.

NOTE

- The second functions are enabled when the X108 or RT signal turns ON.
- To input the X108 signal, set "108" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the function. (If the X108 signal is not assigned to any input terminal in A800-AWH mode, the operation is performed in the full-closed control.)

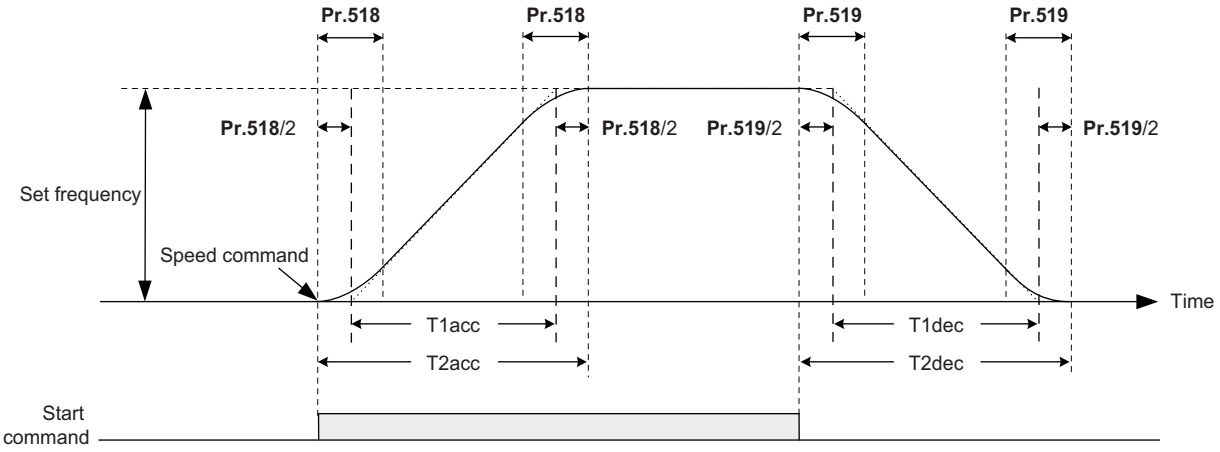
3.3.2 Selecting fork control

The fork control is an operation mode to move the fork of the logistics/transport equipment according to the set frequency while the start command is input via communication. (Used only when one inverter is used to drive two motors.)
(For selecting fork control, refer to page 41.)

◆ Fork selecting operation

Selecting fork control is enabled during speed control operation. The speed command pattern is set in the parameters for selecting fork control (setting frequency, acceleration/deceleration time, and S-curve acceleration/deceleration time).

The fork decelerates to stop when the start command is turned OFF during operation.



Calculate the actual acceleration/deceleration time by the following formula.

- T1acc = (Set frequency - **Pr.13**) × **Pr.44** / **Pr.20**
- T2acc = T1acc + **Pr.518**
- T1dec = (Set frequency - **Pr.10**) × **Pr.45** / **Pr.20**
- T2dec = T1dec + **Pr.519**

3.3.3 Acceleration/deceleration pattern selection for selecting fork control

Set the acceleration/deceleration pattern for selecting fork control.

Pr.	Name	Initial value	Setting range	Description
44 **F020**	**Second acceleration/ deceleration time**	5 s	0 to 3600 s	Set the acceleration/deceleration time for the second motor (time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.20**) for selecting fork control.
45 **F021**	**Second deceleration time**	9999	0 to 3600 s	Set the deceleration time for the second motor (time required to change the frequency from the frequency set in **Pr.20** to stop status (0 Hz)) for selecting fork control.
			9999	The acceleration time applies to the deceleration time.
518 **W110**	**Second S-curve acceleration time**	0.1 s	0.1 to 2.5 s	Set the time required for acceleration (S-pattern) of S-pattern acceleration/deceleration for the second motor for selecting fork control.
519 **W111**	**Second S-curve deceleration time**	0.1 s	0.1 to 2.5 s	

NOTE

- For the functions other than the acceleration/deceleration pattern for selecting fork control (the X108 signal is ON), refer to page 44.
- The specifications of the acceleration/deceleration time or S-curve acceleration/deceleration time set in **Pr.44, Pr.45, Pr.518, and Pr.519** are the same as those set in **Pr.7, Pr.8, Pr.516, and Pr.517**. Refer to the description on page 49.

3.3.4 Restrictions for selecting fork control

When fork selecting is enabled, some functions have restrictions as shown in the following table.

Function name	Description
Stop mode selection at communication error (**Pr.502**)	The **Pr.502 Stop mode selection at communication error** setting is disabled. (The operation is the same as the one when **Pr.502** = "0".)

3.4 Position feed / speed feed switching (X109) signal

- Turning ON/OFF the X109 signal can switch the operation mode between the position feed and speed feed. (The operation mode is changed to the position feed by turning OFF the X109 signal, and to the speed feed by turning ON the X109 signal.)

NOTE

- To input the X109 signal, set "109" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the function. (If the X109 signal is not assigned to any input terminal under full-closed control, the operation is performed in the position feed.)

4 FULL-CLOSED CONTROL

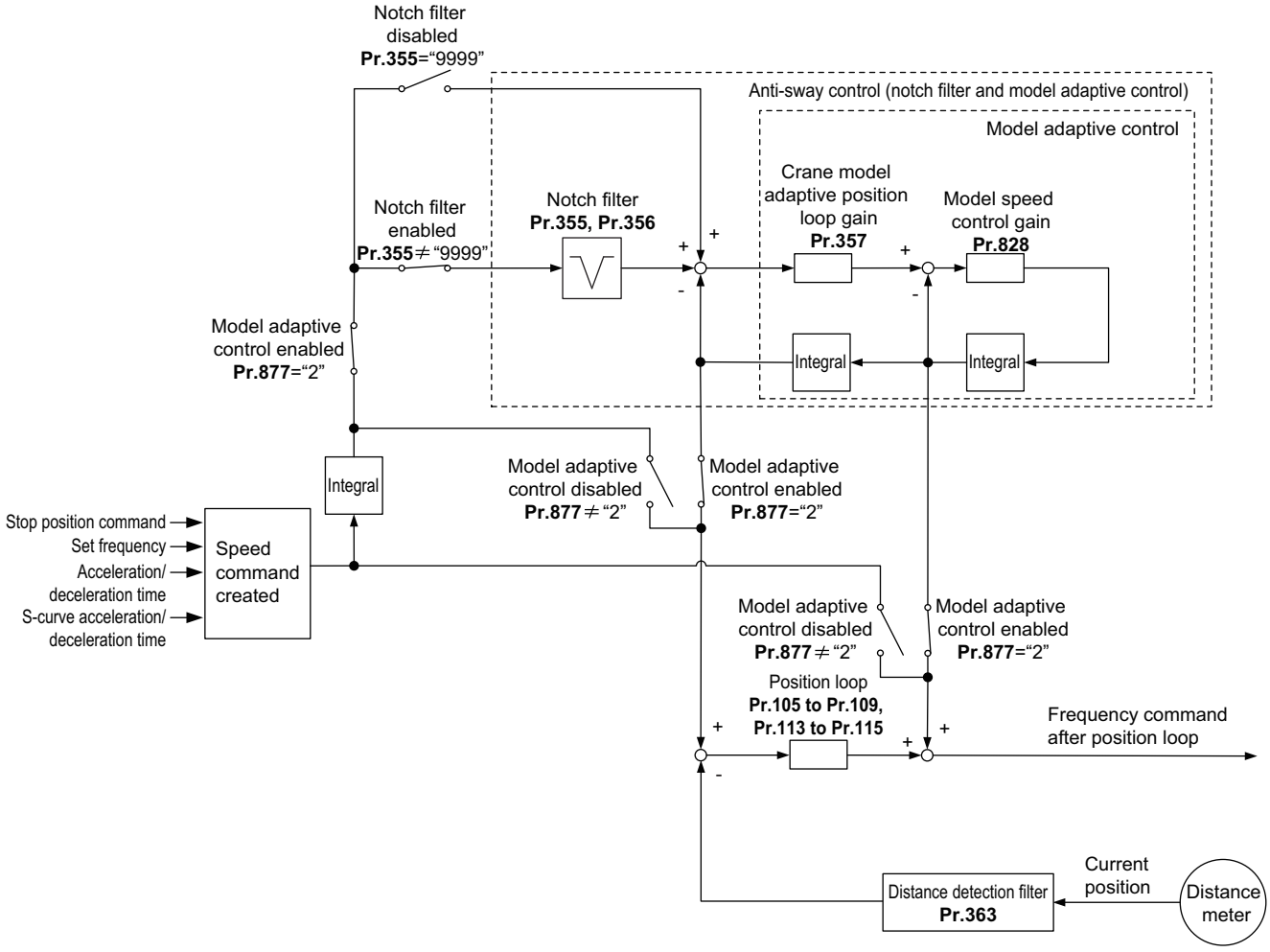
This chapter explains the full-closed control.

This function is used to operate logistics/transport equipment in combination with distance meters and the host controller. The inverter receives the current position data detected by the distance meter, and the position loop compensation is performed so that the logistics/transport equipment travels accurately.

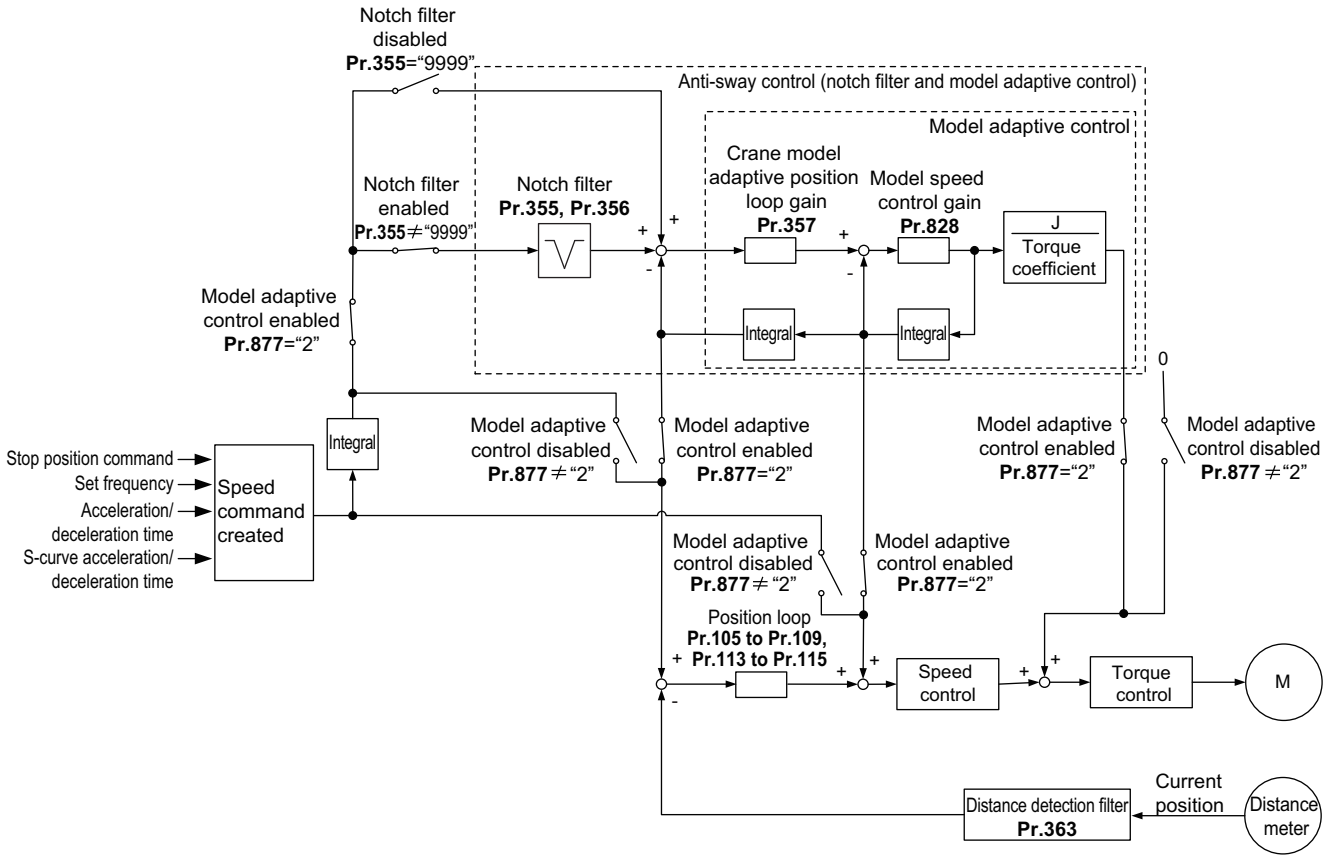
For switching the control mode to the full-closed control, refer to page 41. When the full-closed control is enabled, the operation mode can be switched between the position feed and the speed feed using the X109 signal.

◆ Control block diagram

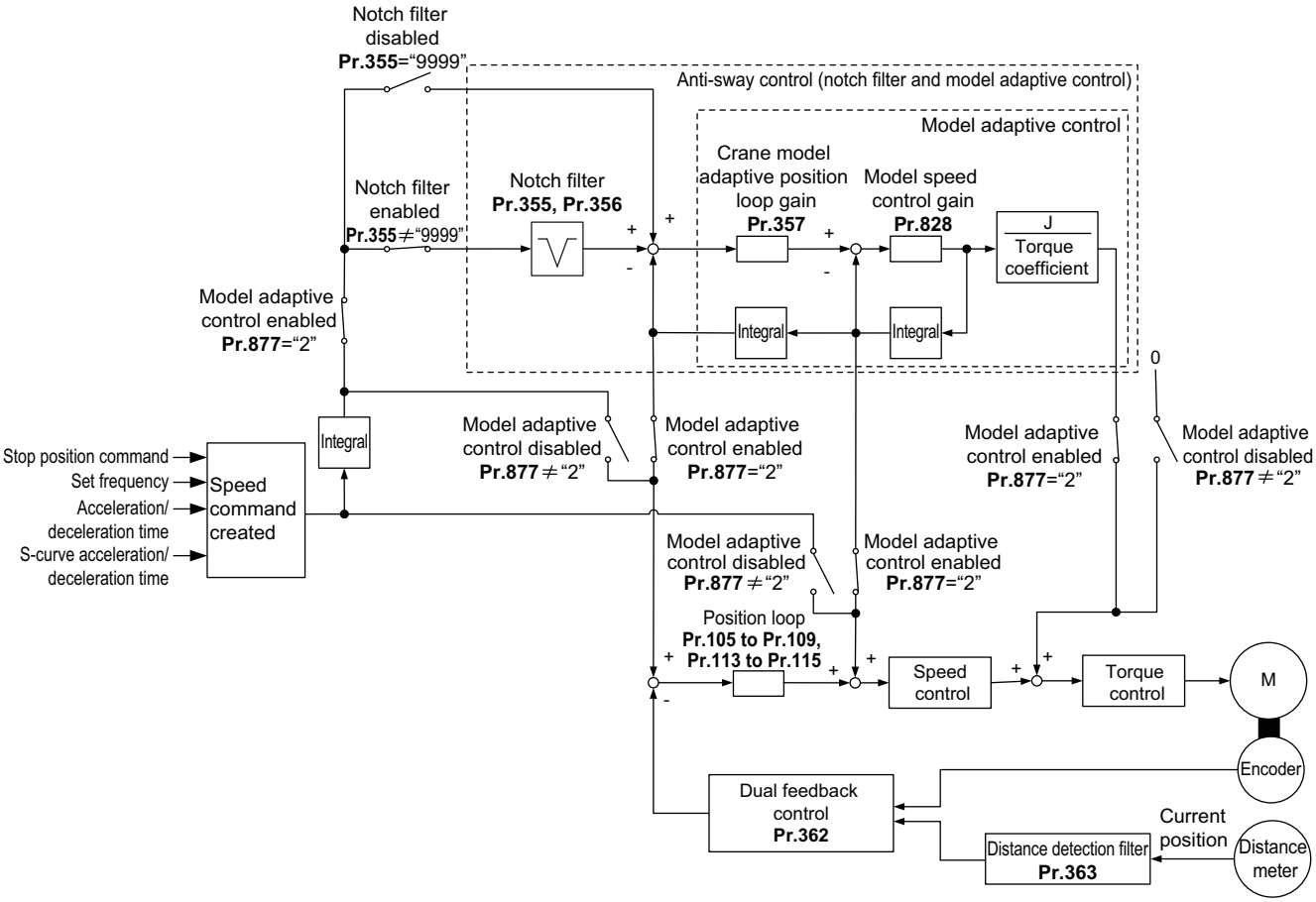
- V/F control, Advanced magnetic flux vector control



- Real sensorless vector control



- Vector control



4.1 FULL-CLOSED CONTROL RELATED PARAMETER

The following parameters are related to the full-closed control.

4.1.1 Acceleration/deceleration pattern selection under full-closed control

During full-closed control, acceleration/deceleration patterns can be set according to the application.

Pr.	Name	Initial value	Setting range	Description
7 **F010**	**Acceleration time**	5 s*1 15 s*2	0 to 3600 s	Set the crane acceleration time (time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.100**).
8 **F011**	**Deceleration time**	5 s*1 15 s*2	0 to 3600 s	Set the crane deceleration time (time required to change the frequency from the frequency set in **Pr.100** to stop status (0 Hz)).
516 **W072**	**S-curve acceleration time**	0.1 s	0.1 to 2.5 s	Set times for S-curve acceleration/deceleration.
517 **W073**	**S-curve deceleration time**	0.1 s	0.1 to 2.5 s	
110 **W070**	**Third acceleration/ deceleration time**	5 s	0 to 3600 s	Set the acceleration/deceleration time when the X110 signal is ON.
			9999	Third acceleration/deceleration is disabled.
111 **W071**	**Third deceleration time**	9999	0 to 3600 s	Set the deceleration time when the X110 signal is ON.
			9999	The acceleration time applies to the deceleration time.
753 **W074**	**Third S-curve acceleration time**	0.1 s	0.1 to 2.5 s	Set the third S-curve acceleration time when the X110 signal is ON.
754 **W075**	**Third S-curve deceleration time**	0.1 s	0.1 to 2.5 s	Set the third S-curve deceleration time when the X110 signal is ON.
1140 **W076**	**Speed feed acceleration time**	9999	0 to 3600 s	Set the acceleration time (time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.100**) when the speed feed is selected.
			9999	The acceleration/deceleration time setting for speed feed is disabled.
1141 **W077**	**Speed feed deceleration time**	9999	0 to 3600 s	Set the deceleration time (time required to change the frequency from the frequency set in **Pr.100** to stop status (0 Hz)) when the speed feed is selected.
			9999	The acceleration time applies to the deceleration time.
1142 **W078**	**Speed feed S-curve acceleration time**	0.1 s	0.1 to 2.5 s	Set the S-curve acceleration time when the speed feed is selected.
1143 **W079**	**Speed feed S-curve deceleration time**	0.1 s	0.1 to 2.5 s	Set the S-curve deceleration time when the speed feed is selected.
395 **W302**	**Deceleration time after system failure detection**	9999	0 to 650 s	Set the deceleration time when system failure is detected.
			9999	**Pr.8, Pr.111** or **Pr.1141** setting value is used for the full-closed control, and **Pr.45** setting value is used for the fork control.
609 **W305**	**S-curve time after system failure detection**	9999	0.1 to 2.5 s	Set the S-curve deceleration time when a system failure occurs.
			9999	**Pr.517, Pr.754** or **Pr.1143** setting value is used for the full-closed control, and **Pr.519** setting value is used for the fork control.

*1 Initial value for the FR-A820-00490(7.5K) or lower and FR-A840-00250(7.5K) or lower.

*2 The initial value for the FR-A820-00630(11K) or higher and FR-A840-00310(11K) or higher.

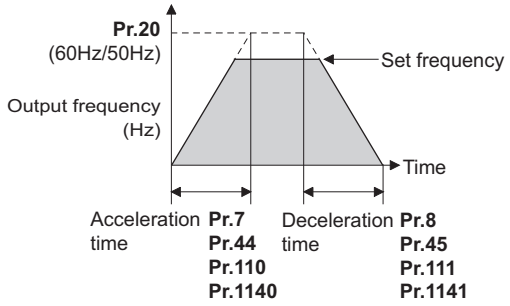
◆ Acceleration time setting (Pr.7, Pr.20)

- Use **Pr.7 Acceleration time** to set the acceleration time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.20 Acceleration/deceleration reference frequency**.
- Set the acceleration time according to the following formula.

Acceleration time setting = **Pr.20** × Acceleration time from stop status to maximum frequency / Maximum frequency

- For example, when the output frequency is increased to the maximum frequency of 50 Hz in 10 seconds with **Pr.20** = 60 Hz (initial value), the **Pr.7** setting value is calculated as follows.

Pr.7 = 60 Hz × 10 s / 50 Hz = 12 s



◆ Deceleration time setting (Pr.8, Pr.20)

- Use **Pr.8 Deceleration time** to set the deceleration time required to change the frequency from the frequency set in **Pr.20 Acceleration/deceleration reference frequency** to stop status.
- Set the deceleration time according to the following formula.

Deceleration time setting = **Pr.20** × Deceleration time from maximum frequency to stop / Maximum frequency

- For example, when the output frequency is decreased from the maximum frequency of 50 Hz in 10 seconds with **Pr.20** = 120 Hz, the **Pr.8** setting value is calculated as follows.

Pr.8 = 120 Hz × 10 s / 50 Hz = 24 s

NOTE

- If the acceleration/deceleration time is set, the actual motor acceleration/deceleration time cannot be made shorter than the shortest acceleration/deceleration time determined by the mechanical system J (moment of inertia) and motor torque.
- If the **Pr.20** setting is changed, the **Pr.125 and Pr.126 (frequency setting signal gain frequency)** settings do not change. Set **Pr.125 and Pr.126** to adjust the gains.

◆ Setting multiple acceleration/deceleration times (X110 signal, Pr.110, Pr.111, Pr.753, Pr.754)

- Switch ON/OFF the X110 (Acceleration/deceleration pattern selection under full-closed control) signal to select the acceleration/deceleration time setting. (Select the time setting when the inverter is stopped. When the time setting is selected during inverter operation, the setting is changed after the inverter is stopped.)

X110 signal	Acceleration time	Deceleration time			S-curve acceleration time	S-curve deceleration time		
		At system failure		In normal operation		At system failure		In normal operation
		Pr.395 ≠ "9999"	Pr.395 = "9999"			Pr.609 ≠ "9999"	Pr.609 = "9999"	
OFF	Pr.7[*1]	Pr.395	Pr.8[*1]		Pr.516	Pr.609	Pr.517	
ON	Pr.110[*1]		Pr.111[*1]		Pr.753		Pr.754	

*1 When the acceleration/deceleration time is set by the master, the setting in the master is valid regardless of the ON/OFF state of the X110 signal.

- To input the X110 signal, set "110" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the function to a terminal.
- When "9999" is set in **Pr.111**, the deceleration time becomes equal to the acceleration time (time set in **Pr.110**).
- For the settings related to system failure, refer to page 101.

NOTE

- Changing the terminal assignment using **Pr.178 to Pr.189 (Input terminal function selection)** may affect the other functions. Set parameters after confirming the function of each terminal.
- The time set in **Pr.395** and **Pr.609** should be shorter than the deceleration time in normal operation.

◆ Setting acceleration/deceleration time when the speed feed is selected (Pr.1140 to Pr.1143)

- **Pr.1140 to Pr.1143** can be used to set the acceleration/deceleration time and S-curve time separately for the speed feed and position feed.

	Acceleration time	Deceleration time			S-curve acceleration time	S-curve deceleration time		
		At system failure		In normal operation		At system failure		In normal operation
		Pr.395 ≠ "9999"	Pr.395 = "9999"			Pr.609 ≠ "9999"	Pr.609 = "9999"	
Position feed or **Pr.1140** = "9999"	**Pr.7, Pr.110**[*1]	**Pr.395**	**Pr.8, Pr.111**[*1]		**Pr.516, Pr.753**[*1]	**Pr.609**	**Pr.517, Pr.754**[*1]	
Speed feed and **Pr.1140** ≠ "9999"	**Pr.1140**		**Pr.1141**		**Pr.1142**		**Pr.1143**	

*1 Switch ON/OFF the X110 signal to select the acceleration/deceleration time setting.

- When "9999" is set in **Pr.111 and Pr.1141**, the deceleration time becomes equal to the acceleration time **(Pr.110, Pr.1140)**.
- For the settings related to system failure, refer to page 101.

NOTE

- The time set in **Pr.395** and **Pr.609** should be shorter than the deceleration time in normal operation.

◆ Setting S-curve acceleration/deceleration time (Pr.516, Pr.517, Pr.753, Pr.754, Pr.1142, Pr.1143)

- Set times for S-curve acceleration/deceleration with **Pr.516, Pr.517, Pr.753, Pr.754, Pr.1142, and Pr.1143**.
  Set the time for acceleration **(Pr.516, Pr.753, or Pr.1142)** and the time for deceleration **(Pr.517, Pr.754, or Pr.1143)**.
- When the S-curve acceleration/deceleration is set, the acceleration/deceleration time becomes longer, as shown below. The set acceleration/deceleration time indicates the actual time taken for linear acceleration/deceleration as calculated based on **Pr.7, Pr.8, Pr.110, Pr.111, Pr.1140, and Pr.1141**.

Actual acceleration time = set acceleration time + S-curve acceleration time / 2

Actual deceleration time = set deceleration time + S-curve deceleration time / 2

- An example of S-curve acceleration/deceleration operation is shown on page 64.

NOTE

- Even if the start signal is turned OFF during acceleration, the inverter does not decelerate immediately to avoid sudden frequency change. (Likewise, the inverter does not immediately accelerate when deceleration is changed to re-acceleration by turning the start signal ON during deceleration, etc.)

4.1.2 Distance measurement direction setting

Set **Pr.112 Distance measurement direction setting** according to whether the distance data sent from the distance meter increases or decreases when the forward rotation command is given. (In the initial setting, the distance data increases when the forward rotation command is given, and decreases when the reverse rotation command is given.)

Pr.	Name	Initial value	Setting range	Description
112 **W080**	**Distance measurement direction setting**	0	0	Forward rotation command: The distance data is increased. Reverse rotation command: The distance data is decreased.
			1	Forward rotation command: The distance data is decreased. Reverse rotation command: The distance data is increased.

4.1.3 Brake sequence

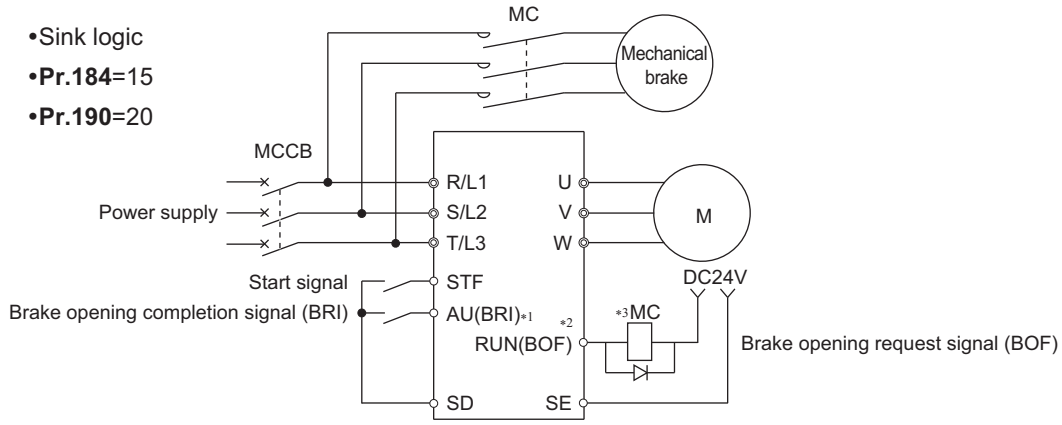
This function outputs operation timing signals of the mechanical brake from the inverter.

This function is useful in preventing load slippage at a start due to poor mechanical brake timing and overcurrent alarm in stop status and enable secure operation.

Pr.	Name	Initial value	Setting range	Description
278 **W221**	**Brake opening frequency** V/F Magnetic flux Sensorless	3 Hz	0 to 30 Hz	Set the rated slip frequency of the motor + approx. 1.0 Hz.
279 **W222**	**Brake opening current** V/F Magnetic flux Sensorless	130%	0% to 400%	Set between 50% and 90% because load slippage is more likely to occur when a start setting is too low. The inverter rated current is regarded as 100%.
280 **W223**	**Brake opening current detection time** V/F Magnetic flux Sensorless	0.3 s	0 to 2 s	Generally set between 0.1 and 0.3 second.
281 **W200**	**Brake operation time at start**	0.3 s	0 to 5 s	Set the mechanical delay time until braking eases.
282 **W201**	**Brake operation frequency**	6 Hz	0 to 30 Hz	Turn OFF the Brake opening request (BOF) signal and set the frequency for operating the electromagnetic brake.
283 **W224**	**Brake operation time at stop** V/F Magnetic flux Sensorless	0.3 s	0 to 5 s	Set the time required to shut off the inverter output after the BOF signal is turned OFF.
350 **W210**	**Brake operation time at deceleration** Vector	3 s	0 to 30 s	Set the time required to turn OFF the BOF signal after the motor speed reaches the **Pr.282** setting during deceleration.
351 **W225**	**Brake operation time at start 2** V/F Magnetic flux Sensorless	9999	0 to 2 s	Set the brake operation time at start.
			9999	Brake operation time at start 2 disabled.
352 **W226**	**Brake operation position range** V/F Magnetic flux Sensorless	9999	0 to 1000 mm	The BOF signal is turned OFF when the current position is within the distance set in **Pr.352** away from the stop position.
			9999	**Pr.104** setting value is effective. (Refer to page 72.)
353 **W227**	**Brake release request signal output selection** V/F Magnetic flux Sensorless	9999	1	The BOF signal is turned OFF according to the **Pr.104** or **Pr.352** setting. The BOF signal is also turned OFF when the frequency command is 0 Hz during the position feed.
			9999	The BOF signal is turned OFF according to **Pr.104** or **Pr.352** setting.
1135 **W228**	**Brake opening current 2** V/F Magnetic flux Sensorless	9999	0% to 400%	Set the brake opening current during reverse rotation.
			9999	**Pr.279** setting value is effective.

◆ Connection example

•Sink logic
•**Pr.184**=15
•**Pr.190**=20



*1 The input signal terminals differ by the settings of **Pr.178 to Pr.189**.
*2 The output signal terminals differ by the settings of **Pr.190 to Pr.196**.
*3 Be careful of the permissible current of the built-in transistors on the inverter. (24 VDC 0.1 A)

NOTE

- To use this function, set the acceleration/deceleration time to 1 second or longer.

◆ Brake opening completion (BRI) signal and Brake opening request (BOF) signal

- Set "15" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the Brake opening completion (BRI) signal to the input terminal.
- Set "20 (positive logic) or 120 (negative logic)" in any parameter from **Pr.190 to Pr.196 (Output terminal function selection)**, and assign the Brake opening request (BOF) signal to the output terminal.
- The brake sequence fault is detected when the status of the BRI signal remains the same after the status of the BOF signal is changed (refer to page 113).

NOTE

- Changing the terminal assignment using **Pr.178 to Pr.189 (Input terminal function selection) and Pr.190 to Pr.196 (Output terminal function selection)** may affect the other functions. Set parameters after confirming the function of each terminal.

◆ Operation under Vector control

- The brake is released or activated by turning ON or OFF the Brake opening request (BOF) signal. The following table shows the conditions to turn ON or OFF the BOF signal.

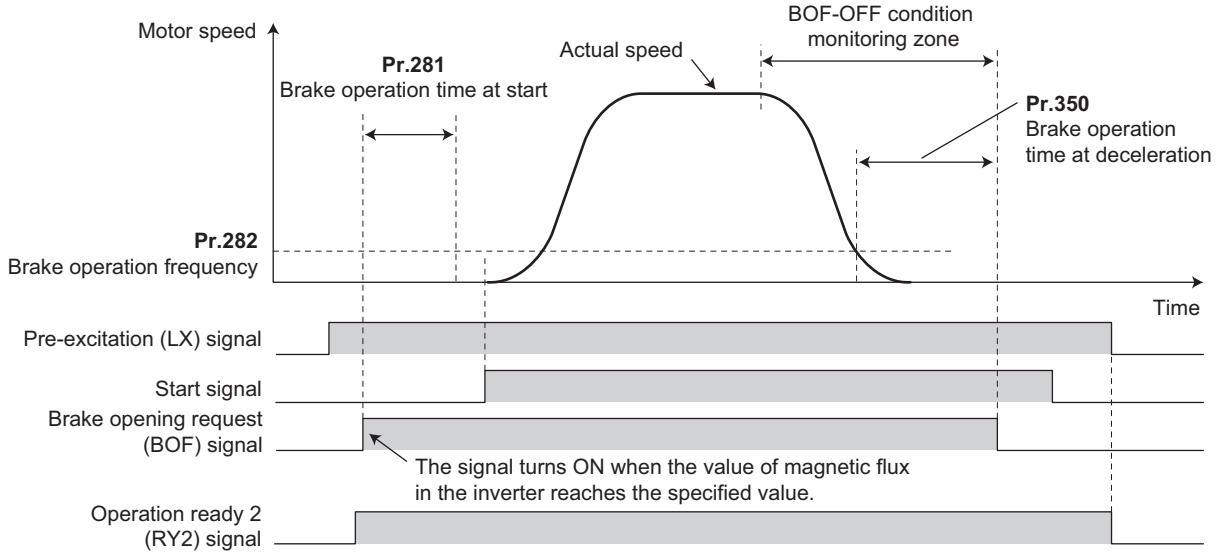
ON/OFF	Condition	
	Position feed	**Speed feed**
ON	When the estimated magnetic flux value reaches the specified value after the Pre-excitation (LX) signal or the start signal is turned ON.	
OFF	When the inverter output is shut off.	
	When the time set in **Pr.350 Brake operation time at deceleration** elapses after the speed is reduced to the level set in **Pr.282 Brake operation frequency** in the BOF-OFF condition monitoring zone (time period from when deceleration starts at the target position or by turning OFF the start signal until the BOF signal is turned OFF or the next position feed operation starts).	When the time set in **Pr.350 Brake operation time at deceleration** elapses after the speed is reduced to the level set in **Pr.282 Brake operation frequency** in the BOF-OFF condition monitoring zone (time period from when deceleration starts by turning OFF the start signal until the BOF signal is turned OFF or the next speed feed operation starts).

- When the LX signal is used, the LX signal is turned ON first, then the BOF signal is turned ON, and after the time period set in **Pr.281 Brake operation time at start**, the output frequency is increased to the set speed. (The output frequency is also increased when the start signal is turned ON within the time period set in **Pr.281**.)
- When the LX signal is not used, the start signal is turned ON first, then the BOF signal is turned ON, and after the time period set in **Pr.281 Brake operation time at start**, the output frequency is increased to the set speed.

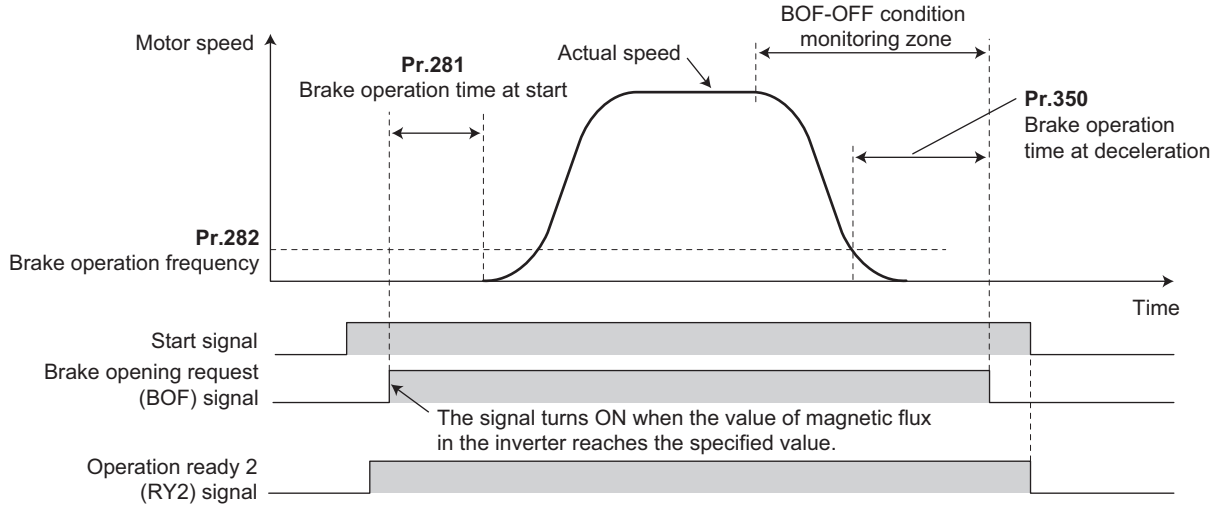
- When any of the following occurs while the time period is counted for **Pr.350 Brake operation time at deceleration**, the counting stops and the counted time is reset.
  When the time period set in **Pr.350** expires, when the output is shut off, and when the next position feed / speed feed operation starts.

■ Basic operation example (position feed)

- When the LX signal is used

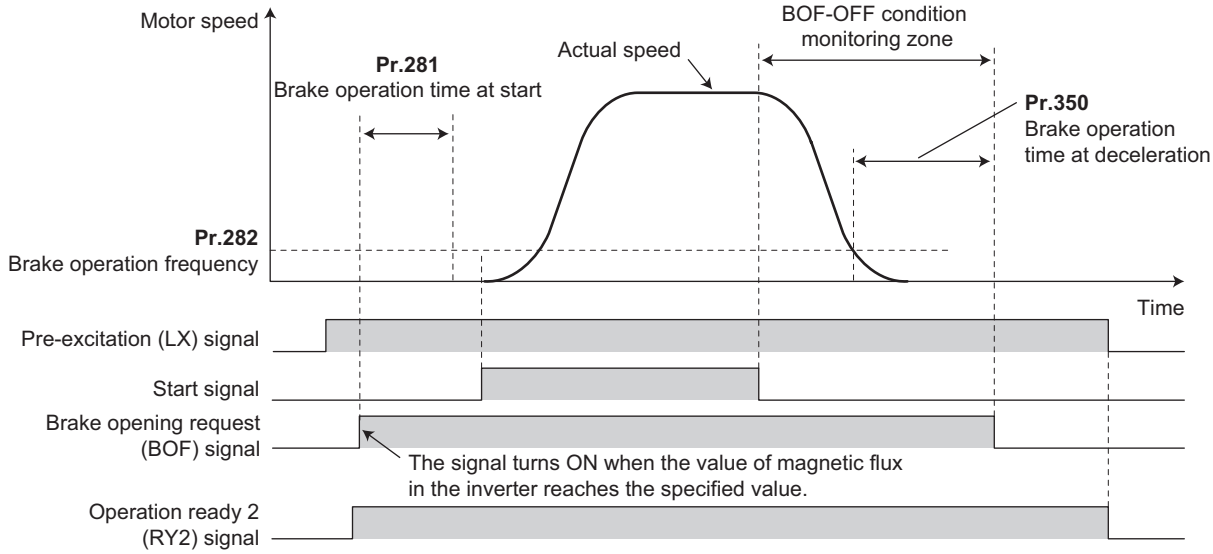


- When the LX signal is not used

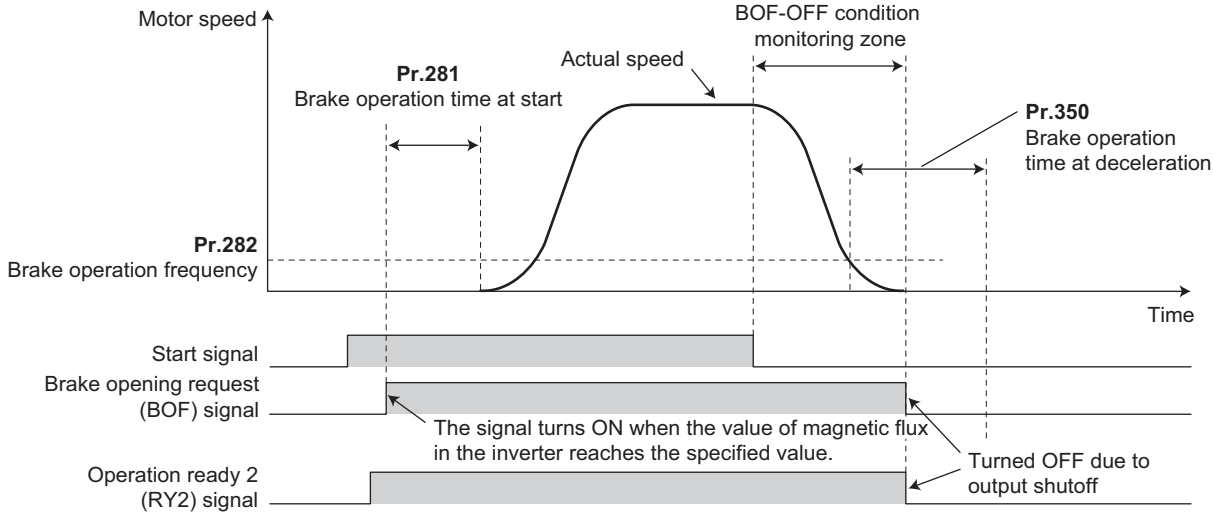


■ Basic operation example (when the start signal is turned OFF during speed feed / position feed)

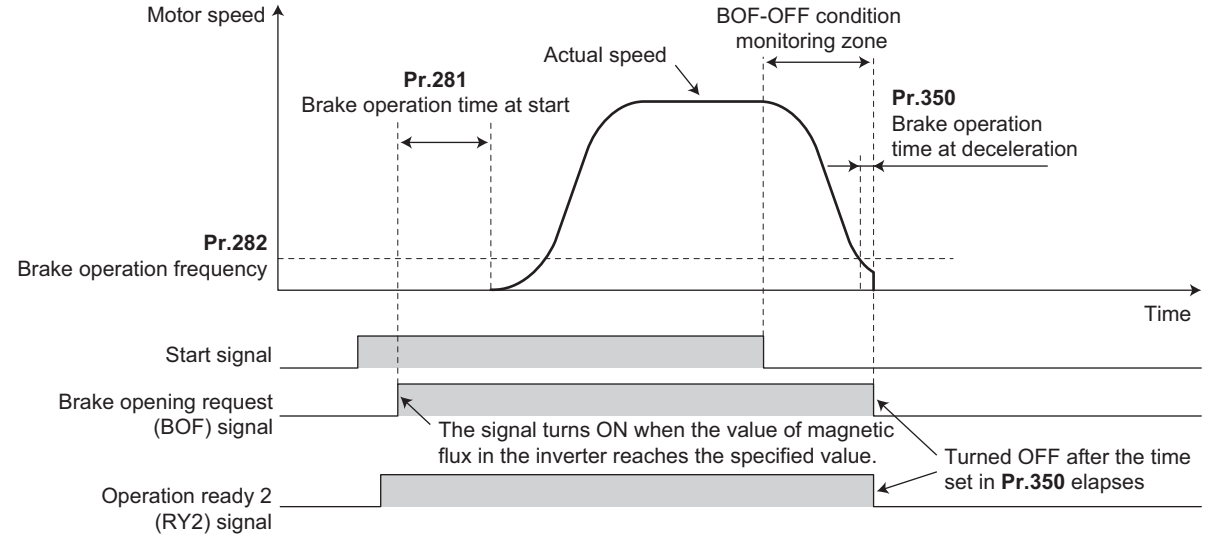
- When the LX signal is used



- When the LX signal is not used (in the case where the **Pr.350** setting is rather long and the BOF signal turns OFF due to output shutoff)

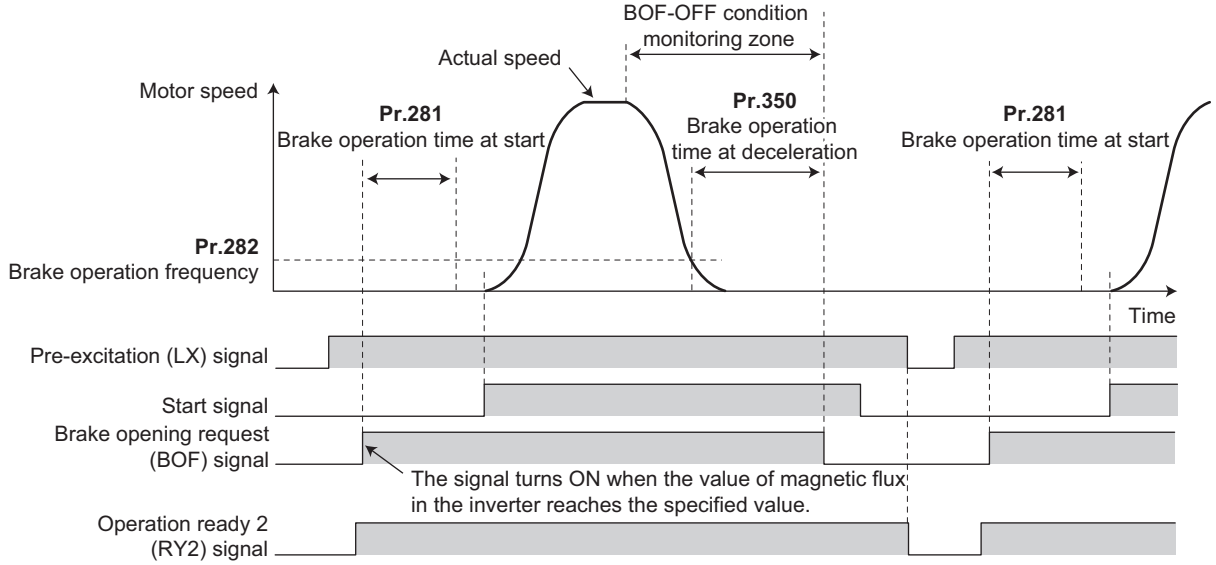


- When the LX signal is not used (in the case where the **Pr.350** setting is rather short and the BOF signal turns OFF when the time set in **Pr.350** expires)

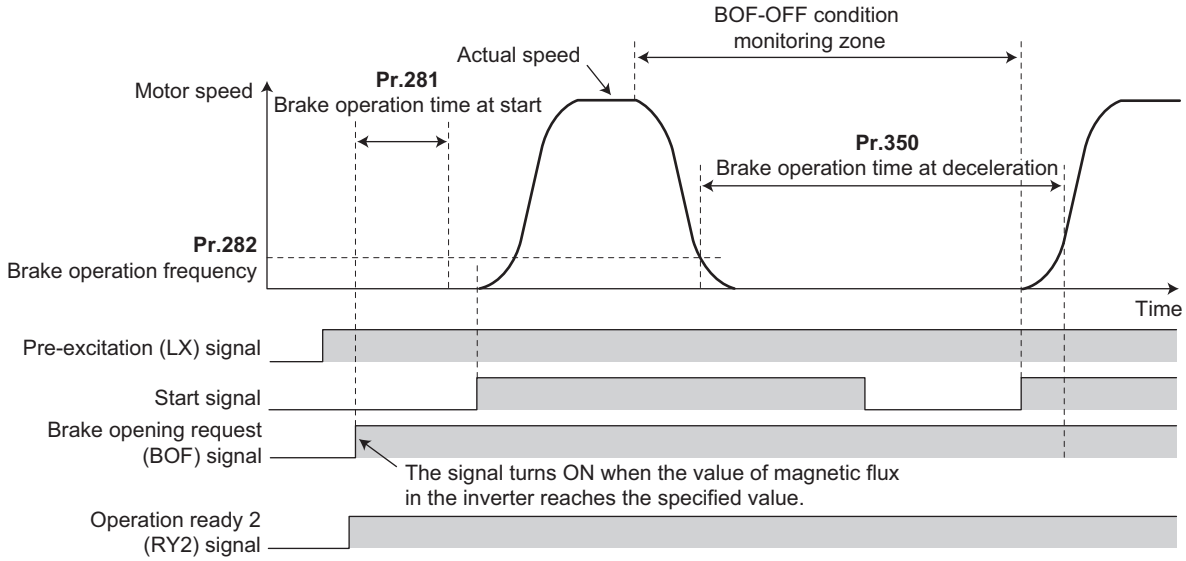


■ Restart operation example (position feed)

- When the operation is restarted while the BOF signal is OFF



- When the operation is restarted while the BOF signal is ON

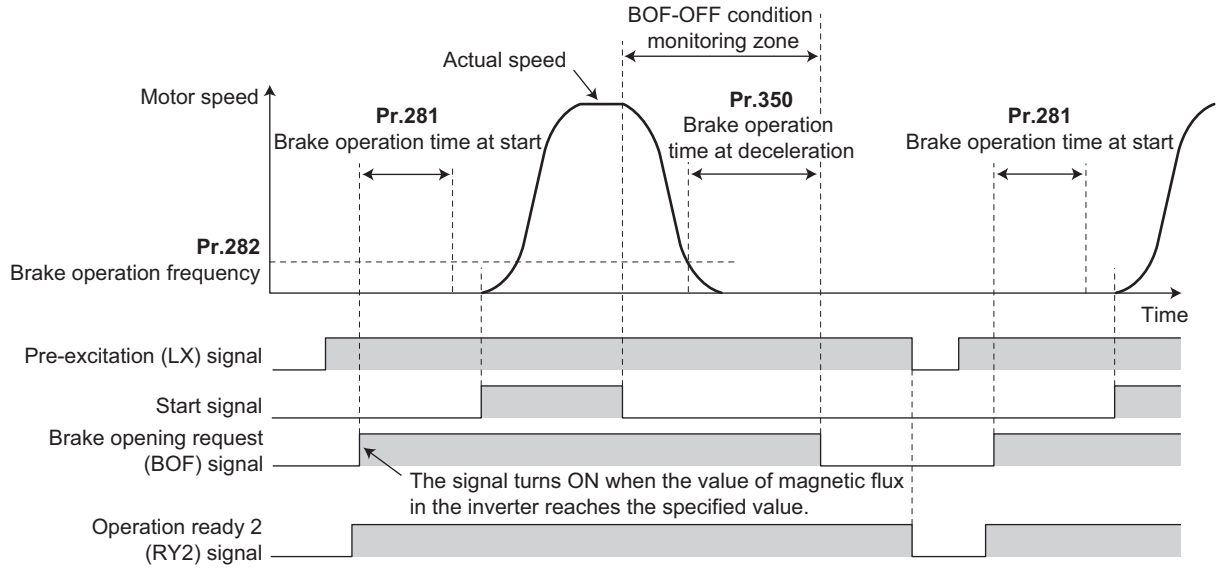


■ Restart operation example (when the start signal is turned OFF during speed feed / position feed)

- When the operation is restarted while the BOF signal is OFF

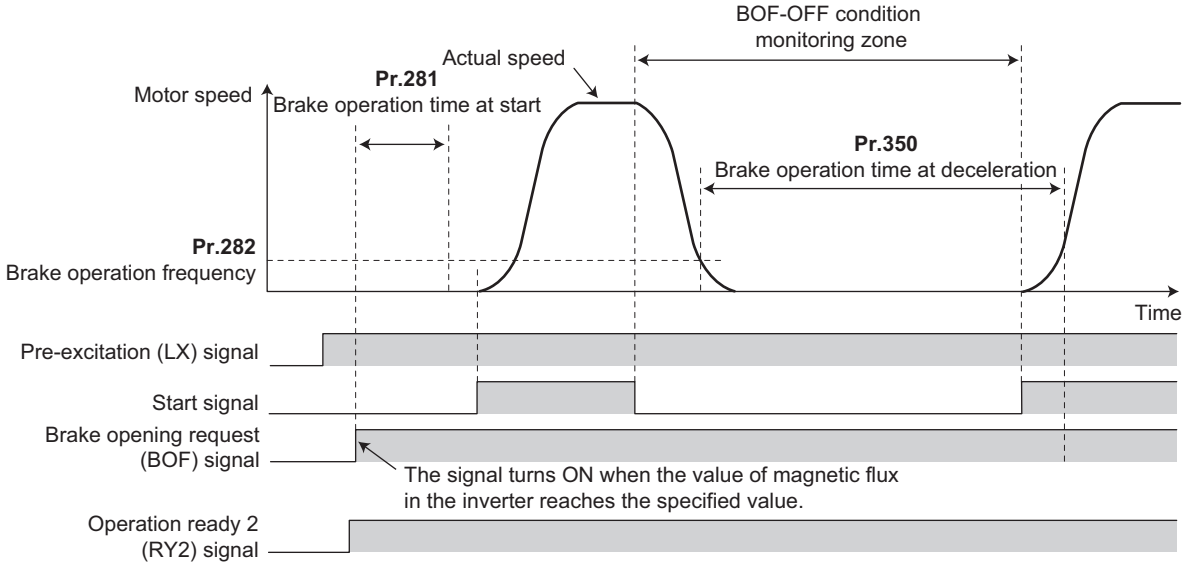
  To restart the operation after the inverter has stopped and the BOF signal has turned OFF, turn OFF the LX signal once.

  The operation can be restarted by turning ON the LX signal again after turning OFF the RY2 signal.



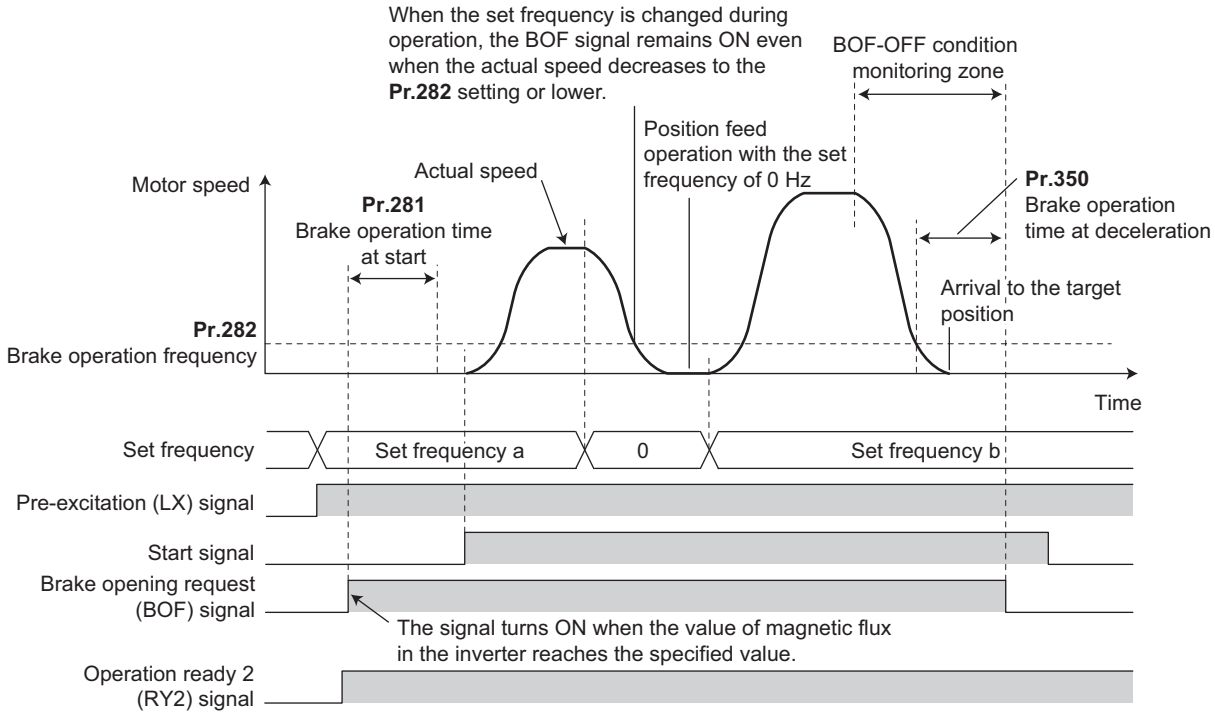
- When the operation is restarted while the BOF signal is ON

  It is possible to restart the operation while the BOF signal is ON without making any change.



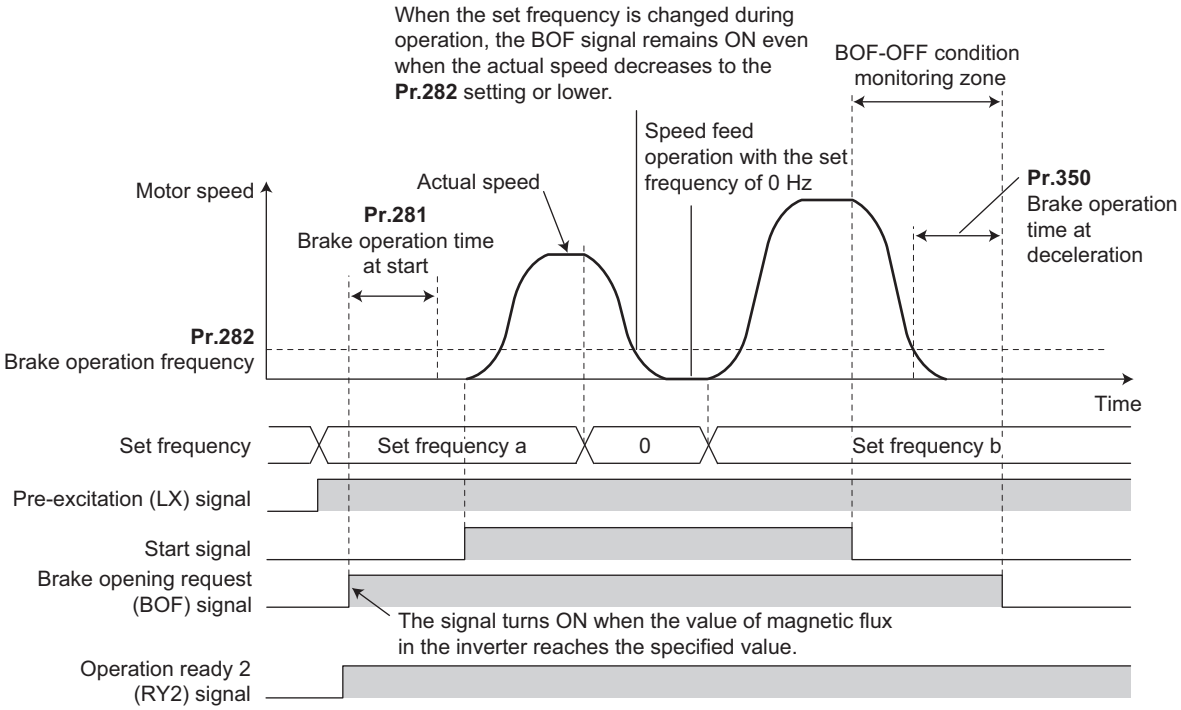
■ Operation example when the set frequency is decreased to the Pr.282 setting or lower during operation (position feed)

- When the set frequency is changed during operation, the BOF signal remains ON even when the actual speed decreases to the **Pr.282** setting or lower, and the position feed operation continues.



■ Operation example when the set frequency is decreased to the Pr.282 setting or lower during operation (speed feed)

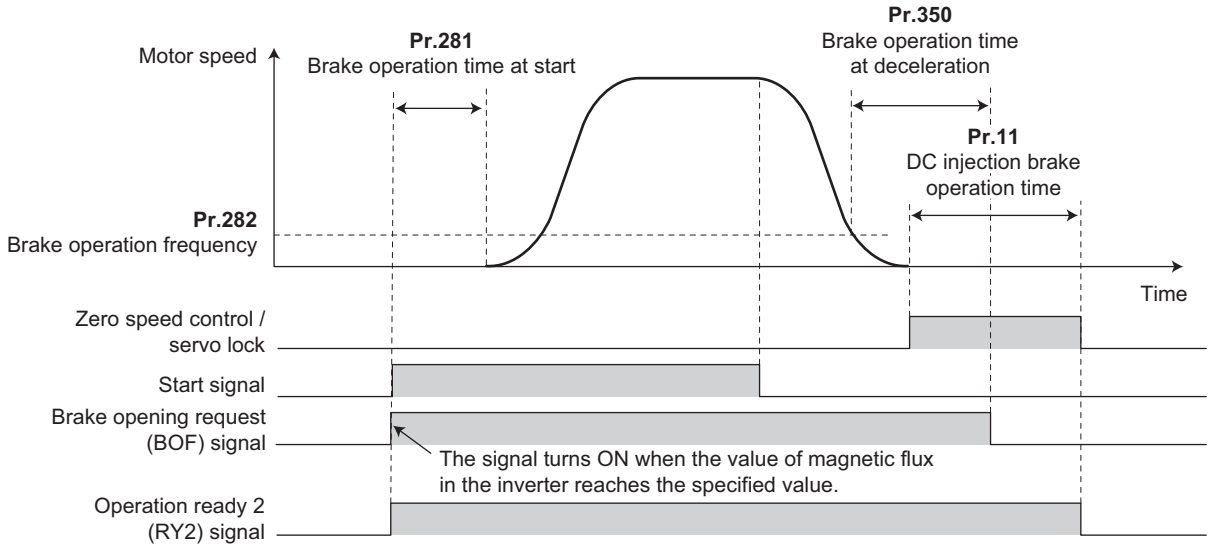
- When the set frequency is changed during operation, the BOF signal remains ON even when the actual speed decreases to the **Pr.282** setting or lower, and the speed feed operation continues.



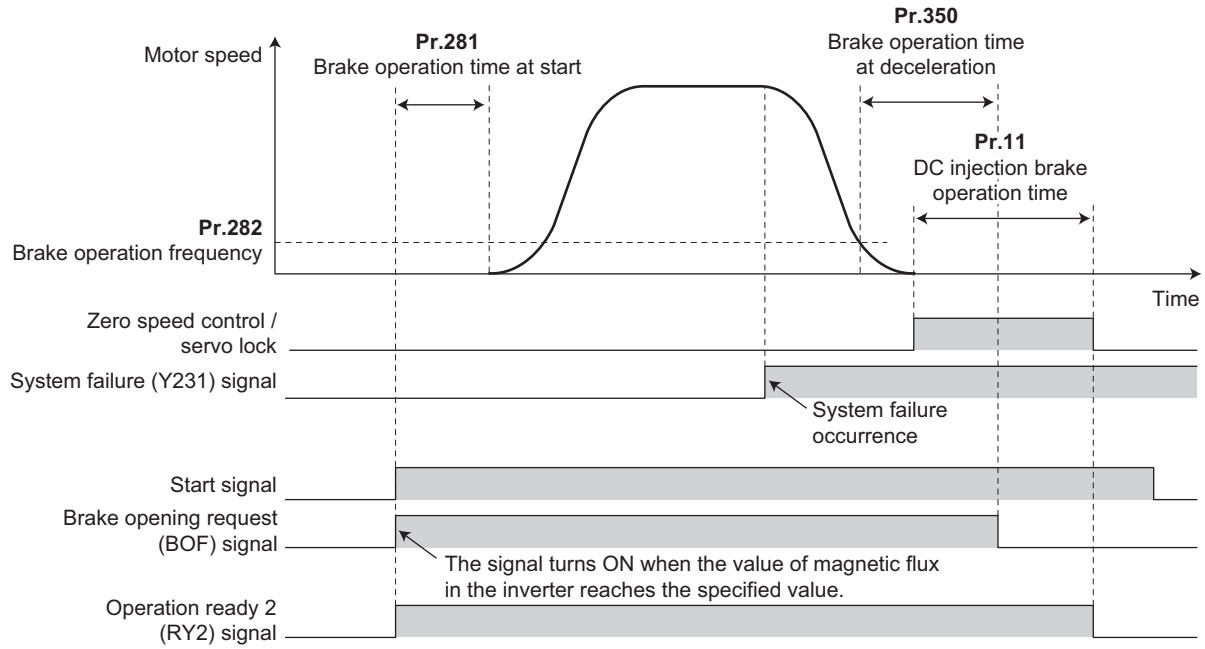
■ DC injection brake operation time (Pr.11)

- When a deceleration stop is started by turning OFF the start signal or due to a system failure, cage slippage on the lift axis can be prevented by DC injection braking (zero speed control / servo lock) during the time period from when the BOF signal is turned OFF until the brake is activated.

- Under full-closed control, DC injection braking (zero speed control / servo lock) is enabled when all of the following conditions are satisfied:
  Vector control
  During a deceleration stop due to a system failure or the start signal turning OFF.
- The DC injection brake operation frequency (**Pr.10**) is fixed at 0 Hz.
- Operation example of a deceleration stop due to the start signal turning OFF



- Operation example of a deceleration stop due to a system failure



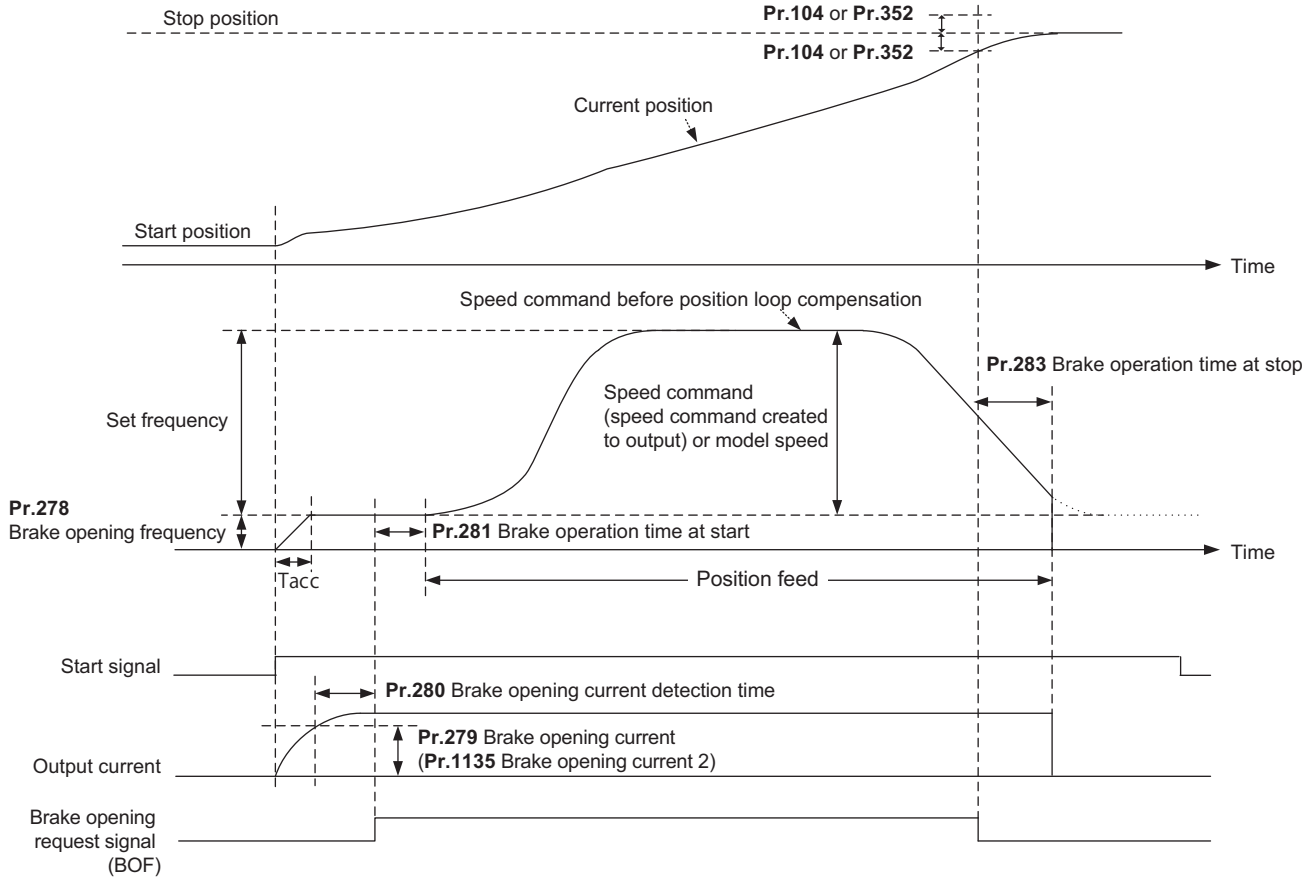
◆ Operation under Real sensorless vector control, Advanced magnetic flux vector control, and V/F control

■ During position feed

- **Pr.351 Brake operation time at start 2** = "9999" (initial value):
  When the start signal is input to the inverter, the inverter starts running. When the output frequency reaches the frequency set in **Pr.278 Brake opening frequency** and the output current is equal to or higher than the current set in **Pr.279 Brake opening current** (during forward rotation) or **Pr.1135 Brake opening current 2** (during reverse rotation), the BOF signal is output after the time period set in **Pr.280 Brake opening current detection time**.
  After the BOF signal is output and the time period set in **Pr.281** has elapsed, the speed command before position loop compensation is increased to the total frequency of the setting frequency and the **Pr.278** setting.

- **Pr.351** ≠ "9999":
  When the start signal is input to the inverter, the BOF signal is turned ON. After the time period set in **Pr.351**, the inverter accelerates to the set frequency.
- When the time period set in **Pr.283 Brake operation time at stop** has elapsed after the BOF signal is turned OFF, the inverter output is shutoff.
- The start signal and BOF signal turn OFF when any value of the output frequency, speed command (speed command created to output), and model speed is equal to or less than **Pr.282** setting value, regardless of the **Pr.351** setting value.

Example when **Pr.351** = "9999" and **Pr.353** = "9999"



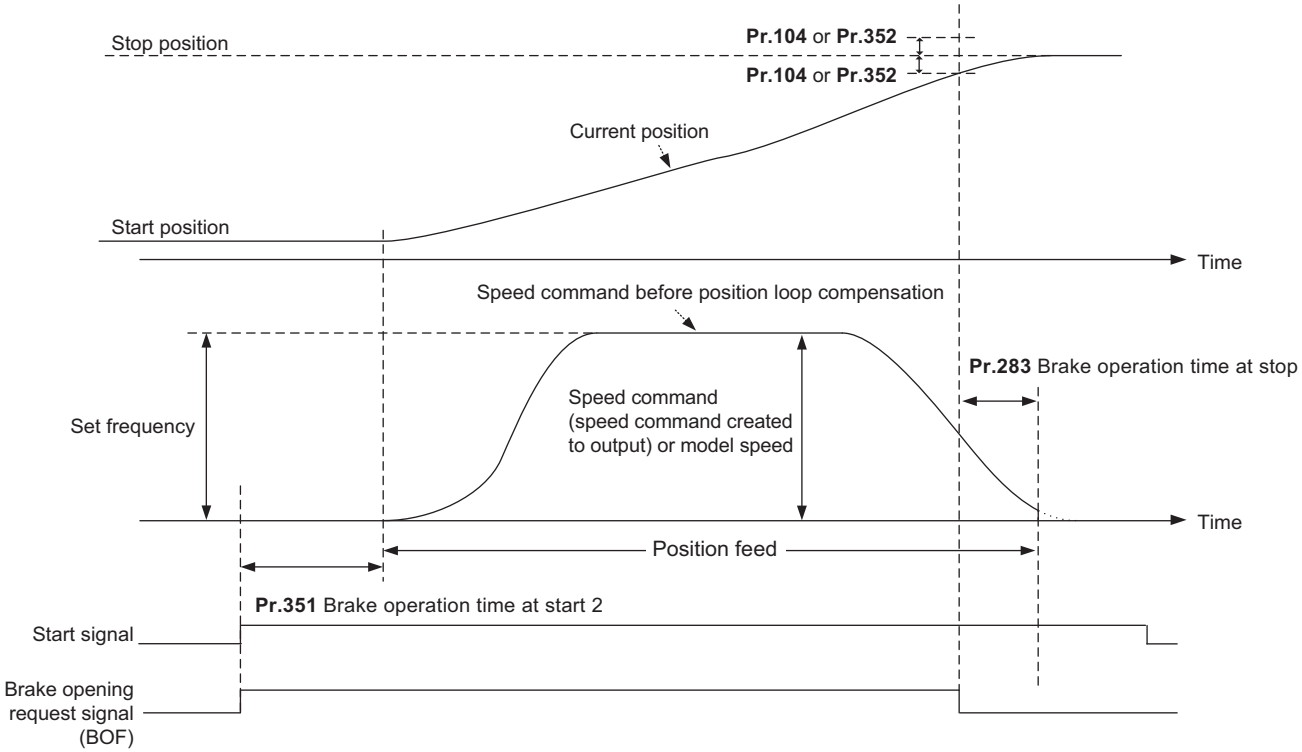
Calculate the actual acceleration/deceleration time by the following formula. Note that the third acceleration/deceleration time has higher priority when the X110 signal is ON. (Refer to page 50.)

Tacc = **Pr.278** × (**Pr.7** or **Pr.110**) / **Pr.20**

NOTE

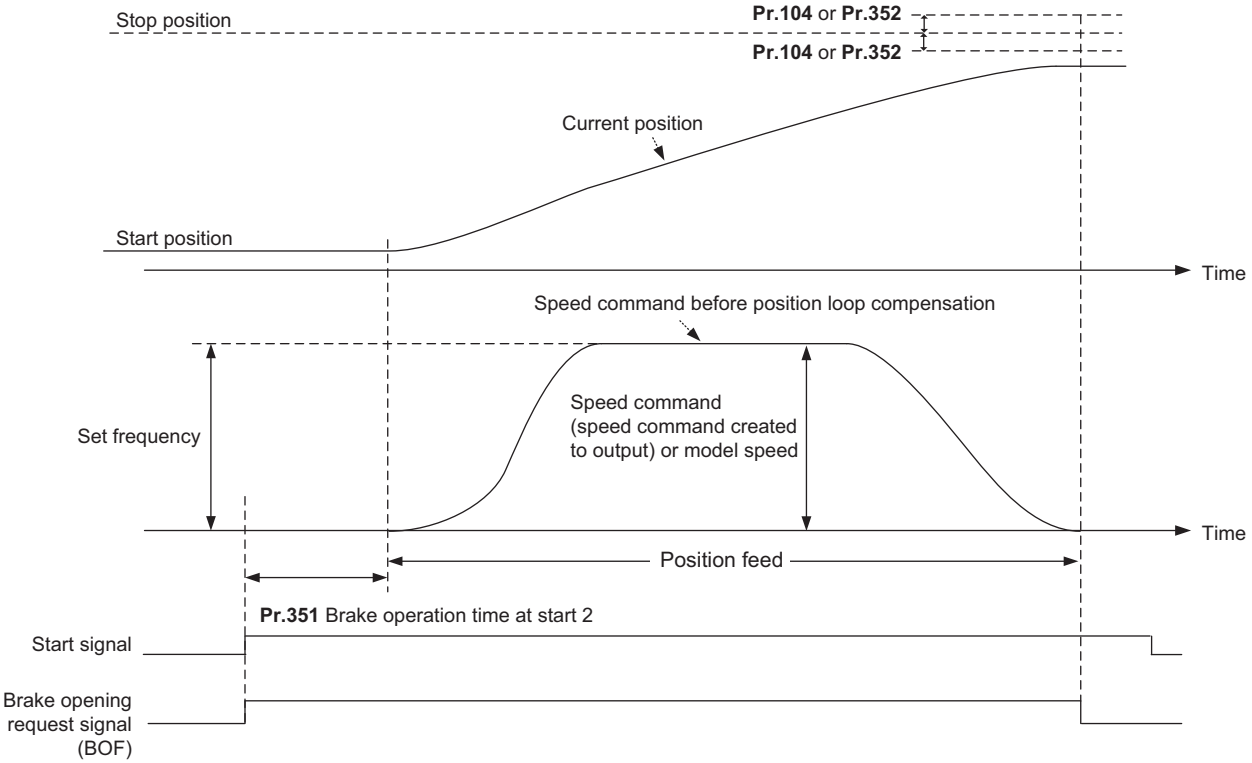
- The position command of the position loop is calculated from the setting frequency to which the frequency set in **Pr.278** has not been added yet. Therefore, when the position loop is enabled, the frequency as the speed command after position loop compensation becomes the setting frequency.

Example when **Pr.351** ≠ "9999" and **Pr.353** = "9999"



While **Pr.353** = "1", the BOF signal is also turned OFF when the frequency command becomes 0 Hz. The following shows the operation example when the BOF signal is turned OFF since the frequency command becomes 0 Hz.

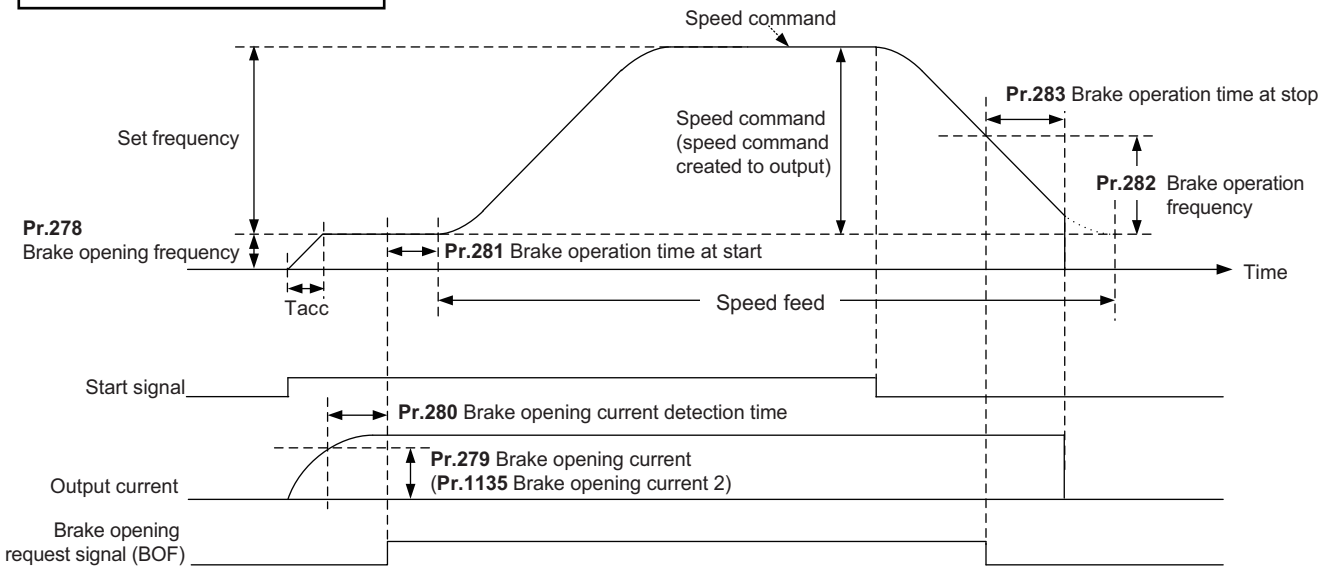
Example when **Pr.351** ≠ "9999" and **Pr.353** = "1"



■ During speed feed

- **Pr.351** = "9999" (initial value):
  When the start signal is input to the inverter, the inverter starts running. When the output frequency reaches the frequency set in **Pr.278** and the output current is equal to or higher than the current set in **Pr.279** (during forward rotation) or **Pr.1135** (during reverse rotation), the BOF signal is output after the time period set in **Pr.280**.
  After the BOF signal is output and the time period set in **Pr.281** has elapsed, the output frequency is increased to the sum of the set speed and **Pr.278** setting.
- **Pr.351** ≠ "9999":
  When the start signal is input to the inverter, the BOF signal is turned ON. After the time period set in **Pr.351**, the inverter accelerates to the set frequency.
- The position command of the position loop is calculated from the setting frequency to which the frequency set in **Pr.278** has not been added yet. Therefore, when the position loop is enabled, the frequency as the speed command after position loop compensation becomes the setting frequency.
- When **Pr.351** = "9999", the start signal and BOF signal turn OFF after the output frequency value is equal to or less than the sum of the setting values of **Pr.282** and **Pr.278**, or after the frequency as the speed command (speed command created to output) is equal to or less than the frequency set in **Pr.282**. When **Pr.351** ≠ "9999", the start signal and BOF signal turn OFF after the output frequency or the frequency as the speed command (speed command created to output) is equal to or less than the frequency set in **Pr.282**.

Example when **Pr.351** = "9999"



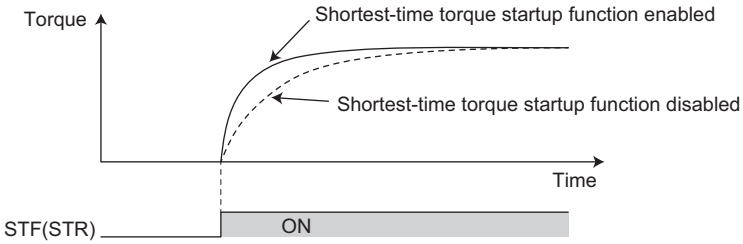
Calculate the actual acceleration/deceleration time by the following formula. Note that the third acceleration/deceleration time has higher priority when the X110 signal is ON. (Refer to page 50.)
Tacc = **Pr.278** × (**Pr.7, Pr.110,** or **Pr.1140**) / **Pr.20**

4.1.4 Shortest-time torque startup

The torque is started up in the shortest time.
When an inverter is connected to a lift, the inverter has a load immediately after the lift brake is released. For lift applications, slow torque startup may cause a delay in the brake opening. Using the shortest-time torque startup function shortens the time from startup to brake opening. This will contribute to tact time reduction.
This function is available only under Real sensorless vector control or vector control (or fork selecting).

Pr.	Name	Initial value	Setting range	Description
1404 **A164**	**Shortest-time torque startup selection**	0	0	Shortest-time torque startup disabled
			1	Shortest-time torque startup enabled

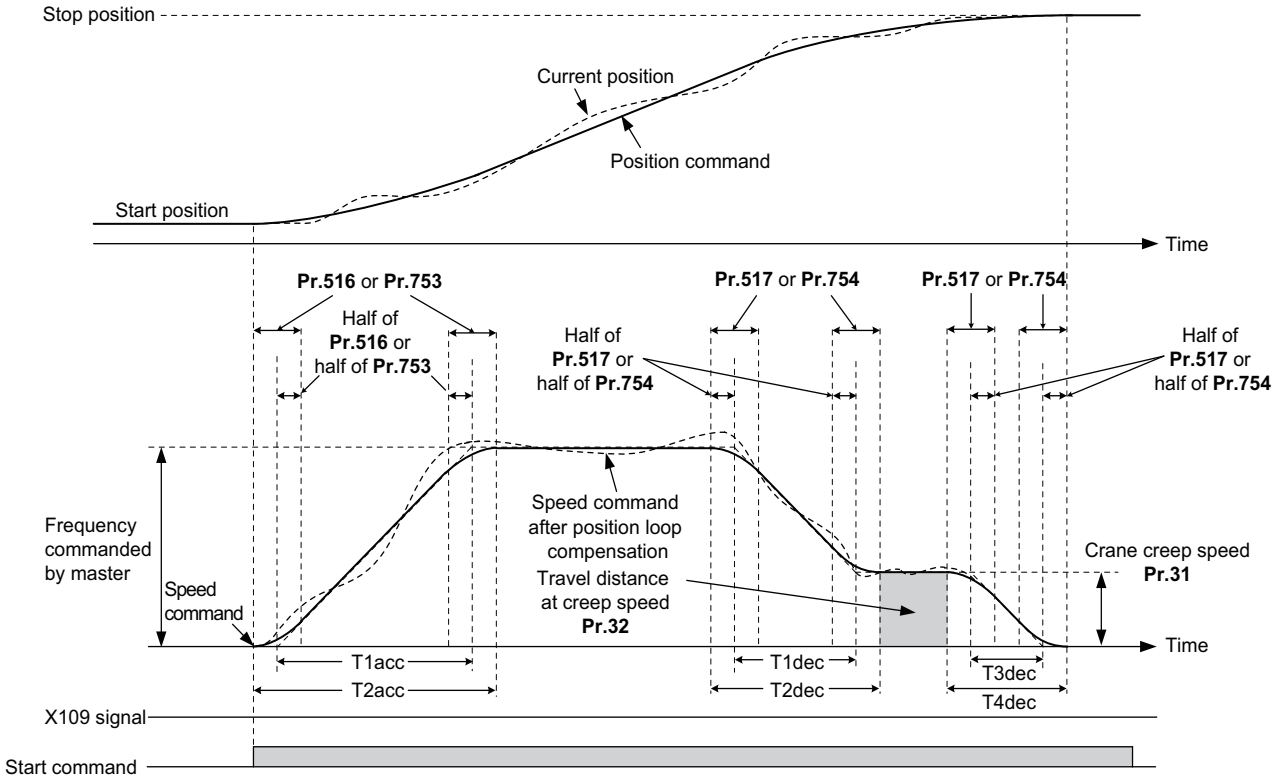
When **Pr.1404 Shortest-time torque startup selection** = "1" and the inverter is not in stop status, the torque is generated by the shortest-time torque startup function.



4.2 Position feed

Using this mode, a transfer crane can travel to the target stop position.
Set the stop position command, the running speed command, and the start command via communication to perform the position loop compensation so that the crane travels to the stop position.
The crane decelerates to stop when the start command is turned OFF during operation.
For switching the operation mode to the position feed, refer to page 41.

◆Example of position feed



Calculate the actual acceleration/deceleration time by the following formula. Note that the third acceleration/deceleration time has higher priority when the X110 signal is ON. (Refer to page 50.)

- T1acc = Set frequency × (**Pr.7** or **Pr.110**) / **Pr.20**
- T2acc = T1acc + (**Pr.516** or **Pr.753**)
- T1dec = (Set frequency - **Pr.31**) × (**Pr.8** or **Pr.111**) / **Pr.20**
- T2dec = T1dec + (**Pr.517** or **Pr.754**)
- T3dec = **Pr.31** × (**Pr.8** or **Pr.111**) / **Pr.20**
- T4dec = T3dec + (**Pr.517** or **Pr.754**)

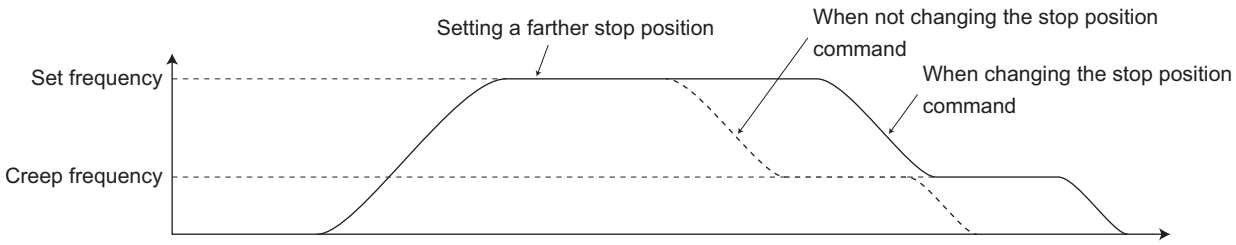
◆When changing the stop position command during operation

The stop position command can be changed during position feed operation.
Whether or not the stop position command can be changed depends on the operation status as shown in the following table.

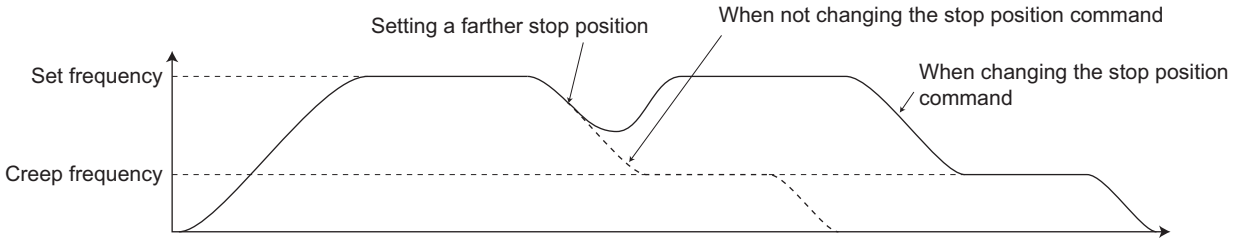
Details of the change		Not during deceleration toward the predetermined stop position	During deceleration toward the predetermined stop position
Setting a farther stop position		○ (Case 1)	○ (Case 2)
Setting a closer stop position	Minimum deceleration distance < Remaining distance toward the new stop position	○ (Case 3)	—
	Remaining distance toward the new stop position < Minimum deceleration distance	×	×

○: Available, ×: Not available, —: Not applicable

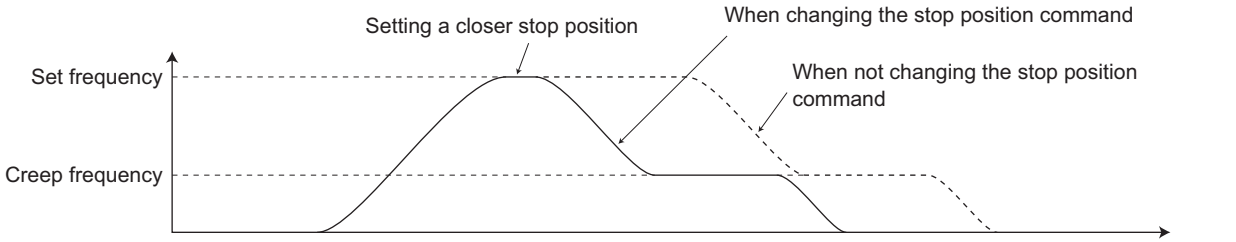
- Case 1



- Case 2

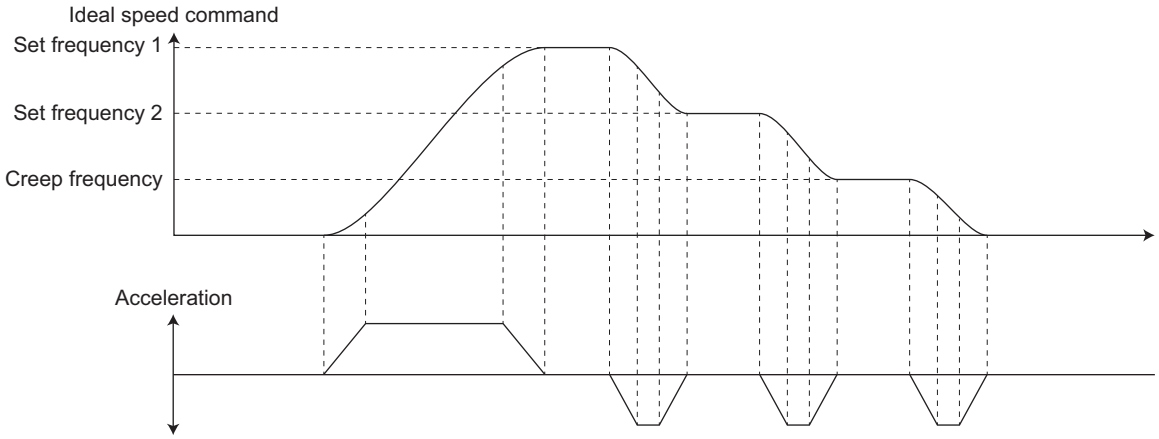


- Case 3



◆When changing the set frequency during operation

- The set frequency can be changed during position feed operation.
- Operation example when the set frequency is changed from the set frequency 1 to the set frequency 2



4.2.1 Creep function

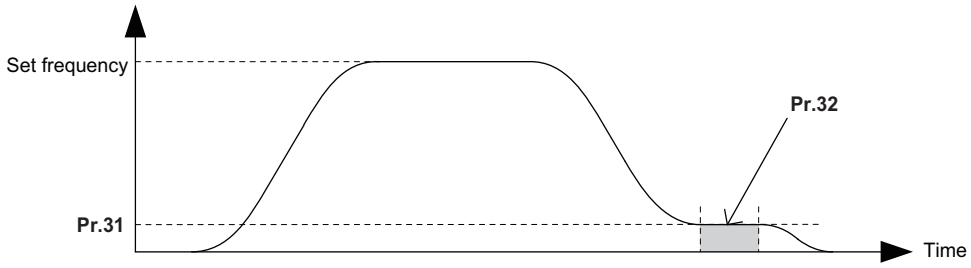
Using this function, a crane sufficiently decelerates near the target position so that the crane does not pass the target position.

Pr.	Name	Initial value	Setting range	Description
31 **W030**	**Crane creep speed**	0 Hz	0 to 60 Hz	Set the crane creep speed. When **Pr.31** = "0" (initial value), the crane creep function is disabled. (The travel distance at creep speed is regarded as 0 mm.)
32 **W031**	**Travel distance at creep speed**	0 mm	0 to 6553.4 mm	Set the travel distance at creep speed.
33 **W032**	**Position loop compensation selection after crane decelerate to creep speed**	1	0	Position loop compensation disabled
			1	Position loop compensation enabled

Pr.	Name	Initial value	Setting range	Description
34 **W033**	**Stop position compensation width**	100 mm	0 to 200 mm	Set the compensation value for the deceleration start position when **Pr.33** = "0" (position loop compensation disabled).

◆ Crane creep speed (Pr.31) and Travel distance at creep speed (Pr.32)

After the crane decelerates to the speed set in **Pr.31** near the target position, the crane travels the distance set in **Pr.32** and decelerates to stop at the target position.



NOTE

- When the **Pr.32** setting value is too large for the travel distance to the target position, the frequency is not increased to the setting frequency, or the travel distance at creep speed is regarded as 0 mm. In this case, set a smaller value in **Pr.32**.

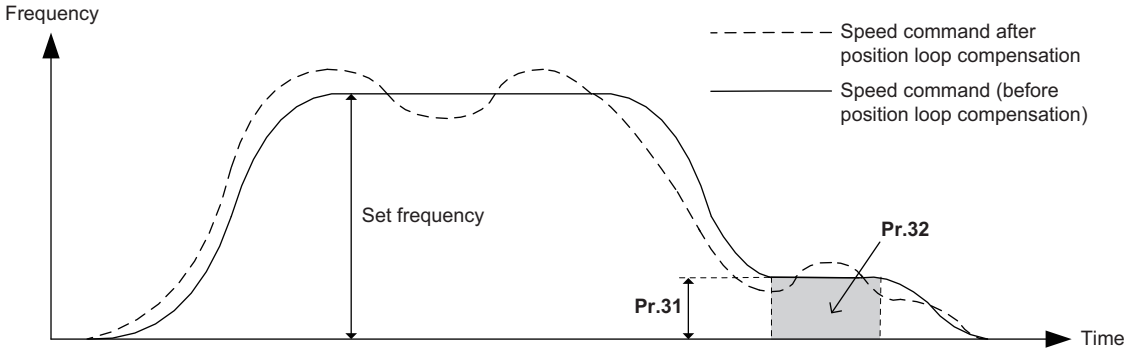
◆ Position loop compensation selection after crane decelerate to creep speed (Pr.33 and Pr.34) V/F Magnetic flux Sensorless

Use **Pr.33 Position loop compensation selection after crane decelerate to creep speed** to select whether the position loop compensation is performed after the crane decelerates to creep speed to prevent the crane from passing the target position due to the position loop. In the initial setting, **Pr.33** = "1" (position loop compensation enabled).

Pr.33 setting	Position loop compensation after crane decelerate to creep speed	How to determine the deceleration start position
0	Position loop compensation disabled	Determined from the position measured by the distance meter
1 (initial value)	Position loop compensation enabled	Determined from the travel distance calculated by adding up the speed command (before position loop compensation)

- When **Pr.33** = "1"

The position loop compensation is always enabled. The crane starts to decelerate when the travel distance calculated by adding up the speed command (before position loop compensation) reaches the deceleration start position.



- When **Pr.33** = "0"

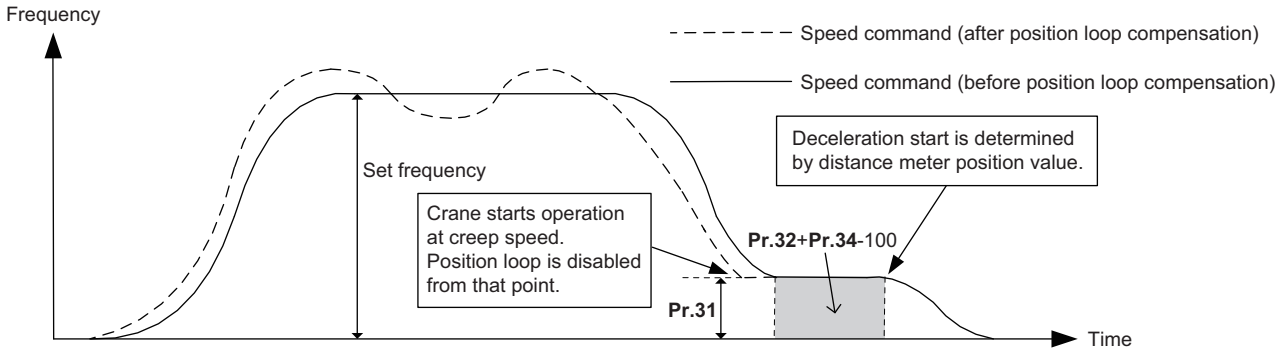
The position loop is available until the speed command (after the position loop compensation) reaches the creep speed. The position loop compensation is disabled after the speed command reaches the creep speed. The crane starts to decelerate when the deceleration start position is detected by the distance meter.

By setting **Pr.34 Stop position compensation width** to compensate the deceleration start position, the stop position can be compensated when an overrun or underrun occurs. **Pr.34** can be set only when **Pr.33** = "0".

Calculate the deceleration start position after the compensation by the following formula (**Pr.34** = "100.0" (initial value) is the reference value (0 mm)).

(Deceleration start position after compensation) = (Deceleration start position) + (**Pr.34** - 100.0)

Pr.34 setting	Operation
100.0 (initial value)	Without deceleration start position compensation
0.0 to 99.9	The deceleration starts at the point the distance calculated by subtracting the **Pr.34** setting value from 100 mm before the original deceleration start position. (When the compensation amount (**Pr.34** setting value) exceeds the travel distance at creep speed, the crane decelerates to stop without deceleration to creep speed.)
100.1 to 200.0	The deceleration starts at the point the distance calculated by subtracting 100 mm from the **Pr.34** setting value after the original deceleration start position. (When the deceleration start position after compensation exceeds the target stop position, the crane decelerates to stop after the crane reaches the target stop position.)



NOTE

- Although the set frequency and the stop position can be changed during operation, the acceleration/deceleration time, the S-curve acceleration/deceleration time, and the crane creep speed cannot be changed.
- Switching the operation mode to the speed feed is disabled during operation.
- **Pr.78 Reverse rotation prevention selection** is enabled or disabled according to the start signal regardless of the rotation direction of the motor as follows.

Pr.78 setting		Start signal	Availability
0	Both forward and reverse rotations allowed	STF	Enabled
		STR	Enabled
1	Reverse rotation disabled	STF	Enabled
		STR	Disabled
2	Forward rotation disabled	STF	Disabled
		STR	Enabled

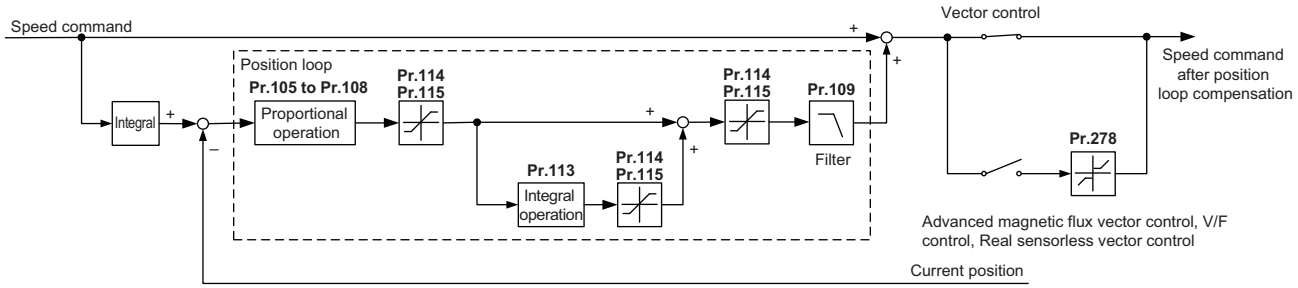
4.2.2 Crane position loop compensation

The speed command is compensated so that the crane travels according to the position command, by using the position command (calculated by adding up the inverter speed command) and the travel distance (calculated by the start position and the current position measured by the distance meter).

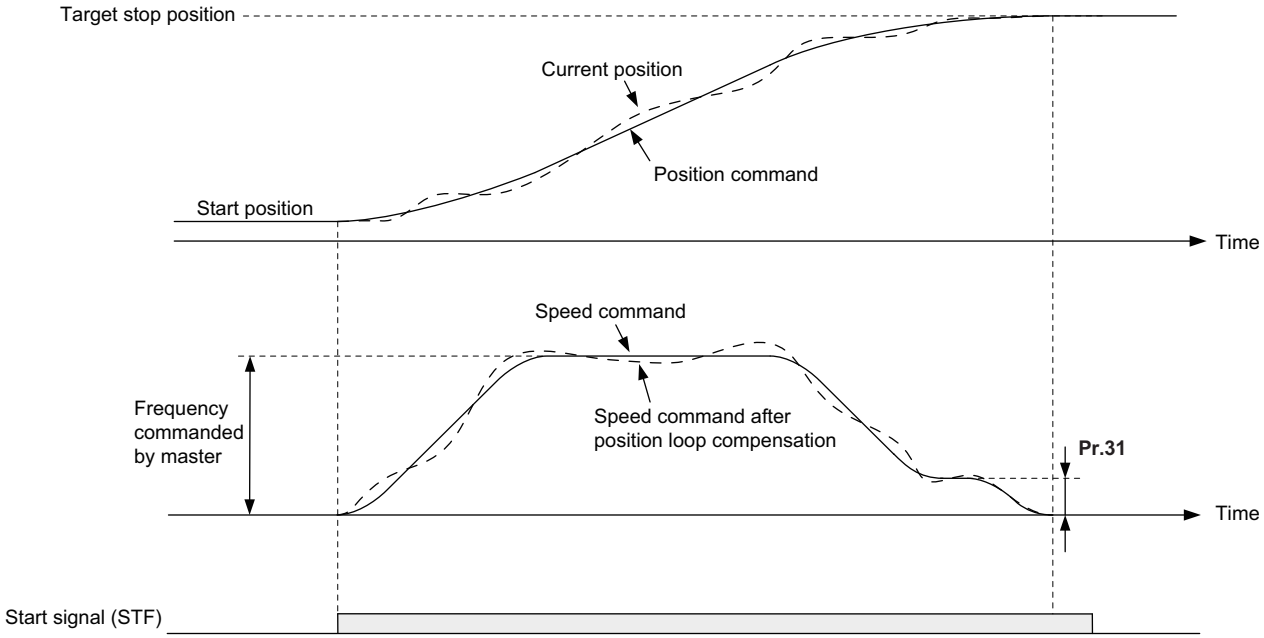
Pr.	Name	Initial value	Setting range	Description
105 **W011**	**Crane position loop P gain 1**	1 s^{-1}	0 to 150 s^{-1}	Set the P gain 1 for the crane position loop.
106 **W012**	**Crane position loop P gain 2**	9999	0 to 150 s^{-1}	Set the P gain 2 for the crane position loop.
			9999	As set in **Pr.105**.
107 **W013**	**Crane position loop P gain corner frequency 1**	0 Hz	0 to 200 Hz	Set the speed command value for the P gain 2 for the crane position loop (**Pr.106** setting).
108 **W014**	**Crane position loop P gain corner frequency 2**	60 Hz	0 to 200 Hz	Set the speed command value for the P gain 1 for the crane position loop (**Pr.105** setting).
109 **W015**	**Crane position loop filter**	0 s	0 to 5 s	Input the primary delay filter for the position loop compensation amount.
113 **W016**	**Crane position loop integral time**	0 s	0 to 10 s	Set the integral time for the crane position loop (in initial setting, the integrating is disabled).

Pr.	Name	Initial value	Setting range	Description
114 **W017**	**Compensation rate of crane position loop upper limit**	9999	0% to 100%	Used to change the limit of the position loop compensation amount when the speed range changes from the low-speed range to high-speed range.
			9999	Without changing the limit of the position loop compensation amount
115 **W018**	**Compensation frequency of low-speed range crane position loop upper limit**	5 Hz	0 to 200 Hz	Set the compensation frequency of the upper limit of the low-speed range crane position loop.

◆ Control block diagram

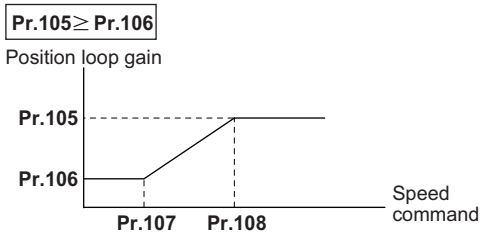


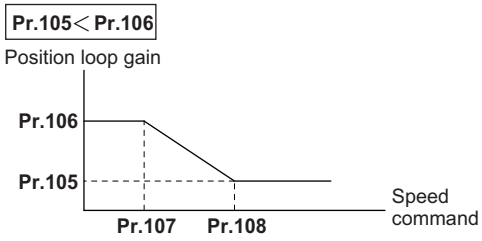
◆ Example of crane position loop compensation



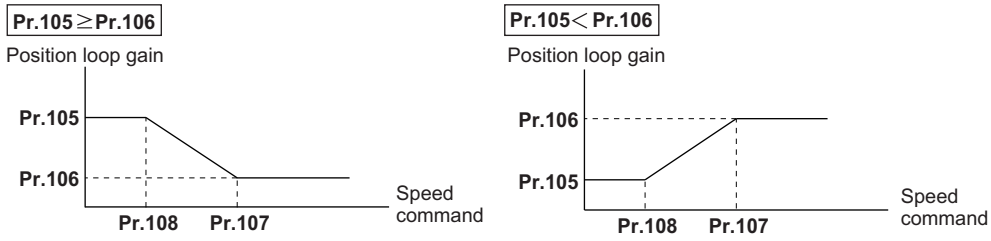
◆ Crane position loop P gain (Pr.105 to Pr.108)

- Set the P gain for the crane position loop in **Pr.105 Crane position loop P gain 1**. When the trackability of the crane is poor, set a larger value in **Pr.105**. When the vibration is strong, set a smaller value in **Pr.105**.
- Set **Pr.106 to Pr.108** to switch the P gain for the crane position loop in the low-speed range. The P gain 2 for the crane position loop is available when **Pr.106 Crane position loop P gain 2** ≠ "9999". (When **Pr.106** = "9999", the **Pr.105** setting is used as the gain for the crane position loop in the low-speed range. When the setting values of **Pr.107** and **Pr.108** are the same, the **Pr.106** setting is used.)
- When the **Pr.107** setting value is equal to or smaller than the **Pr.108** setting value, refer to the following:





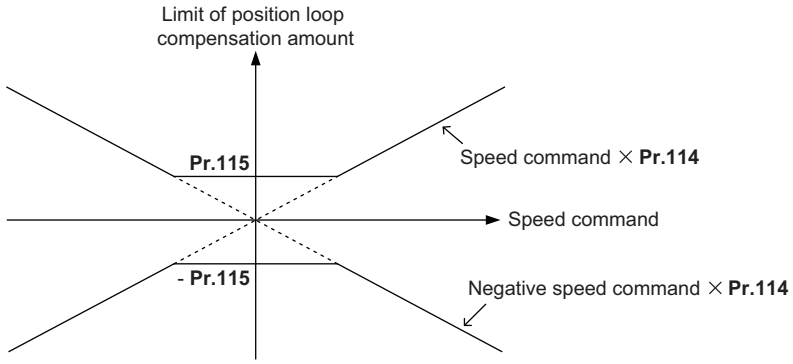
- When the **Pr.107** setting value is larger than **Pr.108** setting value, refer to the following:



◆ Limit of crane position loop compensation amount (Pr.114 and Pr.115)

The maximum value of the crane position loop compensation amount is determined by the **Pr.115 Compensation frequency of low-speed range crane position loop upper limit**.

Set **Pr.114 Compensation rate of crane position loop upper limit** ≠ "9999" to change the limit of the position loop compensation amount when the speed range changes from the low-speed range to high-speed range. Compare the **Pr.115** setting value and the speed command value multiplied by the **Pr.114** setting value, and the larger of the two is used as the limit value of the crane position loop compensation amount.



◆ Crane position loop filter (Pr.109)

The primary delay filter for the position loop compensation amount is available when **Pr.109 Crane position loop filter** ≠ "0" (initial value). A larger setting results in a stable operation with poorer response.

◆ Brake opening frequency (Pr.278)

The lower limit is clamped at the **Pr.278 Brake opening frequency** setting value when the speed command after the position loop compensation is lower than the **Pr.278** setting value under Real sensorless vector control, Advanced magnetic flux vector control, and V/F control. (For the details on **Pr.278**, refer to page 52.)

◆ Monitoring dedicated to position feed

The monitor items related to the position feed can be displayed on the operation panel or the parameter unit by setting the following values in the parameters for monitoring (**Pr.52, Pr.774 to Pr.776, Pr.992**).

Parameter setting for monitoring	Monitor indicator name
52	Speed command (Frequency command after position loop compensation)
92	Speed command (Frequency command after droop compensation)
93	Position command (lower digits)
94	Position command (upper digits)
95	Current position (lower digits)
96	Current position (upper digits)

◆ Troubleshooting for crane position loop compensation

Condition	Possible cause	Countermeasure
The motor speed is unstable.	**Pr.113** ≠ "0".	Set "0" in **Pr.113**.

◆ Adjustment of parameters for crane position loop compensation

Refer to the following to set the adjustment parameters for crane position loop compensation.

Pr.	Name	Reference setting value
105	**Crane position loop P gain 1**	Vector control: 1 to 5 s^{-1} (unit: 0.5 s^{-1}) Real sensorless vector control: 1 to 5 s^{-1} (unit: 0.5 s^{-1}) V/F control and Advanced magnetic flux vector control: 5 to 8 s^{-1} (unit: 1 s^{-1})
109	**Crane position loop filter**	Set a value lower than the **Pr.105** setting value.
820	**Speed control P gain 1**	50% to 100% (unit: 5%)
821	**Speed control integral time 1**	0.01 to 0.1 s (unit: 0.01 s)
824	**Torque control P gain 1 (current loop proportional gain)**	10% to 100% (unit: 10%)
115	**Compensation frequency of low-speed range crane position loop upper limit**	3 to 5 Hz (unit: 0.5 Hz)

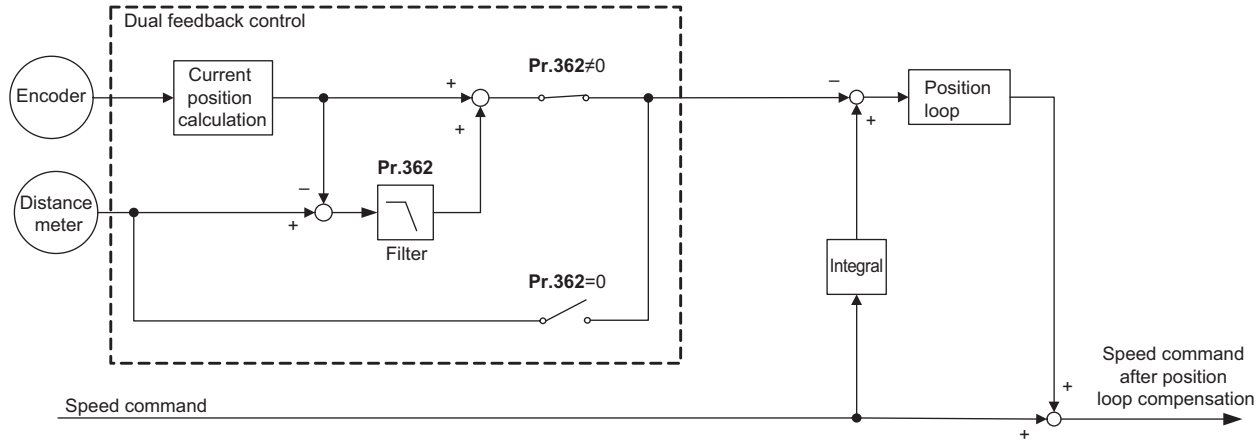
4.2.3 Dual feedback control

Use this control function to reduce the fluctuation of the feedback from the distance meter used for the position loop. Set a larger value in **Pr.362** when the value measured by the distance meter is unstable and the equipment travels unstably, or when the vibration occurs.

This function is available when the position loop is enabled under Vector control in the full-closed control mode. (This function is not available during the full-closed control test operation.)

Pr.	Name	Initial value	Setting range	Description
362 **W060**	**Dual feedback filter**	0 s	0 to 1 s	Compensate the position calculated by the cumulative encoder feedback pulses to make it closer to the current position measured by the distance meter.

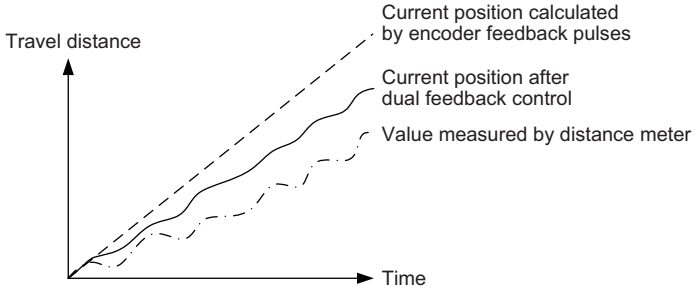
◆ Control block diagram



◆ Dual feedback filter (Pr.362)

Compensate the position calculated by the cumulative encoder feedback pulses to make it closer to the current position measured by the distance meter. (When **Pr.362** = "0" (initial value), the function is disabled.)

When the vibration is strong, setting a larger value in **Pr.362** increases the effect.



4.2.4 Crane position detection filter

Set the primary delay filter for the position data detected by the distance meter (crane position). (When **Pr.363** = "0" (initial value), the function is disabled.)

Pr.	Name	Initial value	Setting range	Description
363 **W061**	**Crane position detection filter**	0 s	0 to 0.5 s	Set the primary delay filter for the position data detected by the distance meter (crane position).

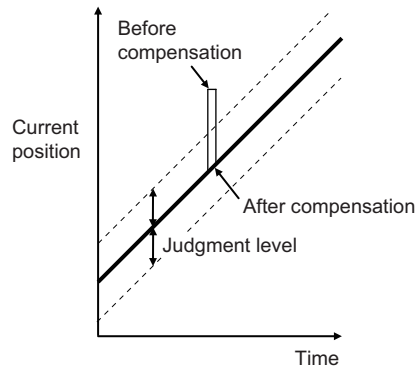
4.2.5 Crane position data compensation

When the value measured by the distance meter is impermissible due to noises or other causes, the impermissible value can be excluded by using this function. The excluded value are compensated with the previous and the second previous values.

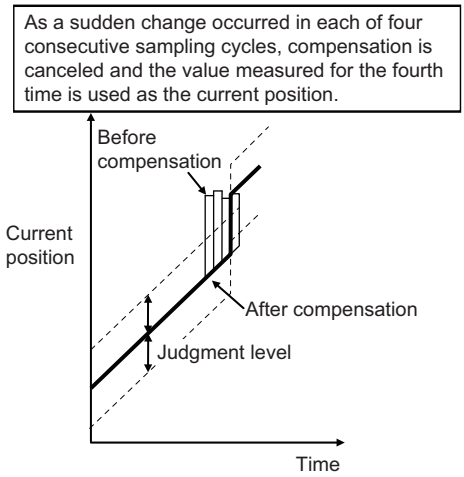
Pr.	Name	Initial value	Setting range	Description
364 **W062**	**Crane position data compensation judgment level**	9999	0 to 1000 mm	Set the permissible range of the crane position when compared with the previous measurement.
			9999	Disabled
365 **W063**	**Upper limit of crane position data compensation**	1	1 to 5	Set the number of the sampling times for the continuous crane position data compensation.

◆ Crane position data compensation judgment level (Pr.364) and Upper limit of crane position data compensation (Pr.365)

- When the difference between the value measured by the distance meter and the previous value is larger than the value set in **Pr.364 Crane position data compensation judgment level**, the latest value will be excluded. Instead, the value linearly interpolated from the previous and the second previous values will be used. (When **Pr.364** = "9999" (initial value), the function is disabled.)
  The measured value is the data before the distance detection filter is used.
- When the number of times that the consecutive samplings of an impermissible measured value (distance meter reference) exceeds the number of times set in **Pr.365 Upper limit of crane position data compensation**, the crane position data compensation is stopped and the latest measured value is used as the current position.



A sudden change occurred in one sampling cycle



A sudden change occurred in four sampling cycles
∗ Upper limit of distance data compensation total count (**Pr.365**) = "3"

◆ Crane position data compensation total count monitor

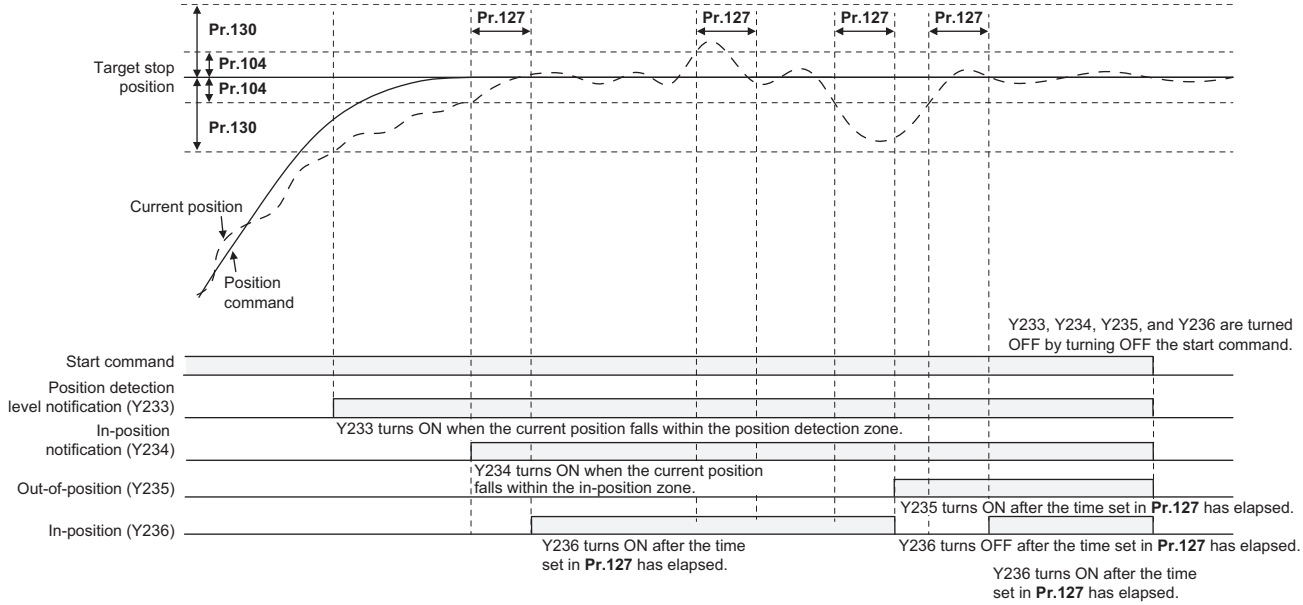
- The total number of crane position data compensation times from when the start command is ON until when the start command is ON next time is displayed. When **Pr.52** = "39", the crane position data compensation total count monitor is displayed on the operation panel.
- The crane position data compensation total count monitor is reset to 0 when the start command is ON next time. When the crane position data compensation is disabled (**Pr.364** = "9999"), the crane position data compensation total count monitor value is "0".

4.2.6 Parameters to detect the crane in-position state

The width of the zone and the time used to determine the crane in-position state can be set.

Pr.	Name	Initial value	Setting range	Description
104 **W040, W220**	**Crane in-position width**	10 mm	0 to 1000 mm	Set the width of the zone used to determine turning ON of the Crane out-of-position (Y235) signal or the Crane in-position (Y236) signal.
127 **W041**	**Crane in-position time**	0 s	0 to 5 s	Set the time used to determine turning ON of the Crane out-of-position (Y235) signal or the Crane in-position (Y236) signal.
130 **W042**	**Crane position detection range**	10 mm	0 to 1000 mm	Set the width of the zone used to determine turning ON of the Crane position detection level notification (Y233) signal for the target stop position.
134 **W043**	**Crane position detection range hysteresis**	9999	0 to 100 mm	Set the hysteresis width for the detected position where the Crane position detection level notification (Y233) signal turns ON.
			9999	Hysteresis width is not set.

◆ Crane in-position time (Pr.127), Crane position detection range (Pr.130), and the related output signals (Y233 to Y236)



- The crane position can be checked with the output signals (Y233 to Y236). The following table shows the condition to turn ON each signal.

Output signal	Required condition
Crane position detection level notification (Y233) signal	Turns ON when the current position falls within the zone limited by the **Pr.130** setting value in both directions from the target position.
Crane in-position notification (Y234) signal	Turns ON when the current position falls within the zone limited by the **Pr.104** setting value in both directions from the target position, and the speed command (speed command created to output) value decreases to 0 Hz.
Crane out-of-position (Y235) signal	Turns ON when the current position after the Y234 signal turns ON is out of the crane in-position width after the time period set in **Pr.127** has elapsed.
Crane in-position (Y236) signal	Turns ON when the current position after the Y234 signal turns ON is within the crane in-position width until the time period set in **Pr.127** has elapsed.

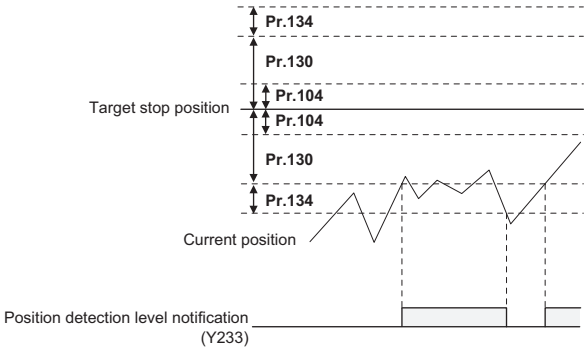
- Set parameters from **Pr.190 to Pr.196 Output terminal function selection** to assign the Y233, Y234, Y235, and Y236 signals to the output terminals. Set "233" (positive logic) or "333" (negative logic) for the Y233 signal, "234" (positive logic) or "334" (negative logic) for the Y234 signal, "235" (positive logic) or "335" (negative logic) for the Y235 signal, and "236" (positive logic) or "336" (negative logic) for the Y236 signal.

NOTE

- The Y233 to Y236 signals are turned OFF when the position feed is not selected.
- Changing the terminal assignment using **Pr.190 to Pr.196 (Output terminal function selection)** may affect the other functions. Set parameters after confirming the function of each terminal.

◆ Crane position detection range hysteresis (Pr.134)

- When a current position varies, the Crane position detection level notification (Y233) signal may repeat ON/OFF (chatter). Setting hysteresis to the detected position prevents chattering of the signal. Use **Pr.134 Crane position detection range hysteresis** to set a hysteresis width.



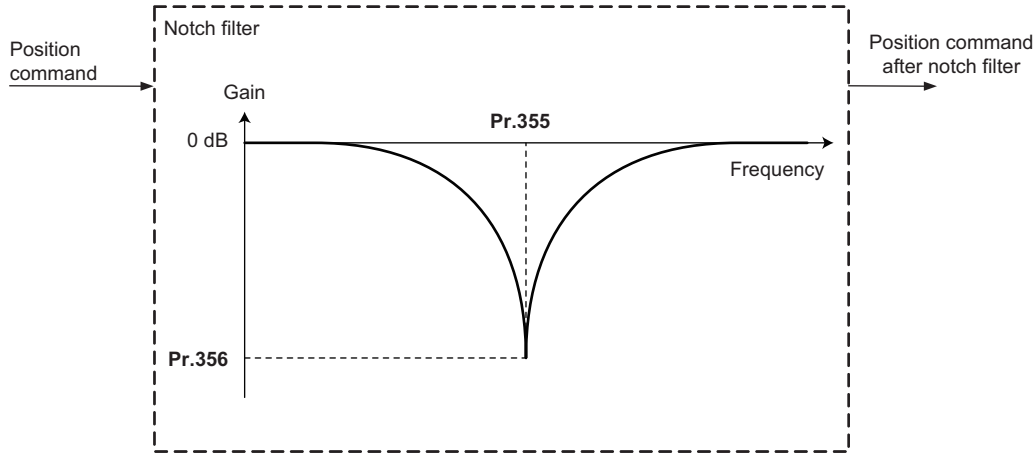
4.2.7 Anti-sway control

The notch filter is used for the position command to suppress the crane vibration.

This function is available when the model adaptive speed control (refer to page 74) is enabled.

Pr.	Name	Initial value	Setting range	Description
355 W050	**Crane vibration suppression frequency**	9999	0.1 to 10 Hz	The notch filter is activated according to the setting value.
			9999	Disabled
356 W051	**Crane vibration suppression gain**	100%	0% to 500%	Set the crane vibration suppression gain.

◆ Control block diagram



◆ Crane vibration suppression frequency (Pr.355) and Crane vibration suppression gain (Pr.356)

- Set a value other than "9999" (initial value) in **Pr.355 Crane vibration suppression frequency**. The notch filter is activated according to the **Pr.355** setting value.

  Calculate the **Pr.355** setting value by the following formula.

  Pr.355 = 1 / Vibration cycle[*1]

*1 The vibration cycle is obtained using the swing of the crane when it stops which is measured by the variation cycle of the torque current.

- Set the crane vibration suppression gain in **Pr.356 Crane vibration suppression gain**. When the **Pr.356** setting value is too large, sensibility of the notch filter becomes higher. (When **Pr.356** = "0", the function is disabled.)

◆ Troubleshooting in Anti-sway control

Condition	Possible cause	Countermeasure
The operation is the same as before setting the anti-sway control.	The setting of the notch filter is incorrect.	Set **Pr.355** ≠ "9999" and **Pr.356** ≠ "0".
The vibration is not suppressed after setting the anti-sway control.	The crane vibration suppression frequency is incorrect.	Change the **Pr.355** setting.
	The effect of the notch filter is insufficient.	Set a larger value in **Pr.356**.

4.2.8 Model adaptive control

Set each response for position commands and for load and external disturbances individually.

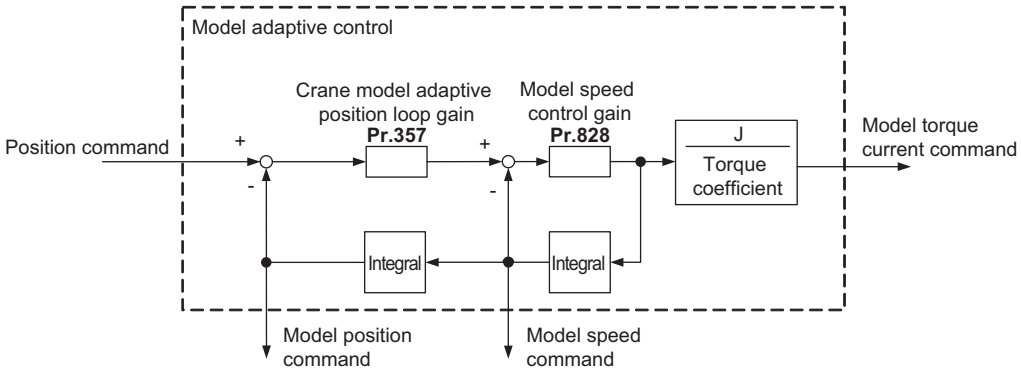
The following conditions must be satisfied to use this function. (Note that this function is not available during deceleration stop operation due to a system failure while **Pr.610 Deceleration stop operation selection after system failure detection** = "1".)

- Position loop is enabled.
- **Pr.877 Speed feed forward control/model adaptive speed control selection** = "2" (Model adaptive speed control)

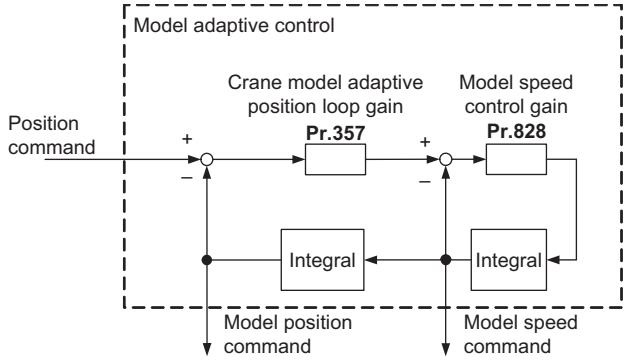
Pr.	Name	Initial value	Setting range	Description
357 **W052**	**Crane model adaptive position loop gain**	1 s^{-1}	0 to 150 s^{-1}	Set the crane model adaptive position loop gain.

◆ Control block diagram

- Vector control, Real sensorless vector control



- Advanced magnetic flux vector control, V/F control



◆ Crane model adaptive position loop gain (Pr.357)

- When setting **Pr.357 Crane model adaptive position loop gain**, set **Pr.877** = "2" to enable the model adaptive position control, **Pr.828 Model speed control gain** ≠ "0", a load inertia ratio in **Pr.880 Load inertia ratio**, and the motor inertia in **Pr.707 Motor inertia (integer)** and **Pr.724 Motor inertia (exponent)**. (**Pr.880** is automatically set when easy gain tuning is performed. For details on easy gain tuning, refer to the FR-A800 Instruction Manual (Detailed).)
- Set a small value in **Pr.357** first, and then increase the setting gradually and use this parameter within the range where an overshoot or vibration will not occur.
- When **Pr.52** = "81", the model speed monitor is displayed on the operation panel.

◆Troubleshooting in model adaptive control

Condition	Possible cause	Countermeasure
The motor does not rotate.	**Pr.357** = "0".	Set a value other than "0" in **Pr.357**.
Motor speed fluctuates.	Speed control gain is not suitable for the machine. (Resonance occurs.)	• Adjust **Pr.820 Speed control P gain 1 and Pr.821 Speed control integral time 1**.*1 • Perform speed feed forward control or model adaptive speed control.
Machine movement is unstable.	Speed control gain is not suitable for the machine.	• Adjust **Pr.820 Speed control P gain 1 and Pr.821 Speed control integral time 1**.*1 • Perform speed feed forward control or model adaptive speed control.

*1 **Pr.820 and Pr.821** are automatically set when easy gain tuning is performed. For details on easy gain tuning, refer to the FR-A800 Instruction Manual (Detailed).

4.2.9 Setting the relative position of the home position

A desired home position can be set to enable writing of the stop position command and monitoring related to the position feed based on the relative position.

Pr.	Name	Initial value	Setting range	Description
128 **W002, W320**	**Motion range 1**	0.01 m	0 to 300 m	Set the lower limit (absolute value) of the motion range that can be specified by the stop position command.
129 **W003, W321**	**Motion range 2**	300 m	0 to 300 m	Set the upper limit (absolute value) of the motion range that can be specified by the stop position command.
131 **W004**	**Motion range sign selection**	0	0	Lower limit: positive, upper limit: positive
			1	Lower limit: negative, upper limit: positive
			2	Lower limit: negative, upper limit: negative
132 **W005***1	**Home position (upper digits)**	0	0 to 300	Set a desired home position.
133 **W006***1	**Home position (lower digits)**	0	0 to 999.9	

*1 The setting is applied after an inverter reset or next power-ON.

◆Converting the absolute position to the relative position (Pr.132 and Pr.133)

- Calculate the home position offset value by the following formula using the setting values of **Pr.132 Home position (upper digits)** and **Pr.133 Home position (lower digits)**. If the result exceeds 300 m, the home position offset value is 300 m.
  Home position offset value (0.1 mm) = **Pr.132** × 10000 + **Pr.133**
- Convert the absolute position to the relative position using the following formula.
  Relative position (0.1 mm) = Absolute position (0.1 mm) - Home position offset value (0.1 mm)

NOTE

- When a desired home position is set, relative positions are used for writing of the stop position command and monitoring related to the position feed.

◆Upper and lower limits of the stop position command

- Calculate the upper and lower limits of the stop position command by the following formula using the home position offset value.
  Lower limit of the stop position command (0.1 mm) = 0 - Home position offset value (0.1 mm)
  Upper limit of the stop position command (0.1 mm) = 3000000 - Home position offset value (0.1 mm)

NOTE

- When a stop position command value out of the range is written via communication, the value is not applied. (The previous value is retained.)

◆ Motion range (Pr.128, Pr.129, and Pr.131)

- The motion range can be specified for the stop position command using **Pr.128 Motion range 1, Pr.129 Motion range 2,** and **Pr.131 Motion range sign selection**.

Pr.131 setting	Lower limit of the motion range	Upper limit of the motion range
0 (initial value)	**Pr.128** multiplied by 100 or the lower limit of the stop position command, whichever larger	**Pr.129** multiplied by 100 or the upper limit of the stop position command, whichever smaller
1	**Pr.128** multiplied by -100 or the lower limit of the stop position command, whichever larger	**Pr.129** multiplied by 100 or the upper limit of the stop position command, whichever smaller
2	**Pr.128** multiplied by -100 or the lower limit of the stop position command, whichever larger	**Pr.129** multiplied by -100 or the upper limit of the stop position command, whichever smaller

4.3 Communication with distance meter

The inverter learns the crane current position accurately by using with a distance meter.
A distance meter can be used during the full-closed control.

4.3.1 Distance meter selection

The following distance meters can be used with this product. Select the inverter and the distance meter according to the distance measurement method and communication method.

Inverter	Distance meter				Refer to page	
	Model	Manufacturer	Measurement method	Communication method	Wiring example	Related parameter
RS-485 model	DME5000-[][]3	SICK	Laser	RS-422 communication	77	79
	OLM100-1[][]3	SICK	Laser (reading bar codes)			
	DL100-[][][][][][]03	SICK	Laser			
	DT1000/DL1000-S11101 DT1000/DL1000-S11102 DT1000/DL1000-S11112	SICK	Laser			
	AMS300i	Leuze	Laser			
	CEV58M-00884	TR-Electronic	Absolute encoder			
Ethernet model	AMS308i	Leuze	Laser	Ethernet communication	79	86
RS-485 model / Ethernet model (only when FR-A8APS-02 installed)	BPS307i	Leuze	Laser (reading bar codes)	SSI communication	Refer to the FR-A8APS-02 Instruction Manual.	
	AMS304i	Leuze	Laser			
	CMV58M-00002	TR-Electronic	Absolute encoder			

NOTE

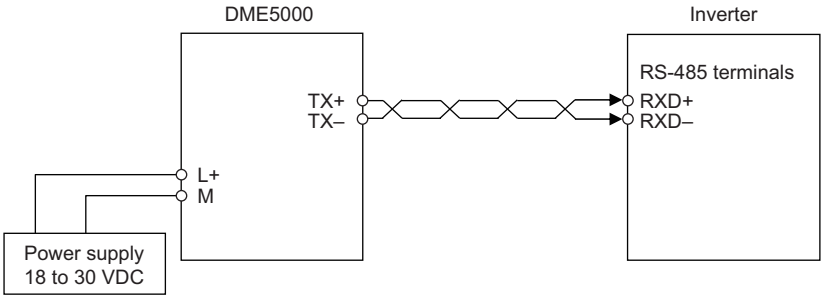
- For details on the specification of the distance meter and the protocol for communication between the distance meter and the inverter, refer to the Instruction Manual of the distance meter.

4.3.2 Connection of distance meter

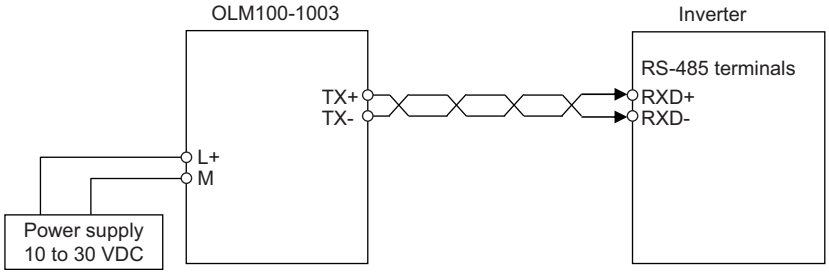
Refer to the following to connect the distance meter to this product.

◆RS-485 model inverter

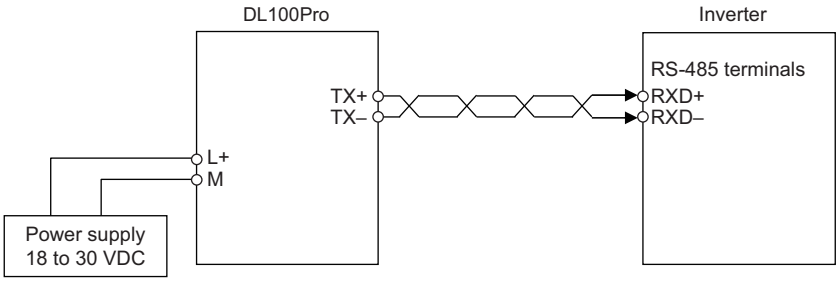
- Example of connection with DME5000



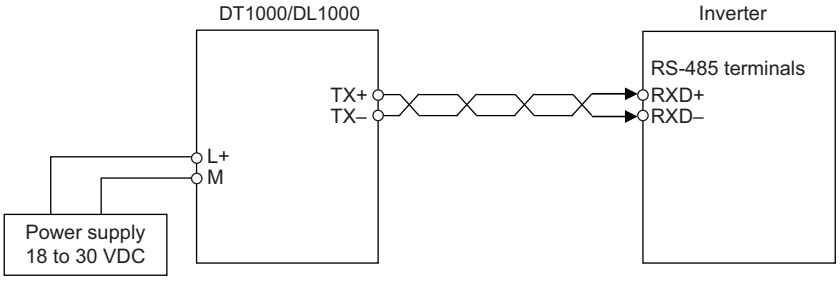
- Example of connection with OLM100-1003



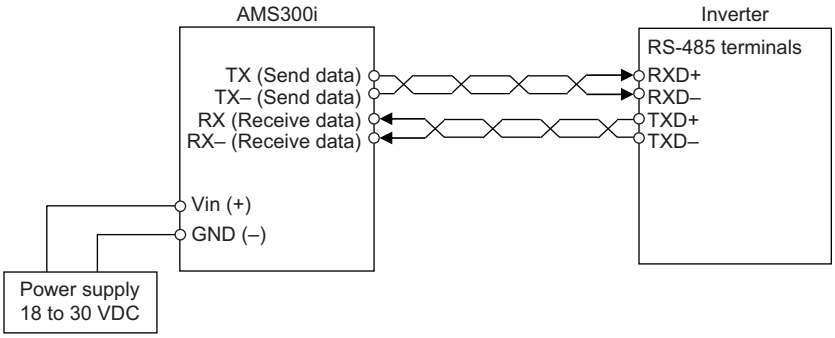
- Example of connection with DL100Pro



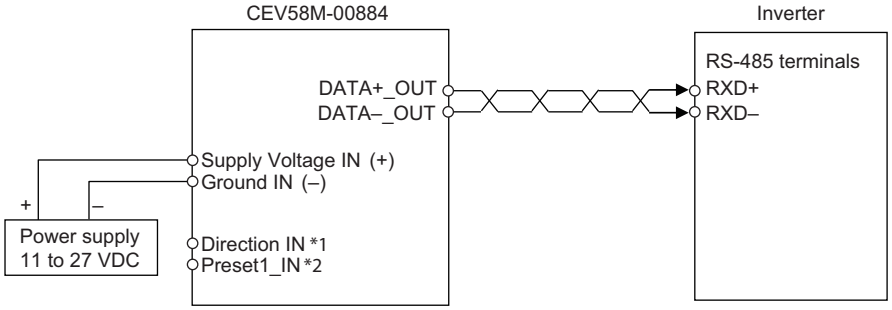
- Example of connection with DT1000/DL1000



- Example of connection with AMS300i



- Example of connection with CEV58M-00884

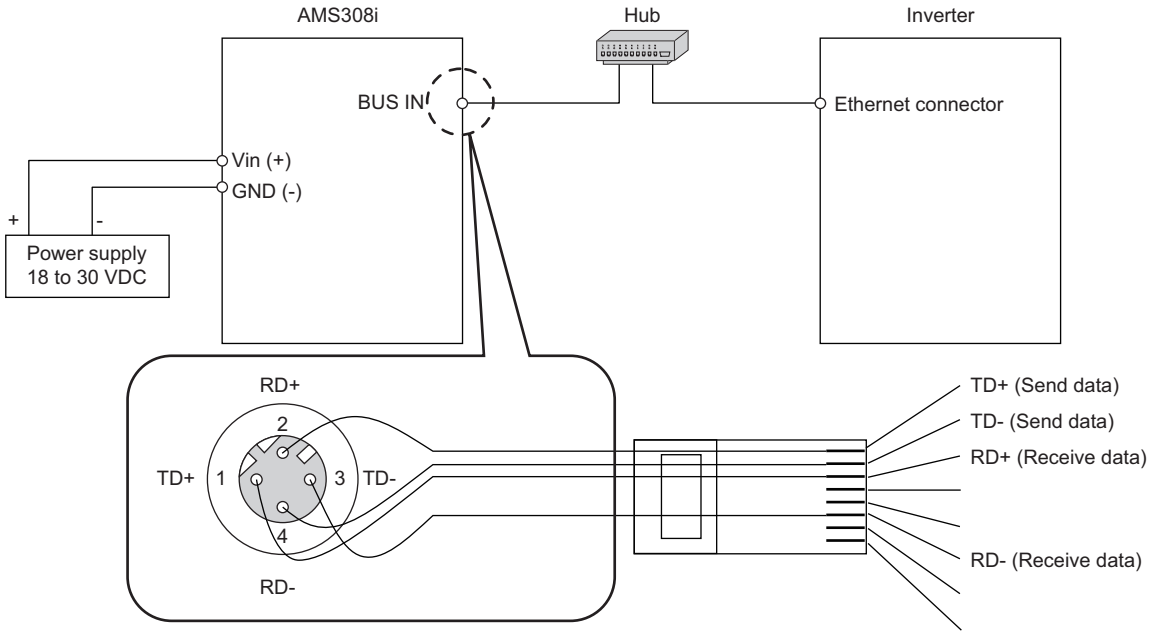


*1 The increase/decrease of the position data is reversed while terminals Direction IN and Supply Voltage IN are shorted.

*2 When terminals Preset1_IN and Supply Voltage IN are shorted, the position data is reset to 0.

◆ Ethernet model inverter

- Example of connection with AMS308i



4.3.3 Communication parameters for distance meters (RS-485 model inverter)

Inverter parameters must be set to establish RS-422 communication with distance meters.

Pr.	Name	Initial value	Setting range	Description	
332 **N031**	**RS-485 communication speed**	96	3, 6, 12, 24, 48, 96, 192, 384, 576, 768, 1152	Select the communication speed of the inverter according to the speed of the distance meter. Select a value which equals one-hundredth of the number of the communication speed. For example, select "192" to set the communication speed of 19200 bps.	
N032	**RS-485 communication data length**	0	0	Data length 8 bits	
			1	Data length 7 bits	
N033	**RS-485 communication stop bit length**	0	0	Stop bit length 1 bit	
			1	Stop bit length 2 bits	
333	**RS-485 communication stop bit length / data length**	1	0	Stop bit length 1 bit	Data length 8 bits
			1	Stop bit length 2 bits	
			10	Stop bit length 1 bit	Data length 7 bits
			11	Stop bit length 2 bits	
334 **N034**	**RS-485 communication parity check selection**	2	0	Parity check is disabled.	
			1	Parity check (odd parity) is enabled.	
			2	Parity check (even parity) is enabled.	
335 **N035**	**RS-485 communication retry count**	1	0 to 10	When the consecutive number of times that an impermissible data is sent from the distance meter exceeds the number of times set in **Pr.335**, the distance measurement is regarded as faulty.	
			9999	The distance measurement is regarded as normal even when impermissible data is received.	
336 **N036**	**RS-485 communication check time interval**	0	0 to 999.8 s	Set the interval of the communication check (signal loss detection) time	
			9999	No communication check (signal loss detection)	

Pr.	Name	Initial value	Setting range	Description
549 **N000**	**Protocol selection**	0	0	Mitsubishi inverter protocol (computer link)
			1	MODBUS RTU protocol
			1000	DME5000 protocol: Standard Binary code (Std.Bin code)
			1001	DME5000 protocol: CRLF BCD code
			1010	OLM100 protocol: CRLF BCD code
			1020	DL100Pro protocol: DstSta (Distance + status) CRLF
			1021	DL100Pro protocol: DstSta (Distance + status) Std
			1030	AMS300i protocol
			1040	CEV58M-00884 protocol
			1050	DT1000/DL1000_DstSta_CRLF
			1051	DT1000/DL1000_DstSta_STX/ETX
757 **W081**	**Distance meter selection**	0*1	0	Use the data input via RS-485 terminals.
			2	Use the data input via the FR-A8APS-02.
758 **W082**	**Unit of measurement of distance meter**	1	0	Unit: 1 mm Set the increment of the distance data sent from the laser distance meter.
			1	Unit: 0.1 mm
760 **W084**	**Travel distance of absolute encoder**	100 mm	0 to 655.35 mm	Set the travel distance per rotation of the absolute encoder distance meter. (The setting is enabled regardless of the **Pr.100** setting.)
761 **W085**	**Distance measurement fault detection interval**	0 s	0 to 999.8 s	Set the communication check time (Distance measurement fault) interval.
			9999	No communication check (Distance measurement fault)
762 **W086**	**Absolute encoder count (upper digits) at zero position calibration**	0	0 to 255	When **Pr.764** = "1", the current encoder count is set as the zero position.
763 **W087**	**Absolute encoder count (lower digits) at zero position calibration**	0	0 to 65535	
764 **W088**	**Absolute encoder zero position calibration**	0	0	Zero point adjustment is disabled.
			1	Zero point adjustment is enabled.
			3	Zero position calibration is complete. (Read only)
			9	Zero position calibration failed. (Read only)

*1 The initial value for the RS-485 models.

NOTE

- The settings are applied after an inverter reset or at the next power-ON. After changing the parameters, communication cannot be made until the inverter is reset.

◆ Protocol selection (Pr.549)

Set **Pr.549 Protocol selection** according to the protocol of the distance meter.

◆ Speed of RS-485 communication (Pr.332), RS-485 communication stop bit length / data length (Pr.333), and RS-485 communication parity check (Pr.334)

Set **Pr.332 RS-485 communication speed, Pr.333 RS-485 communication stop bit length / data length,** and **Pr.334 RS-485 communication parity check selection** according to the communication specification.

(Example) When the communication speed is 19200 bps, the stop bit length is 2 bits, the data length is 7 bits, and the parity check is disabled, set **Pr.332** = "192", **Pr.333** = "11", and **Pr.334** = "0".

◆ Retry count setting (Pr.335)

- Use **Pr.335 RS-485 communication retry count** to set the permissible number of retries when an impermissible data is consecutively received during communication with the distance meter.
- The number of times that an impermissible data is received exceeds the permissible number of the times set in **Pr.335**, the distance meter fault is detected.
- When **Pr.335** = "9999", the distance meter fault is not detected.

◆ RS-485 communication check time interval (Pr.336)

- If a signal loss detection is performed between the inverter and the distance meter and the normal head data is not received from the distance meter within the time period set in **Pr.336 RS-485 communication check time interval**, the distance meter fault is detected.
- When **Pr.336** = "9999", the distance meter fault is not detected.

◆ Distance meter selection (Pr.757)

Use **Pr.757 Distance meter selection** to select connection method from among RS-485 terminals, Ethernet connector, and the FR-A8APS-02 (option for SSI communication), according to the distance meter from which the current position data is received.

When using the RS-485 model inverter, the initial value of **Pr.757** is "0".

◆ Distance measurement unit (Pr.758 and Pr.760)

- Convert the data sent from the distance meter to the current position. The result is limited between 0 and 300 m.
- When using a laser distance meter, set **Pr.758 Unit of measurement of distance meter** according to the unit of measurement of the distance meter.

Pr.758 setting	Unit
0	1 mm
1 (initial value)	0.1 mm

- When using an absolute encoder, set the travel distance per encoder rotation in **Pr.760 Travel distance of absolute encoder**.

NOTE

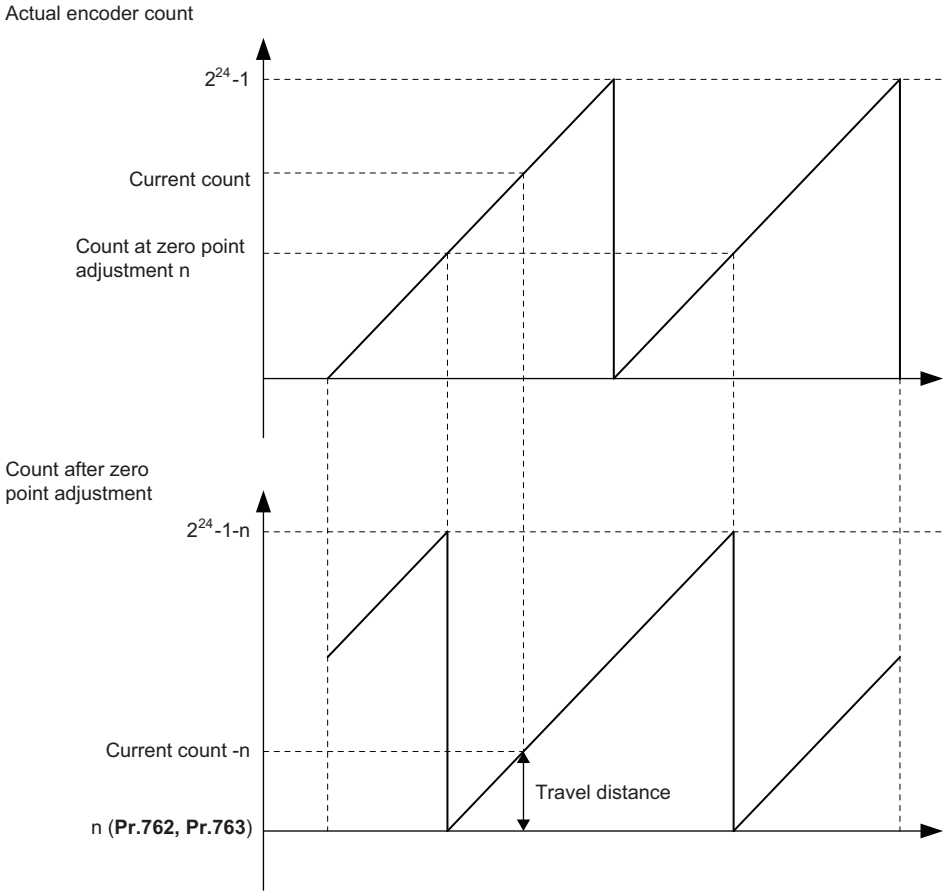
- The setting is available only for the absolute encoder whose number of steps per rotation is 4096 and the number of rotations is maximum 4096.
- When setting **Pr.760**, ensure that the motion range (upper limit - lower limit) is approximately 5% or more smaller than the measuring range of the absolute encoder (maximum rotations per minute × **Pr.760**). Otherwise, the distance meter fault may be detected.

◆ Distance measurement fault detection interval (Pr.761)

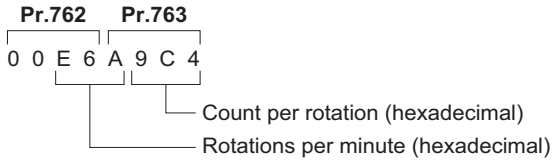
- If a signal loss detection is performed between the inverter and the distance meter and the normal data is not received from the distance meter within the time period set in **Pr.761 Distance measurement fault detection interval**, the Distance meter fault is detected. (Refer to page 110.)
- When **Pr.761** = "9999", the distance meter fault is not detected.

◆ Absolute encoder zero point adjustment (Pr.762 to Pr.764)

- When **Pr.764 Absolute encoder zero position calibration** = "1", the current encoder count is set as the zero position.



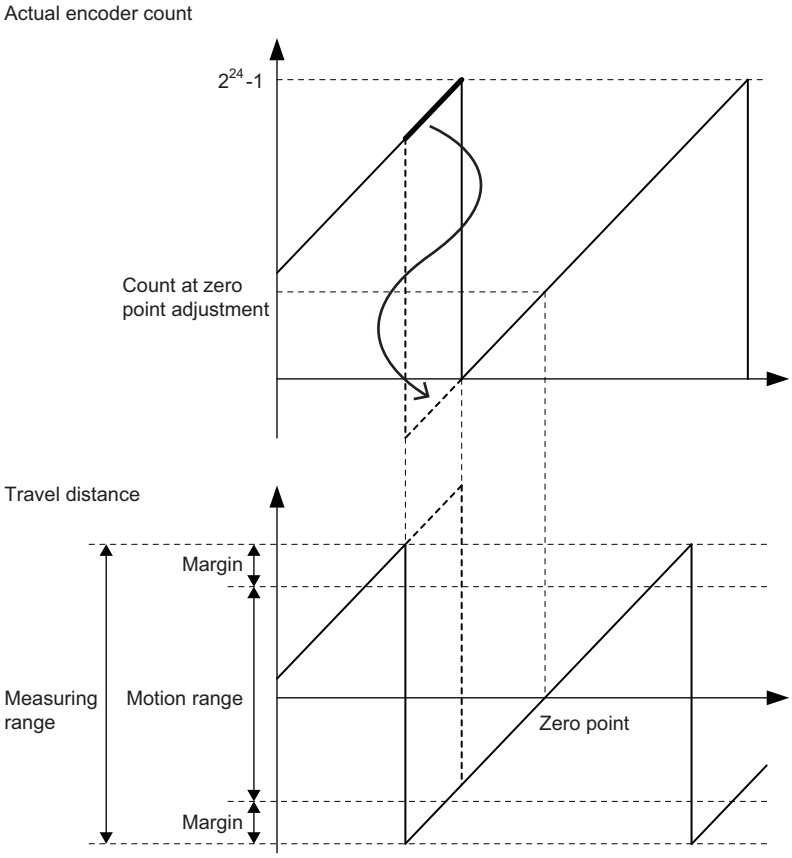
- The count set as the zero position is written separately in **Pr.762 Absolute encoder count (upper digits) at zero position calibration** and **Pr.763 Absolute encoder count (lower digits) at zero position calibration** as the count against the total number of encoder count.
  Example) At the zero point adjustment, "230" is written in **Pr.762** and "43460" in **Pr.763** when the count per rotation is 2500 (H9C4) and the rotations per minute is 3690 (HE6A).



- The following table shows the details on the zero point adjustment according to the **Pr.764** setting.

Pr.764 setting	Description	Operation
0 (initial value)	Zero point adjustment disabled	The zero position calibration is not performed.
1	Zero point adjustment enabled	The zero position calibration starts. According to the processing status, the setting value changes to "3" or "9".
3	Zero position calibration complete	The zero position calibration is complete. The count is written in **Pr.762** and **Pr.763**.
9	Zero position calibration failed	The zero position calibration failed. The count is not written in **Pr.762** and **Pr.763**. The zero position calibration cannot be performed in any of the following conditions: • When the count is outside the permissible range • When communication parameter settings for distance meter are incorrect • During test operation

- The margin, the remaining area after subtracting the motion range from the measuring range of the absolute encoder, can be calculated by the following formula.
  Margin = ((**Pr.760** × Maximum rotations per minute) - (Upper limit - Lower limit (of motion range) × 1000) / 2
  Lower limit of measuring range = Lower limit of motion range - Margin
  Upper limit of measuring range = Upper limit of motion range + Margin
- If the distance data converted from the encoder count is outside of the measuring range, the data is regarded as follows:
  When the data larger than the upper limit of the measuring range: The data is regarded as the distance data for the lower limit of the measuring range.
  When the data smaller than the lower limit of the measuring range: The data is regarded as the distance data for the upper limit of the measuring range.



NOTE

- The zero point adjustment must be performed after the settings of the motion range and measuring range. When the settings are changed, perform the zero point adjustment again. (For details on the motion range, refer to page 75.)
- After the zero position calibration is complete, check that the monitored current position value is "0". Otherwise, the setting of the motion range or measuring range is incorrect.

◆ Setting example of communication parameters for distance meter

Adjust the communication settings for the distance meter and the inverter as follows.

- When using DME5000

Item		Setting value
DME5000	Baud Rate	19.2 kbps
	Data	8, e, 1
	Protocol	Standard
	Mode	Continuous BIN
	Resolution	0.1 mm
Inverter	**Pr.332**	192
	Pr.333	0
	Pr.334	2
	Pr.549	1000
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

- When using OLM100

Item		Setting value
OLM100	Baud Rate	115.2 kbps
	Data	8, e, 1
	Protocol	CRLF
	Mode	Continuous*1
	Resolution	0.1 mm
Inverter	**Pr.332**	1152
	Pr.333	0
	Pr.334	2
	Pr.549	1010
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

- When using DL100Pro

Item		Setting value
DL100Pro	Baud Rate	115.2 kbps
	Data format	8, e, 1
	Protocol	Standard
	CntMode	DstSta (Distance + status, continuous)*1
	ResDst	0.1 mm
Inverter	**Pr.332**	1152
	Pr.333	0
	Pr.334	2
	Pr.549	1021
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

- When using DT1000/DL1000

Item		Setting value
DT1000/DL1000	Baud Rate	115.2 kbps
	Data format	8, e, 1
	RS-422 data protocol	STX/ETX
	Continuous RS-422 output	Distance + service
	Distance value resolution	0.1 mm
Inverter	**Pr.332**	1152
	Pr.333	0
	Pr.334	2
	Pr.549	1051
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

- When using AMS300i

Item		Setting value
AMS300i	Baud Rate	38.4 kbps
	Format	8, e, 1
	Selection	RS422*1
	Position resolution	0.1 mm
Inverter	**Pr.332**	384
	Pr.333	0
	Pr.334	2
	Pr.549	1030*1
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

- When using CEV58M-00884

Item		Setting value
CEV58M-00884	Communication speed	9.6 kbps
	Data format	8, n, 1
Inverter	**Pr.332**	96
	Pr.333	0
	Pr.334	0
	Pr.549	1040*1
	Pr.758	1
	Pr.335	1
	Pr.336	0.1
	Pr.757	0*1

*1 Ensure that the value specified is set.

4.3.4 Communication parameters for distance meter (Ethernet model inverter)

Inverter parameters must be set to establish Ethernet communication with the distance meter.

Pr.	Name	Initial value	Setting range	Description
757 **W081**	**Distance meter selection**	1*1	1	Use the data sent from the distance meter which is connected to the port set in **Pr.1429**.
			2	Use the data input via the FR-A8APS-02. (For details, refer to the FR-A8APS-02 Instruction Manual.)
758 **W082**	**Unit of measurement of distance meter**	1	0	Unit: 1 mm Set the unit of the distance data sent from the distance meter. (Refer to page 81.)
			1	Unit: 0.1 mm
761 **W085**	**Distance measurement fault detection interval**	0 s	0 to 999.8 s	Set the communication check time (Distance measurement fault) interval. (Refer to page 81.)
			9999	No communication check (Distance measurement fault)
1429 **N632**	**Ethernet function selection 3**	9999	502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 10001, 45237, 61450	10001: For communication with AMS308i (UDP/IP)
1434 **N600**	**IP address 1 (Ethernet)**	192	0 to 255	Enter the IP address of the inverter.
1435 **N601**	**IP address 2 (Ethernet)**	168	0 to 255	
1436 **N602**	**IP address 3 (Ethernet)**	50	0 to 255	
1437 **N603**	**IP address 4 (Ethernet)**	1	0 to 255	

*1 The initial value for the Ethernet models.

NOTE

- The settings are applied after an inverter reset or at the next power-ON. After changing the parameters, communication cannot be made until the inverter is reset.

◆ Ethernet function selection 3 (Pr.1429)

Set **Pr.1429 Ethernet function selection 3** = "10001".

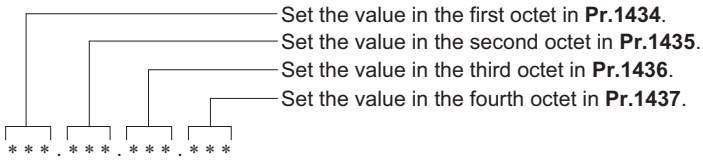
Pr.1429 setting	Applications	Protocol
10001	Communication with AMS308i	UDP/IP

NOTE

- For **Pr.1429** setting values other than "10001", refer to the Ethernet Function Manual.

◆ IP address (Pr.1434 to Pr.1437)

Enter the IP address of the inverter in **Pr.1434 to Pr.1437**.



◆ Distance meter selection (Pr.757)

Use **Pr.757 Distance meter selection** to select connection method from among RS-485 terminals, Ethernet connector, and the FR-A8APS-02 (option for SSI communication), according to the distance meter from which the current position data is received.

When using the Ethernet model inverter, the initial value of **Pr.757** is "1".

◆ Setting example of communication parameters for distance meter

Adjust the communication settings for the distance meter and the inverter as follows.

- AMS308i

Item			Setting value
AMS308i	Ethernet interface	Address	Enter the IP address of the inverter (**Pr.1434 to Pr.1437**).
		Gateway	Enter an optional address of the IP address of the inverter (**Pr.1434 to Pr.1437**).
		Net mask	Set the subnet mask of the inverter (**Pr.1438 to Pr.1441**).
	HOST communication	Activation	UDP/IP: ON, TCP/IP: OFF
		IP address	Enter the IP address of the inverter (**Pr.1434 to Pr.1437**).
		Port number	10001
		Mode	—
Inverter	**Pr.1434 to Pr.1437**		Enter the IP address of the inverter.
	Pr.1438 to Pr.1441		Set the subnet mask of the inverter.
	Pr.761		0.1
	Pr.1429		10001

4.3.5 Troubleshooting when using distance meter

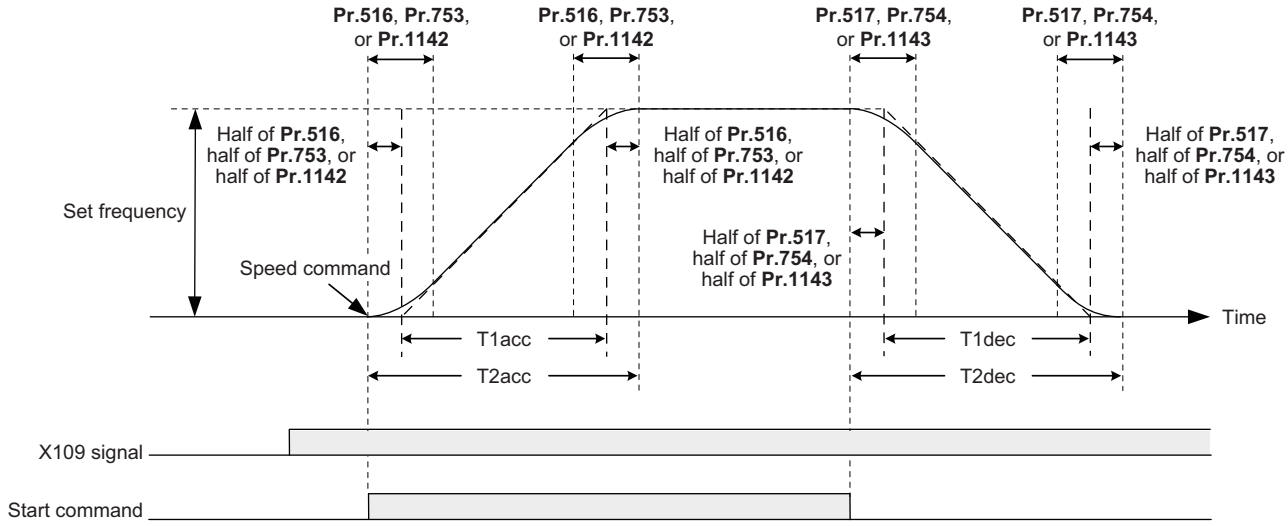
Condition	Possible cause	Countermeasure
The distance data of the crane cannot be received from the distance meter.	The power of the distance meter is OFF.	Turn ON the power of the distance meter.
	The point lighted by the distance meter is out of the detection range of the reflector.	Move the distance meter or the reflector.
	Light from the distance meter is blocked.	Remove objects that block light.
	The continuous data sending mode is disabled in the distance meter.	Enable the continuous data sending mode.
	The settings of communication parameters for distance meter (**Pr.332 to Pr.336, Pr.549, Pr.757 to Pr.761, Pr.1429, Pr.1434 to Pr.1437**) are not changed according to the specification and setting of the distance meter.	Change the setting of inverter parameters according to the specifications and settings of the distance meter.
	The inverter has not been reset after setting communication parameters for the distance meter.	Reset the inverter.

4.4 Speed feed

A transfer crane can travel according to the frequency set in the master while the start command is input via communication.
For switching the operation mode to the speed feed, refer to page 41.

◆ Example of speed feed

The crane operates under speed control. The parameter settings for the full-closed control are used as the speed command pattern (setting frequency, acceleration/deceleration time, and S-curve acceleration/deceleration time).
The crane decelerates to stop when the start command is turned OFF during operation.
When the speed feed is selected, the creep function, position loop compensation, anti-sway control, and model adaptive control are disabled.

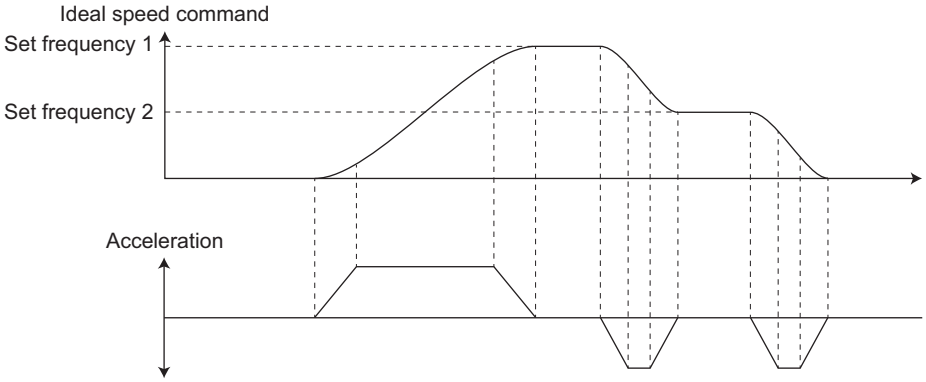


Calculate the actual acceleration/deceleration time by the following formula. Note that the third acceleration/deceleration time has higher priority when the X110 signal is ON. (Refer to page 50.)

- T1acc = Set frequency × (**Pr.7, Pr.110,** or **Pr.1140**) / **Pr.20**
- T2acc = T1acc + (**Pr.516, Pr.753,** or **Pr.1142**)
- T1dec = Set frequency × (**Pr.8, Pr.111,** or **Pr.1141**) / **Pr.20**
- T2dec = T1dec + (**Pr.517, Pr.754,** or **Pr.1143**)

◆ When changing the set frequency during operation

- The set frequency can be changed during speed feed operation.
- Operation example when the set frequency is changed from the set frequency 1 to the set frequency 2



4.4.1 Limit dog operation selection

The availability of the limit dog detection during the speed feed can be selected. (For the limit dog detection as system failure, refer to page 112.)

Pr.	Name	Initial value	Setting range	Description
397 **W304**	**Limit dog operation selection**	1	0	Limit dog detection disabled
			1	Limit dog detection enabled

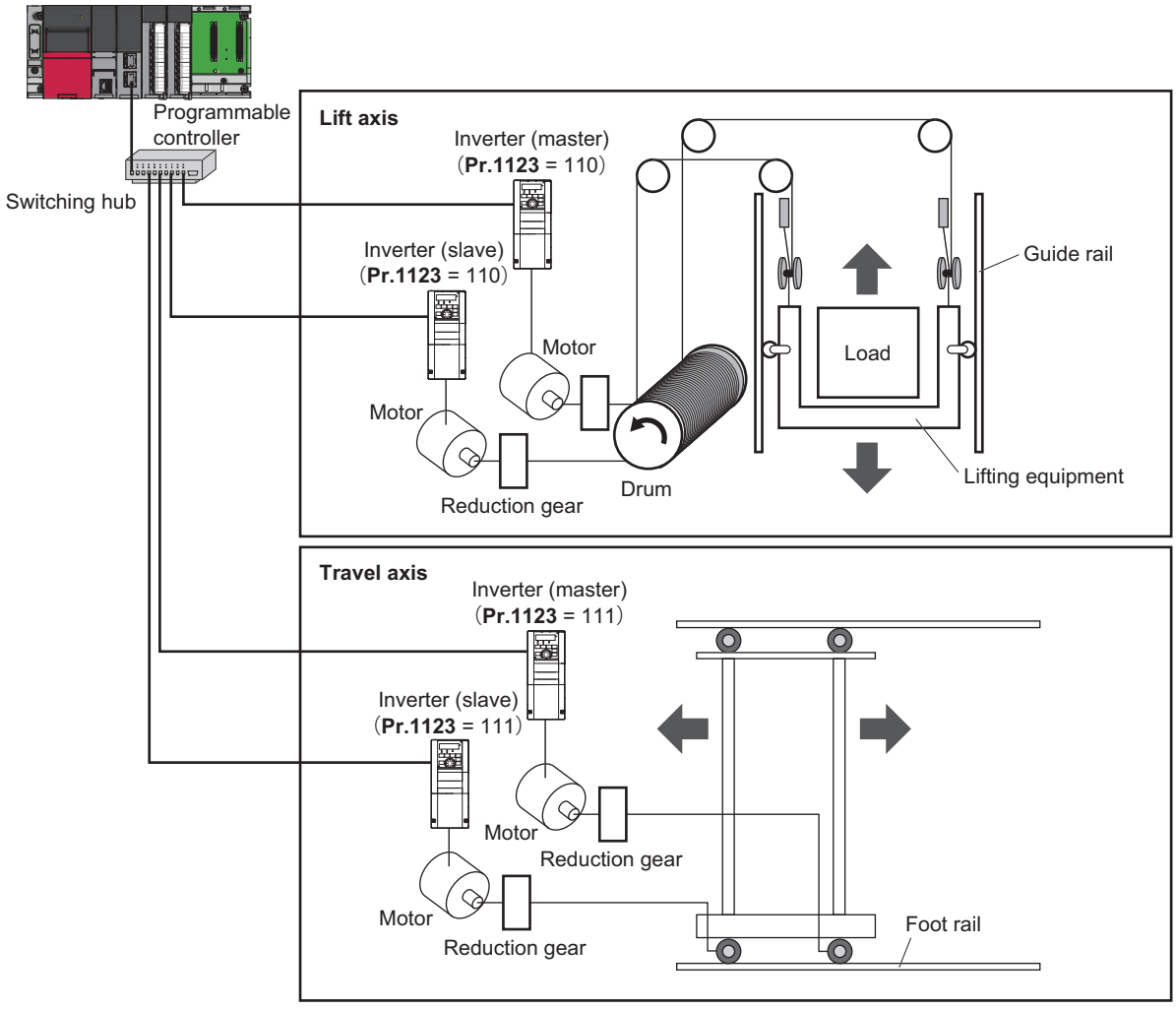
4.5 Multi-axis synchronous control (Ethernet model)

Multiple inverters are controlled in one system by synchronizing torque or speed.
The master station sends data (such as the torque command) to the slave stations using the inverter-to-inverter link function.
The slave stations operate according to the commands from the master station.

Application	Type	Features	Control method			
			Vector control	Real sensorless vector control	Advanced magnetic flux vector control	V/F control
Rigid system*1	Slave station torque control (speed compensation between axes)	Torque balancing control in each axis, vibration suppression during fast-response operation of the master	○	×	×	×
Semi-rigid system*2	Slave station speed control (relative droop compensation)	Torque balancing control in each axis, prevention of sudden speed change when the load changes suddenly	○	○	×	Δ*3

○: Available, ×: Not available, Δ: Available with restrictions

*1 Highly rigid system (difficult to deform when force is applied), requiring torque balancing between axes.
*2 Rigid system which may become a non-rigid system due to reasons such as wheel spin.
*3 Droop control is disabled under V/F control. Speed synchronous control is available.



Point

- The inverter-to-inverter link function is used for multi-axis synchronous control. For details on the inverter-to-inverter link function, refer to page 127.

4.5.1 Slave station torque control

The inverter-to-inverter link function is used for multi-axis synchronous control. The master station broadcasts data to slave stations, enabling torque control in synchronization.

Pr.	Name	Initial value	Setting range	Description	
60 **W000** **W100**	**A800-AWH mode selection**	0	0	A800-AWH mode disabled	
			1	A800-AWH mode enabled	
			2	Full-closed control test operation	
			10	Slave station torque control	
			11	Slave station speed control	
804 **D400**	**Torque command source selection**	0	0	Torque command given by analog input via terminal 1	Refer to the FR-A800 Instruction Manual (Detailed).
			1	Torque command (-400% to 400%) given by the parameter setting (**Pr.805** or **Pr.806**)	
			2	Torque command given by the pulse train input	
			3, 5, 6	Torque command given by communication options	
			4	12/16-bit digital input	
			20	The torque current command from the master station is used as the torque command.	
807 **H410**	**Speed limit selection**	0	0	The speed command value during speed control is used as the speed limit.	Refer to the FR-A800 Instruction Manual (Detailed).
			1	The speed limits for forward and reverse directions are set individually by using **Pr.808 and Pr.809**.	
			2	Forward/reverse speed limit Speed limit is applied by analog voltage input to terminal 1. Speed limit for forward/reverse side is switched by its polarity.	
			20	Speed limit is set by the speed command after position loop of the master station.	
1144 **W065**	**Multi-axis synchronous control (torque control) speed limit width**	0 Hz	0 to 100 Hz	Set the speed limit range during multi-axis synchronous control (torque control).	
1145 **W066**	**Multi-axis synchronous control (torque control) speed compensation P gain**	0%	0% to 1000%	Set the proportional gain during multi-axis synchronous control (torque control).	

◆ Settings in the master station

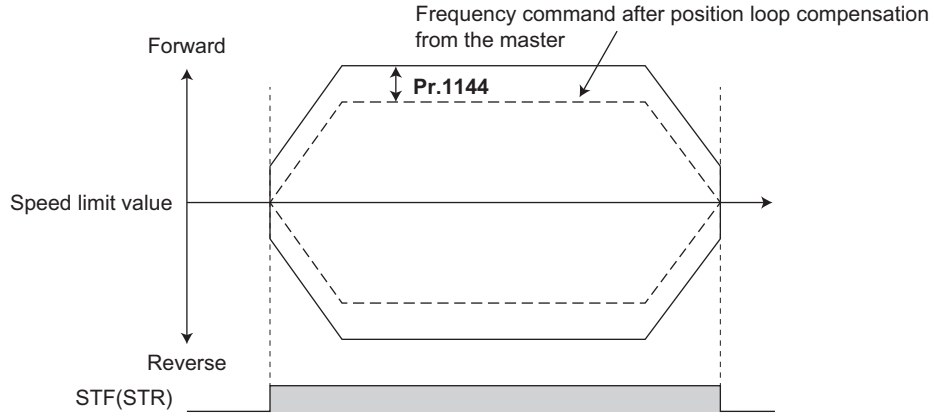
- Enable full-closed control.
- Enable the inverter-to-inverter link function and select the AWH dedicated inverter-to-inverter link function. (Refer to page 127.)

◆ Settings in a slave station

- To perform slave station torque control, configure the settings in a slave station as follows.
  Pr.60 A800-AWH mode selection = "10"
  Pr.804 Torque command source selection = "20"
  Enable torque control.
  Enable the inverter-to-inverter link function (AWH dedicated inverter-to-inverter link function). (Refer to page 127.)
- Set zero for the acceleration/deceleration time of the slave station.

◆ Operation of slave station torque control

- When "20" is set in **Pr.804 Torque command source selection** in a slave station, torque control is performed according to the torque current command sent from the master station.
- P control is performed using the speed controller of the slave station based on the difference of the actual speeds between the master station and the slave station. When vibration occurs in multi-axis operation due to fast-response of the master station, vibration can be suppressed. (Setting is not required when no vibration occurs.)
  P gain can be set using **Pr.1145 Multi-axis synchronous control (torque control) speed compensation P gain**. For **Pr.1145**, 100% corresponds to 200 rad/s in the rated speed range.
- When "20" is set in **Pr.807 Speed limit selection** in a slave station, the frequency command after position loop compensation (which is sent from the master station) is used as the speed limit value.
  Set the speed limit range in **Pr.1144 Multi-axis synchronous control (torque control) speed limit width**. The offset amount when the start signal (STF/STR) is OFF is zero.
- Speed limit by setting **Pr.807** = "20" is activated regardless of whether multi-axis synchronous control is enabled or disabled.



NOTE

- Use the same motor model for both the master station and the slave station.

4.5.2 Slave station speed control

The inverter-to-inverter link function is used for multi-axis synchronous control. The master station broadcasts data to slave stations, enabling speed control in synchronization.

Pr.	Name	Initial value	Setting range	Description
60 **W000** **W100**	**A800-AWH mode selection**	0	0	A800-AWH mode disabled
			1	A800-AWH mode enabled
			2	Full-closed control test operation
			10	Slave station torque control
			11	Slave station speed control

◆ Settings in the master station

- Enable full-closed control.
- Enable the inverter-to-inverter link function and select the AWH dedicated inverter-to-inverter link function. (Refer to page 127.)

◆ Settings in a slave station

- To perform slave station speed control, configure the settings in a slave station as follows.
  Pr.60 A800-AWH mode selection = "11"
  Enable speed control.
  Enable the inverter-to-inverter link function (AWH dedicated inverter-to-inverter link function). (Refer to page 127.)
- Set zero for the acceleration/deceleration time of the slave station.

- Do not use the following functions during slave station speed control.
  Offline auto tuning
  Automatic measurement of the load characteristics reference

◆Operation of slave station speed control

- Speed control is performed according to the frequency command after position loop compensation which is sent from the master station.
- The speed command is zero when the inverter-to-inverter link function is disabled or when this function is disabled in the master station.
- Under Vector control or Real sensorless vector control, the frequency command can be compensated by relative droop control so that toque can be balanced between the master station and the slave station.
  Configure the droop control setting in the slave station (Vector control: setting **Pr.288 (Pr.681)** = "2 or 22" is recommended), and disable droop control in the master station (**Pr.286** = "0", **Pr.679** ="0 or 9999"). Do not set "0, 10, or 20" in **Pr.288 (Pr.681)**.
  Droop control is disabled under V/F control. Do not perform droop control under Advanced magnetic flux vector control.)
  The droop compensation frequency is calculated as follows. (For details on the droop control, refer to the FR-A800 Instruction Manual (Detailed).)

Droop compensation frequency

$$= (\text{Torque current command of the slave} - \text{Torque current command of the master}) \times K \times \frac{\text{Droop compensation reference} \times \text{Droop gain}}{100}$$

When the output frequency is equal to or lower than the rated frequency set in **Pr.84**: K＝1

When the output frequency is higher than the rated frequency set in **Pr.84**: $K = \frac{\text{Rated frequency (Pr.84)}}{\text{Output frequency}}$

NOTE

- Use the same motor model for both the master station and the slave station.
- Set the same control method (such as Vector control and Real sensorless vector control) in both the master station and the slave station.
- When multi-axis synchronous control other than relative droop compensation is performed, do not set the droop gain of the standard function. (Set **Pr.286** = "0" and **Pr.679** = "0 or 9999".)
- The relative droop control is a control mode to compensate the speed of the slave station using the difference of the torque current command values between the slave station and the master station so that toque can be balanced between axes.

4.5.3 Settings when multi-axis synchronous control is selected

- Control all brakes with the BOF signal of the master station.
- When turning ON the STF/STR signals, turn ON the signals in the master station and the slave station at the same time.
- When stopping operation, wait until the speed command value of the master station decreases sufficiently and then turn OFF the STF/STR signal in the slave station. For example, configure the sequence that the STF/STR signal of the slave station will turn OFF after the BOF signal turns OFF.
- Connect wires of three phases of the motor in either positive or negative order to each slave station so that the position increasing/decreasing direction is the same between the master station and slave stations when the STF signal is turned ON during speed feed with the inverter-to-inverter link function disabled. Always use the STF signal as the start command of each slave station since a signed command value (speed command / torque current command) is sent from the master station to the slave station.

Pr.112 setting in master station	Traveling direction	Master station	Slave station
0 (position increasing by the STF signal)	Position increasing direction	Position feed: STF/STR (either is acceptable) Speed feed: STF	STF
	Position decreasing direction	Position feed: STF/STR (either is acceptable) Speed feed: STR	
1 (position decreasing by the STF signal)	Position increasing direction	Position feed: STF/STR (either is acceptable) Speed feed: STR	
	Position decreasing direction	Position feed: STF/STR (either is acceptable) Speed feed: STF	

- If a signal loss occurs while the inverter-to-inverter link function is used, synchronization of the stations is interrupted. Make the signal loss detection time interval as short as possible, and stop the system immediately after a detection. (Example: **Pr.1431** = "3" (E.EHR is activated for a signal loss) and **Pr.1432** = "0.1" (communication check time interval: 0.1 second))
- Before starting operation, check that the LNK signal is ON in all stations. To use the LNK signal, set "242 (positive logic)" or "342 (negative logic)" in any of **Pr.190 to Pr.196 (Output terminal function selection)** to assign the function to the output terminal.
- The following table shows the operation example when a fault occurs in a station.

Fault	Location	Operation example	
		Master	Slave
Inverter protective function (including E.EHR)	Master	Output shutoff	Output shutoff*1
	Slave	Output shutoff*1	Output shutoff
System failure	Master	Deceleration stop	Normal operation*2
		Brake stop (output shutoff)	Output shutoff*1
	Slave	Not detected.	

*1 This operation cannot be performed by the inverter itself. Give a command from the host controller.

*2 The slave stations decelerate to stop according to the command from the master station. If a system failure with higher priority occurs and it is set to brake stop, the output may shut off during deceleration stop.

4.6 Full-closed control test operation

To check the operation of the programmable controller programs, a test operation for full-closed control is available without connecting a motor or distance meter to the inverter.

A virtual speed or a virtual current position is created in the inverter to perform position feed or speed feed operation, and position/speed changes can be checked on the operation panel or by outputting it as analog signals to terminal FM/CA or AM.

All the following conditions must be satisfied to enable the full-closed control test operation.

- **Pr.60 A800-AWH mode selection** = "2"
- The X108 and RT signals are OFF (full-closed control is enabled and the first motor is selected).
- Vector control test operation is selected ("9999" is not set in **Pr.80 Motor capacity** and **Pr.81 Number of motor poles**, and "9" is set in **Pr.800 Control method selection**).
- **Pr.100 Reference travel speed** ≠ "9999"
- The X113 signal is ON.
- Network operation mode
- **Pr.338 Communication operation command source** = "0 (initial value)"
- **Pr.339 Communication speed command source** = "0 (initial value)"

NOTE

- Since current is not detected and voltage is not output, the monitor items related to current and voltage, such as output current and output voltage, cannot be monitored, and the relevant output signals do not work.
- For speed calculation, speed is calculated in consideration of **Pr.880 Load inertia ratio**.
- During the full-closed control test operation, dual feedback control is disabled, and the distance meter fault and the distance meter alarm (system failures) are not detected.

◆ I/O signal operation during the test operation

- Input signal

○: Valid

Input terminal function selection (Pr.178 to Pr.189)	Valid/invalid
Limit dog (X107)	○
Fork selecting (X108)	○
Position feed / speed feed switching (X109)	○
Acceleration/deceleration pattern selection under full-closed control (X110)	○
Crane emergency stop (X111)	○
Limit dog 2 (X112)	○
A800-AWH mode selection (X113)	○

- Output signal

○: Valid, ×: Invalid

Output terminal function selection (Pr.190 to Pr.196)	Valid/invalid
Brake opening request (BOF)	×
System failure (Y231)	○
Crane position detection level notification (Y233)	○
Crane in-position notification (Y234)	○
Crane out-of-position (Y235)	○
Crane in-position (Y236)	○

NOTE

- For other signals, refer to the description of the Vector control test operation in the FR-A800 Instruction Manual (Detailed).

◆ Status of the monitoring during the test operation

○: Enabled, —: Disabled

Monitor item	Monitoring on DU/PU	Output via FM/CA/AM
Crane position data compensation total count	○	—
Speed command (Frequency command after position loop compensation)	○	○
Crane speed	○	○
Model speed	○	○
Speed command (Speed command created to output)	○	○
Speed command (Frequency command after droop compensation)	○	○
Position command (lower digits)	○	—
Position command (upper digits)	○	—
Current position (lower digits)	○	—
Current position (upper digits)	○	—
System failure code	○	—

*1 The monitoring-enabled items differ depending on the output interface (operation panel, parameter unit, terminal FM/CA, or terminal AM). For the details, refer to page 135.

NOTE

- For other monitor items, refer to the description of the Vector control test operation in the FR-A800 Instruction Manual (Detailed).

4.7 Restrictions during full-closed control

4.7.1 Disabled functions

When full-closed control is enabled, the following functions are unavailable.

- Minimum frequency
- Start-time hold
- JOG operation
- Stop-on-contact control
- Automatic restart after instantaneous power failure
- Load torque high-speed frequency control
- Encoder feedback control
- Start self-holding selection (STP (STOP) signal)
- Multi-speed operation
- Analog input
- Analog input compensation
- Pulse train input
- Overspeed detection (E.OS)

4.7.2 Restrictions

When full-closed control is enabled, some functions have restrictions as shown in the following table.

Function name	Description
Maximum frequency (**Pr.1, Pr.18**)	When the setting values of **Pr.1 Maximum frequency** and **Pr.18 High speed maximum frequency** exceeds 200 Hz, the frequency is limited at 200 Hz.
Minimum frequency (**Pr.2**)	When the **Pr.2** setting value is 0 Hz, the frequency is limited at 0.01 Hz.
Stop mode selection at communication error (**Pr.502**)	The setting of **Pr.502 Stop mode selection at communication error** is invalid. (The operation is the same as the one when **Pr.502** = "0".)
DC injection brake (**Pr.10**)	The setting of **Pr.10 DC injection brake operation frequency** is invalid. (Fixed to 0 Hz.)
Starting frequency (**Pr.13**)	The setting of **Pr.13 Starting frequency** is invalid. (Fixed to 0 Hz.)
Emergency stop function (**Pr.1103**)	The setting of **Pr.1103 Deceleration time at emergency stop** is invalid. (When the Emergency stop input (X92) signal is turned ON, the crane decelerates to stop in the deceleration time for the full-closed control.)
Pre-excitation (LX) signal	Available only under Vector control (**Pr.800** = "0").
Frequency command sign selection (**Pr.541**)	The setting of **Pr.541 Frequency command sign selection** is invalid (Unsigned command).
External DC injection brake operation start (X13) signal	Available only under Vector control (**Pr.800** = "0"). (The X13 signal is disabled during inverter running.)

4.8 Troubleshooting in full-closed control

Condition	Possible cause	Countermeasure
The response is slow.	A small gain makes the trackability of the crane poor.	Set larger values in **Pr.820** and **Pr.821**.
		Set a larger value in **Pr.105**. (When the motor sound becomes noisy after setting a larger value in **Pr.105**, set a larger value in **Pr.109**.)
		Set a larger value in **Pr.115**.
	The trackability of the crane is poor since the setting value for the filter or the integral time is large.	Set a smaller value in **Pr.109**.
		Set a smaller value in **Pr.113**.
Hunting occurs during starting or stopping.	A large gain causes excessive compensation.	Set a smaller value in **Pr.115**.
		Set a smaller value in **Pr.105**.
		Set smaller values in **Pr.820** and **Pr.821**.
	The trackability of the crane is poor since the setting value for the filter or the integral time is large.	Set a smaller value in **Pr.109**.
		Set a smaller value in **Pr.113**.
The motor generates abnormal noise or the motor sound is noisy.	A gain or the setting value for the filter is large.	Set smaller values in **Pr.105, Pr.820,** and **Pr.115**.
		Set smaller values in **Pr.109** and **Pr.113**.
		Set a smaller value in **Pr.824**.
A lift crane slippage occurs during staring.	The torque is insufficient when the brake is released.	Enable the torque bias function (only under Vector control).
		Set a larger value in **Pr.278** (only under V/F control, Advanced magnetic flux vector control, or Real sensorless vector control).
The motor does not run at the set frequency.	The parameter setting is incorrect.	Check the parameter settings.
	The setting for the crane travel speed is incorrect.	Check the **Pr.20** and **Pr.100** settings.
	An impermissible position data is received from the distance meter.	Check that the distance meter has no failure.
Shock occurs or stacks collapse at start or stop.	The setting value of the S-curve acceleration/deceleration time is small.	Set larger values in **Pr.516** and **Pr.517**.
The operation is the same as before setting the anti-sway control.	The setting of the notch filter is incorrect.	Set **Pr.355** ≠ "9999" and **Pr.356** ≠ "0".
The vibration is not suppressed after setting the anti-sway control.	The crane vibration suppression frequency is incorrect.	Change the **Pr.355** setting.
	The effect of the notch filter is insufficient.	Set a larger value in **Pr.356**.

Condition	Possible cause	Countermeasure
The stop position accuracy is poor.	The brake operation timing is fast.	Vector control: Adjust the **Pr.282 and Pr.350** settings so that the brake closes after the speed command becomes zero.
		Real sensorless vector control, Advanced magnetic flux vector control, and V/F control: Adjust the **Pr.352** setting to increase the stop position accuracy. Note that the **Pr.352** setting should be smaller than the **Pr.104** setting.
	The trackability of the position command or speed command is poor.	Set larger values in **Pr.820** and **Pr.821**.
		Set a larger value in **Pr.105**. (When the motor sound becomes noisy after setting a larger value in **Pr.105**, set a larger value in **Pr.109**.)
		Set a larger value in **Pr.115**.
		Set a smaller value in **Pr.109**.
		Set a smaller value in **Pr.113**.
	The timing to turn OFF the start command is too fast.	When turning OFF the start command in conjunction with the Y234, Y235, or Y236 signals in the host controller, set the timing to turn OFF the start command in the host controller or in **Pr.127**. Set the timing so that the start command remains ON until the remaining deviation value becomes equal to or less than the permissible value when the remaining deviation is compensated using the position loop of the inverter. Setting example: 1) When turning OFF the start command by turning ON the Y234 signal: In the host controller, set the time period from when the Y234 signal turns ON until the start command turns OFF. 2) When turning OFF the start command by turning ON the Y235 or Y236 signal: Use **Pr.127** to adjust the timing to turn ON the Y235 or Y236 signal.
Torque is unbalanced during multi-axis synchronous control[*1] (when using droop control (except for relative droop control) for the master station or a slave station).	The compensation amount is insufficient due to small droop gain.	Set a larger value in **Pr.286**.
	Droop control is not activated during acceleration/deceleration.	Set a value other than "0, 10, or 20" in **Pr.288**.
	The droop compensation frequency is limited to zero near 0 Hz.	For Vector control, set **Pr.288** = "2 or 22".

*1 Multi-axis synchronous control during which the speed command is sent from the master to a slave by analog input.

5 SYSTEM FAILURE

This chapter explains system failure.
This function enables detection of system failure to stop logistics/transport equipments. Detection is available only under full-closed control (position feed / speed feed) or fork control.

5.1 List of system failure

The following table shows system failure names and their detectability in the full-closed control (position feed / speed feed) and fork control.

Name	Full-closed control		Fork control	Refer to page
	Position feed	Speed feed		
Crane overspeed detection	○	○	×	106
Speed range excess fault	○	×	×	107
Speed deviation detection	○	○	×	108
Position deviation detection	○	×	×	109
Distance meter fault	○*1	×*2	×	110
Stop position command out of motion range	○	×	×	111
Limit dog detection	○	○*3	×	112
Brake sequence fault	○	○	×	113
Emergency stop	○	○	○	113
Distance meter alarm	○*1	×*2	×	113

(○: Available, ×: Unavailable)

*1 Detection is unavailable during the full-closed control test operation.
*2 System failure detection is unavailable when the speed feed is selected, since the crane position measured by the distance meter is not used.
*3 Use **Pr.397** to select the availability of system failure detection. (Refer to page 89.)

5.2 Parameters related to system failure

The following parameters are related to system failure.

Pr.	Name	Initial value	Setting range	Description
393 **W300**	**System failure detection**	65535	0 to 65535	Set the availability of system failure detection.
394 **W301**	**Operation selection after system failure detection**	0	0 to 65535	Set the stop action when system failure is detected.
610 **W306**	**Deceleration stop operation selection after system failure detection**	0	0	S-curve deceleration
			1	Linear deceleration
396 **W303**	**Crane speed detection filter**	0.3 s	0 to 1 s	Input the primary delay filter for the crane speed.
374 **H800**	**Overspeed detection level**	9999	0 to 590 Hz	Set the frequency to detect the crane overspeed.
			9999	• Vector control or Real sensorless vector control: (**Pr.1** setting value + 20Hz) is used. • Advanced magnetic flux vector control or V/F control: (**Pr.18** setting value + 20Hz) is used.
592 **W324**	**Crane overspeed detection time**	0 s	0 to 10 s	Set the time period to detect the crane overspeed.
398 **W322**	**Speed range excess fault detection frequency**	9999	0% to 100%	Set the frequency to detect the speed range excess fault.
			9999	Disabled
399 **W323**	**Speed range excess fault detection time**	0 s	0 to 10 s	Set the time period to detect the speed range excess fault.
593 **W325**	**Speed deviation detection frequency**	9999	0 to 50 Hz	Set the frequency to detect the speed deviation.
			9999	Disabled
594 **W326**	**Speed deviation detection time**	0 s	0 to 10 s	Set the time period to detect the speed deviation.
596 **W328**	**Position deviation detection distance**	9999	0 to 50 m	Set the distance to detect the position deviation.
			9999	Disabled
597 **W329**	**Position deviation detection time**	0 s	0 to 10 s	Set the time period to detect the position deviation.
397 **W304**	**Limit dog operation selection**	1	0	The limit dog detection is disabled under the speed control.
			1	The limit dog detection is enabled under the speed control. (Detection is unavailable when the limit dog detection is disabled according to the **Pr.393** setting.)
595 **W327**	**Brake sequence fault detection time**	2 s	0 to 10 s	Set the time period while the status of the BRI signal remains the same after the status of the BOF signal is changed.
1134 **W330**	**Distance meter fault detection selection**	0	0	Detection always enabled
			1	Detection enabled only during inverter operation

◆ System failure detection (Pr.393) and Operation selection after system failure detection (Pr.394)

- The following table shows the system failure corresponding to the bit when the **Pr.393 System failure detection or Pr.394 Operation selection after system failure detection** value is converted to a binary value.

Bit	System failure	Refer to page
bit 0	Crane overspeed detection	106
bit 1	Speed range excess fault	107
bit 2	Speed deviation detection	108
bit 3	Position deviation detection	109
bit 4	Distance meter fault	110
bit 5	Stop position command out of motion range	111
bit 6	Limit dog detection	112
bit 7	Brake sequence fault*1	113
bit 8	Emergency stop	113
bit 9	Distance meter alarm	113
bit 10	—	—
bit 11	—	—
bit 12	—	—
bit 13	—	—
bit 14	—	—
bit 15	—	—

*1 The crane is stopped with the brake regardless of the **Pr.394** setting.

- Use **Pr.393** to select the availability of system failure detection. In the initial setting (**Pr.393** = "65535"), all system failures can be detected.

Bit setting value when Pr.393 setting value converted to binary value	System failure detection
0	Unavailable
1	Available

(Example) When using the crane overspeed detection, position deviation detection, and distance meter alarm, set **Pr.393** = "521".

- Use **Pr.394 Operation selection after system failure detection** to select the stop action when system failure is detected. The deceleration stop or brake stop can be selected for each system failure.

Bit setting value when Pr.394 setting value converted to binary value	Operation
0	Deceleration stop
1	Brake stop

(Example) When using the brake stop only for the speed range excess fault detection, set **Pr.394** = "2".

- The System failure (Y231) signal turns ON when system failure is detected. Set "231" (positive logic) or "331" (negative logic) in any parameter from **Pr.190 to Pr.196 (Output terminal function selection)** to assign the Y231 signal to the output terminal.
- The system failure codes can be displayed on the operation panel or the parameter unit by setting "97" in the parameters for monitoring (**Pr.52, Pr.774 to Pr.776, Pr.992**).

NOTE

- The priorities of the system failure detection are as follows:
  Brake sequence fault > Limit dog detection (when Bit 6 of **Pr.394** is "1") > Emergency stop (when Bit 8 of **Pr.394** is "1") > others
- If multiple system failures are detected, the displayed system failure code and selected operation are those of the one having higher priority.

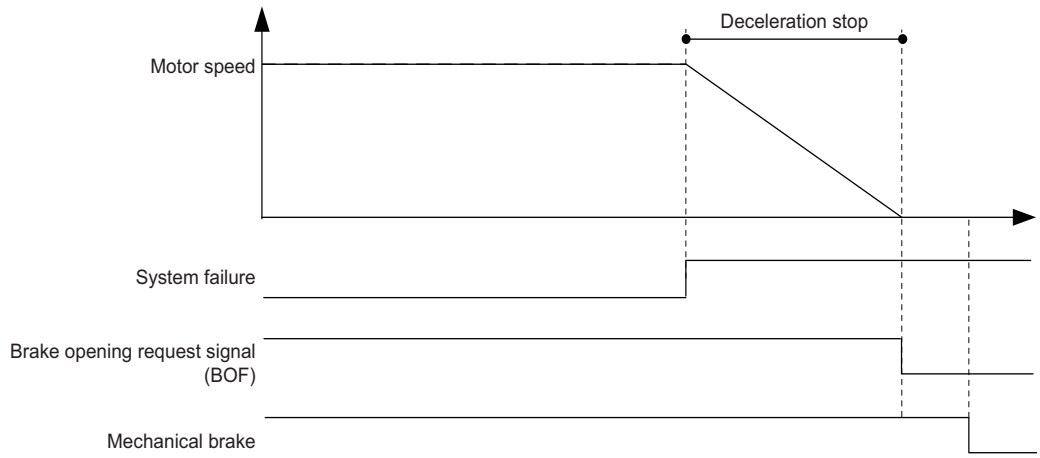
◆ Deceleration stop, brake stop, and Deceleration stop operation selection after system failure detection (Pr.610)

The following description shows the difference between the deceleration stop and brake stop when system failure is detected.

- Deceleration stop

  Either S-curve deceleration or linear deceleration can be selected by using **Pr.610 Deceleration stop operation selection after system failure detection**.

Pr.610 setting	Deceleration stop operation
0 (initial value)	S-curve deceleration is performed. When a system failure is detected during acceleration, deceleration does not start immediately.
1	Linear deceleration is performed from the frequency at which a system failure is detected.

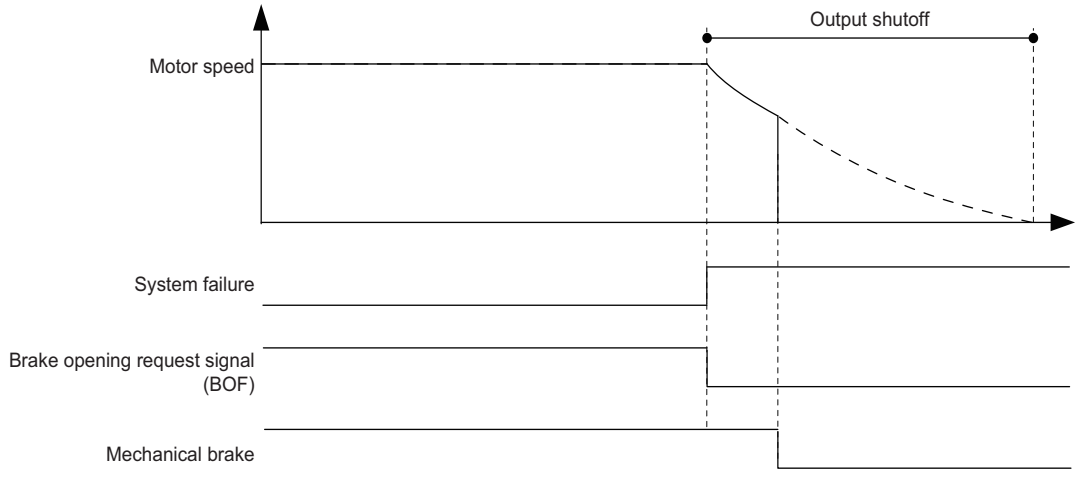


NOTE

- The crane decelerates to stop without operation at creep speed.
- When **Pr.610** = "1", anti-sway control and model adaptive control are disabled during deceleration stop operation due to system failure.

- Brake stop

  The BOF signal turns OFF when the brake starts to operate.



NOTE

- Set the mechanical brake operation after the BOF signal turns OFF according to the system.

◆ Crane speed detection filter (Pr.396)

- Use **Pr.396 Crane speed detection filter** to set the primary delay filter for the speed data (crane speed) obtained by differentiating the position data detected by the distance meter (crane position). The crane speed after using the crane speed detection filter is used as the judgment value for system failure.
- When **Pr.52** = "67", the crane speed monitor after using the crane speed detection filter is displayed on the operation panel.

5.2.1 Resetting system failure

The procedure to reset system failure is as follows.

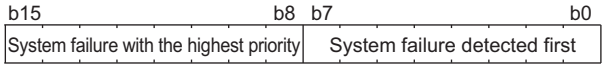
Operating procedure

1. Turn OFF the inverter start signal.
2. Set **Pr.52** = "97" to check the system failure code displayed on the operation panel. (For details on the system failure code monitor, refer to page 104.)
3. Remove the cause of system failure.
4. Reset the inverter.

5.2.2 System failure code monitor

When the monitoring the system failure code is performed during the system failure detection, the system failure code is displayed as follows.

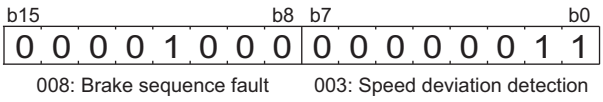
Lower 8 bits: The system failure code of the failure detected first is stored.



Upper 8 bits: The system failure code of the failure which has the highest priority in the failures detected past is stored.

System failure code	Description
000	No failure
001	Crane overspeed detection
002	Speed range excess fault
003	Speed deviation detection
004	Position deviation detection
005	Distance meter fault
006	Stop position command out of motion range
007	Limit dog detection
008	Brake sequence fault
009	Emergency stop
010	Distance meter alarm
011 to 255	(Free)

Example of system failure detection (Brake sequence fault detected after speed deviation detected)



5.2.3 Warning indication for system failure

The following warnings are displayed on the operation panel when system failure is detected. If multiple system failures occur, the warning of the failure detected first is displayed.

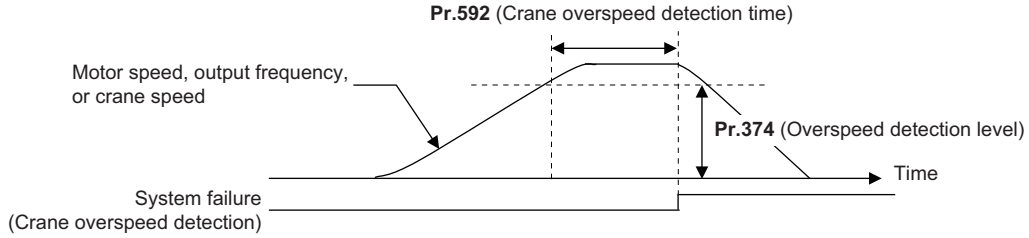
System failure	Operation panel indication
Crane overspeed detection	SY1
Speed range excess fault	SY2
Speed deviation detection	SY3
Position deviation detection	SY4
Distance meter fault	SY5
Stop position command out of motion range	SY6
Limit dog detection	SY7
Brake sequence fault	SY8
Emergency stop	SY9
Distance meter alarm	SY10

5.3 Details of system failure

This chapter explains the details of system failure.

5.3.1 Crane overspeed detection

This system failure is detected when any of the motor speed, output frequency, or crane speed reaches the specified value.
Detection is available when "1" is set in Bit 0 when the **Pr.393** setting value is converted to a binary value.
Set the frequency to detect the crane overspeed in **Pr.374 Overspeed detection level** and the detection time period to regard operation as faulty in **Pr.592 Crane overspeed detection time**.



The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	Detection occurs when one of the following conditions is satisfied. • Vector control: The time period set in **Pr.592** has elapsed after the motor speed becomes higher than the frequency set in **Pr.374**. • Real sensorless vector control: The time period set in **Pr.592** has elapsed after the output frequency becomes higher than the frequency set in **Pr.374**. • Advanced magnetic flux vector control and V/F control: The time period set in **Pr.592** has elapsed after the crane speed becomes higher than the frequency set in **Pr.374**.
Reset condition	None (Detection is not reset unless the inverter is reset.)

The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

Operation mode	Description
Position feed	Detection is available when the inverter is running and one of the following condition is satisfied. • Vector control is selected. • Real sensorless vector control is selected. • Advanced magnetic flux vector control is selected, and the distance meter fault and distance meter alarm are not detected. • V/F control is selected, and the distance meter fault and distance meter alarm are not detected.
Speed feed	Detection is available when the inverter is running and one of the following condition is satisfied. • Vector control is selected. • Real sensorless vector control is selected.

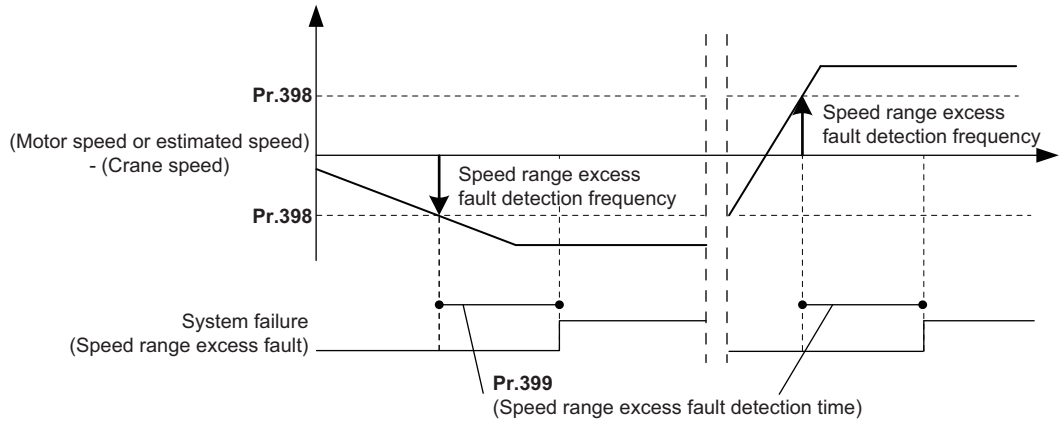
5.3.2 Speed range excess fault

This system failure is detected when the amount of the deviation between the motor speed or estimated speed and the crane speed is larger than the specified speed range. Detection is available when "1" is set in Bit 1 when the **Pr.393** setting value is converted to a binary value.

Set the frequency to detect the speed range excess in **Pr.398 Speed range excess fault detection frequency** and the detection time period to regard operation as faulty in **Pr.399 Speed range excess fault detection time**.

Calculate the speed range excess fault detection frequency by the following formula.

Speed range excess fault detection frequency = **Pr.20** × **Pr.398** / 100



The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	Detection occurs when one of the following conditions is satisfied. • Vector control: The time period set in **Pr.399** has elapsed after the amount of the deviation between the motor speed and the crane speed becomes larger than the frequency set in **Pr.398**. • Real sensorless vector control: The time period set in **Pr.399** has elapsed after the amount of the deviation between the estimated speed and the crane speed becomes larger than the frequency set in **Pr.398**.
Reset condition	None (Detection is not reset unless the inverter is reset.)

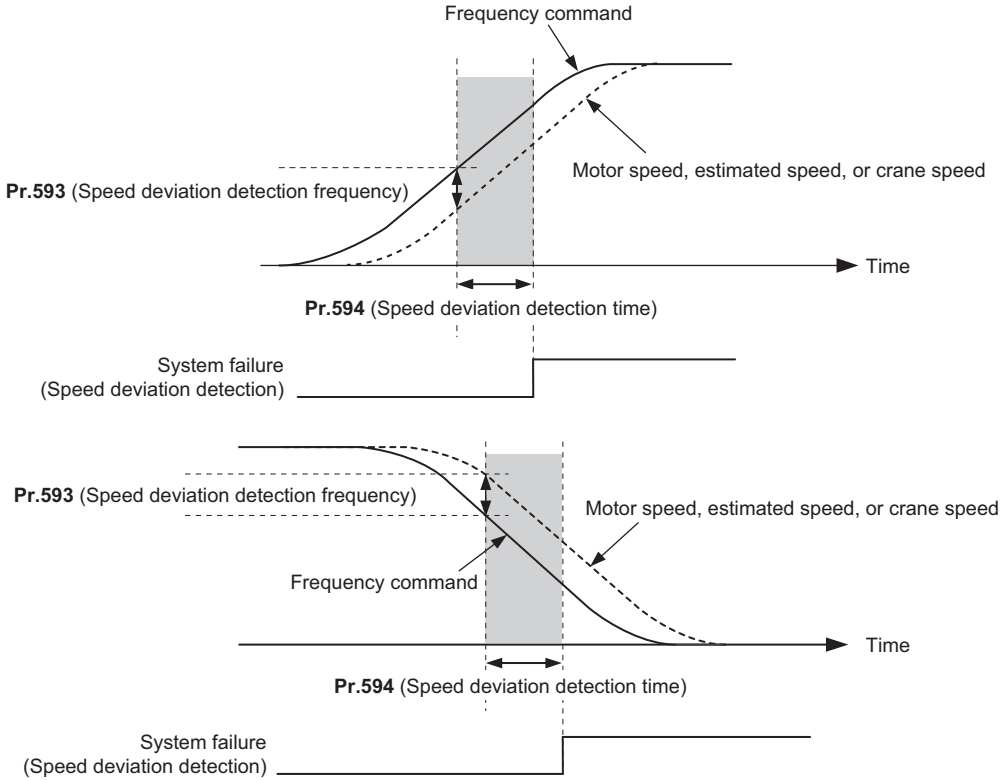
The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

- Inverter is running
- Position feed is selected.
- The distance meter fault and distance meter alarm are not detected.
- **Pr.398** ≠ "9999"
- Vector control or Real sensorless vector control is selected.

5.3.3 Speed deviation detection

This system failure is detected when the amount of the deviation between the frequency command and any of the motor speed, estimated speed, or the crane speed is higher than the speed deviation. Detection is available when "1" is set in Bit 2 when the **Pr.393** setting value is converted to a binary value.

Set the frequency to detect the speed deviation in **Pr.593 Speed deviation detection frequency** and the detection time period to regard operation as faulty in **Pr.594 Speed deviation detection time**.



The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	Detection occurs when one of the following conditions is satisfied. • Vector control: The time period set in **Pr.594** has elapsed after the amount of the deviation between the frequency command and the motor speed becomes higher than the frequency set in **Pr.593**. • Real sensorless vector control: The time period set in **Pr.594** has elapsed after the amount of the deviation between the frequency command and the estimated speed becomes higher than the frequency set in **Pr.593**. • Advanced magnetic flux vector control and V/F control: The time period set in **Pr.594** has elapsed after the amount of the deviation between the frequency command and the crane speed becomes higher than the frequency set in **Pr.593**.
Reset condition	None (Detection is not reset unless the inverter is reset.)

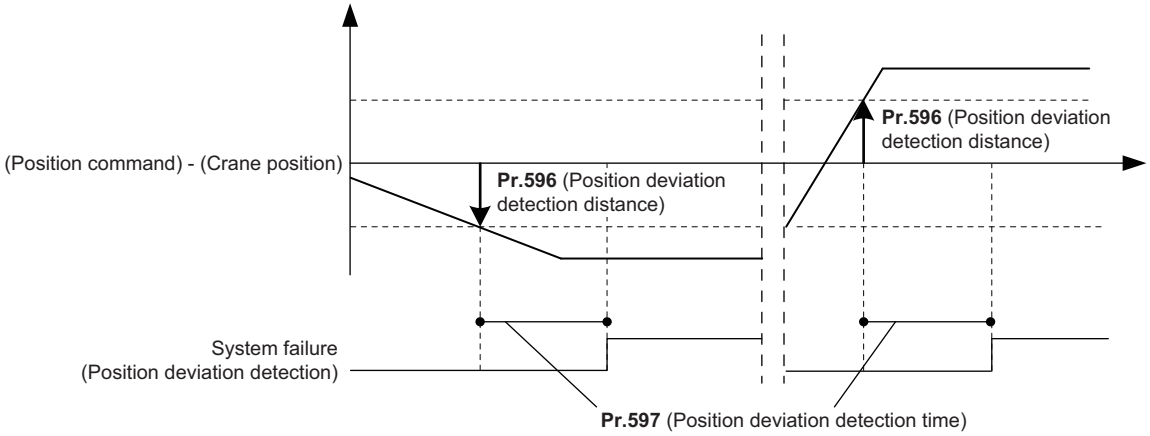
The following conditions must be satisfied to enable the detection. (The conditions must be satisfied.)

Operation mode	Description
Position feed	Detection is available when the inverter is running and **Pr.593** ≠ "9999", and when one of the following condition is satisfied. • Vector control is selected. • Real sensorless vector control is selected. • Advanced magnetic flux vector control is selected, and the distance meter fault and distance meter alarm are not detected. • V/F control is selected, and the distance meter fault and distance meter alarm are not detected.
Speed feed	Detection is available when the inverter is running and **Pr.593** ≠ "9999", and when one of the following condition is satisfied. • Vector control is selected. • Real sensorless vector control is selected.

5.3.4 Position deviation detection

This system failure is detected when the amount of the deviation between the position command and the current position is larger than the position deviation. Detection is available when "1" is set in Bit 3 when the **Pr.393** setting value is converted to a binary value.

Set the frequency to detect the position deviation in **Pr.596 Position deviation detection distance** and the detection time period to regard operation as faulty in **Pr.597 Position deviation detection time**.



The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	The time period set in **Pr.597** has elapsed after the amount of the deviation between the position command and the current position becomes larger than the distance set in **Pr.596**.
Reset condition	None (Detection is not reset unless the inverter is reset.)

The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

- Position loop is enabled.
- **Pr.596** ≠ "9999"

5.3.5 Distance meter fault

This system failure is detected when a communication error occurs between the inverter and the distance meter, or when the data sent from the distance meter is unreliable.

Detection is available when "1" is set in Bit 4 when the **Pr.393** setting value is converted to a binary value.

Set the number of retries at communication error or the detection time period to regard operation as faulty in **Pr.335 RS-485 communication retry count**, **Pr.336 RS-485 communication check time interval**, or **Pr.761 Distance measurement fault detection interval**. (For details on **Pr.335, Pr.336, and Pr.761**, refer to 79 and page 86.)

The distance meter fault codes can be displayed on the operation panel or the parameter unit by setting "54" in the parameters for monitoring (**Pr.52, Pr.774 to Pr.776, Pr.992**). If multiple distance meter faults occur, the code of the fault detected first is displayed.

The conditions to detect the distance meter fault differ depending on the used distance meter as follows. The distance meter fault is detected when one of the required conditions is satisfied.

Distance meter	Fault code (For detection conditions, refer to the next table.)									
	10	20	100	11[]	12[]	13[]	190	200	300	400
DME5000 OLM100-1003	○	—	○	—	—	—	—	○	○	—
CEV58M-00884	○	—	—	—	—	—	—	○	○	○
DL100pro	○	—	—	○	—	—	—	○	○	—
DT1000/DL1000	○	—	—	—	○	—	—	○	○	—
AMS300i	○	—	—	—	—	○	—	○	○	—
AMS308i	—	○	—	—	—	○	—	—	○	—
BPS307i AMS304i	—	—	—	—	—	—	○	—	○	—
CMV58M-00002	—	—	—	—	—	—	○	—	○	○

(○: Required, —: Not required)

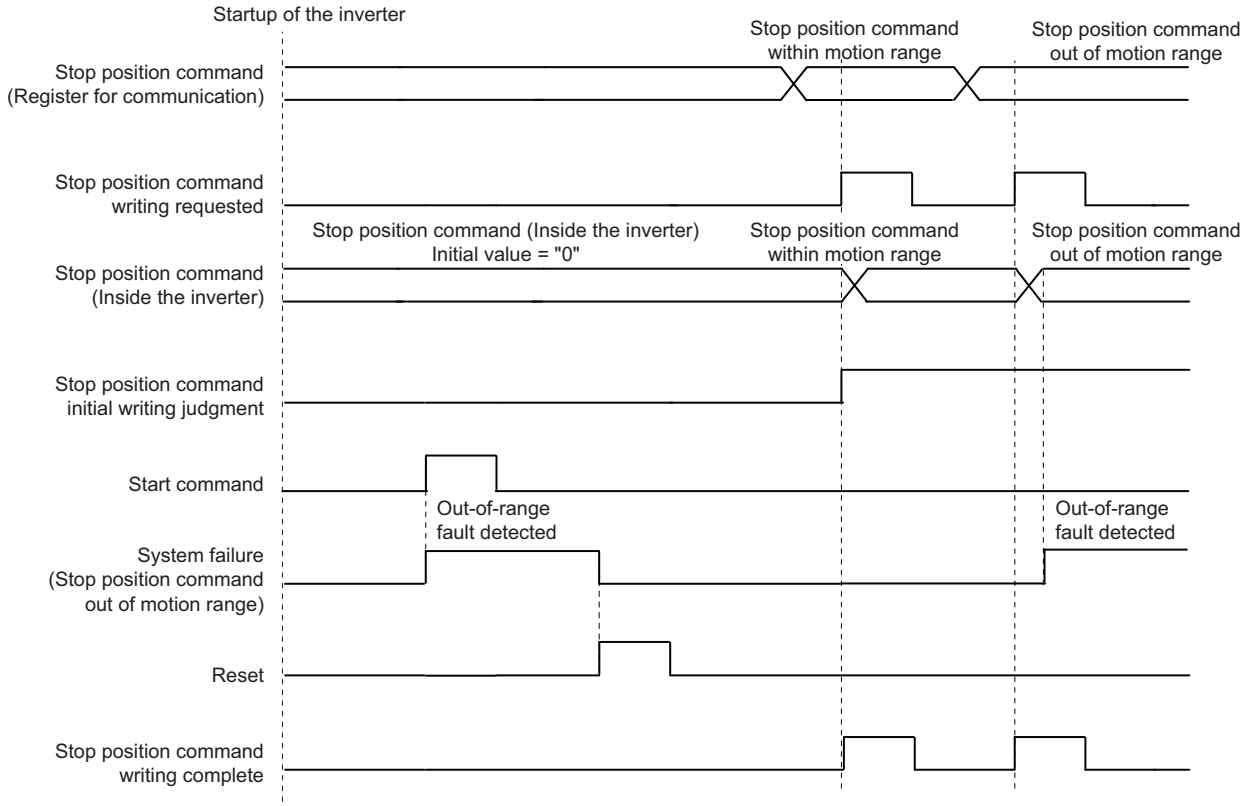
Fault code	Detection condition	
10	The normal head data is not sent from the distance meter within the time period set in **Pr.336**.	
20	The normal data is not sent from the distance meter within the time period set in **Pr.761**.	
100	The distance data sent from the distance meter is "0" consecutively for 30 ms.	
11[]	An error signal is sent from the distance meter consecutively for 30 ms.	110: Data validity error due to shading or other causes 111: Laser light attenuation
12[]		120: Measurement error 121: Ambient light error
13[]		130: Data validity error due to shading or other causes 131: Laser light attenuation 132: Measured value overflow
190	An unreliable data (signal loss detection, polarity fault, or measured value overflow) is sent from the distance meter consecutively for 30 ms.	
200	The consecutive number of times that an impermissible data is received exceeds the number of the times set in **Pr.335**.	
300	The start command turns ON when the normal data has never been sent from the distance meter.	
400	A jump occurs between the area below the lower limit of the measuring range and the area above the upper limit, as the distance data measured by the distance meter is outside the measuring range. (If a jump occurs while the position feed is not selected, the fault is detected instantly when the position feed is selected.)	

The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

- Position feed is selected.
- **Pr.60** = "1"
- **Pr.1134** = "0", or inverter is running with **Pr.1134** = "1"

5.3.6 Stop position command out of motion range

This system failure is detected when the stop position command data set via communication is out of the crane motion range.
Detection is available when "1" is set in Bit 5 when the **Pr.393** setting value is converted to a binary value.
The motion range can be specified for the stop position command using **Pr.128 Motion range 1, Pr.129 Motion range 2,** and **Pr.131 Motion range sign selection**. (For details on **Pr.128, Pr.129, and Pr.131**, refer to page 75.)



The conditions to detect and reset the failure are as follows.

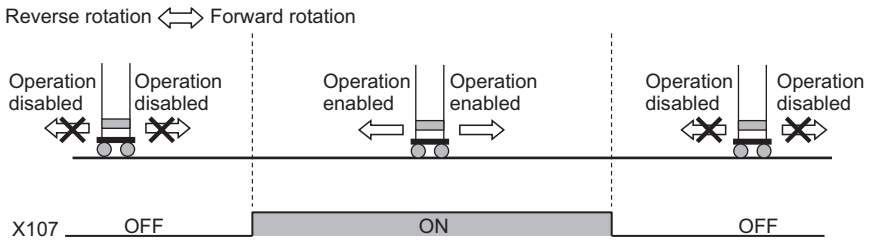
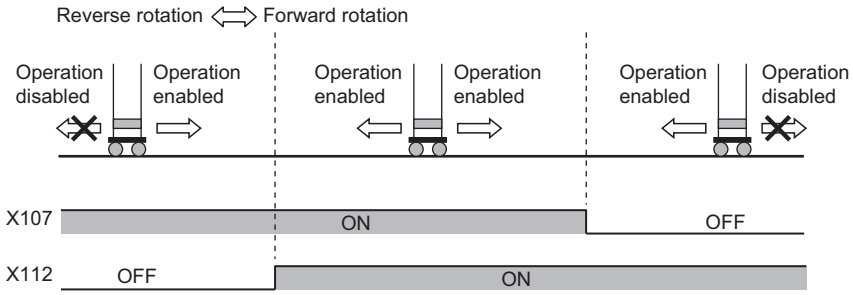
Item	Description
Detection condition	Detection occurs when one of the following conditions is satisfied. • The stop position command is out of the crane motion range. • Lower limit of motion range > Upper limit of motion range • **Pr.760** × 10 × 4096 < (Upper limit - Lower limit (of motion range)) (When using the absolute encoder type distance meter)
Reset condition	None (Detection is not reset unless the inverter is reset.)

The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

- Position feed is selected.
- The start command is ON or the first stop position command is written.

5.3.7 Limit dog detection

This system failure is detected according to the status of the Limit dog (X107) signal or Limit dog 2 (X112) signal and the input status of the forward rotation command or reverse rotation command. (Detection is not reset unless the inverter is reset.)
Detection is available when "1" is set in Bit 6 when the **Pr.393** setting value is converted to a binary value.
The limit dog detection is selected between the limit dog detection 1 and 2. When using the limit dog detection 1, assign the X107 signal to an input terminal. When using the limit dog detection 2, assign the X107 and X112 signals to input terminals. Only commands given via the external terminals are valid for the X107 and X112 signals (refer to page 142).
Use **Pr.397 Limit dog operation selection** to set the availability of the limit dog detection when the speed feed is selected (Initial setting: **Pr.397** = "1" (Limit dog detection enabled)).
The detection conditions are as follows.

Terminal assignment		Limit dog detection	System failure detection
X107 signal	X112 signal		
Not assigned	Not assigned	—	Not detected.
Assigned	Not assigned	Limit dog detection 1	Detected when the X107 signal is OFF. 
Assigned	Assigned	Limit dog detection 2	Detection occurs when one of the following conditions is satisfied. • The X107 signal is OFF and the forward rotation command is input. • The X112 signal is OFF and the reverse rotation command is input. 

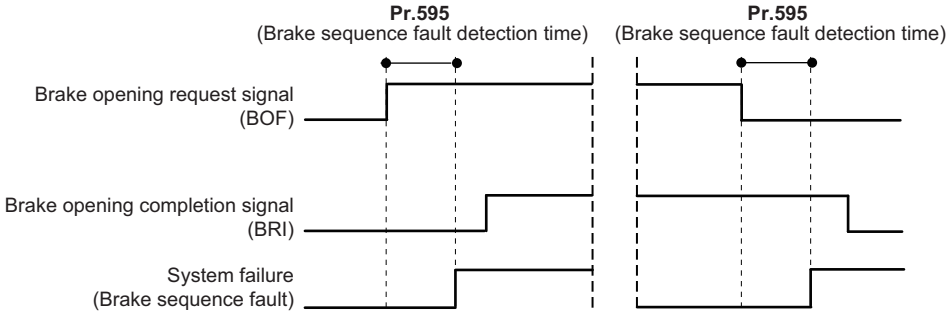
The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

Limit dog detection	Description
Limit dog detection 1	Detection is available when one of the following conditions is satisfied. • **Pr.397** = "1" when the position feed or speed feed is selected. • The X107 signal is assigned to an input terminal and the X112 signal is not assigned.
Limit dog detection 2	Detection is available when one of the following conditions is satisfied. • **Pr.397** = "1" when the position feed or speed feed is selected. • The X107 and X112 signals are assigned to input terminals.

5.3.8 Brake sequence fault

This system failure is detected when the status of the Brake opening completion (BRI) signal remains the same after the status of the Brake opening request (BOF) signal is changed. Detection is available when "1" is set in Bit 7 when the **Pr.393** setting value is converted to a binary value.

Set the detection time period to regard operation as faulty in **Pr.595 Brake sequence fault detection time**.



The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	Detection occurs when one of the following conditions is satisfied. • The BRI signal remains OFF when the time period set in **Pr.595** has elapsed after the BOF signal turns ON. • The BRI signal remains ON when the time period set in **Pr.595** has elapsed after the BOF signal turns OFF.
Reset condition	None (Detection is not reset unless the inverter is reset.)

The following conditions must be satisfied to enable the detection. (All conditions must be satisfied.)

- Full-closed control is enabled
- The BRI signal is assigned to an input terminal.
- The BOF signal is assigned to an output terminal.

5.3.9 Emergency stop

This system failure is detected when the Crane emergency stop (X111) signal is turned ON via communication. Detection is available when "1" is set in Bit 8 when the **Pr.393** setting value is converted to a binary value.

The conditions to detect and reset the failure are as follows.

Item	Description
Detection condition	The X111 signal is turned ON via communication.
Reset condition	None (Detection is not reset unless the inverter is reset.)

Set "111" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the X111 signal to an input terminal. Only commands given via communication are valid for the X111 signal (refer to page 142).

5.3.10 Distance meter alarm

This system failure is detected when the distance meter has any structural failure or the abnormal internal temperature occurs. (Detection is available only when the position feed is selected. During the full-closed control test operation, detection is unavailable.)

Detection is available when "1" is set in Bit 9 when the **Pr.393** setting value is converted to a binary value.

This detection is available when using the DL100Pro, AMS300i, and AMS308i.

6 COMMUNICATION WITH HOST CONTROLLER

This chapter explains the communication between the inverter and the host controller.
The inverter operation is controlled by inputting the start command, speed command, and stop position command from the master to the inverter via communication.
The following communications are available for this product.

- CC-Link (FR-A8NC required)
- CC-Link IE Field Network (FR-A8NCE manufactured in November 2019 or later required)
- CC-Link IE Field Network Basic (Only for Ethernet model.)

NOTE

- Check the board of the FR-A8NCE for its SERIAL number.

  FR-A8NCE SERIAL example

  □ 9 Y ○○○
  Symbol Year Month Control number
  SERIAL

  The SERIAL consists of one symbol, two characters indicating the production year and month, and three characters indicating the control number. The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).
- The FR-A8NCE manufactured in October 2019 or earlier is installed to any plug-in option connector from 1 to 3, the protective function (E.1 to E.3) is activated and the inverter output is shutoff.
- This product supports the remote I/O and remote register devices for logistics/transport functions. For the functions not found in this Manual, refer to the FR-A8NC Instruction Manual, the FR-A8NCE Instruction Manual, and the Ethernet Function Manual according to the communication type.

6.1 Communication parameter settings

Set communication parameters according to the communication used as follows.
The settings are applied after an inverter reset or at the next power-ON. After changing the parameters, communication cannot be made until the inverter is reset.

6.1.1 CC-Link

For the parameter details, refer to the FR-A8NC Instruction Manual.

Pr.	Name	Initial value	Setting range	Description
542 N101	**Communication station number (CC-Link)**	1	1 to 64	Enter the station number of the inverter.
543 N102	**Baud rate selection (CC-Link)**	0	0 to 4	Set the data transmission speed.
544 N103	**CC-Link extended setting**	0	0 to 2, 12, 14, 18, 24, 28, 100, 112, 114, 118, 128*1	Set to "2" (CC-Link Ver.1 (functions dedicated to the logistics/transport compatible (two stations occupied))). (When **Pr.544** ≠ "2", the inverter specification is not satisfied.)

*1 For the setting values other than "2", refer to the Ethernet Function Manual.

6.1.2 CC-Link IE Field Network

For the parameter details, refer to the FR-A8NCE Instruction Manual.

Pr.	Name	Initial value	Setting range	Description
434 N110	**Network number (CC-Link IE)**	0	0 to 255	Enter the network number of the inverter.
435 N401	**Station number (CC-Link IE)**	0	0 to 255*1	Enter the station number of the inverter.

*1 The setting range of **Pr.435** is "0 to 255", but its active range is "1 to 120".
The values out of the active range are invalid because such values cannot be transmitted to the host controller.

6.1.3 CC-Link IE Field Network Basic

For the parameter details, refer to the Ethernet Function Manual.

Pr.	Name	Initial value	Setting range	Description
1434 N600	**IP address 1 (Ethernet)**	192	0 to 255	Enter the IP address of the inverter.
1435 N601	**IP address 2 (Ethernet)**	168		
1436 N602	**IP address 3 (Ethernet)**	50		
1437 N603	**IP address 4 (Ethernet)**	1		
1438 N610	**Subnet mask 1**	255	0 to 255	Enter the subnet mask of the network to which the inverter belongs.
1439 N611	**Subnet mask 2**	255		
1440 N612	**Subnet mask 3**	255		
1441 N613	**Subnet mask 4**	0		
1427 N630	**Ethernet function selection 1**	5001	502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 45237, 61450*2	Set "61450" (CC-Link IE Field Network Basic) in one of the parameters.
1428 N631	**Ethernet function selection 2**	45237		
1429 N632	**Ethernet function selection 3**	9999	502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 10001, 45237, 61450*2	
544 N103	**CC-Link extended setting**	0	0 to 2, 12, 14, 18, 24, 28, 100, 112, 114, 118, 128*1	Set to "2" (CC-Link Ver.1 (functions dedicated to the logistics/transport compatible (two stations occupied))). (When **Pr.544** ≠ "2", the inverter specification is not satisfied.)

*1 For the setting values other than "2", refer to the Ethernet Function Manual.

*2 For the setting values other than "61450", refer to the Ethernet Function Manual.

6.2 Remote I/O and remote register devices

6.2.1 CC-Link, CC-Link IE Field Network Basic

The following describes the remote I/O and remote register devices when CC-Link Ver.1 (functions dedicated to the logistics/transport compatible (two stations occupied)) is used (**Pr.544** = "2").

◆ Remote I/O (64 points (fixed))

Device No.[*5]	Signal	Refer to page
RYn0	Forward rotation command[*4]	[*6]
RYn1	Reverse rotation command[*4]	[*6]
RYn2	High-speed operation command (terminal RH function)[*1]	[*6]
RYn3	Middle-speed operation command (terminal RM function)[*1]	[*6]
RYn4	Low-speed operation command (terminal RL function)[*1]	[*6]
RYn5	Jog operation selection (terminal JOG function)[*1]	[*6]
RYn6	Second function selection (terminal RT function)[*1]	[*6]
RYn7	Current input selection (terminal AU function)[*1]	[*6]
RYn8	Selection of automatic restart after instantaneous power failure (terminal CS function)[*1]	[*6]
RYn9	Output stop[*1]	[*6]
RYnA	Start self-holding selection (terminal STOP function)[*1]	[*6]
RYnB	Reset (terminal RES function)[*1]	[*6]
RYnC	Monitor command	[*6]
RYnD	Frequency setting command (RAM)	[*6]
RYnE	Frequency setting command (RAM, EEPROM)	[*6]
RYnF	Instruction code execution request	[*6]
RY(n+1)0 to RY(n+1)9	Reserved	—
RY(n+1)A	Error reset request flag	[*6]
RY(n+1)B to RY(n+1)F	Reserved	—
RY(n+2)0	Stop position command writing requested	117
RY(n+2)1	H00 (Free)	—
RY(n+2)2	H00 (Free)	—
RY(n+2)3	H00 (Free)	—
RY(n+2)4	H00 (Free)	—
RY(n+2)5	H00 (Free)	—
RY(n+2)6	H00 (Free)	—
RY(n+2)7	H00 (Free)	—
RY(n+2)8	H00 (Free)	—
RY(n+2)9	H00 (Free)	—
RY(n+2)A	H00 (Free)	—
RY(n+2)B	H00 (Free)	—
RY(n+2)C	H00 (Free)	—

Device No.[*5]	Signal	Refer to page
RXn0	Forward running	[*6]
RXn1	Reverse running	[*6]
RXn2	Running (terminal RUN function)[*2]	[*6]
RXn3	Up to frequency (terminal SU function)[*2]	[*6]
RXn4	Overload alarm (terminal OL function)[*2]	[*6]
RXn5	Instantaneous power failure (terminal IPF function)[*2]	[*6]
RXn6	Frequency detection (terminal FU function)[*2]	[*6]
RXn7	Error (terminal ABC1 function)[*2]	[*6]
RXn8	— (terminal ABC2 function)[*2]	[*6]
RXn9	**Pr.313** assignment function (DO0)[*3]	[*6]
RXnA	**Pr.314** assignment function (DO1)[*3]	[*6]
RXnB	**Pr.315** assignment function (DO2)[*3]	[*6]
RXnC	Monitoring	[*6]
RXnD	Frequency setting completion (RAM)	[*6]
RXnE	Frequency setting completion (RAM, EEPROM)	[*6]
RXnF	Instruction code execution completed	[*6]
RX(n+1)0 to RX(n+1)9	Reserved	—
RX(n+1)A	Error status flag	[*6]
RX(n+1)B	Remote station ready	[*6]
RX(n+1)C to RX(n+1)F	Reserved	—
RX(n+2)0	Stop position command receipt complete	117
RX(n+2)1	Stop position command not applied	117
RX(n+2)2	Position feed	117
RX(n+2)3	Speed feed	117
RX(n+2)4	Fork selecting	117
RX(n+2)5	H00 (Free)	—
RX(n+2)6	H00 (Free)	—
RX(n+2)7	H00 (Free)	—
RX(n+2)8	H00 (Free)	—
RX(n+2)9	H00 (Free)	—
RX(n+2)A	H00 (Free)	—
RX(n+2)B	H00 (Free)	—
RX(n+2)C	H00 (Free)	—

Device No.*5	Signal	Refer to page
RY(n+2)D	H00 (Free)	—
RY(n+2)E	H00 (Free)	—
RY(n+2)F	H00 (Free)	—
RY(n+3)0 to RY(n+3)F	H00 (Free)	—

Device No.*5	Signal	Refer to page
RX(n+2)D	H00 (Free)	—
RX(n+2)E	H00 (Free)	—
RX(n+2)F	System failure	117
RX(n+3)0 to RX(n+3)F	H00 (Free)	—

*1 These signals are set in the initial setting. Use **Pr.180 to Pr.186, Pr.188, and Pr.189** to assign a different input signal to the terminal. For details on **Pr.180 to Pr.186, Pr.188, and Pr.189**, refer to the FR-A800 Instruction Manual (Detailed).

*2 These signals are set in the initial setting. Using **Pr.190 to Pr.196**, output signals assigned to the device numbers can be changed. For details on **Pr.190 to Pr.196**, refer to the FR-A800 Instruction Manual (Detailed).

*3 Output signals can be assigned using **Pr.313 to Pr.315**. The settings of **Pr.313 to Pr.315** are the same as those of **Pr.190 to Pr.196 Output terminal function selection**. For details on **Pr.190 to Pr.196**, refer to the FR-A800 Instruction Manual (Detailed).

*4 The signals are fixed. They cannot be changed using parameters.

*5 "n" indicates a value determined by the station number setting.

*6 For the details, refer to the FR-A8NC Instruction Manual or Ethernet Function Manual.

◆Output signals (from the master module to the inverter)

Input signals from the master module to the inverter are as follows.

Device No.	Signal	Description
RY20	Stop position command writing requested	When the RY20 signal is turned ON after the stop position command value is written to RWw4 and RWw5, the stop position command value in RWw4 and RWw5 is written to the inverter RAM. Use the RX20 and RX21 signals to check that the written stop position command value is applied.

◆Input signals (from the inverter to the master module)

Output signals from the inverter to the master module are as follows.

Device No.	Signal	Description
RX20	Stop position command receipt complete	Used to judge whether the written stop position command value is applied when the RY20 signal is ON. The RX20 signal turns ON when the judgment is complete regardless of the result. (For details on the judgment, refer to the RX21 signal.) After the RY20 signal turns OFF, the RX20 signal turns OFF.
RX21	Stop position command not applied	Used to check that the written stop position command value is applied when the RX20 signal is ON. The RX21 signal turns OFF when the value is applied, and turns ON when the value is not applied. The stop position command value cannot be applied (the last command value is used) in the following cases: • An invalid value (a value less than the lower limit or more than the upper limit of the stop position command) is written. • A value specifying the point where the crane cannot stop (the point the crane has already passed or cannot decelerate to stop) is written during inverter operation. • The stop position command is written while the BOF signal is OFF during operation (except during the period from when the start signal turns ON until the BOF signal turns ON). After the RY20 signal turns OFF, the RX21 signal turns OFF.
RX22	Position feed	The RX22 signal turns ON when the position feed is selected.
RX23	Speed feed	The RX23 signal turns ON when the speed feed is selected.
RX24	Fork selecting	The RX24 signal turns ON when the fork control is selected.
RX2F	System failure	The RX2F signal turns ON when system failure is detected. The RX2F turns OFF when the inverter is reset after the system failure is reset.

◆ Remote register (two stations occupied)

Device No.*1	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn	Monitor code 2	Monitor code 1	*2
RWwn+1	Set frequency (0.01 Hz)		*2
RWwn+2	Link parameter extended setting	Instruction code	*2
RWwn+3	Write data		*2
RWwn+4	Lower stop position command data		118
RWwn+5	Upper stop position command data		118
RWwn+6	H00 (Free)		—
RWwn+7	H00 (Free)		—

Device No.*1	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn	First monitor value		*2
RWrn+1	Second monitor value		*2
RWrn+2	Reply code 2	Reply code 1	*2
RWrn+3	Read data		*2
RWrn+4	Lower stop position command monitor data		118
RWrn+5	Upper stop position command monitor data		118
RWrn+6	Lower current position monitor data		118
RWrn+7	Upper current position monitor data		118

*1 "n" indicates a value determined by the station number setting.

*2 For the details, refer to the FR-A8NC Instruction Manual or Ethernet Function Manual.

◆ Remote register (from the master module to the inverter)

Device No.	Signal	Description
RWw4	Lower stop position command data	Set the stop position command value. Setting range: from the lower limit to the upper limit of the stop position command, increment: 0.1 mm, 32-bit hexadecimal signed value. (Lower 16 bits of the value are written in RWw4 and upper 16 bits in RWw5.) Ensure that the setting value is within the range specified in **Pr.128 Motion range 1** and **Pr.129 Motion range 2**. (When a value out of the setting range is written, the stop position command value cannot applied and the RX21 signal turns ON.) When the RY20 signal is turned ON after setting the stop position command value, the value is written to the inverter RAM. Use the RX20 and RX21 signals to check that the written stop position command value is correctly applied.
RWw5	Upper stop position command data	

◆ Remote register (from the inverter to the master module)

Device No.	Signal	Description
RWr4	Lower stop position command monitor data	The monitored value of the stop position command is written to RWr4 and RWr5. Increment: 0.1 mm, 32-bit hexadecimal signed value. Lower 16 bits of the value are written in RWr4 and upper 16 bits in RWr5.
RWr5	Upper stop position command monitor data	
RWr6	Lower current position monitor data	The current position is written to RWr6 and RWr7. (The current position compensated using the dual feedback control (under Vector control) or the distance detection filter (under the other control) is written.) Increment: 0.1 mm, 32-bit hexadecimal signed value. Lower 16 bits of the value are written in RWr6 and upper 16 bits in RWr7.
RWr7	Upper current position monitor data	

NOTE

- The remote resister of the first station is the same as that of the FR-A800 series inverter. For details on the remote resister of the first station, refer to the FR-A8NC Instruction Manual or Ethernet Function Manual.

6.2.2 CC-Link IE Field Network

The following shows the remote I/O and remote register devices for the CC-Link IE Field Network.

◆ Remote I/O (64 points (fixed))

Device No.*5	Signal	Refer to page
RYn0	Forward rotation command*4	*6
RYn1	Reverse rotation command*4	*6
RYn2	High-speed operation command (terminal RH function)*1	*6
RYn3	Middle-speed operation command (terminal RM function)*1	*6

Device No.*5	Signal	Refer to page
RXn0	Forward running	*6
RXn1	Reverse running	*6
RXn2	Running (terminal RUN function)*2	*6
RXn3	Up to frequency (terminal SU function)*2	*6

Device No.*5	Signal	Refer to page
RYn4	Low-speed operation command (terminal RL function)*1	*6
RYn5	Jog operation selection (terminal JOG function)*1	*6
RYn6	Second function selection (terminal RT function)*1	*6
RYn7	Current input selection (terminal AU function)*1	*6
RYn8	Selection of automatic restart after instantaneous power failure (terminal CS function)*1	*6
RYn9	Output stop (terminal MRS function)*1	*6
RYnA	Start self-holding selection (terminal STOP function)*1	*6
RYnB	Reset (terminal RES function)*1	*6
RYnC to RYnF	Reserved	—
RY(n+1)0 to RY(n+1)F		
RY(n+2)0	Monitor command	*6
RY(n+2)1	Frequency setting command (RAM)	*6
RY(n+2)2	Frequency setting command (RAM, EEPROM)	*6
RY(n+2)3	Torque command / torque limit (RAM)	*6
RY(n+2)4	Torque command / torque limit (RAM, EEPROM)	*6
RY(n+2)5	Instruction code execution request	*6
RY(n+2)6 to RY(n+2)F	Reserved	—
RY(n+3)0	Stop position command writing requested	120
RY(n+3)1 to RY(n+3)4	Reserved	—
RY(n+3)5	Acceleration time writing requested	120
RY(n+3)6	Reserved	—
RY(n+3)7	Deceleration time writing requested	120
RY(n+3)8 to RY(n+3)9	Reserved	—
RY(n+3)A	Error reset request flag	*6
RY(n+3)B to RY(n+3)F	Reserved	—

Device No.*5	Signal	Refer to page
RXn4	Overload alarm (terminal OL function)*2	*6
RXn5	Instantaneous power failure (terminal IPF function)*2	*6
RXn6	Frequency detection (terminal FU function)*2	*6
RXn7	Error (terminal ABC1 function)*2	*6
RXn8	— (terminal ABC2 function)*2	*6
RXn9 to RXnF	Reserved	—
RX(n+1)0	**Pr.313** assignment function (DO0)*3	*6
RX(n+1)1	**Pr.314** assignment function (DO1)*3	*6
RX(n+1)2	**Pr.315** assignment function (DO2)*3	*6
RX(n+1)3 to RX(n+1)F	Reserved	—
RX(n+2)0	Monitoring	*6
RX(n+2)1	Frequency setting completion (RAM)	*6
RX(n+2)2	Frequency setting completion (RAM, EEPROM)	*6
RX(n+2)3	Torque command / torque limit setting completion (RAM)	*6
RX(n+2)4	Torque command / torque limit setting completion (RAM, EEPROM)	*6
RX(n+2)5	Instruction code execution completed	*6
RX(n+2)6 to RX(n+2)F	Reserved	—
RX(n+3)0	Stop position command receipt complete	120
RX(n+3)1	Stop position command not applied	120
RX(n+3)2	Position feed	120
RX(n+3)3	Speed feed	120
RX(n+3)4	Fork selecting	120
RX(n+3)5	Acceleration time receipt complete	120
RX(n+3)6	Acceleration time not applied	120
RX(n+3)7	Deceleration time receipt complete	120
RX(n+3)8	Deceleration time not applied	120
RX(n+3)9	System failure	120
RX(n+3)A	Error status flag	*6
RX(n+3)B	Remote station ready	*6
RX(n+3)C to RX(n+3)F	Reserved	—

*1 These signals are set in the initial setting. Using **Pr.180 to Pr.189**, input signals assigned to the device numbers can be changed. For details on **Pr.180 to Pr.189**, refer to the FR-A800 Instruction Manual (Detailed).

*2 These signals are set in the initial setting. Using **Pr.190 to Pr.196**, output signals assigned to the device numbers can be changed. For details on **Pr.190 to Pr.196**, refer to the FR-A800 Instruction Manual (Detailed).

*3 Output signals can be assigned using **Pr.313 to Pr.315**. The settings of **Pr.313 to Pr.315** are the same as those of **Pr.190 to Pr.196 Output terminal function selection**. For details on **Pr.190 to Pr.196**, refer to the FR-A800 Instruction Manual (Detailed).

*4 The signals are fixed. They cannot be changed using parameters.

*5 "n" indicates a value determined by the station number setting.

*6 For details, refer to the FR-A8NCE Instruction Manual.

◆ Output signals (from the master module to the inverter)

Input signals from the master module to the inverter are as follows.

Device No.	Signal	Description
RY30	Stop position command writing requested	When the RY30 signal is turned ON after the stop position command value is written to RWw60 and RWw61, the stop position command value in RWw60 and RWw61 is written to the inverter RAM.
RY35	Acceleration time writing requested	When the RY35 signal is turned ON after the acceleration time is written to RWw62, the acceleration time in RWw62 is written to the inverter RAM.
RY37	Deceleration time writing requested	When the RY37 signal is turned ON after the deceleration time is written to RWw63, the deceleration time in RWw63 is written to the inverter RAM.

◆ Input signals (from the inverter to the master module)

Output signals from the inverter to the master module are as follows.

Device No.	Signal	Description
RX30	Stop position command receipt complete	Used to judge whether the written stop position command value is applied when the RY30 signal is ON. The RX30 signal turns ON when the judgment is complete regardless of the result. (For details on the judgment, refer to the RX31 signal.) After the RY30 signal turns OFF, the RX30 signal turns OFF.
RX31	Stop position command not applied	Used to check that the written stop position command value is applied when the RX30 signal is ON. The RX31 signal turns OFF when the value is applied, and turns ON when the value is not applied. The stop position command value cannot be applied (the last command value is used) in the following cases: • An invalid value (a value less than the lower limit or more than the upper limit of the stop position command) is written. • A value specifying the point where the crane cannot stop (the point the crane has already passed or cannot decelerate to stop) is written during inverter operation. • The stop position command is written while the BOF signal is OFF during operation (except during the period from when the start signal turns ON until the BOF signal turns ON). After the RY30 signal turns OFF, the RX31 signal turns OFF.
RX32	Position feed	The RX32 signal turns ON when the position feed is selected.
RX33	Speed feed	The RX33 signal turns ON when the speed feed is selected.
RX34	Fork selecting	The RX34 signal turns ON when the fork control is selected.
RX35	Acceleration time receipt complete	The RX35 signal turns ON when the RY35 signal is ON regardless of whether the written acceleration time is applied. (For details on the judgment, refer to the RX36 signal.) After the RY35 signal turns OFF, the RX35 signal turns OFF.
RX36	Acceleration time not applied	The RX36 signal turns ON when the RY35 signal is ON and the written acceleration time is not applied. The acceleration time cannot be applied (the last acceleration time is used) in the following cases: • An invalid value (a value less than 0 s or more than 650.00 s) is written. • The acceleration time is written during inverter operation. After the RY35 signal turns OFF, the RX36 signal turns OFF.
RX37	Deceleration time receipt complete	The RX37 signal turns ON when the RY37 signal is ON regardless of whether the written deceleration time is applied. (For details on the judgment, refer to the RX38 signal.) After the RY37 signal turns OFF, the RX37 signal turns OFF.
RX38	Deceleration time not applied	The RX38 signal turns ON when the RY37 signal is ON and the written deceleration time cannot be applied. The deceleration time cannot be applied (the last deceleration time is used) in the following cases: • An invalid value (a value less than 0 s or more than 650.00 s) is written. • The deceleration time is written during inverter operation. After the RY37 signal turns OFF, the RX38 signal turns OFF.
RX39	System failure	The RX39 signal turns ON when system failure is detected. The RX39 turns OFF when the inverter is reset after the system failure is reset.

◆ Remote register (128 words (fixed))

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn	Set frequency (0.01 Hz)		*3
RWwn+1	Reserved		—
RWwn+2	Torque command / torque limit		*3

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn	Reply code		*3
RWrn+1	Reserved		—
RWrn+2	Reply code		*3

Device No.[*2]	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+3 to RWwn+F	Reserved		—
RWwn+10	Link parameter extended setting	Instruction code[*1]	*3
RWwn+11	Data to be written		*3
RWwn+12	Link parameter extended setting	Instruction code[*1]	*3
RWwn+13	Data to be written		*3
RWwn+14	Link parameter extended setting	Instruction code[*1]	*3
RWwn+15	Data to be written		*3
RWwn+16	Link parameter extended setting	Instruction code[*1]	*3
RWwn+17	Data to be written		*3
RWwn+18	Link parameter extended setting	Instruction code[*1]	*3
RWwn+19	Data to be written		*3
RWwn+1A	Link parameter extended setting	Instruction code[*1]	*3
RWwn+1B	Write data		*3
RWwn+1C to RWwn+1F	Reserved		—
RWwn+20	Reserved		—
RWwn+21	Fault history No.		*3
RWwn+22 to RWwn+25	Reserved		—
RWwn+26	Monitor code 1		*3
RWwn+27	Monitor code 2		*3
RWwn+28	Monitor code 3		*3
RWwn+29	Monitor code 4		*3
RWwn+2A	Monitor code 5		*3
RWwn+2B	Monitor code 6		*3
RWwn+2C	Monitor code 7		*3
RWwn+2D	Monitor code 8		*3
RWwn+2E	Monitor code 9		*3
RWwn+2F	Monitor code 10		*3

Device No.[*2]	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+3	Reserved		—
RWrn+4	Reply code		*3
RWrn+5	Reply code		*3
RWrn+6	Reply code		*3
RWrn+7	Reserved		—
RWrn+8	Lower stop position command monitor data		123
RWrn+9	Upper stop position command monitor data		123
RWrn+A	Lower current position monitor data		123
RWrn+B	Upper current position monitor data		123
RWrn+C to RWrn+F	Reserved		—
RWrn+10	Reply code		*3
RWrn+11	Read data[*1]		*3
RWrn+12	Reply code		*3
RWrn+13	Read data[*1]		*3
RWrn+14	Reply code		*3
RWrn+15	Read data[*1]		*3
RWrn+16	Reply code		*3
RWrn+17	Read data[*1]		*3
RWrn+18	Reply code		*3
RWrn+19	Read data[*1]		*3
RWrn+1A	Reply code		*3
RWrn+1B	Read data[*1]		*3
RWrn+1C to RWrn+1F	Reserved		—
RWrn+20	Error status		*3
RWrn+21	Fault history No.	Fault record (fault data)	*3
RWrn+22	Fault record (output frequency)		*3
RWrn+23	Fault record (output current)		*3
RWrn+24	Fault record (output voltage)		*3
RWrn+25	Fault record (energization time)		*3
RWrn+26	First monitor value		*3
RWrn+27	Second monitor value		*3
RWrn+28	Third monitor value		*3
RWrn+29	Fourth monitor value		*3
RWrn+2A	Fifth monitor value		*3
RWrn+2B	Sixth monitor value		*3
RWrn+2C	Seventh monitor value		*3
RWrn+2D	Eighth monitor value		*3
RWrn+2E	Ninth monitor value		*3
RWrn+2F	Tenth monitor value		*3

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+30 to RWwn+48	Reserved		—
RWwn+49 to RWwn+5D	Reserved		—
RWwn+5E	Reserved		—
RWwn+60	Lower stop position command data		123
RWwn+61	Upper stop position command data		123
RWwn+62	Acceleration time		123
RWwn+63	Deceleration time		123

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+30	Output frequency		*3
RWrn+31	Reserved		—
RWrn+32	Output current		*3
RWrn+33	Output voltage		*3
RWrn+34	Reserved		—
RWrn+35	Frequency setting value		*3
RWrn+36	Motor speed		*3
RWrn+37	Motor torque		*3
RWrn+38	Converter output voltage		*3
RWrn+39	Regenerative brake duty		*3
RWrn+3A	Electronic thermal O/L relay load factor		*3
RWrn+3B	Output current peak value		*3
RWrn+3C	Converter output voltage peak value		*3
RWrn+3D	Input power		*3
RWrn+3E	Output power		*3
RWrn+3F	Input terminal status		*3
RWrn+40	Output terminal status		*3
RWrn+41	Load meter		*3
RWrn+42	Motor excitation current		*3
RWrn+43	Reserved		—
RWrn+44	Cumulative energization time		*3
RWrn+45, RWrn+46	Reserved		—
RWrn+47	Actual operation time		*3
RWrn+48	Motor load factor		*3
RWrn+49	Cumulative power		*3
RWrn+4A to RWrn+4F	Reserved		—
RWrn+50	Torque command		*3
RWrn+51	Torque current command		*3
RWrn+52	Motor output		*3
RWrn+53	Feedback pulse monitor		*3
RWrn+54	Reserved		—
RWrn+55	Reserved		—
RWrn+56	Trace status		*3
RWrn+57	Reserved		—
RWrn+58	PLC function user monitor 1		*3
RWrn+59	PLC function user monitor 2		*3
RWrn+5A	PLC function user monitor 3		*3
RWrn+5B	Station number (RS-485 terminals)		*3
RWrn+5C	Station number (PU)		*3
RWrn+5D	Station number (CC-Link)		*3
RWrn+5E to RWrn+61	Reserved		—
RWrn+62	Power saving effect		*3
RWrn+63	Cumulative energy saving		*3

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+64 to RWrn+7F	Reserved		—

Device No.*2	Signal		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+64 to RWrn+69	Reserved		—
RWrn+6A	Option input terminal status 1		*3
RWrn+6B	Option input terminal status 2		*3
RWrn+6C	Option output terminal status		*3
RWrn+6D	Motor thermal load factor		*3
RWrn+6E	Inverter thermal load factor		*3
RWrn+6F	Reserved		—
RWrn+70	PTC thermistor value		*3
RWrn+71 to RWrn+76	Reserved		—
RWrn+77	Cumulative pulse		*3
RWrn+78	Cumulative pulse overflow times		*3
RWrn+79	Cumulative pulse (control terminal option)		*3
RWrn+7A	Cumulative pulse overflow times (control terminal option)		*3
RWrn+7B to RWrn+7F	Reserved		—

*1 Instructions will be processed in the order they are received. Thus, the read value of an instruction may differ at different timings if other writing requests are being made.

*2 "n" indicates a value determined by the station number setting.

*3 For details, refer to the FR-A8NCE Instruction Manual.

◆ Remote register (from the master module to the inverter)

Device No.	Signal	Description
RWw60	Lower stop position command data	Set the stop position command value. Refer to the following description and ensure that the setting value is within the range specified in **Pr.128 Motion range 1** and **Pr.129 Motion range 2**. Setting range: from the lower limit to the upper limit of the stop position command, increment: 0.1 mm, 32-bit hexadecimal signed value. (Lower 16 bits of the value are written in RWw60 and upper 16 bits in RWw61). (When a value out of the setting range is written, the stop position command value cannot applied and the RX31 signal turns ON.) When the RY30 signal is turned ON after setting the stop position command value, the value is written to the inverter RAM. Use the RX30 and RX31 signals to check that the written stop position command value is applied.
RWw61	Upper stop position command data	
RWw62	Acceleration time	Set the acceleration time for full-closed control (position feed / speed feed). Setting range: 0 to 65000, Unit: 0.01 s (the **Pr.21** setting is disabled.) (When the acceleration time is not set via communication, the acceleration time set in **Pr.7, Pr.110,** or **Pr.1140** is used after inverter reset.)
RWw63	Deceleration time	Set the deceleration time for full-closed control (position feed / speed feed). Setting range: 0 to 65000, Unit: 0.01 s (the **Pr.21** setting is disabled.) (When the deceleration time is not set via communication, the deceleration time set in **Pr.8, Pr.111,** or **Pr.1141** is used after inverter reset.)

◆ Remote register (from the inverter to the master module)

Device No.	Signal	Description
RWr8	Lower stop position command monitor data	The monitored value of the stop position command is written to RWr8 and RWr9. Increment: 0.1 mm, 32-bit hexadecimal signed value. Lower 16 bits of the value are written in RWr8 and upper 16 bits in RWr9.
RWr9	Upper stop position command monitor data	
RWrA	Lower current position monitor data	The current position is written to RWrA and RWrB. (The current position compensated using the dual feedback control (under Vector control) or the distance detection filter (under the other controls) is written.) Increment: 0.1 mm, 32-bit hexadecimal signed value. Lower 16 bits of the value are written in RWrA and upper 16 bits in RWrB.
RWrB	Upper current position monitor data	

6.3 Communication setting

The following shows the procedure to input the start command and speed command to the inverter via communication when using the position feed and the speed feed.

6.3.1 Position feed

Operating procedure

1. Checking position feed

Check that the remote I/O device for the position feed is ON.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RX22
CC-Link IE Field Network	RX32

2. Setting speed command

Set the speed command in the remote register device. When the setting frequency is 60 Hz, set "6000" in the following remote register devices.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RWwn+1
CC-Link IE Field Network	RWwn+0

3. Inputting frequency setting command (RAM)

Turn ON the remote I/O device for the frequency setting command (RAM) to write the command to the inverter RAM.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RYD
CC-Link IE Field Network	RY21

4. Checking frequency writing complete

Check that the remote I/O device for the frequency setting complete (RAM) is ON and the remote register device of the reply code is "0".

- Frequency setting completion (RAM)

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RXD
CC-Link IE Field Network	RX21

- Reply code

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RWrn+2
CC-Link IE Field Network	RWrn+0

5. Setting stop position command

Set the stop position command (unit: 0.1 mm) in the following remote register devices, and turn ON the remote I/O device for the stop position command writing requested. When the stop position command is 100 m, set "100000" in the following remote register devices.

- Stop position command

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	Lower: RWwn+4, Upper: RWwn+5
CC-Link IE Field Network	Lower: RWwn+60, Upper: RWwn+61

- Stop position command writing requested

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RY20
CC-Link IE Field Network	RY30

6. Checking stop position command writing complete

Check that the remote I/O device for the stop position command receipt complete is ON and the remote I/O device for the stop position command not applied is OFF.

- Stop position command receipt complete

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RX20
CC-Link IE Field Network	RX30

- Stop position command not applied

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RX21
CC-Link IE Field Network	RX31

NOTE

- The following remote register devices can be used for monitoring the written stop position command.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	Lower: RWrn+4, Upper: RWrn+5
CC-Link IE Field Network	Lower: RWrn+8, Upper: RWrn+9

7. Inputting start command

Turn ON the remote I/O device for the start command (forward rotation / reverse rotation).

When the start command is input, Brake opening request (BOF) signal turns ON and the movement starts toward the target stop position. The settings of the parameters for the acceleration/deceleration pattern selection in the full-closed control (**Pr.7, Pr.8, Pr.516, Pr.517, Pr.110, Pr.111, Pr.753, and Pr.754**) are used as the acceleration/deceleration time and S-curve time during acceleration/deceleration.

Start command	Device No.
Forward rotation command (STF signal)	RY0
Reverse rotation command (STR signal)	RY1

8. Turning OFF start command

When the remote I/O device for the start command (forward rotation / reverse rotation) is turned OFF, the crane decelerates to stop and the BOF signal turns OFF.

6.3.2 Speed feed

Operating procedure

1. Checking speed feed

Check that the remote I/O device for the speed feed is ON.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RX23
CC-Link IE Field Network	RX33

2. Setting speed command

Set the speed command in the remote register device. When the setting frequency is 60 Hz, set "6000" in the following remote register devices.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RWwn+1
CC-Link IE Field Network	RWwn+0

3. Inputting frequency setting command (RAM)

Turn ON the remote I/O device for the frequency setting command (RAM) to write the command to the inverter RAM.

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RYD
CC-Link IE Field Network	RY21

4. Checking frequency writing complete

Check that the remote I/O device for the frequency setting complete (RAM) is ON and the remote register device of the reply code is "0".

- Frequency setting completion (RAM)

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RXD
CC-Link IE Field Network	RX21

- Reply code

Communication	Device No.
CC-Link, CC-Link IE Field Network Basic	RWrn+2
CC-Link IE Field Network	RWrn+0

5. Inputting start command

Turn ON the remote I/O device for the start command (forward rotation / reverse rotation).

When the start command is input, Brake opening request (BOF) signal turns ON and the motor starts to accelerate to the set frequency. The settings of the parameters for the acceleration/deceleration pattern selection in the full-closed control (**Pr.7, Pr.8, Pr.516, Pr.517, Pr.110, Pr.111, Pr.753, Pr.754,** and **Pr.1140 to Pr.1143**) are used as the acceleration/deceleration time and S-curve time during acceleration/deceleration.

Start command	Device No.
Forward rotation command (STF signal)	RY0
Reverse rotation command (STR signal)	RY1

6. Turning OFF start command

When the remote I/O device for the start command (forward rotation / reverse rotation) is turned OFF, the crane decelerates to stop and the BOF signal turns OFF.

6.4 Inverter-to-inverter link function (Ethernet model)

The inverter-to-inverter link function enables communication between multiple inverters (Ethernet models) connected by Ethernet in a small-scale system.

The inverter-to-inverter link function is enabled by simply setting **Pr.1124 Station number in inverter-to-inverter link** and **Pr.1125 Number of inverters in inverter-to-inverter link system**.

Pr.	Name	Initial value	Setting range	Description	
1123 **N680**[*1]	**Inverter-to-inverter link mode selection**	0	0	After the scan by the PLC function is complete, communication with the slave is started using unicast transmissions.	
			110	AWH dedicated inverter-to-inverter link function group 1	Data is transmitted to the slave using broadcast transmissions (multi-axis synchronous control). Two systems can be configured for the inverter-to-inverter link function in the same network.
			111	AWH dedicated inverter-to-inverter link function group 2	
1124 **N681**[*1]	**Station number in inverter-to-inverter link**	9999	0 to 5	Set the station number for the inverter-to-inverter link function.	
			9999	Inverter-to-inverter link function disabled	
1125 **N682**[*1]	**Number of inverters in inverter-to-inverter link system**	2	2 to 6	Set the total number of inverters used for the inverter-to-inverter link function.	

*1 The setting is applied after an inverter reset or next power-ON.

◆ Communication specifications

Item		Description	
		Unicast	AWH dedicated inverter-to-inverter link function (broadcast)
Transmission speed		100 Mbps (Do not use the function at 10 Mbps.)	
Transmission type		Unicast or broadcast	
Number of connectable units		Master: 1 Slave: up to 5	Master: up to 2 Slave: up to 5 for a master (10 in total)
Topology		Star	
Maximum number of links per station	Output device	16 (2 bytes)	—
	Special register	8 (16 bytes)	—

- In unicast transmissions, I/O devices and special registers are sent/received using the PLC function. Inverters can be used for various applications by creating a sequence program.
- The AWH dedicated inverter-to-inverter link function enables sending/receiving of data for multi-axis operation without relying on the PLC function.
  When the AWH dedicated inverter-to-inverter link function is used, the inverter-to-inverter link function using the PLC function is not available although the PLC function itself is available.

◆ Communication setting

- Use **Pr.1123 Inverter-to-inverter link mode selection** to select the transmission type. Setting **Pr.1123** = "110 or 111" enables multi-axis synchronous control.
- Use **Pr.1124** to set the station number.
- Set the total number of inverters including the master station used for the inverter-to-inverter link function in **Pr.1125**.

NOTE

- When the **Pr.1123** settings are different between the master station and the slave station, the link cannot be established during initial communication.
- When master stations using broadcast transmissions or a master station using unicast transmissions and a master station using broadcast transmissions are connected after the link is established, the communication continues without the stations disconnected from the network.
- In a group of inverters with the same **Pr.1123** settings, assign a unique station number to each station. (If different stations have the same station number, the communication cannot be performed properly.)
- Set consecutive numbers for the station numbers. (Do not skip any numbers like 1, 2, then 4.)
- When **Pr.1124** is set to a value equal to or greater than the value set in **Pr.1125**, normal communication is not available.
- Use the Inverter-to-inverter linkup (LNK) signal to check that the master-slave communication is established.

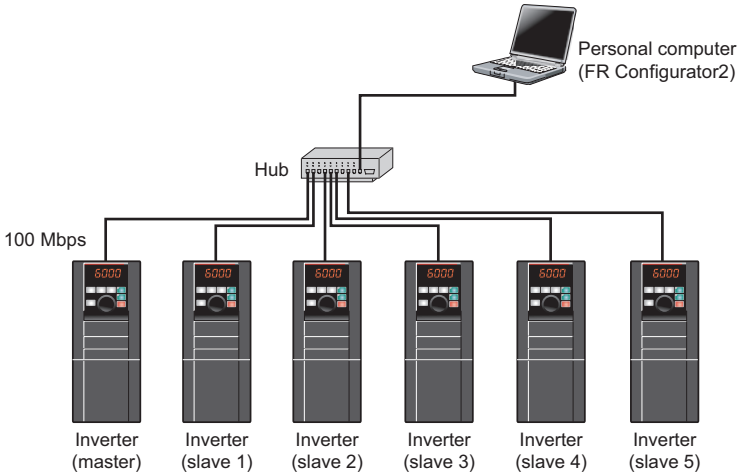
◆ Unicast transmissions

■ Setting procedure

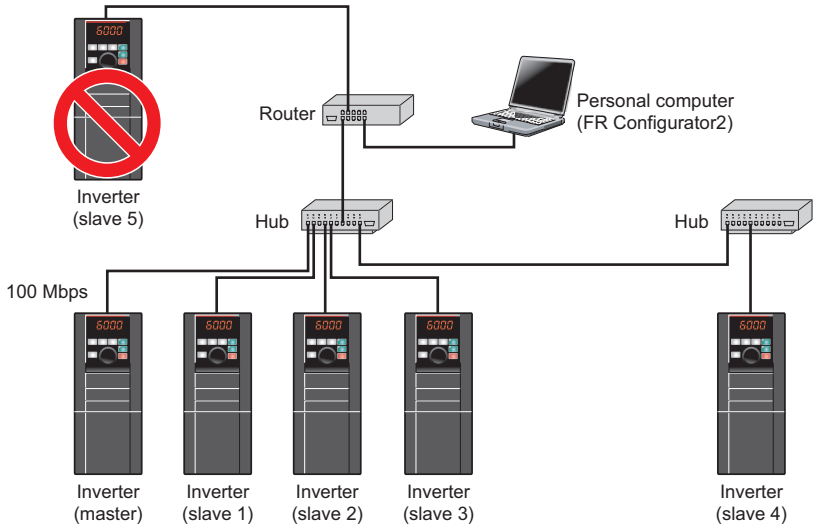
1. Set a value other than "0" in **Pr.414 PLC function operation selection** of both the master station and the slave station to enable the PLC function. Then turn ON the SQ signal. (For details on the PLC function, refer to the PLC Function Programming Manual and the Instruction Manual of FR Configurator2.)
2. To set the inverter as the master, set "0" in **Pr.1124 Station number in inverter-to-inverter link**, and to set the inverter as a slave, select a station number from 1 to 5 and set the number in **Pr.1124**.
3. Set the total number of inverters used for the inverter-to-inverter link function in **Pr.1125 Number of inverters in inverter-to-inverter link system** of the master station. For example, set "3" in **Pr.1125** when two slave inverters and the master inverter are used.
4. Perform an inverter reset.
5. Use FR Configurator2 to write sequence programs to the master and slave inverters. (For details on FR Configurator2, refer to the Instruction Manual of FR Configurator2.)

■ System configuration

- The following shows the system configuration for using the inverter-to-inverter link function. The master inverter can communicate with the slave inverters through hubs (refer to the description of **Pr.1124** for the master/slave setting).



- Up to two hubs can be connected. Communication using the inverter-to-inverter link function is not available for the inverters connected beyond the router.



■ Device map

The following shows the I/O devices and special registers used for the inverter-to-inverter link function. (For details on the other I/O devices and special registers, refer to the PLC Function Programming Manual.)

- I/O device map (master)

Device No.	Name	Device No.	Name
X40 to X4F	Inverter-to-inverter link input (from slave 1 to master)	Y40 to Y4F	Inverter-to-inverter link output (from master to slave 1)
X50 to X5F	Inverter-to-inverter link input (from slave 2 to master)	Y50 to Y5F	Inverter-to-inverter link output (from master to slave 2)
X60 to X6F	Inverter-to-inverter link input (from slave 3 to master)	Y60 to Y6F	Inverter-to-inverter link output (from master to slave 3)
X70 to X7F	Inverter-to-inverter link input (from slave 4 to master)	Y70 to Y7F	Inverter-to-inverter link output (from master to slave 4)
X80 to X8F	Inverter-to-inverter link input (from slave 5 to master)	Y80 to Y8F	Inverter-to-inverter link output (from master to slave 5)

- I/O device map (slave)

Device No.	Name	Device No.	Name
X40 to X4F	Inverter-to-inverter link input (from master to slave)	Y40 to Y4F	Inverter-to-inverter link output (from slave to master)

- Special register (common)

<table>
<tr><th>Device No.</th><th>Name</th><th>Description</th></tr>
<tr><td>SD1460</td><td>Station number in inverter-to-inverter link</td><td>The station number in the inverter-to-inverter link is stored.
b15 b8 b7 b0
Reserved (H00) | Station No.
<table><tr><th>Value</th><th>Station No.</th></tr><tr><td>H00</td><td>Master</td></tr><tr><td>H01</td><td>Slave 1</td></tr><tr><td>H02</td><td>Slave 2</td></tr><tr><td>H03</td><td>Slave 3</td></tr><tr><td>H04</td><td>Slave 4</td></tr><tr><td>H05</td><td>Slave 5</td></tr></table></td></tr>
<tr><td>SD1461</td><td>Communication status of inverter-to-inverter link</td><td>The communication status of the slaves in the inverter-to-inverter link is stored. (In the slave inverter, only its own communication status is indicated.)
b15 b5 b4 b0
<table><tr><th>Bit</th><th>Target station</th><th>Description</th></tr><tr><td>0</td><td>Slave 1</td><td rowspan="5">0: The link is not established.
1: The link is established.</td></tr><tr><td>1</td><td>Slave 2</td></tr><tr><td>2</td><td>Slave 3</td></tr><tr><td>3</td><td>Slave 4</td></tr><tr><td>4</td><td>Slave 5</td></tr></table></td></tr>
</table>

- Special register (master)

Device No.	Name	Description
SD1470 to SD1477	Inverter-to-inverter link receive data 1 to 8 (slave 1)	Data 1 to 8 received from slave 1
SD1478 to SD1485	Inverter-to-inverter link send data 1 to 8 (slave 1)	Data 1 to 8 sent to slave 1
SD1486 to SD1493	Inverter-to-inverter link receive data 1 to 8 (slave 2)	Data 1 to 8 received from slave 2
SD1494 to SD1501	Inverter-to-inverter link send data 1 to 8 (slave 2)	Data 1 to 8 sent to slave 2
SD1502 to SD1509	Inverter-to-inverter link receive data 1 to 8 (slave 3)	Data 1 to 8 received from slave 3
SD1510 to SD1517	Inverter-to-inverter link send data 1 to 8 (slave 3)	Data 1 to 8 sent to slave 3
SD1518 to SD1525	Inverter-to-inverter link receive data 1 to 8 (slave 4)	Data 1 to 8 received from slave 4
SD1526 to SD1533	Inverter-to-inverter link send data 1 to 8 (slave 4)	Data 1 to 8 sent to slave 4
SD1534 to SD1541	Inverter-to-inverter link receive data 1 to 8 (slave 5)	Data 1 to 8 received from slave 5
SD1542 to SD1549	Inverter-to-inverter link send data 1 to 8 (slave 5)	Data 1 to 8 sent to slave 5

- Special register (slave)

Device No.	Name	Description
SD1470 to SD1477	Inverter-to-inverter link receive data 1 to 8 (master)	Data 1 to 8 received from master
SD1478 to SD1485	Inverter-to-inverter link send data 1 to 8 (master)	Data 1 to 8 sent to master
SD1486 to SD1549	For manufacturer setting. Do not set.	

◆AWH dedicated inverter-to-inverter link function (broadcast transmission)

■Setting procedure

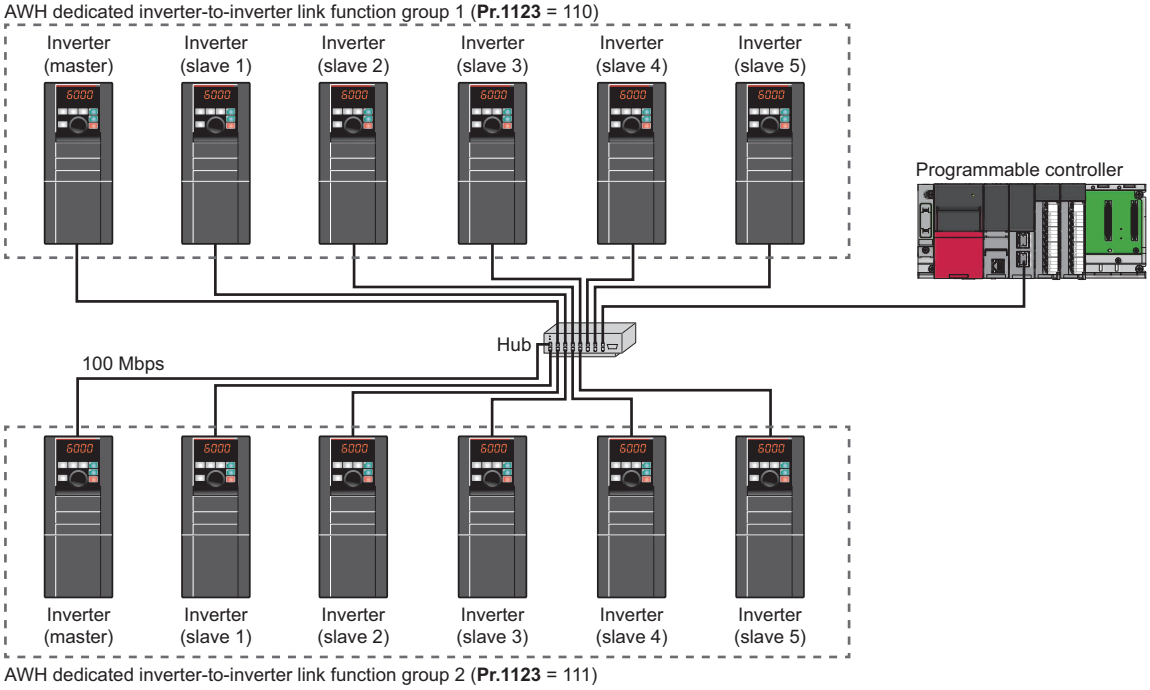
1. Set "110 or 111" in **Pr.1123 Inverter-to-inverter link mode selection**.
2. To set the inverter as the master, set "0" in **Pr.1124 Station number in inverter-to-inverter link**, and to set the inverter as a slave, select a station number from 1 to 5 and set the number in **Pr.1124**.
3. Set the total number of inverters used for the inverter-to-inverter link function in **Pr.1125 Number of inverters in inverter-to-inverter link system** of the master station. For example, set "3" in **Pr.1125** when two slave inverters and the master inverter are used.
4. Perform an inverter reset.
5. Enable multi-axis synchronous control. (Refer to page 90.)

NOTE

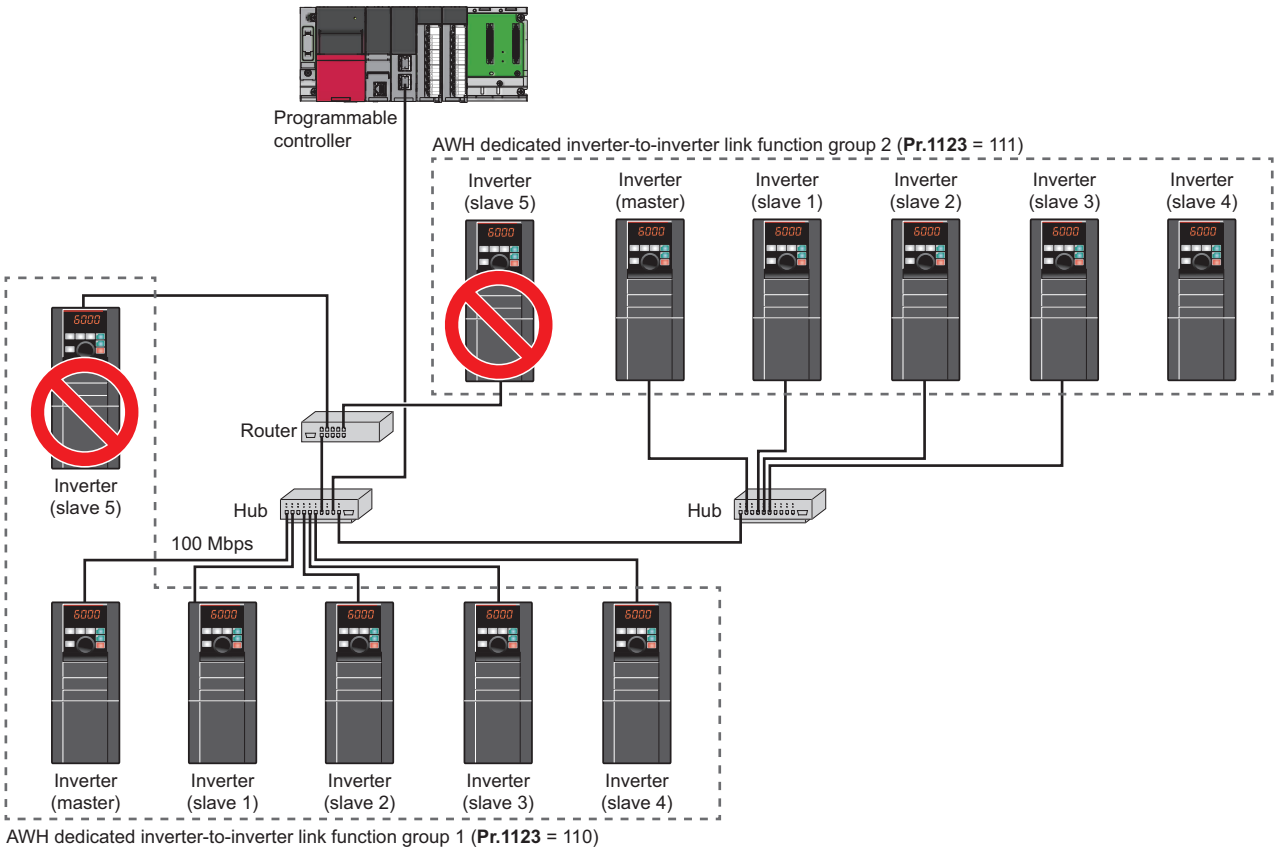
- Data transmission cycle from the master to the slave is about three milliseconds (including the transmission delay).

■ System configuration

- The following shows the system configuration for using the inverter-to-inverter link function. The master inverter can communicate with the slave inverters through hubs (refer to the description of **Pr.1124** for the master/slave setting).

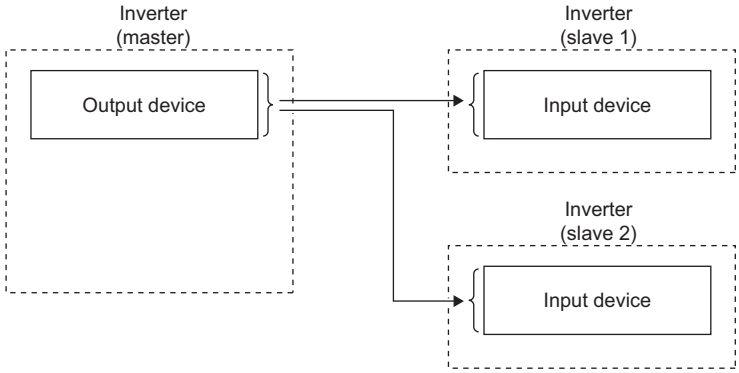


- Up to two hubs can be connected. Communication using the inverter-to-inverter link function is not available for the inverters connected beyond the router.



■ Sent/received data

The data sent/received using the AWH dedicated inverter-to-inverter link function are as follows.



- Data sent from the master station

Name	Description
Output device	Torque current command Speed command (Frequency command after position loop compensation) Current position Actual speed (with sign)

- Data received by the slave

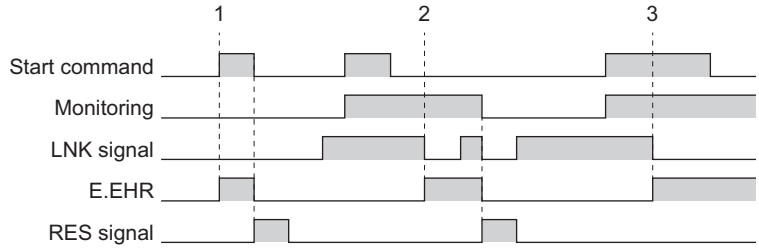
Name	Description
Input device	Torque current command Speed command (Frequency command after position loop compensation) Current position Actual speed (with sign)

◆ Inverter-to-inverter linkup (LNK) signal

- The Inverter-to-inverter linkup (LNK) signal is available to check that the master-slave communication is established.

Master/slave	Signal ON condition	Signal OFF condition
Master station	The inverter receives a response from all the slave inverters during initial communication.	• The inverter does not receive a response from a slave in communication. • The inverter detects a signal loss.
Slave station	The inverter returns a response to the master.	• The inverter does not receive any request from the master. • The inverter detects a signal loss.

- To use the LNK signal, set "242 (positive logic)" or "342 (negative logic)" in any of **Pr.190 to Pr.196 (Output terminal function selection)** to assign the function to the output terminal.
- After enabling the AWH dedicated inverter-to-inverter link function (**Pr.1123** = "110 or 111"), the protective function (E.EHR) is activated when the LNK signal turns OFF after the first start. (When the start command turns ON after inverter reset, the inverter continues monitoring of the LNK signal.)



No.	Description
1	E.EHR is activated as the initial start command turns ON while the LNK signal is OFF.
2	E.EHR is activated as the LNK signal turns OFF after the first start (while the start command is OFF).
3	E.EHR is activated as the LNK signal turns OFF after the first start (while the start command is ON).

Operation panel indication	E.EHR		FR-LU08 indication	—
Name	Ethernet communication fault (Data code: 231 (HE7))*1			
Description	• Appears when Ethernet communication is interrupted by physical factors while **Pr.1431 Ethernet signal loss detection function selection** = "3". • The inverter output is shut off if Ethernet communication is interrupted for the time set in **Pr.1432 Ethernet communication check time interval** or longer for all devices with IP addresses in the range specified for Ethernet command source selection (**Pr.1449 to Pr.1454**). • The inverter output is shut off when excessive noise occurs around the inverter. • When the AWH dedicated inverter-to-inverter link function is enabled, the inverter output is shut off when the LNK signal turns OFF after the first start.			
Check point	• Check that the Ethernet board is connected into the connector securely. • Check for a break in the Ethernet cable. • Check that the **Pr.1432** setting is not too short. • Check for excessive noise around the inverter. • When the AWH dedicated inverter-to-inverter link function is enabled, check that the LNK signal is ON.			
Corrective action	• Connect the Ethernet board securely. • Check that the Ethernet cable is connected to the Ethernet connector properly and the Ethernet cable is not damaged. • Set a larger value in **Pr.1432**. • When excessive noise occurs around the inverter, change the communication setting of the master. (The noise may be reduced by setting a shorter timeout period or increasing the number of retries in the communication setting of the master.) • When the AWH dedicated inverter-to-inverter link function is enabled, turn ON the LNK signal.			

*1 The data code is used for checking the fault detail via communication or with **Pr.997 Fault initiation**. (Refer to the FR-A800 Instruction Manual (Detailed).)

NOTE

- Changing the terminal assignment using **Pr.190 to Pr.196 (Output terminal function selection)** may affect the other functions. Set parameters after confirming the function of each terminal.
- To turn OFF the control power of the inverters when using the AWH dedicated inverter-to-inverter link function, simultaneously turn OFF the control power for the inverters for which the AWH dedicated inverter-to-inverter link communication is performed. (E.EHR may occur when timing to turn OFF the control power differs after the first start.)
- If E.EHR occurs except when the inverter-to-inverter link function is used, refer to the Ethernet Function Manual to take corrective actions.

◆ Troubleshooting

Condition	Possible cause	Countermeasure
Communication is not established.	The same station number is assigned to multiple inverters.	Set **Pr.1124** correctly.
	The station numbers are not consecutive.	Set **Pr.1124** so that the station numbers are consecutive.
	The specified number of inverters in the system is not correct. (**Pr.1124** is set to a value equal to or greater than the value set in **Pr.1125**.)	Set **Pr.1125** correctly.
	The connection is half-duplex.	Use full-duplex connection. (When **Pr.1426 Link speed and duplex mode selection** = "0 (initial value)", check that the hub and the Ethernet cable are compatible with full-duplex connection.)
	The inverter is not reset after **Pr.1124** and **Pr.1125** are set.	Reset the inverter.
A command sent by the master is not applied to a slave.	The PLC function is disabled (for unicast transmissions).	Set a value other than "0" in **Pr.414** to enable the PLC function.

7 PARAMETERS FOR LOGISTICS/TRANSPORT FUNCTIONS

This chapter explains the monitoring and I/O signals for logistics/transport dedicated functions.

7.1 Monitoring of logistics/transport dedicated functions

The monitor item can be changed to the crane speed and the system failure codes.

7.1.1 Monitoring on the operation panel or via communication

- Use **Pr.52, Pr.774 to Pr.776, or Pr.992** to select the item to monitor on the operation panel or the parameter unit.
- Refer to the following table and select the item to be monitored. The value in the Pr. setting column is set in each of the parameters for monitoring (**Pr.52, Pr.774 to Pr.776, and Pr.992**) to determine the monitor item. The value in the RS-485 column is used for the RS-485 communication special monitor selection. The value in the MODBUS RTU column is used for the MODBUS RTU real time monitor. The circle in the Minus sign column denotes the minus sign can be displayed.

Monitor item	Unit	Pr. setting	RS-485	MODBUS RTU	Minus sign[*1]	Description	Refer to page
Crane position data compensation total count	1	39	H27	40239		Display the total number of the crane position data compensations from when the start command is ON until when the start command is ON next time.	71
Speed command (Frequency command after position loop compensation)	0.01 Hz	52	H34	40252	○[*2]	Display the total frequency of the speed compensation amount of the position loop and the model speed command.[*3]	67
Distance meter fault code	1	54	H36	40254		Display the distance meter fault code.	110
Crane speed	0.1 m/min	67	H43	40267	○[*2]	Display the crane speed compensated using **Pr.396 Crane speed detection filter** under full-closed control.[*3]	101
Model speed	0.01 Hz	81	H51	40281	○[*2]	Display the model speed command value calculated from the travel distance, set frequency, acceleration/deceleration time, and S-curve time.[*3]	74
Speed command (Speed command created to output)	0.01 Hz	91	H5B	40291	○[*2]	Display the speed command value calculated from the travel distance, set frequency, acceleration/deceleration time, and S-curve time.[*3]	—
Speed command (Frequency command after droop compensation)	0.01 Hz	92	H5C	40292	○[*2]	Display the total frequency of the frequency command after position loop compensation and the droop compensation amount.[*3]	—[*5]
Position command (lower)	0.1 mm	93	H5D	40293		Display the position command (lower).[*4]	67
Position command (upper)	1 m	94	H5E	40294		Display the position command (upper).[*4]	67
Current position (lower)	0.1 mm	95	H5F	40295		Display the current position (lower).	67
Current position (upper)	1 m	96	H60	40296		Display the current position (upper).	67

Monitor item	Unit	Pr. setting	RS-485	MODBUS RTU	Minus sign*1	Description	Refer to page
System failure code	1	97	H61	40297		Display the system failure code.	101

*1 Indication with a minus sign is not possible via RS-485 or MODBUS RTU communication.
*2 To enable display with a minus sign, set **Pr.290 Monitor negative output selection**. (For details on **Pr.290**, refer to the FR-A800 Instruction Manual (Detailed).)
*3 "0" is displayed when the full-closed control is disabled.
*4 "0" is displayed when the position feed is disabled or the inverter is stopped.
*5 For details on the droop control, refer to the FR-A800 Instruction Manual (Detailed).

7.1.2 Monitoring using analog output (terminals FM/CA and AM)

- Set **Pr.54 FM/CA terminal function selection** for monitoring via terminal FM (pulse train output) or terminal CA (analog current output).
- Set the type of monitor to be output through terminal AM (analog voltage output) in **Pr.158 AM terminal function selection**. Negative signals can be output via terminal AM (in the range of -10 to +10 VDC).
- The circle in the Negative output column indicates that the output of negative signals is available via terminal AM.
- Refer to the following table and select the item to be monitored.

Monitor item	Increment and unit	Pr.54 (FM/CA), Pr.158 (AM) setting	Terminal FM, CA, AM full-scale value	Negative output*1	Refer to page
Speed command (Frequency command after position loop compensation)	0.01 Hz	52	**Pr.55**	○	67
Crane speed	0.1 m/min	67	*2	○	101
Model speed	0.01 Hz	81	**Pr.55**	○	74
Speed command (Speed command created to output)	0.01 Hz	91	**Pr.55**	○	—
Speed command (Frequency command after droop compensation)	0.01 Hz	92	**Pr.55**	○	—*3

*1 To enable display with a minus sign, set **Pr.290 Monitor negative output selection**. (For details on **Pr.290**, refer to the FR-A800 Instruction Manual (Detailed).)
*2 The full-scale value is calculated by the following formula.
Full scale value = **Pr.55 Frequency monitoring reference** × **Pr.100 Reference travel speed** / **Pr.20 Acceleration/deceleration reference frequency**
*3 For details on the droop control, refer to the FR-A800 Instruction Manual (Detailed).

7.1.3 Monitoring using the PLC function / FR Configurator2

Monitor item	PLC function device No.	FR Configurator2 graph function		
		Monitor mode	High speed mode / trace	Trigger level reference
Motor torque (with sign)	SD1350	—	—	—
Torque command (with sign)	SD1351	—	—	—
Torque current command (with sign)	SD1352	—	—	—
Crane position data compensation total count	SD1183	○	—	—
Speed command (Frequency command after position loop compensation)	SD1199	○*1	○*1	*2
Distance meter fault code	SD1201	○	—	—
Crane speed	SD1213	○*1	○*1	*2
Model speed	SD1228	○*1	○*1	*2
Speed command (Speed command created to output)	SD1212	○*1	○*1	*2
Speed command (Frequency command after droop compensation)	SD1202	○*1	○*1	*2
Position command (lower)	SD1203	—	○*1	10000 (0.1 mm)

Monitor item	PLC function device No.	FR Configurator2 graph function		
		Monitor mode	High speed mode / trace	Trigger level reference
Position command (upper)	SD1204	—	○*1	100 (m)
Current position (lower)	SD1222	—	○*1	10000 (0.1 mm)
Current position (upper)	SD1223	—	○*1	100 (m)
System failure code	SD1211	○	—	—

○: Monitoring is available.

*1 Minus signed values can be output. To enable display with a minus sign, set **Pr.290 Monitor negative output selection**. (For details on **Pr.290**, refer to the FR-A800 Instruction Manual (Detailed).)

*2 The terminal CA/FM or AM full-scale value is used as the trigger level reference.

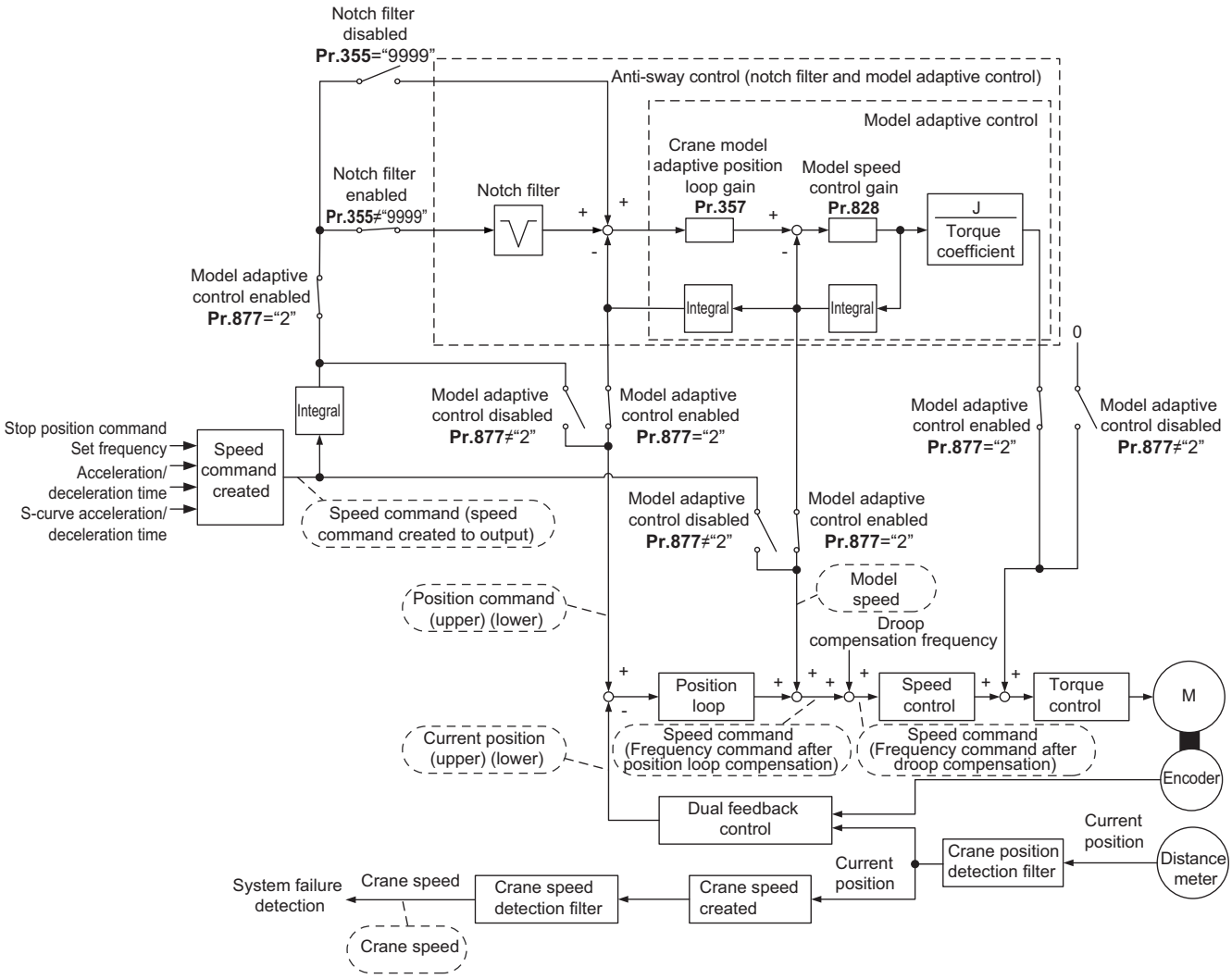
NOTE

- For details on using FR Configurator2 for FR-A800-AWH inverters, refer to the FR Configurator2 Instruction Manual.

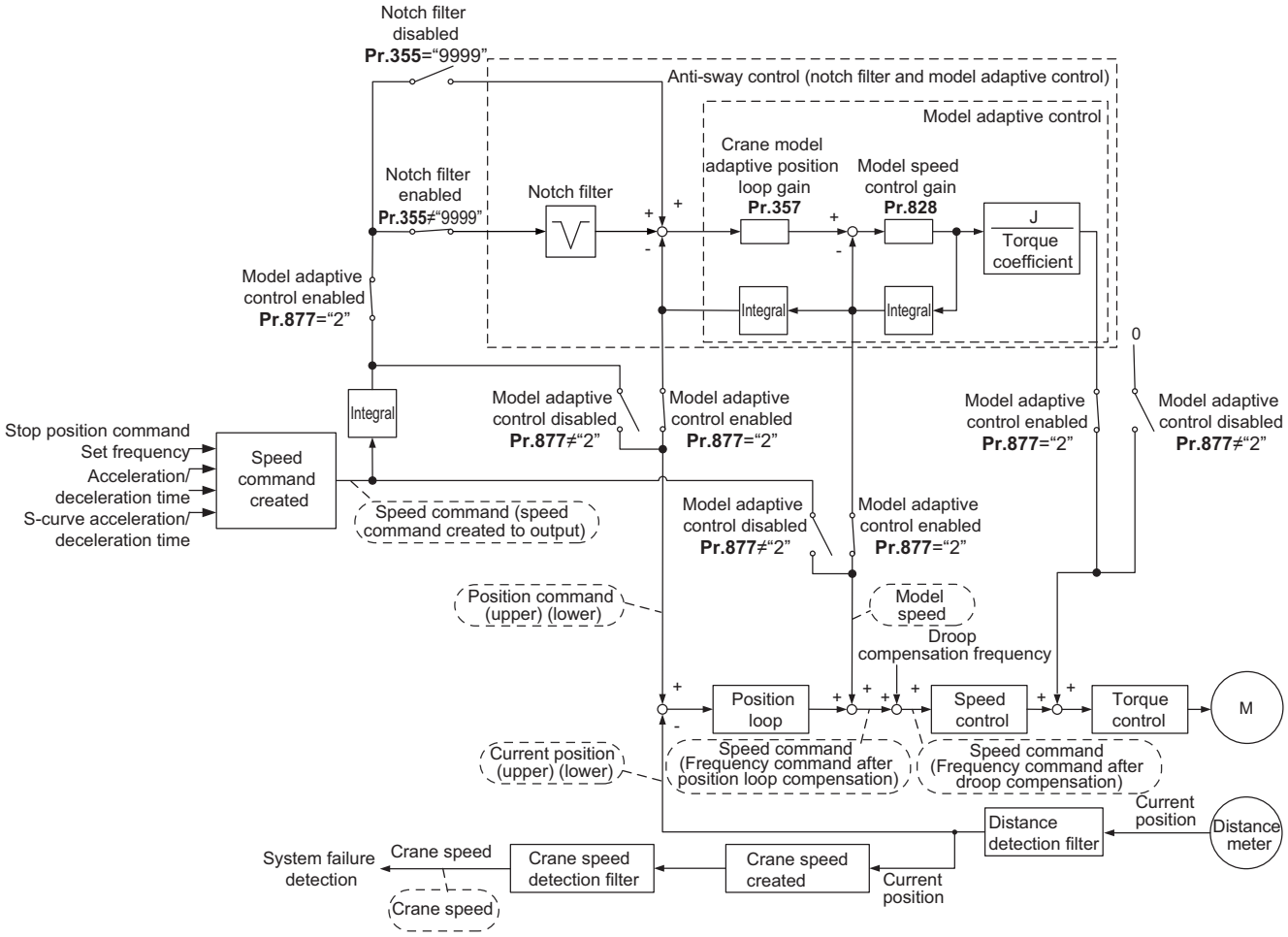
7.1.4 Schematic diagram of monitoring

The following diagram shows the operation timing to display each monitor item.

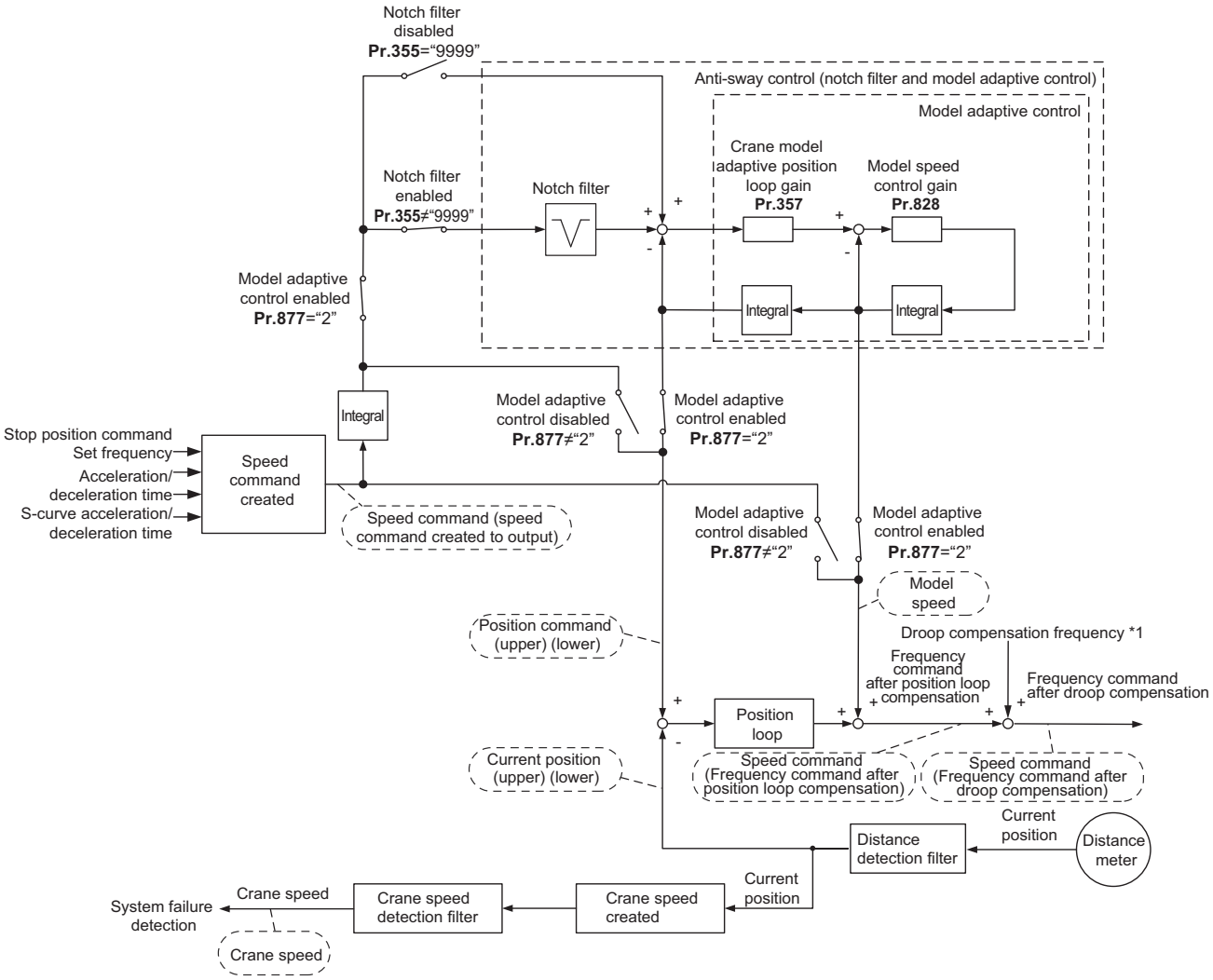
- Vector control



- Real sensorless vector control



• V/F control, Advanced magnetic flux vector control



*1 Droop control is disabled under V/F control. The droop compensation frequency is 0 Hz.

7.2 I/O signals for logistics/transport functions

7.2.1 Input signal

The input signals can be assigned to input terminals by setting **Pr.178 to Pr.189 (Input terminal function selection)**.

◆ Input signal list

Pr.178 to Pr.189 setting	Signal		Description	Refer to page
107	Limit dog	X107	Used to select the availability of the limit dog detection (limit dog detection 1).	112
108	Fork selecting	X108	Used to select the operation mode between the full-closed control and the fork control.	44
109	Position feed / speed feed switching	X109	Used to select the operation mode between the position feed and the speed feed.	46
110	Acceleration/deceleration pattern selection under full-closed control	X110	Used to select the acceleration/deceleration time setting under full-closed control.	50
111	Crane emergency stop	X111	The emergency stop (system failure) is detected when the X111 signal turns ON.	113
112	Limit dog 2	X112	Used to select the availability of the limit dog detection (limit dog detection 2).	112
113	A800-AWH mode selection	X113	Used to select the operation mode between the A800-AWH mode and the standard mode.	43

◆ List of input signals with validity status by operation mode

Pr.178 to Pr.189 setting	Signal		Position feed	Speed feed	Fork control	Standard mode
107	Limit dog	X107	○	○*1	—	—
108	Fork selecting	X108	○	○	○	—
109	Position feed / speed feed switching	X109	○	○	—	—
110	Acceleration/deceleration pattern selection under full-closed control	X110	○	○	—	—
111	Crane emergency stop	X111	○	○	○	—
112	Limit dog 2	X112	○	○*1	—	—
113	A800-AWH mode selection	X113	○	○	○	○

○: Valid, —: Invalid

*1 Use **Pr.397** to select the availability of the failure detection. (Refer to page 89.)

NOTE

- Ensure safe operation before assigning the input signals to the input terminals. Refer to the configuration example of a stacker crane (on page 5) and wiring examples (on page 7) as required.

7.2.2 Output signal

The output signals can be assigned to output terminals by setting **Pr.190 to Pr.196 (Output terminal function selection)**. The output signals are written in the special relay on the sequence program by assigning the signals to **Pr.313 to Pr.319 DO0 output selection to DO6 output selection, Pr.320 to Pr.322 RA1 output selection to RA3 output selection**.

◆ Output signal list

Pr.190 to Pr.196 and Pr.313 to Pr.322 settings		Signal		Description	Refer to page
Positive logic	Negative logic				
20	120	Brake opening request	BOF	Turns ON when the estimated magnetic flux value reaches the specified value in the inverter after the LX signal or the start signal is turned ON.	52
231	331	System failure	Y231	Turns ON when system failure is detected.	102
233	333	Crane position detection level notification	Y233	Turns ON when the current position reaches a point in the range between the point calculated by adding the distance set in **Pr.130** to the target stop position value and the point calculated by subtracting the distance set in **Pr.130** from the target stop position.	71
234	334	Crane in-position notification	Y234	Turns ON when the position feed operation is complete. The signal is output regardless of whether the position feed succeeds or fails. This signal can be used as a guide for turning OFF the start command in the host controller. This signal is output when any of the following conditions is satisfied while the speed command value is decreased to 0 Hz, the start signal is ON, and position feed control is selected. • The current position reaches the specified distance (set in **Pr.104 Crane in-position width**) away from the target stop position value or the stop position when position feed is interrupted*1 (under Vector control). • The BOF signal turns OFF during operation (when the BOF signal is assigned to a terminal). • Position loop gain is set to 0.	71
235	335	Crane out-of-position	Y235	Turns ON when the current position after the Y234 signal turns ON is out of the range specified for the Y234 signal after the time period set in **Pr.127 Crane in-position time** has elapsed.	71
236	336	Crane in-position	Y236	Turns ON when the current position after the Y234 signal turns ON is within the range specified for the Y234 signal until the time period set in **Pr.127** has elapsed.	71

*1 Interruption by deceleration stop due to a system failure or by turning OFF the start signal during position feed

◆ List of input signals with validity status by operation mode

Pr.190 to Pr.196 and Pr.313 to Pr.322 settings		Signal		Position feed	Speed feed	Fork control	Standard mode
Positive logic	Negative logic						
20	120	Brake opening request	BOF	○*1	○*1	—	—
231	331	System failure	Y231	○	○	○	—
233	333	Crane position detection level notification	Y233	○	—	—	—
234	334	Crane in-position notification	Y234	○	—	—	—
235	335	Crane out-of-position	Y235	○	—	—	—
236	336	Crane in-position	Y236	○	—	—	—

○: Valid, —: Invalid

*1 Invalid during the full-closed control test operation.

NOTE

- Ensure safe operation before assigning the output signals to the output terminals. Refer to the configuration example of a stacker crane (on page 5) and wiring examples (on page 7) as required.
- The Inverter operation ready (RY) signal and the Operation ready 2 (RY2) signal can be turned ON in A800-AWH mode when all the following conditions are satisfied. (For the other conditions, refer to the FR-A800 Instruction Manual (Detailed).

Operation mode	Condition
Position feed	• The stop position command has been written at least once after an inverter reset. • No system failure occurred.
Speed feed	No system failure was detected.
Fork control	No system failure was detected.

7.3 Operation command source and speed command source (Pr.338, Pr.339)

The following shows the command sources of the logistics/transport dedicated input signals in the Network operation mode.

Pr.	Name	Initial value	Setting range	Description
338 **D010**	**Communication operation command source**	0	0	Start command source is communication.
			1	For manufacturer setting. Do not use.
339 **D011**	**Communication speed command source**	0	0	Frequency command source is communication.
			1, 2	For manufacturer setting. Do not use.

Command interface selection		**Pr.338 setting**			**0: NET**	**Remarks**
		Pr.339 setting			**0: NET**	
Fixed function (terminal-equivalent function)		Frequency setting through communication			NET	
		Terminal 2			—	
		Terminal 4			—	
		Terminal 1			Compensation	
Selectable function	**Pr.178 to Pr.189** setting	15	BRI	Brake opening completion	EXT	
		24	MRS	Output stop	Combined	**Pr.79** ≠ "7"
				PU operation interlock	EXT	**Pr.79** = "7". When X12 signal is not assigned.
		92	X92	Emergency stop	EXT	
		107	X107	Limit dog	EXT	
		108	X108	Fork selecting	NET	
		109	X109	Position feed / speed feed switching	NET	
		110	X110	Acceleration/deceleration pattern selection under full-closed control	NET	
		111	X111	Crane emergency stop	NET	
		112	X112	Limit dog 2	EXT	
		113	X113	A800-AWH mode selection	NET	

EXT: Only commands given via the external terminals are valid.

NET: Only commands given via communication are valid.

Combined: Any command given via the external terminal or communication is valid.

—: Any command given via the external terminal or communication is invalid.

Compensation: Only commands given via the external terminal are valid when **Pr.28 Multi-speed input compensation selection** = "1".

NOTE

- For other signals, refer to the FR-A800 Instruction Manual (Detailed).

8 APPENDIX

Appendix provides the reference information for use of this product.
Refer to the information as required.

8.1 Parameter setting

Refer to the following to set parameters for the inverter for traveling to drive the SF-V5RU motor (400 V class 7.5 kW) under Vector control.

8.1.1 Parameter setting procedure

Operating procedure

1. Wiring
   Perform wiring properly.
2. Control method selection
   Select the control method according to the application and the motor.

Pr.	Name	Setting example	Remarks
3	**Base frequency**	50 Hz	60/50 Hz
9	**Electronic thermal O/L relay**	16.3 A	Check the rating plate of the motor.
71	**Applied motor**	3	3: Standard motor 13: Constant-torque motor
80	**Motor capacity**	7.5 kW	Set according to the motor specification.
81	**Number of motor poles**	4	Set according to the motor specification.
83	**Rated motor voltage**	380 V	Set according to the motor specification.
84	**Rated motor frequency**	9999 (initial value)	9999: 50 Hz
800	**Control method selection**	0	0: Vector control (speed control) 20: Advanced magnetic flux vector control
359	**Encoder rotation direction**	1 (initial value)	1: Set when using a motor (encoder) for which forward rotation is counterclockwise (CCW) viewed from the shaft, and when the operation is at 120 Hz or less.
369	**Number of encoder pulses**	1024 (initial value)	Set the number of pulses before it is multiplied by 4.

NOTE

- For the parameter details, refer to the FR-A800 Instruction Manual (Detailed).

3. Offline auto tuning
   Perform offline auto tuning as required.

Pr.	Name	Setting example	Remarks
96	**Auto tuning setting/status**	1 or 101	1: Offline auto tuning (without motor rotation) 101: Offline auto tuning (with motor rotation)

NOTE

- For the necessity or details of the offline auto tuning, refer to the FR-A800 Instruction Manual (Detailed).
- After the offline auto tuning, perform the test run of the motor alone to make sure that no fault is found in the motor's behavior.

4. Checking motor rotation direction and cumulative pulse

Select the PU operation mode and input the forward rotation command and the low-speed operation command, and then check that the motor rotation is stable and the distance feedback value increases by using the cumulative pulse monitor.

If the distance feedback value decreases, check the wiring to the motor and **Pr.359** setting value.

Pr.	Name	Setting example	Remarks
52	**Operation panel main monitor selection**	71	71: Cumulative pulse monitor

5. Assignment of I/O signals

Assign the I/O signals to I/O terminals as required.

Pr.	Name	Device number	Setting example	Remarks
180	**RL terminal function selection**	RYn4	108	108: Fork selecting (X108) signal
181	**RM terminal function selection**	RYn3	109	109: Position feed / speed feed switching (X109) signal
182	**RH terminal function selection**	RYn2	113	113: A800-AWH mode selection (X113) signal
183	**RT terminal function selection**	RYn6	107	107: Limit dog (X107) signal
184	**AU terminal function selection**	RYn7	15	15: Brake opening completion (BRI) signal
185	**JOG terminal function selection**	RYn5	110	110: Acceleration/deceleration pattern selection under full-closed control (X110) signal
186	**CS terminal function selection**	RYn8	111	111: Crane emergency stop (X111) signal
187	**MRS terminal function selection**	RYn9	24	24: Output stop (MRS) signal
188	**STOP terminal function selection**	RYnA	112	112: Limit dog 2 (X112) signal
189	**RES terminal function selection**	RYnB	62	RES: Inverter reset (RES) signal
190	**RUN terminal function selection**	RXn2	231	231: System failure (Y231) signal
191	**SU terminal function selection**	RXn3	233	233: Crane position detection level notification (Y233) signal
192	**IPF terminal function selection**	RXn5	234	234: Crane in-position notification (Y234) signal
193	**OL terminal function selection**	RXn4	235	235: Crane out-of-position (Y235) signal
194	**FU terminal function selection**	RXn6	236	236: Crane in-position (Y236) signal
195	**ABC1 terminal function selection**	RXn7	99	99: Fault (ALM) signal
196	**ABC2 terminal function selection**	RXn8	20	20: Brake opening request (BOF) signal

6. Setting communication parameters for distance meter

Adjust the communication settings for the distance meter and the inverter. When using the DL100Pro, the settings are as follows.

- DL100Pro settings

Item	Setting
Baud Rate	115.2 kbps
Date format	8, e, 1
Protocol	Standard
CntMode	DstSta (Distance + status, continuous)
ResDst	0.1 mm

- Inverter setting

Pr.	Name	Setting example	Remarks
332	**RS-485 communication speed**	1152	1152: 115200 bps
333	**RS-485 communication stop bit length / data length**	0	0: Stop bit length is 1 bit and data length is 8 bits.
334	**RS-485 communication parity check selection**	2 (initial value)	2: Parity check (even parity) is enabled.
549	**Protocol selection**	1021	1021: DL100Pro protocol DstSta (Distance + status) Std
758	**Unit of measurement of distance meter**	1 (initial value)	1: The unit of the distance data sent from the distance meter is 0.1 mm.
335	**RS-485 communication retry count**	1 (initial value)	1: The distance measurement is regarded as faulty when the impermissible data is sent from the distance meter twice consecutively.
336	**RS-485 communication check time interval**	0.1 s	0.1 s: Communication check (signal loss detection) time interval
757	**Distance meter selection**	0	0: Use the data input via RS-485 terminals.

7. Setting of parameters for communication with host controller

Set the parameters for communication with host controller. The parameter settings differ depending on the communication method.

- CC-Link

Pr.	Name	Setting example	Remarks
79	**Operation mode selection**	0 (initial value)	0: The operation mode can be switched between the NET operation mode and the PU operation mode.
338	**Communication operation command source**	0 (initial value)	0: Start command source is communication.
339	**Communication speed command source**	0 (initial value)	0: Frequency command source is communication.
340	**Communication startup mode selection**	10	10: The inverter starts up in the NET operation mode at power-ON.
542	**Communication station number (CC-Link)**	1 (initial value)	Enter the station number of the inverter. (Setting range: 1 to 64)
543	**Baud rate selection (CC-Link)**	0 (initial value)	0: 156 kbps 1: 625 kbps 2: 2.5 Mbps 3: 5 Mbps 4: 10 Mbps
544	**CC-Link extended setting**	2	2: CC-Link Ver.1 (functions dedicated to the logistics/transport compatible (two stations occupied)).

- CC-Link IE Field Network

Pr.	Name	Setting example	Remarks
79	**Operation mode selection**	0 (initial value)	0: The operation mode can be switched between the NET operation mode and the PU operation mode.
338	**Communication operation command source**	0 (initial value)	0: Start command source is communication.
339	**Communication speed command source**	0 (initial value)	0: Frequency command source is communication.
340	**Communication startup mode selection**	10	10: The inverter starts up in the NET operation mode at power-ON.
434	**Network number (CC-Link IE)**	0 (initial value)	Enter the network number. (Setting range: 0 to 255)
435	**Station number (CC-Link IE)**	0 (initial value)	Enter the station number of the inverter. (Setting range: 0 to 255)

- CC-Link IE Field Network Basic

Pr.	Name	Setting example	Remarks
79	**Operation mode selection**	0 (initial value)	0: The operation mode can be switched between the NET operation mode and the PU operation mode.
338	**Communication operation command source**	0 (initial value)	0: Start command source is communication.
339	**Communication speed command source**	0 (initial value)	0: Frequency command source is communication.
340	**Communication startup mode selection**	10	10: The inverter starts up in the NET operation mode at power-ON.
544	**CC-Link extended setting**	2	2: CC-Link Ver.1 (functions dedicated to the logistics/transport compatible (two stations occupied)).

Pr.	Name	Setting example	Remarks
1427	**Ethernet function selection 1**	61450	61450: CC-Link IE Field Network Basic Set "61450" in any parameter from **Pr.1427 to Pr.1429**. (When **Pr.1429** = "61450", an Ethernet communication type distance meter cannot be used.)
1428	**Ethernet function selection 2**	45237 (initial value)	
1429	**Ethernet function selection 3**	10001	10001: For communication with AMS308i (UDP/IP)
1434	**IP address 1 (Ethernet)**	192 (initial value)	Enter the IP address of the inverter to be connected to Ethernet.
1435	**IP address 2 (Ethernet)**	168 (initial value)	
1436	**IP address 3 (Ethernet)**	50 (initial value)	
1437	**IP address 4 (Ethernet)**	1 (initial value)	
1438	**Subnet mask 1**	255 (initial value)	Enter the subnet mask of the network to which the inverter belongs.
1439	**Subnet mask 2**	255 (initial value)	
1440	**Subnet mask 3**	255 (initial value)	
1441	**Subnet mask 4**	0 (initial value)	
1449	**Ethernet command source selection IP address 1**	0 (initial value)	To limit the network devices that send the operation or speed command through the Ethernet network (CC-Link IE Field Network Basic), set the range of IP addresses of the devices.
1450	**Ethernet command source selection IP address 2**	0 (initial value)	
1451	**Ethernet command source selection IP address 3**	0 (initial value)	
1452	**Ethernet command source selection IP address 4**	0 (initial value)	
1453	**Ethernet command source selection IP address 3 range specification**	9999 (initial value)	
1454	**Ethernet command source selection IP address 4 range specification**	9999 (initial value)	

8. Brake sequence settings

Set the parameters for the brake sequence.

NOTE

- **Pr.278 to Pr.280, Pr.283, Pr.351 to Pr.353,** and **Pr.1135** can be set under Real sensorless vector control, Advanced magnetic flux vector control, and V/F control. (Refer to page 52.)

Pr.	Name	Setting example	Remarks
282	**Brake operation frequency**	0.1 Hz	The Brake opening request (BOF) signal turns OFF when the time period set in **Pr.350** has elapsed after the inverter decelerates to the frequency set in **Pr.282**.
350	**Brake operation time at deceleration**	1 s	

9. Operation mode settings

Set the operation mode, the distance measurement direction, and other related settings.

Pr.	Name	Setting example	Remarks
20	**Acceleration/deceleration reference frequency**	60 Hz	Set the reference frequency for the acceleration/deceleration time and the crane travel speed. As acceleration/deceleration time, set the time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.20** and vice versa.
100	**Reference travel speed**	100 m/min	Set the crane travel speed when the operation is at the frequency set in **Pr.20**.
60	**A800-AWH mode selection**	1	1: A800-AWH mode enabled
450	**Second applied motor**	9999	9999: Full-closed control Other than 9999: Fork control
128	**Motion range 1**	0.01 m (initial value)	Set the lower limit (absolute value) of the motion range that can be specified by the stop position command.
129	**Motion range 2**	300 m (initial value)	Set the upper limit (absolute value) of the motion range that can be specified by the stop position command.
131	**Motion range sign selection**	0 (initial value)	0: Lower limit: positive, upper limit: positive 1: Lower limit: negative, upper limit: positive 2: Lower limit: negative, upper limit: negative
132	**Home position (upper digits)**	0 (initial value)	Set a desired home position.
133	**Home position (lower digits)**	0 (initial value)	

Pr.	Name	Setting example	Remarks
112	**Distance measurement direction setting**	0 (initial value)	0: Forward rotation command: The distance data is increased. Reverse rotation command: The distance data is decreased. 1: Forward rotation command: The distance data is decreased. Reverse rotation command: The distance data is increased.
30	**Regenerative function selection**	1	1: Use an external brake resistor.
70	**Special regenerative brake duty**	50	Set the %ED of the built-in brake transistor operation.

10. Limit dog setting

Set the availability of the limit dog detection during the speed feed.

Pr.	Name	Setting example	Remarks
397	**Limit dog operation selection**	1 (initial value)	0: Limit dog detection disabled 1: Limit dog detection enabled

11. Setting of parameters for acceleration/deceleration

Set the parameters for the acceleration/deceleration. The speed command is determined by the stop position and the running frequency set in the host controller, and the acceleration/deceleration time and the creep speed described in the following table.

Pr.	Name	Setting example	Remarks
7	**Acceleration time**	5 s/15 s	Set the crane acceleration time (time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.100**).
8	**Deceleration time**	5 s/15 s	Set the crane deceleration time (time required to change the frequency from the frequency set in **Pr.100** to stop status (0 Hz)).
516	**S-curve acceleration time**	1 s	Set the time required for acceleration (S-pattern) of S-pattern acceleration/deceleration.
517	**S-curve deceleration time**	1 s	
110	**Third acceleration/ deceleration time**	4 s	Set the acceleration/deceleration time when the X110 signal is ON.
111	**Third deceleration time**	9999 (initial value)	0 to 3600 s: Set the deceleration time when the X110 signal is ON.
753	**Third S-curve acceleration time**	0.5 s	Set the third S-curve acceleration time when the X110 signal is ON.
754	**Third S-curve deceleration time**	0.5 s	Set the third S-curve deceleration time when the X110 signal is ON.
1140	**Speed feed acceleration time**	3 s	Set the acceleration time (time required to change the frequency from stop status (0 Hz) to the frequency set in **Pr.100**) when the speed feed is selected.
1141	**Speed feed deceleration time**	9999 (initial value)	0 to 3600 s: Set the deceleration time (time required to change the frequency from the frequency set in **Pr.100** to stop status (0 Hz)) when the speed feed is selected.
1142	**Speed feed S-curve acceleration time**	0.2 s	Set the S-curve acceleration time when the speed feed is selected.
1143	**Speed feed S-curve deceleration time**	0.2 s	Set the S-curve deceleration time when the speed feed is selected.
395	**Deceleration time after system failure detection**	2 s	Set the deceleration time when a system failure is detected.
609	**S-curve time after system failure detection**	9999 (initial value)	0.1 to 2.5 s: Set the S-curve deceleration time when a system failure occurs.
610	**Deceleration stop operation selection after system failure detection**	1	0: S-curve deceleration 1: Linear deceleration
31	**Crane creep speed**	0 Hz (initial value)	Set the crane creep speed.
32	**Travel distance at creep speed**	0 mm (initial value)	Set the travel distance at creep speed.

12. Checking mechanical specifications

Check the following points to ensure that the inverter settings are consistent with the mechanical specifications.

- The crane travels according to the **Pr.100** setting. (This can be checked by the monitoring of the crane speed.)
- The distance data increases/decreases correctly when the forward rotation command is input.
- The crane is stopped correctly by the right and left dogs when the low-speed operation command is input.

8.1.2 Adjustment parameter

The following explains the adjustment parameters for the full-closed control. Change the following parameter settings according to the system as required.

◆ Speed feed

- Adjustment of speed loop gain

Pr.	Name	Setting example	Remarks
820	**Speed control P gain 1**	60% (initial value)	Set a larger value when the trackability of the crane is poor. Set a smaller value when the machine vibration is strong.
821	**Speed control integral time 1**	0.333 s (initial value)	Set a smaller value when the trackability of the crane is poor. Set a larger value when the overshoot is large.

- Adjustment of parameters for S-curve acceleration/deceleration

Pr.	Name	Setting example	Remarks
516	**S-curve acceleration time**	0.1 s (initial value)	Set a smaller value when the crane traveling time is long.
517	**S-curve deceleration time**	0.1 s (initial value)	Set a smaller value when the crane traveling time is long.

- Adjustment of parameters for model adaptive control and anti-sway control

Pr.	Name	Setting example	Remarks
877	**Speed feed forward control/ model adaptive speed control selection**	2	Set a larger value when the value measured by the distance meter is unstable and the crane travels unstably, or when the machine vibration is strong.
880	**Load inertia ratio**	*1	Set the load inertia ratio.
707	**Motor inertia (integer)**	*1	Set the motor inertia.
724	**Motor inertia (exponent)**	*1	
355	**Crane vibration suppression frequency**	*2	0.1 to 10 Hz: The notch filter is activated according to the setting value.
356	**Crane vibration suppression gain**	100%	When setting a larger value, the sensibility of the notch filter becomes higher.

*1 Differs depending on the applied motor.

*2 Differs depending on the vibration cycle. The vibration cycle is obtained using the swing of the crane when it stops which is measured by the variation cycle of the torque current.

◆ Position feed

- Adjustment of maximum amount of crane position loop compensation

Pr.	Name	Setting example	Remarks
114	**Compensation rate of crane position loop upper limit**	9999 (initial value)	Used to change the limit of the position loop compensation amount to use different speed ranges for the low-speed range and the high-speed range. Compare the **Pr.115** setting value and the speed command value multiplied by the **Pr.114** setting value, and the larger of the two is used as the limit value of the crane position loop compensation amount.
115	**Compensation frequency of low-speed range crane position loop upper limit**	3 Hz	Set a small value in **Pr.115** first, and then increase the setting value gradually. Set a larger value in **Pr.820** when the trackability of the crane is poor.

- Adjustment of crane position loop gain

Pr.	Name	Setting example	Remarks
105	**Crane position loop P gain 1**	0.1 s^{-1}	Set a larger value when the trackability of the crane is poor. Set a smaller value when the motor sound is noisy. Recommended setting value: 0.1 to 0.5 s^{-1}
106	**Crane position loop P gain 2**	9999	Set **Pr.106 to Pr.108** to switch the P gain for the crane position loop in the low-speed range. The P gain 2 for the crane position loop is available when **Pr.106** ≠ "9999".
107	**Crane position loop P gain corner frequency 1**	6 Hz	
108	**Crane position loop P gain corner frequency 2**	12 Hz	
113	**Crane position loop integral time**	0.3 s^{-1}	Set a smaller value when the trackability of the crane is poor. Set a larger value when the overshoot is large or the speed is unstable. These adjustments are effective under V/F control, Advanced magnetic flux vector control, Real sensorless vector control.

8.2 Differences in the functions from the standard inverter

- The following functions of the FR-A800 standard inverter are deleted in the FR-A800-AWH inverter. Parameters, I/O signals, and monitors relative to the deleted functions are also deleted or used differently in the FR-A800-AWH inverter.

Function		Parameter	Input signal[*1]	Output signal[*2]	Monitor[*3]
PM motor control		**Pr.373, Pr.702, Pr.706, Pr.711, Pr.712, Pr.717, Pr.721, Pr.725, Pr.738 to Pr.743, Pr.746, Pr.747, Pr.788, Pr.791, Pr.792, Pr.998, Pr.1002, Pr.1105, Pr.1412, Pr.1413** **Pr.71** setting range change ("330, 333, 334, 8090, 8093, 8094, 9090, 9093, and 9094" are deleted.) **Pr.450** setting range change ("330, 333, 334, 8090, 8093, 8094, 9090, 9093, and 9094" are deleted.)	—	IPM (57)	—
PID control	PID control	**Pr.127 to Pr.134, Pr.553, Pr.554, Pr.575 to Pr.577, Pr.609, Pr.610, Pr.1015, Pr.1134, Pr.1135**	X14 (14) X64 (64) X72 (72)	FDN (14) FUP (15) RL (16) PID (47) Y48 (48) SLEEP (70)	PID set point (52) PID measured value (53) PID deviation (54) PID measured value 2 (67) PID manipulated amount (91)
	Second PID control	**Pr.753 to Pr.758, Pr.1136 to Pr.1149**	X73 (73) X79 (79) X80 (80)	FDN2 (200) FUP2 (201) RL2 (202) PID2 (203) SLEEP2 (204) Y205 (205)	Second PID set point (92) Second PID measured value (93) Second PID deviation (94) Second PID measured value 2 (95) Second PID manipulated amount (96)
	PID Pre-charge function	**Pr.760 to Pr.764**	X77 (77)	Y49 (49) Y51 (51) Y53 (53)	—
	Second PID Pre-charge function	**Pr.765 to Pr.769**	X78 (78)	Y50 (50) Y52 (52) Y54 (54)	—
	PID display unit	**Pr.759, C42 (Pr.934), C43 (Pr.934), C44 (Pr.935), C45 (Pr.935)**	—	—	—
	Dancer control	—	—	—	Dancer main set speed (97)
Position control		**Pr.419 to Pr.421, Pr.423 to Pr.427, Pr.429, Pr.446, Pr.464 to Pr.494, Pr.1220 to Pr.1290, Pr.1292 to Pr.1298** **Pr.451** setting range change ("3 to 5, 13, and 14" are deleted.) **Pr.800** setting range change ("3 to 5, 13, 14" are deleted.)	CLRN (59) NP (68) CLR (69) X76 (76) X87 (87)	Y36 (36) MEND (38) ZA (56) FP (60) PBSY (61) ZP (63) RDY (84)	Position pulse (19) Position command (lower) (26) Position command (upper) (27) Current position (lower) (28) Current position (upper) (29) Droop pulse (lower) (30) Droop pulse (upper) (31) Multi-revolution counter (75)
Orientation function		**Pr.350 to Pr.358, Pr.360 to Pr.366, Pr.393 to Pr.399**	X22 (22)	ORA (27) ORM (28)	Orientation status (22)
Pulse monitor selection		**Pr.430**	—	—	—
Acceleration/deceleration pattern selection		**Pr.29, Pr.140 to Pr.143, Pr.380 to Pr.383**	—	—	—
Frequency jump		**Pr.31 to Pr.36, Pr.552**	—	—	—
Remote function		**Pr.59**	—	—	—
Energy saving control		**Pr.60**	—	—	—
PWM frequency selection		**Pr.72** setting range change ("0, 1, 3 to 5, 7 to 9, 11 to 13, 15, and 25" are deleted.)	—	—	—
Automatic acceleration/ deceleration		**Pr.61 to Pr.64, Pr.292, Pr.293**	—	—	—

Function	Parameter	Input signal[*1]	Output signal[*2]	Monitor[*3]
Adjustable 5 points V/F	**Pr.100 to Pr.109** **Pr.71** setting range change ("2" is deleted.)	—	—	—
Third function selection	**Pr.110 to Pr.116**	X9 (9)	FU3 (6) FB3 (43)	—
Electronic bypass sequence	**Pr.135, Pr.136, Pr.138, Pr.139, Pr.159**	—	MC2 (18) MC3 (19)	—
Self power management	**Pr.137, Pr.248, Pr.254**	94 (X94) 95 (X95) 96 (X96)	17 (MC1)	—
Power failure time deceleration-to-stop function	**Pr.261 to Pr.266, Pr.294 to Pr.668**	—	Y46 (46)	—
Brake sequence control	**Pr.284, Pr.639 to Pr.648, Pr.650, Pr.651**	BRI2 (45)	BOF2 (22)	—
Control method selection (fast-response operation)	**Pr.451** setting range change ("100 to 106, and 110 to 114" are deleted.) **Pr.800** setting range change ("100 to 106, and 110 to 114" are deleted.)	—	—	—
Control mode switchover	**Pr.451** setting range change ("2 and 12" are deleted.) **Pr.800** setting range change ("2 and 12" are deleted.)	MC (26)	—	—
Stop mode selection at communication error	**Pr.502** setting range change ("11 and 12" are deleted.)	—	—	—
Stop frequency function	**Pr.522**	—	—	—
Start-time hold function	**Pr.571**	—	—	—
Traverse function	**Pr.592 to Pr.597**	X37 (37)	—	—
Automatic parameter setting	**Pr.999** setting range change ("1 and 2" are deleted.)	—	—	—
Notch filter	**Pr.1003 to Pr.1005**	—	—	—
Anti-sway control function	**Pr.1072 to Pr.1079**	—	—	—
Writing parameter settings while inverter running (when **Pr.77** = "2")	**Pr.7, Pr.8, Pr.44, and Pr.45** cannot be written.	—	—	—
SSCNET III communication (with FR-A8NS)	**Pr.379, Pr.449, Pr.499**	X85 (85) X88 (88) X89 (89)	—	SSCNET III communication status (39)
Changeover between inverter and high power factor converter (with FR-A8AVP)	**Pr.328**	—	—	—
Parameter information (with FR-LU08 installed)	—	—	—	—

*1 The **Pr.178 to Pr.189 (Input terminal function selection)** setting is shown in the parentheses.
*2 The **Pr.190 to Pr.196 (Output terminal function selection)** setting is shown in the parentheses.
*3 The monitor selection parameter setting is shown in the parentheses.

- When the FR-A800-AWH inverter is operated under full-closed control, the parameters for the acceleration/deceleration time are the same regardless of the status of the Second function selection (RT) signal as follows. (In the fork control mode, the second functions are unavailable even when the RT signal is turned ON.)

Function	RT signal-ON	RT signal-OFF
Acceleration time	**Pr.7, Pr.110**[*1]**, Pr.1140**	
Deceleration time	**Pr.8, Pr.110**[*1]**, Pr.111**[*1]**, Pr.1141**	
S-curve acceleration time	**Pr.516, Pr.753**[*1]**, Pr.1142**	
S-curve deceleration time	**Pr.517, Pr.754**[*1]**, Pr.1143**	

*1 Switch ON/OFF the X110 signal to select the acceleration/deceleration time setting. (refer to page 49).

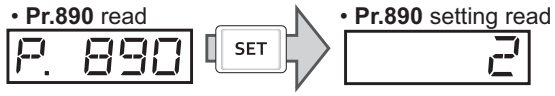
NOTE

- Functions not mentioned above are the same as those of the FR-A800 standard inverter. (The functions added in and after December 2017 are not supported.)
- For details on general specifications, refer to the catalog or Instruction Manual of the FR-A800 inverter.
- The RT signal is assigned to terminal RT in the initial status. Set "3" in any parameter from **Pr.178 to Pr.189 (Input terminal function selection)** to assign the RT signal to another terminal.
- Changing the terminal assignment using **Pr.178 to Pr.189 (Input terminal function selection)** may affect the other functions. Set parameters after confirming the function of each terminal.

8.3 Checking faulty area in the internal storage device

When E.PE6 (Internal storage device fault) occurs, faulty area in the internal storage device can be checked by reading **Pr.890**. When the read value of **Pr.890** is "7" or smaller, an inverter reset after All parameter clear can return the operation to normal. (The parameters that had been changed before All parameter clear must be set again.)

Pr.	Name	Initial value	Setting range	Description
890 **H325**	**Internal storage device status indication**	0	(0 to 511)	A detected faulty area can be indicated in the internal storage device.



- Use the read value of **Pr.890** to check the faulty area.
  The following table shows faulty areas indicated by the read value of **Pr.890**. Some read values indicate that there are multiple faulty areas. (For example, the read value "7" indicates that all the areas described in No. 1 to No. 3 are faulty.)

No.	Read value	Description
1	1, 3, 5, 7	Storage area other than the area for parameter settings is faulty (such as area for the set frequency). (When All parameter clear is performed, the set frequency, host name for Ethernet communication, and offline auto tuning data are cleared.)
2	2, 3, 6, 7	Storage area for standard parameter settings is faulty.
3	4, 5, 6, 7	Storage area for communication parameter settings is faulty.
4	8 to 511	Area for manufacturer setting

- Internal storage device fault

Operation panel indication	**E.PE6**	E. PE6	**FR-LU08 indication**	**Fault**
Description	This protective function is activated by an inverter reset if writing data fails due to power-OFF or a data fault occurs in the storage device during parameter operations[*1].			
Check point	Check if the power was turned OFF during parameter operations.			
Corrective action	Check the power supply or the devices on the power system to check that the devices have no fault. • When E.PE6 occurs due to power-OFF during parameter operations: Check the read value of **Pr.890**. When the value is "7" or smaller, perform All parameter clear and then an inverter reset. The parameters that had been changed before All parameter clear must be set again. • When E.PE6 occurs due to other reason (such as turning OFF/ON the power or an inverter reset) or when the read value of **Pr.890** is "8" or more: Contact your sales representative.			

*1 For example, when parameter clear, All parameter clear, Parameter copy, or offline auto tuning is performed in the inverter, or when parameter batch write is performed in FR Configurator2.

NOTE

- "E.PE6" does not activate the retry function.
- "E.PE6" outputs the Fault output 3 (Y91) signal.
- "E.PE6" turns OFF the Safety monitor output (SAFE) signal.
- "E.PE6" is not cleared by turning ON the Fault clear (X51) signal.
- The communication data code for "E.PE6" is 172 (HAC).

8.4 Compatible options

◆ Plug-in option

The following plug-in options are available in this product.

Name	Model
Vector control	FR-A8AP
Vector control / encoder pulse dividing output	FR-A8AL
Vector control / resolver interface	FR-A8APR
Vector control / EnDat interface	FR-A8APS
SSI communication	FR-A8APS-02
16-bit digital input	FR-A8AX
Digital output / additional analog output	FR-A8AY
Relay output	FR-A8AR
Bipolar analog output / high-resolution analog input / motor thermistor interface	FR-A8AZ
CC-Link communication	FR-A8NC
CC-Link IE Field Network communication	FR-A8NCE
DeviceNet communication	FR-A8ND*2
FL remote communication	FR-A8NF*2
PROFIBUS-DP communication	FR-A8NP*2
EtherCAT communication	A8NECT_2P*1*2
EtherNet/IP communication	A8NEIP_2P*1*2
PROFINET communication	A8NPRT_2P*1*2
PROFIBUS-DP communication (DP-V1)	A8NDPV1*1*2

*1 Manufactured by HMS Industrial Networks AB
*2 Available only when the standard mode is selected.

◆ Control terminal option

The following control terminal options are available in this product.

Name	Model
Vector control	FR-A8TP
Screw terminal block	FR-A8TR

8.5 Common specifications

Control	Control method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, and Vector control[*1]
	Output frequency range		0.2 to 590 Hz (The upper-limit frequency is 400 Hz under Advanced magnetic flux vector control, Real sensorless vector control, and Vector control[*1]. The upper-limit frequency is 200 Hz when the full-closed control is enabled.)
	Frequency setting and resolution	Analog input	0.015 Hz/60 Hz at 0 to 10 V/12 bits (terminals 2 and 4). 0.03 Hz/60 Hz at 0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits (terminals 2 and 4), at 0 to ±10 V/12 bits (terminal 1). 0.06 Hz/60 Hz at 0 to ±5 V/11 bits (terminal 1).
		Digital input	0.01 Hz
	Frequency accuracy	Analog input	Within ±0.2% of the maximum output frequency (25 ±10°C)
		Digital input	Within 0.01% of the set output frequency
	Voltage/frequency characteristics		Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern can be selected.
	Starting torque		SLD rating: 120% 0.3 Hz, LD rating: 150% 0.3 Hz, ND rating: 200%[*2] 0.3 Hz, HD rating: 250%[*2] 0.3 Hz (under Real sensorless vector control or Vector control[*1])
	Torque boost		Manual torque boost
	Acceleration/deceleration time setting		0 to 3600 s (acceleration and deceleration can be set individually.)
	DC injection braking		Operation frequency (0 to 120 Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable
	Stall prevention operation level		Activation range of stall prevention operation (SLD rating: 0% to 120%, LD rating: 0% to 150%, ND rating: 0% to 220%, HD rating: 0% to 280%). Whether to use the stall prevention or not can be selected (V/F control, Advanced magnetic flux vector control)
	Torque limit level		Torque limit value can be set (0 to 400% variable). (Real sensorless vector control, Vector control[*1])
Operation	Frequency setting signal	Analog input	Terminals 2 and 4: 0 to 10 V / 0 to 5 V / 4 to 20 mA (0 to 20 mA). Terminal 1: -10 to +10 V / -5 to +5 V.
		Digital input	Input using the setting dial of the operation panel or parameter unit. Input of four-digit BCD (binary-coded decimal) or 16-bit binary (when the option FR-A8AX is installed).
	Start signal		Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.
	Input signal (12)		Low-speed operation command, middle-speed operation command, high-speed operation command, second function selection, terminal 4 input selection, JOG operation selection, automatic restart after instantaneous power failure / flying start, output stop, start self-holding selection, forward rotation command, reverse rotation command, inverter reset The input signal can be changed using **Pr.178 to Pr.189 (Input terminal function selection)**.
		Pulse train input	100k pulses/s
	Operational function		Acceleration/deceleration pattern selection under full-closed control, brake sequence, creep function, crane position loop compensation, dual feedback control, cane position detection filter, crane position data compensation, anti-sway control, model adaptive control, limit dog operation selection, acceleration/deceleration pattern selection for selecting fork control, maximum and minimum frequency settings, multi-speed operation, acceleration/deceleration pattern, thermal protection, DC injection brake, starting frequency, JOG operation, output stop (MRS), stall prevention, regeneration avoidance, increased magnetic excitation deceleration, DC feeding, rotation indication, automatic restart after instantaneous power failure, retry function, carrier frequency selection, fast-response current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, droop control, load torque high-speed frequency control, speed smoothing control, auto tuning, applied motor selection, gain tuning, RS-485 communication, cooling fan operation selection, stop selection (deceleration stop/coasting), stop-on-contact control, PLC function, life diagnosis, maintenance timer, current average monitor, multiple ratings, speed control, torque control, pre-excitation, torque limit, test run, 24 V power supply input for control circuit, safety stop function
	Output signal	Open collector output (5) Relay output (2)	Inverter running, up to frequency, instantaneous power failure/undervoltage, overload alarm, output frequency detection, fault The output signal can be changed using **Pr.190 to Pr.196 (Output terminal function selection)**. Fault codes (4 bits) of the inverter can be output from the open collector.
		Pulse train output (FM type inverter)	50k pulses/s

Indication	For indication on external meters	Pulse train output (FM type inverter)	Max. 2.4 kHz via one terminal (for the indication of inverter output frequency). The monitor item can be changed using **Pr.54 FM/CA terminal function selection**.
		Current output (CA type inverter)	Max. 20 mADC via one terminal (for the indication of inverter output frequency). The monitor item can be changed using **Pr.54 FM/CA terminal function selection**.
		Voltage output	Max. 10 VDC via one terminal (for the indication of inverter output frequency). The monitor item can be changed using **Pr.158 AM terminal function selection**.
	Operation panel (FR-DU08)	Status monitoring	Output frequency, output current, output voltage, and frequency setting value The monitor item can be changed using **Pr.52 Operation panel main monitor selection**.
		Fault record	When a protective function is activated, a fault indication is displayed and the output voltage, output current, output frequency, cumulative energization time, date (year, month, day) and time at the occurrence of the fault are stored. Each fault is recorded and the last 8 records can be displayed.
Protective function		Protective Function	Overcurrent trip during acceleration, overcurrent trip during constant speed, overcurrent trip during deceleration or stop, regenerative overvoltage trip during acceleration, regenerative overvoltage trip during constant speed, regenerative overvoltage trip during deceleration or stop, inverter overload trip (electronic thermal relay function), motor overload trip (electronic thermal relay function), heat sink overheat, instantaneous power failure, undervoltage, input phase loss[*3], stall prevention stop, brake transistor alarm detection, upper limit fault detection, lower limit fault detection, output side earth (ground) fault overcurrent, output short circuit, output phase loss, external thermal relay operation[*3], PTC thermistor operation[*3], option fault, communication option fault, parameter storage device fault, PU disconnection, retry count excess[*3], CPU fault, operation panel power supply short circuit / RS-485 terminals power supply short circuit, 24 VDC power fault, abnormal output current detection[*3], inrush current limit circuit fault, communication fault (inverter)[*4], analog input fault, USB communication fault, safety circuit fault, overspeed occurrence[*3], speed deviation excess detection[*1*3], signal loss detection[*1*3], excessive position fault[*1*3], brake sequence fault[*3], encoder phase fault[*1*3], 4 mA input fault[*3], option fault, opposite rotation deceleration fault[*3], internal circuit fault, external fault during output operation[*3], Ethernet communication fault[*5], internal storage device fault
		Warning function	Fan alarm, stall prevention (overcurrent), stall prevention (overvoltage), regenerative brake pre-alarm[*3], electronic thermal O/L relay pre-alarm, PU stop, speed limit indication (output during speed limit)[*3], parameter copy, safety stop, maintenance timer 1 to 3[*3], USB host error, operation panel lock[*3], password locked[*3], parameter write error, copy operation error, 24 V external power supply operation, continuous operation during communication fault[*3], load failure warning, Ethernet communication fault[*5]
		System failure	Crane overspeed detection, speed range excess fault, speed deviation detection, position deviation detection, distance meter fault, stop position command out of motion range, limit dog detection, brake sequence fault, emergency stop, distance meter alarm
Environment	Surrounding air temperature		-10 to +50°C (non-freezing) (LD, ND, HD ratings) -10 to +40°C (non-freezing) (SLD rating)
	Ambient humidity		95% RH or less (non-condensing) (With circuit board coating (conforming to IEC 60721-3-3:1994 3C2/3S2)) 90% RH or less (non-condensing) (Without circuit board coating)
	Storage temperature[*6]		-20 to +65°C
	Ambience		Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
	Altitude/vibration		Maximum 2500 m[*7], 5.9 m/s^2 or less at 10 to 55 Hz in X, Y, and Z directions

*1 Available when a Vector control compatible option is installed.
*2 In the initial setting for the FR-A820-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, the starting torque is limited to 150% by the torque limit level.
*3 Not activated in the inverter unit in the initial state.
*4 Available only for the RS-485 model.
*5 Available only for the Ethernet model.
*6 Applicable to conditions for a short time, for example, in transit.
*7 For installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.

8.6 Parameters (functions) and instruction codes under different control methods

*1 Instruction codes are used to read and write parameters in accordance with the Mitsubishi inverter protocol of RS-485 communication. (For details on the RS-485 communication, refer to the FR-A800 Instruction Manual (Detailed).)

*2 Function availability under each control method is shown as follows:
○: Available
×: Not available
Δ: Available with some restrictions

*3 For Parameter copy, Parameter clear, and All parameter clear, ○ indicates the function is available, and × indicates the function is not available.

*4 Communication parameters that are not cleared by parameter clear or all clear (H5A5A or H55AA) via communication. (For details on the RS-485 communication, refer to the FR-A800 Instruction Manual (Detailed).)

*5 When a communication option is installed, parameter clear (lock release) during password lock (**Pr.297 Password lock/unlock** ≠ "9999") can be performed only from the communication option.

*6 Reading and writing via the PU connector are available.

Symbols in the table indicate parameters that operate when the options are connected.

AP FR-A8AP, AL FR-A8AL, TP FR-A8TP, APR FR-A8APR, APS FR-A8APS, AR FR-A8AR, AX FR-A8AX, AY FR-A8AY, AZ FR-A8AZ, NC FR-A8NC, NCE FR-A8NCE, ND FR-A8ND, NP FR-A8NP, NF FR-A8NF

Pr.	Name	Instruction code*1			Control method*2						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy*3	Clear*3	All clear*3
0	Torque boost	00	80	0	○	×	×	×	×	×	○	○	○
1	Maximum frequency	01	81	0	○	○	○	○	○	○	○	○	○
2	Minimum frequency	02	82	0	○	○	○	○	○	○	○	○	○
3	Base frequency	03	83	0	○	×	×	×	×	×	○	○	○
4	Multi-speed setting (high speed)	04	84	0	○	○	○	○	○	○	○	○	○
5	Multi-speed setting (middle speed)	05	85	0	○	○	○	○	○	○	○	○	○
6	Multi-speed setting (low speed)	06	86	0	○	○	○	○	○	○	○	○	○
7	Acceleration time	07	87	0	○	○	○	Δ	○	Δ	○	○	○
8	Deceleration time	08	88	0	○	○	○	Δ	○	Δ	○	○	○
9	Electronic thermal O/L relay	09	89	0	○	○	○	○	○	○	○	○	○
10	DC injection brake operation frequency	0A	8A	0	○	○	○	○	○	○	○	○	○
11	DC injection brake operation time	0B	8B	0	○	○	○	○	○	○	○	○	○
12	DC injection brake operation voltage	0C	8C	0	○	○	×	×	×	×	○	○	○
13	Starting frequency	0D	8D	0	○	○	○	○	○	○	○	○	○
14	Load pattern selection	0E	8E	0	○	×	×	×	×	×	○	○	○
15	Jog frequency	0F	8F	0	○	○	○	○	○	○	○	○	○
16	Jog acceleration/deceleration time	10	90	0	○	○	○	○	○	○	○	○	○
17	MRS input selection	11	91	0	○	○	○	○	○	○	○	○	○
18	High speed maximum frequency	12	92	0	○	○	○	○	○	○	○	○	○
19	Base frequency voltage	13	93	0	○	×	×	×	×	×	○	○	○
20	Acceleration/deceleration reference frequency	14	94	0	○	○	○	○	○	○	○	○	○
21	Acceleration/deceleration time increments	15	95	0	○	○	○	○	○	○	○	○	○
22	Stall prevention operation level (Torque limit level)	16	96	0	○	○	○	○	○	○	○	○	○
23	Stall prevention operation level compensation factor at double speed	17	97	0	○	○	×	×	×	×	○	○	○
24	Multi-speed setting (speed 4)	18	98	0	○	○	○	○	○	○	○	○	○
25	Multi-speed setting (speed 5)	19	99	0	○	○	○	○	○	○	○	○	○
26	Multi-speed setting (speed 6)	1A	9A	0	○	○	○	○	○	○	○	○	○
27	Multi-speed setting (speed 7)	1B	9B	0	○	○	○	○	○	○	○	○	○
28	Multi-speed input compensation selection	1C	9C	0	○	○	○	○	○	○	○	○	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
30	Regenerative function selection	1E	9E	0	○	○	○	○	○	○	○	○	○
31	Crane creep speed	1F	9F	0	○	○	○	×	○	×	○	○	○
32	Travel distance at creep speed	20	A0	0	○	○	○	×	○	×	○	○	○
33	Position loop compensation selection after crane decelerate to creep speed	21	A1	0	○	○	×	×	○	×	○	○	○
34	Stop position compensation width	22	A2	0	○	○	×	×	○	×	○	○	○
37	Speed display	25	A5	0	○	○	○	○	○	○	○	○	○
41	Up-to-frequency sensitivity	29	A9	0	○	○	○	×	○	×	○	○	○
42	Output frequency detection	2A	AA	0	○	○	○	Δ	○	Δ	○	○	○
43	Output frequency detection for reverse rotation	2B	AB	0	○	○	○	Δ	○	Δ	○	○	○
44	Second acceleration/deceleration time	2C	AC	0	○	○	○	Δ	○	Δ	○	○	○
45	Second deceleration time	2D	AD	0	○	○	○	Δ	○	Δ	○	○	○
46	Second torque boost	2E	AE	0	○	×	×	×	×	×	○	○	○
47	Second V/F (base frequency)	2F	AF	0	○	×	×	×	×	×	○	○	○
48	Second stall prevention operation level	30	B0	0	○	○	×	×	×	×	○	○	○
49	Second stall prevention operation frequency	31	B1	0	○	○	×	×	×	×	○	○	○
50	Second output frequency detection	32	B2	0	○	○	○	Δ	○	Δ	○	○	○
51	Second electronic thermal O/L relay	33	B3	0	○	○	○	○	○	○	○	○	○
52	Operation panel main monitor selection	34	B4	0	○	○	○	Δ	○	Δ	○	○	○
54	FM/CA terminal function selection	36	B6	0	○	○	○	Δ	○	Δ	○	○	○
55	Frequency monitoring reference	37	B7	0	○	○	○	○	○	○	○	○	○
56	Current monitoring reference	38	B8	0	○	○	○	○	○	○	○	○	○
57	Restart coasting time	39	B9	0	○	○	○	○	○	○	○	○	○
58	Restart cushion time	3A	BA	0	○	○	×	×	×	×	○	○	○
60	A800-AWH mode selection	3C	BC	0	○	○	○	Δ	○	Δ	○	○	○
65	Retry selection	41	C1	0	○	○	○	○	○	○	○	○	○
66	Stall prevention operation reduction starting frequency	42	C2	0	○	○	×	×	×	×	○	○	○
67	Number of retries at fault occurrence	43	C3	0	○	○	○	○	○	○	○	○	○
68	Retry waiting time	44	C4	0	○	○	○	○	○	○	○	○	○
69	Retry count display erase	45	C5	0	○	○	○	○	○	○	○	○	○
70	Special regenerative brake duty	46	C6	0	○	○	○	○	○	○	○	○	○
71	Applied motor	47	C7	0	○	○	○	Δ	○	Δ	○	○	○
72	PWM frequency selection	48	C8	0	○	○	○	○	○	○	○	○	○
73	Analog input selection	49	C9	0	○	○	○	○	○	○	○	×	○
74	Input filter time constant	4A	CA	0	○	○	○	○	○	○	○	○	○
75	Reset selection/disconnected PU detection/ PU stop selection	4B	CB	0	○	○	○	○	○	○	○	×	×
76	Fault code output selection	4C	CC	0	○	○	○	○	○	○	○	○	○
77[*6]	Parameter write selection	4D	CD	0	○	○	○	○	○	○	○	○	○
78	Reverse rotation prevention selection	4E	CE	0	○	○	○	○	○	○	○	○	○
79[*6]	Operation mode selection	4F	CF	0	○	○	○	○	○	○	○	○	○
80	Motor capacity	50	D0	0	×	○	○	○	○	○	○	○	○
81	Number of motor poles	51	D1	0	×	○	○	○	○	○	○	○	○
82	Motor excitation current	52	D2	0	×	○	○	○	○	○	○	×	○
83	Rated motor voltage	53	D3	0	×	○	○	○	○	○	○	○	○
84	Rated motor frequency	54	D4	0	×	○	○	○	○	○	○	○	○
85	Excitation current break point	55	D5	0	×	○	×	×	○	○	○	×	○
86	Excitation current low-speed scaling factor	56	D6	0	×	○	×	×	○	○	○	×	○
89	Speed control gain (Advanced magnetic flux vector)	59	D9	0	×	○	×	×	×	×	○	×	○
90	Motor constant (R1)	5A	DA	0	×	○	○	○	○	○	○	×	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
91	Motor constant (R2)	5B	DB	0	×	○	○	○	○	○	○	×	○
92	Motor constant (L1)/d-axis inductance (Ld)	5C	DC	0	×	○	○	○	○	○	○	×	○
93	Motor constant (L2)/q-axis inductance (Lq)	5D	DD	0	×	○	○	○	○	○	○	×	○
94	Motor constant (X)	5E	DE	0	×	○	○	○	○	○	○	×	○
95	Online auto tuning selection	5F	DF	0	×	○	○	○	○	○	○	○	○
96	Auto tuning setting/status	60	E0	0	×	○	○	○	○	○	○	×	○
100	Reference travel speed	00	80	1	○	○	○	×	○	×	○	○	○
104	Crane in-position width	04	84	1	○	○	○	×	○	×	○	○	○
105	Crane position loop P gain 1	05	85	1	○	○	○	×	○	×	○	○	○
106	Crane position loop P gain 2	06	86	1	○	○	○	×	○	×	○	○	○
107	Crane position loop P gain corner frequency 1	07	87	1	○	○	○	×	○	×	○	○	○
108	Crane position loop P gain corner frequency 2	08	88	1	○	○	○	×	○	×	○	○	○
109	Crane position loop filter	09	89	1	○	○	○	×	○	×	○	○	○
110	Third acceleration/deceleration time	0A	8A	1	○	○	○	×	○	×	○	○	○
111	Third deceleration time	0B	8B	1	○	○	○	×	○	×	○	○	○
112	Distance measurement direction setting	0C	8C	1	○	○	○	×	○	×	○	○	○
113	Crane position loop integral time	0D	8D	1	○	○	○	×	○	×	○	○	○
114	Compensation rate of crane position loop upper limit	0E	8E	1	○	○	○	×	○	×	○	○	○
115	Compensation frequency of low-speed range crane position loop upper limit	0F	8F	1	○	○	○	×	○	×	○	○	○
117	PU communication station number	11	91	1	○	○	○	○	○	○	○	○[*4]	○[*4]
118	PU communication speed	12	92	1	○	○	○	○	○	○	○	○[*4]	○[*4]
119	PU communication stop bit length / data length	13	93	1	○	○	○	○	○	○	○	○[*4]	○[*4]
120	PU communication parity check	14	94	1	○	○	○	○	○	○	○	○[*4]	○[*4]
121	PU communication retry count	15	95	1	○	○	○	○	○	○	○	○[*4]	○[*4]
122	PU communication check time interval	16	96	1	○	○	○	○	○	○	○	○[*4]	○[*4]
123	PU communication waiting time setting	17	97	1	○	○	○	○	○	○	○	○[*4]	○[*4]
124	PU communication CR/LF selection	18	98	1	○	○	○	○	○	○	○	○[*4]	○[*4]
125	Terminal 2 frequency setting gain frequency	19	99	1	○	○	○	○	○	○	○	×	○
126	Terminal 4 frequency setting gain frequency	1A	9A	1	○	○	○	○	○	○	○	×	○
127	Crane in-position time	1B	9B	1	○	○	○	×	○	×	○	○	○
128	Motion range 1	1C	9C	1	○	○	○	×	○	×	○	○	○
129	Motion range 2	1D	9D	1	○	○	○	×	○	×	○	○	○
130	Crane position detection range	1E	9E	1	○	○	○	×	○	×	○	○	○
131	Motion range sign selection	1F	9F	1	○	○	○	×	○	×	○	○	○
132	Home position (upper digits)	20	A0	1	○	○	○	×	○	×	○	○	○
133	Home position (lower digits)	21	A1	1	○	○	○	×	○	×	○	○	○
134	Crane position detection range hysteresis	22	A2	1	○	○	○	×	○	×	○	○	○
144	Speed setting switchover	2C	AC	1	○	○	○	○	○	○	○	○	○
145	PU display language selection	2D	AD	1	○	○	○	○	○	○	○	×	×
147	Acceleration/deceleration time switching frequency	2F	AF	1	○	○	○	○	○	○	○	○	○
148	Stall prevention level at 0 V input	30	B0	1	○	○	×	×	×	×	○	○	○
149	Stall prevention level at 10 V input	31	B1	1	○	○	×	×	×	×	○	○	○
150	Output current detection level	32	B2	1	○	○	○	○	○	○	○	○	○
151	Output current detection signal delay time	33	B3	1	○	○	○	○	○	○	○	○	○
152	Zero current detection level	34	B4	1	○	○	○	○	○	○	○	○	○
153	Zero current detection time	35	B5	1	○	○	○	○	○	○	○	○	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
		Read	Write	Extended	V/F	Magnetic flux	Vector: Speed control	Vector: Torque control	Sensorless: Speed control	Sensorless: Torque control	Copy[*3]	Clear[*3]	All clear[*3]
154	Voltage reduction selection during stall prevention operation	36	B6	1	○	○	×	×	×	×	○	○	○
155	RT signal function validity condition selection	37	B7	1	○	○	○	×	○	×	○	○	○
156	Stall prevention operation selection	38	B8	1	○	○	○	×	○	×	○	○	○
157	OL signal output timer	39	B9	1	○	○	○	○	○	○	○	○	○
158	AM terminal function selection	3A	BA	1	○	○	○	Δ	○	Δ	○	○	○
160	User group read selection	00	80	2	○	○	○	○	○	○	○	○	○
161	Frequency setting/key lock operation selection	01	81	2	○	○	○	○	○	○	○	×	○
162	Automatic restart after instantaneous power failure selection	02	82	2	○	○	○	○	○	○	○	○	○
163	First cushion time for restart	03	83	2	○	○	×	×	×	×	○	○	○
164	First cushion voltage for restart	04	84	2	○	○	×	×	×	×	○	○	○
165	Stall prevention operation level for restart	05	85	2	○	○	×	×	×	×	○	○	○
166	Output current detection signal retention time	06	86	2	○	○	○	○	○	○	○	○	○
167	Output current detection operation selection	07	87	2	○	○	○	○	○	○	○	○	○
168 169	Parameter for manufacturer setting. Do not set.												
170	Watt-hour meter clear	0A	8A	2	○	○	○	○	○	○	○	×	○
171	Operation hour meter clear	0B	8B	2	○	○	○	○	○	○	×	×	×
172	User group registered display/batch clear	0C	8C	2	○	○	○	○	○	○	×	×	×
173	User group registration	0D	8D	2	○	○	○	○	○	○	×	×	×
174	User group clear	0E	8E	2	○	○	○	○	○	○	×	×	×
178	STF terminal function selection	12	92	2	○	○	○	Δ	○	Δ	○	×	○
179	STR terminal function selection	13	93	2	○	○	○	Δ	○	Δ	○	×	○
180	RL terminal function selection	14	94	2	○	○	○	Δ	○	Δ	○	×	○
181	RM terminal function selection	15	95	2	○	○	○	Δ	○	Δ	○	×	○
182	RH terminal function selection	16	96	2	○	○	○	Δ	○	Δ	○	×	○
183	RT terminal function selection	17	97	2	○	○	○	Δ	○	Δ	○	×	○
184	AU terminal function selection	18	98	2	○	○	○	Δ	○	Δ	○	×	○
185	JOG terminal function selection	19	99	2	○	○	○	Δ	○	Δ	○	×	○
186	CS terminal function selection	1A	9A	2	○	○	○	Δ	○	Δ	○	×	○
187	MRS terminal function selection	1B	9B	2	○	○	○	Δ	○	Δ	○	×	○
188	STOP terminal function selection	1C	9C	2	○	○	○	Δ	○	Δ	○	×	○
189	RES terminal function selection	1D	9D	2	○	○	○	Δ	○	Δ	○	×	○
190	RUN terminal function selection	1E	9E	2	○	○	○	Δ	○	Δ	○	×	○
191	SU terminal function selection	1F	9F	2	○	○	○	Δ	○	Δ	○	×	○
192	IPF terminal function selection	20	A0	2	○	○	○	Δ	○	Δ	○	×	○
193	OL terminal function selection	21	A1	2	○	○	○	Δ	○	Δ	○	×	○
194	FU terminal function selection	22	A2	2	○	○	○	Δ	○	Δ	○	×	○
195	ABC1 terminal function selection	23	A3	2	○	○	○	Δ	○	Δ	○	×	○
196	ABC2 terminal function selection	24	A4	2	○	○	○	Δ	○	Δ	○	×	○
232	Multi-speed setting (speed 8)	28	A8	2	○	○	○	○	○	○	○	○	○
233	Multi-speed setting (speed 9)	29	A9	2	○	○	○	○	○	○	○	○	○
234	Multi-speed setting (speed 10)	2A	AA	2	○	○	○	○	○	○	○	○	○
235	Multi-speed setting (speed 11)	2B	AB	2	○	○	○	○	○	○	○	○	○
236	Multi-speed setting (speed 12)	2C	AC	2	○	○	○	○	○	○	○	○	○
237	Multi-speed setting (speed 13)	2D	AD	2	○	○	○	○	○	○	○	○	○
238	Multi-speed setting (speed 14)	2E	AE	2	○	○	○	○	○	○	○	○	○
239	Multi-speed setting (speed 15)	2F	AF	2	○	○	○	○	○	○	○	○	○
240	Soft-PWM operation selection	30	B0	2	○	○	○	○	○	○	○	○	○
241	Analog input display unit switchover	31	B1	2	○	○	○	○	○	○	○	○	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
242	Terminal 1 added compensation amount (terminal 2)	32	B2	2	○	○	○	○	○	○	○	○	○
243	Terminal 1 added compensation amount (terminal 4)	33	B3	2	○	○	○	○	○	○	○	○	○
244	Cooling fan operation selection	34	B4	2	○	○	○	○	○	○	○	○	○
245	Rated slip	35	B5	2	○	×	×	×	×	×	○	○	○
246	Slip compensation time constant	36	B6	2	○	×	×	×	×	×	○	○	○
247	Constant output range slip compensation selection	37	B7	2	○	×	×	×	×	×	○	○	○
249	Earth (ground) fault detection at start	39	B9	2	○	○	×	×	×	×	○	○	○
250	Stop selection	3A	BA	2	○	○	○	○	○	○	○	○	○
251	Output phase loss protection selection	3B	BB	2	○	○	○	○	○	○	○	○	○
252	Override bias	3C	BC	2	○	○	○	○	○	○	○	○	○
253	Override gain	3D	BD	2	○	○	○	○	○	○	○	○	○
255	Life alarm status display	3F	BF	2	○	○	○	○	○	○	×	×	×
256	Inrush current limit circuit life display	40	C0	2	○	○	○	○	○	○	×	×	×
257	Control circuit capacitor life display	41	C1	2	○	○	○	○	○	○	×	×	×
258	Main circuit capacitor life display	42	C2	2	○	○	○	○	○	○	×	×	×
259	Main circuit capacitor life measuring	43	C3	2	○	○	○	○	○	○	○	○	○
260	PWM frequency automatic switchover	44	C4	2	○	○	○	○	○	○	○	○	○
267	Terminal 4 input selection	4B	CB	2	○	○	○	○	○	○	○	×	○
268	Monitor decimal digits selection	4C	CC	2	○	○	○	○	○	○	○	○	○
269	Parameter for manufacturer setting. Do not set.												
270	Stop-on contact/load torque high-speed frequency control selection	4E	CE	2	○	○	○	×	○	×	○	○	○
271	High-speed setting maximum current	4F	CF	2	○	○	○	×	○	×	○	○	○
272	Middle-speed setting minimum current	50	D0	2	○	○	○	×	○	×	○	○	○
273	Current averaging range	51	D1	2	○	○	○	×	○	×	○	○	○
274	Current averaging filter time constant	52	D2	2	○	○	○	×	○	×	○	○	○
275	Stop-on contact excitation current low-speed scaling factor	53	D3	2	×	○	×	×	○	×	○	○	○
276	PWM carrier frequency at stop-on contact	54	D4	2	×	○	×	×	○	×	○	○	○
278	Brake opening frequency	56	D6	2	○	○	×	×	○	×	○	○	○
279	Brake opening current	57	D7	2	○	○	×	×	○	×	○	○	○
280	Brake opening current detection time	58	D8	2	○	○	×	×	○	×	○	○	○
281	Brake operation time at start	59	D9	2	○	○	○	×	○	×	○	○	○
282	Brake operation frequency	5A	DA	2	○	○	○	×	○	×	○	○	○
283	Brake operation time at stop	5B	DB	2	○	○	×	×	○	×	○	○	○
285	Overspeed detection frequency (Speed deviation excess detection frequency)	5D	DD	2	×	Δ	○	×	×	×	○	○	○
286	Droop gain	5E	DE	2	×	○	○	×	○	×	○	○	○
287	Droop filter time constant	5F	DF	2	×	×	○	×	○	×	○	○	○
288	Droop function activation selection	60	E0	2	×	○	○	×	○	×	○	○	○
289	Inverter output terminal filter	61	E1	2	○	○	○	○	○	○	○	×	○
290	Monitor negative output selection	62	E2	2	○	○	○	○	○	○	○	○	○
291	Pulse train I/O selection	63	E3	2	○	○	○	○	○	○	○	×	○
295	Frequency change increment amount setting	67	E7	2	○	○	○	○	○	○	○	○	○
296	Password lock level	68	E8	2	○	○	○	○	○	○	○	×	○
297	Password lock/unlock	69	E9	2	○	○	○	○	○	○	○	○[*5]	○
298	Frequency search gain	6A	EA	2	○	○	×	×	○	○	○	×	○
299	Rotation direction detection selection at restarting	6B	EB	2	○	○	×	×	○	×	○	○	○
300	BCD input bias AX	00	80	3	○	○	○	○	○	○	○	○	○

Pr.	Name	Instruction code*1			Control method*2						Parameter		
		Read	Write	Extended	V/F	Magnetic flux	Vector: Speed control	Vector: Torque control	Sensorless: Speed control	Sensorless: Torque control	Copy*3	Clear*3	All clear*3
301	BCD input gain AX	01	81	3	○	○	○	○	○	○	○	○	○
302	BIN input bias AX	02	82	3	○	○	○	○	○	○	○	○	○
303	BIN input gain AX	03	83	3	○	○	○	○	○	○	○	○	○
304	Digital input and analog input compensation enable/disable selection AX	04	84	3	○	○	○	○	○	○	○	○	○
305	Read timing operation selection AX	05	85	3	○	○	○	○	○	○	○	○	○
306	Analog output signal selection AY	06	86	3	○	○	○	Δ	○	Δ	○	○	○
307	Setting for zero analog output AY	07	87	3	○	○	○	○	○	○	○	○	○
308	Setting for maximum analog output AY	08	88	3	○	○	○	○	○	○	○	○	○
309	Analog output signal voltage/current switchover AY	09	89	3	○	○	○	○	○	○	○	○	○
310	Analog meter voltage output selection AY	0A	8A	3	○	○	○	Δ	○	Δ	○	○	○
311	Setting for zero analog meter voltage output AY	0B	8B	3	○	○	○	○	○	○	○	○	○
312	Setting for maximum analog meter voltage output AY	0C	8C	3	○	○	○	○	○	○	○	○	○
313	DO0 output selection AY NC NCE	0D	8D	3	○	○	○	Δ	○	Δ	○	×	○
314	DO1 output selection AY NC NCE	0E	8E	3	○	○	○	Δ	○	Δ	○	×	○
315	DO2 output selection AY NC NCE	0F	8F	3	○	○	○	Δ	○	Δ	○	×	○
316	DO3 output selection AY	10	90	3	○	○	○	Δ	○	Δ	○	×	○
317	DO4 output selection AY	11	91	3	○	○	○	Δ	○	Δ	○	×	○
318	DO5 output selection AY	12	92	3	○	○	○	Δ	○	Δ	○	×	○
319	DO6 output selection AY	13	93	3	○	○	○	Δ	○	Δ	○	×	○
320	RA1 output selection AR	14	94	3	○	○	○	Δ	○	Δ	○	×	○
321	RA2 output selection AR	15	95	3	○	○	○	Δ	○	Δ	○	×	○
322	RA3 output selection AR	16	96	3	○	○	○	Δ	○	Δ	○	×	○
323	AM0 0V adjustment AY	17	97	3	○	○	○	○	○	○	○	×	○
324	AM1 0mA adjustment AY	18	98	3	○	○	○	○	○	○	○	×	○
326	Motor temperature feedback reference AZ	1A	9A	3	×	×	○	○	×	×	○	×	○
329	Digital input unit selection AX	1D	9D	3	○	○	○	○	○	○	○	×	○
331	RS-485 communication station number	1F	9F	3	○	○	○	○	○	○	○	○*4	○*4
332	RS-485 communication speed	20	A0	3	○	○	○	○	○	○	○	○*4	○*4
333	RS-485 communication stop bit length / data length	21	A1	3	○	○	○	○	○	○	○	○*4	○*4
334	RS-485 communication parity check selection	22	A2	3	○	○	○	○	○	○	○	○*4	○*4
335	RS-485 communication retry count	23	A3	3	○	○	○	○	○	○	○	○*4	○*4
336	RS-485 communication check time interval	24	A4	3	○	○	○	○	○	○	○	○*4	○*4
337	RS-485 communication waiting time setting	25	A5	3	○	○	○	○	○	○	○	○*4	○*4
338	Communication operation command source	26	A6	3	○	○	○	○	○	○	○	○*4	○*4
339	Communication speed command source	27	A7	3	○	○	○	○	○	○	○	○*4	○*4
340	Communication startup mode selection	28	A8	3	○	○	○	○	○	○	○	○*4	○*4
341	RS-485 communication CR/LF selection	29	A9	3	○	○	○	○	○	○	○	○*4	○*4
342	Communication EEPROM write selection	2A	AA	3	○	○	○	○	○	○	○	○	○
343	Communication error count	2B	AB	3	○	○	○	○	○	○	×	×	×
345	DeviceNet address ND	2D	AD	3	○	○	○	○	○	○	○	○*4	○*4
346	DeviceNet baud rate ND	2E	AE	3	○	○	○	○	○	○	○	○*4	○*4
349	Communication reset selection/Ready bit status selection NC NCE ND NP NF	31	B1	3	○	○	○	○	○	○	○	○*4	○*4
350	Brake operation time at deceleration	32	B2	3	×	×	○	×	×	×	○	○	○
351	Brake operation time at start 2	33	B3	3	○	○	×	×	○	×	○	○	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
352	Brake operation position range	34	B4	3	○	○	×	×	○	×	○	○	○
353	Brake release request signal output selection	35	B5	3	○	○	×	×	○	×	○	○	○
355	Crane vibration suppression frequency	37	B7	3	○	○	○	×	○	×	○	○	○
356	Crane vibration suppression gain	38	B8	3	○	○	○	×	○	×	○	○	○
357	Crane model adaptive position loop gain	39	B9	3	○	○	○	×	○	×	○	○	○
359	Encoder rotation direction AP AL APR APS	3B	BB	3	○	○	○	○	×	×	○	○	○
362	Dual feedback filter	3E	BE	3	×	×	○	×	×	×	○	○	○
363	Crane position detection filter	3F	BF	3	○	○	○	×	○	×	○	○	○
364	Crane position data compensation judgment level	40	C0	3	○	○	○	×	○	×	○	○	○
365	Upper limit of crane position data compensation	41	C1	3	○	○	○	×	○	×	○	○	○
367	Speed feedback range AP AL TP APR APS	43	C3	3	○	○	×	×	×	×	○	○	○
368	Feedback gain AP AL TP APR APS	44	C4	3	○	○	×	×	×	×	○	○	○
369	Number of encoder pulses AP AL	45	C5	3	○	○	○	○	×	×	○	○	○
374	Overspeed detection level	4A	CA	3	×	×	○	○	○	○	○	○	○
376	Encoder signal loss detection enable/disable selection AP AL APR APS	4C	CC	3	×	×	○	○	×	×	○	○	○
384	Input pulse division scaling factor	54	D4	3	○	○	○	○	○	○	○	○	○
385	Frequency for zero input pulse	55	D5	3	○	○	○	○	○	○	○	○	○
386	Frequency for maximum input pulse	56	D6	3	○	○	○	○	○	○	○	○	○
393	System failure detection	5D	DD	3	○	○	○	×	○	×	○	○	○
394	Operation selection after system failure detection	5E	DE	3	○	○	○	×	○	×	○	○	○
395	Deceleration time after system failure detection	5F	DF	3	○	○	○	×	○	×	○	○	○
396	Crane speed detection filter	60	E0	3	○	○	○	×	○	×	○	○	○
397	Limit dog operation selection	61	E1	3	○	○	○	×	○	×	○	○	○
398	Speed range excess fault detection frequency	62	E2	3	×	×	○	×	○	×	○	○	○
399	Speed range excess fault detection time	63	E3	3	×	×	○	×	○	×	○	○	○
406	High resolution analog input selection AZ	06	86	○	○	○	○	○	○	○	○	×	○
407	Motor temperature detection filter AZ	07	87	○	○	○	○	○	○	○	○	○	○
408	Motor thermistor selection AZ	08	88	○	○	○	○	○	○	○	○	○	○
413	Encoder pulse division ratio AL	0D	8D	4	○	○	○	○	○	○	○	○	○
414	PLC function operation selection	0E	8E	4	○	○	○	○	○	○	○	×	×
415	Inverter operation lock mode setting	0F	8F	4	○	○	○	○	○	○	○	○	○
416	Pre-scale function selection	10	90	4	○	○	○	○	○	○	○	○	○
417	Pre-scale setting value	11	91	4	○	○	○	○	○	○	○	○	○
418	Extension output terminal filter AY AR	12	92	4	○	○	○	○	○	○	○	×	○
422	Position control gain	16	96	4	×	×	×	×	×	×	○	○	○
432	Pulse train torque command bias AL	20	A0	4	×	×	×	○	×	○	○	○	○
433	Pulse train torque command gain AL	21	A1	4	×	×	×	○	×	○	○	○	○
434	Network number (CC-Link IE) NCE	22	A2	4	○	○	○	○	○	○	○	○[*4]	○[*4]
435	Station number (CC-Link IE) NCE	23	A3	4	○	○	○	○	○	○	○	○[*4]	○[*4]
447	Digital torque command bias AX	2F	AF	4	×	×	×	○	×	○	○	○	○
448	Digital torque command gain AX	30	B0	4	×	×	×	○	×	○	○	○	○
450	Second applied motor	32	B2	4	○	○	○	Δ	○	Δ	○	○	○
451	Second motor control method selection	33	B3	4	○	○	○	Δ	○	Δ	○	○	○
453	Second motor capacity	35	B5	4	×	○	○	○	○	○	○	○	○
454	Number of second motor poles	36	B6	4	×	○	○	○	○	○	○	○	○
455	Second motor excitation current	37	B7	4	×	○	○	○	○	○	○	×	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
456	Rated second motor voltage	38	B8	4	×	○	○	○	○	○	○	○	○
457	Rated second motor frequency	39	B9	4	×	○	○	○	○	○	○	○	○
458	Second motor constant (R1)	3A	BA	4	×	○	○	○	○	○	○	×	○
459	Second motor constant (R2)	3B	BB	4	×	○	○	○	○	○	○	×	○
460	Second motor constant (L1)	3C	BC	4	×	○	○	○	○	○	○	×	○
461	Second motor constant (L2)	3D	BD	4	×	○	○	○	○	○	○	×	○
462	Second motor constant (X)	3E	BE	4	×	○	○	○	○	○	○	×	○
463	Second motor auto tuning setting/status	3F	BF	4	×	○	○	○	○	○	○	×	○
495	Remote output selection	5F	DF	4	○	○	○	○	○	○	○	○	○
496	Remote output data 1	60	E0	4	○	○	○	○	○	○	×	×	×
497	Remote output data 2	61	E1	4	○	○	○	○	○	○	×	×	×
498	PLC function flash memory clear	62	E2	4	○	○	○	○	○	○	×	×	×
500	Communication error execution waiting time NC NCE ND NP NF	00	80	5	○	○	○	○	○	○	○	○	○
501	Communication error occurrence count display NC NCE ND NP NF	01	81	5	○	○	○	○	○	○	×	○	○
502	Stop mode selection at communication error	02	82	5	○	○	○	○	○	○	○	○	○
503	Maintenance timer 1	03	83	5	○	○	○	○	○	○	×	×	×
504	Maintenance timer 1 warning output set time	04	84	5	○	○	○	○	○	○	○	×	○
505	Speed setting reference	05	85	5	○	○	○	○	○	○	○	○	○
516	S-curve acceleration time	10	90	5	○	○	○	×	○	×	○	○	○
517	S-curve deceleration time	11	91	5	○	○	○	×	○	×	○	○	○
518	Second S-curve acceleration time	12	92	5	○	○	○	×	○	×	○	○	○
519	Second S-curve deceleration time	13	93	5	○	○	○	×	○	×	○	○	○
539	MODBUS RTU communication check time interval	27	A7	5	○	○	○	○	○	○	○	○[*4]	○[*4]
541	Frequency command sign selection NC NCE NP	29	A9	5	○	○	○	×	○	×	○	○[*4]	○[*4]
542	Communication station number (CC-Link) NC	2A	AA	5	○	○	○	○	○	○	○	○[*4]	○[*4]
543	Baud rate selection (CC-Link) NC	2B	AB	5	○	○	○	○	○	○	○	○[*4]	○[*4]
544	CC-Link extended setting NC	2C	AC	5	○	○	○	Δ	○	Δ	○	○[*4]	○[*4]
547	USB communication station number	2F	AF	5	○	○	○	○	○	○	○	○[*4]	○[*4]
548	USB communication check time interval	30	B0	5	○	○	○	○	○	○	○	○[*4]	○[*4]
549	Protocol selection	31	B1	5	○	○	○	Δ	○	Δ	○	○[*4]	○[*4]
550	NET mode operation command source selection	32	B2	5	○	○	○	○	○	○	○	○[*4]	○[*4]
551	PU mode operation command source selection	33	B3	5	○	○	○	○	○	○	○	○[*4]	○[*4]
555	Current average time	37	B7	5	○	○	○	○	○	○	○	○	○
556	Data output mask time	38	B8	5	○	○	○	○	○	○	○	○	○
557	Current average value monitor signal output reference current	39	B9	5	○	○	○	○	○	○	○	○	○
560	Second frequency search gain	3C	BC	5	○	○	×	×	○	○	○	×	○
561	PTC thermistor protection level	3D	BD	5	○	○	○	○	○	○	○	×	○
563	Energization time carrying-over times	3F	BF	5	○	○	○	○	○	○	×	×	×
564	Operating time carrying-over times	40	C0	5	○	○	○	○	○	○	×	×	×
565	Second motor excitation current break point	41	C1	5	×	○	×	×	○	○	○	×	○
566	Second motor excitation current low-speed scaling factor	42	C2	5	×	○	×	×	○	○	○	×	○
569	Second motor speed control gain	45	C5	5	×	○	×	×	×	×	○	×	○
570	Multiple rating setting	46	C6	5	○	○	○	○	○	○	○	×	×
573	4 mA input check selection	49	C9	5	○	○	○	○	○	○	○	○	○

Pr.	Name	Instruction code*1			Control method*2						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy*3	Clear*3	All clear*3
574	Second motor online auto tuning	4A	CA	5	×	○	○	○	○	○	○	○	○
592	Crane overspeed detection time	5C	DC	5	○	○	○	×	○	×	○	○	○
593	Speed deviation detection frequency	5D	DD	5	○	○	○	×	○	×	○	○	○
594	Speed deviation detection time	5E	DE	5	○	○	○	×	○	×	○	○	○
595	Brake sequence fault detection time	5F	DF	5	○	○	○	×	○	×	○	○	○
596	Position deviation detection distance	60	E0	5	○	○	○	×	○	×	○	○	○
597	Position deviation detection time	61	E1	5	○	○	○	×	○	×	○	○	○
598	Undervoltage level	62	E2	5	○	○	○	○	○	○	○	○	○
599	X10 terminal input selection	63	E3	5	○	○	○	○	○	○	○	○	○
600	First free thermal reduction frequency 1	00	80	6	○	○	○	○	○	○	○	○	○
601	First free thermal reduction ratio 1	01	81	6	○	○	○	○	○	○	○	○	○
602	First free thermal reduction frequency 2	02	82	6	○	○	○	○	○	○	○	○	○
603	First free thermal reduction ratio 2	03	83	6	○	○	○	○	○	○	○	○	○
604	First free thermal reduction frequency 3	04	84	6	○	○	○	○	○	○	○	○	○
606	Power failure stop external signal input selection	06	86	6	○	○	○	○	○	○	○	○	○
607	Motor permissible load level	07	87	6	○	○	○	○	○	○	○	○	○
608	Second motor permissible load level	08	88	6	○	○	○	○	○	○	○	○	○
609	S-curve time after system failure detection	09	89	6	○	○	○	×	○	×	○	○	○
610	Deceleration stop operation selection after system failure detection	0A	8A	6	○	○	○	×	○	×	○	○	○
611	Acceleration time at a restart	0B	8B	6	○	○	○	×	○	×	○	○	○
617	Reverse rotation excitation current low-speed scaling factor	11	91	6	×	○	×	×	○	○	○	×	○
635	Cumulative pulse clear signal selection AP AL TP APR APS	23	A3	6	○	○	○	○	○	○	○	○	○
636	Cumulative pulse division scaling factor AP AL TP APR APS	24	A4	6	○	○	○	○	○	○	○	○	○
637	Control terminal option-Cumulative pulse division scaling factor AP AL TP APR APS	25	A5	6	○	○	○	○	○	○	○	○	○
638	Cumulative pulse storage AP AL TP APR APS	26	A6	6	○	○	○	○	○	○	○	○	○
653	Speed smoothing control	35	B5	6	○	×	×	×	×	×	○	○	○
654	Speed smoothing cutoff frequency	36	B6	6	○	×	×	×	×	×	○	○	○
655	Analog remote output selection	37	B7	6	○	○	○	○	○	○	○	○	○
656	Analog remote output 1	38	B8	6	○	○	○	○	○	○	×	×	×
657	Analog remote output 2	39	B9	6	○	○	○	○	○	○	×	×	×
658	Analog remote output 3	3A	BA	6	○	○	○	○	○	○	×	×	×
659	Analog remote output 4	3B	BB	6	○	○	○	○	○	○	×	×	×
660	Increased magnetic excitation deceleration operation selection	3C	BC	6	○	○	○	×	○	×	○	○	○
661	Magnetic excitation increase rate	3D	BD	6	○	○	○	×	○	×	○	○	○
662	Increased magnetic excitation current level	3E	BE	6	○	○	×	×	×	×	○	○	○
663	Control circuit temperature signal output level	3F	BF	6	○	○	○	○	○	○	○	○	○
665	Regeneration avoidance frequency gain	41	C1	6	○	○	○	×	○	×	○	○	○
673	SF-PR slip amount adjustment operation selection	49	C9	6	○	×	×	×	×	×	○	○	○
674	SF-PR slip amount adjustment gain	4A	CA	6	○	×	×	×	×	×	○	○	○
675	User parameter auto storage function selection	4B	CB	6	○	○	○	○	○	○	○	○	○
679	Second droop gain	4F	CF	6	×	○	○	×	○	×	○	○	○
680	Second droop filter time constant	50	D0	6	×	○	○	×	○	×	○	○	○
681	Second droop function activation selection	51	D1	6	×	○	○	×	○	×	○	○	○
682	Second droop break point gain	52	D2	6	×	○	○	×	○	×	○	○	○
683	Second droop break point torque	53	D3	6	×	○	○	×	○	×	○	○	○

Pr.	Name	Instruction code*1			Control method*2						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy*3	Clear*3	All clear*3
684	Tuning data unit switchover	54	D4	6	×	○	○	○	○	○	○	○	○
686	Maintenance timer 2	56	D6	6	○	○	○	○	○	○	×	×	×
687	Maintenance timer 2 warning output set time	57	D7	6	○	○	○	○	○	○	○	×	○
688	Maintenance timer 3	58	D8	6	○	○	○	○	○	○	×	×	×
689	Maintenance timer 3 warning output set time	59	D9	6	○	○	○	○	○	○	○	×	○
690	Deceleration check time	5A	DA	6	×	×	○	×	×	×	○	○	○
692	Second free thermal reduction frequency 1	5C	DC	6	○	○	○	○	○	○	○	○	○
693	Second free thermal reduction ratio 1	5D	DD	6	○	○	○	○	○	○	○	○	○
694	Second free thermal reduction frequency 2	5E	DE	6	○	○	○	○	○	○	○	○	○
695	Second free thermal reduction ratio 2	5F	DF	6	○	○	○	○	○	○	○	○	○
696	Second free thermal reduction frequency 3	60	E0	6	○	○	○	○	○	○	○	○	○
699	Input terminal filter	63	E3	6	○	○	○	○	○	○	○	×	○
707	Motor inertia (integer)	07	87	7	×	×	○	×	○	×	○	○	○
724	Motor inertia (exponent)	18	98	7	×	×	○	×	○	×	○	○	○
744	Second motor inertia (integer)	2C	AC	7	×	×	○	×	○	×	○	○	○
745	Second motor inertia (exponent)	2D	AD	7	×	×	○	×	○	×	○	○	○
750	Motor temperature detection level AZ	32	B2	7	○	○	○	○	○	○	○	○	○
751	Reference motor temperature AZ	33	B3	7	○	○	○	○	○	○	○	○	○
753	Third S-curve acceleration time	35	B5	7	○	○	○	×	○	×	○	○	○
754	Third S-curve deceleration time	36	B6	7	○	○	○	×	○	×	○	○	○
757	Distance meter selection	39	B9	7	○	○	○	×	○	×	○	○	○
758	Unit of measurement of distance meter	3A	BA	7	○	○	○	×	○	×	○	○	○
760	Travel distance of absolute encoder	3C	BC	7	○	○	○	×	○	×	○	○	○
761	Distance measurement fault detection interval	3D	BD	7	○	○	○	×	○	×	○	○	○
762	Absolute encoder count (upper digits) at zero position calibration	3E	BE	7	○	○	○	×	○	×	○	○	○
763	Absolute encoder count (lower digits) at zero position calibration	3F	BF	7	○	○	○	×	○	×	○	○	○
764	Absolute encoder zero position calibration	40	C0	7	○	○	○	×	○	×	○	○	○
774	Operation panel monitor selection 1	4A	CA	7	○	○	○	○	○	○	○	○	○
775	Operation panel monitor selection 2	4B	CB	7	○	○	○	○	○	○	○	○	○
776	Operation panel monitor selection 3	4C	CC	7	○	○	○	○	○	○	○	○	○
777	4 mA input fault operation frequency	4D	CD	7	○	○	○	○	○	○	○	○	○
778	4 mA input check filter	4E	CE	7	○	○	○	○	○	○	○	○	○
779	Operation frequency during communication error	4F	CF	7	○	○	○	○	○	○	○	○	○
799	Pulse increment setting for output power	63	E3	7	○	○	○	○	○	○	○	○	○
800	Control method selection	00	80	8	○	○	○	Δ	○	Δ	○	○	○
802	Pre-excitation selection	02	82	8	×	×	○	×	×	×	○	○	○
803	Constant output range torque characteristic selection	03	83	8	×	×	○	○	○	○	○	○	○
804	Torque command source selection	04	84	8	×	×	×	○	×	○	○	○	○
805	Torque command value (RAM)	05	85	8	×	×	×	○	×	○	×	○	○
806	Torque command value (RAM, EEPROM)	06	86	8	×	×	×	○	×	○	○	○	○
807	Speed limit selection	07	87	8	×	×	×	○	×	○	○	○	○
808	Forward rotation speed limit/speed limit	08	88	8	×	×	×	○	×	○	○	○	○
809	Reverse rotation speed limit/reverse-side speed limit	09	89	8	×	×	×	○	×	○	○	○	○
810	Torque limit input method selection	0A	8A	8	×	×	○	○	○	○	○	○	○
811	Set resolution switchover	0B	8B	8	○	○	○	○	○	○	○	○	○
812	Torque limit level (regeneration)	0C	8C	8	×	×	○	○	○	○	○	○	○
813	Torque limit level (3rd quadrant)	0D	8D	8	×	×	○	○	○	○	○	○	○

Pr.	Name	Instruction code*1			Control method*2						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy*3	Clear*3	All clear*3
814	Torque limit level (4th quadrant)	0E	8E	8	×	×	○	○	○	○	○	○	○
815	Torque limit level 2	0F	8F	8	×	×	○	○	○	○	○	○	○
816	Torque limit level during acceleration	10	90	8	×	×	○	○	○	○	○	○	○
817	Torque limit level during deceleration	11	91	8	×	×	○	○	○	○	○	○	○
818	Easy gain tuning response level setting	12	92	8	×	×	○	×	○	×	○	○	○
819	Easy gain tuning selection	13	93	8	×	×	○	×	○	×	○	×	○
820	Speed control P gain 1	14	94	8	×	×	○	×	○	×	○	○	○
821	Speed control integral time 1	15	95	8	×	×	○	×	○	×	○	○	○
822	Speed setting filter 1	16	96	8	×	×	○	○	○	○	○	○	○
823	Speed detection filter 1 AP AL TP APR APS	17	97	8	×	×	○	○	×	×	○	○	○
824	Torque control P gain 1 (current loop proportional gain)	18	98	8	×	×	○	○	○	○	○	○	○
825	Torque control integral time 1 (current loop integral time)	19	99	8	×	×	○	○	○	○	○	○	○
826	Torque setting filter 1	1A	9A	8	×	×	○	○	○	○	○	○	○
827	Torque detection filter 1	1B	9B	8	×	×	○	○	○	○	○	○	○
828	Model speed control gain	1C	9C	8	×	×	○	×	○	×	○	○	○
829	Number of machine end encoder pulses	1D	9D	8	○	○	○	×	×	×	○	○	○
830	Speed control P gain 2	1E	9E	8	×	×	○	×	○	×	○	○	○
831	Speed control integral time 2	1F	9F	8	×	×	○	×	○	×	○	○	○
832	Speed setting filter 2	20	A0	8	×	×	○	○	○	○	○	○	○
833	Speed detection filter 2 AP AL TP APR APS	21	A1	8	×	×	○	×	×	×	○	○	○
834	Torque control P gain 2 (current loop proportional gain)	22	A2	8	×	×	○	○	○	○	○	○	○
835	Torque control integral time 2 (current loop integral time)	23	A3	8	×	×	○	○	○	○	○	○	○
836	Torque setting filter 2	24	A4	8	×	×	○	○	○	○	○	○	○
837	Torque detection filter 2	25	A5	8	×	×	○	○	○	○	○	○	○
838	Torque detection filter 2 AZ	26	A6	8	○	○	○	Δ	○	Δ	○	○	○
839	DA1 output filter AZ	27	A7	8	○	○	○	○	○	○	○	○	○
840	Torque bias selection	28	A8	8	×	×	○	×	○	×	○	○	○
841	Torque bias 1	29	A9	8	×	×	○	×	○	×	○	○	○
842	Torque bias 2	2A	AA	8	×	×	○	×	○	×	○	○	○
843	Torque bias 3	2B	AB	8	×	×	○	×	○	×	○	○	○
844	Torque bias filter	2C	AC	8	×	×	○	×	○	×	○	○	○
845	Torque bias operation time	2D	AD	8	×	×	○	×	○	×	○	○	○
846	Torque bias balance compensation	2E	AE	8	×	×	○	×	○	×	○	○	○
847	Fall-time torque bias terminal 1 bias	2F	AF	8	×	×	○	×	○	×	○	○	○
848	Fall-time torque bias terminal 1 gain	30	B0	8	×	×	○	×	○	×	○	○	○
849	Analog input offset adjustment	31	B1	8	○	○	○	○	○	○	○	○	○
850	Brake operation selection	32	B2	8	×	×	×	×	○	○	○	○	○
851	Control terminal option-Number of encoder pulses TP	33	B3	8	○	○	○	○	×	×	○	○	○
852	Control terminal option-Encoder rotation direction TP	34	B4	8	○	○	○	○	×	×	○	○	○
853	Speed deviation time AP AL TP APR APS	35	B5	8	×	×	○	×	×	×	○	○	○
854	Excitation ratio	36	B6	8	×	×	○	○	○	○	○	○	○
855	Control terminal option-Signal loss detection enable/disable selection TP	37	B7	8	×	×	○	○	×	×	○	○	○
857	DA1-0V adjustment AZ	39	B9	8	○	○	○	○	○	○	○	×	○
858	Terminal 4 function assignment	3A	BA	8	○	○	○	○	○	○	○	×	○
859	Torque current	3B	BB	8	×	○	○	○	○	○	○	×	○
860	Second motor torque current	3C	BC	8	×	○	○	○	○	○	○	×	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
862	Encoder option selection AP AL TP APR APS	3E	BE	8	○	○	○	○	×	×	○	○	○
863	Control terminal option-Encoder pulse division ratio TP	3F	BF	8	○	○	○	○	○	○	○	○	○
864	Torque detection	40	C0	8	×	×	○	○	○	○	○	○	○
865	Low speed detection	41	C1	8	○	○	○	○	○	○	○	○	○
866	Torque monitoring reference	42	C2	8	×	○	○	○	○	○	○	○	○
867	AM output filter	43	C3	8	○	○	○	○	○	○	○	○	○
868	Terminal 1 function assignment	44	C4	8	○	○	○	○	○	○	○	×	○
869	Current output filter	45	C5	8	○	○	○	○	○	○	○	○	○
870	Speed detection hysteresis	46	C6	8	○	○	○	○	○	○	○	○	○
872	Input phase loss protection selection	48	C8	8	○	○	○	○	○	○	○	○	○
873	Speed limit AP AL TP APR APS	49	C9	8	×	×	○	×	×	×	○	○	○
874	OLT level setting	4A	CA	8	×	×	○	×	○	×	○	○	○
875	Fault definition	4B	CB	8	○	○	○	○	○	○	○	○	○
876	Thermal protector input TP	4C	CC	8	○	○	○	○	○	○	○	○	○
877	Speed feed forward control/model adaptive speed control selection	4D	CD	8	×	×	○	×	○	×	○	○	○
878	Speed feed forward filter	4E	CE	8	×	×	○	×	○	×	○	○	○
879	Speed feed forward torque limit	4F	CF	8	×	×	○	×	○	×	○	○	○
880	Load inertia ratio	50	D0	8	×	×	○	×	○	×	○	×	○
881	Speed feed forward gain	51	D1	8	×	×	○	×	○	×	○	○	○
882	Regeneration avoidance operation selection	52	D2	8	○	○	○	×	○	×	○	○	○
883	Regeneration avoidance operation level	53	D3	8	○	○	○	×	○	×	○	○	○
884	Regeneration avoidance at deceleration detection sensitivity	54	D4	8	○	○	○	×	○	×	○	○	○
885	Regeneration avoidance compensation frequency limit value	55	D5	8	○	○	○	×	○	×	○	○	○
886	Regeneration avoidance voltage gain	56	D6	8	○	○	○	×	○	×	○	○	○
888	Free parameter 1	58	D8	8	○	○	○	○	○	○	○	×	×
889	Free parameter 2	59	D9	8	○	○	○	○	○	○	○	×	×
890	Internal storage device status indication	5A	DA	8	○	○	○	○	○	○	×	×	×
891	Cumulative power monitor digit shifted times	5B	DB	8	○	○	○	○	○	○	○	○	○
892	Load factor	5C	DC	8	○	○	○	○	○	○	○	○	○
893	Energy saving monitor reference (motor capacity)	5D	DD	8	○	○	○	○	○	○	○	○	○
894	Control selection during commercial power-supply operation	5E	DE	8	○	○	○	○	○	○	○	○	○
895	Power saving rate reference value	5F	DF	8	○	○	○	○	○	○	○	○	○
896	Power unit cost	60	E0	8	○	○	○	○	○	○	○	○	○
897	Power saving monitor average time	61	E1	8	○	○	○	○	○	○	○	○	○
898	Free parameter 2	62	E2	8	○	○	○	○	○	○	○	×	○
899	Operation time rate (estimated value)	63	E3	8	○	○	○	○	○	○	○	○	○
C0 (900)	FM/CA terminal calibration	5C	DC	1	○	○	○	○	○	○	○	×	○
C1 (901)	AM terminal calibration	5D	DD	1	○	○	○	○	○	○	○	×	○
C2 (902)	Terminal 2 frequency setting bias frequency	5E	DE	1	○	○	○	○	○	○	○	×	○
C3 (902)	Terminal 2 frequency setting bias	5E	DE	1	○	○	○	○	○	○	○	×	○
125 (903)	Terminal 2 frequency setting gain frequency	5F	DF	1	○	○	○	○	○	○	○	×	○
C4 (903)	Terminal 2 frequency setting gain	5F	DF	1	○	○	○	○	○	○	○	×	○

Pr.	Name	Instruction code*1			Control method*2						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy*3	Clear*3	All clear*3
C5 (904)	Terminal 4 frequency setting bias frequency	60	E0	1	○	○	○	○	○	○	○	×	○
C6 (904)	Terminal 4 frequency setting bias	60	E0	1	○	○	○	○	○	○	○	×	○
126 (905)	Terminal 4 frequency setting gain frequency	61	E1	1	○	○	○	○	○	○	○	×	○
C7 (905)	Terminal 4 frequency setting gain	61	E1	1	○	○	○	○	○	○	○	×	○
C12 (917)	Terminal 1 bias frequency (speed)	11	91	9	×	×	○	○	○	○	○	×	○
C13 (917)	Terminal 1 bias (speed)	11	91	9	×	×	○	○	○	○	○	×	○
C14 (918)	Terminal 1 gain frequency (speed)	12	92	9	×	×	○	○	○	○	○	×	○
C15 (918)	Terminal 1 gain (speed)	12	92	9	×	×	○	○	○	○	○	×	○
C16 (919)	Terminal 1 bias command (torque/magnetic flux)	13	93	9	×	×	○	○	○	○	○	×	○
C17 (919)	Terminal 1 bias (torque/magnetic flux)	13	93	9	×	×	○	○	○	○	○	×	○
C18 (920)	Terminal 1 gain command (torque/magnetic flux)	14	94	9	×	×	○	○	○	○	○	×	○
C19 (920)	Terminal 1 gain (torque/magnetic flux)	14	94	9	×	×	○	○	○	○	○	×	○
C29 (925)	Motor temperature detection calibration (analog input) AZ	19	99	9	○	○	○	○	○	○	○	×	○
C30 (926)	Terminal 6 bias frequency (speed) AZ	1A	9A	9	○	○	○	○	○	○	○	×	○
C31 (926)	Terminal 6 bias (speed) AZ	1A	9A	9	○	○	○	○	○	○	○	×	○
C32 (927)	Terminal 6 gain frequency (speed) AZ	1B	9B	9	○	○	○	○	○	○	○	×	○
C33 (927)	Terminal 6 gain (speed) AZ	1B	9B	9	○	○	○	○	○	○	○	×	○
C34 (928)	Terminal 6 bias command (torque) AZ	1C	9C	9	×	×	○	○	○	○	○	×	○
C35 (928)	Terminal 6 bias (torque) AZ	1C	9C	9	×	×	○	○	○	○	○	×	○
C36 (929)	Terminal 6 gain command (torque) AZ	1D	9D	9	×	×	○	○	○	○	○	×	○
C37 (929)	Terminal 6 gain (torque) AZ	1D	9D	9	×	×	○	○	○	○	○	×	○
C8 (930)	Current output bias signal	1E	9E	9	○	○	○	○	○	○	○	○	○
C9 (930)	Current output bias current	1E	9E	9	○	○	○	○	○	○	○	○	○
C10 (931)	Current output gain signal	1F	9F	9	○	○	○	○	○	○	○	○	○
C11 (931)	Current output gain current	1F	9F	9	○	○	○	○	○	○	○	○	○
C38 (932)	Terminal 4 bias command (torque/magnetic flux)	20	A0	9	×	×	○	○	○	○	○	×	○
C39 (932)	Terminal 4 bias (torque/magnetic flux)	20	A0	9	×	×	○	○	○	○	○	×	○
C40 (933)	Terminal 4 gain command (torque/magnetic flux)	21	A1	9	×	×	○	○	○	○	○	×	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
C41 (933)	Terminal 4 gain (torque/magnetic flux)	21	A1	9	×	×	○	○	○	○	○	×	○
977	Input voltage mode selection	4D	CD	9	○	○	○	○	○	○	○	×	×
989	Parameter copy alarm release	59	D9	9	○	○	○	○	○	○	○	×	○
990	PU buzzer control	5A	DA	9	○	○	○	○	○	○	○	○	○
991	PU contrast adjustment	5B	DB	9	○	○	○	○	○	○	○	×	○
992	Operation panel setting dial push monitor selection	5C	DC	9	○	○	○	Δ	○	Δ	○	○	○
994	Droop break point gain	5E	DE	9	×	○	○	×	○	×	○	○	○
995	Droop break point torque	5F	DF	9	×	○	○	×	○	×	○	○	○
997	Fault initiation	61	E1	9	○	○	○	○	○	○	×	○	○
999	Automatic parameter setting	63	E3	9	○	○	○	○	○	○	×	×	○
1000	Direct setting selection	00	80	A	○	○	○	○	○	○	○	○	○
1003	Notch filter frequency	03	83	A	×	×	○	×	○	×	○	○	○
1004	Notch filter depth	04	84	A	×	×	○	×	○	×	○	○	○
1005	Notch filter width	05	85	A	×	×	○	×	○	×	○	○	○
1006	Clock (year)	06	86	A	○	○	○	○	○	○	×	×	×
1007	Clock (month, day)	07	87	A	○	○	○	○	○	○	×	×	×
1008	Clock (hour, minute)	08	88	A	○	○	○	○	○	○	×	×	×
1016	PTC thermistor protection detection time	10	90	A	○	○	○	○	○	○	○	×	○
1018	Monitor with sign selection	12	92	A	○	○	○	○	○	○	○	○	○
1019	Analog meter voltage negative output selection AY	13	93	A	○	○	○	○	○	○	○	○	○
1020	Trace operation selection	14	94	A	○	○	○	○	○	○	○	○	○
1021	Trace mode selection	15	95	A	○	○	○	○	○	○	○	○	○
1022	Sampling cycle	16	96	A	○	○	○	○	○	○	○	○	○
1023	Number of analog channels	17	97	A	○	○	○	○	○	○	○	○	○
1024	Sampling auto start	18	98	A	○	○	○	○	○	○	○	○	○
1025	Trigger mode selection	19	99	A	○	○	○	○	○	○	○	○	○
1026	Number of sampling before trigger	1A	9A	A	○	○	○	○	○	○	○	○	○
1027	Analog source selection (1ch)	1B	9B	A	○	○	○	Δ	○	Δ	○	○	○
1028	Analog source selection (2ch)	1C	9C	A	○	○	○	Δ	○	Δ	○	○	○
1029	Analog source selection (3ch)	1D	9D	A	○	○	○	Δ	○	Δ	○	○	○
1030	Analog source selection (4ch)	1E	9E	A	○	○	○	Δ	○	Δ	○	○	○
1031	Analog source selection (5ch)	1F	9F	A	○	○	○	Δ	○	Δ	○	○	○
1032	Analog source selection (6ch)	20	A0	A	○	○	○	Δ	○	Δ	○	○	○
1033	Analog source selection (7ch)	21	A1	A	○	○	○	Δ	○	Δ	○	○	○
1034	Analog source selection (8ch)	22	A2	A	○	○	○	Δ	○	Δ	○	○	○
1035	Analog trigger channel	23	A3	A	○	○	○	○	○	○	○	○	○
1036	Analog trigger operation selection	24	A4	A	○	○	○	○	○	○	○	○	○
1037	Analog trigger level	25	A5	A	○	○	○	○	○	○	○	○	○
1038	Digital source selection (1ch)	26	A6	A	○	○	○	○	○	○	○	○	○
1039	Digital source selection (2ch)	27	A7	A	○	○	○	○	○	○	○	○	○
1040	Digital source selection (3ch)	28	A8	A	○	○	○	○	○	○	○	○	○
1041	Digital source selection (4ch)	29	A9	A	○	○	○	○	○	○	○	○	○
1042	Digital source selection (5ch)	2A	AA	A	○	○	○	○	○	○	○	○	○
1043	Digital source selection (6ch)	2B	AB	A	○	○	○	○	○	○	○	○	○
1044	Digital source selection (7ch)	2C	AC	A	○	○	○	○	○	○	○	○	○
1045	Digital source selection (8ch)	2D	AD	A	○	○	○	○	○	○	○	○	○
1046	Digital trigger channel	2E	AE	A	○	○	○	○	○	○	○	○	○
1047	Digital trigger operation selection	2F	AF	A	○	○	○	○	○	○	○	○	○
1048	Display-off waiting time	30	B0	A	○	○	○	○	○	○	○	○	○
1049	USB host reset	31	B1	A	○	○	○	○	○	○	×	○	○

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
1103	Deceleration time at emergency stop	03	83	B	○	○	○	○	○	○	○	○	○
1106	Torque monitor filter	06	86	B	○	○	○	○	○	○	○	○	○
1107	Running speed monitor filter	07	87	B	○	○	○	○	○	○	○	○	○
1108	Excitation current monitor filter	08	88	B	○	○	○	○	○	○	○	○	○
1109	PROFIBUS communication command source selection NP	09	89	B	×	○	○	○	○	○	○	○[*4]	○[*4]
1110	PROFIBUS format selection NP	0A	8A	B	○	○	○	○	○	○	○	○[*4]	○[*4]
1113	Speed limit method selection	0D	8D	B	×	×	×	○	×	○	○	○	○
1114	Torque command reverse selection	0E	8E	B	×	×	×	○	×	○	○	○	○
1115	Speed control integral term clear time	0F	8F	B	×	×	○	×	○	×	○	○	○
1116	Constant output range speed control P gain compensation	10	90	B	×	×	○	×	○	×	○	○	○
1117	Speed control P gain 1 (per-unit system)	11	91	B	×	×	○	×	○	×	○	○	○
1118	Speed control P gain 2 (per-unit system)	12	92	B	×	×	○	×	○	×	○	○	○
1119	Model speed control gain (per-unit system)	13	93	B	×	×	○	×	○	×	○	○	○
1121	Per-unit speed control reference frequency	15	95	B	×	×	○	×	○	×	○	○	○
1123	Inverter-to-inverter link mode selection	17	97	B	○	○	○	○	○	○	○	○[*4]	○[*4]
1124	Station number in inverter-to-inverter link	18	98	B	○	○	○	○	○	○	○	○[*4]	○[*4]
1125	Number of inverters in inverter-to-inverter link system	19	99	B	○	○	○	○	○	○	○	○[*4]	○[*4]
1134	Distance meter fault detection selection	22	A2	B	○	○	○	×	○	×	○	○	○
1135	Brake opening current 2	23	A3	B	○	○	○	×	○	×	○	○	○
1140	Speed feed acceleration time	28	A8	B	○	○	○	×	○	×	○	○	○
1141	Speed feed deceleration time	29	A9	B	○	○	○	×	○	×	○	○	○
1142	Speed feed S-curve acceleration time	2A	AA	B	○	○	○	×	○	×	○	○	○
1143	Speed feed S-curve deceleration time	2B	AB	B	○	○	○	×	○	×	○	○	○
1144	Multi-axis synchronous control (torque control) speed limit width	2C	AC	B	×	×	×	○	×	○	○	○	○
1145	Multi-axis synchronous control (torque control) speed compensation P gain	2D	AD	B	×	×	×	○	×	○	○	○	○
1150	PLC function user parameters 1	32	B2	B	○	○	○	○	○	○	○	○	○
1151	PLC function user parameters 2	33	B3	B	○	○	○	○	○	○	○	○	○
1152	PLC function user parameters 3	34	B4	B	○	○	○	○	○	○	○	○	○
1153	PLC function user parameters 4	35	B5	B	○	○	○	○	○	○	○	○	○
1154	PLC function user parameters 5	36	B6	B	○	○	○	○	○	○	○	○	○
1155	PLC function user parameters 6	37	B7	B	○	○	○	○	○	○	○	○	○
1156	PLC function user parameters 7	38	B8	B	○	○	○	○	○	○	○	○	○
1157	PLC function user parameters 8	39	B9	B	○	○	○	○	○	○	○	○	○
1158	PLC function user parameters 9	3A	BA	B	○	○	○	○	○	○	○	○	○
1159	PLC function user parameters 10	3B	BB	B	○	○	○	○	○	○	○	○	○
1160	PLC function user parameters 11	3C	BC	B	○	○	○	○	○	○	○	○	○
1161	PLC function user parameters 12	3D	BD	B	○	○	○	○	○	○	○	○	○
1162	PLC function user parameters 13	3E	BE	B	○	○	○	○	○	○	○	○	○
1163	PLC function user parameters 14	3F	BF	B	○	○	○	○	○	○	○	○	○
1164	PLC function user parameters 15	40	C0	B	○	○	○	○	○	○	○	○	○
1165	PLC function user parameters 16	41	C1	B	○	○	○	○	○	○	○	○	○
1166	PLC function user parameters 17	42	C2	B	○	○	○	○	○	○	○	○	○
1167	PLC function user parameters 18	43	C3	B	○	○	○	○	○	○	○	○	○
1168	PLC function user parameters 19	44	C4	B	○	○	○	○	○	○	○	○	○
1169	PLC function user parameters 20	45	C5	B	○	○	○	○	○	○	○	○	○
1170	PLC function user parameters 21	46	C6	B	○	○	○	○	○	○	○	○	○
1171	PLC function user parameters 22	47	C7	B	○	○	○	○	○	○	○	○	○

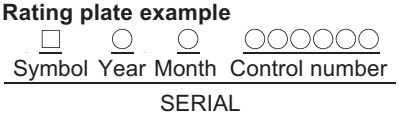
Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
1172	PLC function user parameters 23	48	C8	B	○	○	○	○	○	○	○	○	○
1173	PLC function user parameters 24	49	C9	B	○	○	○	○	○	○	○	○	○
1174	PLC function user parameters 25	4A	CA	B	○	○	○	○	○	○	○	○	○
1175	PLC function user parameters 26	4B	CB	B	○	○	○	○	○	○	○	○	○
1176	PLC function user parameters 27	4C	CC	B	○	○	○	○	○	○	○	○	○
1177	PLC function user parameters 28	4D	CD	B	○	○	○	○	○	○	○	○	○
1178	PLC function user parameters 29	4E	CE	B	○	○	○	○	○	○	○	○	○
1179	PLC function user parameters 30	4F	CF	B	○	○	○	○	○	○	○	○	○
1180	PLC function user parameters 31	50	D0	B	○	○	○	○	○	○	○	○	○
1181	PLC function user parameters 32	51	D1	B	○	○	○	○	○	○	○	○	○
1182	PLC function user parameters 33	52	D2	B	○	○	○	○	○	○	○	○	○
1183	PLC function user parameters 34	53	D3	B	○	○	○	○	○	○	○	○	○
1184	PLC function user parameters 35	54	D4	B	○	○	○	○	○	○	○	○	○
1185	PLC function user parameters 37	55	D5	B	○	○	○	○	○	○	○	○	○
1186	PLC function user parameters 37	56	D6	B	○	○	○	○	○	○	○	○	○
1187	PLC function user parameters 38	57	D7	B	○	○	○	○	○	○	○	○	○
1188	PLC function user parameters 39	58	D8	B	○	○	○	○	○	○	○	○	○
1189	PLC function user parameters 40	59	D9	B	○	○	○	○	○	○	○	○	○
1190	PLC function user parameters 41	5A	DA	B	○	○	○	○	○	○	○	○	○
1191	PLC function user parameters 42	5B	DB	B	○	○	○	○	○	○	○	○	○
1192	PLC function user parameters 43	5C	DC	B	○	○	○	○	○	○	○	○	○
1193	PLC function user parameters 44	5D	DD	B	○	○	○	○	○	○	○	○	○
1194	PLC function user parameters 45	5E	DE	B	○	○	○	○	○	○	○	○	○
1195	PLC function user parameters 46	5F	DF	B	○	○	○	○	○	○	○	○	○
1196	PLC function user parameters 47	60	E0	B	○	○	○	○	○	○	○	○	○
1197	PLC function user parameters 48	61	E1	B	○	○	○	○	○	○	○	○	○
1198	PLC function user parameters 49	62	E2	B	○	○	○	○	○	○	○	○	○
1199	PLC function user parameters 50	63	E3	B	○	○	○	○	○	○	○	○	○
1299	Second pre-excitation selection	63	E3	C	×	×	○	×	×	×	○	○	○
1348	P/PI control switchover frequency	30	B0	D	×	×	○	×	○	×	○	○	○
1349	Emergency stop operation selection	31	B1	D	○	○	○	○	○	○	○	○	○
1404	Shortest-time torque startup selection	04	84	E	×	×	○	×	○	×	○	○	○
1410	Starting times lower 4 digits	0A	8A	E	○	○	○	○	○	○	×	×	×
1411	Starting times upper 4 digits	0B	8B	E	○	○	○	○	○	○	×	×	×
1424	Ethernet communication network number	18	98	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1425	Ethernet communication station number	19	99	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1426	Link speed and duplex mode selection	1A	9A	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1427	Ethernet function selection 1	1B	9B	E	○	○	○	Δ	○	Δ	○	○[*4]	○[*4]
1428	Ethernet function selection 2	1C	9C	E	○	○	○	Δ	○	Δ	○	○[*4]	○[*4]
1429	Ethernet function selection 3	1D	9D	E	○	○	○	Δ	○	Δ	○	○[*4]	○[*4]
1431	Ethernet signal loss detection function selection	1F	9F	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1432	Ethernet communication check time interval	20	A0	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1434	IP address 1 (Ethernet)	22	A2	E	○	○	○	○	○	○	×	○[*4]	○[*4]
1435	IP address 2 (Ethernet)	23	A3	E	○	○	○	○	○	○	×	○[*4]	○[*4]
1436	IP address 3 (Ethernet)	24	A4	E	○	○	○	○	○	○	×	○[*4]	○[*4]
1437	IP address 4 (Ethernet)	25	A5	E	○	○	○	○	○	○	×	○[*4]	○[*4]
1438	Subnet mask 1	26	A6	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1439	Subnet mask 2	27	A7	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1440	Subnet mask 3	28	A8	E	○	○	○	○	○	○	○	○[*4]	○[*4]

Pr.	Name	Instruction code[*1]			Control method[*2]						Parameter		
							Vector		Sensorless				
		Read	Write	Extended	V/F	Magnetic flux	Speed control	Torque control	Speed control	Torque control	Copy[*3]	Clear[*3]	All clear[*3]
1441	Subnet mask 4	29	A9	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1442	IP filter address 1 (Ethernet)	2A	AA	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1443	IP filter address 2 (Ethernet)	2B	AB	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1444	IP filter address 3 (Ethernet)	2C	AC	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1445	IP filter address 4 (Ethernet)	2D	AD	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1446	IP filter address 2 range specification (Ethernet)	2E	AE	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1447	IP filter address 3 range specification (Ethernet)	2F	AF	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1448	IP filter address 4 range specification (Ethernet)	30	B0	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1449	Ethernet command source selection IP address 1	31	B1	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1450	Ethernet command source selection IP address 2	32	B2	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1451	Ethernet command source selection IP address 3	33	B3	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1452	Ethernet command source selection IP address 4	34	B4	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1453	Ethernet command source selection IP address 3 range specification	35	B5	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1454	Ethernet command source selection IP address 4 range specification	36	B6	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1455	Keepalive time	37	B7	E	○	○	○	○	○	○	○	○[*4]	○[*4]
1480	Load characteristics measurement mode	50	D0	E	○	○	×	×	×	×	○	○	○
1481	Load characteristics load reference 1	51	D1	E	○	○	×	×	×	×	○	○	○
1482	Load characteristics load reference 2	52	D2	E	○	○	×	×	×	×	○	○	○
1483	Load characteristics load reference 3	53	D3	E	○	○	×	×	×	×	○	○	○
1484	Load characteristics load reference 4	54	D4	E	○	○	×	×	×	×	○	○	○
1485	Load characteristics load reference 5	55	D5	E	○	○	×	×	×	×	○	○	○
1486	Load characteristics maximum frequency	56	D6	E	○	○	×	×	×	×	○	○	○
1487	Load characteristics minimum frequency	57	D7	E	○	○	×	×	×	×	○	○	○
1488	Upper limit warning detection width	58	D8	E	○	○	×	×	×	×	○	○	○
1489	Lower limit warning detection width	59	D9	E	○	○	×	×	×	×	○	○	○
1490	Upper limit fault detection width	5A	DA	E	○	○	×	×	×	×	○	○	○
1491	Lower limit fault detection width	5B	DB	E	○	○	×	×	×	×	○	○	○
1492	Load status detection signal delay time / load reference measurement waiting time	5C	DC	E	○	○	×	×	×	×	○	○	○
1499	Parameter for manufacturer setting. Do not set.												

8.7 How to check specification changes

Check the SERIAL number indicated on the inverter rating plate or packaging. For how to read the SERIAL number, refer to the following.

Rating plate example



The SERIAL consists of one symbol, two characters indicating the production year and month, and six characters indicating the control number.
The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).

8.7.1 Details of specification changes

◆Functions available for the inverters manufactured in November 2020 or later

Item	Change
Changed parameter setting range	• Setting value "52" added for **Pr.52, Pr.54, Pr.158, Pr.774 to Pr.776, Pr.992, Pr.1027 to Pr.1034** • Setting value "2" added for **Pr.60**

◆Functions available for the inverters manufactured in July 2021 or later

Item	Change
Enhanced brake sequence function	**Pr.1135** and **Pr.1136** added
Enhanced system failure function	**Pr.1134** added

◆Functions available for the inverters manufactured in February 2022 or later

Item	Change
Distance meter fault code monitor	Setting value "54" added for **Pr.52, Pr.774 to Pr.776, and Pr.992**
Setting the relative position of the home position	**Pr.131 to Pr.133** added
Distance meter (DT1000/DL1000)	Setting value "1050 and 1051" added for **Pr.549**
Setting of the S-curve deceleration time when a system failure occurs	**Pr.609** added
Deceleration stop operation selection after system failure detection	**Pr.610** added
Absolute encoder zero position adjustment	**Pr.762 to Pr.764** added
Internal storage device status indication	**Pr.890** added
	E.PE6 (Internal storage device fault) fault added
Setting of acceleration/deceleration time when the speed feed is selected	**Pr.1140 to Pr.1143** added
Warning indication for system failure	SY1 to SY10 added
Monitoring using the PLC function	Motor torque (with sign), torque command (with sign), and torque current command (with sign) are added.

◆Functions available for the inverters manufactured in January 2023 or later

Item	Change
Multi-axis synchronous control	• **Pr.1123, Pr.1144, and Pr.1145** added • **Pr.60** = "10, 11", **Pr.804** = "20", **Pr.807** = "20"
Notch filter	**Pr.1003 to Pr.1005** added
Crane position detection range hysteresis	**Pr.134** added

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Revision
Sep. 2019	IB(NA)-0600893ENG-A	First edition
Oct. 2020	IB(NA)-0600893ENG-B	Added • Full-closed control test operation • Droop control during full-closed control
Jun. 2021	IB(NA)-0600893ENG-C	Added • Pr.1134 to Pr.1136
Dec. 2021	IB(NA)-0600893ENG-D	Added • Pr.52, Pr.774 to Pr.776, Pr.992 = "54" • Setting the relative position of the home position (Pr.131 to Pr.133) • Pr.549 = "1050, 1051" • S-curve time after system failure detection (Pr.609) • Deceleration stop operation selection after system failure detection (Pr.610) • Absolute encoder zero point adjustment (Pr.762 to Pr.764) • Internal storage device status indication (Pr.890) • Acceleration/deceleration time setting for speed feed (Pr.1140 to Pr.1143)
Nov. 2022	IB(NA)-0600893ENG-E	Added • Multi-axis synchronous control (Pr.60 = "10, 11", Pr.804 = "20", Pr.807 = "20", Pr.1123, Pr.1144, Pr.1145) • Notch filter (Pr.1003 to Pr.1005) • Crane position detection range hysteresis (Pr.134)

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