Additional function

For Version 3.1

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Note :
Sections listed about Ver.2, Ver.3.0 and Ver.3.1 are added to this instruction manual. If there is the description about the same item to the plural points, the substance described in the Ver.3.1 section has priority most. The substance described in the Ver.3.0 section takes first priority next. The next priority is the substance described in the Ver.2. Please refer to the substance described in other sections for the item that is not described in Ver.3.1 section, Ver.3.0 section and Ver.2 section.

Improvement of the reaction time of overload output signal

- Processing cycle of overload advance notice signal (OL, OL2) is selectable from 40ms / 2ms by C901. Please select appropriate processing cycle for your application.
- C902 and C903 are available only when C901 = 01.
- Overload signal is turned off when output current is lower than
  "overload warning level (C041 / C241, C111), and its hysteresis can be specified by overload advance notice signal hysteresis (C903)".
  (If C903 is bigger than overload warning level, overload advance notice signal is turned off when motor stops.)
- If overload advance notice signal repeats switching on/off in short time due to the instability of output current, please adjust C902 and C903. Because a response changes depends on C902 and C903 value, please be careful.

NOTE:. Parameters marked with "✓" in A column can set even in inverter running and marked with "✕" cannot set in inverter running. Parameters marked with "✓" in B column can set even in inverter running and marked with "✕" cannot set in inverter running when in the high level access mode, which means that b031 is set to "10".

Table Ver.3.1-1

Func. Code	Name	Description	A	B	Initial data	Modbus register number	Resolution
C901	Processing cycle of overload advance notice signal select	**00**…40 msec. **01**…2 msec.	✕	✓	00	14f0h	–
C902	Filter time constant for overload advance notice signal	It effects detection of output current that is used for judgement of overload advance notice signal, range is 0 to 9999 msec.	✕	✓	0	14f1h	1 [ms]
C903	Overload advance notice signal hysteresis	The ratio for the rated current of each INV mode. It effects turning off of overload advance notice signal, range is 0.00 to 50.00 %	✕	✓	10.00	14f2h	0.01 [%]

Timing chart of overload advance notice signal (2msec)

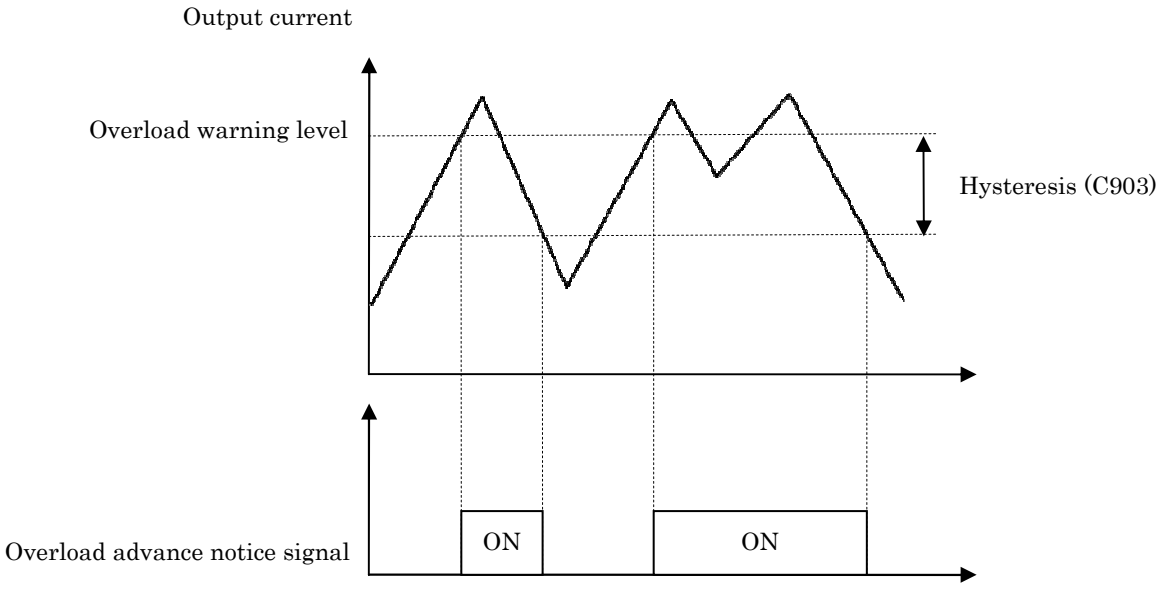

Fig. Ver.3.1-1

Improvement of speed detection with single-phase encoder

- P900 can switch half cycle / whole cycle of pulse input at speed detection with single-phase encoder. Please set 01 to P900 if detection precision is not high due to the dispersion of duty ratio of single-phase encoder.
- If the result of speed detection with pulse input of single-phase encoder is not stable even if P900 is set to 01, please adjust P901. Because a response changes depends on P901 value, please be careful.

Table Ver.3.1-2

Func. Code	Name	Description	A	B	Initial data	Modbus register number	Resolution
P900	Single-phase encoder pulse input half cycle / whole cycle select	**00**…Half cycle **01**…Whole cycle	✕	✓	00	16f6h	–
P901	Filter time constant for speed detection	It effects speed detection by encoder pulse input, range is 0 to 9999 msec.	✕	✓	20	14f1h	1 [ms]

Addition of special monitor and error display

- The set range of b145 has been expanded to support a new special monitor and error display.
  In the expanded setting of b145, the signal states of EDM, GS1 and GS2 are monitored and special monitor display content or error code is showed on keypad in accordance with table Ver.3.1-5.

  <CAUTION>
  - This additional monitor function is just a supplementary display function. A whole system must be designed and configured in accordance with the instructions in Appendix E.

- b146 can adjust the delay time that specifies time to transit from state (4) to state(7) depicted in fig. Ver.3.1-2. This parameter is valid only when b145=05. Once the state transits to state (7) in fig. Ver.3.1-2, it is necessary to active (open) both GS1 and GS2 again (to state (2)), and then deactivate (close) both GS1 and GS2 in order to return to normal operation (state (1)).

Table Ver.3.1-3

Func. Code	Name	Description	A	B	Initial data	Modbus register number	Resolution
b145	GS input mode select	00 -05 Displays special monitor display content and error specified in table Ver.3.1-5. Please refer to table Ver3.1-5.	✗	✓	00	1394h	–
b146	Delay time of release operation	Valid only when b145 = 05, range is 0.00 to 2.00 sec.	✗	✓	0.00	1395h	0.01 [sec]

- The table Ver.3.1-4 below shows the newly supported monitor display content and error codes related to the parameter b145. Refer to table Ver.3.1-5 and fig Ver.3.1-2 together.

Table Ver.3.1-4

Display of the Keypad	Description	Trip or No Trip
-S--	GS1 and GS2 are both opened. No inconsistency in signal states of GS1, GS2 and EDM signal.	No trip
-F01	Inconsistency of signal states of GS1 and GS2. Delay of GS1 during transition from "-S--" (state (2)) → "Normal operation" (state (1)). *3	No trip
-F02	Inconsistency of signal states of GS1 and GS2. Delay of GS2 during transition from "-S--" (state (2)) → "Normal operation" (state (1)). *3	No trip
-F10	Inconsistency of signal states of GS1 and GS2. Delay of GS1 during transition from "Normal operation" (state (1)) → "-S--" (state (2)). *3	No trip
-F20	Inconsistency of signal states of GS1 and GS2. Delay of GS2 during transition from "Normal operation" (state (1)) → "-S--" (state (2)). *3	No trip
E37 *1	At least either GS1 or GS2 is opened.	Trip
E98 *2	States of GS1 and GS2 are inconsistent.	Trip
E99 *2	States of GS1/GS2 and EDM are inconsistent.	Trip

Note 1: This trip is canceled by terminal RS(reset) and cycling power, but the reset of keypad is impossible.

Note 2: The error E98 and E99 are cleared (reset) only by cycling power.

Note 3: Refer to fig. Ver.3.1-2 state transition diagram, for the details of each state.

- The table Ver.3.1-5 shows signal status of GS1/GS2/EDM and corresponding special monitor display content / error codes according to setting of b145.

Table Ver.3.1-5

GS1		Close	Open	Close	Open	Close	Open	Close	Open (Shut Act)
GS2		Close	Close	Open	Open	Close	Close	Open	Open
EDM		Open				Close (Act)			
b145	00	–	–	–	–	–	–	–	–
	01	–	E37	E37	E37	–	E37	E37	E37
	02	–	E98	E98	E99	E99	E99	E99	-S--
	03	–	–	–	E99	E99	E99	E99	-S--
	04	–	–	–	–	–	–	–	-S--
	05	–	-F01 or -F20	-F02 or -F10	E99	E99	E99	E99	-S--
	06	–	-F01 or -F20	-F02 or -F10	–	–	–	–	-S--

・ State transition diagram (b145=05, 06)

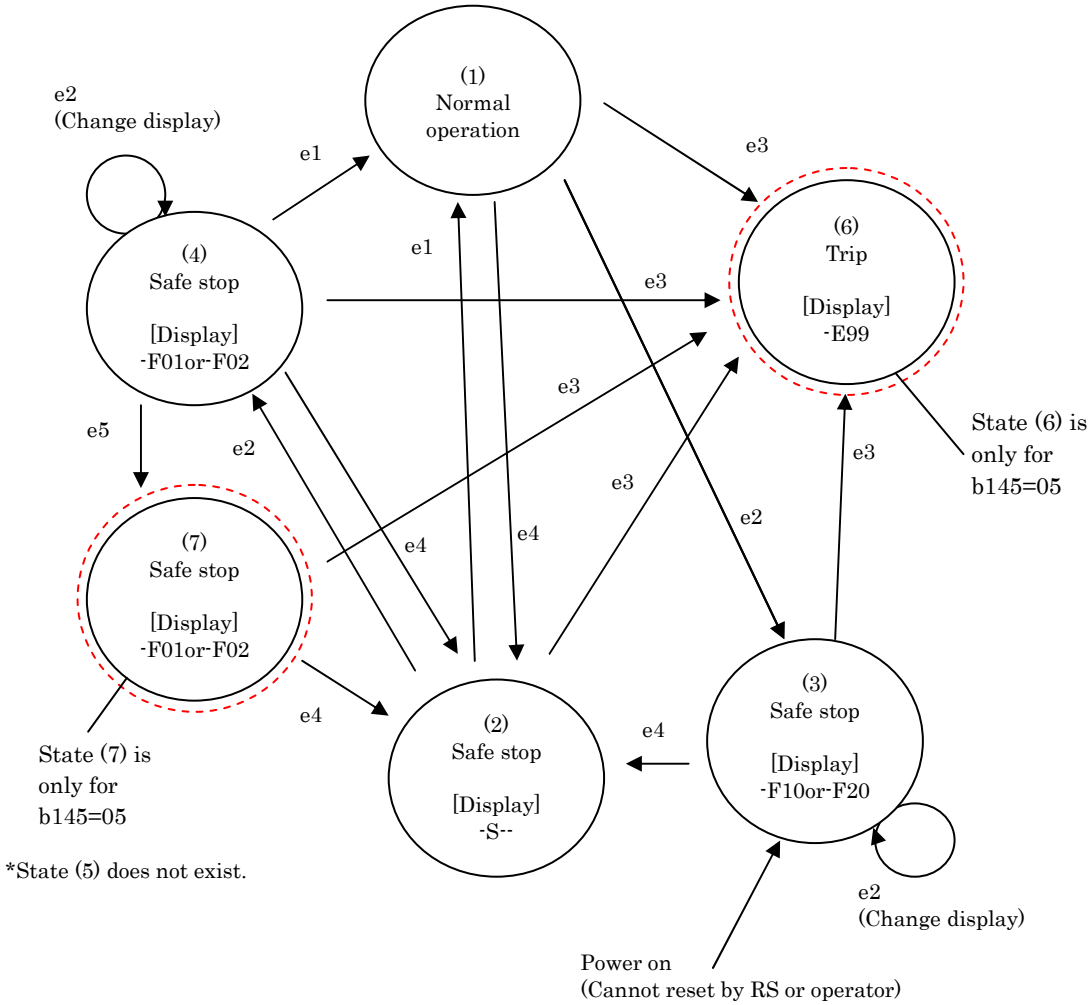

Fig. Ver.3.1-2 State transition diagram

Definition of state ① to ⑧

Terminal	①	②	③	④	⑤	⑥	⑦	⑧
GS1	Close	Open	Close	Open	Close	Open	Close	Open
GS2	Close	Close	Open	Open	Close	Close	Open	Open
EDM	Open				Close			

Definition of event e1 to e5

Event	Description
e1	Signal state becomes ①
e2	Signal state becomes ② or ③
e3	Signal state becomes either ④ to ⑦ This event does not occur when b145=06
e4	Signal state becomes ⑧
e5	Signal state is held more than T(b146). This event does not occur when b145=06.

Special monitor display (-S--, -F**) cancellation

- The parameter of b147 can be used to select whether special monitor display is canceled temporarily by pressing down a key on the keypad during special monitor display (-S--, -F**) is displayed. Please refer to table Ver.3.1-5 for details of special monitor display.
- In the case of b147=00 (Cancellation of special display is invalid) setting, key operation is not accepted at all, and special monitor display (-S--, -F**) is kept on being displayed.
- In the case of b147=01 (Cancellation of special display is valid) setting, special monitor display is canceled temporarily by pressing a key on the keypad and then normal display (parameter display) is displayed.
- After having canceled special monitor display, it returns to an original special monitor display content if no key operation has been done for the time specified by b148 (Special monitor display re-display time). If content of special monitor display is changed due to transition of signal status, it displays corresponding special monitor display content immediately regardless of the cancellation time. (e.g.: change into "-F**" state from "-S--" state)
- b148 can adjust the time to re-display special monitor display after it has been cancelled. Special display is displayed again after passing time specified by b148 from the last key operation.

Table Ver.3.1-6

Func. Code	Name	Description	A	B	Initial data	Modbus register number	Resolution
b147	Special monitor display cancellation	**00**…Cancellation of special display is invalid **01**…Cancellation of special display is valid	✗	✓	01	13d0h	–
b148	Special monitor display re-display time	Time to return to special display, range is 1 to 30 sec.	✗	✓	30	13d1h	1 [sec]

Increase of upper limit up of BRD Activation Level

- The upper limit of b096 "BRD Activation Level" of 200V and 400V class are increased by 10V and 20V respectively.

Table Ver.3.1-7

Func. Code	Name	Description	A	B	Initial data	Modbus register number	Resolution
b096	BRD activation level	When internal DC voltage exceeds the specified level, BRD circuit is activated. When internal DC voltage falls below the level, BRD circuit is inactivated. (Ver. 3.0 or before)Range is: 330 to 380 V (200V class) 660 to 760 V (400V class) (Ver. 3.1 or after)Range is: 330 to 390 V (200V class) 660 to 780 V (400V class)	✗	✓	360/ 720	1363h	1 [V]